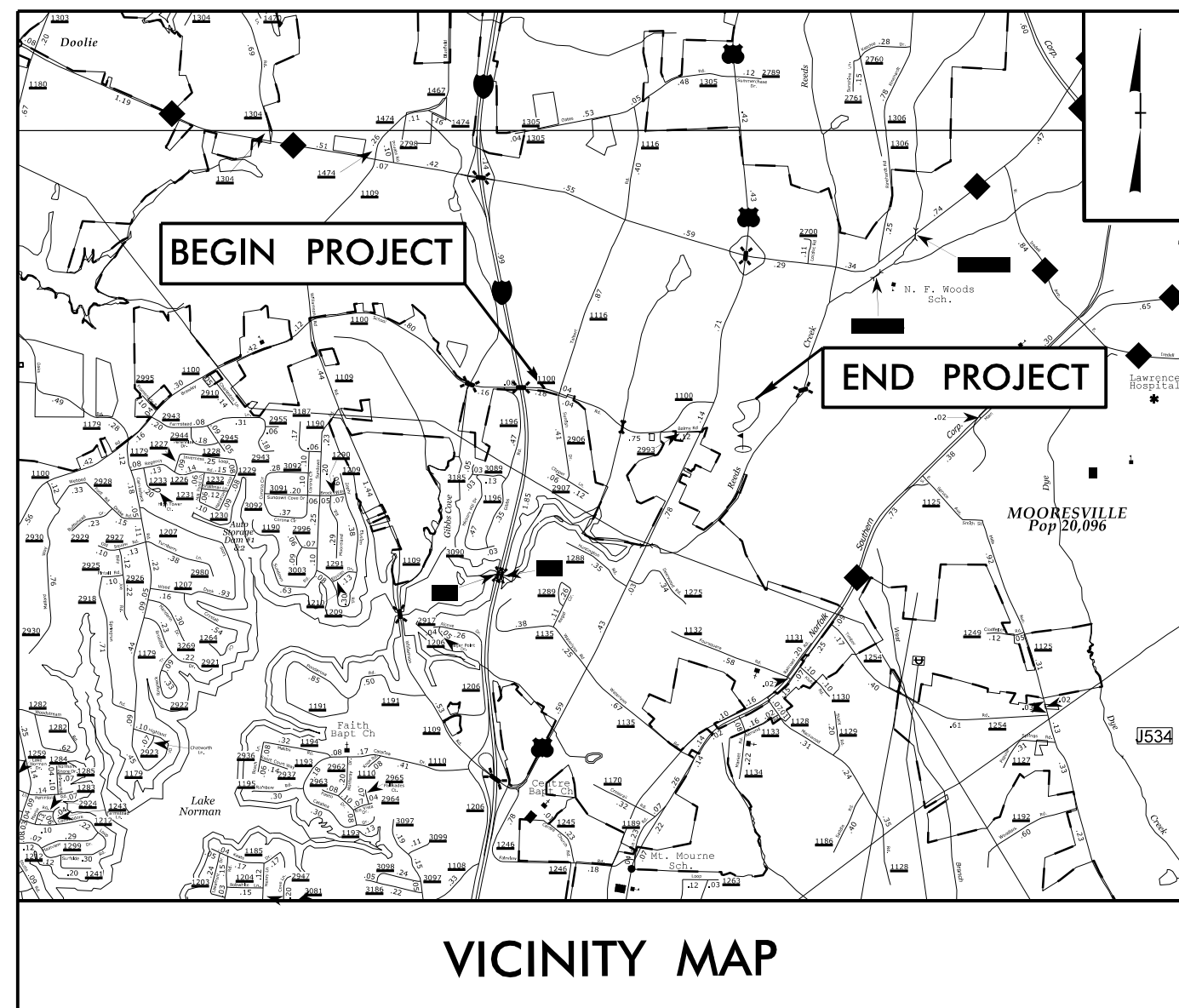


TIP PROJECT: R-3833C

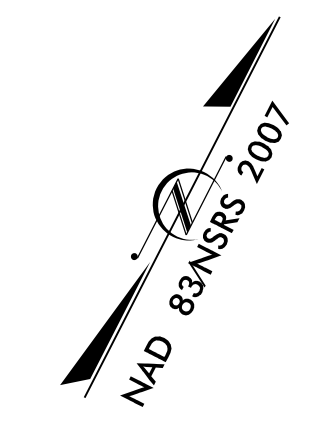
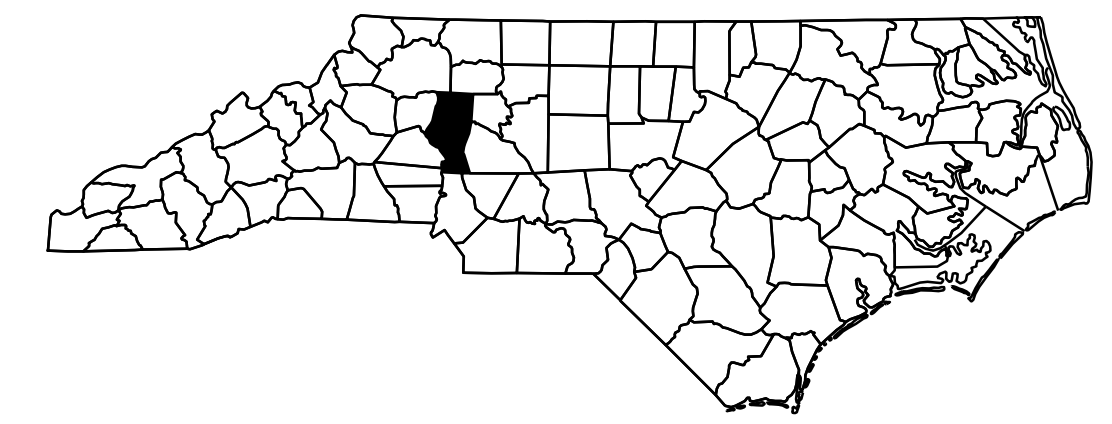


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

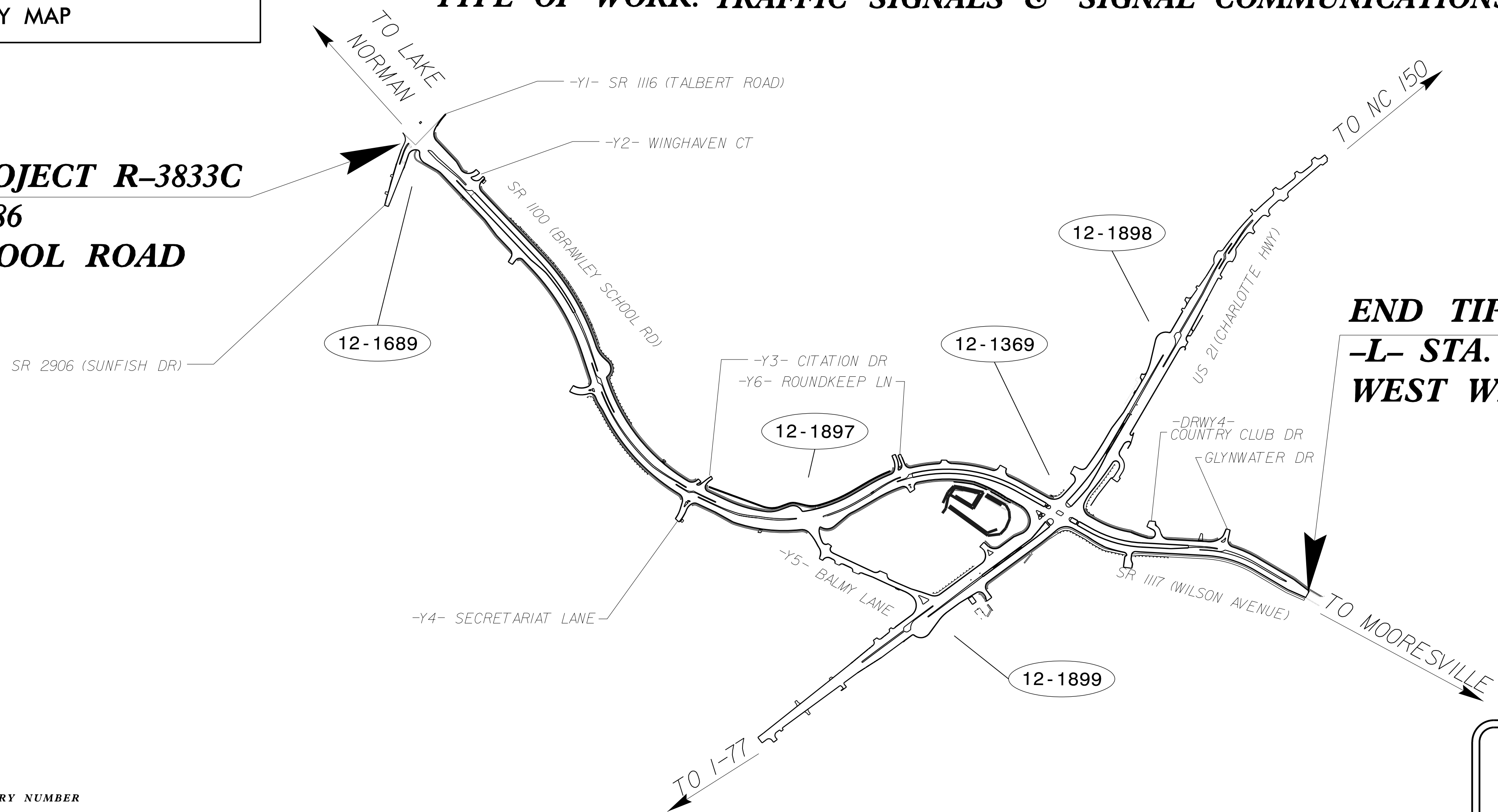
**LOCATION: SR 1100 BRAWLEY SCHOOL ROAD FROM
SR 1116 TALBERT ROAD TO
1000' EAST OF US 21**

TYPE OF WORK: TRAFFIC SIGNALS & SIGNAL COMMUNICATIONS



**BEGIN TIP PROJECT R-3833C
-L- POT 18+05.86
BRAWLEY SCHOOL ROAD**

**END TIP PROJECT R-3833C
-L- STA. 75+82.64
WEST WILSON AVENUE**



LEGEND
XX-XXXX - SIGNAL INVENTORY NUMBER

INDEX OF PLANS		
SHEET NO.	SIG. INV. #	DESCRIPTION
SIG-1.0		Title Sheet
SIG-1.1 - SIG-1.2		Standard Plate Sheets
SIG-2.0 - SIG-5.3	12-1689	SR 1100 (Brawley School Road) at SR 1116 (Talbert Road) / SR 2906 (Sunfish Drive)
SIG-6.0 - SIG 6.6	12-1897	SR 1100 (Brawley School Road) at Balmy Lane
SIG-7.0 - SIG-12.5	12-1369	US 21 (Charlotte Highway) at SR 1100 (Brawley School Road) / SR 1117 (Wilson Avenue)
SIG-13.0 - SIG-13.2	12-1898	US 21 (Charlotte Highway) at SR 1100 (Brawley School Road) U-Turn
SIG-14.0 - SIG-14.2	12-1899	US 21 (Charlotte Highway) at SR 1100 (Wilson Avenue) U-Turn / Balmy Lane
MI - M8		Metal Pole Standards
SCP-01 - SCP-10		Signal Communication Plans

**INTELLIGENT TRANSPORTATION
AND SIGNALS UNIT**
Contacts:

Tim Williams, PE
Signals Engineer, Western Region

Todd Joyce, PE
Signal Equipment Design Review Engineer

Gregory Green
Signal Communication Project Engineer

Heidi Berggren, EIT
Signal Communication Project Design Engineer

Plans Prepared for the NCDOT
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY & SAFETY DIVISION

750 N. Greenfield Parkway, Garner, NC 27529

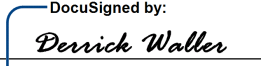
Stantec

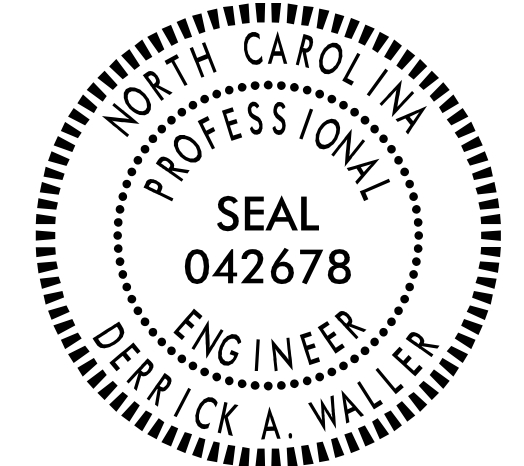
Stantec Consulting Services Inc.
801 Jones Franklin Rd-Suite 300
Raleigh, NC 27606

Tel. 919.851.6866
Fax. 919.851.7024
www.stantec.com
License No. F-0672

Betsy L. Watson, PE Senior Principal
Derrick Waller, PE Transportation Engineer
Regina Muncey, PE Transportation Engineer
James Hambright Senior Transportation Technician

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

APPROVED: 
DATE: 3/22/2023

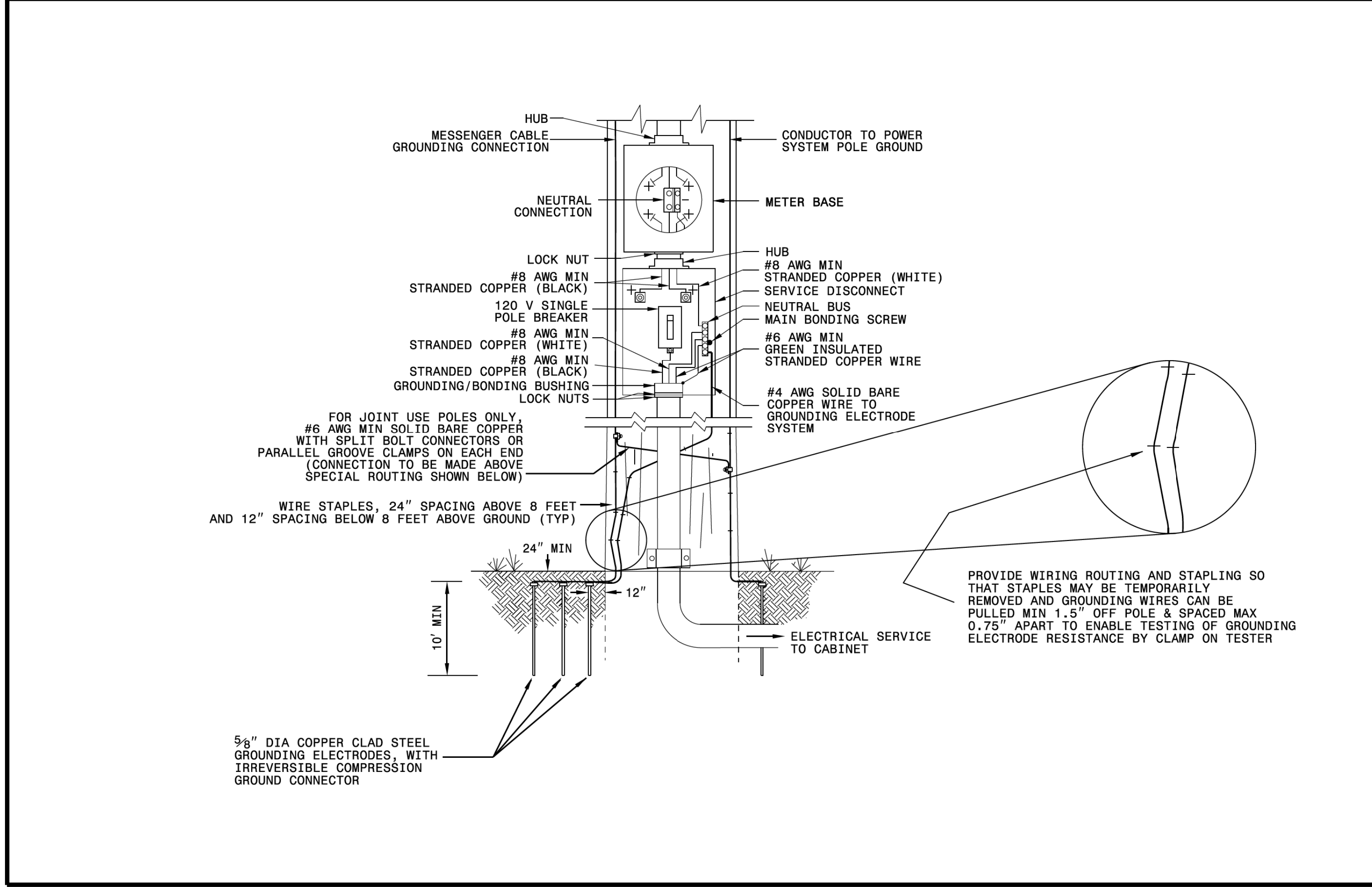


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1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR
ELECTRICAL SERVICE GROUNDING
GROUNDING AND BONDING

