

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

Project No.	Sheet No.
R-4707	Sig. 1.0

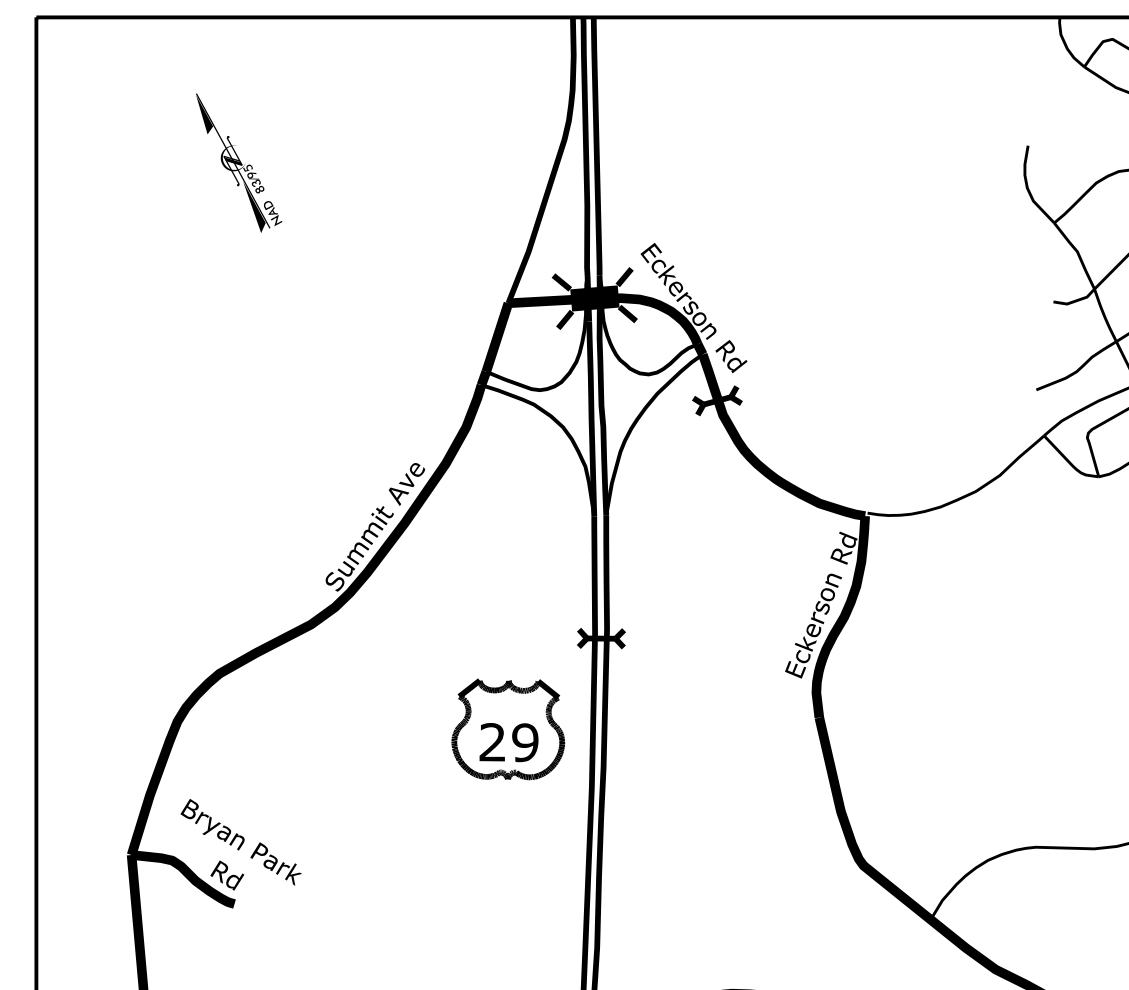
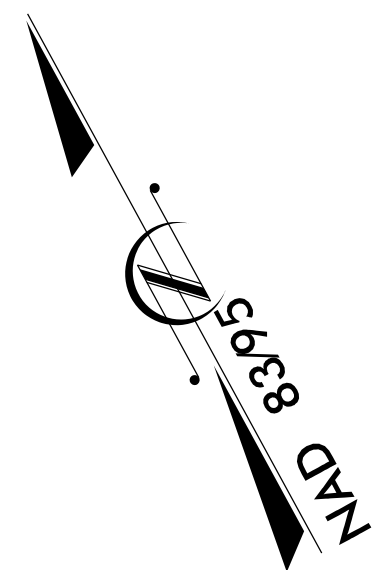
Guilford County

**LOCATION: SR 4771 (REEDY FORK PARKWAY) FROM
SR 2526 (SUMMIT AVENUE) TO
SR 2790 (ECKERSON RD) IN GREENSBORO**

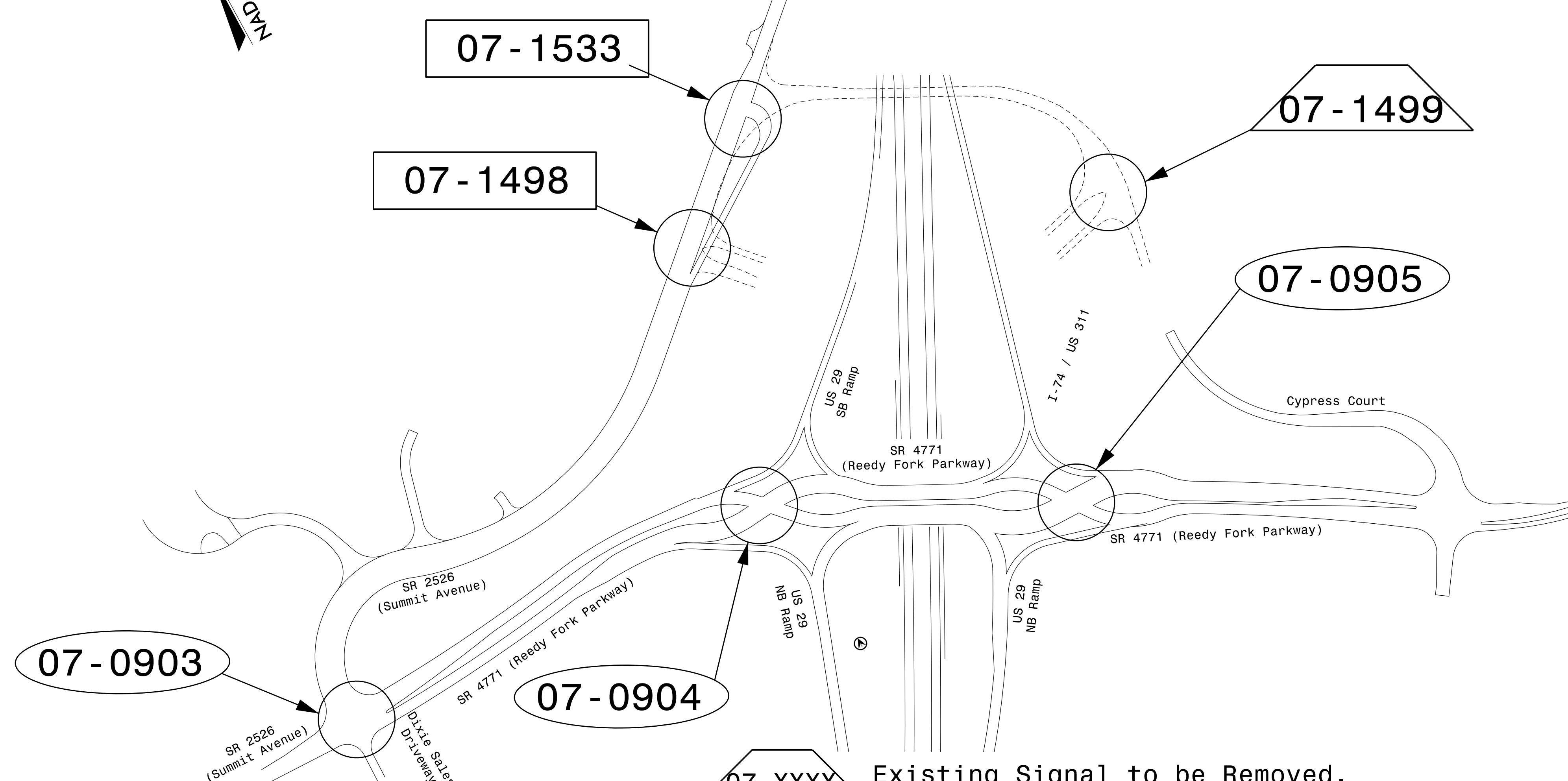
TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS

Project: R-4707

Contract: C204499



VICINITY MAP



- Existing Signal to be Removed.
- Existing Signal to be Modified then Removed.
- New Signal

HOME OFFICE:
119 BROOKSTOWN AVENUE, SUITE PH1
WINSTON-SALEM, NC 27101
336.744.1636 www.davenportworld.com
NCBELS FIRM LICENSE NO. C-2522

Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.

Index of Plans		
Sheet #	Reference #	Location/Description
Sig. 1.0	-----	Title Sheet
Sig. 1.1-1.2	-----	Standard Plate Sheets
REMOVE	07-1499	SR 4771 (Reedy Fork Parkway) at US 29 Northbound Ramps
Sig. 2.0-3.1	07-1533	SR 2526 (Summit Avenue) at US 29 SB Ramp
Sig. 4.0-5.1	07-1498	SR 2526 (Summit Avenue) at SR 4771 (Reedy Fork Parkway)
Sig. 6.0-9.4	07-0903	SR 4771 (Reedy Fork Parkway) at SR 2526 (Summit Avenue) / Dixie Sales Driveway
Sig. 10.0-12.2	07-0904	SR 4771 (Reedy Fork Parkway) at US 29 SB Ramps
Sig. 13.0-15.3	07-0905	SR 4771 (Reedy Fork Parkway) at US 29 NB Ramps
Sig. M1-M8	-----	Metal Pole Standard Drawings
SCP-1	-----	Wireless Radio Communication Plan

TRANSPORTATION MOBILITY AND SAFETY DIVISION

Robert J. Ziemba, PE - Central Region Signals Engineer
Keith M. Mims, PE - Signal Equipment Design Engineer
Gregg Green - Signal Communications Project Engineer

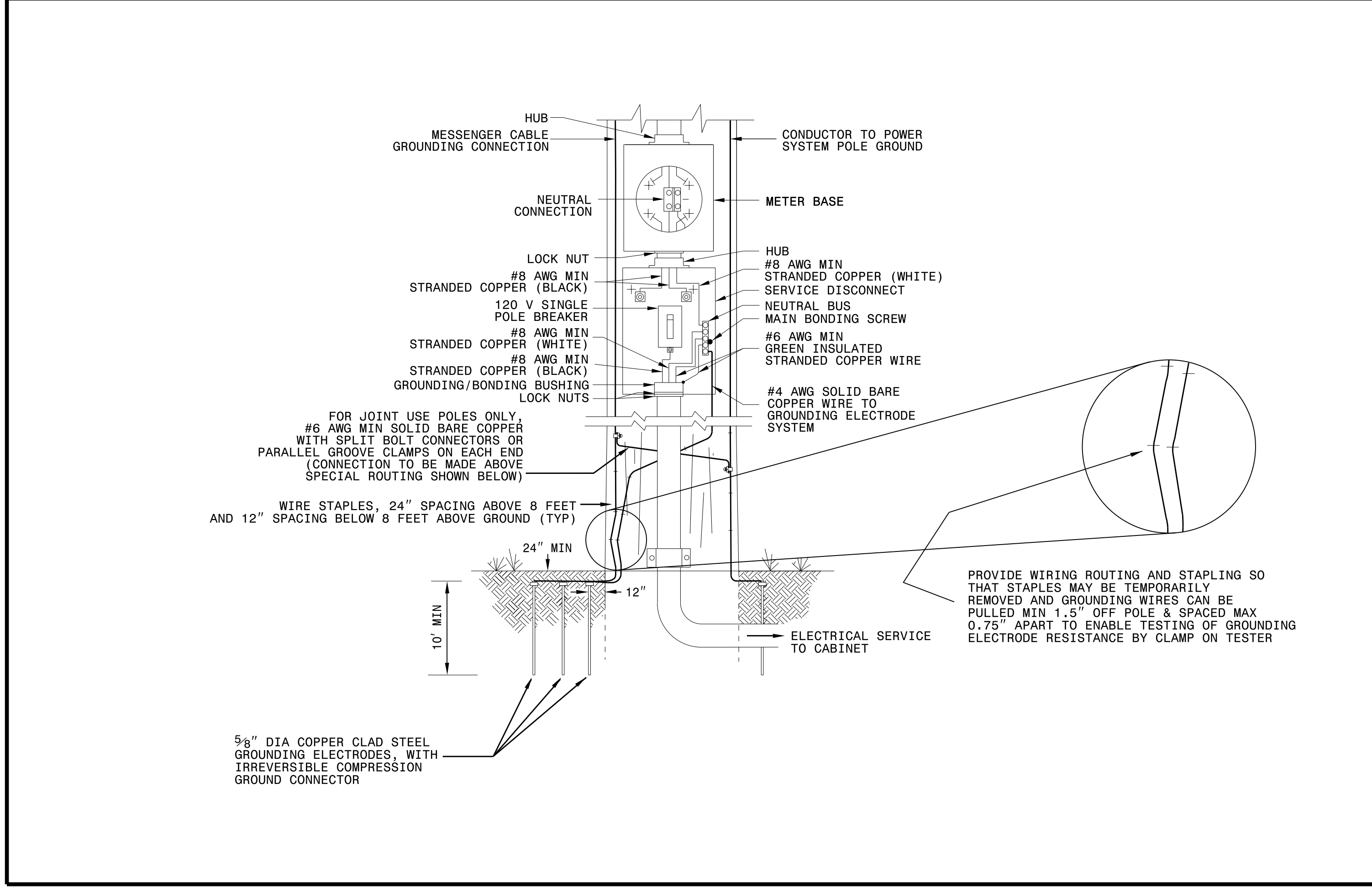
Prepared in the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY DIVISION

750 N. Greenfield Parkway, Garner, NC 27529
Telephone: (919) 773-2800

1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR
ELECTRICAL SERVICE GROUNDING
GROUNDING AND BONDING

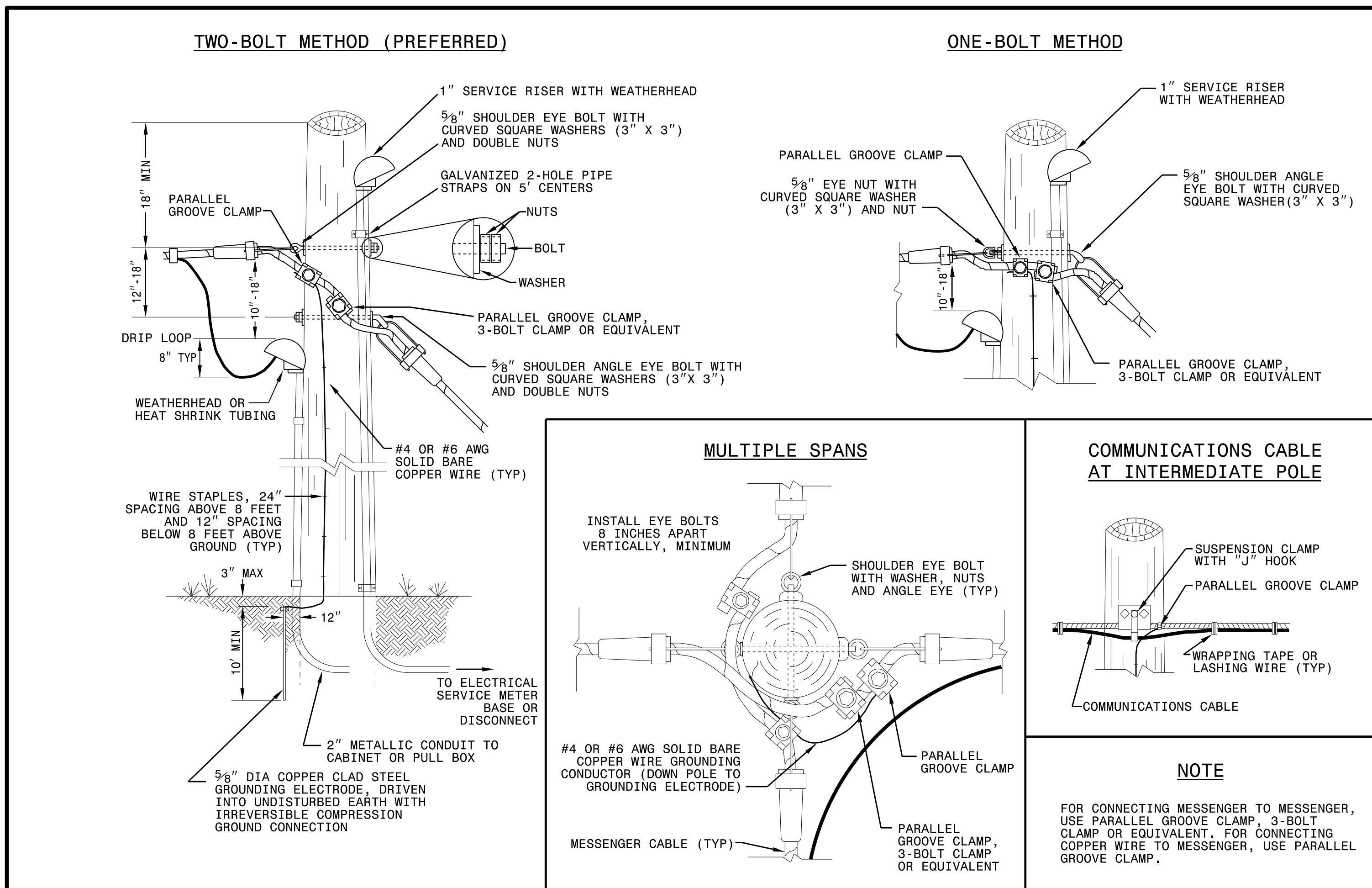
SHEET 1 OF 1
1700D01



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR
WOOD POLES
METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1
1720D01



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

See Plate for Title

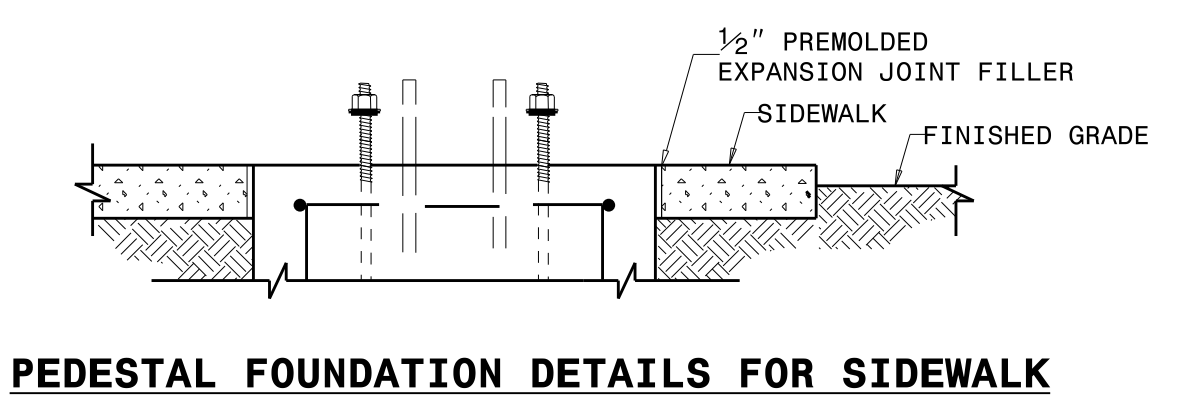
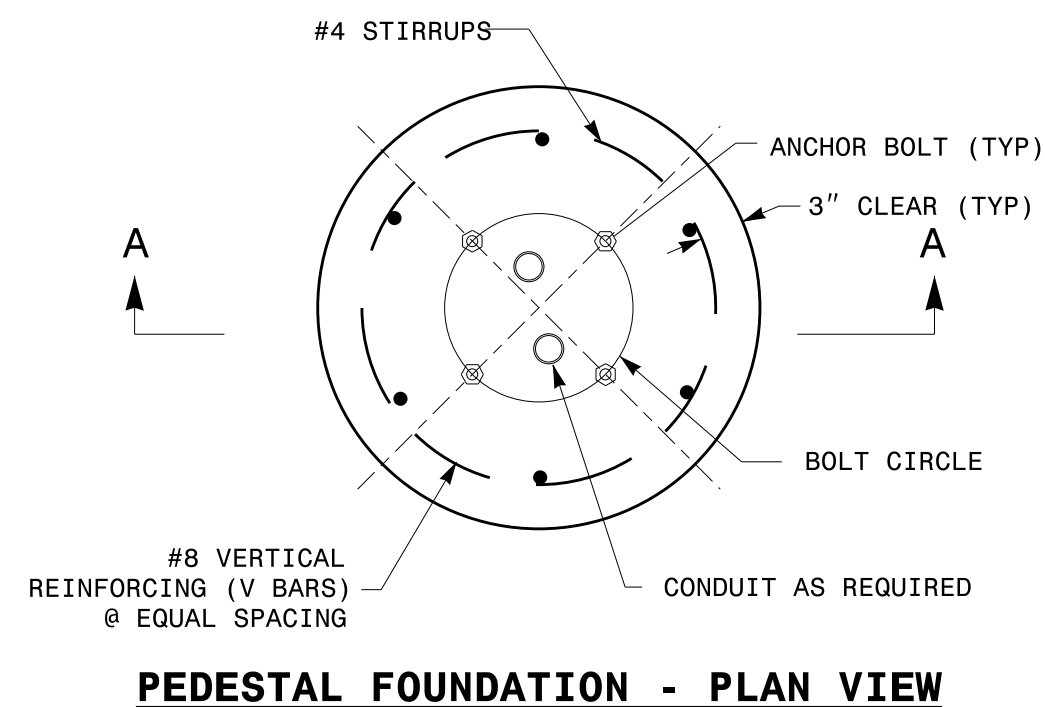
Prepared in the Offices of:

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Garner, NC 27529

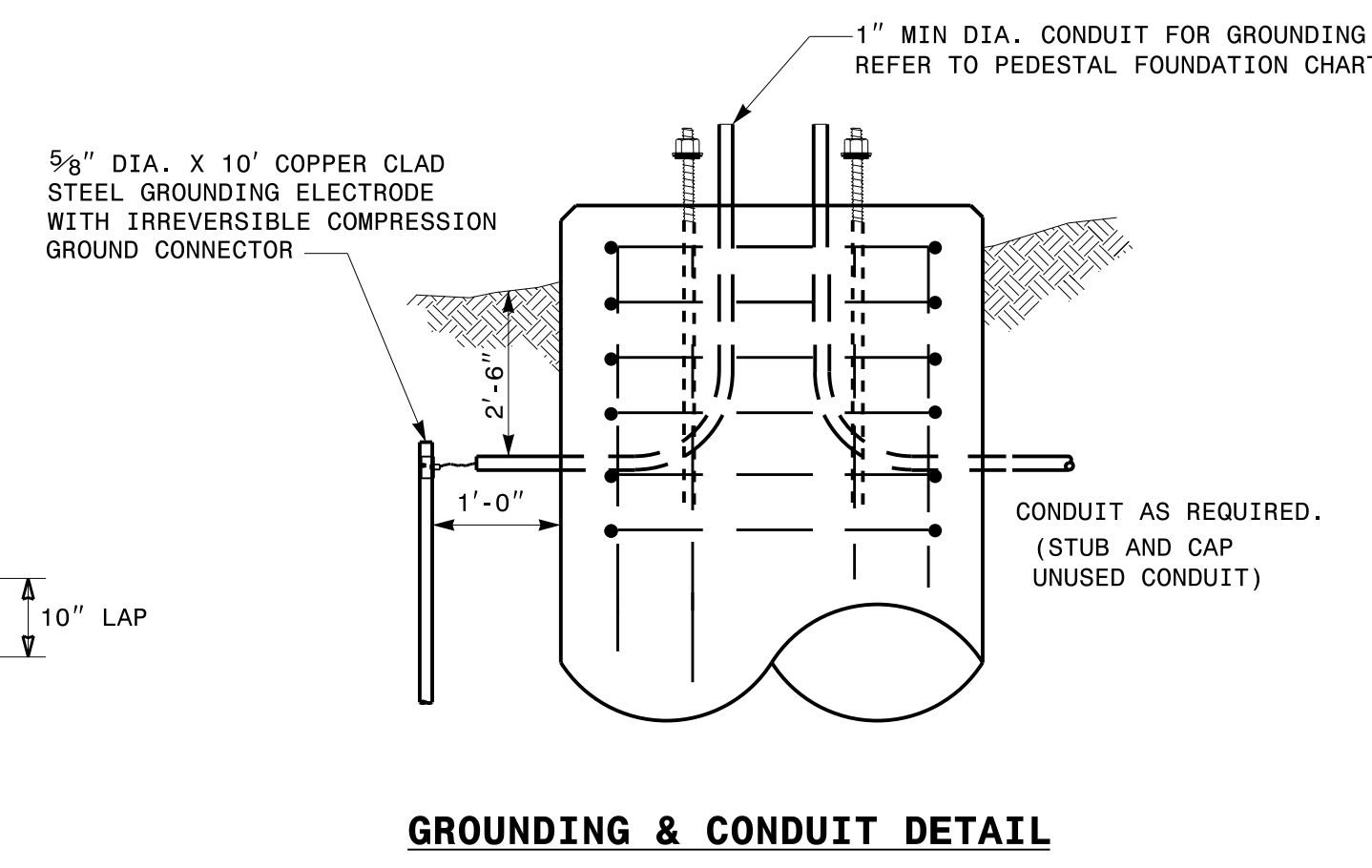
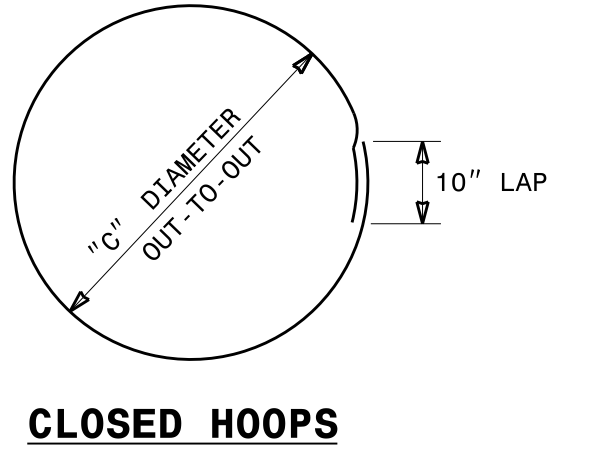
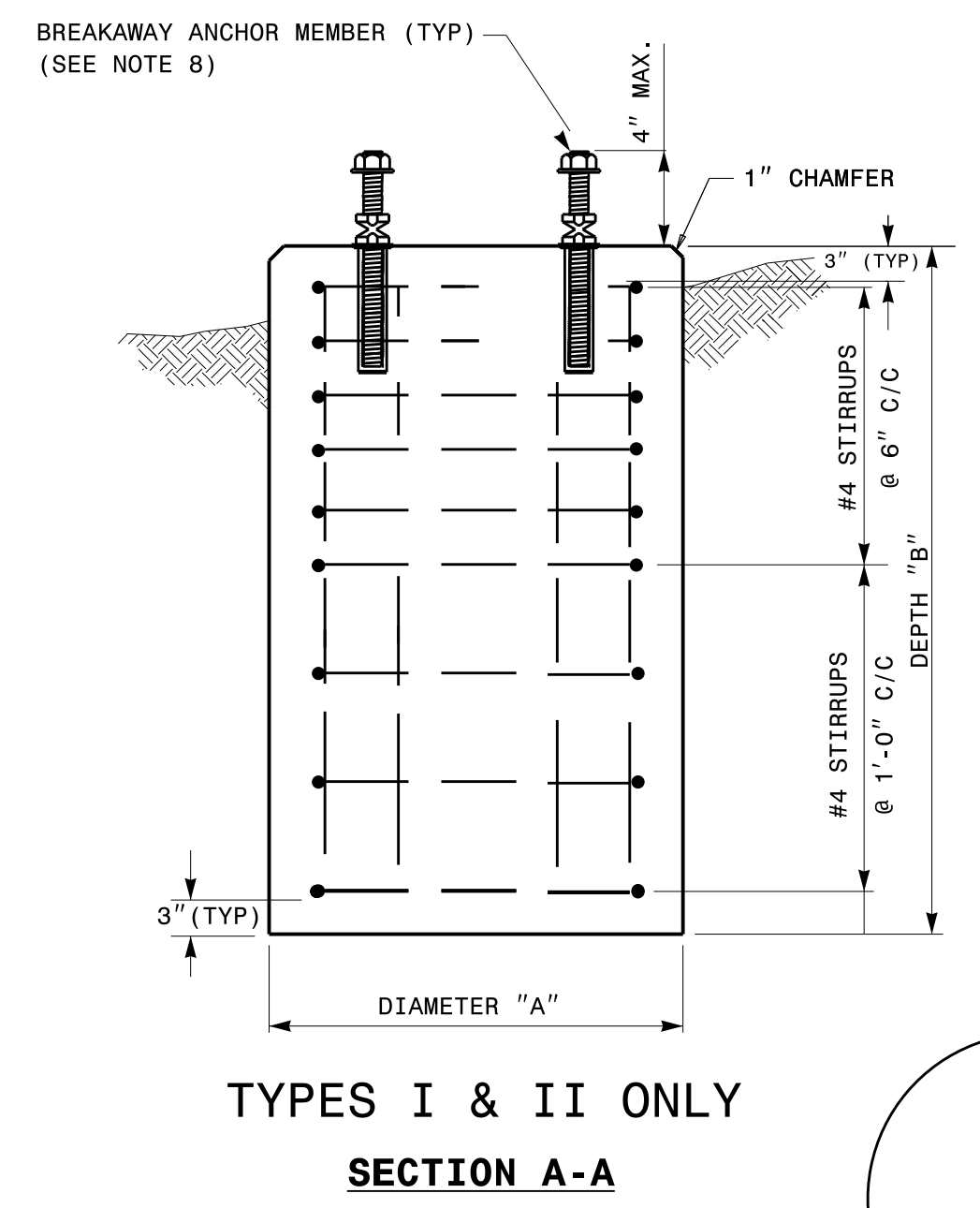
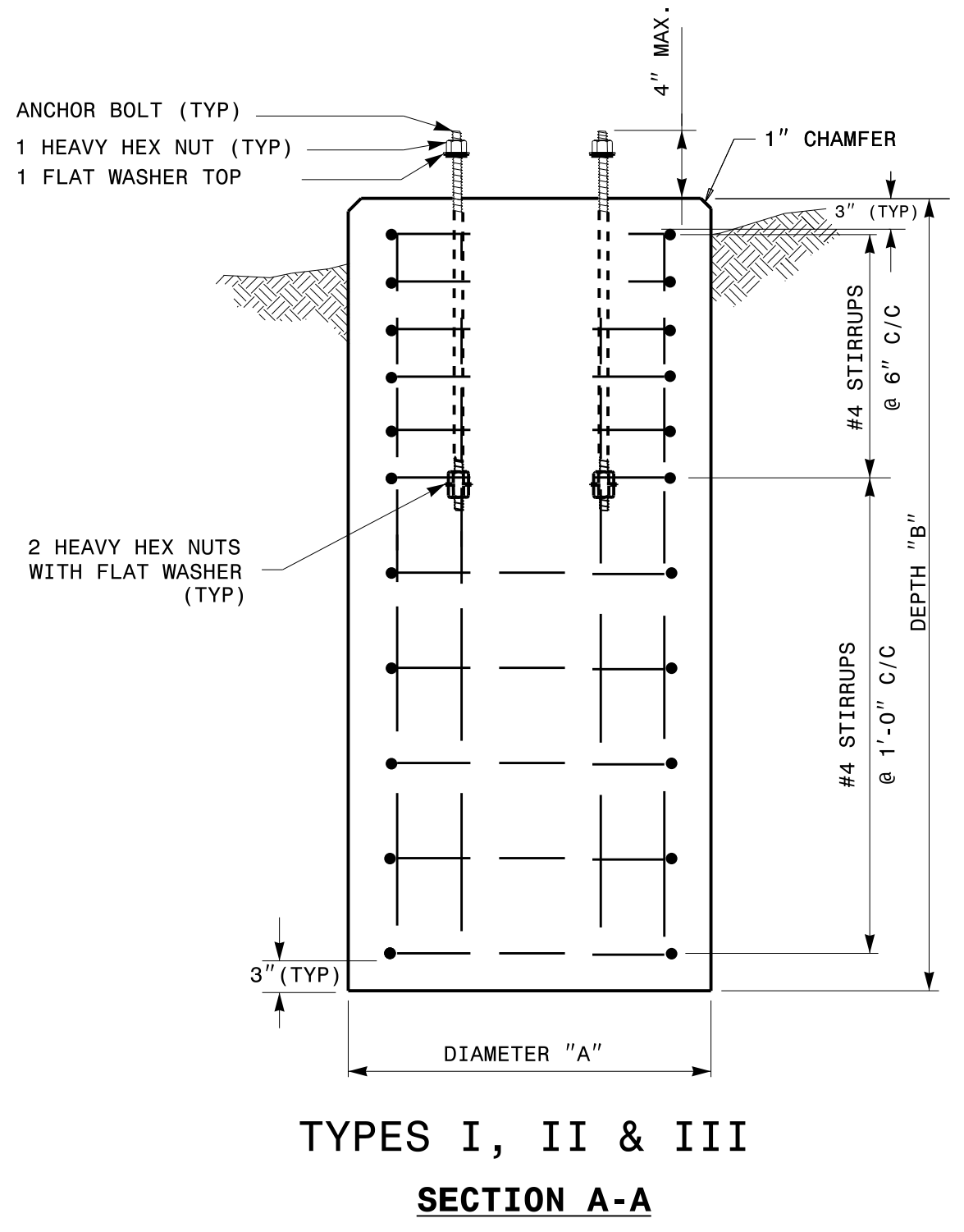
SEAL

Mohd A. Aslami
10/11/2017
DATE

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- NOTES:**
- CAST FOUNDATION AGAINST UNDISTURBED SOIL WHEREVER CONDITIONS PERMIT. IN UNSTABLE SOIL, CAST-IN-PLACE TUBE FORMS ARE ALLOWED WITH APPROVAL.
 - COMPLY WITH APPLICABLE PROVISIONS OF SECTION 825 FOR CONCRETE CONSTRUCTION.
 - USE CLASS "A" CONCRETE THAT MEETS THE REQUIREMENTS OF SECTION 1000 WITH A COMPRESSION STRENGTH AT 28 DAYS OF $F'c = 3000$ PSI (MIN.).
 - USE ASTM GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL.
 - GRADE IS ASSUMED TO BE (8H:1V) OR FLATTER. FOUNDATION SIZE AND DEPTHS ARE BASED ON THE FOLLOWING SOIL DESIGN PARAMETERS:
 - A. SANDY TYPE SOIL
 - B. NO GROUND WATER WITHIN 5'-0" OF SURFACE ELEVATION
 - C. WIND SPEED NOT TO EXCEED 140 MPH
 IF ACTUAL CONDITIONS VARY SUBSTANTIALLY FROM THOSE ASSUMED, THE FOUNDATION DEPTH MAY BE ADJUSTED. IN THIS CASE, CONTACT THE ENGINEER.
 - MAINTAIN AT LEAST 3" COVER ON ALL REINFORCEMENT.
 - ORIENT CONDUIT AS REQUIRED BY THE DESIGN OR AS DICTATED BY FIELD CONDITIONS.
 - USE ADHESIVE ANCHOR FOR THREADED COUPLING INSERT. FOR TYPE I MINIMUM DEPTH NECESSARY IS 0'-4 1/2" AND FOR TYPE II MINIMUM DEPTH NECESSARY IS 0'-6 5/8". FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS.



PEDESTAL FOUNDATION TYPE AND SIZE							
TYPE	PEDESTAL DESCRIPTION	SIZE			ANCHOR BOLT		INSTALL GROUNDING SYSTEM (YES/NO)
		DIAMETER "A" FT	DEPTH "B" FT	CONCRETE VOLUME CY	DIAMETER (MIN.) IN	LENGTH FT-IN	
I	PEDESTRIAN PUSHBUTTON	2'-0"	3'-6"	.41	1/2	1'-6"	NO
II	NORMAL-DUTY	2'-0"	5'-0"	.58	3/4	2'-0"	YES
III	HEAVY-DUTY	2'-6"	7'-0"	1.27	1	4'-0"	YES

REINFORCING STEEL SCHEDULE													
TYPE	V-BAR				STIRRUP								
	SIZE #	QTY	LENGTH	WEIGHT LBS	SIZE #	QUANTITY			LENGTH	DIAMETER "C" FT	OVERLAP MIN.	WEIGHT LBS	TOTAL STEEL WEIGHT LBS
						VERTICAL SPACING ON 6" CENTERS	ON 12" CENTERS	TOTAL					
I	8	6	3'-0"	56	4	0	4	4	5'-7"	1'-6"	0'-10"	15	71
II	8	6	4'-6"	86	4	5	3	8	5'-7"	1'-6"	0'-10"	30	116
III	8	6	6'-6"	122	4	7	4	11	7'-2"	2'-0"	0'-10"	53	175

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

ENGLISH STANDARD DRAWING FOR
PEDESTALS
 FOUNDATIONS

SHEET 1 OF 1
1743D01

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SIGNATURES COMPLETED

See Plate for Title

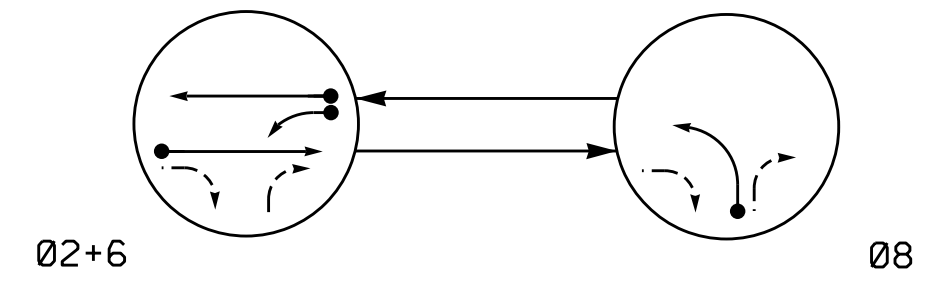
Prepared in the Offices of:

750 N. Greenfield Parkway
Garner, NC 27529

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
028094
ENGINEER
DEBESH C. SARKAR

Disc Signed by: *Debes C. Sarkar* 10/11/2017
DATE

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02+6	08	LEAVE
21, 22	G	R	Y
61	F	R	Y
62, 63	G	R	Y
81, 82	R	Y	R

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A/S3	6X6	300	5	-	2	Y	Y	-	-	-	Y	-
6A/S4	6X6	300	5	-	6	Y	Y	-	-	-	Y	-
6B	6X40	0	2-4-2	-	6	Y	Y	Y	-	3	-	-
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	-	-	-

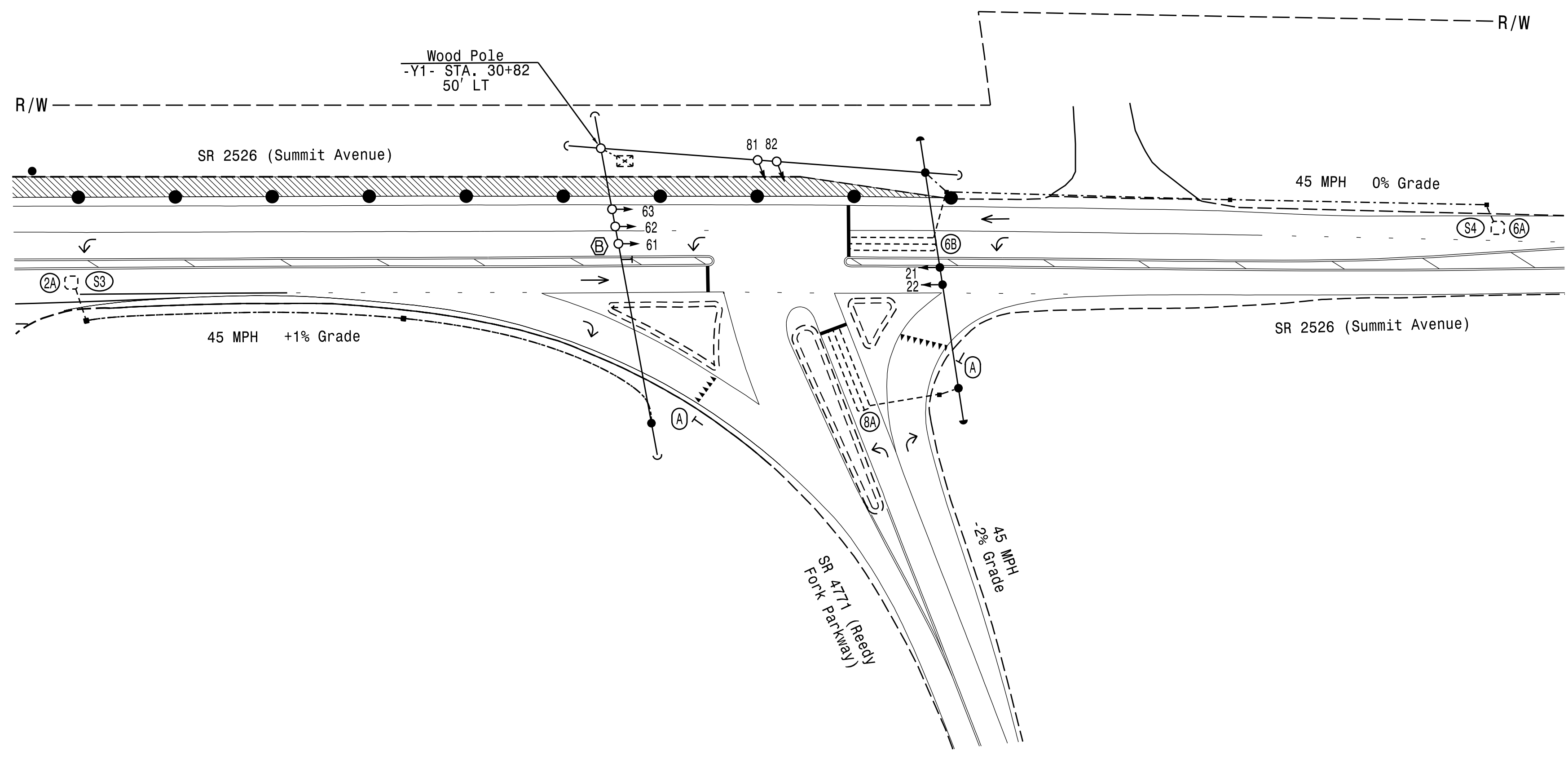
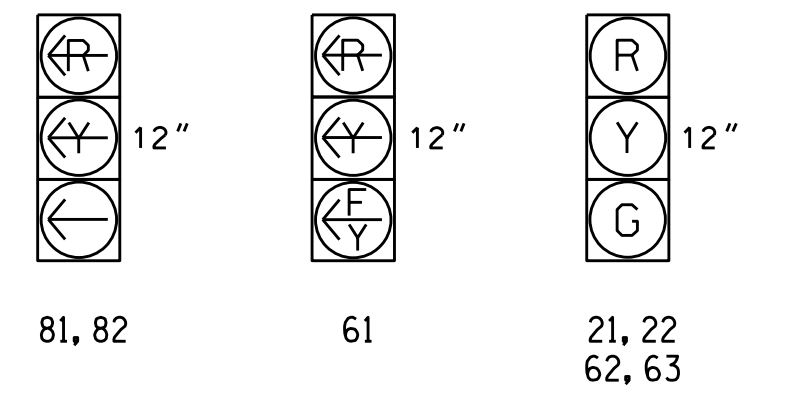
2 Phase Fully Actuated SR 2526 (Summit Avenue) CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #: 1533.

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 TIMING CHART

FEATURE	PHASE		
	2	6	8
Min. Green 1 *	12	12	7
Extension 1 *	6.0	6.0	2.0
Max Green 1 *	60	60	35
Yellow Clearance	4.5	4.5	3.3
Red Clearance	1.0	1.0	2.1
Red Revert	2.0	2.0	2.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	2.5	2.5	-
Max Variable Initial *	34	34	-
Time Before Reduction *	15	15	-
Time To Reduce *	30	30	-
Minimum Gap	3.0	3.0	-
Recall Mode	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	YELLOW	YELLOW	-
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

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

LEGEND

- | PROPOSED | EXISTING |
|--|----------|
| ○→ Traffic Signal Head | ●→ |
| ●→ Modified Signal Head | N/A |
| — Sign | — |
| ⊞ Pedestrian Signal Head With Push Button & Sign | ⊞ |
| ○→ Signal Pole with Guy | ●→ |
| ○→ Signal Pole with Sidewalk Guy | ●→ |
| ⊞ Inductive Loop Detector | ⊞ |
| ⊞ Controller & Cabinet | ⊞ |
| ⊞ Junction Box | ⊞ |
| --- 2-in Underground Conduit | --- |
| N/A Right of Way | --- |
| → Directional Arrow | → |
| ▨ Construction Zone | N/A |
| ● Construction Barrel | N/A |
| Ⓐ "YIELD" Sign (R1-2) | Ⓐ |
| Ⓟ Left Arrow "ONLY" Sign (R3-5L) | Ⓟ |

Signal Upgrade Temporary Design 1 (TMP Phase I - Step 2)

Project #: 180914

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SR 2526 (Summit Avenue) at SR 4771 (Reedy Fork Parkway)

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: R. Hinshaw

PREPARED BY: A. Hayes REVIEWED BY:

SCALE: 1" = 40'

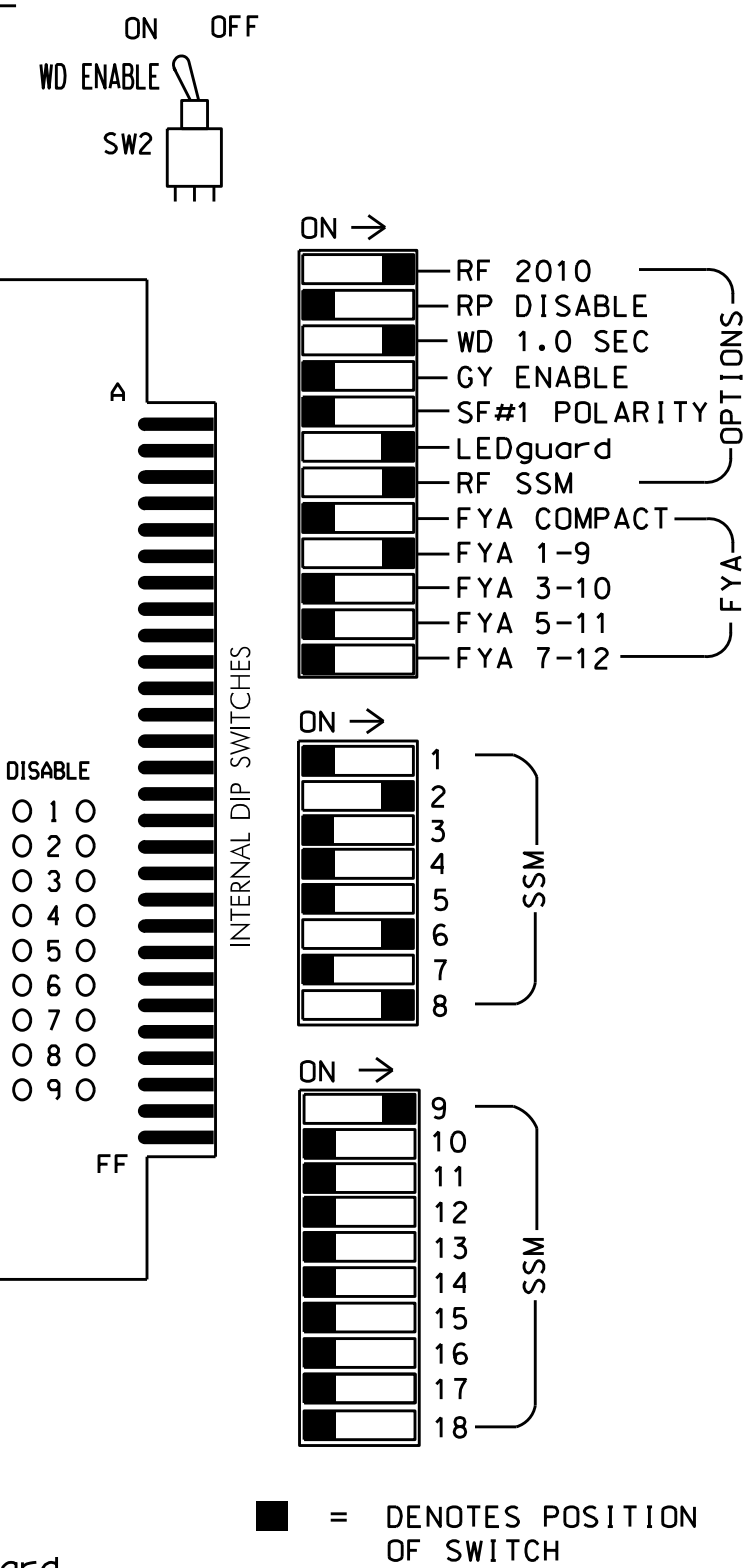
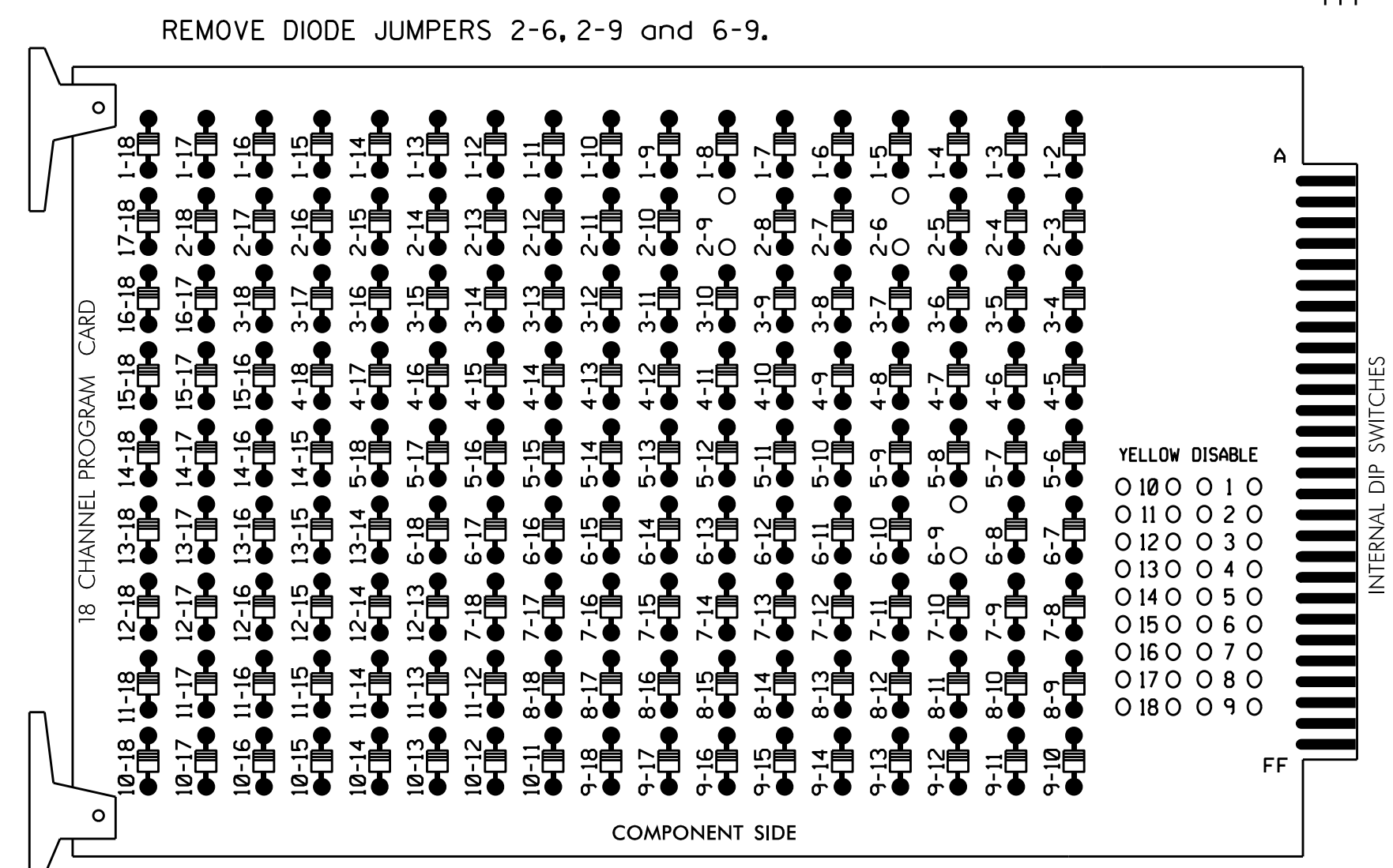
SEAL: R. ROYAL HINSHAW, PROFESSIONAL ENGINEER, NO. 032117

DocuSigned by: R. Royal Hinshaw 4/20/2020

SIG. INVENTORY NO. 07-153311

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the SR 2526 (Summit Avenue) CLS.

EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S8,S11,AUX S1
 PHASES USED.....2,6,8
 OVERLAP "A".....2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

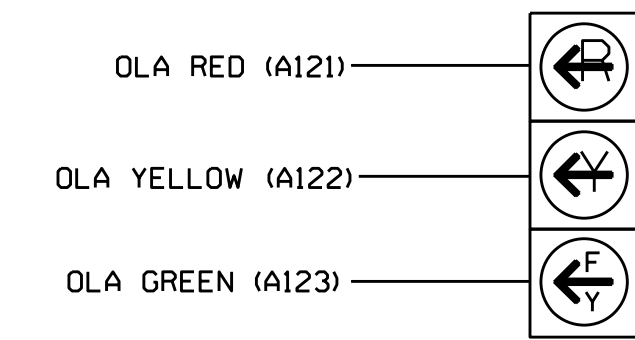
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	NU	62,63	NU	NU	81,82	NU	61	NU	NU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

NU = Not Used

* See pictorial of head wiring in detail below.

3 SECTION FYA PPLT SIGNAL WIRING DETAIL

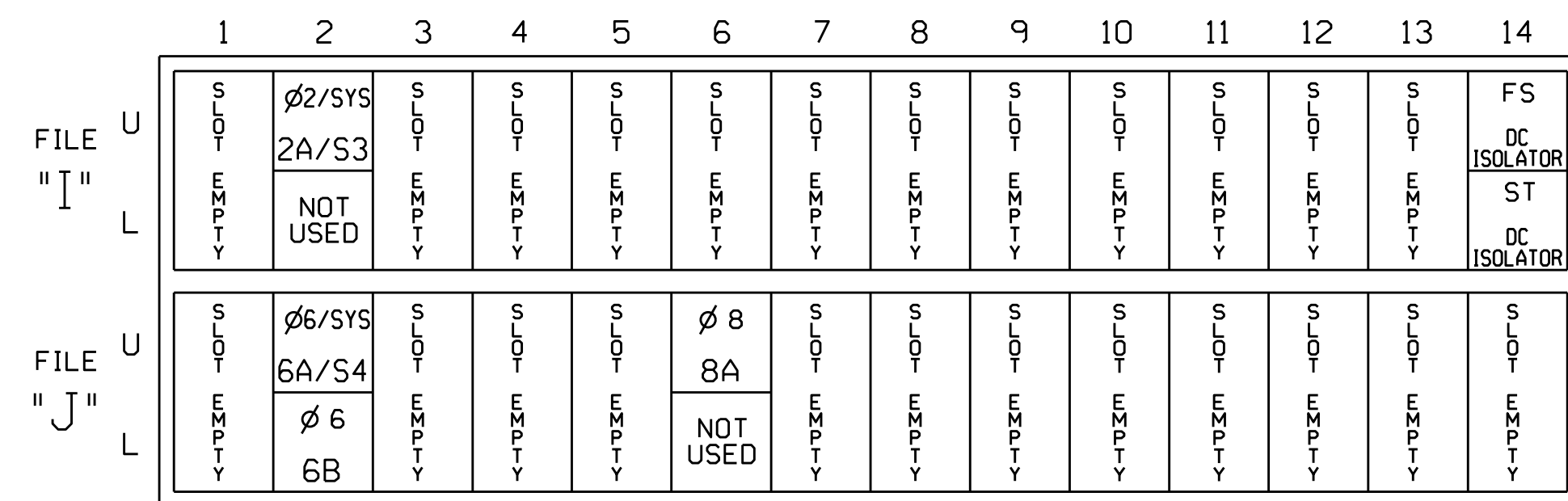
(wire signal heads as shown)



61

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```

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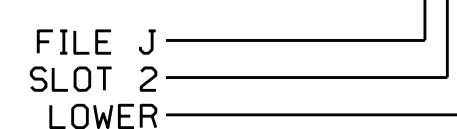
← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A/S3	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
6A/S4	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y	Y		3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L



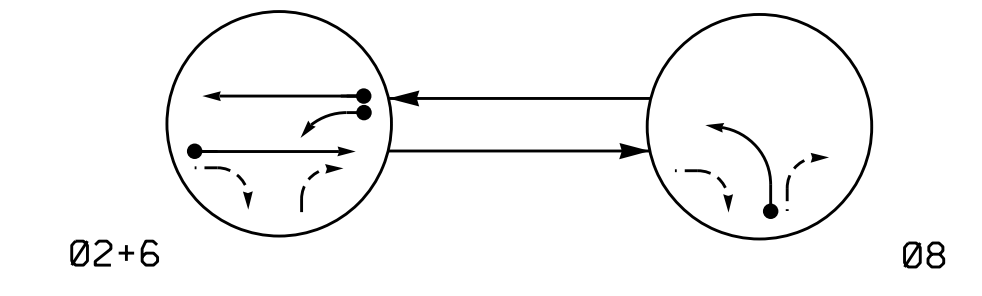
Project #: 180914

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 NCBELS FIRM LICENSE NO. C-2522

Electrical Details - Temporary Design 1 (TMP Phase I - Step 2)

ELECTRICAL AND PROGRAMMING DETAILS FOR:		SR 2526 (Summit Avenue) at SR 4771 (Reedy Fork Parkway)		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared for: 		Division 7 Guilford County Greensboro		SEAL STATE OF NORTH CAROLINA PROFESSIONAL ENGINEER ROYAL HINSHAW	
PLAN DATE: April 2020	REVIEWED BY: A. Hayes	SEAL 032117		DocuSigned by: R. Royal Hinshaw 4/20/2020	
PREPARED BY: R. Hinshaw	REVIEWED BY:	SIGNATURE		DATE	
REVISIONS	INIT.	DATE		SIG. INVENTORY NO. 07-1533T1	

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02+6	08	LEADER
21, 22	G	R	Y
61	F	R	Y
62, 63	G	R	Y
81, 82	R	Y	R

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

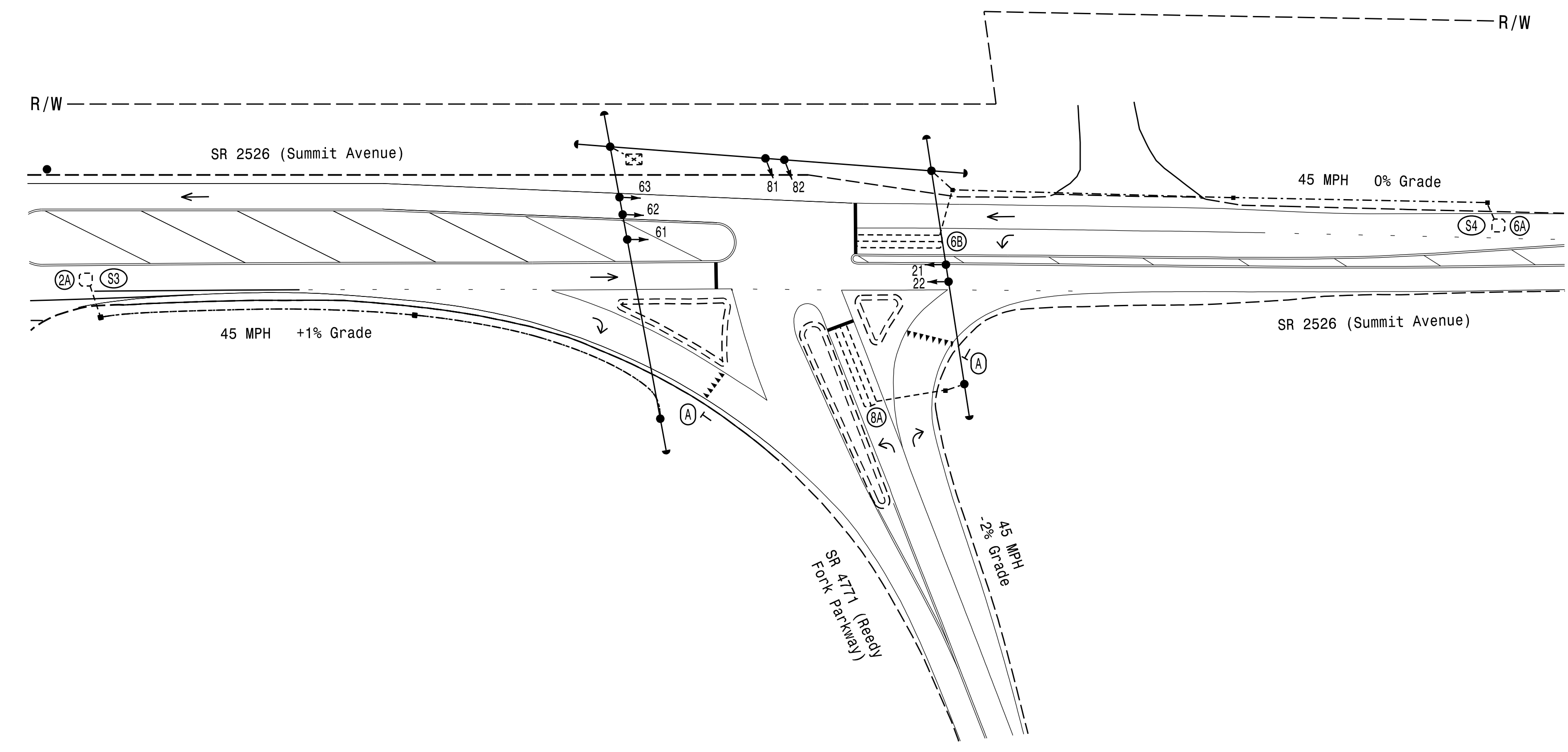
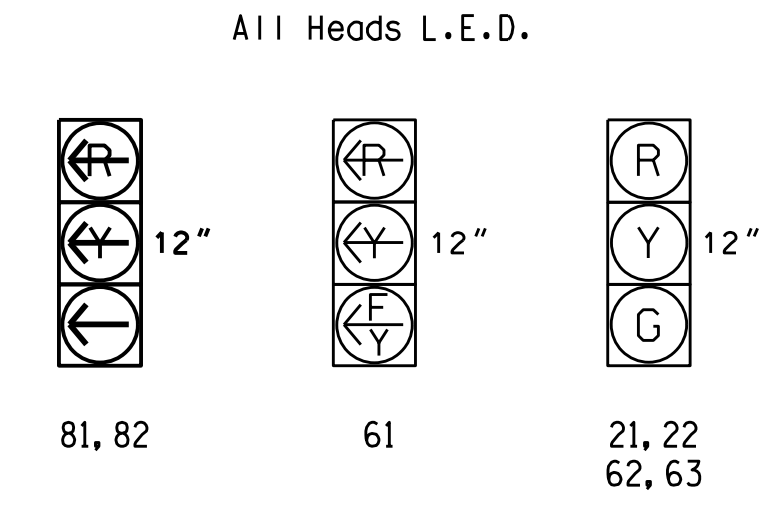
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A/S3	6X6	300	5	-	2	Y	Y	-	-	-	Y	-
6A/S4	6X6	300	5	-	6	Y	Y	-	-	-	Y	-
6B	6X40	0	2-4-2	-	6	Y	Y	Y	-	3	-	-
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	-	-	-

2 Phase
Fully Actuated
SR 2526 (Summit Avenue) CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Reposition existing signal heads numbered 62 and 63.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #: 1533.

SIGNAL FACE I.D.



OASIS 2070 TIMING CHART

FEATURE	PHASE		
	2	6	8
Min. Green 1 *	12	12	7
Extension 1 *	6.0	6.0	2.0
Max Green 1 *	60	60	35
Yellow Clearance	4.5	4.5	3.3
Red Clearance	1.0	1.0	2.1
Red Revert	2.0	2.0	2.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	2.5	2.5	-
Max Variable Initial *	34	34	-
Time Before Reduction *	15	15	-
Time To Reduce *	30	30	-
Minimum Gap	3.0	3.0	-
Recall Mode	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	YELLOW	YELLOW	-
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

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

LEGEND

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

Signal Upgrade
Temporary Design 2 (TMP Phase II - Step 8)

Project #: 180914

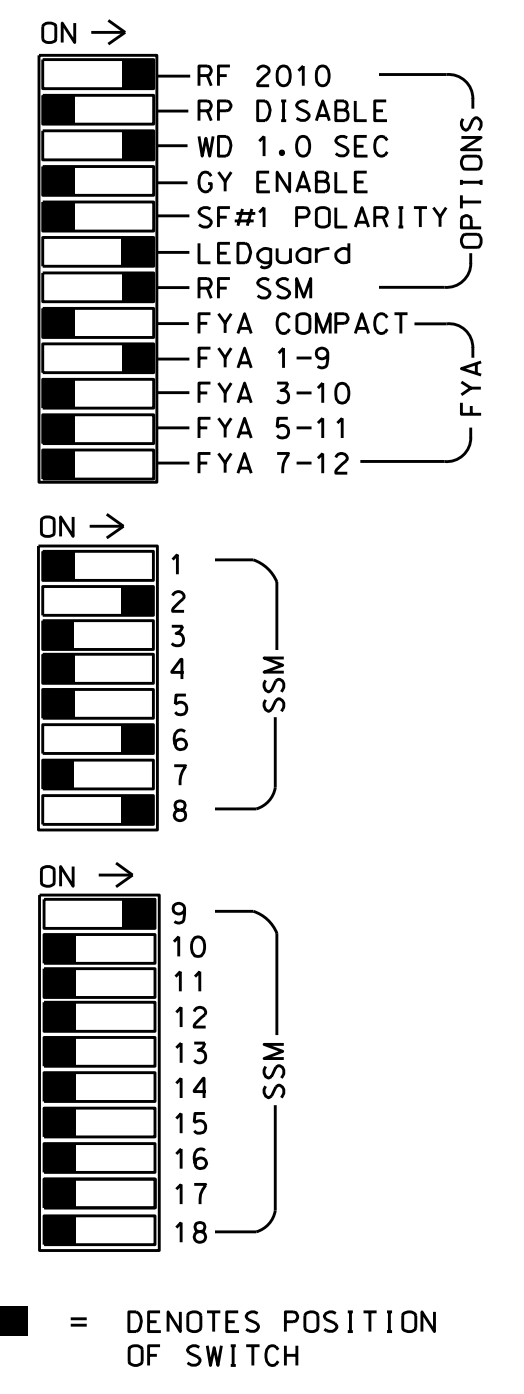
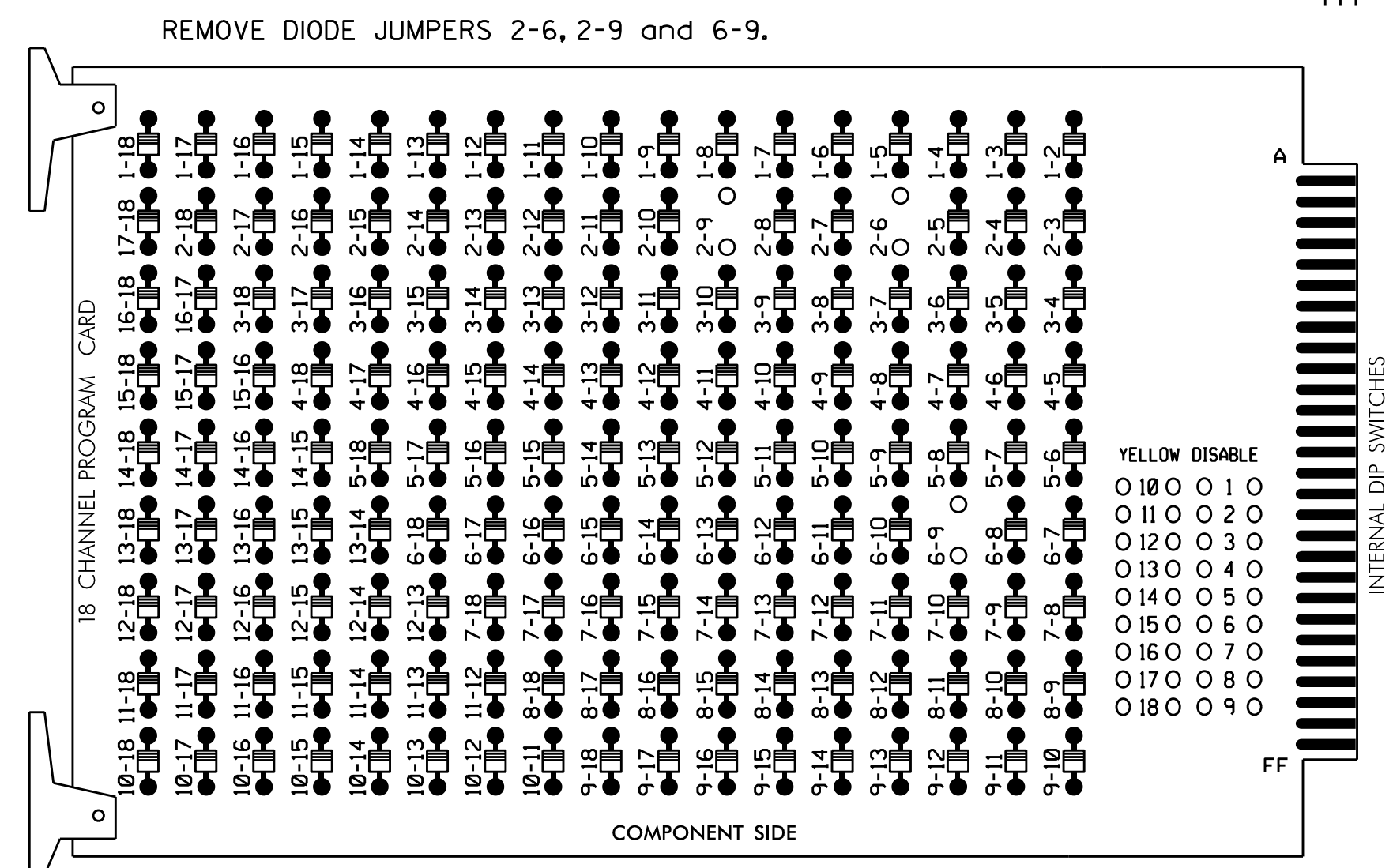
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	SR 2526 (Summit Avenue) at SR 4771 (Reedy Fork Parkway)		
	Division 7 Guilford County Greensboro PLAN DATE: April 2020 REVIEWED BY: R. Hinshaw PREPARED BY: A. Hayes REVIEWED BY:	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
750 N. Greenfield Pkwy, Garner, NC 27529 SCALE: 0 40 1" = 40'	REVISIONS:	INIT. DATE:	DocuSigned by: R. Hinshaw DATE: 4/20/2020 SIG. INVENTORY NO. 07-153312

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the SR 2526 (Summit Avenue) CLS.

EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S8,S11,AUX S1
 PHASES USED.....2,6,8
 OVERLAP "A".....2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

PROJECT REFERENCE NO.	SHEET NO.
R-4707	Sig.3.1

SIGNAL HEAD HOOK-UP CHART

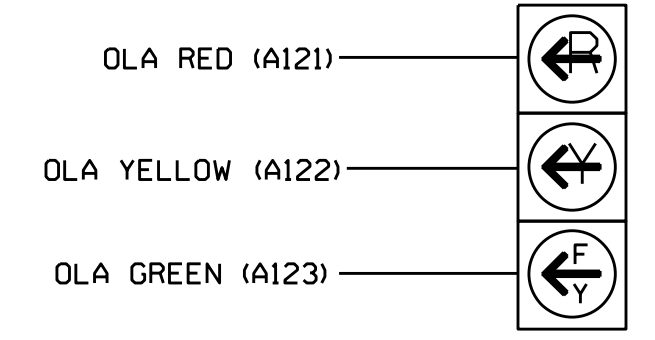
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	NU	62,63	NU	NU	81,82	NU	61	NU	NU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

NU = Not Used

* See pictorial of head wiring in detail below.

