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Project No.	Sheet No.
U–5806	Sig. 1.0

Project: U–5806

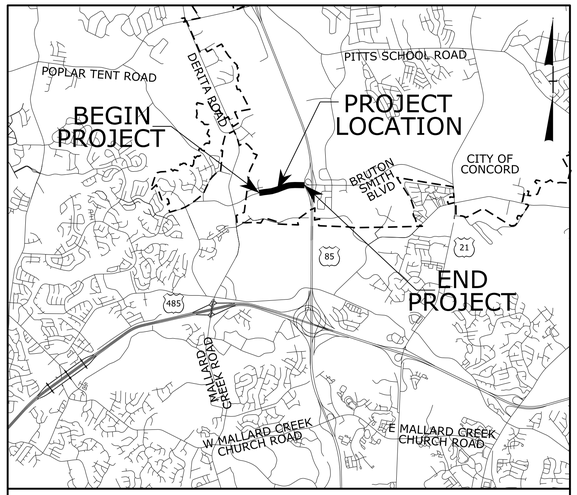
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CABARRUS COUNTY

NC GRID
NAD 83
NA 2011

LOCATION: SR 2894 (CONCORD MILLS BLVD.) FROM BEXLEY WAY TO I–85 SB RAMPS IN CONCORD

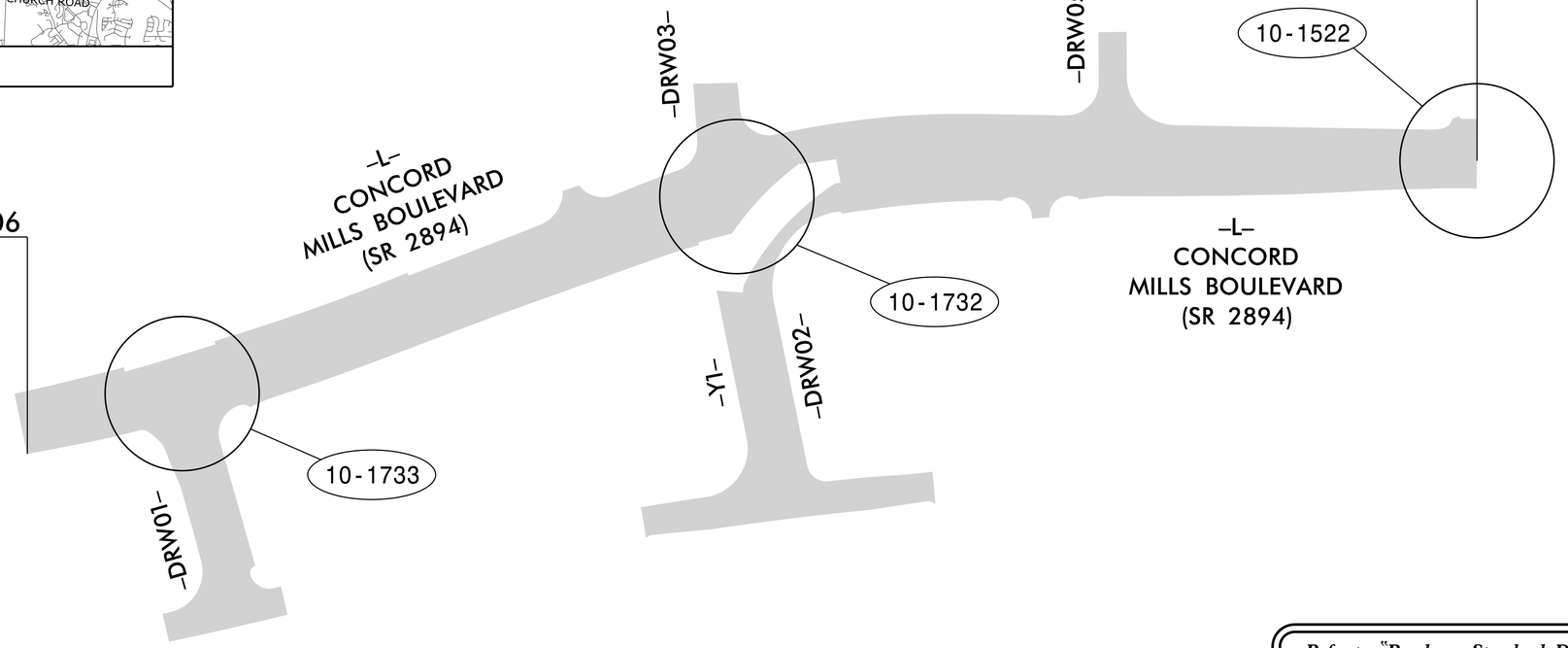
TYPE OF WORK: SIGNALS



VICINITY MAP

BEGIN TIP PROJECT U–5806
–L– Sta. 14+16.00

END TIP PROJECT U–5806
–L– Sta. 37+07.00



Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.

Index of Plans

Sheet #	Reference #	Location/Description
Sig. 1.0	--------	Title Sheet
Sig. 2.0–4.2	10–1733	SR 2894 (Concord Mills Blvd.) at Concord Mills Entrance/Bexley Way
Sig. 5.0–8.0	10–1732	SR 2894 (Concord Mills Blvd.) at Concord Mills Entrance/Shopping Center Entrance
Sig. 9.0–10.1	10–1522	SR 2894 (Concord Mills Blvd./Bruton Smith Blvd.) at I–85 SB Ramps
Sig. M1–M8	--------	Metal Pole Standard Drawings
Sig. P1–P3	--------	Pedestrian Pushbutton Location Details
SCP. 1–6	--------	Signal Communication Plans

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

Tim Williams, PE – Western Region Signals Engineer
Keith Mims, PE – Signal Equipment Design Engineer
Neil Avery – Intelligent Transportation Systems Engineer

Prepared In the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY DIVISION

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

750 N. Greenfield Parkway, Garner, NC 27529

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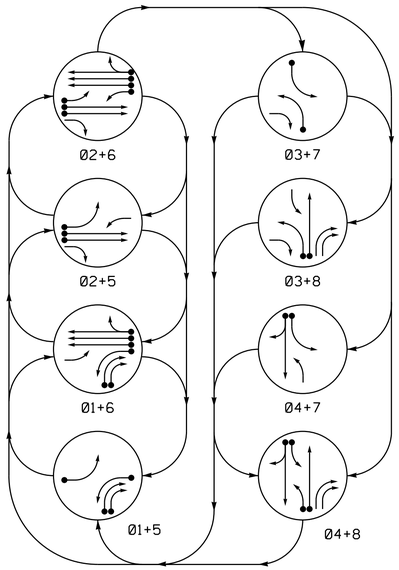
PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 2.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

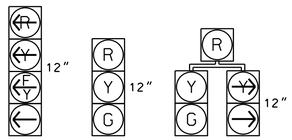
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11	←̶	←̶	F̶Y̶	F̶Y̶	R̶	R̶	R̶	R̶	Y̶
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R/→	R/→	R	R	Y
31	R̶	R̶	R̶	R̶	←̶	←̶	F̶Y̶	F̶Y̶	R̶
41, 42	R	R	R	R	R	R	G	G	R
51	←̶	F̶Y̶	←̶	F̶Y̶	R̶	R̶	R̶	R̶	Y̶
61, 62, 63	R	G	R	G	R	R	R	R	Y
71	R̶	R̶	R̶	R̶	←̶	F̶Y̶	←̶	F̶Y̶	R̶
81	R	R	R	R	R	G	R	G	R
82, 83	R/←	R/←	R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

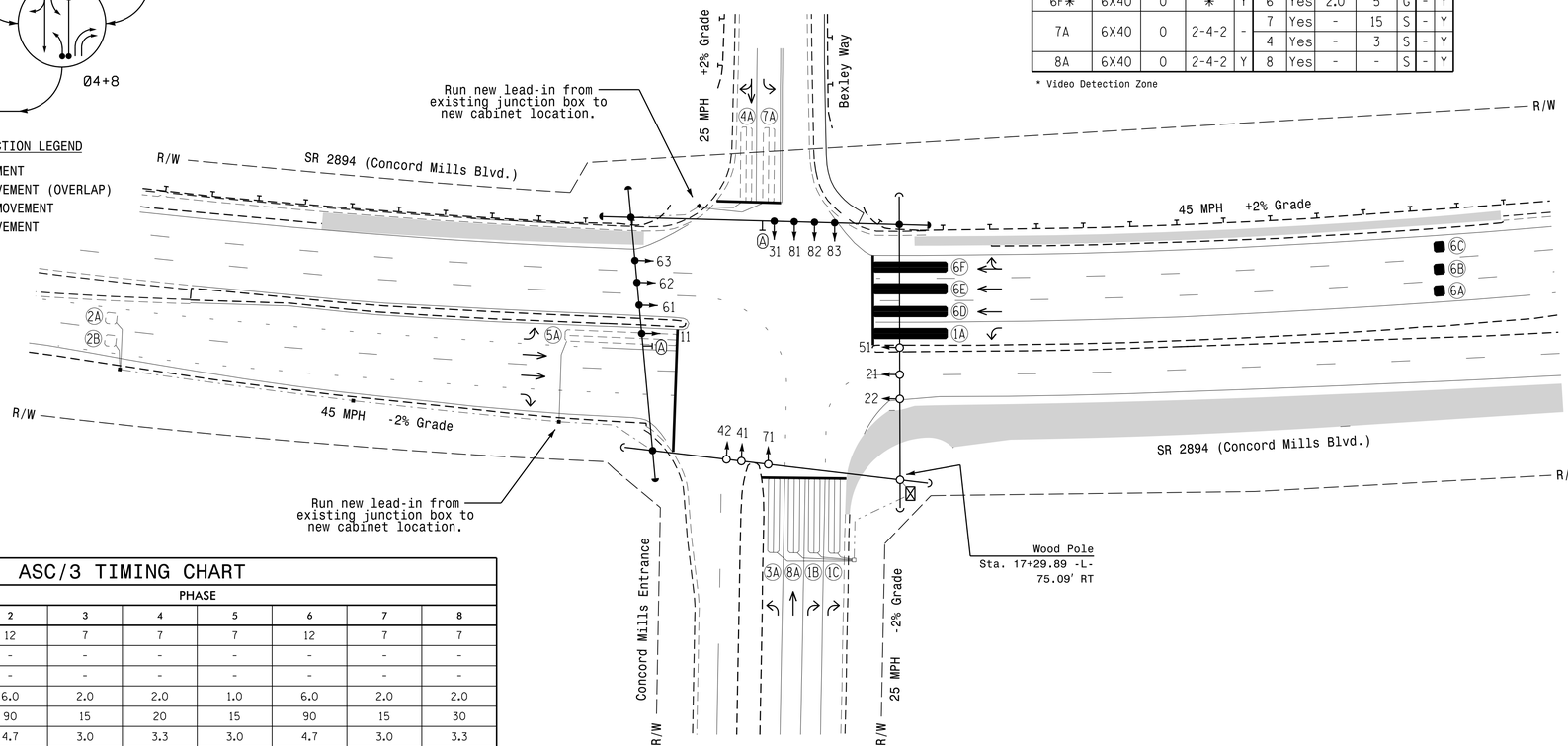


11, 31, 51, 71 — 21, 41, 42, 61, 62, 63, 81 — 22, 82, 83

ASC/3 DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP	NEW CARD
1A*	6X40	0	*	Y	1	Yes	-	15	S	-	Y
					6	Yes	-	3	G	-	Y
1B	6X40	0	2-4-2	Y	1	Yes	-	15	S	-	Y
1C	6X40	0	2-4-2	Y	1	Yes	-	15	S	-	Y
2A	6X6	300	EXIST	-	2	Yes	-	-	S	-	Y
2B	6X6	300	EXIST	-	2	Yes	-	-	S	-	Y
3A	6X40	0	2-4-2	Y	3	Yes	-	15	S	-	Y
					8	Yes	-	-	S	-	Y
4A	6X40	0	2-4-2	-	4	Yes	-	10	S	-	Y
5A	6X60	0	2-4-2	-	5	Yes	-	15	S	-	Y
					2	Yes	-	3	G	-	Y
6A*	6X6	300	*	Y	6	Yes	-	-	S	-	Y
6B*	6X6	300	*	Y	6	Yes	-	-	S	-	Y
6C*	6X6	300	*	Y	6	Yes	-	-	S	-	Y
6D*	6X40	0	*	Y	6	Yes	2.0	5	G	-	Y
6E*	6X40	0	*	Y	6	Yes	2.0	5	G	-	Y
6F*	6X40	0	*	Y	6	Yes	2.0	5	G	-	Y
7A	6X40	0	2-4-2	-	7	Yes	-	15	S	-	Y
					4	Yes	-	3	S	-	Y
8A	6X40	0	2-4-2	Y	8	Yes	-	-	S	-	Y

* Video Detection Zone



ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	-	-	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	1.0	6.0	2.0	2.0
Max 1 *	30	90	15	20	15	90	15	30
Yellow	3.0	4.7	3.0	3.3	3.0	4.7	3.0	3.3
Red Clear	3.1	1.8	3.3	3.3	2.8	1.8	3.1	3.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	-	-	-	-
Max Initial *	-	34	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	X	-	-	-	X
Simultaneous Gap	X	X	X	X	X	X	X	X

* 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.

8 Phase
Fully Actuated
Concord Mills Blvd. CLS

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. Install new 2070E Controller in new cabinet.
4. Phase 1 and/or phase 5 may be lagged.
5. Phase 3 and/or phase 7 may be lagged.
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 #: 1733

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	→
N/A	Guardrail	⊥⊥
▒	Construction Zone	▒
▬	Video Detection Zone	▬
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ

Signal Upgrade - Temporary Design 1 - Phase I

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SR 2894 (Concord Mills Blvd.)
at
Concord Mills Entrance/
Bexley Way

Diviison 10 Cabarrus County Concord

PLAN DATE: August 2017 REVIEWED BY: T.J. Williams

PREPARED BY: R.N. Zinser REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R.N. Zinser 9/25/2017
F1388973472248F... DATE

SIG. INVENTORY NO. 10-1733 TI

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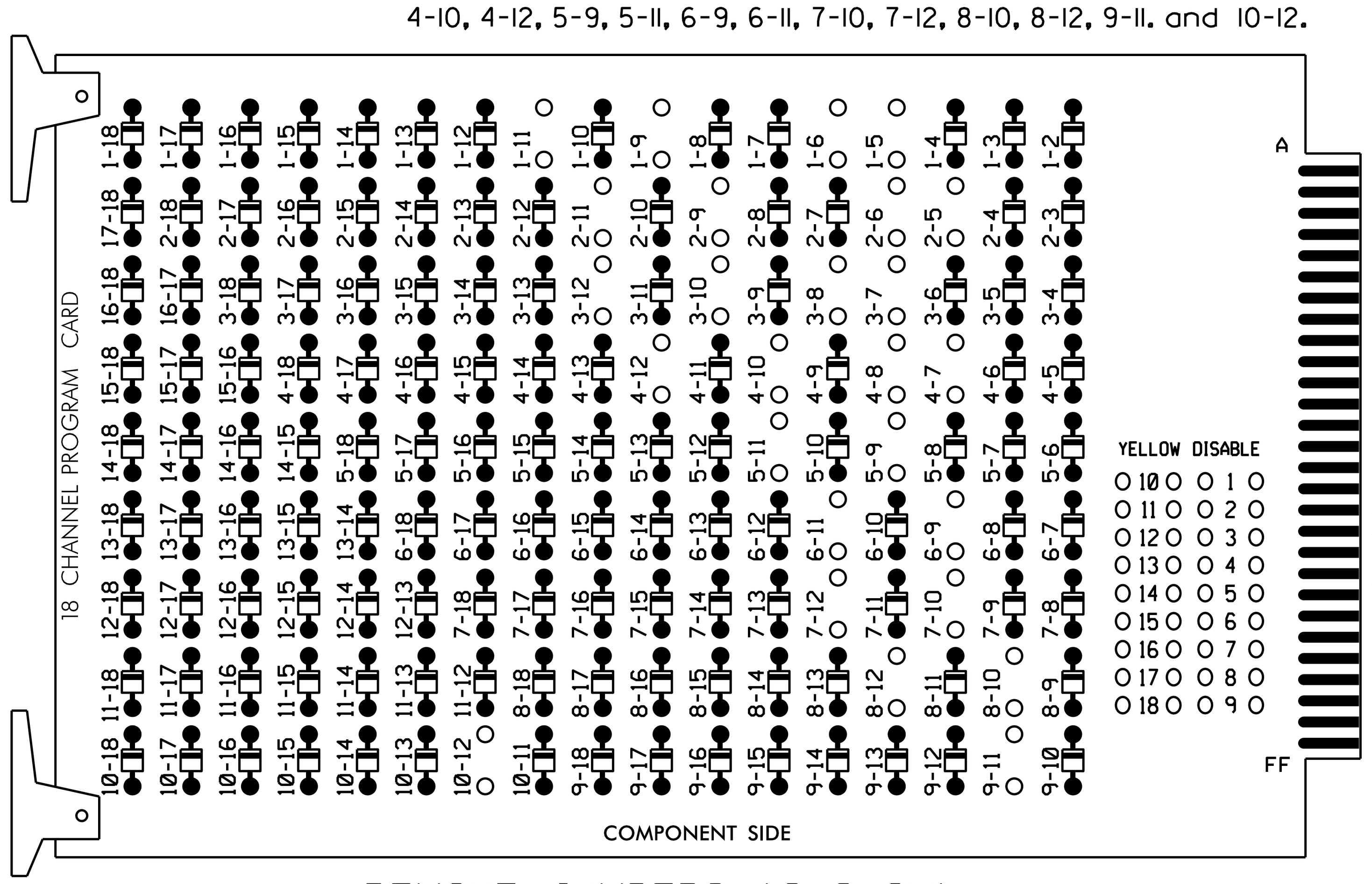
rnzinser

PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 2.1

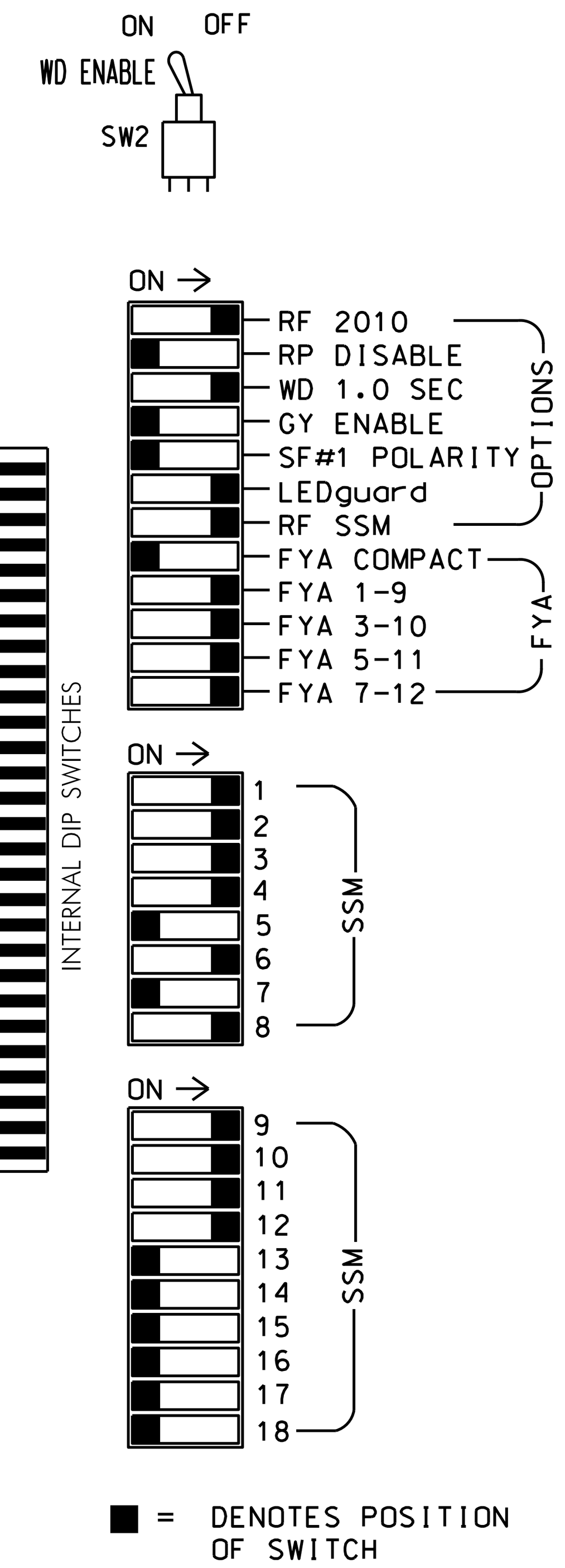
EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11, and 10-12.



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. Integrate monitor with Ethernet network in cabinet.

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. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for volume density operation.
5. Program controller to start up in phase 2 Green and 6 Green.
6. The cabinet and controller are part of the Concord Mills Blvd. CLS.

EQUIPMENT INFORMATION

CONTROLLER..............2070E
CABINET.................332 W/AUX
SOFTWARE................ECONOLITE ASC/3-2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S4,S5,S7,S8,S10,S11, AUX S1,AUX S2,AUX S4,AUX S5
PHASES USED.............1,2,3,4,5,6,7,8
OVERLAP "A".............*
OVERLAP "B".............*
OVERLAP "C".............*
OVERLAP "D".............*

* See overlap programming detail on sheet 2

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★	82,83	21,22	NU	22	31★	41,42	NU	51★	61,62 63	NU	71★	81,82 83	NU	11★	31★	NU	51★	71★	NU
RED		✻	128		✻		101			134			107							
YELLOW			129				102		✻	135		✻	108							
GREEN			130				103			136			109							
RED ARROW															A121	A124		A114	A101	
YELLOW ARROW		126			117										A122	A125		A115	A102	
FLASHING YELLOW ARROW															A123	A126		A116	A103	
GREEN ARROW	127	127			118	118			133			124								

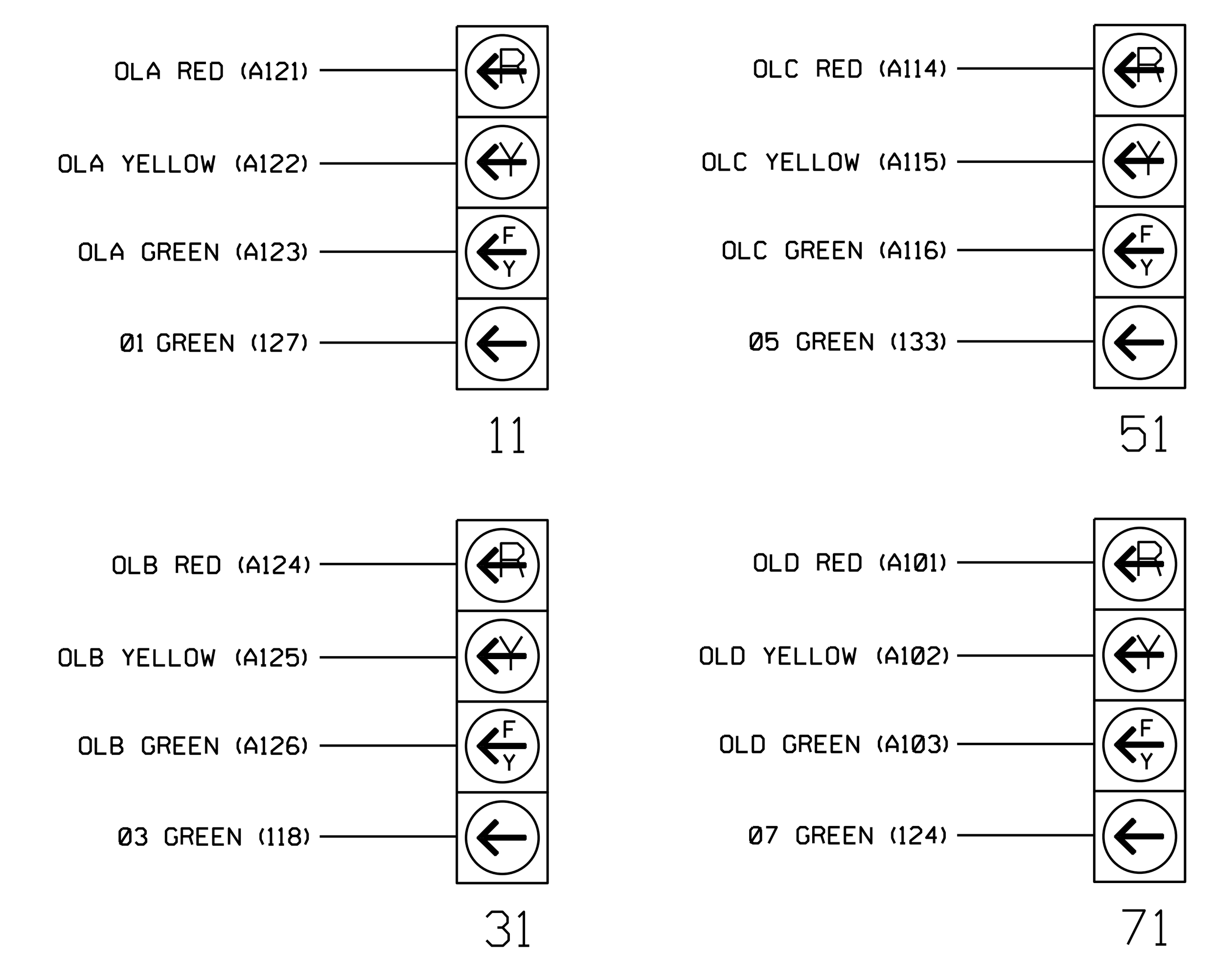
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø 1 1B	Ø 2 2A	WIRED INPUT ⊗	Ø 3 3A	Ø 4 4A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		Ø 1 1C	Ø 2 2B		NOT USED	NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 7 7A	Ø 8 8A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED				NOT USED	NOT USED								

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

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	DETECTOR TYPE
1B	TB2-5,6	I2U	39	2	1	YES		15	S
1C	TB2-7,8	I2L	43	12	1	YES		15	S
2A	TB2-9,10	I3U	63	32	2	YES			S
2B	TB2-11,12	I3L	76	42	2	YES			S
3A [1]	TB4-5,6	I5U	58	3	3	YES		15	S
	-	J8U	50	28	8	YES			S
4A	TB4-9,10	I6U	41	4	4	YES		10	S
5A [2]	TB3-1,2	J1U	55	5	5	YES		15	S
	-	I4U	47	22	2	YES		3	G
7A [3]	TB5-5,6	J5U	57	7	7	YES		15	S
	-	I8U	49	24	4	YES		3	S
8A	TB5-9,10	J6U	42	8	8	YES			S

[1] Add jumper from I5-W to J8-W, on rear of input file.

[2] Add jumper from J1-W to I4-W, on rear of input file.

[3] Add jumper from J5-W to I8-W, on rear of input file.

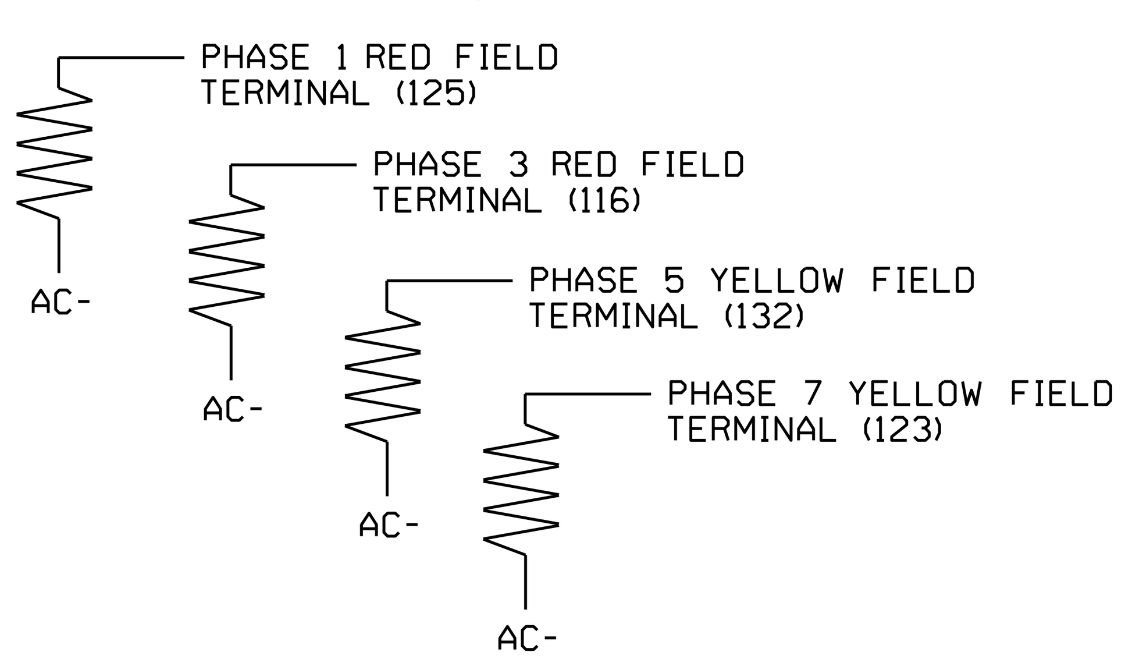
INPUT FILE POSITION LEGEND: J2L
- FILE J
- SLOT 2
- LOWER

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)



SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans for the following loops: 1A, 6A, 6B, 6C, 6D, 6E, and 6F.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1733T1
DESIGNED: August 2017
SEALED: 9/25/2017
REVISED: N/A

Electrical Detail - Temp Design 1 - Phase I - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2894 (Concord Mills Blvd.) at Concord Mills Entrance/ Bexley Way

Division 10 Cabarrus County Concord

PLAN DATE: September 2017 REVIEWED BY:

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared In the Offices of: ITS & Signals Management Section, Transportation Mobility and Safety Division, Department of Transportation, State of North Carolina

750 N.Greenfield Pkwy,Garner,NC 27529

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE

DocuSigned by: Zachary M. Little 9/26/2017
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DATE

SIG. INVENTORY NO. 10-1733T1

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sarmstrong

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [2. VEHICLE OVERLAPS]

OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

```
TMG VEH OVLP...[A] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    1
OPPOSING THROUGH.......   PHASE    2

FLASHING ARROW OUTPUT.....CH9  ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 0
```

Toggle Once

OVERLAP B

Select TMG VEH OVLP [B] and 'PPLT FYA'

```
TMG VEH OVLP...[B] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    3
OPPOSING THROUGH.......   PHASE    4

FLASHING ARROW OUTPUT.....CH10 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 0
```

Toggle Once

OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

```
TMG VEH OVLP...[C] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    5
OPPOSING THROUGH.......   PHASE    6

FLASHING ARROW OUTPUT.....CH11 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 0
```

Toggle Once

OVERLAP D

Select TMG VEH OVLP [D] and 'PPLT FYA'

```
TMG VEH OVLP...[D] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    7
OPPOSING THROUGH.......   PHASE    8

FLASHING ARROW OUTPUT.....CH12 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 0
```

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1733T1
DESIGNED: August 2017
SEALED: 9/25/2017
REVISED: N/A

Electrical Detail - Temp Design 1 - Phase I - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:

ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation

750 N.Greenfield Pkwy,Garner,NC 27529

SR 2894 (Concord Mills Blvd.)
at
Concord Mills Entrance/
Bexley Way

Division 10 | Cabarrus County | Concord

PLAN DATE: September 2017	REVIEWED BY:
PREPARED BY: S. Armstrong	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE

DocuSigned by: Zachary M. Little 9/26/2017
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DATE

SIG. INVENTORY NO. 10-1733T1

26-SEP-2017 11:31
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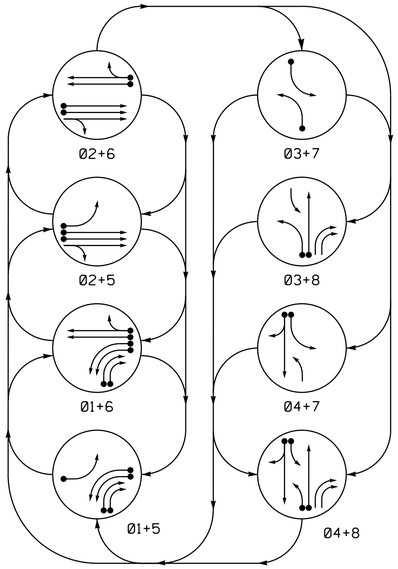
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 3.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

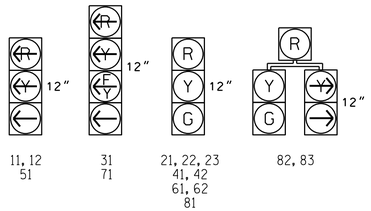
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03+07	03+08	04+07	04+08	FLASH
11, 12	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22, 23	R	R	G	G	R	R	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~F Y~~	~~F Y~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	~~F Y~~	←	~~F Y~~	~~R~~
81	R	R	R	R	R	G	R	G	R
82, 83	R/←	R/←	R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



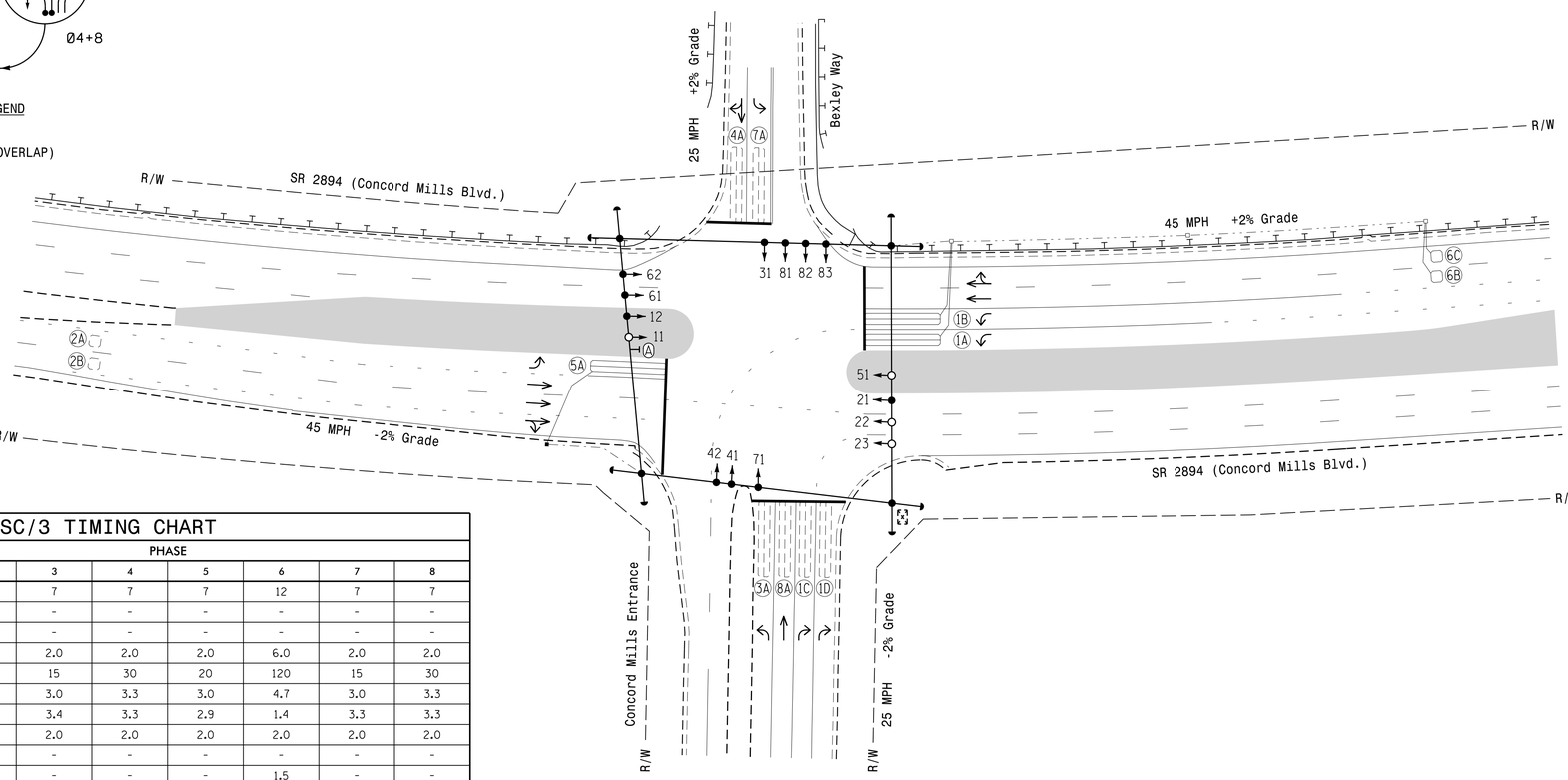
ASC/3 DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Yes	-	-	S	-	-
1B	6X40	0	2-4-2	Y	1	Yes	-	-	S	-	-
1C	6X40	0	2-4-2	-	1	Yes	-	15	S	-	-
1D	6X40	0	2-4-2	-	1	Yes	-	15	S	-	-
2A	6X6	300	EXIST	-	2	Yes	-	-	S	-	-
2B	6X6	300	EXIST	-	2	Yes	-	-	S	-	-
3A	6X40	0	2-4-2	-	3	Yes	-	15	S	-	-
					8	Yes	-	-	S	-	-
4A	6X40	0	2-4-2	-	4	Yes	-	10	S	-	-
5A	6X40	0	2-4-2	Y	5	Yes	-	-	S	-	-
6B	6X6	300	5	Y	6	Yes	-	-	S	-	-
6C	6X6	300	5	Y	6	Yes	-	-	S	-	-
7A	6X40	0	2-4-2	-	7	Yes	-	15	S	-	-
					4	Yes	-	3	S	-	-
8A	6X40	0	2-4-2	-	8	Yes	-	-	S	-	-

