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See Plate for Title

Prepared in the Offices of:

SEAL

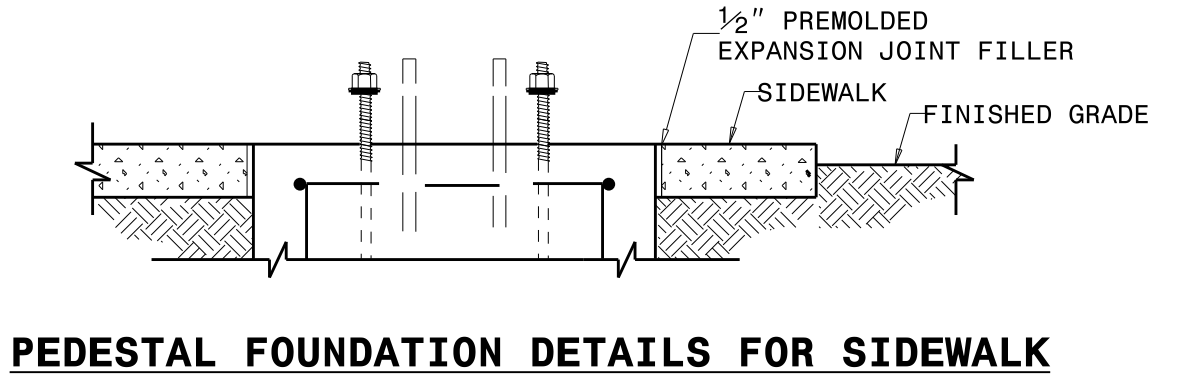
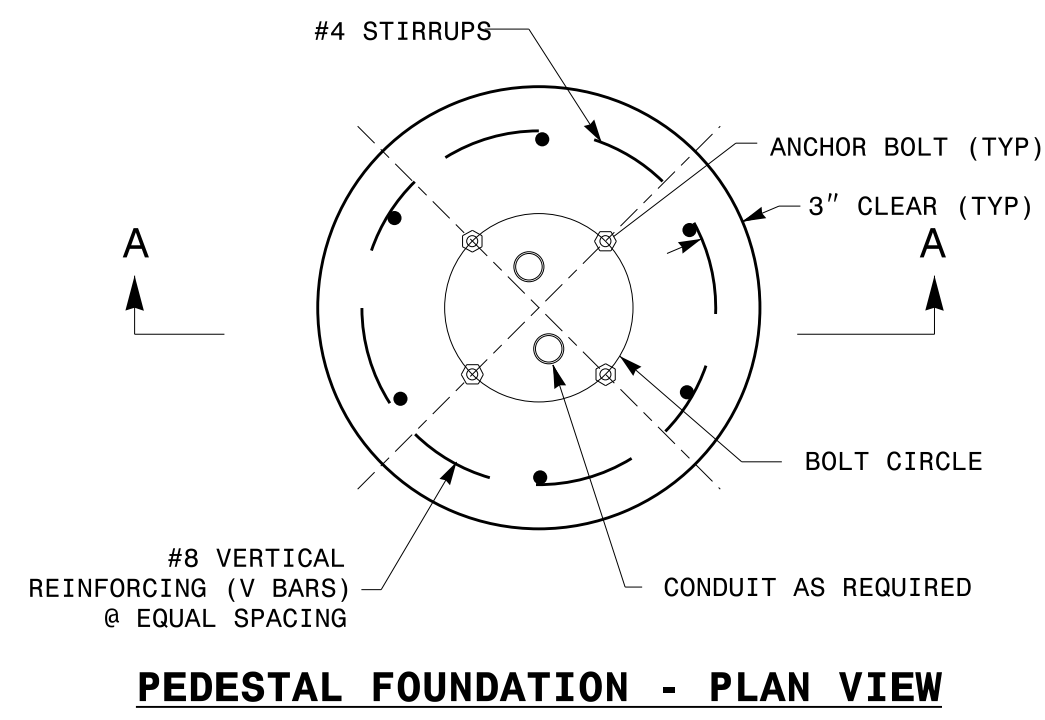
DocuSigned by:
Mohd Aslami

10/11/2017

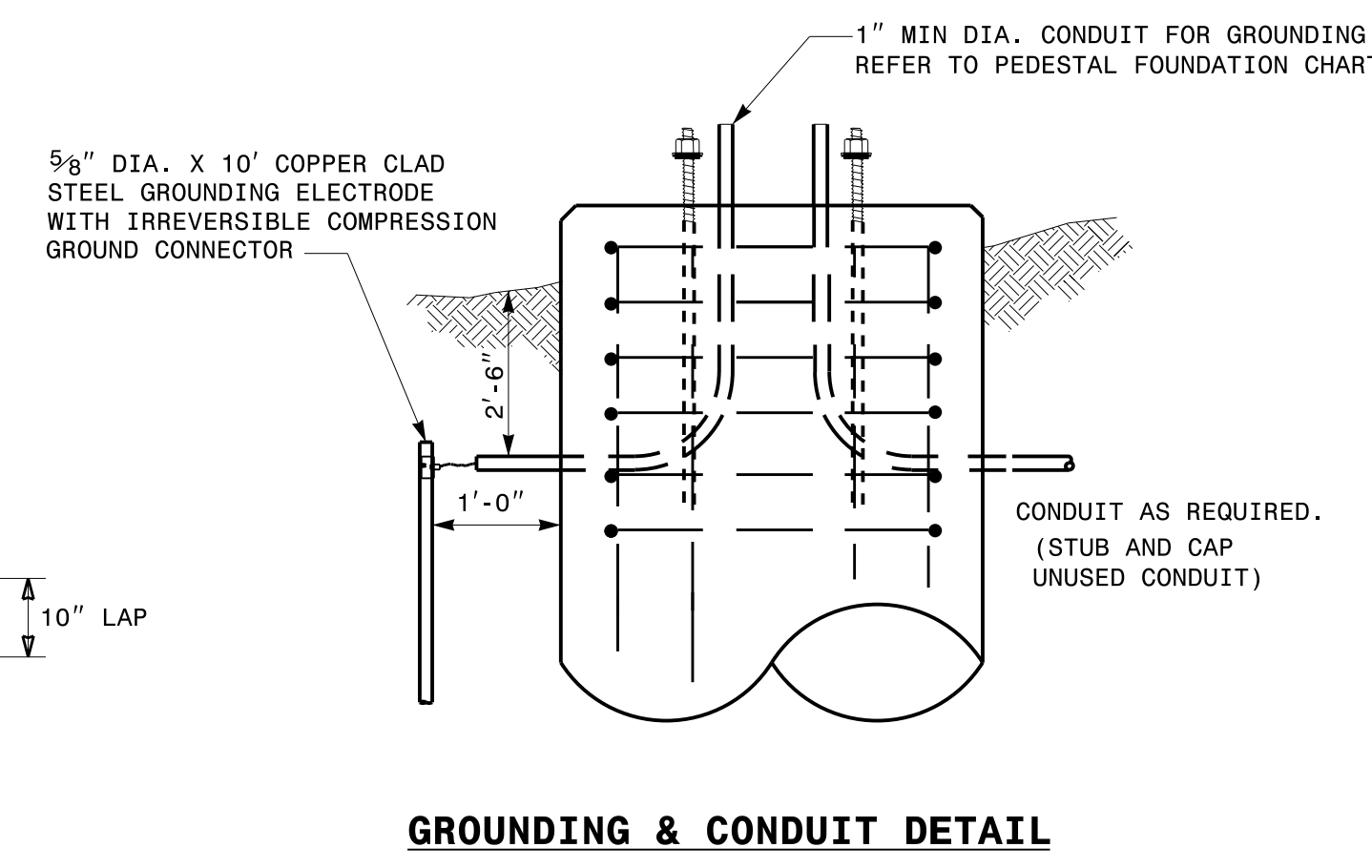
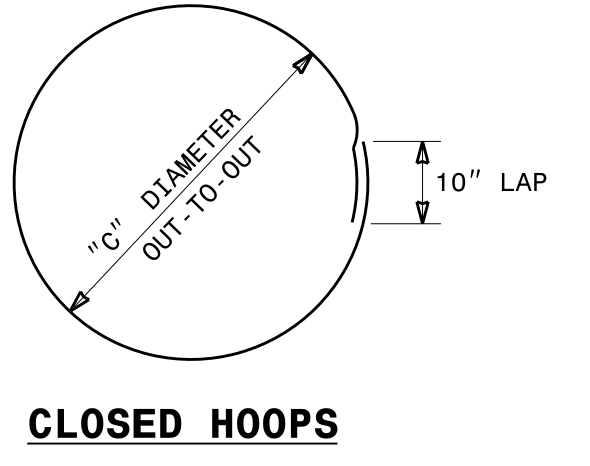
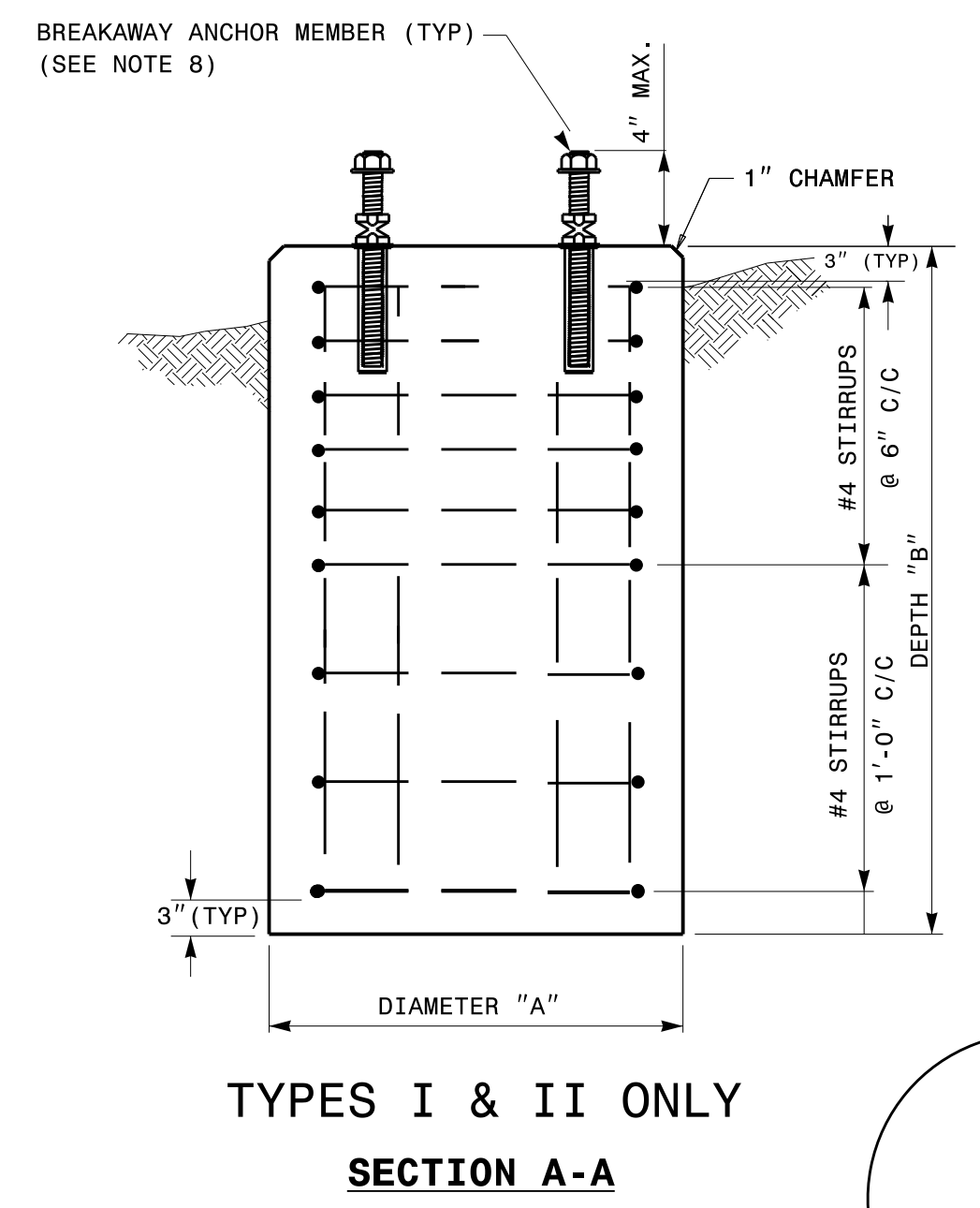
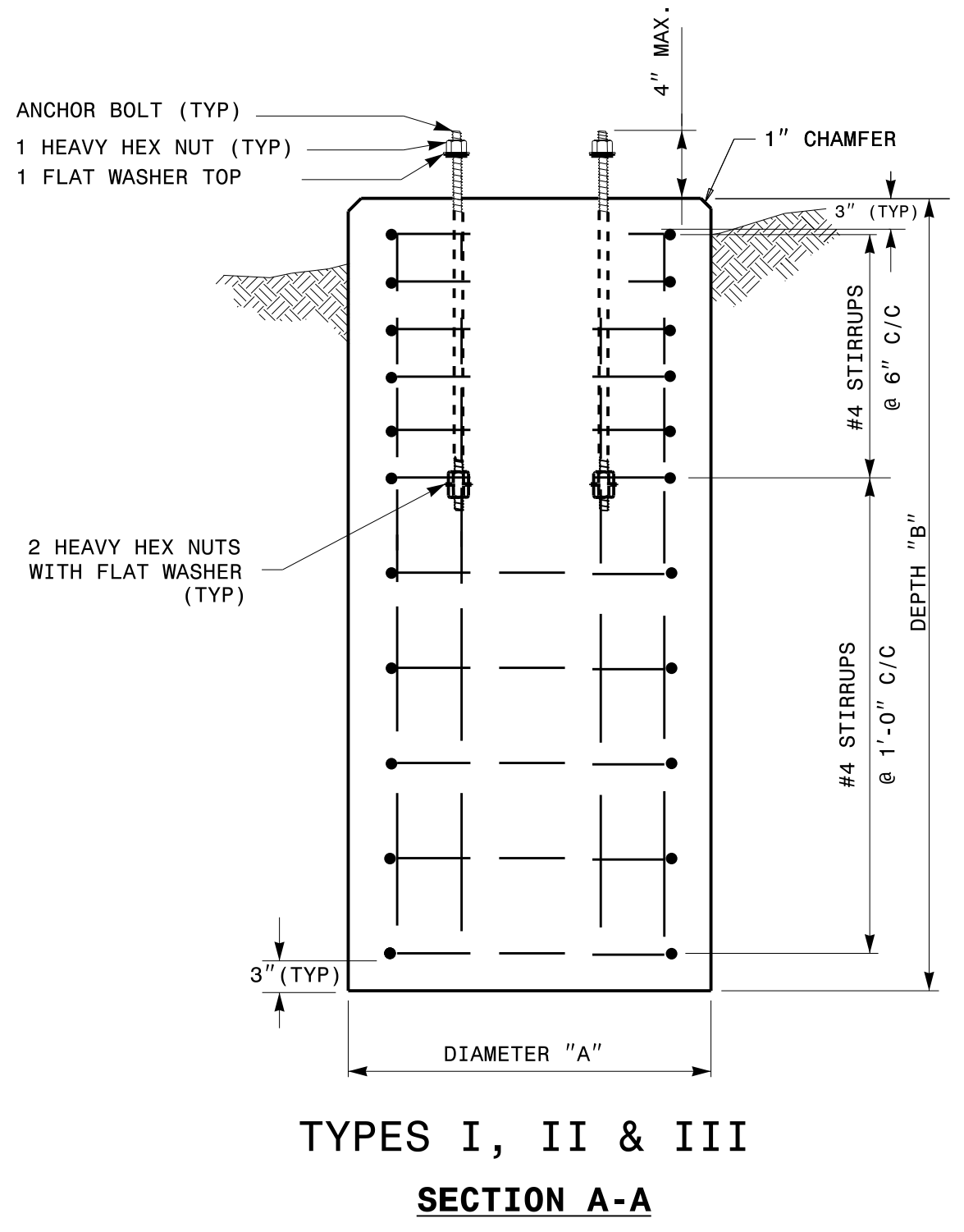
750 N. Greenfield Parkway
Garner, NC 27529

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:
 - SANDY TYPE SOIL
 - NO GROUND WATER WITHIN 5'-0" OF SURFACE ELEVATION
 - 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	QUANTITY			LENGTH	DIAMETER "C" FT	OVERLAP MIN.	WEIGHT LBS	TOTAL STEEL WEIGHT LBS
					VERTICAL ON 6" CENTERS	ON 12" CENTERS	TOTAL					
I	8	6	3'-0"	56	4	0	4	5'-7"	1'-6"	0'-10"	15	71
II	8	6	4'-6"	86	4	5	3	5'-7"	1'-6"	0'-10"	30	116
III	8	6	6'-6"	122	4	7	4	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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See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

SEAL
028094
ENGINEER
DEBESH C. SARKAR

Disc Signed by
Debesh C. Sarkar
10/11/2017
DATE

PHASING DIAGRAM

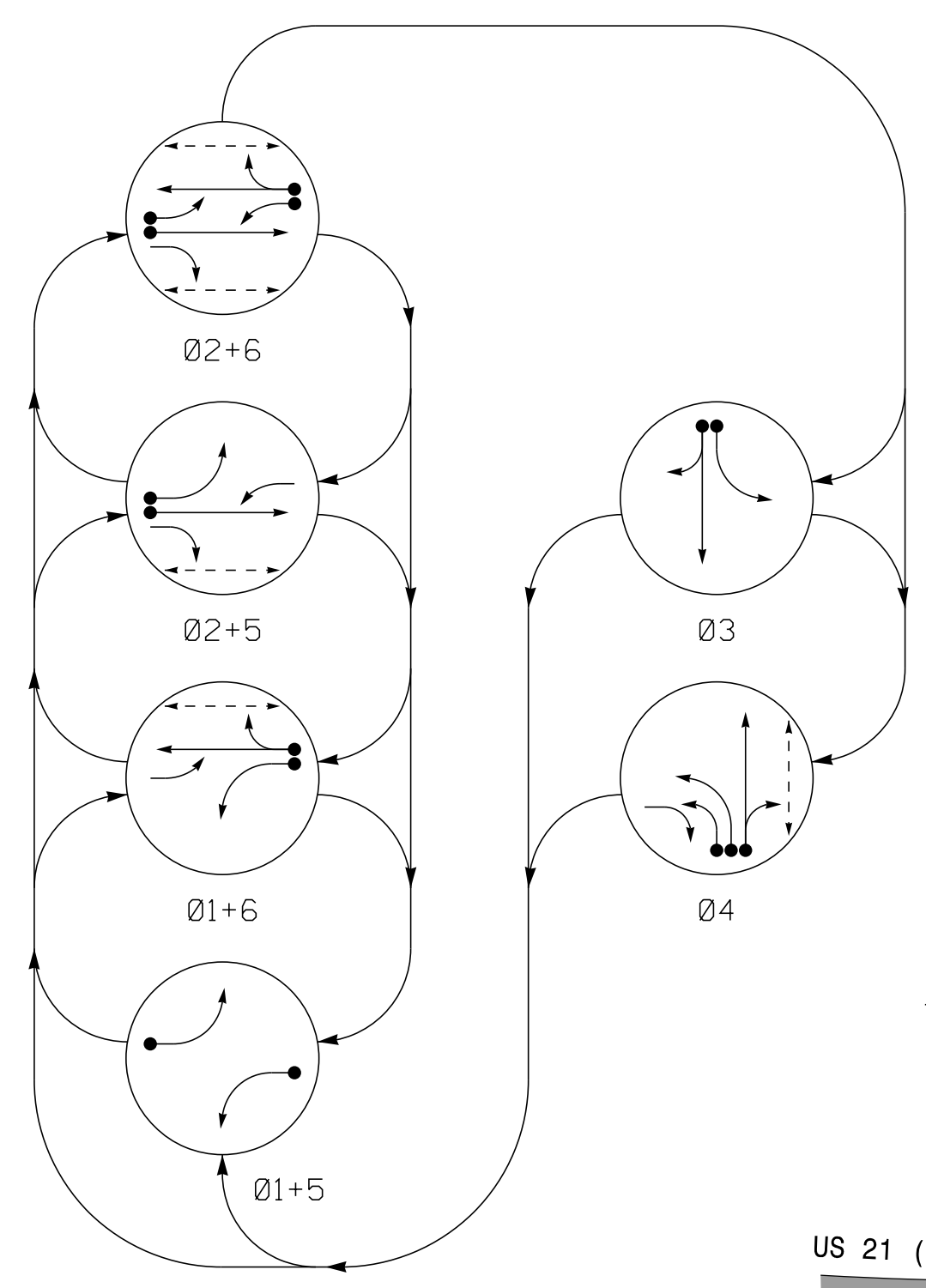
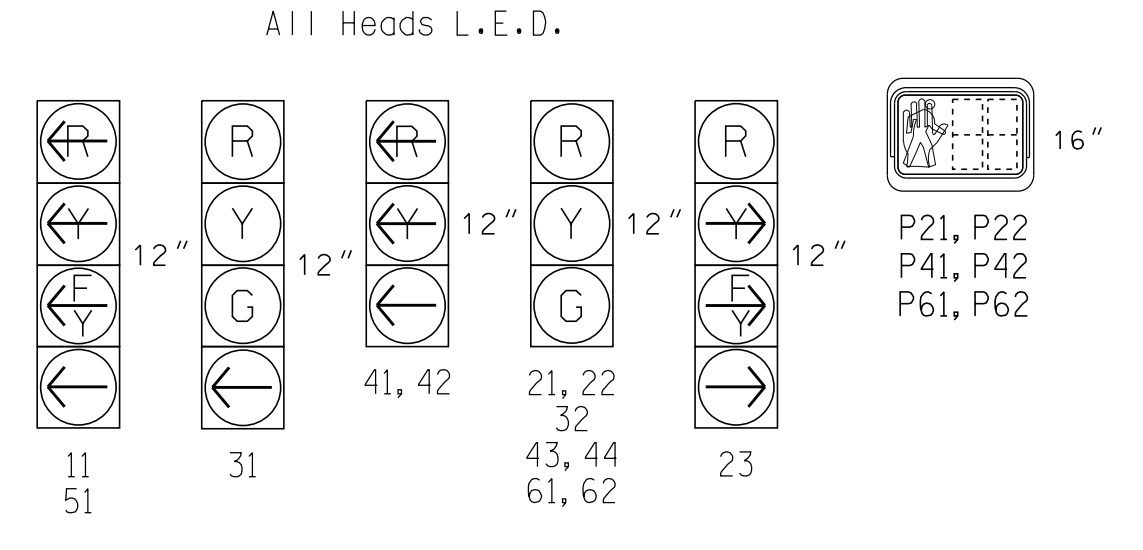


TABLE OF OPERATION table with columns for SIGNAL FACE, PHASE, and signal status (e.g., R, G, Y, W, DRK).

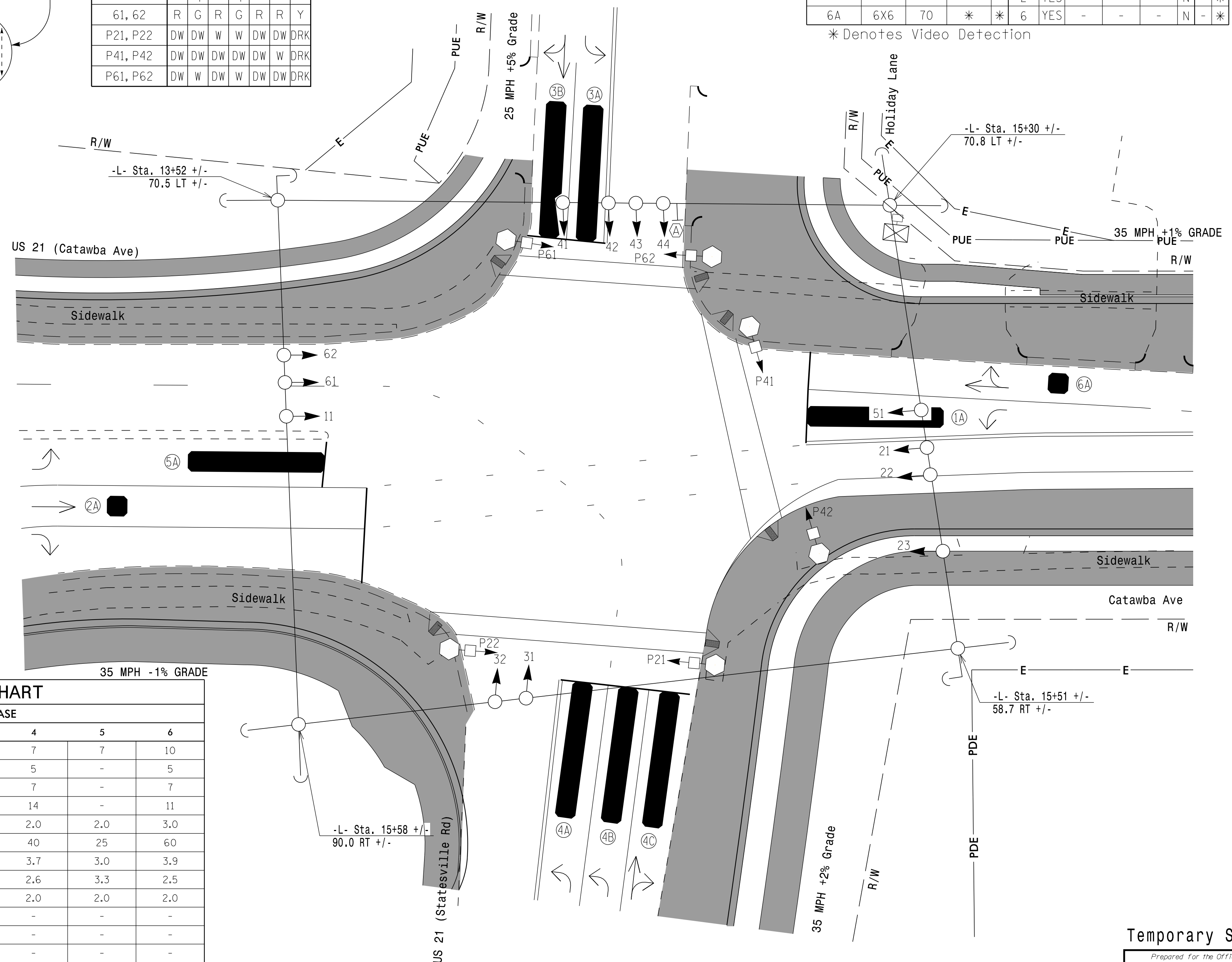
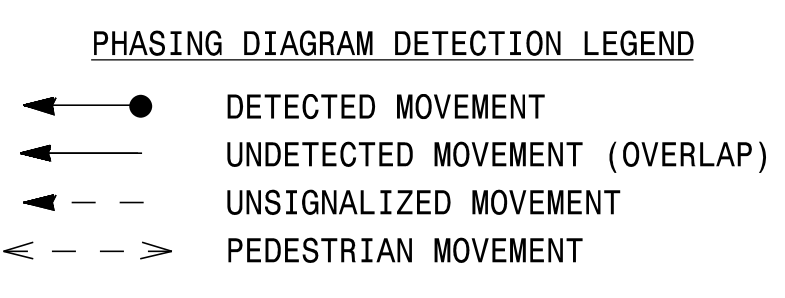
SIGNAL FACE I.D.



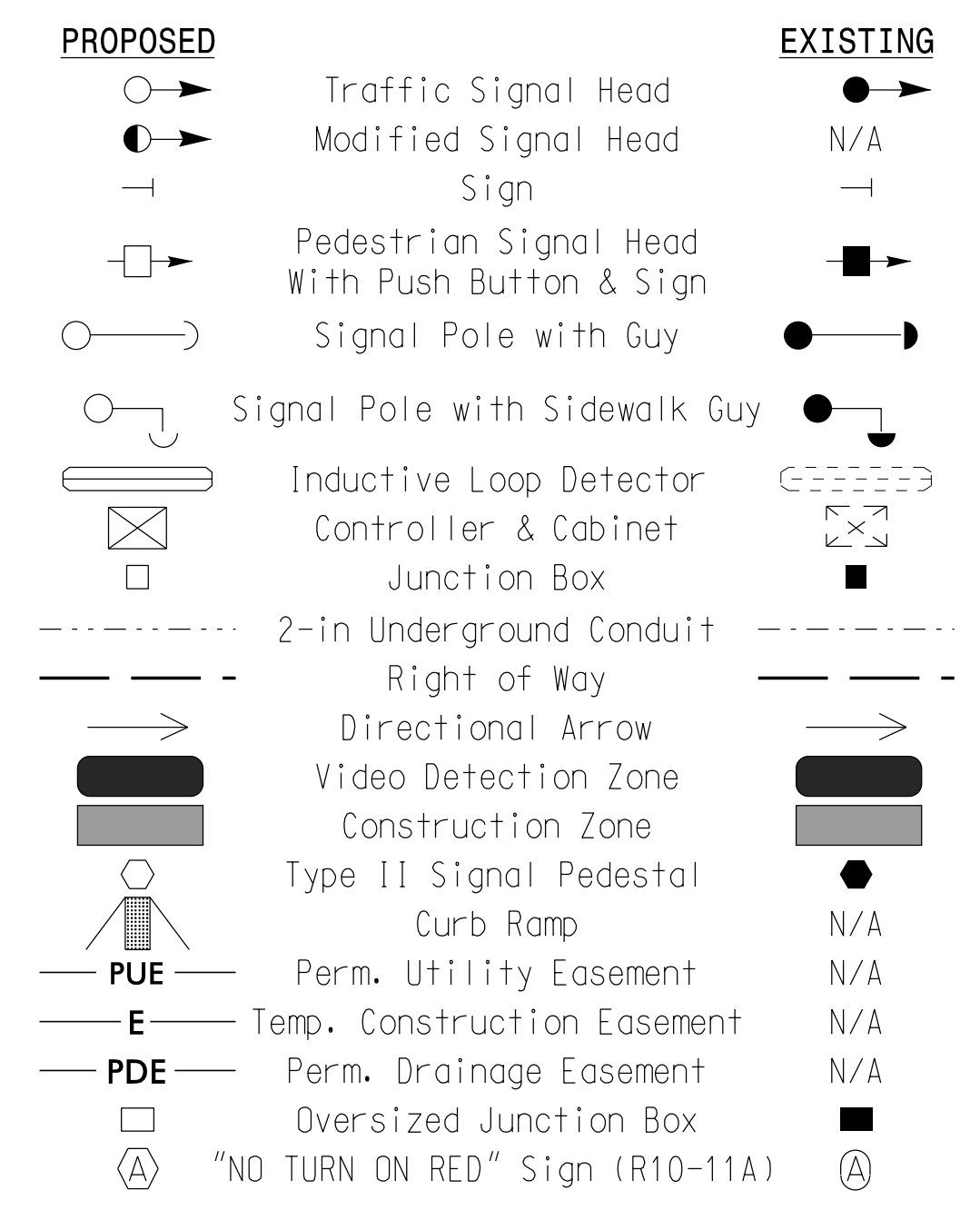
ASC/3 DETECTOR INSTALLATION CHART table with columns for DETECTOR (LOOP, SIZE, DISTANCE, TURNS, NEW LOOP) and PROGRAMMING (PHASE, CALLING, EXTEND TIME, DELAY TIME, USE ADDED INITIAL, TYPE, SYSTEM LOOP, NEW CARD).