3 SECTION FYA PPLT SIGNAL WIRING DETAIL

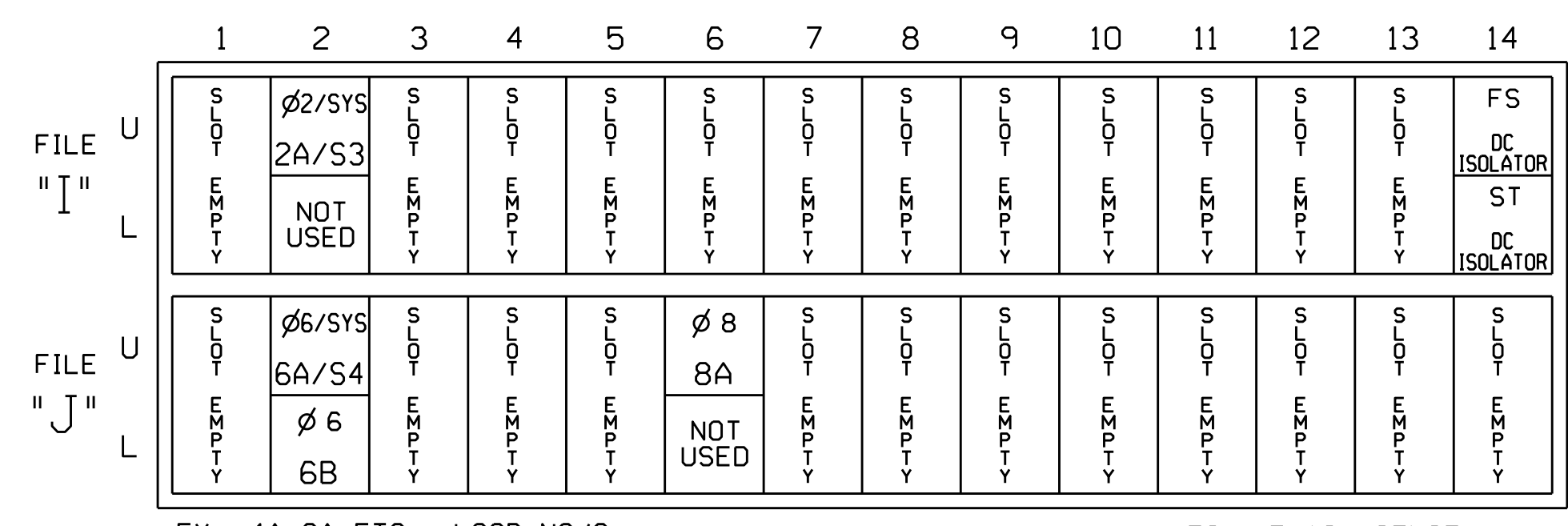
(wire signal heads as shown)



61

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```

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

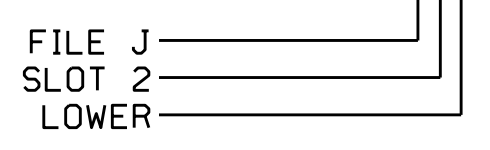
← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A/S3	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
6A/S4	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y	Y		3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L



Project #: 180914

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Electrical Details - Temporary Design 2 (TMP Phase II - Step 8)

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SEAL

SR 2526 (Summit Avenue)
 at
 SR 4771 (Reedy Fork Parkway)

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: R. Hinshaw

PREPARED BY: A. Ayuninjam REVIEWED BY:

REVISIONS INIT. DATE

DocuSigned by:
 R. Hinshaw 4/20/2020

SIGNATURE DATE

SIG. INVENTORY NO. 07-153372

PHASING DIAGRAM

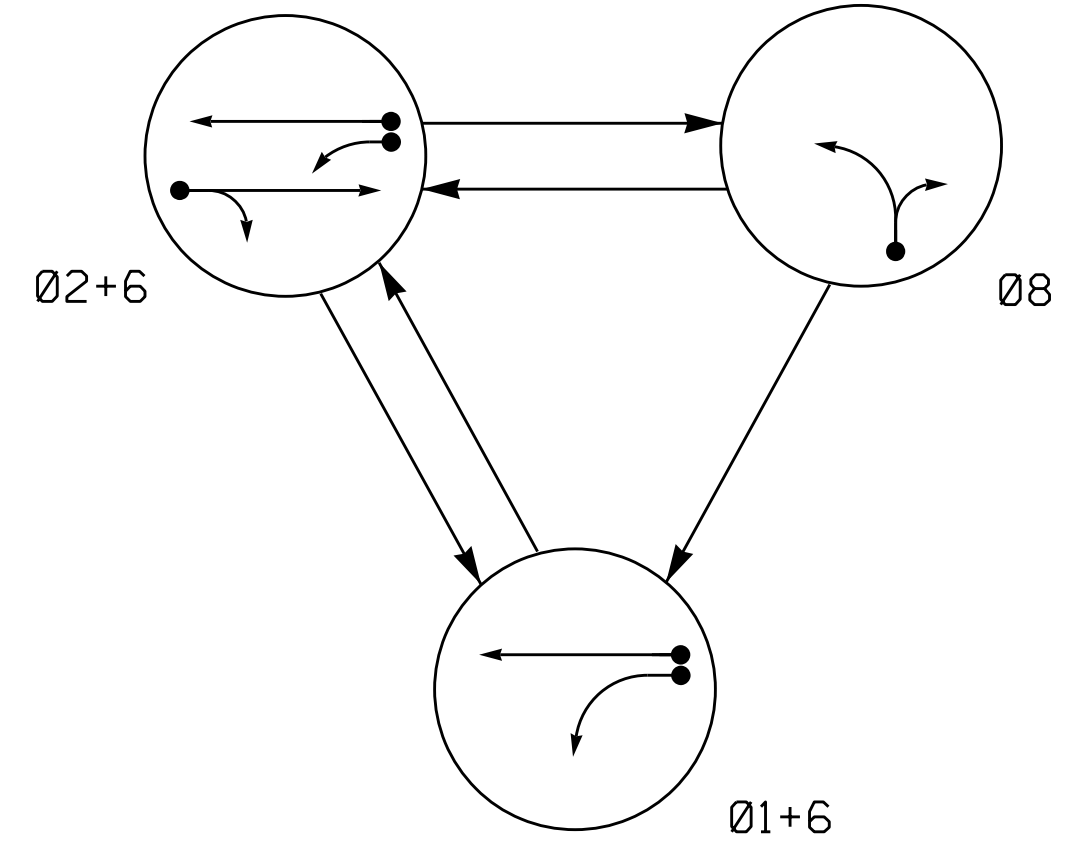
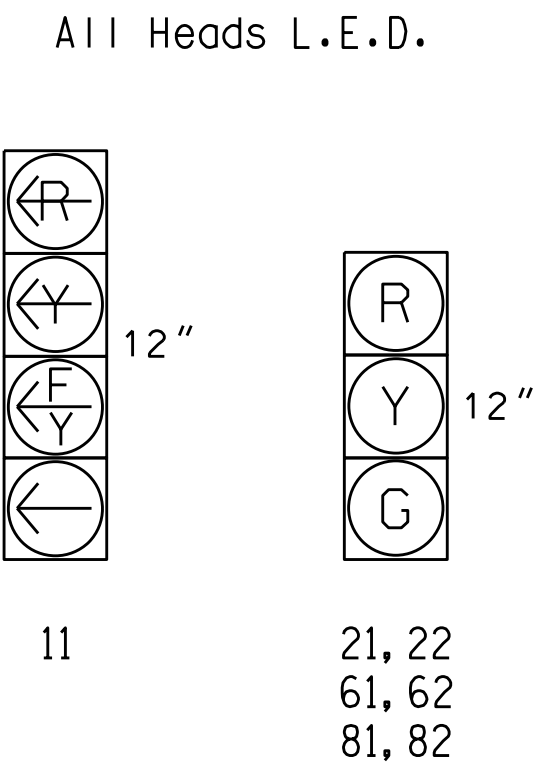


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	Ø 1 + 6	Ø 2 + 6	Ø 8	FLASH
11	←	←	←	←
21, 22	R	G	R	Y
61, 62	G	G	R	Y
81, 82	R	R	G	R

SIGNAL FACE I.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP/ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A**	6X40	0	**	**	1	Y	Y	-	-	15	-	**
2A/S1	6X6	300	5	-	2	Y	Y	-	-	3	-	-
6A/S2**	6X6	300	**	**	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	5	-	-
8B	6X15	0	3	-	8	Y	Y	-	-	15	-	-

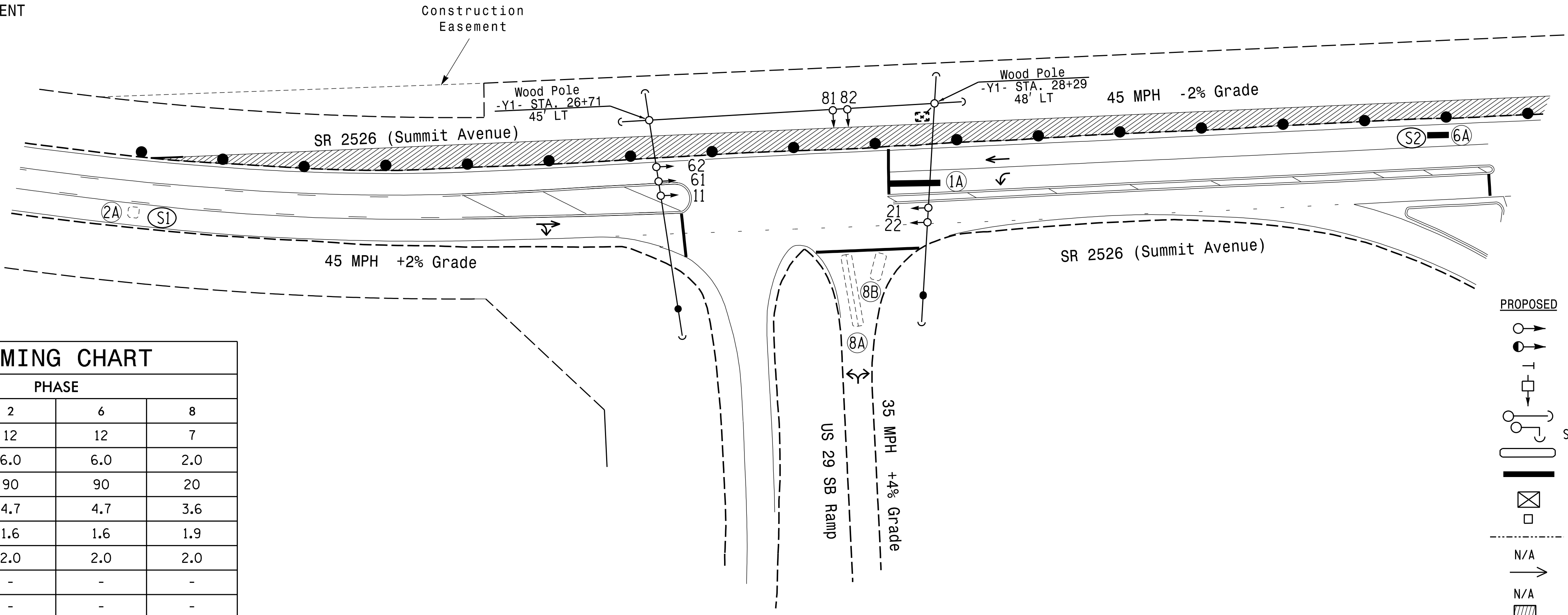
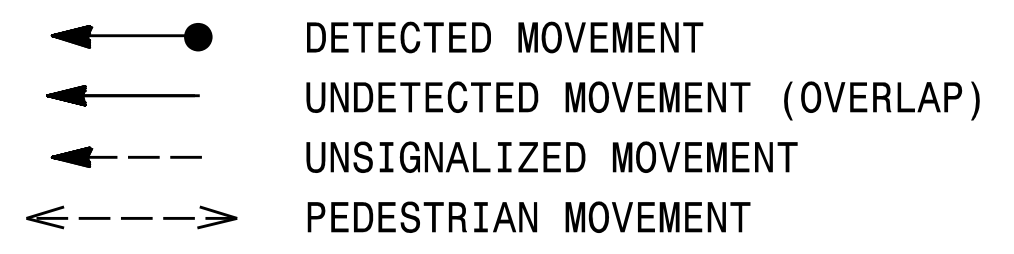
** Video Detection

3 Phase Fully Actuated
SR 2526 (Summit Avenue) CLS

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Pavement markings are existing unless otherwise shown.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Closed loop system data:
Master Asset #: 10724,
Controller Asset #: 1498.
8. A video imaging loop emulator detection system is used to provide traffic detection during this temporary phase. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on Signal Design Plans.

PHASING DIAGRAM DETECTION LEGEND

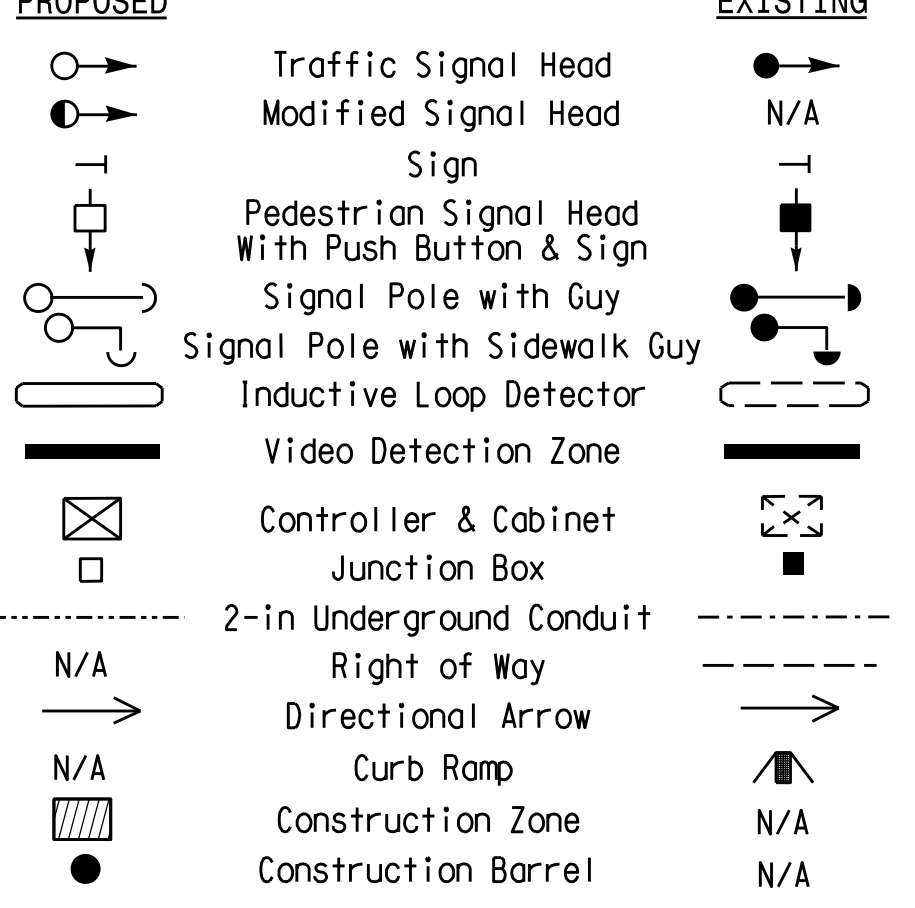


OASIS 2070 TIMING CHART

FEATURE	PHASE			
	1	2	6	8
Min Green 1 *	7	12	12	7
Extension 1 *	2.0	6.0	6.0	2.0
Max Green 1 *	20	90	90	20
Yellow Clearance	3.0	4.7	4.7	3.6
Red Clearance	2.9	1.6	1.6	1.9
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	2.5	2.5	-
Max Variable Initial *	-	34	34	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	30	30	-
Minimum Gap	-	3.0	3.0	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND



Signal Upgrade
Temporary Design 1 (TMP Phase I - Step 2)

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SR 2526 (Summit Avenue)
at
US 29 Southbound Ramps

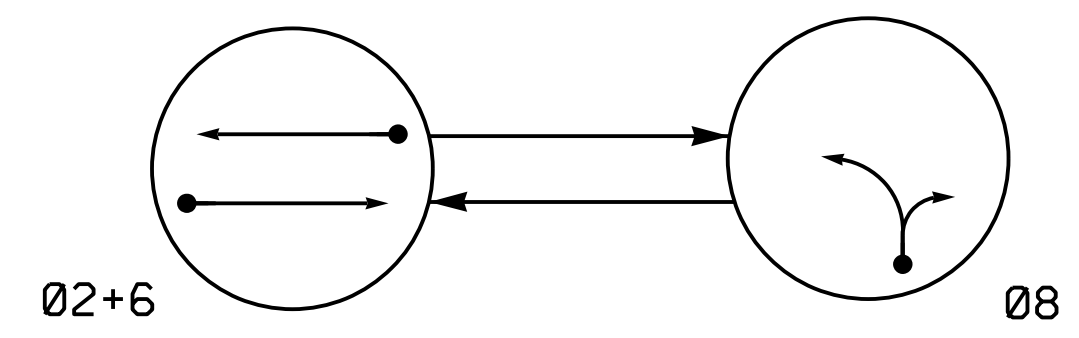
Division 7 Guilford County Greensboro
PLAN DATE: April 2020 REVIEWED BY: L Boyer
PREPARED BY: K. Dean REVIEWED BY:

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
L. BOYER
030912
04/20/2020
SIG. INVENTORY NO. 07-149811

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

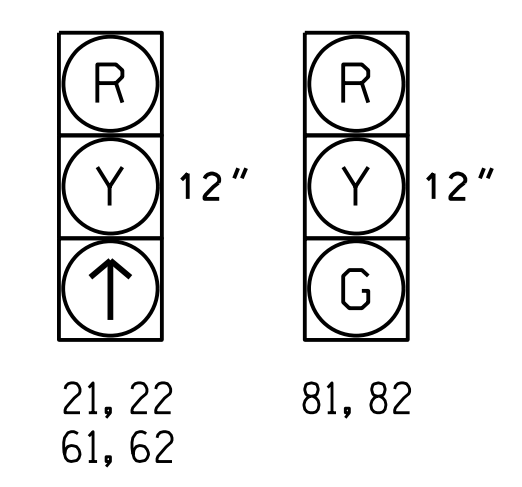
- DETECTED MOVEMENT
UNDETECTED MOVEMENT (OVERLAP)
UNSIGNALIZED MOVEMENT
PEDESTRIAN MOVEMENT

TABLE OF OPERATION

Table with columns: SIGNAL FACE, PHASE (02+6, 08, FLASH), and timing values for phases 2, 6, and 8.

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

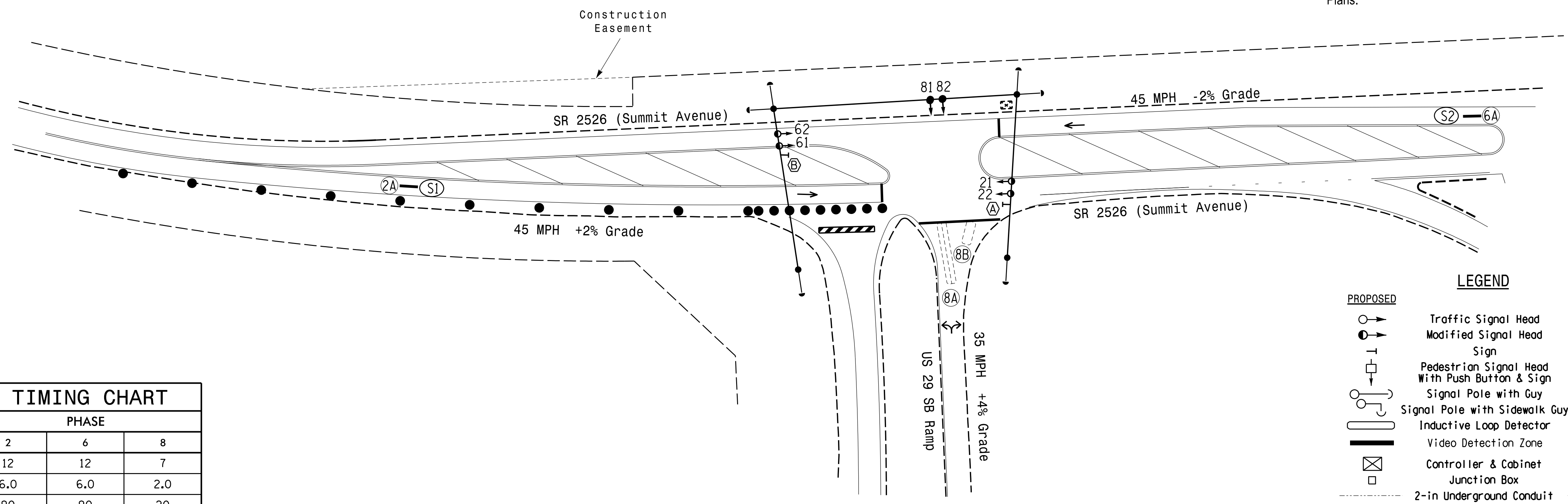
Table with columns: LOOP/ZONE, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, PHASE, CALLING, EXTENSION, FULL TIME DELAY, STRETCH TIME, DELAY TIME, SYSTEM LOOP, NEW CARD.

** Video Detection

2 Phase Fully Actuated SR 2526 (Summit Avenue) CLS

NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018...
2. Do not program signal for late night flashing operation...
3. Reposition existing signal heads 61 and 62.
4. Set all detector units to presence mode.
5. Maximum times shown in timing chart are for free-run operation only.
6. Closed loop system data: Master Asset #: 10724, Controller Asset #: 1498.
7. A video imaging loop emulator detection system is used to provide traffic detection during this temporary phase.



OASIS 2070 TIMING CHART

Timing chart table with columns: FEATURE, PHASE (2, 6, 8), and values for Min Green, Extension, Max Green, Clearance, etc.

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

LEGEND

- PROPOSED: Traffic Signal Head, Modified Signal Head, Pedestrian Signal Head, Signal Pole with Guy, Inductive Loop Detector, Video Detection Zone, Controller & Cabinet, Junction Box, Right of Way, Directional Arrow, Curb Ramp, Barrier.
EXISTING: Signal Head, Sign, Signal Pole with Guy, Conduit, Right of Way, Directional Arrow, Curb Ramp, Barrier, Construction Barrel, No Right Turn Sign, No U-Turn/No Left Turn Sign.

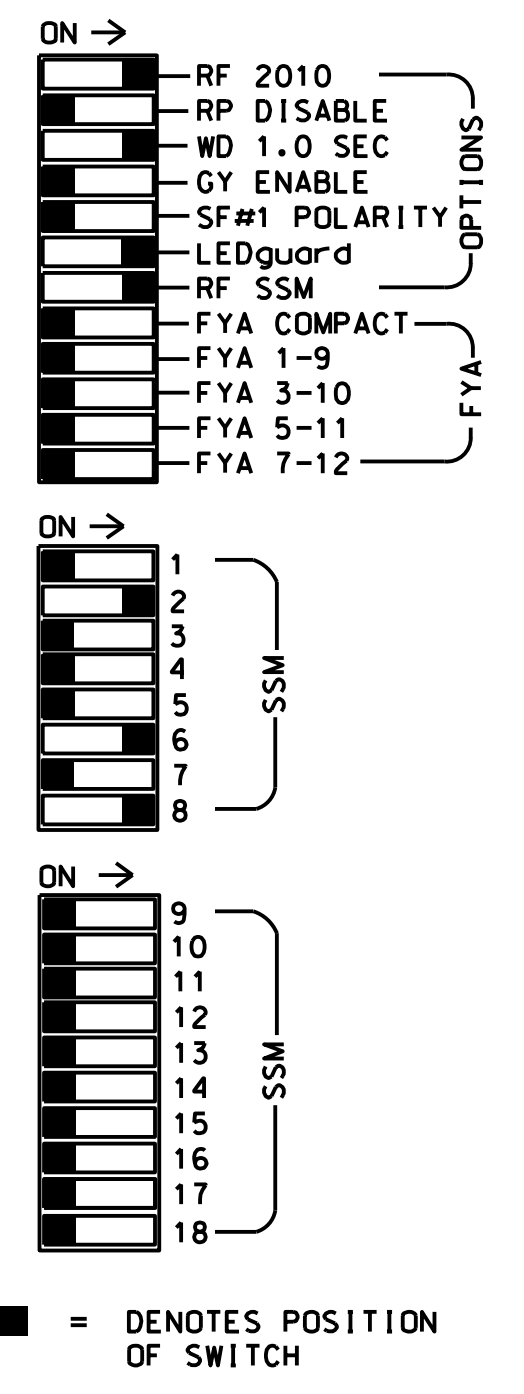
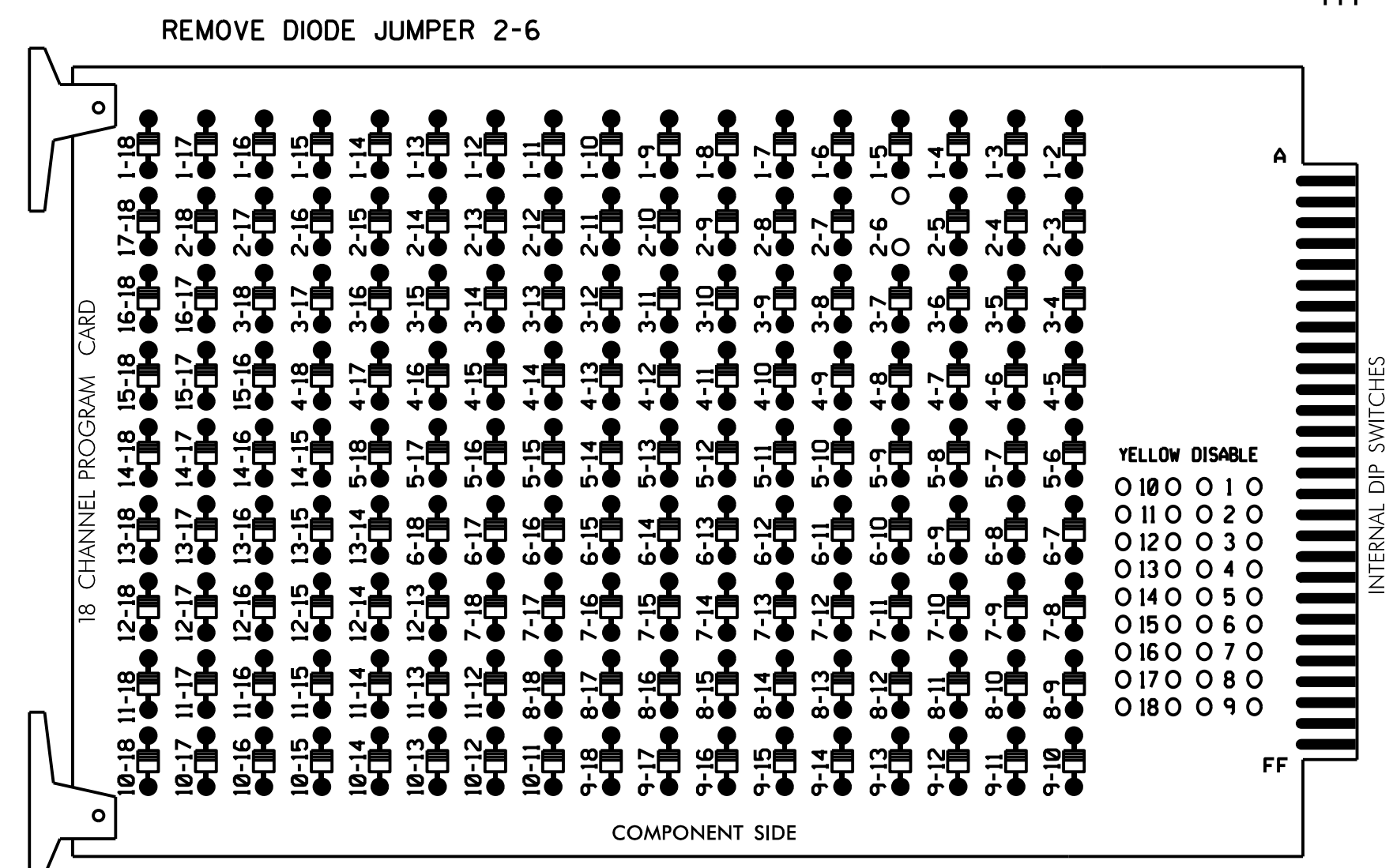
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Signal Upgrade Temporary Design 2 (TMP Phase II - Step 8)

Project details: SR 2526 (Summit Avenue) at US 29 Southbound Ramps, Division 7 Guilford County Greensboro, Plan Date: April 2020, Prepared by: K. Dean, Reviewed by: T.S. Warren, L. Boyer. Includes seal and signature area.

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
6. The cabinet and controller are part of the SR 2526 (Summit Avenue) CLS.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S8,S11
 PHASES USED.....2,6,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128							134		107							
YELLOW		129							135		108							
GREEN											109							
RED ARROW																		
YELLOW ARROW																		
FLASHING YELLOW ARROW																		
GREEN ARROW		130							136									

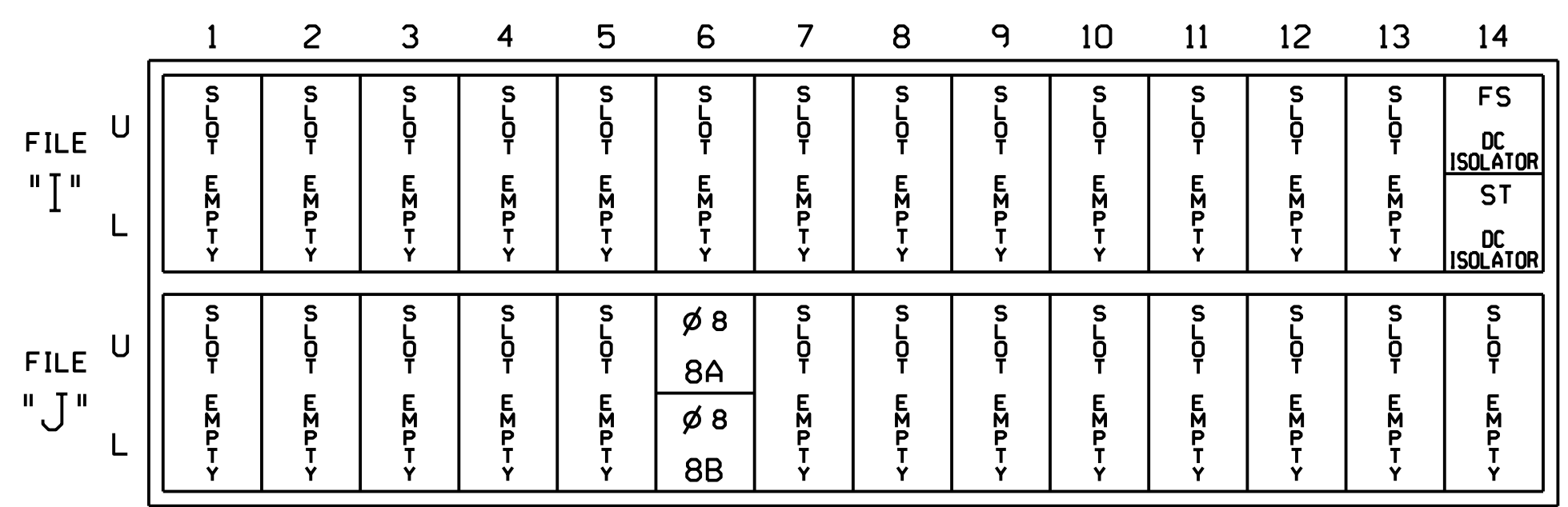
NU = Not Used

SPECIAL DETECTOR NOTE

1. Install a video detection system for vehicle detection zones 2A/S1 and 6A/S2. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

INPUT FILE POSITION LAYOUT

(front view)



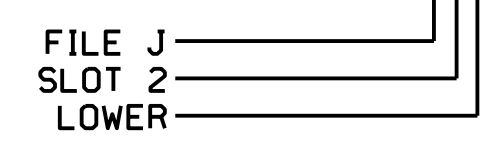
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

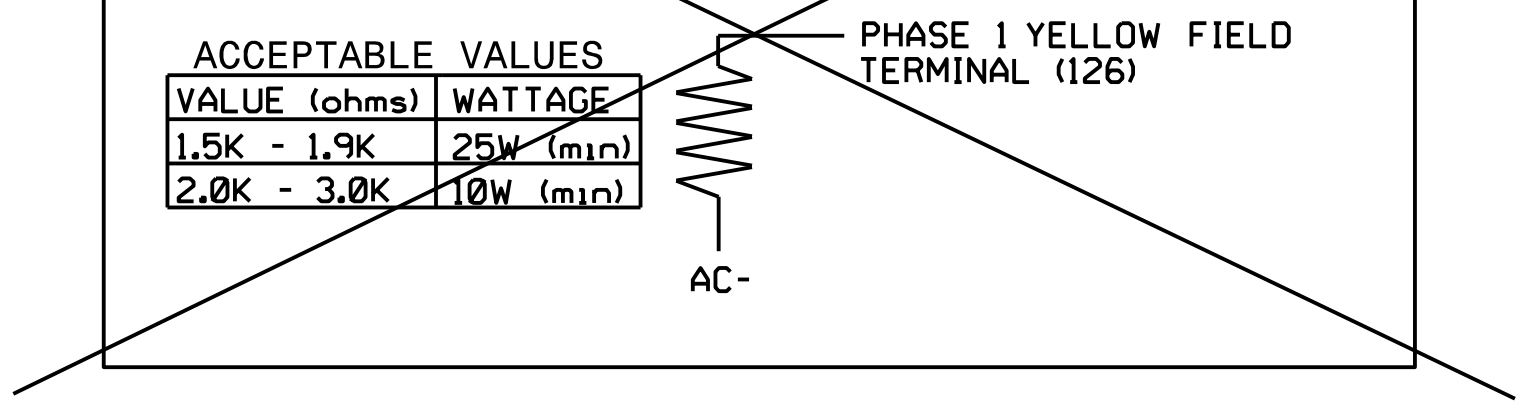
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			5
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



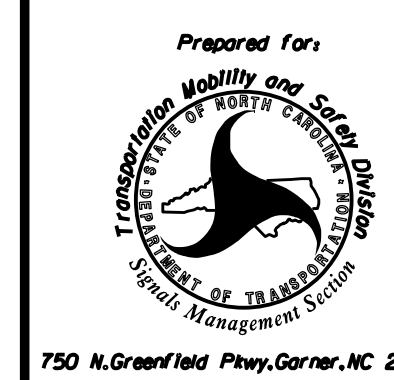
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1498T2
 DESIGNED: April 2020
 SEALED: 04/20/2020
 REVISED: N/A

Project #: 180914



Electrical Details
 Temporary Design 2 (TMP Phase II - Step 8)

ELECTRICAL AND PROGRAMMING DETAILS FOR:



SR 2526 (Summit Avenue)
 at
 US 29 Southbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: L Boyer
 PREPARED BY: K Dean REVIEWED BY:

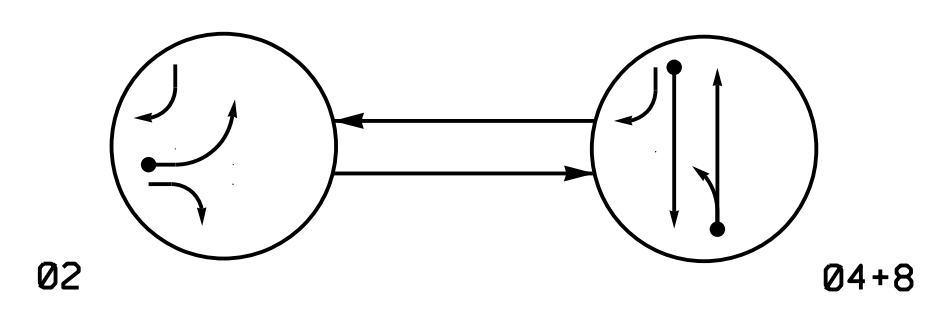
REVISIONS	INIT.	DATE

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SEAL

SEAL 030912
 LORI M. BOYER
 ENGINEER
 STATE OF NORTH CAROLINA
 04/20/2020
 SIGNATURE DATE
 SIG. INVENTORY NO. 07-1498T2

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

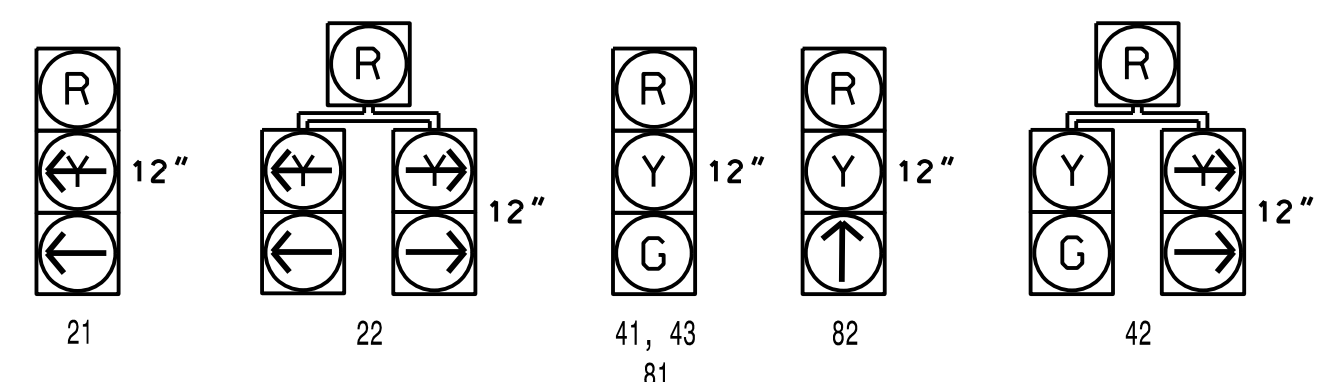
- ● DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02	04+8	F L S H
21	—	R R	
22	—	R R	
41,43	R	G R	
42	R	G R	
81	R	G R	
82	R	↑	R

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	PROGRAMMING							
			TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP
2A**	6X40	0	**	**	2	Yes	-	-	S	**
4A**	6X40	0	**	**	4	Yes	-	3	S	**
8A**	6X40	0	**	**	8	Yes	-	-	S	**

** Video Detection

2 Phase Fully Actuated
 SR 4771 (Reedy Fork Parkway) CLS
 Signal System: 10727

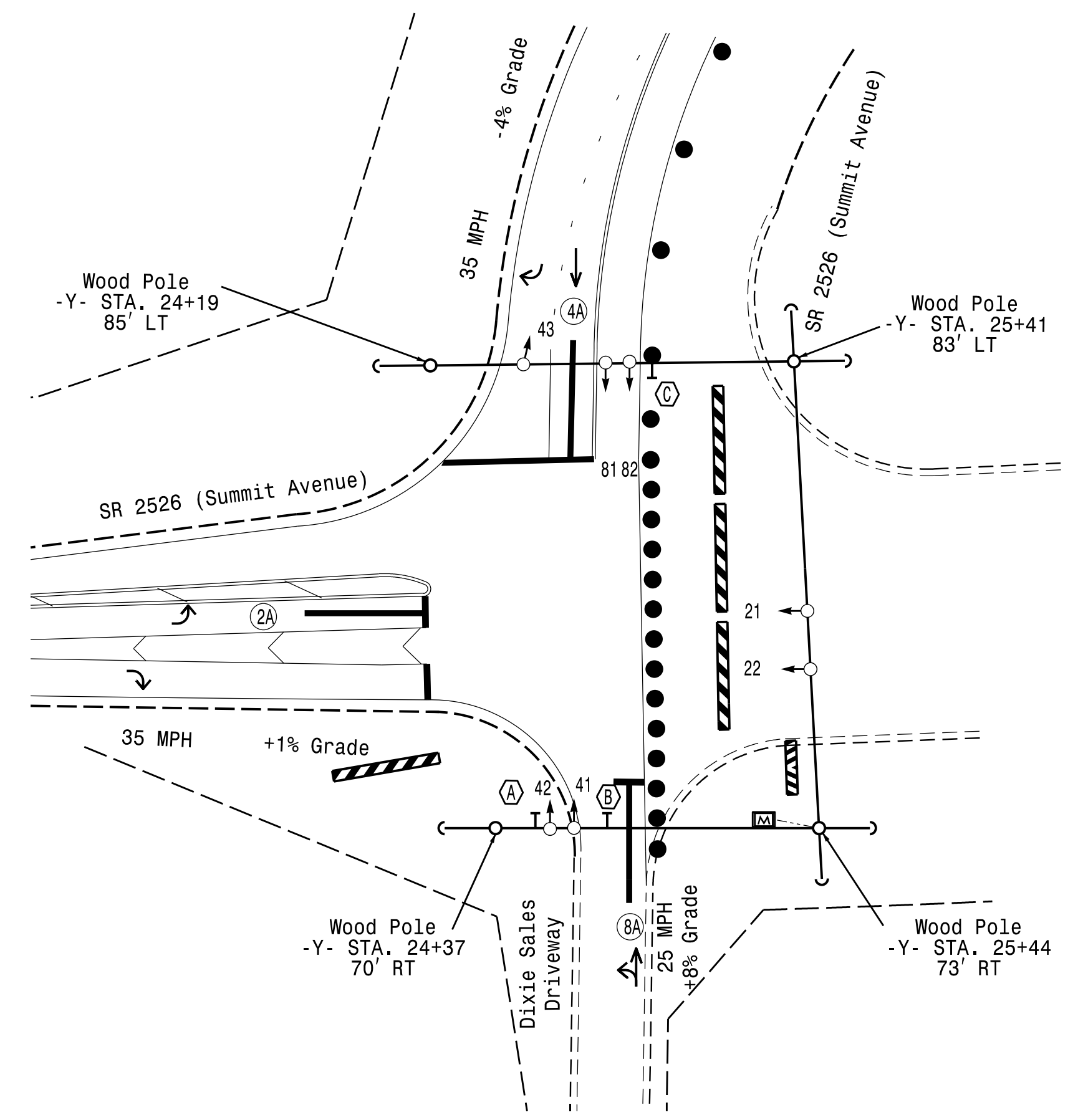
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. A video imaging loop emulator detection system is used to provide traffic detection during this temporary phase. Perform installation according to manufacturer's directions and NCDOT engineer - approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Program controller to startup in phase 4 + 8 All Red.
8. Closed loop system data:
 Master Asset #: 10727
 Controller Asset #: 0903

ASC/3 TIMING CHART

FEATURE	PHASE		
	2	4	8
Min Green *	10	7	7
Walk *	0	0	0
Ped Clear	0	0	0
Veh. Extension *	2.0	2.0	2.0
Max 1 *	60	30	30
Yellow	3.0	4.1	3.0
Red Clear	2.6	1.7	3.2
Actuations B4 Add *	-	-	-
Seconds /Actuation *	-	-	-
Max Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Latching Detector	-	-	-
Recall Position	VEH. RECALL	-	-
Dual Entry	-	X	X
Simultaneous Gap	X	X	X

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



LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → Traffic Signal Head
○ → Modified Signal Head	N/A
— Sign	— Sign
○ Pedestrian Signal Head With Push Button & Sign	○ Pedestrian Signal Head With Push Button & Sign
□ Metal Pole with Mastarm	□ Metal Pole with Mastarm
Video Detection Area	Video Detection Area
Master Controller & Cabinet Junction Box	Master Controller & Cabinet Junction Box
Oversized Junction Box	Oversized Junction Box
2-in Underground Conduit	2-in Underground Conduit
— Directional Drill	N/A
N/A Right of Way	N/A Right of Way
→ Directional Arrow	→ Directional Arrow
(A) Right Arrow "ONLY" Sign (R3-SR)	(A) Right Arrow "ONLY" Sign (R3-SR)
(B) No Left Turn Sign (R3-2)	(B) No Left Turn Sign (R3-2)
(C) No Right Turn Sign (R3-1)	(C) No Right Turn Sign (R3-1)

New Installation
 Temporary Design 1 (TMP Phase II - Step 8)

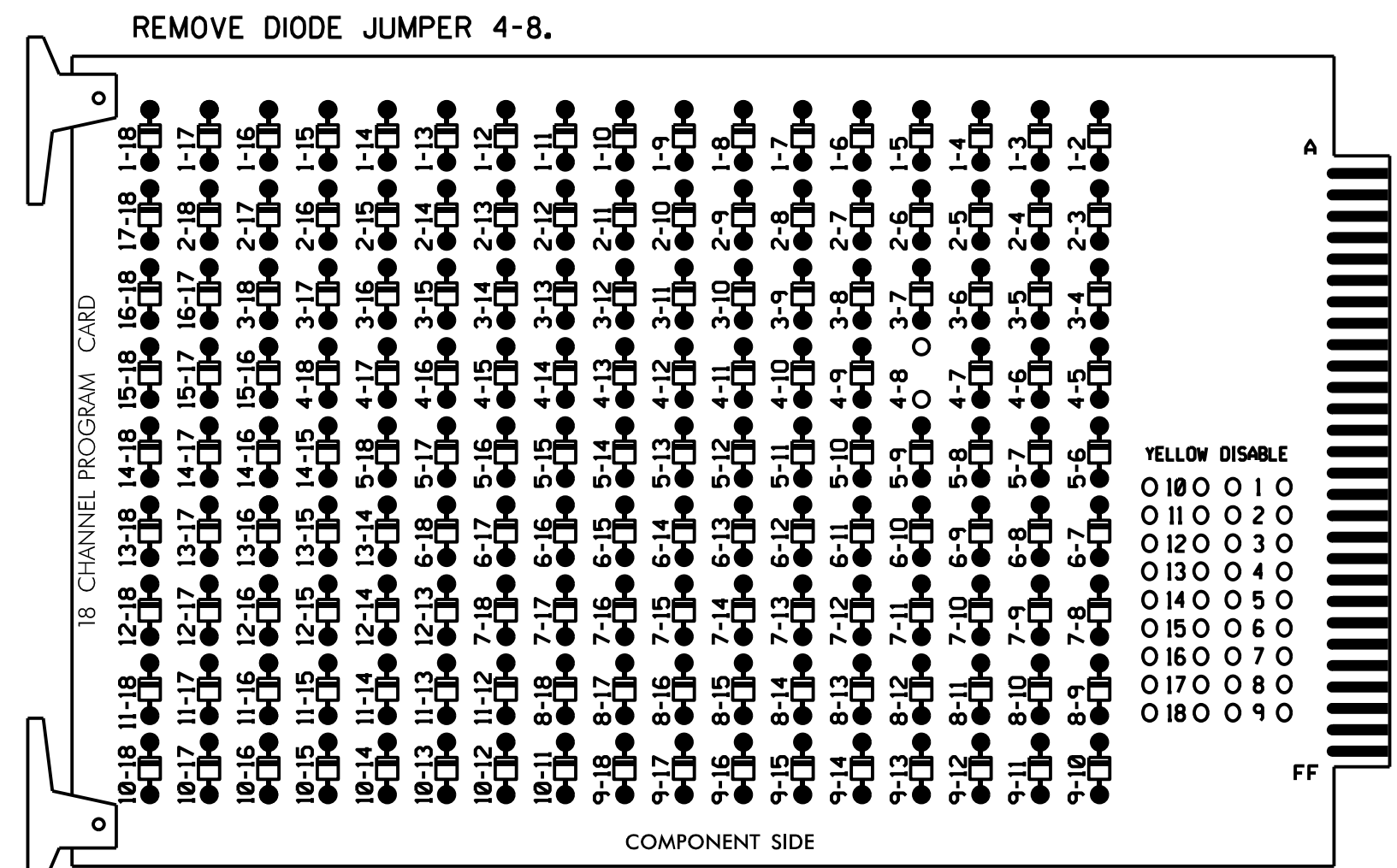
Project #: 180914

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 NCBELS FIRM LICENSE NO. C-2522

<p>Prepared for: TRANSPORTATION MOBILITY AND SAFETY DIVISION NORTH CAROLINA DEPARTMENT OF TRANSPORTATION SIGNAL DESIGN SECTION</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>SR 4771 (Reedy Fork Parkway) at SR 2526 (Summit Avenue) / Dixie Sales Driveway</p> <p>Division 7 Guilford County Greensboro</p> <p>PLAN DATE: April 2020 REVIEWED BY: L Boyer</p> <p>PREPARED BY: A. Hayes REVIEWED BY:</p>	<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p>SEAL</p> <p>DATE: 04/20/2020</p> <p>SIGNATURE: L. Boyer</p> <p>DATE: 04/20/2020</p> <p>SIG. INVENTORY NO. 07-090311</p>
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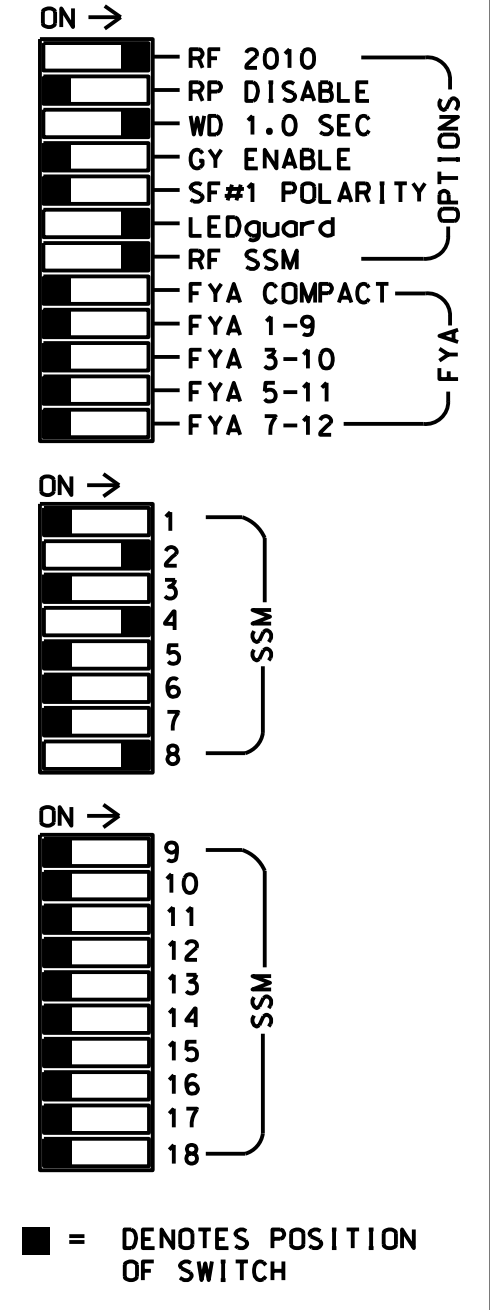
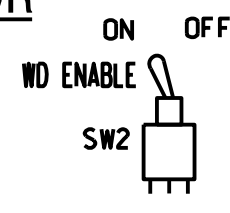
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



NOTES:

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



NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 4 + 8 All Red.
4. The cabinet and controller are part of the SR 4771 (Reedy Fork Parkway) CLS. Signal System: 10727.

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.....S2,S5,S11
 PHASES USED.....2,4,8
 OVERLAPS.....NONE

PROJECT REFERENCE NO.	SHEET NO.
R-4707	Sig.6.1

SIGNAL HEAD HOOK-UP CHART

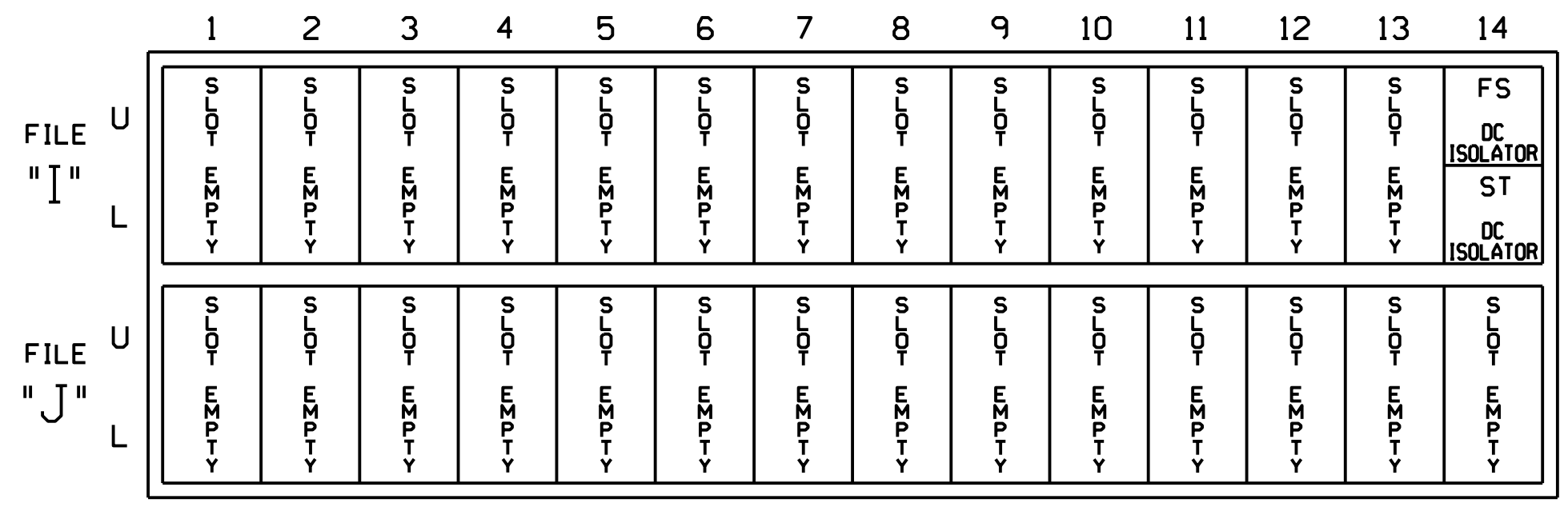
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21	22*	42	NU	41,42,43	NU	NU	NU	NU	81	82	NU	NU	NU	NU	NU	NU
RED		128	128			101					107	107						
YELLOW						102					108	108						
GREEN						103					109							
RED ARROW																		
YELLOW ARROW		129	129	129														
FLASHING YELLOW ARROW																		
GREEN ARROW		130	130	130							109							
Hand icon																		
Person icon																		

NU = Not Used

* See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

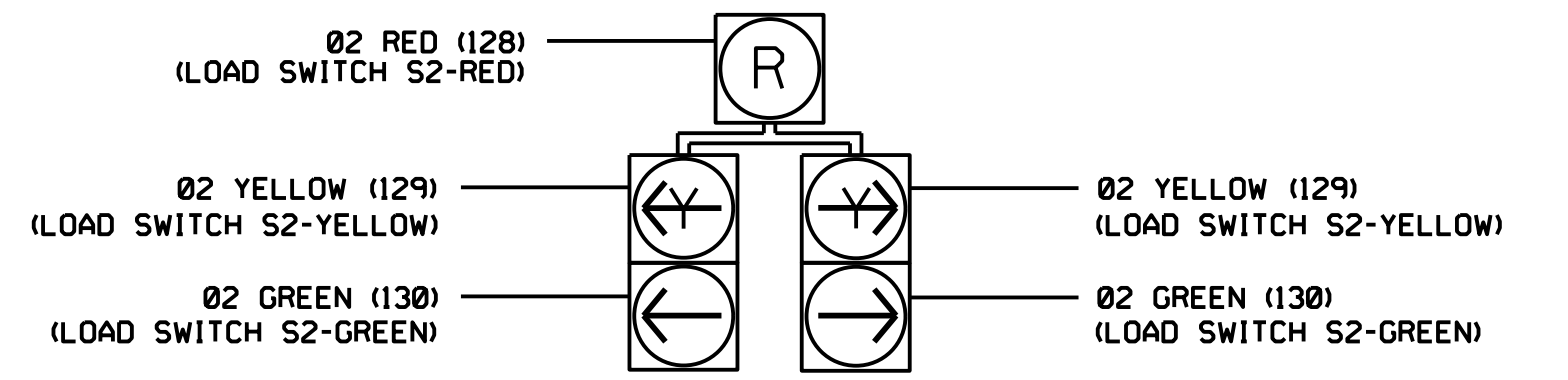
⊗ Wired Input - Do not populate slot with detector card

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.

SIGNAL WIRING DETAIL

(wire signal heads as shown)



22

Electrical Detail
 Temporary Design 1 (TMP Phase II - Step 8)

Electrical and Programming Details For: SR 4771 (Reedy Fork Parkway) at SR 2526 (Summit Avenue)/Dixie Sales Driveway

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: L. Boyer

PREPARED BY: A. Hayes REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Corner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

SEAL 030912

Professional Engineer

Lori M. Boyer

04/20/2020

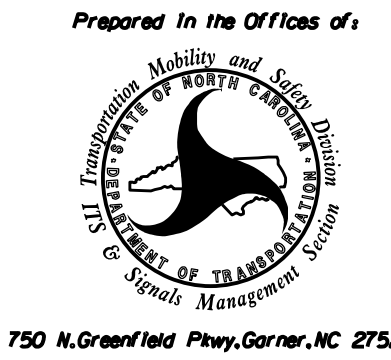
SIG. INVENTORY NO. 07-0903T1

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0903T1
 DESIGNED: April 2020
 SEALED: 04/20/2020
 REVISED: N/A

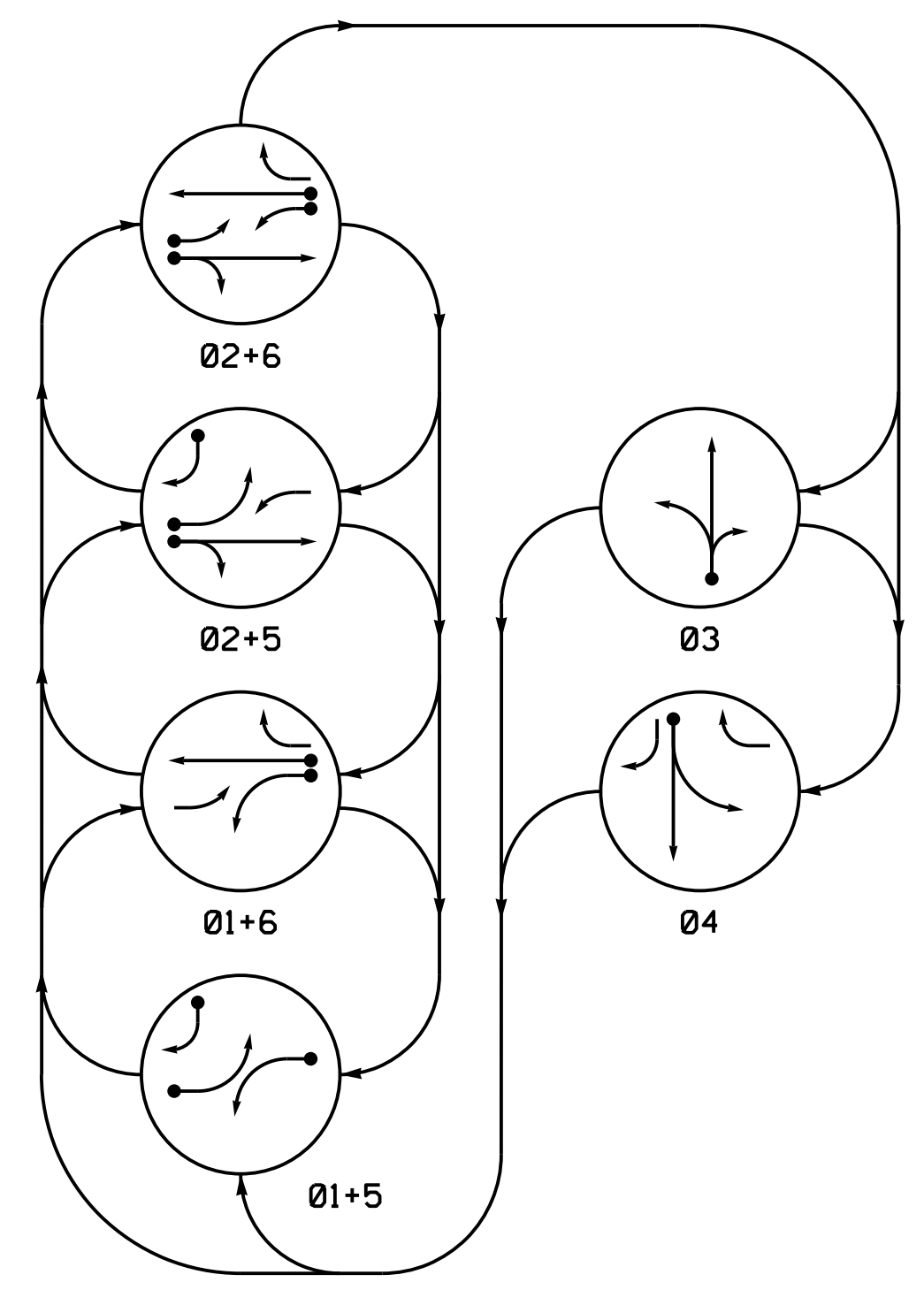
Project #: 180914

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PHASING DIAGRAM



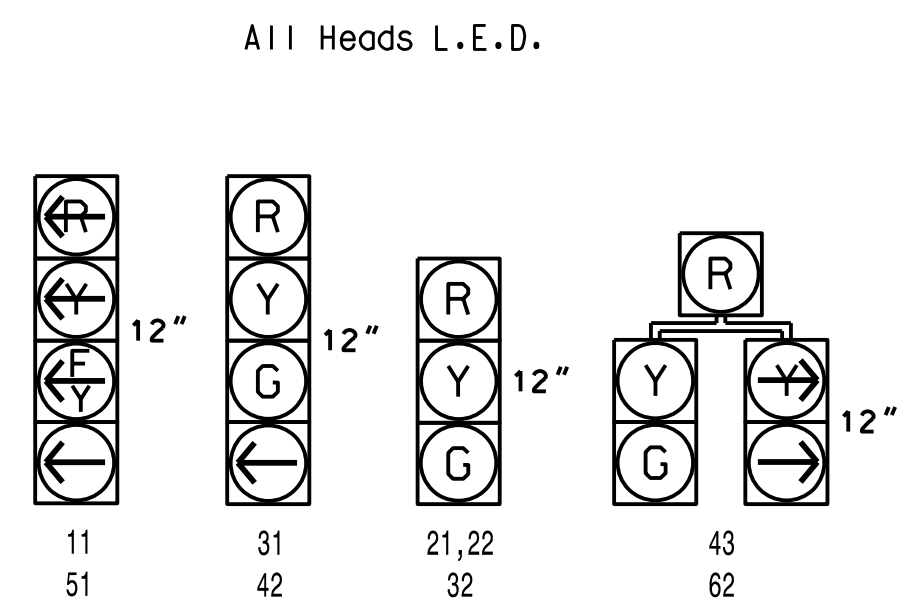
PHASING DIAGRAM DETECTION LEGEND

- ◄● DETECTED MOVEMENT
- ◄◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄- UNSIGNALED MOVEMENT
- ◄- - PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE						L	E	R
	01+5	01+6	02+5	02+6	03	04			
11	-	-	F	F	R	R	-	-	-
21,22	R	R	G	G	R	R	Y	Y	Y
31	R	R	R	R	G	R	R	R	R
32	R	R	R	R	G	R	R	R	R
42	R	R	R	R	G	R	R	R	R
43	R	R	R	R	G	R	R	R	R
44	R	R	R	R	G	R	R	R	R
51	-	F	-	F	R	R	-	-	-
61	R	G	R	G	R	R	Y	Y	Y
62	R	G	R	G	R	R	Y	Y	Y

SIGNAL FACE I.D.



ASC/3 DETECTOR INSTALLATION CHART

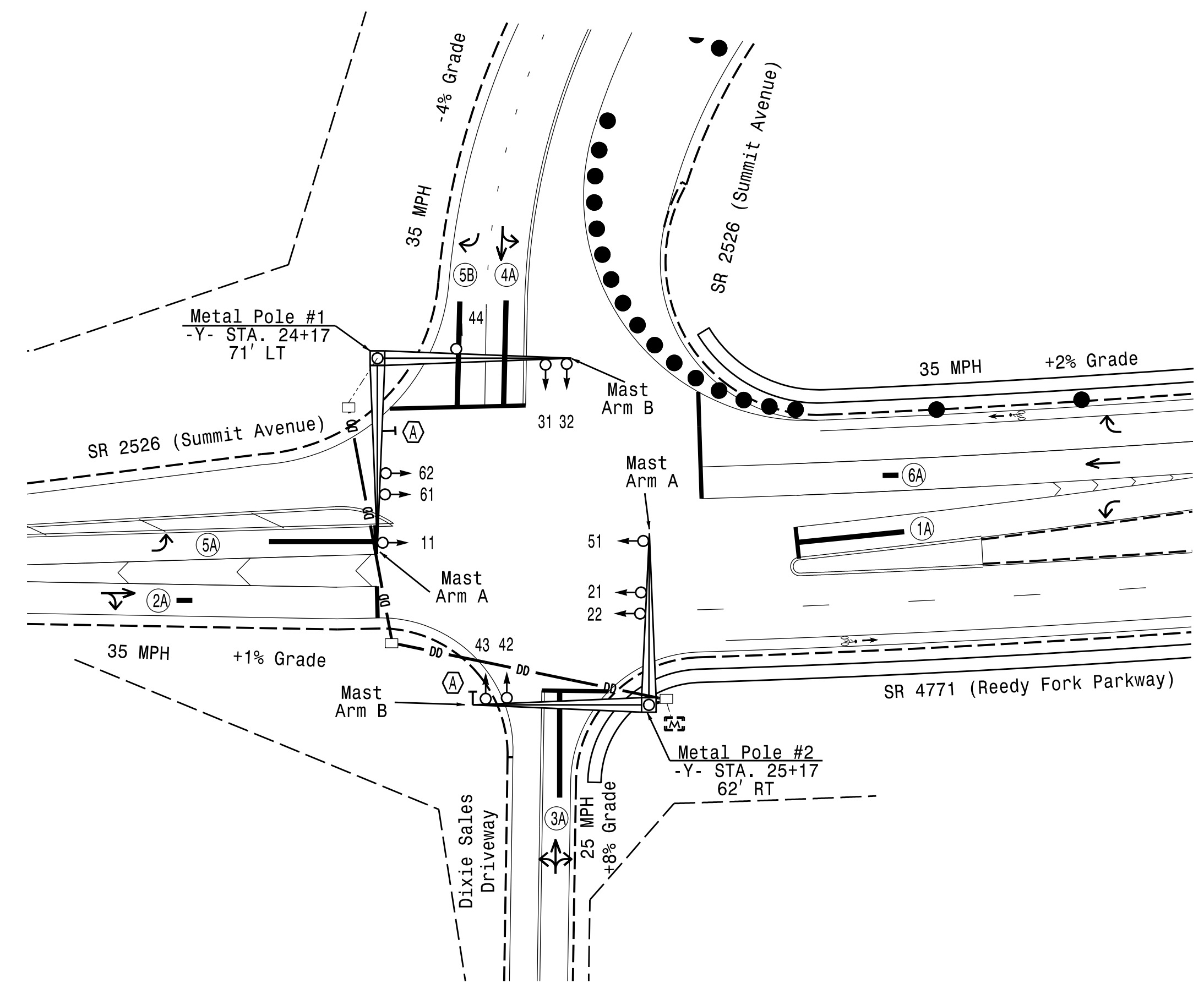
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING					TYPE	SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTEND TIME	DELAY TIME				
1A**	6X40	0	**	**	1	Yes	-	15	S	-	**	
					6	Yes	-	-	S	-	**	
2A**	6X6	70	**	**	2	Yes	-	-	S	-	**	
3A**	6X40	0	**	**	3	Yes	-	5	S	-	**	
4A**	6X40	0	**	**	4	Yes	-	3	S	-	**	
5A**	6X40	0	**	**	5	Yes	-	15	S	-	**	
					2	Yes	-	-	S	-	**	
5B**	6X40	0	**	**	5	Yes	-	15	S	-	**	
6A**	6X6	70	**	**	6	Yes	-	-	S	-	**	

** Video Detection

6 Phase Fully Actuated
SR 4771 (Reedy Fork Parkway) CLS Signal System: 10727

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/ or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Set all detector units to presence mode.
- A video imaging loop emulator detection system is used to provide traffic detection during this temporary phase. Perform installation according to manufacturer's directions and NCDOT engineer - approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data:
Master Asset #: 10727
Controller Asset #: 0903



ASC/3 TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green *	7	10	7	7	7	10
Walk *	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0
Veh. Extension *	2.0	3.0	2.0	2.0	2.0	3.0
Max 1 *	20	60	15	30	20	60
Yellow	3.0	3.8	3.0	4.1	3.0	3.8
Red Clear	3.3	2.6	3.3	1.7	2.6	2.6
Actuations B4 Add *	-	-	-	-	-	-
Seconds / Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
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.

LEGEND

PROPOSED	EXISTING
○→ Traffic Signal Head	●→ Traffic Signal Head
○→ Modified Signal Head	N/A
— Sign	— Sign
— Pedestrian Signal Head With Push Button & Sign	— Pedestrian Signal Head With Push Button & Sign
— Metal Pole with Mastarm	— Metal Pole with Mastarm
— Video Detection Area	— Video Detection Area
— Master Controller & Cabinet	— Master Controller & Cabinet
— Junction Box	— Junction Box
— Oversize Junction Box	— Oversize Junction Box
— 2-in Underground Conduit	— 2-in Underground Conduit
— Directional Drill	— Directional Drill
— Right of Way	— Right of Way
→ Directional Arrow	→ Directional Arrow
Ⓐ Right Arrow "ONLY" Sign (R3-SR)	Ⓐ Right Arrow "ONLY" Sign (R3-SR)

Signal Upgrade - Temporary Design 2
(TMP Phase III - Steps 2&3; Phase IV - Step 3)

Project #: 180914

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NCBELS FIRM LICENSE NO. C-2522

SR 4771 (Reedy Fork Parkway) at SR 2526 (Summit Avenue) / Dixie Sales Driveway

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: L Boyer

PREPARED BY: T.S. Warren REVIEWED BY:

REVISIONS

NO.	INIT.	DATE

SIGNATURE: *Lori M. Boyer* DATE: 04/20/2020

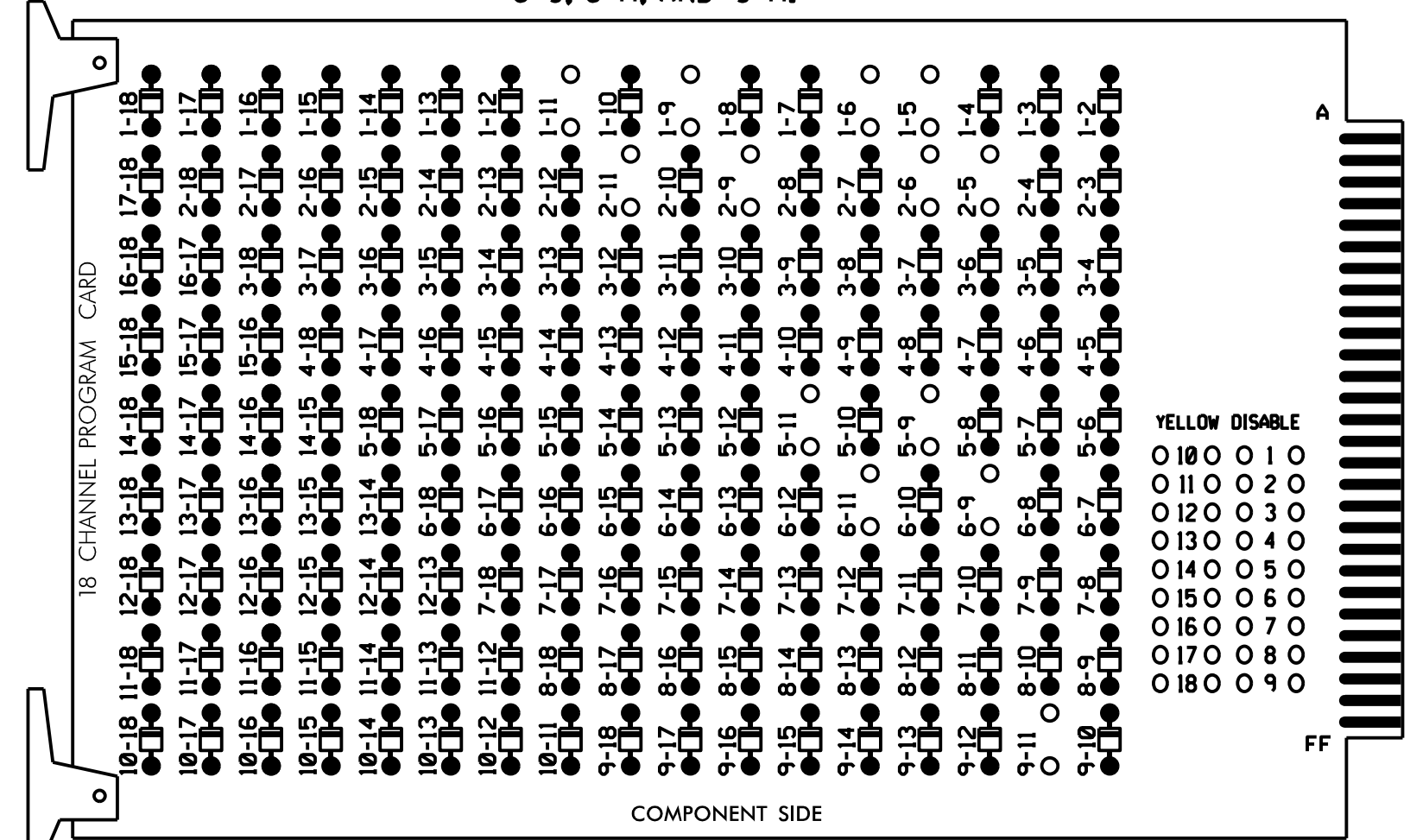
SIG. INVENTORY NO. 07-090312

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

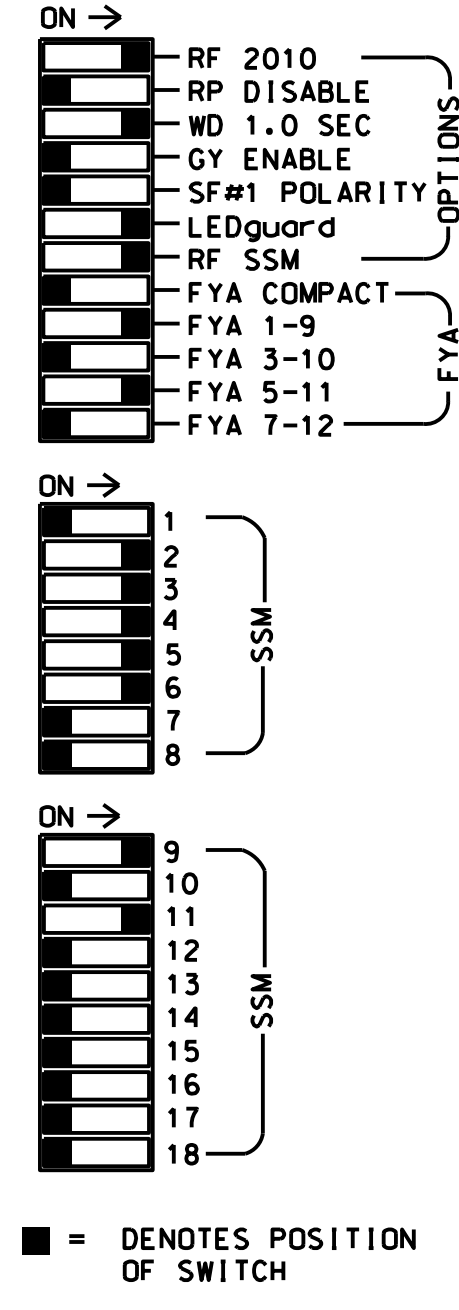
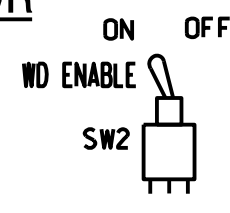
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 5-9, 5-11, 6-9, 6-11, AND 9-11.



REMOVE JUMPERS AS SHOWN

NOTES:

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



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the SR 4771 (Reedy Fork Parkway) CLS. Signal System: 10727.