8 Phase
Fully Actuated
Concord Mills Blvd. CLS

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. Phase 3 and/or phase 7 may be lagged.
5. Reposition existing signal heads 21, 61, and 62.
6. Set all detector units to presence mode.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Closed loop system data: Controller Asset #: 1733



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	→
N/A	Guardrail	⊥⊥⊥
▒	Construction Zone	▒
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	-	-	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max 1 *	45	120	15	30	20	120	15	30
Yellow	3.0	4.7	3.0	3.3	3.0	4.7	3.0	3.3
Red Clear	3.4	1.4	3.4	3.3	2.9	1.4	3.3	3.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	X	-	-	-	X
Simultaneous Gap	X	X	X	X	X	X	X	X

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

Signal Upgrade - Temporary Design 2 - Phase II

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SR 2894 (Concord Mills Blvd.)
at
Concord Mills Entrance/
Bexley Way

Diviison 10 Cabarrus County Concord

PLAN DATE: August 2017 REVIEWED BY: T.J. Williams
PREPARED BY: R.N. Zinser REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R.N. Zinser F1588073472248F 9/25/2017 DATE

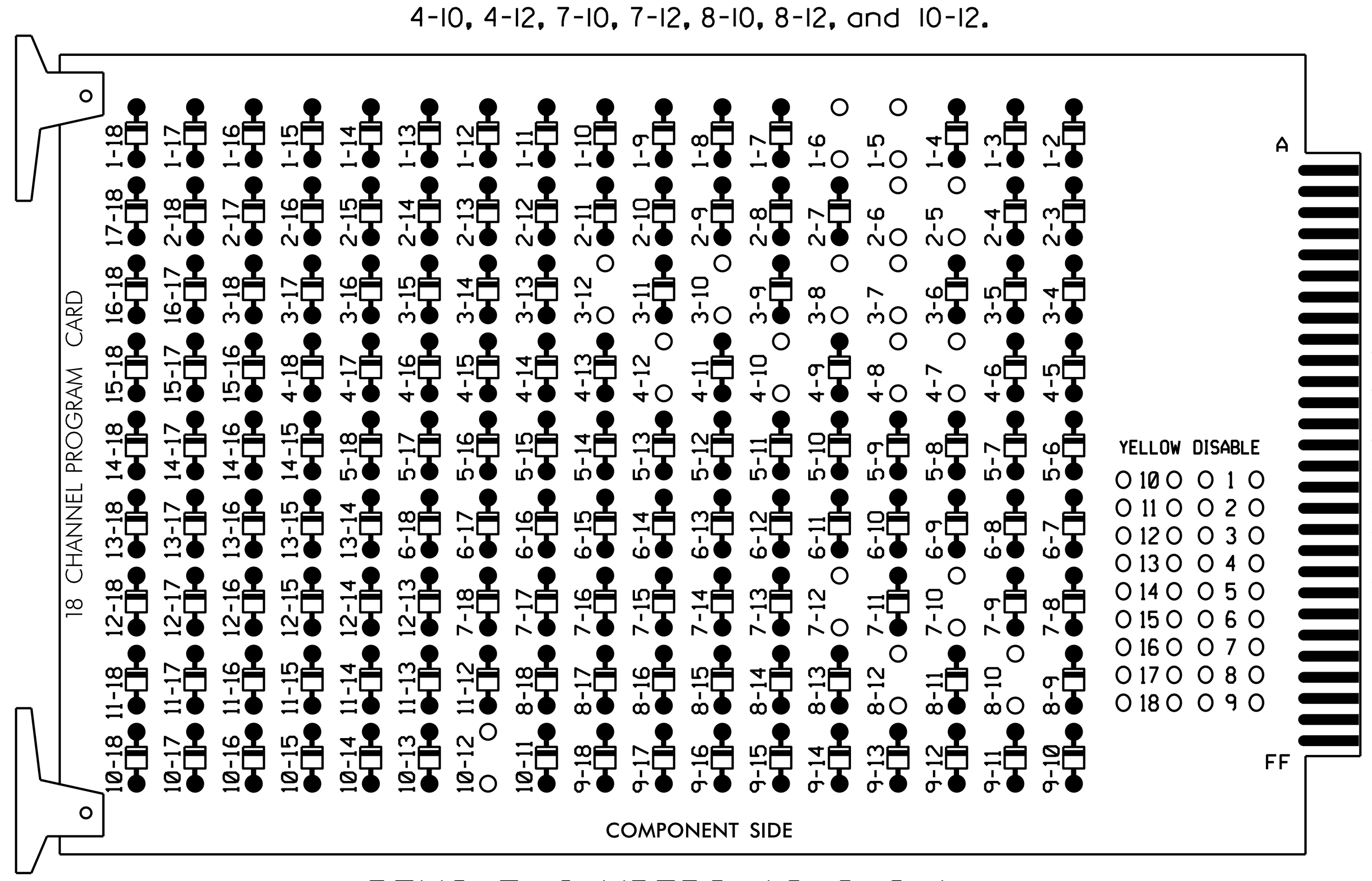
SIG. INVENTORY NO. 10-1733 T2

25-SEP-2017 10:51
S:\Signals\MTS Signals\Signal Design Section\Western Region\Div-10\U-5806\10-1733\10173T2_sig_dsn_2017mods.dgn
rnzinser

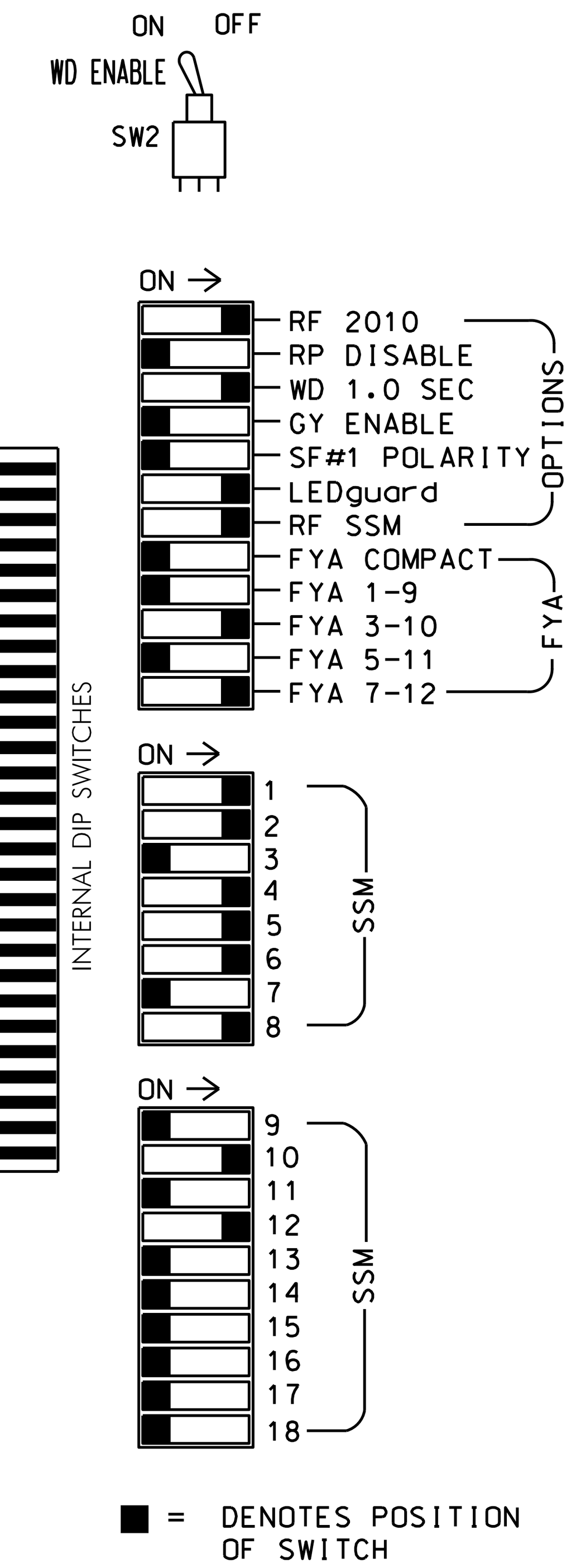
EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 7-10, 7-12, 8-10, 8-12, and 10-12.



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. Integrate monitor with Ethernet network in cabinet.

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. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for volume density operation.
5. Program controller to start up in phase 2 Green and 6 Green.
6. The cabinet and controller are part of the Concord Mills Blvd. CLS.

EQUIPMENT INFORMATION

CONTROLLER..............2070E
CABINET.................332 W/AUX
SOFTWARE................ECONOLITE ASC/3-2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1, S2, S4, S5, S7, S8, S10, S11, AUX S2, AUX S5
PHASES USED.............1, 2, 3, 4, 5, 6, 7, 8
OVERLAP "A".............NOT USED
OVERLAP "B".............*
OVERLAP "C".............NOT USED
OVERLAP "D".............*

* See overlap programming detail on sheet 2

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.	11,12	82,83	21,22 23	NU	31★	41,42	NU	51	61,62	NU	71★	81,82 83	NU	NU	31★	NU	NU	71★	NU
RED			128			101			134			107							
YELLOW			129		*	102			135		*	108							
GREEN			130			103			136			109							
RED ARROW	125							131							A124			A101	
YELLOW ARROW	126	126						132							A125			A102	
FLASHING YELLOW ARROW															A126			A103	
GREEN ARROW	127	127			118			133			124								

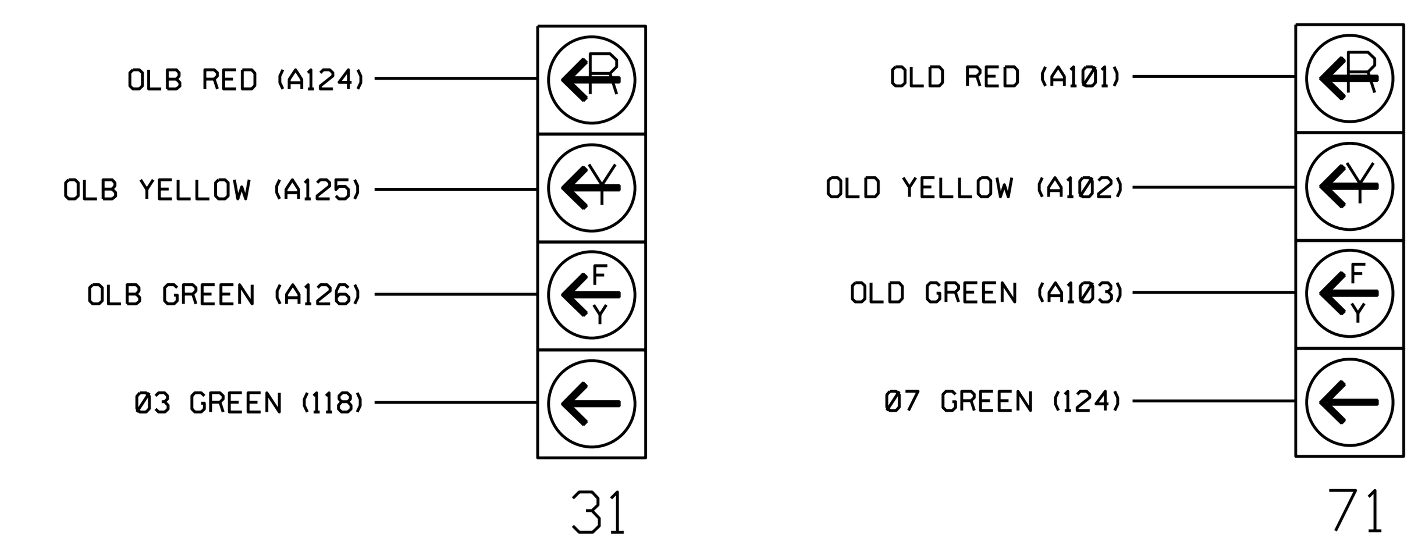
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 1 1C	Ø 2 2A	SLOT EMPTY	Ø 3 3A	Ø 4 4A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	Ø 1 1B	Ø 1 1D	Ø 2 2B		NOT USED	NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	NOT USED	Ø 6 6C	SLOT EMPTY	Ø 7 7A	Ø 8 8A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø 6 6B	NOT USED		NOT USED	NOT USED								

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

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	DETECTOR TYPE
1A	TB2-1,2	I1U	56	1	1	YES			S
1B	TB2-3,4	I1L	56	1	1	YES			S
1C	TB2-5,6	I2U	39	2	1	YES		15	S
1D	TB2-7,8	I2L	43	12	1	YES		15	S
2A	TB2-9,10	I3U	63	32	2	YES			S
2B	TB2-11,12	I3L	76	42	2	YES			S
3A [1]	TB4-5,6	I5U	58	3	3	YES		15	S
	-	J8U	50	28	8	YES			S
4A	TB4-9,10	I6U	41	4	4	YES		10	S
5A	TB3-1,2	J1U	55	5	5	YES			S
6B	TB3-7,8	J2L	44	16	6	YES			S
6C	TB3-9,10	J3U	64	36	6	YES			S
7A [2]	TB5-5,6	J5U	57	7	7	YES		15	S
	-	I8U	49	24	4	YES		3	S
8A	TB5-9,10	J6U	42	8	8	YES			S

[1] Add jumper from I5-W to J8-W, on rear of input file.

[2] Add jumper from J5-W to I8-W, on rear of input file.

Remove jumper from J1-W to I4-W, on rear of input file.

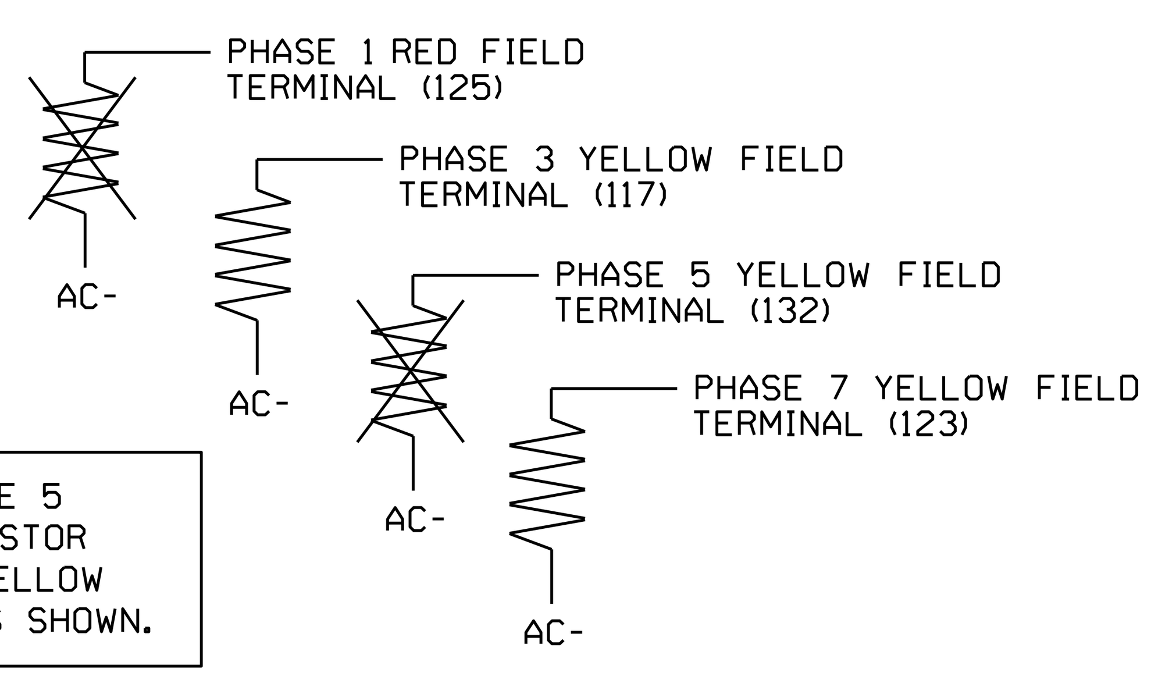
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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)



REMOVE PHASE 1 AND PHASE 5 RESISTORS, AND MOVE RESISTOR FROM RED TERMINAL TO YELLOW TERMINAL FOR PHASE 3 AS SHOWN.

SPECIAL DETECTOR NOTE

Remove all video detection equipment that was installed during the Temporary Design - Phase I construction.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1733T2
DESIGNED: August 2017
SEALED: 9/25/2017
REVISED: N/A

Electrical Detail - Temp Design 2 - Phase II - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2894 (Concord Mills Blvd.) at Concord Mills Entrance/ Bexley Way

Division 10 Cabarrus County Concord

PLAN DATE: September 2017 REVIEWED BY:
PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Transportation Mobility and Safety Division, ITS & Signals Management Section, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE

DocuSigned by: Zachary M. Little 0C21EFD94F5341F... 9/26/2017 DATE

SIG. INVENTORY NO. 10-1733T2

26-SEP-2017 11:38
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sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 3.2

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select `2. CONTROLLER`
2. From CONTROLLER Submenu select `2. VEHICLE OVERLAPS`

REMOVE OVERLAP A PROGRAMMING

OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

```
TMG VEH OVLP...[A] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....    PHASE    1
OPPOSING THROUGH.......    PHASE    2

FLASHING ARROW OUTPUT.....CH9  ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 0
```

Toggle Once

OVERLAP B

Select TMG VEH OVLP [B] and 'PPLT FYA'

```
TMG VEH OVLP...[B] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....    PHASE    3
OPPOSING THROUGH.......    PHASE    4

FLASHING ARROW OUTPUT.....CH10 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 0
```

Toggle Once

REMOVE OVERLAP C PROGRAMMING

OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

```
TMG VEH OVLP...[C] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....    PHASE    5
OPPOSING THROUGH.......    PHASE    6

FLASHING ARROW OUTPUT.....CH11 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 0
```

Toggle Once

OVERLAP D

Select TMG VEH OVLP [D] and 'PPLT FYA'

```
TMG VEH OVLP...[D] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....    PHASE    7
OPPOSING THROUGH.......    PHASE    8

FLASHING ARROW OUTPUT.....CH12 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 0
```

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1733T2
DESIGNED: August 2017
SEALED: 9/25/2017
REVISED: N/A

Electrical Detail - Temp Design 2 - Phase II - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2894 (Concord Mills Blvd.)
at
Concord Mills Entrance/
Bexley Way

Division 10 Cabarrus County Concord

Prepared in the Offices of:
ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

PLAN DATE: September 2017	REVIEWED BY:
PREPARED BY: S. Armstrong	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE

DocuSigned by: Zachary M. Little 9/26/2017
0C21EFD94F5341F...
DATE

SIG. INVENTORY NO. 10-1733T2

26-SEP-2017 11:38
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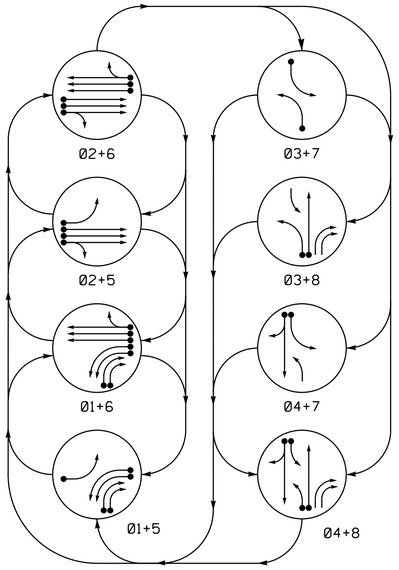
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 4.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

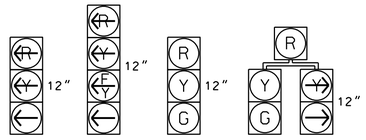
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	FLASH
11, 12	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22, 23	R	R	G	G	R	R	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	~~←~~	~~←~~	~~FY~~	~~FY~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	~~←~~	~~R~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62, 63	R	G	R	G	R	R	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	~~←~~	~~←~~	~~FY~~	~~FY~~	~~R~~
81	R	R	R	R	R	G	R	G	R
82, 83	~~R~~ / ~~R~~ →		R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



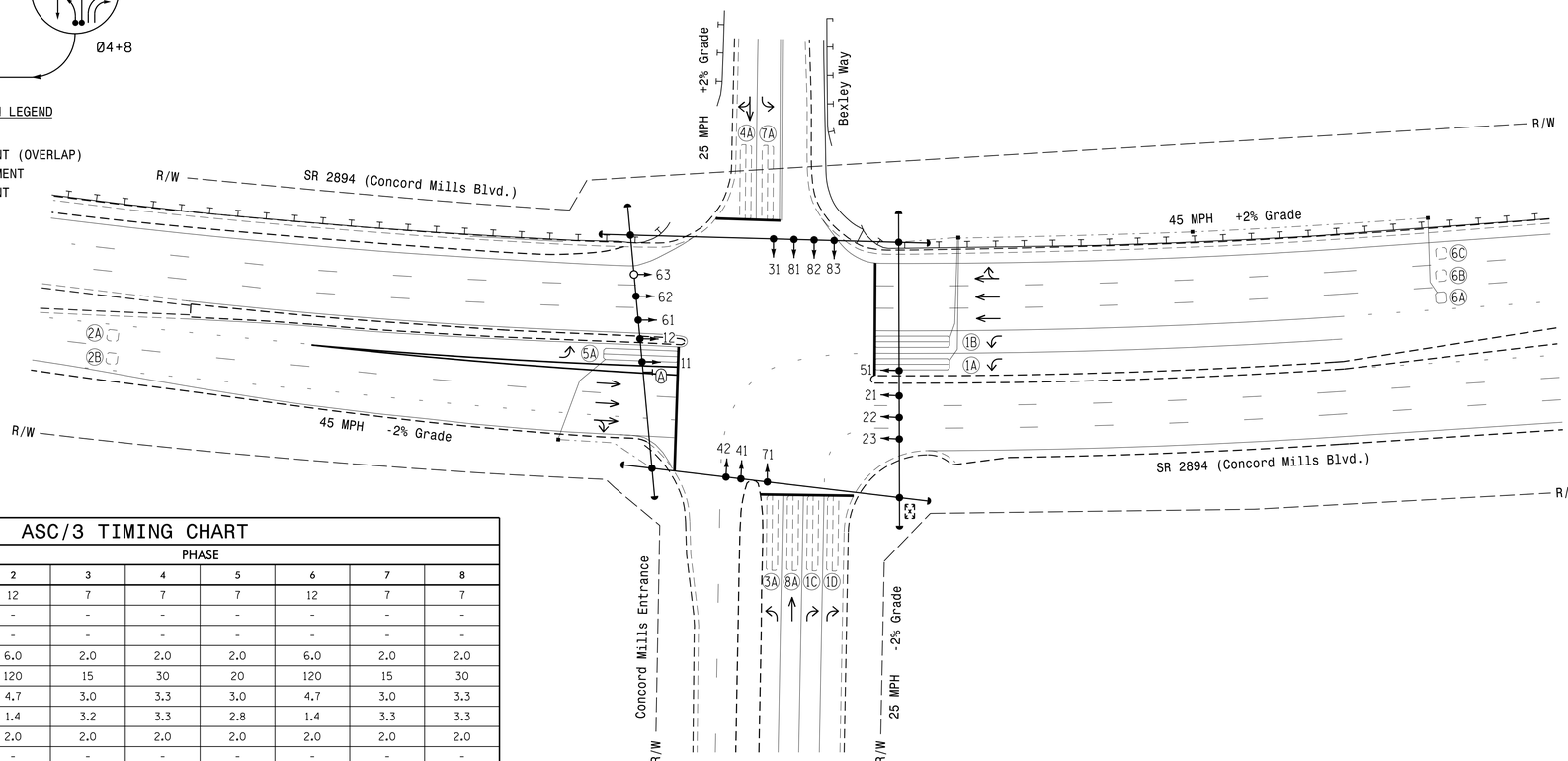
ASC/3 DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Yes	-	-	S	-	-
1B	6X40	0	2-4-2	Y	1	Yes	-	-	S	-	-
1C	6X40	0	2-4-2	-	1	Yes	-	15	S	-	-
1D	6X40	0	2-4-2	-	1	Yes	-	15	S	-	-
2A	6X6	300	EXIST	-	2	Yes	-	-	S	-	-
2B	6X6	300	EXIST	-	2	Yes	-	-	S	-	-
3A	6X40	0	2-4-2	-	3	Yes	-	15	S	-	-
					8	Yes	-	-	S	-	-
4A	6X40	0	2-4-2	-	4	Yes	-	10	S	-	-
5A	6X40	0	2-4-2	Y	5	Yes	-	-	S	-	-
6A	6X6	300	5	Y	6	Yes	-	-	S	-	-
6B	6X6	300	5	-	6	Yes	-	-	S	-	-
6C	6X6	300	5	-	6	Yes	-	-	S	-	-
7A	6X40	0	2-4-2	-	7	Yes	-	15	S	-	-
					4	Yes	-	3	S	-	-
8A	6X40	0	2-4-2	-	8	Yes	-	-	S	-	-

8 Phase
Fully Actuated
Concord Mills Blvd. CLS

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. Phase 3 and/or phase 7 may be lagged.
5. Reposition existing signal heads numbered 11, 12, 51, 61, and 62.
6. Set all detector units to presence mode.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Closed loop system data: Controller Asset #: 1733



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	→
N/A	Guardrail	⊥⊥
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	-	-	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max 1 *	45	120	15	30	20	120	15	30
Yellow	3.0	4.7	3.0	3.3	3.0	4.7	3.0	3.3
Red Clear	3.3	1.4	3.2	3.3	2.8	1.4	3.3	3.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	X	-	-	-	X
Simultaneous Gap	X	X	X	X	X	X	X	X

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

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared In the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 2894 (Concord Mills Blvd.)
at
Concord Mills Entrance/
Bexley Way

Division 10 Cabarrus County Concord

PLAN DATE: August 2017 REVIEWED BY: T.J. Williams
PREPARED BY: R.N. Zinser REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R.N. Zinser 9/25/2017
F13B9B73472248F DATE

SIG. INVENTORY NO. 10-1733

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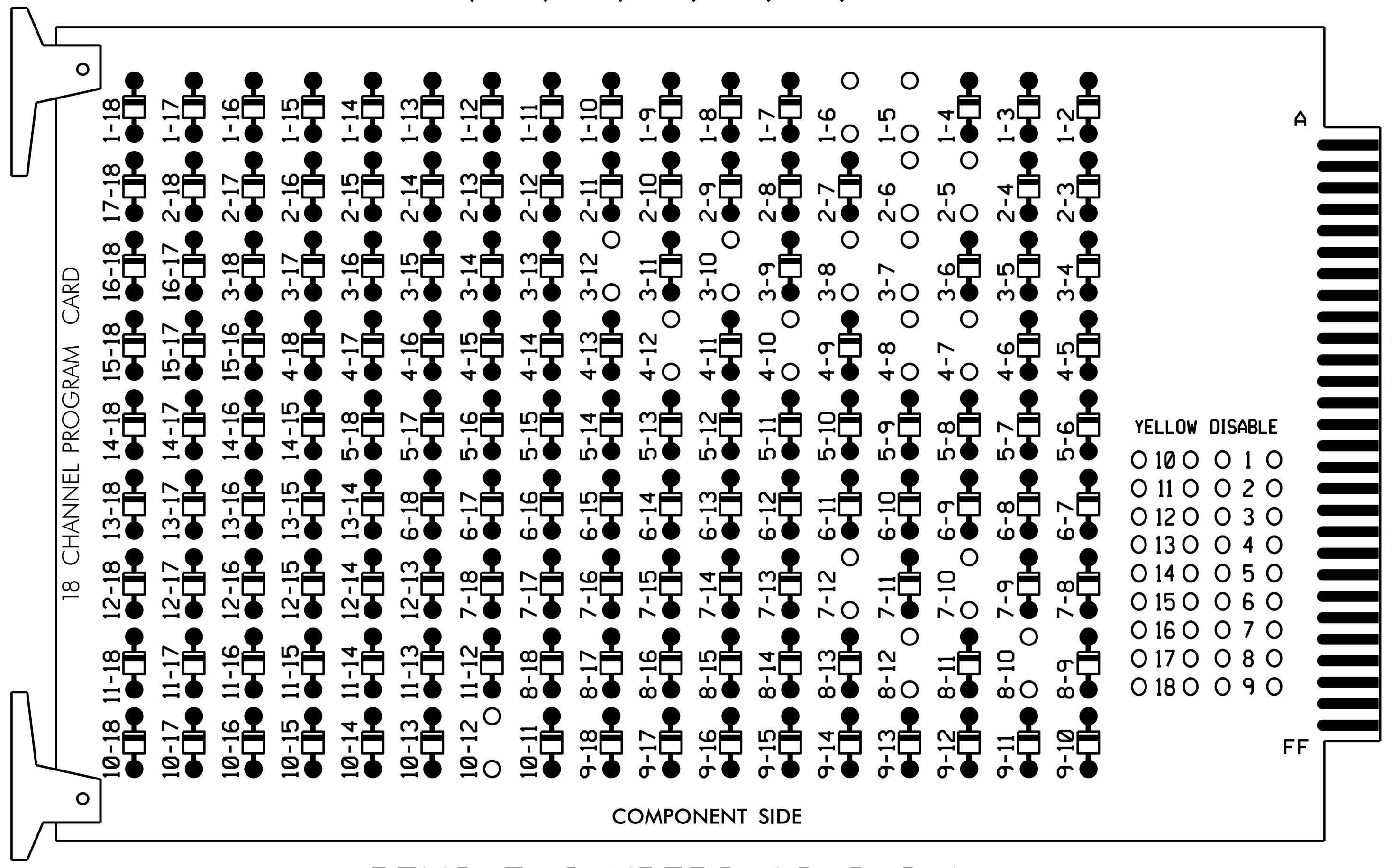
rnzinser

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

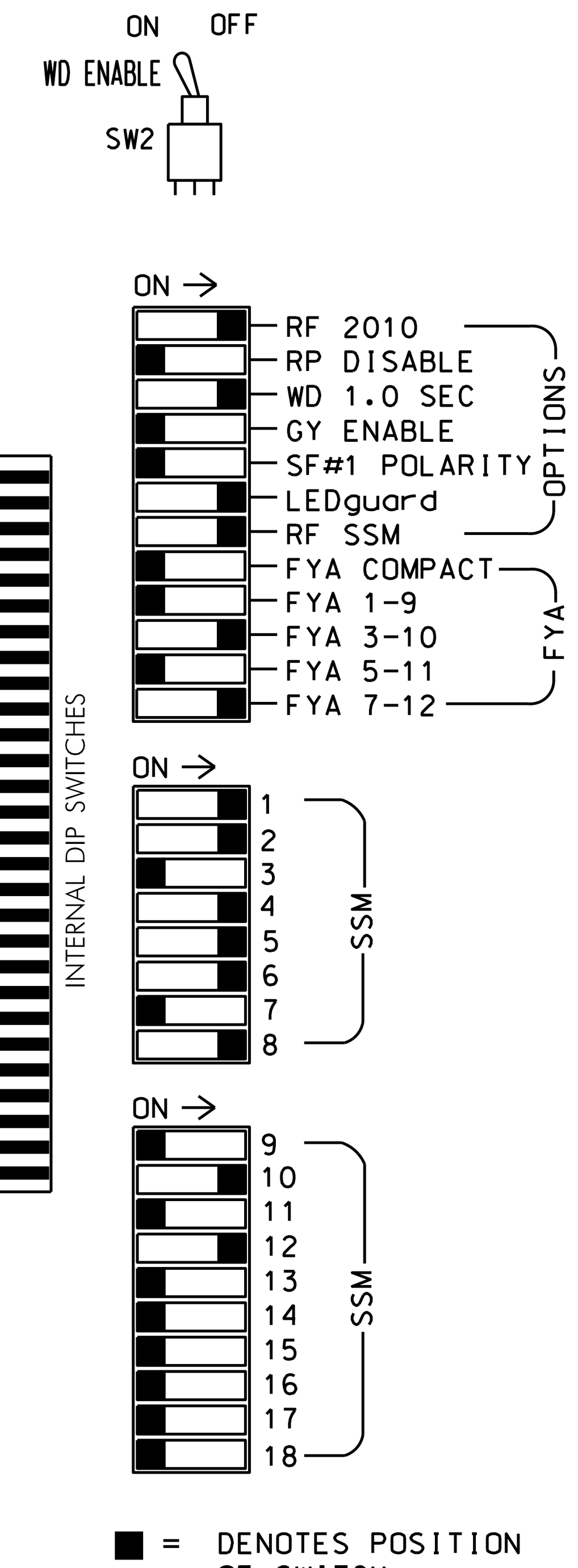
REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 7-10, 7-12, 8-10, 8-12, and 10-12.



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. Integrate monitor with Ethernet network in cabinet.



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. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for volume density operation.
5. Program controller to start up in phase 2 Green and 6 Green.
6. The cabinet and controller are part of the Concord Mills Blvd. CLS.