6 Phase Fully Actuated Cornelius CLS D10-18 NOTES

- Notes 1-14 detailing project requirements, detector installation, and timing chart usage.



LEGEND



ASC/3 TIMING CHART table with columns for FEATURE and PHASE (1-6) and timing values.

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

This plan supersedes the signal plan signed and sealed by S. Nick Matthews, PE on 05/31/2022.

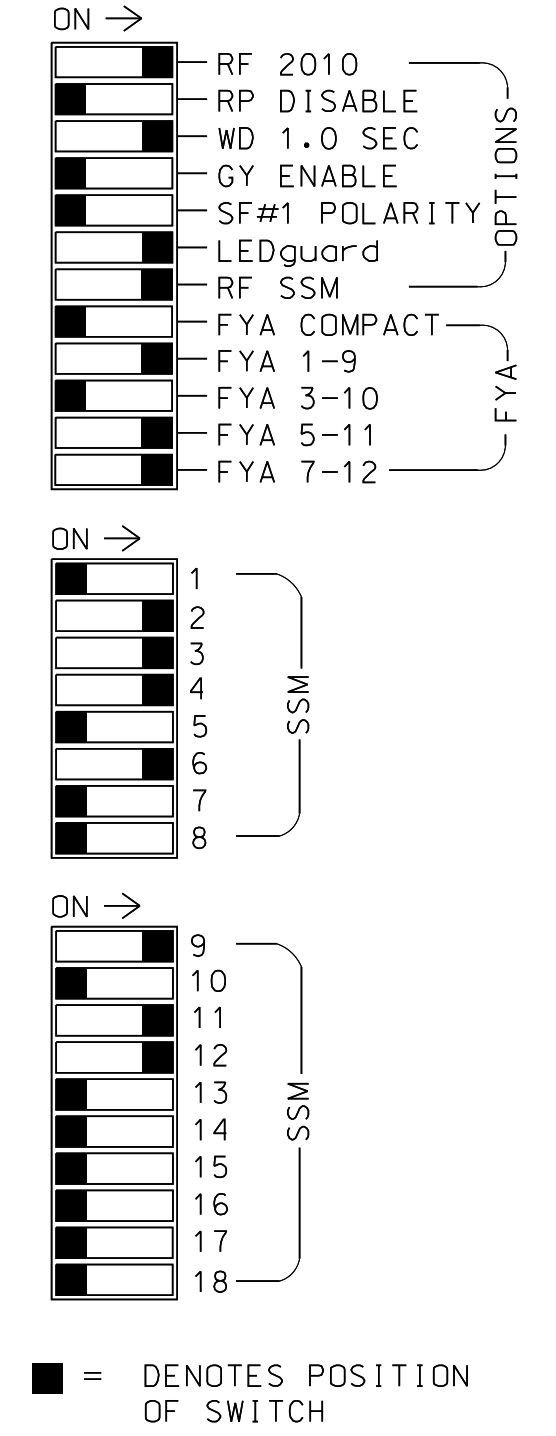
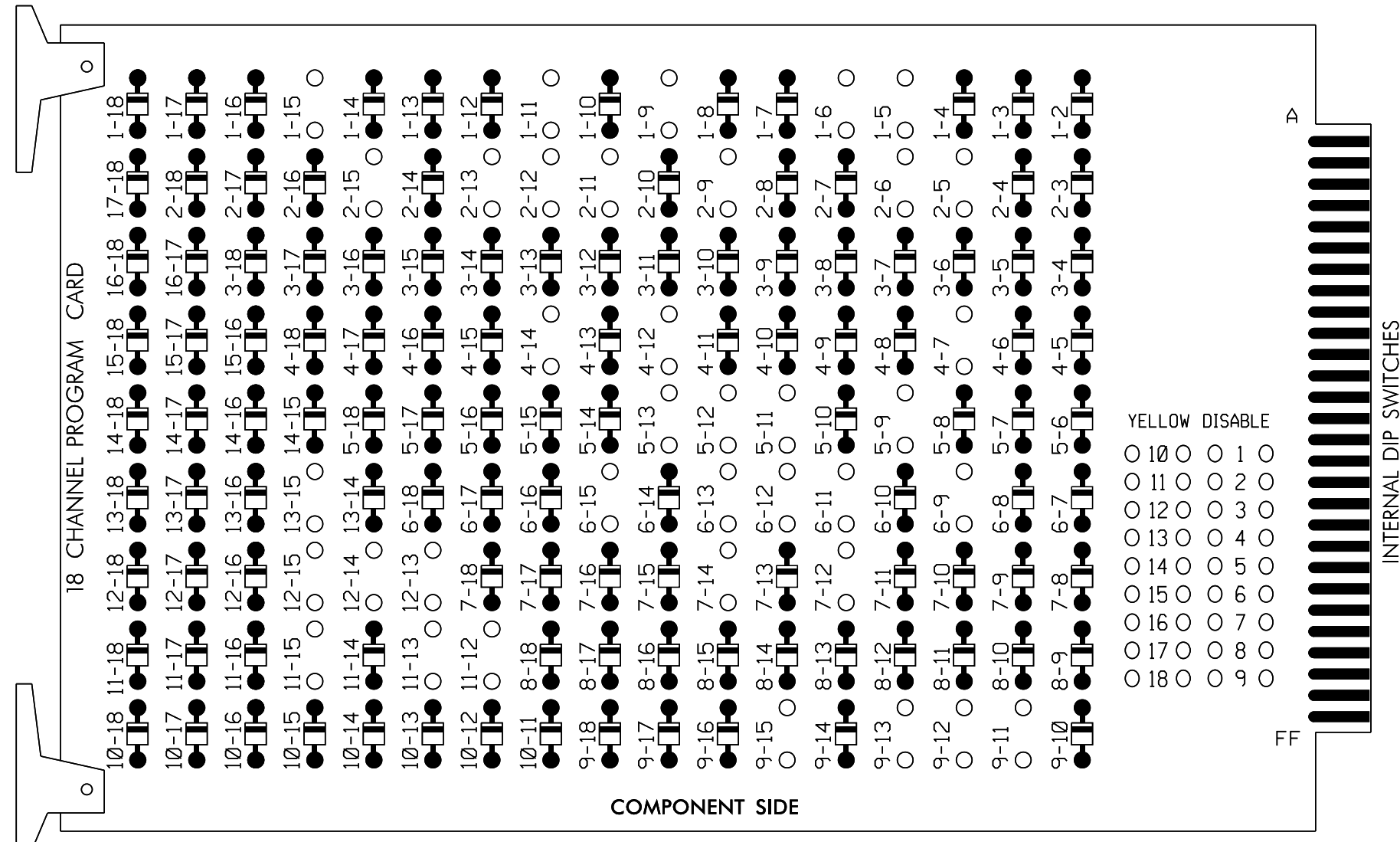


Project title block containing: Temporary Signal 1 - TCP Phase 1, US 21 (Catawba Avenue) / Catawba Avenue at US 21 (Statesville Road) / Holiday Lane, Division 10 Mecklenburg County, and professional seals/signatures.

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS I-5, I-6, I-9, I-11, I-15, 2-5, 2-6, 2-9, 2-11, 2-12, 2-13, 2-15, 4-7, 4-12, 4-14, 5-9, 5-11, 5-12, 5-13, 6-9, 6-11, 6-12, 6-13, 6-15, 7-12, 7-14, 9-11, 9-12, 9-13, 9-15, 11-2, 11-13, 11-15, 12-13, 12-14, 12-15, and 13-15.



- NOTES: 1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently. 2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board. 3. Ensure that Red Enable is active at all times during normal operation. 4. Integrate monitor with Ethernet network in cabinet.

NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans. 2. Program controller to start up in phase 2 Green and phase 6 Green. 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location. 4. The cabinet and controller are part of the 11018 Cornelius Signal System.

NOTE THAT PHASES 2 + 6 DO NOT START IN WALK!

EQUIPMENT INFORMATION

CONTROLLER.....2070LX 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,S3,S4,S5, S6,S7,S8,S9,S10,AUX S1, AUX S4,AUX S5 PHASES USED.....1,2,2PED,3,4, 4PED,5,6,6PED OVERLAP "A".....* OVERLAP "B".....NOT USED OVERLAP "C".....* OVERLAP "D".....* OVERLAP "E".....NOT USED OVERLAP "F".....NOT USED OVERLAP "G".....* * See overlap programming detail on sheet 2

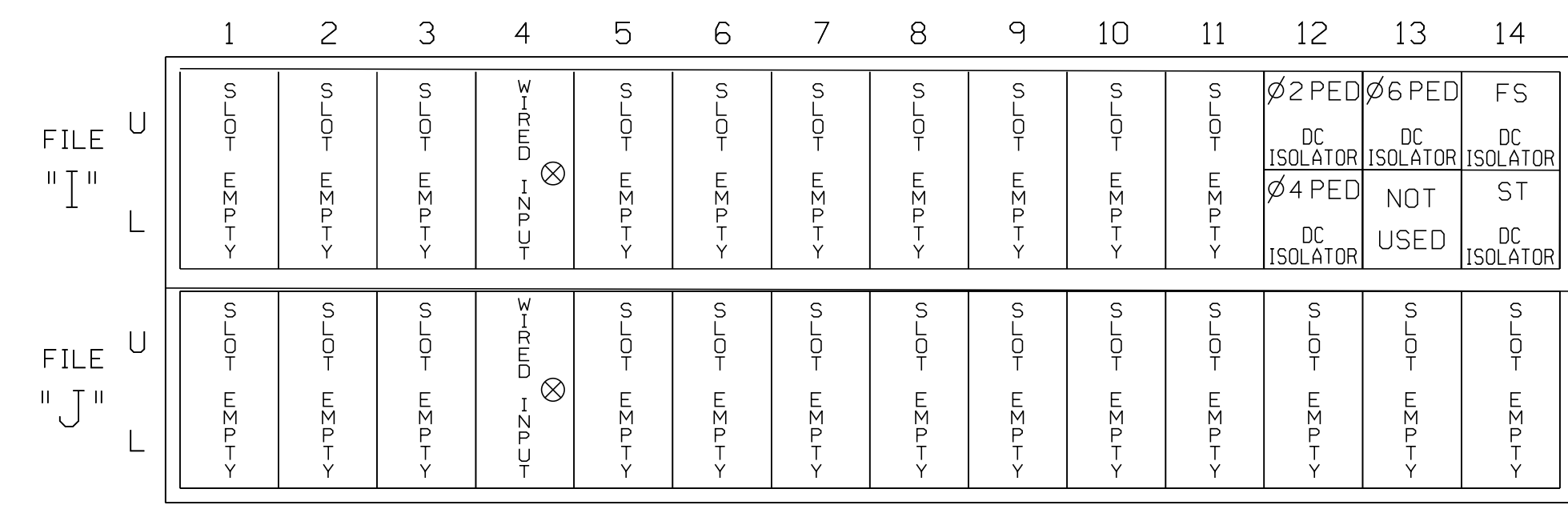
This plan supersedes the electrical plan signed and sealed by Steven G. Haynie, PE on 05/31/2022.

SIGNAL HEAD HOOK-UP CHART

Table with columns for LOAD SWITCH NO., S1-S10, AUX S1-S6, PHASE, SIGNAL HEAD NO., RED, YELLOW, GREEN, RED ARROW, YELLOW ARROW, FLASHING YELLOW ARROW, GREEN ARROW. Includes a legend for NU = Not Used and symbols for load resistors and pedestrian signals.

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

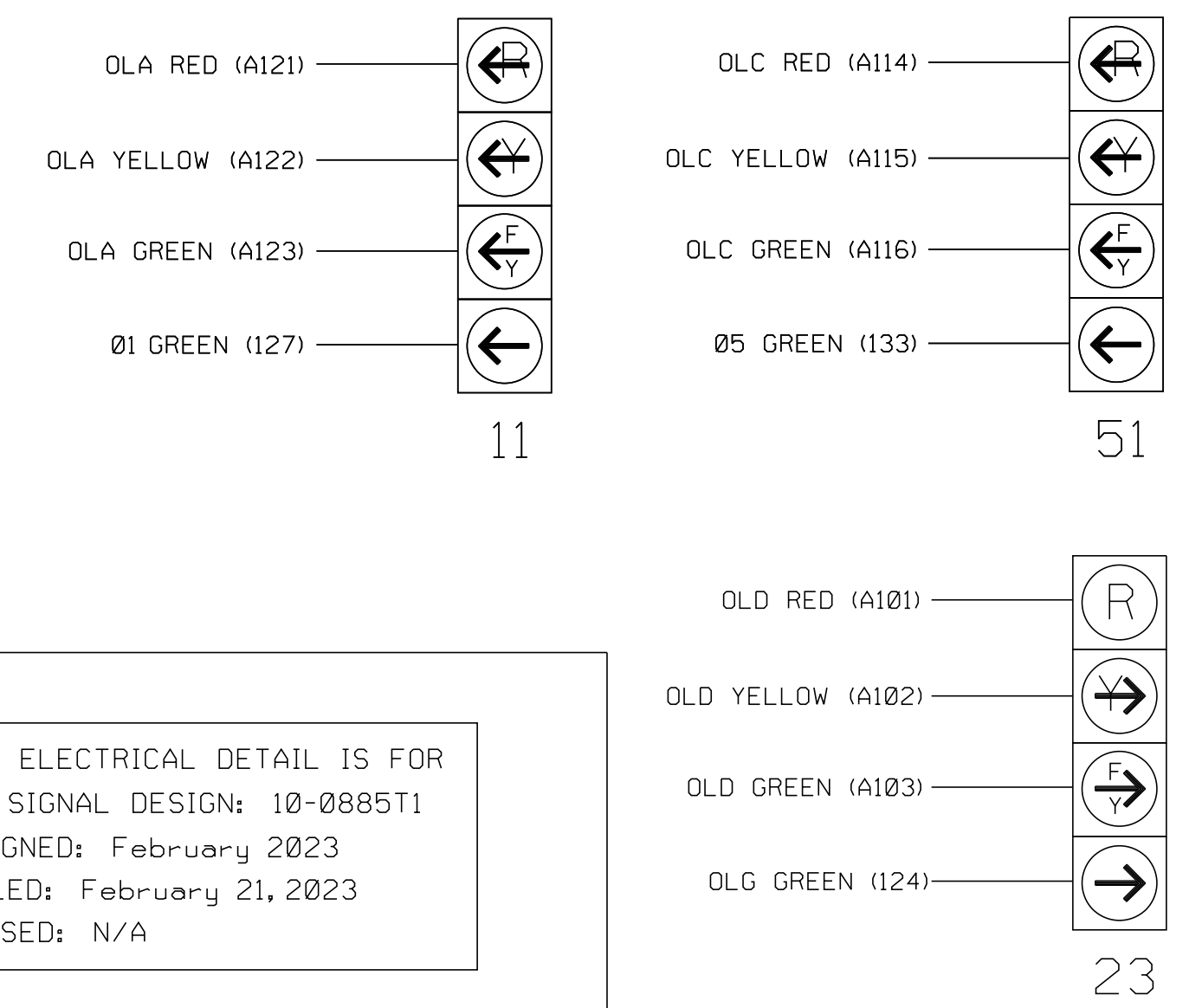
INPUT FILE CONNECTION & PROGRAMMING CHART

Table with columns: 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. Includes a note about DC isolators and input file position legend.

1 Add jumper from I1-W to J4-W, on rear of input file. 2 Add jumper from J1-W to I4-W, on rear of input file.

FYA SIGNAL WIRING DETAIL

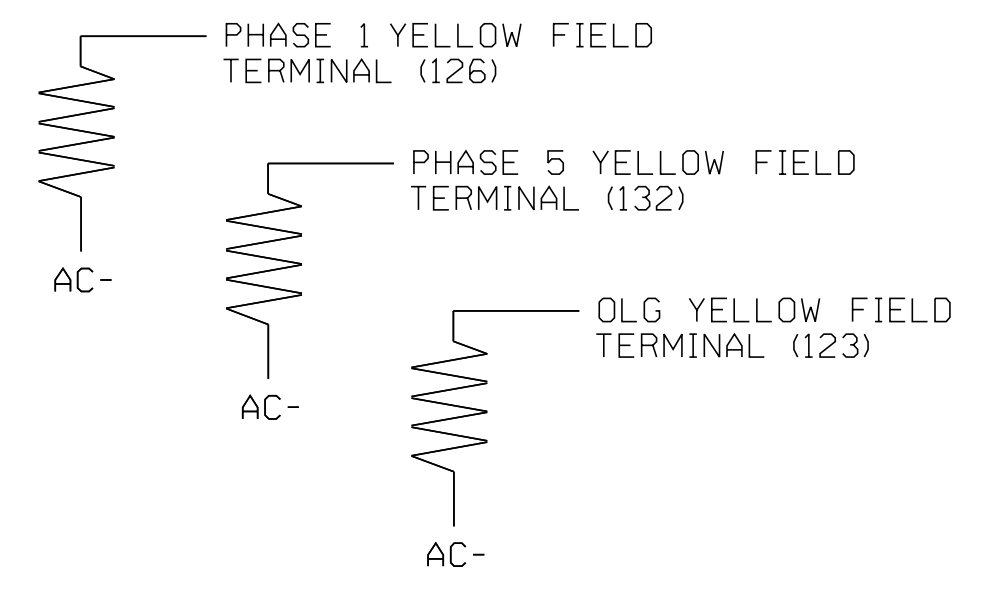
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

Table with columns: VALUE (ohms), WATTAGE. Values: 1.5K - 1.9K, 25W (min); 2.0K - 3.0K, 10W (min).



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

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 Detection Zones 1A and 5A, the equipment placement and slots reserved for wired inputs are typical for a NCDOT installation.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-0885T1 DESIGNED: February 2023 SEALED: February 21, 2023 REVISION: N/A

Temporary Signal 1 Electrical Detail Sheet 1 of 2

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Professional seal for Steven G. Haynie, PE, and project information including plan date, reviewed by, and signature lines.

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **2. CONTROLLER**
- From CONTROLLER Submenu select **2. VEHICLE OVERLAPS**
- Press "Toggle" until positioned on Overlap G

OVERLAP G

Select TMG VEH OVLP [G] and 'NORMAL'

```

TMG VEH OVLP...[G] TYPE: ....NORMAL
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED. . . X . . . . .
LAG GRN 0.0 YEL 0.0 RED 0.0

```

Press Toggle until positioned over Overlap A

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

```

Toggle Once

OVERLAP D

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

```

TMG VEH OVLP...[D] TYPE: ....PPLT FYA
PROTECTED LEFT TURN.... OVERLAP G
OPPOSING THROUGH..... PHASE 2
FLASHING ARROW OUTPUT....CH12 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0

```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-088511
 DESIGNED: February 2023
 SEALED: February 21, 2023
 REVISED: N/A

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING FOR FYA SUPPRESSION DURING THE DELAYED GREEN PERIOD

(program controller as shown)

- 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 PED ON PH WALK 2 IS ON
AND VEH GREEN ON PH 2 IS OFF
THEN SIG SET OLP RED 1 ON
SIG SET OLP YELLOW 1 OFF
SIG SET OVLP GREEN 1 OFF
ELSE

```

← LOGIC STATEMENT FOR ADVANCE WALK WITH FYA'S. TURN FYA HEAD 11 OFF DURING PED 2 ADVANCE WALK.

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

```

LP#: 2 COPY FROM: 1 ACTIVE: M (T/F)
IF PED ON PH WALK 2 IS ON
AND VEH GREEN ON PH 2 IS OFF
THEN SIG SET OLP RED 4 ON
SIG SET OLP YELLOW 4 OFF
SIG SET OVLP GREEN 4 OFF
ELSE

```

← LOGIC STATEMENT FOR ADVANCE WALK WITH FYA'S. TURN FYA HEAD 23 OFF DURING PED 2 ADVANCE WALK.