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,AUX S1,
 AUX S4
 PHASES USED.....1,2,3,4,5,6
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED
 * 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	21,22	NU	31	32	42	43,44	62	NU	51	43	61,62	NU	NU	NU	11	NU	51	NU
RED		128		116	116	101	101			*		134							
YELLOW	*	129		117	117	102	102					135							
GREEN		130		118	118	103	103					136							
RED ARROW																A121		A114	
YELLOW ARROW							102			132						A122		A115	
FLASHING YELLOW ARROW																A123		A116	
GREEN ARROW	127			118		103		103	133	133									
Hand icon																			
Person icon																			

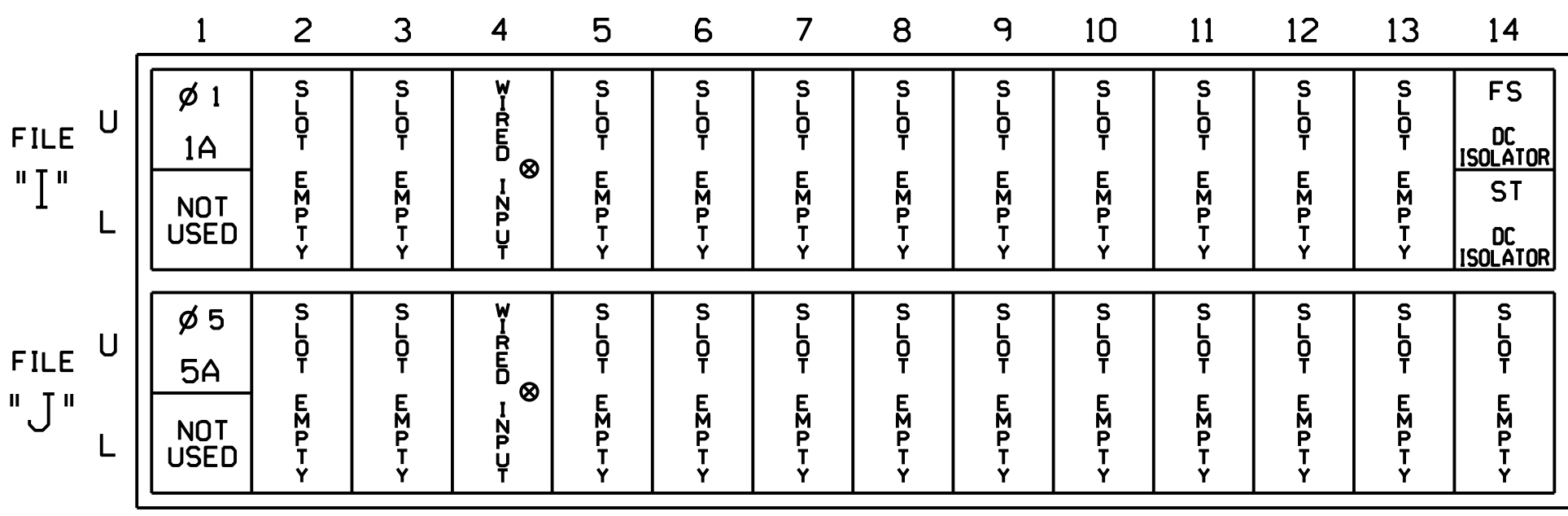
NU = Not Used

* 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)



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

FS = FLASH SENSE
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

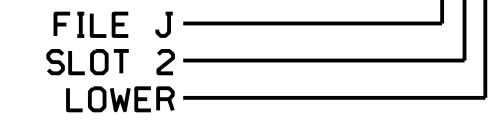
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A ¹	TB2-1,2	11U	56	1	1	YES		15		S
	-	J4U	48	26	6	YES				S
5A ²	TB3-1,2	J1U	55	5	5	YES		15		S
	-	14U	47	22	2	YES				S

¹Add jumper from I1-W to J4-W, on rear of input file.

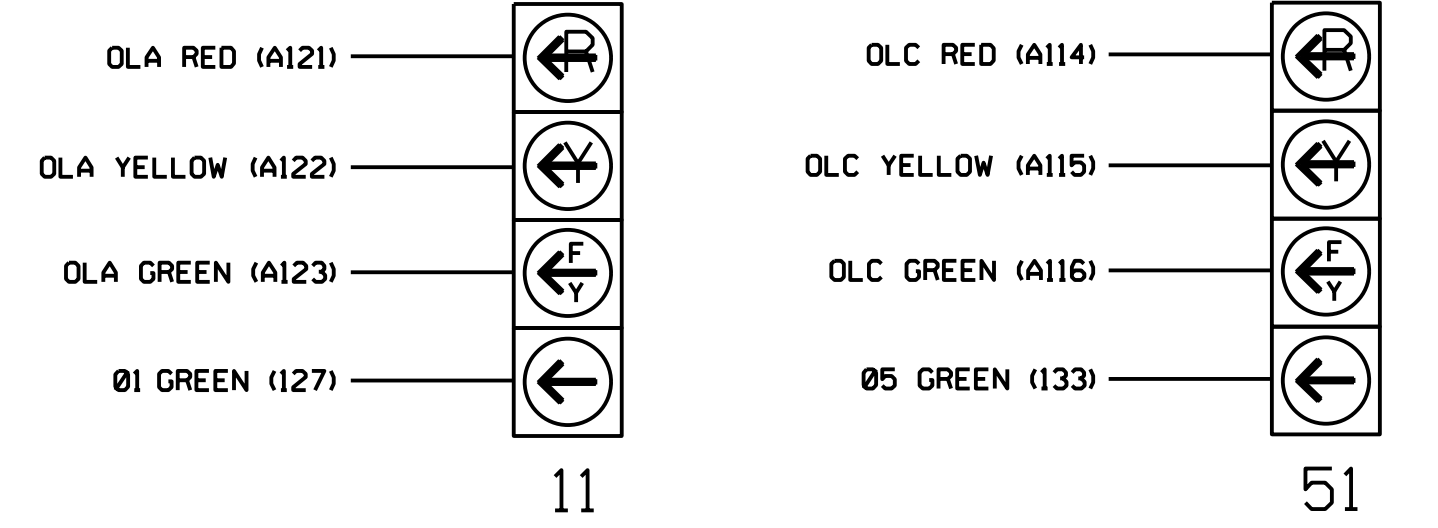
²Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

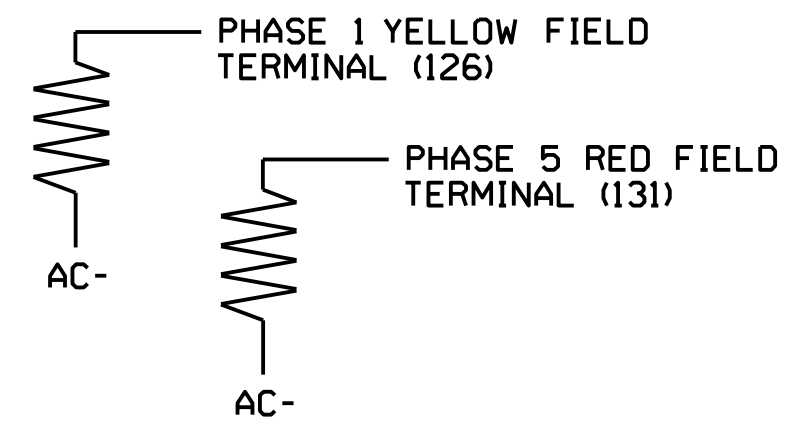
(wire signal heads as shown)



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)



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 loops 1A and 5A detector card placement and slot reserved for wired input is typical for a NCDOT installation.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0903T2
 DESIGNED: April 2020
 SEALED: 04/20/2020
 REVISED: N/A

Project #: 180914

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Electrical Detail - Sheet 1 of 2 Temporary Design 2
 (TMP Phase III - Step 1&2; Phase IV - Step 3)

	Prepared For: 	SR 4771 (Reedy Fork Parkway) at SR 2526 (Summit Avenue)/ Dixie Sales Driveway	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL
	Division 7 Guilford County Greensboro	PLAN DATE: April 2020 REVIEWED BY: L. Boyer PREPARED BY: T.S. Warren REVIEWED BY:	

750 N. Greenfield Pkwy, Corner, NC 27529

DocuSigned by:
 Lori M. Boyer
 04/20/2020

SIG. INVENTORY NO. 07-0903T2

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 Twice

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

END PROGRAMMING

Project #: 180914

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0903T2
DESIGNED: April 2020
SEALED: 04/20/2020
REVISED: N/A



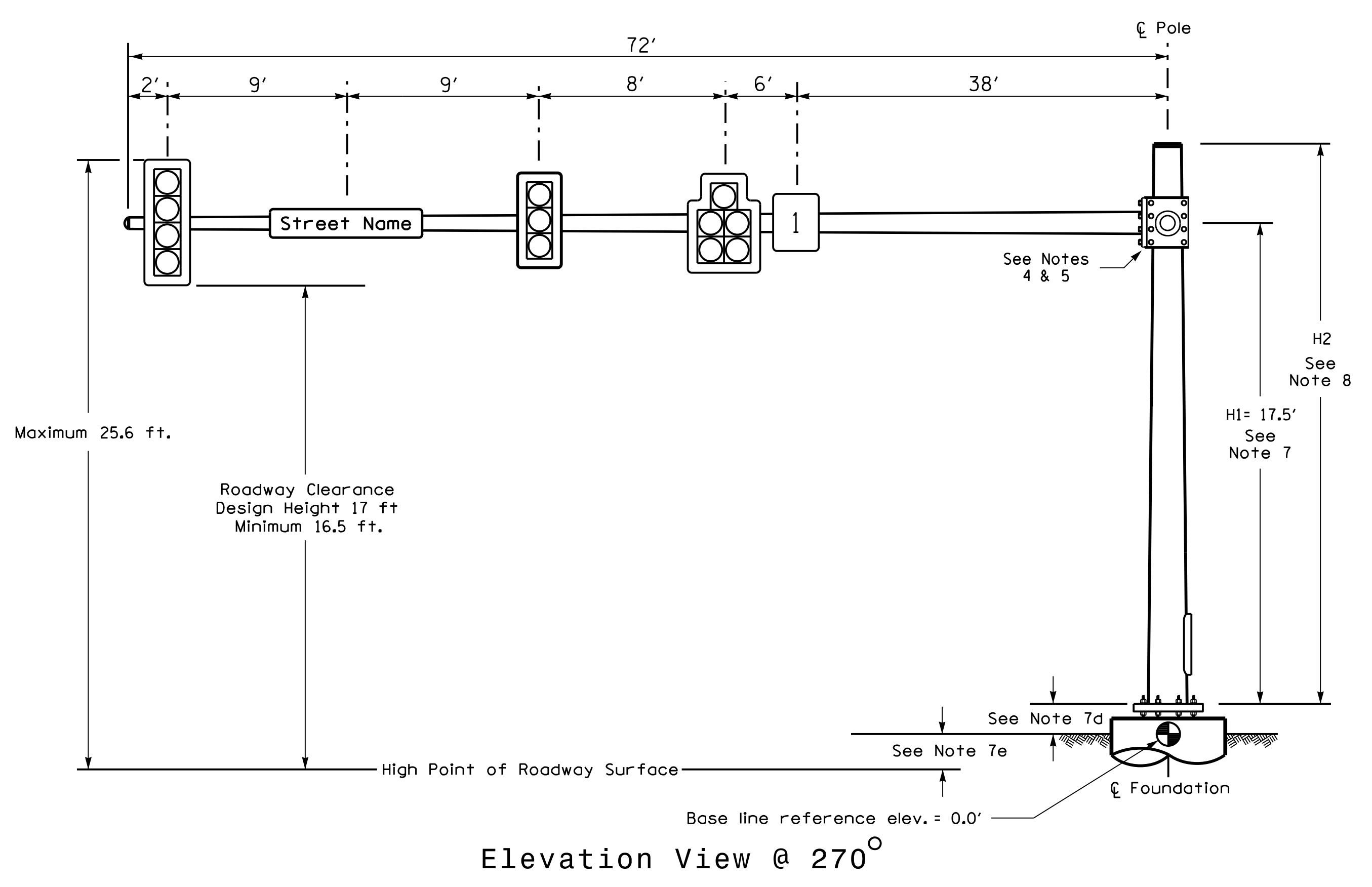
Electrical Detail - Sheet 2 of 2 Temporary Design 2
(TMP Phase III - Step 1&2; Phase IV - Step 3)

**DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED**

<p style="font-size: small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared For: 750 N. Greenfield Hwy, Garner, NC 27529</p>	<p style="font-size: large; font-weight: bold;">SR 4771 (Reedy Fork Parkway) at SR 2526 (Summit Avenue)/ Dixie Sales Driveway</p> <p style="font-size: x-small;">Division 7 Guilford County Greensboro</p> <p style="font-size: x-small;">PLAN DATE: April 2020 REVIEWED BY: L. Boyer</p> <p style="font-size: x-small;">PREPARED BY: T.S. Warren REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	REVISIONS	INIT.	DATE										<p style="font-size: x-small;">SEAL</p> <p style="font-size: x-small;">NORTH CAROLINA PROFESSIONAL ENGINEER L. BOYER</p> <p style="font-size: x-small;">DocuSigned by: <i>Lori M. Boyer</i> 4/20/2020 1FC9650A812463</p> <p style="font-size: x-small;">DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-0903T2</p>
REVISIONS	INIT.	DATE												

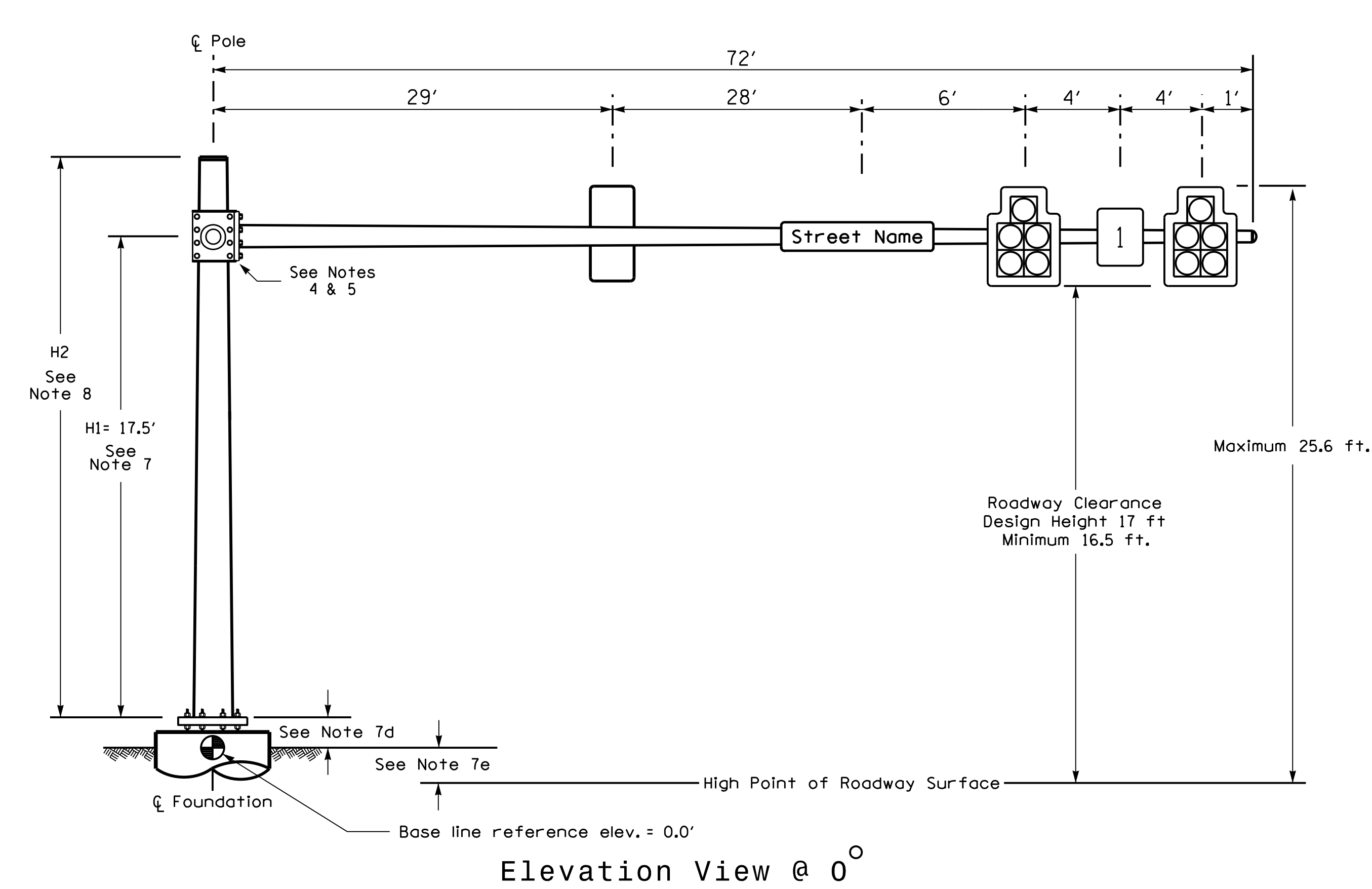
METAL POLE No. 1

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



Elevation View @ 270°

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

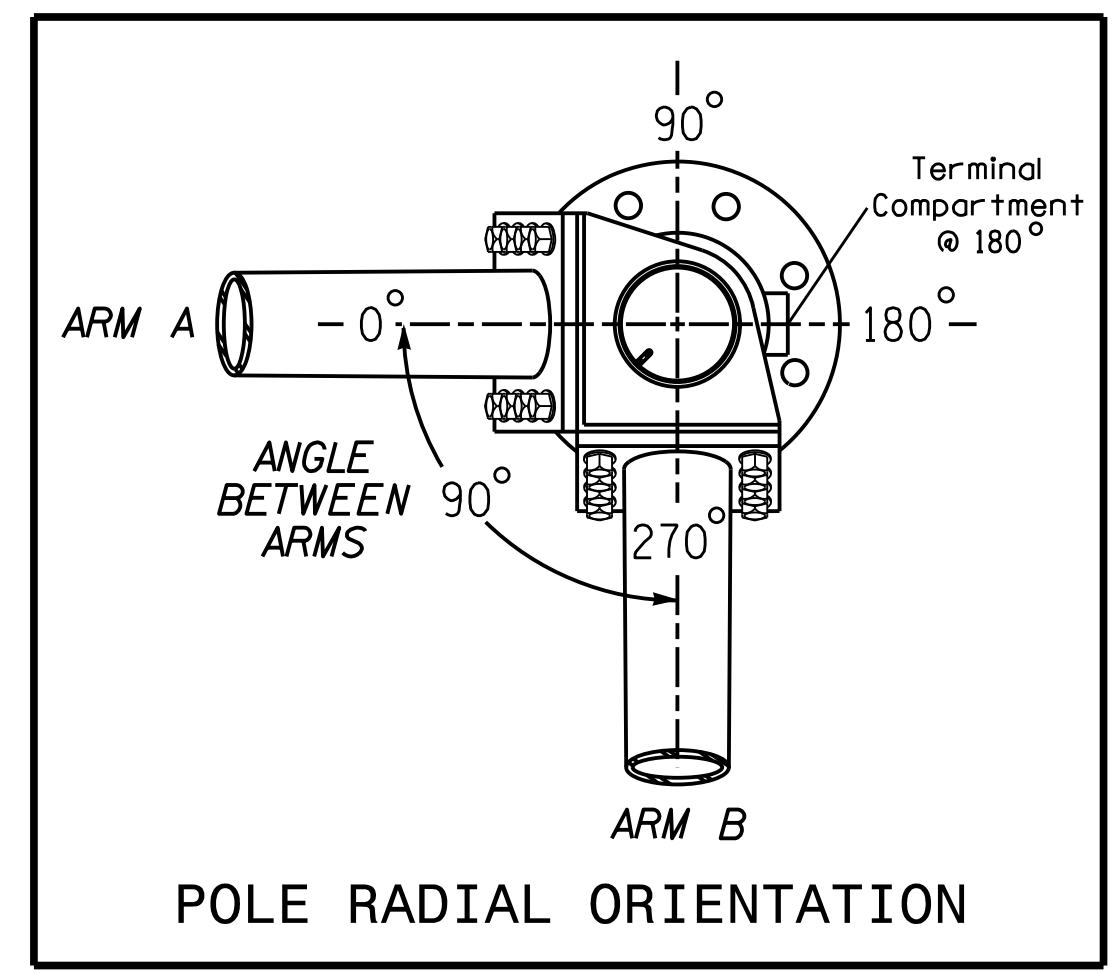


Elevation View @ 0°

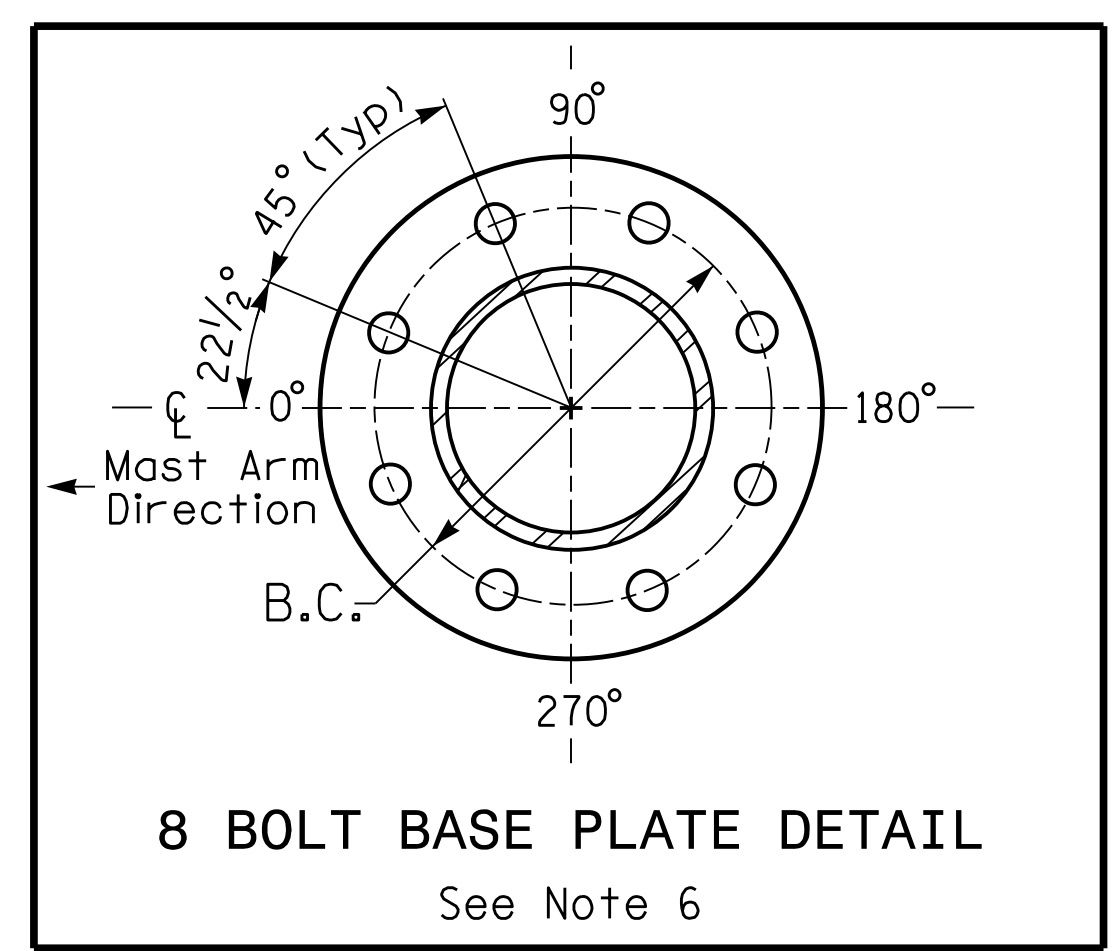
SPECIAL NOTE
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project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

Elevation Data for Mast Arm Attachment (H1)

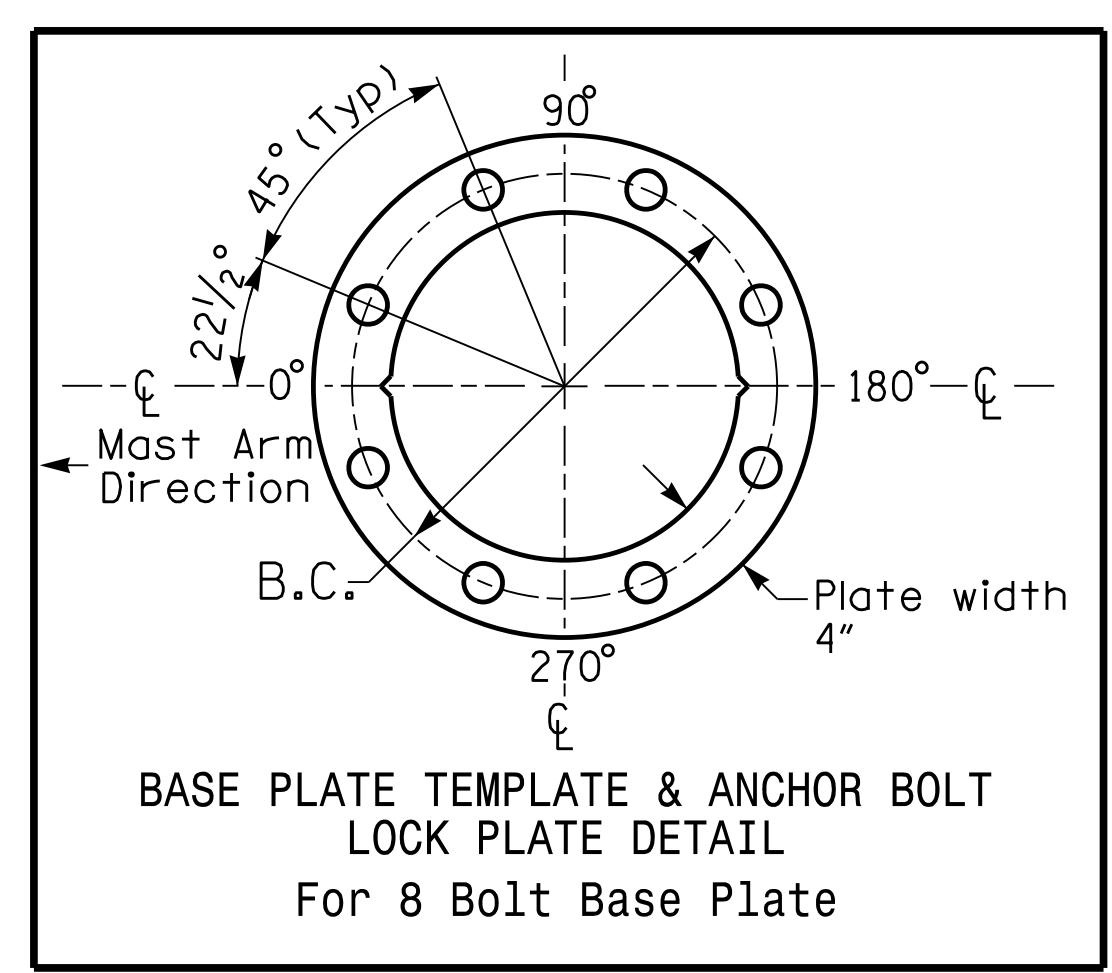
Elevation Differences for:	Arm 'A'	Arm 'B'
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-1.8 ft.	-2.3 ft.
Elevation difference at Edge of travelway or face of curb	-1.8 ft.	-2.3 ft.



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



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

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
[Symbol]	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
[Symbol]	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
[Symbol]	RIGID MOUNTED SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0" W X 56.0" L	103 LBS
[Symbol]	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0" L	36 LBS
[Symbol]	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS

NOTES

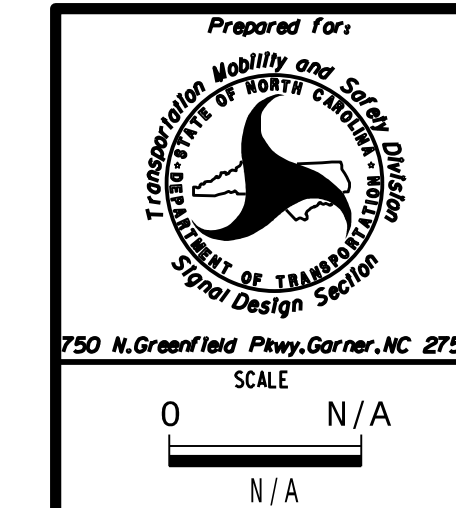
DESIGN REFERENCE MATERIAL

- 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 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions. The 2018 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>

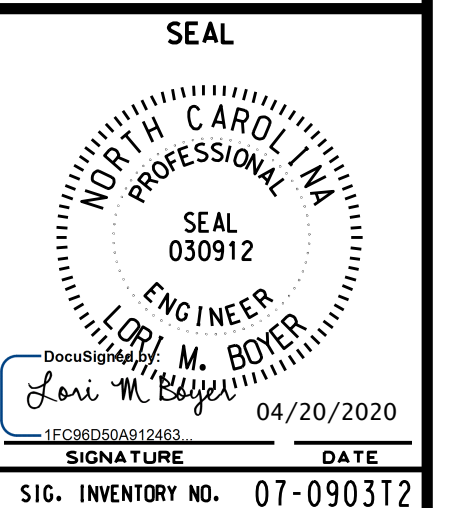
DESIGN REQUIREMENTS

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 4 (90 mph)



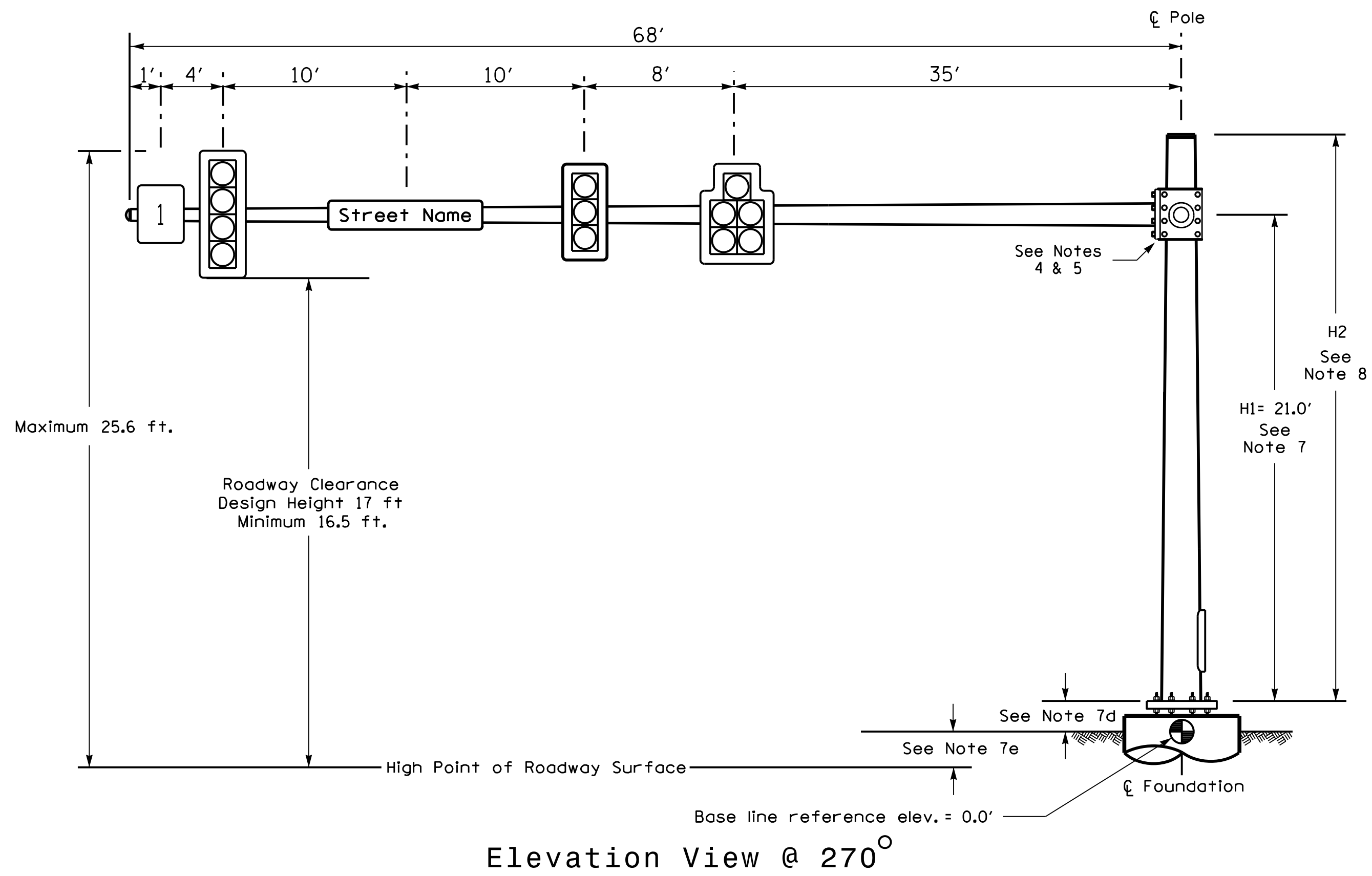
SR 4771 (Reedy Fork Parkway) at SR 2526 (Summit Avenue) / Dixie Sales Driveway	
Division 07 Guilford County Greensboro	
PLAN DATE: April 2020	REVIEWED BY: L. Boyer
PREPARED BY: T.S. Warren	REVIEWED BY:
SCALE: 0 N/A	



Project #: 180914

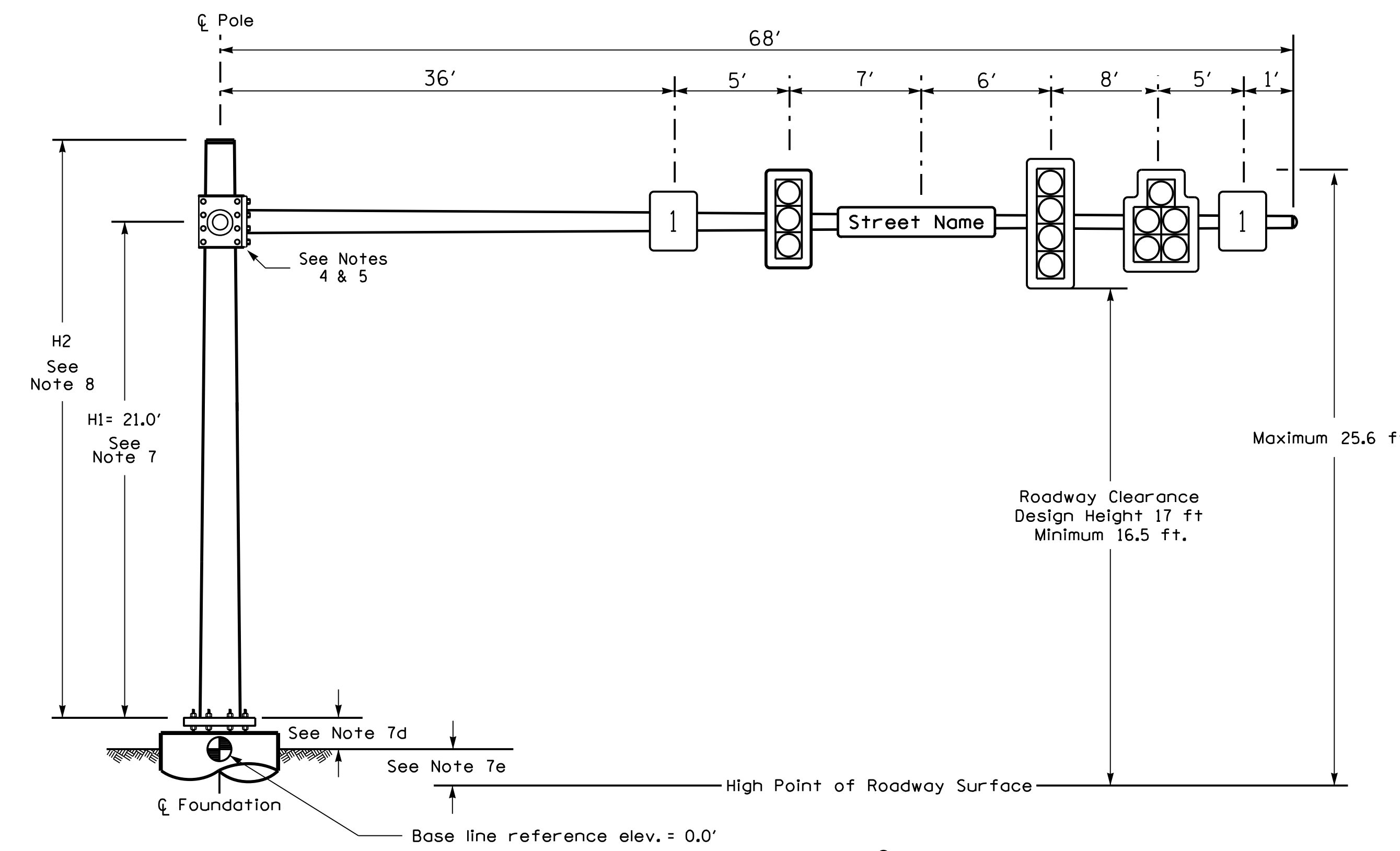
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336.744.1636 www.davenportnc.com
NCBELS FIRM LICENSE NO. C-2522

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



Elevation View @ 270°

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

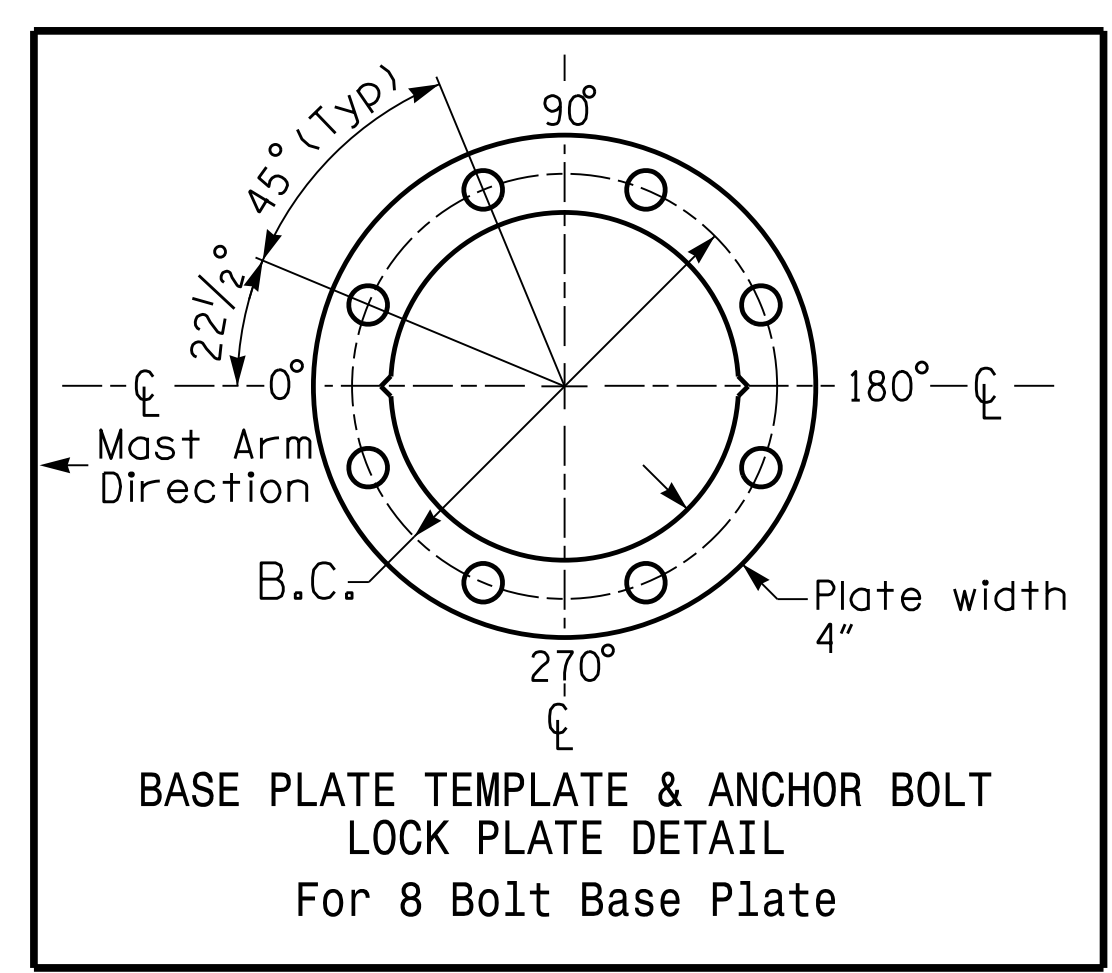
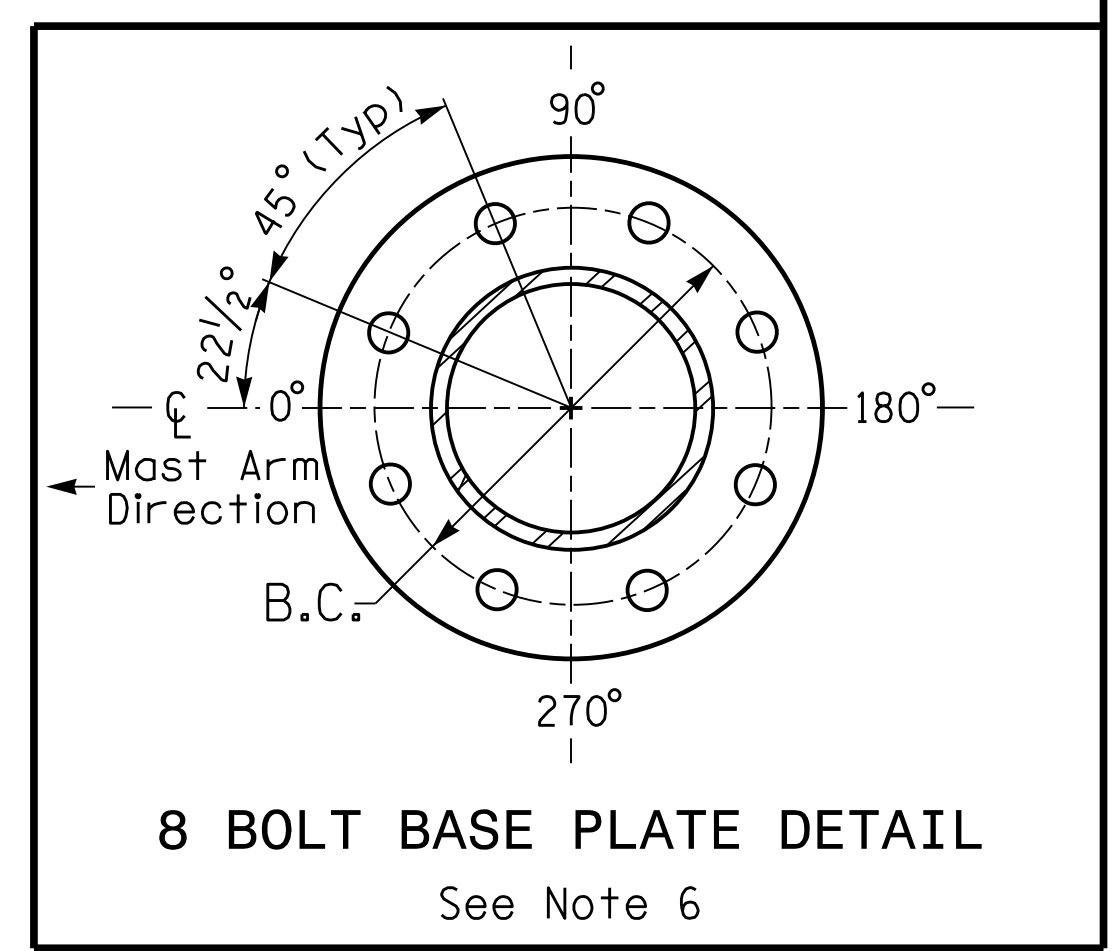
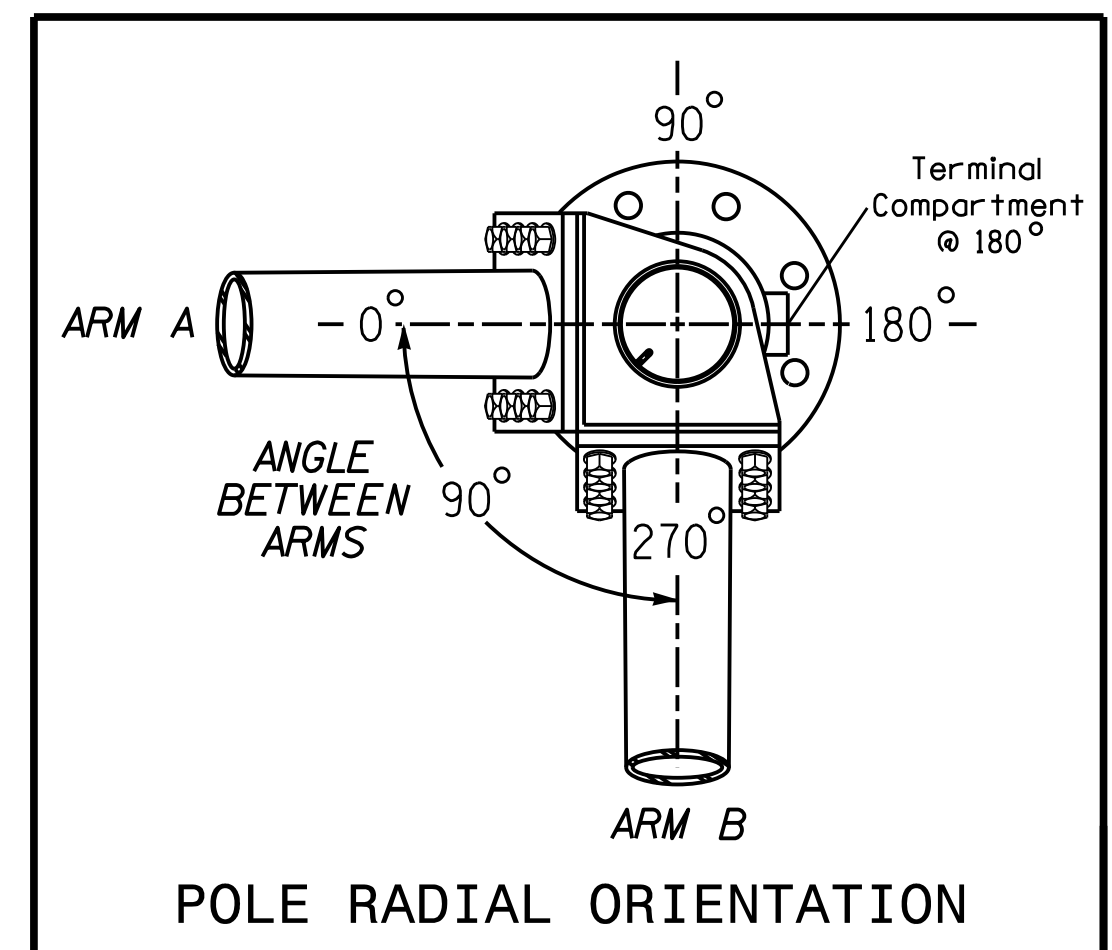


Elevation View @ 0°

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

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm 'A'	Arm 'B'
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+2.0 ft.	+0.2 ft.
Elevation difference at Edge of travelway or face of curb	+0.5 ft.	+0.2 ft.



METAL POLE No. 2

PROJECT REFERENCE NO.	SHEET NO.
R-4707	Sig.7.4

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
[Symbol]	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
[Symbol]	RIGID MOUNTED SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0" W X 56.0" L	103 LBS
[Symbol]	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
[Symbol]	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0" L	36 LBS
[Symbol]	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS

NOTES

DESIGN REFERENCE MATERIAL

- Design the traffic signal structure and foundation in accordance with:
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 - The 2018 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

- 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.
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- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
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- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
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- 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) 814-5000.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

Project #: 180914

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NCDOT Wind Zone 4 (90 mph)

SR 4771 (Reedy Fork Parkway)
at
SR 2526 (Summit Avenue) /
Dixie Sales Driveway

Division 07 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: L. Boyer

PREPARED BY: T.S. Warren REVIEWED BY:

SCALE: 0 N/A

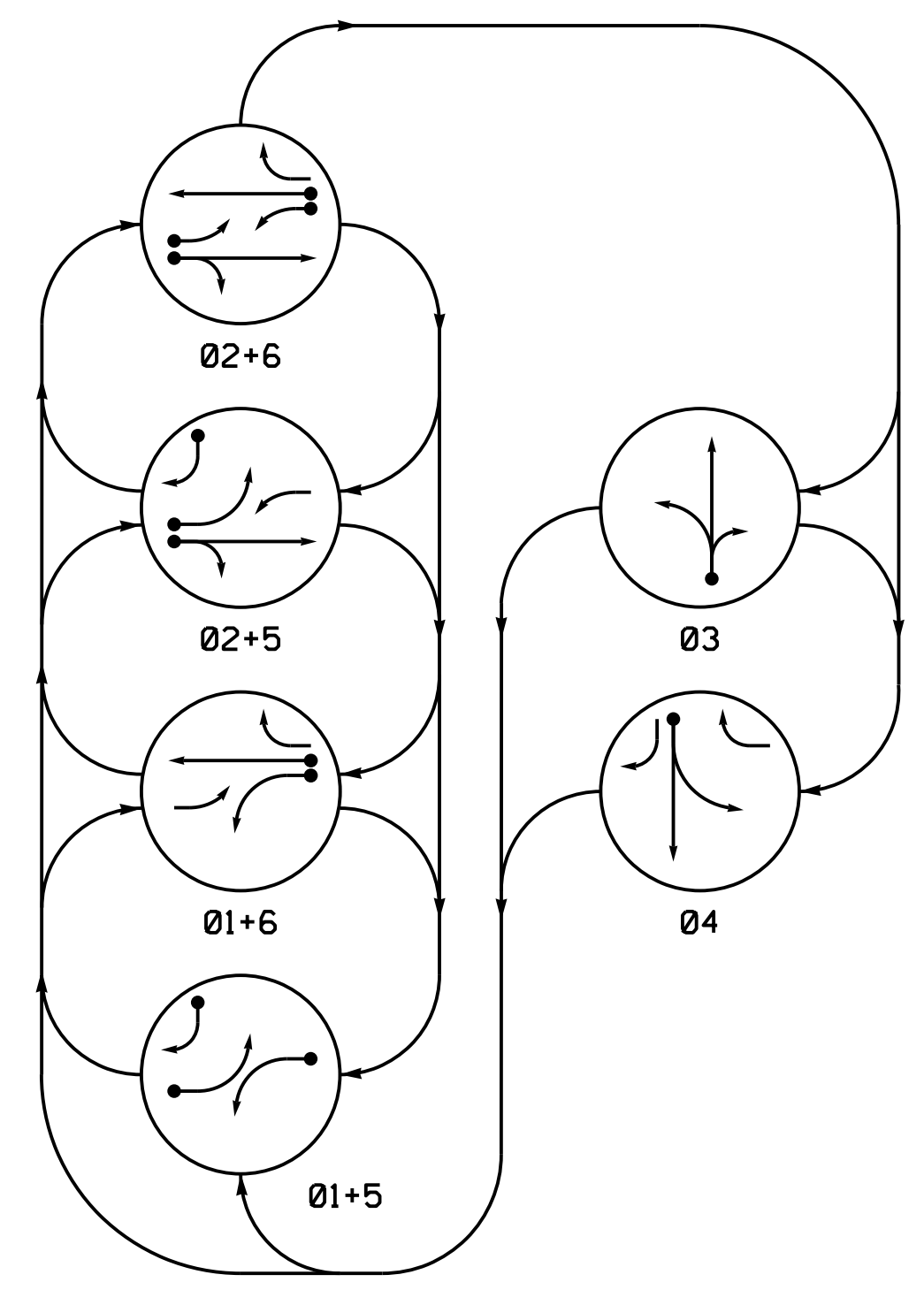
SEAL: [Professional Engineer Seal]

SIGNATURE: [Signature]

DATE: 04/20/2020

SIG. INVENTORY NO. 07-090312

DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

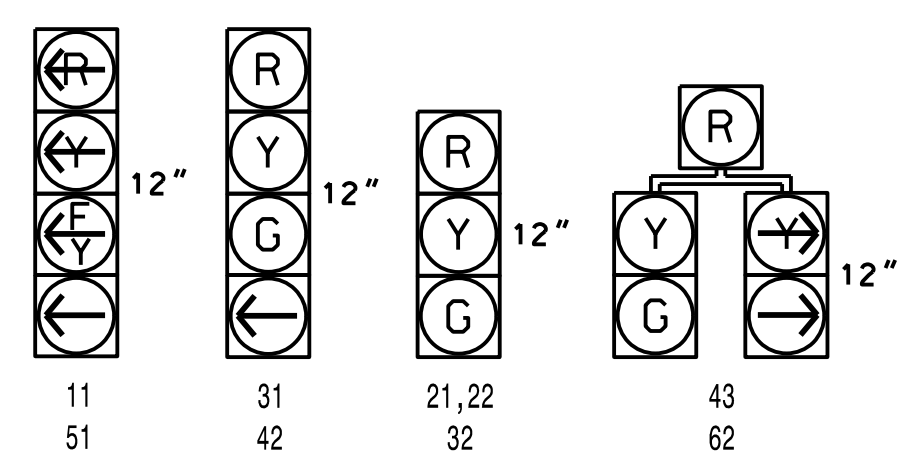
- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- ←- - -> UNSIGNALIZED MOVEMENT
- ←- - -> PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11			F	F	F	F
21,22	R	R	G	G	R	Y
31	R	R	R	R	G	R
32	R	R	R	R	G	R
42	R	R	R	R	G	R
43	R	R	R	R	G	R
44	R	R	R	R	G	R
51		F	F	F	F	F
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

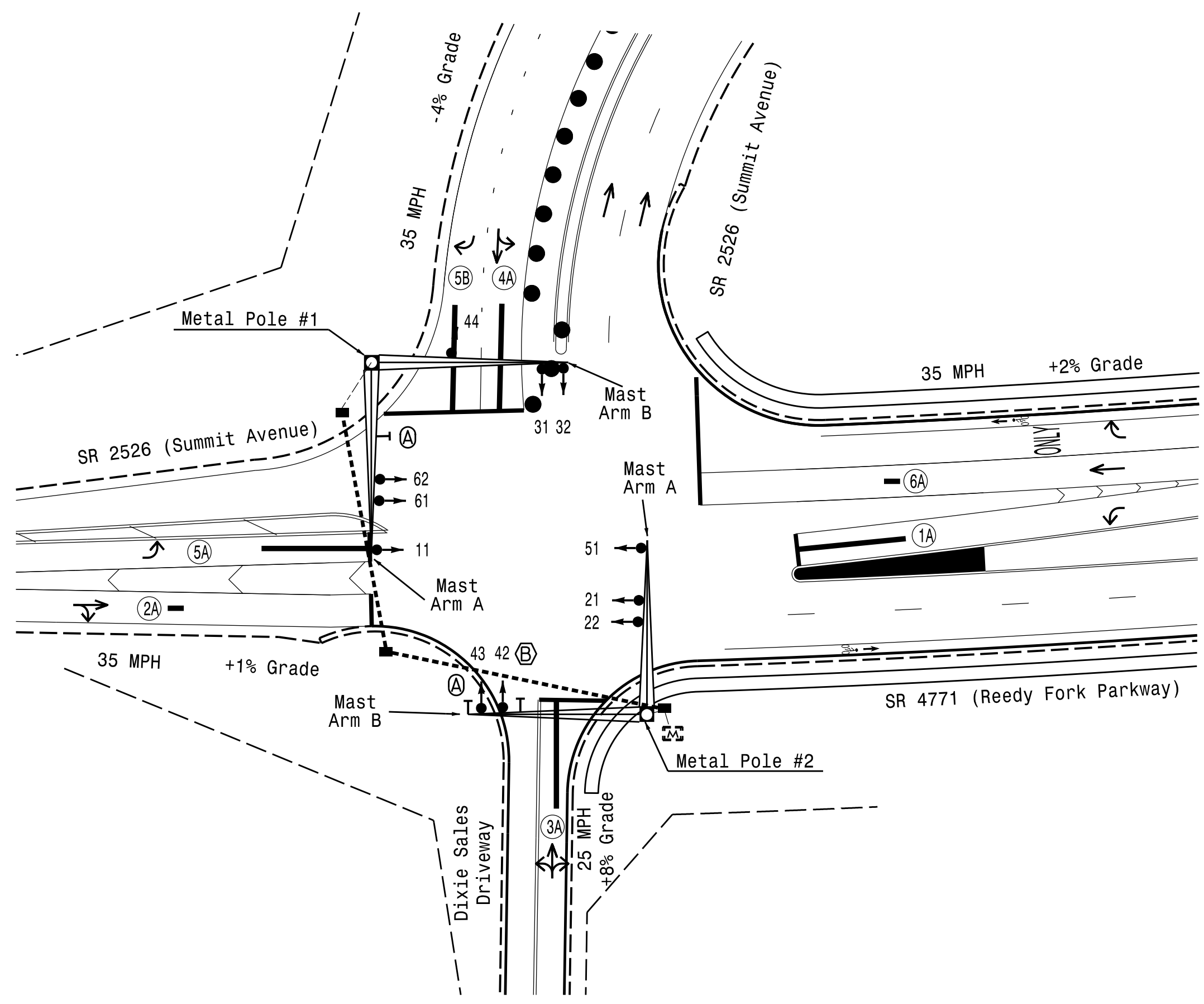
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING				TYPE	SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTEND TIME	DELAY TIME			
1A**	6X40	0	**	**	1	Yes	-	15	S	-	**
2A**	6X6	70	**	**	2	Yes	-	-	S	-	**
3A**	6X40	0	**	**	3	Yes	-	5	S	-	**
4A**	6X40	0	**	**	4	Yes	-	3	S	-	**
5A**	6X40	0	**	**	5	Yes	-	15	S	-	**
5B**	6X40	0	**	**	2	Yes	-	-	S	-	**
6A**	6X6	70	**	**	6	Yes	-	-	S	-	**

** Video Detection

6 Phase Fully Actuated
SR 4771 (Reedy Fork Parkway) CLS Signal System: 10727

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/ or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Set all detector units to presence mode.
- A video imaging loop emulator detection system is used to provide traffic detection during this temporary phase. Perform installation according to manufacturer's directions and NCDOT engineer - approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data:
Master Asset #: 10727
Controller Asset #: 0903



ASC/3 TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green *	7	10	7	7	7	10
Walk *	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0
Veh. Extension *	2.0	3.0	2.0	2.0	2.0	3.0
Max I *	20	60	15	30	20	60
Yellow	3.0	3.8	3.0	4.1	3.0	3.8
Red Clear	3.3	2.6	3.3	2.1	3.1	2.6
Actuations B4 Add *	-	-	-	-	-	-
Seconds / Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
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.

LEGEND

PROPOSED	EXISTING
○→ Traffic Signal Head	●→ Traffic Signal Head
○→ Modified Signal Head	N/A
↓ Sign	↓ Sign
↓ Pedestrian Signal Head With Push Button & Sign	↓ Pedestrian Signal Head With Push Button & Sign
▭ Metal Pole with Mastarm	▭ Metal Pole with Mastarm
▭ Video Detection Area	▭ Video Detection Area
▭ Master Controller & Cabinet	▭ Master Controller & Cabinet
▭ Junction Box	▭ Junction Box
▭ Oversize Junction Box	▭ Oversize Junction Box
▭ 2-in Underground Conduit	▭ 2-in Underground Conduit
--- Directional Drill	--- Directional Drill
N/A Right of Way	N/A Right of Way
→ Directional Arrow	→ Directional Arrow
(A) Right Arrow "ONLY" Sign (R3-SR)	(A) Right Arrow "ONLY" Sign (R3-SR)
(B) U-Turn Yield to Right Turn Sign (R10-16)	(B) U-Turn Yield to Right Turn Sign (R10-16)

Signal Upgrade Temporary Design 3 (TMP Phase IV - Step 4)

Project #: 180914

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NCBLS FIRM LICENSE NO. C-2522

Prepared for:
TRANSPORTATION MOBILITY AND SAFETY DIVISION
UNIVERSITY OF NORTH CAROLINA
SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING
Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

SR 4771 (Reedy Fork Parkway) at SR 2526 (Summit Avenue) / Dixie Sales Driveway

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: L Boyer

PREPARED BY: T.S. Warren REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

SEAL 030912

ENGINEER LORI M. BOYER

Signature: *Lori M. Boyer*

DATE: 04/20/2020

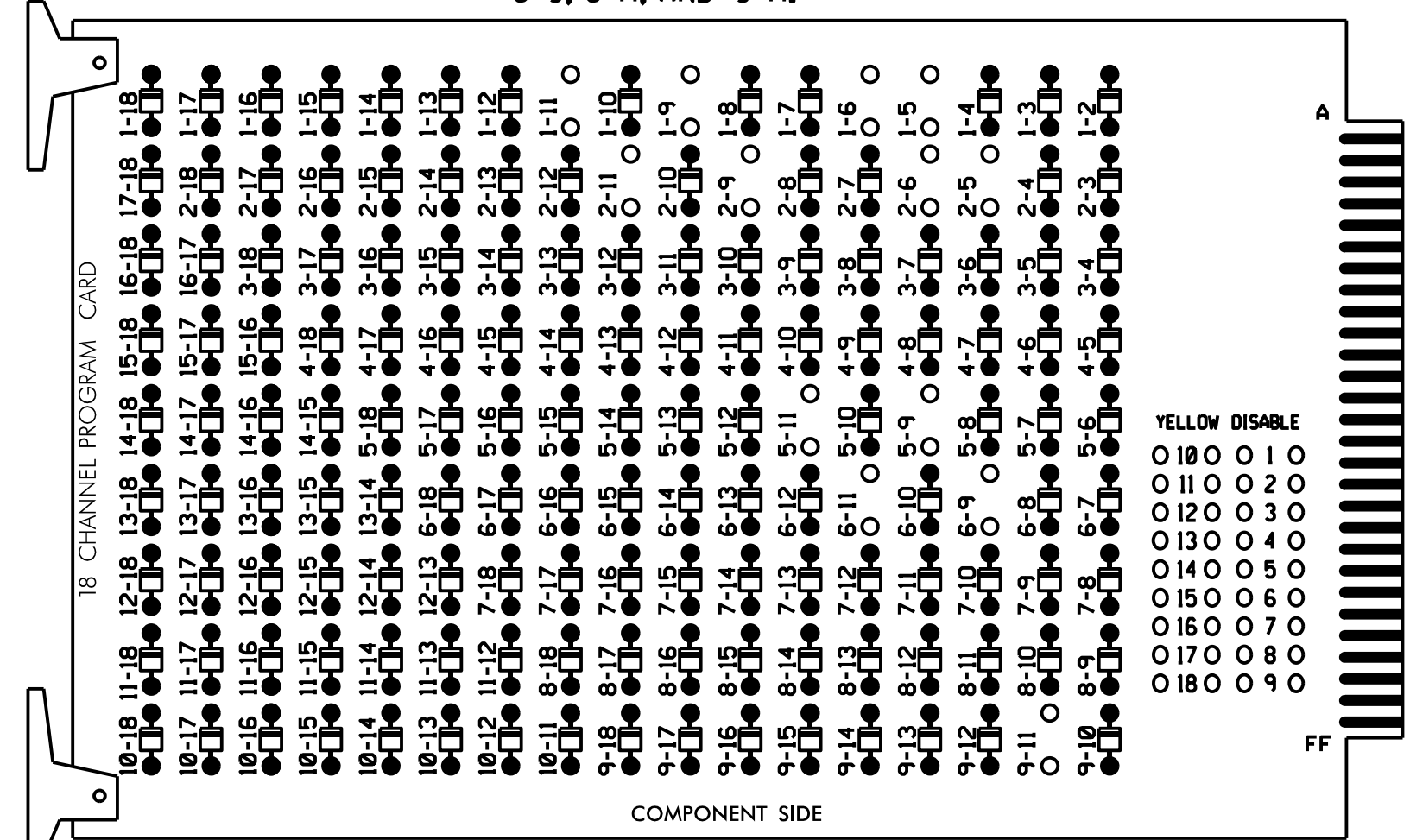
SIGNATURE DATE

SIG. INVENTORY NO. 07-090313

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

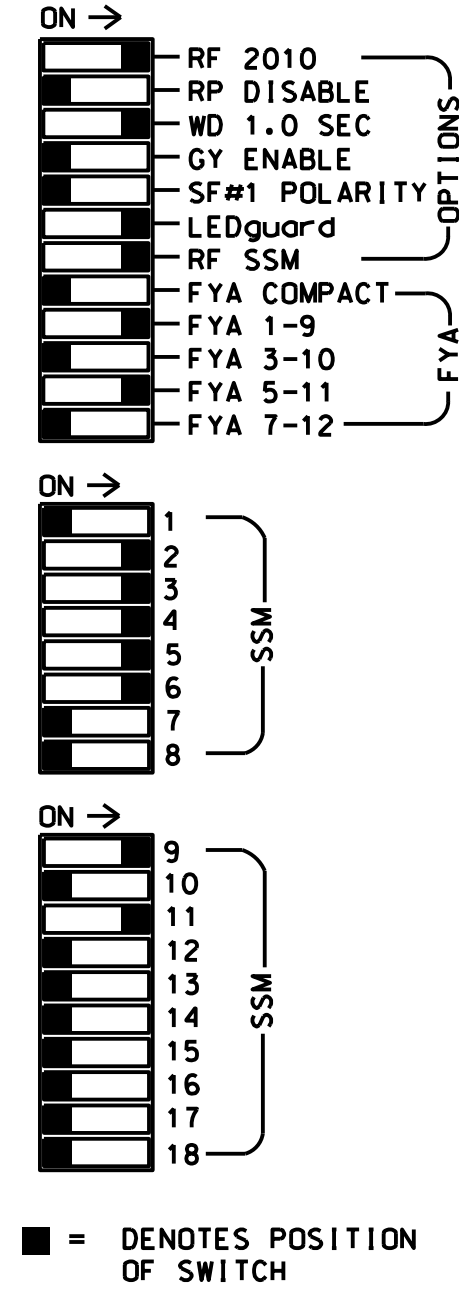
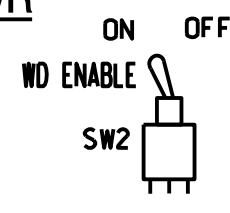
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 5-9, 5-11, 6-9, 6-11, AND 9-11.



REMOVE JUMPERS AS SHOWN

NOTES:

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



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the SR 4771 (Reedy Fork Parkway) CLS. Signal System: 10727.

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,AUX S1,
 AUX S4
 PHASES USED.....1,2,3,4,5,6
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED

* See overlap programming detail on sheet 2

PROJECT REFERENCE NO.	SHEET NO.
R-4707	Sig.8.1

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	21,22	NU	31	32	42	43,44	62	NU	51	43	61,62	NU	NU	NU	11	NU	51	NU		
RED		128		116	116	101	101			*		134									
YELLOW	*	129		117	117	102	102					135									
GREEN		130		118	118	103	103					136									
RED ARROW																			A121	A114	
YELLOW ARROW								102		132										A122	A115
FLASHING YELLOW ARROW																				A123	A116
GREEN ARROW	127			118	103	103		133	133												
Hand icon																					
Person icon																					

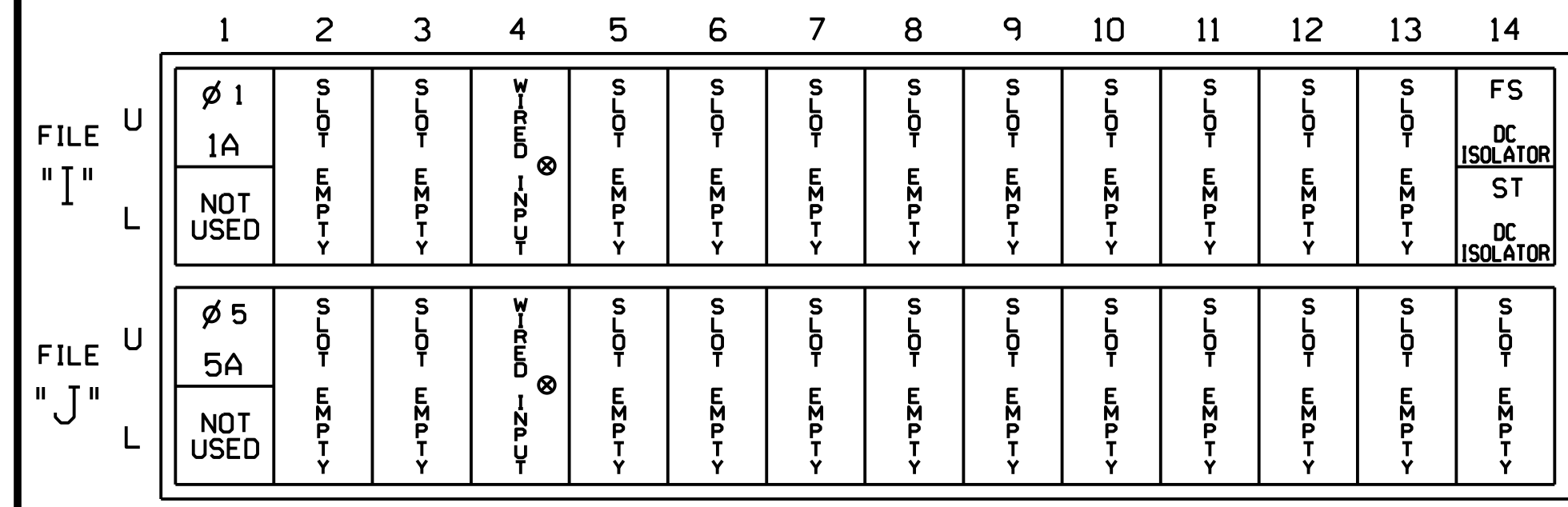
NU = Not Used

* 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)



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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

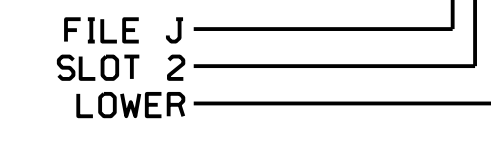
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A ¹	TB2-1,2	J1U	56	1	1	YES		15		S
	-	J4U	48	26	6	YES				S
5A ²	TB3-1,2	J1U	55	5	5	YES		15		S
	-	14U	47	22	2	YES				S

¹Add jumper from I1-W to J4-W, on rear of input file.