EQUIPMENT INFORMATION

CONTROLLER..............2070E
CABINET.................332 W/AUX
SOFTWARE................ECONOLITE ASC/3-2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S4,S5,S7,S8,S10,S11, AUX S2,AUX S5
PHASES USED.............1,2,3,4,5,6,7,8
OVERLAP "A".............NOT USED
OVERLAP "B".............✱
OVERLAP "C".............NOT USED
OVERLAP "D".............✱

✱ See overlap programming detail on sheet 2

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.	11,12	82,83	21,22 23	NU	31★	41,42	NU	51	61,62 63	NU	71★	81,82 83	NU	NU	31★	NU	NU	71★	NU
RED			128			101			134			107							
YELLOW			129		✱	102			135		✱	108							
GREEN			130			103			136			109							
RED ARROW	125							131							A124			A101	
YELLOW ARROW	126	126						132							A125			A102	
FLASHING YELLOW ARROW															A126			A103	
GREEN ARROW	127	127			118			133			124								

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 1 1C	Ø 2 2A	SLOT EMPTY	Ø 3 3A	Ø 4 4A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	Ø 1 1B	Ø 1 1D	Ø 2 2B		NOT USED	NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 6 6A	Ø 6 6C	SLOT EMPTY	Ø 7 7A	Ø 8 8A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø 6 6B	NOT USED		NOT USED	NOT USED								

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

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	DETECTOR TYPE
1A	TB2-1,2	I1U	56	1	1	YES			S
1B	TB2-3,4	I1L	56	1	1	YES			S
1C	TB2-5,6	I2U	39	2	1	YES		15	S
1D	TB2-7,8	I2L	43	12	1	YES		15	S
2A	TB2-9,10	I3U	63	32	2	YES			S
2B	TB2-11,12	I3L	76	42	2	YES			S
3A [1]	TB4-5,6	I5U	58	3	3	YES		15	S
	-	J8U	50	28	8	YES			S
4A	TB4-9,10	I6U	41	4	4	YES		10	S
5A	TB3-1,2	J1U	55	5	5	YES			S
6A	TB3-5,6	J2U	40	6	6	YES			S
6B	TB3-7,8	J2L	44	16	6	YES			S
6C	TB3-9,10	J3U	64	36	6	YES			S
7A [2]	TB5-5,6	J5U	57	7	7	YES		15	S
	-	I8U	49	24	4	YES		3	S
8A	TB5-9,10	J6U	42	8	8	YES			S

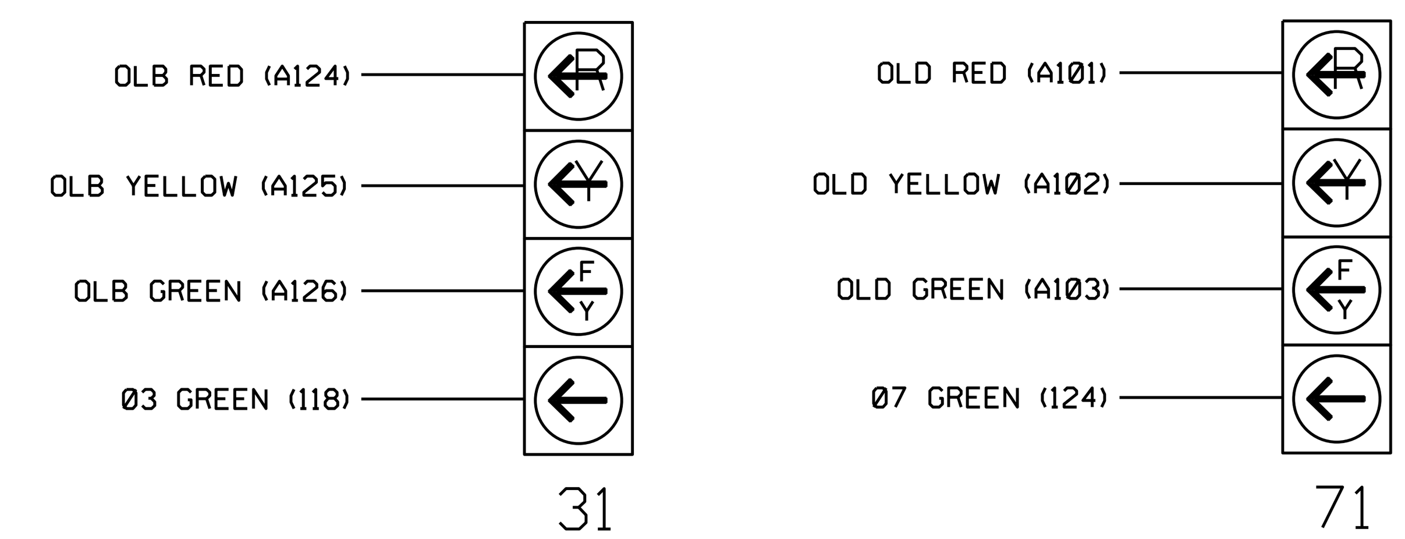
[1] Add jumper from I5-W to J8-W, on rear of input file.

[2] Add jumper from J5-W to I8-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

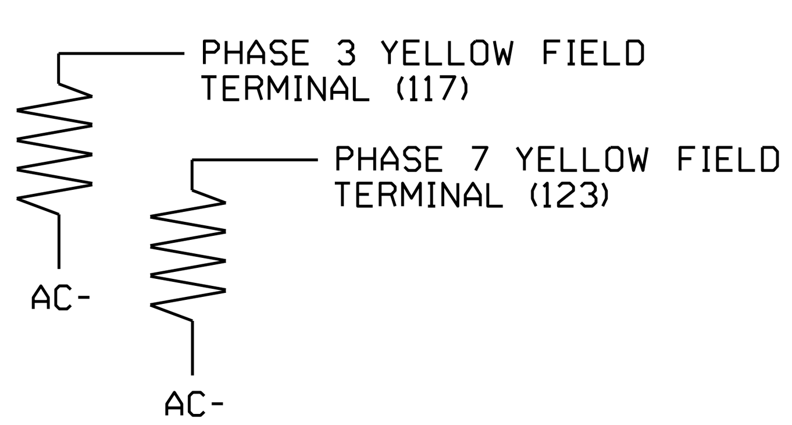


LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1733
DESIGNED: August 2017
SEALED: 9/25/2017
REVISED: N/A

Electrical Detail - Final Design- Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2894 (Concord Mills Blvd.)
at
Concord Mills Entrance/
Bexley Way

Division 10 Cabarrus County Concord

PLAN DATE: September 2017 REVIEWED BY:

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared In the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030530 ZACHARY M. LITTLE

DocuSigned by: Zachary M. Little 9/26/2017
0C21EFD94F5341F...
DATE

SIG. INVENTORY NO. 10-1733

26-SEP-2017 11:40
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sarmstrong

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [2. VEHICLE OVERLAPS]

Toggle Twice

OVERLAP B

Select TMG VEH OVLP [B] and 'PPLT FYA'

```
TMG VEH OVLP...[B] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    3
OPPOSING THROUGH.......   PHASE    4

FLASHING ARROW OUTPUT.....CH10 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 0
```

Toggle Twice

OVERLAP D

Select TMG VEH OVLP [D] and 'PPLT FYA'

```
TMG VEH OVLP...[D] TYPE: .....PPLT FYA

PROTECTED LEFT TURN....   PHASE    7
OPPOSING THROUGH.......   PHASE    8

FLASHING ARROW OUTPUT.....CH12 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE........... 0
```

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1733
DESIGNED: August 2017
SEALED: 9/25/2017
REVISED: N/A

Electrical Detail - Final Design - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2894 (Concord Mills Blvd.) at Concord Mills Entrance/ Bexley Way

Division 10 Cabarrus County Concord

PLAN DATE: September 2017	REVIEWED BY:
PREPARED BY: S. Armstrong	REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE

DocuSigned by: Zachary M. Little 9/26/2017
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DATE

SIG. INVENTORY NO. 10-1733

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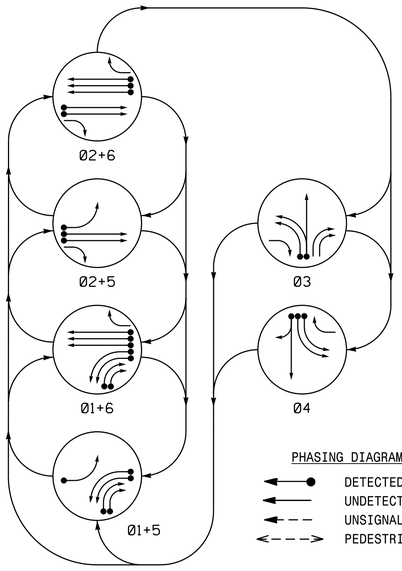
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 5.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

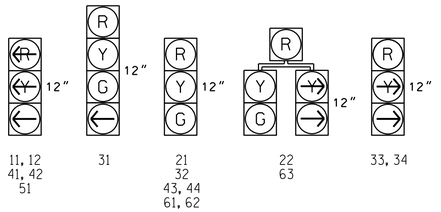
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11, 12	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	Y
22	R	R	G	G	R/←	R	Y
31	R	R	R	R	G	R	R
32	R	R	R	R	G	R	R
33, 34	→	→	R	R	→	R	R
41, 42	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~
43, 44	R	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	Y
63	R	G	R	G	R/→		Y

SIGNAL FACE I.D.

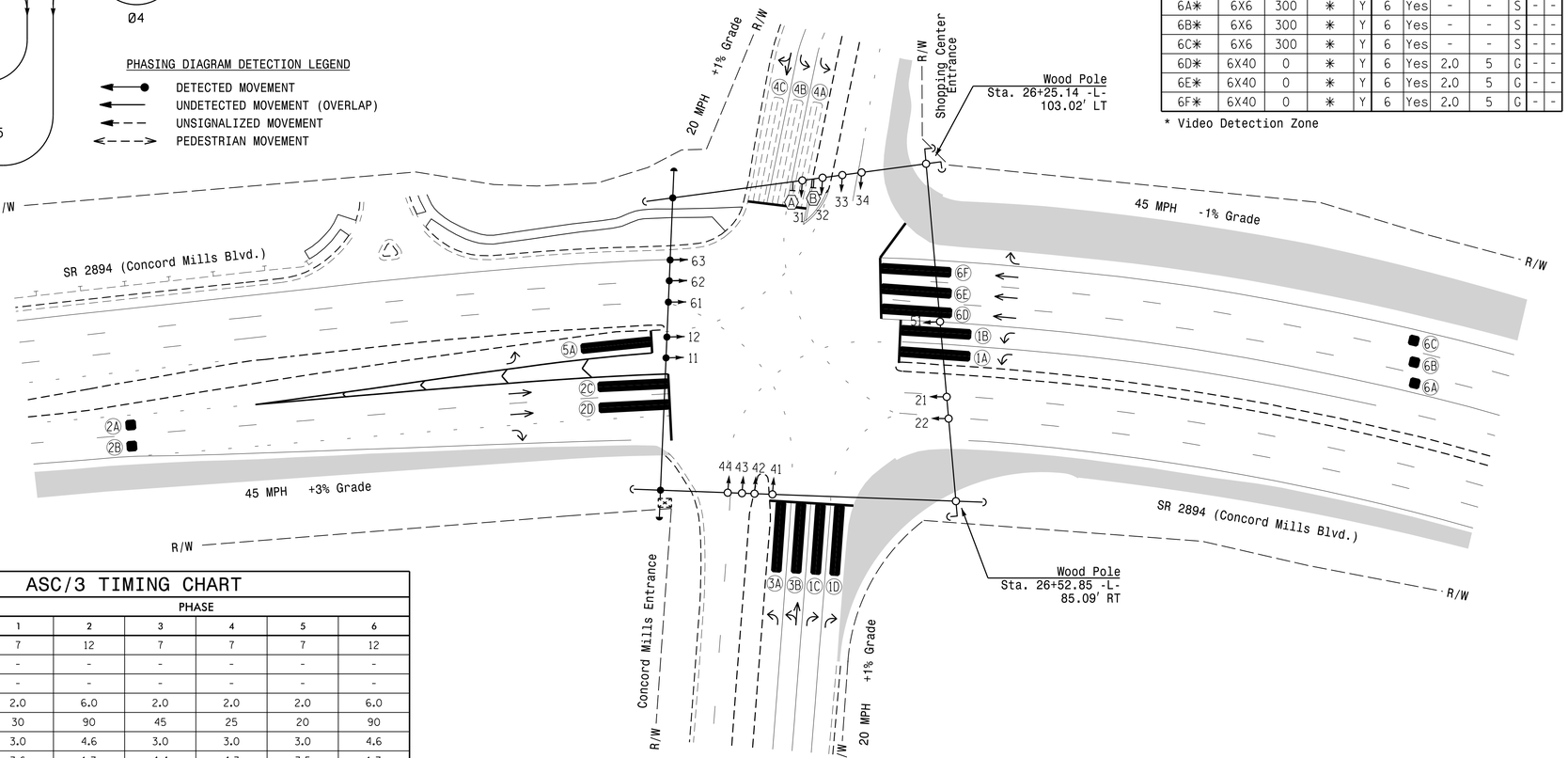
All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP	NEW CARD
1A*	6X40	0	*	Y	1	Yes	-	-	S	-	-
1B*	6X40	0	*	Y	1	Yes	-	-	S	-	-
1C*	6X40	0	*	Y	1	Yes	-	15	S	-	-
1D*	6X40	0	*	Y	1	Yes	-	15	S	-	-
2A*	6X6	300	*	Y	2	Yes	-	-	S	-	-
2B*	6X6	300	*	Y	2	Yes	-	-	S	-	-
2C*	6X40	0	*	Y	2	Yes	2.0	5	G	-	-
2D*	6X40	0	*	Y	2	Yes	2.0	5	G	-	-
3A*	6X40	0	*	Y	3	Yes	-	-	S	-	-
3B*	6X40	0	*	Y	3	Yes	-	-	S	-	-
4A	6X60	0	2-4-2	-	4	Yes	-	-	S	-	-
4B	6X60	0	2-4-2	-	4	Yes	-	-	S	-	-
4C	6X60	0	2-4-2	-	4	Yes	-	10	S	-	-
5A*	6X40	0	*	Y	5	Yes	-	-	S	-	-
6A*	6X6	300	*	Y	6	Yes	-	-	S	-	-
6B*	6X6	300	*	Y	6	Yes	-	-	S	-	-
6C*	6X6	300	*	Y	6	Yes	-	-	S	-	-
6D*	6X40	0	*	Y	6	Yes	2.0	5	G	-	-
6E*	6X40	0	*	Y	6	Yes	2.0	5	G	-	-
6F*	6X40	0	*	Y	6	Yes	2.0	5	G	-	-

* Video Detection Zone



ASC/3 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green *	7	12	7	7	7	12
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	30	90	45	25	20	90
Yellow	3.0	4.6	3.0	3.0	3.0	4.6
Red Clear	3.6	1.7	4.4	4.3	3.5	1.7
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	45	-	-	-	45
Minimum Gap	-	3.0	-	-	-	3.0
Locking Detector	-	X	-	-	-	X
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X

* 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.

6 Phase
Fully Actuated
Concord Mills Blvd. CLS

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. Install new 2070E Controller in existing cabinet.
4. Phase 1 and/or phase 5 may be lagged.
5. The order of phase 3 and phase 4 may be reversed.
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. 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 #: 1732

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	→
▒	Construction Zone	▒
▬	Video Detection Zone	▬
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Combined Through and Left Arrow Sign (R3-6L)	Ⓑ

Signal Upgrade - Temporary Design 1 - Phase I

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 2894 (Concord Mills Blvd.)
at
Concord Mills Entrance/
Shopping Center Entrance

Division 10 Cabarrus County Concord

PLAN DATE: July 2017 REVIEWED BY: T.J. Williams
PREPARED BY: R.N. Zinser REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R.N. Zinser F13B807347224BF... 9/25/2017 DATE

SIG. INVENTORY NO. 10-1732 TI

25-SEP-2017 10:04
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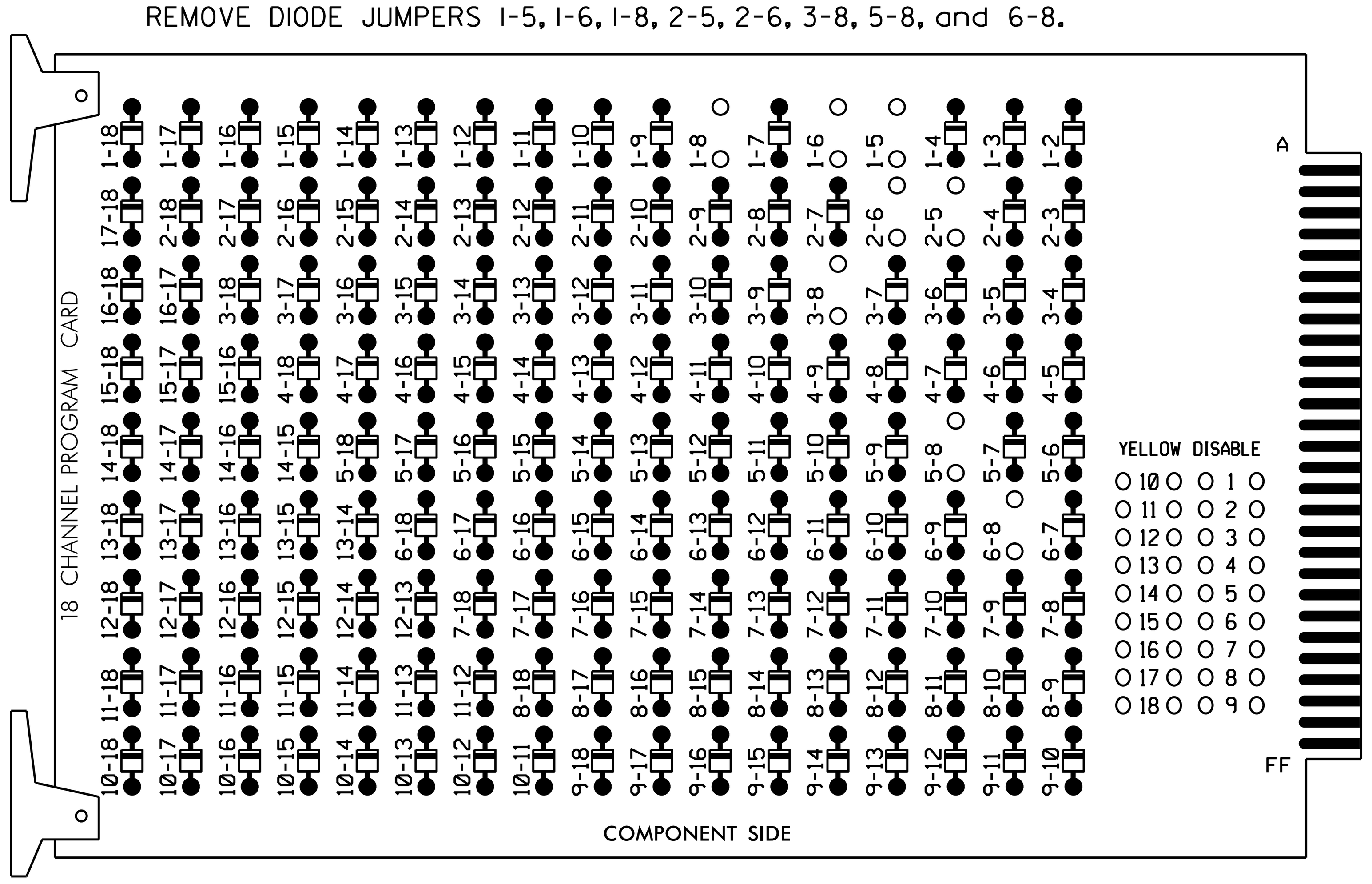
rnzinser

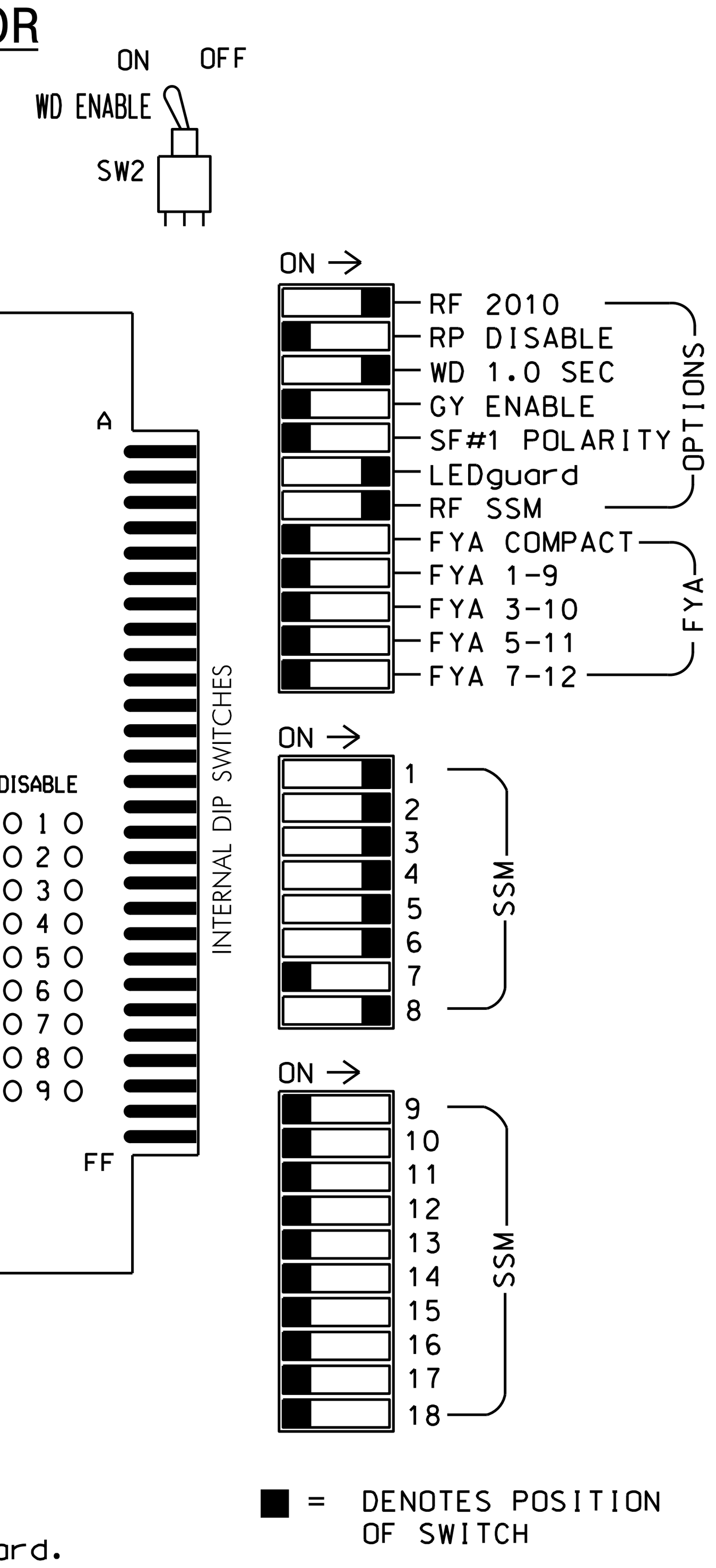
PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 5.1

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-8, 2-5, 2-6, 3-8, 5-8, and 6-8.





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. Integrate monitor with Ethernet network in cabinet.

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. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for volume density operation.
4. Program controller to start up in phase 2 Green and 6 Green.
5. The cabinet and controller are part of the Concord Mills Blvd. CLS.

EQUIPMENT INFORMATION

CONTROLLER..............2070E
CABINET.................332
SOFTWARE................ECONOLITE ASC/3-2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S1,S2,S4,S5,S7,S8,S11
PHASES USED.............1,2,3,4,5,6
OVERLAP E...............1+3

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	OLE	8 PED
SIGNAL HEAD NO.	11,12	21,22	NU	22	31	32	41,42	43,44	63	NU	51	61,62 63	NU	NU	33,34	NU
RED		128			116	116		101				134			107	
YELLOW		129			117	117		102				135				
GREEN		130			118	118		103				136				
RED ARROW	125						101				131					
YELLOW ARROW	126			117			102		102		132				108	
GREEN ARROW	127			118	118		103		103		133				109	

NU = Not Used

NOTE: The output for load switch S11 has been reassigned. See sheet 2 for details.

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	Ø 4 4A	Ø 4 4C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L							Ø 4 4B	NOT USED						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

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	DETECTOR TYPE
4A	TB6-1,2	I7U	65	34	4	YES			S
4B	TB6-3,4	I7L	78	44	4	YES			S
4C	TB6-5,6	I8U	49	24	4	YES		10	S

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans for the following loops: 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 5A, 6A, 6B, 6C, 6D, 6E, & 6F.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1732T1
DESIGNED: July 2017
SEALED: 9/25/2017
REVISED: N/A

Electrical Detail - Temp Design 1 - Phase I - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2894 (Concord Mills Blvd.)
at
Concord Mills Entrance/
Shopping Center Entrance

Division 10 Cabarrus County Concord

PLAN DATE: September 2017 REVIEWED BY:
PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
ITS & Signals Management Section, Transportation Mobility and Safety Division, Department of Transportation, State of North Carolina
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036880 ENGINEER KEITH M. MIMS

DocuSigned by: Keith M. Mims 2F80786E8CD34A5...
9/26/2017
DATE

SIG. INVENTORY NO. 10-1732T1

26-SEP-2017 13:43
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sarmstrong

ECONOLITE ASC/3-2070
LOAD SWITCH ASSIGNMENT DETAIL

(program controller as shown)

To assign load switch S11 as OLE, program LD SWITCH 8 as OVLP '5' TYPE 'O' as shown below.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [3. LOAD SW ASSIGN]

LD SWITCH ASSIGN

	PHASE /OVLP	TYPE	DIMMING R	Y	G	D	FLASH PWR	AUT	TGR
1	1	V	.	.	.	+	A	R	X
2	2	V	.	.	.	+	A	Y	.
3	3	V	.	.	.	+	A	R	X
4	4	V	.	.	.	+	A	R	.
5	5	V	.	.	.	−	A	R	.
6	6	V	.	.	.	−	A	Y	X
7	7	V	.	.	.	−	A	R	.
→ 8	5	O	.	.	.	−	A	R	X
9	1	O	.	.	.	+	A	R	X
10	2	O	.	.	.	+	A	R	X
11	3	O	.	.	.	−	A	R	.
12	4	O	.	.	.	−	A	R	.
13	2	P	.	.	.	+	A	.	.
14	4	P	.	.	.	−	A	.	.
15	6	P	.	.	.	+	A	.	.
16	8	P	.	.	.	−	A	.	.

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [2. VEHICLE OVERLAPS]