ENTER A "3" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```

LP#: 3 COPY FROM: 1 ACTIVE: M (T/F)
IF PED ON PH WALK 6 IS ON
AND VEH GREEN ON PH 6 IS OFF
THEN SIG SET OLP RED 3 ON
SIG SET OLP YELLOW 3 OFF
SIG SET OVLP GREEN 3 OFF
ELSE

```

← LOGIC STATEMENT FOR ADVANCE WALK WITH FYA'S. TURN FYA HEAD 51 OFF DURING PED 6 ADVANCE WALK.

END PROGRAMMING

- 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 & 3 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	E	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30
LP 31-45
LP 46-60
LP 61-75
LP 76-90

END PROGRAMMING

ECONOLITE ASC/3-2070 LOAD SWITCH ASSIGNMENT DETAIL

(program controller as shown)

To assign load switch S10 as OLG, program LD SWITCH 7 as OVLP '7' TYPE '0' as shown below.

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

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

NOTICE OVLP 7 ASSIGNED TO LD SWITCH 7

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

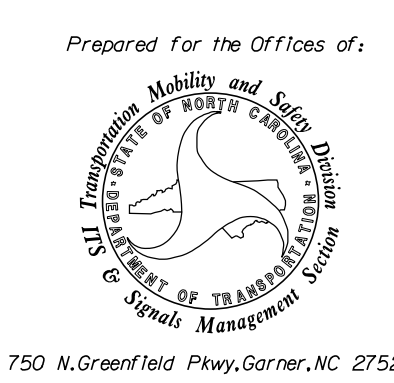
THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

This plan supersedes the electrical plan signed and sealed by Steven G. Haynie, PE on 05/31/2022.

Temporary Signal 1
Electrical Detail Sheet 2 of 2

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21-Feb-23 2:02:52 PM
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20-52-55



US 21 (Catawba Avenue)/ Catawba Avenue at US 21 (Statesville Road)/ Holiday Lane		Division 10 Mecklenburg County Cornelius	
PLAN DATE: February 2023	REVIEWED BY: V. Kaiser	PREPARED BY: S.G. Haynie	REVIEWED BY:
REVISIONS	INIT.	DATE	

SEAL	DATE
Steven G. Haynie	2/21/2023
SIGNATURE	DATE
Sig. Inventory No.	10-088511

PHASING DIAGRAM

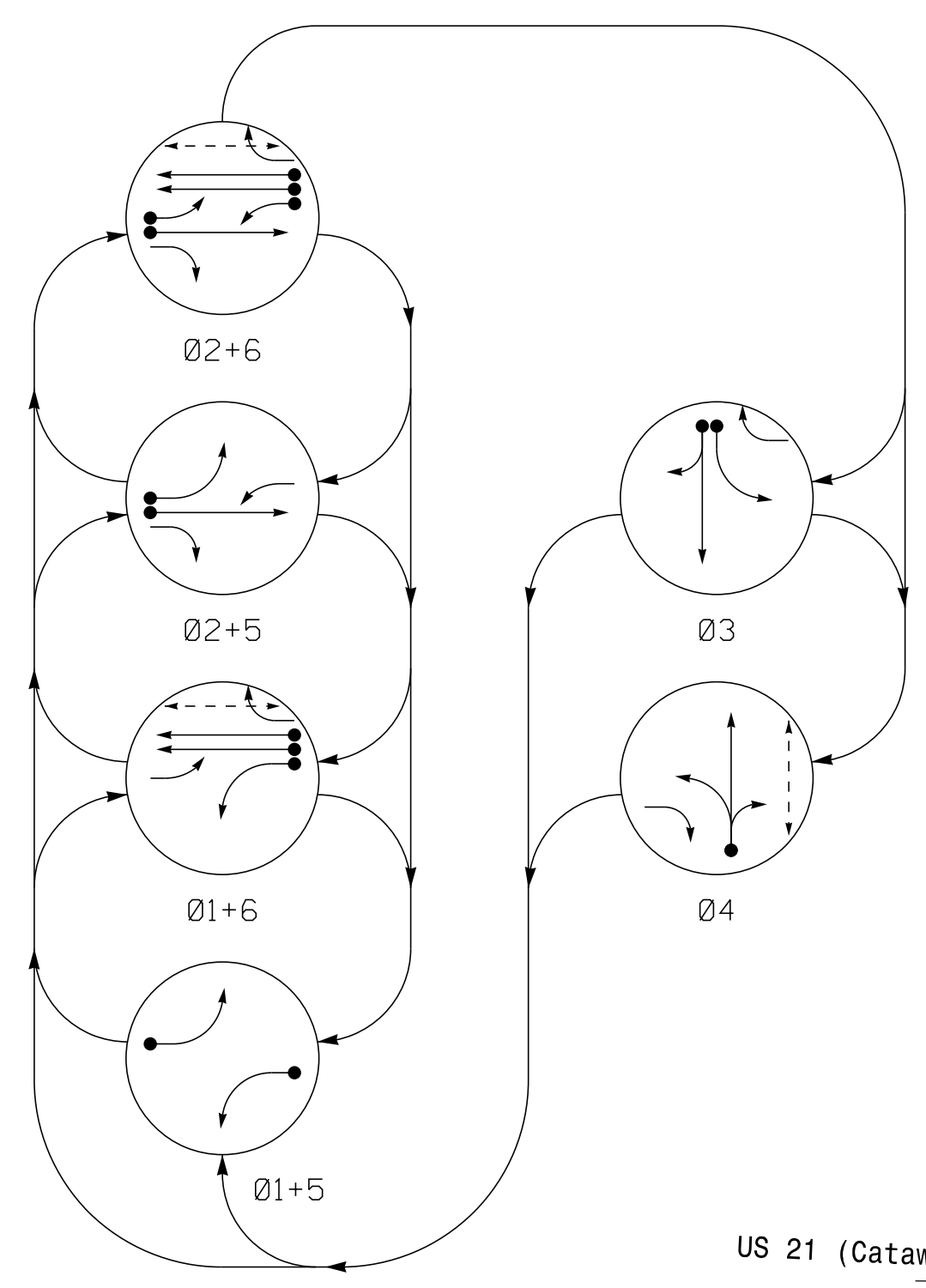
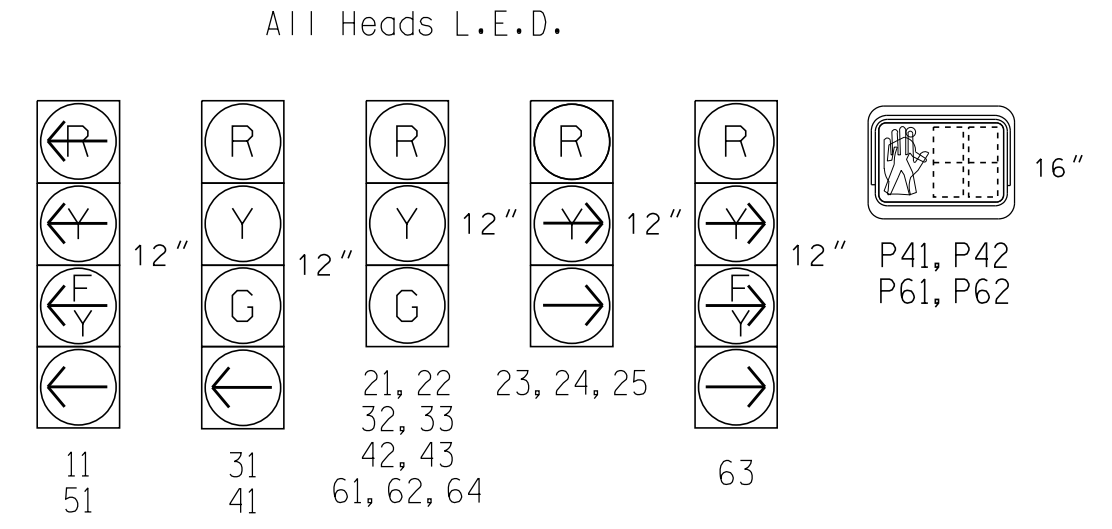


TABLE OF OPERATION table with columns for SIGNAL FACE, PHASE (01+5, 01+6, 02+6, 03, 04, FLASH), and signal face status (R, G, Y, W, DRK).

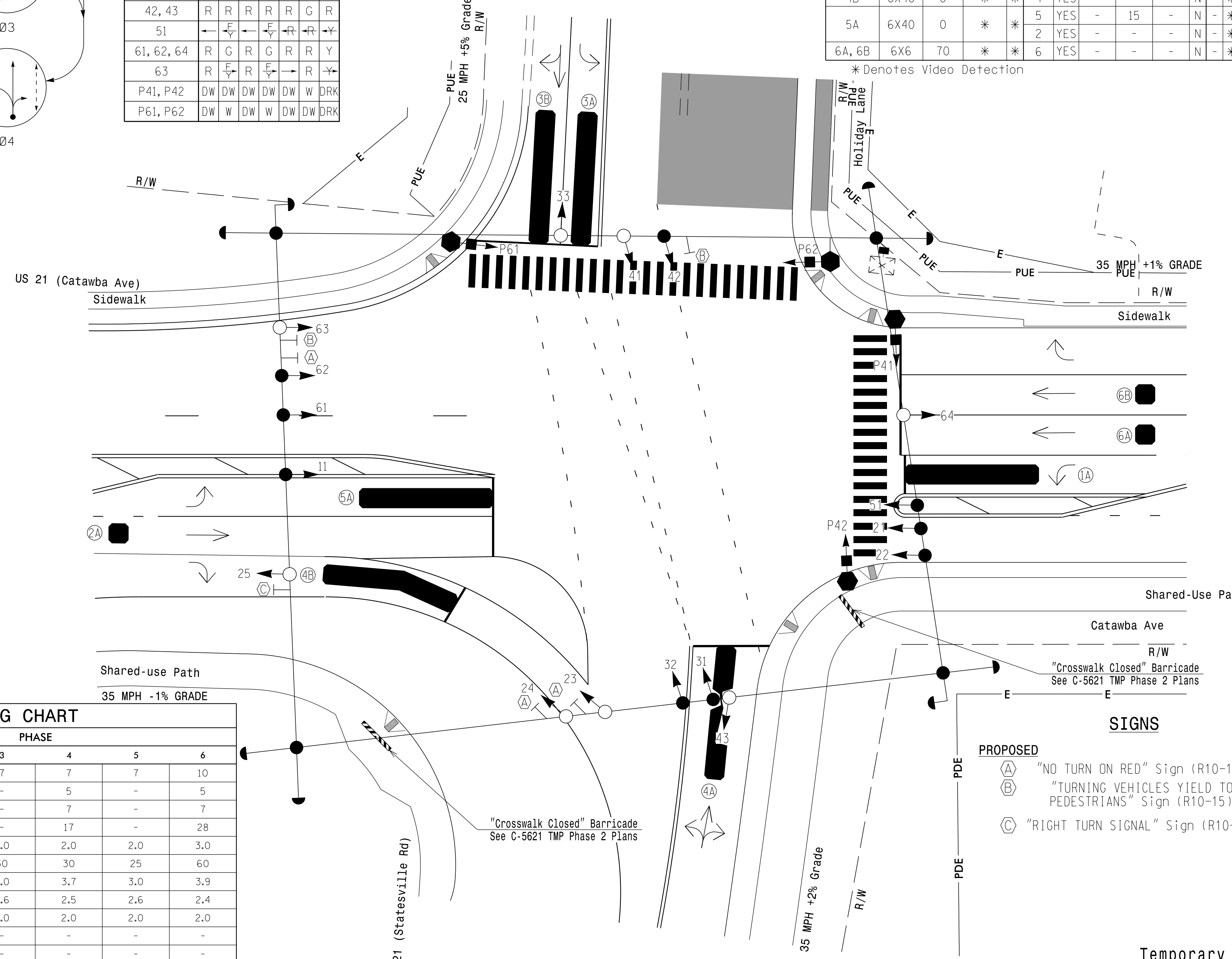
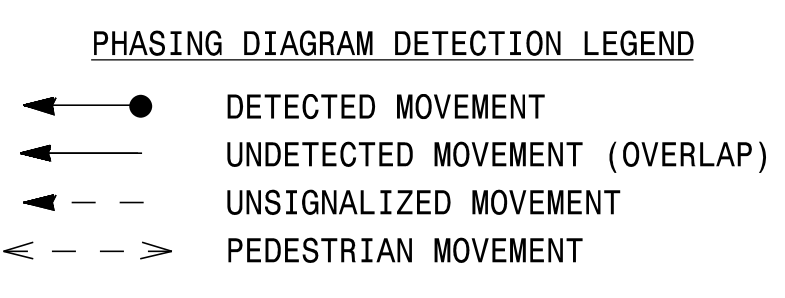
SIGNAL FACE I.D.



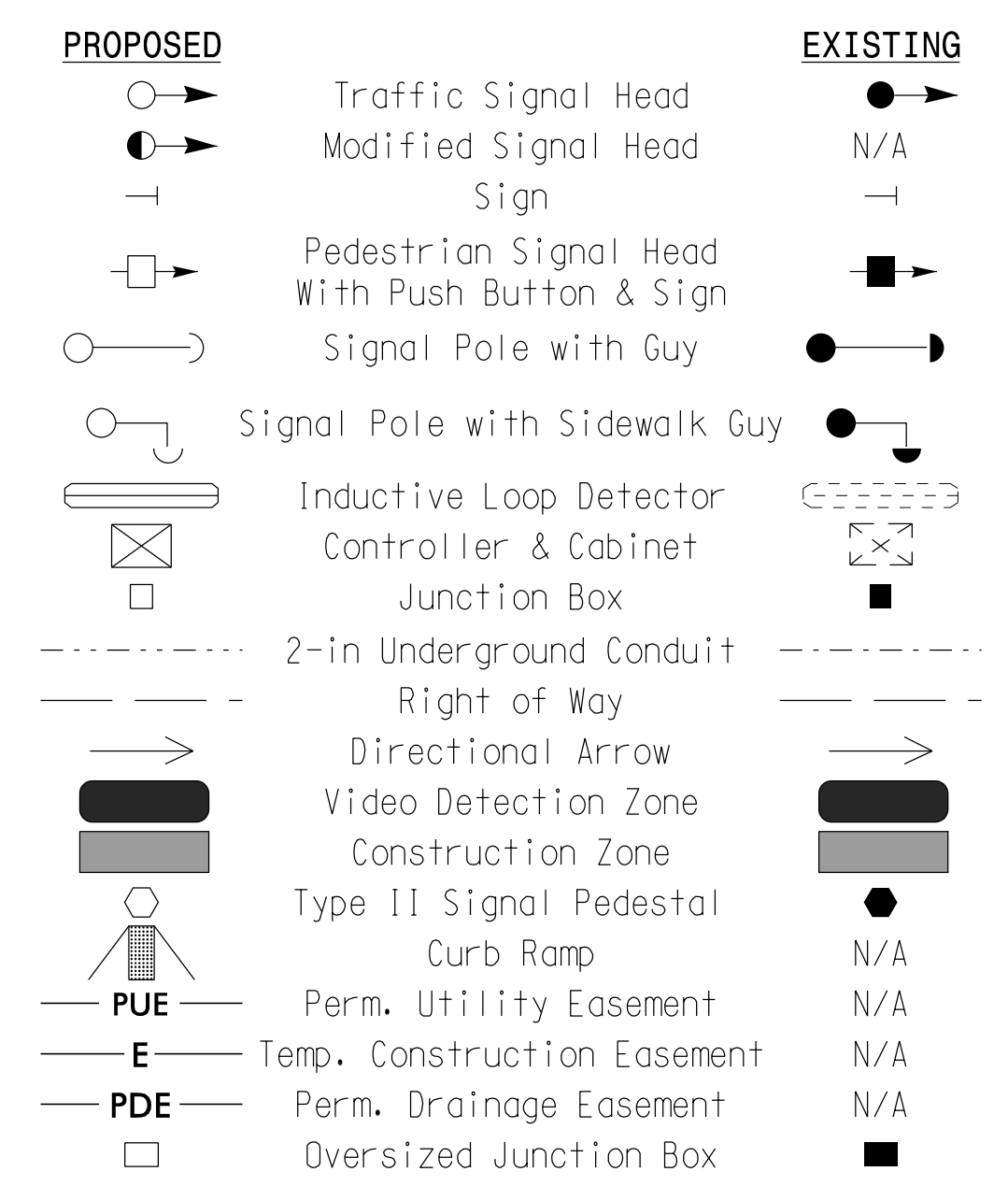
ASC/3 DETECTOR INSTALLATION CHART table with columns for DETECTOR (LOOP, SIZE, DISTANCE, TURNS, NEW LOOP) and PROGRAMMING (PHASE, CALLING, EXTEND TIME, DELAY TIME, USE ADDED INITIAL, TYPE, SYSTEM LOOP, NEW CARD).

3 Phase Fully Actuated Cornelius CLS D10-18 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. Reposition existing signal for late night flashing operation unless otherwise directed by the Engineer.
4. Rename existing signal head 44 to 42 and reposition.
5. Remove portable pedestrian signals P21 and P22.
6. Set all detector units to presence mode.
7. All pedestrian signal equipment shall be placed on portable bases to allow for relocation as required by Division 10 traffic engineer.
8. Pedestrian head and pushbutton signal cables shall be directly attached to overhead spanwire.
9. Pedestrian pedestal locations to be determined by Division 10 traffic engineer.
10. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
11. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
12. Program controller to allow an Advanced Walk movement before serving the vehicle phase.
13. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
14. See C-5621 TMP Phase 2 for pavement markings and pedestrian detour routing.
15. Portions of crosswalk masked for clarity.
16. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

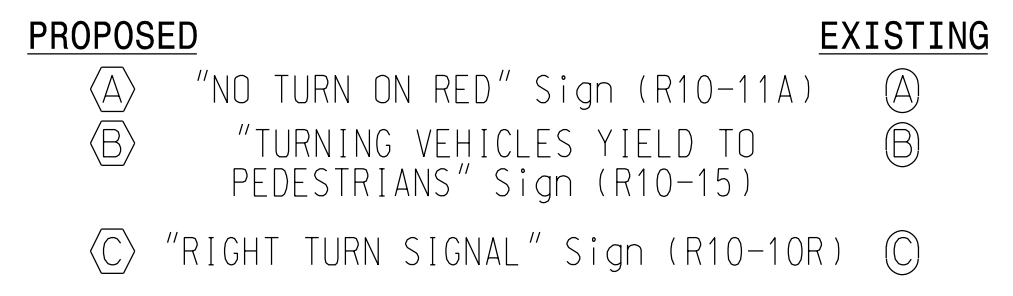


LEGEND



ASC/3 TIMING CHART table with columns for FEATURE and PHASE (1, 2, 3, 4, 5, 6) and rows for Min Green, Delayed Green, Walk, Ped Clear, Veh. Extension, Max 1, Yellow, Red Clear, Red Revert, Actuations B4 Add, Seconds /Actuation, Max Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Locking Detector, Recall Position, Dual Entry, Simultaneous Gap.

SIGNS

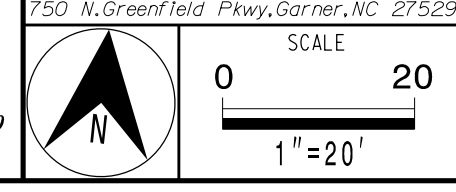


Temporary Signal 2 - TCP Phase 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Professional seal and signature block for S. Nick Matthews, PE, dated 2/21/2023. Includes project title: US 21 (Catawba Avenue) / Catawba Avenue at US 21 (Statesville Road) / Holiday Lane, Division 10 Mecklenburg County, and various administrative fields.

This plan supersedes the signal plan signed and sealed by S. Nick Matthews, PE on 05/31/2022.



* 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.

21-Feb-23 13:36:22 R:\Projects\2023\0221-000\Drawings\Signal\0221-000-Sig-3.0.dwg 2/21/2023 13:36:22

PHASING DIAGRAM

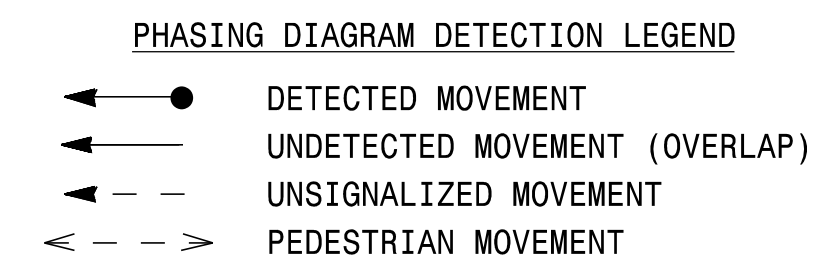
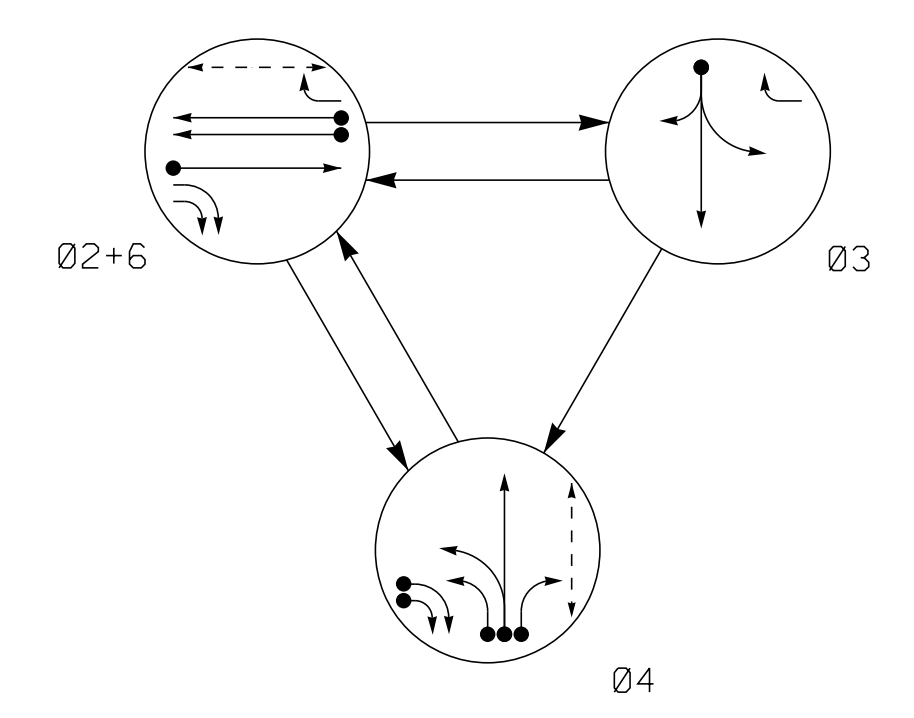
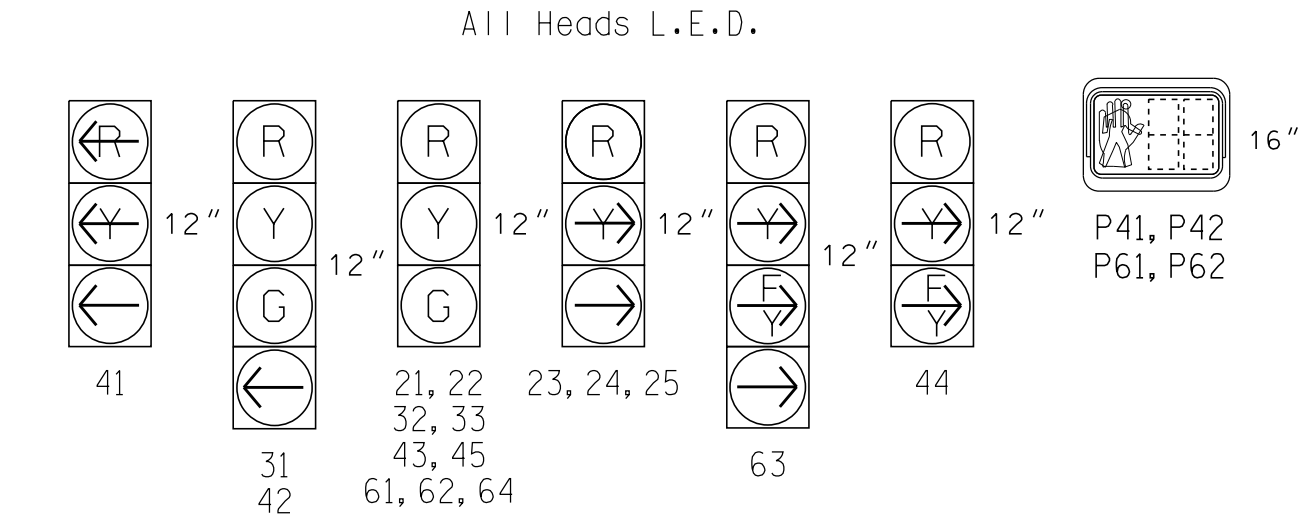


TABLE OF OPERATION

SIGNAL FACE	PHASE				FLASH
	02+6	03	04		
21, 22	G	R	R	Y	
23, 24, 25	→	R	→	Y	
31	R	G	R	R	
32, 33	R	G	R	R	
41	←	←	←	←	
42	R	R	G	R	
43, 45	R	R	G	R	
44	R	R	E	R	
61, 62, 64	G	R	R	Y	
63	←	→	→	Y	
P41, P42	DW	DW	W	DRK	
P61, P62	W	DW	DW	DRK	

SIGNAL FACE I.D.



ASC/3 DETECTOR INSTALLATION CHART