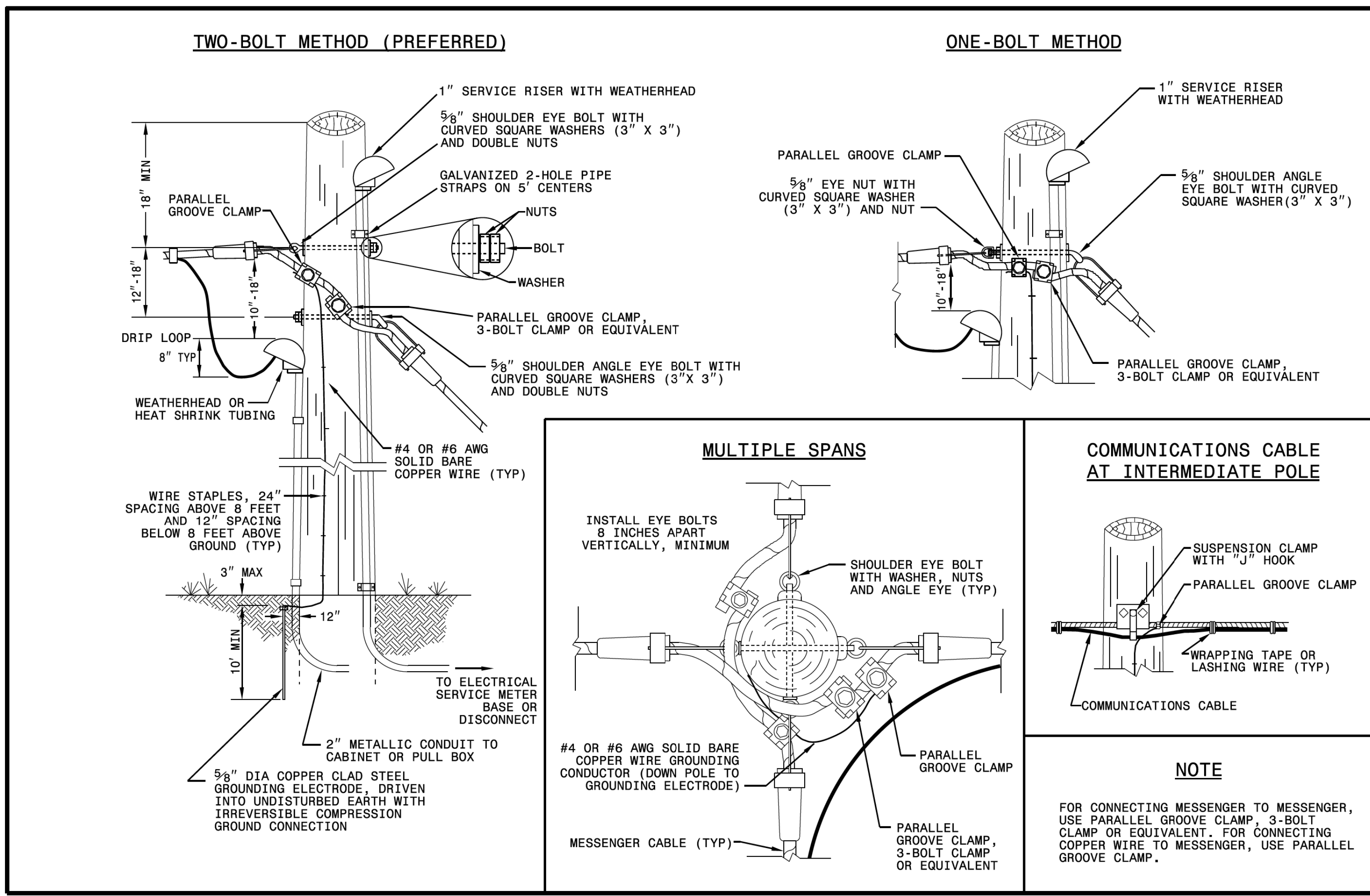
SHEET 1 OF 1
1700D01



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

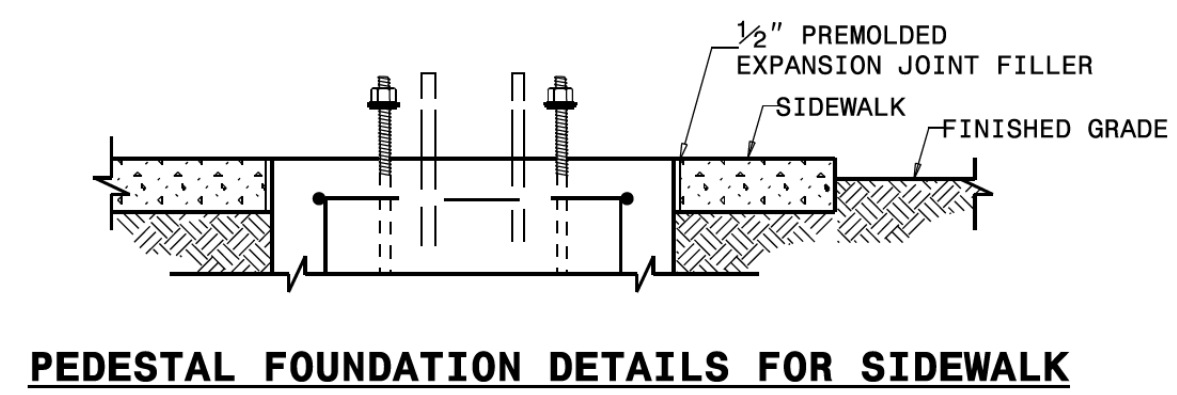
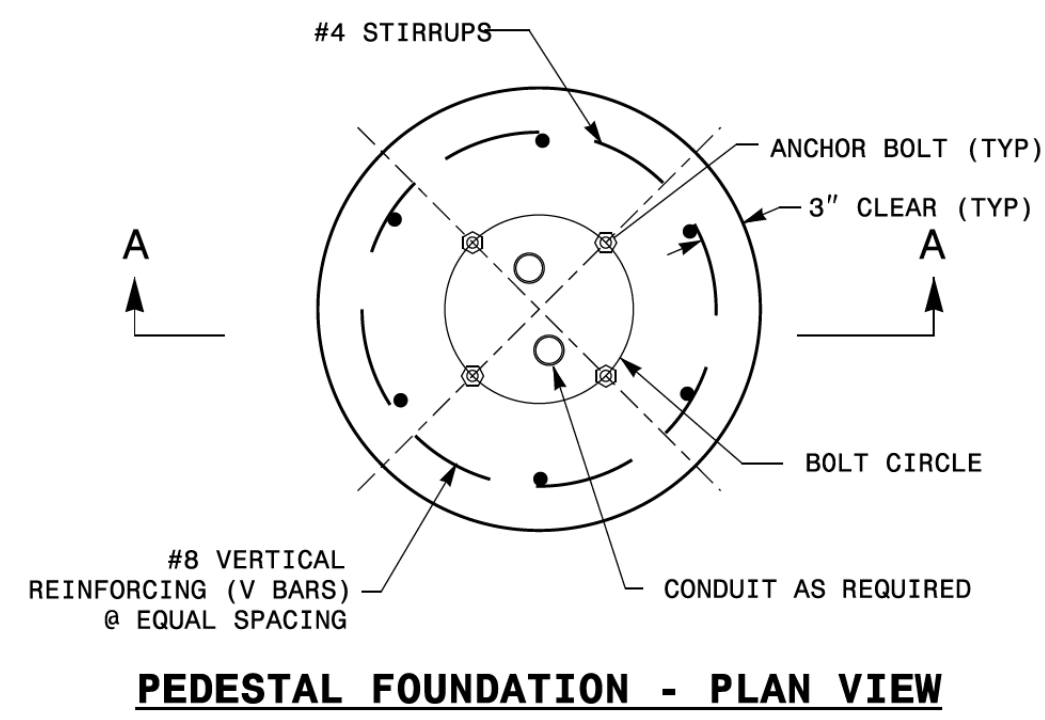


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FINAL UNLESS ALL
SIGNATURES COMPLETED

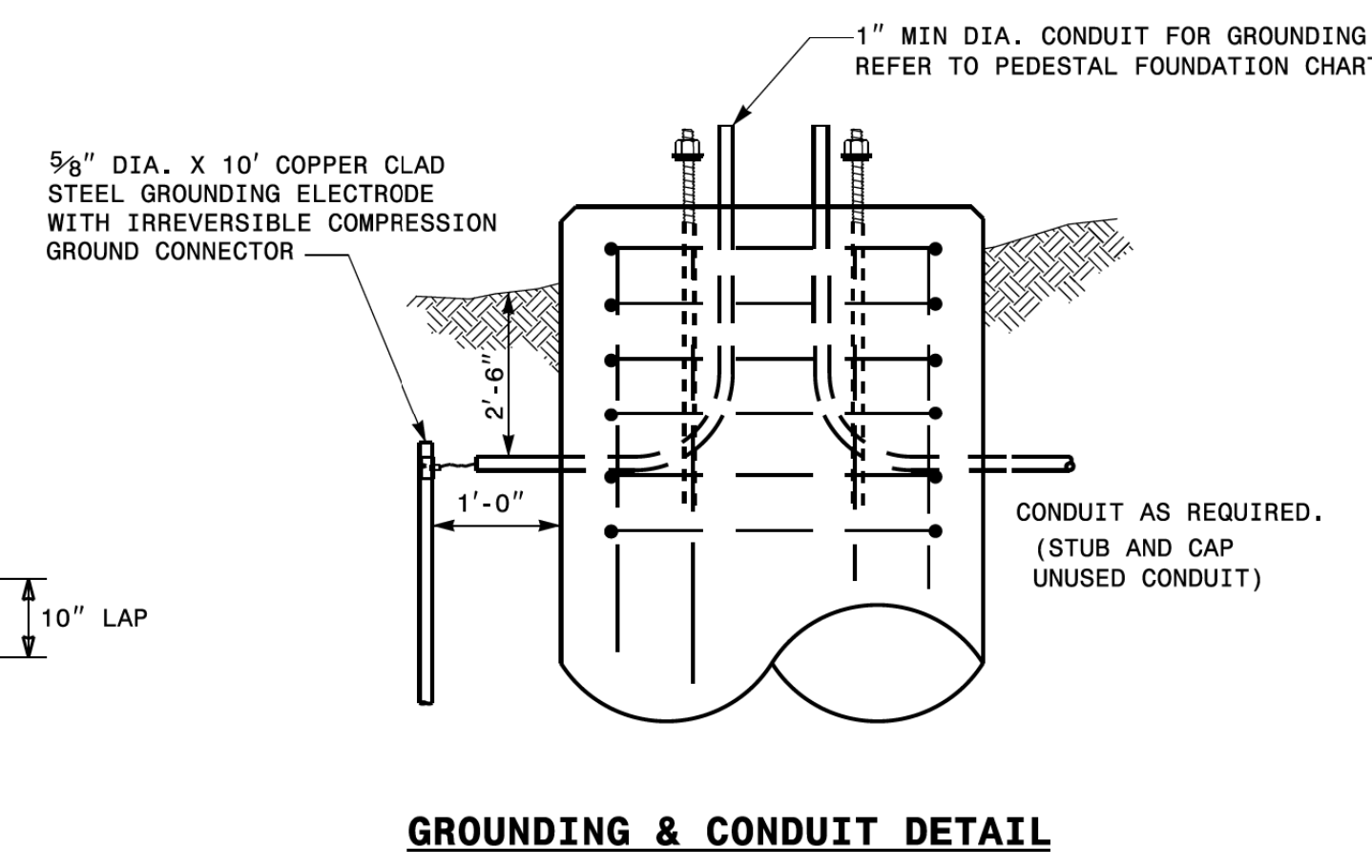
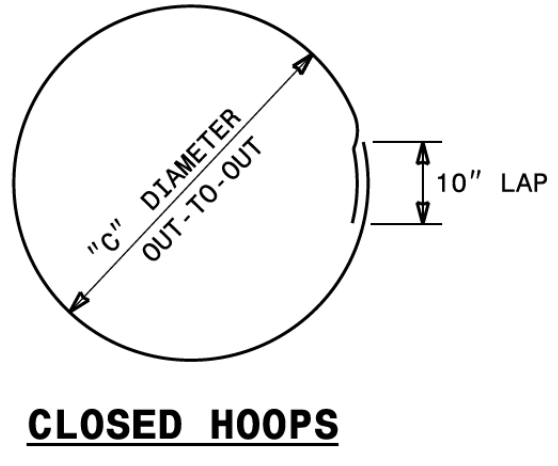
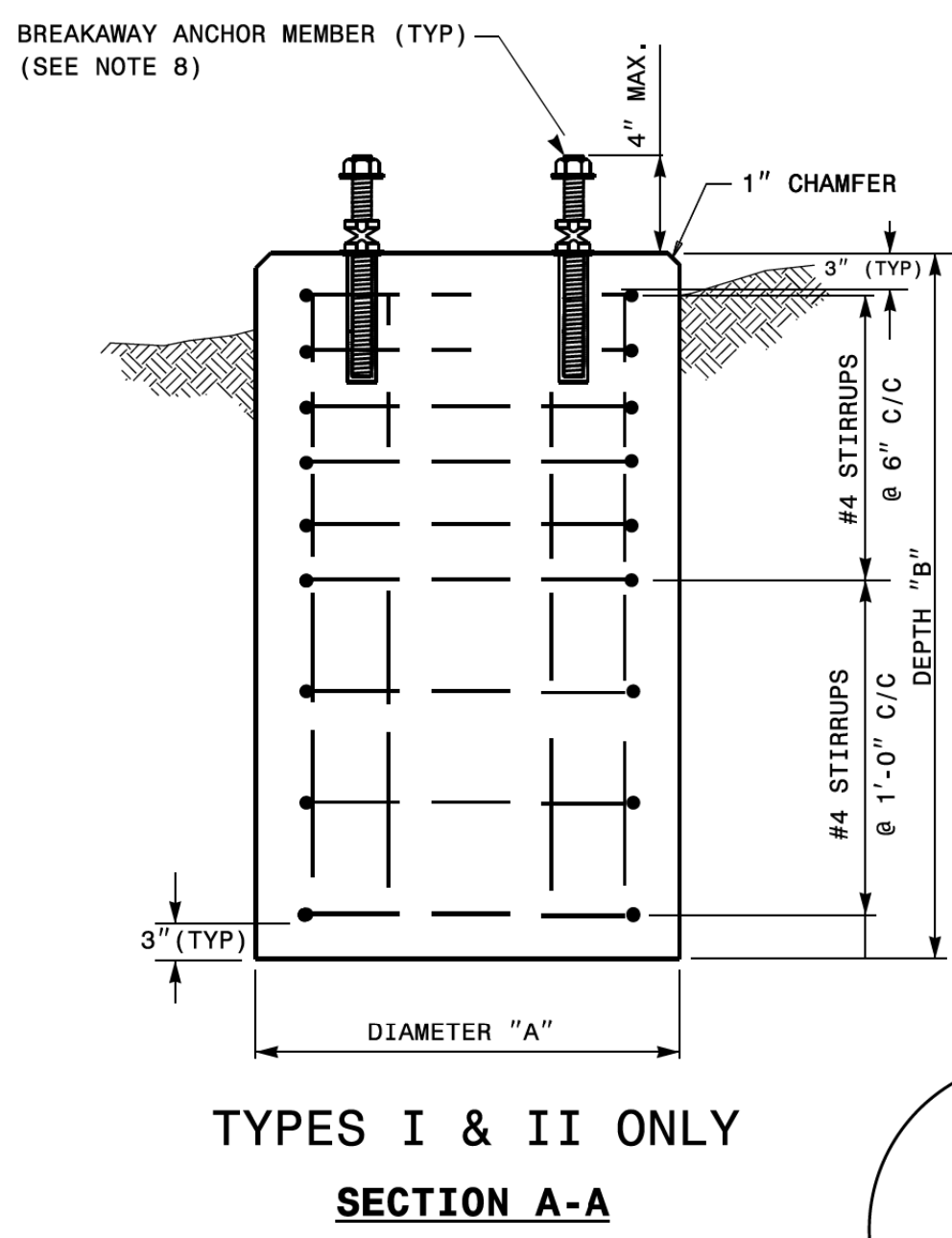
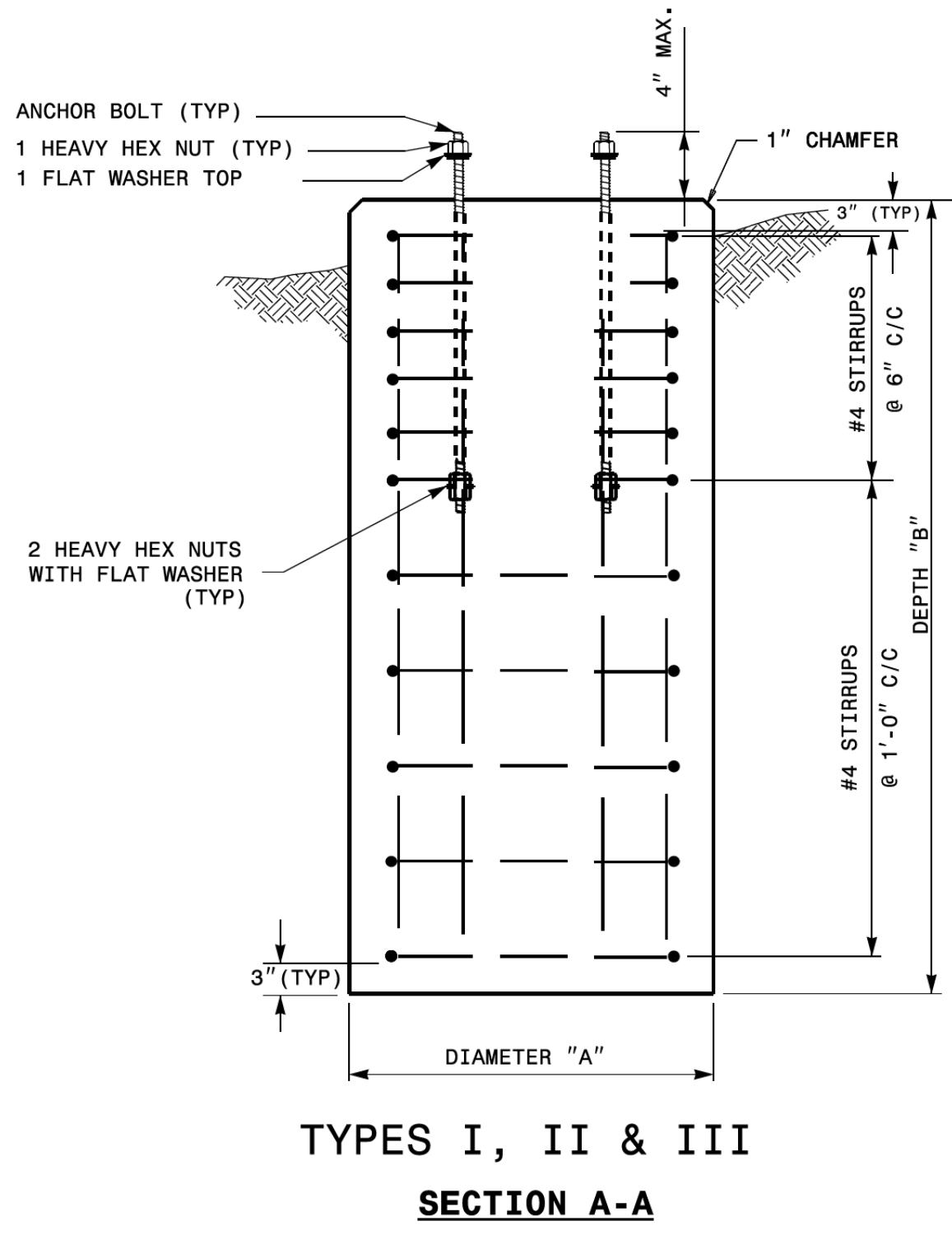
See Plate for Title