Toggle Four Times

OVERLAP E

Select TMG VEH OVLP [E] and 'NORMAL'

```
TMG VEH OVLP...[E] TYPE: ......NORMAL
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED X . X . . . . . . . . . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1732T1
DESIGNED: July 2017
SEALED: 9/25/2017
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2894 (Concord Mills Blvd.)
at
Concord Mills Entrance/
Shopping Center Entrance

Division 10 Cabarrus County Concord

PLAN DATE: September 2017	REVIEWED BY:
PREPARED BY: S. Armstrong	REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
NC Department of Transportation Mobility and Safety Division ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036880 ENGINEER KEITH M. MIMS

DocuSigned by: Keith M. Mims 9/26/2017
2F807BE8CD04A9... DATE

SIG. INVENTORY NO. 10-1732T1

26-SEP-2017 13:44
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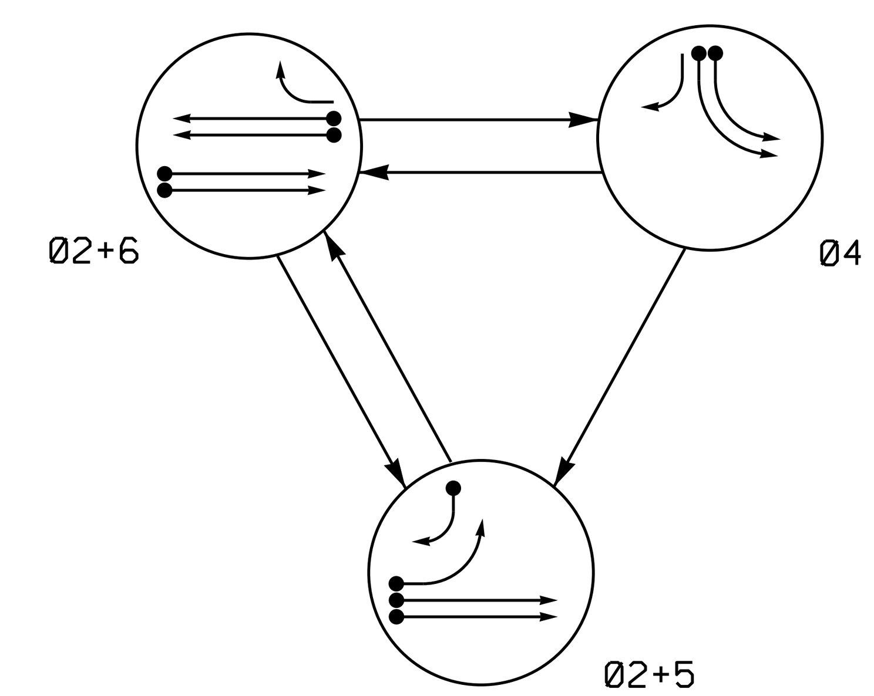
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 6.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

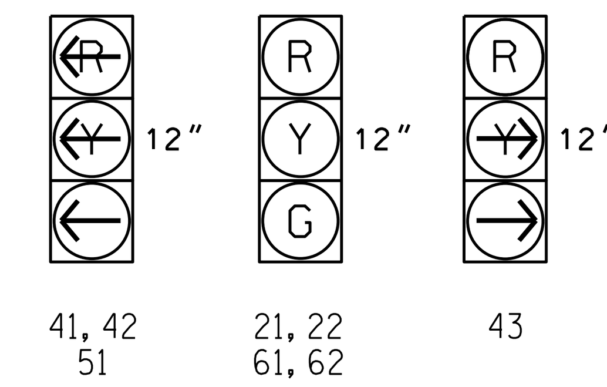
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

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

SIGNAL FACE I.D.

All Heads L.E.D.



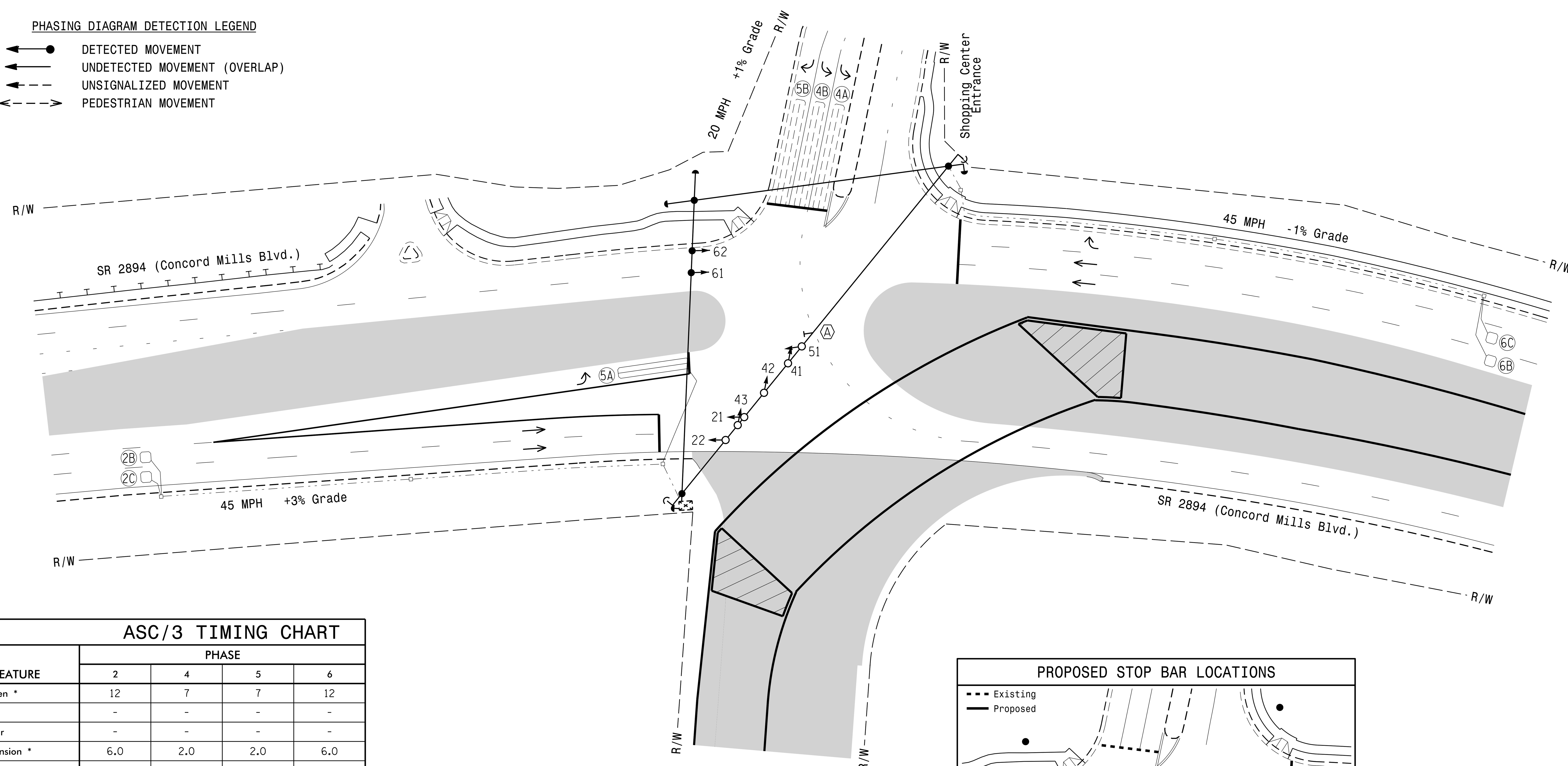
ASC/3 DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP	NEW CARD
2B	6X6	285	4	Y	2	Yes	-	-	S	-	-
2C	6X6	285	4	Y	2	Yes	-	-	S	-	-
4A	6X60	0	2-4-2	-	4	Yes	-	-	S	-	-
4B	6X60	0	2-4-2	-	4	Yes	-	-	S	-	-
5A	6X40	0	2-4-2	Y	5	Yes	-	-	S	-	-
5B	6X60	0	2-4-2	-	5	Yes	-	15	S	-	-
6B	6X6	300	6	Y	6	Yes	-	-	S	-	-
6C	6X6	300	6	Y	6	Yes	-	-	S	-	-

3 Phase
Fully Actuated
Concord Mills Blvd. CLS

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 5 may be lagged.
4. Reposition existing signal heads numbered 61 and 62.
5. Set all detector units to presence mode.
6. 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.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Closed loop system data: Controller Asset #: 1732



LEGEND

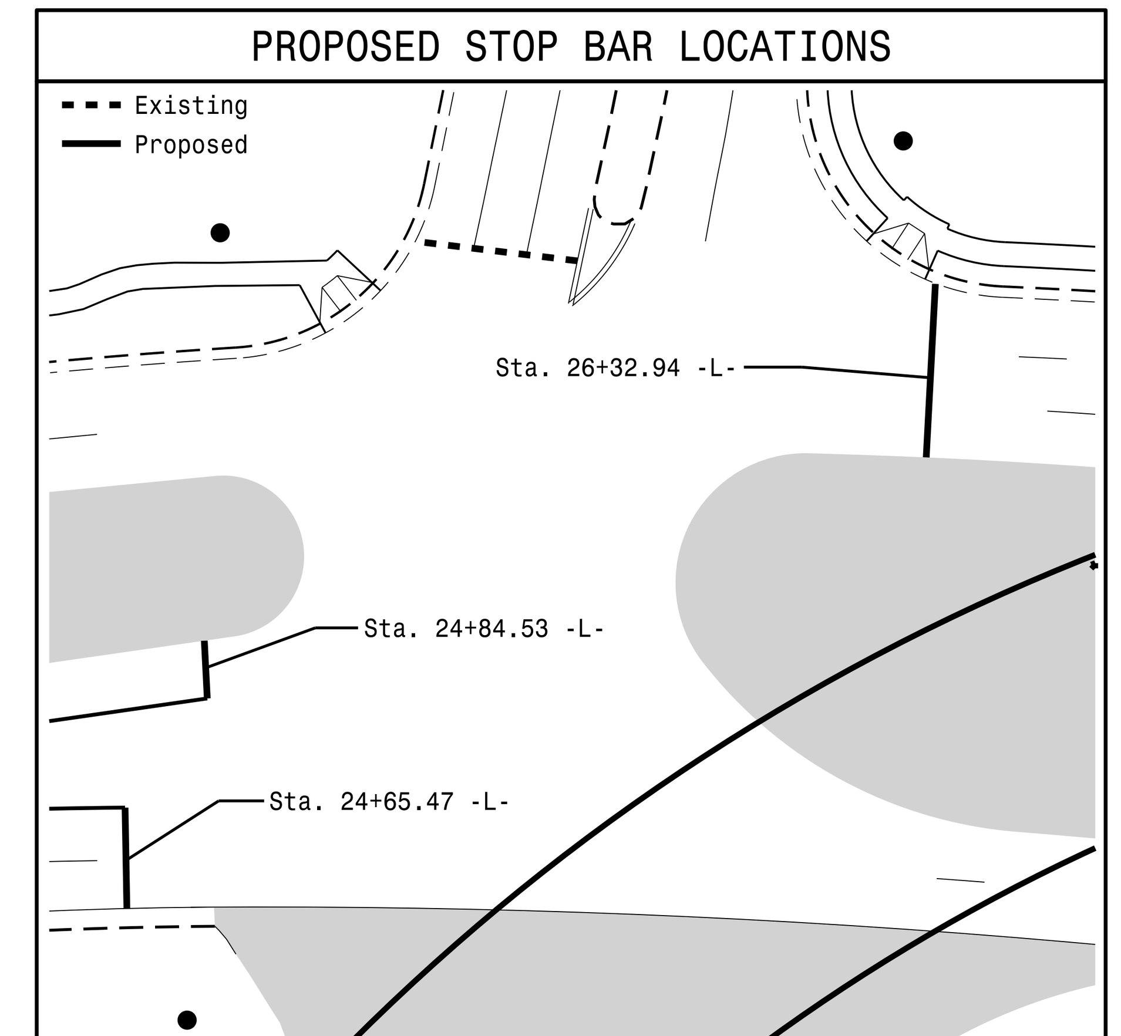
PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Construction Zone	
A	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	A

ASC/3 TIMING CHART

FEATURE	PHASE 2	4	5	6
Min Green *	12	7	7	12
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Veh. Extension *	6.0	2.0	2.0	6.0
Max 1 *	90	30	20	90
Yellow	4.6	3.0	3.0	4.6
Red Clear	1.8	4.6	3.6	1.8
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	1.5	-	-	1.5
Max Initial *	33	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.0	-	-	3.0
Locking Detector	X	-	-	X
Recall Position	VEH. RECALL	-	-	VEH. RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

* 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.

PROPOSED STOP BAR LOCATIONS



Signal Upgrade - Temporary Design 2 - Phase II

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
Transportation Mobility and Safety Division — Signal Design Section
750 N.Greenfield Pkwy.Garner.NC 27529

SR 2894 (Concord Mills Blvd.)
at
Shoping Center Entrance

Division 10 Cabarrus County Concord

PLAN DATE: July 2017	REVIEWED BY: T.J. Williams
PREPARED BY: R.N. Zinser	REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R.N. Zinser 9/25/2017 DATE

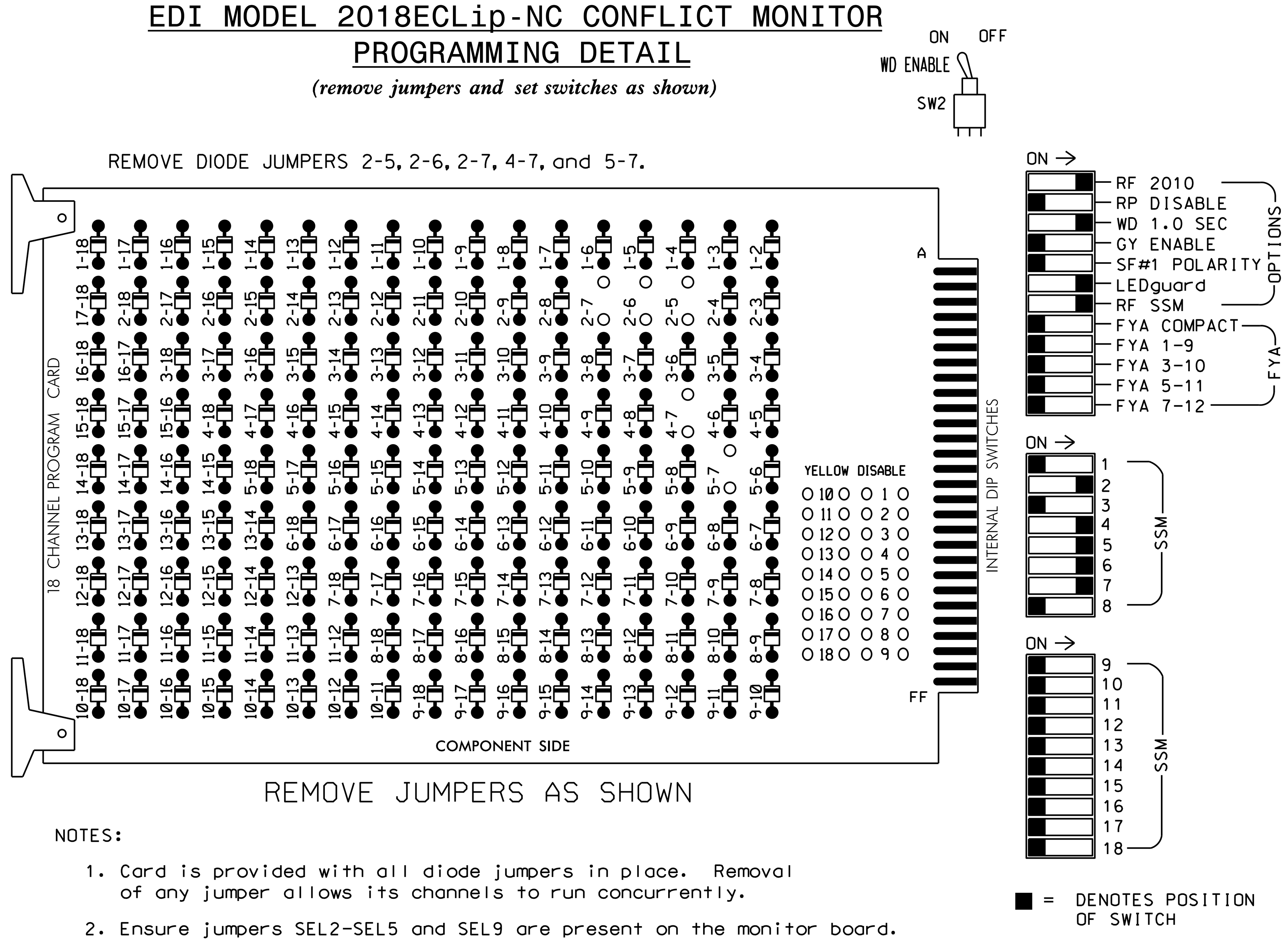
SIG. INVENTORY NO. 10-1732 T2

25-SEP-2017 10:06
S:*ITS&SU\ITS Signals\Signal Design Section\Western Region\Div-10\U-5806\10-1732\10173212_sig_dsn_2017tmpd.dgn
rnzinser

PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 6.1

EDI MODEL 2018ECLip-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. Integrate monitor with Ethernet network in cabinet.

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. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for volume density operation.
4. Program controller to start up in phase 2 Green and 6 Green.
5. The cabinet and controller are part of the Concord Mills Blvd. CLS.

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	OLE	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51	61,62	NU	43	NU	NU
RED		128						134		122		
YELLOW		129						135				
GREEN		130						136				
RED ARROW					101		131					
YELLOW ARROW					102		132			123		
GREEN ARROW					103		133			124		

NU = Not Used

NOTE: The outputs for load switches S10 and S11 have been reassigned. See sheet 2 for details.

EQUIPMENT INFORMATION

CONTROLLER..............2070E
CABINET.................332
SOFTWARE................ECONOLITE ASC/3-2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S2,S5,S7,S8,S10
PHASES USED.............2,4,5,6
OVERLAP E...............4+5

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	NOT USED	ø 2 2C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
"I"	L		ø 2 2B	NOT USED				ø 4 4B							ST DC ISOLATOR
"J"	U	ø 5 5A	ø 5 5B	NOT USED	ø 6 6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
"J"	L	NOT USED	NOT USED	ø 6 6B	NOT USED										

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	DETECTOR TYPE
2B	TB2-7,8	I2L	43	12	2	YES			S
2C	TB2-9,10	I3U	63	32	2	YES			S
4A	TB6-1,2	I7U	65	34	4	YES			S
4B	TB6-3,4	I7L	78	44	4	YES			S
5A	TB3-1,2	J1U	55	5	5	YES			S
5B	TB3-5,6	J2U	40	6	5	YES		15	S
6B	TB3-11,12	J3L	77	46	6	YES			S
6C	TB5-1,2	J4U	48	26	6	YES			S

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1732T2
DESIGNED: July 2017
SEALED: 9/25/2017
REVISED: N/A

SPECIAL DETECTOR NOTE

Remove all video detection equipment that was installed during the Temporary Design - Phase I construction.

Electrical Detail - Temp Design 2 - Phase II - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2894 (Concord Mills Blvd.) at Shopping Center Entrance

Division 10 Cabarrus County Concord

PLAN DATE: September 2017 REVIEWED BY:

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

Prepared in the Offices of: ITS & Signals Management Section, Transportation Mobility and Safety Division, NC Department of Transportation

750 N.Greenfield Pkwy,Garner,NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036880 ENGINEER KEITH M. MIMS

Keith M. Mims 9/26/2017

DATE

SIG. INVENTORY NO. 10-1732T2

26-SEP-2017 13:46
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sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 6.2

ECONOLITE ASC/3-2070 LOAD SWITCH ASSIGNMENT DETAIL

(program controller as shown)

To assign load switch S10 as OLE, program LD SWITCH 7 as OVLP '5' TYPE 'O' as shown below. To change load switch S11 back to a vehicle load switch, program LD SWITCH 8 as PHASE '8' TYPE 'V' as shown below.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [3. LOAD SW ASSIGN]

LD SWITCH ASSIGN

	PHASE /OVLP	TYPE	DIMMING R	Y	G	D	---FLASH--- PWR	AUT	TGR
1	1	V	.	.	.	+	A	R	X
2	2	V	.	.	.	+	A	Y	.
3	3	V	.	.	.	+	A	R	X
4	4	V	.	.	.	+	A	R	.
5	5	V	.	.	.	−	A	R	.
6	6	V	.	.	.	−	A	Y	X
➡ 7	5	O	.	.	.	−	A	R	.
➡ 8	8	V	.	.	.	−	A	R	X
9	1	O	.	.	.	+	A	R	X
10	2	O	.	.	.	+	A	R	X
11	3	O	.	.	.	−	A	R	.
12	4	O	.	.	.	−	A	R	.
13	2	P	.	.	.	+	A	.	.
14	4	P	.	.	.	−	A	.	.
15	6	P	.	.	.	+	A	.	.
16	8	P	.	.	.	−	A	.	.

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [2. VEHICLE OVERLAPS]

Toggle Four Times

OVERLAP E

Select TMG VEH OVLP [E] and 'NORMAL'

```
TMG VEH OVLP...[E] TYPE: .......[NORMAL]
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . X X . . . . . . . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1732T2
DESIGNED: July 2017
SEALED: 9/25/2017
REVISED: N/A

Electrical Detail - Temp Design 2 - Phase II - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2894 (Concord Mills Blvd.)
at
Shopping Center Entrance

Division 10 Cabarrus County Concord

PLAN DATE: September 2017	REVIEWED BY:
PREPARED BY: S. Armstrong	REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

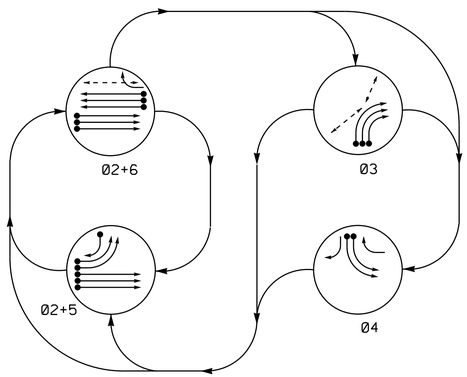
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036880 ENGINEER KEITH M. MIMS

DocuSigned by: Keith M. Mims 2F80786E8CD34A5... 9/26/2017 DATE

SIG. INVENTORY NO. 10-1732T2

PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 7.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

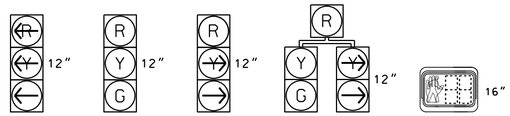
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø3	Ø4	FLASH
21, 22, 23	G	G	R	R	Y
31,32,33,34	R	R	→	R	R
41, 42	R	R	R	←	R
43	→	R	R	→	R
51, 52	←	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	R	Y
63	R	G	R	R/	Y
P31, P32	DW	DW	W	DW	DRK
P33, P34	DW	DW	W	DW	DRK
P61, P62	DW	W	DW	DW	DRK

SIGNAL FACE I.D.

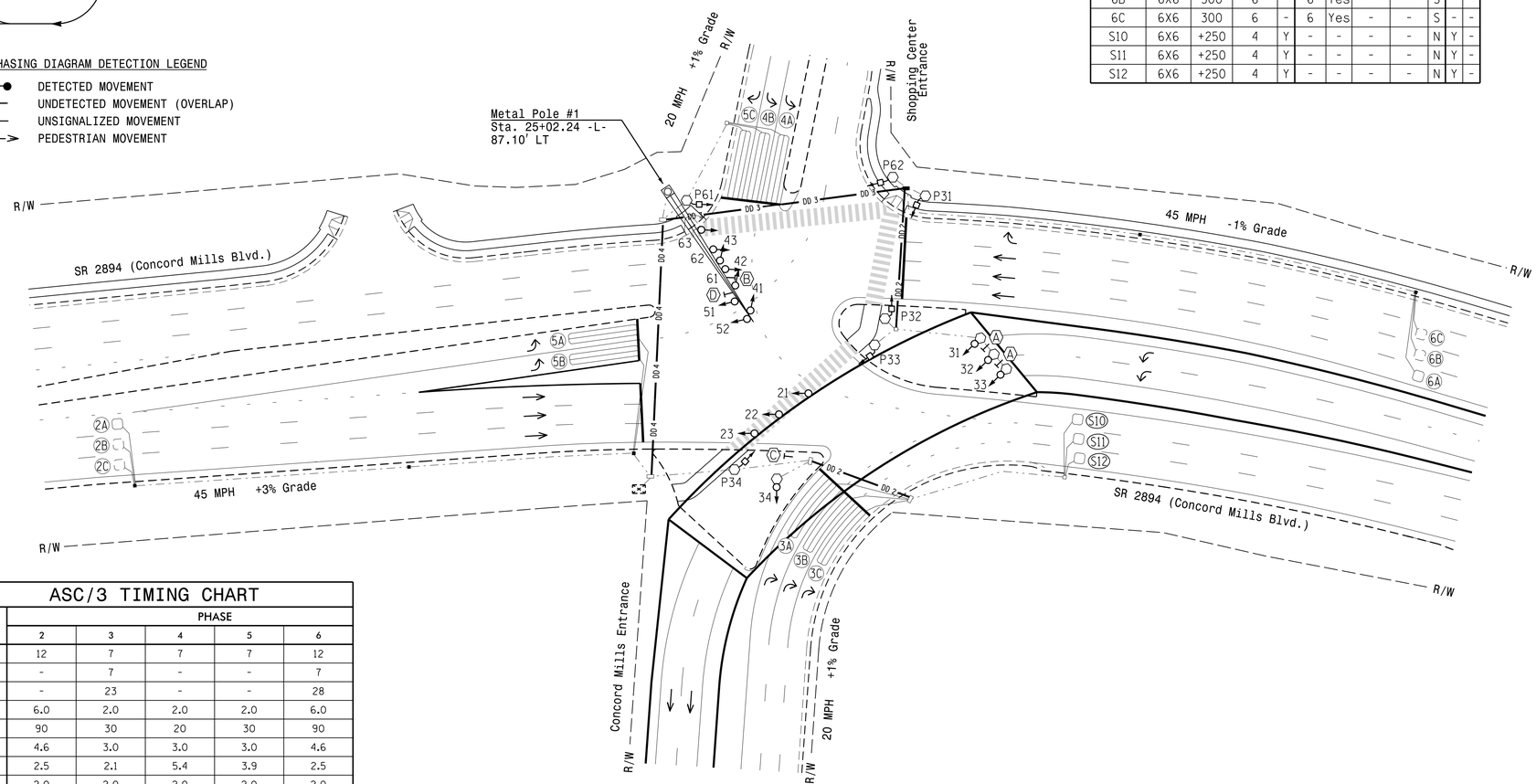
All Heads L.E.D.



41, 42 51, 52 | 21, 22, 23 61, 62 | 31, 32, 33, 34 43 | 63 | P31, P32 P33, P34 P61, P62

ASC/3 DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	4	Y	2	Yes	-	-	S	-	-
2B	6X6	300	4	-	2	Yes	-	-	S	-	-
2C	6X6	300	4	-	2	Yes	-	-	S	-	-
3A	6X40	0	2-4-2	Y	3	Yes	-	-	S	-	-
3B	6X40	0	2-4-2	Y	3	Yes	-	-	S	-	-
3C	6X40	0	2-4-2	Y	3	Yes	-	-	S	-	-
4A	6X40	0	2-4-2	Y	4	Yes	-	-	S	-	-
4B	6X40	0	2-4-2	Y	4	Yes	-	-	S	-	-
5A	6X40	0	2-4-2	Y	5	Yes	-	-	S	-	-
5B	6X40	0	2-4-2	Y	5	Yes	-	-	S	-	-
5C	6X40	0	2-4-2	Y	5	Yes	-	15	S	-	-
6A	6X6	300	6	Y	6	Yes	-	-	S	-	-
6B	6X6	300	6	-	6	Yes	-	-	S	-	-
6C	6X6	300	6	-	6	Yes	-	-	S	-	-
S10	6X6	+250	4	Y	-	-	-	-	N	Y	-
S11	6X6	+250	4	Y	-	-	-	-	N	Y	-
S12	6X6	+250	4	Y	-	-	-	-	N	Y	-



ASC/3 TIMING CHART

FEATURE	PHASE 2	3	4	5	6
Min Green *	12	7	7	7	12
Walk *	-	7	-	-	7
Ped Clear	-	23	-	-	28
Veh. Extension *	6.0	2.0	2.0	2.0	6.0
Max 1 *	90	30	20	30	90
Yellow	4.6	3.0	3.0	3.0	4.6
Red Clear	2.5	2.1	5.4	3.9	2.5
Red Revert	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-
Seconds /Actuation *	1.5	-	-	-	1.5
Max Initial *	34	-	-	-	34
Time Before Reduction *	15	-	-	-	15
Time To Reduce *	45	-	-	-	45
Minimum Gap	3.0	-	-	-	3.0
Locking Detector	X	-	-	-	X
Recall Position	VEH. RECALL	-	-	-	VEH. RECALL
Dual Entry	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X

* 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.

4 Phase
Fully Actuated
Concord Mills Blvd. CLS

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 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Signal heads 21, 22, and 23 shall be attached to the bridge flyover as shown.
6. Set all detector units to presence mode.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pedestrian pedestals are conceptual and shown for reference only. See sheets P1-P3 for pushbutton location details.
10. See Pavement Marking Plans for stop bar and crosswalk locations.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. Closed loop system data: Controller Asset #: 1732

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	----
DD	Directional Drill	N/A
N/A	Right of Way	----
→	Directional Arrow	→
○	Metal Pole with Mastarm	○
⬡	Type II Signal Pedestal	●
Ⓐ	"NO TURN ON RED" Sign (R10-11)	Ⓐ
Ⓑ	No Left Turn Sign (R3-2)	Ⓑ
Ⓒ	No Right Turn Sign (R3-1)	Ⓒ
Ⓓ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓓ

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared In the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 2894 (Concord Mills Blvd.)
at
Concord Mills Exit/
Shopping Center Entrance

Division 10 Cabarrus County Concord

PLAN DATE: July 2017 REVIEWED BY: T.J. Williams
PREPARED BY: R.N. Zinser REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R.N. Zinser 9/25/2017
F1388973472248F DATE

SIG. INVENTORY NO. 10-1732

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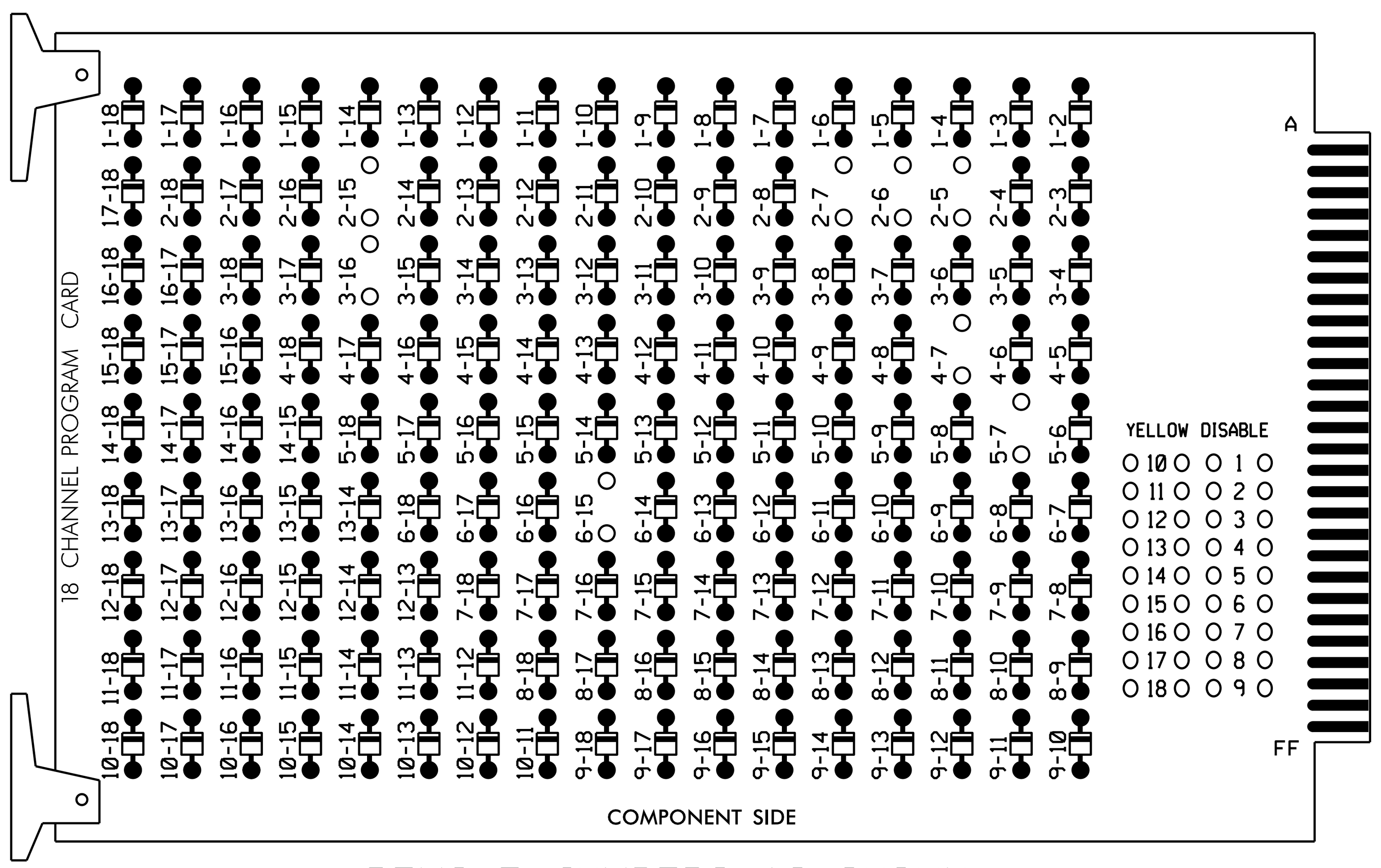
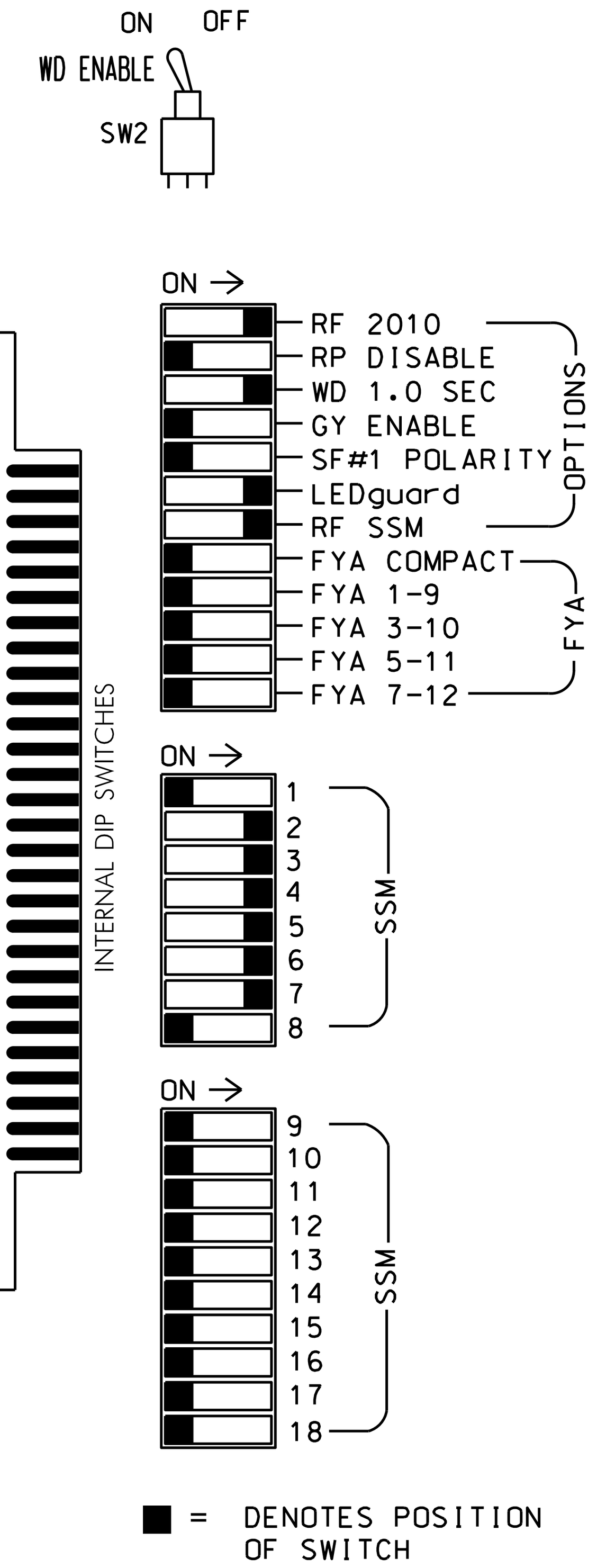
EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-7, 2-15, 3-16, 4-7, 5-7, 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. Integrate monitor with Ethernet network in cabinet.

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. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for volume density operation.
4. Program controller to start up in phase 2 Green and 6 Walk.
5. The cabinet and controller are part of the Concord Mills Blvd. CLS.

EQUIPMENT INFORMATION

CONTROLLER..............2070E
CABINET.................332
SOFTWARE................ECONOLITE ASC/3-2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S2,S4,S5,S7,S8,S9,S10,S12
PHASES USED.............2,3,3PED,4,5,6,6PED
OVERLAP E...............4+5

* Phase used for timing purposes only.

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 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	OLE	8	3 PED
SIGNAL HEAD NO.	NU	21,22 23	NU	31,32 33,34	41,42	63	NU	51,52	61,62 63	P61, P62	43	NU	P31,P32 P33,P34
RED		128		116					134		122		
YELLOW		129							135				
GREEN		130							136				
RED ARROW					101			131					
YELLOW ARROW				117	102	102		132			123		
GREEN ARROW				118	103	103		133			124		
(Don't Walk hand)										119			110
(Walk person)										121			112

NU = Not Used

NOTE: The outputs for load switches S10 and S12 have been reassigned. See sheet 2 for details.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø 2 2A	Ø 2 2C	SLOT EMPTY	Ø 3 3A	Ø 3 3B	Ø 4 4A	SLOT EMPTY	SYS. DET. S10	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L		Ø 2 2B	NOT USED		NOT USED	Ø 3 3C	Ø 4 4B		SYS. DET. S11				Ø3 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 5 5B	Ø 6 6A	Ø 6 6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S12	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø 5 5C	Ø 6 6B	NOT USED					NOT USED					

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES			S
2B	TB2-7,8	I2L	43	12	2	YES			S
2C	TB2-9,10	I3U	63	32	2	YES			S
3A	TB4-5,6	I5U	58	3	3	YES			S
3B	TB4-9,10	I6U	41	4	3	YES			S
3C	TB4-11,12	I6L	45	14	3	YES			S
4A	TB6-1,2	I7U	65	34	4	YES			S
4B	TB6-3,4	I7L	78	44	4	YES			S
5A	TB3-1,2	J1U	55	5	5	YES			S
5B	TB3-5,6	J2U	40	6	5	YES			S
5C	TB3-7,8	J2L	44	16	5	YES		15	S
6A	TB3-9,10	J3U	64	36	6	YES			S
6B	TB3-11,12	J3L	77	46	6	YES			S
6C	TB5-1,2	J4U	48	26	6	YES			S
* S10	TB6-9,10	I9U	60	11	SYS	NO			N
* S11	TB6-11,12	I9L	62	13	SYS	NO			N
* S12	TB7-9,10	J9U	59	15	SYS	NO			N
PED PUSH BUTTONS									
P31,P32 P33,P34	TB8-8,9	I13L	70	PED 8	3 PED				
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED				

NOTE:
INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

* System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

ECONOLITE ASC/3-2070 VEHICLE OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [2. VEHICLE OVERLAPS]