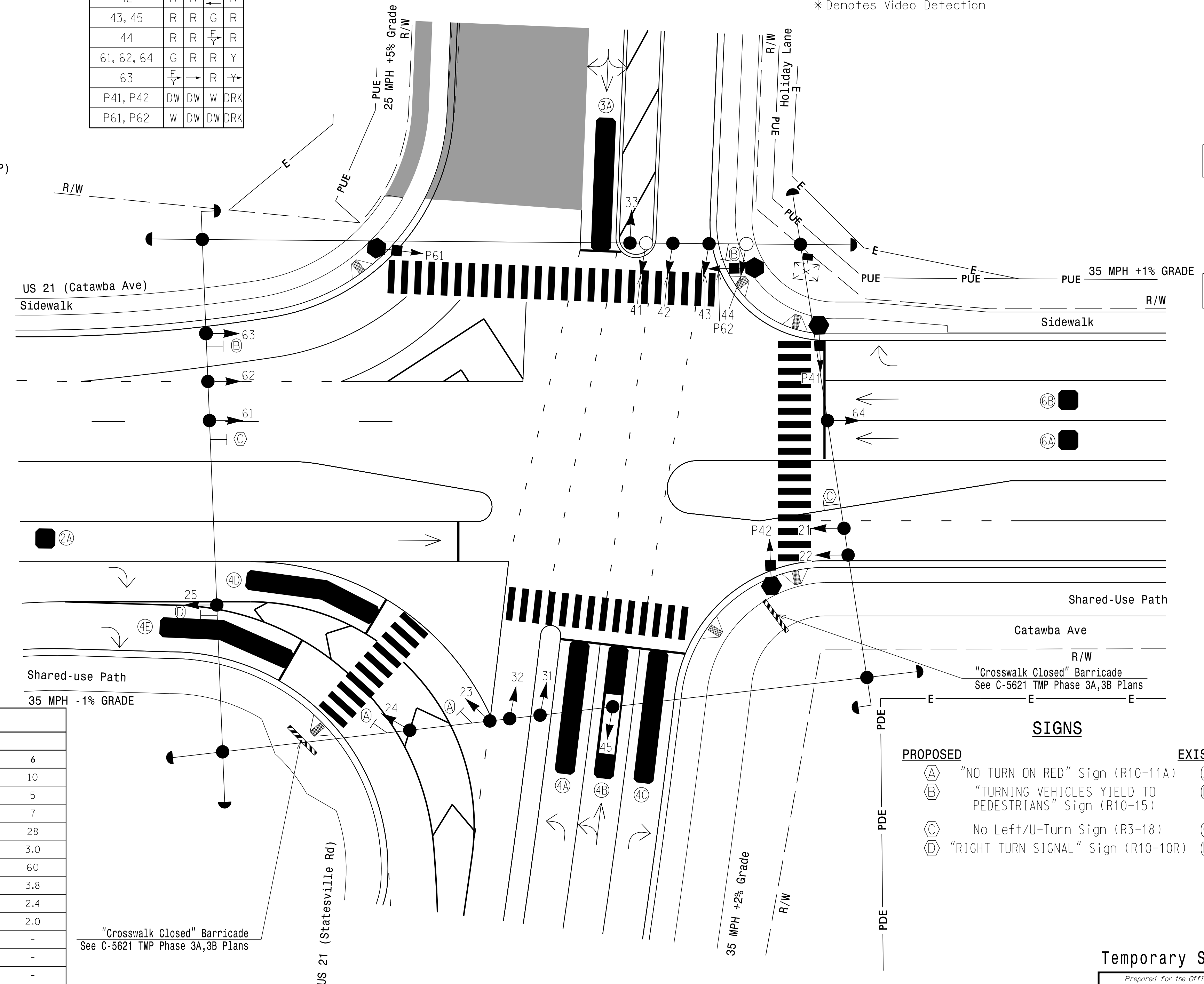
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	70	*	*	2	YES	-	-	-	N	-	*
3A	6X40	0	*	*	3	YES	-	3	-	N	-	*
4A, 4B	6X40	0	*	*	4	YES	-	-	-	N	-	*
4C	6X40	0	*	*	4	YES	-	15	-	N	-	*
4D, 4E	6X40	0	*	*	4	YES	-	-	-	N	-	*
6A, 6B	6X6	70	*	*	6	YES	-	-	-	N	-	*

* Denotes Video Detection

3 Phase Fully Actuated Cornelius CLS D10-18

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018, and all applicable sections of the latest version of the generic Project Special Provisions.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Reposition existing signal heads 21, 22, 23, 24, 25, 31, 32, 33, and 43.
- Rename existing signal heads 41 as 42, and 43 as 45. Reposition as shown.
- Set all detector units to presence mode.
- All pedestrian signal equipment shall be placed on portable bases to allow for relocation as required by Division 10 traffic engineer.
- Pedestrian head and pushbutton signal cables shall be directly attached to overhead spanwire.
- Pedestrian pedestal locations to be determined by Division 10 traffic engineer.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Program controller to allow an Advanced Walk movement before serving the vehicle phase.
- Relocate existing "TURNING VEHICLES YIELD TO PEDESTRIANS" sign (R10-15).
- This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- See C-5621 TMP Phases 3A, 3B for pavement markings and pedestrian detour plan.
- Portions of crosswalk and video detection zones masked for clarity.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

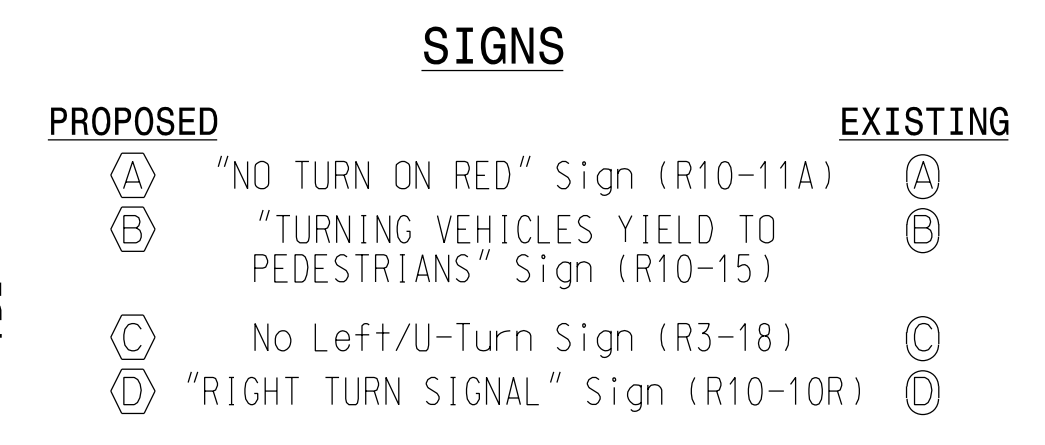
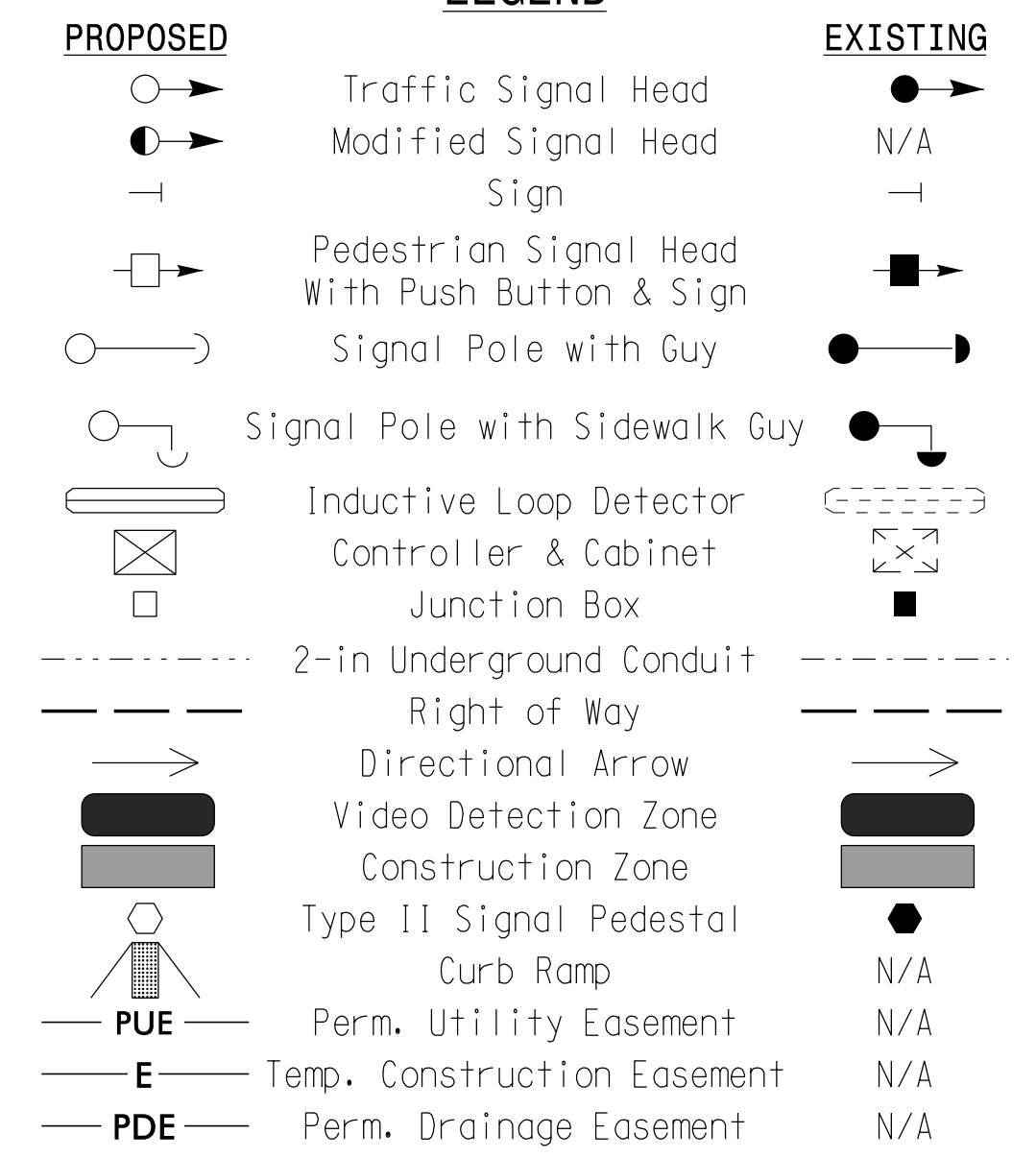


ASC/3 TIMING CHART

FEATURE	PHASE			
	2	3	4	6
Min Green *	10	7	7	10
Delayed Green	-	-	5	5
Walk *	-	-	7	7
Ped Clear	-	-	17	28
Veh. Extension *	3.0	2.0	2.0	3.0
Max I *	60	30	30	60
Yellow	3.9	3.0	3.7	3.8
Red Clear	2.0	3.6	2.2	2.4
Red Revert	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	X	-	-	X
Recall Position	VEH. RECALL	-	-	VEH. RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

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

LEGEND



Temporary Signal 3 - TCP Phase 3A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

 NC FIRM LICENSE No: F-0493 8521 SIX FORKS ROAD, SUITE 400 RALEIGH, NC 27615 (919) 926-4100	Prepared for the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION DEPARTMENT OF TRANSPORTATION SIGNAL DESIGN SECTION	US 21 (Catawba Avenue) / Catawba Avenue at US 21 (Statesville Road) / Holiday Lane Division 10 Mecklenburg County Cornelius PLAN DATE: February 2023 REVIEWED BY: S.G. Haynie PREPARED BY: S.N. Matthews REVIEWED BY:	SEAL S. NICK MATTHEWS ENGINEER 046989 DATE: 2/21/2023
	SCALE 0 20 1"=20'	REVISIONS INITI. DATE	SIGNATURE DATE 2/21/2023	Sig Inventory No. 10-088513

This plan supersedes the signal plan signed and sealed by S. Nick Matthews, PE on 05/31/2022.

2/21/2023 15:48:08
 R:\Projects\2023\10-088513\Drawings\Signal\10-088513_Sig.dgn-20230221.dgn
 15:48:08

PHASING DIAGRAM

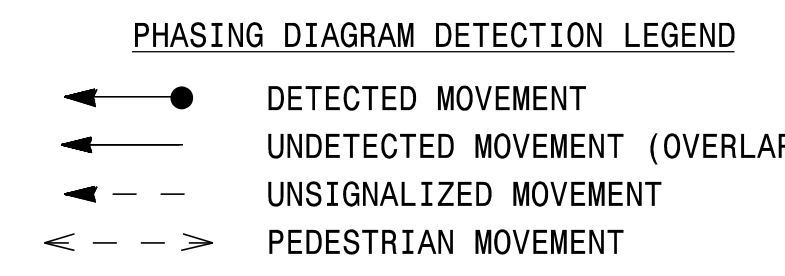
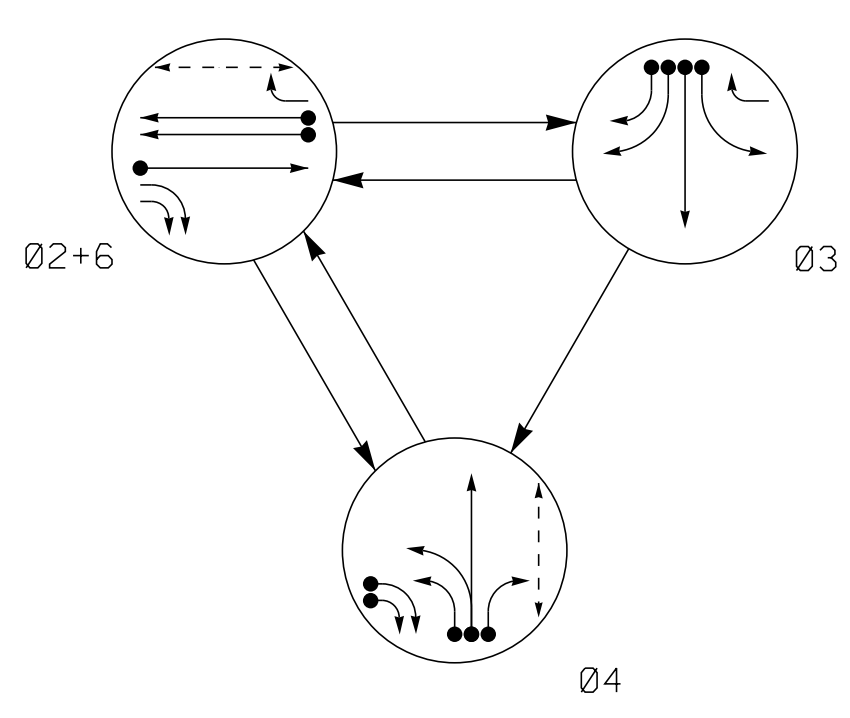
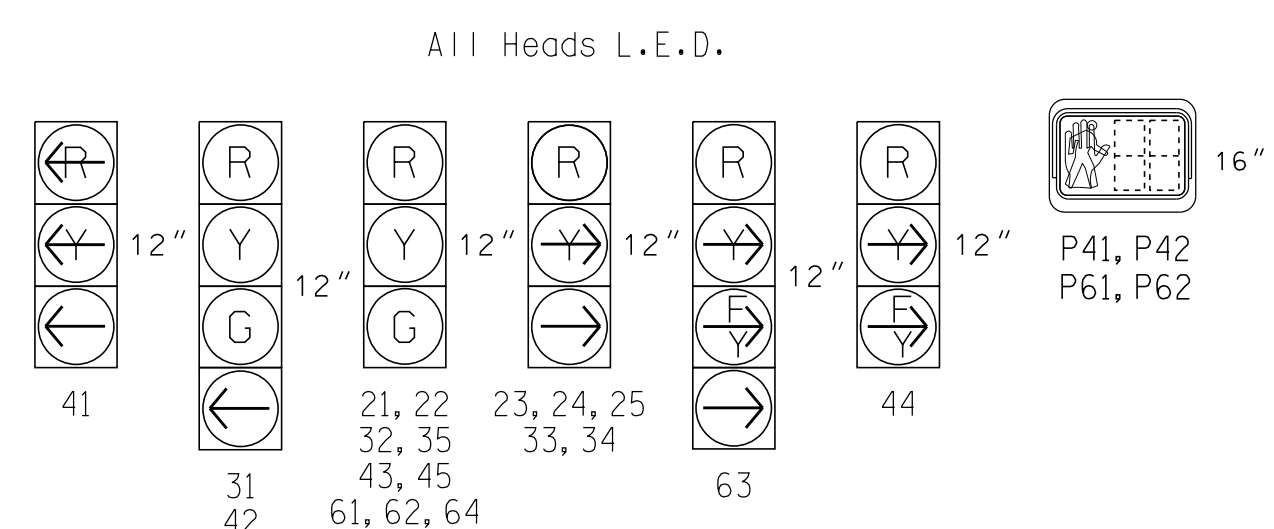


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	Ø 2+6	Ø 3	Ø 4	Ø 4
21, 22	G	R	R	Y
23, 24, 25	→	R	→	→
31	R	G	R	R
32, 35	R	G	R	R
33, 34	R	→	R	R
41	R	R	→	→
42	R	R	G	R
43, 45	R	R	G	R
44	R	R	E	R
61, 62, 64	G	R	R	Y
63	→	R	→	→
P41, P42	DW	DW	W	DRK
P61, P62	W	DW	DW	DRK

SIGNAL FACE I.D.



ASC/3 DETECTOR INSTALLATION CHART

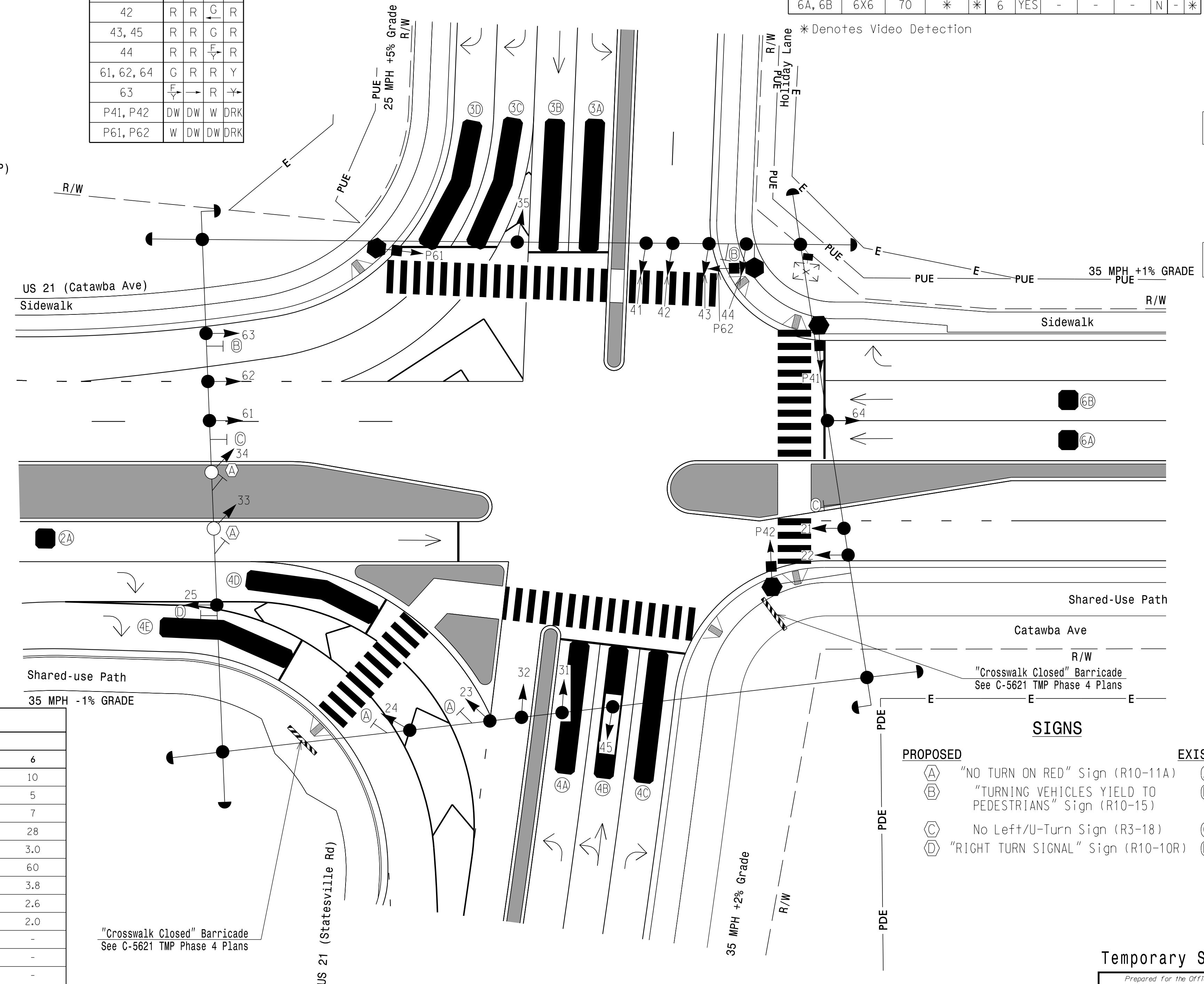
DETECTOR				PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	70	*	*	2	YES	-	-	-	N	-	*
3A, 3B	6X40	0	*	*	3	YES	-	-	-	N	-	*
3C, 3D	6X40	0	*	*	3	YES	-	-	-	N	-	*
4A, 4B	6X40	0	*	*	4	YES	-	-	-	N	-	*
4C	6X40	0	*	*	4	YES	-	15	-	N	-	*
4D, 4E	6X40	0	*	*	4	YES	-	-	-	N	-	*
6A, 6B	6X6	70	*	*	6	YES	-	-	-	N	-	*

* Denotes Video Detection

3 Phase Fully Actuated Cornelius CLS D10-18

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018, and all applicable sections of the latest version of the generic Project Special Provisions.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Reposition existing signal heads 31 and 32.
- Rename existing signal head 33 as 35 and reposition.
- Set all detector units to presence mode.
- All pedestrian signal equipment shall be placed on portable bases to allow for relocation as required by Division 10 traffic engineer.
- Pedestrian head and pushbutton signal cables shall be directly attached to overhead spanwire.
- Pedestrian pedestal locations to be determined by Division 10 traffic engineer.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Program controller to allow an Advanced Walk movement before serving the vehicle phase.
- This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- See C-5621 TMP Phase 4 for pavement markings and pedestrian detour plan.
- Portions of crosswalk and video detection zones masked for clarity.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