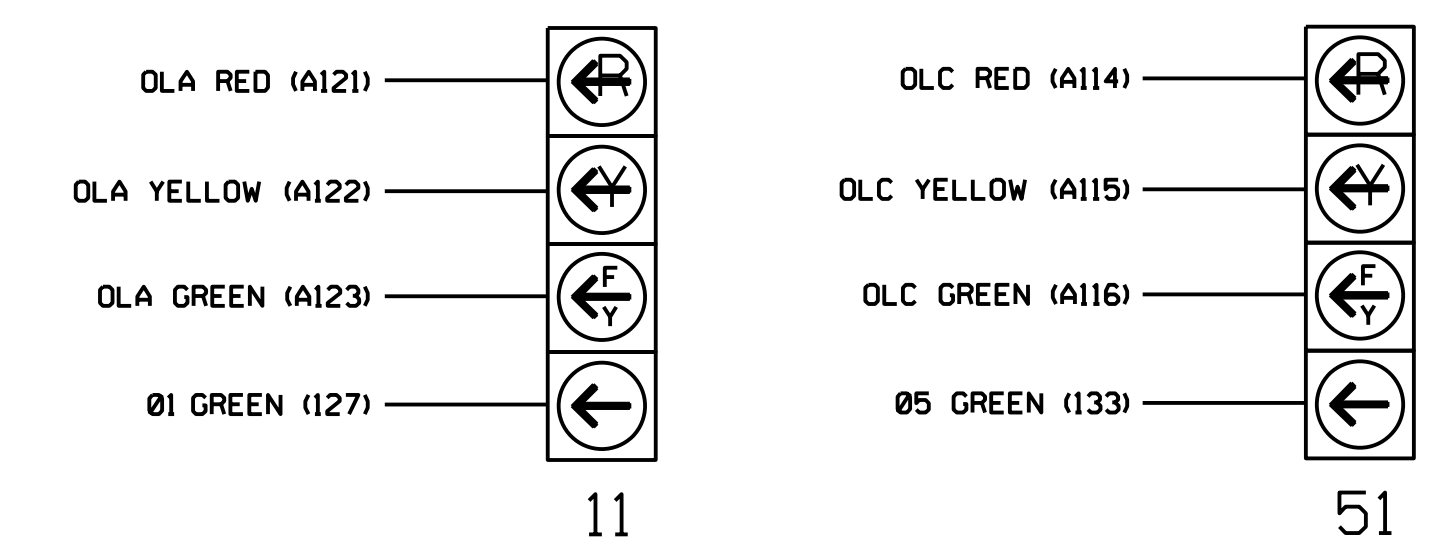
²Add jumper from J1-W to 14-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

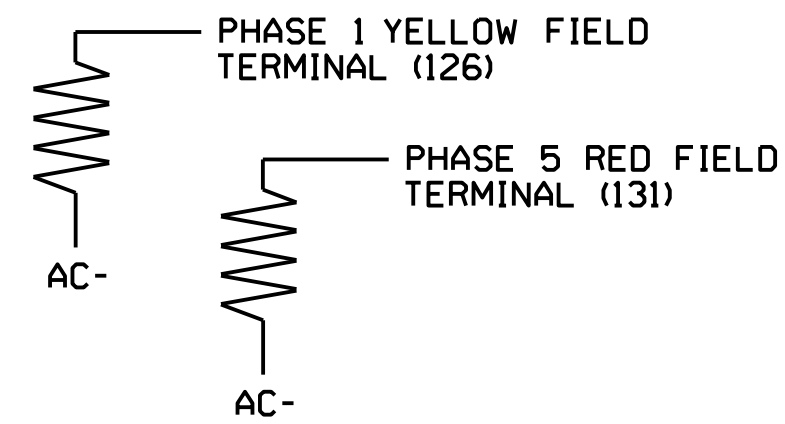
(wire signal heads as shown)



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)



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 loops 1A and 5A detector card placement and slot reserved for wired input is typical for a NCDOT installation.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0903T3
 DESIGNED: April 2020
 SEALED: 04/20/2020
 REVISED: N/A

Project #: 180914

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Electrical Detail - Sheet 1 of 2
Temporary Design 3 (TMP Phase IV - Step 4)

ELECTRICAL AND PROGRAMMING DETAILS FOR:



SR 4771 (Reedy Fork Parkway) at
 SR 2526 (Summit Avenue)/
 Dixie Sales Driveway

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: L. Boyer

PREPARED BY: T.S. Warren REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

DocuSigned by:
 Lori M. Boyer
 04/20/2020

SIG. INVENTORY NO. 07-0903T3

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 Twice

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

END PROGRAMMING

Project #: 180914

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0903T3
DESIGNED: April 2020
SEALED: 04/20/2020
REVISED: N/A



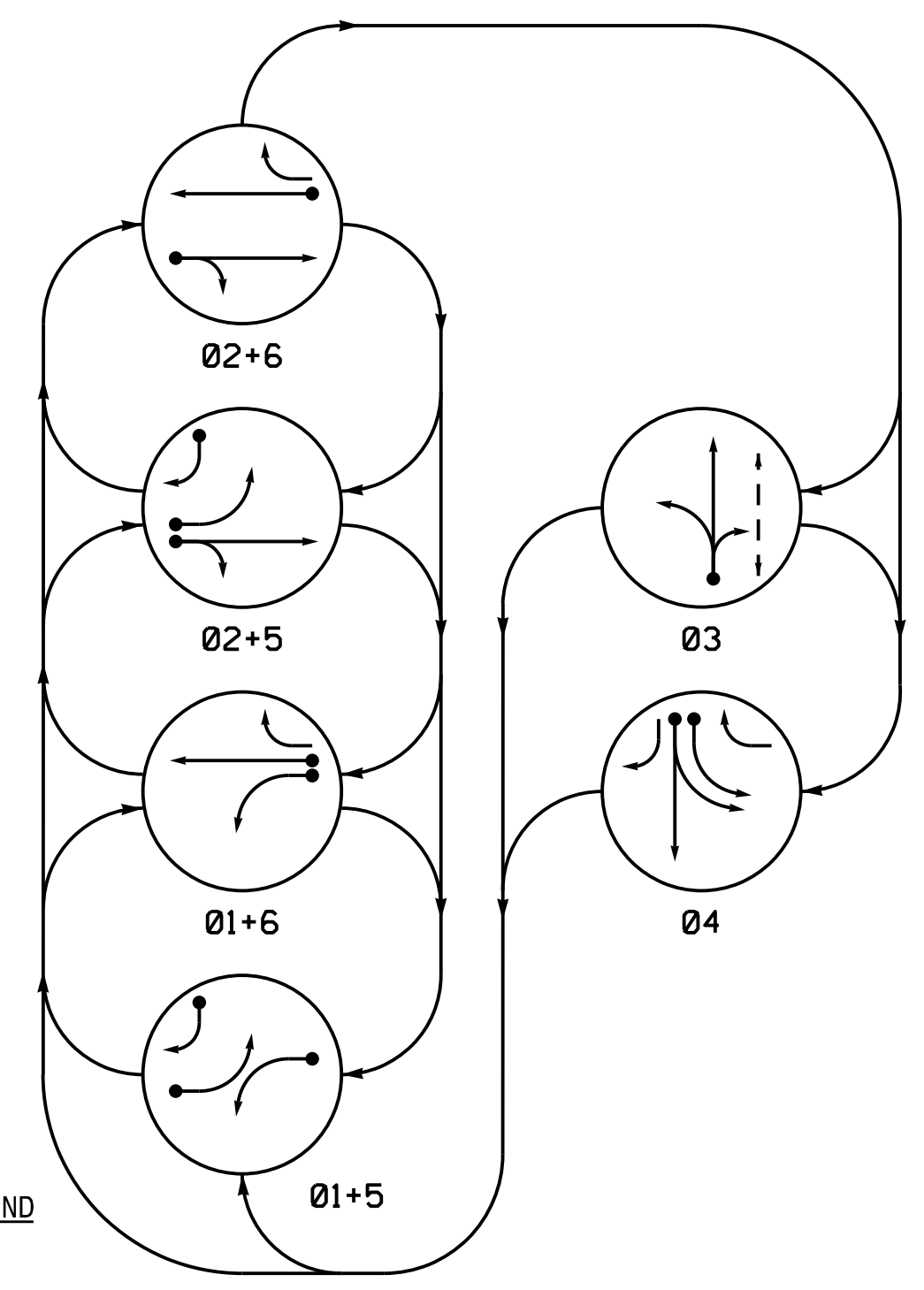
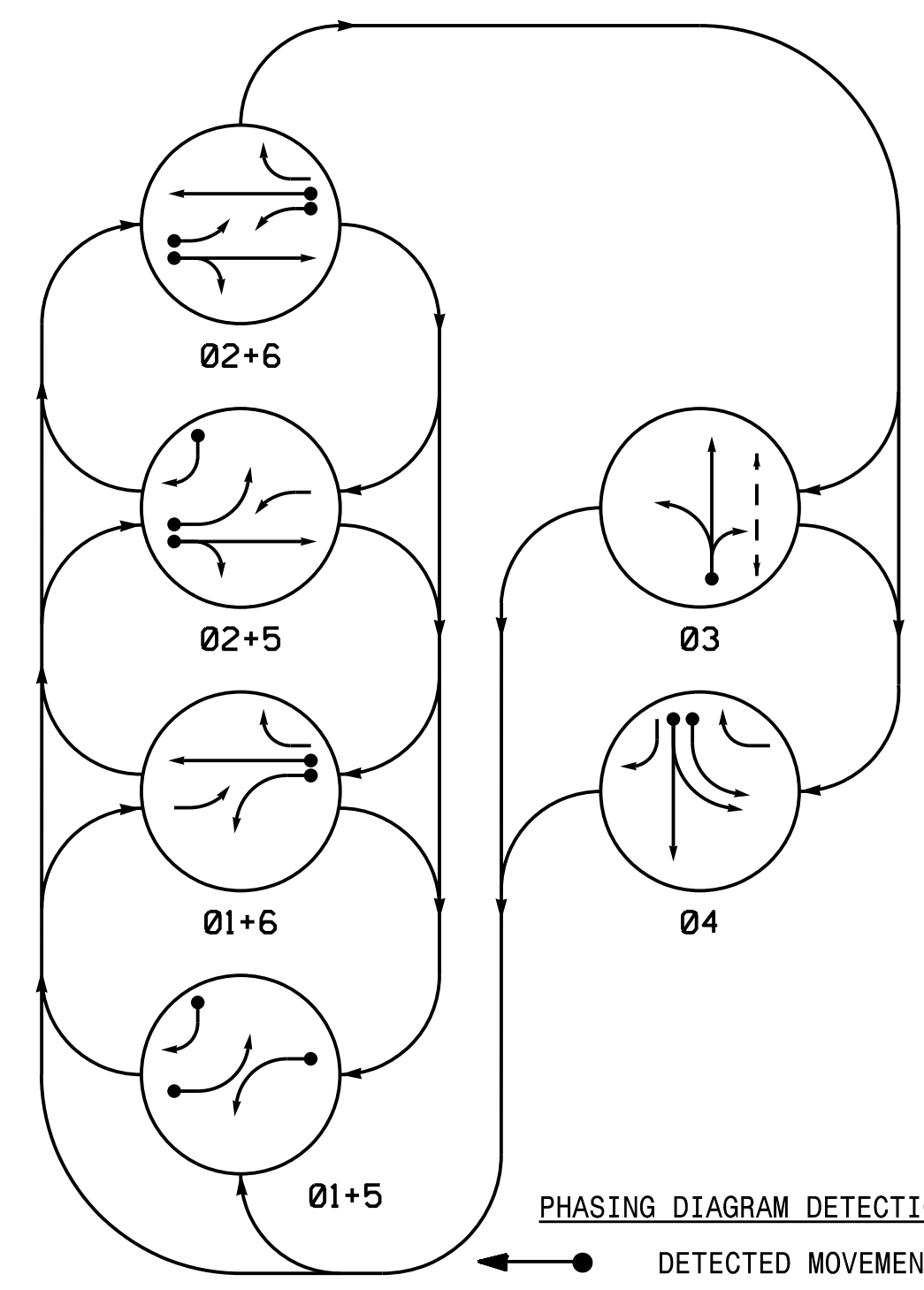
Electrical Detail - Sheet 2 of 2
Temporary Design 3 (TMP Phase IV - Step 4)

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FINAL UNLESS ALL
SIGNATURES COMPLETED**

<p style="font-size: small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <div style="text-align: center;"> <p style="font-size: x-small;">Prepared For:</p> <p style="font-size: x-small;">750 N. Greenfield Hwy, Garner, NC 27529</p> </div>	<p style="font-size: large; font-weight: bold;">SR 4771 (Reedy Fork Parkway) at SR 2526 (Summit Avenue)/ Dixie Sales Driveway</p> <p style="font-size: small;">Division 7 Guilford County Greensboro</p> <table style="width: 100%; font-size: x-small;"> <tr> <td>PLAN DATE: April 2020</td> <td>REVIEWED BY: L. Boyer</td> </tr> <tr> <td>PREPARED BY: T.S. Warren</td> <td>REVIEWED BY:</td> </tr> </table> <table style="width: 100%; font-size: x-small;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	PLAN DATE: April 2020	REVIEWED BY: L. Boyer	PREPARED BY: T.S. Warren	REVIEWED BY:	REVISIONS	INIT.	DATE										<p style="font-size: small;">SEAL</p> <div style="text-align: center;"> <p style="font-size: x-small;">L. M. Boyer 04/20/2020</p> </div> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-0903T3</p>
PLAN DATE: April 2020	REVIEWED BY: L. Boyer																	
PREPARED BY: T.S. Warren	REVIEWED BY:																	
REVISIONS	INIT.	DATE																

DEFAULT PHASING DIAGRAM

ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND
 ● DETECTED MOVEMENT
 ○ UNDETECTED MOVEMENT (OVERLAP)
 — UNSIGNALIZED MOVEMENT
 ⇄ PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11	—	—	—	—	—	—
21,22	R	R	G	G	R	R
31	R	R	R	R	G	R
32	R	R	R	R	G	R
41	—	—	—	—	—	—
42	R	R	R	R	G	R
43	R	R	R	R	G	R
44	R	R	R	R	G	R
51	—	—	—	—	—	—
61	R	G	R	G	R	R
62	R	G	R	G	R	R
P31,P32	DW	DW	DW	DW	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11	—	—	—	—	—	—
21,22	R	R	G	G	R	R
31	R	R	R	R	G	R
32	R	R	R	R	G	R
41	—	—	—	—	—	—
42	R	R	R	R	G	R
43	R	R	R	R	G	R
44	R	R	R	R	G	R
51	—	—	—	—	—	—
61	R	G	R	G	R	R
62	R	G	R	G	R	R
P31,P32	DW	DW	DW	DW	W	DRK

ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING						
					PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP	
1A	6x40	0	2-4-2	X	1	Yes	-	15*	S	-	X
					6#	Yes	-	-	S	-	X
2A	6x6	70	3	X	2	Yes	-	-	S	-	X
3A	6x40	0	2-4-2	X	3	Yes	-	5	S	-	X
4A	6x40	0	2-4-2	X	4	Yes	-	-	S	-	X
4B	6x40	0	2-4-2	X	4	Yes	-	-	S	-	X
5A	6x40	0	2-4-2	X	5	Yes	-	15**	S	-	X
					2#	Yes	-	-	S	-	X
5B	6x40	0	2-4-2	X	5	Yes	-	15	S	-	X
6A	6x6	70	3	X	6	Yes	-	-	S	-	X

* Disable delay during Alternate Phasing Operation.
 ** Reduce delay to 3 seconds during Alternate Phasing Operation.
 # Disable phase call for loop during Alternate Phasing Operation.

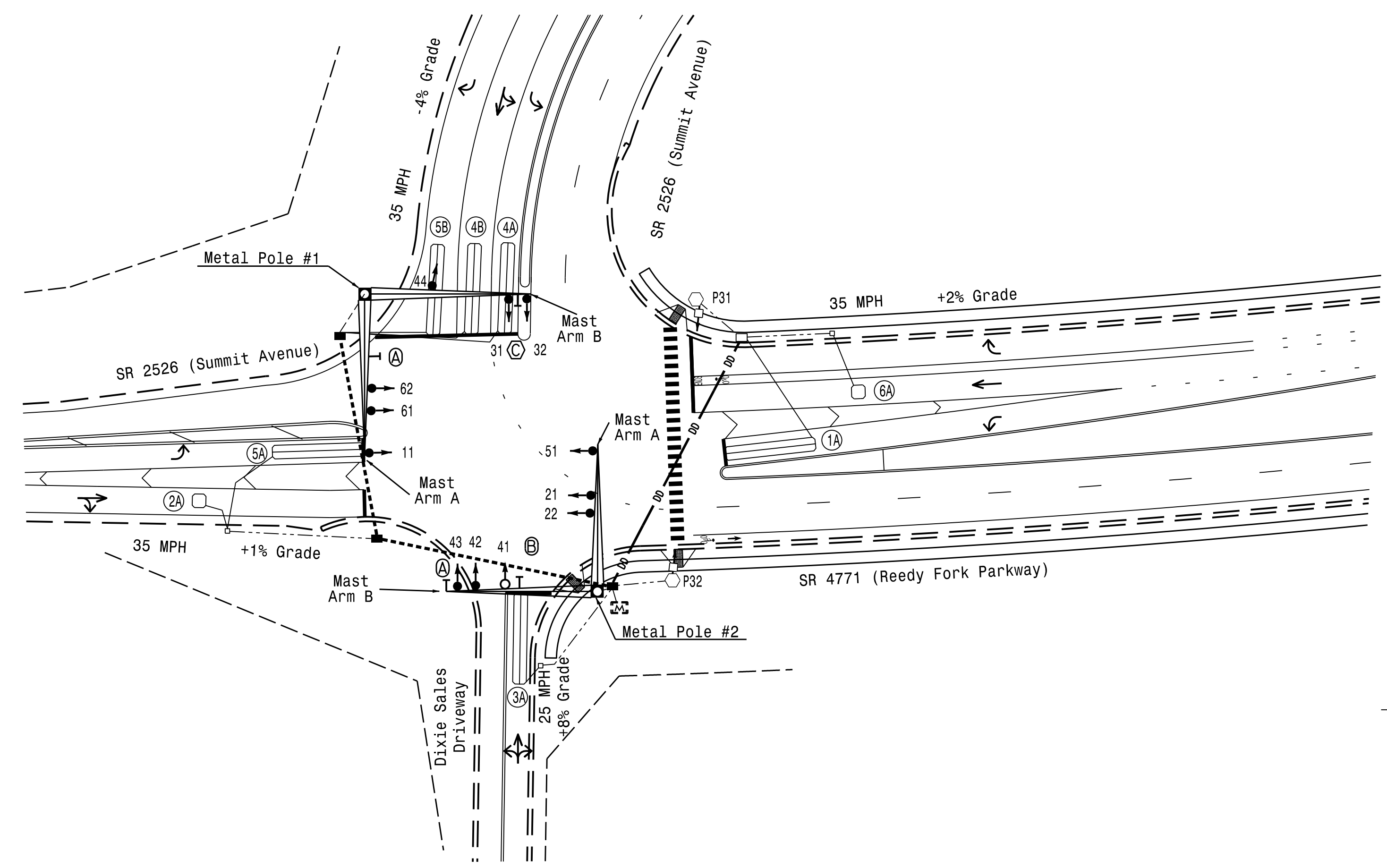
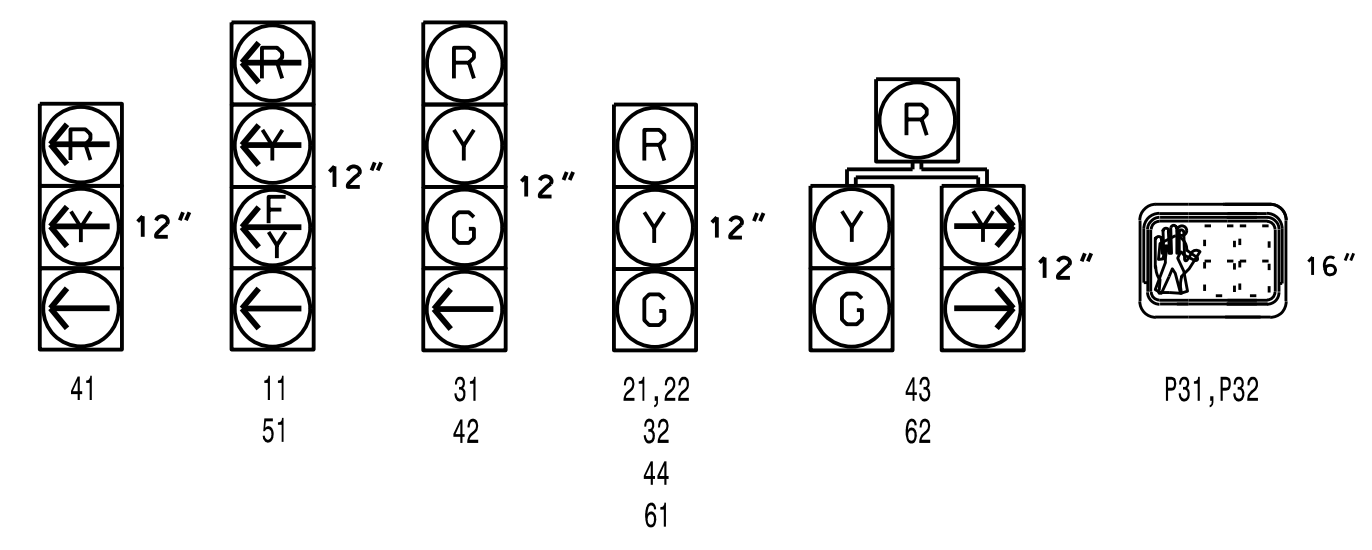
6 Phase Fully Actuated
 SR 4771 (Reedy Fork Parkway) CLS
 Signal System: 10727

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/ or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Reposition existing signal head numbered 62.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data:
 Master Asset #: 10727
 Controller Asset #: 0903

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green *	7	10	7	7	7	10
Walk *	0	0	7	0	0	0
Ped Clear	0	0	26	0	0	0
Veh. Extension *	2.0	3.0	2.0	2.0	2.0	3.0
Max 1 *	20	60	15	30	20	60
Yellow	3.0	3.8	3.0	4.1	3.0	3.8
Red Clear	3.3	2.7	3.3	2.5	3.1	2.7
Actuations B4 Add *	-	-	-	-	-	-
Seconds / Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
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.

LEGEND

PROPOSED	EXISTING
	N/A
N/A	

Signal Upgrade - Final Design

Project #: 180914

DAVENPORT

HOME OFFICE:
 119 BROOKSTOWN AVENUE, SUITE PH1
 WINSTON-SALEM, NC 27101
 336.744.1636 www.davenportworld.com
 NCBELS FIRM LICENSE NO. C-2522

SR 4771 (Reedy Fork Parkway) at SR 2526 (Summit Avenue) / Dixie Sales Driveway

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: R. Hinshaw

PREPARED BY: T.S. Warren REVIEWED BY: L. Boyer

REVISIONS

NO.	DESCRIPTION	INIT.	DATE

SCALE: 1" = 40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER, LORI M. BOYER, No. 030912

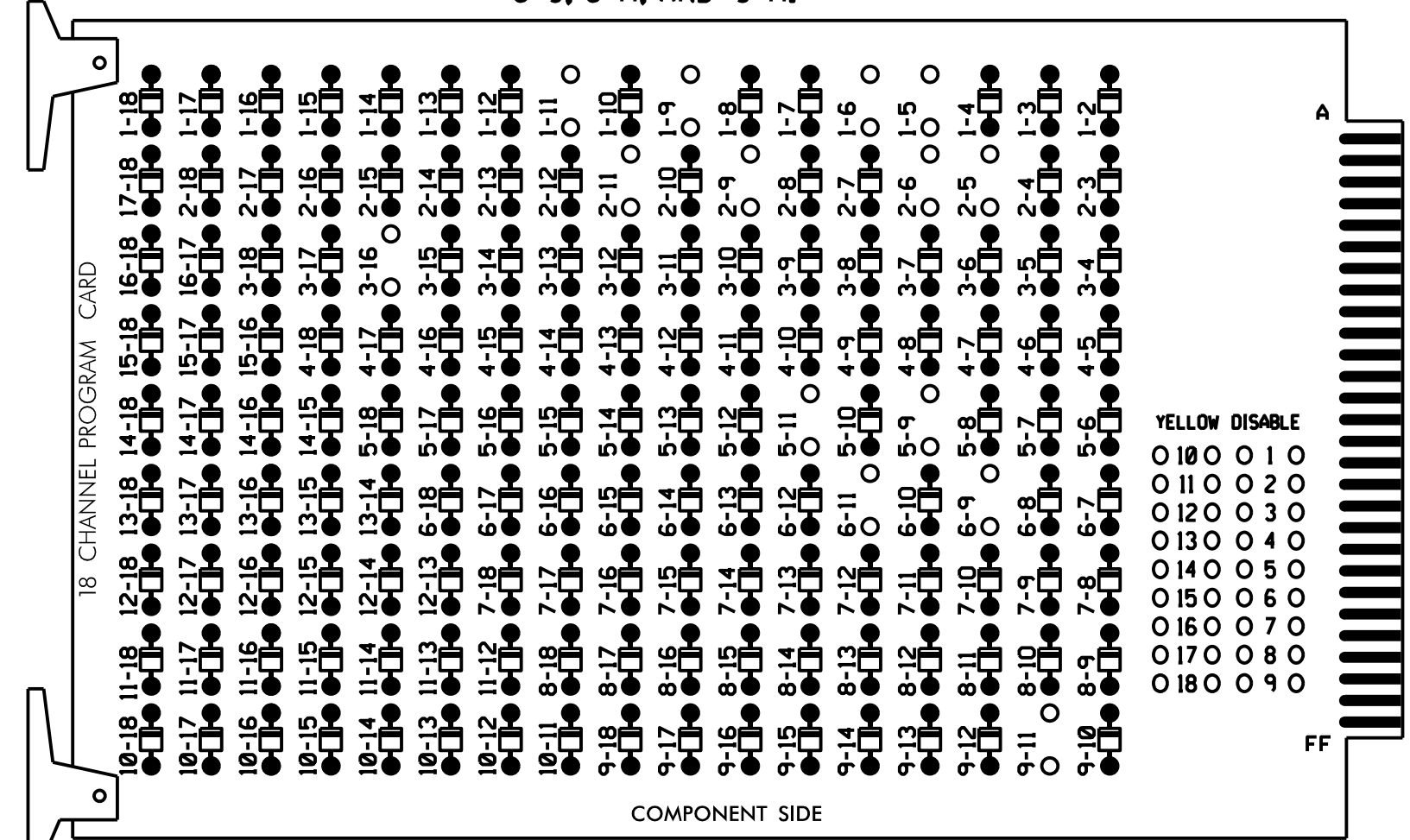
SIGNATURE: LORI M. BOYER DATE: 04/20/2020

SIG. INVENTORY NO. 07-0903

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

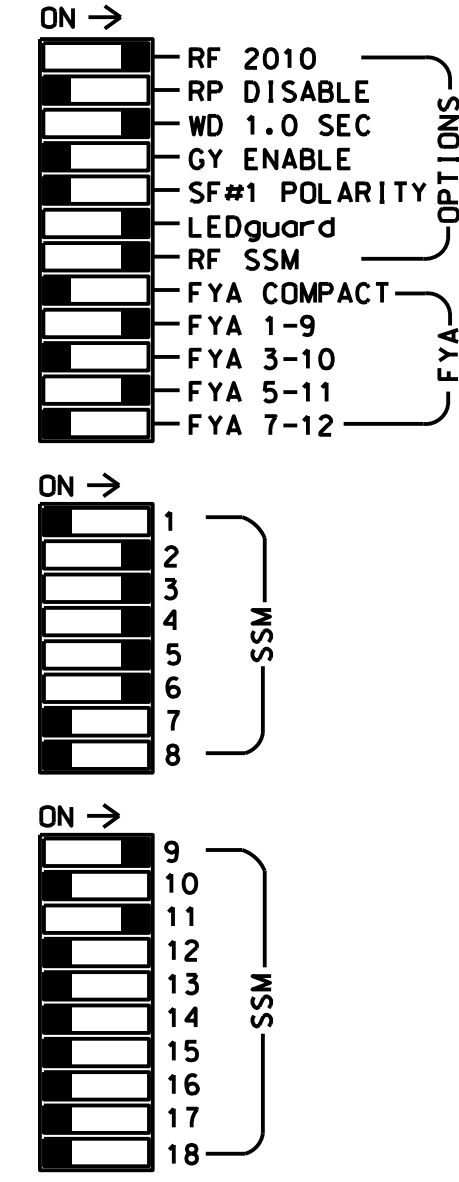
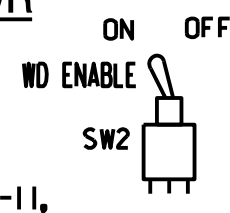
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-16, 5-9, 5-11, 6-9, 6-11, AND 9-11.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the SR 4771 (Reedy Fork Parkway) CLS, Signal System 10727.

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,S12, AUX S1,AUX S4
 PHASES USED.....1,2,3,4,5,6
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED

* See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

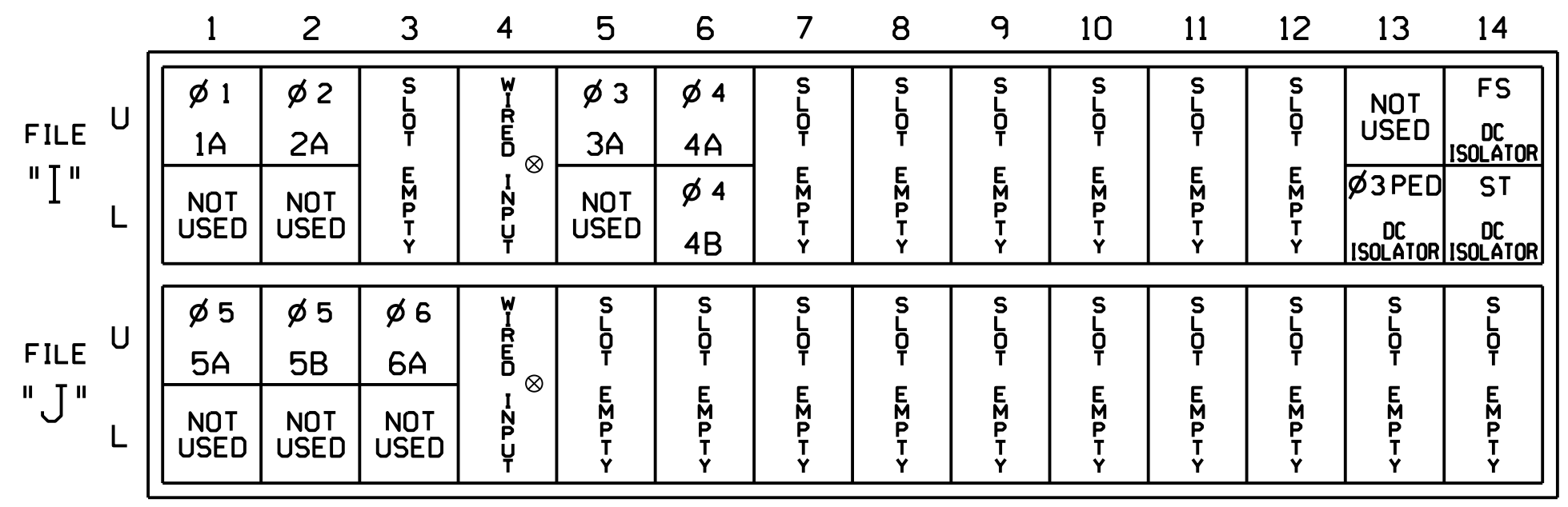
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6							
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18							
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	** PED	OLA	OLB	SPARE	OLC	OLD	SPARE							
SIGNAL HEAD NO.	11	21,22	NU	31	32	41	42	43,44	62	NU	51	43	61,62	NU	NU	NU	P31, P32	11	NU	NU	51	NU	NU		
RED		128		116	116	101	101			*			134												
YELLOW	*	129		117	117	102	102						135												
GREEN		130		118	118	103	103						136												
RED ARROW						101															A121			A114	
YELLOW ARROW						102		102				132									A122				A115
FLASHING YELLOW ARROW																					A123				A116
GREEN ARROW	127			118		103	103	103		133	133														
Hand icon																							110		
Person icon																							112		

NU = Not Used

- * Denotes install load resistor. See load resistor installation detail this sheet.
- ** Load switch S12 must be reassigned from phase 8 Ped to phase 3 Ped. See programming detail on sheet 2.
- ★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

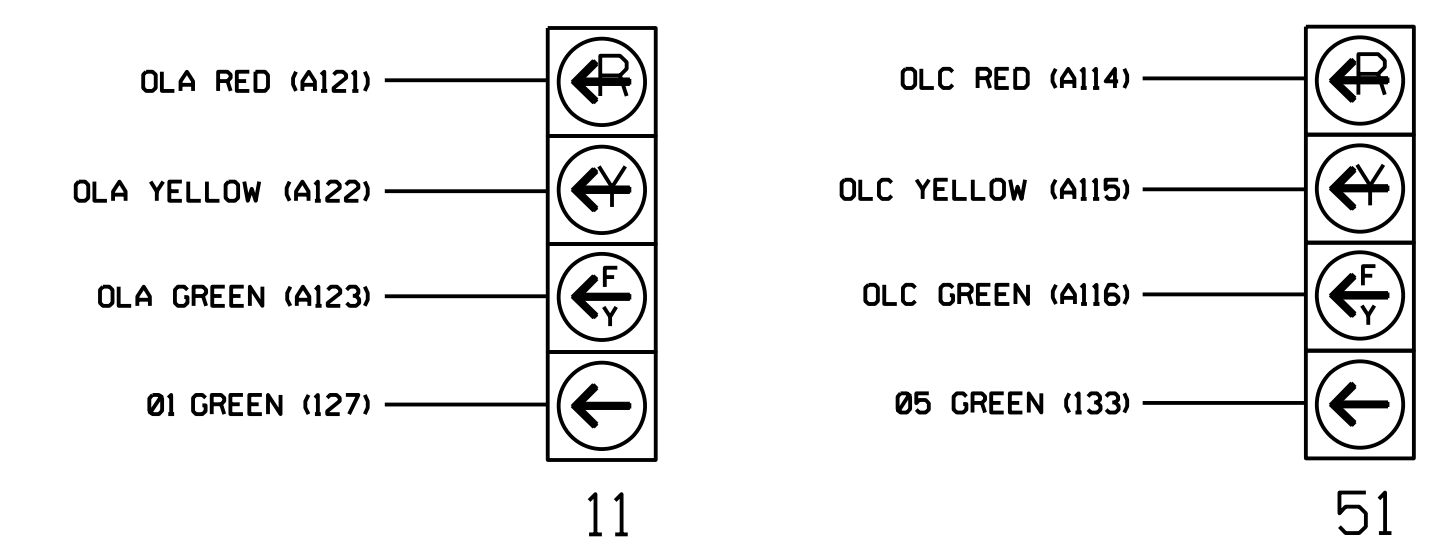
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A ¹	TB2-1,2	11U	56	1 ★	1	YES		15		S
	-	J4U	48	26 ★	6	YES				S
	2A	TB2-5,6	12U	39	2	YES				S
3A	TB4-5,6	15U	58	3	YES		5			S
4A	TB4-9,10	16U	41	4	YES					S
4B	TB4-11,12	16L	45	14	4	YES				S
5A ²	TB3-1,2	J1U	55	5 ★	5	YES		15		S
	-	14U	47	22 ★	2	YES				S
5B	TB3-5,6	J2U	40	6	5	YES		15		S
6A	TB3-9,10	J3U	64	36	6	YES				S
PED PUSH BUTTONS										
P31,P32	TB8-8,9	113L	70	PED 8	3 PED					

NOTE:
 INSTALL DC ISOLATOR IN INPUT FILE SLOT 113.

- Add jumper from I1-W to J4-W. on rear of input file.
 - Add jumper from J1-W to I4-W. on rear of input file.
- ★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 3.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



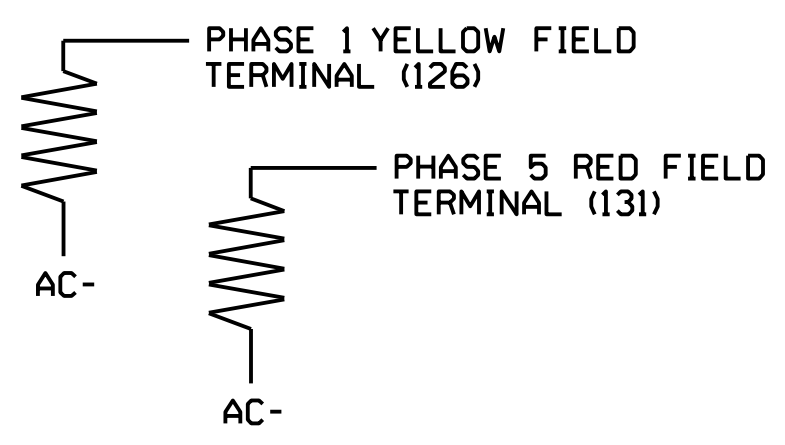
NOTE

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

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: 07-0903
 DESIGNED: April 2020
 SEALED: 04/20/2020
 REVISED: N/A

Project #: 180914

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Electrical Detail - Final Design - Sheet 1 of 4

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SEAL

Prepared for: SR 4771 (Reedy Fork Parkway) at SR 2526 (Summit Avenue)/Dixie Sales Driveway

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: R. Hinshaw

PREPARED BY: T.S. Warren REVIEWED BY: L. Boyer

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Corner, NC 27529

Seal of North Carolina Professional Engineer L. M. Boyer

DATE: 04/20/2020

SIG. INVENTORY NO. 07-0903

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..... 1	

← NOTICE ACTION PLAN SF BIT "1"

Toggle Twice

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..... 5	

← NOTICE ACTION PLAN SF BIT "5"

END PROGRAMMING

ECONOLITE ASC/3-2070 PED 3 PROGRAMMING ASSIGNMENT DETAIL

(program controller as shown)

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

← NOTICE PED DETECTOR 8 ASSIGNED TO PHASE 3

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

LD SWITCH ASSIGN									
PHASE	DIMMING	---FLASH---							
/OVLP	TYPE	R	Y	G	D	PWR	AUT		
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	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	.	.

NOTICE PHASE 3 PED ASSIGNED TO LD SWITCH 16 →

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0903
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Electrical Detail - Final Design - Sheet 2 of 4		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED													
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REVISIONS	INIT.	DATE													

ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A AND 5A

IMPORTANT!

(program controller as shown)

Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

1. From Main Menu select **8. UTILITIES**
2. From UTILITIES Submenu select **1. COPY/CLEAR**
3. Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

```

COPY / CLEAR UTILITY
FROM          TO
PHASE TIMING.... > PHASE TIMING....
TIMING PLAN.... > TIMING PLAN....
PH DET OPT PLAN. > PH DET OPT PLAN.
DETECTOR PLAN... 1 > DETECTOR PLAN... 2
TOGGLE TO SELECT A "FROM" AND A "TO"
THEN PRESS ENTER
  
```

4. From Main Menu select **6. DETECTORS**
5. From DETECTOR Submenu select **2. VEHICLE DETECTOR SETUP**
6. Place cursor in VEH DET PLAN [] position and enter "2".

- Place cursor in VEH DETECTOR [] position and enter "1".
- Set delay time to "0".

```

VEH DETECTOR [ 1]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
1 1 .....
EXTEND TIME... 0.0 DELAY TIME... 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
  
```

← NOTICE VEH DET PLAN 2

← ENSURE DELAY IS SET TO '0'

- Place cursor in VEH DETECTOR [] position and enter "26".
- Set assigned phase to "0".

```

VEH DETECTOR [26]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
26 0 .....
EXTEND TIME... 0.0 DELAY TIME... 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
  
```

← NOTICE VEH DET PLAN 2

← ENSURE PHASE IS SET TO "0"

- Place cursor in VEH DETECTOR [] position and enter "5".
- Set delay time to "3".

```

VEH DETECTOR [ 5]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
5 5 .....
EXTEND TIME... 0.0 DELAY TIME... 3.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
  
```

← NOTICE VEH DET PLAN 2

← ENSURE DELAY IS SET TO '3'

- Place cursor in VEH DETECTOR [] position and enter "22".
- Set assigned phase to "0".

```

VEH DETECTOR [22]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
22 0 .....
EXTEND TIME... 0.0 DELAY TIME... 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
  
```

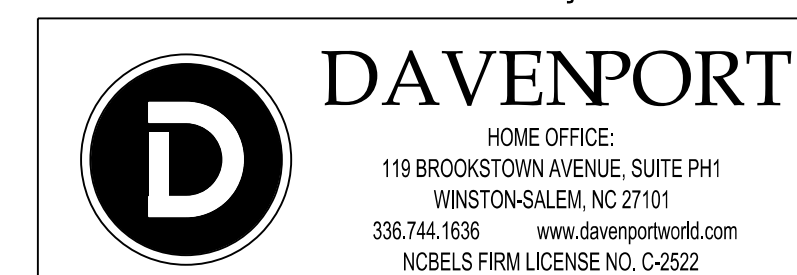
← NOTICE VEH DET PLAN 2

← ENSURE PHASE IS SET TO "0"

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0903
DESIGNED: April 2020
SEALED: 04/20/2020
REVISED: N/A

Project #: 180914



Electrical Detail - Final Design - Sheet 3 of 4		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Offices of: 	SR 4771 (Reedy Fork Parkway) at SR 2526 (Summit Avenue)/ Dixie Sales Driveway Division 7 Guilford County Greensboro PLAN DATE: April 2020 REVIEWED BY: R. Hinshaw PREPARED BY: T.S. Warren REVIEWED BY: L. Boyer REVISIONS INIT. DATE	SEAL L. BOYER 04/20/2020 DATE SIG. INVENTORY NO. 07-0903

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1 and 5.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1 and 5.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	NONE
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	1, 5

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BITS 1 AND 5 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SF BITS 1,5: Modifies overlap parent phases for heads 11 and 51 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

1. From Main Menu select 5. TIME BASE
2. From TIME BASE Submenu select 2. ACTION PLAN

ACTION PLAN... [1]										
PATTERN.....	AUTO	SYS OVERRIDE....	NO							
TIMING PLAN.....	0	SEQUENCE.....	0							
VEH DETECTOR PLAN..	2	DET LOG.....	NONE							
FLASH.....	--	RED REST.....	NO							
VEH DET DIAG PLN...	0	PED DET DIAG PLN..	0							
DIMMING ENABLE..	NO	PRIORITY RETURN.	NO							
PED PR RETURN..	NO	QUEUE DELAY....	NO							
PMT COND DELAY	NO									
PHASE	1	2	3	4	5	6	7	8	9	0
PED RCL	.	.	.	.	.	.	.	.	.	.
WALK 2	.	.	.	.	.	.	.	.	.	.
VEX 2	.	.	.	.	.	.	.	.	.	.
VEH RCL	.	.	.	.	.	.	.	.	.	.
MAX RCL	.	.	.	.	.	.	.	.	.	.
MAX 2	.	.	.	.	.	.	.	.	.	.
PHASE	1	2	3	4	5	6	7	8	9	0
MAX 3	.	.	.	.	.	.	.	.	.	.
CS INH	.	.	.	.	.	.	.	.	.	.
OMIT	.	.	.	.	.	.	.	.	.	.
SPC FCT	X	.	.	.	X	.	.	.	.	(1-8)
AUX FCT	.	.	.	.	.	.	.	.	.	(1-3)
	1	2	3	4	5	6	7	8	9	0
LP 1-15	.	.	.	.	.	.	.	.	.	.
LP 16-30	.	.	.	.	.	.	.	.	.	.
LP 31-45	.	.	.	.	.	.	.	.	.	.
LP 46-60	.	.	.	.	.	.	.	.	.	.
LP 61-75	.	.	.	.	.	.	.	.	.	.
LP 76-90	.	.	.	.	.	.	.	.	.	.
LP 91-100	.	.	.	.	.	.	.	.	.	.

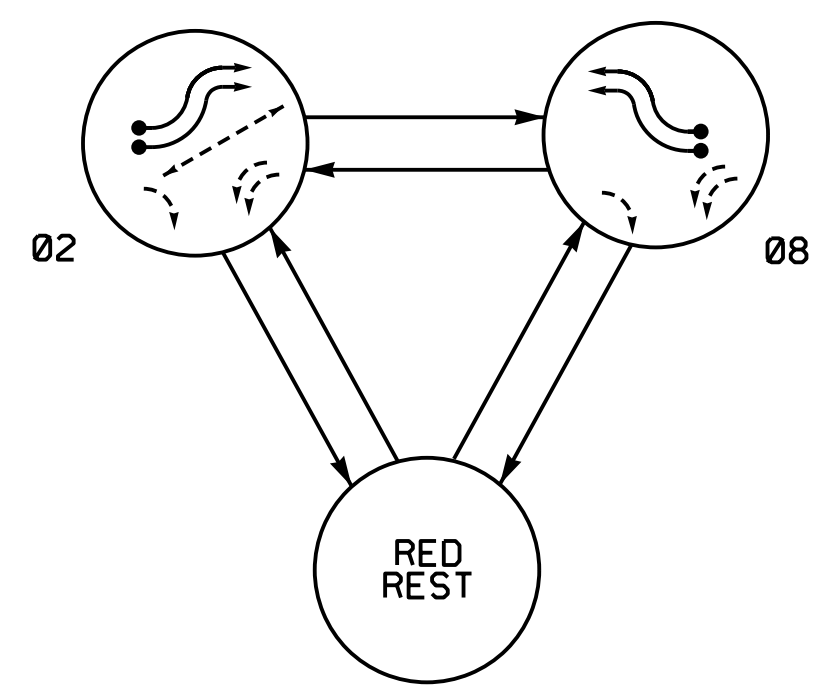
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0903
 DESIGNED: April 2020
 SEALED: 04/20/2020
 REVISED: N/A

Project #: 180914



Electrical Detail - Final Design - Sheet 4 of 4		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Offices of: 750 N. Greenfield Pkwy, Corner, NC 27529	SR 4771 (Reedy Fork Parkway) at SR 2526 (Summit Avenue)/ Dixie Sales Driveway Division 7 Guilford County Greensboro PLAN DATE: April 2020 REVIEWED BY: R. Hinshaw PREPARED BY: T.S. Warren REVIEWED BY: L. Boyer REVISIONS INIT. DATE	SEAL DATE: 04/20/2020 SIG. INVENTORY NO. 07-0903

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

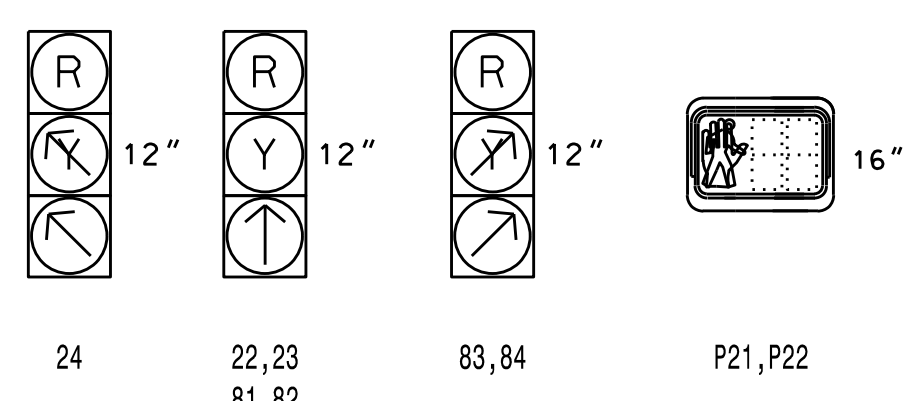
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02	08	RED REST	LIGHTHOUSE
22,23	↑	R	R	R
24	↘	R	R	R
81,82	R	↑	R	R
83,84	R	↗	R	R
P21,P22	W	DW	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

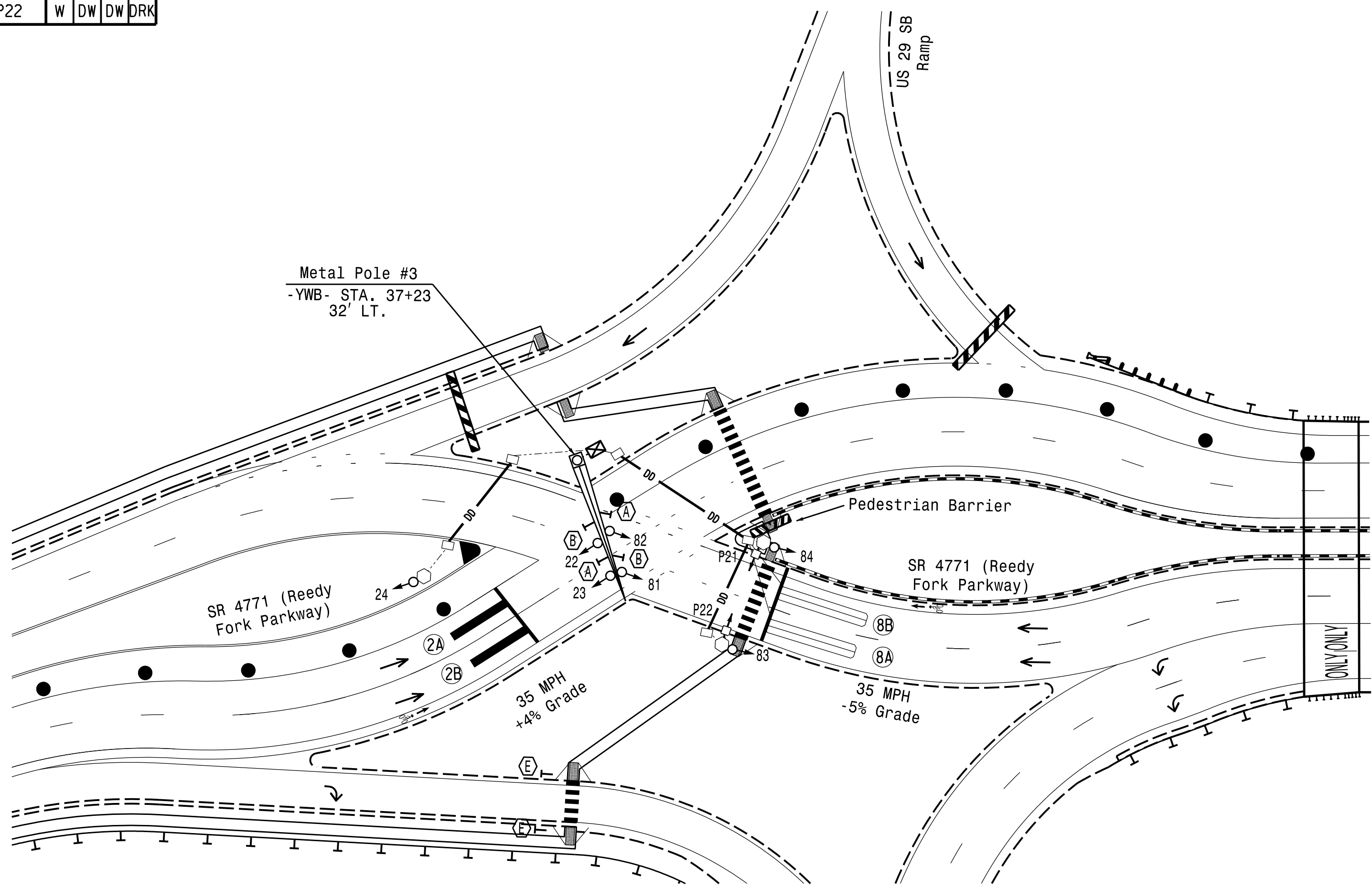
LOOP/ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP	NEW CARD	
2A**	6X40	0	**	**	2	Yes	-	-	-	S	-	**
2B**	6X40	0	**	**	2	Yes	-	-	-	S	-	**
8A	6X40	0	2-4-2	X	8	Yes	-	-	-	S	-	X
8B	6X40	0	2-4-2	X	8	Yes	-	-	-	S	-	X

** Video Detection

2 Phase Fully Actuated
SR 4771 (Reedy Fork Parkway) CLS
Signal System: 10727

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Program controller to startup in Phase 2 Red Clear.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Program all phases for "Red Rest".
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. 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 #: 0904
11. A video imaging loop emulator detection system is used to provide traffic detection during this temporary phase. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on Signal Design Plans.



ASC/3 TIMING CHART

FEATURE	PHASE	
	2	8
Min Green *	10	10
Walk *	7	-
Ped Clear	7	-
Veh. Extension *	2.0	2.0
Max I *	60	60
Yellow	3.6	4.2
Red Clear	2.4	1.8
Red Revert	5.0	5.0
Actuations B4 Add *	-	-
Seconds / Actuation *	-	-
Max Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Locking Detector	-	-
Recall Position	NONE	NONE
Dual Entry	-	-
Simultaneous Gap	X	X

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

LEGEND

- | | | | |
|--|---|--|---|
| | Proposed Traffic Signal Head | | Existing Traffic Signal Head |
| | Proposed Modified Signal Head | | Existing Modified Signal Head |
| | Proposed Pedestrian Signal Head | | Existing Pedestrian Signal Head |
| | Proposed Signal Pole with Guy | | Existing Signal Pole with Guy |
| | Proposed Signal Pole with Sidewalk Guy | | Existing Signal Pole with Sidewalk Guy |
| | Proposed Inductive Loop Detector | | Existing Inductive Loop Detector |
| | Proposed Controller & Cabinet | | Existing Controller & Cabinet |
| | Proposed Junction Box | | Existing Junction Box |
| | Proposed Oversize Junction Box | | Existing Oversize Junction Box |
| | Proposed Directional Drill | | Existing Directional Drill |
| | Proposed 2-in Underground Conduit | | Existing 2-in Underground Conduit |
| | Proposed Right of Way | | Existing Right of Way |
| | Proposed Directional Arrow | | Existing Directional Arrow |
| | Proposed Guardrail | | Existing Guardrail |
| | Proposed Type II Signal Pedestal | | Existing Type II Signal Pedestal |
| | Proposed Curb Ramp | | Existing Curb Ramp |
| | Proposed Video Detection Zone | | Existing Video Detection Zone |
| | Proposed No Right Turn Sign (R3-1) | | Existing No Right Turn Sign (R3-1) |
| | Proposed No Left Turn Sign (R3-2) | | Existing No Left Turn Sign (R3-2) |
| | Proposed Pedestrian Crossing Sign (W11-2) w/ Diagonal Arrow Plaque (W16-7p) | | Existing Pedestrian Crossing Sign (W11-2) w/ Diagonal Arrow Plaque (W16-7p) |

New Installation
Temporary Design 1 (TMP Phase III-Step 4)

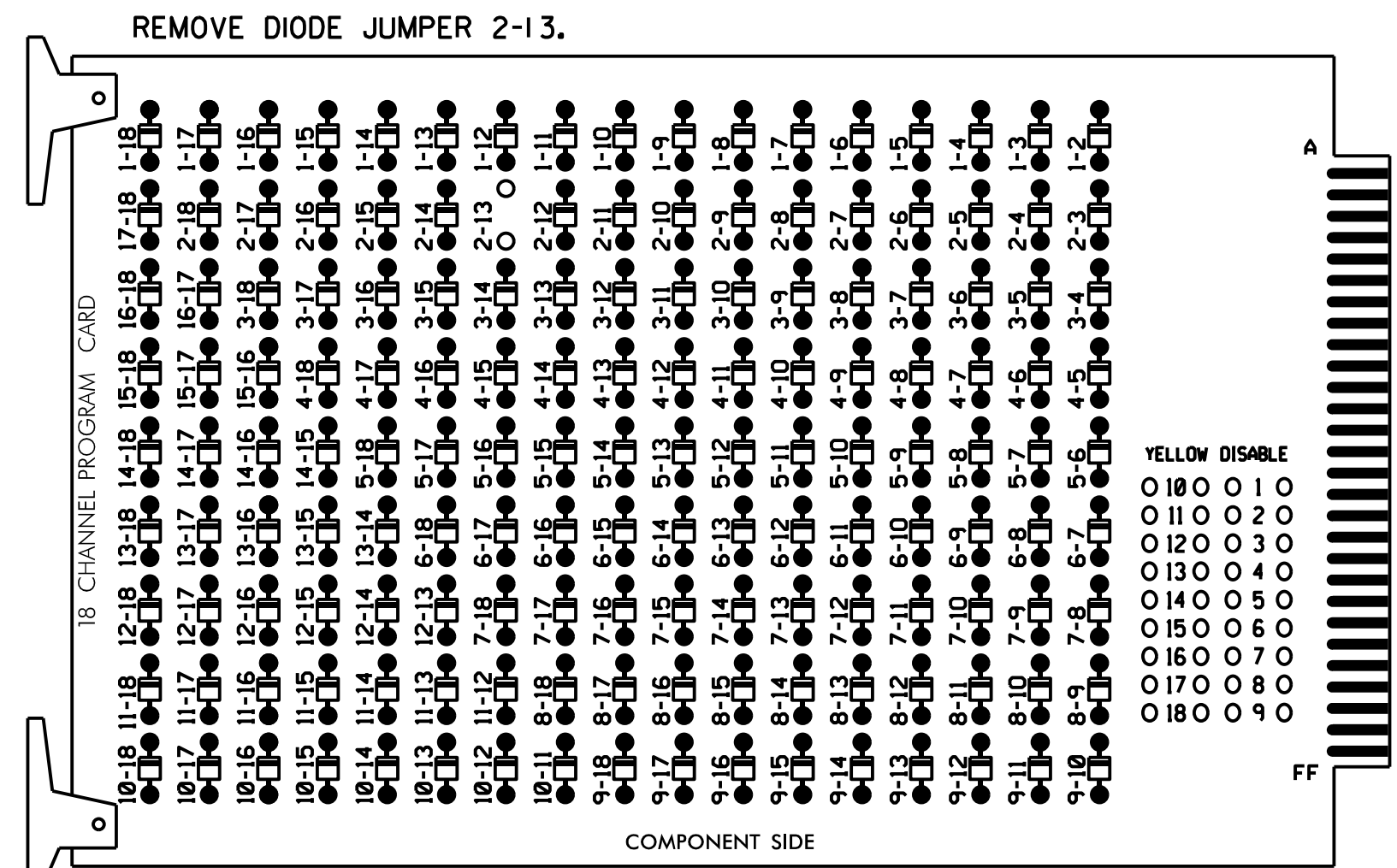
Project #: 180914

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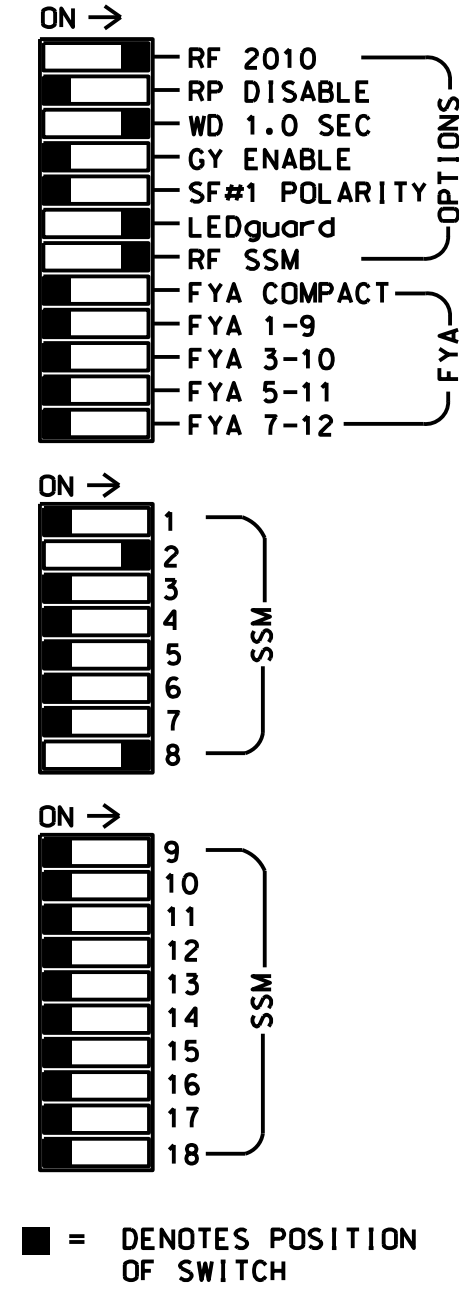
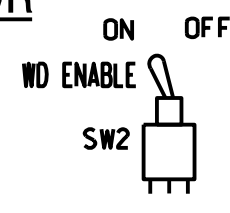
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	SR 4771 (Reedy Fork Parkway) at US 29 Southbound Ramps		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL L. M. BOYER PROFESSIONAL ENGINEER No. 030912 State of North Carolina 04/20/2020 DATE	
	Division 7 Guilford County Greensboro	PREPARED BY: T.S. Warren REVIEWED BY: L. Boyer		
	PLAN DATE: April 2020	REVISIONS INIT. DATE		
	SCALE 0 40 1" = 40'	PREPARED BY: T.S. Warren REVIEWED BY: L. Boyer		

**EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



- NOTES:**
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
 - Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
 - Ensure that Red Enable is active at all times during normal operation.
 - Integrate monitor with Ethernet network in cabinet.



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Enable Simultaneous Gap-Out for all Phases.
- Program controller to start up in phase 2 Red Clear.
- The cabinet and controller are part of the SR 4771 (Reedy Fork Parkway) CLS, Signal System 10727.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....332
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S3,S11
 PHASES USED.....2.2PED.8
 OVERLAPNONE

PROJECT REFERENCE NO.	SHEET NO.
R-4707	Sig.10.1

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	22,23	24	P21, P22	NU	NU	NU	NU	NU	NU	81,82	83,84
RED		128	128								107	107
YELLOW		129									108	
GREEN												
RED ARROW												
YELLOW ARROW			129								108	
GREEN ARROW		130	130								109	109
Hand icon				113								
Walking person icon				115								

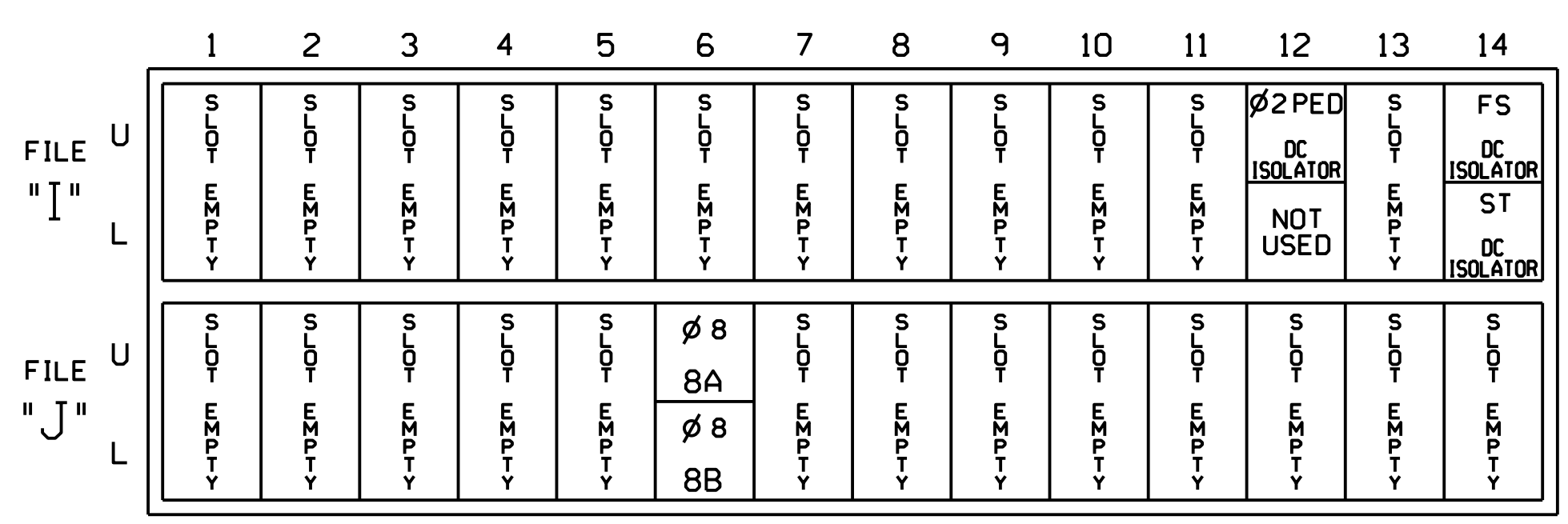
NU = Not Used

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)

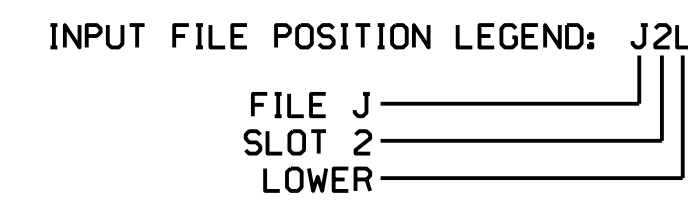


EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
8A	T85-9,10	J6U	42	8	8	YES				S
8B	T85-11,12	J6L	46	18	8	YES				S
PED PUSH BUTTONS										
P21,P22	T88-4,6	I12U	67	PED 2	2 PED					

NOTE:
 INSTALL DC ISOLATOR IN INPUT FILE SLOT 112.



SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection zones 2A and 2B. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0904T1
 DESIGNED: April 2020
 SEALED: 04/20/2020
 REVISED: N/A

Project #: 180914

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Electrical Detail - Sheet 1 of 2
 Temporary Design 1 (TMP Phase III - Step 4)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

750 N. Greenfield Pkwy, Corner, NC 27529

SR 4771 (Reedy Fork Parkway) at US 29 Southbound Ramps

Division 7	Guilford County	Greensboro
PLAN DATE: April 2020	REVIEWED BY: R. Hinshaw	
PREPARED BY: T.S. Warren	REVIEWED BY: L. Boyer	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

North Carolina Professional Engineer Seal for L. M. Boyer, License No. 030912, dated 04/20/2020.

SIG. INVENTORY NO. 07-0904T1

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

1. From Main Menu select 5. TIME BASE
2. From TIME BASE Submenu select 2. ACTION PLAN

```

ACTION PLAN...[ 1]
PATTERN.....AUTO  SYS OVERRIDE.... NO
TIMING PLAN..... 0  SEQUENCE..... 0
VEH DETECTOR PLAN.. 2  DET LOG.....NONE
FLASH..... --  RED REST..... YES
VEH DET DIAG PLN.. 0  PED DET DIAG PLN..0
DIMMING ENABLE.. NO  PRIORITY RETURN. NO
PED PR RETURN.. NO  QUEUE DELAY..... NO
PMT COND DELAY  NO

  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
PED RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
WALK 2   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEH RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
MAX 3    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
CS INH   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
OMIT     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
SPC FCT  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
AUX FCT  .  .  .  (1-3)
          1  2  3  4  5  6  7  8  9  0  1  2  3  4  5

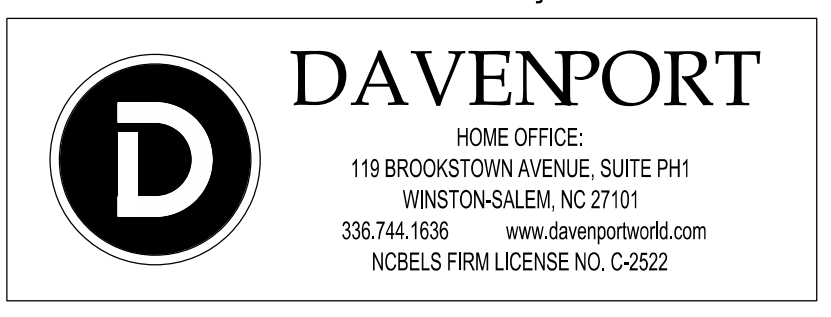
LP 1-15  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 16-30 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 31-45 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 46-60 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 61-75 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 76-90 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 91-100 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
    
```

← SET RED REST TO "YES"

3. From TIME BASE Submenu Select 1. Clock/Calendar Data
4. Enable Action Plan 1

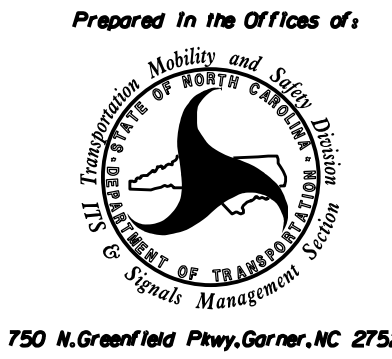
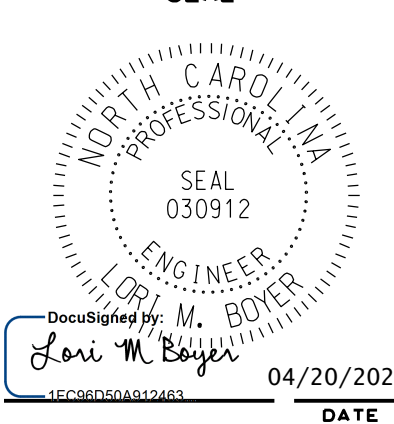
Project #: 180914

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0904T1
DESIGNED: April 2020
SEALED: 04/20/2020
REVISED: N/A

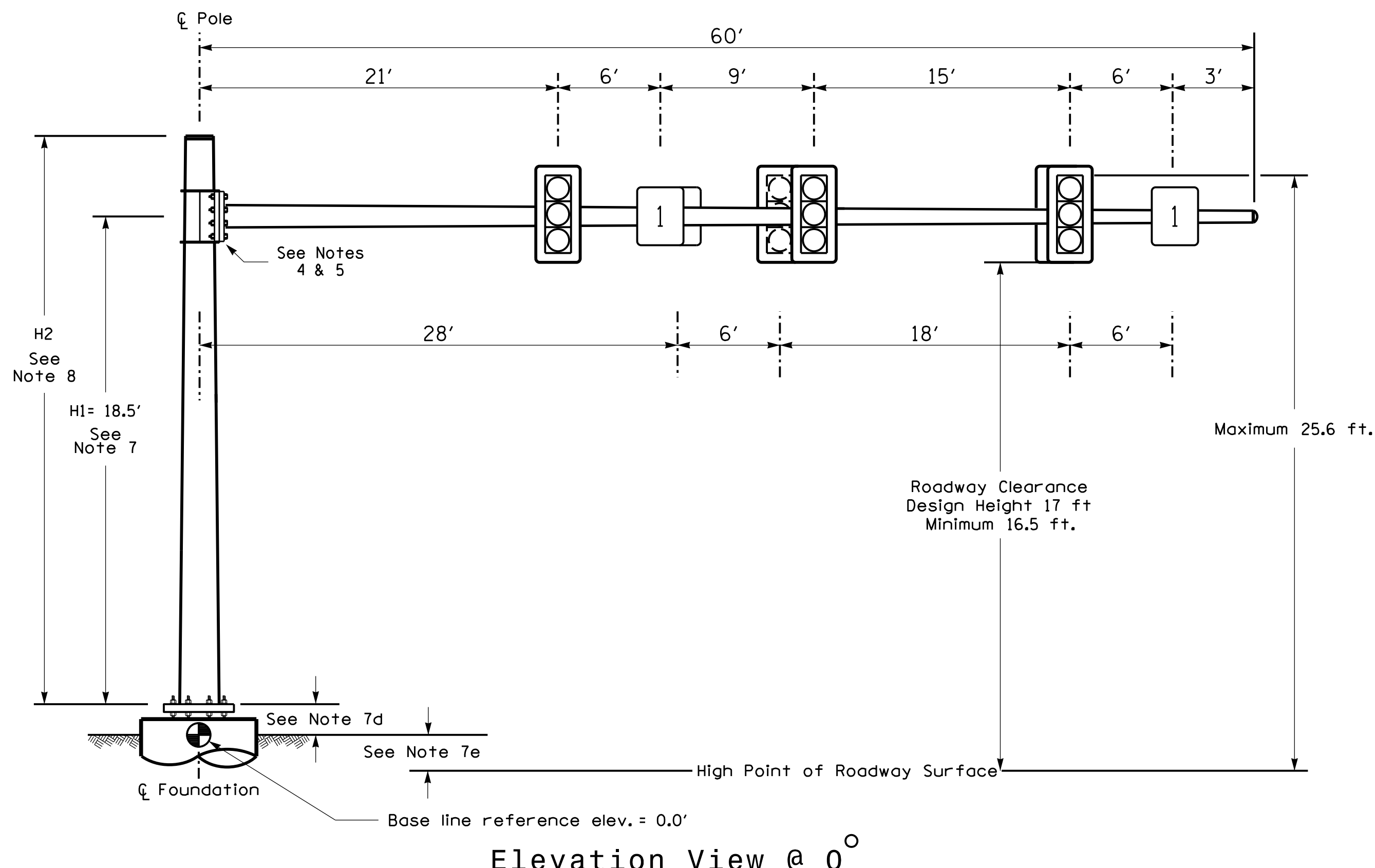


Electrical Detail - Sheet 2 of 2
Temporary Design 1 (TMP Phase III - Step 4)

**DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED**

<p><small>ELECTRICAL AND PROGRAMMING DETAILS FOR:</small></p> <p><small>Prepared In the Offices of:</small></p> 	<p>SR 4771 (Reedy Fork Parkway) at US 29 Southbound Ramps</p> <p><small>Division 7 Guilford County Greensboro</small></p> <p><small>PLAN DATE: April 2020 REVIEWED BY: L. Boyer</small></p> <p><small>PREPARED BY: A. Ravipati REVIEWED BY:</small></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">REVISIONS</th> <th style="width: 10%;">INIT.</th> <th style="width: 20%;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE							<p>SEAL</p>  <p><small>DocuSigned by: Lori M. Boyer 04/20/2020</small></p> <p><small>SIG. INVENTORY NO. 07-0904T1</small></p>
REVISIONS	INIT.	DATE									

Design Loading for METAL POLE NO. 3



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

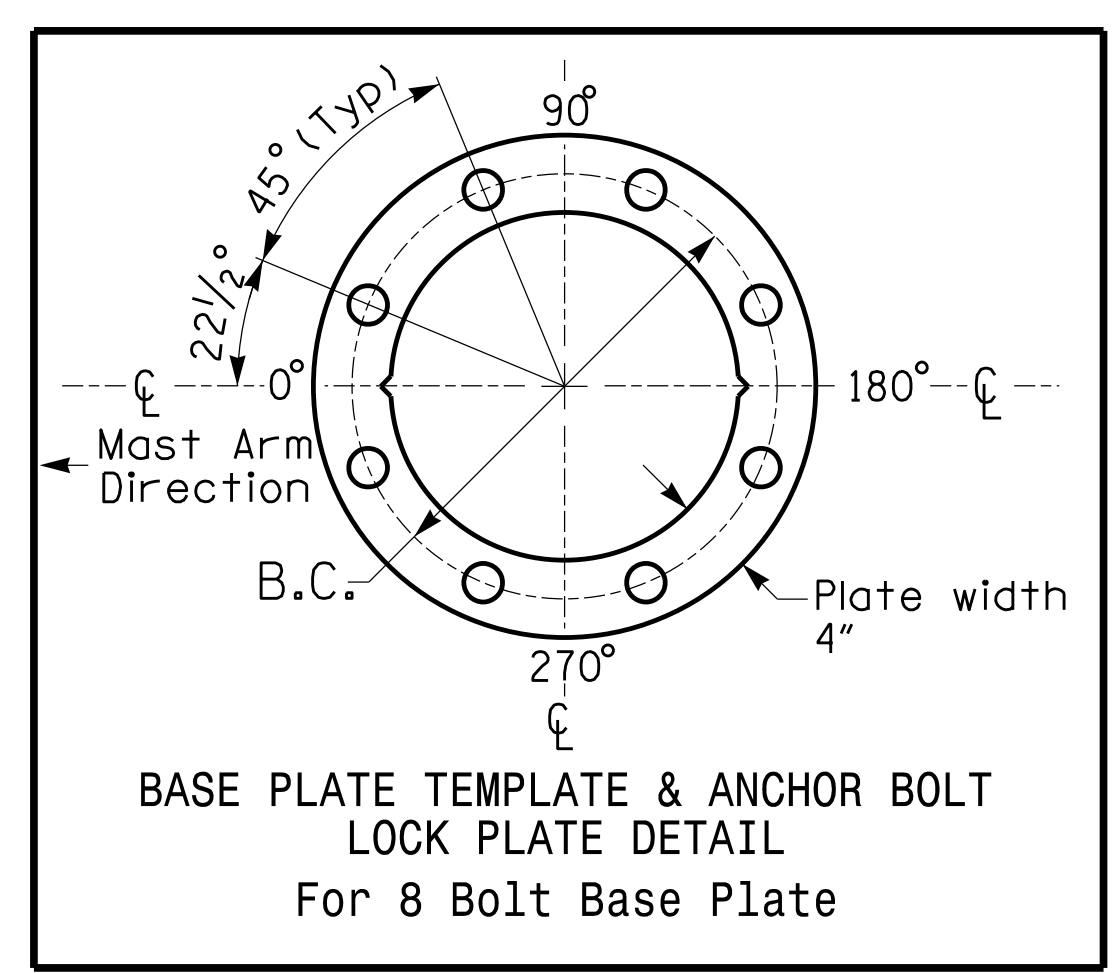
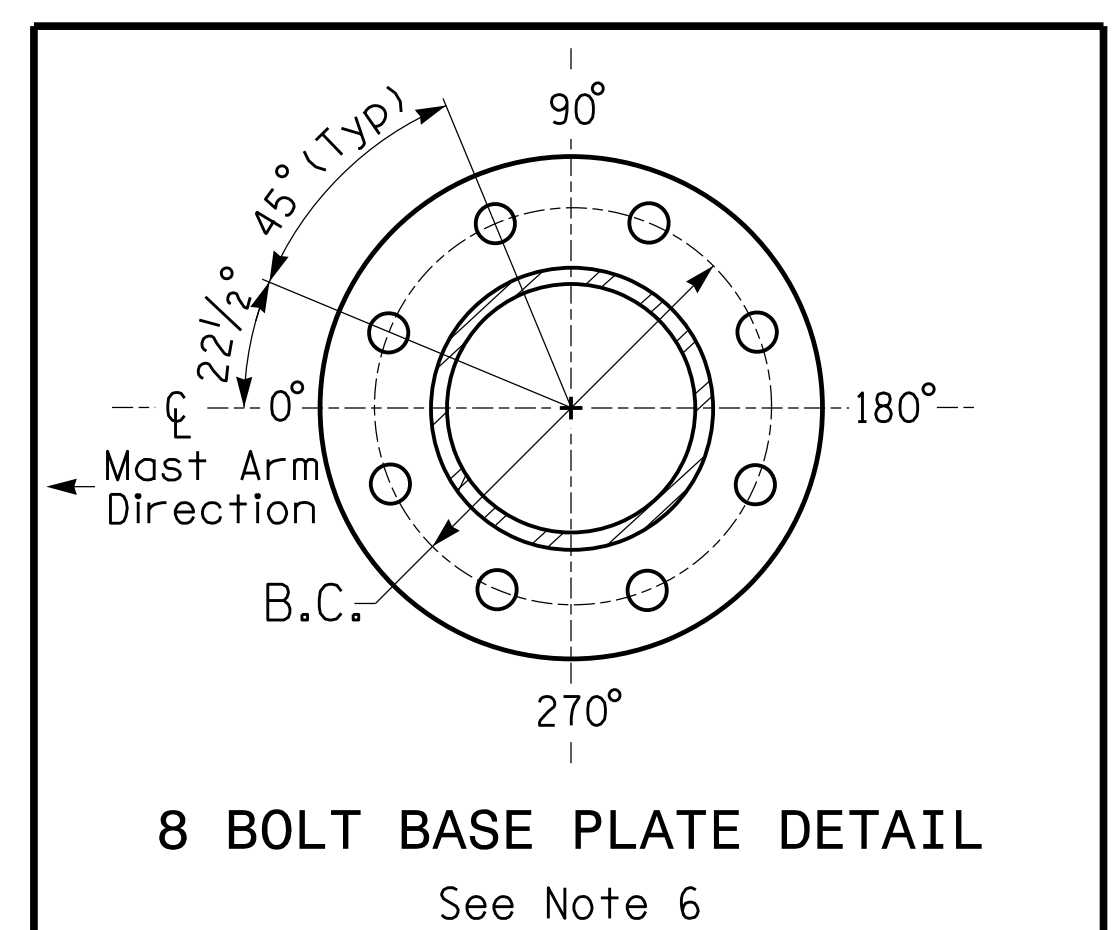
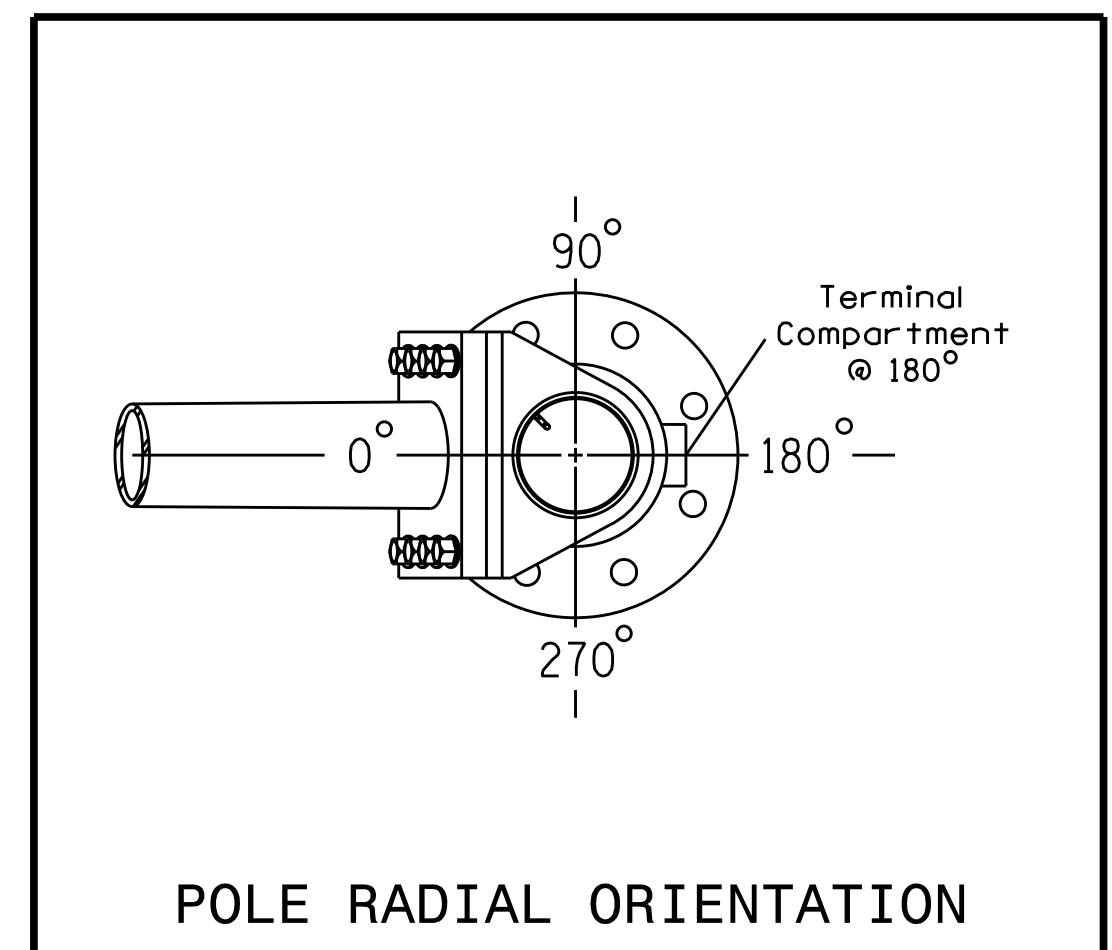
Elevation Data for Mast Arm Attachment (H1)	
Elevation Differences for:	Pole 3
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	-0.7 ft.
Elevation difference at Edge of travelway or face of curb	-0.7 ft.