Toggle Four Times

OVERLAP E

Select TMG VEH OVLP [E] and 'NORMAL'

```
TMG VEH OVLP...[E] TYPE: .......NORMAL
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . X X . . . . . . . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1732
DESIGNED: July 2017
SEALED: 9/25/2017
REVISED: N/A

Electrical Detail - Final Design - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2894 (Concord Mills Blvd.) at Concord Mills Exit/ Shopping Center Entrance

Division 10 | Cabarrus County | Concord

PLAN DATE: September 2017 | REVIEWED BY:
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS | INIT. | DATE

Prepared in the Offices of: ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

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SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036880 ENGINEER KEITH M. MIMS

DocuSigned by: Keith M. Mims 2F80786E8CD34A5... 9/26/2017 DATE

SIG. INVENTORY NO. 10-1732

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PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 7.2

ECONOLITE ASC/3-2070
LOAD SWITCH ASSIGNMENT DETAIL

(program controller as shown)

To assign load switch S10 as OLE, program LD SWITCH 7 as OVLP '5' TYPE 'O' as shown below. To assign load switch S12 as Ped load switch 3, program LD SWITCH 16 as PHASE '3' TYPE 'P' as shown below.

1. From Main Menu select **1. CONFIGURATION**
2. From CONFIGURATION Submenu select **3. LOAD SW ASSIGN**

LD SWITCH ASSIGN

	PHASE /OVLP	TYPE	DIMMING R	Y	G	D	FLASH PWR	AUT	TGR
1	1	V	.	.	.	+	A	R	X
2	2	V	.	.	.	+	A	Y	.
3	3	V	.	.	.	+	A	R	X
4	4	V	.	.	.	+	A	R	.
5	5	V	.	.	.	−	A	R	.
6	6	V	.	.	.	−	A	Y	X
→ 7	5	O	.	.	.	−	A	R	.
8	8	V	.	.	.	−	A	R	X
9	1	O	.	.	.	+	A	R	X
10	2	O	.	.	.	+	A	R	X
11	3	O	.	.	.	−	A	R	.
12	4	O	.	.	.	−	A	R	.
13	2	P	.	.	.	+	A	.	.
14	4	P	.	.	.	−	A	.	.
15	6	P	.	.	.	+	A	.	.
→ 16	3	P	.	.	.	−	A	.	.

ECONOLITE ASC/3-2070 PED DETECTOR PROGRAMMING ASSIGNMENT DETAIL

(program controller as shown)

For Ped Detector 8 to call Phase 3 Ped, program Ped Detector 8 as shown below.

1. From Main Menu select **6. DETECTORS**
2. From DETECTOR Submenu select **3. PED DETECTOR INPUT ASSIGNMENT**

PED DET PHASE ASSIGNMENT MODE: NTCIP

PHASE	1	2	3	4	5	6	7	8
DETECTOR	0	2	8	4	0	6	0	0

← NOTICE PED DETECTOR 8.

PHASE	9	10	11	12	13	14	15	16
DETECTOR	0	0	0	0	0	0	0	0

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1732
DESIGNED: July 2017
SEALED: 9/25/2017
REVISED: N/A

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2894 (Concord Mills Blvd.)
at
Concord Mills Exit/
Shopping Center Entrance

Division 10 Cabarrus County Concord

PLAN DATE: September 2017 REVIEWED BY:

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
NC DEPARTMENT OF TRANSPORTATION
Traffic Engineering & Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036880 ENGINEER KEITH M. MIMS

DocuSigned by: Keith M. Mims 9/26/2017 DATE
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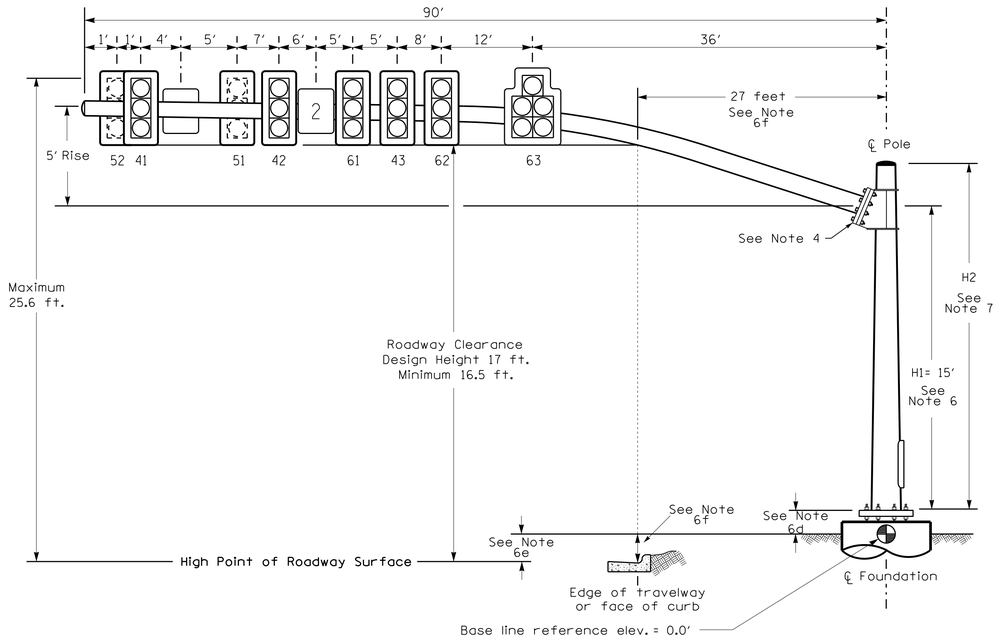
METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 8.0

Design Loading for METAL POLE NO. 1



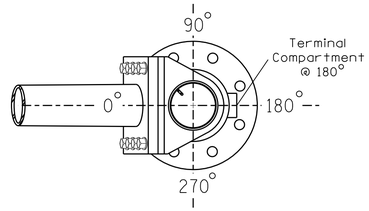
Elevation View

SPECIAL NOTE

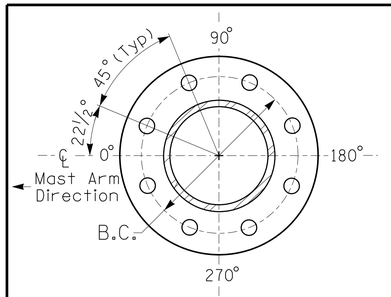
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+0.72 ft.	
Elevation difference at Edge of travelway or face of curb	+0.53 ft.	

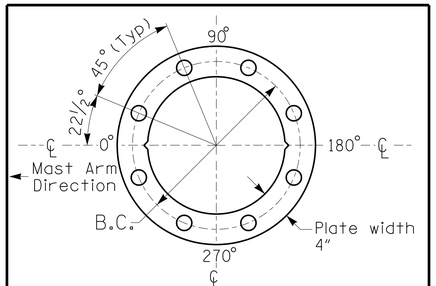


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 5



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

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5"W X 52.5"L	60 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0"W X 56.0"L	103 LBS
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0"W X 36.0"L	14 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 6th Edition 2013 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 the 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.
   - The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

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. 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.
5. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
6. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Nominal vertical rise in mast arm is 5 feet as measured from the centerline of the arm base to the centerline of the free end of the arm.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
   f. Provide horizontal distance from the proposed centerline of the foundation to the edge of travelway. Refer to the Elevation Data Chart for elevation difference between the proposed foundation ground level and the edge of travelway. This information is necessary to ensure that the roadway clearance is maintained at the edge of the travelway and to aid in the camber design of the arm.
7. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
8. 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 Signal Design Section Senior Structural Engineer for assistance at (919) 773-2800.
9. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
10. 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 in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 2894 (Concord Mills Blvd.)
at
Concord Mills Exit/
Shopping Center Entrance

Division 10 Cabarrus County Concord

PLAN DATE: July 2017 REVIEWED BY: T.J. Williams
PREPARED BY: R.N. Zinser REVIEWED BY:

SCALE: 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R.N. Zinser F130B0734722488F 9/25/2017 DATE

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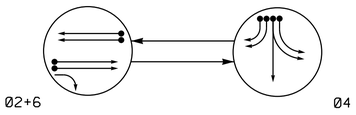
PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 9.0

PHASING DIAGRAM



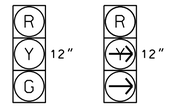
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION			
SIGNAL FACE	PHASE 02+6	PHASE 04	PHASE FLASH
21, 22	G	R	Y
41, 42	R	G	R
43, 44	R	→	R
61, 62	G	R	Y

SIGNAL FACE I.D.

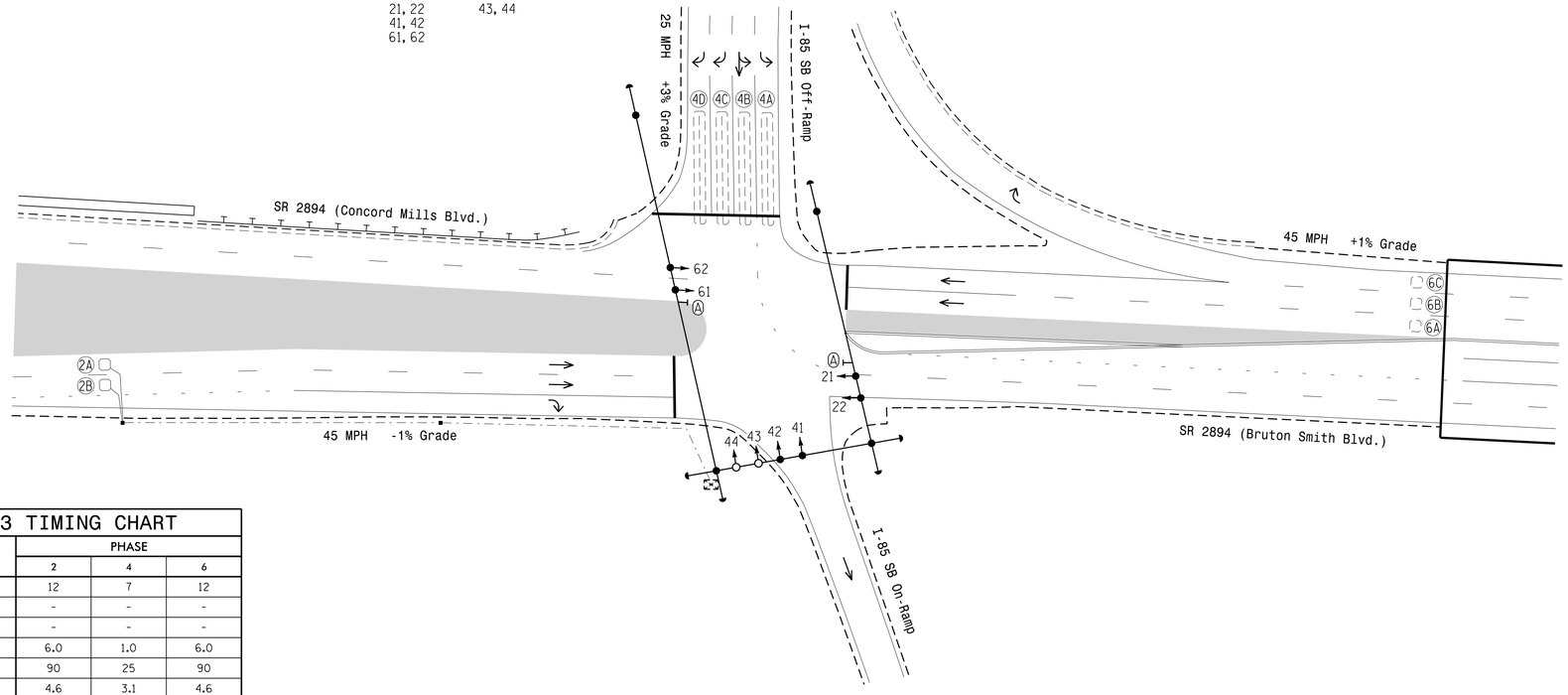
All Heads L.E.D.



21, 22
41, 42
61, 62

43, 44

ASC/3 DETECTOR INSTALLATION CHART											
DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	4	Y	2	Yes	-	-	S	-	-
2B	6X6	300	4	Y	2	Yes	-	-	S	-	-
4A	6X60	+5	2-4-2	-	4	Yes	-	-	S	-	-
4B	6X60	+5	2-4-2	-	4	Yes	-	-	S	-	-
4C	6X60	+5	2-4-2	-	4	Yes	-	15	S	-	-
4D	6X60	+5	2-4-2	-	4	Yes	-	15	S	-	-
6A	6X6	300	4	-	6	Yes	-	-	S	-	-
6B	6X6	300	4	-	6	Yes	-	-	S	-	-
6C	6X6	300	4	-	6	Yes	-	-	S	-	-



ASC/3 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green *	12	7	12
Walk *	-	-	-
Ped Clear	-	-	-
Veh. Extension *	6.0	1.0	6.0
Max 1 *	90	25	90
Yellow	4.6	3.1	4.6
Red Clear	1.7	3.1	1.7
Red Revert	2.0	2.0	2.0
Actuations B4 Add *	-	-	-
Seconds /Actuation *	1.5	-	1.5
Max Initial *	34	-	34
Time Before Reduction *	15	-	15
Time To Reduce *	45	-	45
Minimum Gap	3.0	-	3.0
Locking Detector	X	-	X
Recall Position	VEH. RECALL	-	VEH. RECALL
Dual Entry	-	-	-
Simultaneous Gap	X	X	X

* 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
Concord City Signal 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. Install new 2070E Controller in existing cabinet.
4. Reposition existing signal heads numbered 21, 22, 61, and 62.
5. Reposition existing signs "A".
6. Disconnect existing system detectors S12, S13, and S14.
7. Set all detector units to presence mode.
8. 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.
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 #: 1522

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	→
▒	Construction Zone	▒
Ⓐ	No Left Turn Sign (R3-2)	Ⓐ

Signal Upgrade - Temporary Design - Phase II

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared In the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 2894 (Concord Mills Blvd./ Bruton Smith Blvd.) at I-85 SB Ramps

Division 10 Cabarrus County Concord

PLAN DATE: August 2017 REVIEWED BY: T.J. Williams

PREPARED BY: R.N. Zinser REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R.N. Zinser F13B8973472249F 9/25/2017 DATE

SIG. INVENTORY NO. 10-1522 T

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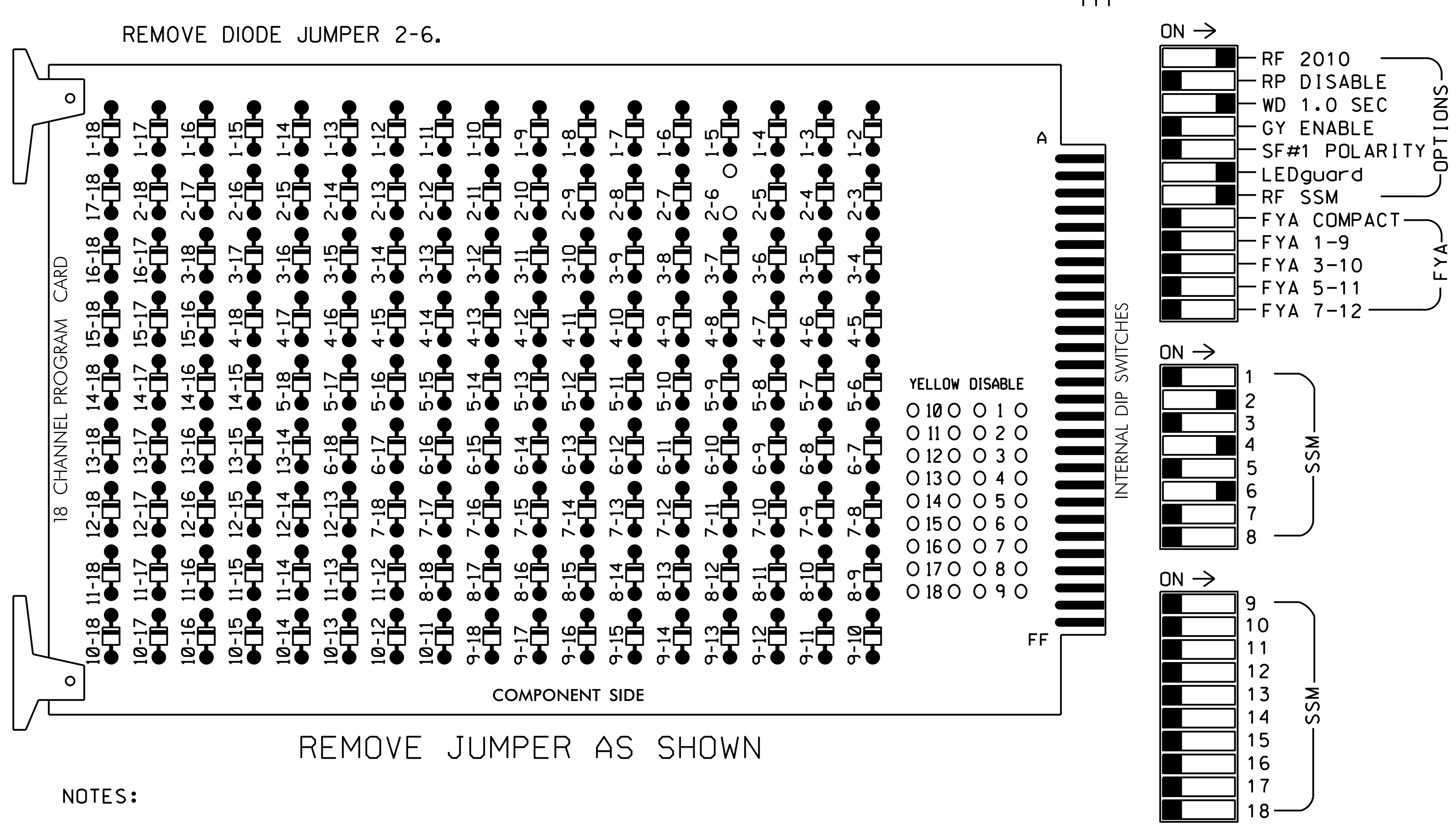
rnzinser

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)

ON OFF
WD ENABLE
SW2

REMOVE DIODE JUMPER 2-6.



REMOVE JUMPER 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. Integrate monitor with Ethernet network in cabinet.

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. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for volume density operation.
4. Program controller to start up in phase 2 Green and 6 Green.
5. The cabinet and controller are part of the Concord City Signal System.

EQUIPMENT INFORMATION

CONTROLLER..............2070E
CABINET.................332
SOFTWARE................ECONOLITE ASC/3-2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S2,S5,S8
PHASES USED.............2,4,6
OVERLAPS................NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	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	43,44	NU	NU	61,62	NU	NU	NU	NU
RED		128			101	101			134				
YELLOW		129			102				135				
GREEN		130			103				136				
RED ARROW													
YELLOW ARROW						102							
GREEN ARROW						103							

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø 2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 4 4A	Ø 4 4C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		Ø 2 2B				Ø 4 4B	Ø 4 4D							ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 6 6A	Ø 6 6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø 6 6B	NOT USED											

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES			S
2B	TB2-7,8	I2L	43	12	2	YES			S
4A	TB4-9,10	I6U	41	4	4	YES			S
4B	TB4-11,12	I6L	45	14	4	YES			S
4C	TB6-1,2	I7U	65	34	4	YES		15	S
4D	TB6-3,4	I7L	78	44	4	YES		15	S
6A	TB3-5,6	J2U	40	6	6	YES			S
6B	TB3-7,8	J2L	44	16	6	YES			S
6C	TB3-9,10	J3U	64	36	6	YES			S

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1522T
DESIGNED: August 2017
SEALED: 9/25/2017
REVISED: N/A

Electrical Detail - Temporary Design - Phase II

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2894 (Concord Mills Blvd./ Bruton Smith Blvd.) at I-85 SB Ramps

Division 10 | Cabarrus County | Concord

PLAN DATE: September 2017 | REVIEWED BY:
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared In the Offices of: ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030530 ZACHARY M. LITTLE

DocuSigned by: Zachary M. Little 9/26/2017
0C21EFD94F5341F...
DATE

SIG. INVENTORY NO. 10-1522T

26-SEP-2017 13:35
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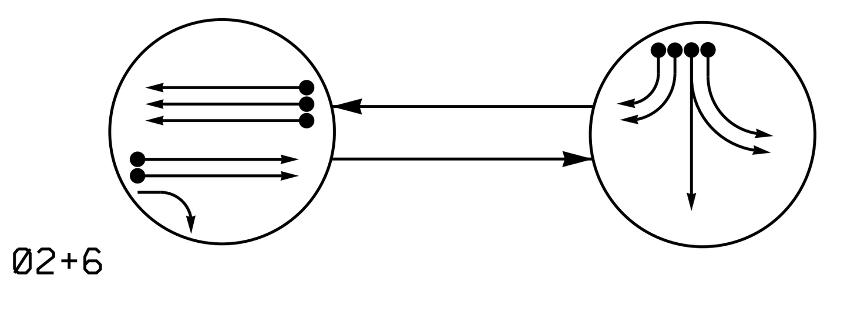
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
U-5806	Sig. 10.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

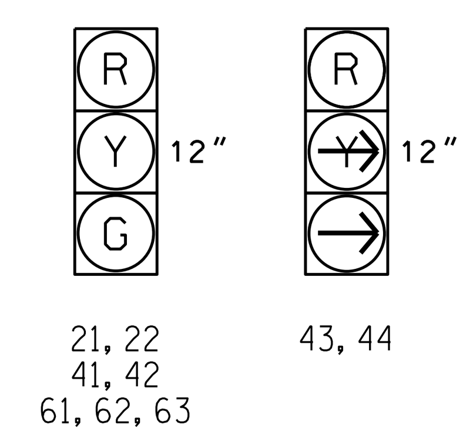
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4	PHASE FLASH
21, 22	G	R	Y
41, 42	R	G	R
43, 44	R	→	R
61, 62, 63	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



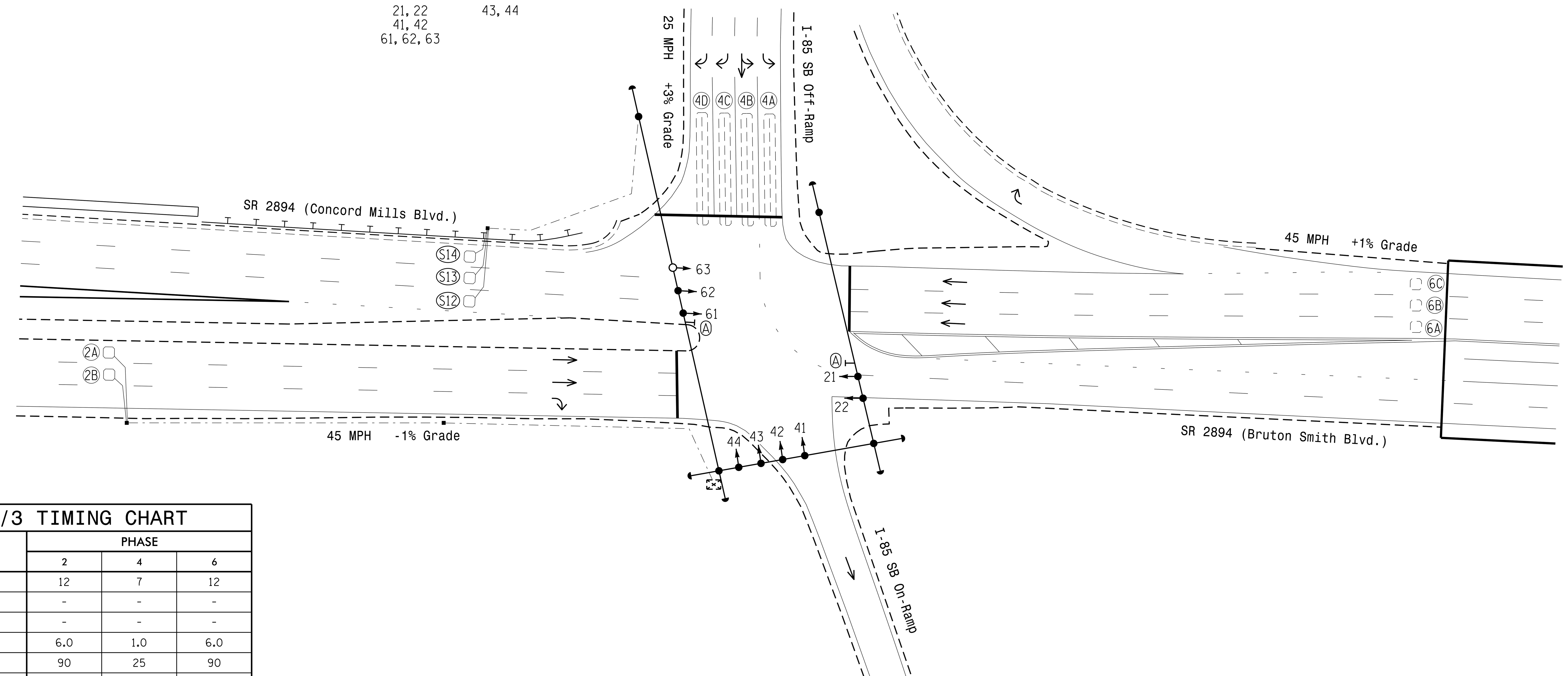
ASC/3 DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	4	Y	2	Yes	-	-	S	-	-
2B	6X6	300	4	Y	2	Yes	-	-	S	-	-