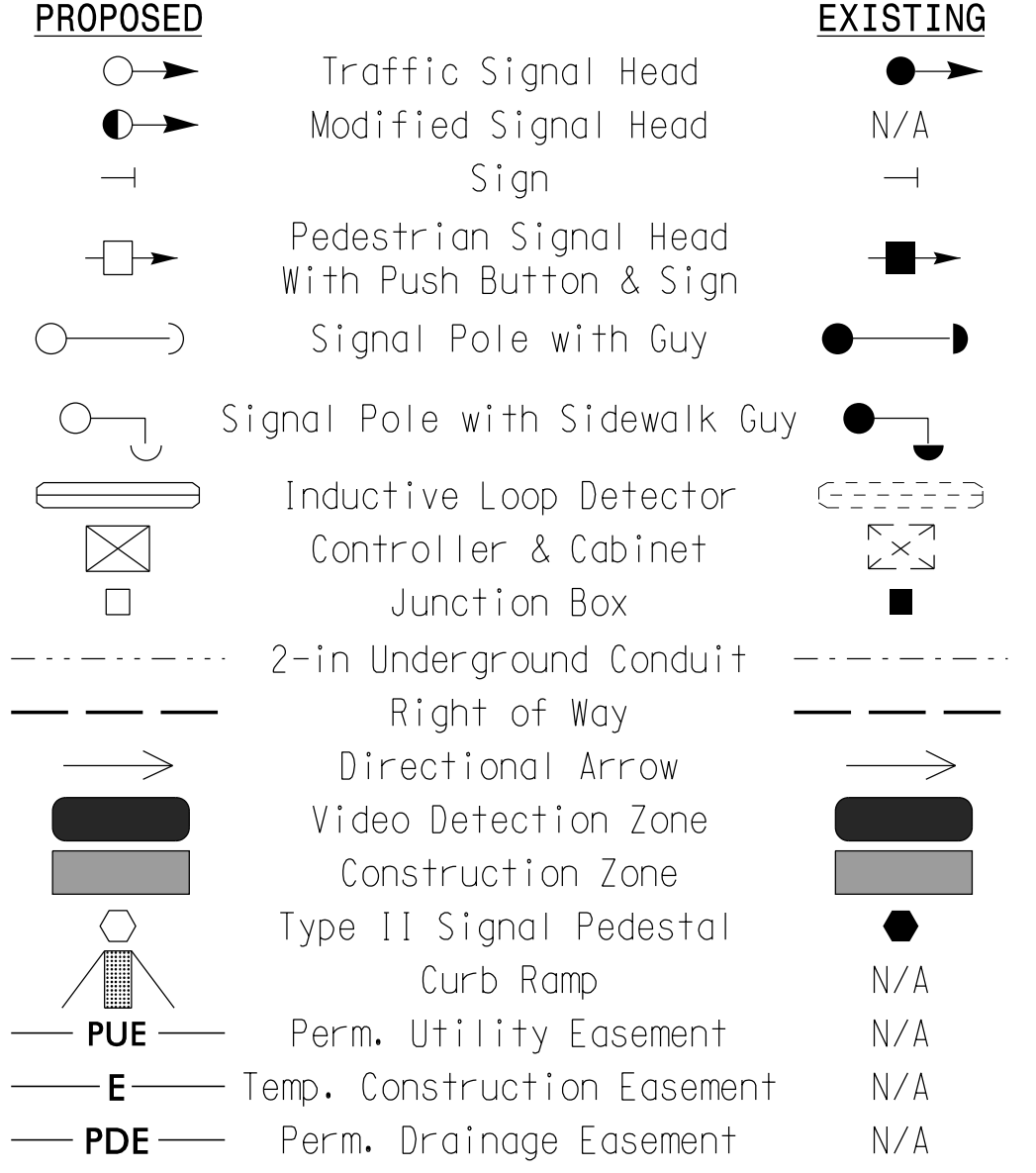


ASC/3 TIMING CHART

FEATURE	PHASE			
	2	3	4	6
Min Green *	10	7	7	10
Delayed Green	-	-	5	5
Walk *	-	-	7	7
Ped Clear	-	-	17	28
Veh. Extension *	3.0	2.0	2.0	3.0
Max I *	60	30	30	60
Yellow	3.9	3.0	3.7	3.8
Red Clear	2.0	3.7	2.6	2.6
Red Revert	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	X	-	-	X
Recall Position	VEH. RECALL	-	-	VEH. RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

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

LEGEND



- SIGNS**
- | | | | |
|--|--|--|--|
| | PROPOSED "NO TURN ON RED" Sign (R10-11A) | | EXISTING "NO TURN ON RED" Sign (R10-11A) |
| | PROPOSED "TURNING VEHICLES YIELD TO PEDESTRIANS" Sign (R10-15) | | EXISTING "TURNING VEHICLES YIELD TO PEDESTRIANS" Sign (R10-15) |
| | PROPOSED No Left/U-Turn Sign (R3-18) | | EXISTING No Left/U-Turn Sign (R3-18) |
| | PROPOSED "RIGHT TURN SIGNAL" Sign (R10-10R) | | EXISTING "RIGHT TURN SIGNAL" Sign (R10-10R) |

Temporary Signal 4 - TCP Phases 3B, 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

8521 SIX FORKS ROAD, SUITE 400
RALEIGH, NC 27615
(919) 926-4100

US 21 (Catawba Avenue) /
Catawba Avenue at
US 21 (Statesville Road) /
Holiday Lane

Division 10 Mecklenburg County Cornelius

PLAN DATE: February 2023 REVIEWED BY: S.G. Haynie

PREPARED BY: S.N. Matthews REVIEWED BY:

SEAL

2/21/2023

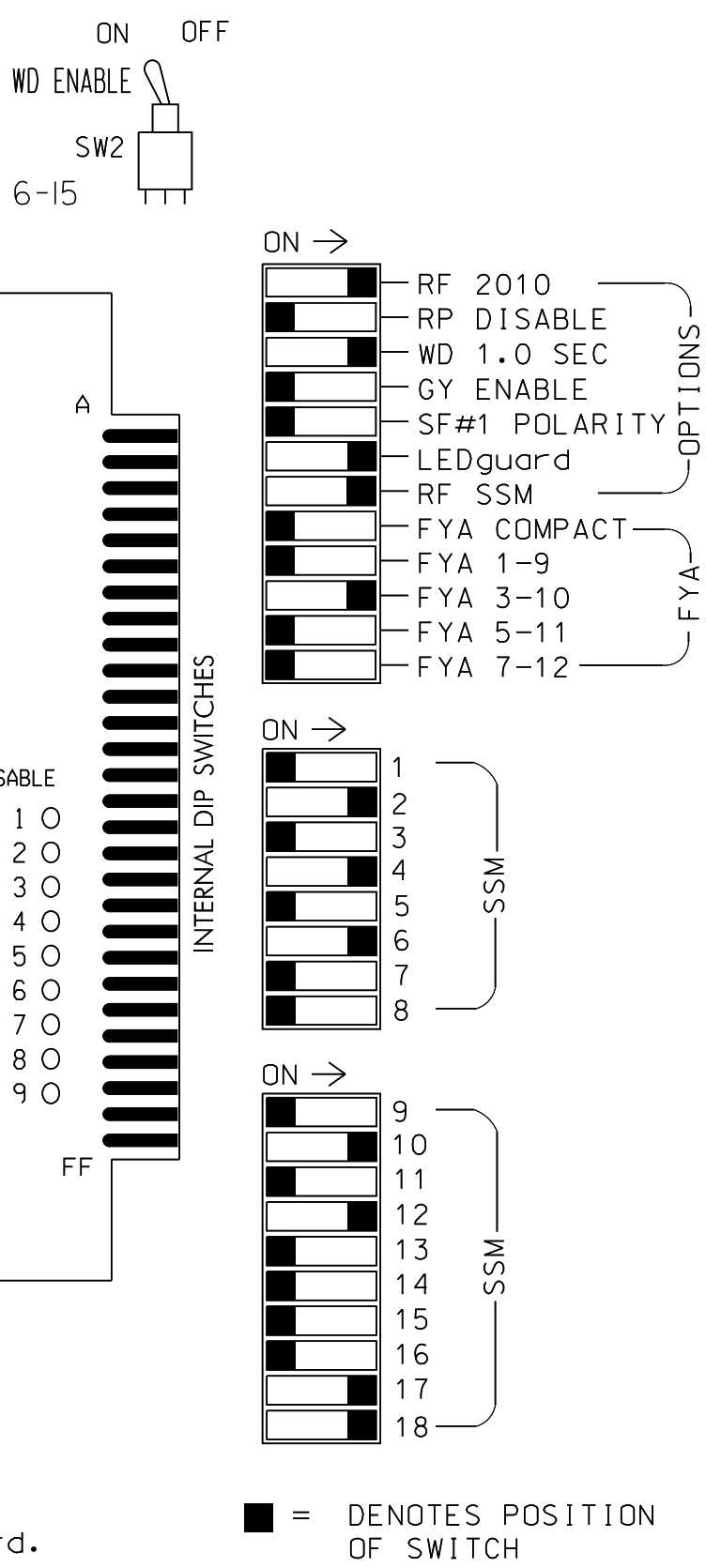
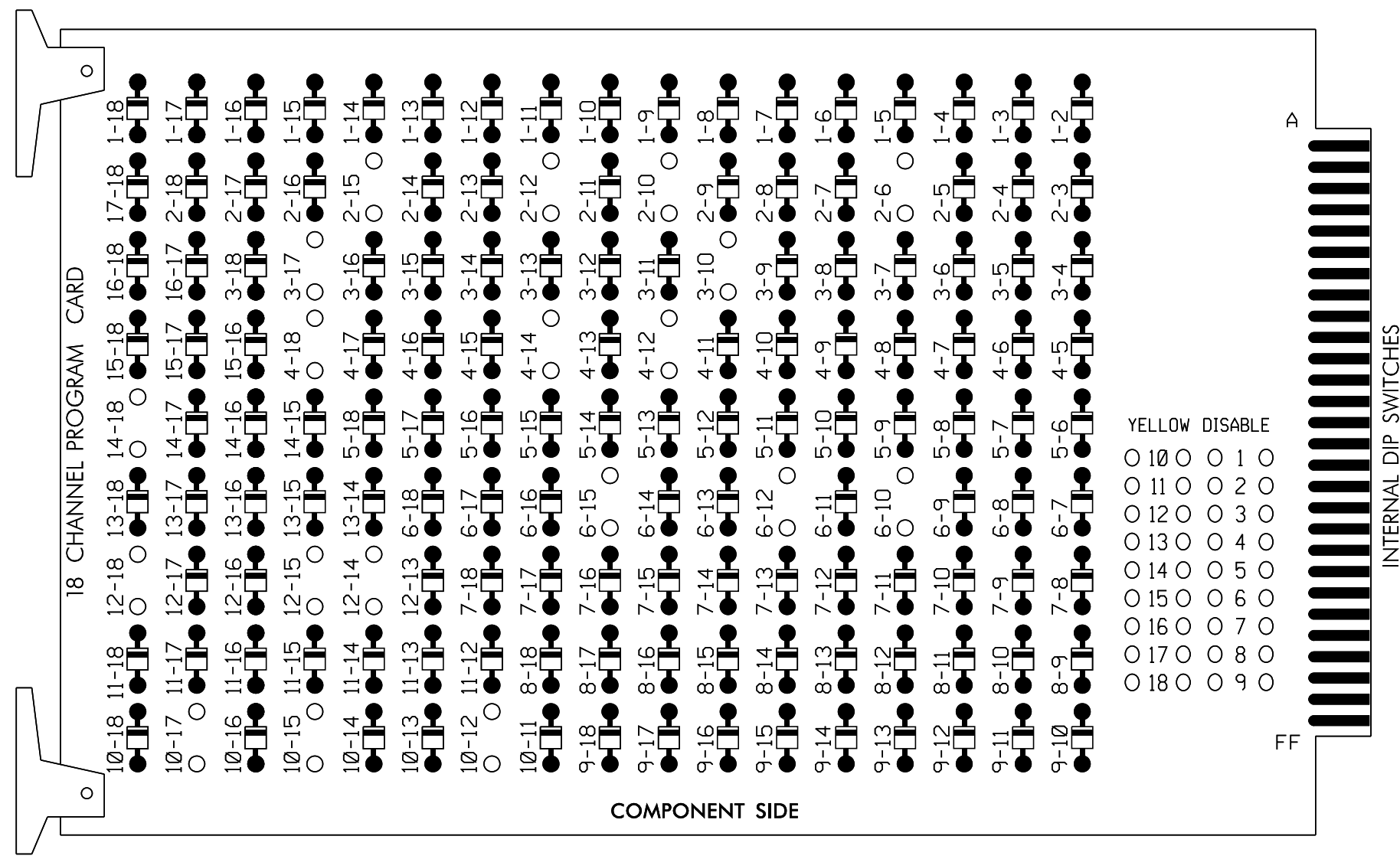
This plan supersedes the signal plan signed and sealed by S. Nick Matthews, PE on 05/31/2022.

2: Feb-23 13:42:04
 6: P:\Projects\cns\gms\gms\10088514_sig_dsm-20230221.dgn
 13: 42:04

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-6, 2-10, 2-12, 2-15, 3-10, 3-17, 4-12, 4-14, 4-18, 6-10, 6-12, 6-15, 10-12, 10-15, 10-17, 12-14, 12-15, 12-18, and 14-18



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.
 - Program controller to start up in phase 2 Green and phase 6 Walk.
- NOTE THAT PHASE 6 DOES NOT START IN WALK!
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
 - The cabinet and controller are part of the 11018 Cornelius Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE
 ASC/3-2070

CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX.
 OUTPUT FILE

LOAD SWITCHES USED.....S2,S4,S5,S6,S8,
 S9,AUX S2,AUX S3
 AUX S5, AUX S6

PHASES USED.....2,4,4PED,
 6,6PED

OVERLAP "A".....NOT USED
 OVERLAP "B".....*
 OVERLAP "C".....NOT USED
 OVERLAP "D".....*
 OVERLAP "E".....*
 OVERLAP "F".....*
 OVERLAP "G".....*

* See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

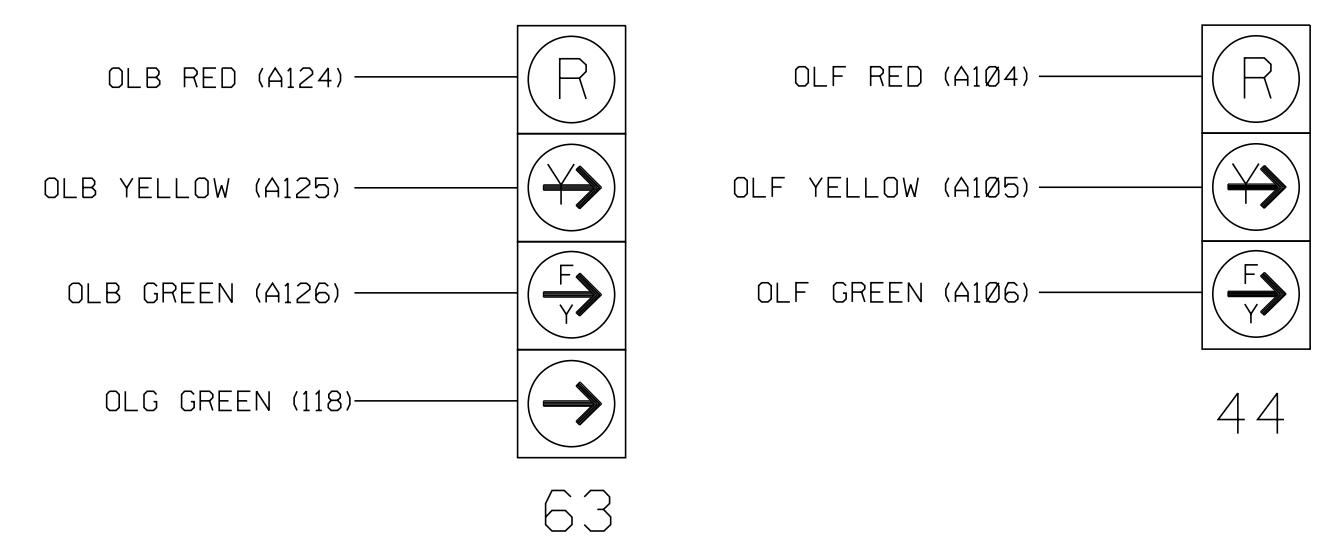
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6				
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18				
PHASE	1	2	2 PED	OLG	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	OLE	OLC	OLD	OLF				
SIGNAL HEAD NO.	NU	21,22	NU	63*	41	42	43,45	P41, P42	NU	61, 62,64	P61, P62	NU	NU	NU	63*	31	32,35	33,34	NU	23, 24,25	44*	
RED		128			101	101				134					A124	A111	A111	A111		A101	A104	
YELLOW		129		*	102	102				135					A112	A112						
GREEN		130			103	103				136					A113	A113						
RED ARROW					101																	
YELLOW ARROW					102										A125		A112		A102	A105		
FLASHING YELLOW ARROW															A126							A106
GREEN ARROW					118	103	103								A113		A113		A103			
Hand								104			119											
Walker								106			121											

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.
 * See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE CONNECTION & PROGRAMMING CHART

(front view)

FILE	U	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L

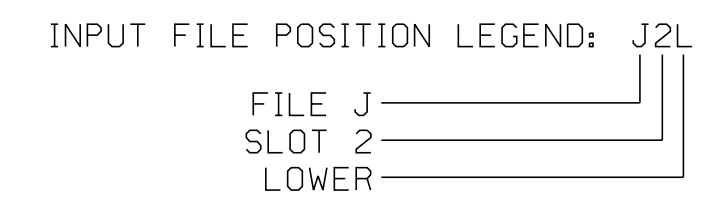
EX.: 1A, 2A, ETC. = LOOP NO.'S

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
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

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



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.

This plan supersedes the electrical plan signed and sealed by Steven G. Haynie, PE on 05/31/2022.



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: 10-0885T4
 DESIGNED: February 2023
 SEALED: February 21, 2023
 REVISED: N/A

Temporary Signal 4 - TCP Phases 3B, 4
 Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

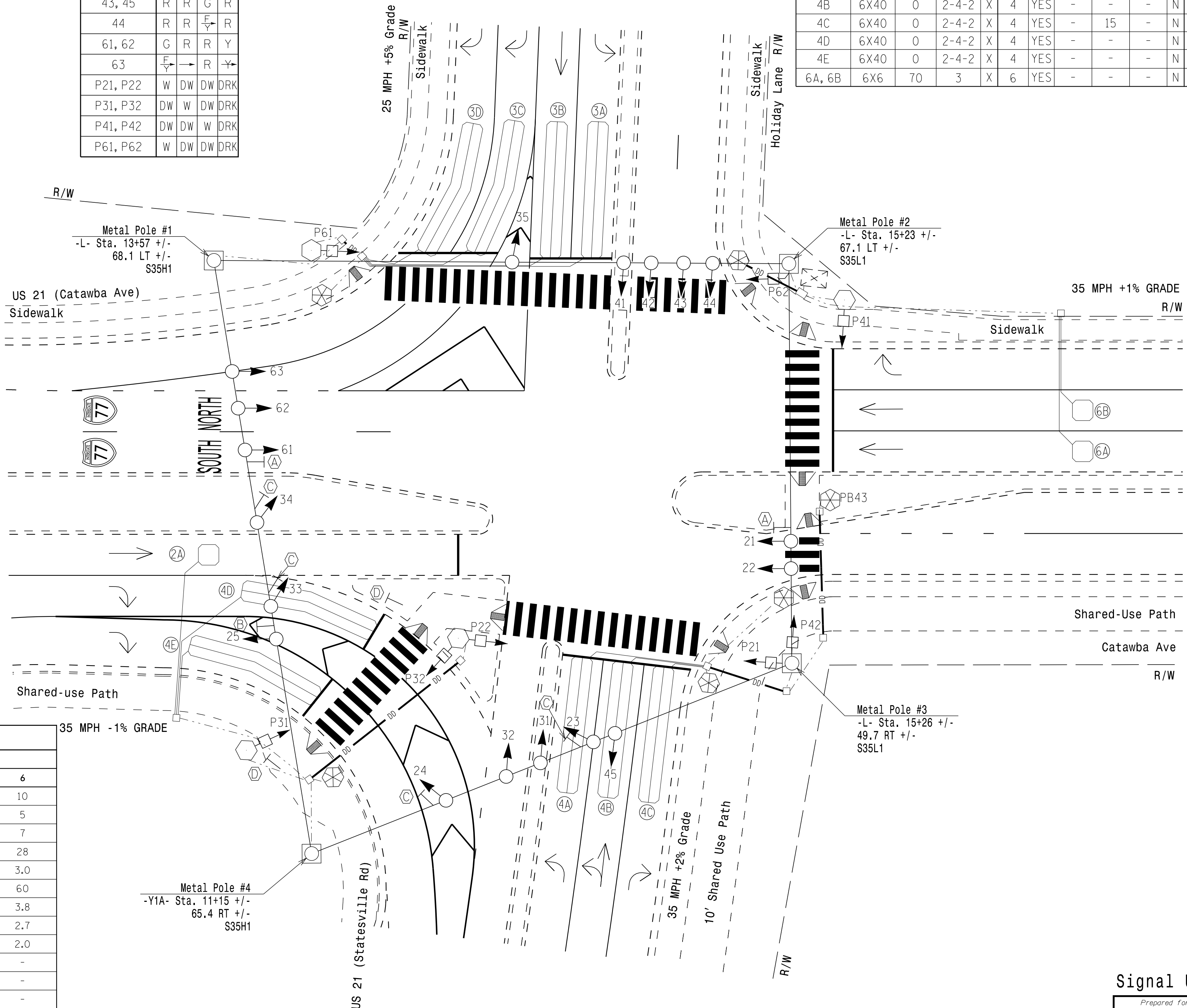
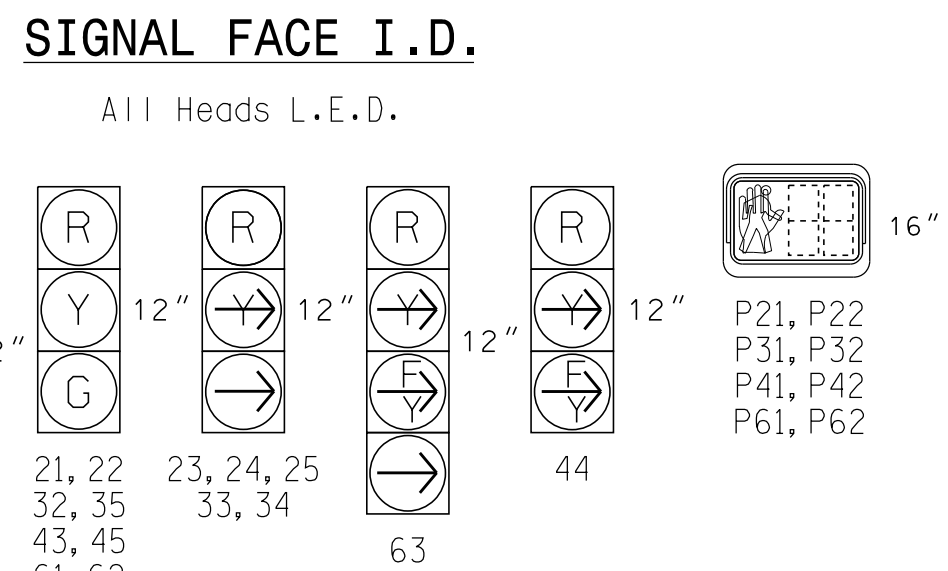
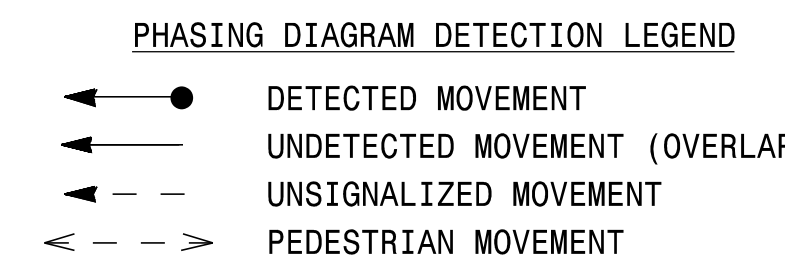
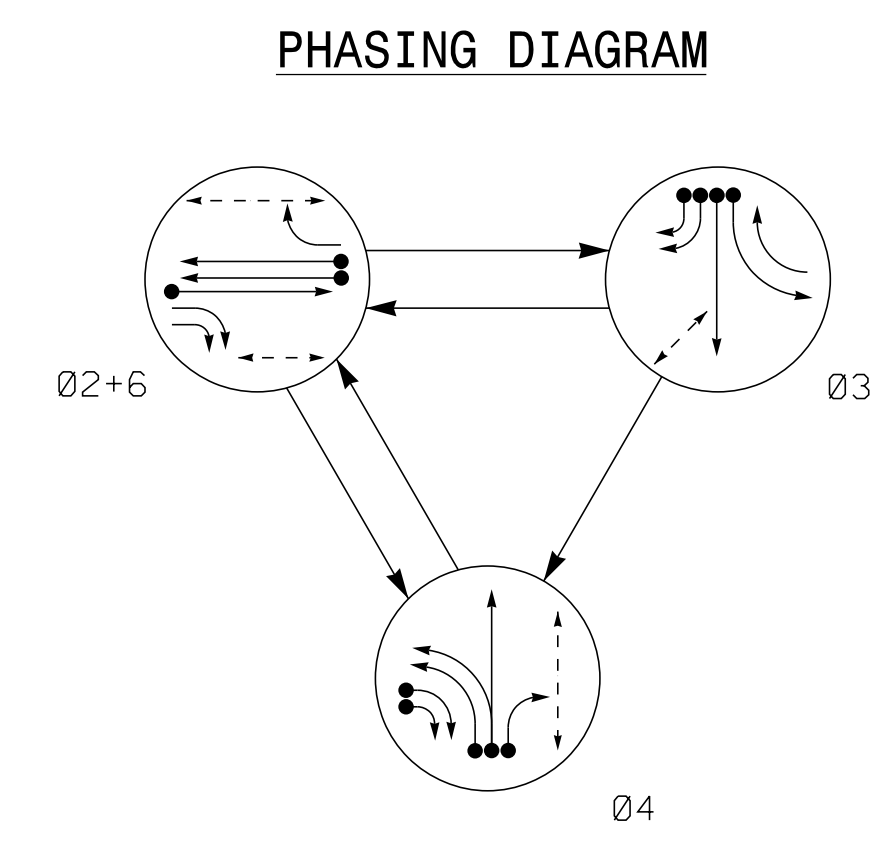
Prepared for the Offices of: 	US 21 (Catawba Avenue)/ Catawba Avenue at US 21 (Statesville Road)/ Holiday Lane Division 10 Mecklenburg County Cornelius		SEAL
	PLAN DATE: March 2023 PREPARED BY: S.G. Haynie	REVIEWED BY: V. Kaiser REVIEWED BY:		DATE:
REVISIONS		INIT.	DATE
Steven G. Haynie 3/8/2023		DATE	
Sig. Inventory No. 10-0885T4		DATE	

3 Phase Fully Actuated Cornelius CLS D10-18