METAL POLE No. 3

PROJECT REFERENCE NO.	R-4707
SHEET NO.	Fig. 10.3

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
	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS



NOTES

DESIGN REFERENCE MATERIAL

- 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 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
The 2018 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

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
Mast arm attachment height (H1) plus 2 feet, or
H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 4 (90 mph)

Prepared For:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 N/A

SR 4771 (Reedy Fork Parkway)
at
US 29 Southbound Ramps

Division 07 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: R. Hinshaw

PREPARED BY: T.S. Warren REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

04/20/2020

SIGNATURE DATE

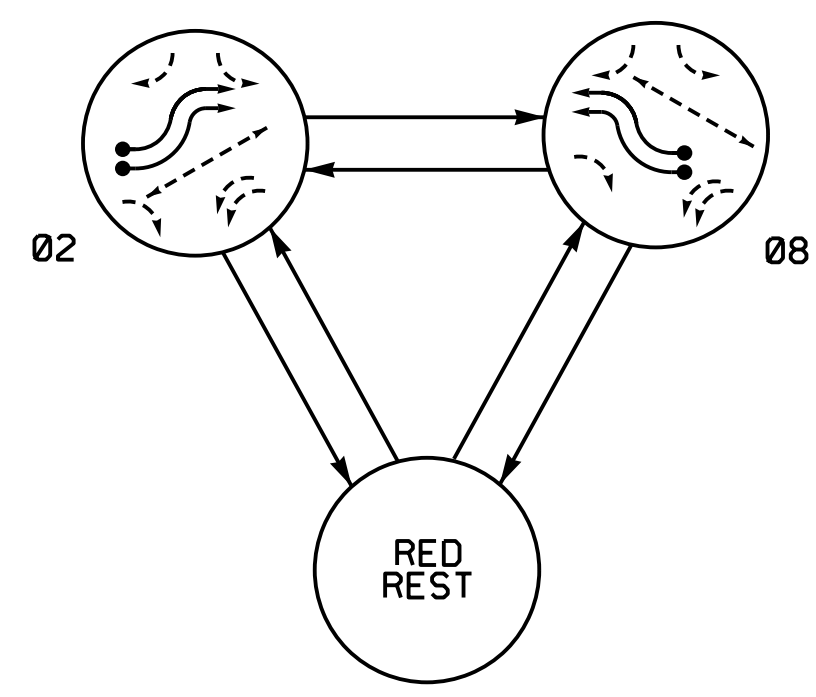
SIG. INVENTORY NO. 07-090411

Project #: 180914

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PHASING DIAGRAM

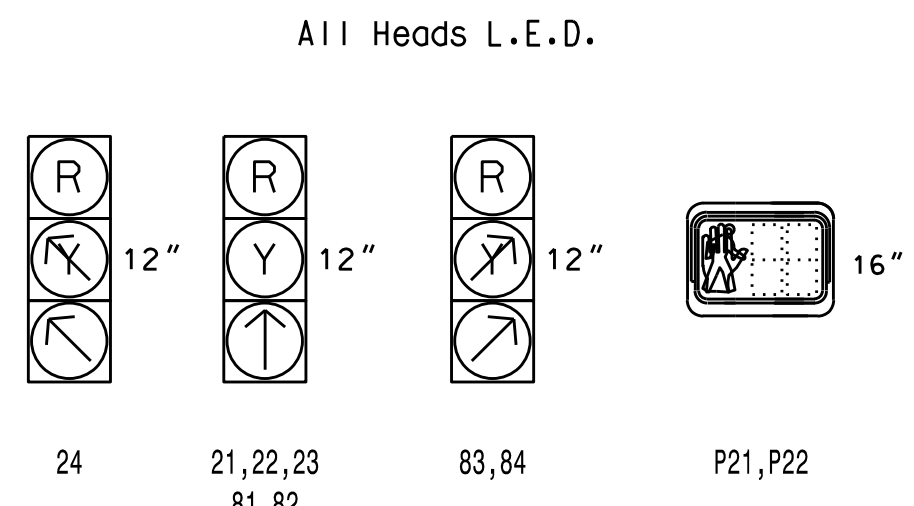


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	02	08	RED REST	L.F. HOUS
21,22,23	↑	R	R	R
24	↘	R	R	R
81,82	R	↑	R	R
83,84	R	↗	R	R
P21,P22	W	DW	DW	DRK

SIGNAL FACE I.D.

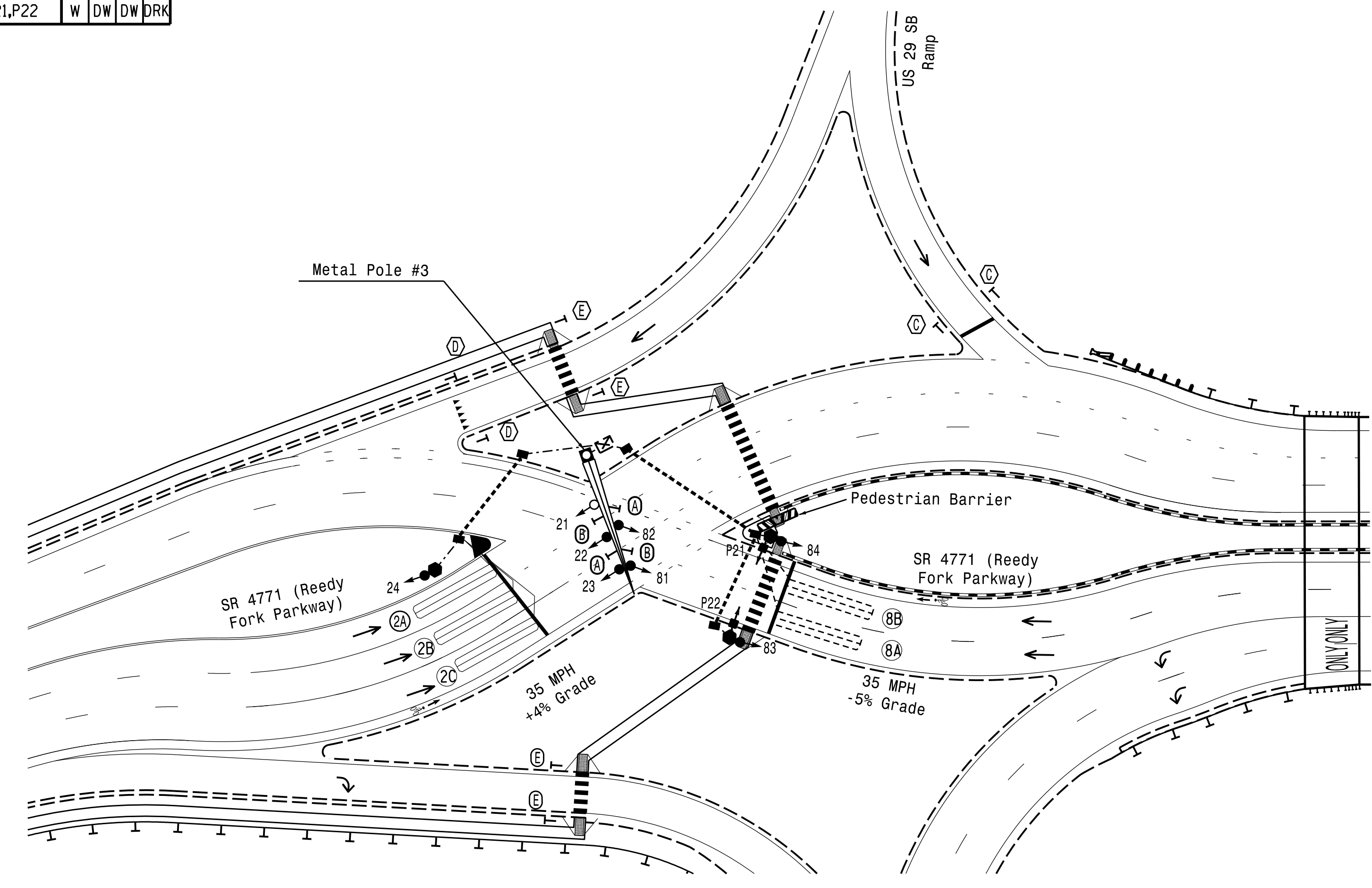


ASC/3 DETECTOR INSTALLATION CHART										
DETECTOR				PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP NEW CARD
2A	6X40	0	2-4-2	X	2	Yes	-	-	S	- X
2B	6X40	0	2-4-2	X	2	Yes	-	-	S	- X
2C	6X40	0	2-4-2	X	2	Yes	-	-	S	- X
8A	6X40	0	2-4-2	-	8	Yes	-	-	S	- -
8B	6X40	0	2-4-2	-	8	Yes	-	-	S	- -

2 Phase Fully Actuated
SR 4771 (Reedy Fork Parkway) CLS
Signal System: 10727

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Program controller to startup in Phase 2 Red Clear.
- Set all detector units to presence mode.
- Program all phases for "Red Rest".
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data:
Controller Asset #: 0904



FEATURE	PHASE	
	2	8
Min Green *	10	10
Walk *	7	-
Ped Clear	7	-
Veh. Extension *	2.0	2.0
Max 1 *	60	60
Yellow	3.6	4.2
Red Clear	2.4	2.3
Red Revert	5.0	5.0
Actuations B4 Add *	-	-
Seconds /Actuation *	-	-
Max Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Locking Detector	-	-
Recall Position	NONE	NONE
Dual Entry	-	-
Simultaneous Gap	X	X

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

PROPOSED	LEGEND	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	⊥
⊥	Oversize Junction Box	⊥
⊥	2-in Underground Conduit	⊥
—	Directional Drill	---
N/A	Right of Way	---
→	Directional Arrow	→
N/A	Guardrail	—
○	Type II Signal Pedestal	●
N/A	Curb Ramp	▲
⊙	No Right Turn Sign (R3-1)	⊙
⊙	No Left Turn Sign (R3-2)	⊙
⊙	Stop Sign (R1-1)	⊙
⊙	Yield Sign (R1-2)	⊙
⊙	Pedestrian Crossing Sign (W11-2) w/Diagonal Arrow Plaque (W16-7p)	⊙

Signal Upgrade - Temporary Design 2
(TMP Phase III- Step 5; Phase IV- Steps 1-3)

Project #: 180914

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NCBELS FIRM LICENSE NO. C-2522

Prepared for:
TRANSPORTATION MOBILITY AND SAFETY DIVISION
UNIVERSITY OF NORTH CAROLINA
SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING
Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

SR 4771 (Reedy Fork Parkway)
at
US 29 Southbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: L. Boyer

PREPARED BY: T.S. Warren REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

PROFESSIONAL ENGINEER
L. BOYER
030912

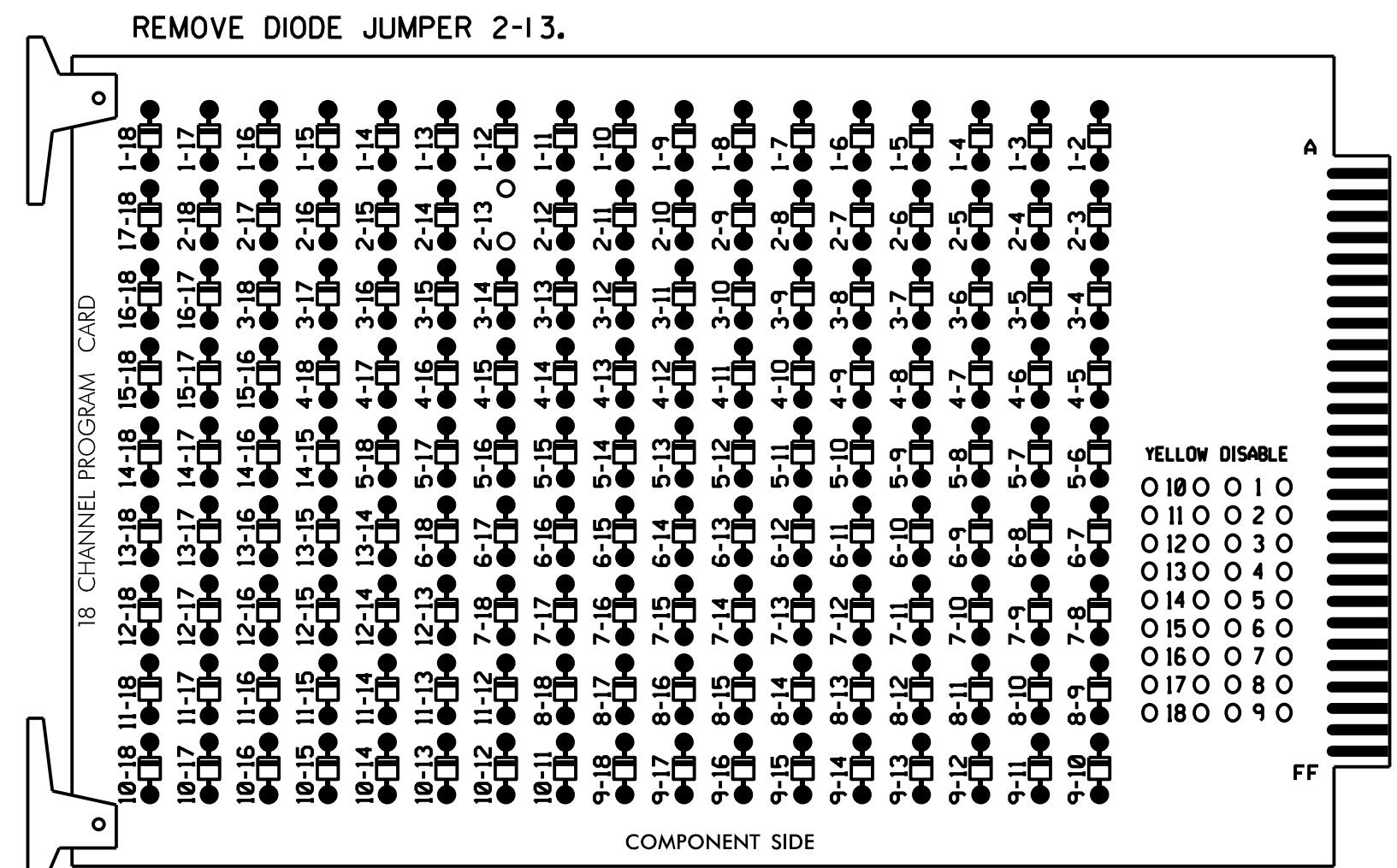
04/20/2020

SIGNATURE DATE

SIG. INVENTORY NO. 07-090412

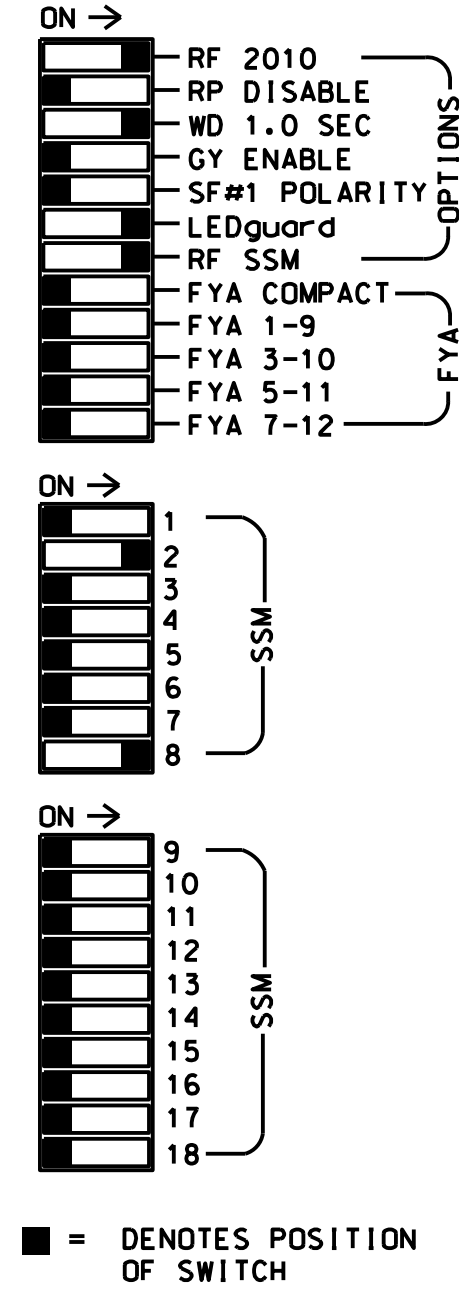
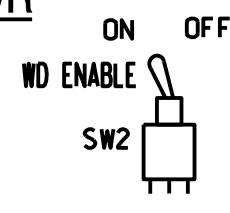
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Enable Simultaneous Gap-Out for all Phases.
- Program controller to Startup in Phase 2 Red Clear.
- The cabinet and controller are part of the SR 4771 (Reedy Fork Parkway) CLS, Signal System 10727.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....332
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S3,S11
 PHASES USED.....2,2PED,8
 OVERLAPS.....NONE

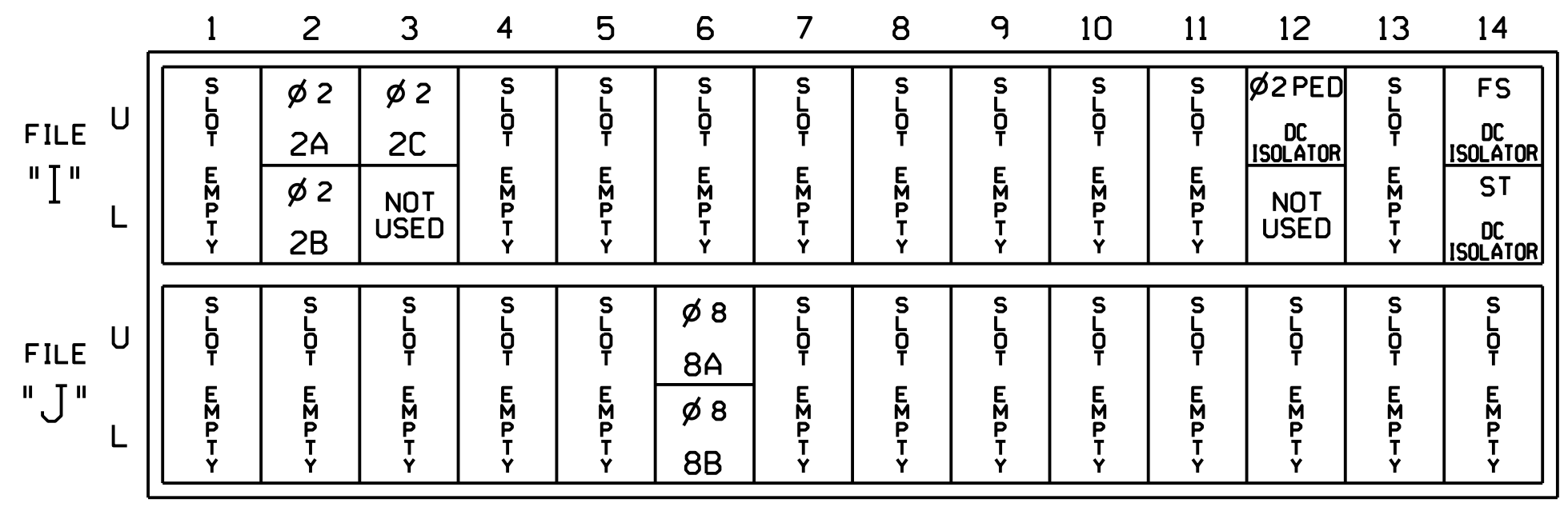
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22, 23	24	P21, P22	NU	NU	NU	NU	NU	NU	81,82	83,84
RED		128	128								107	107
YELLOW		129									108	
GREEN												
RED ARROW												
YELLOW ARROW			129								108	
GREEN ARROW		130	130								109	109
Hand icon				113								
Walking person icon				115								

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	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
8A	TB5-9,10	J6U	42	8	8	YES				S
8B	TB5-11,12	J6L	46	18	8	YES				S
PED PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED					

NOTE:
 INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.

INPUT FILE POSITION LEGEND: J2L
 FILE J
 SLOT 2
 LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0904T2
 DESIGNED: April 2020
 SEALED: 04/20/2020
 REVISED: N/A

Project #: 180914

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Electrical Detail - Sheet 1 of 2 Temporary Design 2 (TMP Phase III - Step 5; Phase IV - Steps 1-3)

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SEAL

SR 4771 (Reedy Fork Parkway) at US 29 Southbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: R. Hinshaw

PREPARED BY: T.S. Warren REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Corner, NC 27529

Seal of Loni M. Boyer, Professional Engineer, License No. 030912, State of North Carolina.

DATE: 04/20/2020

SIG. INVENTORY NO. 07-0904T2

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

1. From Main Menu select 5. TIME BASE
2. From TIME BASE Submenu select 2. ACTION PLAN

ACTION PLAN...[1]																
PATTERN.....	AUTO	SYS OVERRIDE....	NO													
TIMING PLAN.....	0	SEQUENCE.....	0													
VEH DETECTOR PLAN..	2	DET LOG.....	NONE													
FLASH.....	--	RED REST.....	YES													
VEH DET DIAG PLN...	0	PED DET DIAG PLN..	0													
DIMMING ENABLE..	NO	PRIORITY RETURN.	NO													
PED PR RETURN..	NO	QUEUE DELAY.....	NO													
PMT COND DELAY	NO															
PHASE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
PED RCL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
WALK 2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
VEX 2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
VEH RCL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
MAX RCL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
MAX 2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PHASE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
MAX 3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CS INH	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
OMIT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SPC FCT	.	.	.	.	.	.	.	.	.	(1-8)	.	.	.	.	.	.
AUX FCT	.	.	.	(1-3)	.	.	.	.	.	.	.	.	.	.	.	.
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	
LP 1-15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 31-45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 46-60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 61-75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 76-90	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 91-100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

← SET RED REST TO "YES"

3. From TIME BASE Submenu Select 1. Clock/Calendar Data
4. Enable Action Plan 1

Project #: 180914

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0904T2
DESIGNED: April 2020
SEALED: 04/20/2020
REVISED: N/A

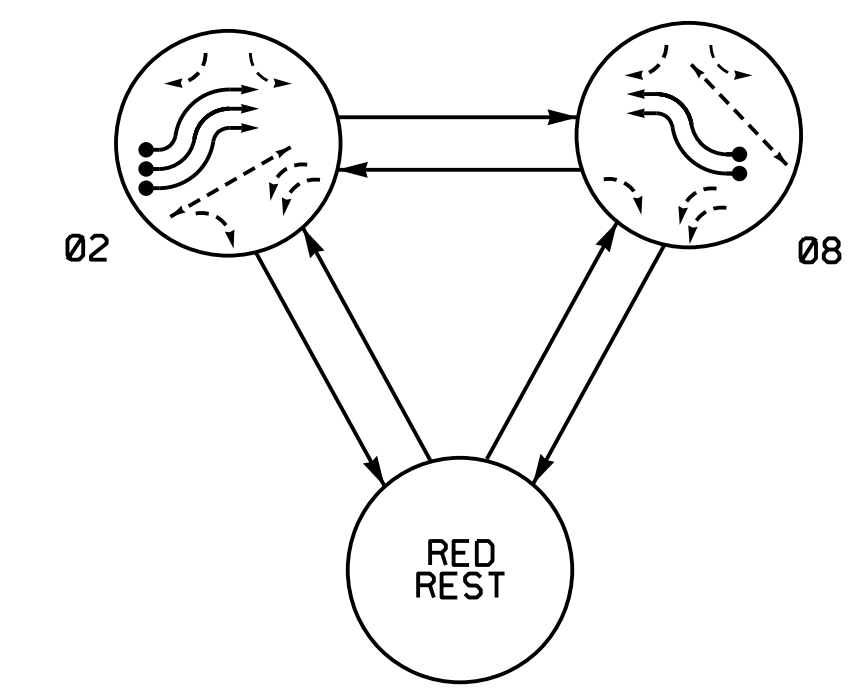
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Electrical Detail - Sheet 2 of 2 Temporary Design 2
(TMP Phase III - Step 5; Phase IV - Steps 1-3)

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SIGNATURES COMPLETED**

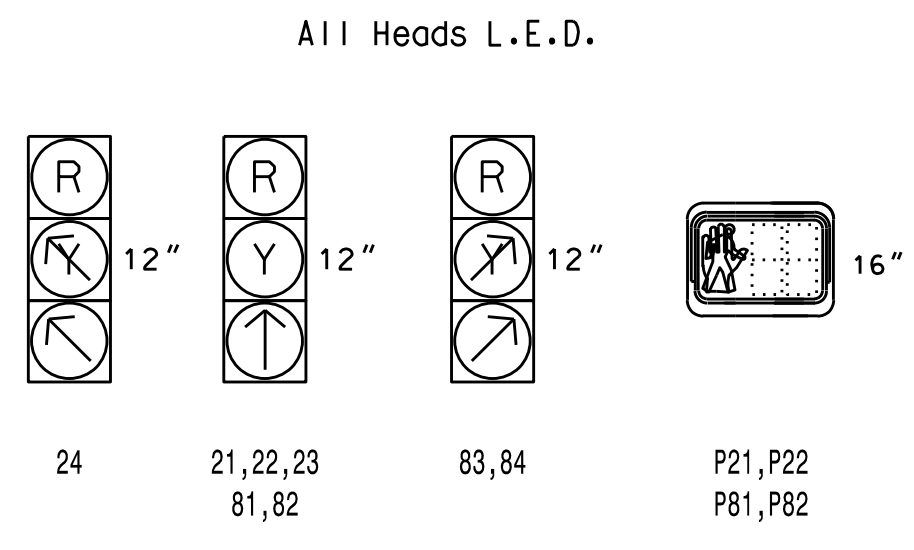
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REVISIONS	INIT.	DATE												

PHASING DIAGRAM



SIGNAL FACE	PHASE			
	02	08	RED REST	LEFT TURN
21,22,23	↑	R	R	R
24	↘	R	R	R
81,82	R	↑	R	R
83,84	R	↗	R	R
P21,P22	W	DW	DW	DRK
P81,P82	DW	W	DW	DRK

SIGNAL FACE I.D.



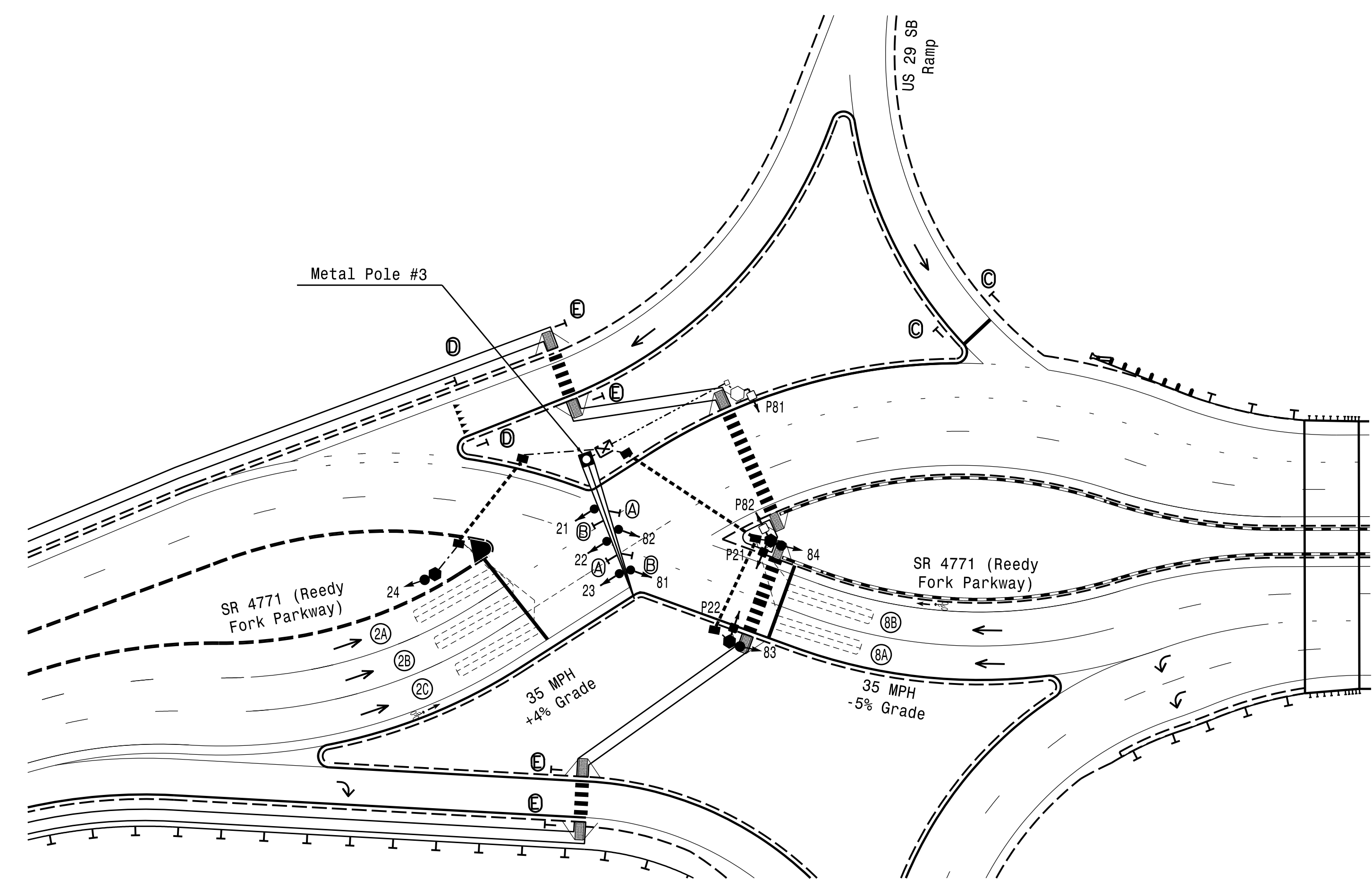
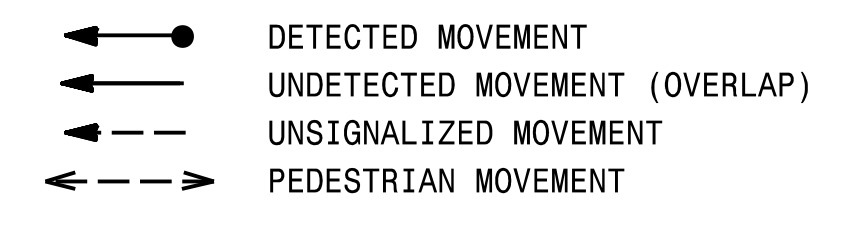
ASC/3 DETECTOR INSTALLATION CHART										
DETECTOR					PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP NEW CARD
2A	6X40	0	2-4-2	-	2	Yes	-	-	S	-
2B	6X40	0	2-4-2	-	2	Yes	-	-	S	-
2C	6X40	0	2-4-2	-	2	Yes	-	-	S	-
8A	6X40	0	2-4-2	-	8	Yes	-	-	S	-
8B	6X40	0	2-4-2	-	8	Yes	-	-	S	-

2 Phase Fully Actuated
SR 4771 (Reedy Fork Parkway) CLS
Signal System: 10727

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Program controller to startup in Phase 2 Red Clear.
4. Set all detector units to presence mode.
5. Program all phases for "Red Rest".
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Closed loop system data:
Controller Asset #: 0904

PHASING DIAGRAM DETECTION LEGEND



FEATURE	PHASE	
	2	8
Min Green *	10	10
Walk *	7	7
Ped Clear	7	11
Veh. Extension *	2.0	2.0
Max I *	60	60
Yellow	3.6	4.2
Red Clear	2.4	2.3
Red Revert	5.0	5.0
Actuations B4 Add *	-	-
Seconds / Actuation *	-	-
Max Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Locking Detector	-	-
Recall Position	NONE	NONE
Dual Entry	-	-
Simultaneous Gap	X	X

PROPOSED	LEGEND	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	
	Oversize Junction Box	
	2-in Underground Conduit	
	Directional Drill	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	
	Type II Signal Pedestal	
	Metal Pole with Mastarm	
N/A	Curb Ramp	
	No Right Turn Sign (R3-1)	
	No Left Turn Sign (R3-2)	
	Stop Sign (R1-1)	
	Yield Sign (R1-2)	
	Pedestrian Crossing Sign (W11-2) w/ Diagonal Arrow Plaque (W16-7p)	

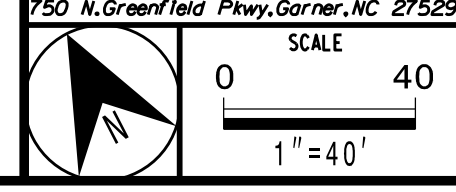
* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 2 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade - Final Design

Project #: 180914

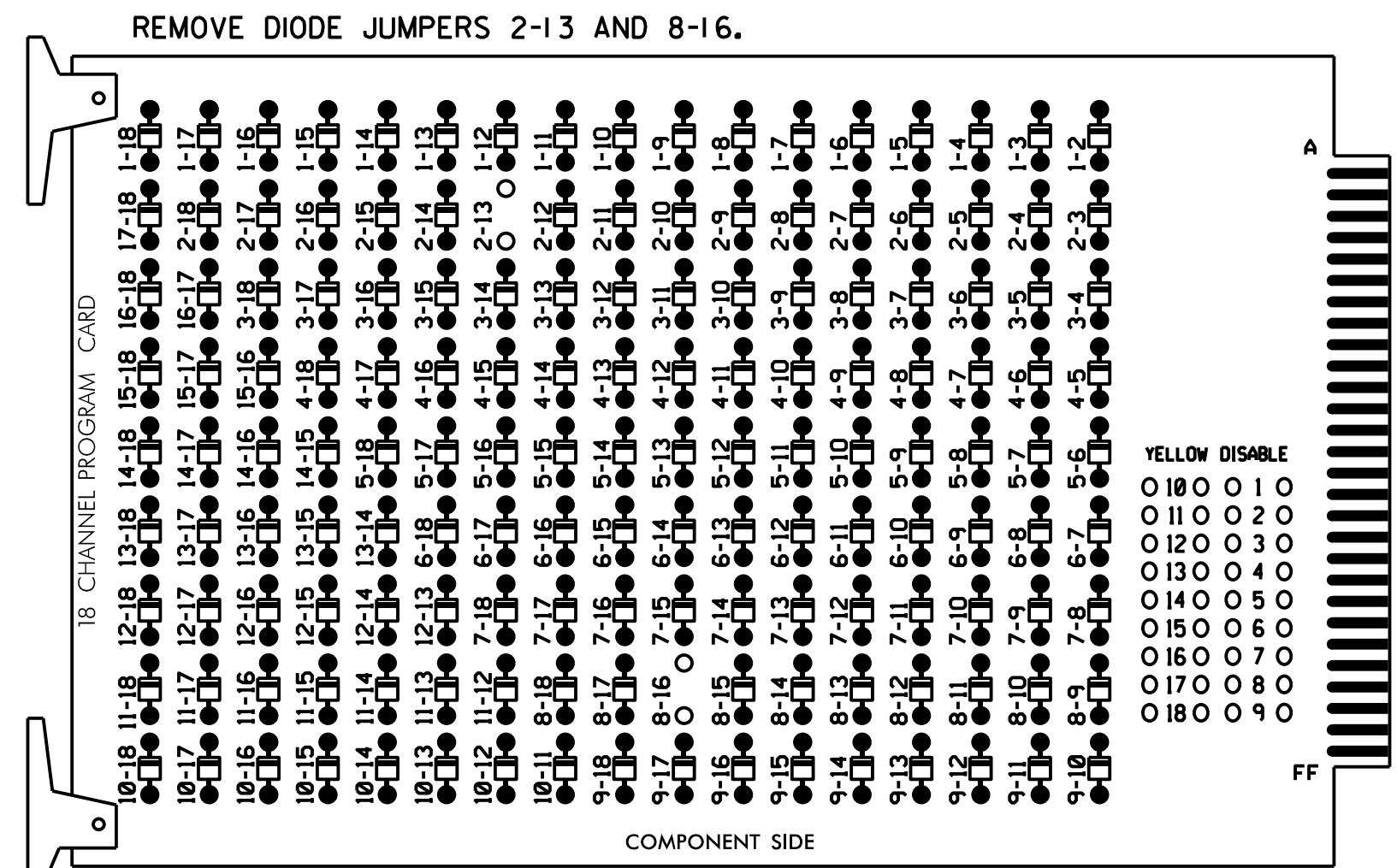
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	SR 4771 (Reedy Fork Parkway) at US 29 Southbound Ramps	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER LORI M. BOYER 030912 04/20/2020
	Division 7 Guilford County Greensboro	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	PLAN DATE: April 2020 REVIEWED BY: R. Hinshaw	PREPARED BY: T.S. Warren REVIEWED BY:
	REVISIONS:	SIGNATURE: DATE:



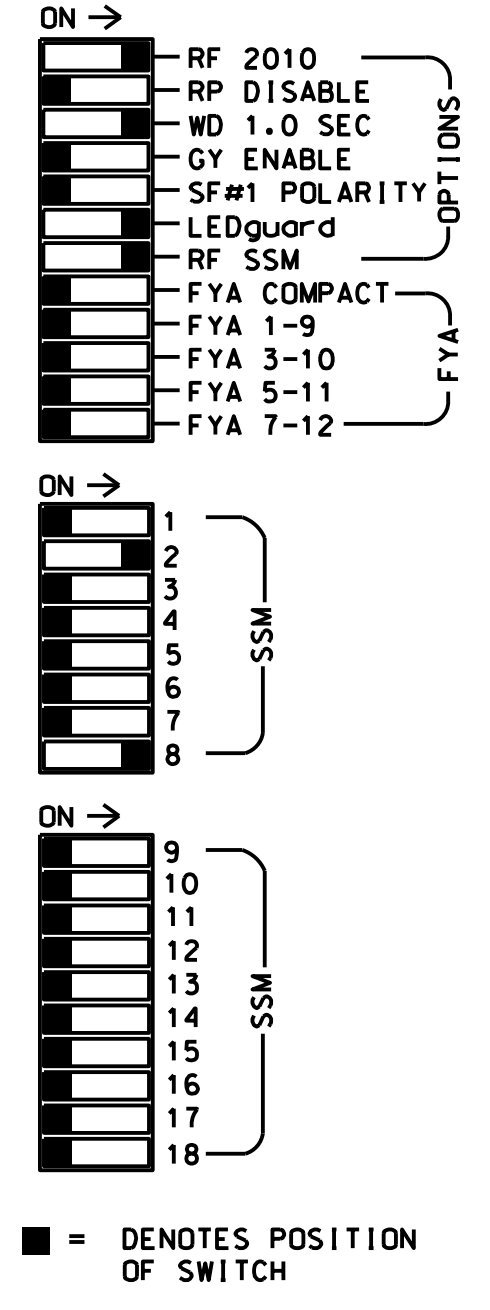
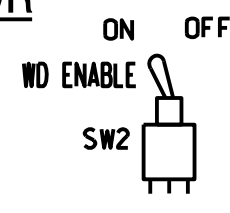
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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



■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all Phases.
3. Program controller to start up in phase 2 Red Clear.
4. The cabinet and controller are part of the SR 4771 (Reedy Fork Parkway) CLS, Signal System 10727.

PROJECT REFERENCE NO.	SHEET NO.
R-4707	Sig.12.1

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12		
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16		
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED		
SIGNAL HEAD NO.	NU	21,22, 23	24	P21, P22	NU	NU	NU	NU	NU	NU	81,82	83,84	P81, P82	
RED		128	128										107	107
YELLOW		129											108	
GREEN														
RED ARROW														
YELLOW ARROW			129										108	
FLASHING YELLOW ARROW														
GREEN ARROW		130	130										109	109
Hand icon				113										110
Person icon				115										112

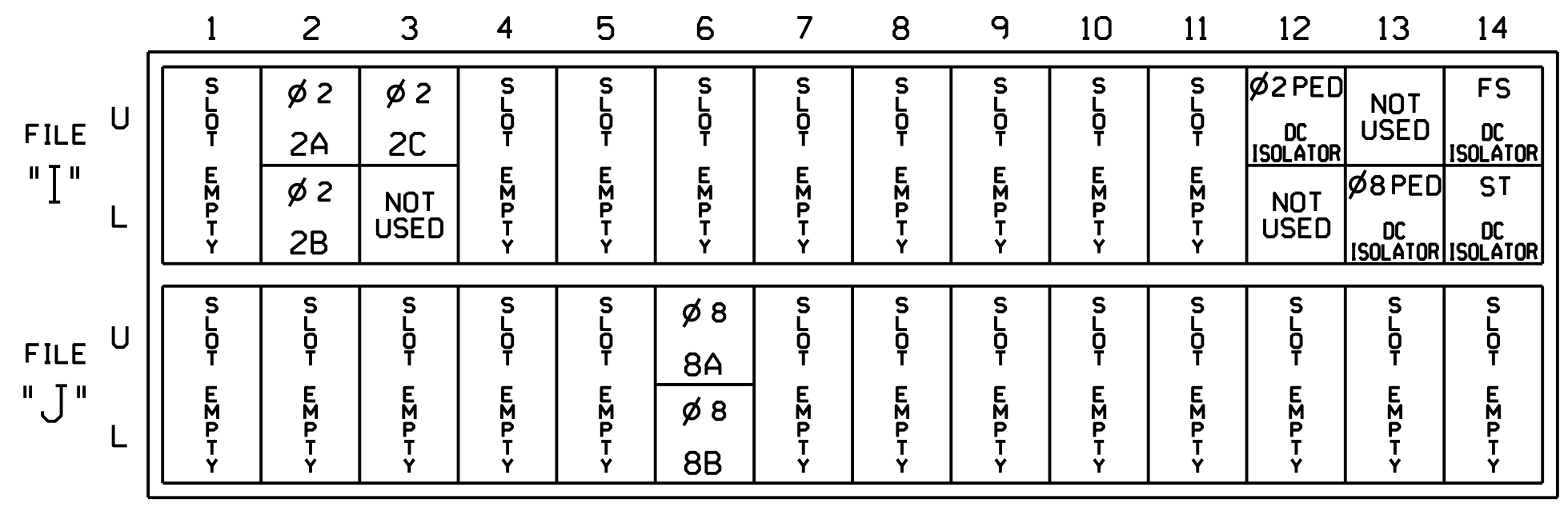
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....332
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S3,S11,S12
 PHASES USED.....2,2PED,8,8PED
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)



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

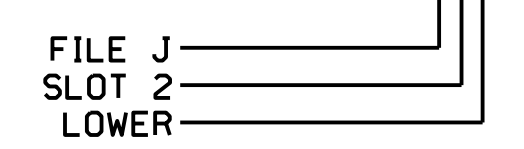
FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	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
8A	TB5-9,10	J6U	42	8	8	YES				S
8B	TB5-11,12	J6L	46	18	8	YES				S
PED PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED					
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED					

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

INPUT FILE POSITION LEGEND: J2L



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.

Electrical Detail - Sheet 1 of 2

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0904
 DESIGNED: April 2020
 SEALED: 04/20/2020
 REVISED: N/A

Project #: 180914

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
 Lori M. Boyer, Professional Engineer
 750 N. Greenfield Pkwy, Corner, NC 27529

SR 4771 (Reedy Fork Parkway) at US 29 Southbound Ramps

Division 7	Guilford County	Greensboro
PLAN DATE: April 2020	REVIEWED BY: L. Boyer	
PREPARED BY: A. Hayes	REVIEWED BY:	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

04/20/2020
 DATE

SIG. INVENTORY NO. 07-0904

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

1. From Main Menu select **5. TIME BASE**

2. From TIME BASE Submenu select **2. ACTION PLAN**

```

ACTION PLAN...[ 1]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH..... --   RED REST..... YES
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE.. NO   PRIORITY RETURN. NO
PED PR RETURN.. NO   QUEUE DELAY..... NO
PMT COND DELAY   NO
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
PED RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
WALK 2   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEH RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
MAX 3    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
CS INH   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
OMIT     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
SPC FCT  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
AUX FCT  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
          1  2  3  4  5  6  7  8  9  0  1  2  3  4  5
LP 1-15  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 16-30 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 31-45 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 46-60 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 61-75 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 76-90 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 91-100 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  
```

← SET RED REST TO "YES"

3. From TIME BASE Submenu Select **1. Clock/Calendar Data**
 4. Enable Action Plan 1

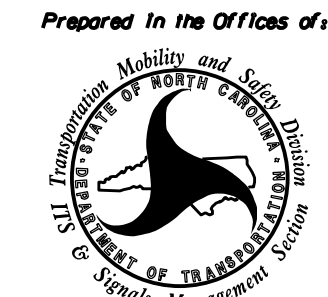
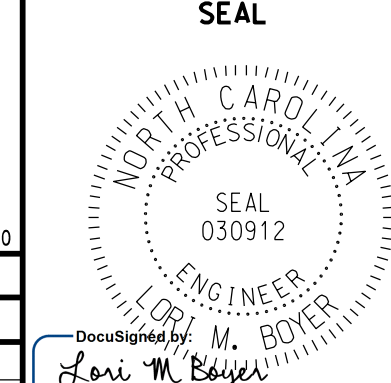
Project #: 180914

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 07-0904
 DESIGNED: April 2020
 SEALED: 04/20/2020
 REVISED: N/A



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Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: <i>Prepared in the Offices of:</i>  750 N. Greenfield Pkwy, Corner, NC 27529	SR 4771 (Reedy Fork Parkway) at US 29 Southbound Ramps	SEAL 
	Division 7 Guilford County Greensboro PLAN DATE: April 2020 REVIEWED BY: L. Boyer PREPARED BY: A. Ravipati REVIEWED BY:	REVISIONS INIT. DATE _____ _____	04/20/2020 DATE SIG. INVENTORY NO. 07-0904

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

PHASING DIAGRAM

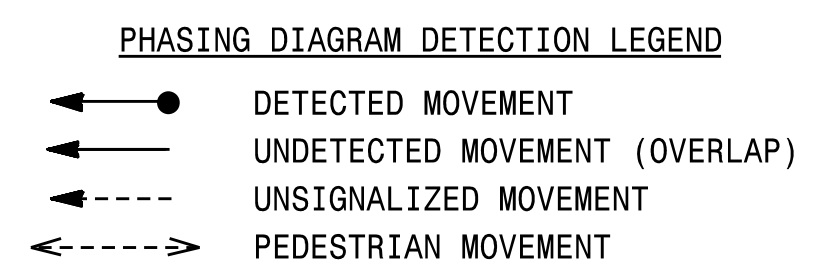
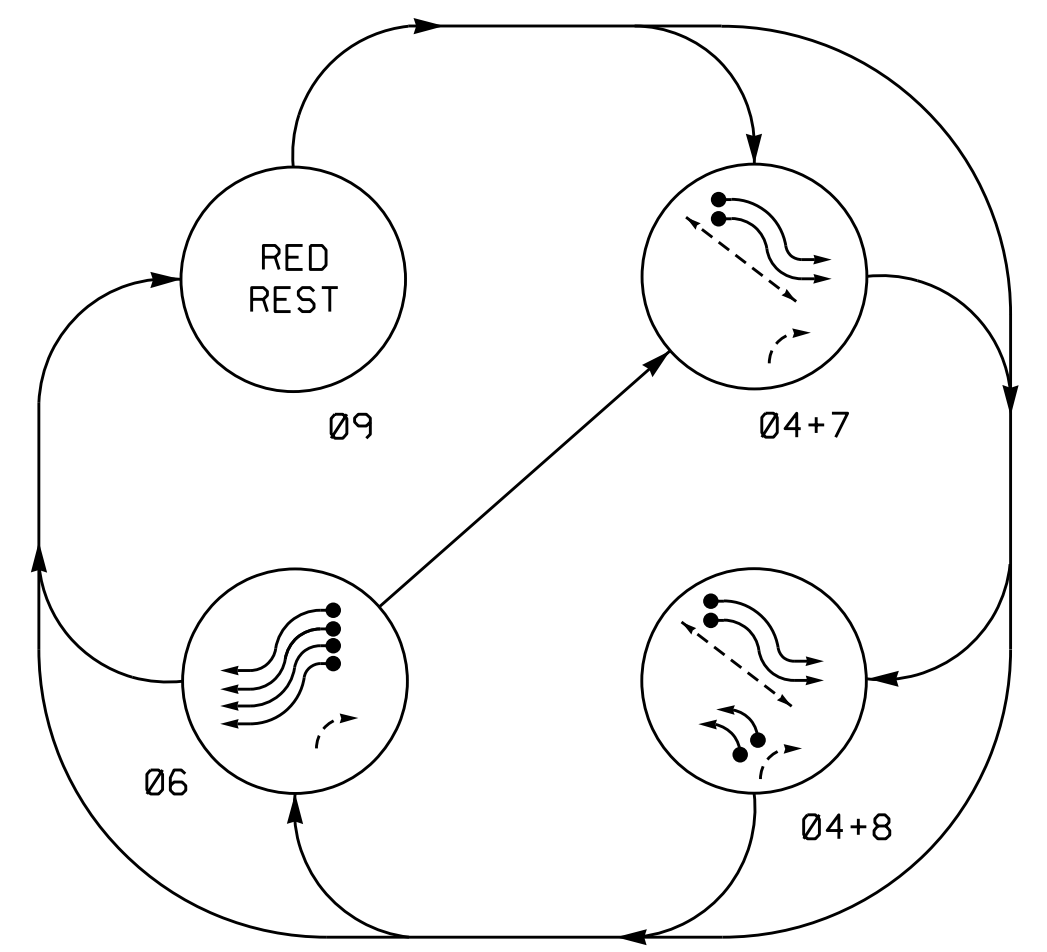


TABLE OF OPERATION

SIGNAL FACE	PHASE				
	Ø 6	Ø 4 + 7	Ø 4 + 8	Ø 9	FLASH
41,42	R	|	|	R	R
43,44	R	/	/	R	R
61,62,63,64	|	R	R	R	R
65,66	\	R	R	R	R
81,82	R	R	\	R	R
83,84	R	R	/	R	R
P41,P42	DW	W	W	DW	DRK

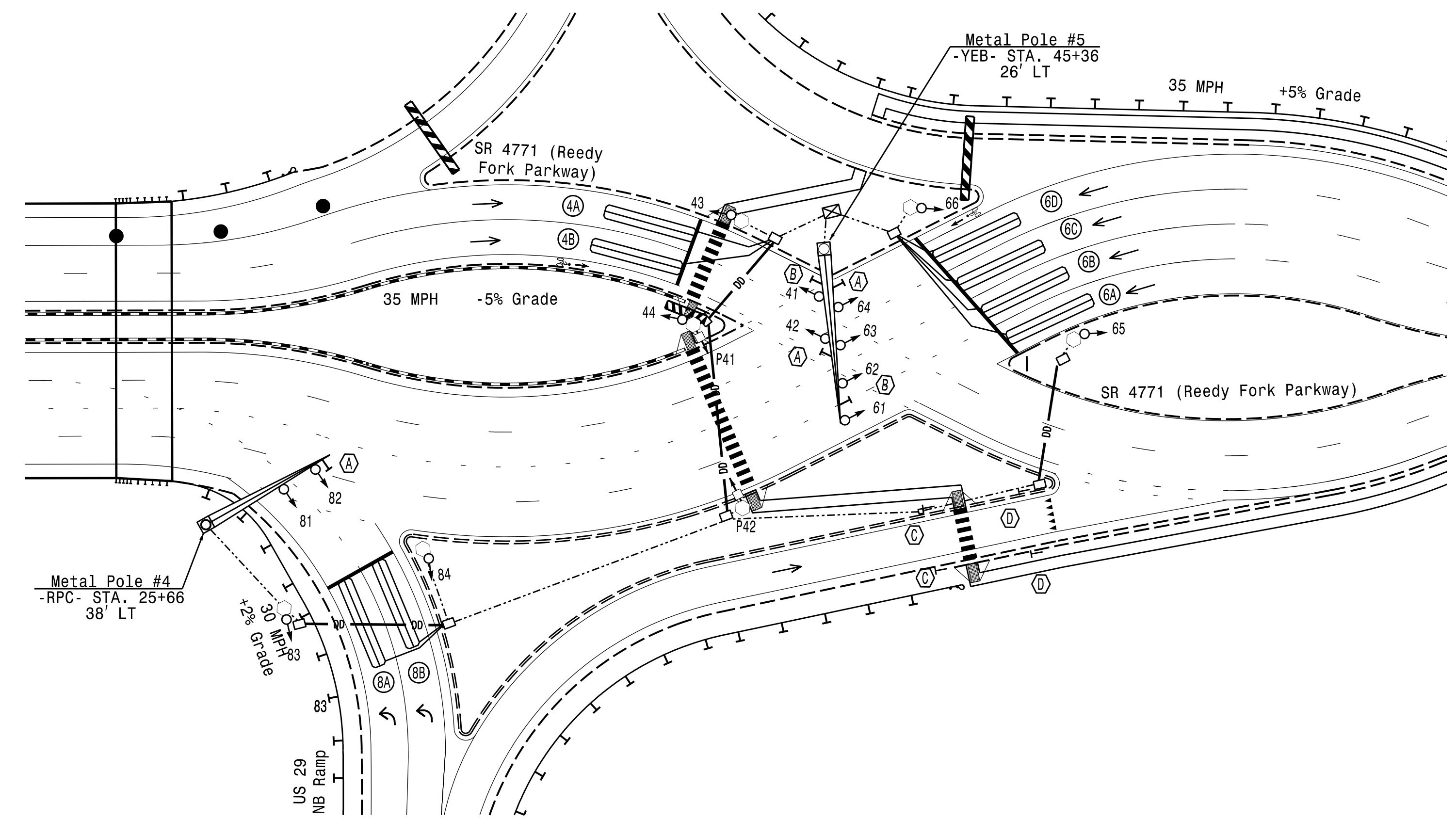
ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
4A	6X40	0	2-4-2	X	4	Yes	-	-	-	S	-	X
4B	6X40	0	2-4-2	X	4	Yes	-	-	-	S	-	X
6A	6X40	0	2-4-2	X	6	Yes	-	-	-	S	-	X
6B	6X40	0	2-4-2	X	6	Yes	-	-	-	S	-	X
6C	6X40	0	2-4-2	X	6	Yes	-	-	-	S	-	X
6D	6X40	0	2-4-2	X	6	Yes	-	-	-	S	-	X
8A	6X40	0	2-4-2	X	8	Yes	-	-	-	S	-	X
8B	6X40	0	2-4-2	X	8	Yes	-	-	-	S	-	X

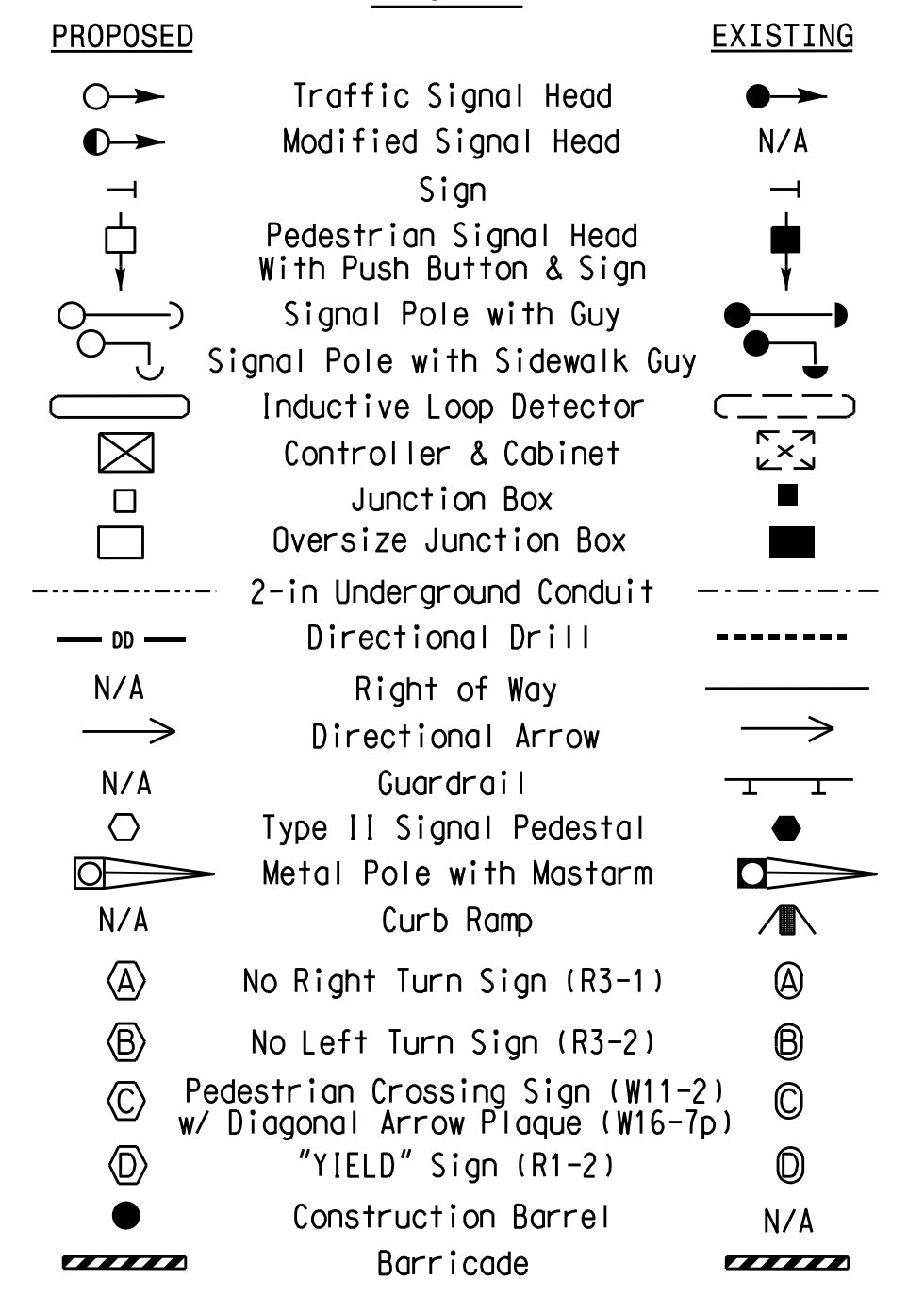
3 Phase Fully Actuated SR 4771 (Reedy Fork Parkway) CLS Signal System: 10727

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Program controller for start up in phase 4 Red Clear and phase 8 Red Clear.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit phase 8 during phase 6 on.
- Program controller to clear from phase 6 to phase 8 by progressing through phase 7.
- Omit phase 7 during phase 8 on.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data:
Controller Asset #: 0905



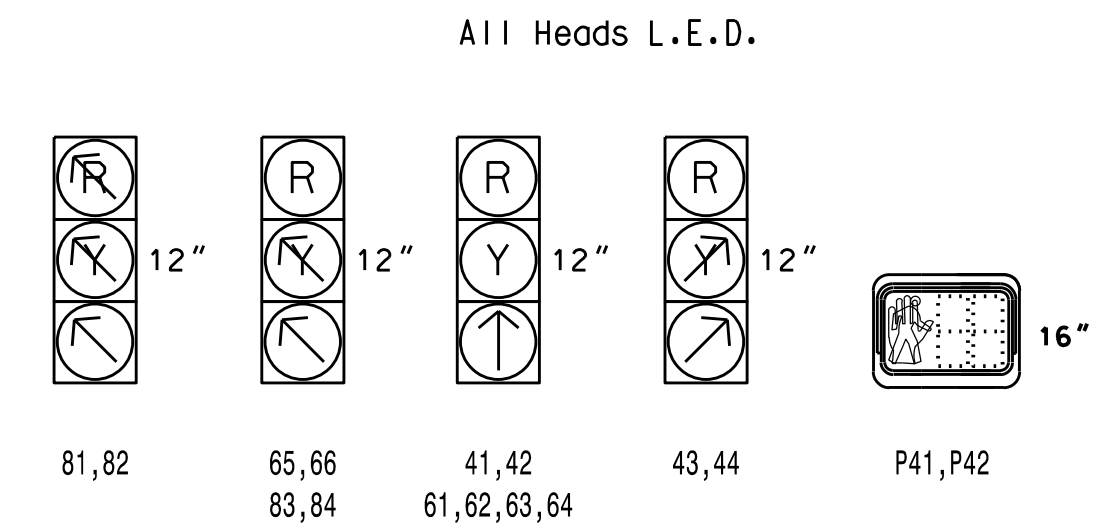
LEGEND



ASC/3 TIMING CHART

FEATURE	PHASE				
	4	6	7 (DUMMY)	8	9 (ALL RED)
Min Green *	10	10	1	10	1
Walk *	7	0	0	0	0
Ped Clear	15	0	0	0	0
Veh. Extension *	2.0	2.0	0.0	2.0	0.0
Max 1 *	60	60	1	60	1
Yellow	4.2	3.6	3.0	3.4	3.0
Red Clear	2.6	2.3	1.0	2.1	1.0
Red Revert	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-
Seconds / Actuation *	-	-	-	-	-
Max Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Locking Detector	-	-	-	-	-
Recall Position	-	-	-	-	SOFT RECALL
Dual Entry	X	-	X	-	-
Simultaneous Gap	X	X	X	X	X

SIGNAL FACE I.D.



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

New Installation - Temporary Design 1 ; (TMP Phase III-Step 1)

Project #: 180914

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SR 4771 (Reedy Fork Parkway) at US 29 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: L. Boyer

PREPARED BY: T.S. Warren REVIEWED BY: R. Hinshaw

REVISIONS: INITI. DATE

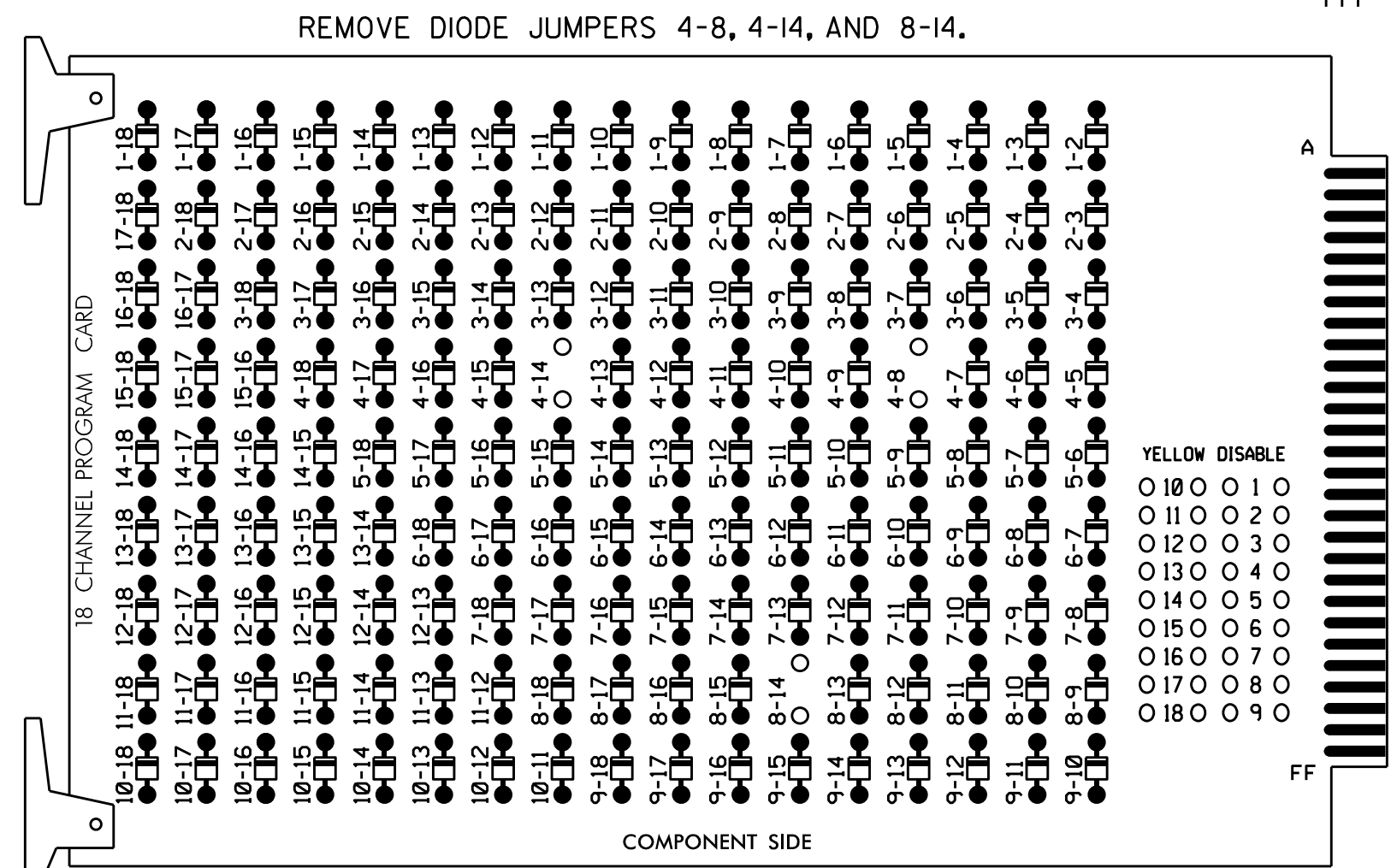
Seal: T. S. Warren, Professional Engineer, No. 032117, State of North Carolina

DocuSigned by: T. S. Warren, 4/20/2020

SIG. INVENTORY NO. 07-090511

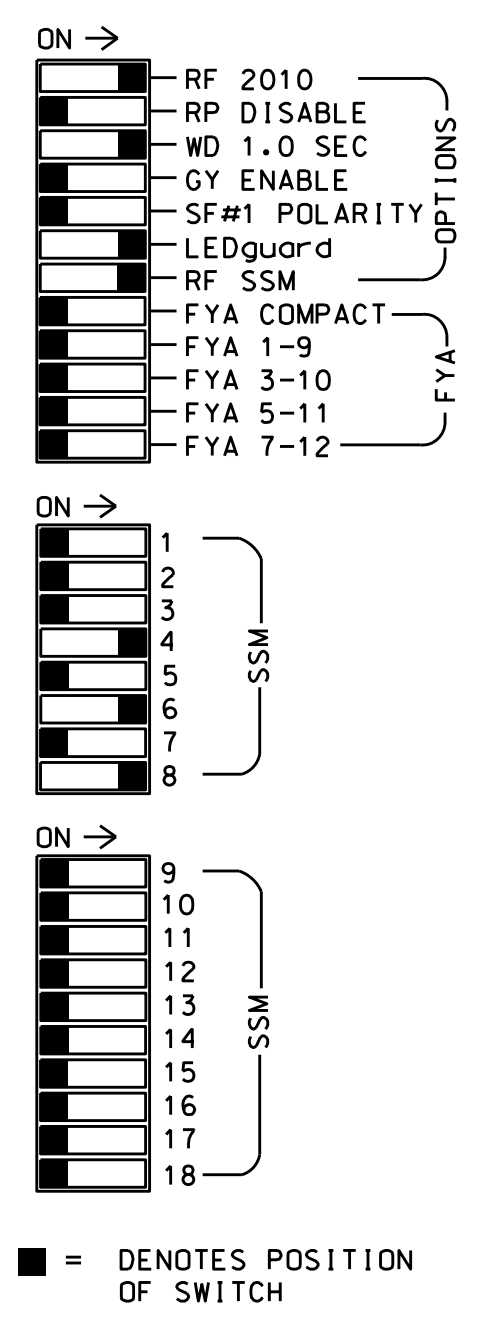
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 7 for Dual Entry.
- Program controller to start up in phase 4 Red Clear and 8 Red Clear.
- The cabinet and controller are part of the SR 4771 (Reedy Fork Parkway) CLS Signal System: 10727.

EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET.....332
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S5,S6,S8,S9,S11,S12
 PHASES USED.....4,4 PED,6,7*,8,9*
 OVERLAPS.....NONE
 * PHASE USED FOR TIMING PURPOSES ONLY

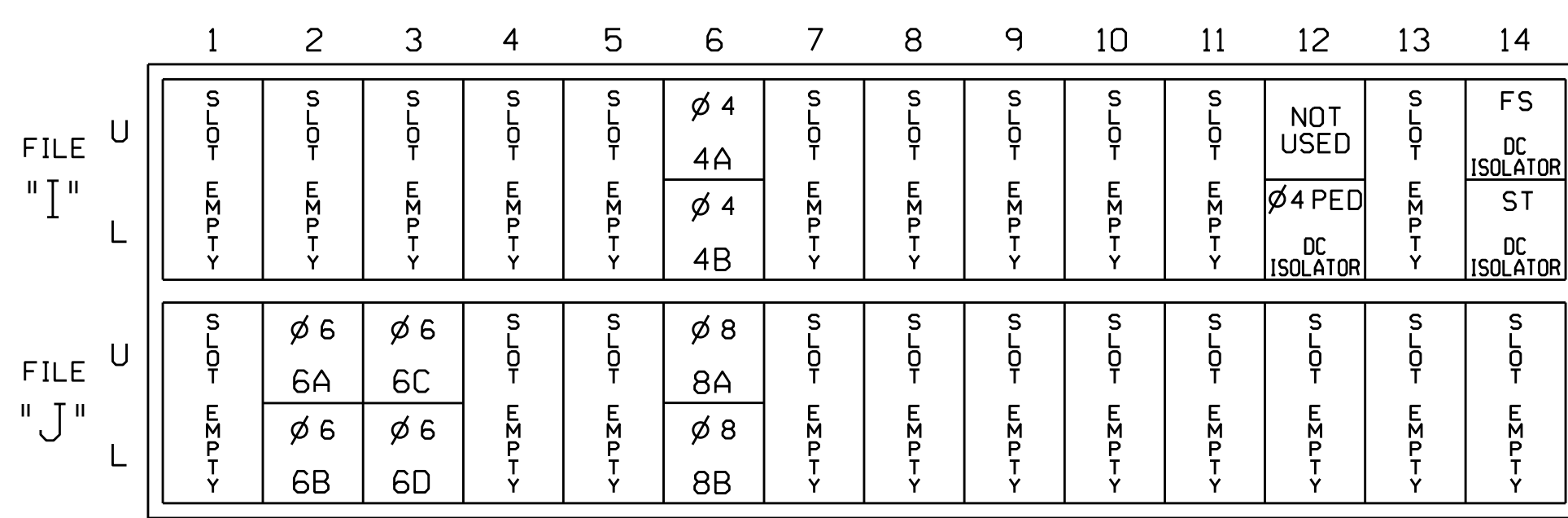
SIGNAL HEAD HOOK-UP CHART

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	NU	NU	NU	41,42	43,44	P41, P42	61,62, 63,64	65,66	NU	NC	81,82 83,84
RED					101	101		134	134			107
YELLOW					102			135				
GREEN												
RED ARROW											107	
YELLOW ARROW						102		135			108	108
GREEN ARROW						103	103	136	136		109	109
Hand							104					
Walking							106					

NU = Not Used
 NC = Not Connected

INPUT FILE POSITION LAYOUT

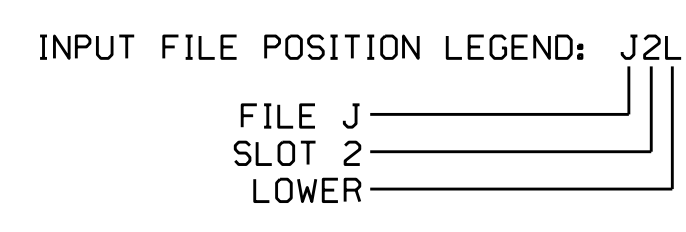
(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
4A	TB4-9,10	I6U	41	4	4	YES				S
4B	TB4-11,12	I6L	45	14	4	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
6D	TB3-11,12	J3L	77	46	6	YES				S
8A	TB5-9,10	J6U	42	8	8	YES				S
8B	TB5-11,12	J6L	46	18	8	YES				S

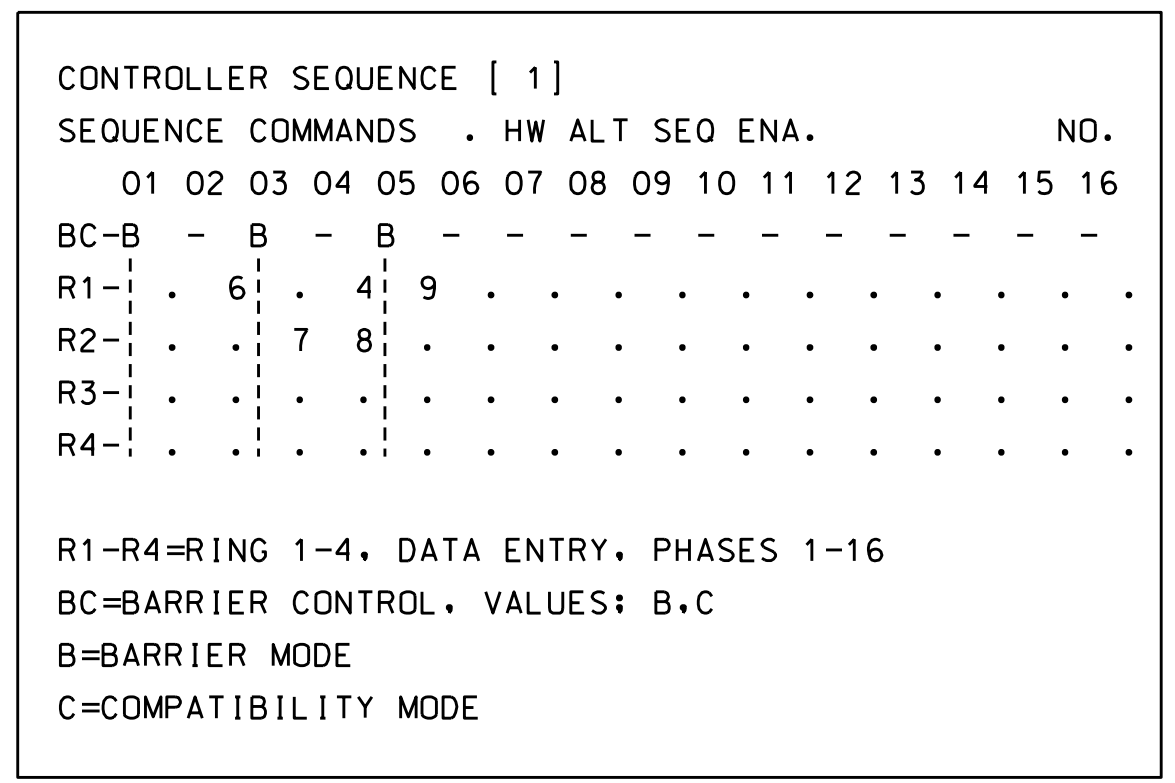
NOTE:
 INSTALL A DC ISOLATOR IN INPUT FILE SLOT I12.



ECONOLITE ASC/3-2070 CONTROLLER SEQUENCE PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **1. CONTROLLER SEQ**
- From CONTROLLER SEQUENCE Submenu select **1. PHASE RING SEQUENCE AND ASSIGNMENT**



END PROGRAMMING

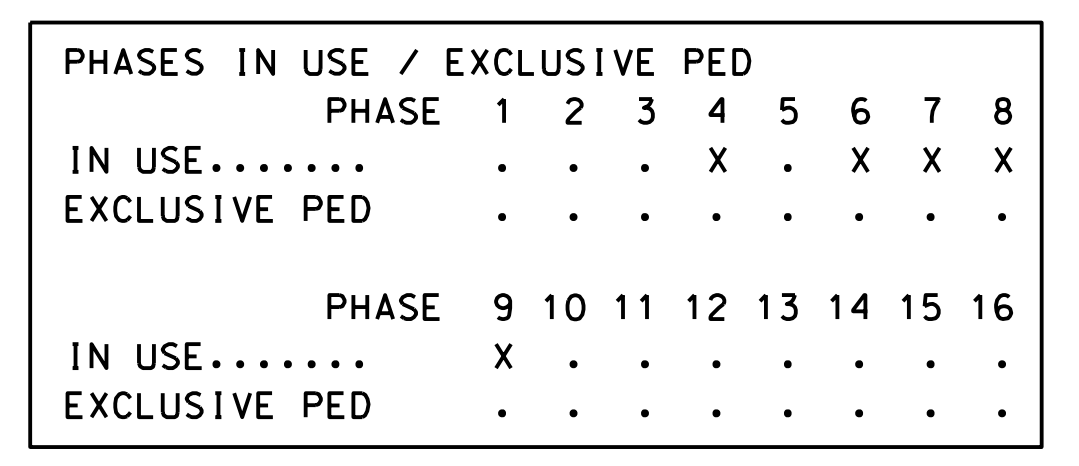
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

ECONOLITE ASC/3-2070 PHASES IN USE PROGRAMMING DETAIL

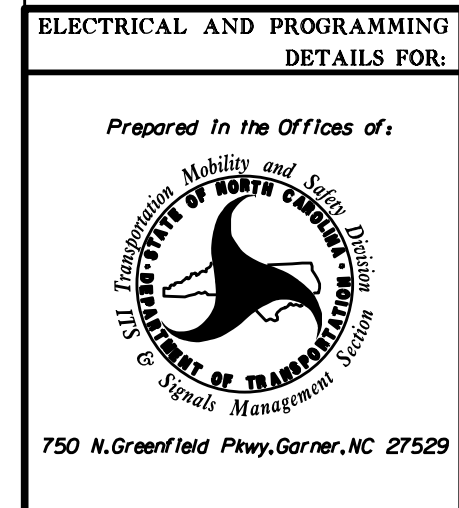
(program controller as shown)

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **2. PHASE IN USE/PED**



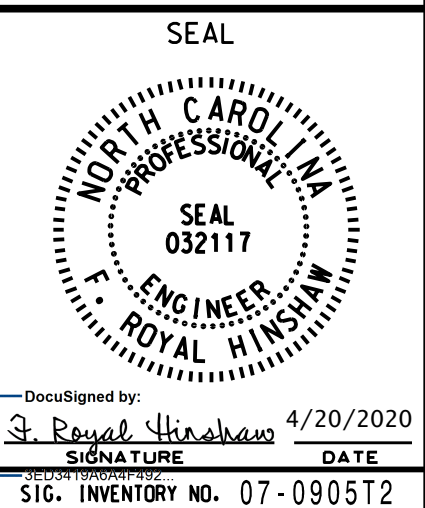
END PROGRAMMING

Electrical Detail - Sheet 1 of 2
 Tempory Design 1 (TMP Phase III, Step 1)

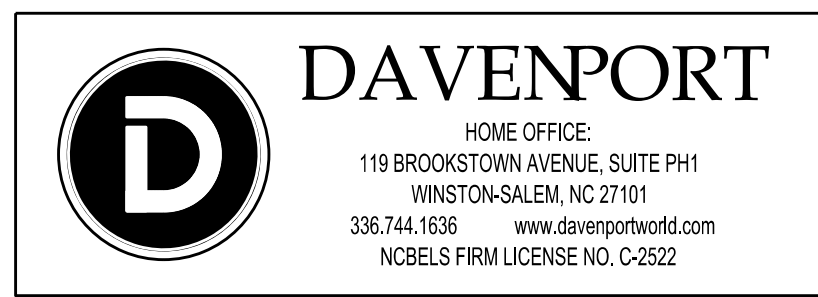


SR 4771 (Reedy Fork Parkway) at US 29 Northbound Ramp			
Division 7	Guilford County	Greensboro	
PLAN DATE: April 2020	REVIEWED BY: R. Hinshaw		
PREPARED BY: T.S. Warren	REVIEWED BY:		
REVISIONS	INIT.	DATE	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0905T1
 DESIGNED: April 2020
 SEALED: April 20, 2020
 REVISED: N/A



DocuSigned by:
 Royal Hinshaw
 4/20/2020
 SIG. INVENTORY NO. 07-0905T2

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING DETAIL

(program controller as shown)

THIS LOGIC PROCESSOR PROGRAMMING PROVIDES ADDITIONAL RED CLEARANCE FOR THE TRANSITION TO PHASE 8 FROM PHASE 6 BY FORCING THE CONTROLLER TO SERVE PHASE 7 FIRST. THIS IS NECESSARY DUE TO THE LONG THROAT DISTANCE BETWEEN THE TWO MOVEMENTS.

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **8. LOGIC PROCESSOR**
- From LOGIC PROCESSOR Submenu select **1. LOGIC STATEMENT CONTROL**

ENABLE LOGIC PROCESSOR STATEMENTS 1 & 2 BY POSITIONING THE CURSOR OVER THE FIELDS SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE THEM.

LOGIC STATEMENT CONTROL															
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
LP 1-15	E	E	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30
LP 31-45
LP 46-60
LP 61-75
LP 76-90

END PROGRAMMING

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **8. LOGIC PROCESSOR**
- From LOGIC PROCESSOR Submenu select **2. LOGIC STATEMENTS**

ENTER A "1" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```

LP#: 1 COPY FROM: 1 ACTIVE:M (T/F)
IF CTR PHASE TIMING 6 IS ON

THEN CTR OMIT PHASE 8 ON
ELSE
  
```

ENTER A "2" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```

LP#: 2 COPY FROM: 2 ACTIVE:M (T/F)
IF CTR ON PHASE CHECK 8 IS ON
OR CTR ON PH PED CHK 8 IS ON

THEN CTR CALL PHASE 7 ON
ELSE
  
```

END PROGRAMMING

ECONOLITE ASC/3-2070 BACKUP PROTECTION ENABLE PROGRAMMING

(program controller as shown)

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **1. CONTROLLER SEQ**
- From CONTROLLER SEQUENCE Submenu select **3. BACKUP PREVENT PHASES**

Follow programming as shown below. On the 'ENABLE BACKUP PREVENT' screen move cursor to the appropriate field and press 'YES/NO' on the controller keypad to toggle field value between 'X', 'B', 'C' and 'OFF'.

ENABLE BACKUP PREVENT																
TMG/BKUP	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
1
2
3
4
5
6
7
8	X	.	.	.	.	.	.	.	.	.
9
10
11
12
13
14
15
16

END PROGRAMMING

NOTE

'X' inhibits the controller from servicing the 'BACKUP' (column) phase when the 'TIMING' (row) phase is active or next.

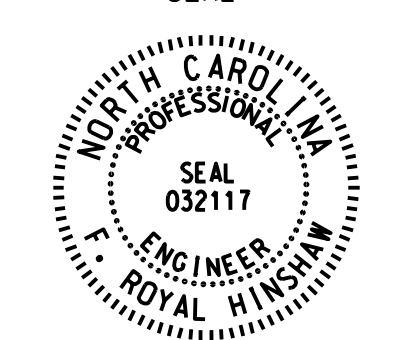
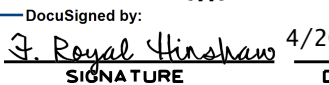
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0905T1
 DESIGNED: April 2020
 SEALED: April 20, 2020
 REVISED: N/A

Project #: 180914



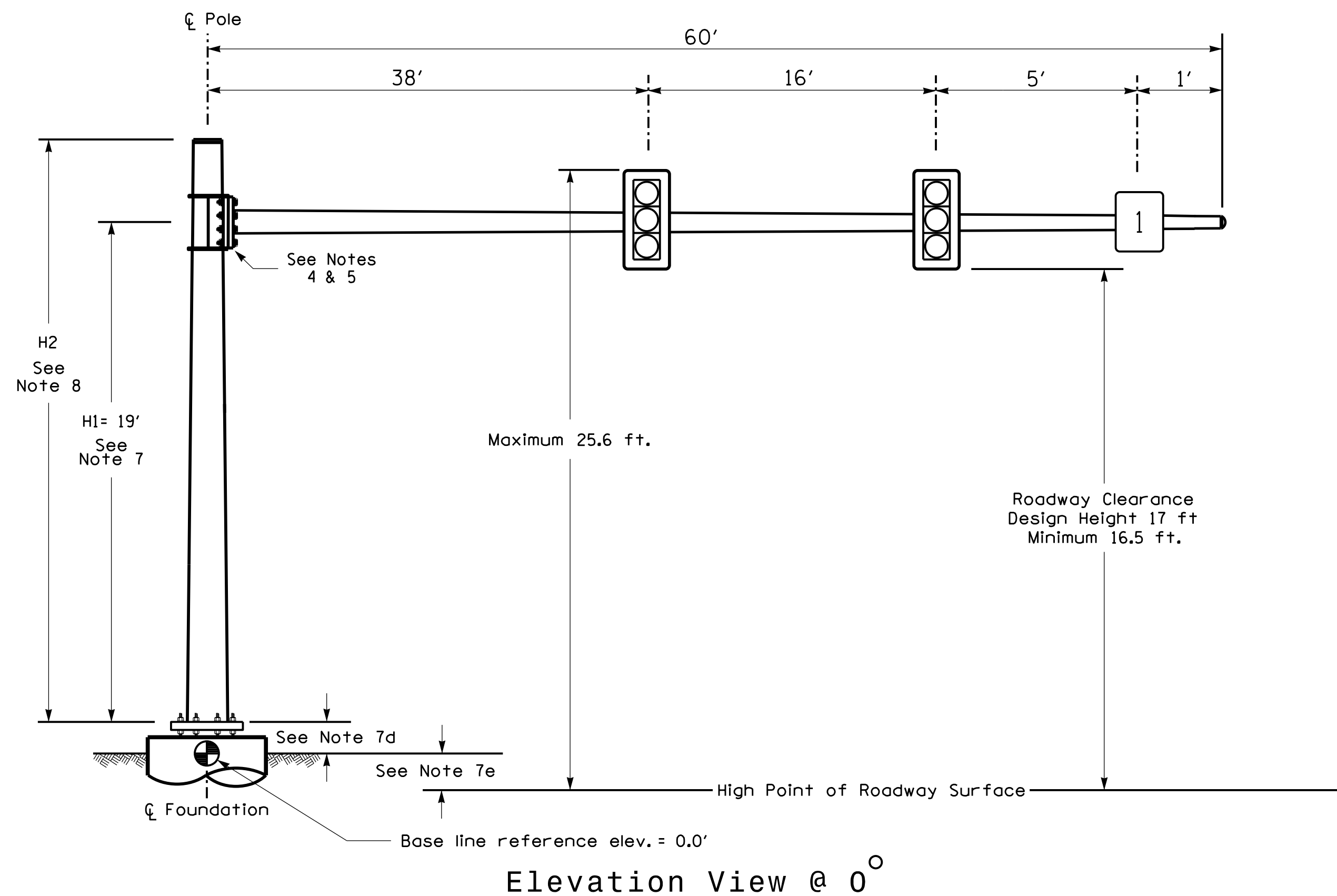
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Electrical Detail - Sheet 2 of 2
 Tempory Design 1 (TMP Phase III, Step 1)

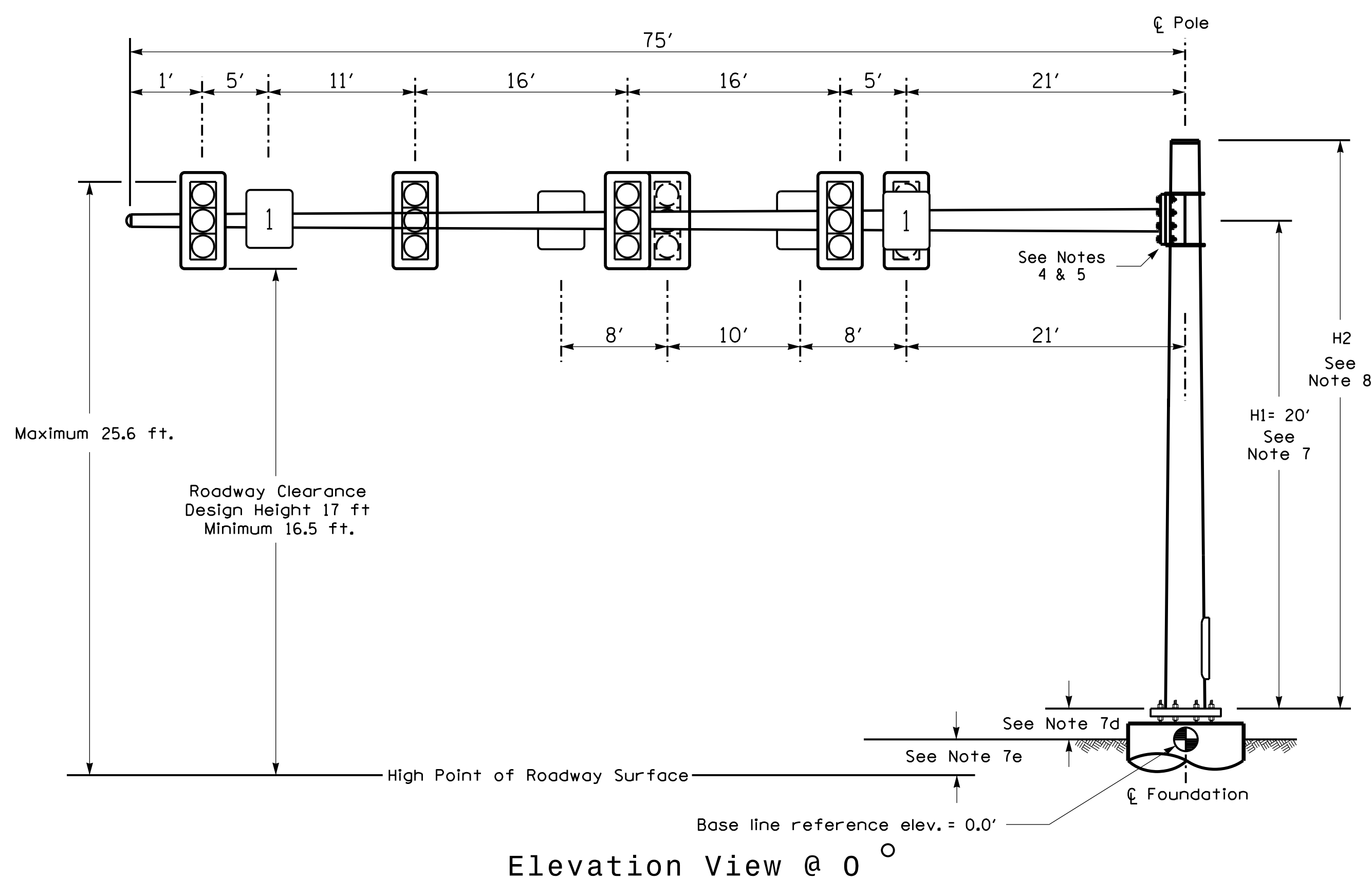
ELECTRICAL AND PROGRAMMING DETAILS FOR:		SR 4771 (Reedy Fork Parkway) at US 29 Northbound Ramp		 SEAL 032117 ROYAL HINSHAW
Division 7	Guilford County	Greensboro		
PLAN DATE: April 2020	REVIEWED BY: R. Hinshaw	PREPARED BY: T.S. Warren	REVIEWED BY:	DocuSigned by:  DATE: 4/20/2020 SIG. INVENTORY NO. 07-0905T2
REVISIONS		INIT.	DATE	

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Design Loading for METAL POLE NO. 4



Design Loading for METAL POLE NO. 5

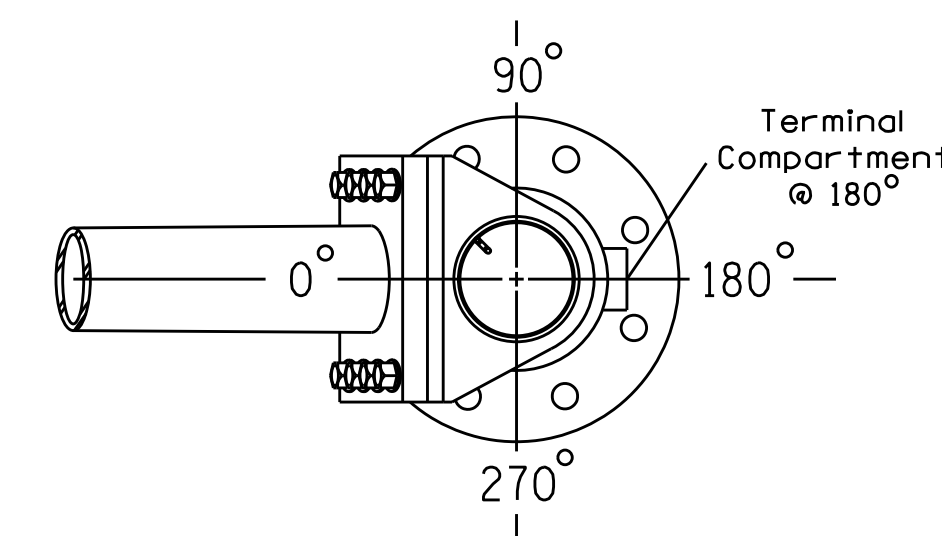


SPECIAL NOTE

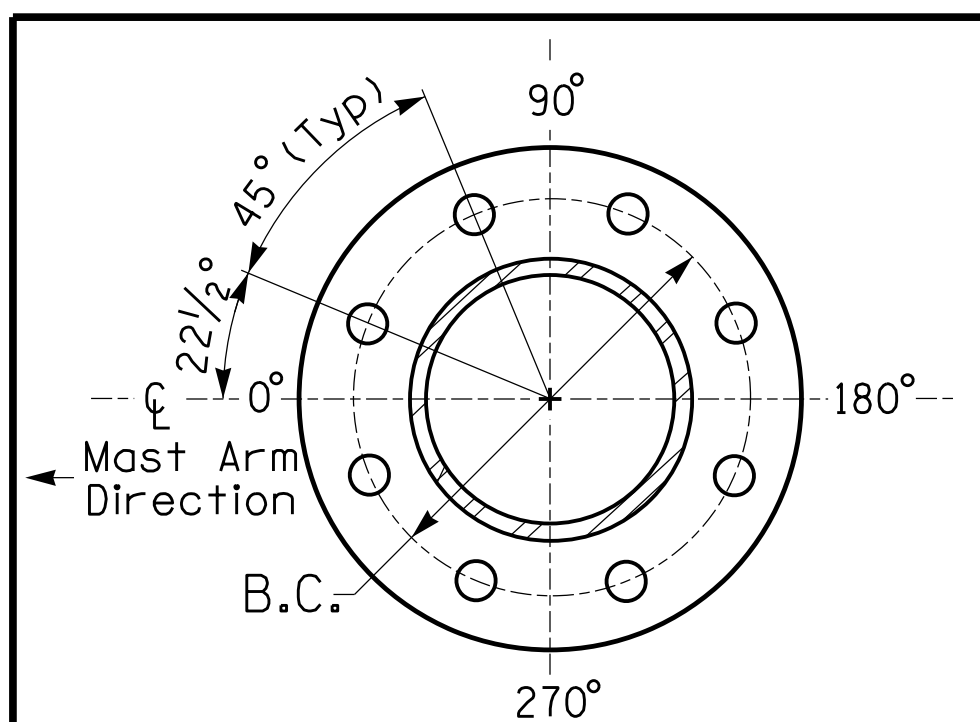
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

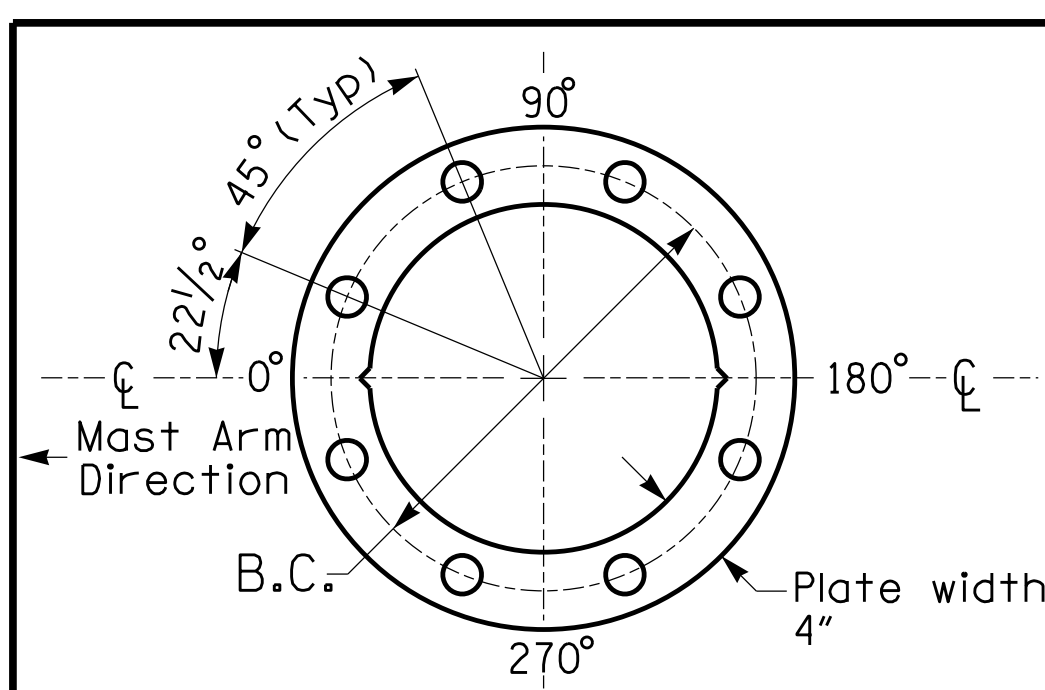
Elevation Differences for:	Pole 4	Pole 5
Baseline reference point at \odot Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-0.3 ft.	+0.9 ft.
Elevation difference at Edge of travelway or face of curb	-0.3 ft.	+0.9 ft.



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

METAL POLE No. 4 AND 5

PROJECT REFERENCE NO.	SHEET NO.
R-4707	Sig. 13.3

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
	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS

NOTES

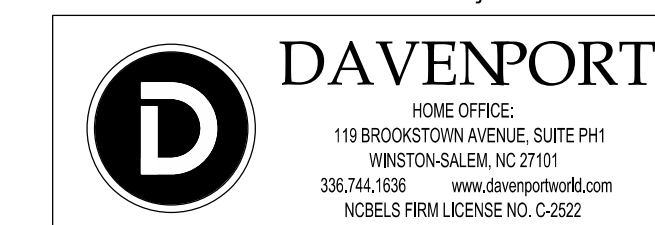
DESIGN REFERENCE MATERIAL

- 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 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
The 2018 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>

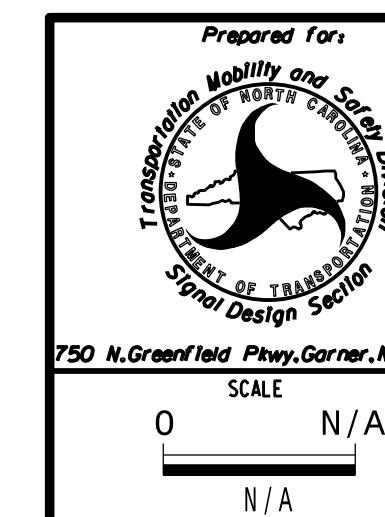
DESIGN REQUIREMENTS

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
b. Signal heads 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.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
Mast arm attachment height (H1) plus 2 feet, or
H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

Project #: 180914



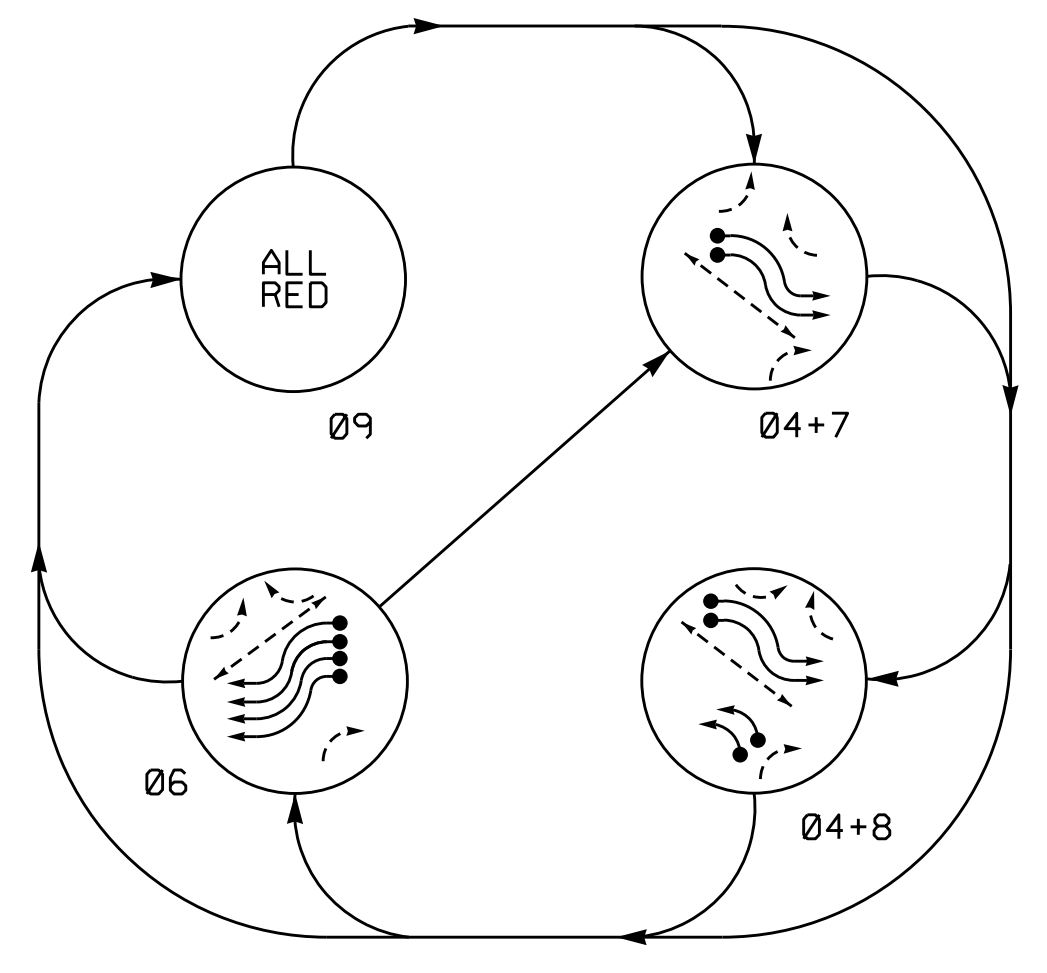
NCDOT Wind Zone 4 (90 mph)



Prepared for: SR 4771 (Reedy Fork Parkway) at US 29 Northbound Ramps	
Division 07	Guilford County Greensboro
PLAN DATE: April 2020	REVIEWED BY: L Boyer
PREPARED BY: K Dean	REVIEWED BY:
SCALE: 0 N/A	REVISIONS: INIT. DATE
DocuSigned by: S. Royal Hinkshaw 4/20/2020	
SIGNATURE DATE	
SIG. INVENTORY NO. 07-0905	



PHASING DIAGRAM



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

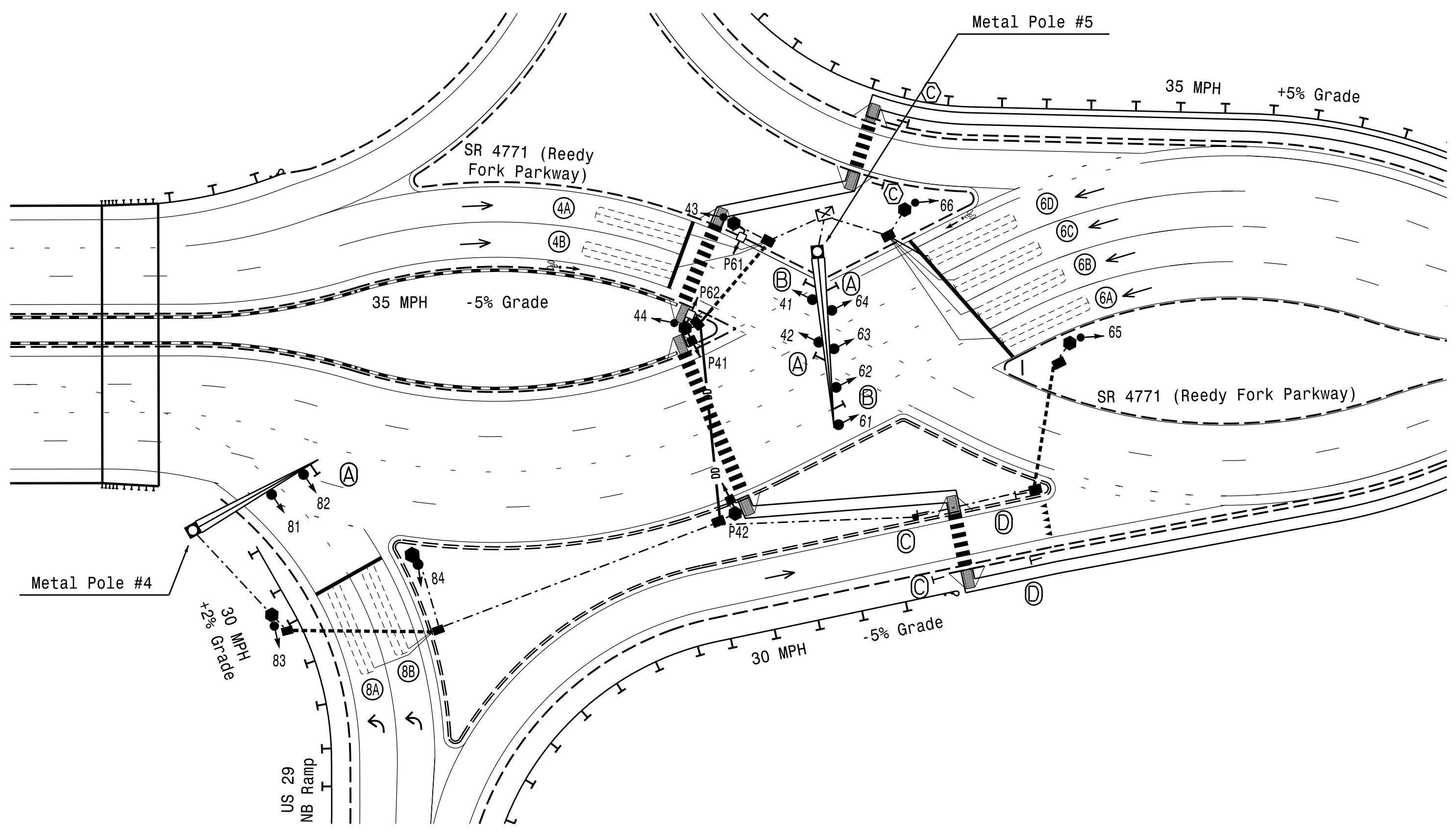
SIGNAL FACE	PHASE							
	Ø 6	Ø 4 + 7	Ø 4 + 8	Ø 6	A Ø 6	F Ø 6	H Ø 6	L Ø 6
41,42	R	|	|	R	R			
43,44	R	/	/	R	R			
61,62,63,64	|	R	R	R	R			
65,66	/	R	R	R	R			
81,82	R	R	/	R	R			
83,84	R	R	/	R	R			
P41,P42	DW	W	W	DW	DRK			
P61,P62	W	DW	DW	DW	DRK			

ASC/3 DETECTOR INSTALLATION CHART											
DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	S	-
4B	6X40	0	2-4-2	-	4	Yes	-	-	-	S	-
6A	6X40	0	2-4-2	-	6	Yes	-	-	-	S	-
6B	6X40	0	2-4-2	-	6	Yes	-	-	-	S	-
6C	6X40	0	2-4-2	-	6	Yes	-	-	-	S	-
6D	6X40	0	2-4-2	-	6	Yes	-	-	-	S	-
8A	6X40	0	2-4-2	-	8	Yes	-	-	-	S	-
8B	6X40	0	2-4-2	-	8	Yes	-	-	-	S	-

3 Phase Fully Actuated SR 4771 (Reedy Fork Parkway) CLS Signal System: 10727

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Program controller for start up in phase 4 Red Clear and phase 8 Red Clear.
- Set all detector units to presence mode.
- Omit phase 8 during phase 6 on.
- Program controller to clear from phase 6 to phase 8 by progressing through phase 7.
- Omit phase 7 during phase 8 on.
- Phase 7 provides red clearance for vehicles traveling eastbound on Reedy Fork Parkway.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #: 0905

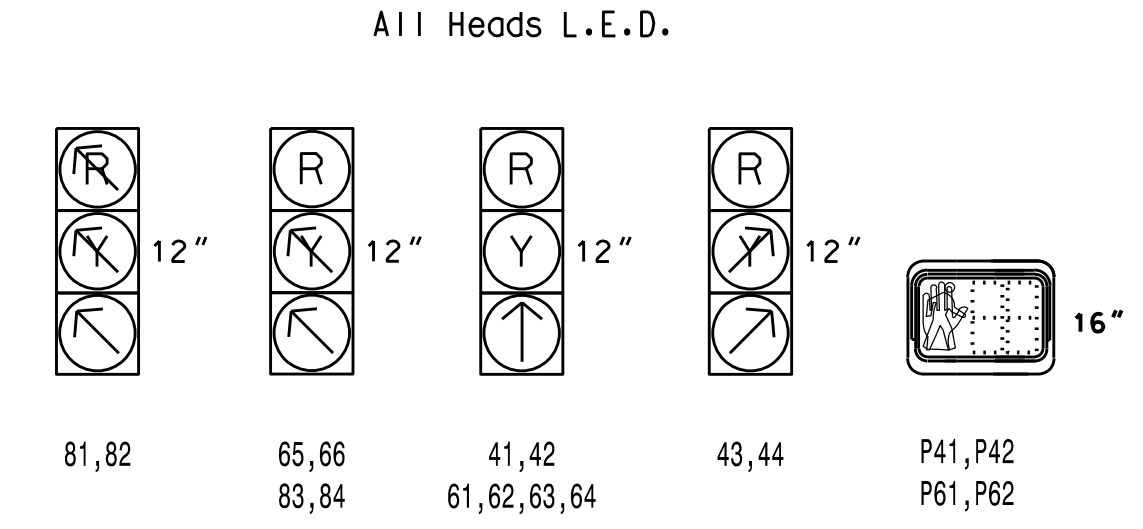


LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
○ → Modified Signal Head	○ → N/A
○ → Pedestrian Signal Head	○ → N/A
○ → Signal Pole with Push Button & Sign	○ → N/A
○ → Signal Pole with Guy	○ → N/A
○ → Signal Pole with Sidewalk Guy	○ → N/A
□ → Inductive Loop Detector	□ → N/A
□ → Controller & Cabinet	□ → N/A
□ → Junction Box	□ → N/A
□ → Oversize Junction Box	□ → N/A
- - - → 2-in Underground Conduit	- - - → N/A
- - - → Directional Drill	- - - → N/A
N/A → Right of Way	N/A → N/A
→ → Directional Arrow	→ → N/A
N/A → Guardrail	N/A → N/A
○ → Type II Signal Pedestal	○ → N/A
○ → Metal Pole with Mastarm	○ → N/A
N/A → Curb Ramp	N/A → N/A
Ⓐ → No Right Turn Sign (R3-1)	Ⓐ → N/A
Ⓑ → No Left Turn Sign (R3-2)	Ⓑ → N/A
Ⓒ → Pedestrian Crossing Sign (W11-2) w/ Diagonal Arrow Plaque (W16-Tp)	Ⓒ → N/A
Ⓓ → "YIELD" Sign (R1-2)	Ⓓ → N/A

FEATURE	ASC/3 TIMING CHART				
	4	6	7 (DUMMY)	8	9 (ALL RED)
Min Green *	10	10	1	10	1
Walk *	7	7	0	0	0
Ped Clear	15	7	0	0	0
Veh. Extension *	2.0	2.0	0.0	2.0	0.0
Max I *	60	60	1	60	1
Yellow	4.2	3.6	3.0	3.4	3.0
Red Clear	2.6	2.3	1.0	2.1	1.0
Red Revert	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-
Seconds / Actuation *	-	-	-	-	-
Max Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Locking Detector	-	-	-	-	-
Recall Position	-	-	-	-	SOFT RECALL
Dual Entry	X	-	X	-	-
Simultaneous Gap	X	X	X	X	X

SIGNAL FACE I.D.



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

Signal Upgrade - Temporary Design 2; (TMP Phase III- Step 5)

Project #: 180914
DAVENPORT
 HOME OFFICE: 119 BROOKSTOWN AVENUE, SUITE PH1 WINSTON-SALEM, NC 27101
 336.744.1636 www.davenportworld.com
 NCBELS FIRM LICENSE NO. C-2522

Prepared for: **TRANSFORMATION MOBILITY AND SAFETY DIVISION**
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 Signal Design Section
 750 N. Greenfield Pkwy, Garner, NC 27529

SR 4771 (Reedy Fork Parkway) at US 29 Northbound Ramps
 Division 7 Guilford County Greensboro
 PLAN DATE: April 2020 REVIEWED BY: L. Boyer
 PREPARED BY: T.S. Warren REVIEWED BY: R. Hinshaw

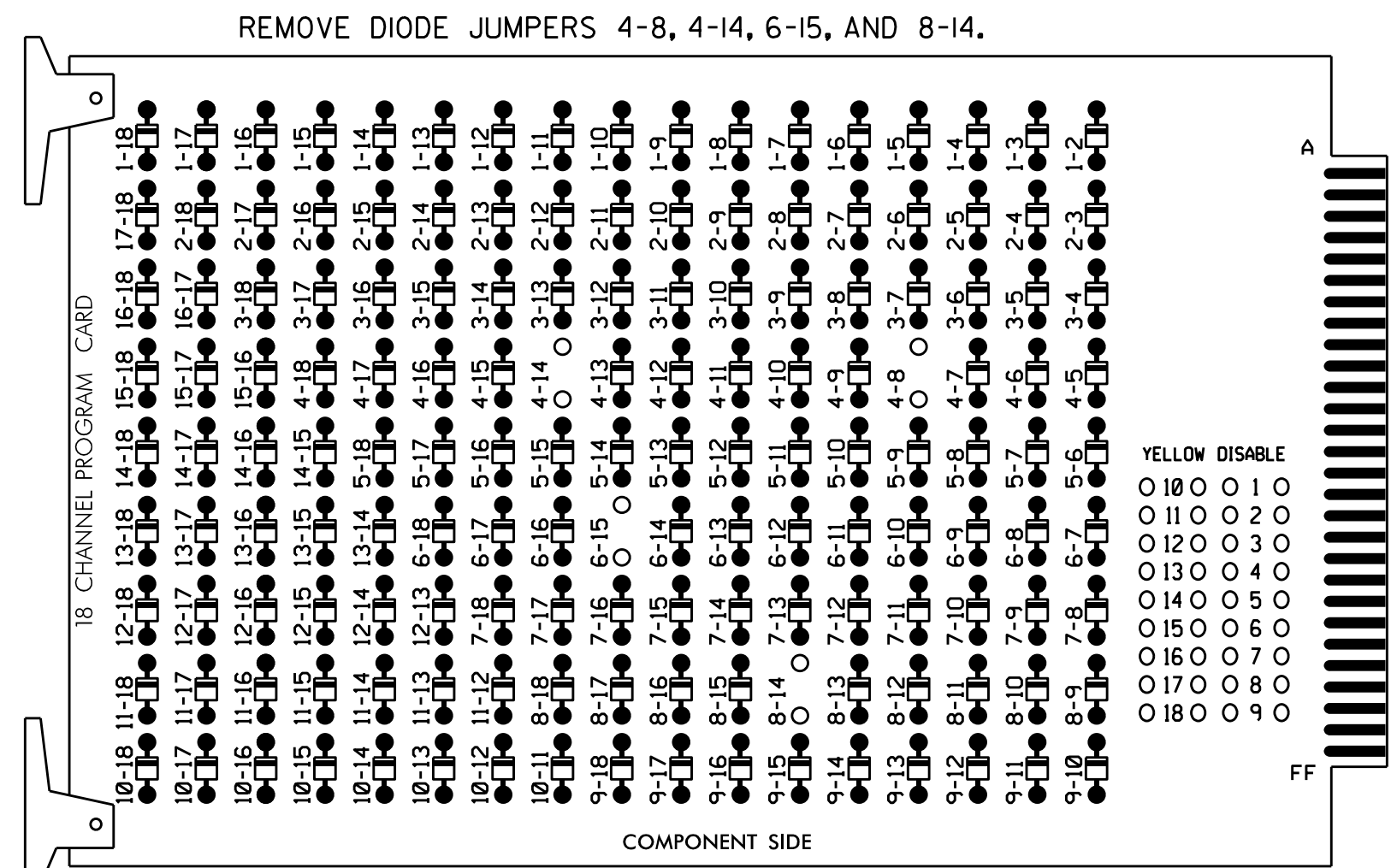
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 032117
 T. ROYAL HINSHAW
 ROYAL HINSHAW & ASSOCIATES, P.A.
 4/20/2020
 DATE
 SIG. INVENTORY NO. 07-090572

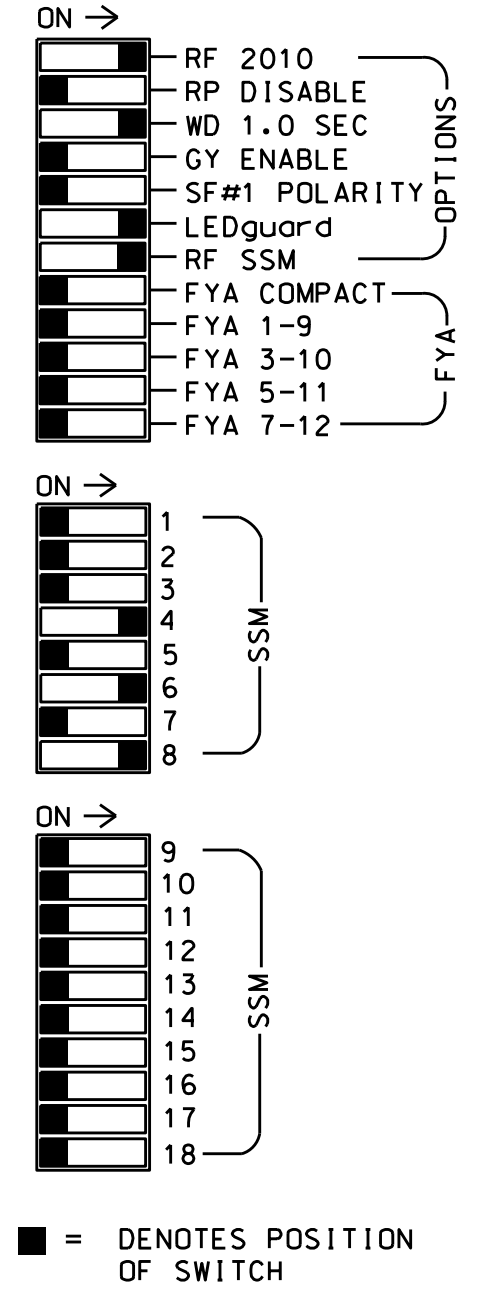
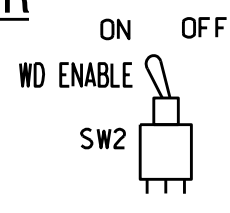
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 7 for Dual Entry.
- Program controller to start up in phase 4 Red Clear and 8 Red Clear.
- The cabinet and controller are part of the SR 4771 (Reedy Fork Parkway) CLS Signal System: 10727.

PROJECT REFERENCE NO.	SHEET NO.
R-4707	Fig. 14.1

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	NU	NU	NU	41,42	43,44	NU	61,62, 63,64	65,66	61, 62	81,82	83,84
RED					101	101		134	134			107
YELLOW					102			135				
GREEN												
RED ARROW											107	
YELLOW ARROW						102			135		108	108
GREEN ARROW						103	103		136	136	109	109
Hand icon							104				119	
Walking person icon							106				121	

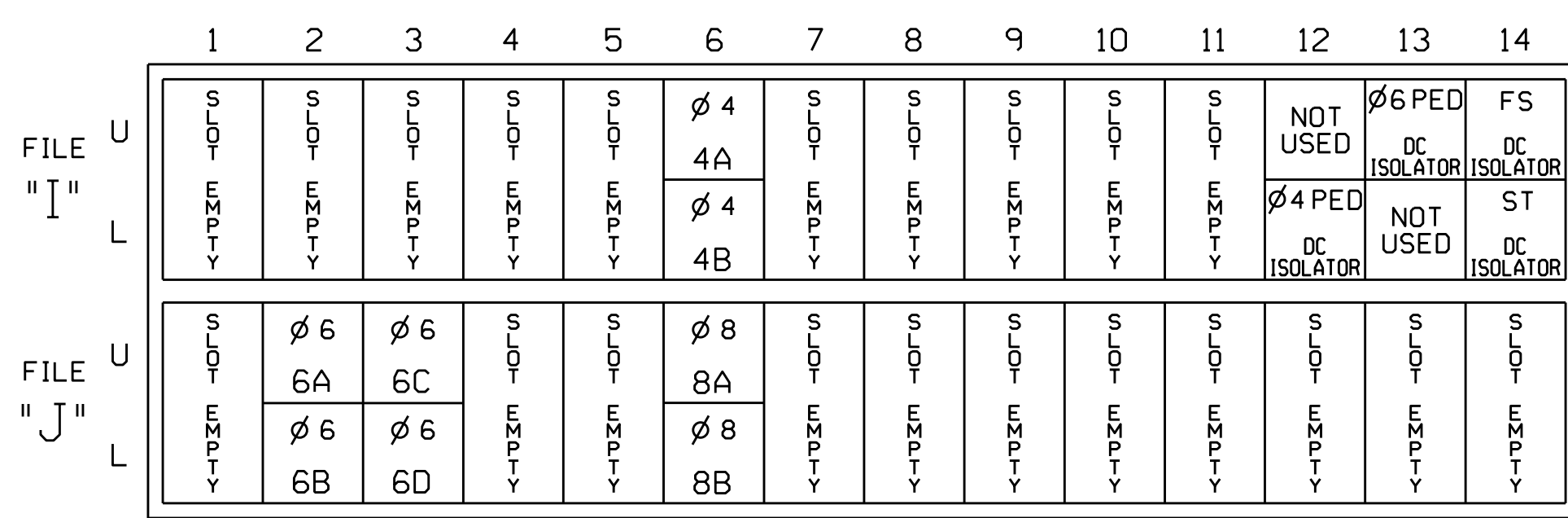
NU = Not Used
NC = Not Connected

EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET.....332
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S5,S6,S8,S9,S11
 PHASES USED.....4,4 PED,6,6 PED,7*,8,9*
 OVERLAPS.....NONE
 * PHASE USED FOR TIMING PURPOSES ONLY

INPUT FILE POSITION LAYOUT

(front view)



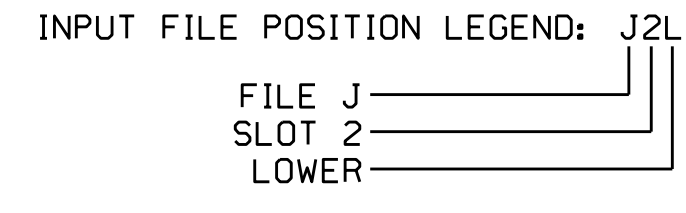
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
4A	TB4-9,10	I6U	41	4	4	YES				S
4B	TB4-11,12	I6L	45	14	4	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
6D	TB3-11,12	J3L	77	46	6	YES				S
8A	TB5-9,10	J6U	42	8	8	YES				S
8B	TB5-11,12	J6L	46	18	8	YES				S

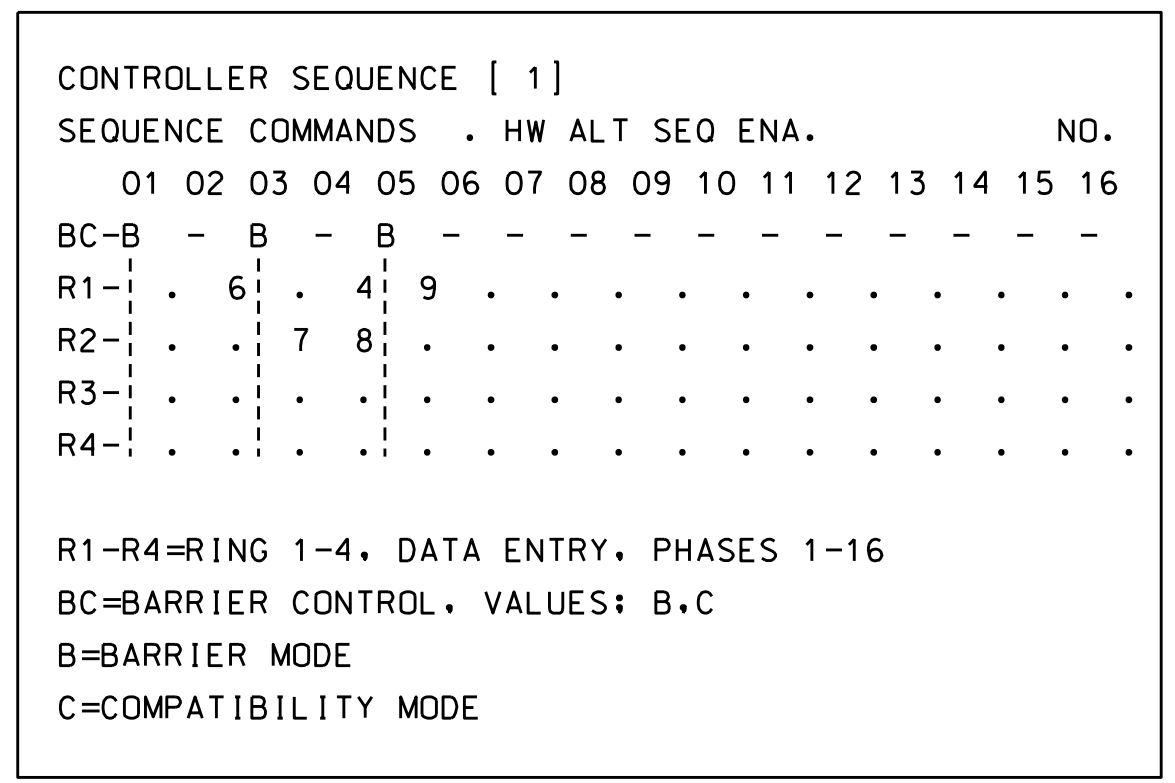
NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.



ECONOLITE ASC/3-2070 CONTROLLER SEQUENCE PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **1. CONTROLLER SEQ**
- From CONTROLLER SEQUENCE Submenu select **1. PHASE RING SEQUENCE AND ASSIGNMENT**



END PROGRAMMING

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

ECONOLITE ASC/3-2070 PHASES IN USE PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **2. PHASE IN USE/PED**

PHASES IN USE / EXCLUSIVE PED	PHASE 1	2	3	4	5	6	7	8
IN USE.....				X		X	X	X
EXCLUSIVE PED								
PHASE 9 10 11 12 13 14 15 16								
IN USE.....	X							
EXCLUSIVE PED								

END PROGRAMMING

Electrical Detail - Sheet 1 of 2
Temporary Design 2 - TMP Phase III, Step 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SR 4771 (Reedy Fork Parkway) at US 29 Northbound Ramp

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: R. Hinshaw

PREPARED BY: T.S. Warren REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

DocuSigned by: R. Hinshaw 4/20/2020

SIGNATURE DATE

SIG. INVENTORY NO. 07-0905T2

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0905T2
 DESIGNED: April 2020
 SEALED: April 20, 2020
 REVISED: N/A

Project #: 180914

HOME OFFICE:
119 BROOKSTOWN AVENUE, SUITE PH1
WINSTON-SALEM, NC 27101
336.744.1636 www.davenportworld.com
NCBELS FIRM LICENSE NO. C-2522

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING DETAIL

(program controller as shown)

THIS LOGIC PROCESSOR PROGRAMMING PROVIDES ADDITIONAL RED CLEARANCE FOR THE TRANSITION TO PHASE 8 FROM PHASE 6 BY FORCING THE CONTROLLER TO SERVE PHASE 7 FIRST. THIS IS NECESSARY DUE TO THE LONG THROAT DISTANCE BETWEEN THE TWO MOVEMENTS.

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **8. LOGIC PROCESSOR**
- From LOGIC PROCESSOR Submenu select **1. LOGIC STATEMENT CONTROL**

ENABLE LOGIC PROCESSOR STATEMENTS 1 & 2 BY POSITIONING THE CURSOR OVER THE FIELDS SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE THEM.

LOGIC STATEMENT CONTROL															
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
LP 1-15	E	E	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30
LP 31-45
LP 46-60
LP 61-75
LP 76-90

END PROGRAMMING

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **8. LOGIC PROCESSOR**
- From LOGIC PROCESSOR Submenu select **2. LOGIC STATEMENTS**

ENTER A "1" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```
LP#: 1 COPY FROM: 1 ACTIVE:M (T/F)
IF CTR PHASE TIMING 6 IS ON

THEN CTR OMIT PHASE 8 ON
ELSE
```

ENTER A "2" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```
LP#: 2 COPY FROM: 2 ACTIVE:M (T/F)
IF CTR ON PHASE CHECK 8 IS ON
OR CTR ON PH PED CHK 8 IS ON

THEN CTR CALL PHASE 7 ON
ELSE
```

END PROGRAMMING

ECONOLITE ASC/3-2070 BACKUP PROTECTION ENABLE PROGRAMMING

(program controller as shown)

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **1. CONTROLLER SEQ**
- From CONTROLLER SEQUENCE Submenu select **3. BACKUP PREVENT PHASES**

Follow programming as shown below. On the 'ENABLE BACKUP PREVENT' screen move cursor to the appropriate field and press 'YES/NO' on the controller keypad to toggle field value between 'X', 'B', 'C' and 'OFF'.

ENABLE BACKUP PREVENT																
TMG/BKUP	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
1
2
3
4
5
6
7
8	X	.	.	.	.	.	.	.	.
9
10
11
12
13
14
15
16

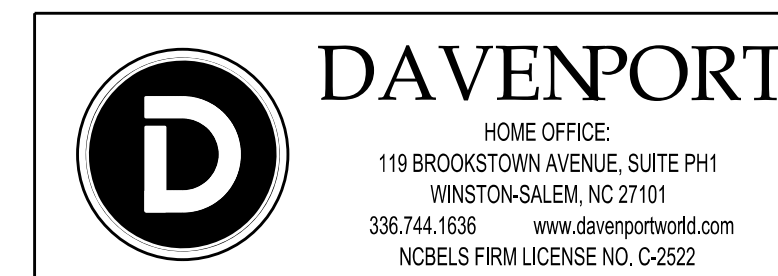
END PROGRAMMING

NOTE

'X' inhibits the controller from servicing the 'BACKUP' (column) phase when the 'TIMING' (row) phase is active or next.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0905T2
 DESIGNED: April 2020
 SEALED: April 20, 2020
 REVISED: N/A

Project #: 180914

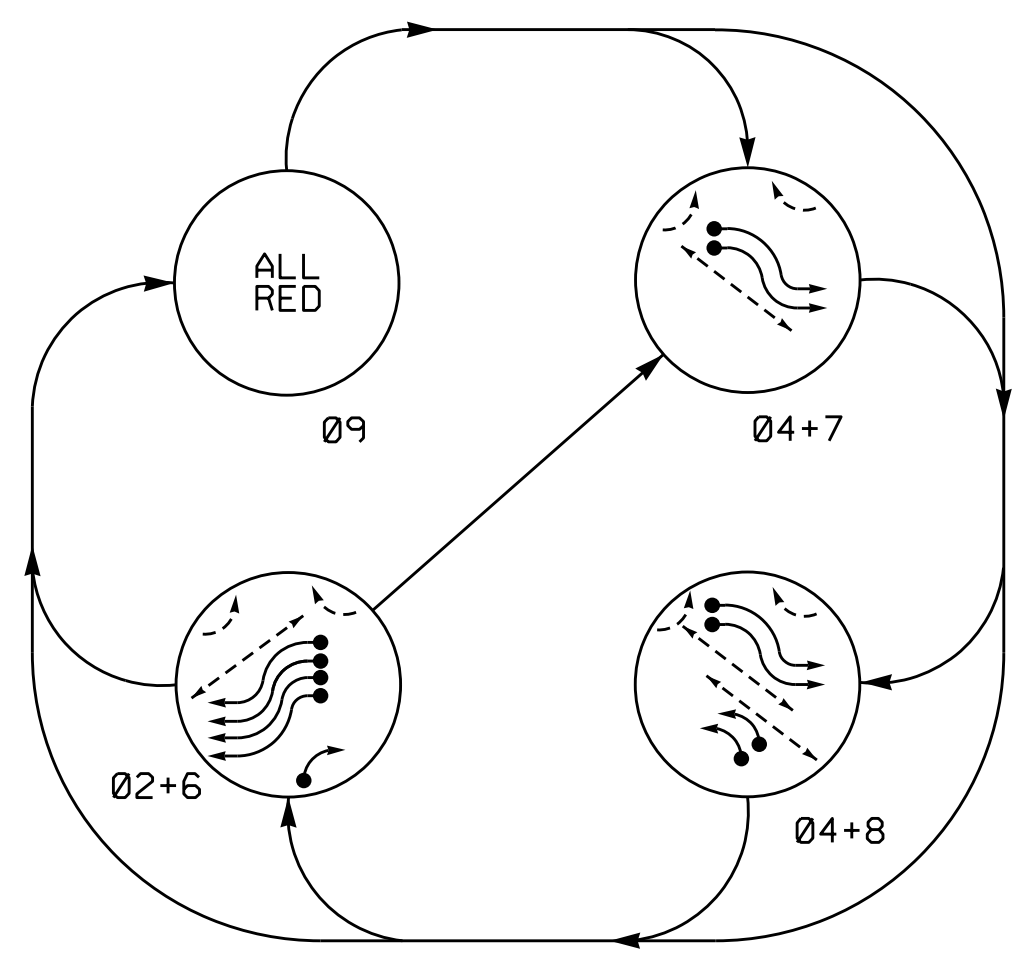


Electrical Detail - Sheet 2 of 2
 Temporary Design 2 - TMP Phase III, Step 5

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	SR 4771 (Reedy Fork Parkway) at US 29 Northbound Ramp	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL SEAL 032117 ROYAL HINSHAW ENGINEER
	Division 7 Guilford County Greensboro PLAN DATE: April 2020 REVIEWED BY: R. Hinshaw PREPARED BY: T.S. Warren REVIEWED BY:		REVISIONS INIT. DATE

DocuSigned by:
 R. Hinshaw 4/20/2020
 SIGNATURE DATE
 SIG. INVENTORY NO. 07-0905T2

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE				
	02+6	04+7	04+8	09	ALL RED
21,22	G	R	R	R	R
23,24	/	R	R	R	R
41,42	R	/	/	R	R
43,44	R	/	/	R	R
61,62,63,64	/	R	R	R	R
65,66	/	R	R	R	R
81,82	R	R	/	R	R
83,84	R	R	/	R	R
P41,P42	DW	W	W	DW	DRK
P61,P62	W	DW	DW	DW	DRK
P81,P82	DW	DW	W	DW	DRK

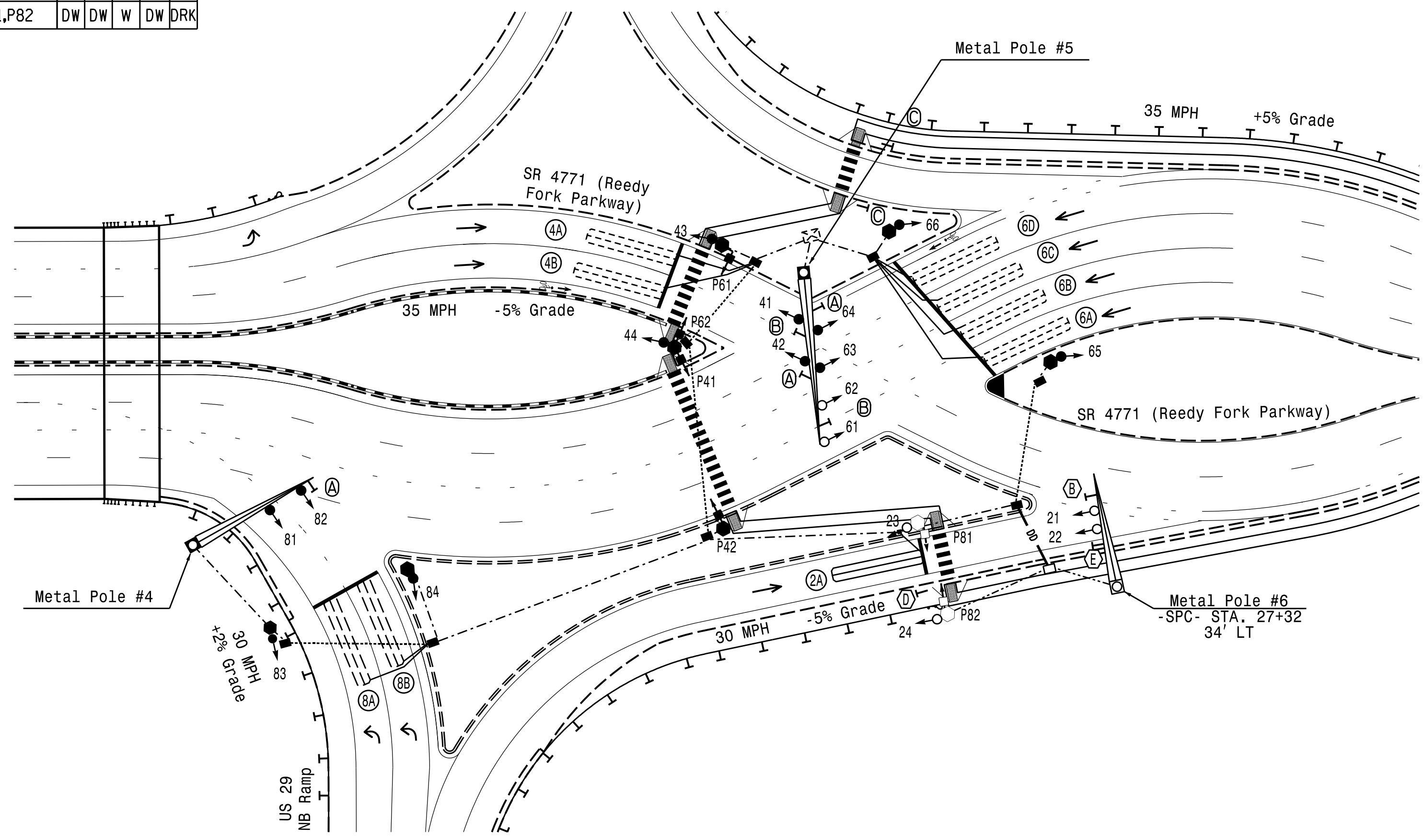
ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X40	0	2-4-2	X	2	Yes	-	-	-	S	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	S	-	-
4B	6X40	0	2-4-2	-	4	Yes	-	-	-	S	-	-
6A	6X40	0	2-4-2	-	6	Yes	-	-	-	S	-	-
6B	6X40	0	2-4-2	-	6	Yes	-	-	-	S	-	-
6C	6X40	0	2-4-2	-	6	Yes	-	-	-	S	-	-
6D	6X40	0	2-4-2	-	6	Yes	-	-	-	S	-	-
8A	6X40	0	2-4-2	-	8	Yes	-	-	-	S	-	-
8B	6X40	0	2-4-2	-	8	Yes	-	-	-	S	-	-

4 Phase Fully Actuated SR 4771 (Reedy Fork Parkway) CLS Signal System: 10727

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Program controller to start up in phase 4 Red Clear and phase 8 Red Clear.
- Set all detector units to presence mode.
- Omit phase 8 during phase 2 on.
- Program controller to clear from phase 2 to phase 8 by progressing through phase 7.
- Omit phase 7 during phase 8 on.
- Phase 7 provides red clearance for vehicles traveling eastbound on Reedy Fork Parkway.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #: 0905



LEGEND

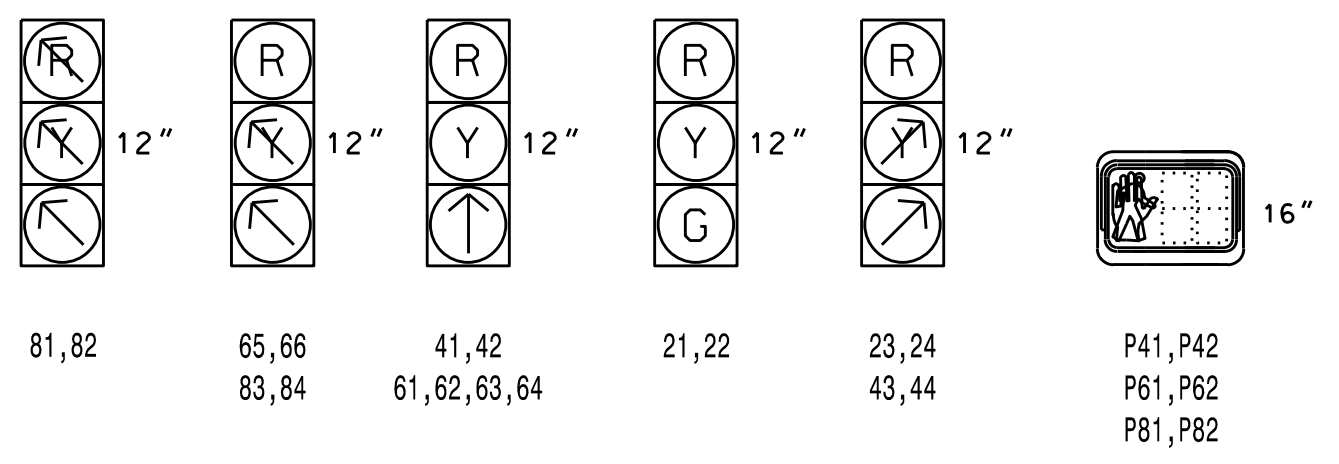
- | PROPOSED | EXISTING |
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ASC/3 TIMING CHART

FEATURE	PHASE					
	2	4	6	7 (DUMMY)	8	9 (ALL RED)
Min Green *	10	10	10	1	10	1
Walk *	0	7	7	0	5	0
Ped Clear	0	15	7	0	4	0
Veh. Extension *	2.0	2.0	2.0	0.0	2.0	0.0
Max I *	60	60	60	1	60	1
Yellow	3.8	4.2	3.6	3.0	3.4	3.0
Red Clear	3.0	4.0	2.3	1.0	2.1	1.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-
Seconds / Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Locking Detector	-	-	-	-	-	-
Recall Position	-	-	-	-	-	SOFT RECALL
Dual Entry	X	X	X	X	-	-
Simultaneous Gap	X	X	X	X	X	X

SIGNAL FACE I.D.

All Heads L-E-D.