4A	6X60	+5	2-4-2	-	4	Yes	-	-	S	-	-
4B	6X60	+5	2-4-2	-	4	Yes	-	-	S	-	-
4C	6X60	+5	2-4-2	-	4	Yes	-	15	S	-	-
4D	6X60	+5	2-4-2	-	4	Yes	-	15	S	-	-
6A	6X6	300	4	-	6	Yes	-	-	S	-	-
6B	6X6	300	4	-	6	Yes	-	-	S	-	-
6C	6X6	300	4	-	6	Yes	-	-	S	-	-
S12	6X6	+200	4	Y	-	-	-	-	N	Y	-
S13	6X6	+200	4	Y	-	-	-	-	N	Y	-
S14	6X6	+200	4	Y	-	-	-	-	N	Y	-

2 Phase
Fully Actuated
Concord City Signal 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. Reposition existing signal heads numbered 61 and 62.
4. Reposition existing signs "A".
5. Set all detector units to presence mode.
6. 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.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Closed loop system data: Controller Asset #: 1522



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	No Left Turn Sign (R3-2)	A

ASC/3 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green *	12	7	12
Walk *	-	-	-
Ped Clear	-	-	-
Veh. Extension *	6.0	1.0	6.0
Max 1 *	90	25	90
Yellow	4.6	3.1	4.6
Red Clear	1.7	3.1	1.7
Red Revert	2.0	2.0	2.0
Actuations B4 Add *	-	-	-
Seconds /Actuation *	1.5	-	1.5
Max Initial *	34	-	34
Time Before Reduction *	15	-	15
Time To Reduce *	45	-	45
Minimum Gap	3.0	-	3.0
Locking Detector	X	-	X
Recall Position	VEH. RECALL	-	VEH. RECALL
Dual Entry	-	-	-
Simultaneous Gap	X	X	X

* 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.

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rnzinser

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of: Transportation Mobility and Safety Division, Signal Design Section, Department of Transportation, State of North Carolina
750 N.Greenfield Pkwy.Garner.NC 27529

SR 2894 (Concord Mills Blvd./ Bruton Smith Blvd.) at I-85 SB Ramps

Division 10 Cabarrus County Concord

PLAN DATE: August 2017	REVIEWED BY: T.J. Williams
PREPARED BY: R.N. Zinser	REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

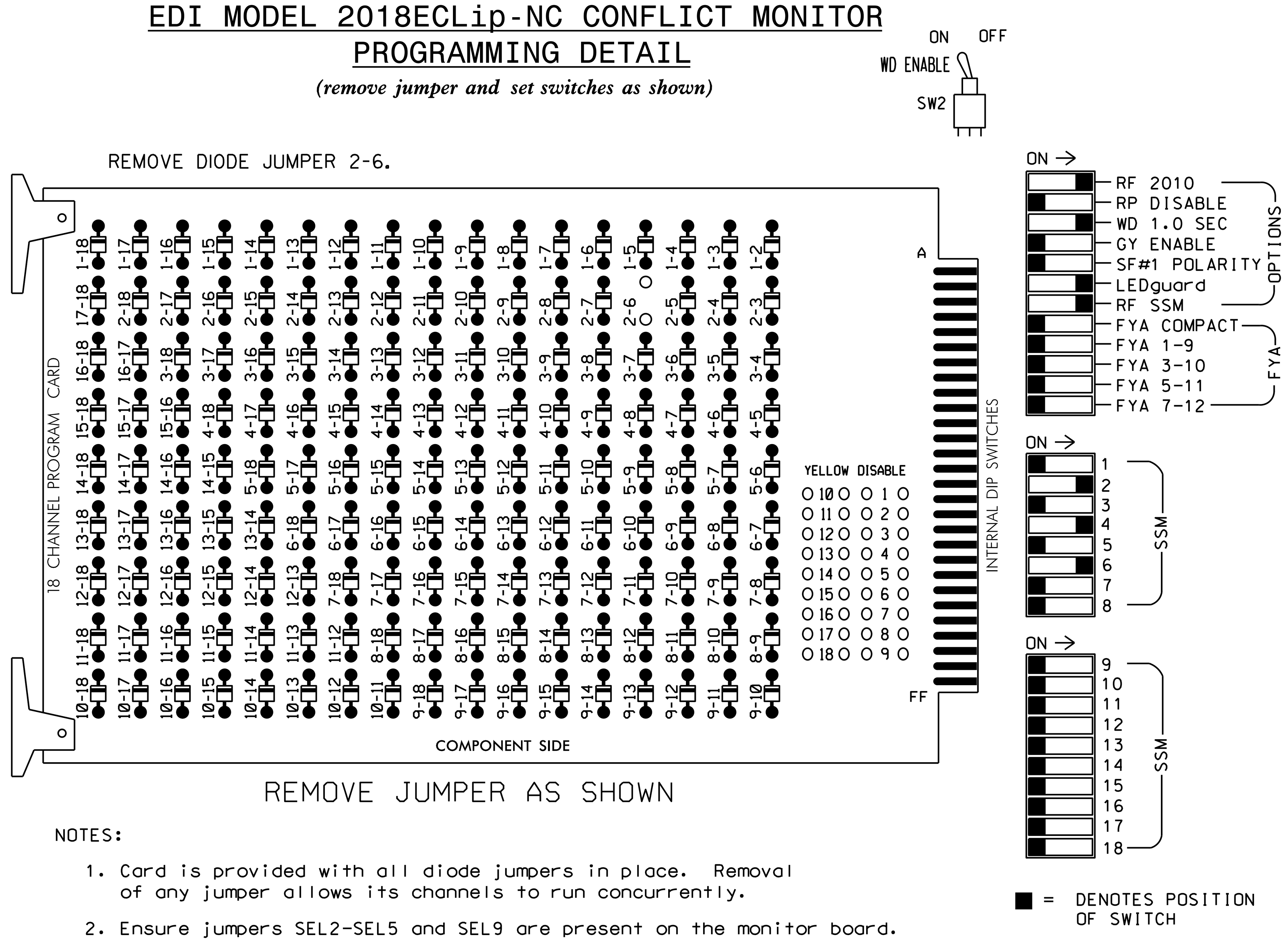
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R.N. Zinser F13889734722248F... 9/25/2017
DATE

SIG. INVENTORY NO. 10-1522

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPER 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. Integrate monitor with Ethernet network in cabinet.

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. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for volume density operation.
4. Program controller to start up in phase 2 Green and 6 Green.
5. The cabinet and controller are part of the Concord City Signal 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	43,44	NU	NU	61,62 63	NU	NU	NU	NU
RED		128			101	101			134				
YELLOW		129			102				135				
GREEN		130			103				136				
RED ARROW													
YELLOW ARROW						102							
GREEN ARROW						103							

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER..............2070E
CABINET.................332
SOFTWARE................ECONOLITE ASC/3-2070
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)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	SLOT	ø2 2A	SLOT	SLOT	SLOT	ø4 4A	ø4 4C	SLOT	SYS. DET. S12	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
"I"	L	EMPTY	ø2 2B	EMPTY	EMPTY	EMPTY	ø4 4B	ø4 4D	EMPTY	SYS. DET. S13	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
"J"	U	SLOT	ø6 6A	ø6 6C	SLOT	SLOT	SLOT	SLOT	SLOT	SYS. DET. S14	SLOT	SLOT	SLOT	SLOT	SLOT
"J"	L	EMPTY	ø6 6B	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES			S
2B	TB2-7,8	I2L	43	12	2	YES			S
4A	TB4-9,10	I6U	41	4	4	YES			S
4B	TB4-11,12	I6L	45	14	4	YES			S
4C	TB6-1,2	I7U	65	34	4	YES		15	S
4D	TB6-3,4	I7L	78	44	4	YES		15	S
6A	TB3-5,6	J2U	40	6	6	YES			S
6B	TB3-7,8	J2L	44	16	6	YES			S
6C	TB3-9,10	J3U	64	36	6	YES			S
* S12	TB6-9,10	I9U	60	11	SYS	NO			N
* S13	TB6-11,12	I9L	62	13	SYS	NO			N
* S14	TB7-9,10	J9U	59	15	SYS	NO			N

* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1522
DESIGNED: August 2017
SEALED: 9/25/2017
REVISED: N/A

Electrical Detail - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 2894 (Concord Mills Blvd./ Bruton Smith Blvd.) at I-85 SB Ramps

Division 10 Cabarrus County Concord

PLAN DATE: September 2017 REVIEWED BY:
PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE

DocuSigned by: Zachary M. Little 9/26/2017
DATE

SIG. INVENTORY NO. 10-1522

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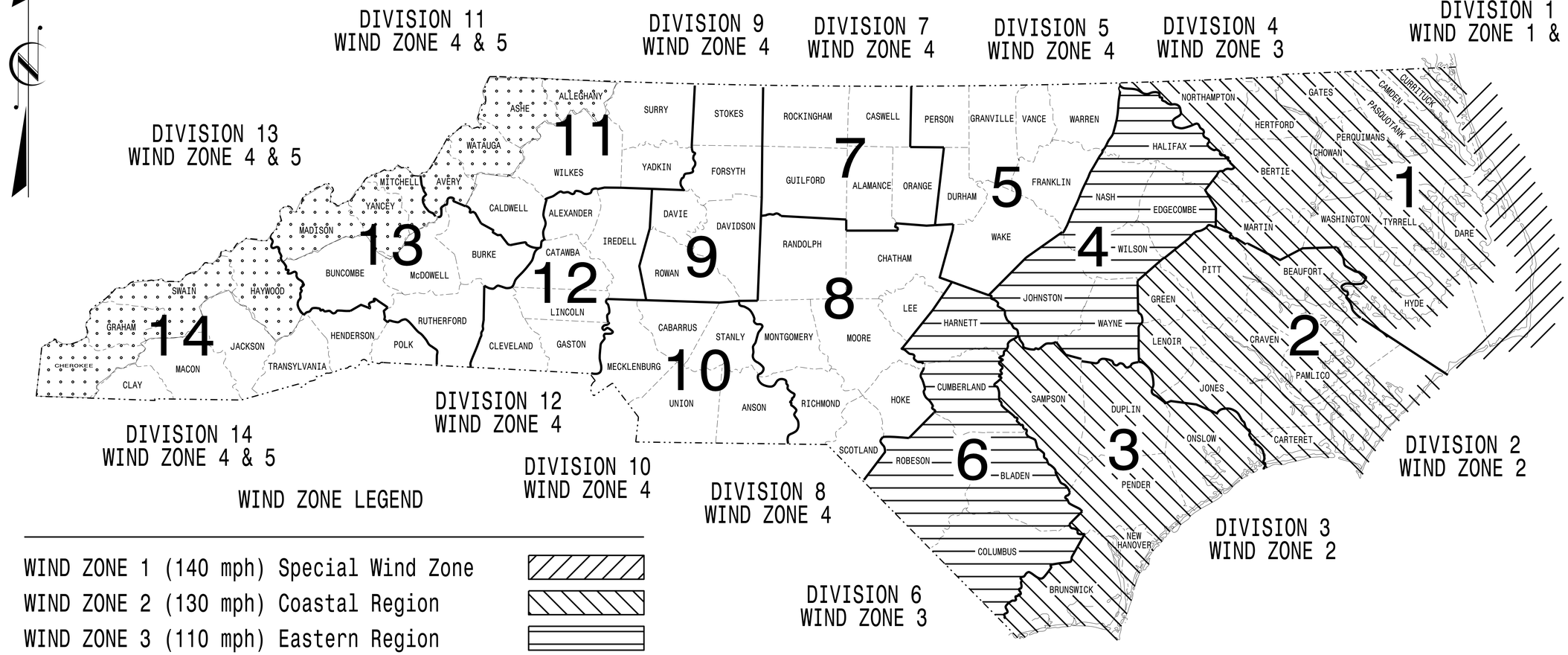
sarmstrong

NCDOT METAL POLE STANDARDS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT I.D. NO.	SHEET NO.
U-5806	Sig.M1

STANDARD DRAWINGS FOR ALL 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	

https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

Prepared In the Offices of:

Transportation Mobility and Safety Division
Signal Design Section
STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

750 N.Greenfield Pkwy.
Garner,NC 27529

Designed in conformance with the latest 2015 Interim to the 6th Edition 2013

AASHTO

Standard Specifications for Structural Supports for Highway Signs, Luminaires, 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 – ITS AND SIGNALS JOURNEY STRUCTURAL ENGINEER

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

DocuSigned by: Debesh C. Sarkar
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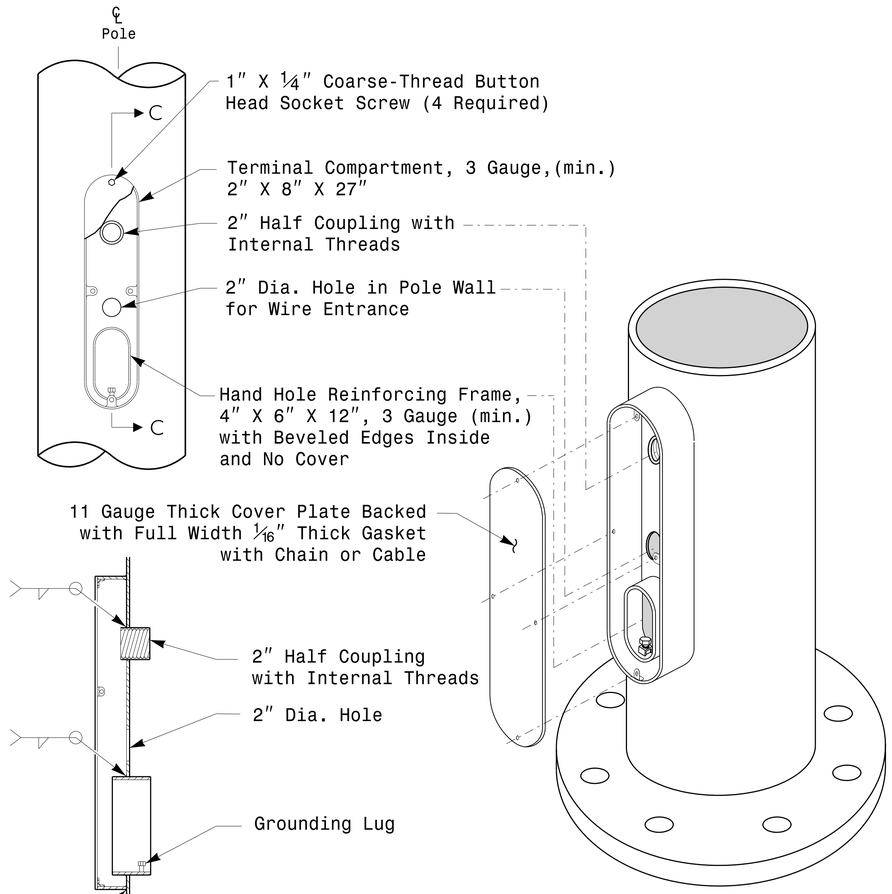
SIGNATURE

2/17/2016
DATE



Section C-C

Note: Unless otherwise specified, locate Terminal Compartment 1 foot above the pole base plate at 180 degrees on the pole's radial index.

Terminal Compartment Detail

MFG _____	MFG. DATE: MM/YY
SHAFT D/T/L/Y	----/----/----/----
ARM-A D/T/L/Y	----/----/----/----
	----/----/----/----
ARM-B D/T/L/Y	----/----/----/----
	----/----/----/----
A.B. DIA./B.C./L/Y	----/----/----/----
NCDOT SIG. INV. NO.	_____
NCDOT POLE NO.	_____

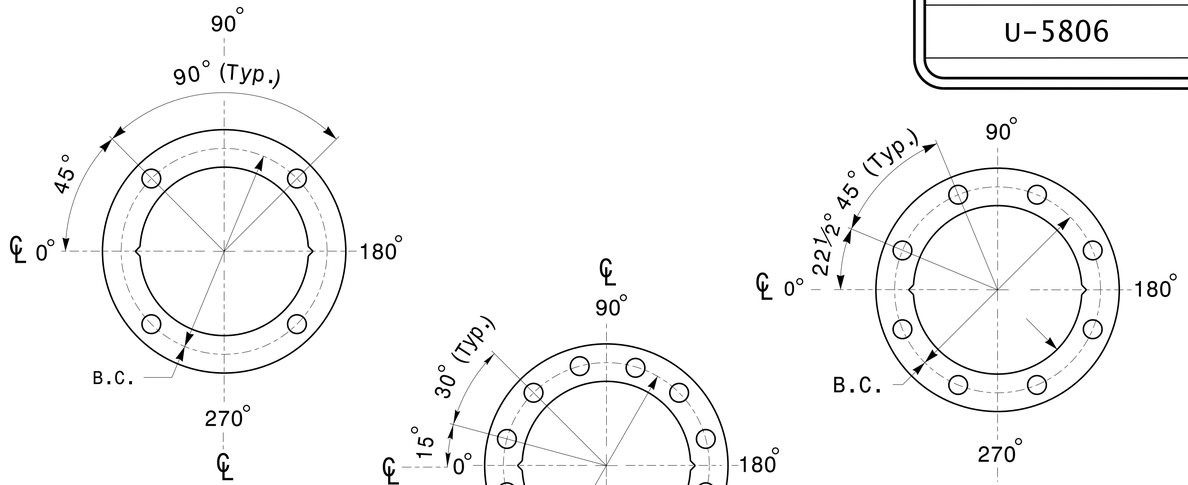
Shaft I.D. Tag
(Provide on Shaft of Strain Poles and Mast Arm Poles Shaft)

MFG _____	MFG. DATE: MM/YY
SECTION D/T/L/Y	----/----/----/----
NCDOT SIG. INV. NO.	_____
NCDOT POLE NO.	_____

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

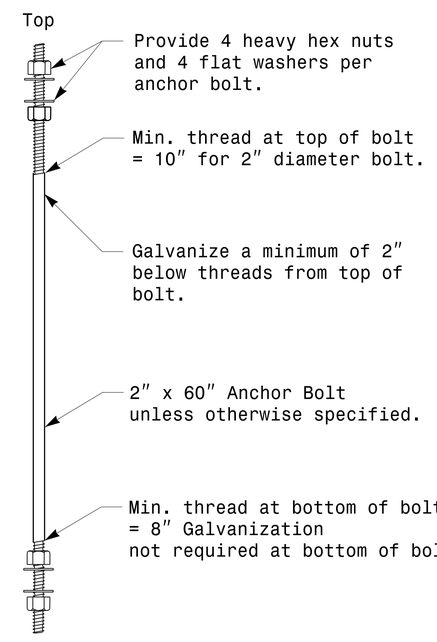
Notes:
1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
2) A.B. = Anchor Bolt
3) B.C. = Bolt Circle of Anchor Bolts
4) If Custom Design, use "NCDOT STANDARD" line for Signal Inv. Number and pole I.D. number
5) See drawing M3 and M4 for mounting positions of I.D. tags.

Identification Tag Details

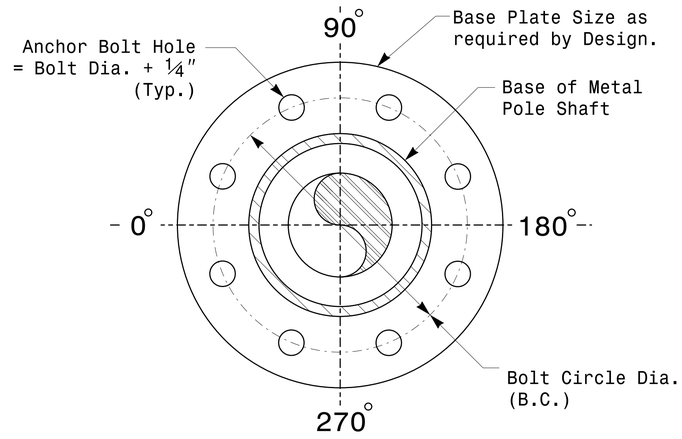


Construct Templates and Plates from ¼" min. thick Steel. Galvanizing is not required.

Base Plate Template and Anchor Bolt Lock Plate Details



Anchor Bolt Detail



Note: Base plate may be circular,octagonal,square or rectangular in shape.

Typical Base Plate Detail

Fabrication Details – All Metal Poles

PROJECT ID. NO.	SHEET NO.
U-5806	Sig.M2

Prepared in 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 NA — NONE

Typical Fabrication Details For All Metal Poles

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	C.F.ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

DocuSigned by: Debesh C. Sarkar
SIGNATURE 44E8E32E147E4C4...

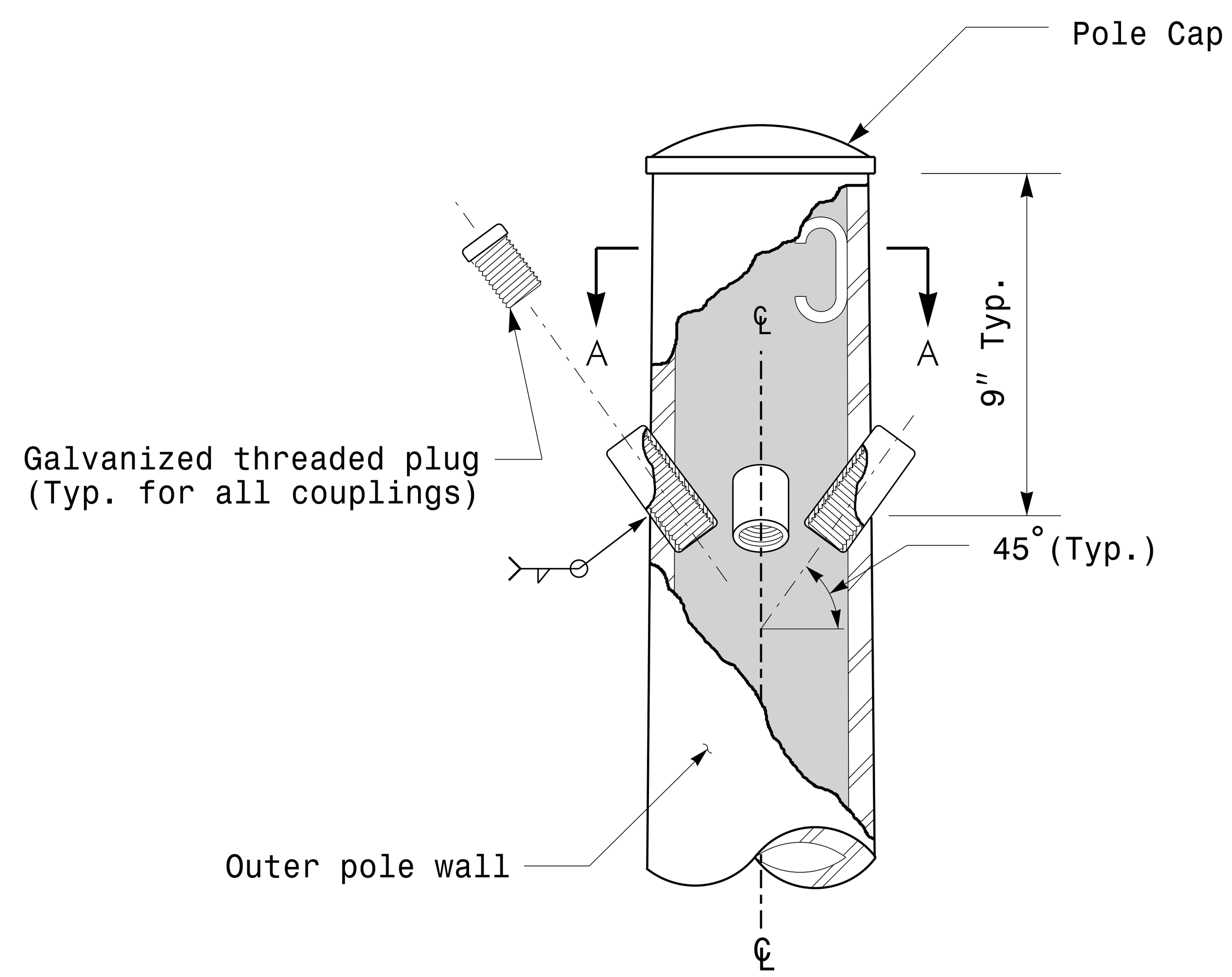
2/17/2016
DATE

17-FEB-2016 16:02
S:\MITS&SW\ITS Signals\Signal Design Section\Eastern Region\MM Sheets\2016\2014 Sig.M2 Std. Fabrication Details-All Poles..dgn
jgallaway

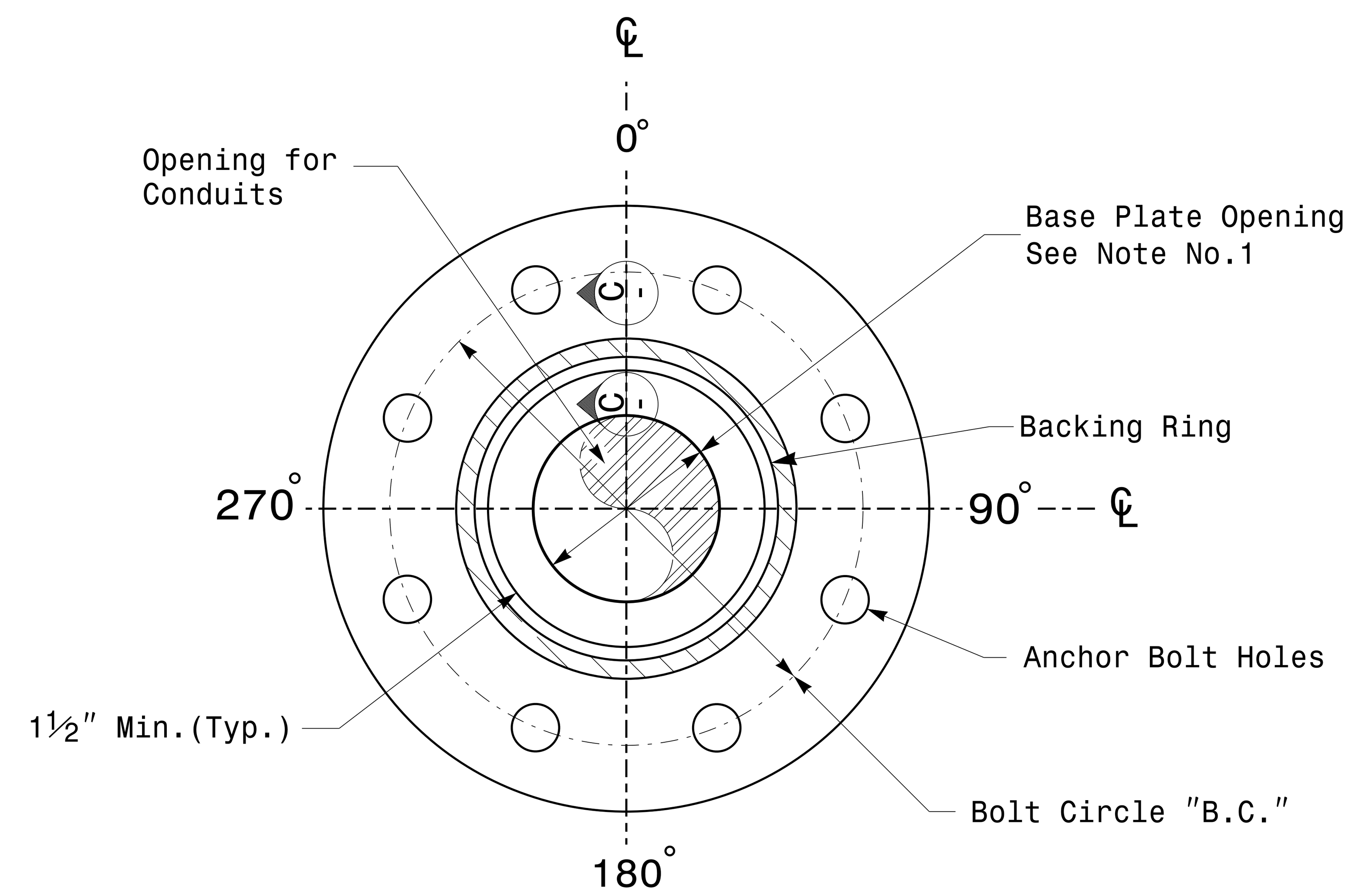
PROJECT ID. NO.	SHEET NO.
U-5806	Sig.M3

Fabrication Details – Strain Poles

Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3½″ but shall not be less than 8½″.

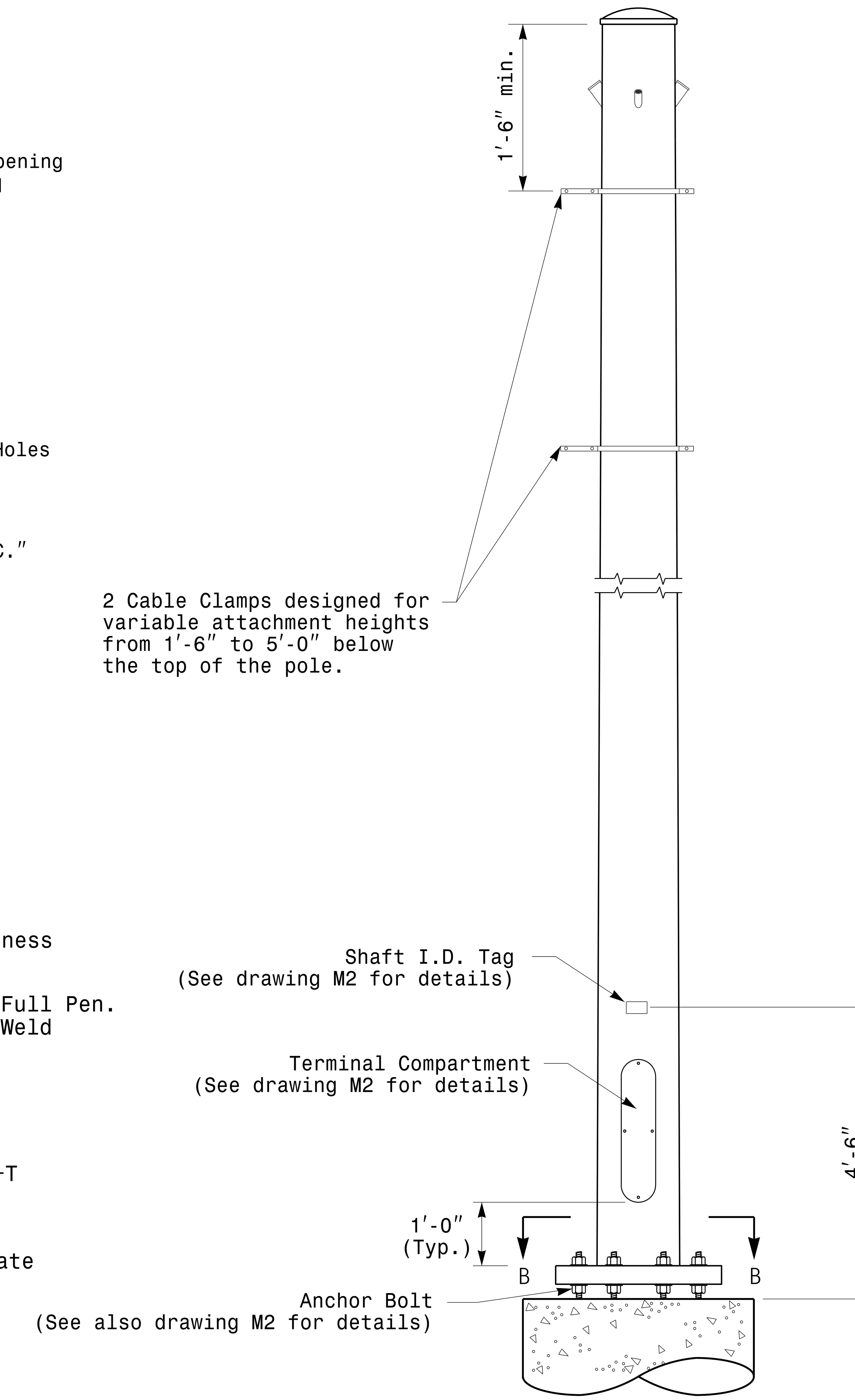


Cable Entrances at Top of Pole

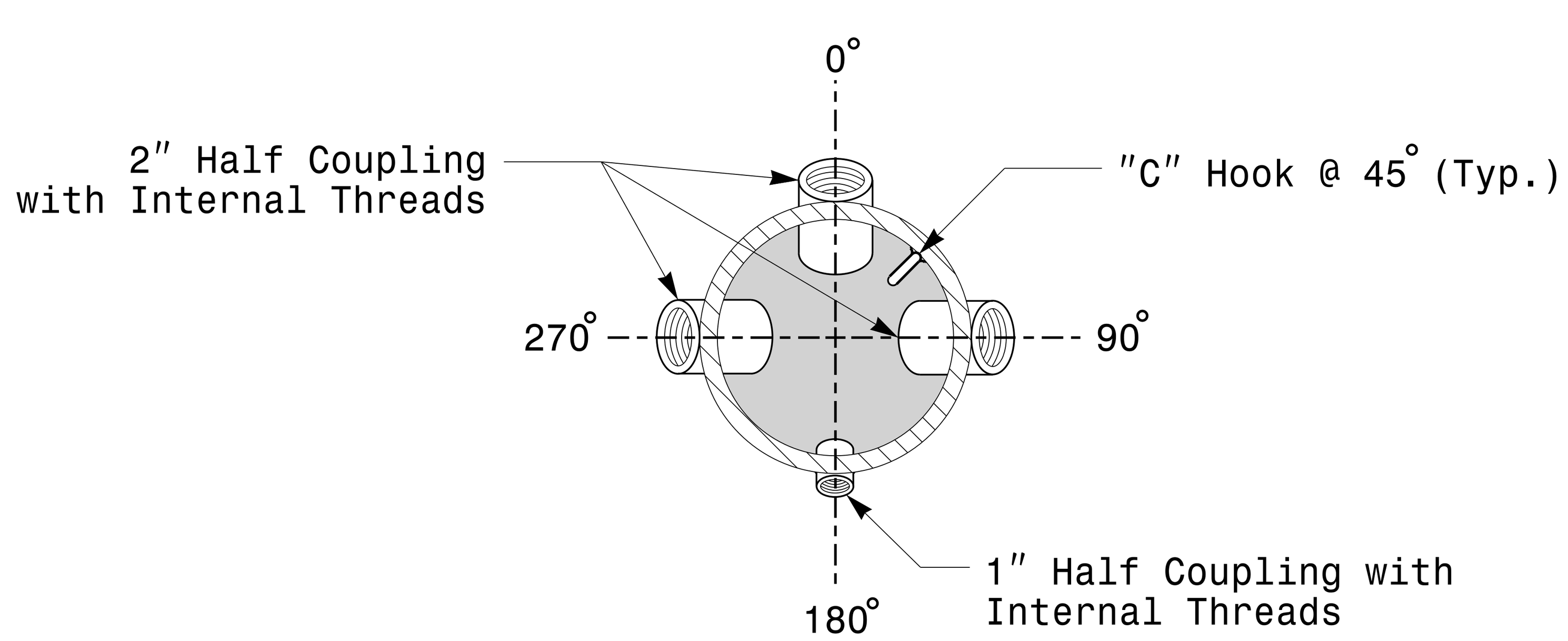


Section B-B

Pole Base Plate Details
(8 and 12 Bolt Pattern)

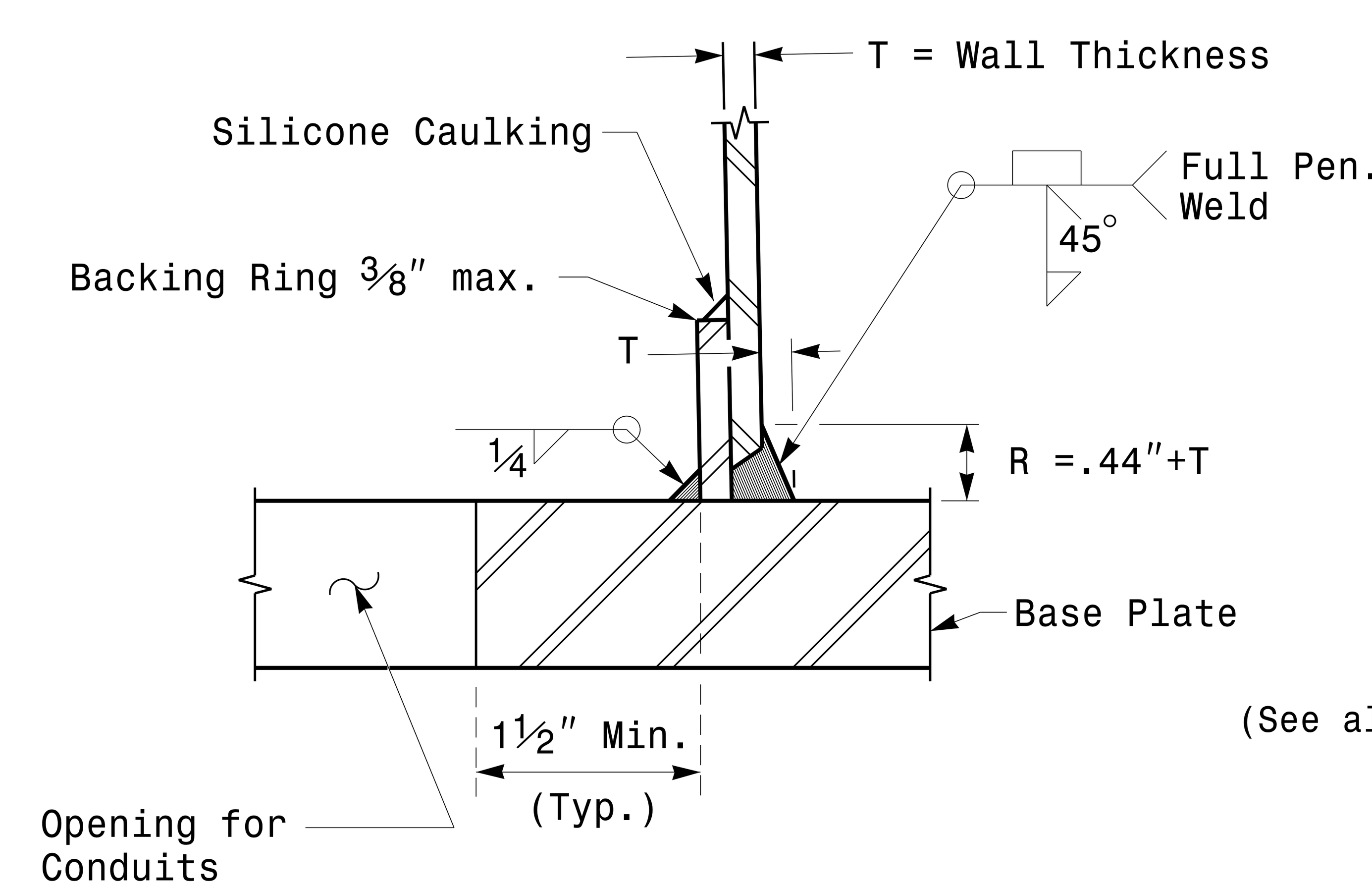


Monotube Strain Pole



Section A-A

Radial Orientation for Factory Installed
Accessories at Top of Pole



Section C-C

(Pole Attachment to Base Plate)

Full-Penetration
Groove Weld Detail

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SCALE
0 NA
NONE

Typical Fabrication Details
For
Strain Poles

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	K.C.DURIGON
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

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Debesh C. Sarkar
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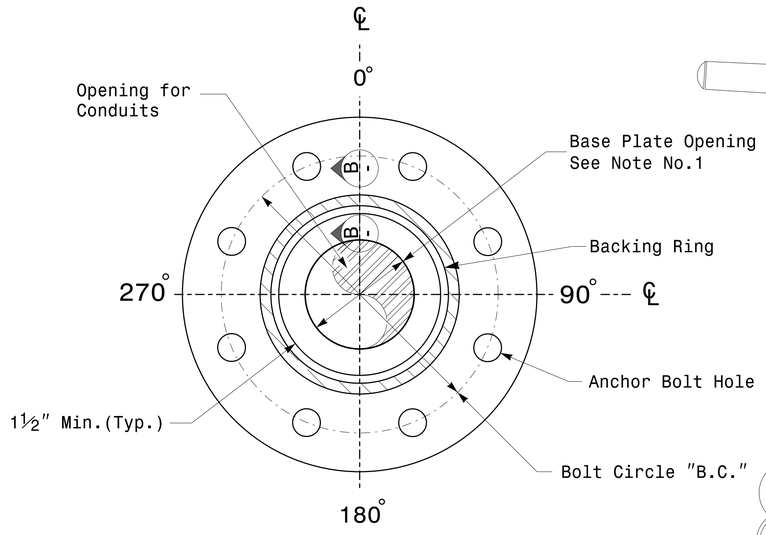
jgalloway

PROJECT ID. NO.	SHEET NO.
U-5806	Sig.M4

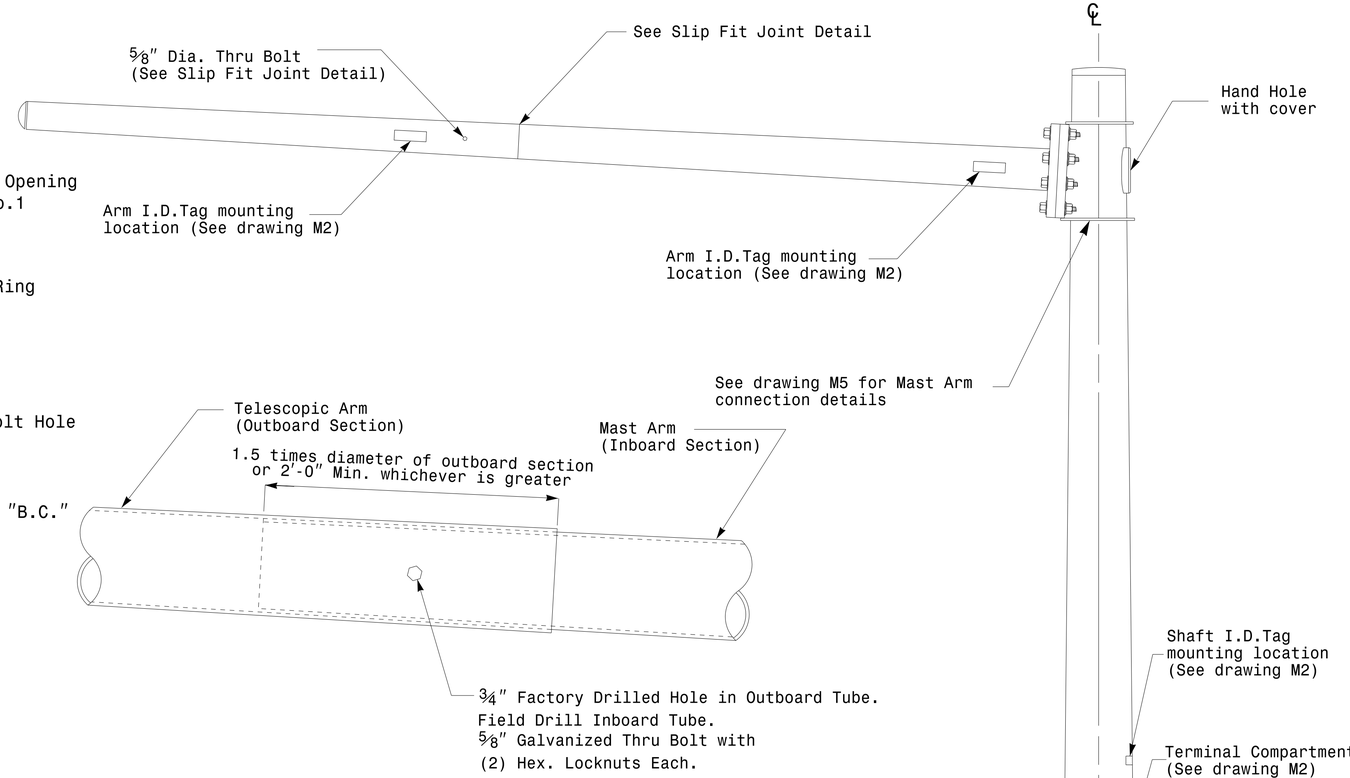
Fabrication Details – Mast Arm Poles

Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3½" but shall not be less than 8½".

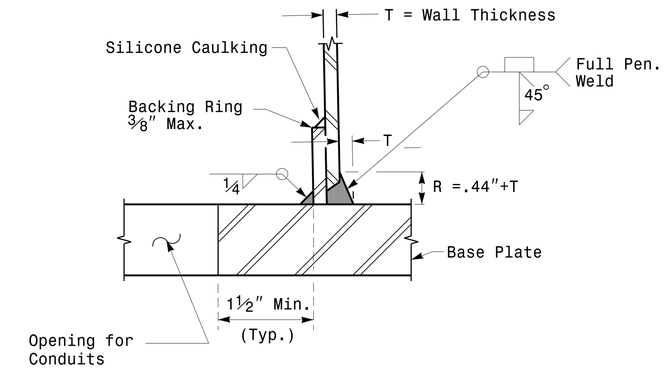


Section A-A

Pole Base Plate Details



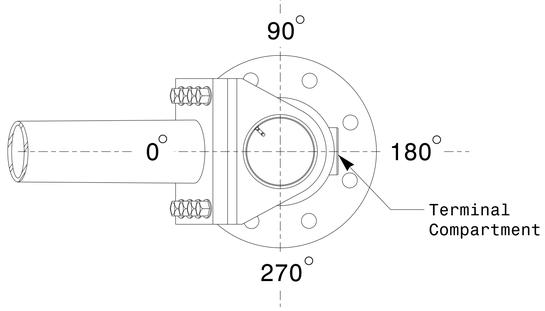
Slip Fit Joint Detail for Mast Arm



Section B-B

(Pole Attachment to Base Plate)

Full-Penetration Groove Weld Detail



Mast Arm Radial Orientation

Mast Arm Pole

Prepared in 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 NA NONE

Typical Fabrication Details For Mast Arm Poles

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	K.C.DURIGON
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

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DATE

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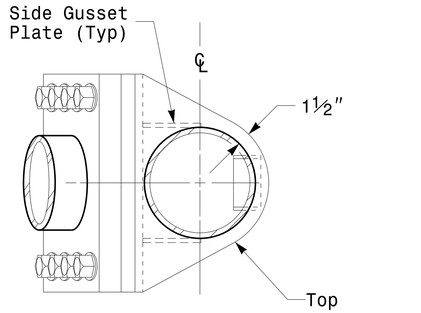
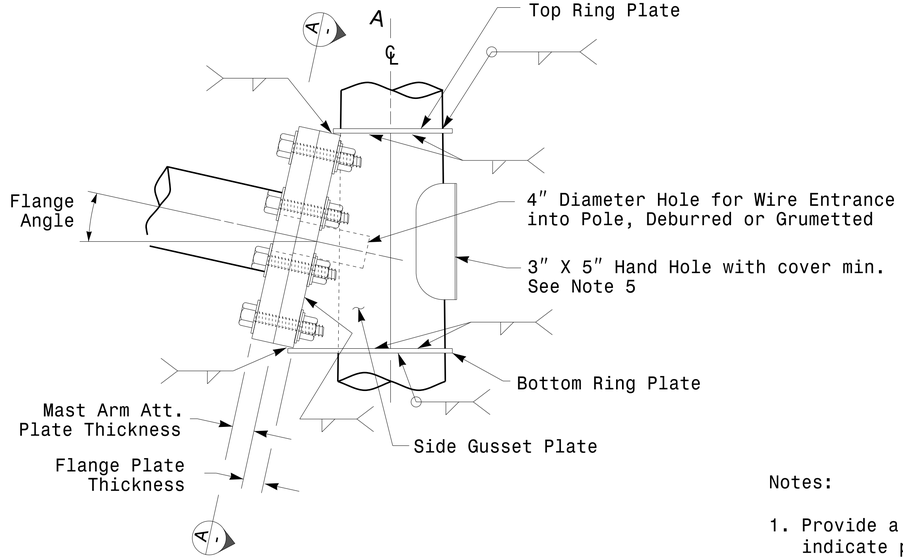
Jayne Lowry

Welded Ring Stiffened Mast Arm Connection

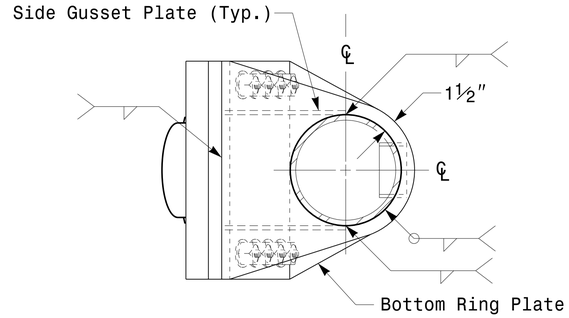
PROJECT ID. NO.	SHEET NO.
U-5806	Sig.M5



Plan View



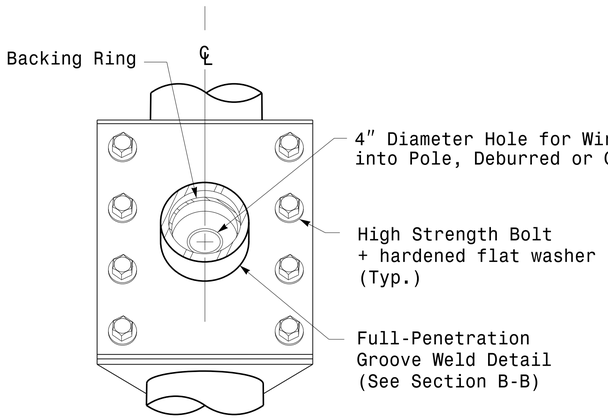
Side Elevation View



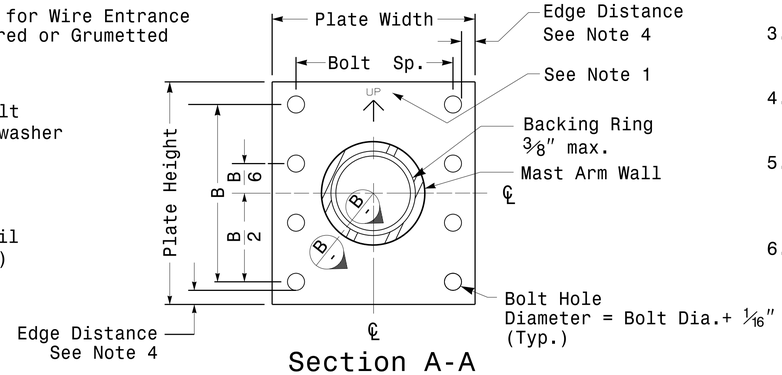
Bottom View

Notes:

1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Fabricator is responsible for providing appropriate holes at drainage points to drain galvanizing materials.
4. For minimum edge distance follow AISC Table J3.4 and J3.5. For nominal bolt hole size use Table J3.3.
5. Provide upper handhole as necessary when shaft extensions are reguired for luminaire arms or camera. For poles without luminaires/camera, wiring can be done through the top of pole.
6. Allowable range of flange tilt angle will vary from 0° to as required.

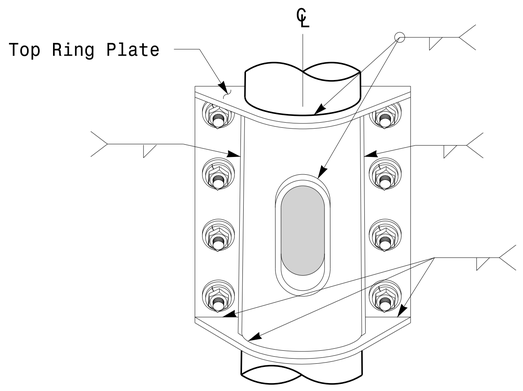


Front Elevation View

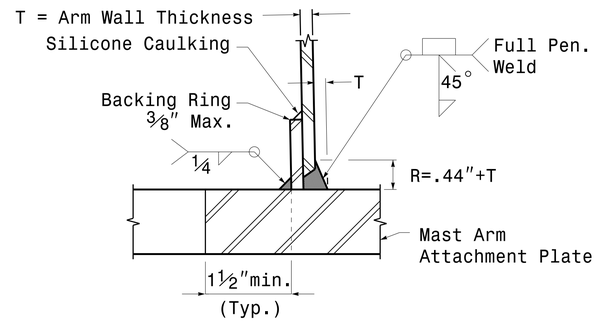


Section A-A

Mast Arm Attachment Plate



Back Elevation View



Section B-B

Full-Penetration Groove Weld Detail

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

Typical Fabrication Details For Mast Arm Connection To Pole

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	C.F.ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SCALE 0 NA NONE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

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SIGNATURE 44E8E32E147E4C4...
2/17/2016
DATE

Fabrication Details – Mast Arm Connection

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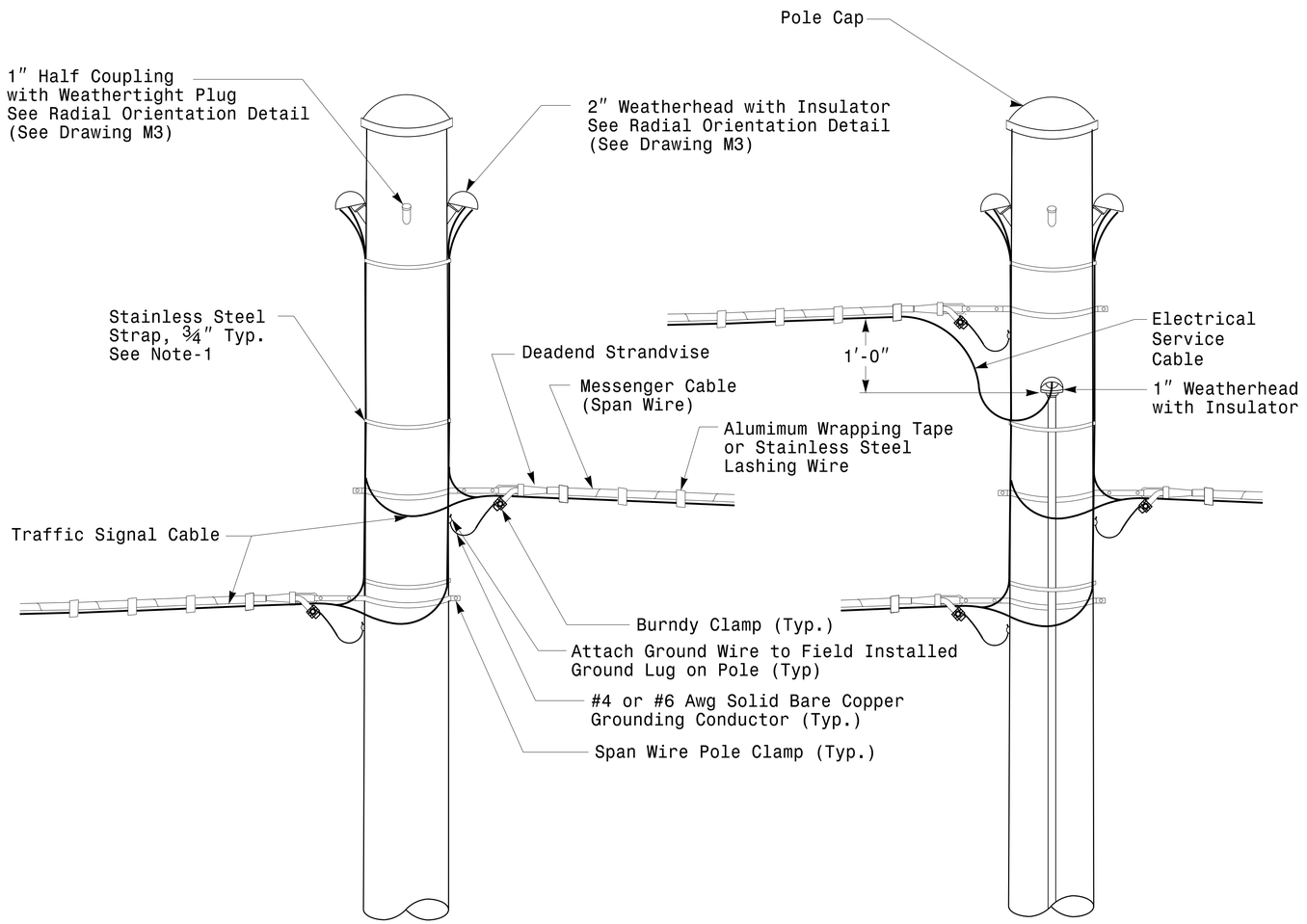
jsullivan

PROJECT ID. NO.	SHEET NO.
U-5806	Sig.M6

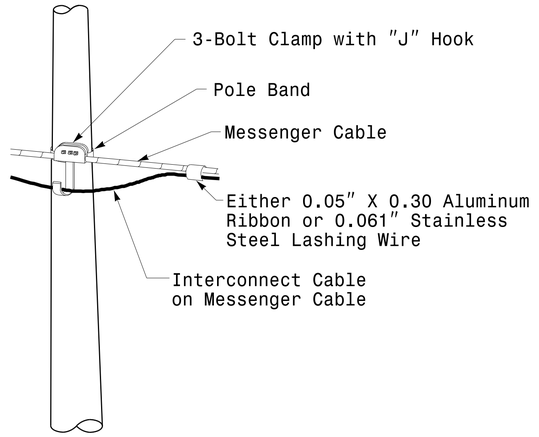
Fabrication Details – Strain Pole Attachments