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018, and all applicable sections of the latest version of the generic Project Special Provisions.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- The order of Phase 3 and Phase 4 may be reversed.
- 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.
- Program controller to allow an Advanced Walk movement before serving the vehicle phase.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Portions of high-visibility crosswalk masked for clarity.
- The Division Traffic Engineer will determine pushbutton locations.
- See C-5621 pavement marking plans for existing and proposed pavement markings.

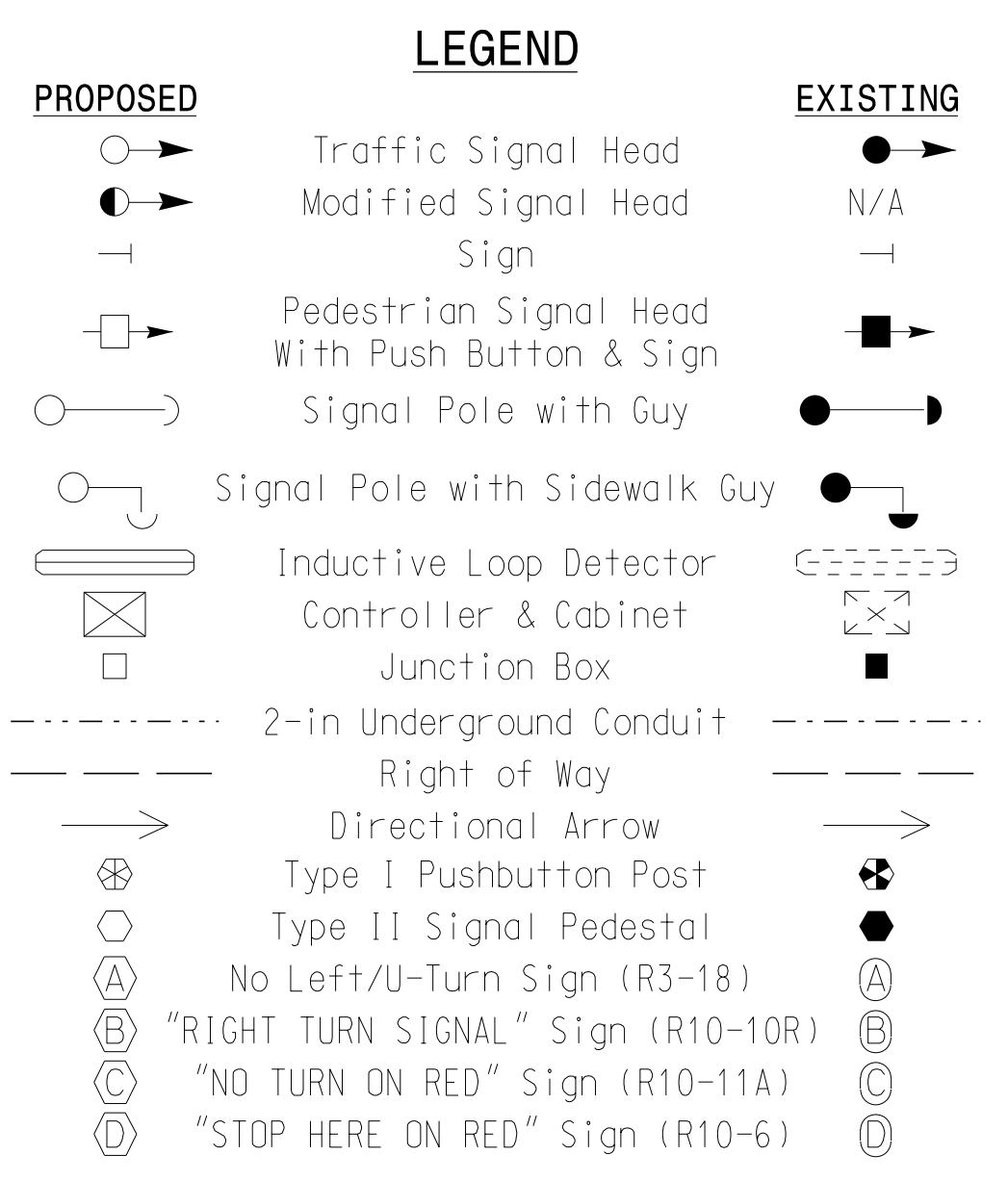
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	70	5	X	2	YES	-	-	-	N	-	X
3A	6X40	0	2-4-2	X	3	YES	-	-	-	N	-	X
3B	6X40	0	2-4-2	X	3	YES	-	-	-	N	-	X
3C	6X40	0	2-4-2	X	3	YES	-	-	-	N	-	X
3D	6X40	0	2-4-2	X	3	YES	-	-	-	N	-	X
4A	6X40	0	2-4-2	X	4	YES	-	-	-	N	-	X
4B	6X40	0	2-4-2	X	4	YES	-	-	-	N	-	X
4C	6X40	0	2-4-2	X	4	YES	-	15	-	N	-	X
4D	6X40	0	2-4-2	X	4	YES	-	-	-	N	-	X
4E	6X40	0	2-4-2	X	4	YES	-	-	-	N	-	X
6A,6B	6X6	70	3	X	6	YES	-	-	-	N	-	X

SIGNAL FACE	PHASE			
	Ø 2 + 6	Ø 3	Ø 4	FLASH
21, 22	G	R	R	Y
23, 24, 25	→	R	→	→
31	R	G	R	R
32, 35	R	G	R	R
33, 34	R	→	R	R
41	R	R	←	←
42	R	R	G	R
43, 45	R	R	G	R
44	R	R	←	←
61, 62	G	R	R	Y
63	→	R	→	→
P21, P22	W	DW	DW	DRK
P31, P32	DW	W	DW	DRK
P41, P42	DW	DW	W	DRK
P61, P62	W	DW	DW	DRK



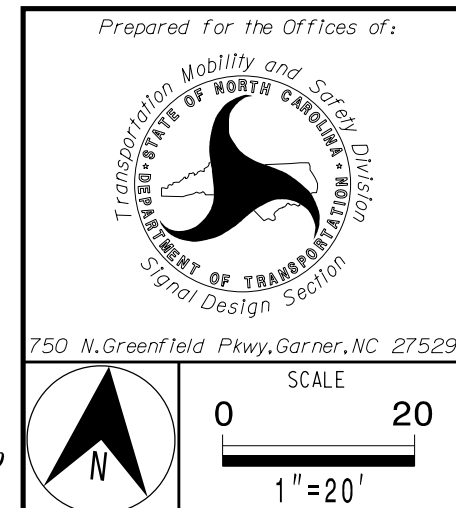
FEATURE	PHASE			
	2	3	4	6
Min Green *	10	7	7	10
Delayed Green	-	-	5	5
Walk *	7	7	7	7
Ped Clear	14	9	17	28
Yeh. Extension *	3.0	2.0	2.0	3.0
Max I *	60	30	30	60
Yellow	3.9	3.0	3.7	3.8
Red Clear	2.0	3.7	2.6	2.7
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	X	-	-	X
Recall Position	VEH. RECALL	-	-	VEH. RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

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



Signal Upgrade - Final

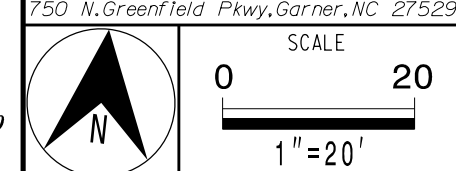
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



US 21 (Catawba Avenue) /
Catawba Avenue at
US 21 (Statesville Road) /
Holiday Lane
Division 10 Mecklenburg County Cornelius
PLAN DATE: February 2023 REVIEWED BY: S.G. Haynie
PREPARED BY: S.N. Matthews REVIEWED BY: _____
REVISIONS: _____ INIT: _____ DATE: _____

SEAL
S. NICK MATTHEWS
ENGINEER
10-0885

This plan supersedes the signal plan signed and sealed by S. Nick Matthews, PE on 05/31/2022.

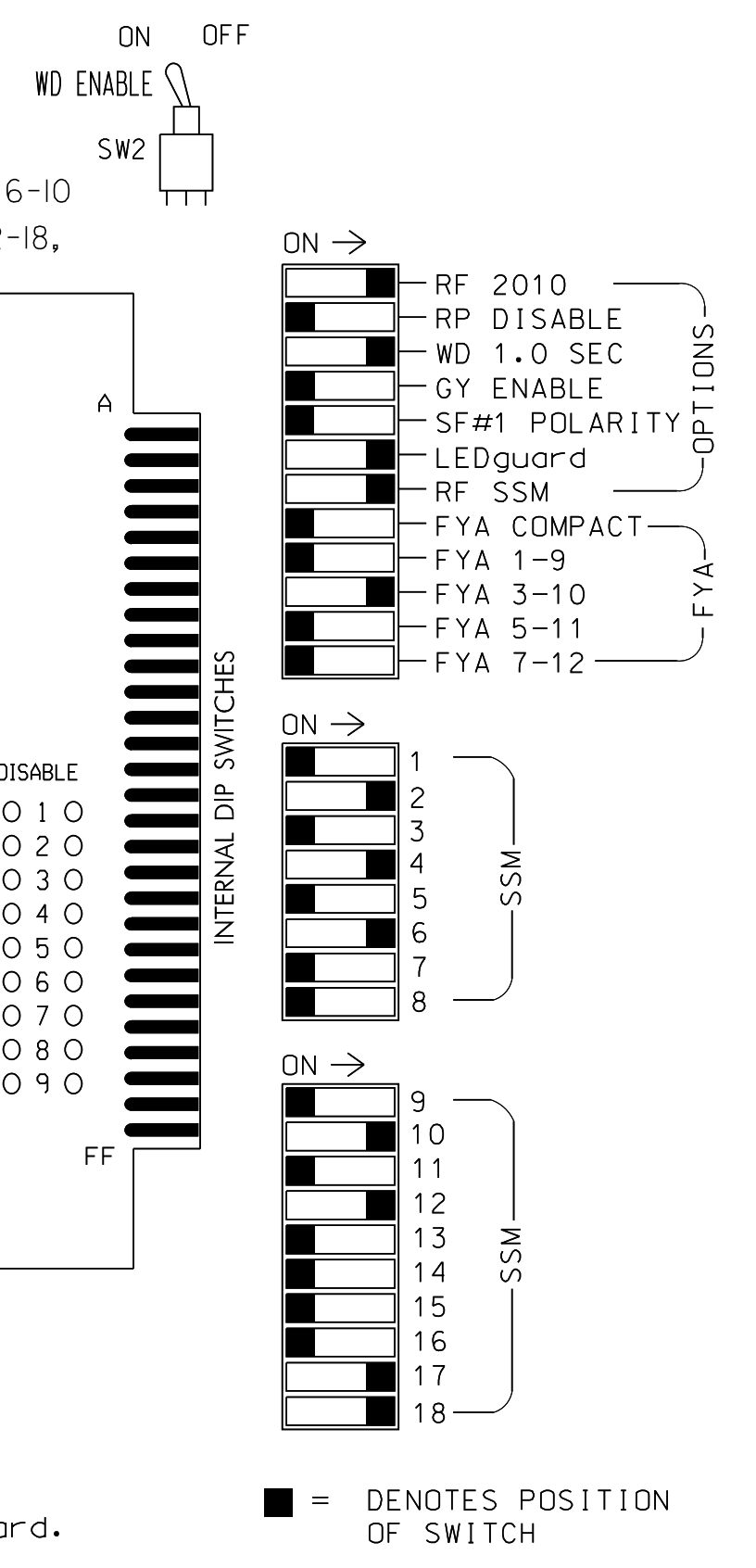
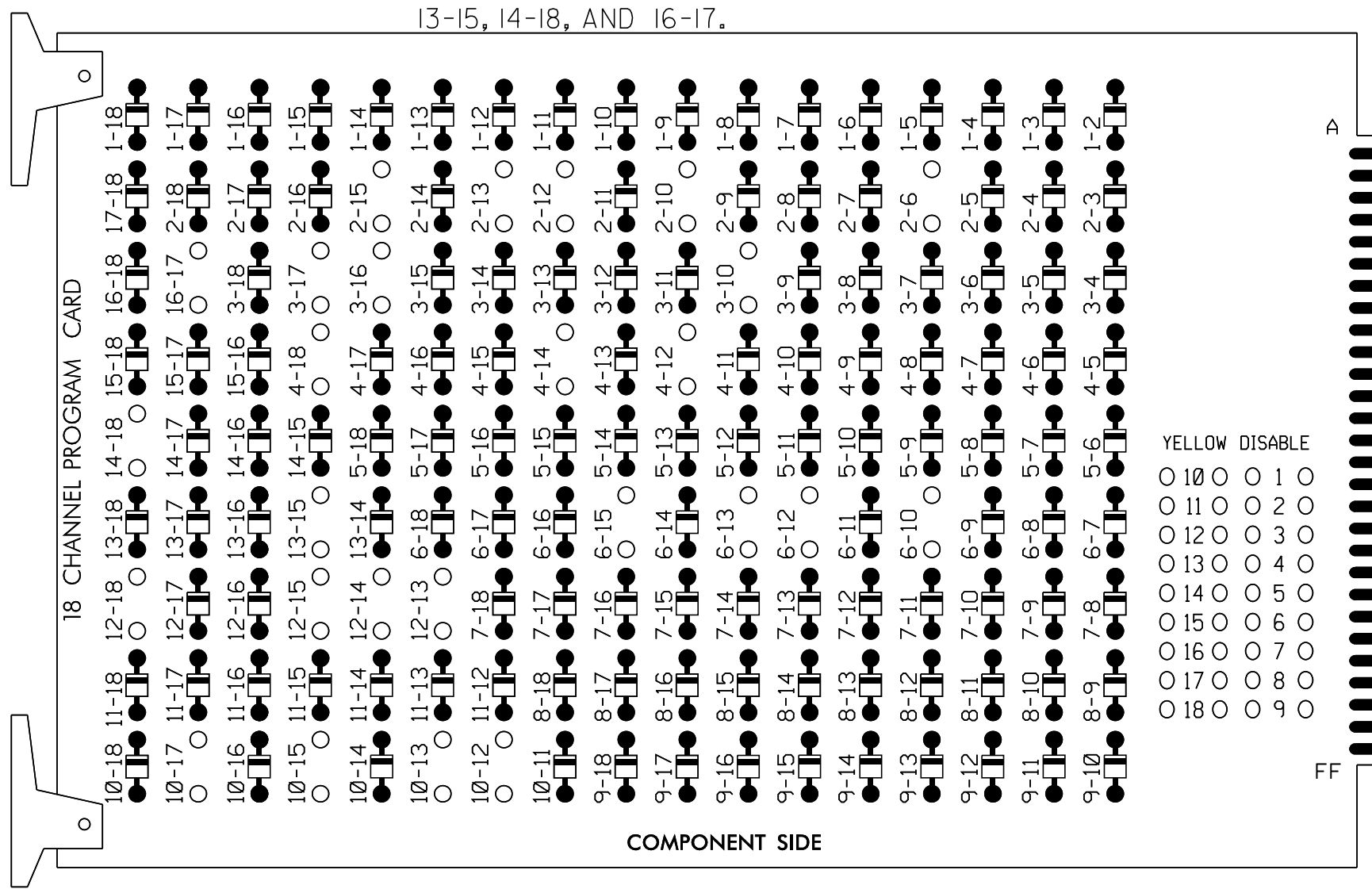


2: File: 23_13:31:31
 6: \\P:\OFFICE\GIS\GIS\Drawings\100885.dwg, den_20230221.dgn
 13:31:31

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-6, 2-10, 2-12, 2-13, 2-15, 3-10, 3-16, 3-17, 4-12, 4-14, 4-18, 6-10, 6-12, 6-13, 6-15, 10-12, 10-13, 10-15, 10-17, 12-13, 12-14, 12-15, 12-18, 13-15, 14-18, AND 16-17.



NOTES:

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

NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to start up in phase 2 Green and 6 Green.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the 11018 Cornelius Signal System.

NOTE THAT PHASE 6 DOES NOT START IN WALK!

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE ASC/3-2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S3,S4,S5, S6,S8,S9,S12, AUX S2, AUX S3, AUX S5, AUX S6
PHASES USED.....2,2PED,3PED, 4,4PED,6,6PED
OVERLAP "A".....NOT USED
OVERLAP "B".....*
OVERLAP "C".....NOT USED
OVERLAP "D".....*
OVERLAP "E".....*
OVERLAP "F".....*
OVERLAP "G".....*
* See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

Table with columns for Load Switch No., S1-S6, S7-S10, S11-S12, AUX S1-S6, and Signal Head No. (RED, YELLOW, GREEN, RED ARROW, YELLOW ARROW, FLASHING YELLOW ARROW, GREEN ARROW). Includes pedestrian and wheelchair icons.

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)

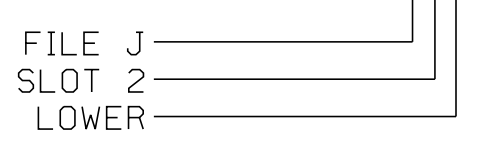
Table showing input file positions 1-14 with loop numbers and file names (e.g., 2A, 4A, 6A, 8A, 10A, 12A, 14A).

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

INPUT FILE CONNECTION & PROGRAMMING CHART

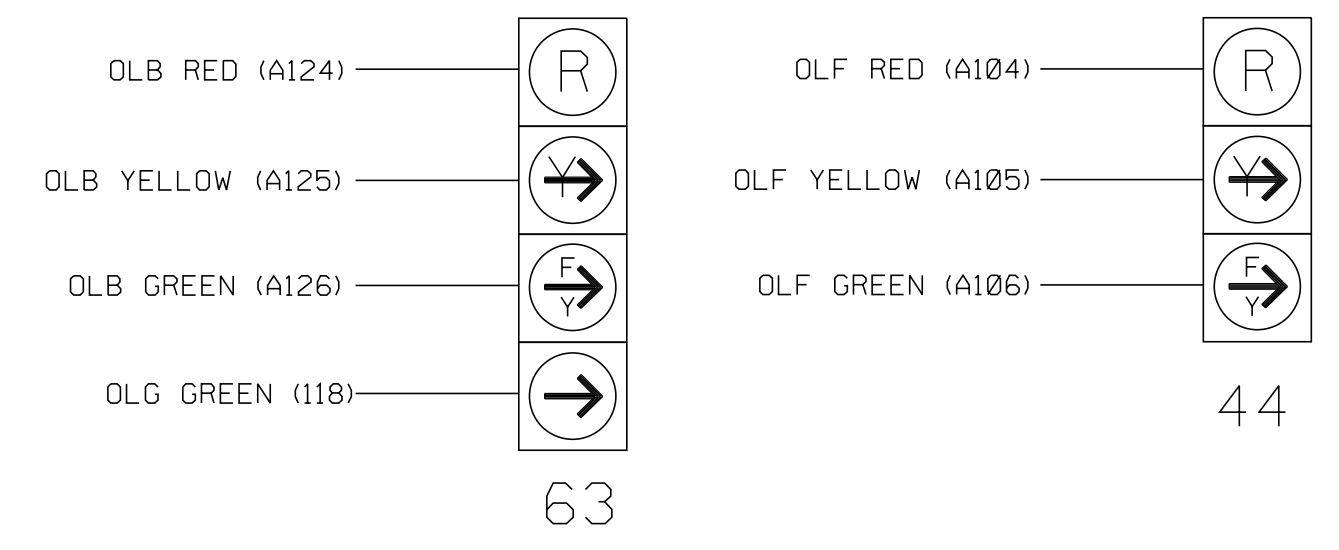
Table with columns: LOOP NO., LOOP TERMINAL, INPUT FILE POS., PIN NO., DETECTOR NO., NEMA PHASE, CALL, EXTEND TIME, DELAY TIME, ADDED INITIAL, DETECTOR TYPE. Includes PED PUSH BUTTONS and notes on DC isolators.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



FLASHER CIRCUIT MODIFICATION DETAIL

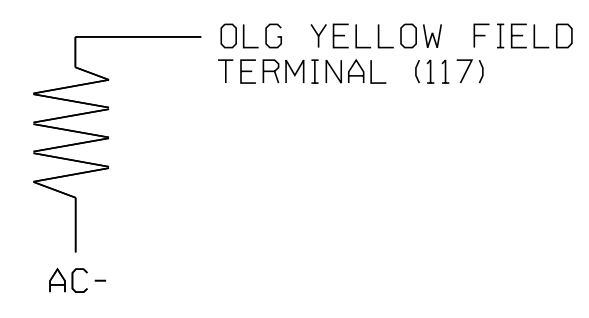
IN ORDER TO ENSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

Table with columns: VALUE (ohms), WATTAGE. Values: 1.5K - 1.9K, 25W (min); 2.0K - 3.0K, 10W (min).



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

This plan supersedes the signal plan signed and sealed by Steven G. Haynie, PE on 05/31/2022.



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Professional seal area for Steven G. Haynie, PE, including project details, dates, and signatures.

11/8/2023 8:41:07 AM C:\Users\sgm\OneDrive\Documents\100885_sml\10-20230221.dgn