<p>Prepared in the Offices of:</p>	<p>SEAL</p>
<p>750 N. Greenfield Parkway Garner, NC 27529</p>	<p>DocuSigned by: <i>Mohd Aslami</i> 10/11/2017 DATE</p>

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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	
					ON 6" CENTERS	ON 12" CENTERS	TOTAL						
I	8	6	3'-0"	56	4	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
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR
PEDESTALS
FOUNDATIONS

SHEET 1 OF 1
1743D01

See Plate for Title

Prepared in the Offices of:

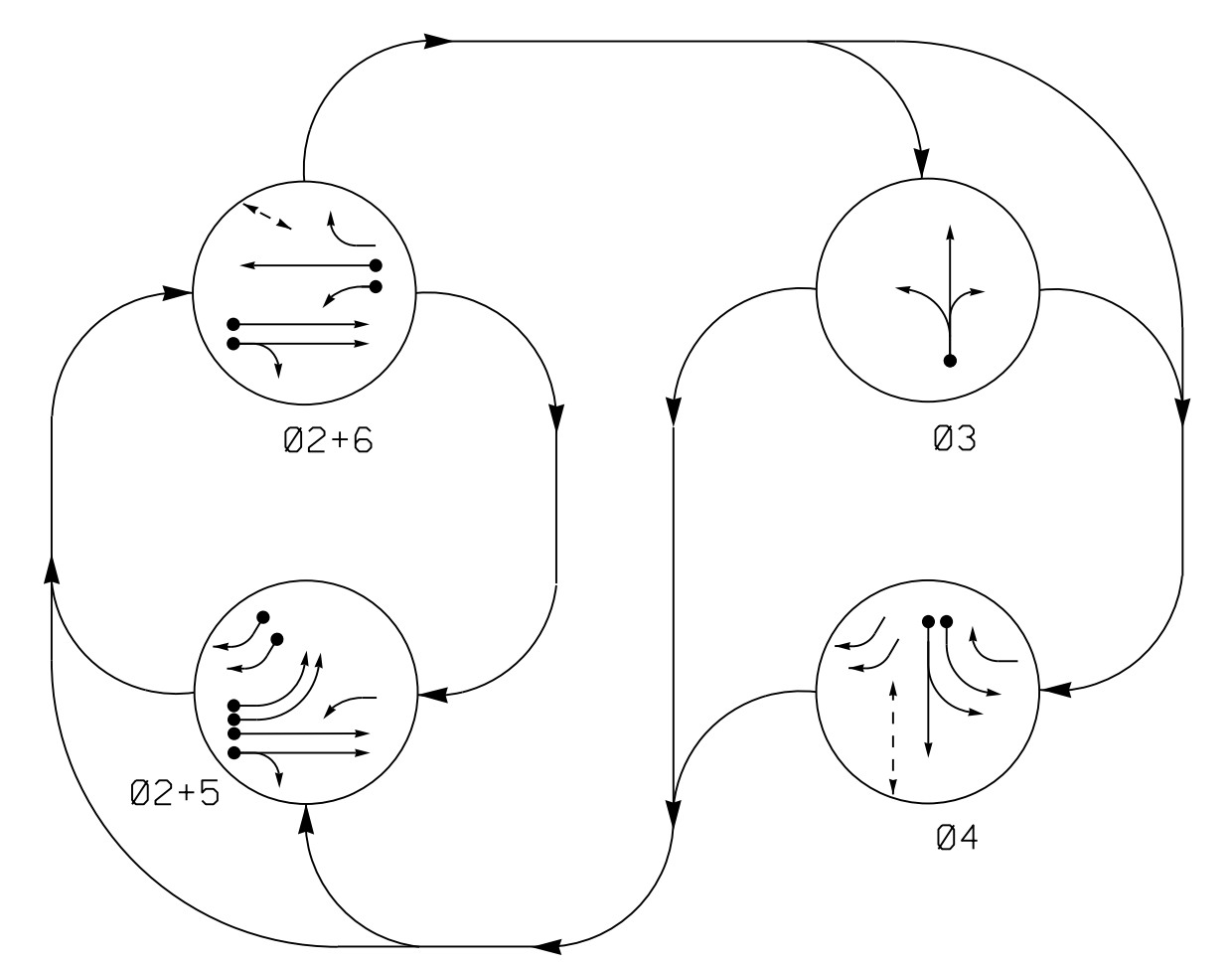
SEAL
NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL 028094
DEBESH C. SARKAR

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

DOCUMENT NOT CONSIDERED
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SIGNATURES COMPLETED

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PHASING DIAGRAM



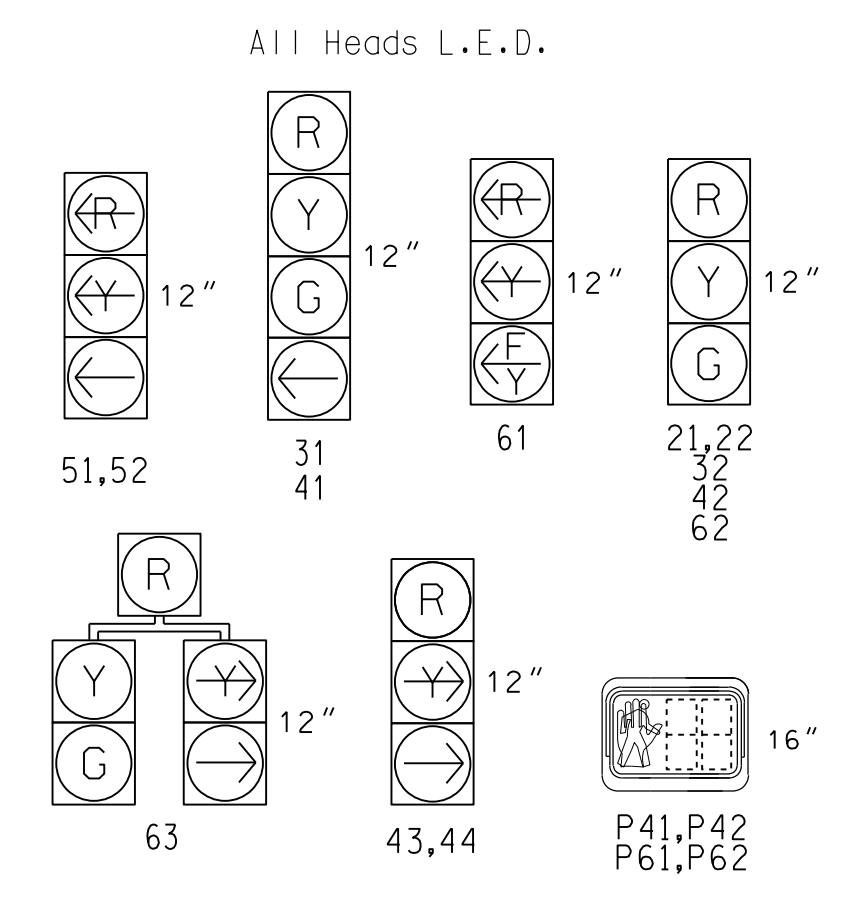
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE				
	02+5	02+6	03	04	FLSH
21,22	G	G	R	R	Y
31	R	R	G	R	R
32	R	R	G	R	R
41	R	R	R	G	R
42	R	R	R	G	R
43,44	→	R	R	→	R
51,52	←	R	R	←	R
61	E	E	R	R	Y
62	R	G	R	R	Y
63	R	G	R	Y	Y
P41,P42	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	DW	DRK

SIGNAL FACE I.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING									
				NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD	
2A/S1	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y	-
2B/S2	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	Y	-
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	-	10	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-	-
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-	-
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	-	-
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	-	-
5C	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	-	-
5D	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	-	-
6A	6X6	300	*	*	6	Y	Y	-	-	-	-	-	*
6B	6X40	0	*	*	6	Y	Y	Y	-	-	3	-	*
6C	6X40	0	*	*	6	Y	Y	Y	2.0	5	-	-	*

* Video Detection Area
Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

4 Phase Fully Actuated Signal System 11210

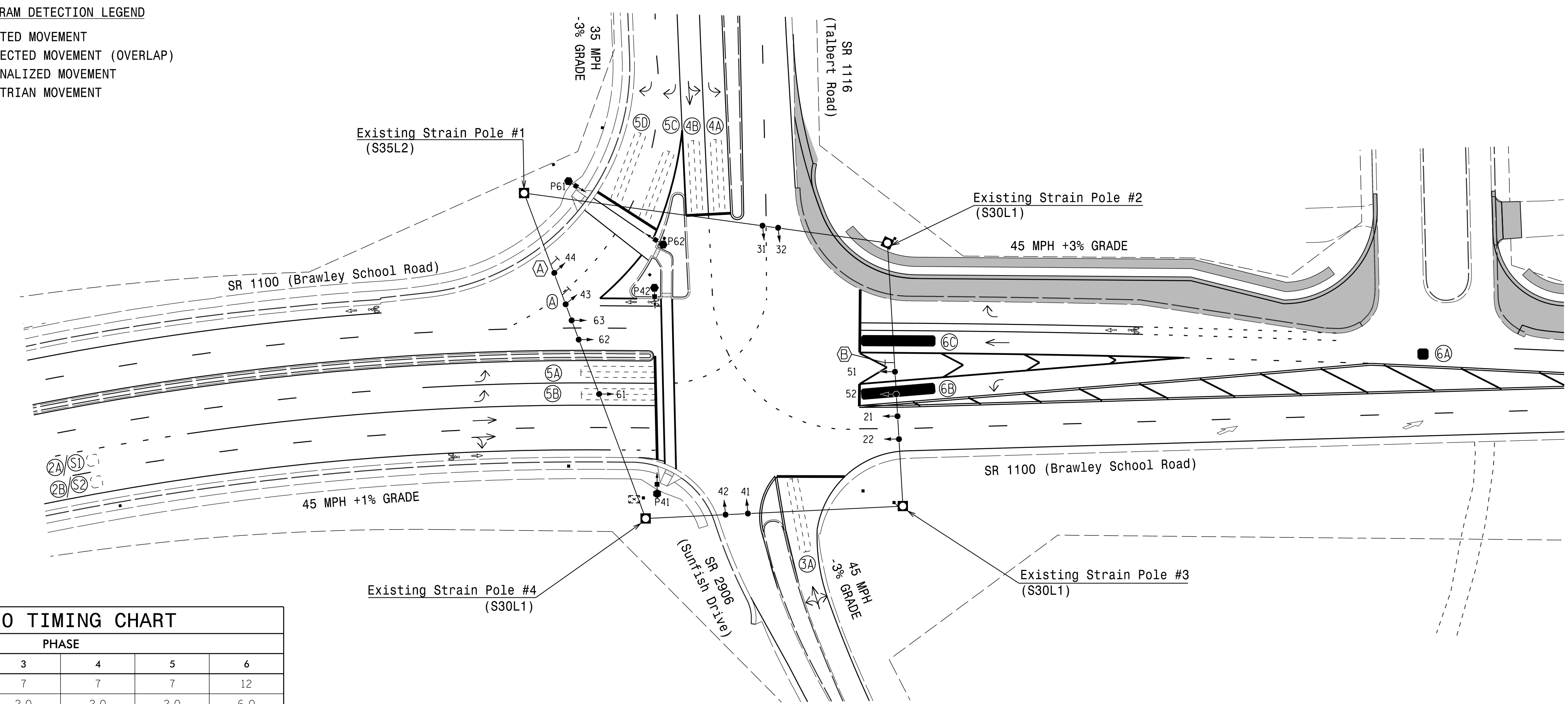
NOTES

- 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 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Set all detector units to presence mode.
- This intersection features a video detection system. Shown locations of detectors are conceptual only. Detectors should be placed to ensure the desired operation parameters are achieved.
- 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.

OASIS 2070 TIMING CHART

FEATURE	PHASE				
	2	3	4	5	6
Min Green 1 *	12	7	7	7	12
Extension 1 *	6.0	2.0	2.0	2.0	6.0
Max Green 1 *	90	25	25	30	90
Yellow Clearance	4.4	4.8	4.1	3.0	4.4
Red Clearance	1.6	1.6	2.9	2.9	1.6
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	7	-	7
Don't Walk 1	-	-	24	-	9
Seconds Per Actuation *	1.5	-	-	-	-
Max Variable Initial *	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	-	-	-	-
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

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



LEGEND

- | PROPOSED | EXISTING |
|--|----------|
| ○ → Traffic Signal Head | ● → N/A |
| ○ → Modified Signal Head | ○ → N/A |
| ○ → Pedestrian Signal Head | ○ → N/A |
| ○ → Pedestrian Signal Head With Push Button & Sign | ○ → N/A |
| ○ → Signal Pole with Guy | ○ → N/A |
| ○ → Signal Pole with Sidewalk Guy | ○ → N/A |
| ○ → Inductive Loop Detector | ○ → N/A |
| ○ → Controller & Cabinet | ○ → N/A |
| ○ → Junction Box | ○ → N/A |
| ○ → 2-in Underground Conduit | ○ → N/A |
| ○ → Right of Way | ○ → N/A |
| ○ → Directional Arrow | ○ → N/A |
| ○ → Metal Strain Pole | ○ → N/A |
| ○ → Directional Drill | ○ → N/A |
| ○ → Video Detection Area | ○ → N/A |
| ○ → Type II Signal Pedestal | ○ → N/A |
| ○ → Construction Zone | ○ → N/A |
| ○ → "NO TURN ON RED" Sign (R10-11) | ○ → N/A |
| ○ → "U-TURN YIELD TO RIGHT TURN" Sign (R10-16) | ○ → N/A |

Signal Upgrade Temporary Design 1 - TMP Phase I

Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road-Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
Signal Design Section
750 N. Greenfield Pkwy, Garner, NC 27526
SCALE: 1" = 40'

SR 1100 (Brawley School Road) at SR 1116 (Talbert Road)/SR 2906 (Sunfish Drive)
Division 12 Iredell County Mooresville
PLAN DATE: May 2022 REVIEWED BY: E D Harris
PREPARED BY: J. Hambricht REVIEWED BY: R M Muncey

REVISIONS	INIT.	DATE

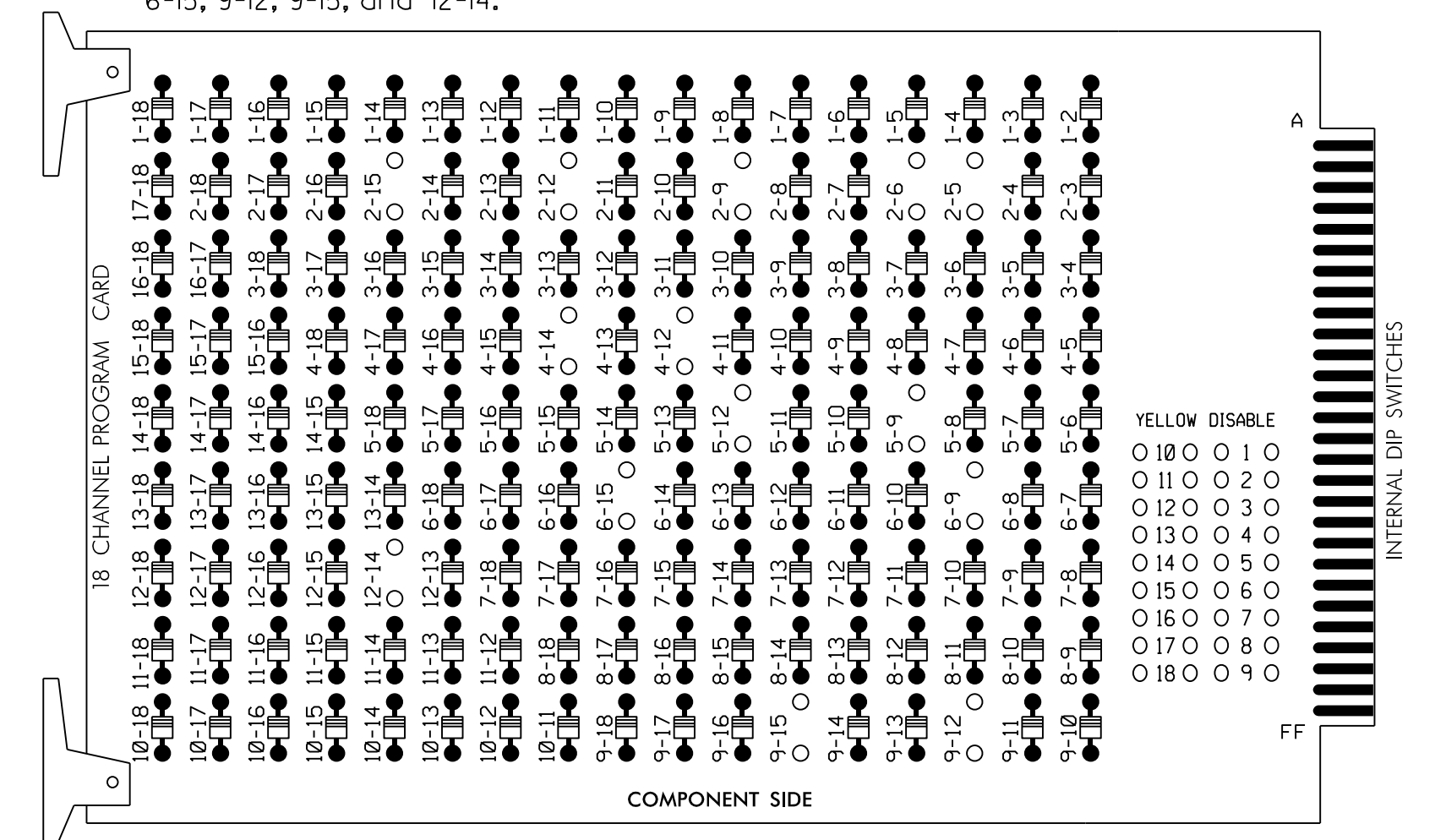
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 042678
D. BRADY A. WALLER
DocuSigned by:
Dorrick Waller 3/24/2023
DATE
SIG. INVENTORY NO. 12-168911

3/24/2023 10:41:00 AM U:\Projects\Signal\Signal\Oasis\Signal\Design\Temporary Design\SR-3833C.sif.dgn_12_168911.dgn User: daniel.liber

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-12, 2-15, 4-12, 4-14, 5-9, 5-12, 6-9, 6-15, 9-12, 9-15, and 12-14.