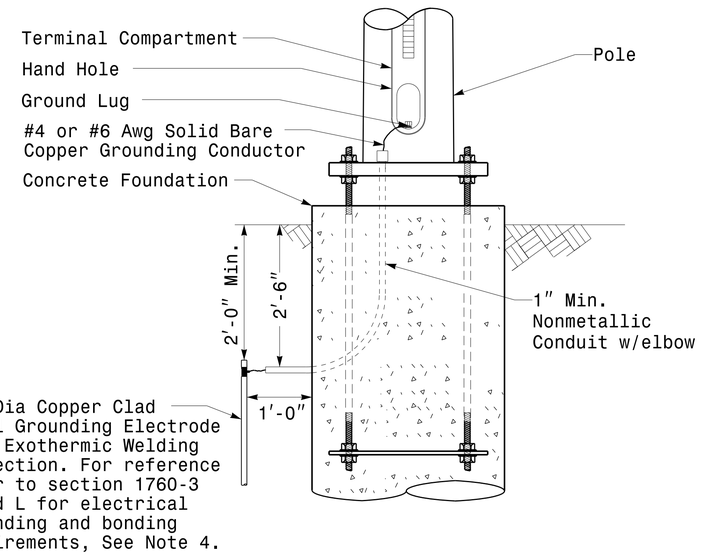
Strain Pole Attachments

NOTE:

1. 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 3′-0″.
2. Provide minimum two spanwire pole clamps per pole.
3. It is prohibited to attach two span wires at one pole clamp.
4. For general requirements refer to NCDOT Standard Specifications for Roadway and Structures, January 2012.



Attachment of Cable to Intermediate Metal Pole



Metal Pole Grounding Detail For Strain Pole and Mast Arm

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SCALE
0 NA
NONE

Typical Fabrication Details
For
Strain Pole Attachments

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	C.F.ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

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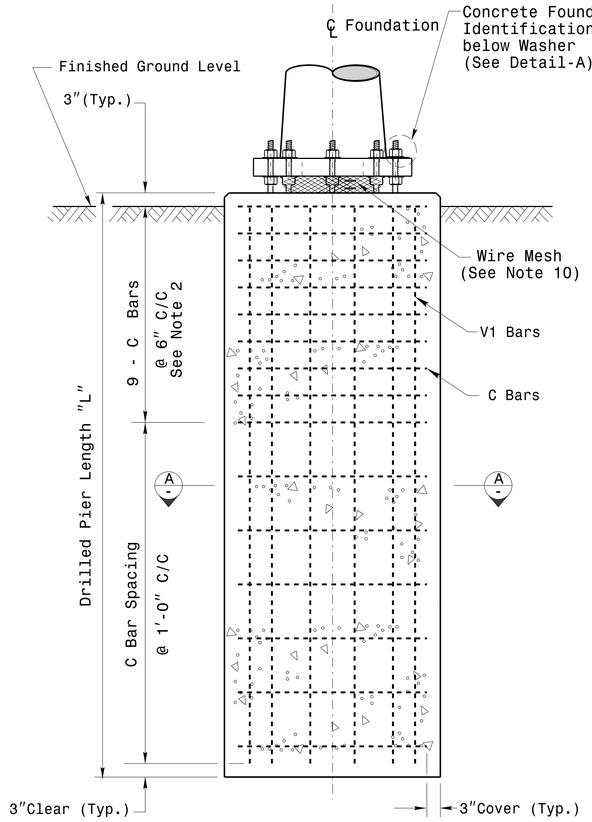
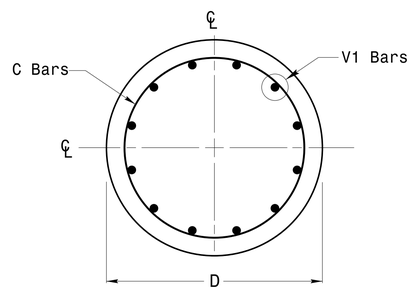
PROJECT ID. NO.	SHEET NO.
U-5806	Sig.M7

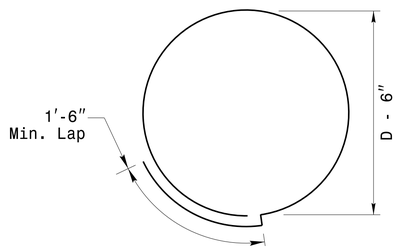
Construction Details – Foundations



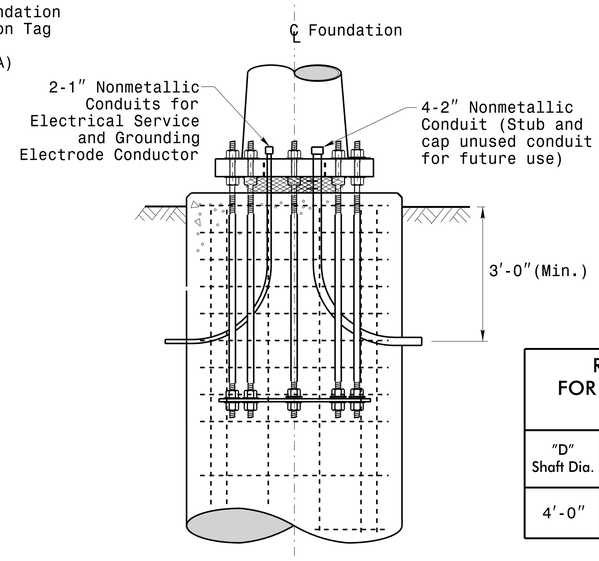
Concrete Shaft Elevation



Section A-A



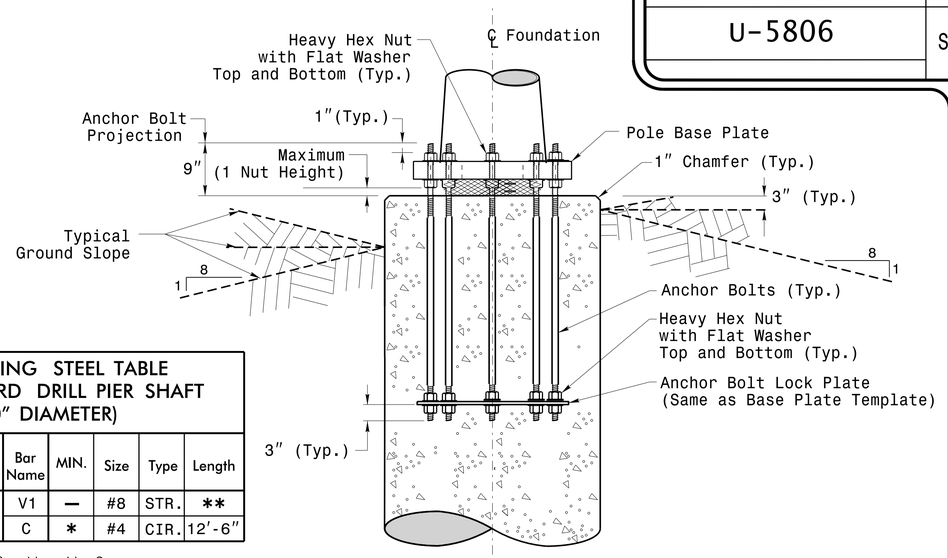
Typical "C" Bar Detail



Typical Foundation Conduit Details

REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (4′–0″ DIAMETER)						
"D" Shaft Dia.	Conc. Volume (cu. yds.)	Bar Name	MIN.	Size	Type	Length
4′-0″	.465 x L	V1	—	#8	STR.	**
		C	*	#4	CIR.	12′-6″

* See Note No. 2
** See Note No. 3



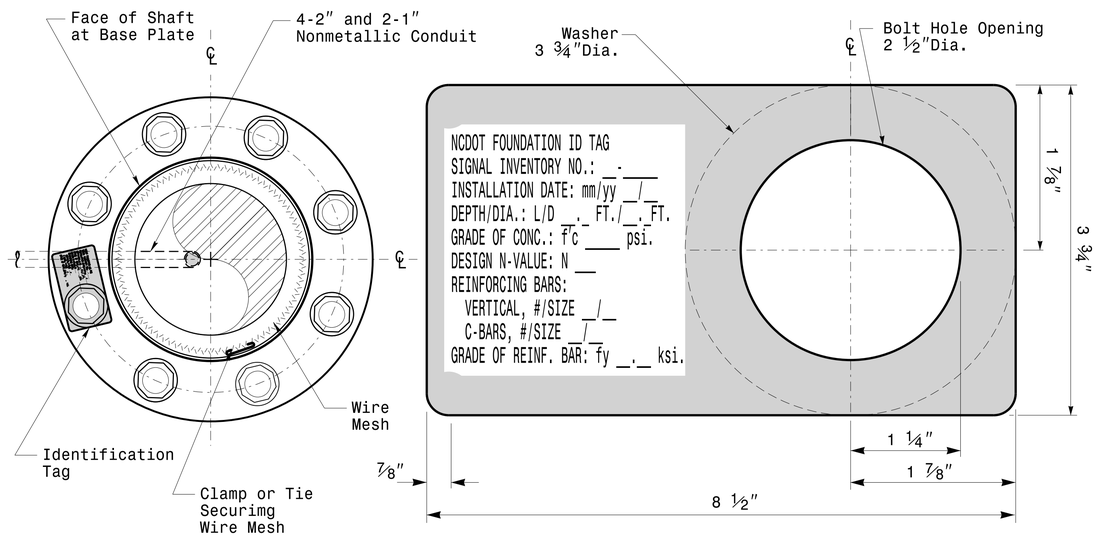
Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)

General Notes:

1. If actual subsurface conditions differ significantly from boring data contact the Engineer before excavating or placing concrete.
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. For standard foundations, see sheet Sig. M8 for details. Vertical reinforcing bars (V1) may be horizontally adjusted by +/-3″ to facilitate the installation of electrical conduit entering into the cage.
4. Provide 2″ to 5″ foundation projection above ground level depending on the ground slope.
5. Unless otherwise shown, foundation designs are based on non-sloping level ground surfaces with slope ratios of 8:1 (H:V) or flatter. If actual ground line slopes are steeper contact the Engineer before excavating or placing concrete.
6. Construct foundations in accordance with NCDOT Standard Provisions SP09 R005- Foundations and Anchor Rod Assemblies for Metal Poles. All applicable 2012 NCDOT Standard Specifications are referenced in this provision. Refer to the NCDOT Resources/Specifications page located on the Connect NCDOT website.

   https://connect.ncdot.gov/resources/Specifications and Special Provisions.aspx
7. Use air entrained AA concrete mix with a compression strength of f′c=4500 psi.(min.) after 28 days.
8. Use ASTM A615 grade 60 deformed bars for all reinforcing steel. Maintain at least 3″ cover on all reinforcement.
9. Locate the Identification Tag on the top of the base plate, directly above the conduit's entry point.
10. Provide two layers of galvanized welded 23 gauge (0.25) 6″ wide 4 mesh wire around pipes under the base plate and secure it with ties if necessary.
11. Preferred location for the I.D. Tag is as shown in Detail-A; directly above the conduit entering the foundation.



Concrete Foundation Identification Tag Details

D = Diameter
L = Length/Depth
mm = Month
yy = Year

Detail-A

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

Construction Details For Foundations

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	C.B.COGDELL
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REV. NO.	COMMENTS	INIT.	DATE
1	Revised Foundation Tag Details	N.B.	5/11/2015

SCALE: 0 NA — NONE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

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Debesh C. Sarkar
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DATE

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jsullivan2

SOIL CONDITION

PROJECT ID. NO.	SHEET NO.
U-5806	Sig.M8

		STANDARD STRAIN POLES						STANDARD FOUNDATIONS 48" Diameter Drilled Pier Length (L) – Feet							Reinforcement			
					Reactions at the Pole Base			Clay				Sand			Longitudinal		Stirrups	
		Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Axial (kip)	Shear (kip)	Moment (ft-kip)	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	Bar Size (#)	Quantity (ea.)	Bar Size (#)	Spacing (in.)
WIND ZONE 1	LIGHT	S26L3	26	25	2	11	270	19	13	10	8	17	14.5	12.5	8	12	4	12
		S30L3	30	25	2	11	300	19.5	13.5	10	8	17.5	15	13	8	14	4	12
		S35L3	35	25	3	11	320	20	13.5	10.5	8	17.5	15	13	8	14	4	12
	HEAVY	S30H3	30	29	3	16	450	24.5	16	12	9	21	17.5	15	8	16	4	6
		S35H3	35	29	4	16	515	26	17	12.5	9.5	22	18.5	16	8	16	4	6
WIND ZONE 2	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6
WIND ZONE 3	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6
WIND ZONE 4	LIGHT	S26L1	26	22	2	8	190	16	11.5	8.5	8	15	12.5	11	8	12	4	12
		S30L1	30	22	2	8	205	16.5	11.5	9	8	15	13	11.5	8	12	4	12
		S35L1	35	22	3	8	230	17	12	9	8	15.5	13.5	11.5	8	12	4	12
	HEAVY	S30H1	30	25	3	12	320	20.5	13.5	10.5	8	18	15	13.5	8	16	4	6
		S35H1	35	25	4	12	350	21	14	10.5	8.5	18.5	15.5	13.5	8	16	4	6
WIND ZONE 5	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6

48" Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Drilled Pier Length

General Notes:

1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

Foundation Selection:

1. Perform a standard penetration test at each proposed foundation site to determine "N" value.
2. Select the appropriate wind zone from M 1 drawing.
3. Select the soil type (Clay or Sand) that best describes the soil characteristics.
4. Get the appropriate standard pole case number from the plans or from the Engineer.
5. Select the appropriate column under "Standard Foundations" based on soil type and "N" value. Select the appropriate row based on the pole load case.
6. The foundation depth is the value shown in the "Standard Foundations" category where the column and the row intersect.
7. Use Construction Procedures and Design Methods prescribed by FHWA-NHI-10-016 for Reference Drilled Shafts.

Standard Strain Pole Foundation–All Soil Condition

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

Standard Strain Pole Foundation for All Soil Conditions

PLAN DATE:	FEBRUARY 2016	DESIGNED BY:	C.B. COGDELL
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE
Changed "Foundation Depth" to "Drilled Pier Length"in Conc. Eqn.	N.B.	7/12/2015

SCALE: 0 NA NONE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBRESH C. SARKAR

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Debresh C. Sarkar
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jgallaway

PROJECT NO.	SHEET NO.
U-5806	Sig. P1

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

06-14

ENGLISH DETAIL DRAWING FOR

PEDESTRIAN PUSHBUTTON LOCATIONS

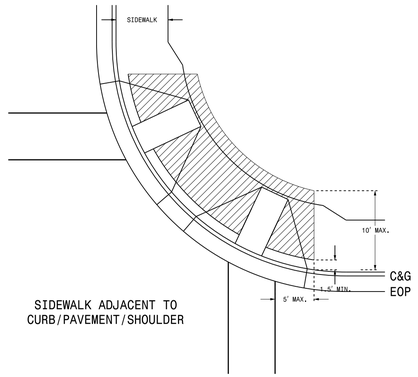
PLACEMENT DETAIL

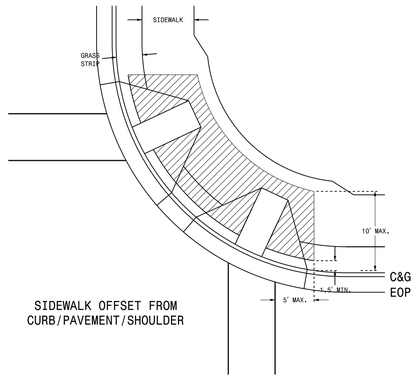
SHEET 1 OF 3

1705D01

PUSHBUTTON PLACEMENT

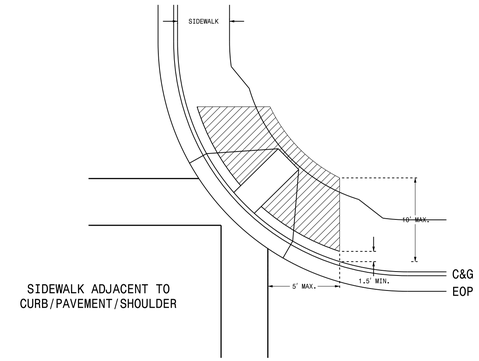
SEPARATE CURB RAMPS

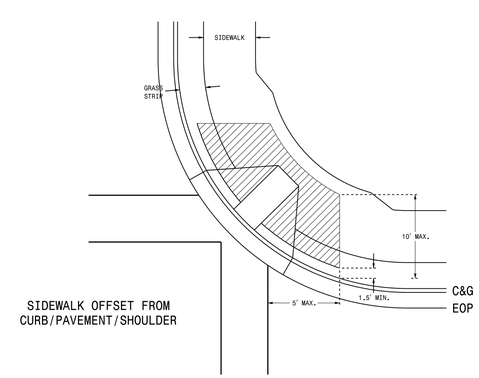




PUSHBUTTON PLACEMENT

SHARED CURB RAMP





NOTES

1. Pushbutton pedestals should not be located further than 10 feet from the edge of curb, shoulder, or pavement.
2. The face of the pushbutton should be parallel to the applicable crosswalk.
3. Separate pushbuttons used on the same corner should be separated by a distance of at least 10 feet.
4. Pushbuttons shall be installed adjacent to a level surface with a maximum reach distance of 10 inches.
5. Maintain 4 feet of clearance around pedestal if located in sidewalk.
6. Refer to section 1705 of the 2012 NCDOT Roadway Standard Drawings for Pushbutton Assembly details.
7. Refer to section 1743 of the 2012 NCDOT Roadway Standard Drawings for Pedestal details.
8. Contact Division Traffic Engineer for pushbutton location approval prior to installation.
9. Curb ramps are for symbolic use only and may not reflect actual design or field conditions.

LEGEND

PROPOSED

- Signal Pole
- Type I Pushbutton Post
- Type II Signal Pedestal
- Pushbutton & Sign
- Pedestrian Signal Head
- Curb Ramp
- Pushbutton Location Area

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

06-14

ENGLISH DETAIL DRAWING FOR

PEDESTRIAN PUSHBUTTON LOCATIONS

PLACEMENT DETAIL

SHEET 1 OF 3

1705D01

See Plate for Title

Prepared in the Offices of:

Transportation Mobility and Safety Division
Signal Design Section

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

DocuSigned by:

SIGNATURE

6/17/2014

DATE

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rrziemba

PROJECT NO.	SHEET NO.
U-5806	Sig. P2

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

06-14

ENGLISH DETAIL DRAWING FOR

PEDESTRIAN PUSHBUTTON LOCATIONS

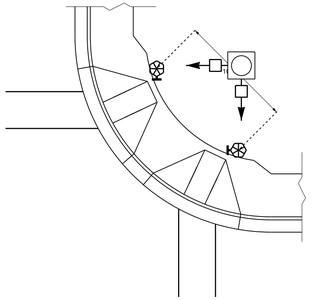
PLACEMENT DETAIL

SHEET 2 OF 3

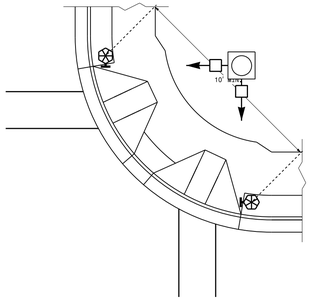
1705D01

TYPICAL PUSHBUTTON LOCATIONS (CASE I)

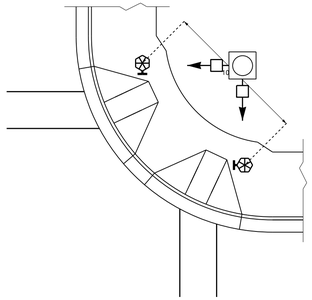
SEPARATE CURB RAMPS W/ TYPE I PEDESTALS



BACK OF SIDEWALK IS WITHIN 10′
OF CURB OR PAVEMENT/SHOULDER



GRASS STRIP PLACEMENT IF BACK
OF SIDEWALK EXCEEDS 10′ FROM
CURB OR PAVEMENT/SHOULDER



PUSHBUTTON PLACEMENT
IN WIDE SIDEWALK

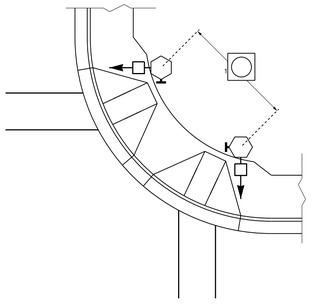
PROPOSED

LEGEND

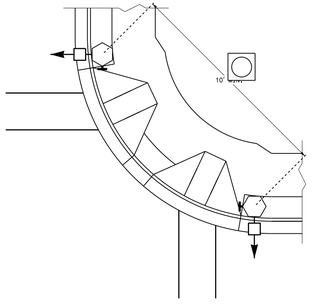
- Signal Pole
- Type I Pushbutton Post
- Type II Signal Pedestal
- Pushbutton & Sign
- Pedestrian Signal Head
- Curb Ramp
- Pushbutton Location Area

TYPICAL PUSHBUTTON LOCATIONS (CASE II)

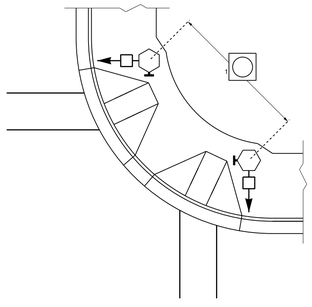
SEPARATE CURB RAMPS W/ TYPE II PEDESTALS



BACK OF SIDEWALK IS WITHIN 10′
OF CURB OR PAVEMENT/SHOULDER



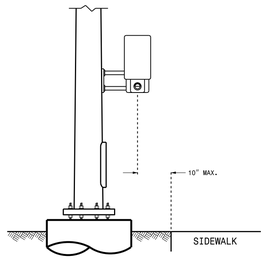
GRASS STRIP PLACEMENT IF BACK
OF SIDEWALK EXCEEDS 10′ FROM
CURB OR PAVEMENT/SHOULDER



PUSHBUTTON PLACEMENT
IN WIDE SIDEWALK

OPTIONAL PUSHBUTTON EXTENSION

FACE OF PUSHBUTTON PARALLEL TO
APPLICABLE CROSSWALK



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

06-14

ENGLISH DETAIL DRAWING FOR

PEDESTRIAN PUSHBUTTON LOCATIONS

PLACEMENT DETAIL

SHEET 2 OF 3

1705D01

See Plate for Title

Prepared in the Offices of:

Transportation Mobility and Safety Division
Signal Design Section
DEPARTMENT OF TRANSPORTATION · STATE OF NORTH CAROLINA

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

NORTH CAROLINA
PROFESSIONAL
SEAL
026486
ENGINEER
ROBERT J. ZIEMBA

DocuSigned by:
[signature]
SIGNATURE

6/17/2014
DATE

11-MAY-2017 15:12
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rziemer

PROJECT NO.	SHEET NO.
U-5806	Sig. P3

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

06-14

ENGLISH DETAIL DRAWING FOR

PEDESTRIAN PUSHBUTTON LOCATIONS

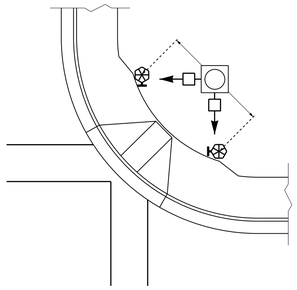
PLACEMENT DETAIL

SHEET 3 OF 3

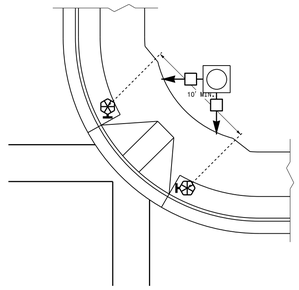
1705D01

TYPICAL PUSHBUTTON LOCATIONS (CASE III)

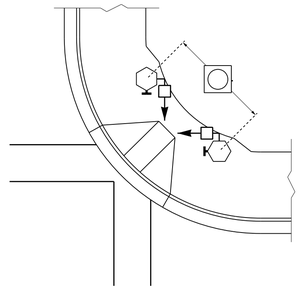
SHARED CURB RAMPS