Semi-Actuated Rectangular Rapid Flashing Beacon (RRFB) Cornelius Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018, and all applicable sections of the latest version of the generic Project Special Provisions.
2. Align the front face of the pedestrian push button assembly parallel with the crosswalk.
3. The distance to the pushbutton from the edge of the sidewalk should be no greater than 1'-6".
4. The lump sum item for RRFB (Rectangular Rapid Flashing Beacon) shall include but not limited to the foundations, pedestals, signs, push buttons, flashing beacons, solar panel, battery, controller assembly, and all incidentals related to the installation of the RRFB.

ERECT RRFB ON TYPE II PEDESTAL (STD. DWG. 1743.02) WITH SIGNS

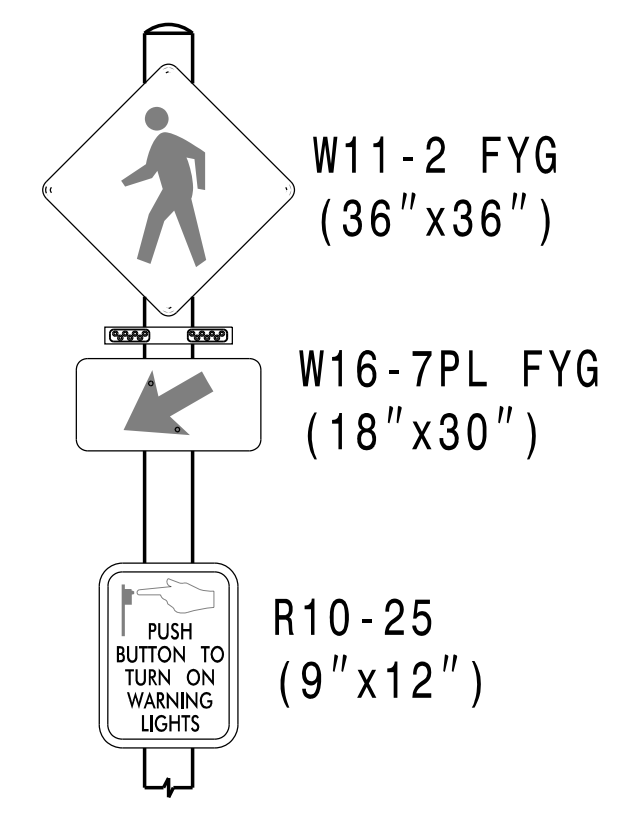


FIGURE 1 - SIGN B

ERECT RRFB ON TYPE II PEDESTAL (STD. DWG. 1743.02) WITH SIGNS

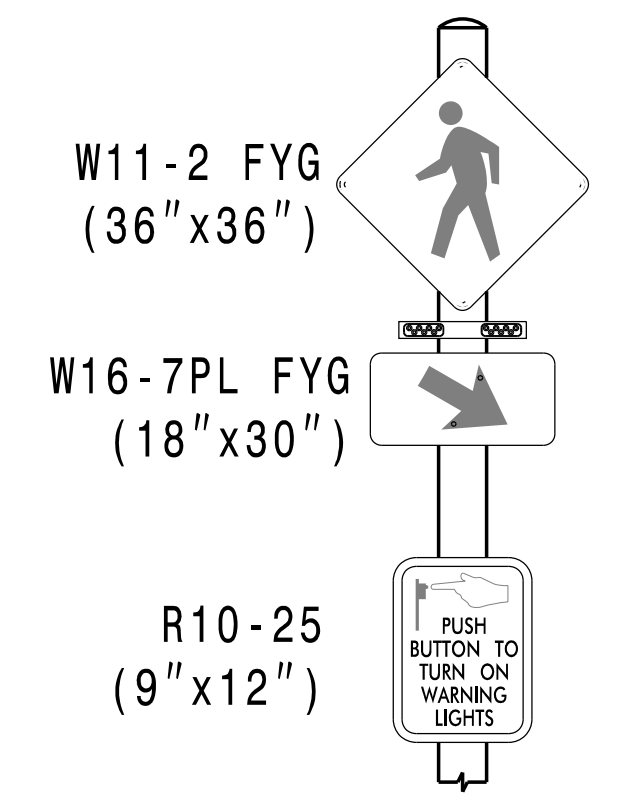
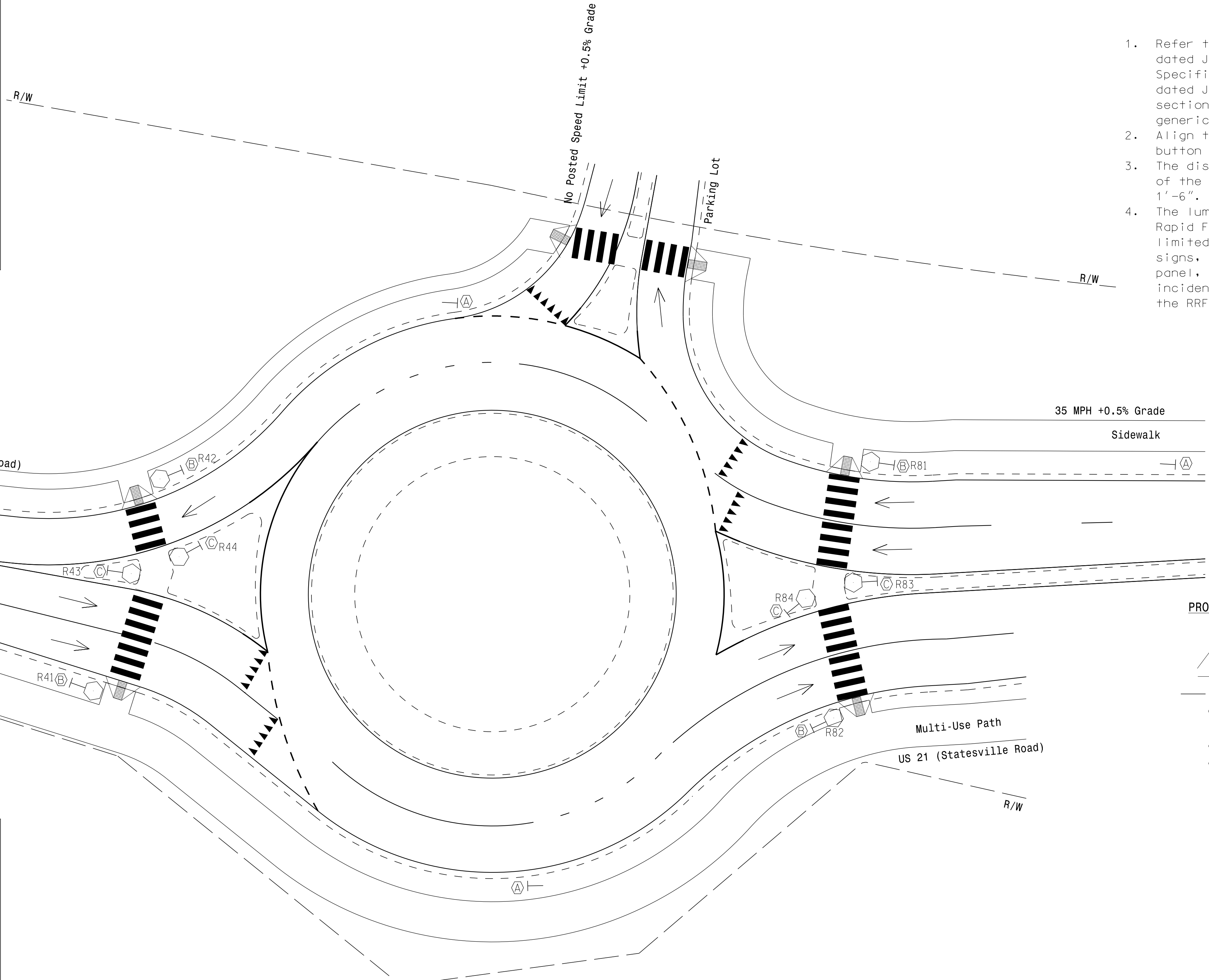


FIGURE 2 - SIGN C



LEGEND

PROPOSED	EXISTING
Sign	Sign
Type II Signal Pedestal	Type II Signal Pedestal
Curb Ramp	Curb Ramp
Directional Arrow	Directional Arrow
Right of Way	Right of Way
(A) Pedestrian Warning Sign (W11-2) w/ "AHEAD" Plaque (W16-9P)	(A) Pedestrian Warning Sign (W11-2) w/ "AHEAD" Plaque (W16-9P)
(B) RRFB w/ Left Arrow (See Fig. 1)	(B) RRFB w/ Left Arrow (See Fig. 1)
(C) RRFB w/ Right Arrow (See Fig. 2)	(C) RRFB w/ Right Arrow (See Fig. 2)

TIMING CHART				
FEATURE	RRFB GROUP	RRFB GROUP	RRFB GROUP	RRFB GROUP
	R41/43	R42/44	R82/84	R81/83
RRFB Flash Time	19	13	19	19

Notes:
1. These values may be field adjusted. Do not adjust RRFB Flash times lower than what is shown.

This plan supersedes the signal plan signed and sealed by S. Nick Matthews, PE on 05/31/2022.



Pedestrian Crossings

US 21 (Statesville Road) at Parking Lot Entrance

Division 10 Mecklenburg County Cornelius

PLAN DATE: February 2023 REVIEWED BY: S.G. Haynie

PREPARED BY: S.N. Matthews REVIEWED BY:

REVISIONS INIT. DATE

SCALE: 1"=20'

750 N. Greenfield Pkwy, Garner, NC 27528

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: S. NICK MATTHEWS, PE, ENGINEER, 046989, 2/21/2023

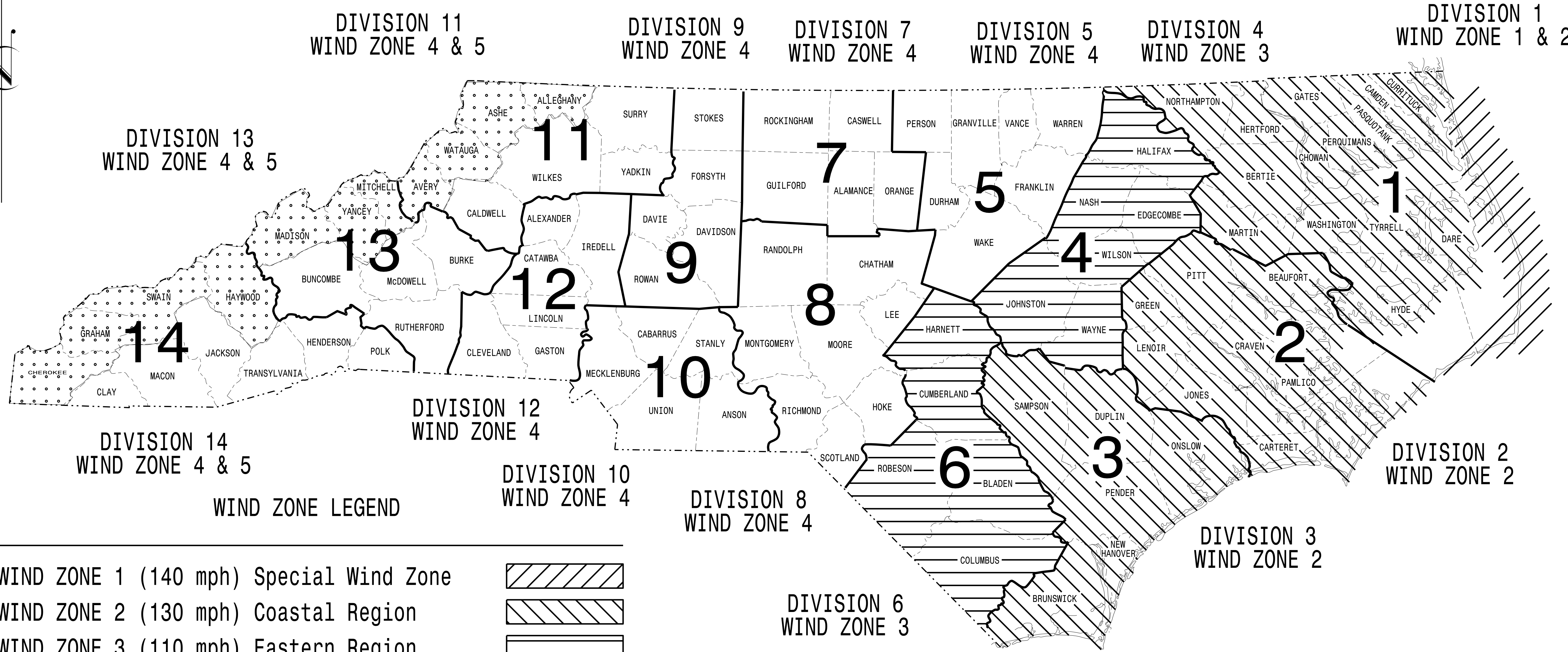
Sig Inventory No. N/A

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 11: 11:07:27

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

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

STANDARD DRAWINGS FOR ALL METAL POLES



WIND ZONE LEGEND

WIND ZONE 1 (140 mph) Special Wind Zone	
WIND ZONE 2 (130 mph) Coastal Region	
WIND ZONE 3 (110 mph) Eastern Region	
WIND ZONE 4 (90 mph) Central & Mtn. Region	
WIND ZONE 5 (120 mph) Special Wind Zone	

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

Prepared In the Offices of:

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

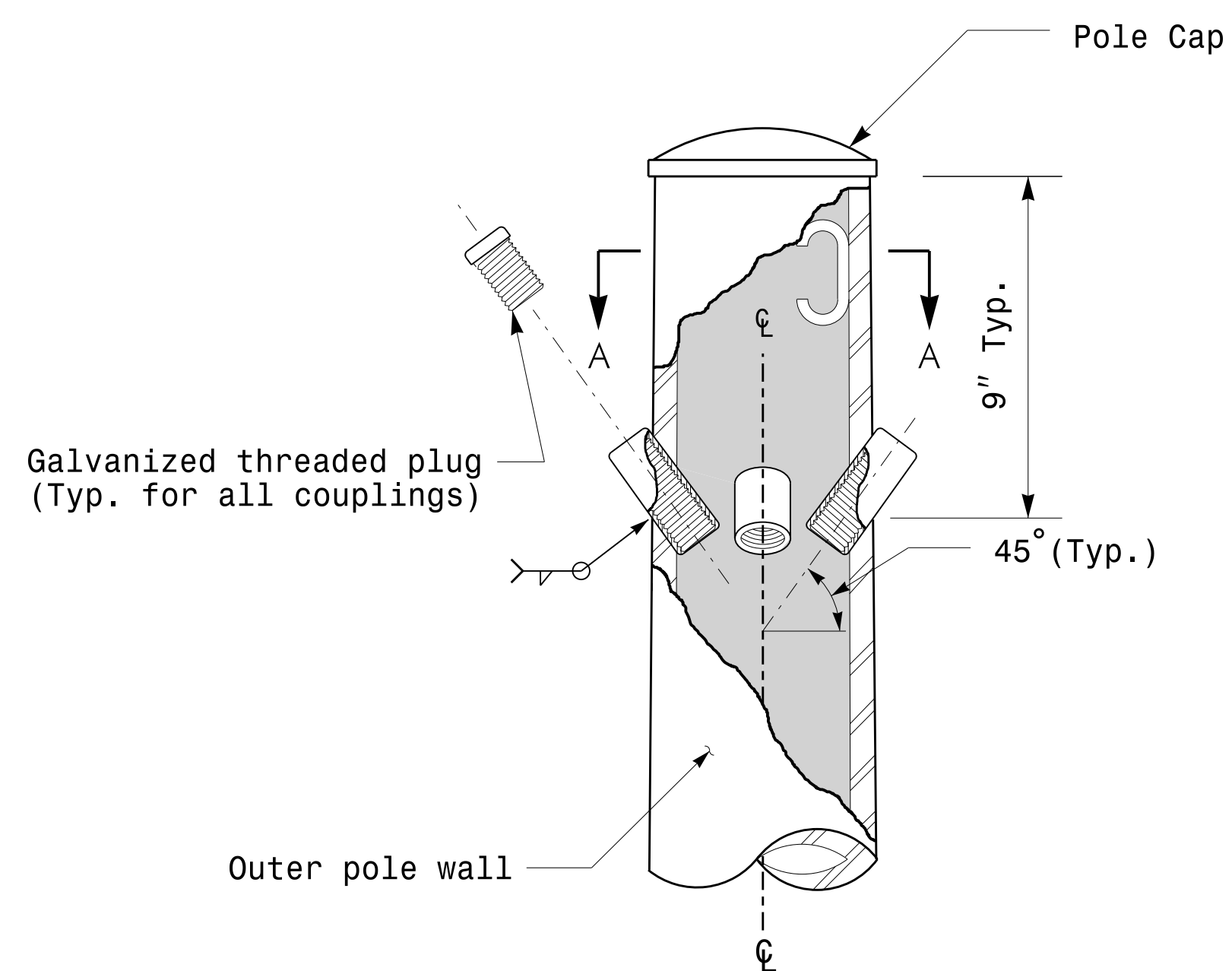
J.P. GALLOWAY, P.E. - STATE SIGNALS ENGINEER

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

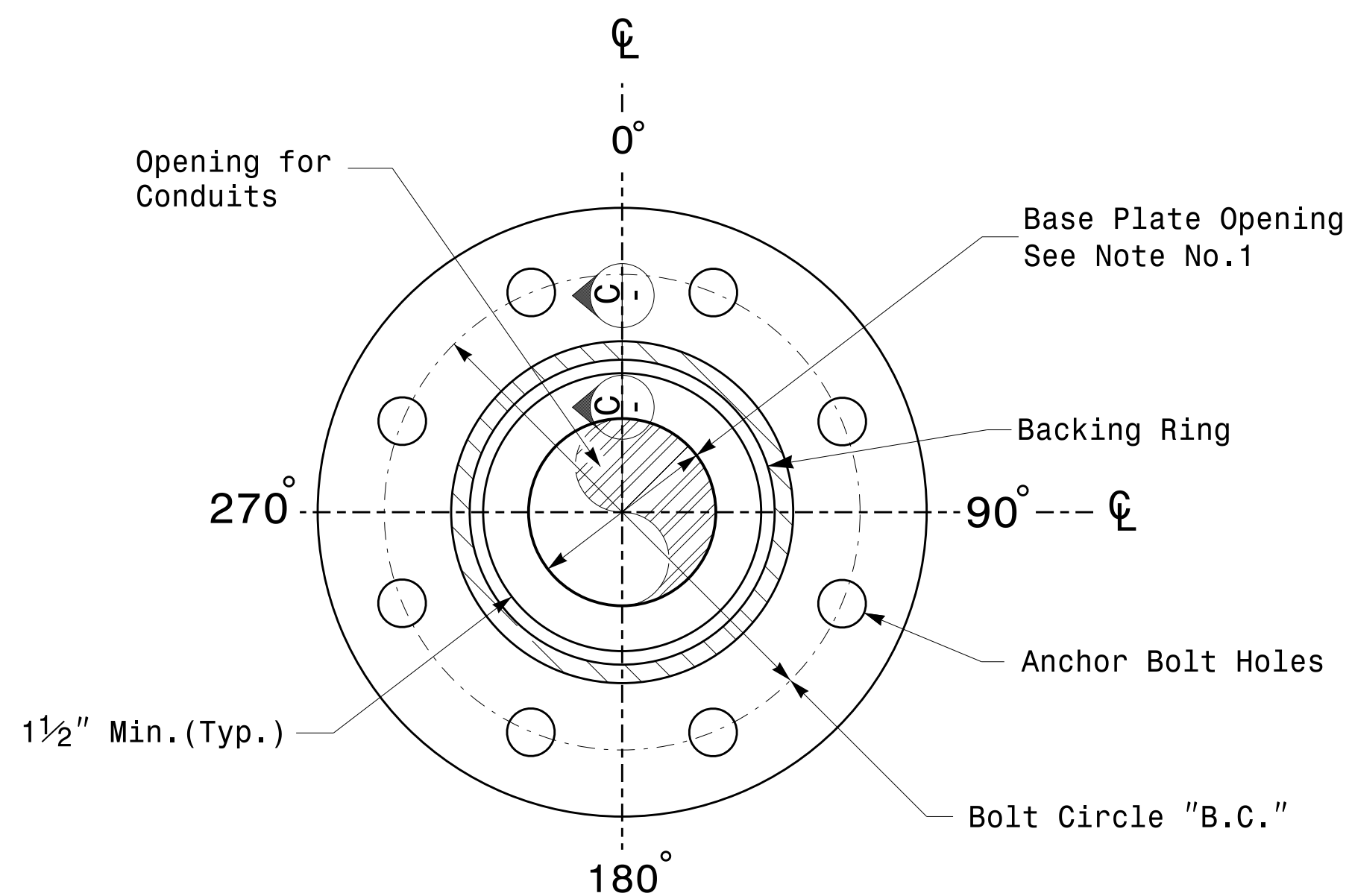
SEAL

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

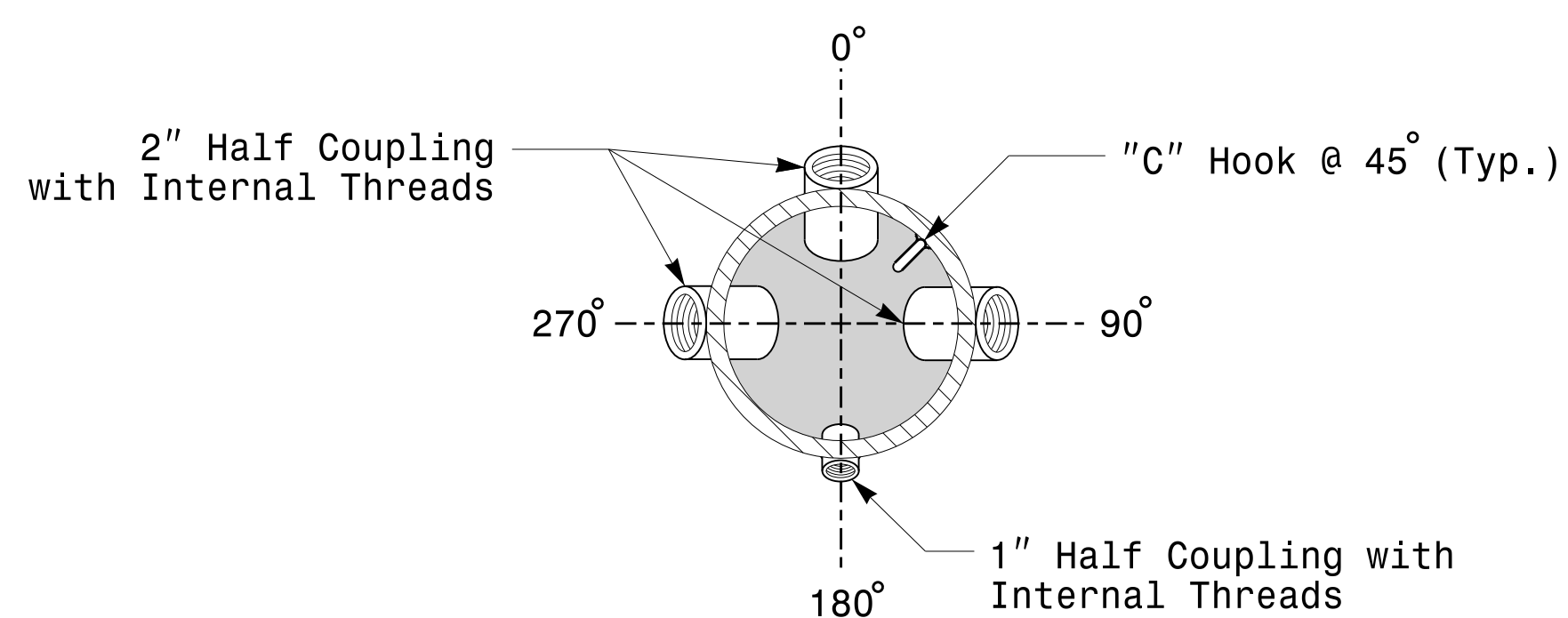
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



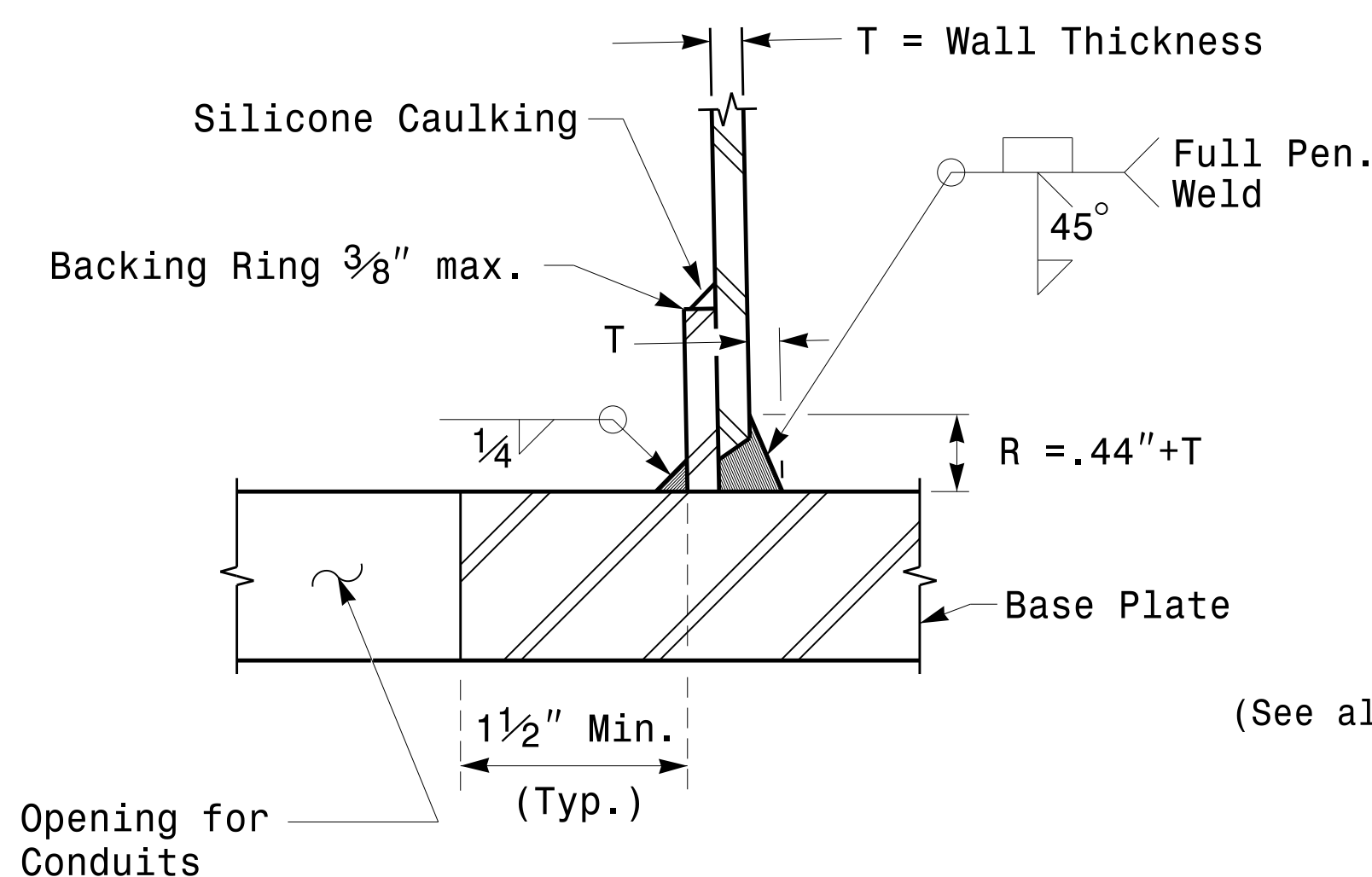
Cable Entrances at Top of Pole



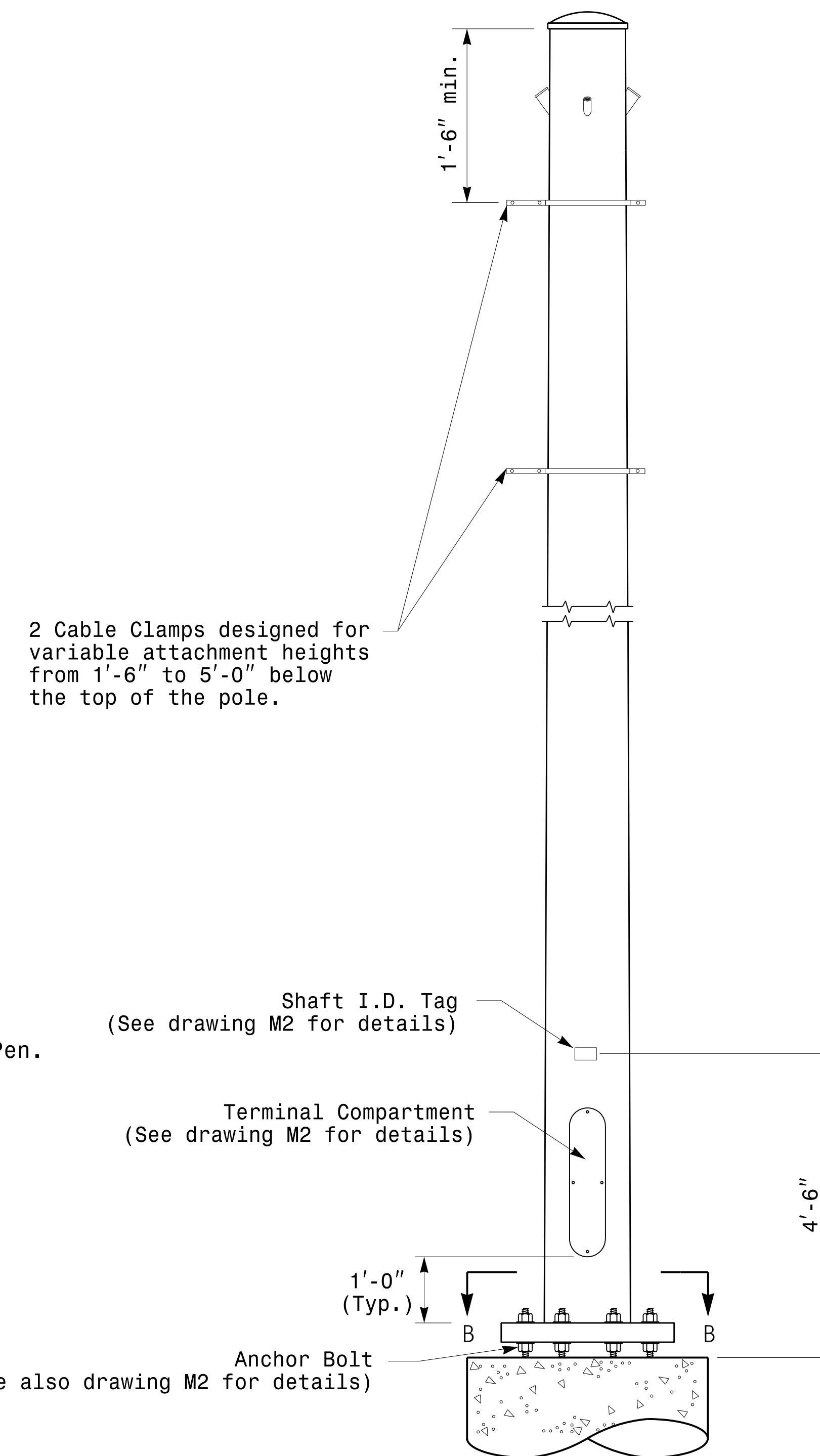
Section B-B
Pole Base Plate Details
(8 and 12 Bolt Pattern)



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

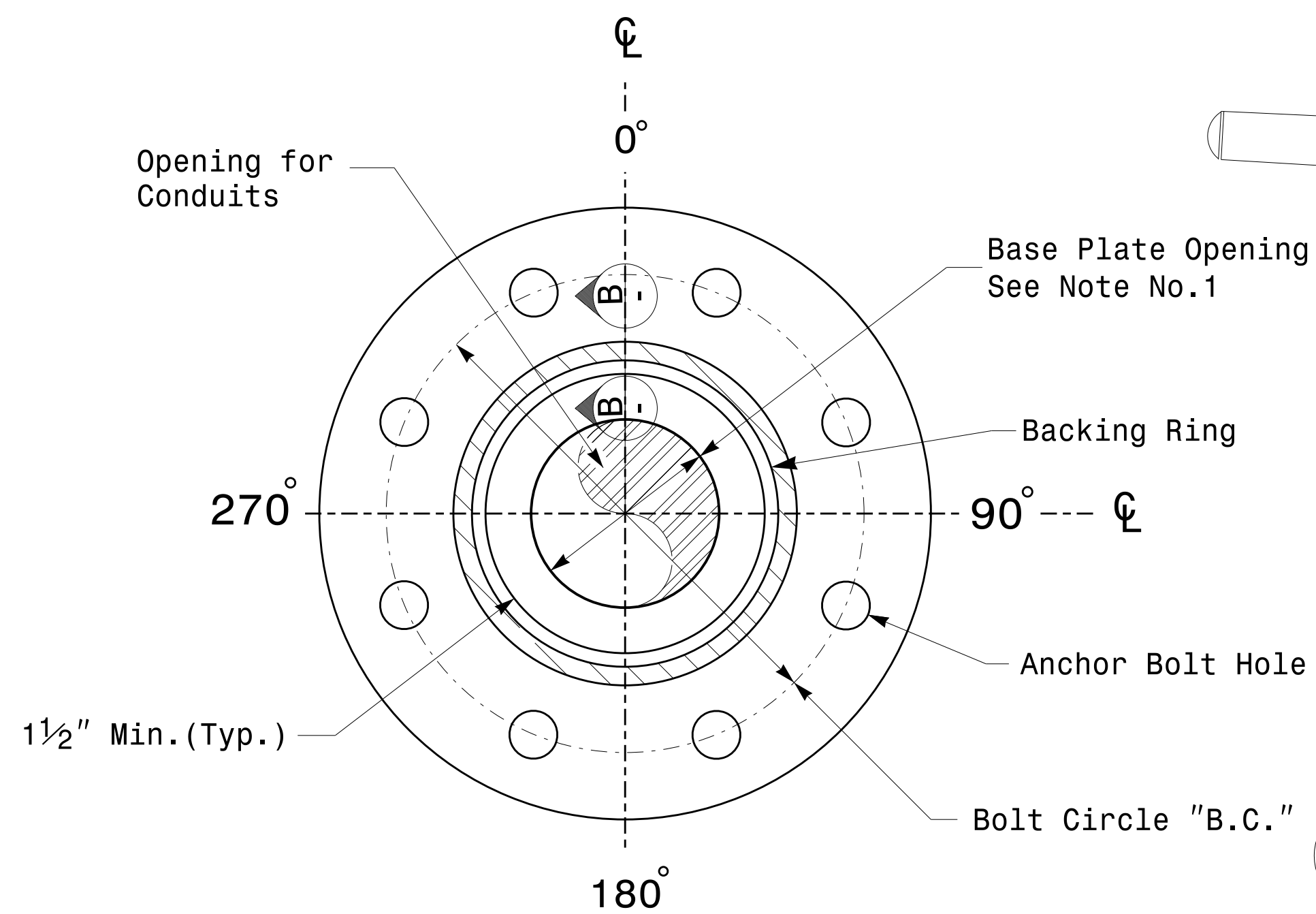


Monotube Strain Pole

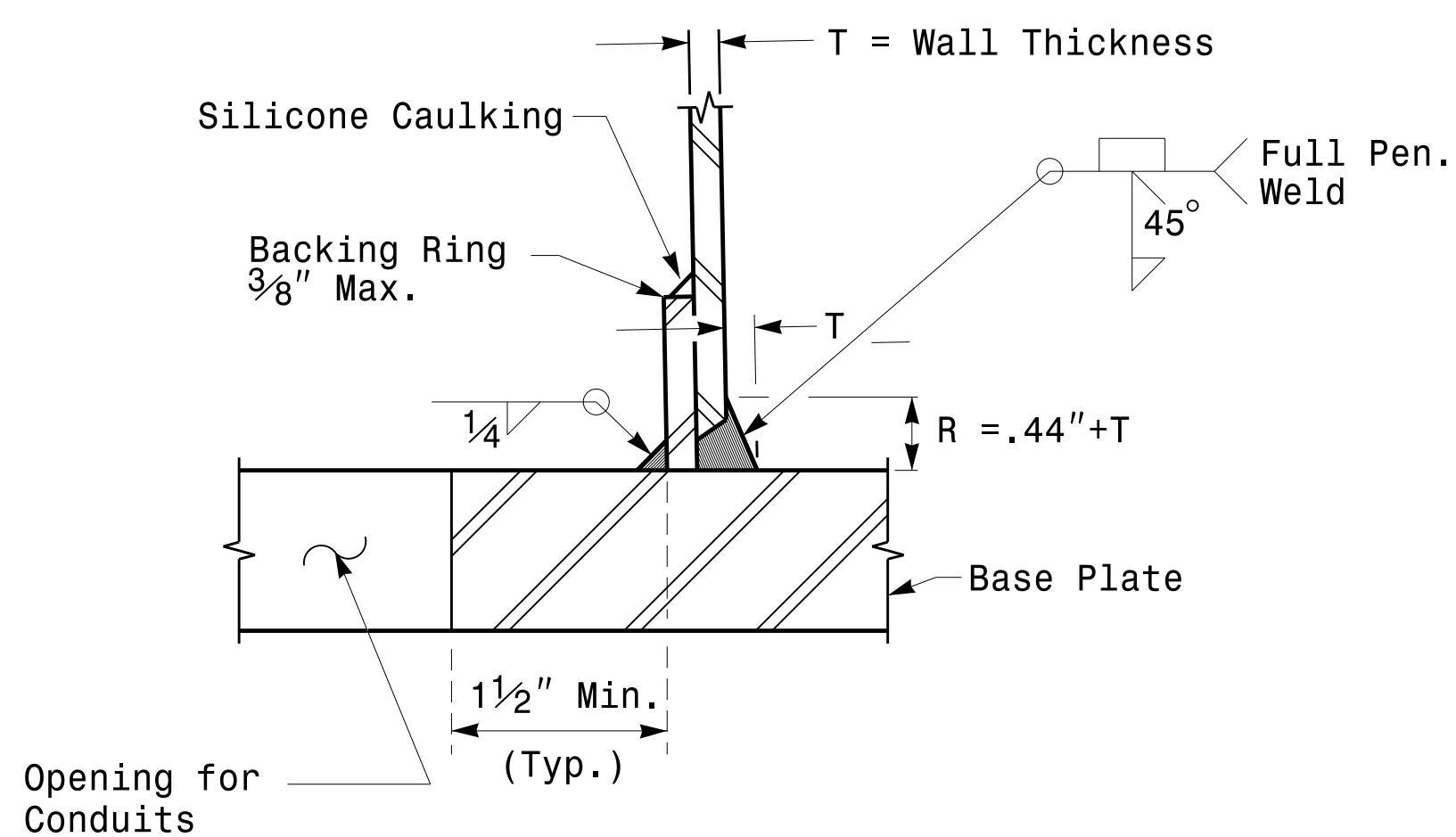
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Typical Fabrication Details For Strain Poles</p>		
	<p>PLAN DATE: OCTOBER 2017</p>	<p>DESIGNED BY: K.C. DURIGON</p>		SEAL
<p>SCALE: NONE</p>	<p>PREPARED BY: N. BITTING</p>	<p>REVIEWED BY: D.C. SARKAR</p>	<p>DocuSigned by: Debesh C. Sarkar</p>
<p>SCALE: NONE</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>	<p>10/11/2017</p>

Fabrication Details – Strain Poles

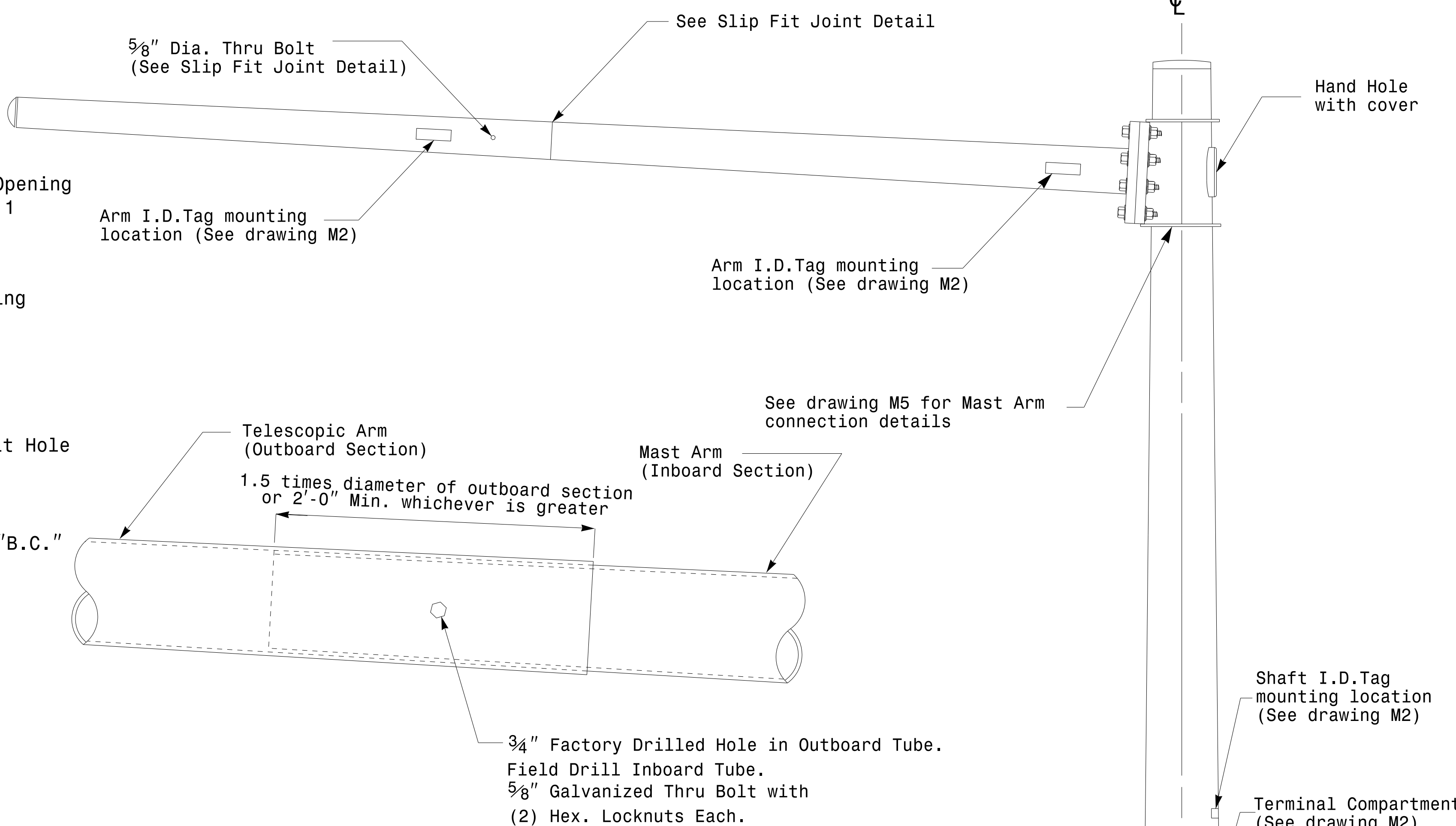
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



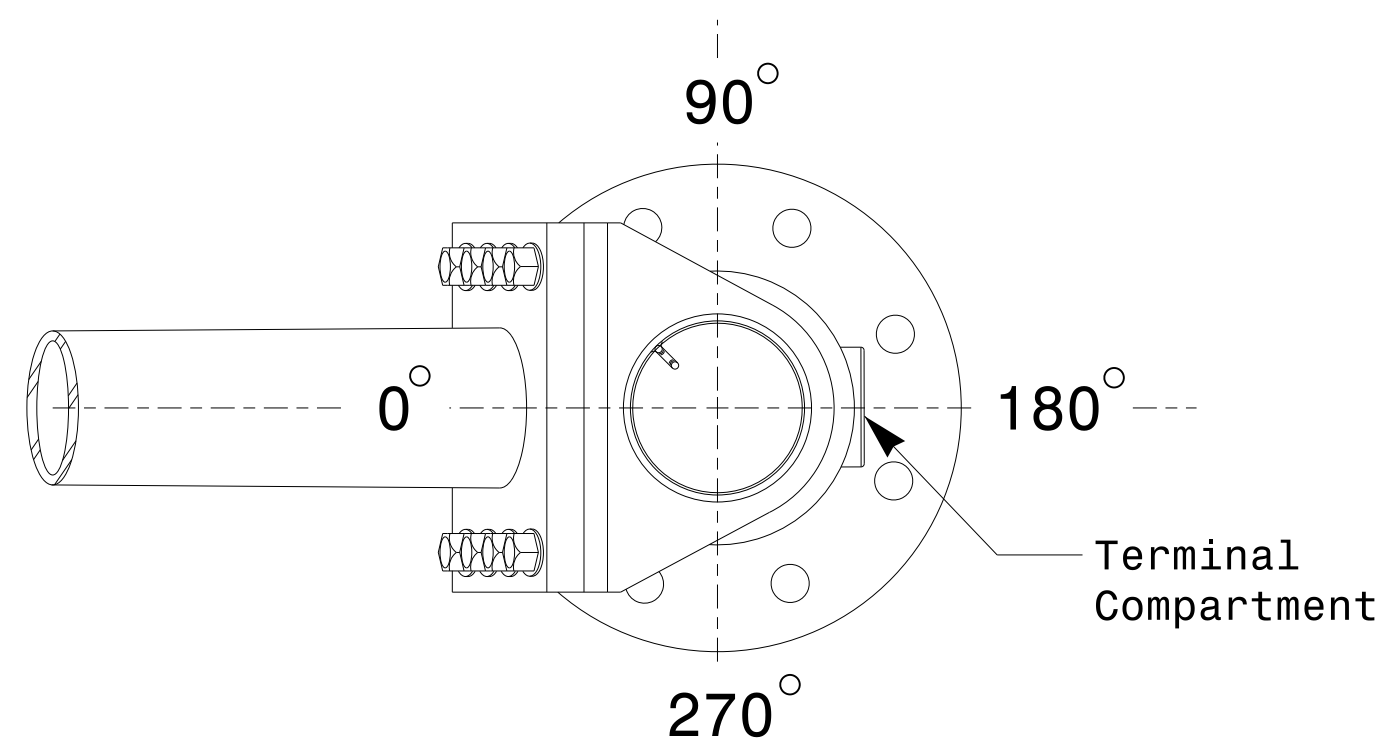
Section A-A
Pole Base Plate Details



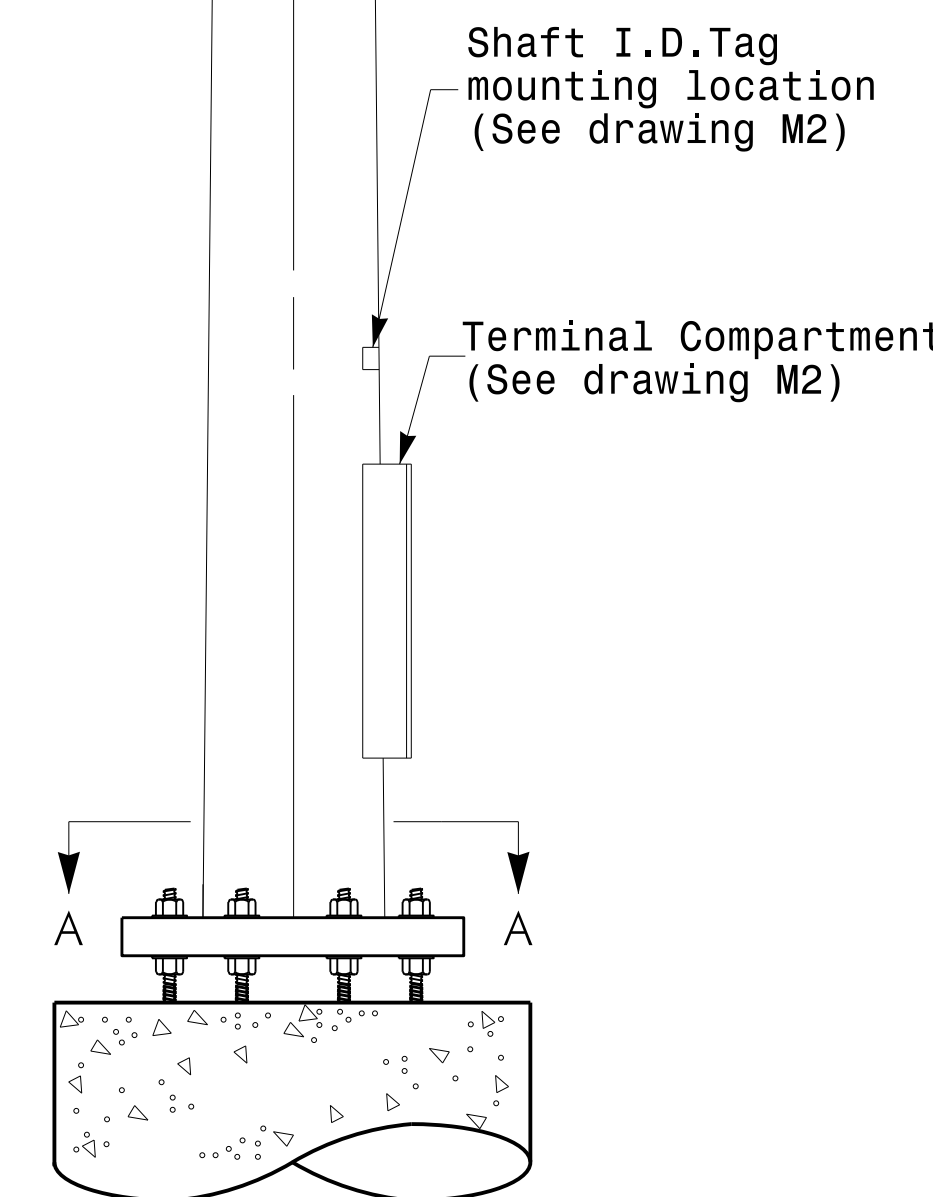
Section B-B
 (Pole Attachment to Base Plate)
Full-Penetration Groove Weld Detail



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation



Mast Arm Pole

Fabrication Details – Mast Arm Poles

<p>Prepared in the Offices of: Transportation Mobility and Safety Division UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE Signal Design Section 750 N. Greenfield Pkwy, Garner, NC 27529</p>	Typical Fabrication Details For Mast Arm Poles		SEAL
	PLAN DATE: OCTOBER 2017 DESIGNED BY: K.C. DURIGON PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR	REVISIONS INIT. DATE	
SCALE: 0 NA NONE	DocuSigned by: Dinesh C. Sarkar (Signature)		10/11/2017 DATE

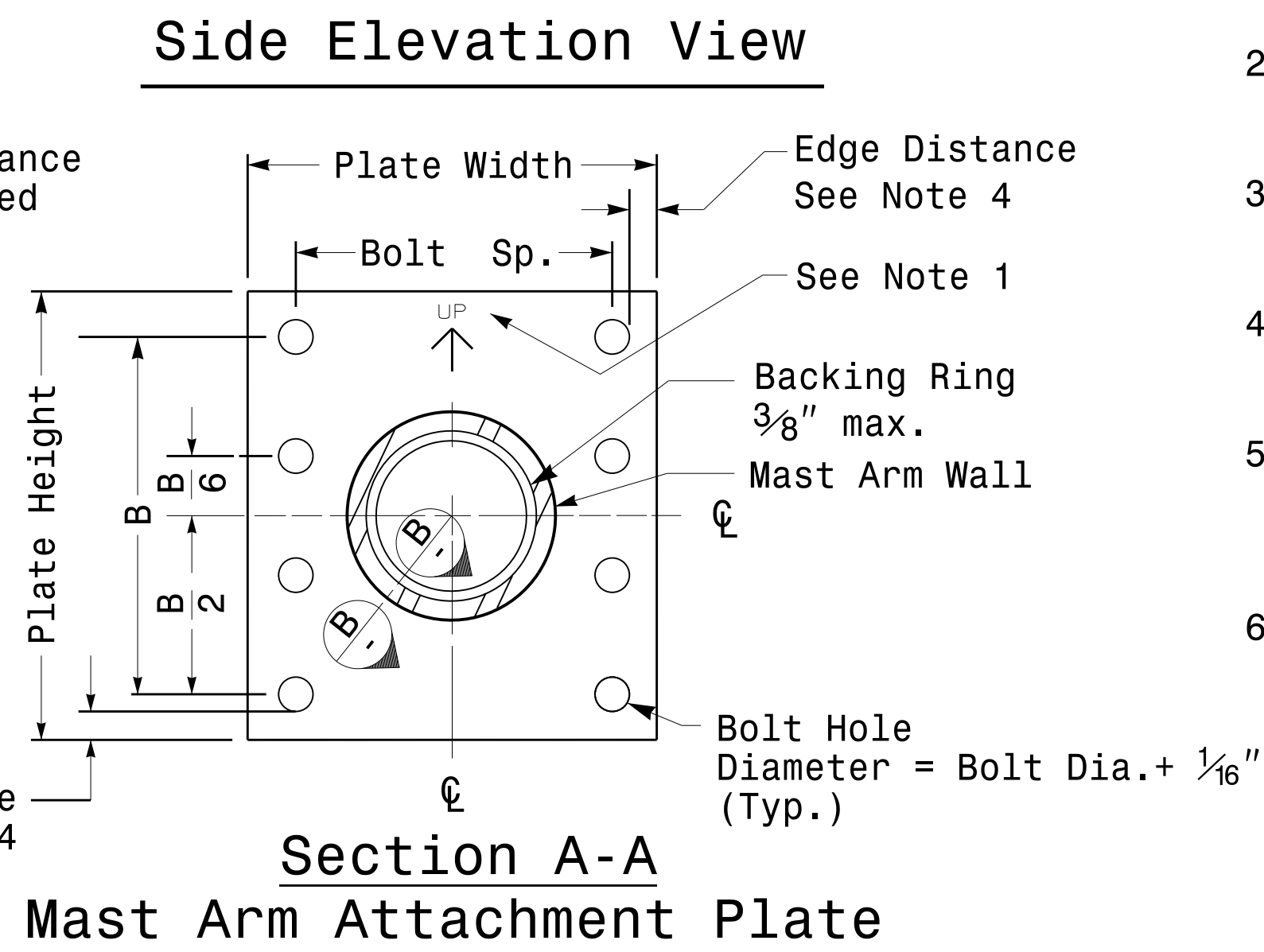
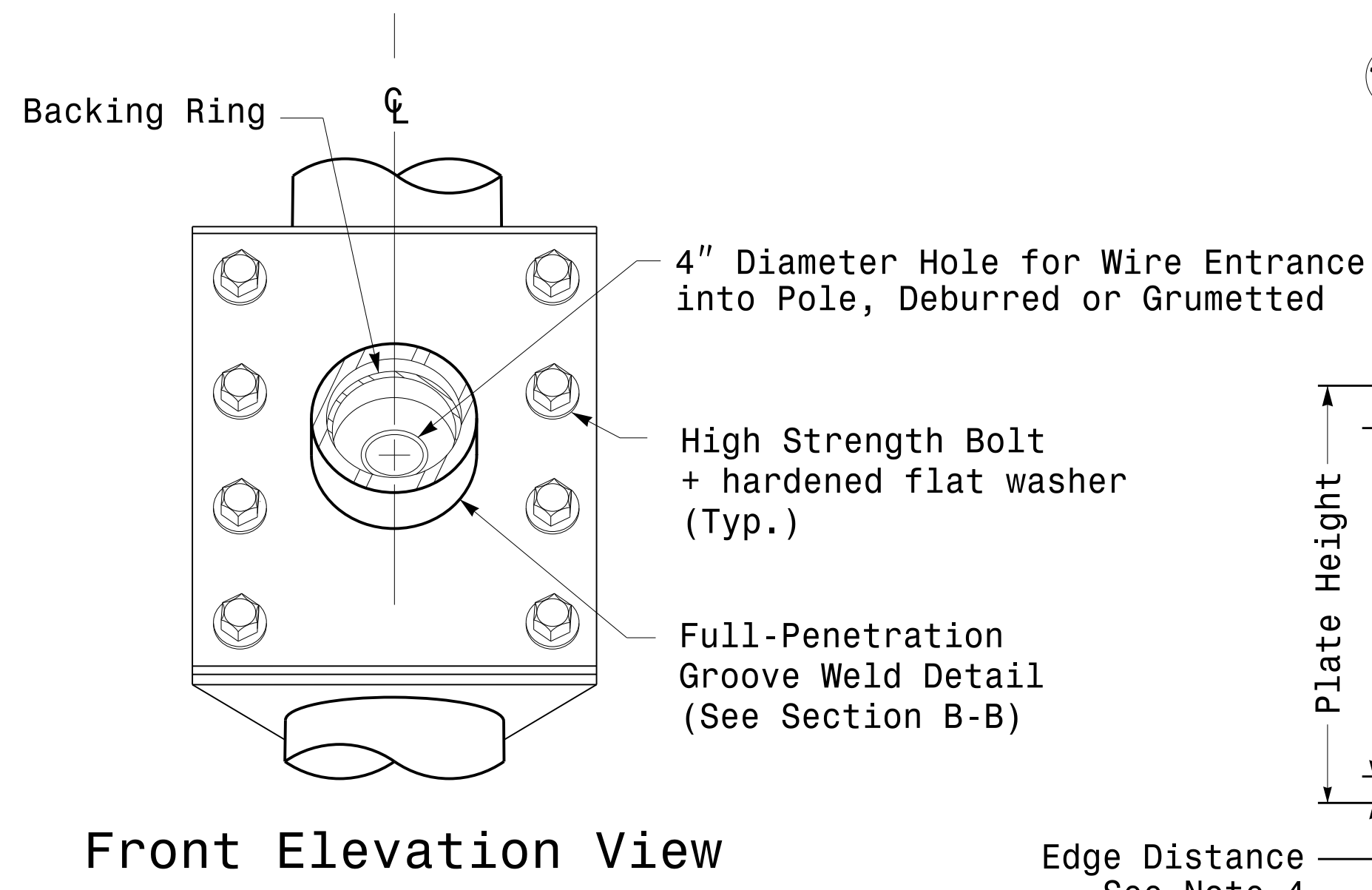
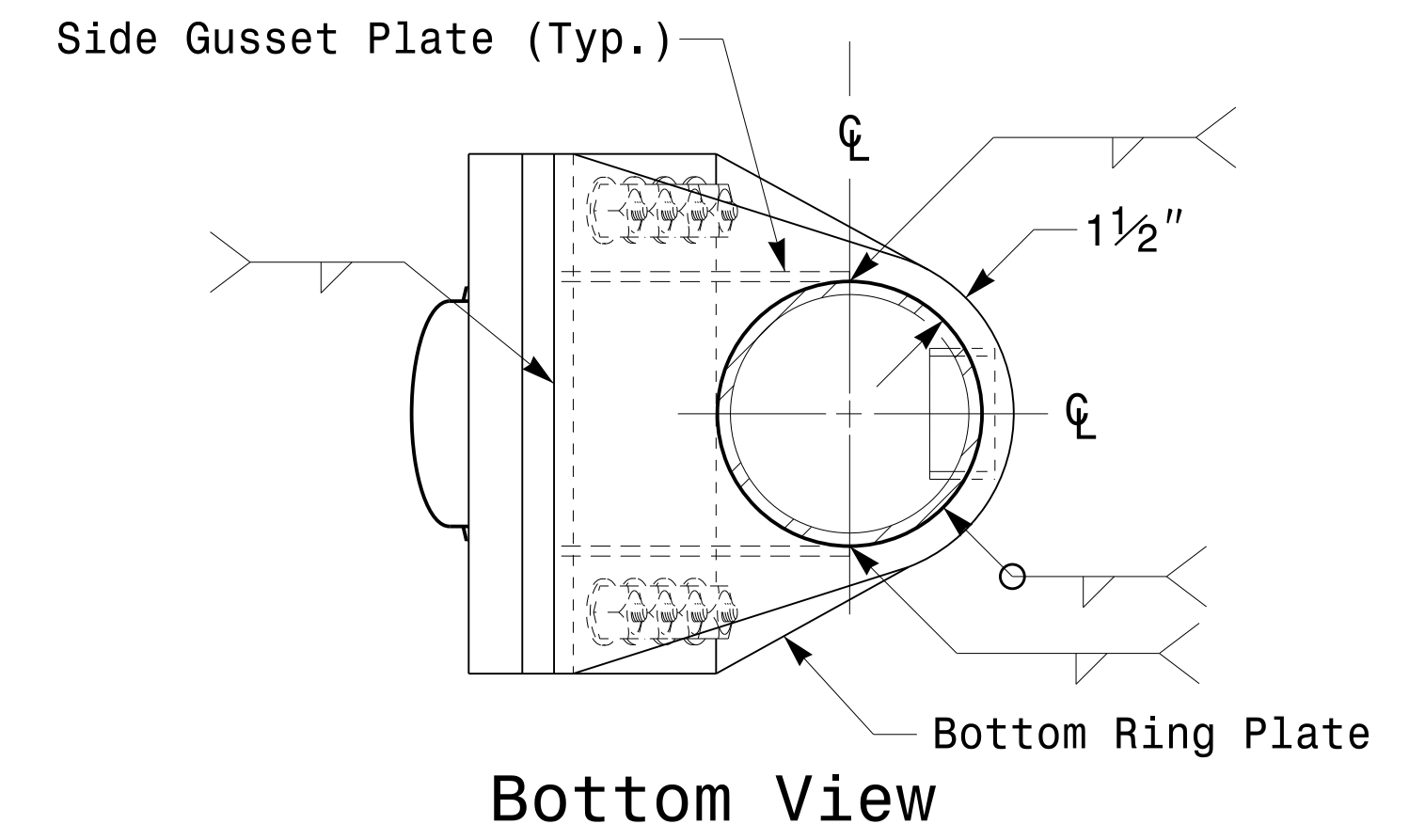
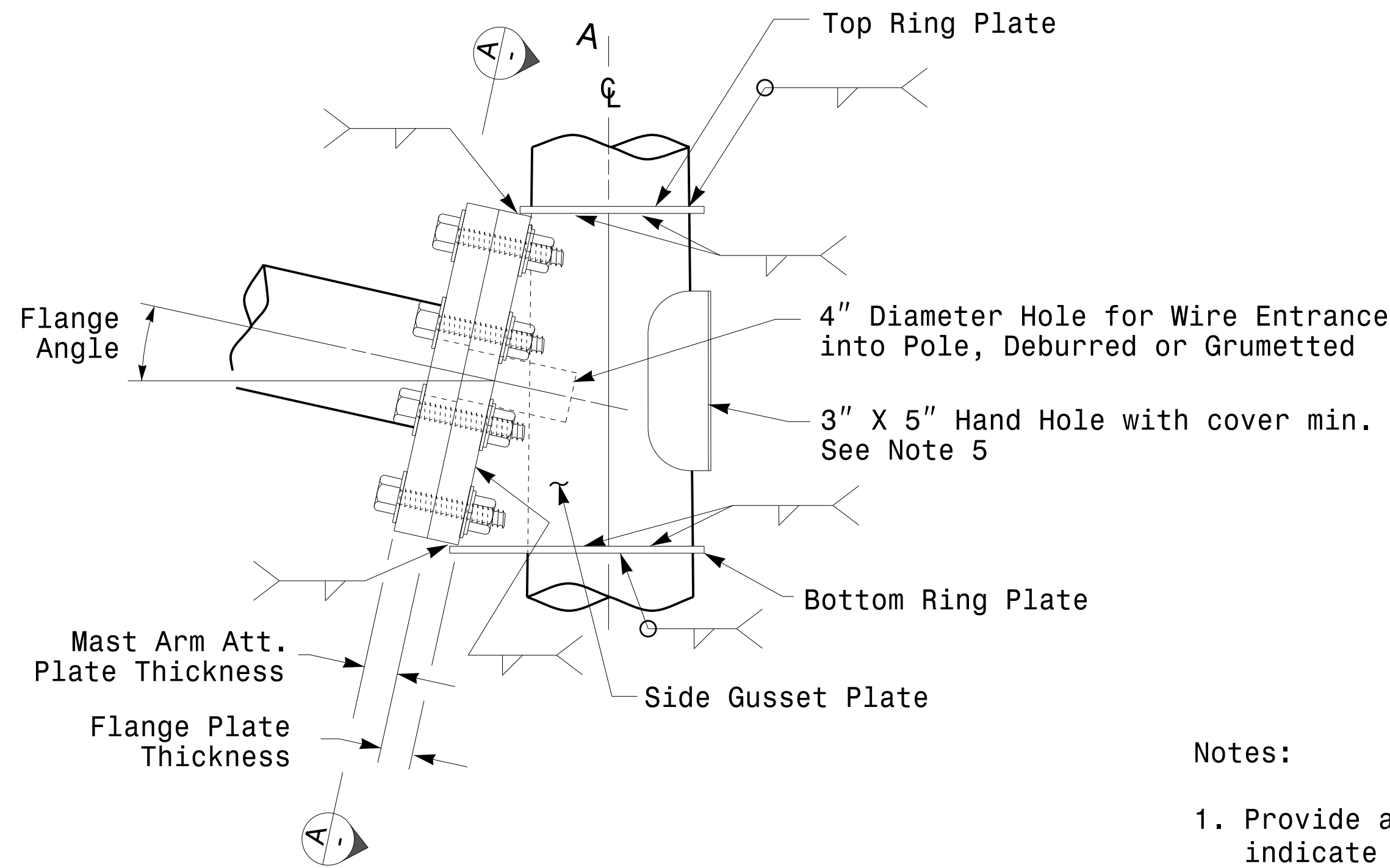