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.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Startup In Green.
- Program phases 4 and 6 for Startup Ped Call.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

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,S4,S5,S6,S7,S8,S9,AUX S1,
 AUX S5
 PHASES USED.....2,3,4,PED,5,6,6PED
 OVERLAP "A".....2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....4+5

SIGNAL HEAD HOOK-UP CHART

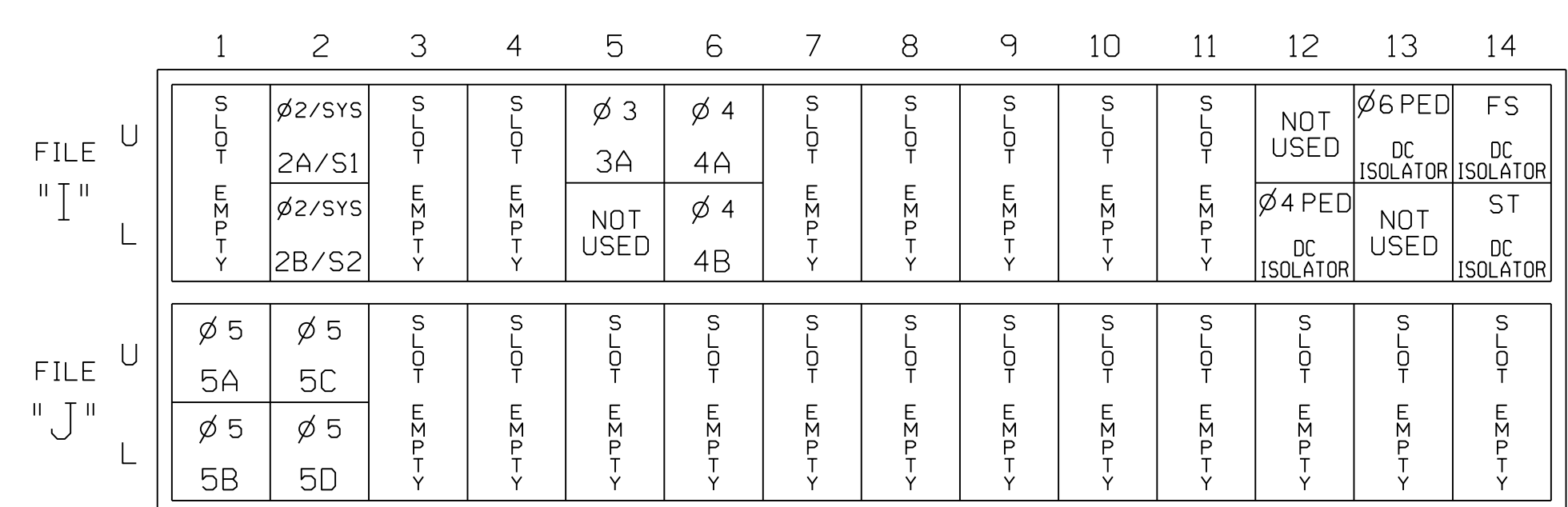
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22	NU	31	32	41	42	63	P41, P42	51,52	62,63	P61, P62	NU	61	NU	NU	NU	43,44	NU
RED	128		116	116	101	101					134							A101	
YELLOW	129		117	117	102	102					135								
GREEN	130		118	118	103	103					136								
RED ARROW										131								A121	
YELLOW ARROW								102		132								A122	
FLASHING YELLOW ARROW																		A123	
GREEN ARROW				118	103	103			133										A103
Hand icon									104										
Walking 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

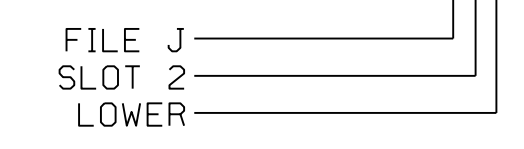
FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A/S1	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S2	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			10
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-3,4	J1L	55	17	5	5	Y	Y			
5C	TB3-5,6	J2U	40	2	6	5	Y	Y			
5D	TB3-7,8	J2L	44	6	16	5	Y	Y			
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					

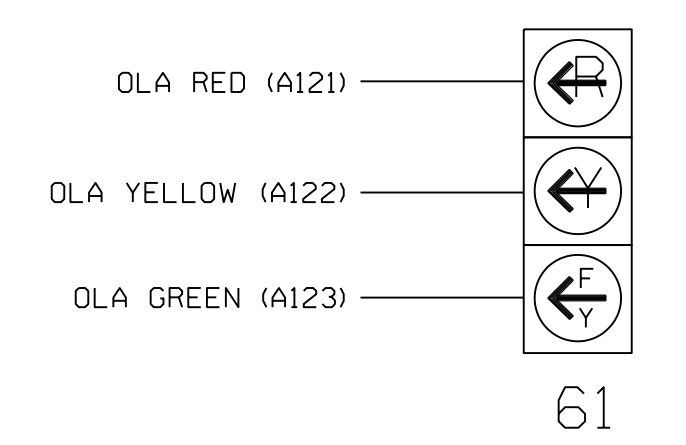
NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1689T1
 DESIGNED: MAY 2022
 SEALED: 3/24/2023
 REVISED: N/A

SPECIAL DETECTOR NOTE

For Detector Zones 6A, 6B and 6C, install a temporary 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.

Temporary Design 1 - TMP Phase I Electrical Detail - Sheet 1 of 2

SR 1100 (Brawley School Road) at SR 1116 (Talbert Road)/SR 2906 (Sunfish Drive)	
Division 12 Iredell County Mooresville	
PLAN DATE: May 2022	REVIEWED BY: E D Harris
PREPARED BY: D A Waller	REVIEWED BY: R M Muncey
REVISIONS	INIT. DATE

Seal of Derrick A. Waller, Professional Engineer, License No. 042678, State of North Carolina. Date: 3/24/2023.

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?...N
GREEN EXTENSION (0-255 SEC).....0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0

```

← NOTICE GREEN FLASH

PRESS '+' THREE TIMES