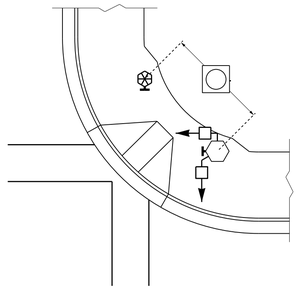
BACK OF SIDEWALK IS WITHIN 10′ OF CURB OR PAVEMENT/SHOULDER



GRASS STRIP PLACEMENT IF BACK OF SIDEWALK EXCEEDS 10′ FROM CURB OR PAVEMENT/SHOULDER

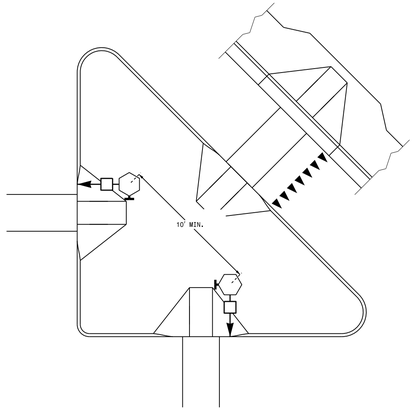


PUSHBUTTON PLACEMENT IN WIDE SIDEWALK (CORRESPONDING PUSHBUTTONS AND SIGNAL HEADS ON DIFFERENT PEDESTALS)

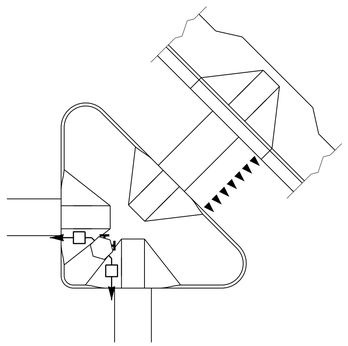


PUSHBUTTON PLACEMENT WITH SHARED TYPE II SIGNAL PEDESTAL AND TYPE I PUSHBUTTON POST

TRAFFIC ISLAND PUSHBUTTON LOCATIONS

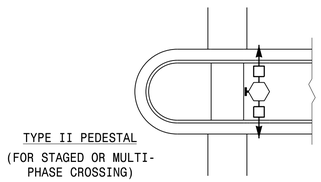


PUSHBUTTON PLACEMENT IN LARGE "PORK CHOP ISLAND" WITH SEPARATE PEDESTALS



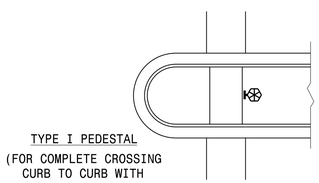
PUSHBUTTON PLACEMENT IN SMALL "PORK CHOP ISLAND" WITH SHARED PEDESTAL

PUSHBUTTON PLACEMENT IN MEDIAN



TYPE II PEDESTAL

(FOR STAGED OR MULTI-PHASE CROSSING)



TYPE I PEDESTAL

(FOR COMPLETE CROSSING CURB TO CURB WITH OPTIONAL REFUGE)

PROPOSED

LEGEND

- Signal Pole
- Type I Pushbutton Post
- Type II Signal Pedestal
- Pushbutton & Sign
- Pedestrian Signal Head
- Curb Ramp
- Pushbutton Location Area

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

06-14

ENGLISH DETAIL DRAWING FOR

PEDESTRIAN PUSHBUTTON LOCATIONS

PLACEMENT DETAIL

SHEET 3 OF 3

1705D01

See Plate for Title

Prepared in the Offices of:

Transportation Mobility and Safety Division
Signal Design Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

DocuSigned by:
SIGNATURE

6/17/2014
DATE

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rziemba

PROJECT REFERENCE NO.	SHEET NO.
U-5806	SCP.1

1. INSTALL REA, PE – 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
2. INSTALL COAX CABLE
3. INSTALL ETHERNET CABLE
4. INSTALL SMFO CABLE
5. INSTALL MMFO CABLE
6. INSTALL FIBER OPTIC DROP CABLE
7. INSTALL TRACER WIRE
8. TRENCH
9. INSTALL PVC CONDUIT
10. INSTALL RIGID, GALVANIZED STEEL CONDUIT
11. INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12. INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
13. INSTALL OUTER–DUCT POLYETHYLENE CONDUIT
14. INSTALL POLYETHYLENE CONDUIT
15. DIRECTIONAL DRILL CONDUIT
16. BORE AND JACK CONDUIT
17. INSTALL CABLE(S) IN EXISTING CONDUIT
18. INSTALL CABLE(S) IN NEW CONDUIT
19. INSTALL CABLE(S) IN EXISTING RISER
20. INSTALL CABLE(S) IN NEW RISER
21. INSTALL CABLE(S) IN EXISTING CONDUIT STUB–OUTS
22. INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
23. INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
24. INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
25. INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
26. MODIFY EXISTING INTERCONNECT CENTER /SPLICE ENCLOSURE
27. INSTALL NEW FIBER OPTIC TRANSCEIVER
28. INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPLICE CABLE IN CABINET
29. INSTALL UNDERGROUND SPLICE ENCLOSURE
30. INSTALL AERIAL SPLICE ENCLOSURE
31. INSTALL POLE MOUNTED SPLICE CABINET
32. INSTALL BASE MOUNTED SPLICE CABINET
33. REMOVE EXISTING SPLICE CABINET
34. INSTALL CABINET FOUNDATION
35. REMOVE EXISTING CABINET FOUNDATION
36. INSTALL CCTV CAMERA ASSEMBLY
37. INSTALL CCTV CAMERA WOOD POLE
38. INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
39. INSTALL JUNCTION BOX
40. INSTALL OVERSIZED JUNCTION BOX
41. REMOVE EXISTING JUNCTION BOX
42. INSTALL WOOD POLE
43. REMOVE EXISTING WOOD POLE
44. INSTALL AERIAL GUY ASSEMBLY
45. INSTALL STANDARD GUY ASSEMBLY
46. INSTALL SIDEWALK GUY ASSEMBLY
47. INSTALL MESSENGER CABLE
48. REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
49. REMOVE EXISTING MESSENGER CABLE
50. INSTALL TELEPHONE SERVICE
51. INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
52. INSTALL DELINEATOR MARKER
53. STORE 20 FEET OF COMMUNICATIONS CABLE
54. LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
55. LASH CABLE(S) TO EXISTING MESSENGER CABLE
56. LASH CABLE(S) TO NEW MESSENGER CABLE
57. MODIFY EXISTING ELECTRICAL SERVICE
58. INSTALL NEW ELECTRICAL SERVICE
59. INSTALL NEW FIELD ETHERNET SWITCH
60. BOND TRACER WIRE TO EQUIPMENT GROUND BUS
61. DO NOT BOND TRACER WIRE TO EQUIPMENT GROUND BUS
62. BOND RISER AND MESSENGER CABLE TO POLE GROUND

ATTACHMENT POINT:

- XX"/SS / YYY — DISTANCE ABOVE (IN)/ATTACHMENT POINT REFERENCE POINT
- YYY / XX"/SS — REFERENCE POINT DISTANCE BELOW (IN)/ATTACHMENT POINT

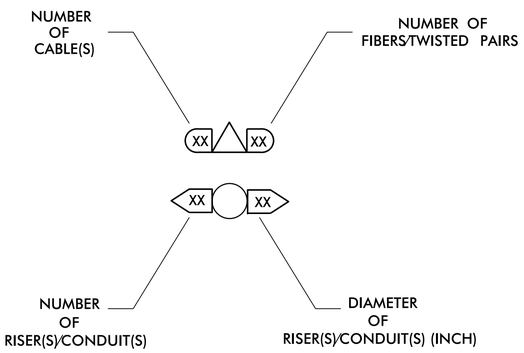
"SS"	REFERENCE LOCATION
FS =	FRONT SIDE OF POLE
BS =	BACK SIDE OF POLE

LEGEND

- FO — NEW FIBER OPTIC COMMUNICATIONS CABLE
- TWIST PR — NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXI — EXISTING COMMUNICATIONS CABLE
- REM — EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- DD — NEW DIRECTIONAL DRILLED CONDUIT
- B&J — NEW BORED AND JACKED CONDUIT
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- S — AERIAL SPLICE ENCLOSURE
- NEW METAL POLE
- EXISTING METAL POLE
- NEW CCTV ASSEMBLY
- NEW STANDARD GUY ASSEMBLY
- NEW SIDEWALK GUY ASSEMBLY
- NEW CABLE STORAGE RACKS (SNOW SHOES)
- EXISTING CONTROLLER AND CABINET
- S — EXISTING SPLICE CABINET
- S — NEW SPLICE CABINET
- SP — SIGNAL POLE
- XX–XXXX — SIGNAL INVENTORY NUMBER

CONSTRUCTION NOTE SYMBOLOGY KEY

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



TMP PHASE 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION — Transportation Mobility and Safety Division

750 N. Greenfield Pkwy. , Garner, NC 27529

CONSTRUCTION NOTES

DIVISION 10 CABARRUS COUNTY CONCORD

PLAN DATE: AUGUST 2017 — REVIEWED BY: DocuSigned by: Mil Avery 09F5DB6CBED3443...

PREPARED BY: A. J. SKUCE

REVISIONS	INIT.	DATE

SEAL

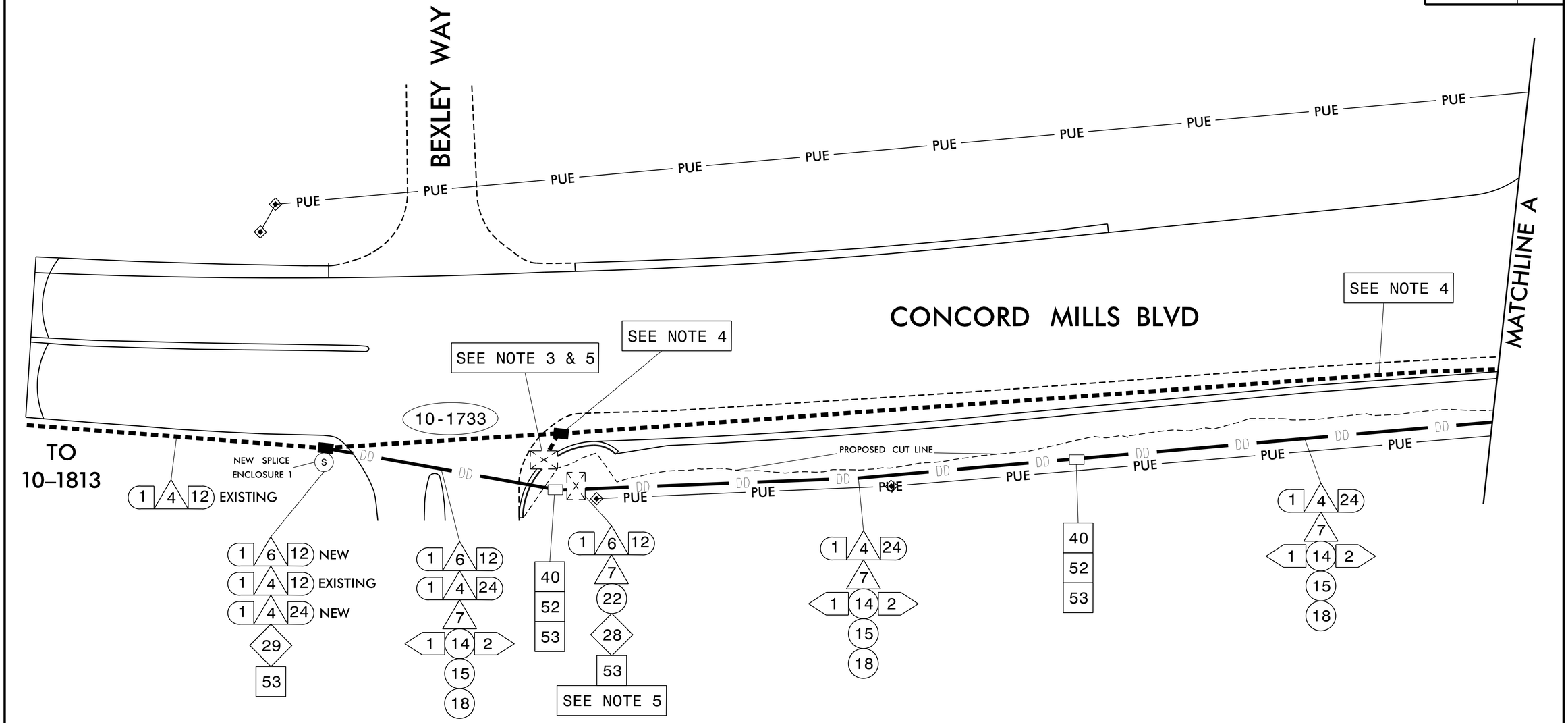
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami 5D9B0BA6DBB6495...

8/24/2017

DATE

PROJECT REFERENCE NO.	SHEET NO.
U-5806	SCP.2



1) NOTIFY THE CITY OF CONCORD TRAFFIC ENGINEER, ANDREI DUMITRU, AT (704) 920–5377 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEM COMMUNICATIONS CABLE. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS–BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) BACK PULL EXISTING 12–FIBER CABLE TO "NEW SPLICE ENCLOSURE 1".

4) ABANDON EXISTING CONDUIT, REMOVE JUNCTION BOXES AND FILL TO GRADE WITH SUITABLE MATERIAL.

5) RELOCATE EXISTING FIELD ETHERNET SWITCH TO NEW CABINET.

TMP PHASE 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:

750 N. Greenfield Pkwy., Garner, NC 27529

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS

DIVISION 10 CABARRUS COUNTY CONCORD

PLAN DATE: AUGUST 2017

PREPARED BY: A. J. SKUCE

REVIEWED BY: Neil Avery
DocuSigned by: 09F5DB4CBED3443...

SCALE 0 30′ 1" = 30′

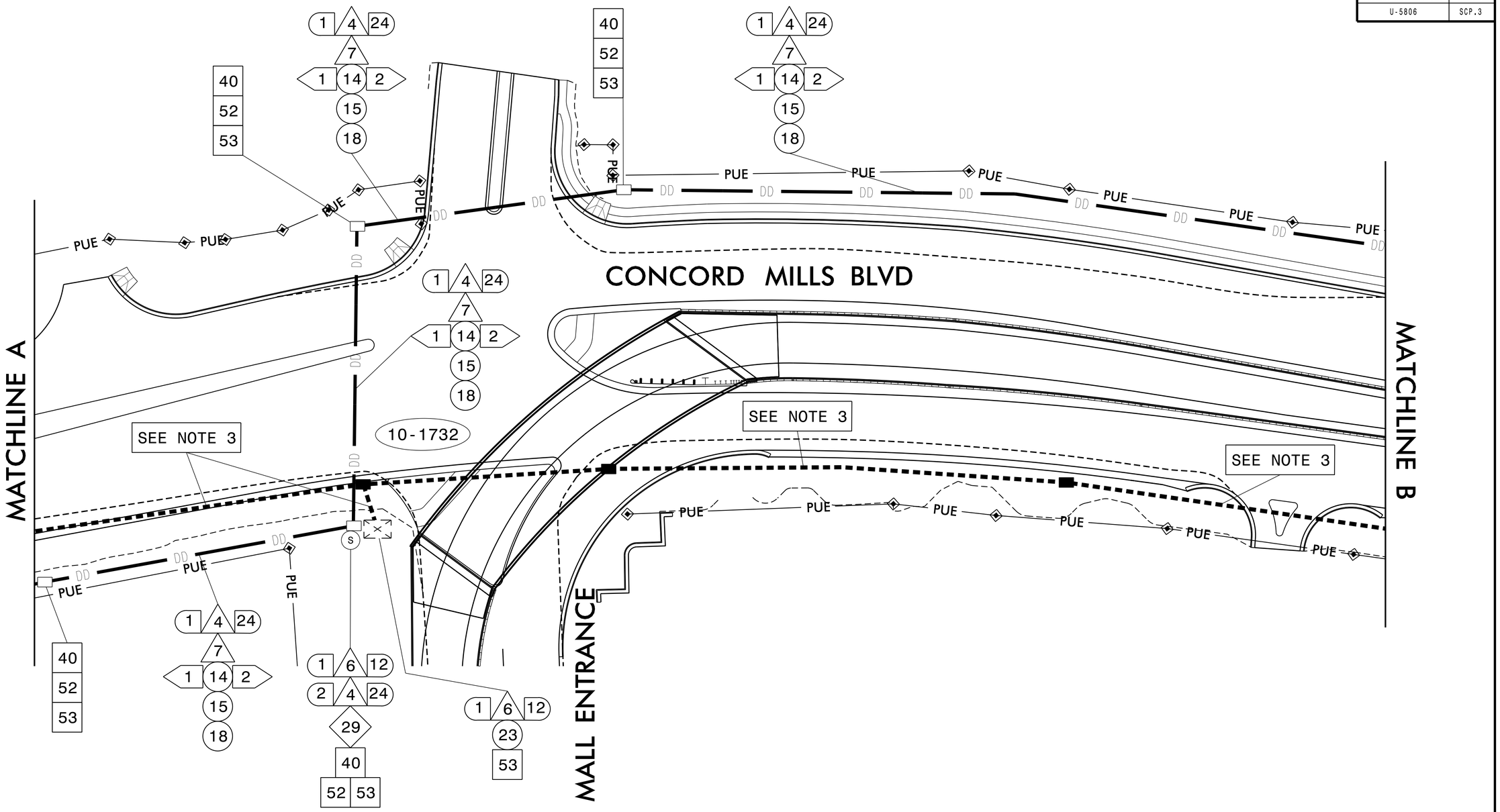
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami
5D9B0BA6DBB6495...

8/24/2017
DATE

PROJECT REFERENCE NO.	SHEET NO.
U-5806	SCP.3



1) NOTIFY THE CITY OF CONCORD TRAFFIC ENGINEER, ANDREI DUMITRU, AT (704) 920–5377 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEM COMMUNICATIONS CABLE. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS–BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) ABANDON EXISTING CONDUIT. REMOVE EXISTING JUNCTION BOXES AND FILL TO GRADE WITH SUITABLE MATERIAL.

TMP PHASE 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:

750 N. Greenfield Pkwy. , Garner, NC 27529

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS

DIVISION 10 CABARRUS COUNTY CONCORD

PLAN DATE: AUGUST 2017

PREPARED BY: A. J. SKUCE

REVIEWED BY: DocuSigned by: Mil Avery 09F5DB4CBED3443...

SCALE 0 30′ 1" = 30′

REVISIONS	INIT.	DATE

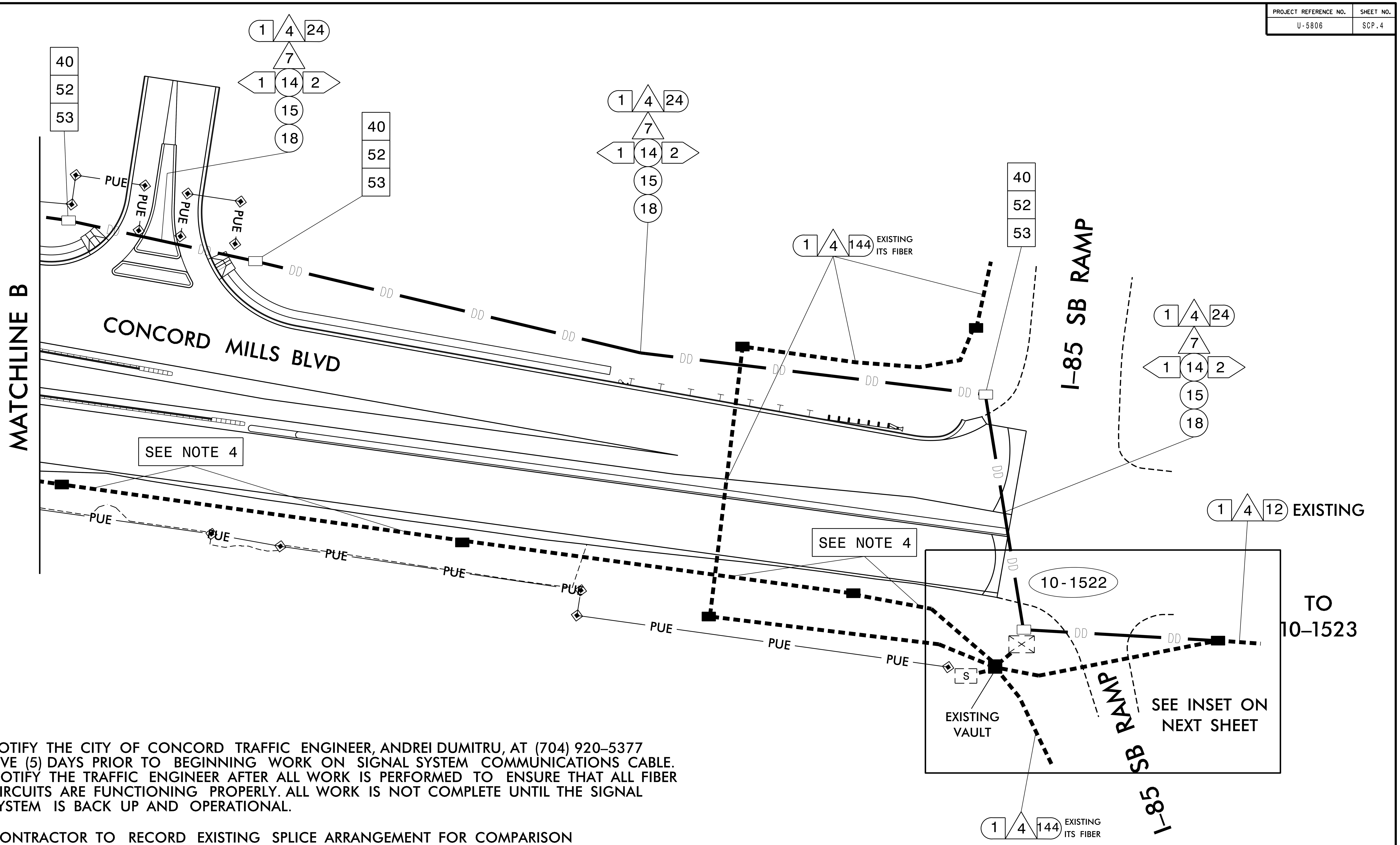
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami 5D9B0BA80BB6495...

8/24/2017

DATE



1) NOTIFY THE CITY OF CONCORD TRAFFIC ENGINEER, ANDREI DUMITRU, AT (704) 920–5377 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEM COMMUNICATIONS CABLE. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS–BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) BACKPULL EXISTING 12–FIBER CABLE FROM THE SIGNAL CABINET TO THE NEW UNDERGROUND SPLICE ENCLOSURE.

4) ABANDON EXISTING CONDUIT. REMOVE EXISTING JUNCTION BOXES AND FILL TO GRADE WITH SUITABLE MATERIAL.

5) DO NOT DISTURB OR MODIFY THE EXISTING 144–FIBER ITS CABLE.

TMP PHASE 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS

DIVISION 10 CABARRUS COUNTY CONCORD

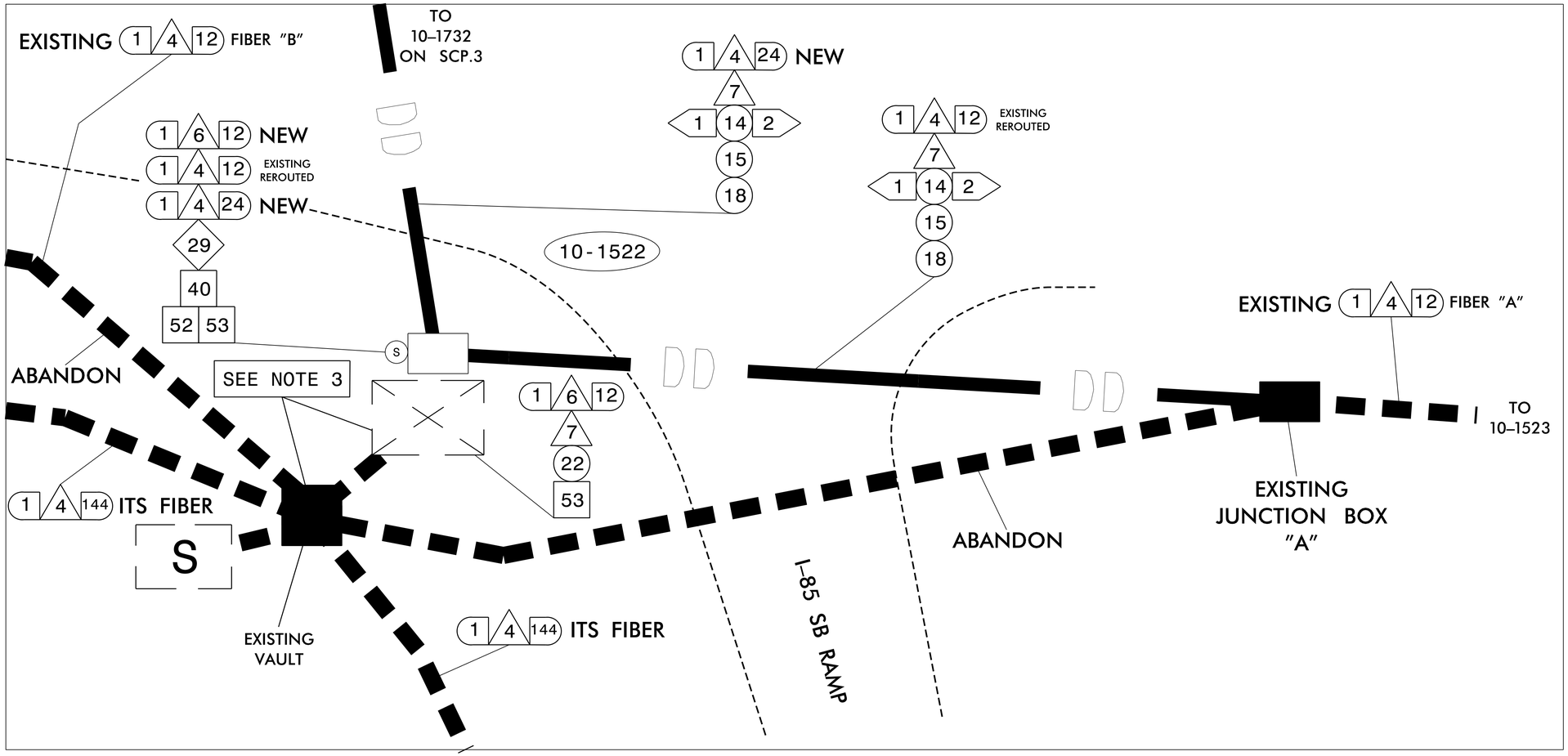
PLAN DATE: AUGUST 2017 | REVIEWED BY: DocuSigned by: Nil Avery 09F5DB4CBED3443...
PREPARED BY: A. J. SKUCE

SCALE 0 30′ 1″ = 30′

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI
DocuSigned by: Mohd Aslami 5D9B0BA6DBB6495...
8/24/2017
DATE

PROJECT REFERENCE NO.	SHEET NO.
U-5806	SCP.5



1) NOTIFY THE CITY OF CONCORD TRAFFIC ENGINEER, ANDREI DUMITRU, AT (704) 920–5377 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEM COMMUNICATIONS CABLE. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS–BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) REMOVE AND DISCARD EXISTING 12–FIBER CABLE "B" FROM THE SIGNAL CABINET AND THE EXISTING VAULT. BACKPULL EXISTING 12–FIBER CABLE "A" FROM THE SIGNAL CABINET (10–1522) TO EXISTING JUNCTION BOX "A" RE–PULL EXISTING FIBER "A" THROUGH NEW DIRECTION DRILL CONDUIT TO THE NEW JUNCTION BOX AND UNDERGROUND SPLICE ENCLOSURE.

4) DO NOT DISTURB OR MODIFY THE EXISTING 144–FIBER ITS CABLE. EXISTING VAULT AND SPLICE CABINET TO REMAIN IN PLACE. ONLY BACKPULL OR REMOVE THE SPECIFIED CABLES.

TMP PHASE 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:

750 N. Greenfield Pkwy. , Garner, NC 27529

SPLICE DETAIL

DIVISION 10 CABARRUS COUNTY CONCORD

PLAN DATE: AUGUST 2017

PREPARED BY: A. J. SKUCE

REVIEWED BY: Mil Avery (DocuSigned by: 09F5DB4CBED3443...)

SCALE 0 30' 1" = 30'

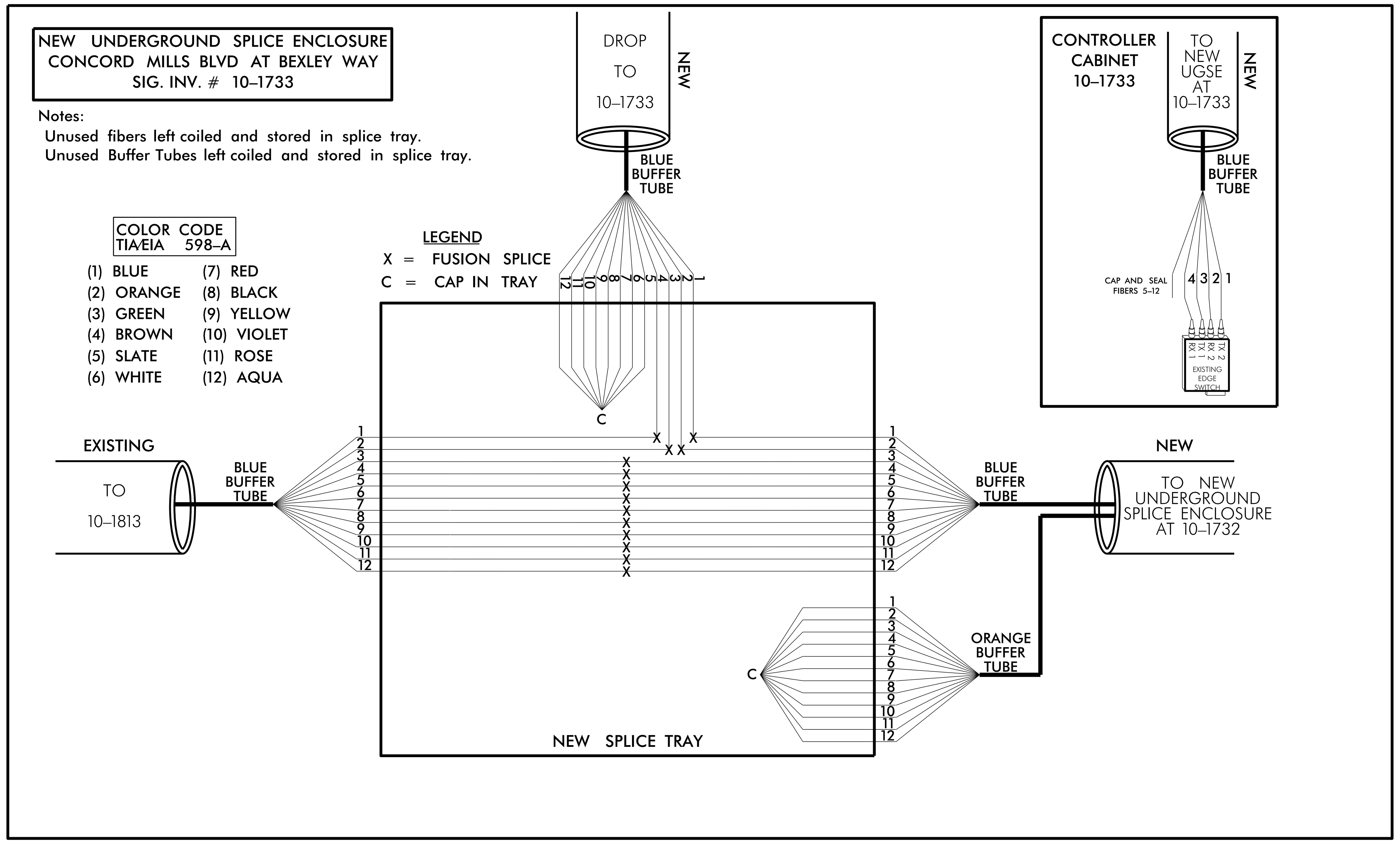
REVISIONS	INIT.	DATE

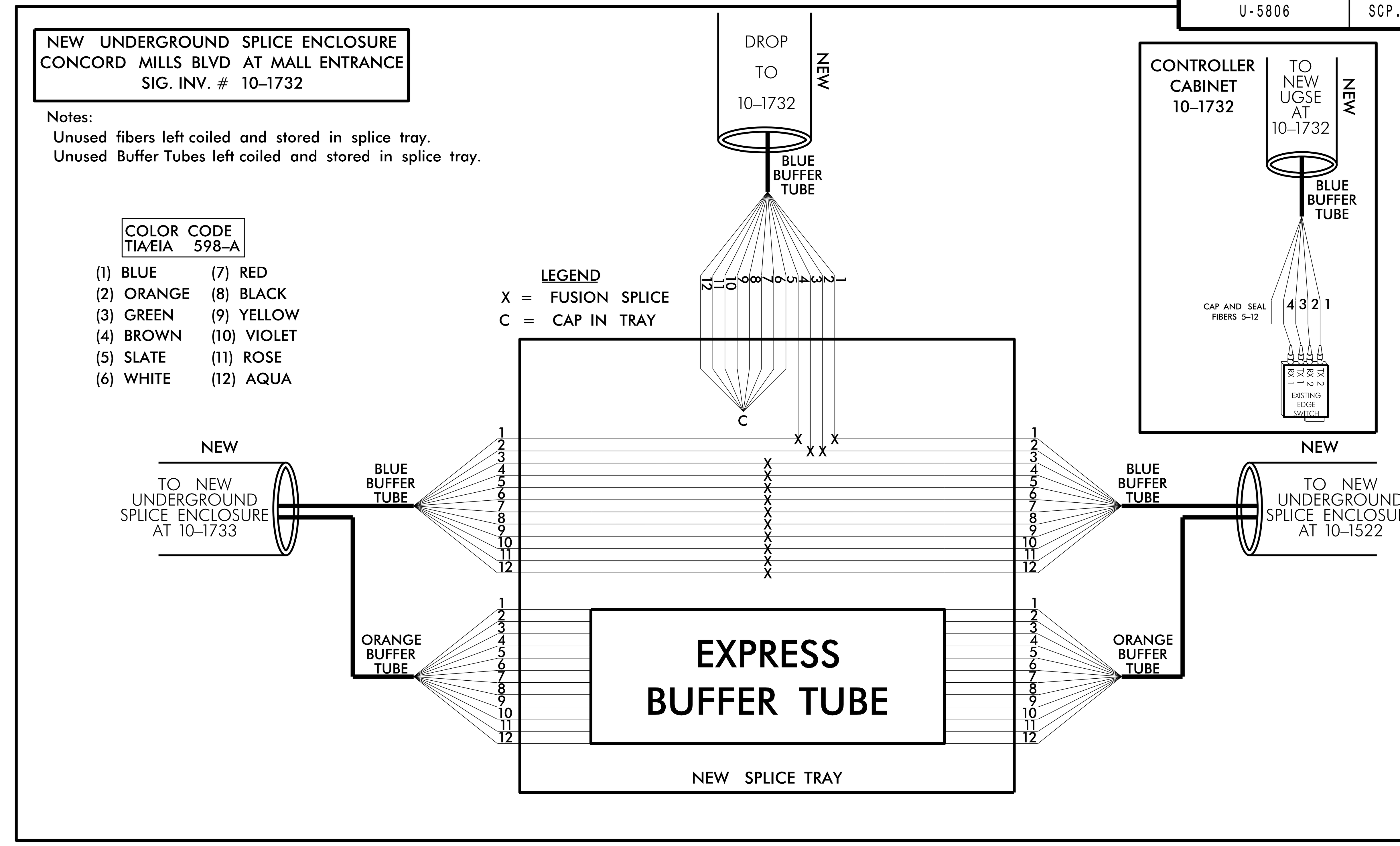
SEAL

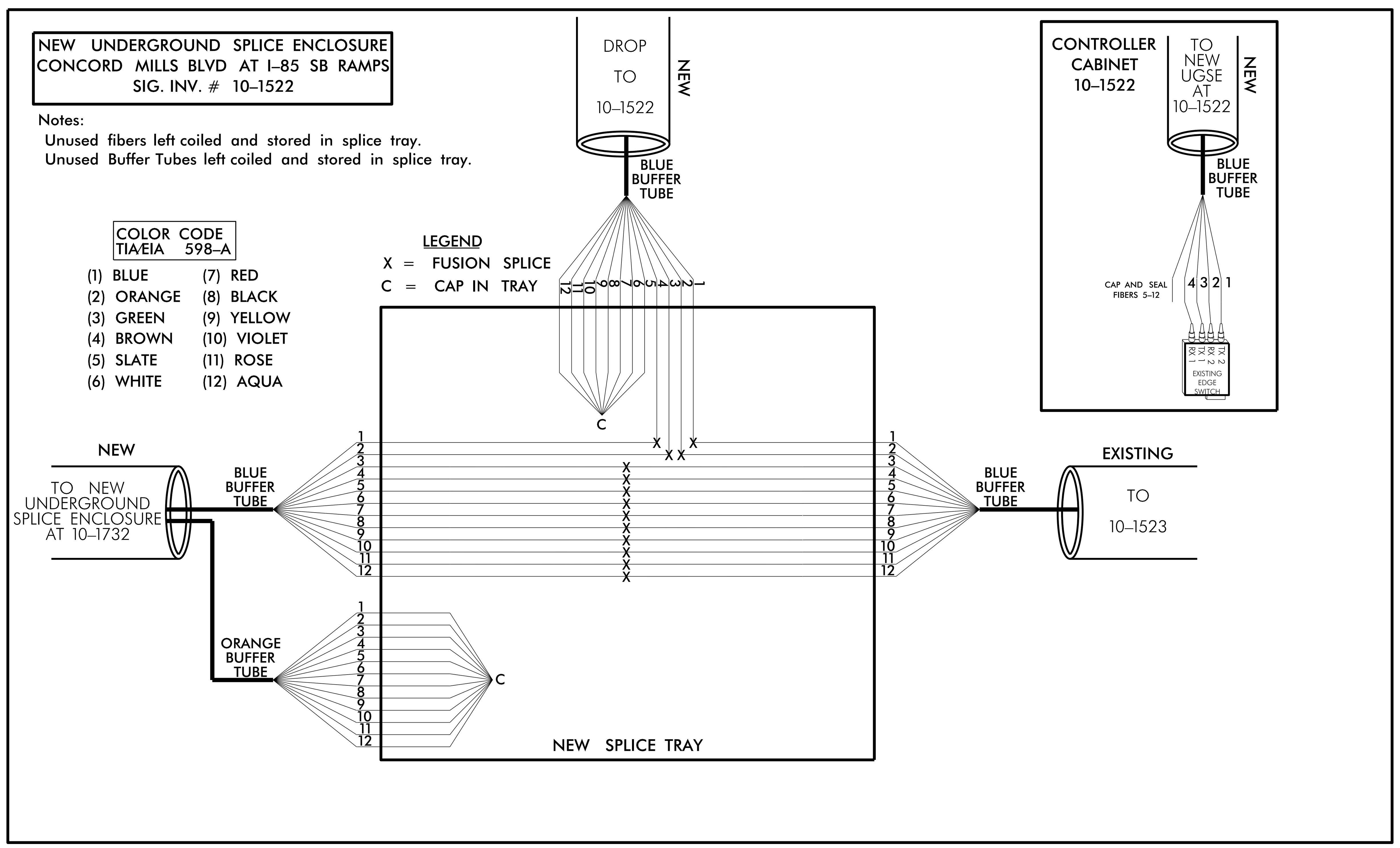
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

Mohd Aslami (DocuSigned by: 5D9B0BA6DBB6495...) 8/24/2017

DATE







1) NOTIFY THE CITY OF CONCORD TRAFFIC ENGINEER, ANDREI DUMITRU, AT (704) 920–5377 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEM COMMUNICATIONS CABLE. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS–BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS.

4) INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING: REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

1) SPLICE LOCATION
2) DATE
3) COMPANY NAME
4) NAME OF INDIVIDUAL PERFORMING THE SPLICING

PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1–4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

TMP PHASE 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
Transportation Mobility and Safety Division, Intelligent Transportation Systems Section — State of North Carolina Department of Transportation
750 N. Greenfield Pkwy., Garner, NC 27529

SPLICE DETAIL

DIVISION 10 CABARRUS COUNTY CONCORD

PLAN DATE:	AUGUST 2017	REVIEWED BY:	DocuSigned by: Mil Avery 09F5DB4CBED3443...
PREPARED BY:	A. J. SKUCE		

REVISIONS	INIT.	DATE

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