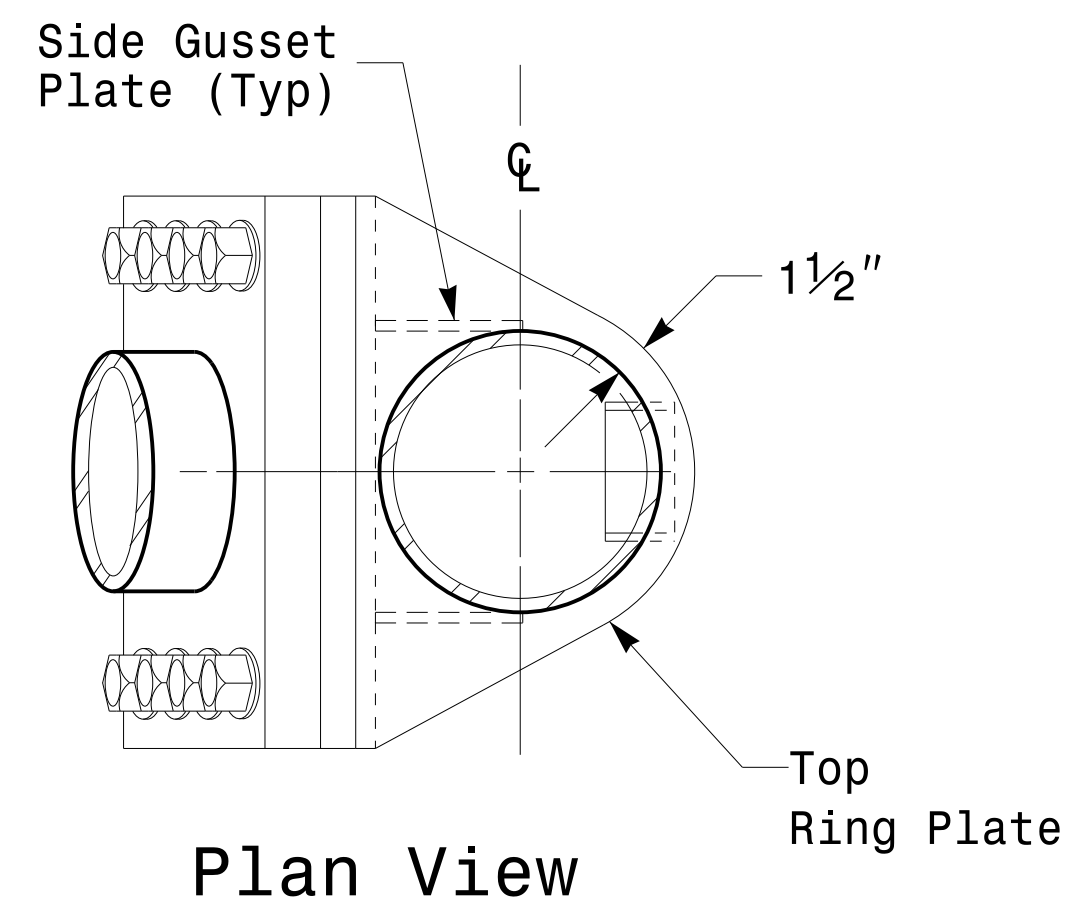
11-OCT-2017 08:33
 C:\Users\sig\Documents\Design Section\Eastern Region\Sheet\2016\2014_Sig_M4_Std_Fabrication_Details_Mast_Arm_Poles.dgn
 P12/25

Welded Ring Stiffened Mast Arm Connection

PROJECT ID. NO.

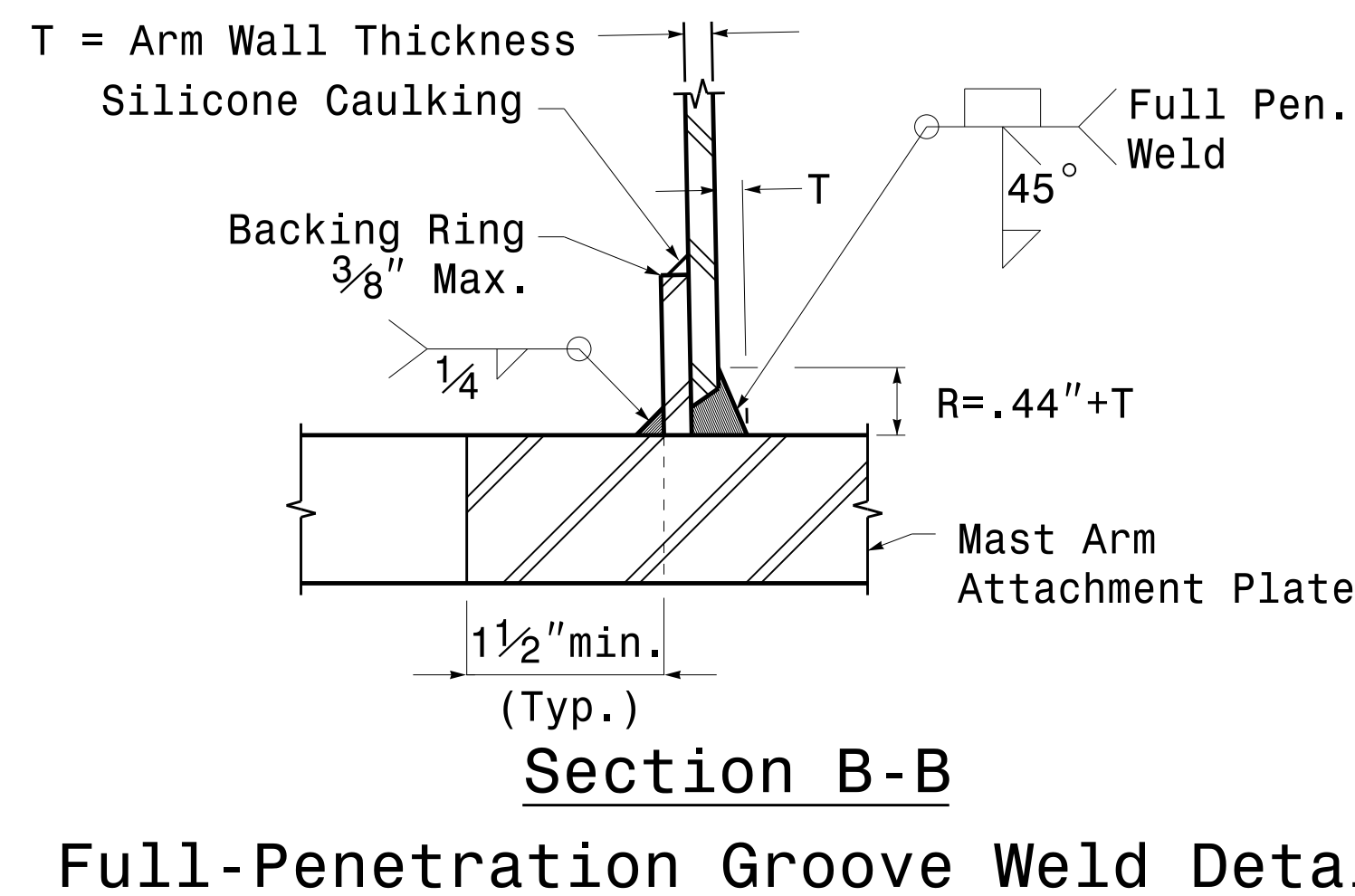
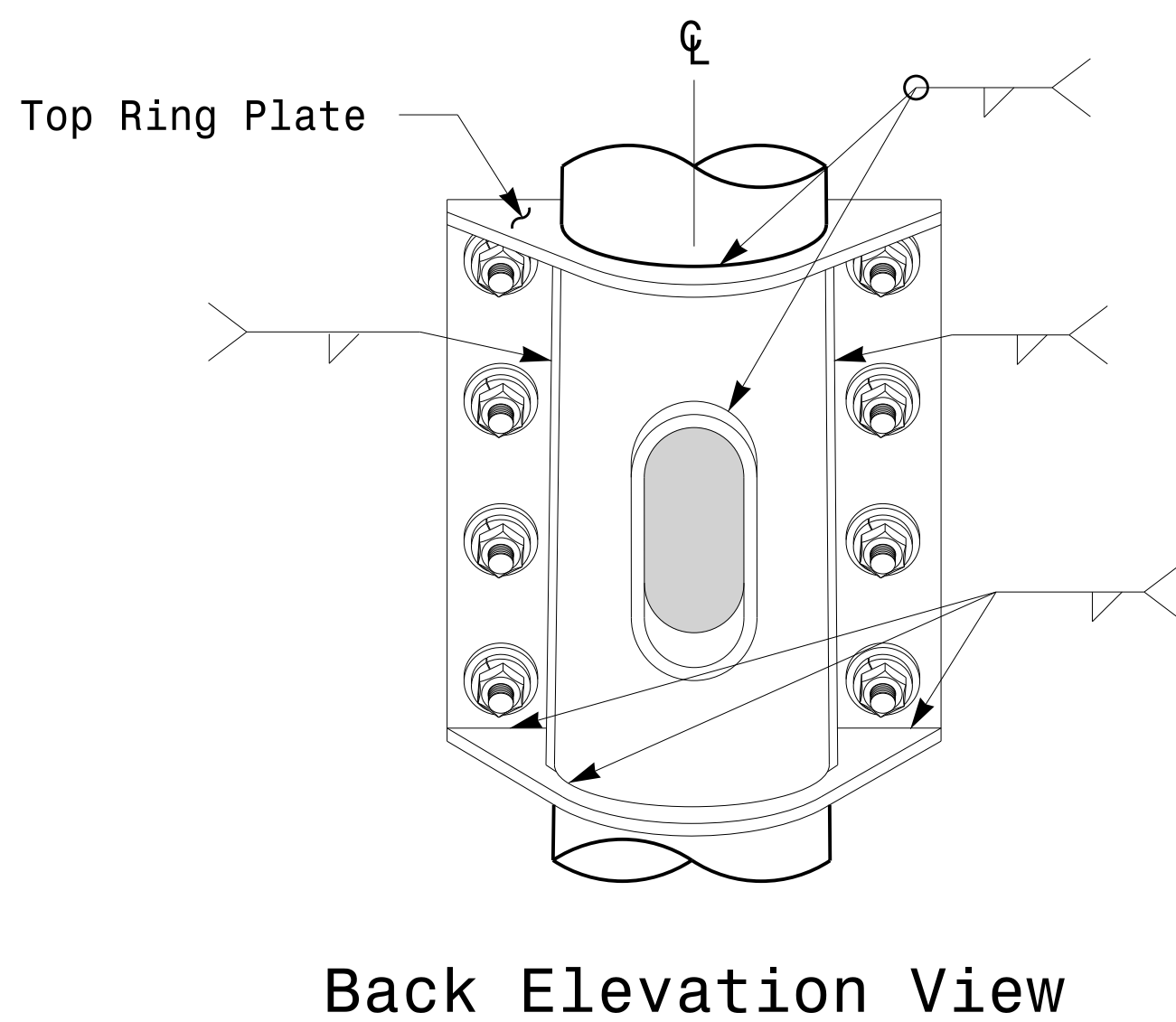
SHEET NO.

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:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 NA NONE

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
REVISIONS	INIT. DATE

SEAL

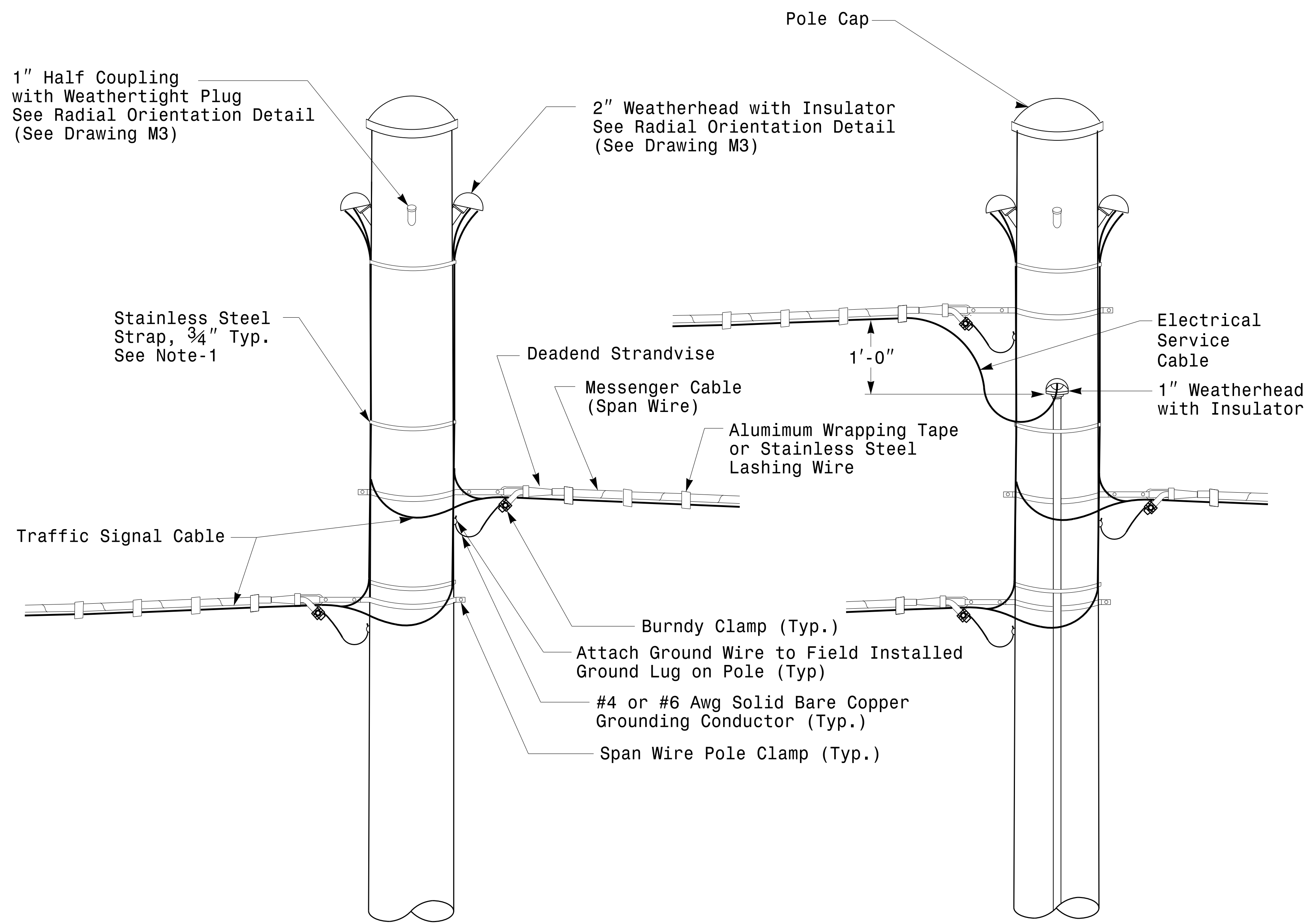
Discussed by: D.C. Sarkar

10/11/2017

DATE

Fabrication Details - Mast Arm Connection

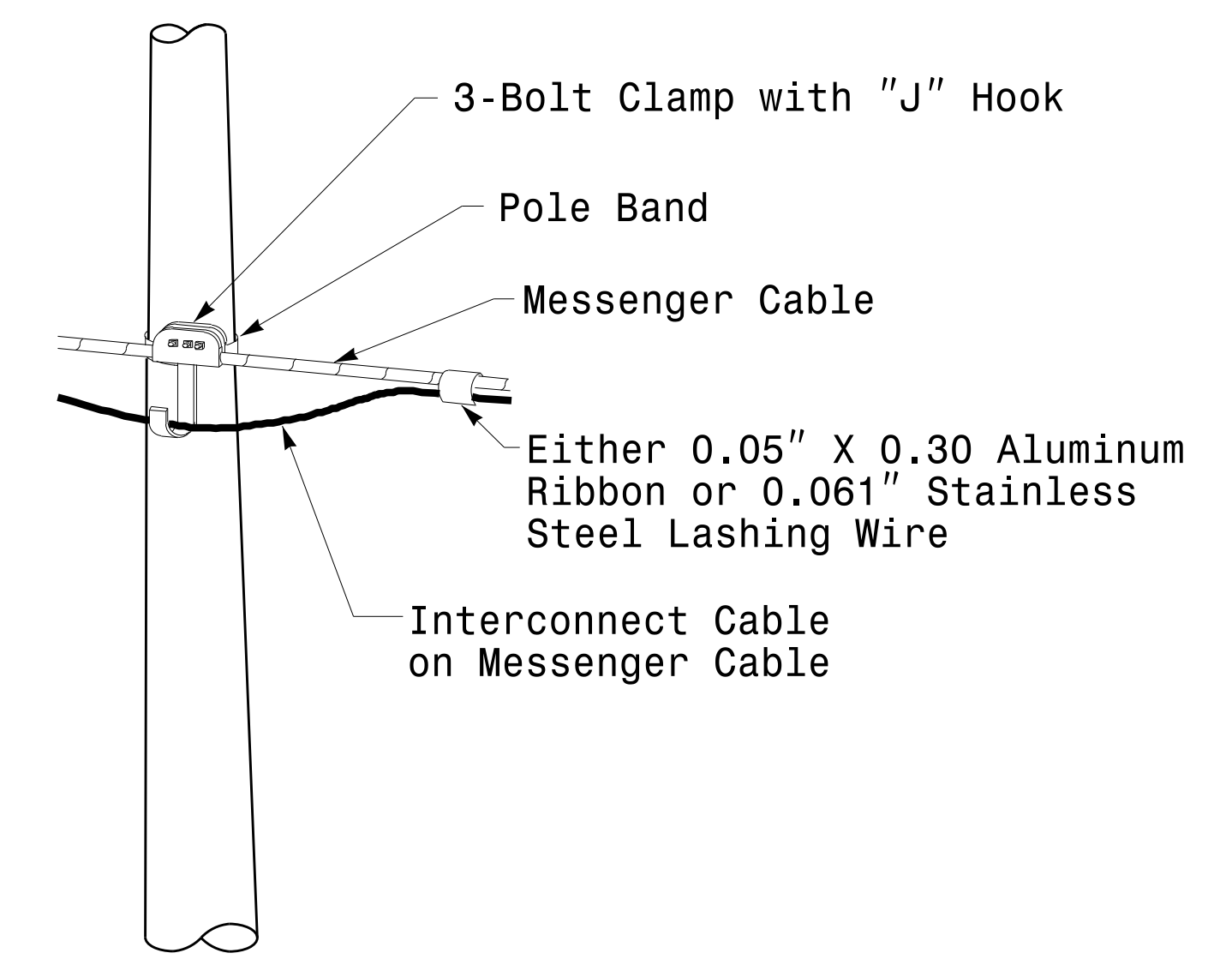
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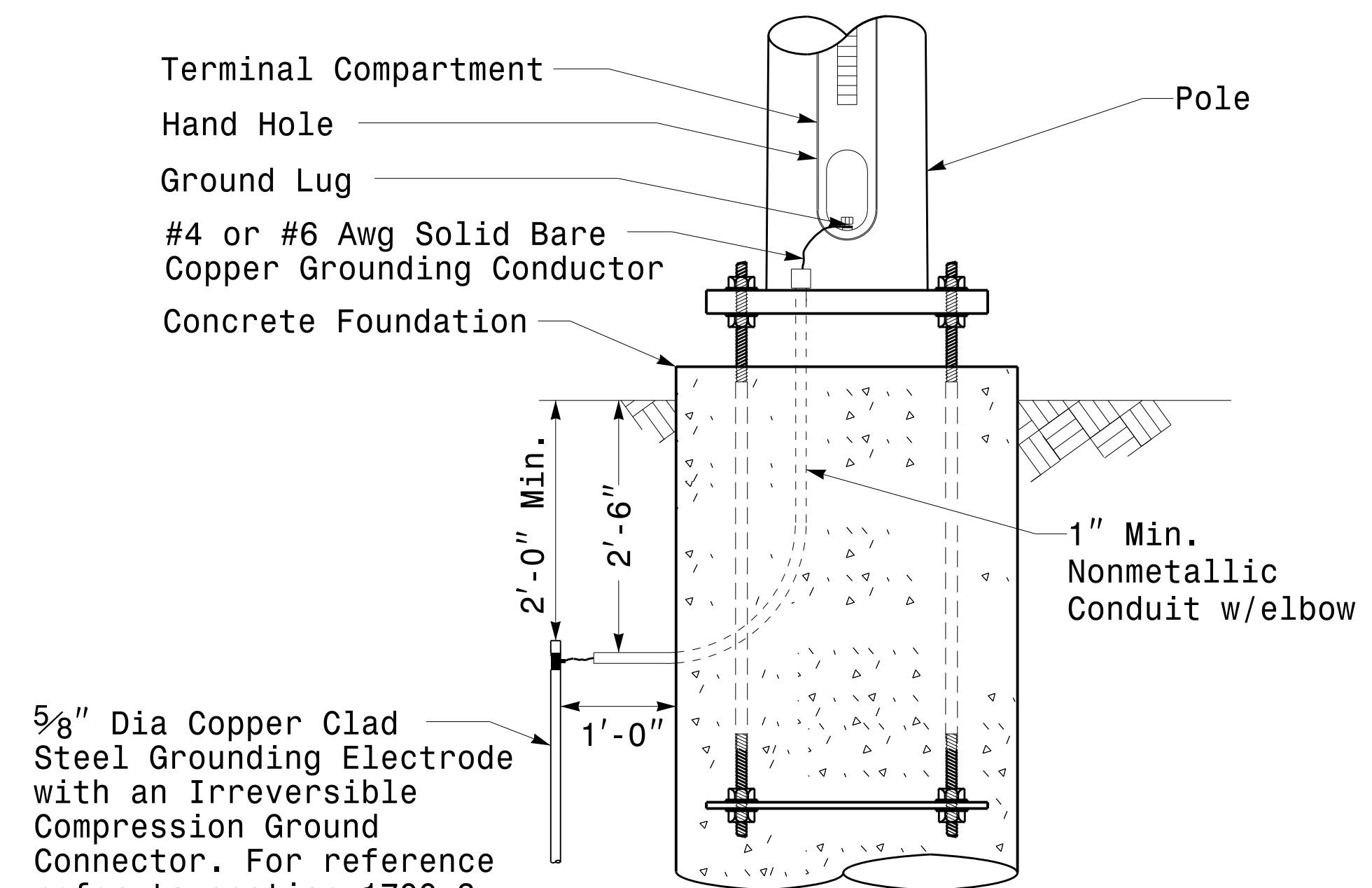
Strain Pole Attachments

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>SEAL</p> <p>DocuSigned by: D. C. Sarkar DATE: 10/11/2017</p>
	<p>PLAN DATE: OCTOBER 2017</p> <p>PREPARED BY: N. BITTING</p> <p>SCALE: 0 NA NONE</p>	<p>DESIGNED BY: C.F. ANDREWS</p> <p>REVIEWED BY: D.C. SARKAR</p>		REVISIONS INIT. DATE

SOIL CONDITION

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

General Notes:

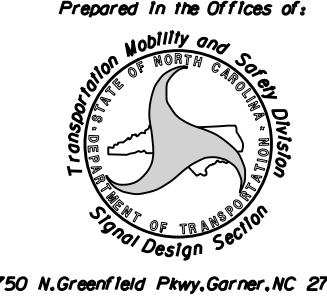
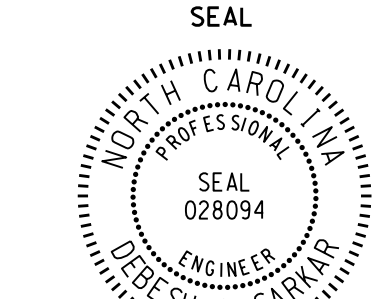
1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

Foundation Selection:

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

Standard Strain Pole Foundation-All Soil Condition

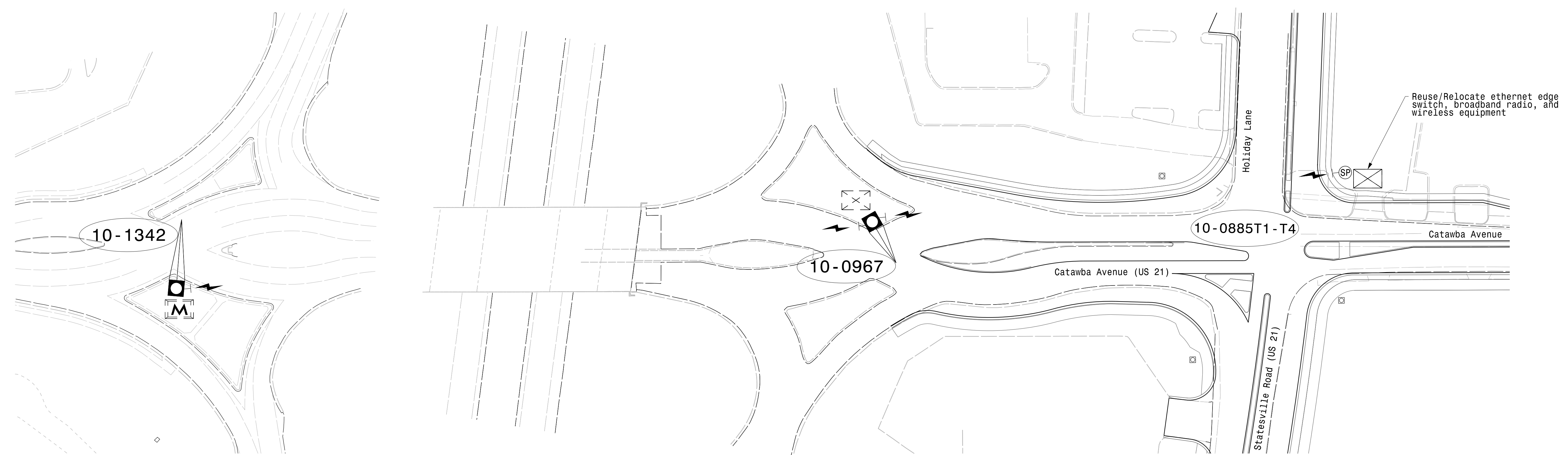
48" Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Drilled Pier Length

	<p>Standard Strain Pole Foundation for All Soil Conditions</p> <p>PLAN DATE: OCTOBER 2017 DESIGNED BY: C.B. COGDILL PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR</p>	
SCALE: 0 NA NONE	REVISIONS: Changed "Foundation Depth" to "Drilled Pier Length" in Conc. Egn. N.B. 7/12/2015	DATE: 10/11/2017

I:\Projects\2017_08-10_Sig.M8\15_Sig.M8_Sig.M8_Std_Strain Pole Found_Saturated Soil_Condition.dgn
 Sheets: 2017_08-10_Sig.M8_Sig.M8_Std_Strain Pole Found_Saturated Soil_Condition.dgn
 mzi:insg

NOTES

1. INSTALL ANTENNA CABLE:
ON TEMPORARY WOOD POLE, RUN ANTENNA CABLE UP THROUGH A RISER AND OUT THE WEATHERHEAD TO THE ANTENNA.
2. MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
3. RELOCATE AND REATTACH ANTENNA AT THE SAME ATTACHMENT HEIGHT. FIELD ADJUST AS NECESSARY TO ENSURE FULLY FUNCTIONING COMMUNICATIONS.
4. REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."



LEGEND

- FLAT PANEL ANTENNA
- SIGNAL INVENTORY NUMBER
- EXISTING CONTROLLER AND CABINET
- MASTER RADIO LOCATION
- NEW CONTROLLER AND CABINET
- NEW METAL POLE
- NEW WOOD POLE
- SIGNAL POLE
- EXISTING METAL POLE WITH MAST ARM

Temporary Configuration
TCP Phases 1 thru 4

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

This plan supersedes the wireless communication plan signed and sealed by Steven G. Haynie, PE on 05/31/2022.



Prepared for the Office of:

 750 N. Greenfield Pkwy., Garner, NC 27529
 NC FIRM LICENSE No: F-0493
 SCALE: 0 50 1"=50'

**Catawba Avenue
at US 21 (Statesville Road)
Wireless Communications Plans**

Division 10 Mecklenburg County Cornelius
 PLAN DATE: February 2023 REVIEWED BY: S. Haynie
 PREPARED BY: P. Koloski REVIEWED BY:

REVISIONS	INIT.	DATE

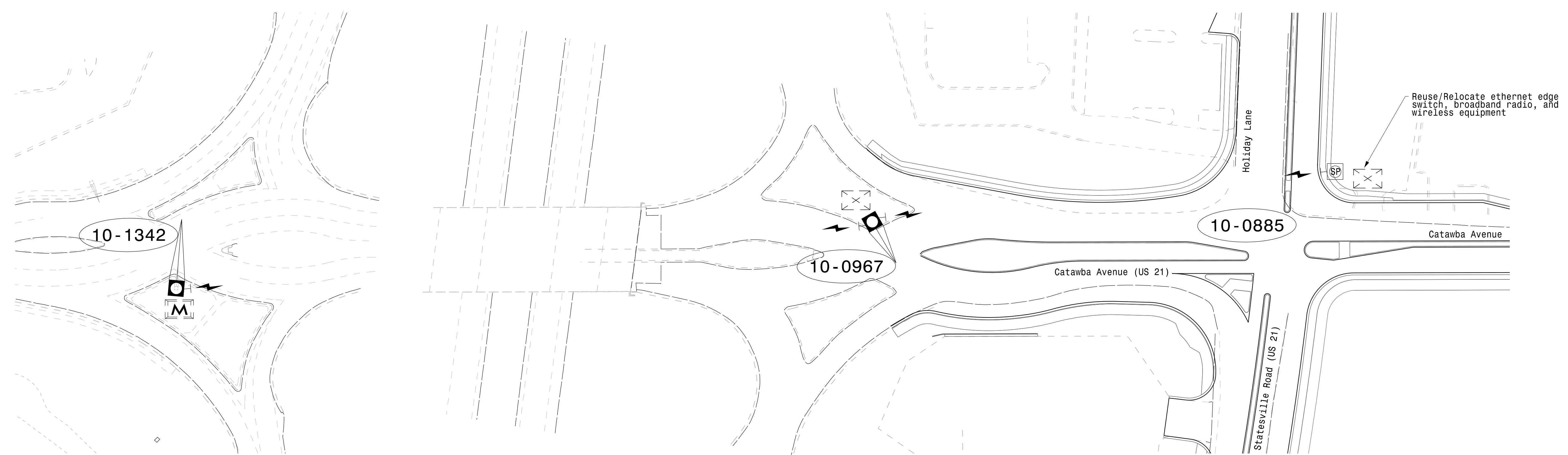
SEAL

 Steven G. Haynie
 PE
 DATE: 2/21/2023
 CADD Filename: C-5621scp01.dgn

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NOTES

1. INSTALL ANTENNA CABLE:
ON PERMANENT METAL STRAIN POLES, RUN ANTENNA CABLE UP THROUGH THE POLE AND OUT THE WEATHERHEAD AND ROUTE THE ANTENNA CABLE TO THE ANTENNA.
2. MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
3. RELOCATE AND REATTACH ANTENNA AT THE SAME ATTACHMENT HEIGHT. FIELD ADJUST AS NECESSARY TO ENSURE FULLY FUNCTIONING COMMUNICATIONS.
4. REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."



LEGEND

- FLAT PANEL ANTENNA
- SIGNAL INVENTORY NUMBER
- EXISTING CONTROLLER AND CABINET
- MASTER RADIO LOCATION
- NEW CONTROLLER AND CABINET
- NEW METAL POLE
- NEW WOOD POLE
- SIGNAL POLE
- EXISTING METAL POLE WITH MAST ARM

This plan supersedes the wireless communication plan signed and sealed by Steven G. Haynie, PE on 05/31/2022.

Final Configuration

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Office of:
Catawba Avenue at US 21 (Statesville Road) Wireless Communications Plans

Division 10 Mecklenburg County Cornelius
 PLAN DATE: February 2023 REVIEWED BY: S. Haynie
 PREPARED BY: P. Koloski REVIEWED BY:

REVISIONS	INIT.	DATE

750 N. Greenfield Pkwy., Garner, NC 27529
 NC FIRM LICENSE No: F-0493
RS&H
 8521 SIX FORKS ROAD, SUITE 400
 RALEIGH, NC 27615
 (919) 926-4100

Seal of Steven G. Haynie, PE, Professional Engineer, License No. 029531, State of North Carolina.

DATE: 2/21/2023
 CADD Filename: C-5621scp02.dgn

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