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

Signal Upgrade - Final Design

DAVENPORT
 HOME OFFICE:
 119 BROOKSTOWN AVENUE, SUITE PH1
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 336.744.1636 www.davenportworld.com
 NCBELS FIRM LICENSE NO. C-2522

Project #: 180914

SR 4771 (Reedy Fork Parkway) at US 29 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2020 REVIEWED BY: L. Boyer

PREPARED BY: A. Ravipti REVIEWED BY: R. Hinshaw

REVISIONS	INIT.	DATE

DocuSigned by: *St. Raymond* 4/20/2020

SIGNATURE DATE

SIG. INVENTORY NO. 07-0905

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

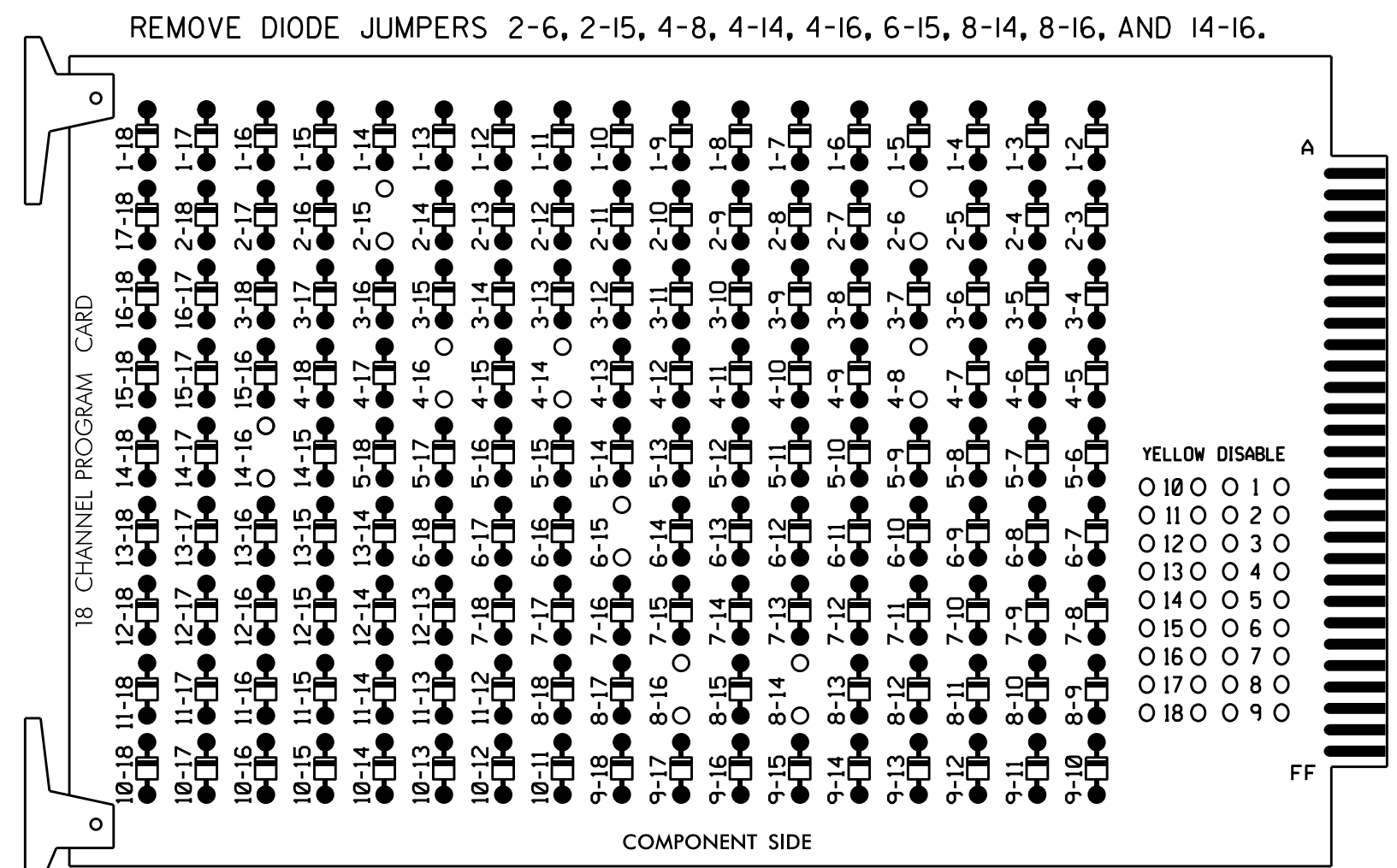
NOTARY PUBLIC

SEAL 032117

ROYAL HINSHAW

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

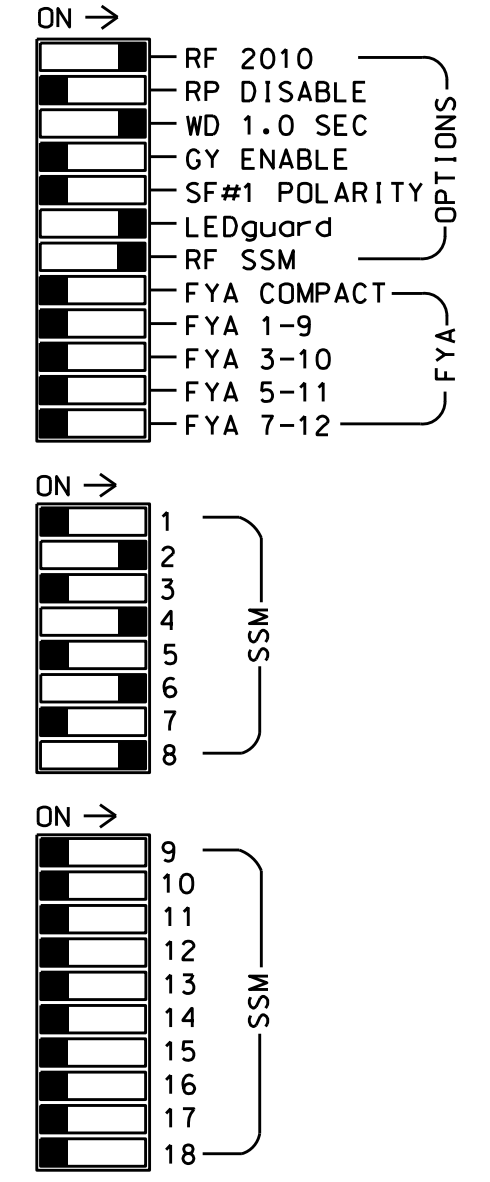
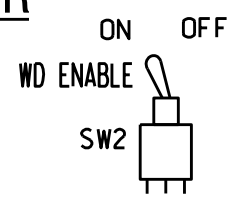
(remove jumpers and set switches as shown)



NOTES:

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

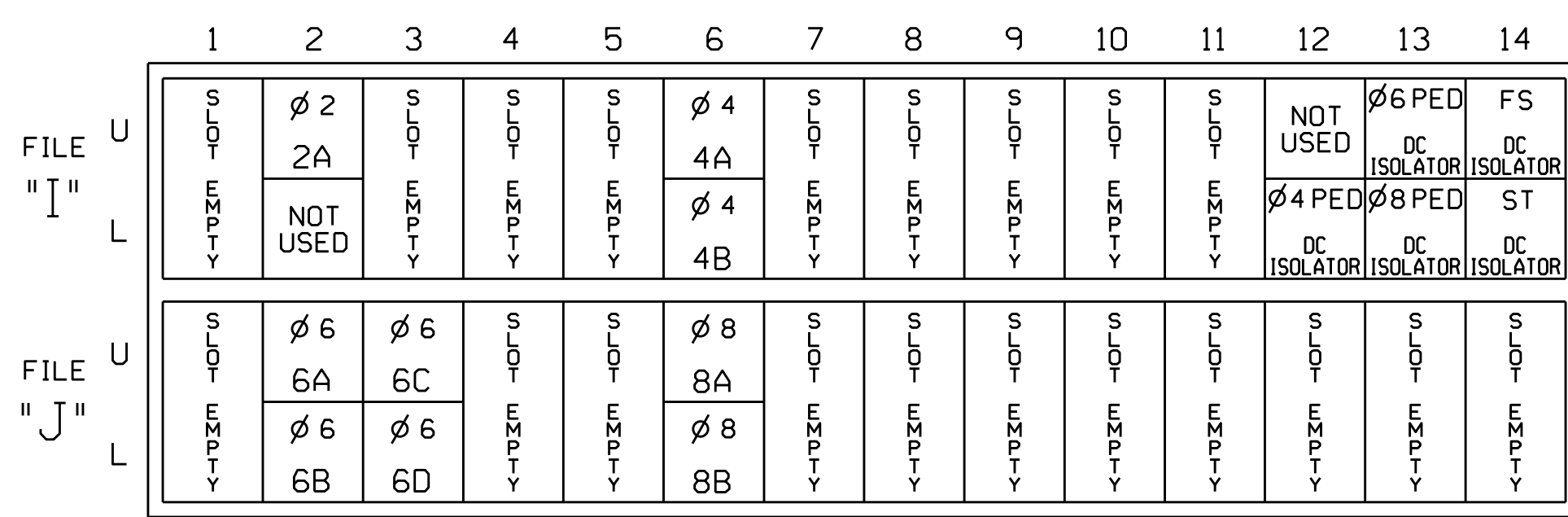
■ = DENOTES POSITION OF SWITCH



REMOVE JUMPERS AS SHOWN

INPUT FILE POSITION LAYOUT

(front view)

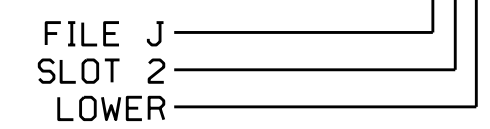


INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES				S
4A	TB4-9,10	I6U	41	4	4	YES				S
4B	TB4-11,12	I6L	45	14	4	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
6D	TB3-11,12	J3L	77	46	6	YES				S
8A	TB5-9,10	J6U	42	8	8	YES				S
8B	TB5-11,12	J6L	46	18	8	YES				S

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

INPUT FILE POSITION LEGEND: J2L



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 2, 4, 6, and 7 for Dual Entry.
- Program controller to start up in phase 4 Red Clear and 8 Red Clear.
- The cabinet and controller are part of the SR 4771 (Reedy Fork Parkway) CLS Signal System: 10727.

EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET.....332
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S5,S6,S8,S9,S11,S12
 PHASES USED.....2,4,4 PED,6,6 PED,
 7*,8,8 PED,9*
 OVERLAPS.....NONE
 * PHASE USED FOR TIMING PURPOSES ONLY

SIGNAL HEAD HOOK-UP CHART

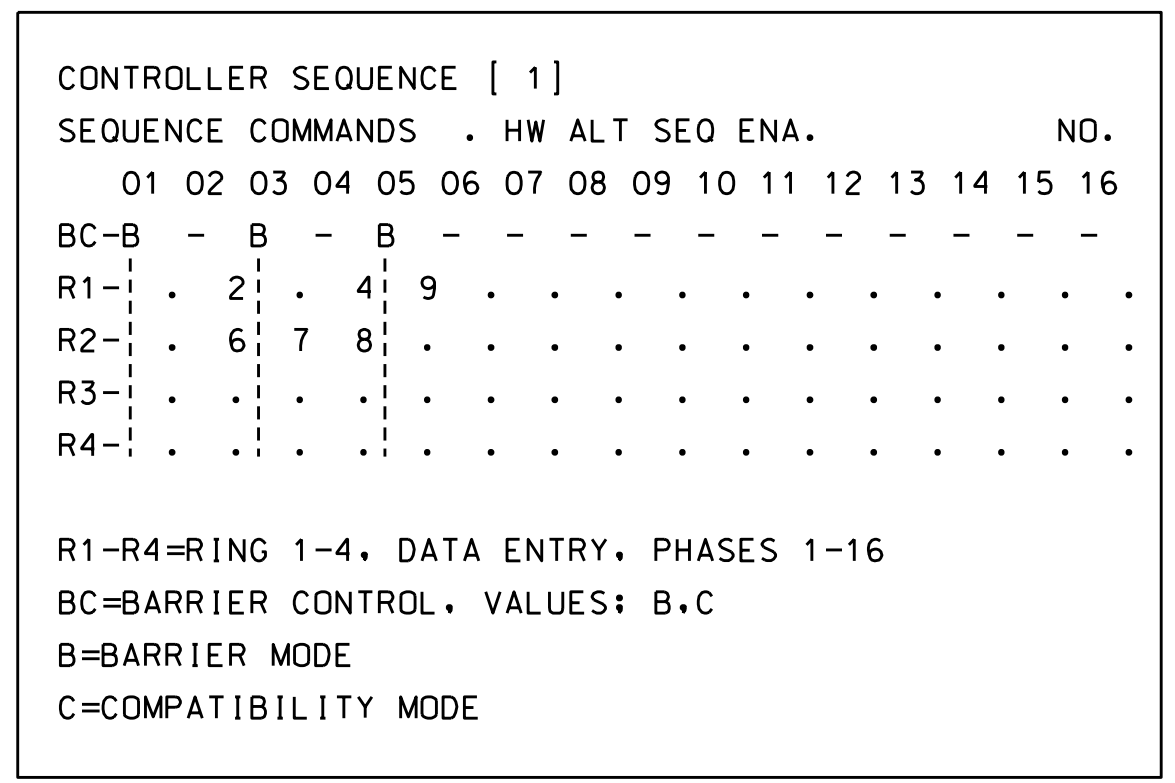
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	23,24	NU	NU	41,42	43,44	P41, P42	NU	61,62, 63,64	65,66	P61, P62
RED		128	128		101	101		134	134			107
YELLOW		129			102			135				
GREEN		130										
RED ARROW											107	
YELLOW ARROW		129			102			135		108	108	
GREEN ARROW		130			103	103		136	136	109	109	
Hand icon							104			119		110
Walking person icon							106			121		112

NU = Not Used
 NC = Not Connected

ECONOLITE ASC/3-2070 CONTROLLER SEQUENCE PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **1. CONTROLLER SEQ**
- From CONTROLLER SEQUENCE Submenu select **1. PHASE RING SEQUENCE AND ASSIGNMENT**



END PROGRAMMING

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

ECONOLITE ASC/3-2070 PHASES IN USE PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **2. PHASE IN USE/PED**

PHASES IN USE / EXCLUSIVE PED	PHASE 1	2	3	4	5	6	7	8
IN USE.....		X		X		X	X	X
EXCLUSIVE PED								

PHASES IN USE / EXCLUSIVE PED	PHASE 9	10	11	12	13	14	15	16
IN USE.....	X							
EXCLUSIVE PED								

END PROGRAMMING

Electrical Detail - Final Design - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:
 Prepared in the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

SR 4771 (Reedy Fork Parkway)
 at
 US 29 Northbound Ramp
 Division 7 Guilford County Greensboro
 PLAN DATE: April 2020 REVIEWED BY: R. Hinshaw
 PREPARED BY: T.S. Warren REVIEWED BY:
 REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
 SEAL

 DocuSigned by:
 Royal Hinshaw
 4/20/2020
 SIGNATURE DATE
 SIG. INVENTORY NO. 07-0905

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0905
 DESIGNED: April 2020
 SEALED: April 20, 2020
 REVISED: N/A

Project #: 180914

DAVENPORT
 HOME OFFICE:
 119 BROOKSTOWN AVENUE, SUITE PH1
 WINSTON-SALEM, NC 27101
 336.744.1636 www.davenportworld.com
 NCBELS FIRM LICENSE NO. C-2522

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING DETAIL

(program controller as shown)

THIS LOGIC PROCESSOR PROGRAMMING PROVIDES ADDITIONAL RED CLEARANCE FOR THE TRANSITION TO PHASE 8 FROM PHASE 6 BY FORCING THE CONTROLLER TO SERVE PHASE 7 FIRST. THIS IS NECESSARY DUE TO THE LONG THROAT DISTANCE BETWEEN THE TWO MOVEMENTS.

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **8. LOGIC PROCESSOR**
- From LOGIC PROCESSOR Submenu select **1. LOGIC STATEMENT CONTROL**

ENABLE LOGIC PROCESSOR STATEMENTS 1 & 2 BY POSITIONING THE CURSOR OVER THE FIELDS SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE THEM.

LOGIC STATEMENT CONTROL															
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
LP 1-15	E	E	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30
LP 31-45
LP 46-60
LP 61-75
LP 76-90

END PROGRAMMING

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **8. LOGIC PROCESSOR**
- From LOGIC PROCESSOR Submenu select **2. LOGIC STATEMENTS**

ENTER A "1" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```

LP#: 1 COPY FROM: 1 ACTIVE:M (T/F)
IF CTR PHASE TIMING 6 IS ON

THEN CTR OMIT PHASE 8 ON
ELSE

```

ENTER A "2" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```

LP#: 2 COPY FROM: 2 ACTIVE:M (T/F)
IF CTR ON PHASE CHECK 8 IS ON
OR CTR ON PH PED CHK 8 IS ON

THEN CTR CALL PHASE 7 ON
ELSE

```

END PROGRAMMING

ECONOLITE ASC/3-2070 BACKUP PROTECTION ENABLE PROGRAMMING

(program controller as shown)

- From Main Menu select **1. CONFIGURATION**
- From CONFIGURATION Submenu select **1. CONTROLLER SEQ**
- From CONTROLLER SEQUENCE Submenu select **3. BACKUP PREVENT PHASES**

Follow programming as shown below. On the 'ENABLE BACKUP PREVENT' screen move cursor to the appropriate field and press 'YES/NO' on the controller keypad to toggle field value between 'X', 'B', 'C' and 'OFF'.

ENABLE BACKUP PREVENT																
TMG/BKUP	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
1
2
3
4
5
6
7
8	X	.	.	.	.	.	.	.	.
9
10
11
12
13
14
15
16

END PROGRAMMING

NOTE

'X' inhibits the controller from servicing the 'BACKUP' (column) phase when the 'TIMING' (row) phase is active or next.

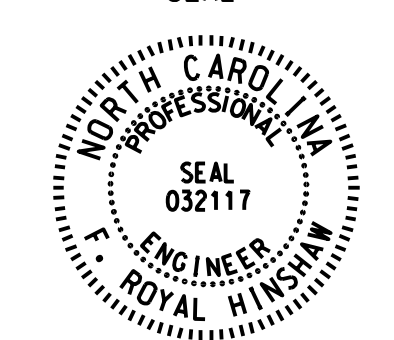
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0905
DESIGNED: April 2020
SEALED: April 20, 2020
REVISED: N/A

Project #: 180914



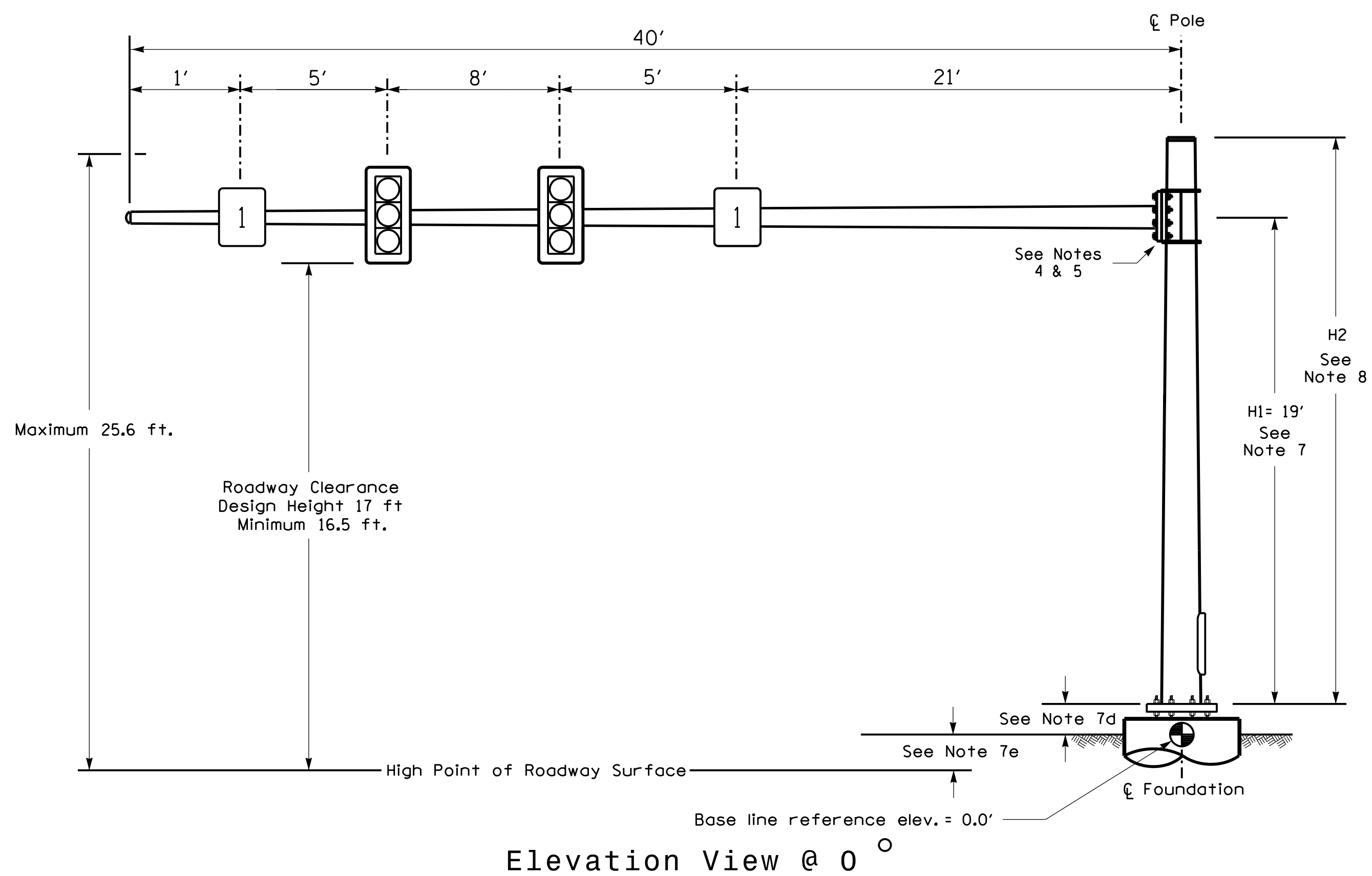
DAVENPORT
HOME OFFICE:
119 BROOKSTOWN AVENUE, SUITE PH1
WINSTON-SALEM, NC 27101
336.744.1636 www.davenportworld.com
NCBELS FIRM LICENSE NO. C-2522

Electrical Detail - Final Design - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:		SR 4771 (Reedy Fork Parkway) at US 29 Northbound Ramp		 SEAL 032117 ROYAL HINSHAW
Prepared In the Offices of:		Division 7 Guilford County Greensboro		
PLAN DATE: April 2020	REVIEWED BY: R. Hinshaw	PREPARED BY: T.S. Warren	REVIEWED BY:	DocuSigned by: R. Hinshaw 4/20/2020
REVISIONS		INIT.	DATE	SIGNATURE DATE
750 N. Greenfield Pkwy, Garner, NC 27529				SIG. INVENTORY NO. 07-0905

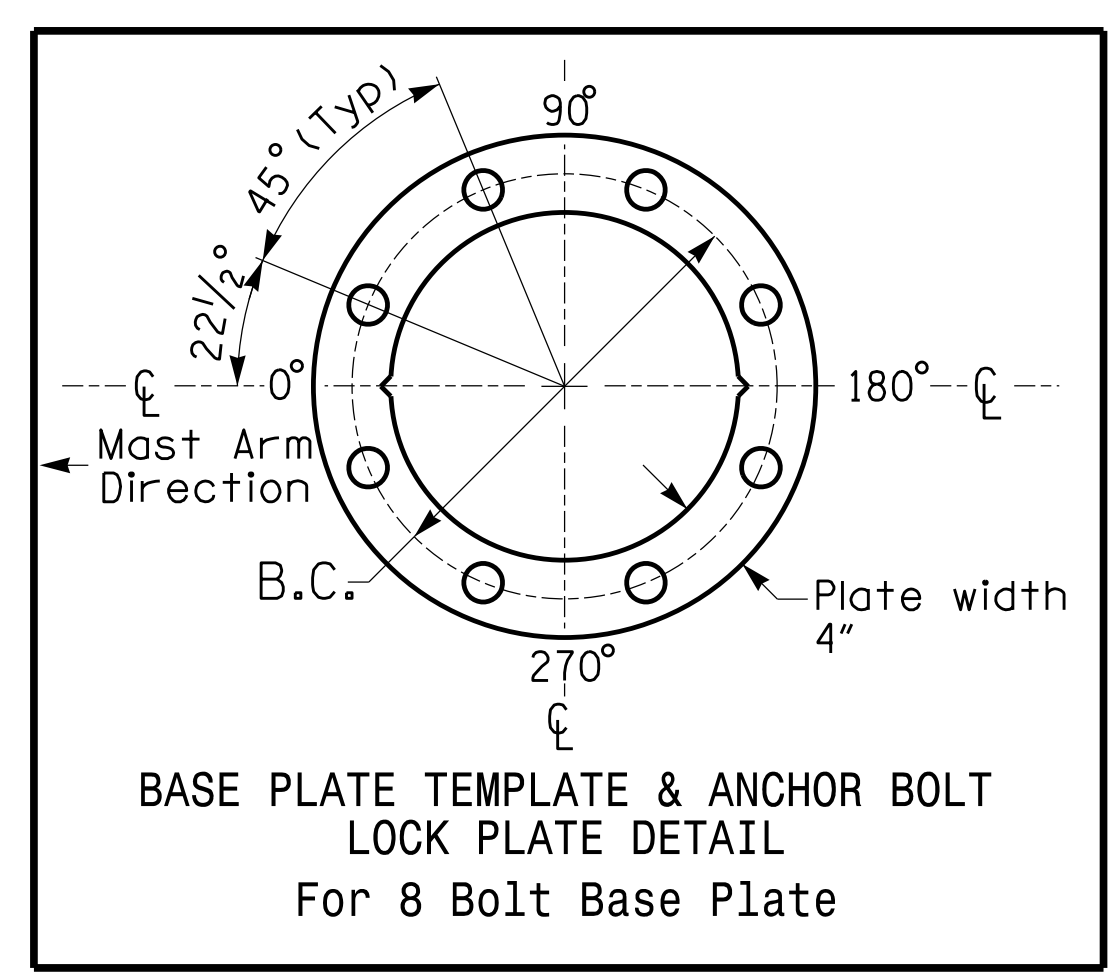
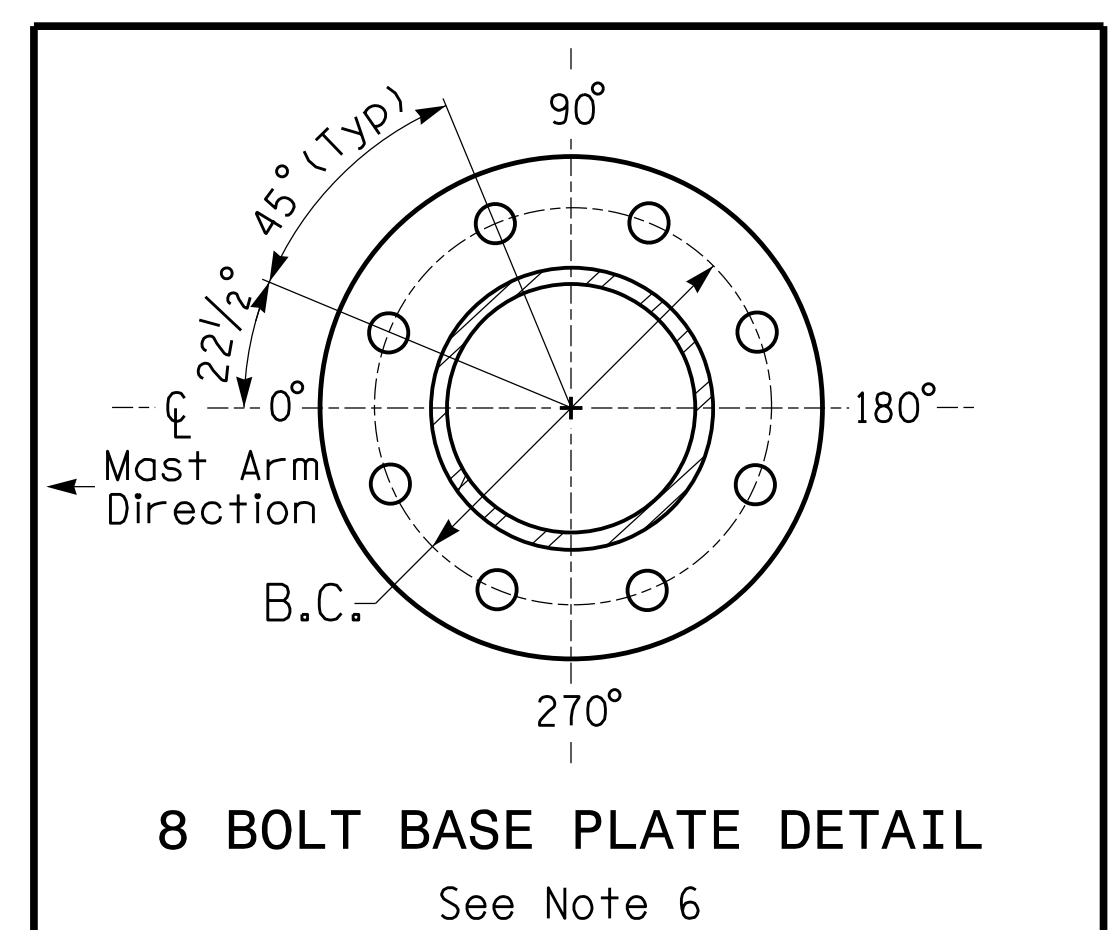
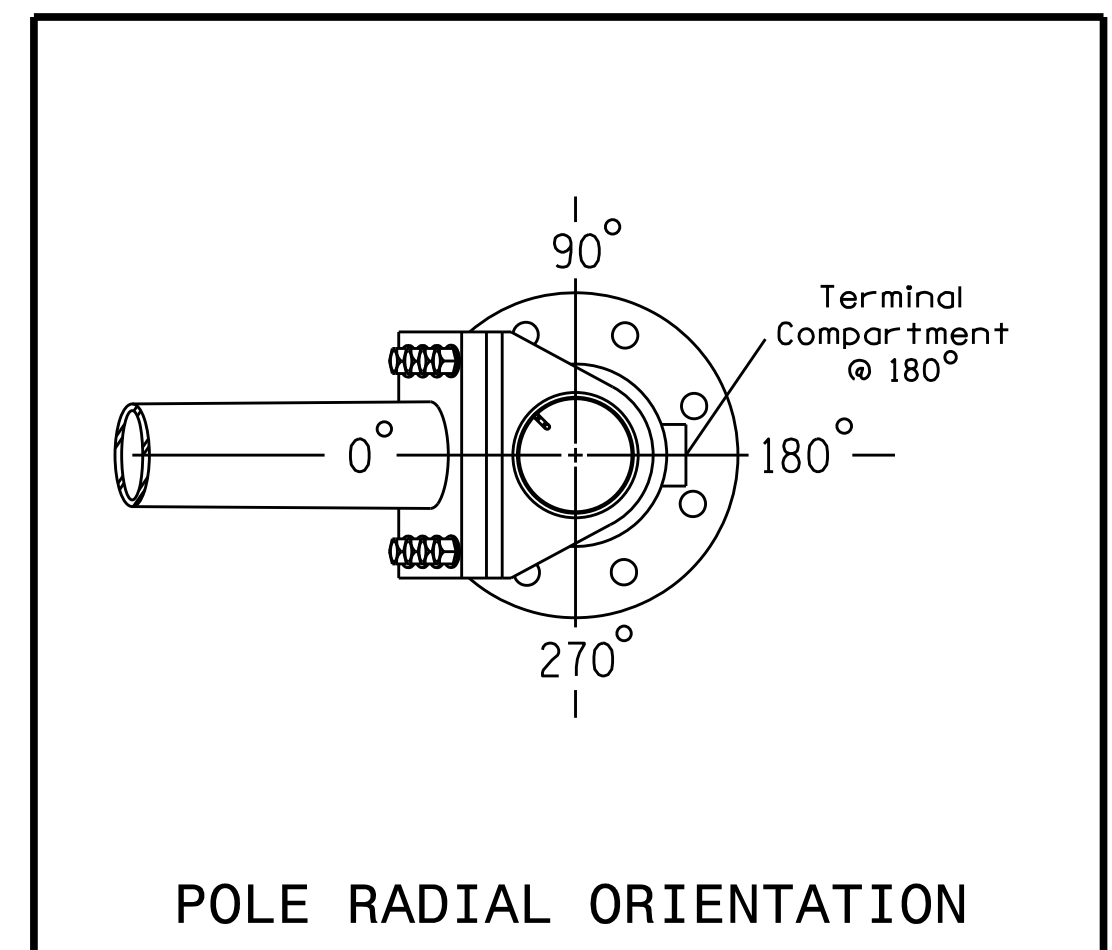
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Design Loading for METAL POLE NO. 6



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 6
Baseline reference point at ☉ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	-0.3 ft.
Elevation difference at Edge of travelway or face of curb	-0.3 ft.



METAL POLE No. 6

PROJECT REFERENCE NO.	SHEET NO.
R-4707	Sig. 15.3

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
1	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS

NOTES

DESIGN REFERENCE MATERIAL

- 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 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
The 2018 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

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
Mast arm attachment height (H1) plus 2 feet, or
H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

Project #: 180914



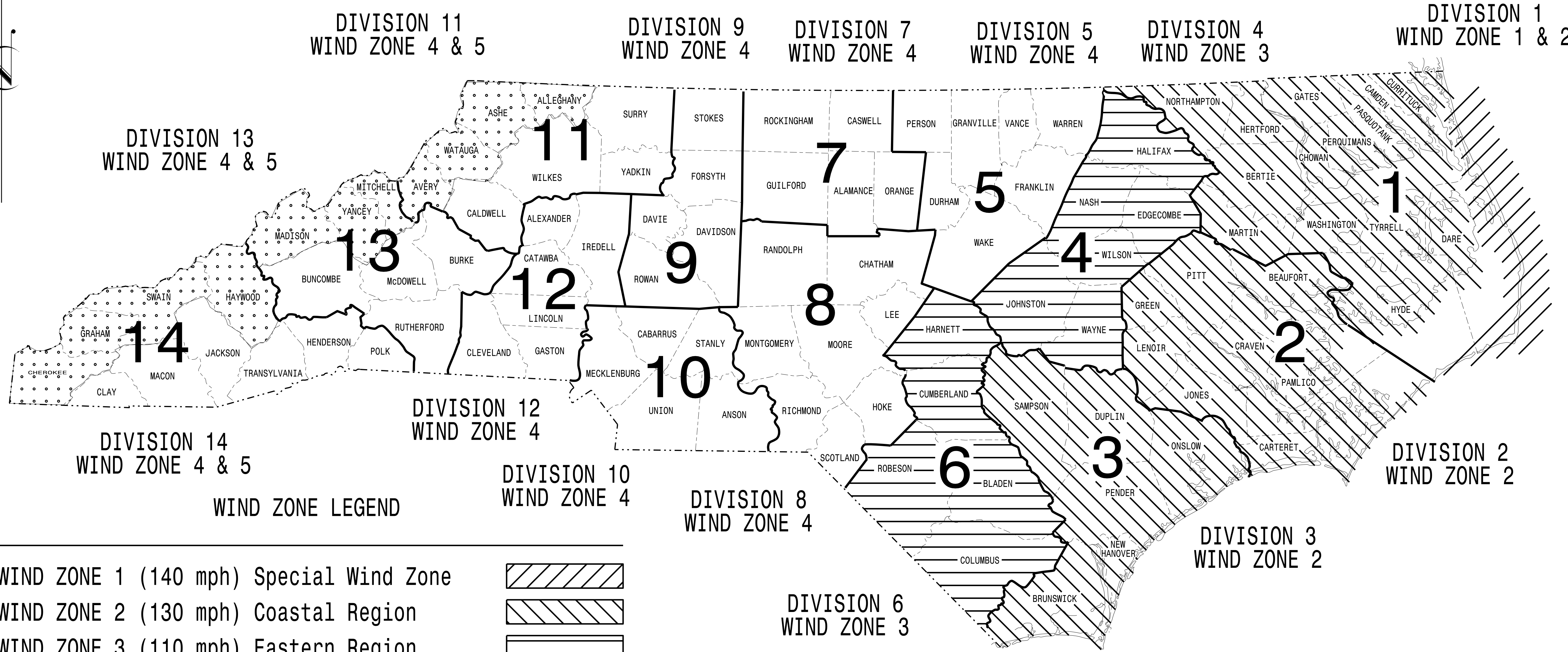
NCDOT Wind Zone 4 (90 mph)

	Prepared for: SR 4771 (Reedy Fork Parkway) at US 29 Northbound Ramps	SEAL NORTH CAROLINA PROFESSIONAL SEAL 032117 ENGINEER R. ROYAL HINSHAW
	Division 07 Guilford County Greensboro PLAN DATE: April 2020 REVIEWED BY: L Boyer PREPARED BY: K Dean REVIEWED BY: R. Hinshaw	
SCALE 0 N/A N/A	REVISIONS INIT. DATE	DocuSigned by: R. Royal Hinshaw 4/20/2020 SIGNATURE DATE SIG. INVENTORY NO. 07-0905

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

PROJECT I.D. NO.	SHEET NO.
	Sig.M1

STANDARD DRAWINGS FOR ALL METAL POLES



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

Prepared In the Offices of:

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

DRAWING NUMBER	DESCRIPTION
Sig. M 1	Statewide Wind Zone Map
Sig. M 2	Typical Fabrication Details-All Metal Poles
Sig. M 3	Typical Fabrication Details-Strain Poles
Sig. M 4	Typical Fabrication Details-Mast Arm Poles
Sig. M 5	Typical Fabrication Details-Mast Arm Connection
Sig. M 6	Typical Fabrication Details-Strain Pole Attachments
Sig. M 7	Construction Details-Foundations
Sig. M 8	Standard Strain Pole Foundation-All Soil Conditions

NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION - ITS AND SIGNALS UNIT

M.M. MCDIARMID, P.E. - STATE ITS AND SIGNALS ENGINEER

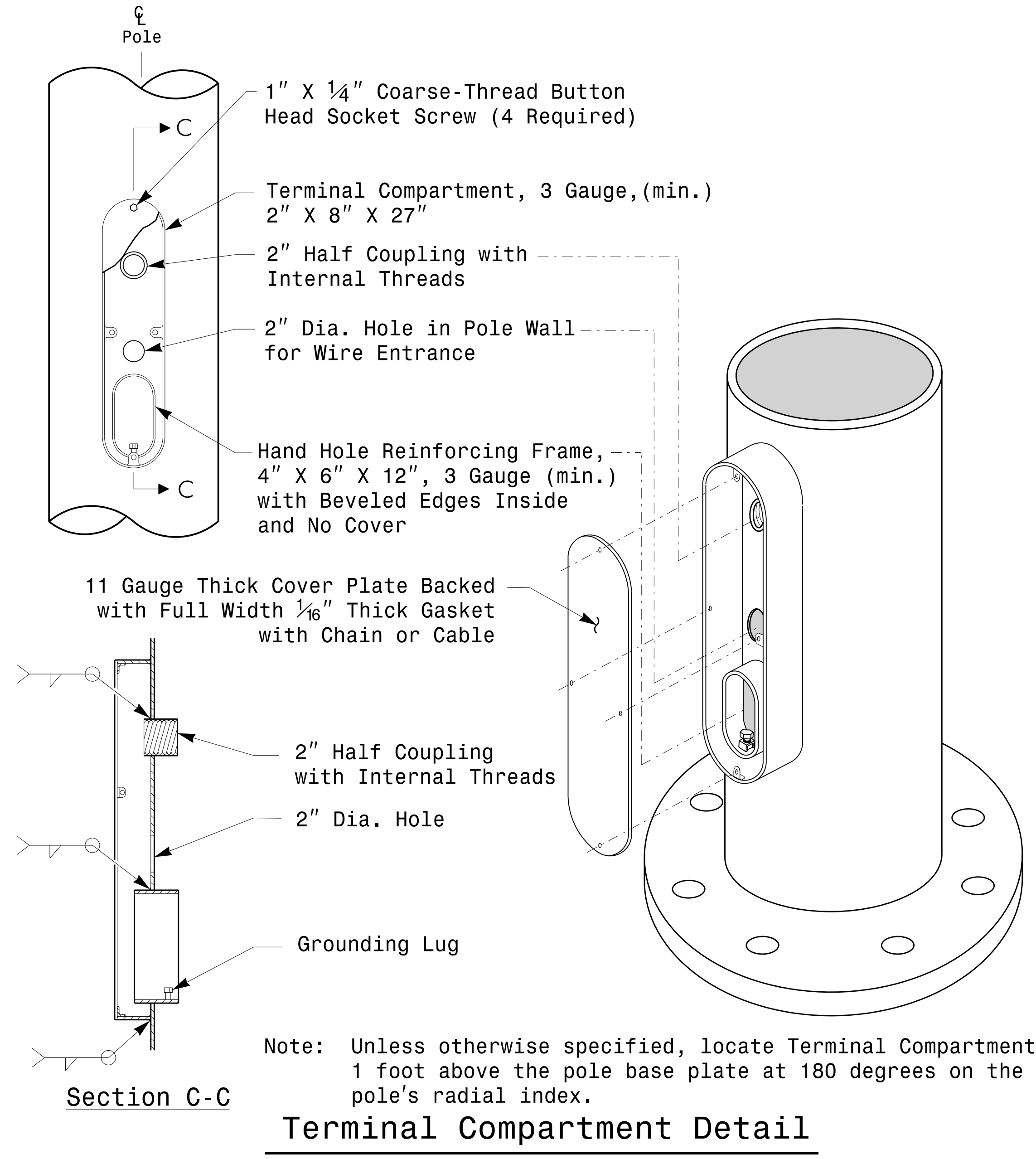
J.P. GALLOWAY, P.E. - STATE SIGNALS ENGINEER

D.C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER

SEAL

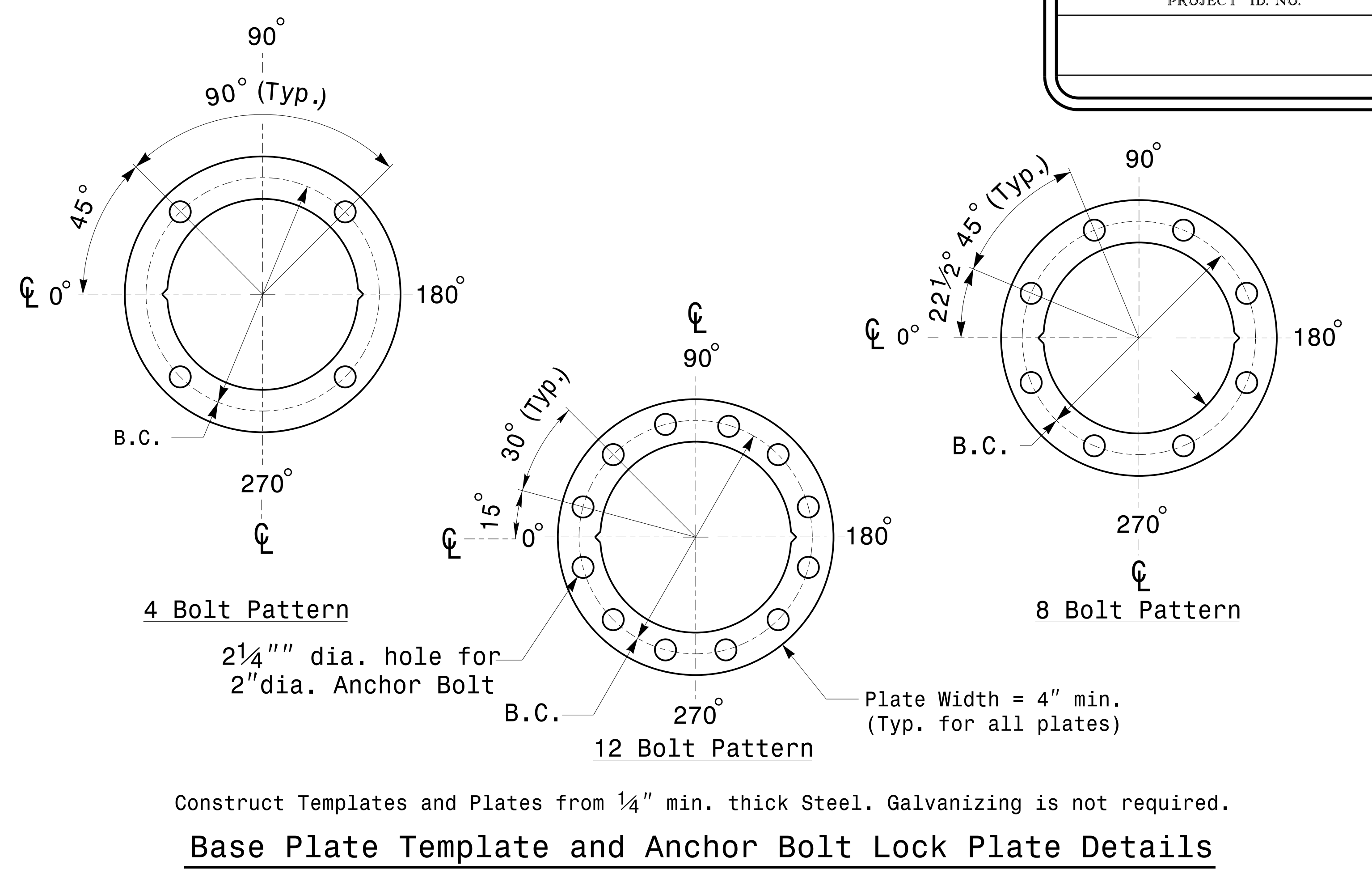
DocuSigned by:
Debesh C. Sarkar

10/11/2017
DATE



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. _____

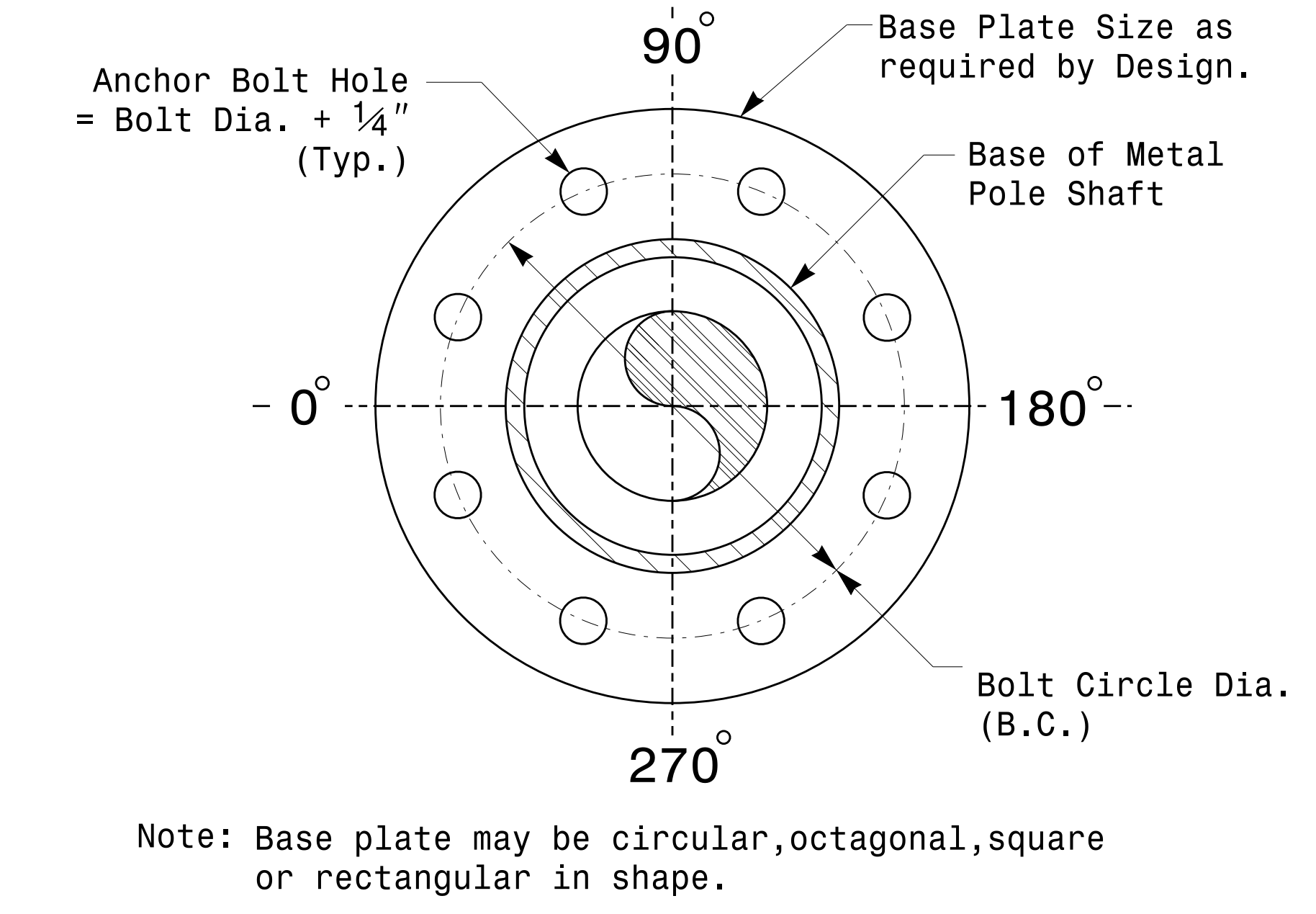
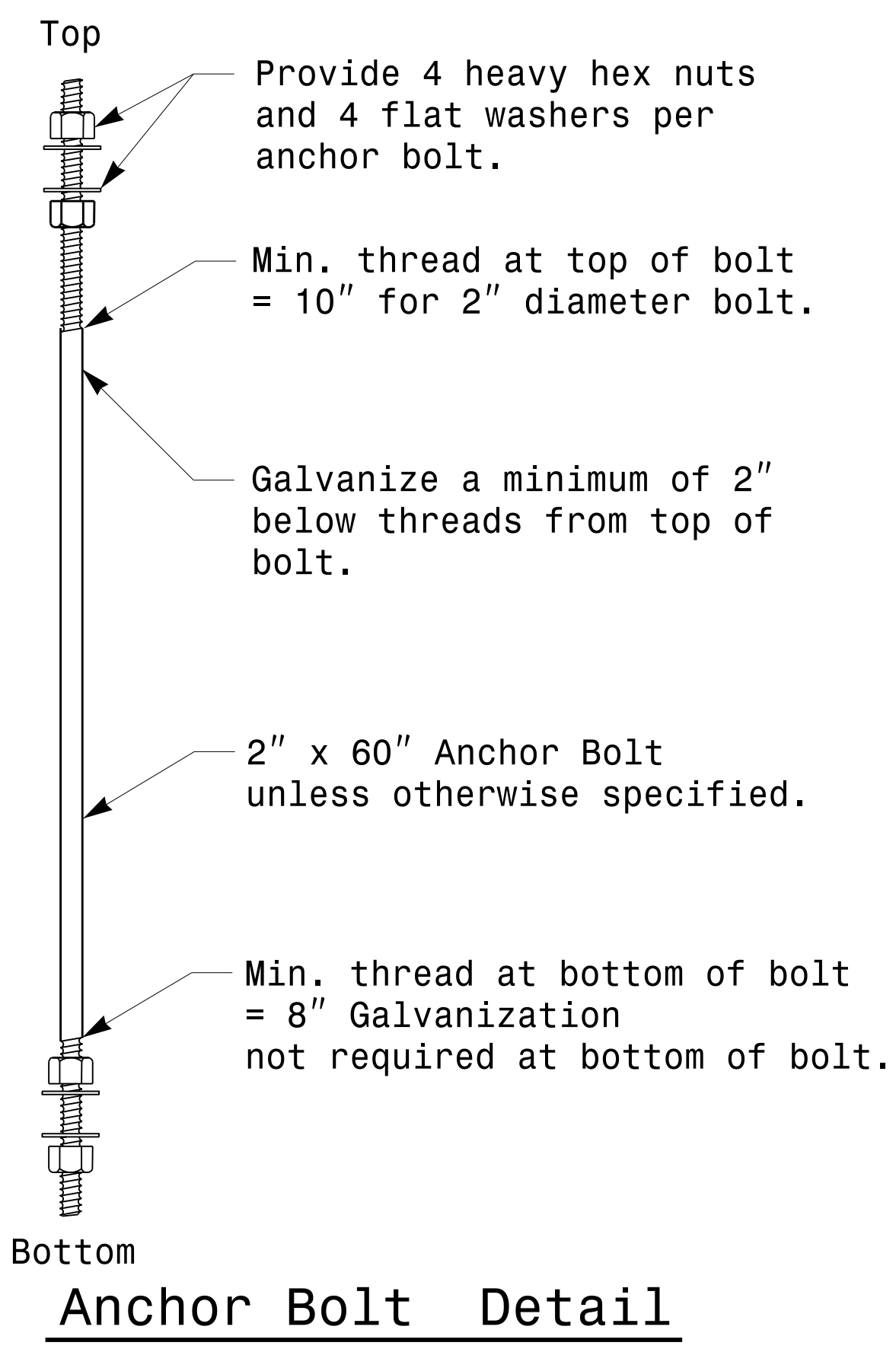
Shaft I.D. Tag
 (Provide on Shaft of Strain Poles
 and Mast Arm Poles Shaft)

- 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

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.)



Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

Typical Fabrication Details For All Metal Poles			
PLAN DATE:	OCTOBER 2017	DESIGNED BY:	C.F. ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR
REVISIONS		INIT.	DATE

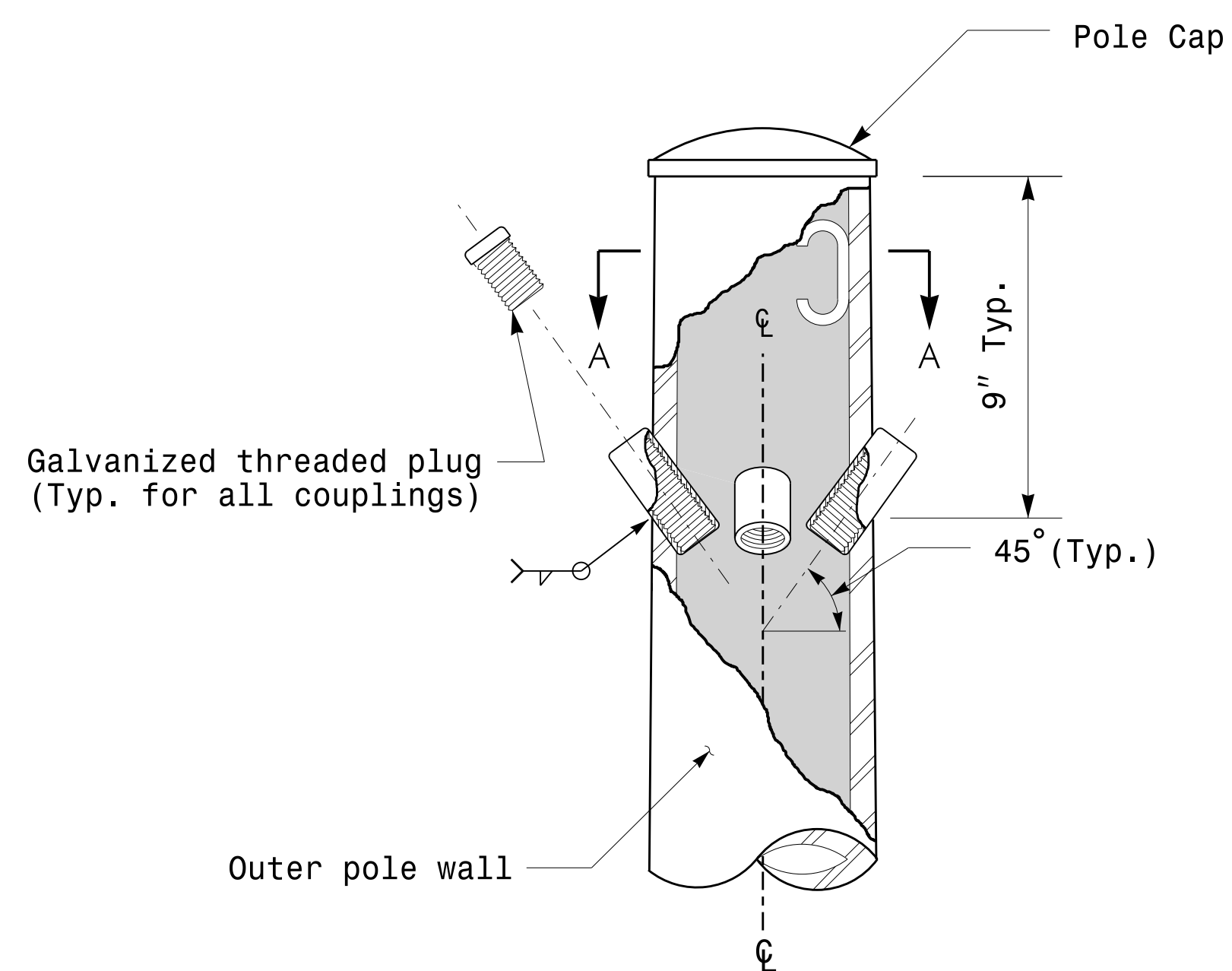
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DocuSigned by:
 Dinesh C. Sarkar
 4486328

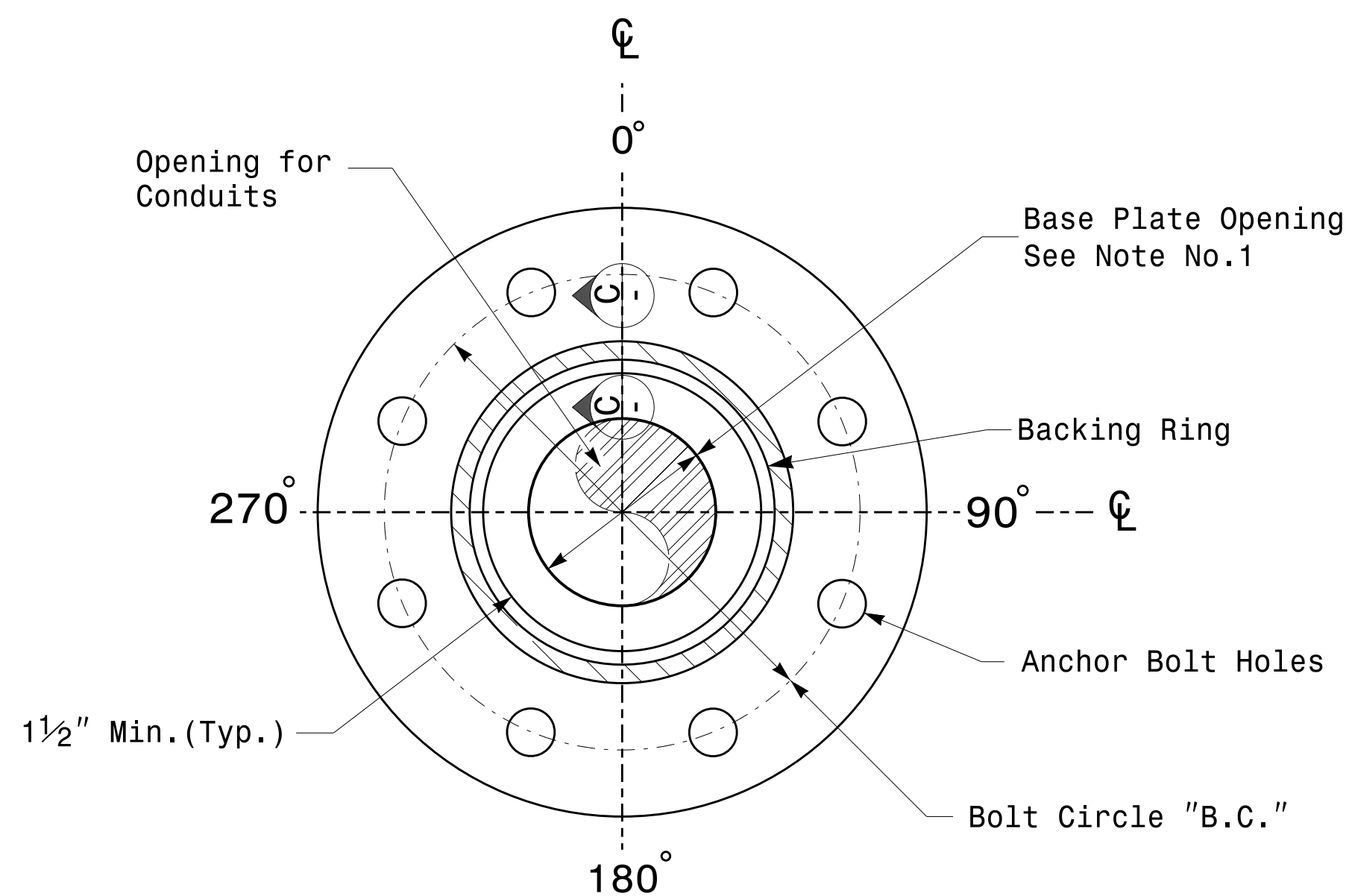
10/11/2017
 DATE

11-DEC-2017 08:30 115604115 Signal Design Section Eastern Region/MS/0162014 Sig.M2 Std. Fabrication Detail-All Poles.dgn

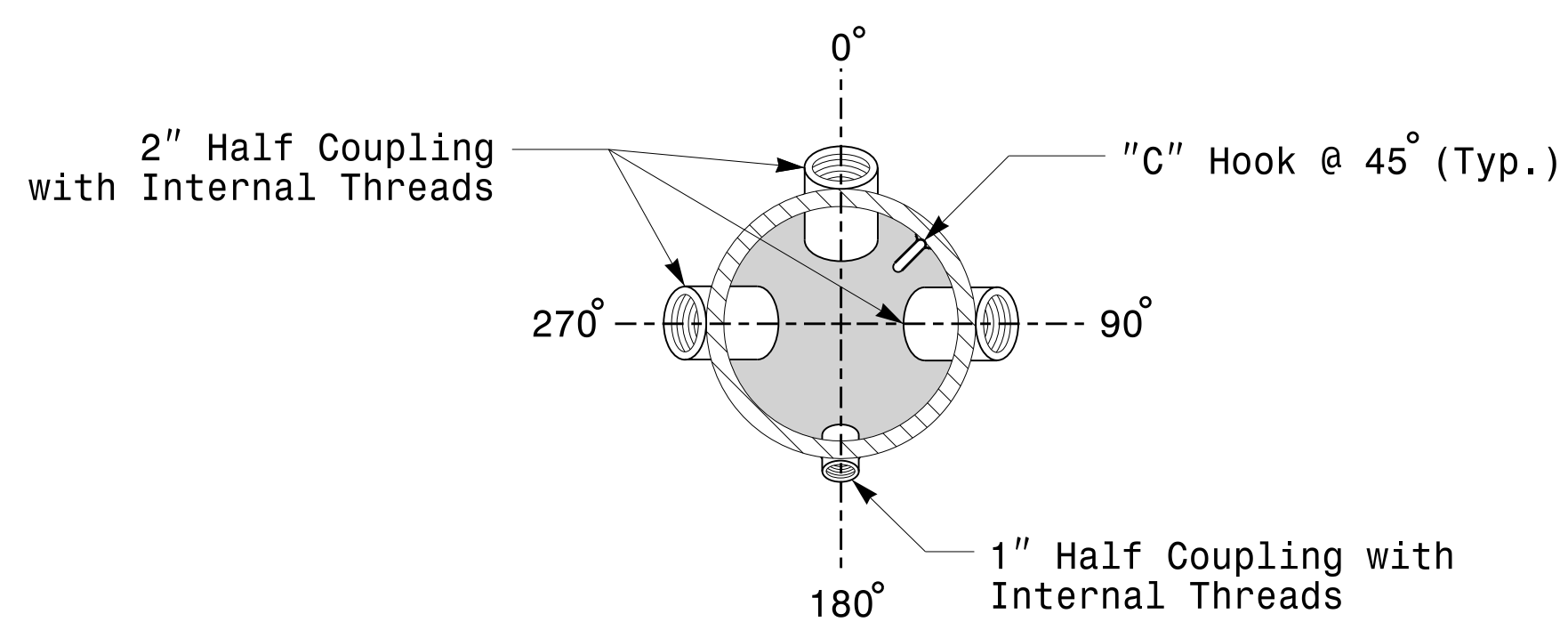
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



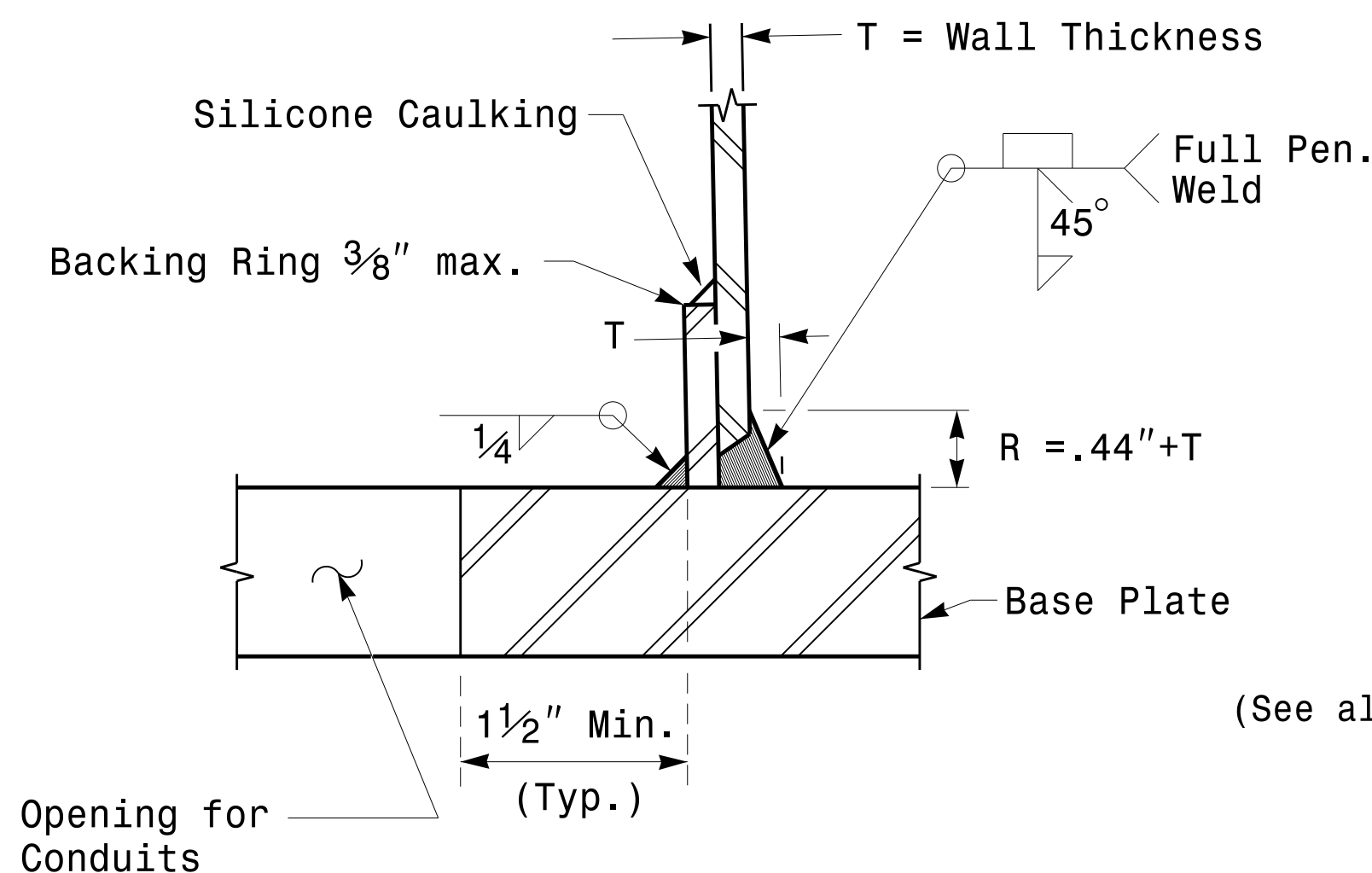
Cable Entrances at Top of Pole



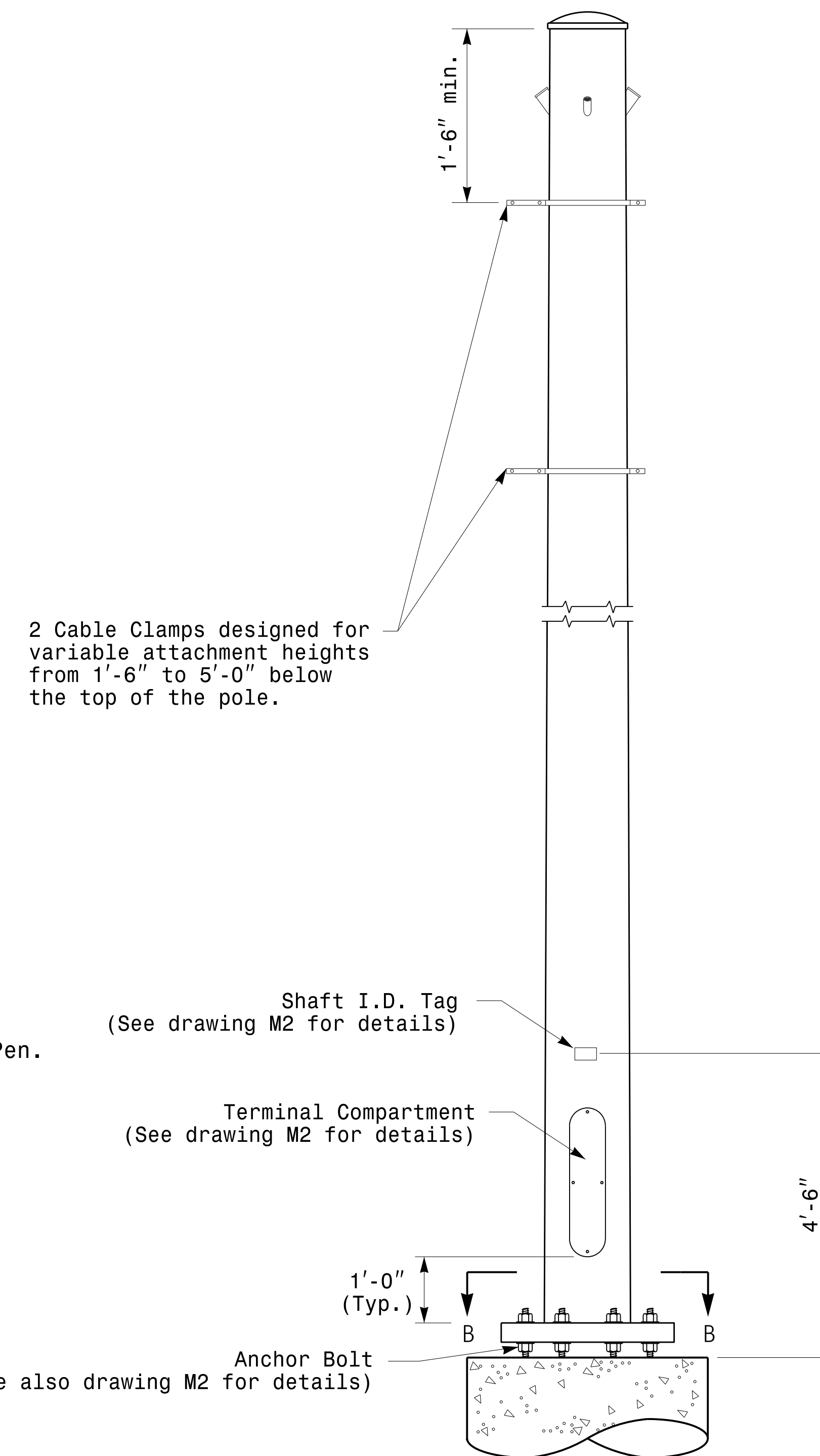
Section B-B
Pole Base Plate Details
(8 and 12 Bolt Pattern)



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



Monotube Strain Pole

Prepared in the Offices of:

 750 N. Greenleaf Pkwy, Garner, NC 27529

SCALE: 0 NA NONE

Typical Fabrication Details For Strain Poles

PLAN DATE: OCTOBER 2017	DESIGNED BY: K.C. DURIGON
PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE

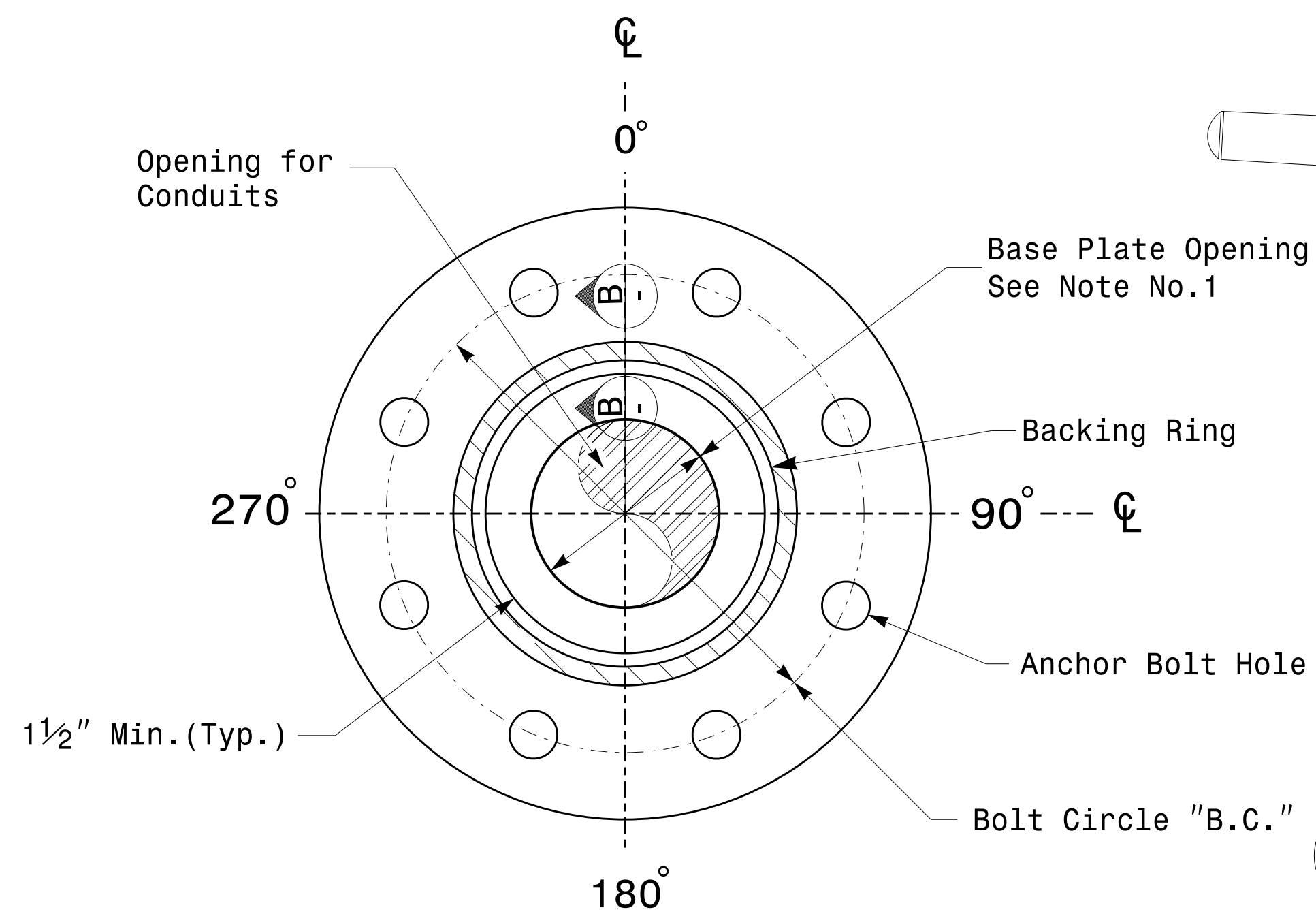
SEAL

DocuSigned by:
 Debesh C. Sarkar
 44EB87816FA4F49E

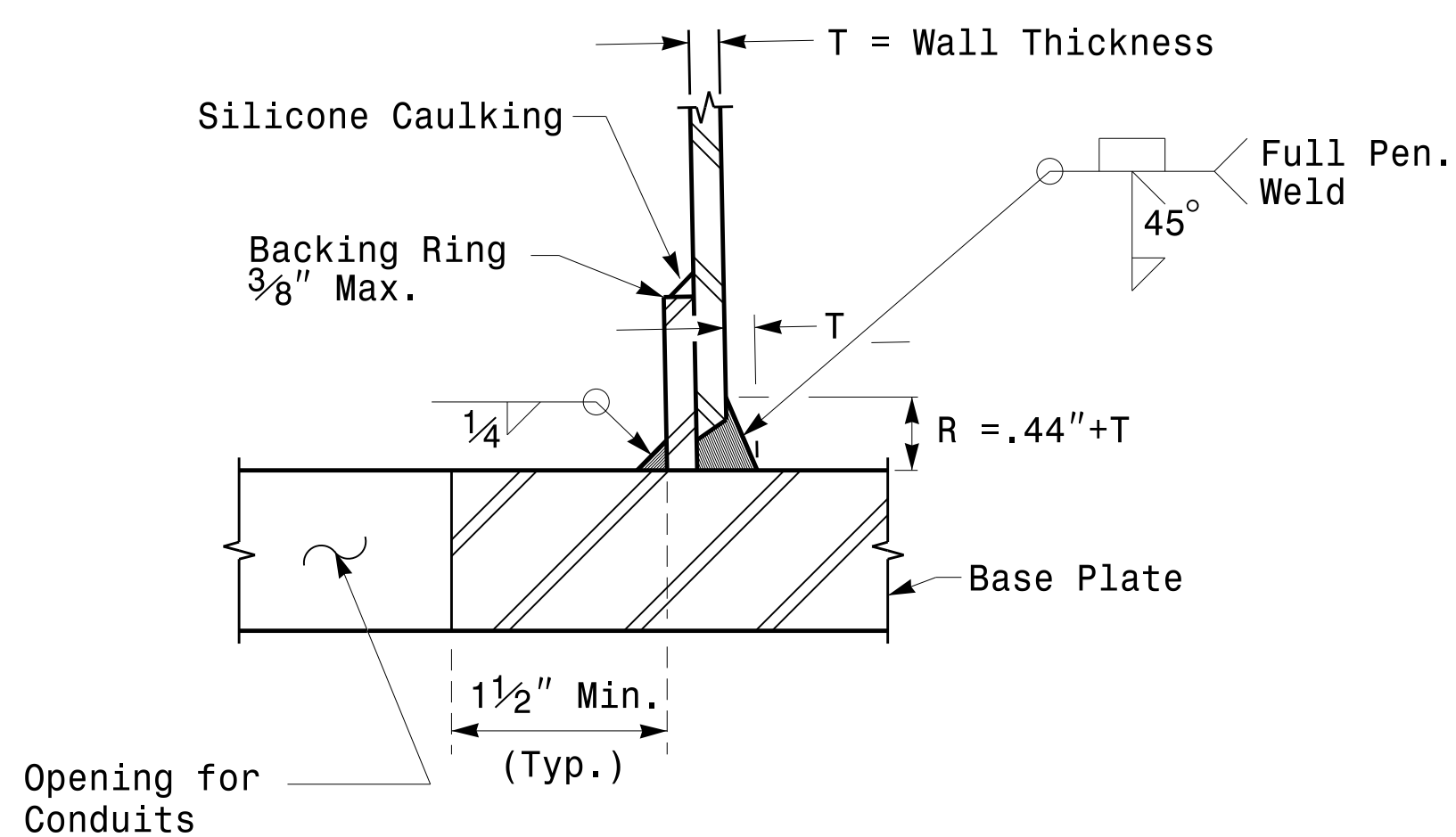
10/11/2017
 DATE

Fabrication Details – Strain Poles

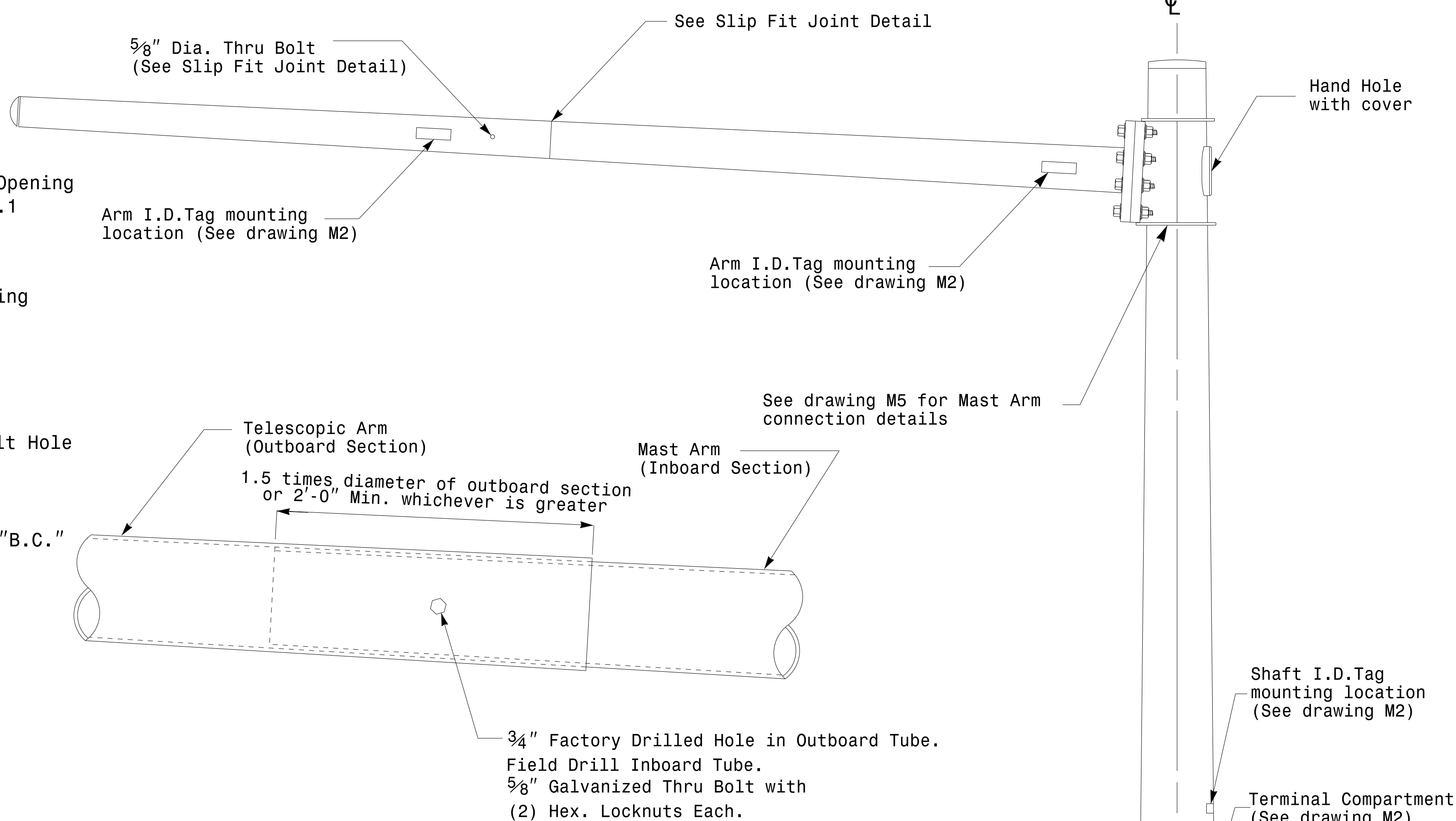
Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



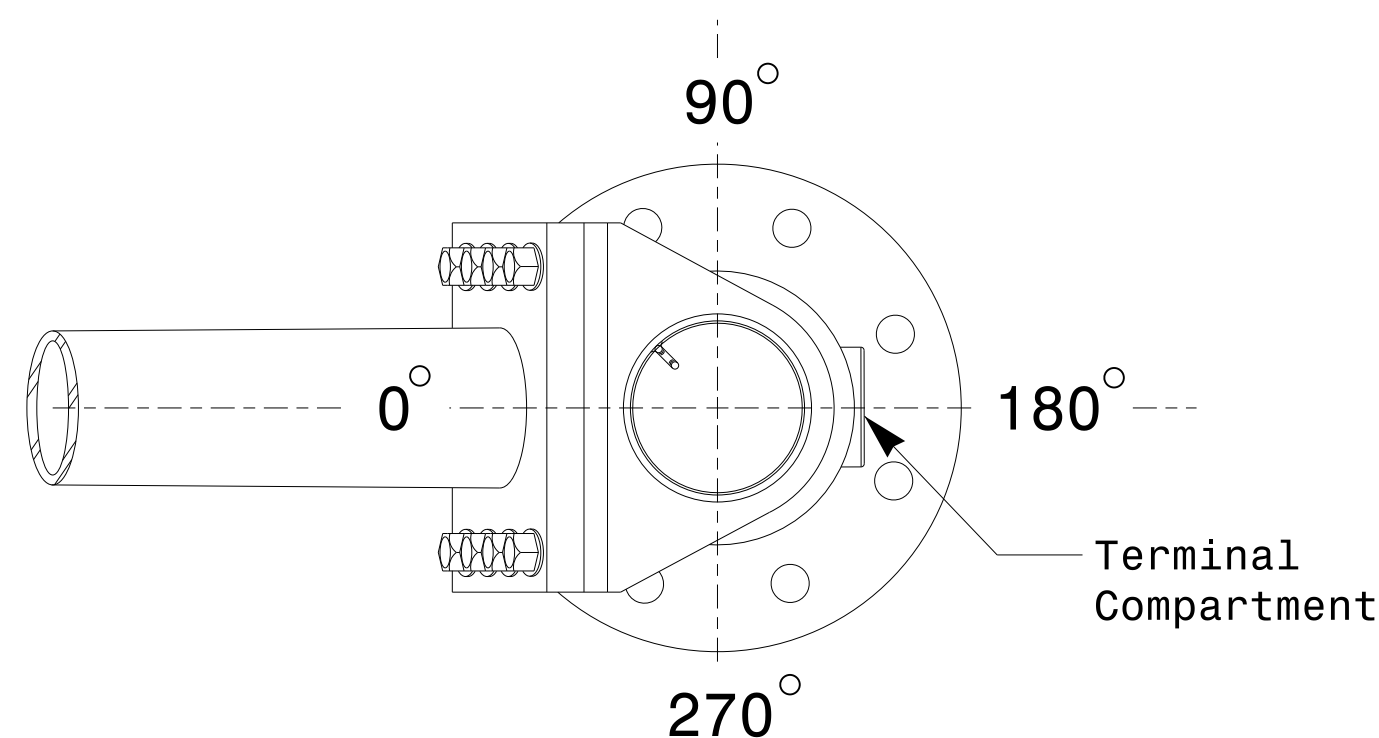
Section A-A
Pole Base Plate Details



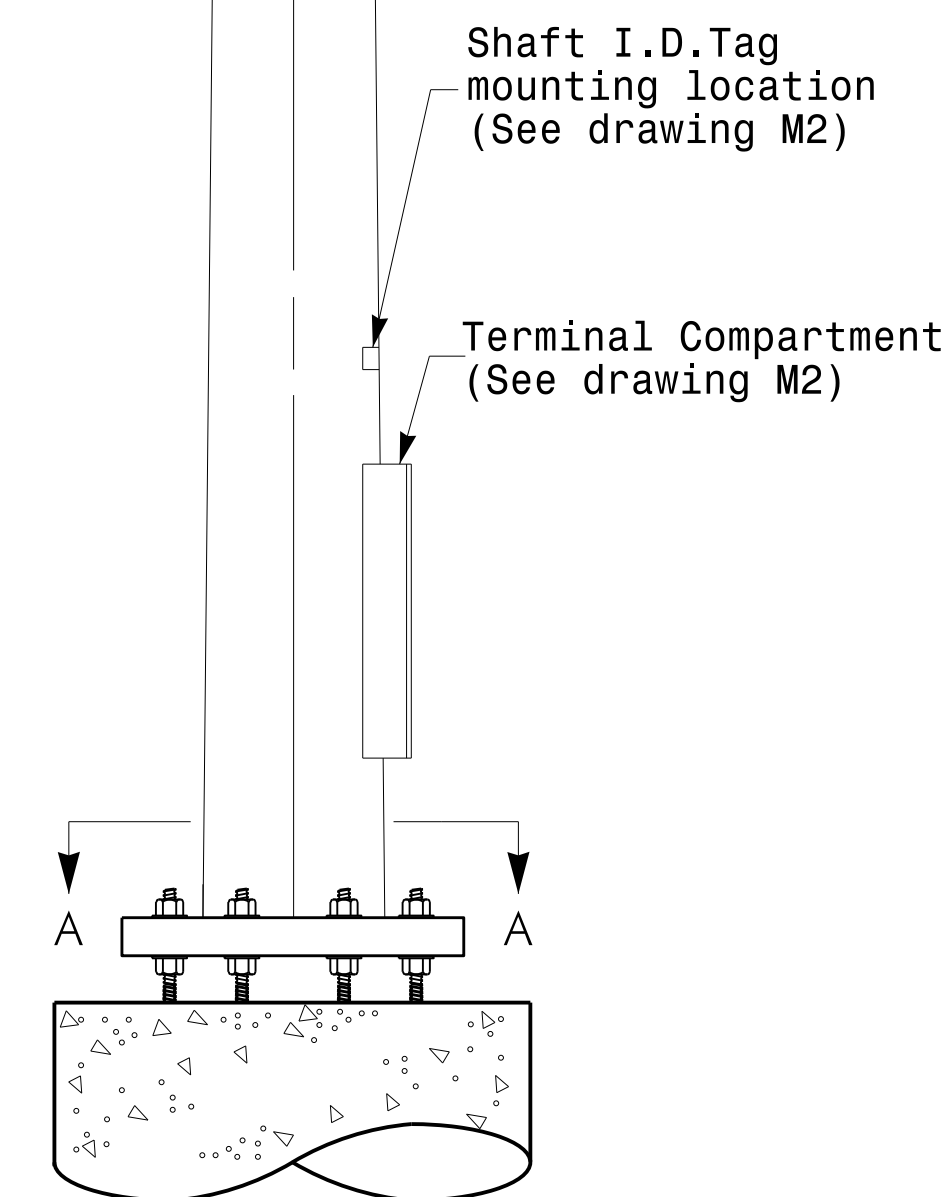
Section B-B
(Pole Attachment to Base Plate)
Full-Penetration Groove Weld Detail



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation



Mast Arm Pole

<p>Prepared in the Offices of:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Typical Fabrication Details For Mast Arm Poles</p>		<p>SEAL</p>
	<p>PLAN DATE: OCTOBER 2017</p>	<p>DESIGNED BY: K.C. DURIGON</p>		DocuSigned by: Dinesh C. Sarkar
<p>SCALE: 0 NA NONE</p>	<p>PREPARED BY: N. BITTING</p>	<p>REVIEWED BY: D.C. SARKAR</p>	<p>10/11/2017</p>
<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>	<p>DATE</p>

11-OCT-2017 08:33 136504115 Signal&Signal Design Section Eastern Region\m4 Sheets\2016\2014 Sig.M4 Std. Fabrication Detail-Mast Arm Poles.dgn

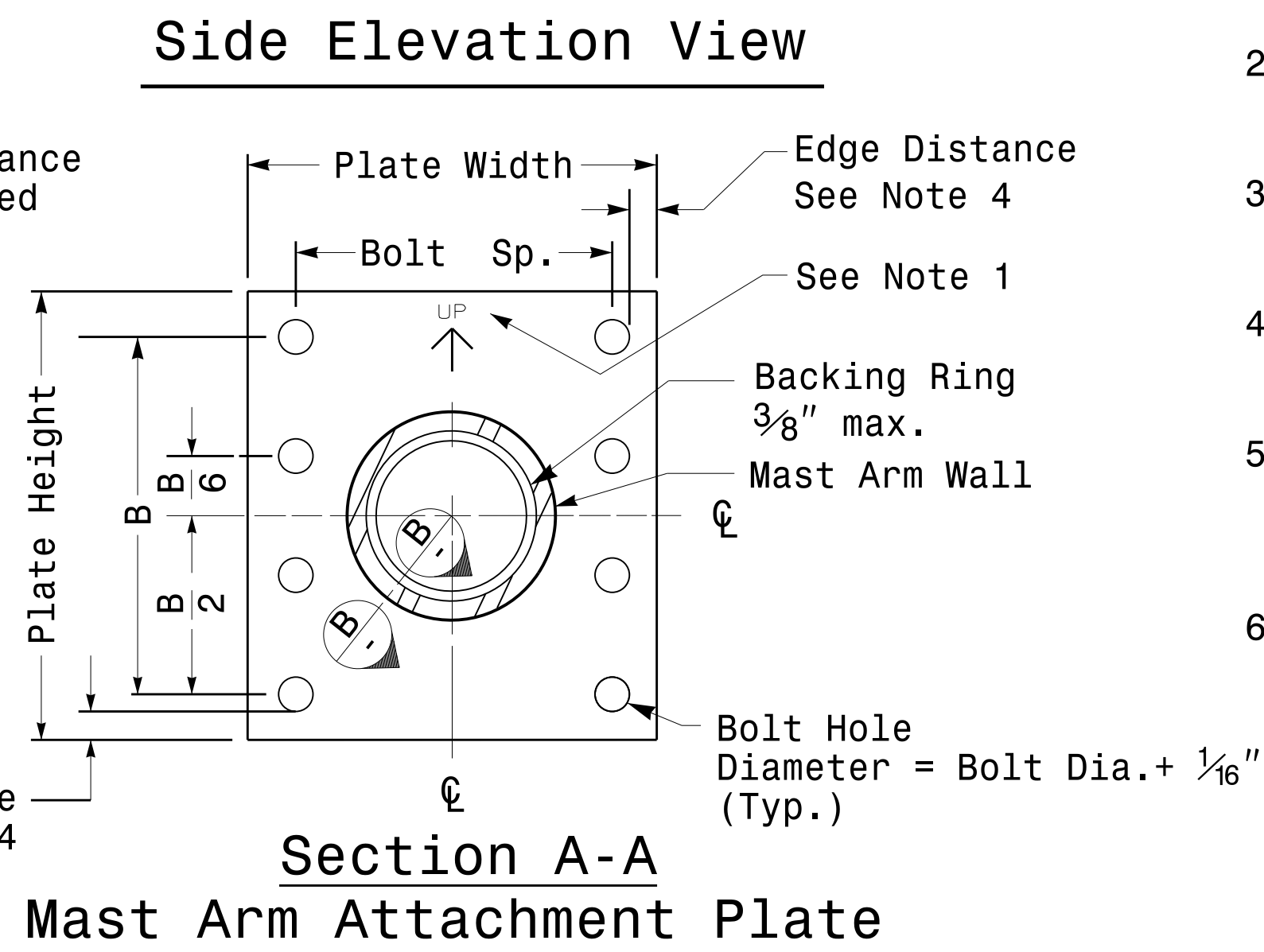
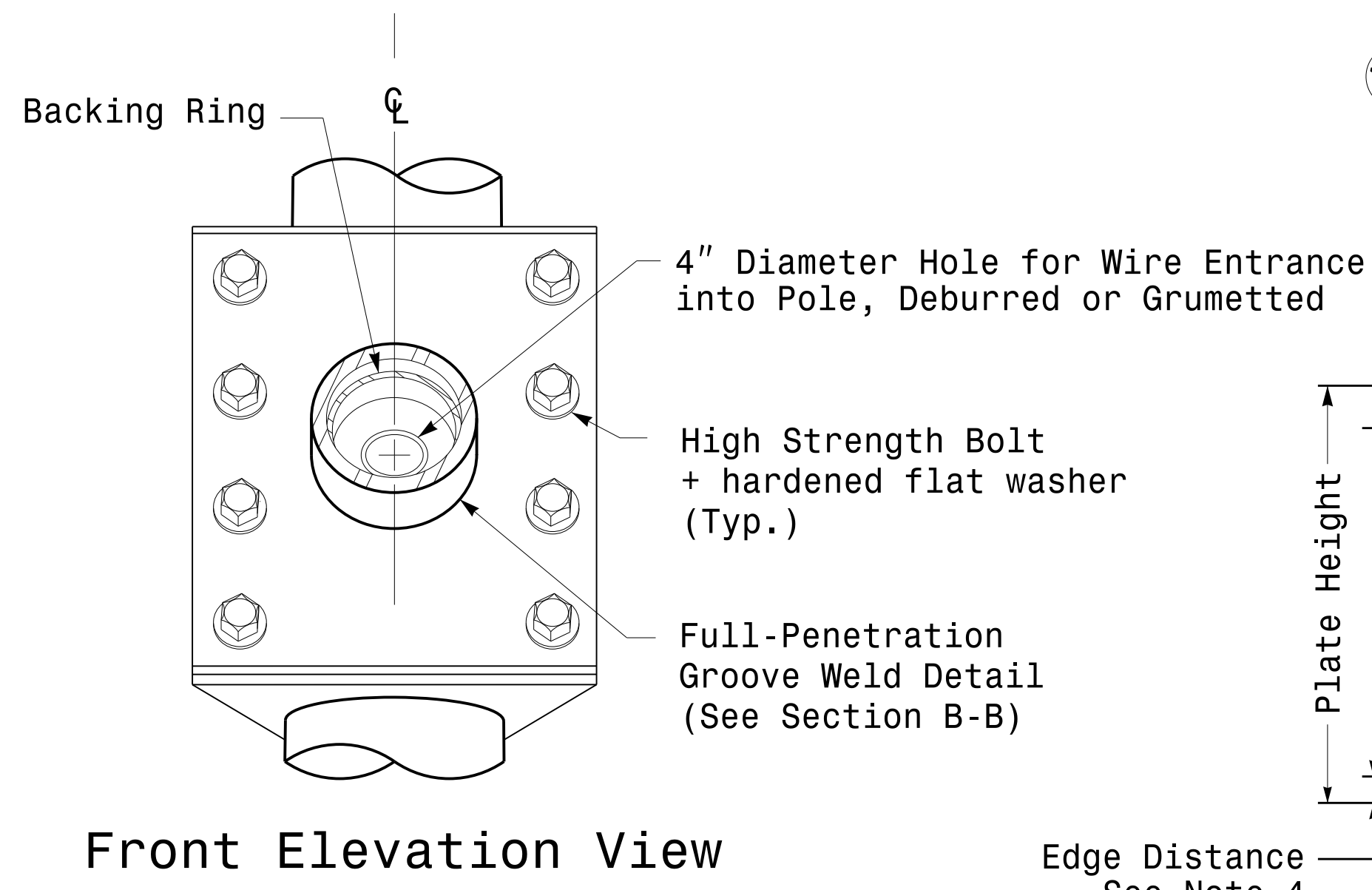
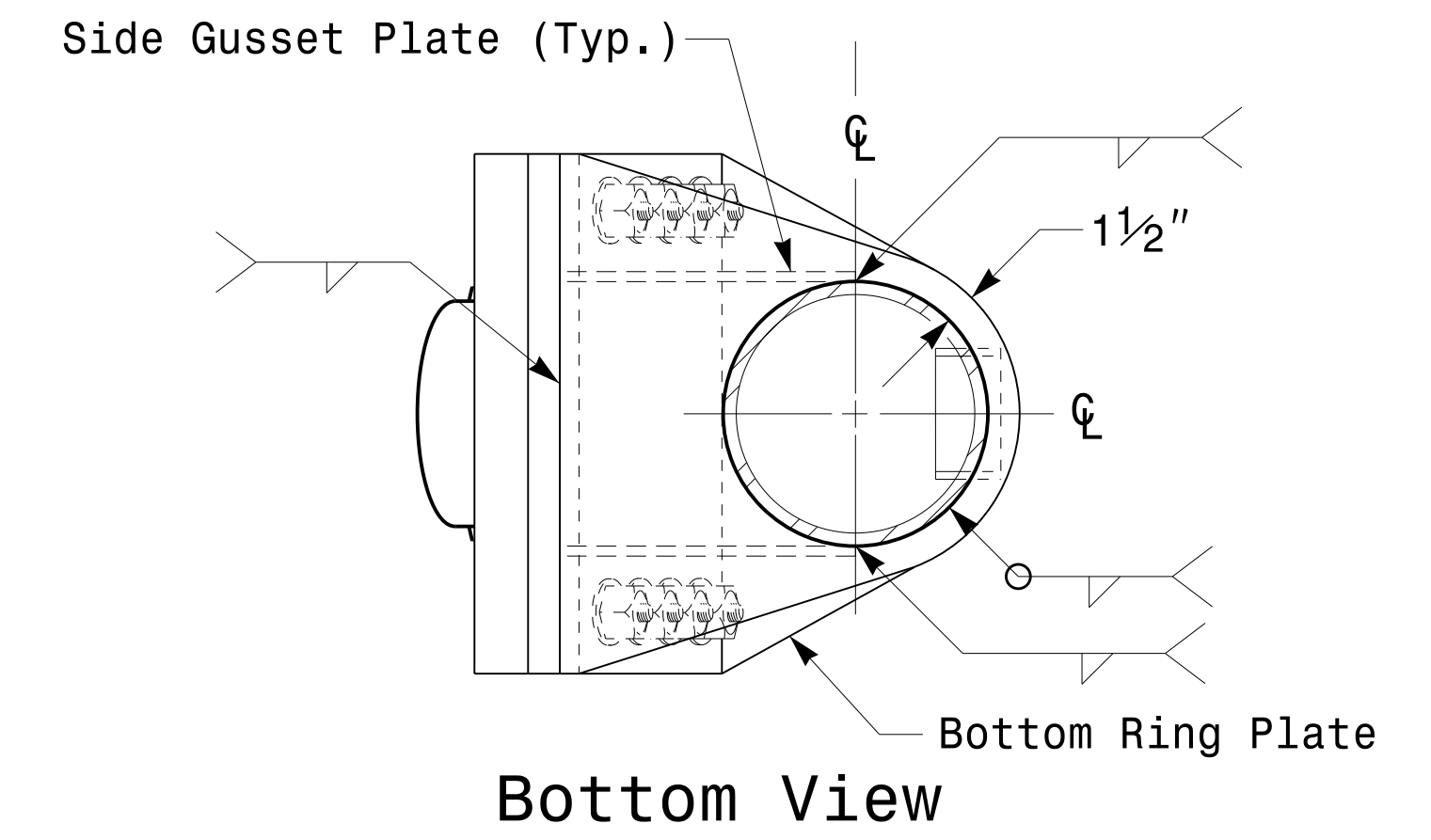
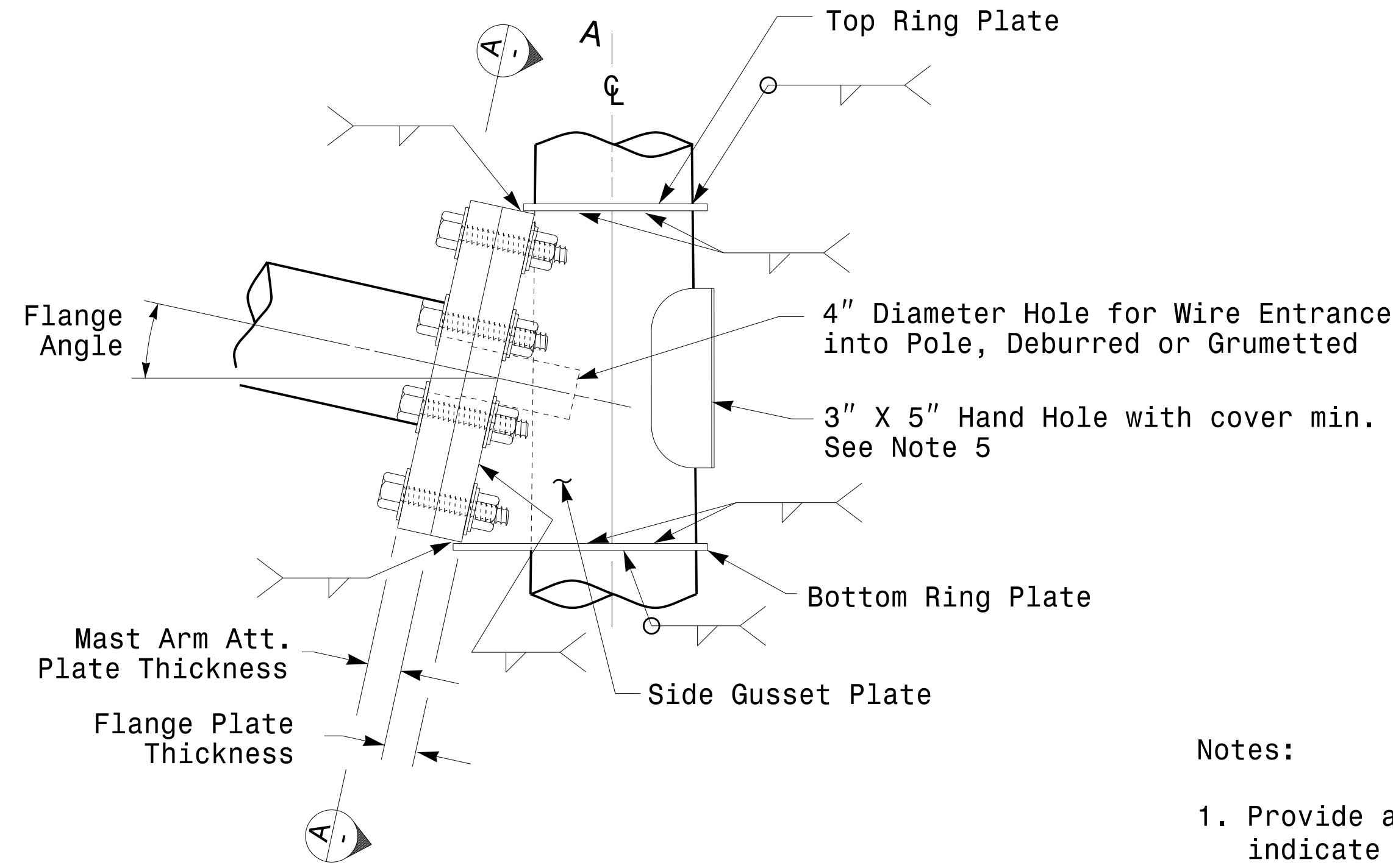
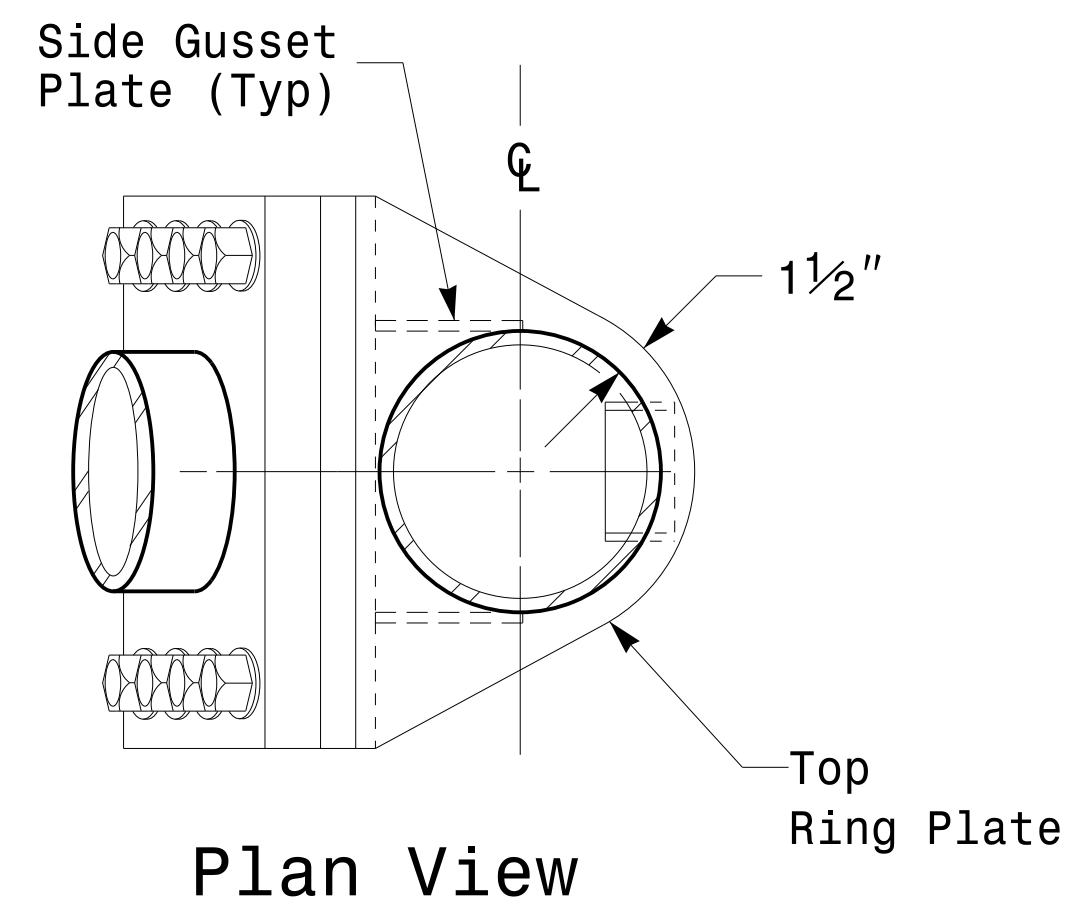
Fabrication Details - Mast Arm Poles

Welded Ring Stiffened Mast Arm Connection

PROJECT ID. NO.

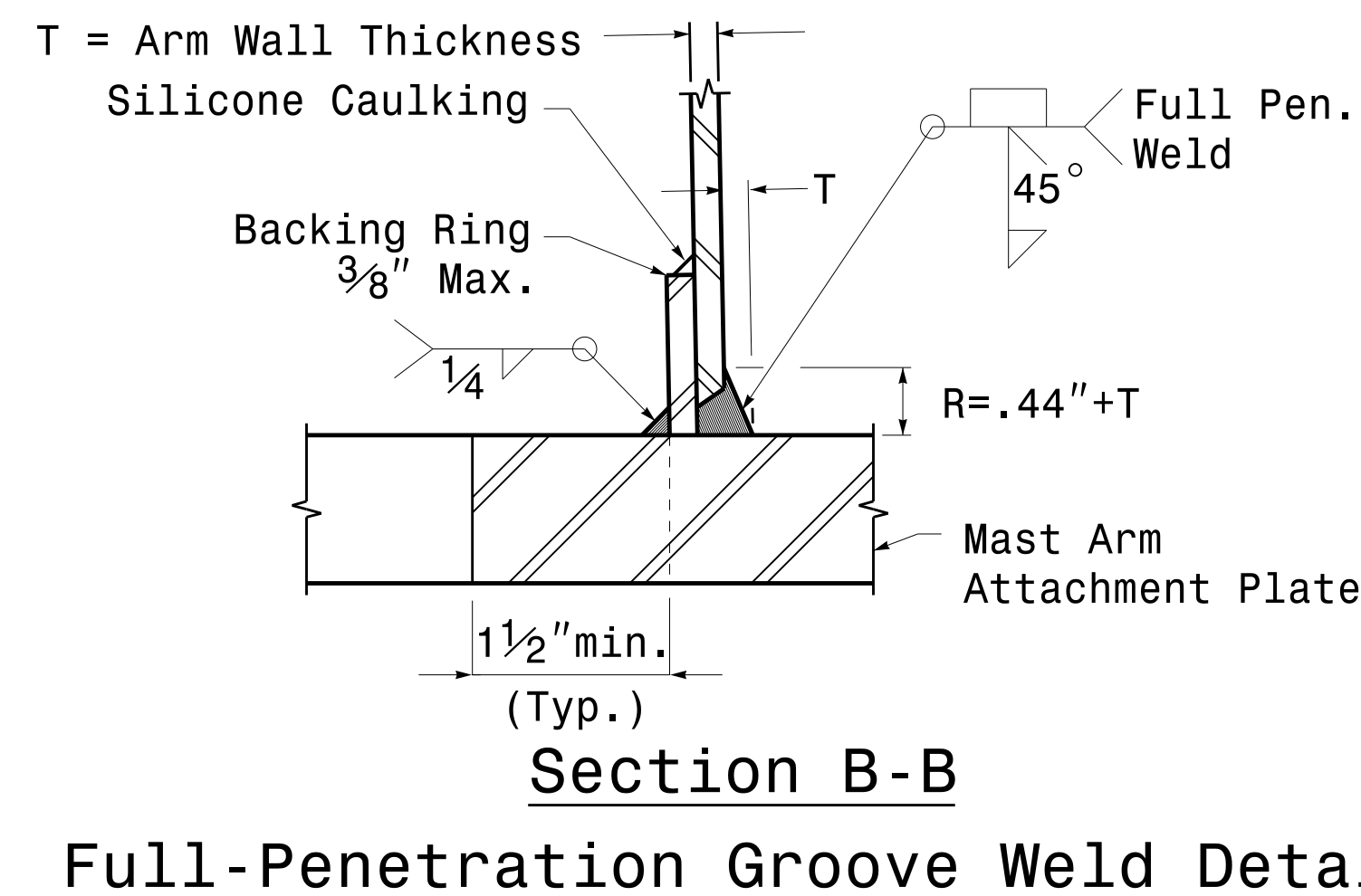
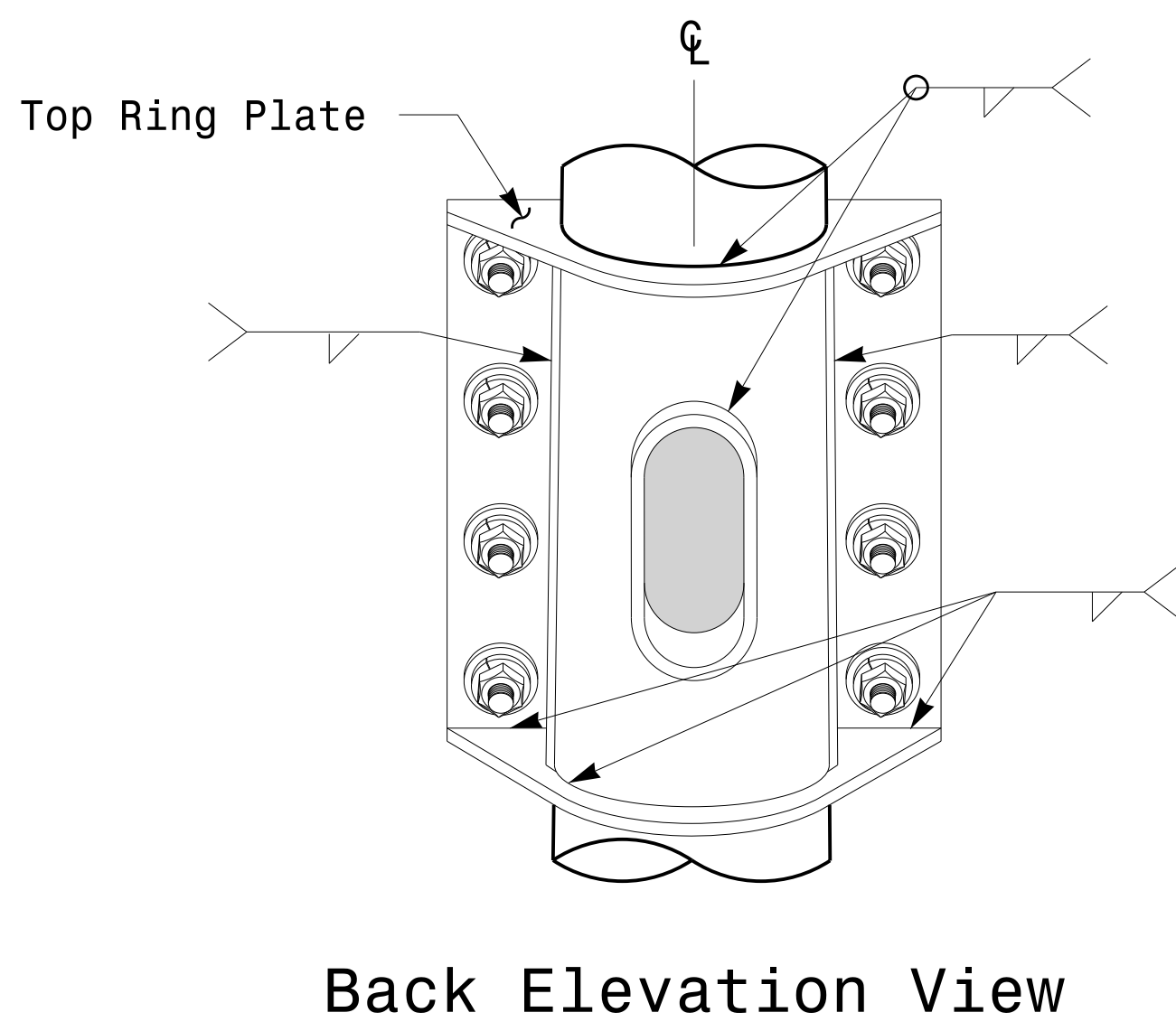
SHEET NO.

Sig.M5



Notes:

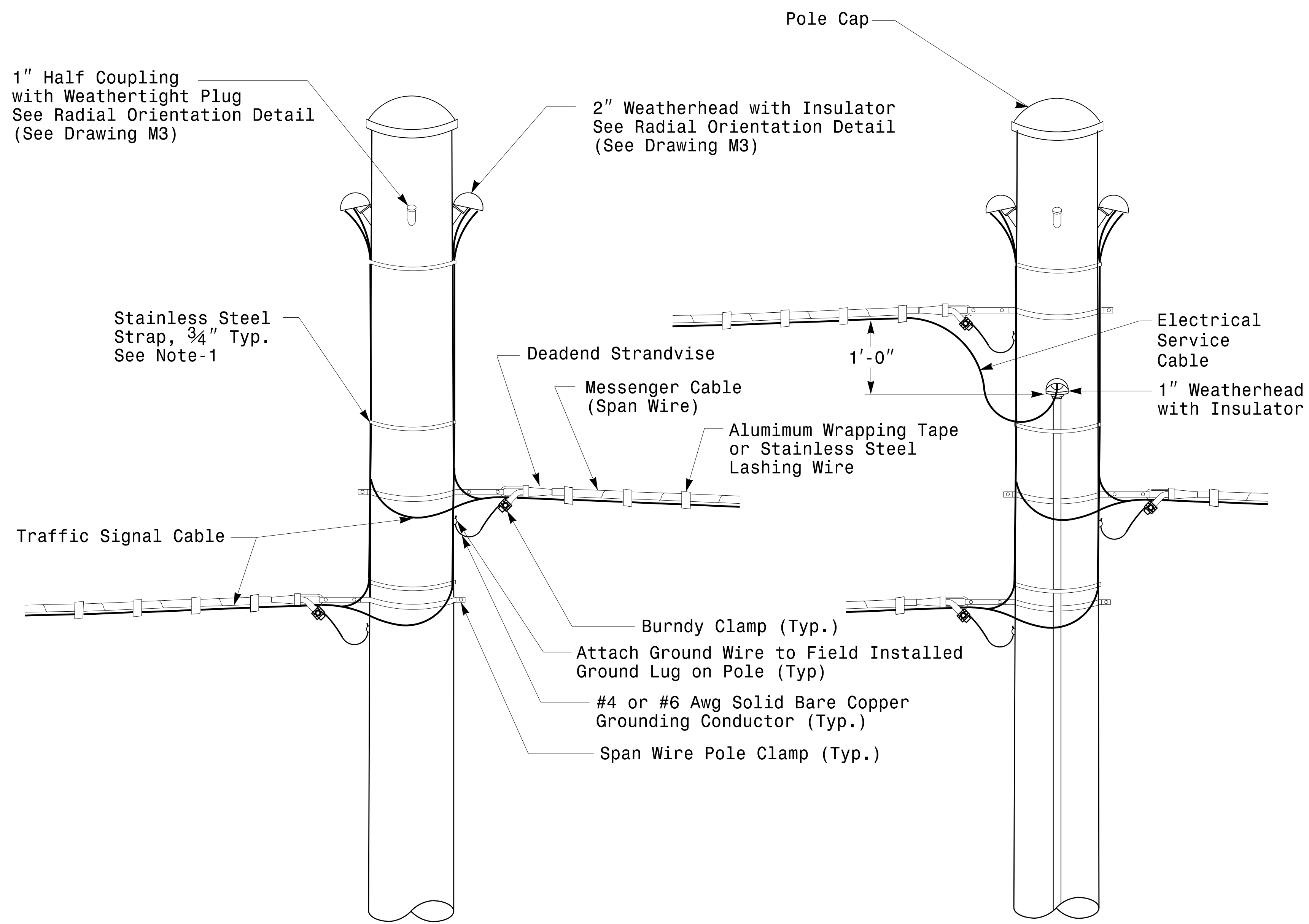
1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Fabricator is responsible for providing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



Prepared In the Offices of:		Typical Fabrication Details For Mast Arm Connection To Pole	
PLAN DATE:	OCTOBER 2017	DESIGNED BY:	C.F. ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR
SCALE		REVISIONS	INIT. DATE
0 NA			
NONE			

SEAL
 NORTH CAROLINA
 PROFESSIONAL ENGINEER
 028094
 DEBESH C. SARKAR

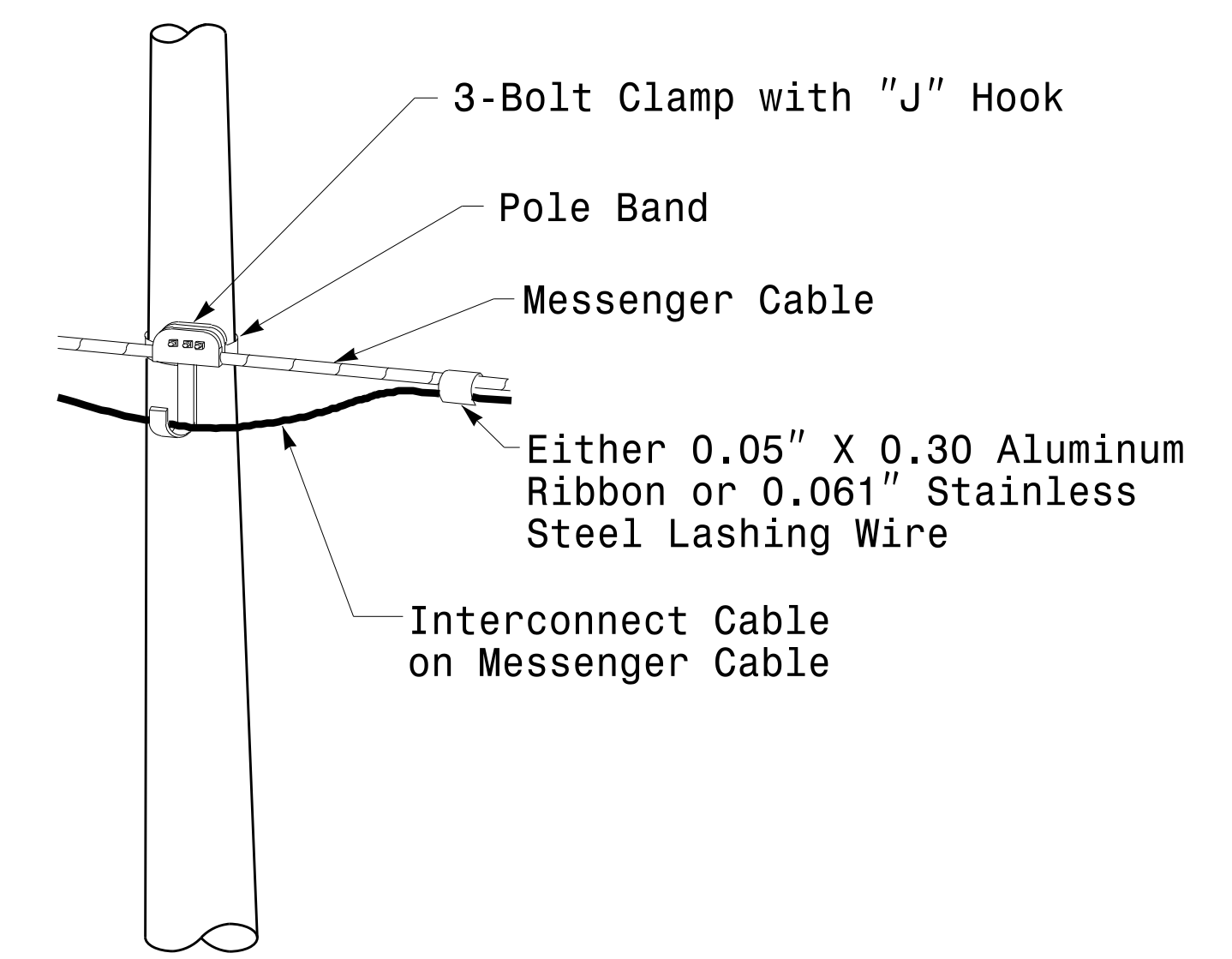
Discussed by:
 Debesh C. Sarkar
 DATE: 10/11/2017



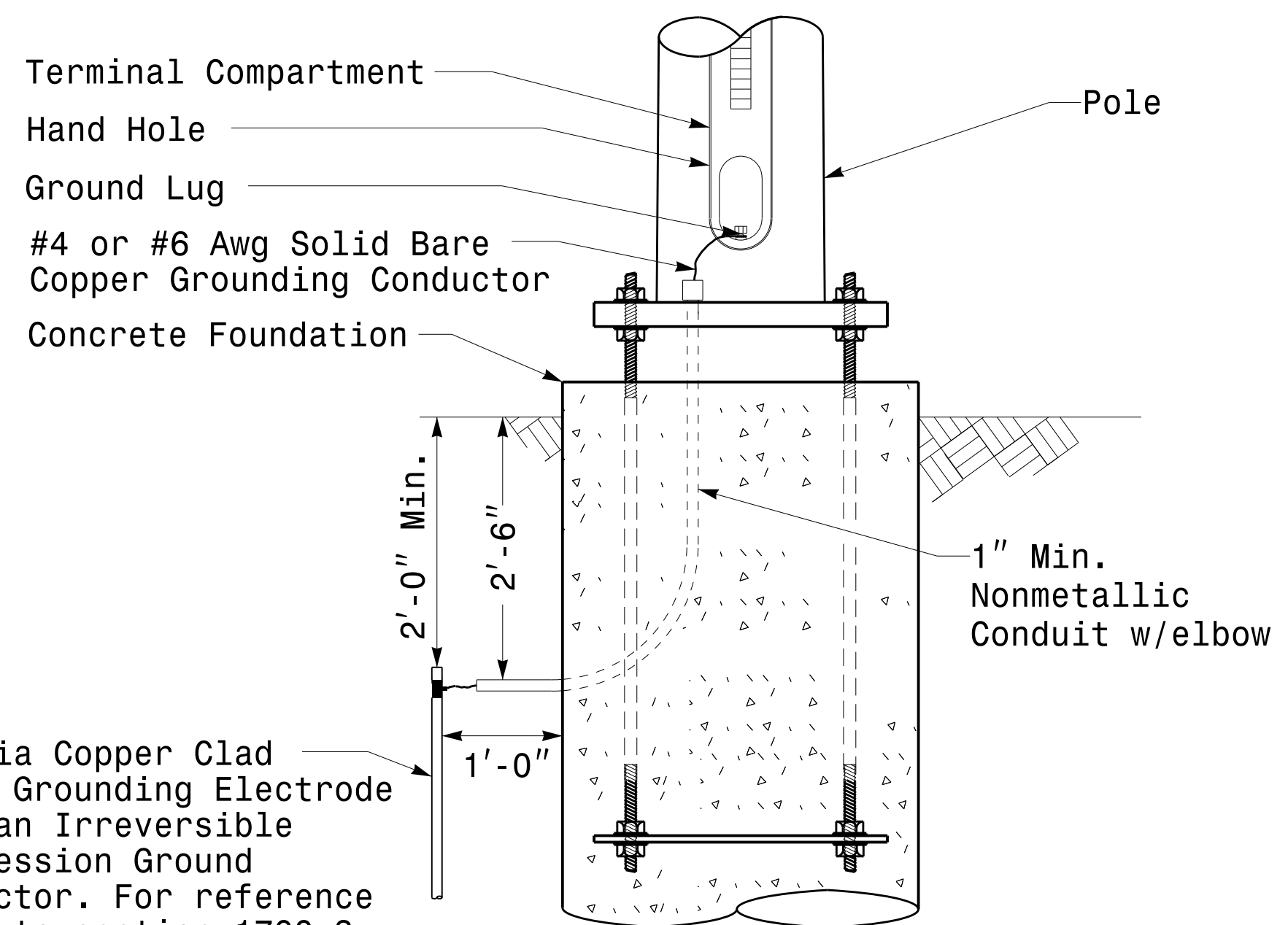
Strain Pole Attachments

NOTE:

1. Strap all signal cables to the side of the pole with 3/4" 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 2018.



Attachment of Cable to Intermediate Metal Pole

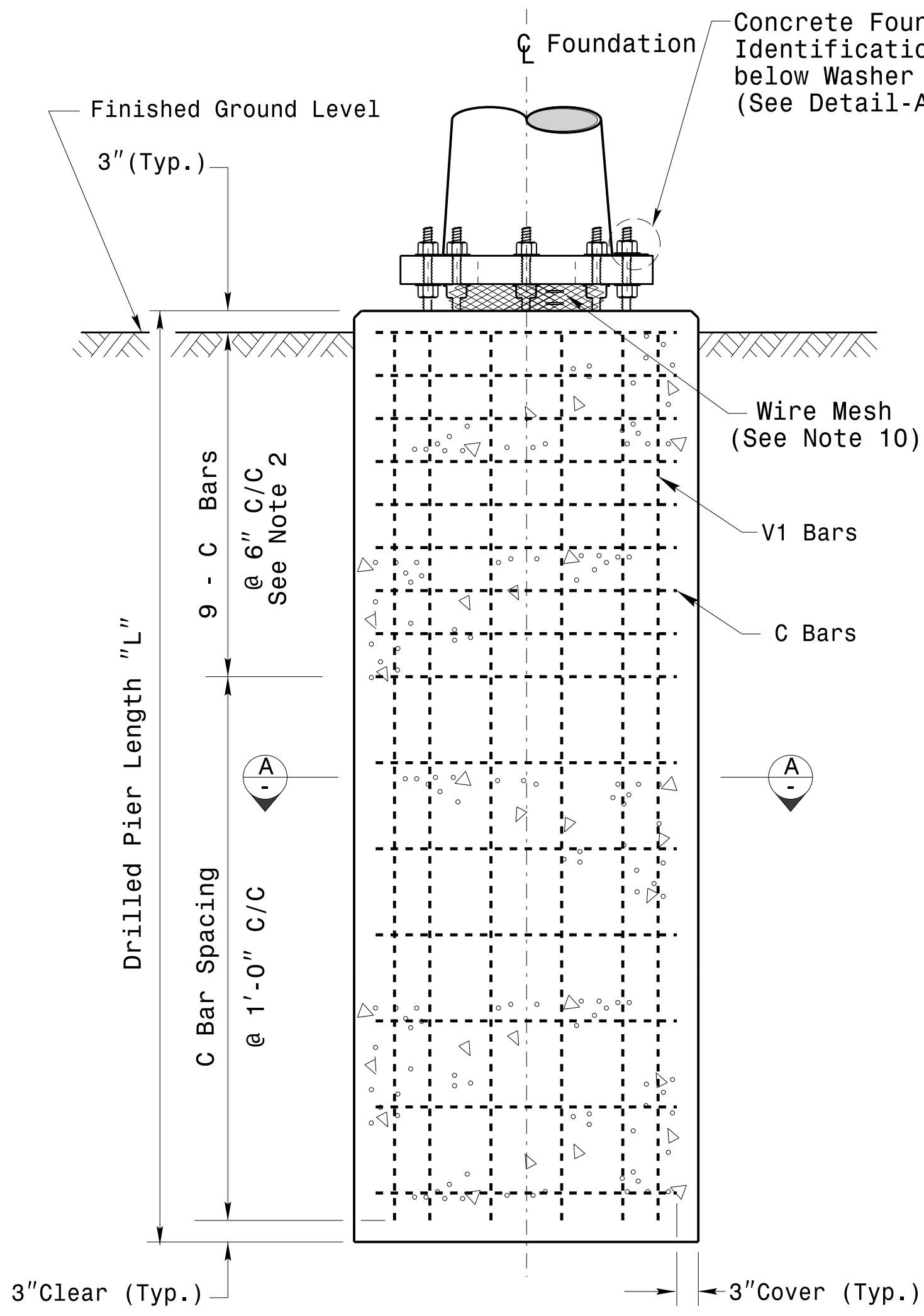


5/8" Dia Copper Clad Steel Grounding Electrode with an Irreversible Compression Ground Connector. For reference refer to section 1700-3 K and L for electrical grounding and bonding requirements, See Note 4.

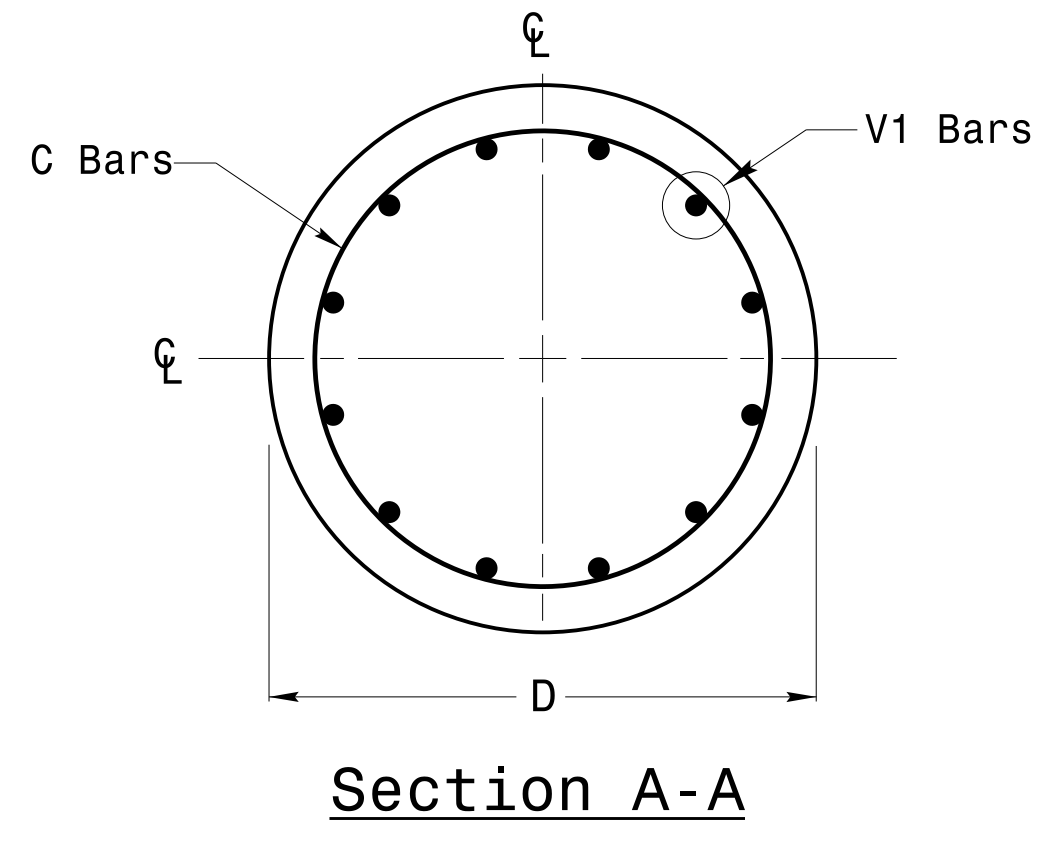
Metal Pole Grounding Detail For Strain Pole and Mast Arm

11-0CT-2017-08:36 136504115 StrainPole.dgn Design Section Eastern Region 0162014 Sig.M6 Std. Fabrication Detail: Strain Poles.dgn

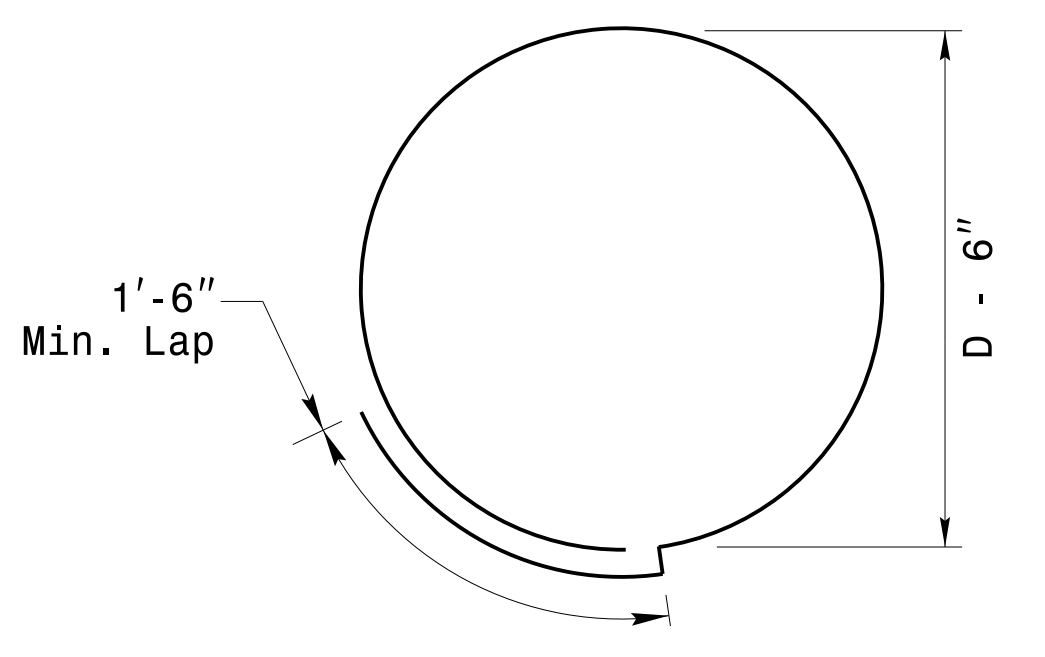
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Typical Fabrication Details For Strain Pole Attachments</p>		
	<p>PLAN DATE: OCTOBER 2017</p>	<p>DESIGNED BY: C.F. ANDREWS</p>		REVIEWED BY: D.C. SARKAR
<p>SCALE: 0 NA NONE</p>	<p>PREPARED BY: N. BITTING</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>
			<p>DocuSigned by: D. Sarkar 10/11/2017</p>



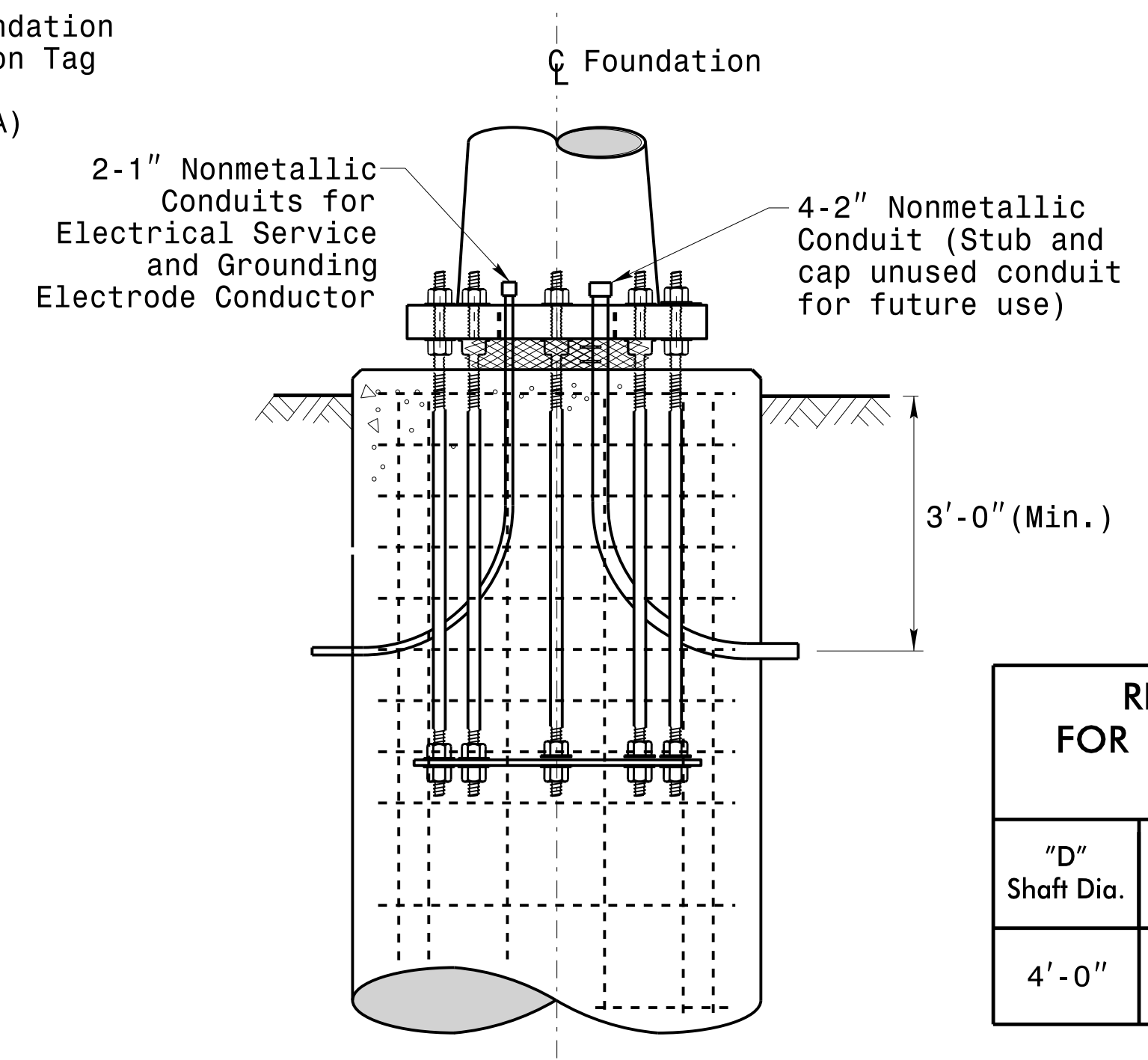
Concrete Shaft Elevation



Section A-A



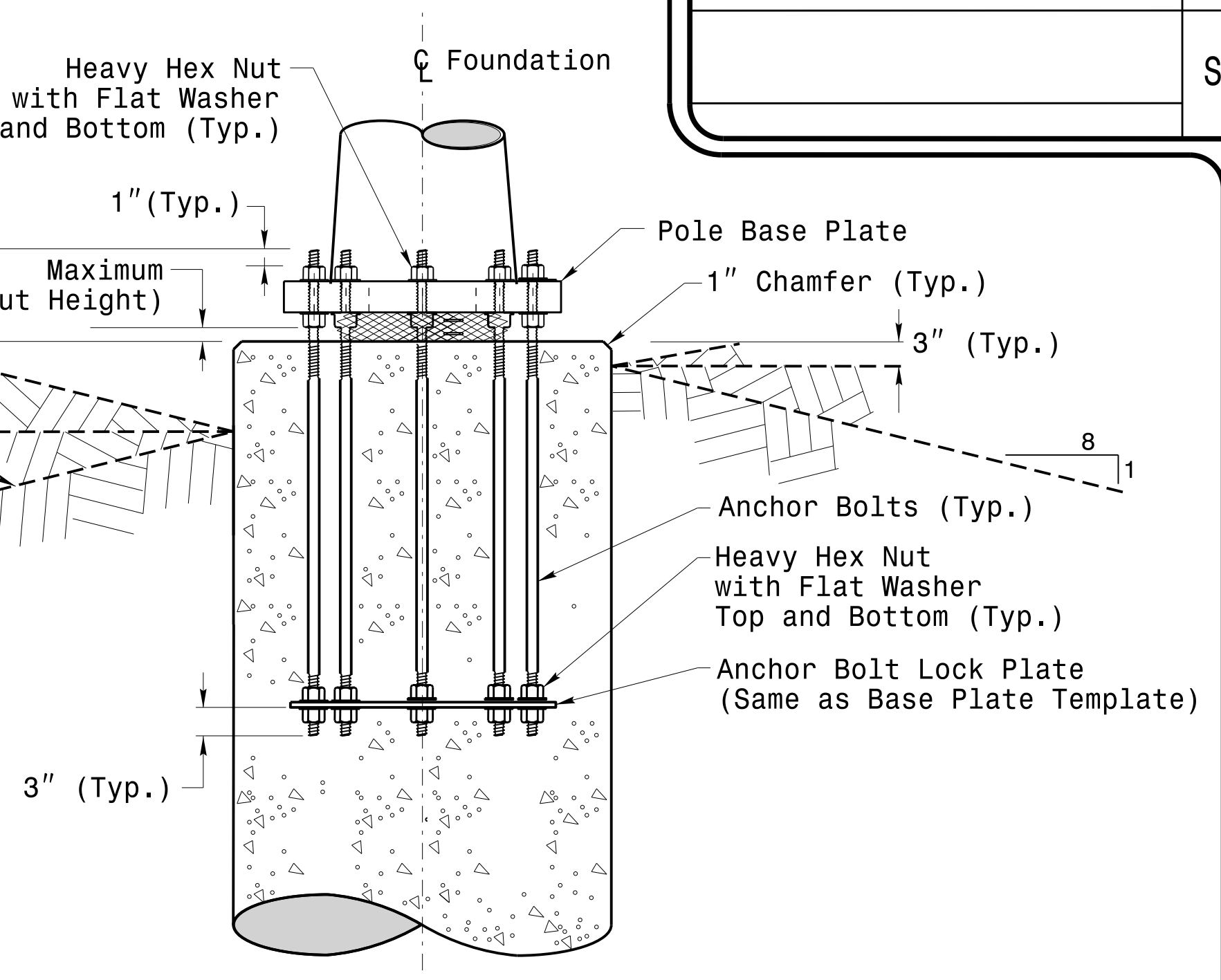
Typical "C" Bar Detail



Typical Foundation Conduit Details

"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

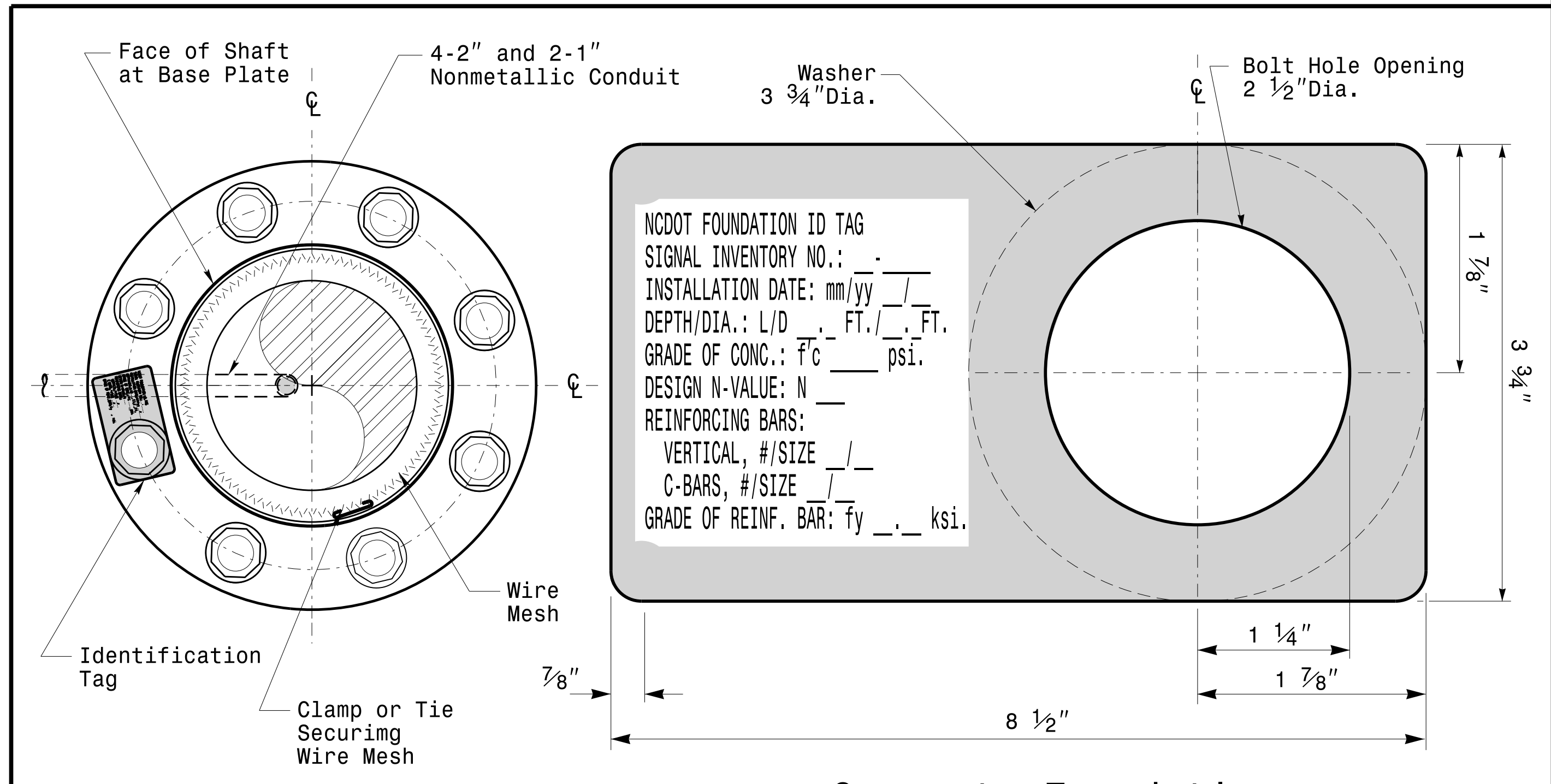


Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)

General Notes:

- If actual subsurface conditions differ significantly from boring data contact the Engineer before excavating or placing concrete.
- 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.
- 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.
- Provide 2" to 5" foundation projection above ground level depending on the ground slope.
- 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.
- Construct foundations in accordance with NCDOT Standard Provisions SP09 R005- Foundations and Anchor Rod Assemblies for Metal Poles. All applicable 2018 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](https://connect.ncdot.gov/resources/Specifications%20and%20Special%20Provisions.aspx)
- Use air entrained AA concrete mix with a compression strength of f'c=4500 psi.(min.) after 28 days.
- Use ASTM A615 grade 60 deformed bars for all reinforcing steel. Maintain at least 3" cover on all reinforcement.
- Locate the Identification Tag on the top of the base plate, directly above the conduit's entry point.
- 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.
- 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

Detail-A

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

	Construction Details For Foundations		
	PLAN DATE: OCTOBER 2018 PREPARED BY: N. BITTING	DESIGNED BY: C.B. COGDILL REVIEWED BY: D.C. SARKAR		SEAL 028094 D.C. SARKAR ENGINEER
SCALE: NONE	REV. NO. 1 COMMENTS: Revised Foundation Tag Details	INIT. N.B. DATE: 5/11/2015	DocuSigned by: Debesha C. Sarkar 10/11/2017

11-001-2017-08-33T 13:56:01.15 Signatures:gnrcal Design Section\Eastern Region\msh\Sheets\2016\2014_Sig.M7_Shd_Construction_Detail\Is-Strain_Poles.dgn

Construction Details - Foundations