```

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE:      |12345678910111213141516
VEH OVL PARENTS: | XX
VEH OVL NOT VEH: |
VEH OVL NOT PED: |
VEH OVL GRN EXT: |
STARTUP COLOR:  | _ RED _ YELLOW _ GREEN
FLASH COLORS:   | _ RED _ YELLOW _ 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

```

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 12-1689T1
 DESIGNED: MAY 2022
 SEALED: 3/24/2023
 REVISED: N/A


Temporary Design 1 - TMP Phase I
Electrical Detail - Sheet 2 of 2

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Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

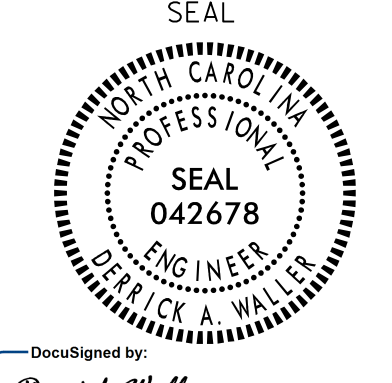
SR 1100 (Brawley School Road)
 at SR 1116 (Talbert Road)/SR
 2906 (Sunfish Drive)

Division 12 Iredell County Mooresville

PLAN DATE: May 2022	REVIEWED BY: E D Harris
PREPARED BY: D A Waller	REVIEWED BY: R M Muncy

REVISIONS	INIT.	DATE

SEAL

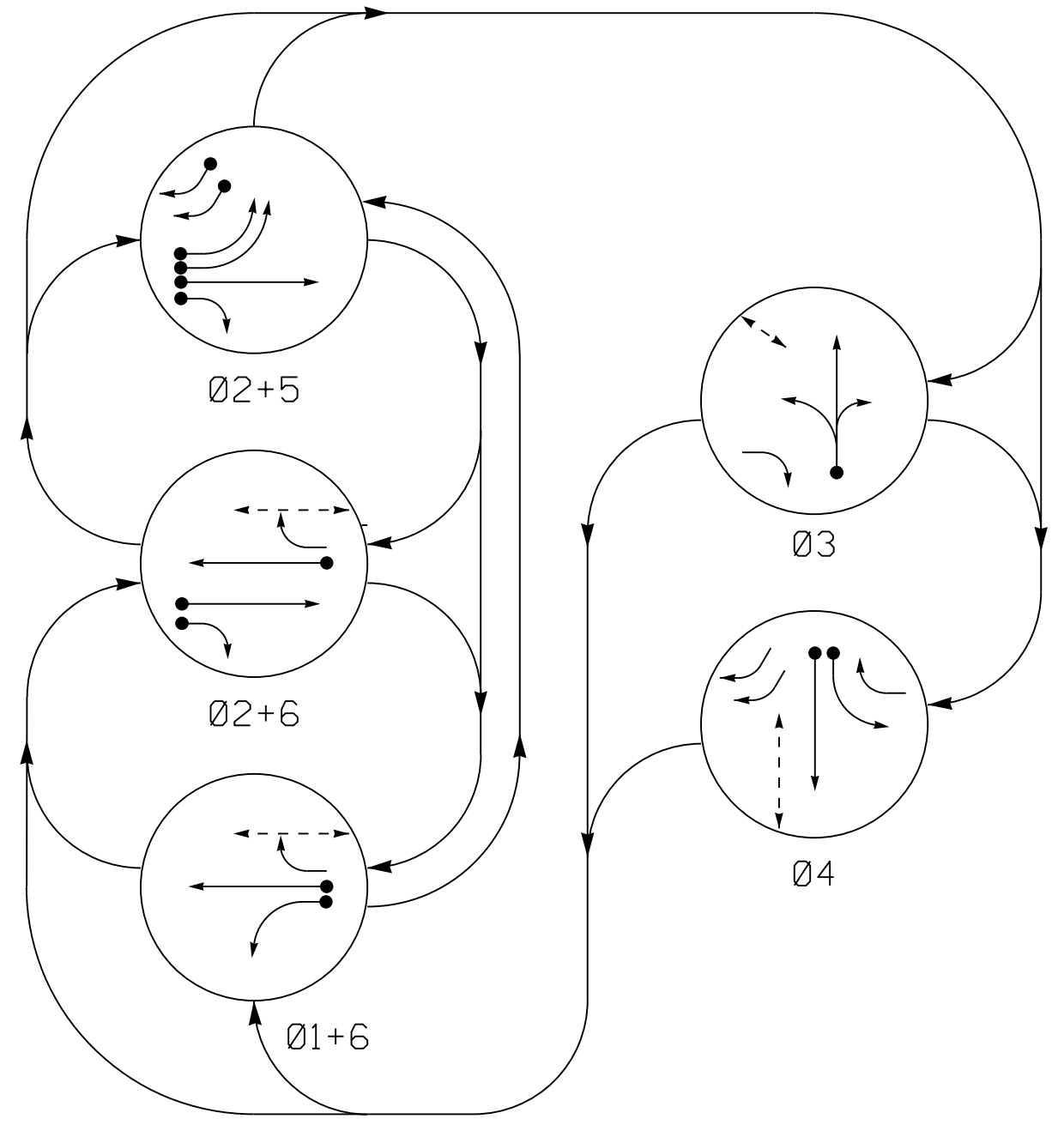


DocuSigned by:
 Derrick Waller 3/24/2023

SIG. INVENTORY NO. 12-1689T1

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PHASING DIAGRAM

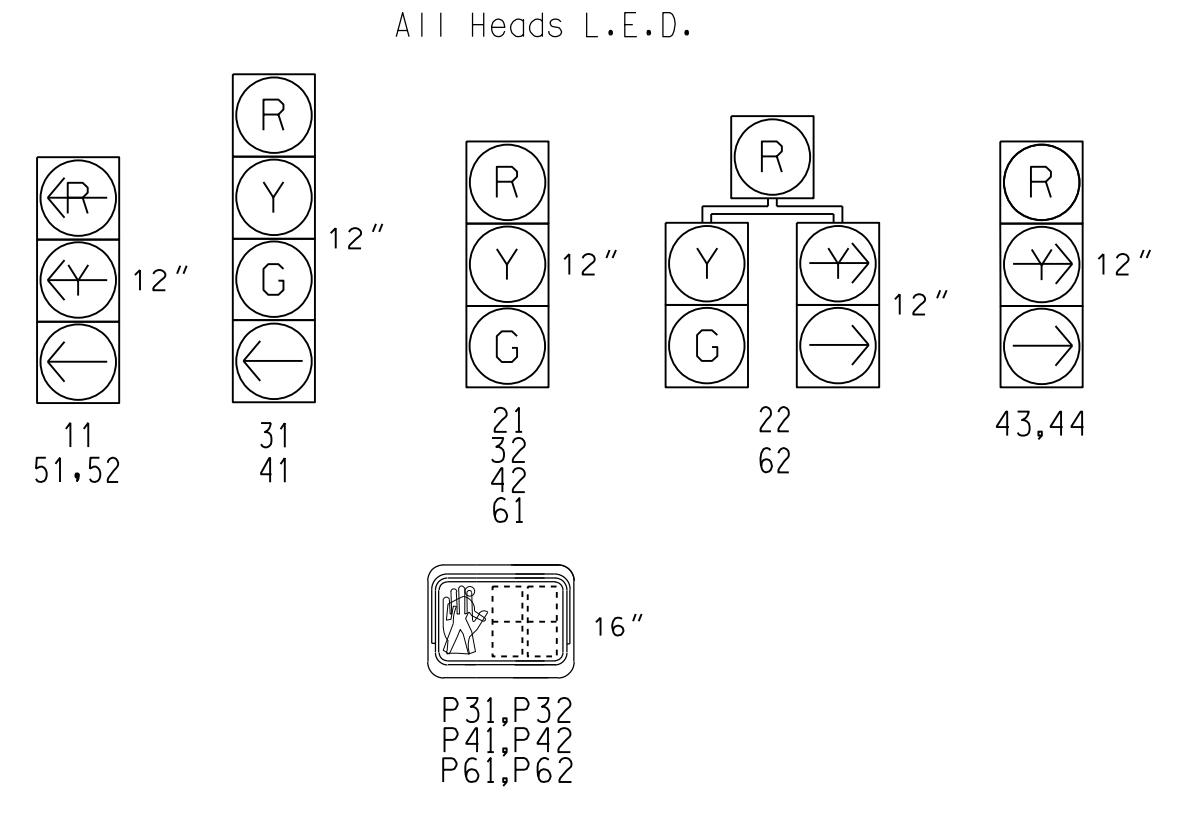


PHASING DIAGRAM DETECTION LEGEND
DETECTED MOVEMENT
UNDETECTED MOVEMENT (OVERLAP)
UNSIGNALIZED MOVEMENT
PEDESTRIAN MOVEMENT

TABLE OF OPERATION

Table with columns: SIGNAL FACE, PHASE (01+6, 02+5, 02+6, 03, 04), and various signal face numbers (11, 21, 22, 31, 32, 41, 42, 43,44, 51,52, 61, 62, P31,P32, P41,P42, P61,P62).

SIGNAL FACE I.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

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

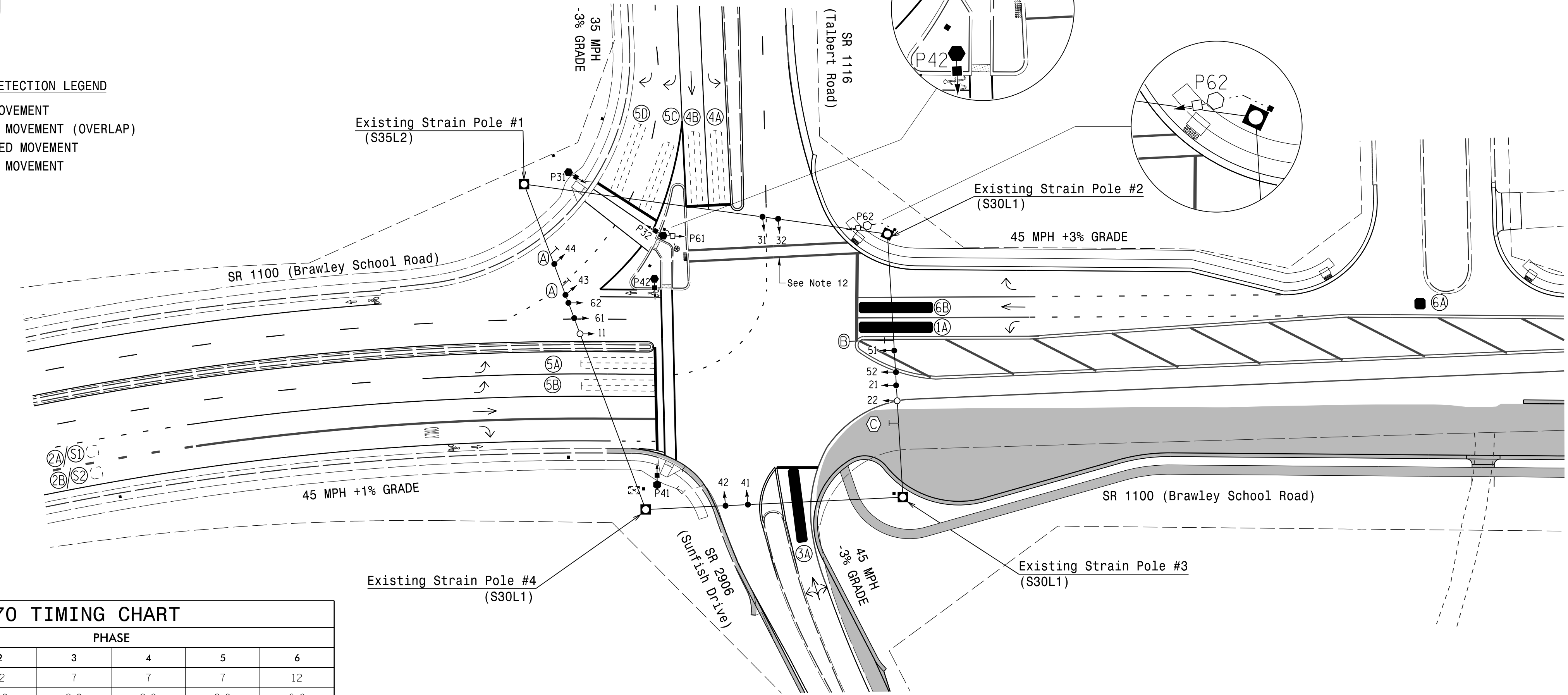
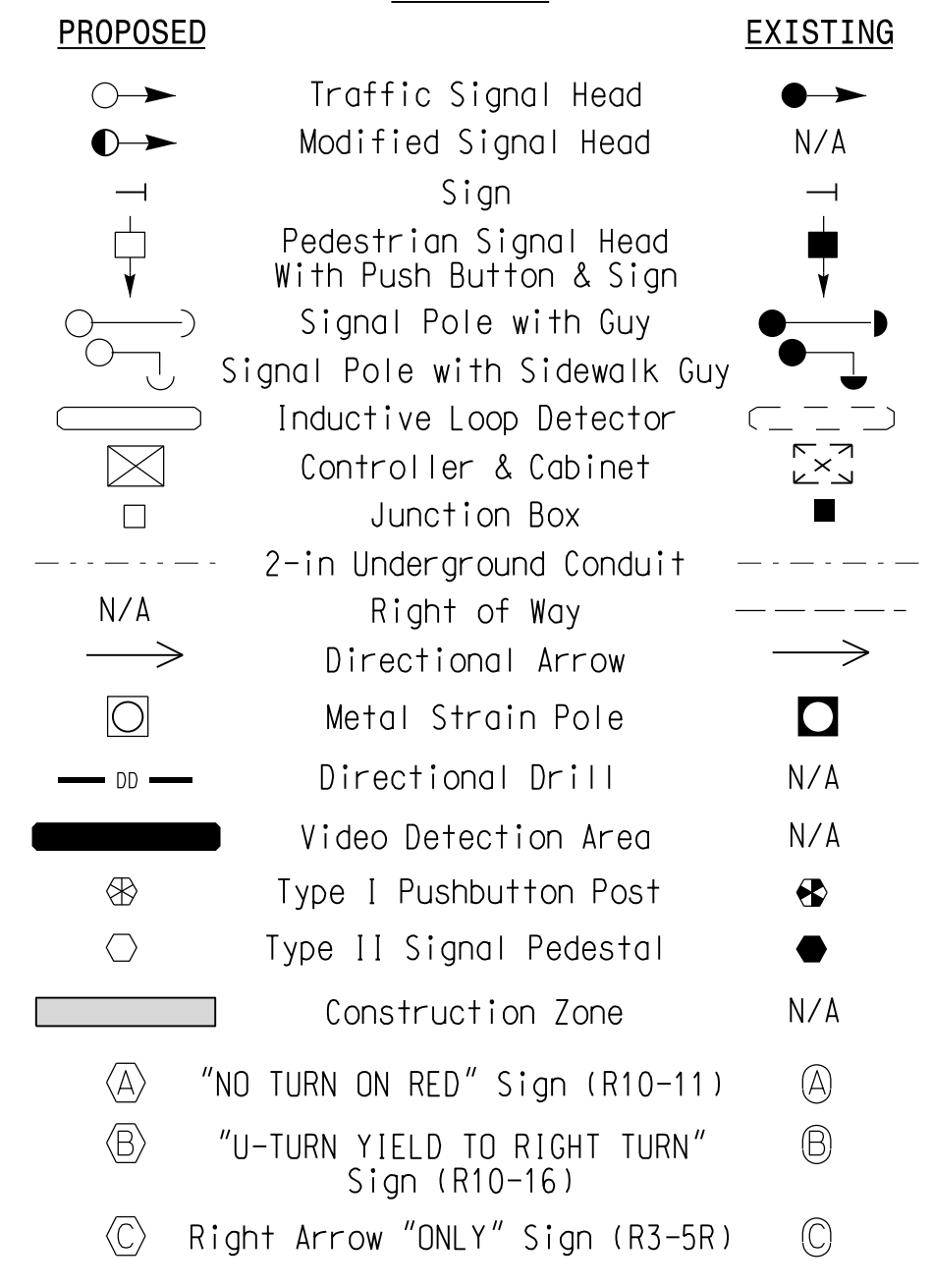
* Video Detection Area
Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

5 Phase Fully Actuated Signal System 11210

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 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Renumber signal heads 62 and 63 to 61 and 62, renumber pedestrian signal heads P61 and P62 to P31 and P32, and renumber pedestrian signal heads P63 and P64 to P61 and P62, respectively.
6. Set all detector units to presence mode.
7. This intersection features a video detection system. Shown locations of detectors are conceptual only. Detectors should be placed to ensure the desired operation parameters are achieved.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Shift signal heads 11, 21, 51, 52, 61, 62, and Sign B.
12. Crosswalk to be installed as shown in final pattern as part of the TMP.

LEGEND



OASIS 2070 TIMING CHART

Timing chart table with columns: FEATURE, PHASE (1-6), and values for Min Green, Extension, Max Green, Yellow Clearance, Red Clearance, Red Revert, Walk, Don't Walk, Seconds Per Actuation, Max Variable Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Recall Mode, Vehicle Call Memory, Dual Entry, Simultaneous Gap.

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

Signal Upgrade Temporary Design 2 - TMP Phase II

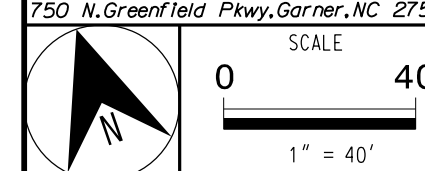
Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606.

Professional Engineer seal for J. Hanbright, State of North Carolina, License No. 27528.

Project title block: SR 1100 (Brawley School Road) at SR 1116 (Talbert Road)/SR 2906 (Sunfish Drive). Includes plan date (May 2022), reviewed by (E D Harris), and preparation by (J. Hanbright).

Professional Engineer seal for D. A. Walker, State of North Carolina, License No. 042678.

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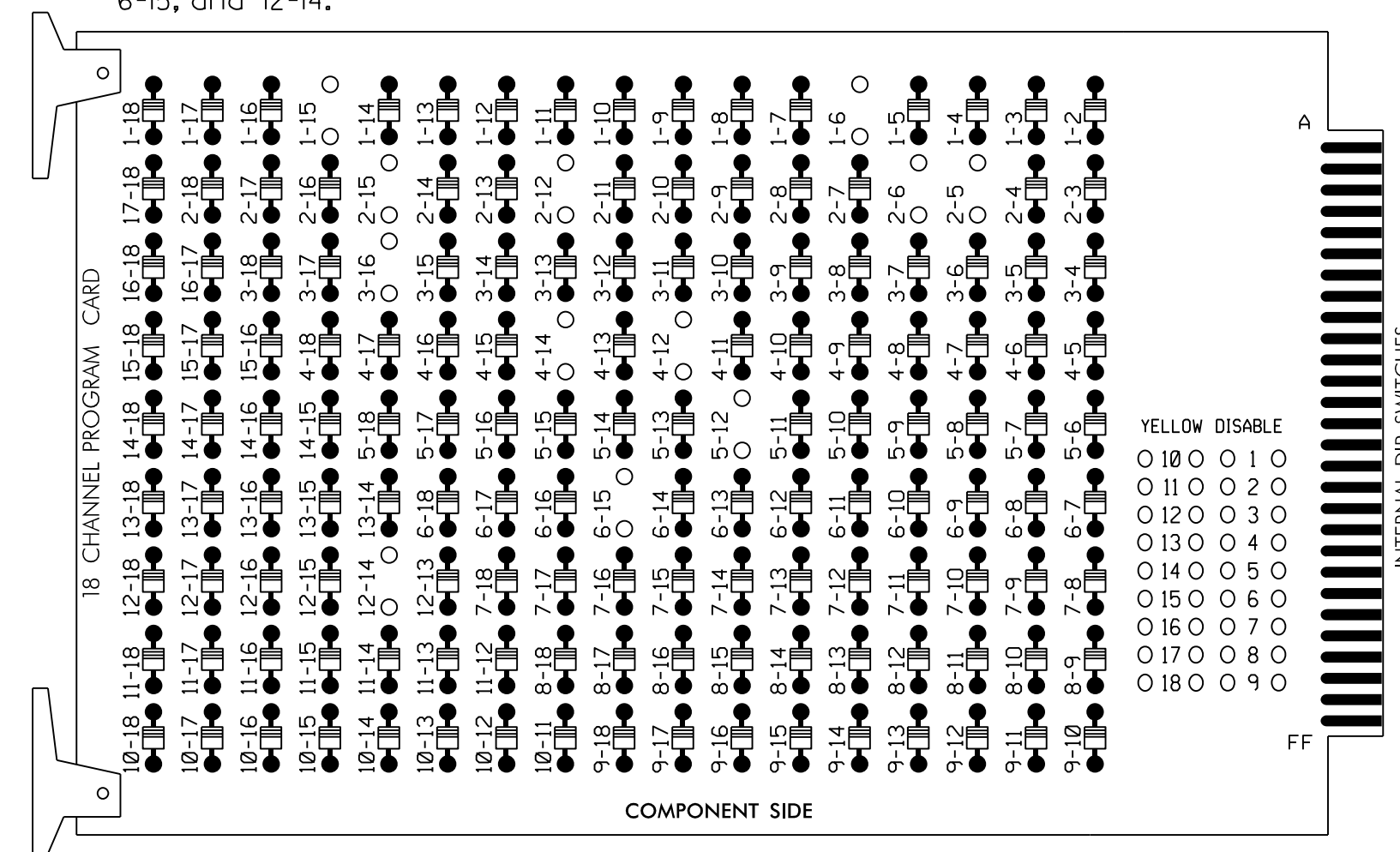
DocuSigned by: Doreick Walker 3/24/2023

3/24/2023 11:41:00 AM C:\Users\jhanbright\OneDrive\Work\Projects\SR 1100\Drawings\11210\SIG-3.0.dgn

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

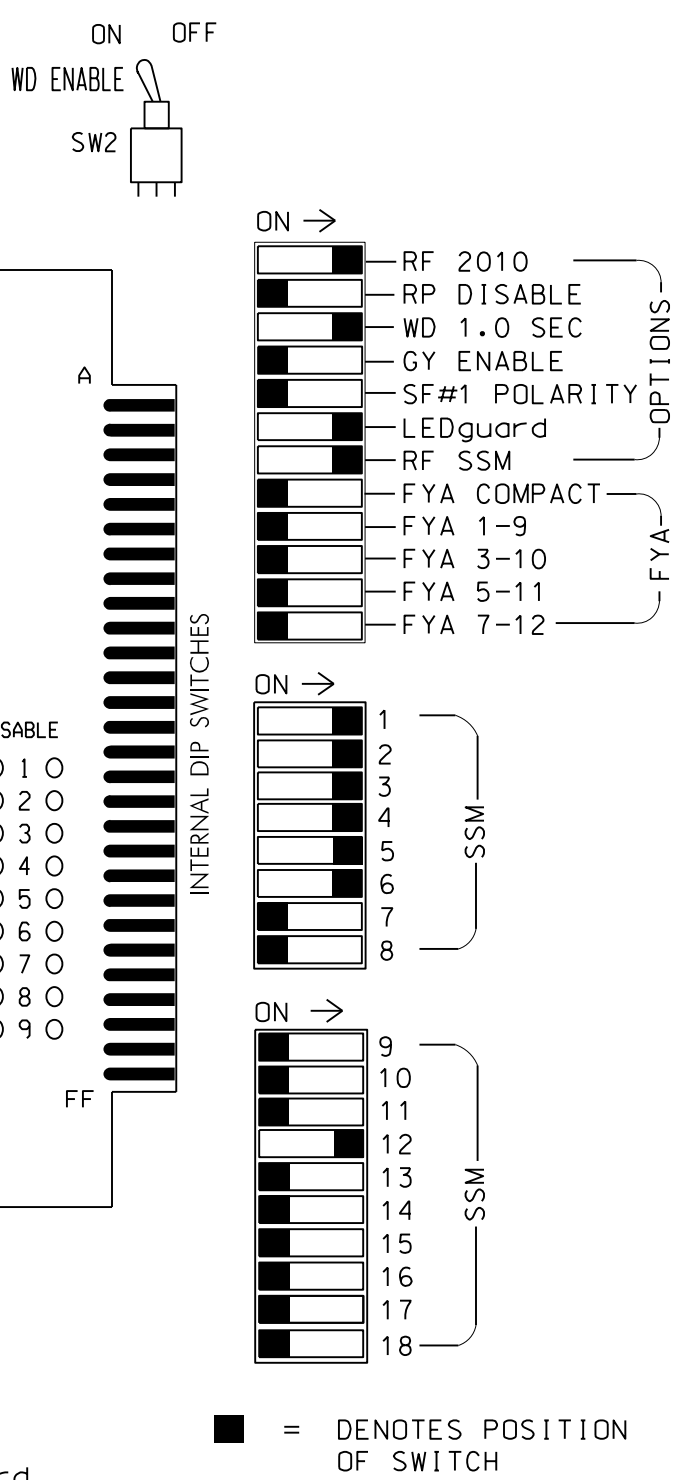
REMOVE DIODE JUMPERS 1-6, 1-15, 2-5, 2-6, 2-12, 2-15, 3-16, 4-12, 4-14, 5-12, 6-15, and 12-14.



REMOVE JUMPERS AS SHOWN

NOTES:

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



NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file.
2. Return controller to Factory Defaults before programming per this electrical detail.
3. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Startup In Green.
6. Program phases 3, 4 and 6 for Startup Ped Call.
7. Program phases 2 and 6 for Yellow Flash.
8. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

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.....S1,S2,S4,S5,S6,S7,S8,S9,S12,AUX S5
PHASES USED.....1,2,3,3PED,4,4PED,5,6,6PED
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....4+5

SIGNAL HEAD HOOK-UP CHART

Table with columns for Load Switch No., S1-S12, AUX S1-S6, and Signal Head No. (RED, YELLOW, GREEN, RED ARROW, YELLOW ARROW, GREEN ARROW). Includes a legend for NU = Not Used and a note to see pictorial of head wiring.

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

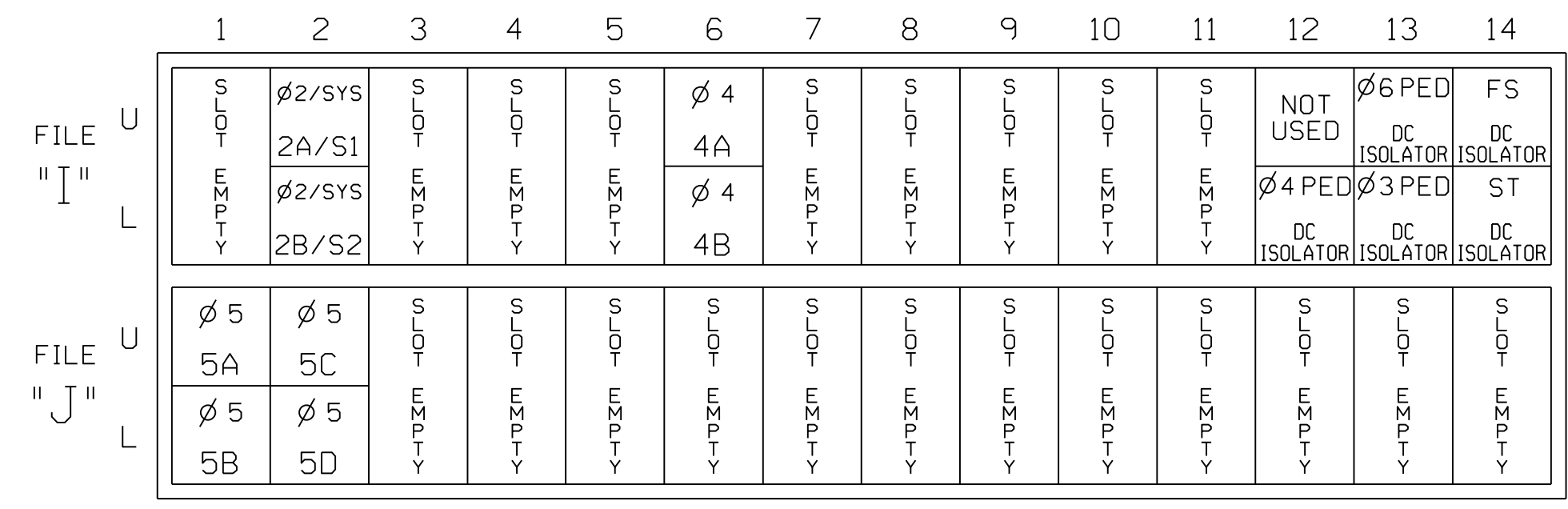
PRESS '+' FOUR TIMES

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: RED YELLOW GREEN
FLASH COLORS: RED YELLOW 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

OVERLAP PROGRAMMING COMPLETE

INPUT FILE POSITION LAYOUT

(front view)



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

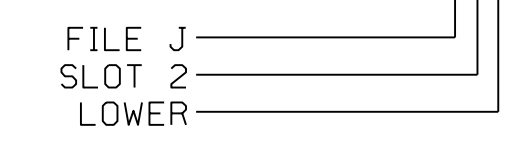
FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

Table with columns: LOOP NO., LOOP TERMINAL, INPUT FILE POS., PIN NO., INPUT ASSIGNMENT NO., DETECTOR NO., NEMA PHASE, CALL, EXTEND, FULL TIME DELAY, STRETCH TIME, DELAY TIME. Includes rows for 2A/S1, 2B/S2, 4A, 4B, 5A, 5B, 5C, 5D, PED PUSH BUTTONS, P41,P42, P61,P62, P31,P32.

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

INPUT FILE POSITION LEGEND: J2L



SPECIAL DETECTOR NOTE

For Detector Zones 1A, 3A, 6A and 6B, install a temporary 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.

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.

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE 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.

Temporary Design 2 - TMP Phase II Electrical Detail - Sheet 1 of 2

Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606.

Professional Engineer Seal for Derrick A. Waller, State of North Carolina, License No. 042678.

Project information: SR 1100 (Brawley School Road) at SR 1116 (Talbert Road)/SR 2906 (Sunfish Drive). Division 12, Iredell County, Mooresville. Plan Date: May 2022. Prepared by: D A Waller. Reviewed by: E D Harris, R M Muncey.

Professional Engineer Seal for Derrick A. Waller, State of North Carolina, License No. 042678. Date: 3/24/2023. Inventory No. 12-1689T2.

PED 3 PROGRAMMING DETAIL

(program controller as shown below)

CHANGING OUTPUT ASSIGNMENTS

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

CHANGING INPUT ASSIGNMENTS

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

PROGRAMMING COMPLETE

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1		NEXT: PAGES)					
RNG	LEAD	BARRIER 1	X-LAG	LEAD	BARRIER 2	X-LAG	
1	1	2	0	3	4	0	0
2	0	6	0	5	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1689T2
DESIGNED: MAY 2022
SEALED: 3/24/2023
REVISED: N/A

Temporary Design 2 - TMP Phase II
Electrical Detail - Sheet 2 of 2

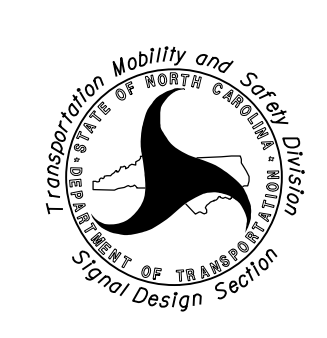
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Stantec

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Fax. (919) 851-7024
www.stantec.com
License No. F-0672

Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529


SR 1100 (Brawley School Road)
at SR 1116 (Talbert Road)/SR
2906 (Sunfish Drive)

Division 12 Iredell County Mooresville

PLAN DATE: May 2022	REVIEWED BY: E D Harris
PREPARED BY: D A Waller	REVIEWED BY: R M Muncey

REVISIONS	INIT.	DATE

SEAL

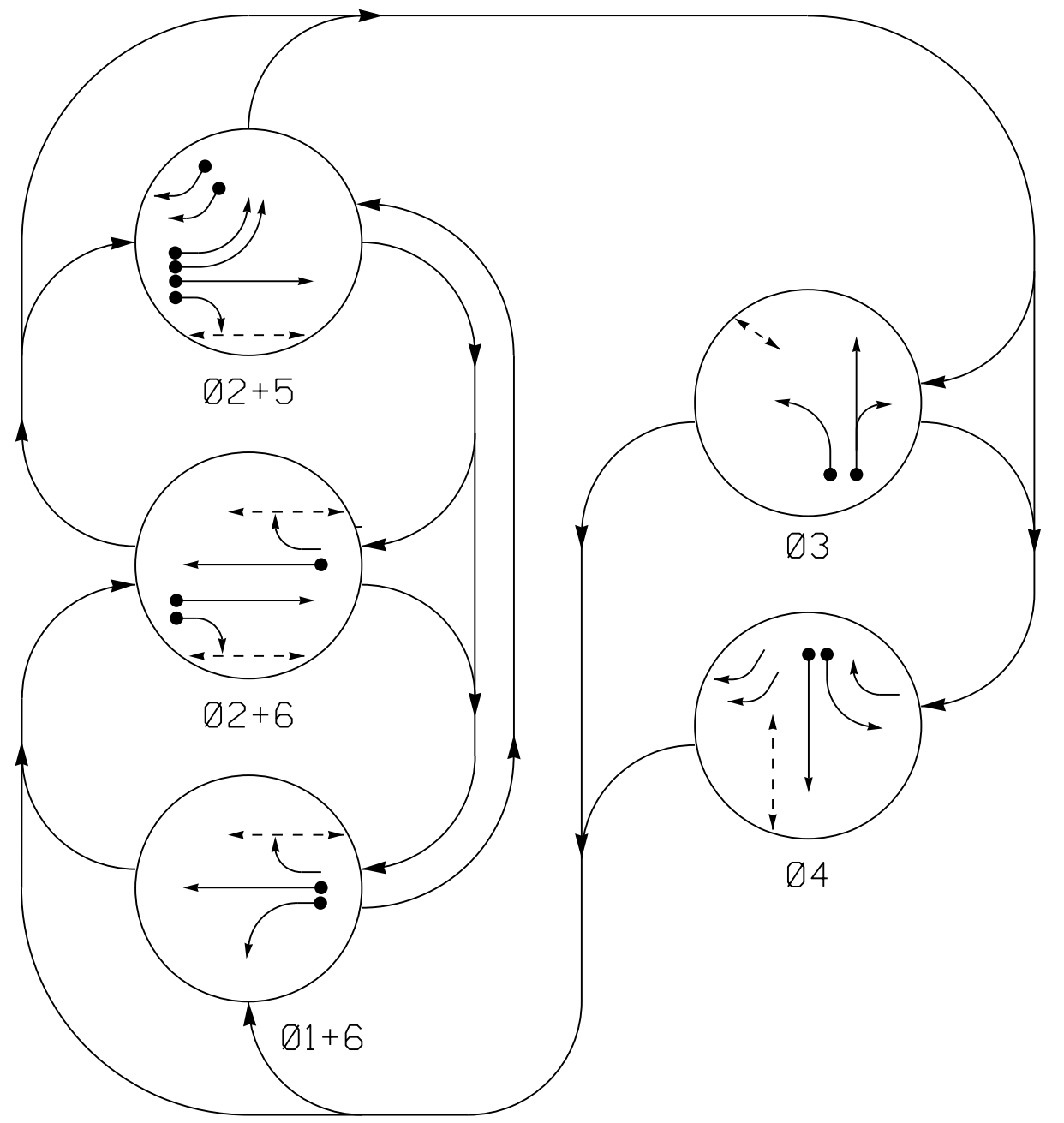


DocuSigned by:
Derrick Waller 3/24/2023

SIG. INVENTORY NO. 12-1689T2

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User: dwall118r

PHASING DIAGRAM



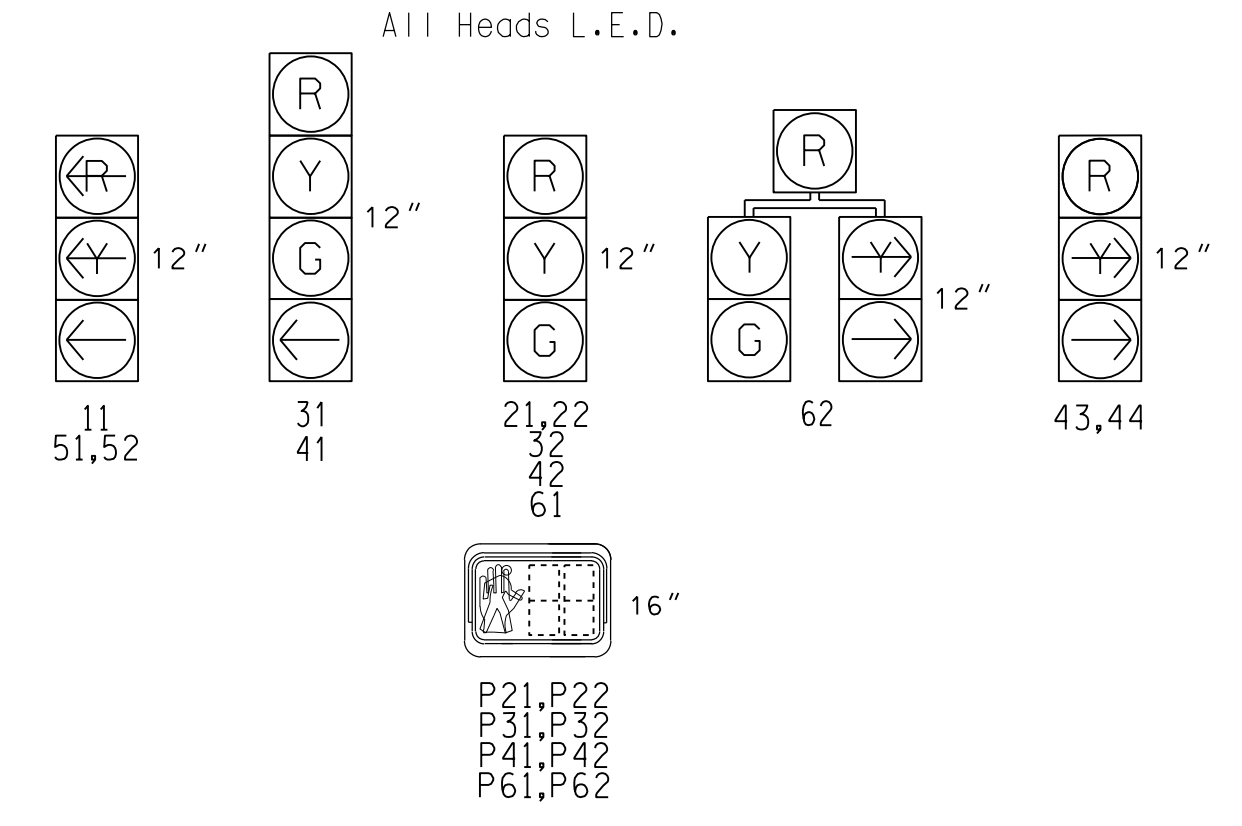
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

Table with columns for SIGNAL FACE and PHASE (Ø1+6, Ø2+5, Ø2+6, Ø3, Ø4, FLASH). Rows list signal face numbers and their corresponding phase assignments.

SIGNAL FACE I.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

Table with columns for LOOP, SIZE, DISTANCE FROM STOPBAR, TURNS, PHASE, CALLING, EXTENSION, FULL TIME DELAY, STRETCH TIME, DELAY TIME, SYSTEM LOOP, NEW CARD.

* Video Detection Area
Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

5 Phase Fully Actuated Signal System 11210

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 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. This intersection features a video detection system. Shown locations of detectors are conceptual only. Detectors should be placed to ensure the desired operation parameters are achieved.
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. Shift signal heads 11,21,51,52, and Sign B.
11. Crosswalk to be installed as shown in final pattern as part of the TMP.

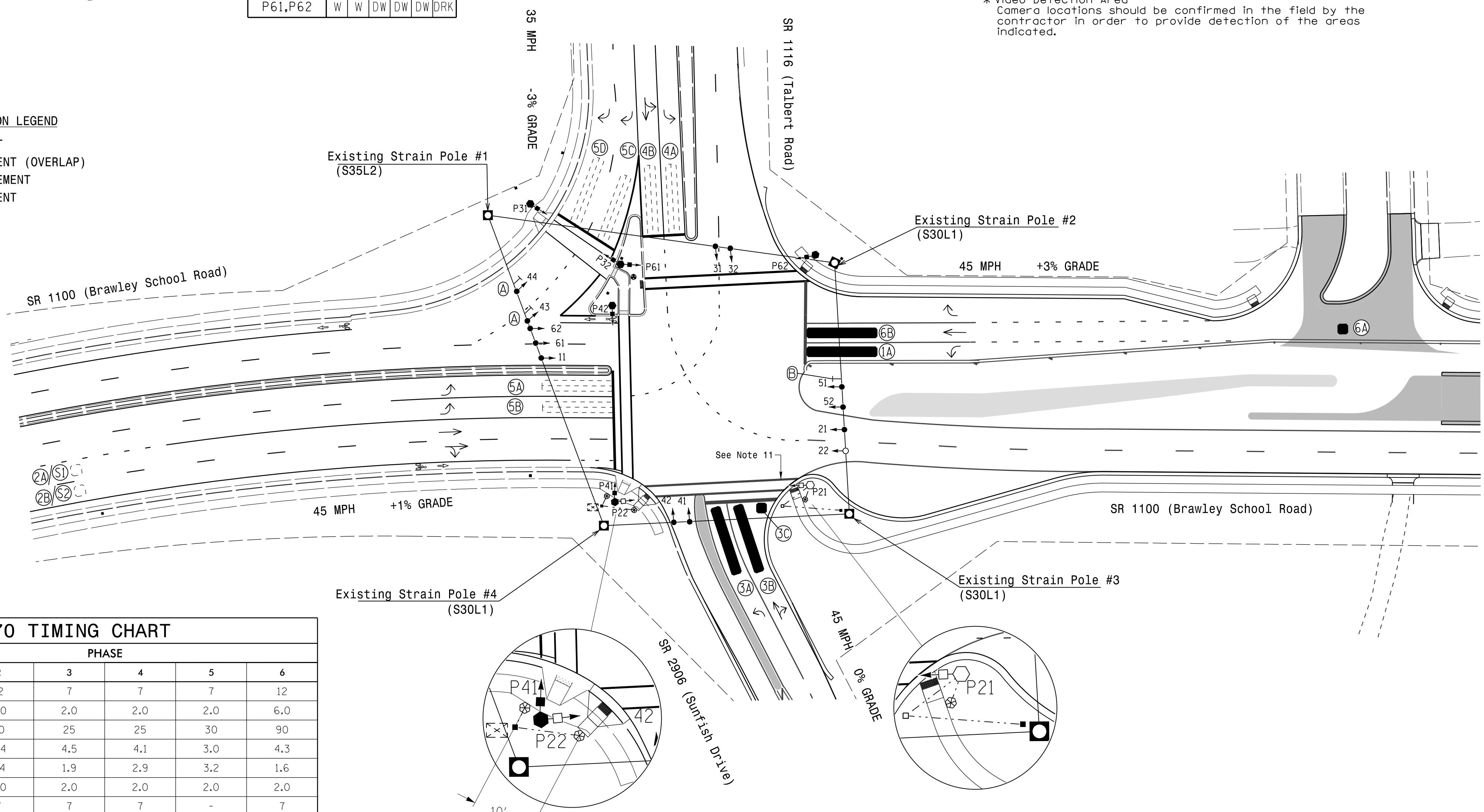
LEGEND

- PROPOSED: Traffic Signal Head, Modified Signal Head, Pedestrian Signal Head, Signal Pole with Guy, Inductive Loop Detector, 2-in Underground Conduit, Right of Way, Directional Arrow, Metal Strain Pole, Directional Drill, Video Detection Area, Type I Pushbutton Post, Type II Signal Pedestal, Construction Zone.
EXISTING: N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A.

OASIS 2070 TIMING CHART

Timing chart table with columns for FEATURE and PHASE (1-6). Rows include Min Green, Extension, Max Green, Yellow Clearance, Red Clearance, Red Revert, Walk, Don't Walk, Seconds Per Actuation, Max Variable Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Recall Mode, Vehicle Call Memory, Dual Entry, Simultaneous Gap.

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



Signal Upgrade Temporary Design 3 - TMP Phase III

Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606.

Professional Engineer seal for J. Hanbright, State of North Carolina, License No. 27528.

Project information: SR 1100 (Brawley School Road) at SR 1116 (Talbert Road)/SR 2906 (Sunfish Drive). Division 12, Iredell County, Mooresville. Plan Date: May 2022. Prepared by: J. Hanbright. Reviewed by: E.D. Harris, R.M. Muncey.

Professional Engineer seal for Brock A. Walker, State of North Carolina, License No. 042678.

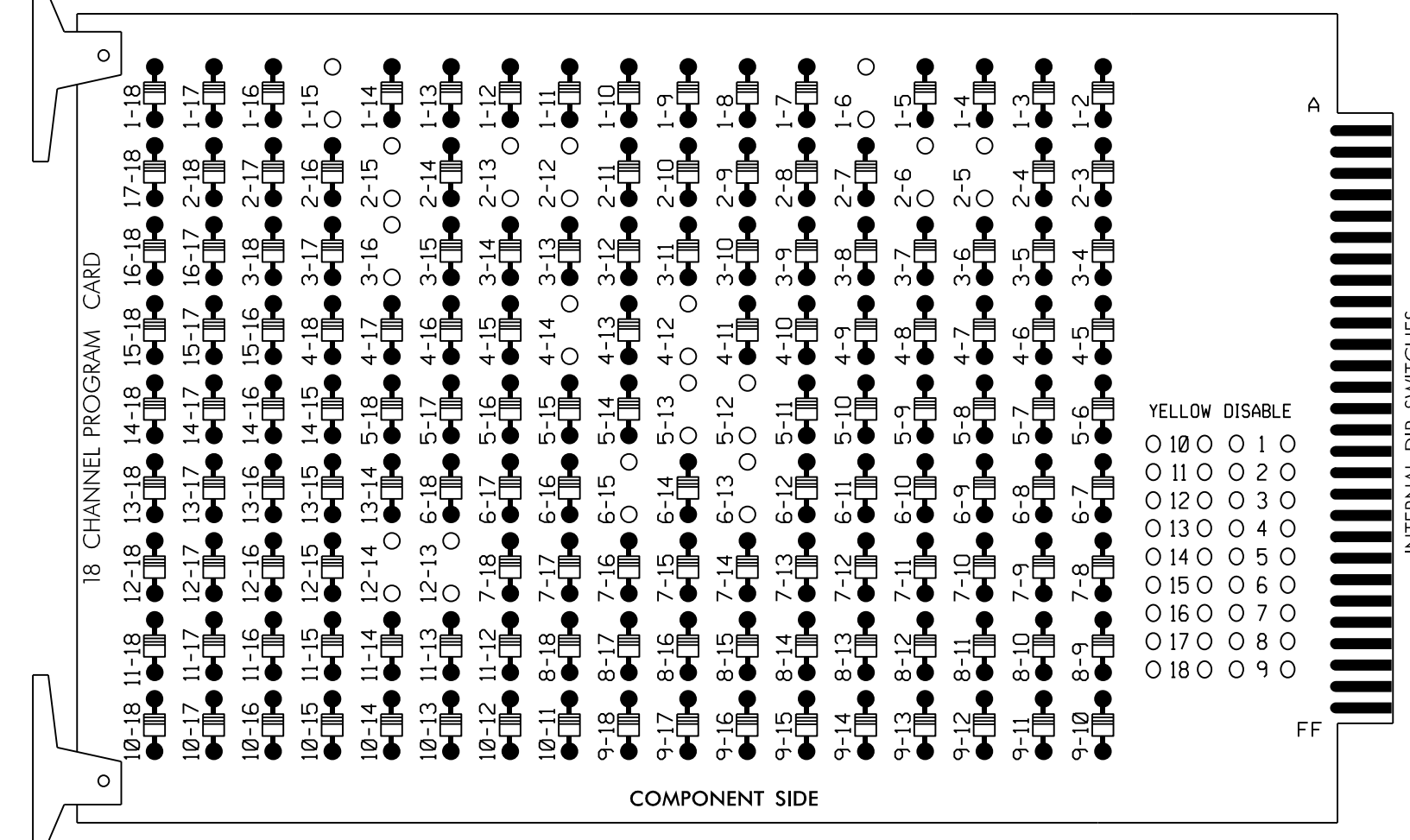
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3/24/2023 11:41:00 AM C:\Users\jhanbrigt\Documents\Signal\1100-Talbert\1100-Talbert\SIG-4.0.dwg User: jhanbrigt

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

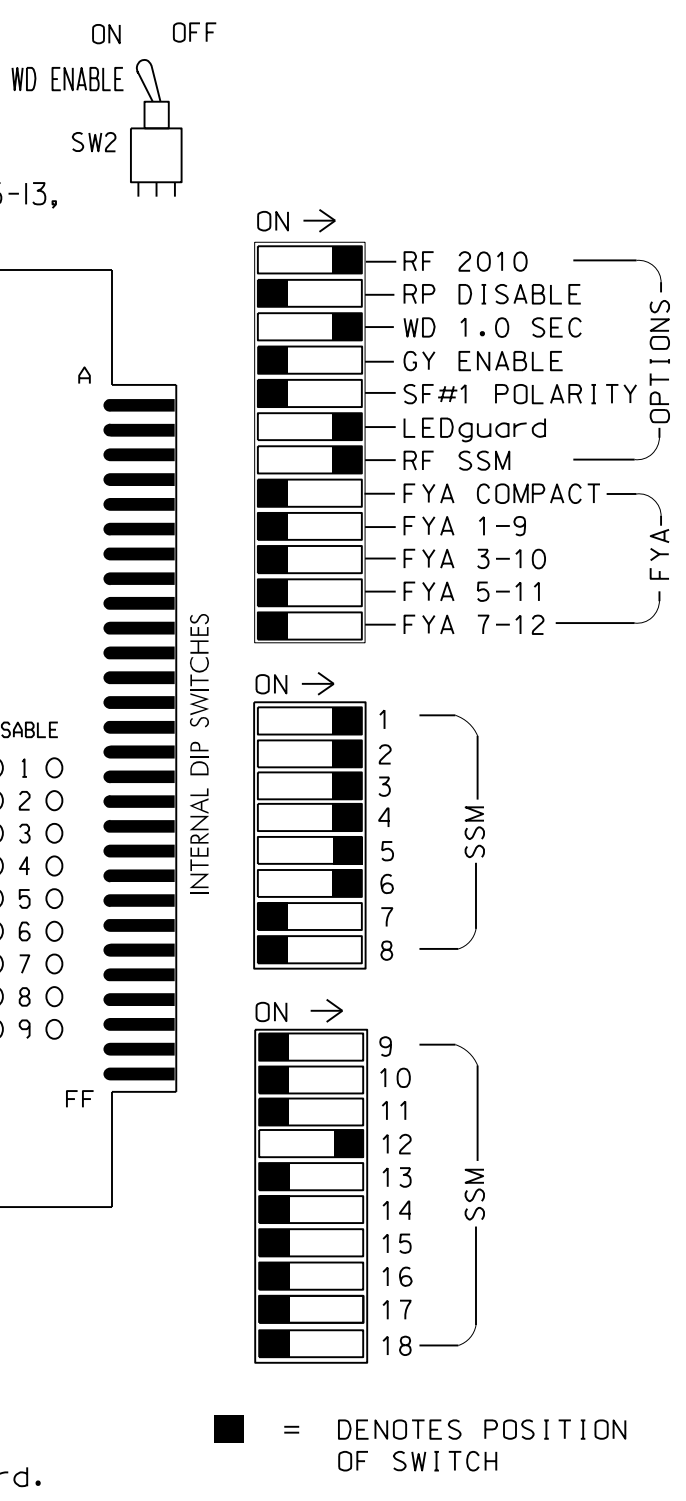
REMOVE DIODE JUMPERS 1-6, 1-15, 2-5, 2-6, 2-12, 2-13, 2-15, 3-16, 4-12, 4-14, 5-12, 5-13, 6-13, 6-15, 12-13 and 12-14.



REMOVE JUMPERS AS SHOWN

NOTES:

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



NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file.
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 Startup In Green.
5. Program phases 2, 3, 4 and 6 for Startup Ped Call.
6. Program phases 2 and 6 for Yellow Flash.
7. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX.
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S12,AUX S5
PHASES USED.....1,2,PED,3,3PED,4,4PED,5,6,PED
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....4+5

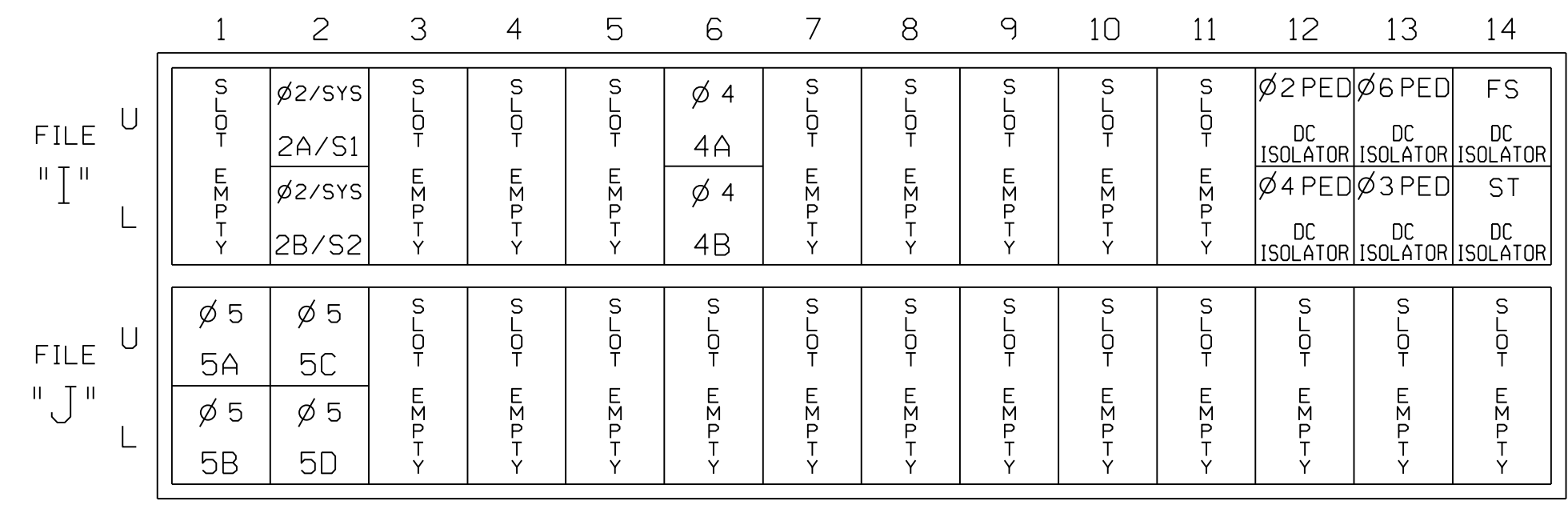
SIGNAL HEAD HOOK-UP CHART

Table with columns for Load Switch No., CMU Channel No., Phase, Signal Head No., and various signal types (RED, YELLOW, GREEN, RED ARROW, YELLOW ARROW, GREEN ARROW) mapped to switch numbers S1-S18.

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

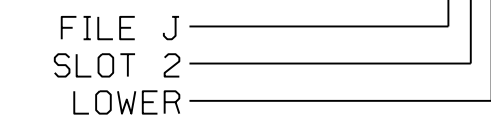
FS = FLASH SENSE
ST = STOP TIME

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 rows for 2A/S1, 2B/S2, 4A, 4B, 5A, 5B, 5C, 5D, PED PUSH BUTTONS, P21,P22, P31,P32, P41,P42, P61,P62.

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

INPUT FILE POSITION LEGEND: J2L



OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+' FOUR TIMES

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: _ RED _ YELLOW _ GREEN
FLASH COLORS: _ RED _ YELLOW _ 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

OVERLAP PROGRAMMING COMPLETE

SPECIAL DETECTOR NOTE

For Detector Zones 1A, 3A, 3B, 3C, 6A and 6B, install a temporary 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.

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.

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE 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.

Temporary Design 3 - TMP Phase III Electrical Detail - Sheet 1 of 2

Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606.

Professional Engineer Seal for Derrick A. Waller, License No. F-0672, State of North Carolina.

Project information: SR 1100 (Brawley School Road) at SR 1116 (Talbert Road)/SR 2906 (Sunfish Drive). Division 12, Iredell County, Mooresville. Prepared by: D A Waller, R M Muncey.

Professional Engineer Seal for Derrick A. Waller, License No. F-0672, State of North Carolina. Date: 3/24/2023.

11-17-24 AM User: dwall118

PED 3 PROGRAMMING DETAIL

(program controller as shown below)

CHANGING OUTPUT ASSIGNMENTS

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

CHANGING INPUT ASSIGNMENTS

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

PROGRAMMING COMPLETE

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1		NEXT: PAGES)					
RNG	LEAD	BARRIER 1	X-LAG	RNG	LEAD	BARRIER 2	X-LAG
1	1	2	0	3	4	0	0
2	0	0	5	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1689T3
DESIGNED: MAY 2022
SEALED: 3/24/2023
REVISED: N/A

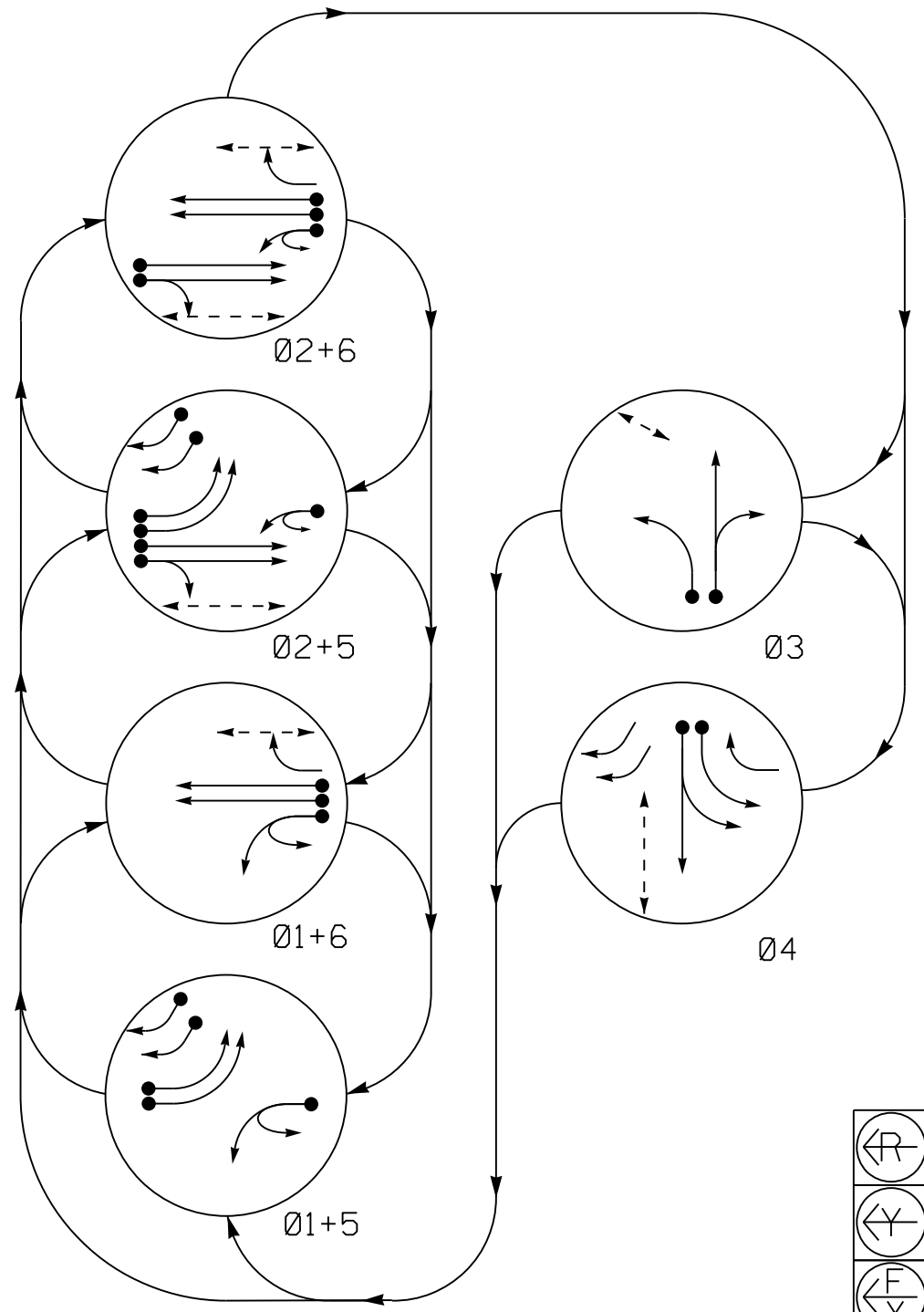
Temporary Design 3 - TMP Phase III
Electrical Detail - Sheet 2 of 2

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<p style="font-size: x-small;">Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672</p>	<p style="font-size: x-small;">Prepared for the Offices of:</p> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>SR 1100 (Brawley School Road) at SR 1116 (Talbert Road)/SR 2906 (Sunfish Drive)</p> <p>Division 12 Iredell County Mooresville</p> <table style="width: 100%; font-size: x-small;"> <tr> <td>PLAN DATE: May 2022</td> <td>REVIEWED BY: E D Harris</td> </tr> <tr> <td>PREPARED BY: D A Waller</td> <td>REVIEWED BY: R M Muncey</td> </tr> </table> <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> </tbody> </table>	PLAN DATE: May 2022	REVIEWED BY: E D Harris	PREPARED BY: D A Waller	REVIEWED BY: R M Muncey	REVISIONS	INIT.	DATE							<p style="font-size: x-small;">DocuSigned by: Derrick Waller 3/24/2023</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 12-1689T3</p>
PLAN DATE: May 2022	REVIEWED BY: E D Harris															
PREPARED BY: D A Waller	REVIEWED BY: R M Muncey															
REVISIONS	INIT.	DATE														

11:47:31 AM
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User: dwall118r

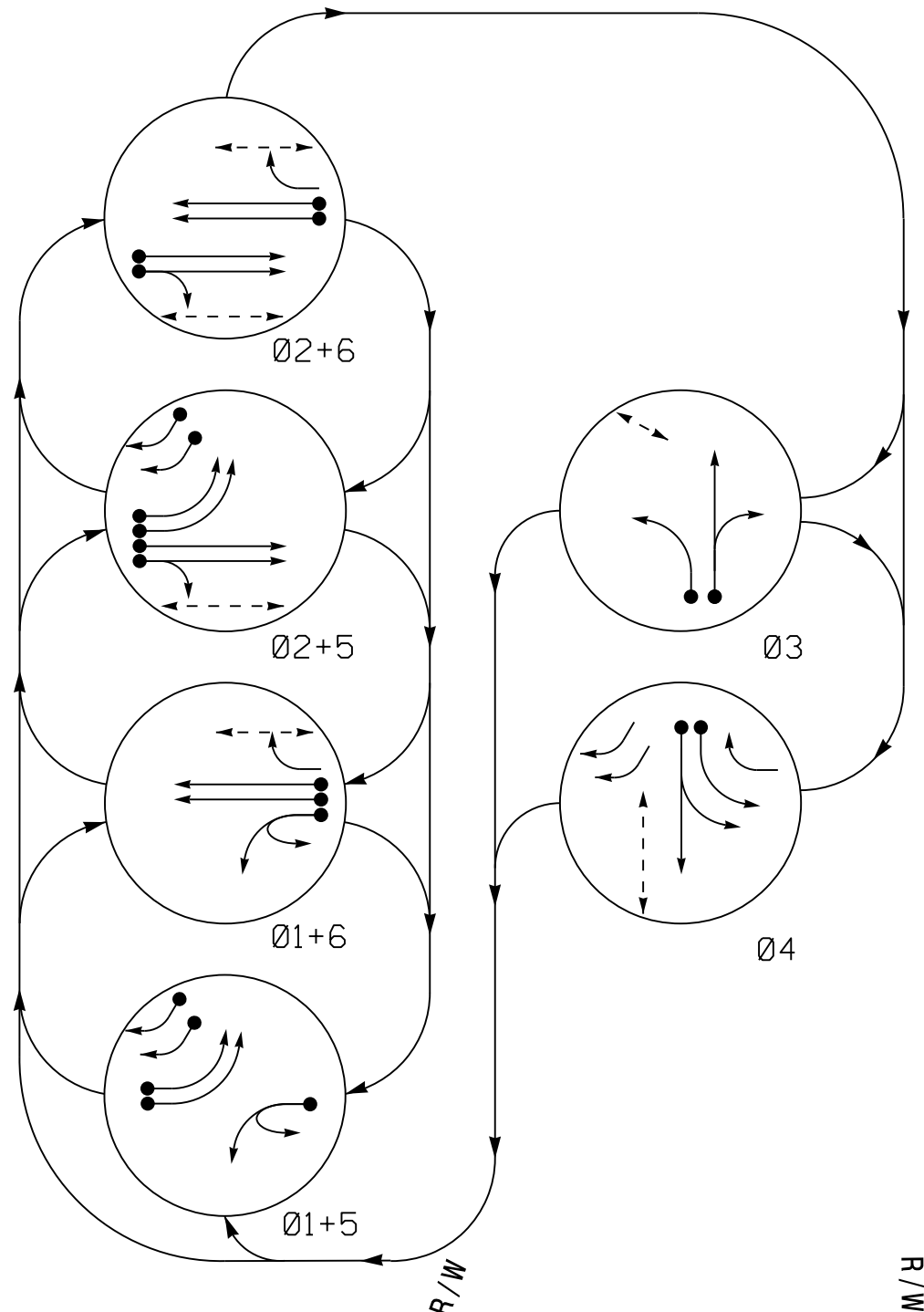
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

Table with columns: SIGNAL FACE, PHASE (01+5, 01+6, 02+5, 02+6, 03, 04, FLASH), and rows for various signal faces like 11, 21,22, 31, 32, 41, 42, 43,44, 51,52, 61,63, 62, P21,P22, P31,P32, P41,P42, P61,P62.

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

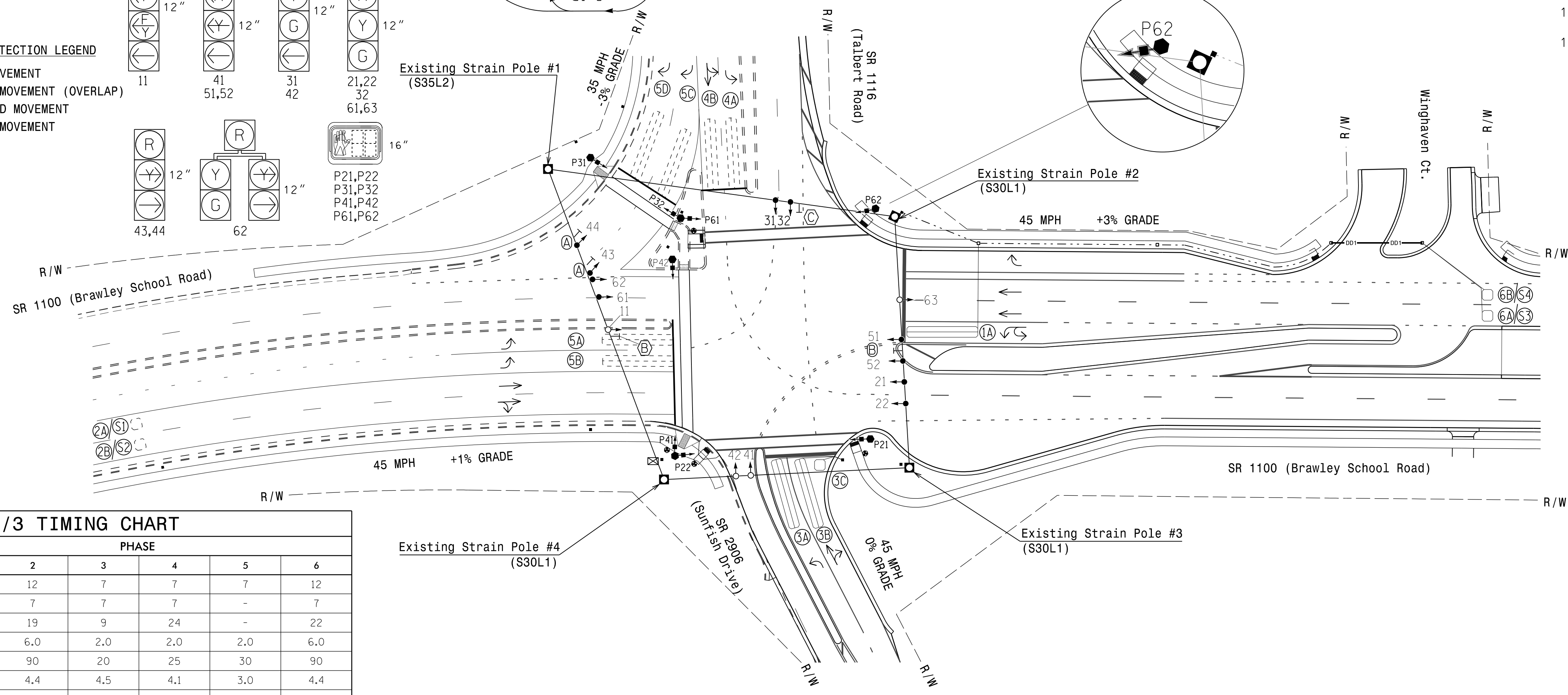
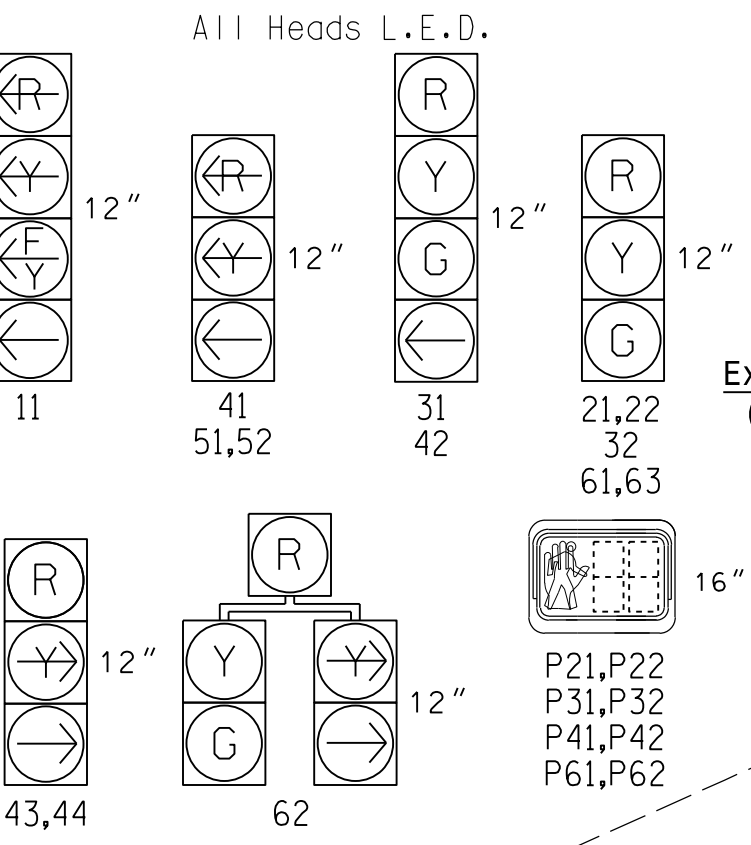
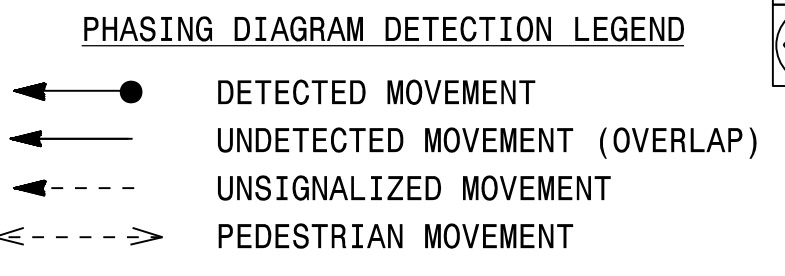
Table with columns: SIGNAL FACE, PHASE (01+5, 01+6, 02+5, 02+6, 03, 04, FLASH), and rows for various signal faces like 11, 21,22, 31, 32, 41, 42, 43,44, 51,52, 61,63, 62, P21,P22, P31,P32, P41,P42, P61,P62.

ASC/3 DETECTOR INSTALLATION CHART

Table with columns: DETECTOR (LOOP, SIZE, DISTANCE FROM STOPBAR, TURNS, NEW LOOP), PROGRAMMING (PHASE, CALLING, EXTEND TIME, DELAY TIME, USE ADDED INITIAL, TYPE, SYSTEM LOOP, NEW CARD), and rows for detectors 1A through 6B/S4.

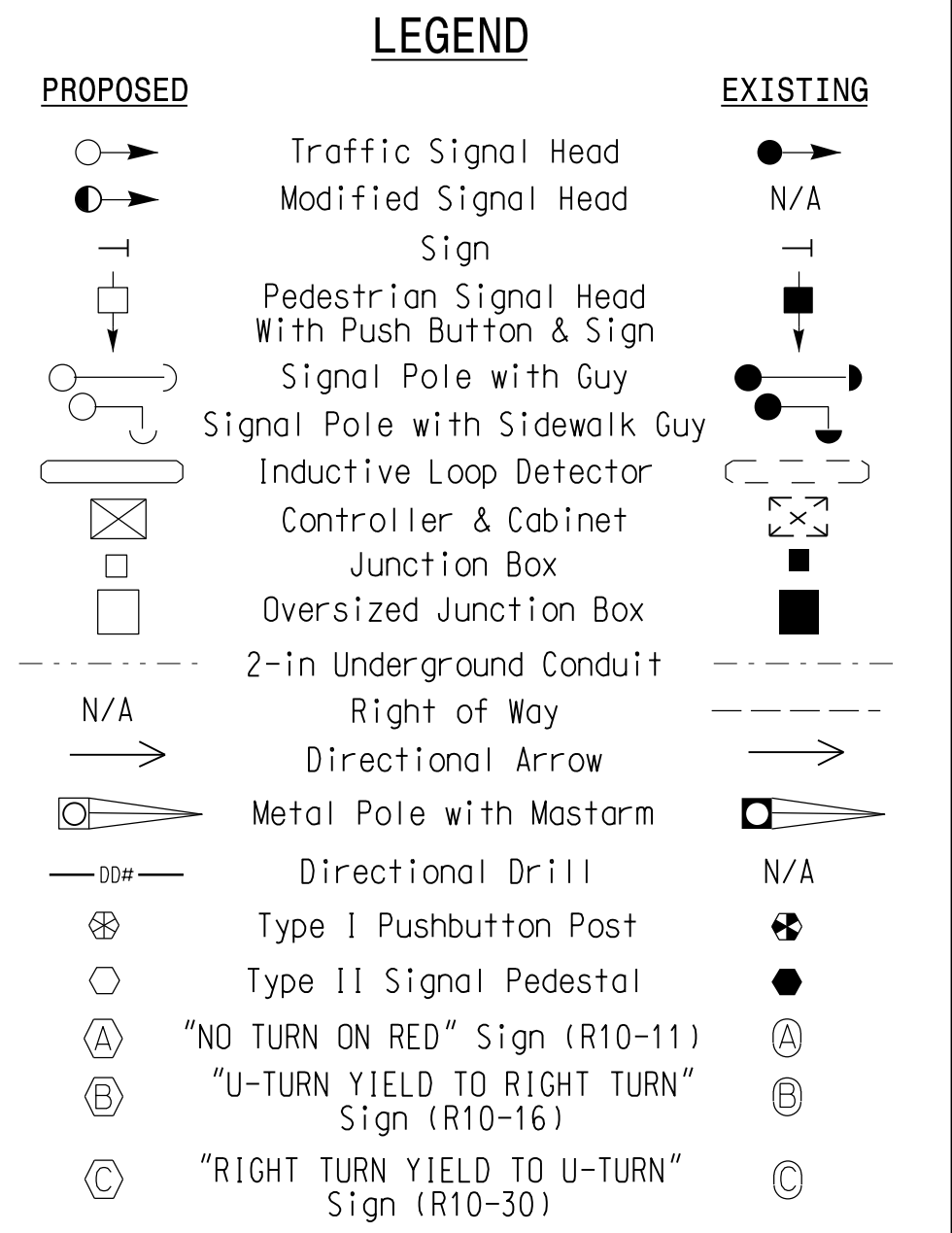
6 Phase Fully Actuated w/Alternate Phasing Operation Signal System 11210

- NOTES: 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018... 2. Do not program signal for late night flashing operation... 3. Phase 1 and/or phase 5 may be lagged... 4. The order of phase 3 and phase 4 may be reversed... 5. Set all detector units to presence mode... 6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls... 7. Program pedestrian heads to countdown the flashing "Don't Walk" time only... 8. The Division Traffic Engineer will determine the hours of use for each phasing plan... 9. Maximum times shown in timing chart are for free-run operation only... 10. Install new cabinet on the existing cabinet foundation... 11. Shift signal heads 11,61,62 and Sign B.



ASC/3 TIMING CHART

Timing chart table with columns: FEATURE, PHASE (1-6), and rows for Min Green, Walk, Ped Clear, Veh. Extension, Max I, 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.



Signal Upgrade - Final Design

Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606, Tel. (919) 851-6866, Fax. (919) 851-7024, www.stantec.com, License No. F-0672

Professional Engineer seal for J. Hambricht, State of North Carolina, License No. 27528.

Project information: SR 1100 (Brawley School Road) at SR 1116 (Talbert Road)/SR 2906 (Sunfish Drive), Division 12, Iredell County, Mooresville, PLAN DATE: May 2022, REVIEWED BY: E D Harris, PREPARED BY: J. Hambricht, REVIEWED BY: R M Muncey.

Professional Engineer seal for David A. Walker, State of North Carolina, License No. 042678.

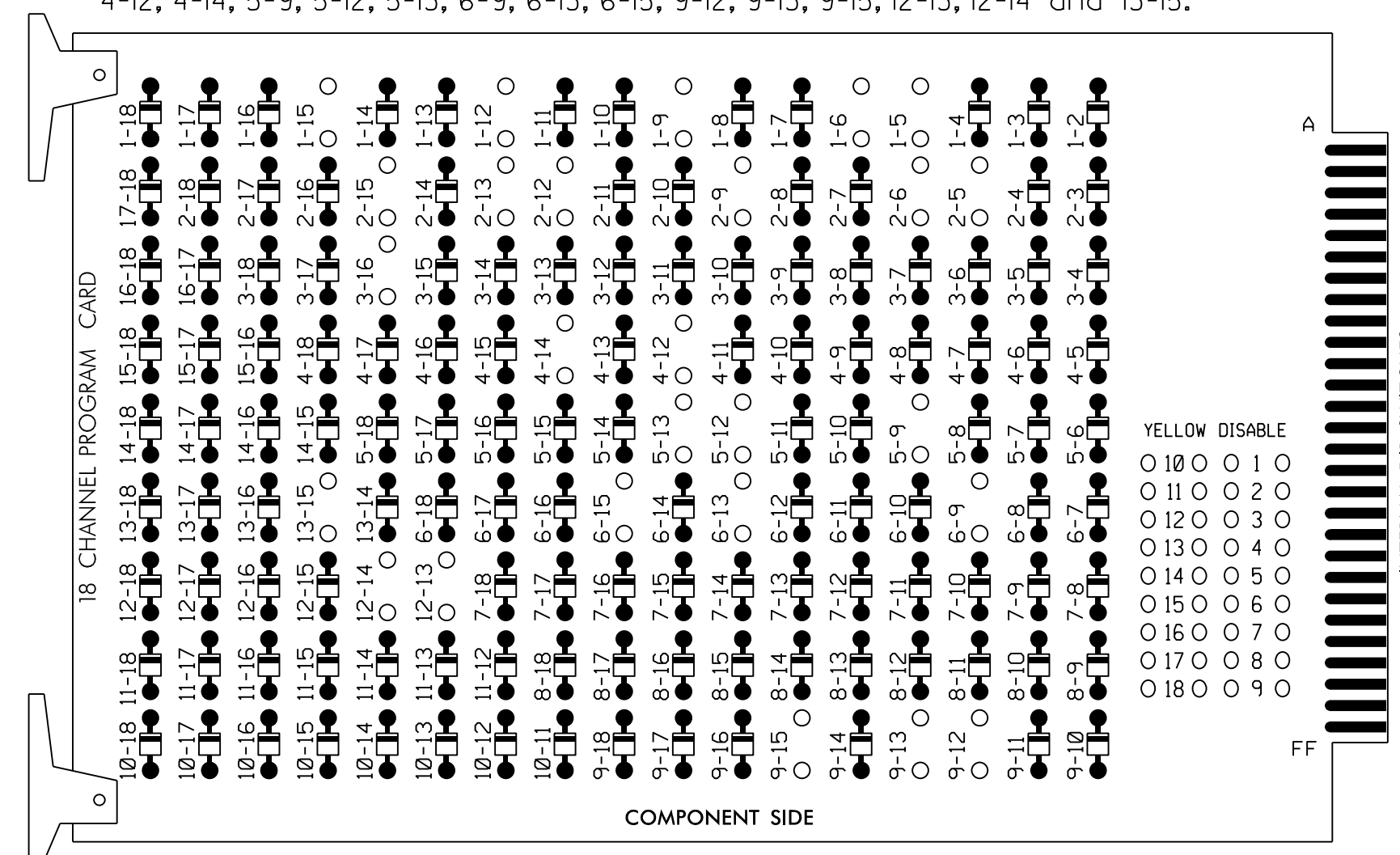
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* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

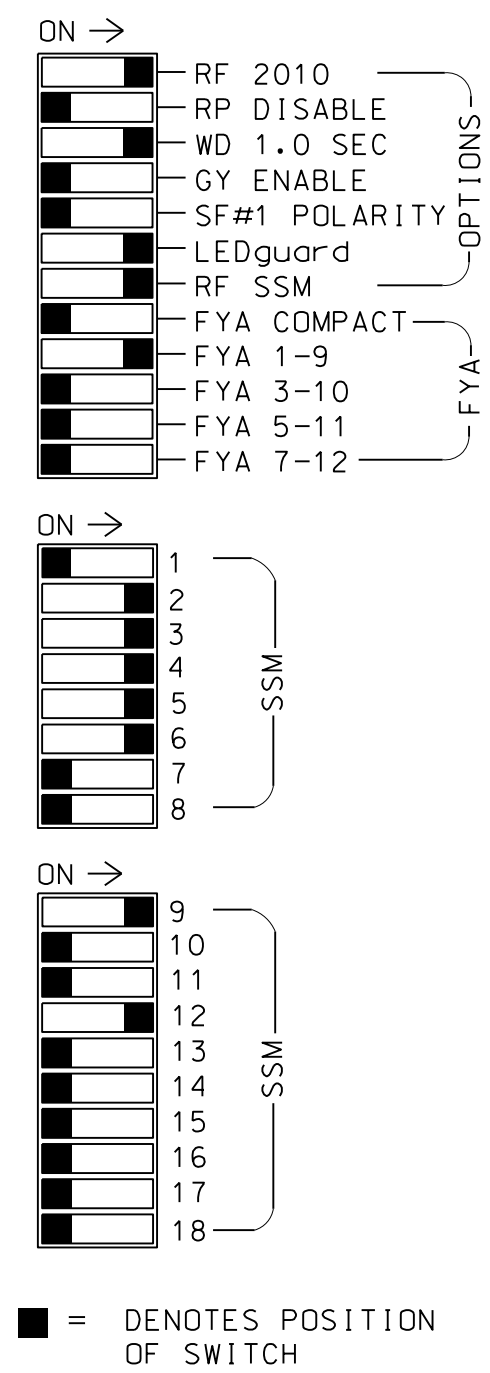
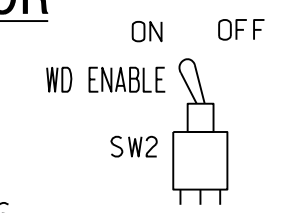
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-12, 1-15, 2-5, 2-6, 2-9, 2-12, 2-13, 2-15, 3-16, 4-12, 4-14, 5-9, 5-12, 5-13, 6-9, 6-13, 6-15, 9-12, 9-13, 9-15, 12-13, 12-14 and 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

- 1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. 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.
2. Return controller to Factory Defaults before programming per this electrical detail.
3. Program controller to start up in phase 2 Walk and 6 Walk.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
CABINET.....332 W/AUX
SOFTWARE.....ECONOLITE ASC/3-2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX.
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S12,AUX S1,AUX S5
PHASES USED.....1,2,2PED,3,3PED,4,4PED,5,6,6PED
OVERLAP "A".....*
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....*
* See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

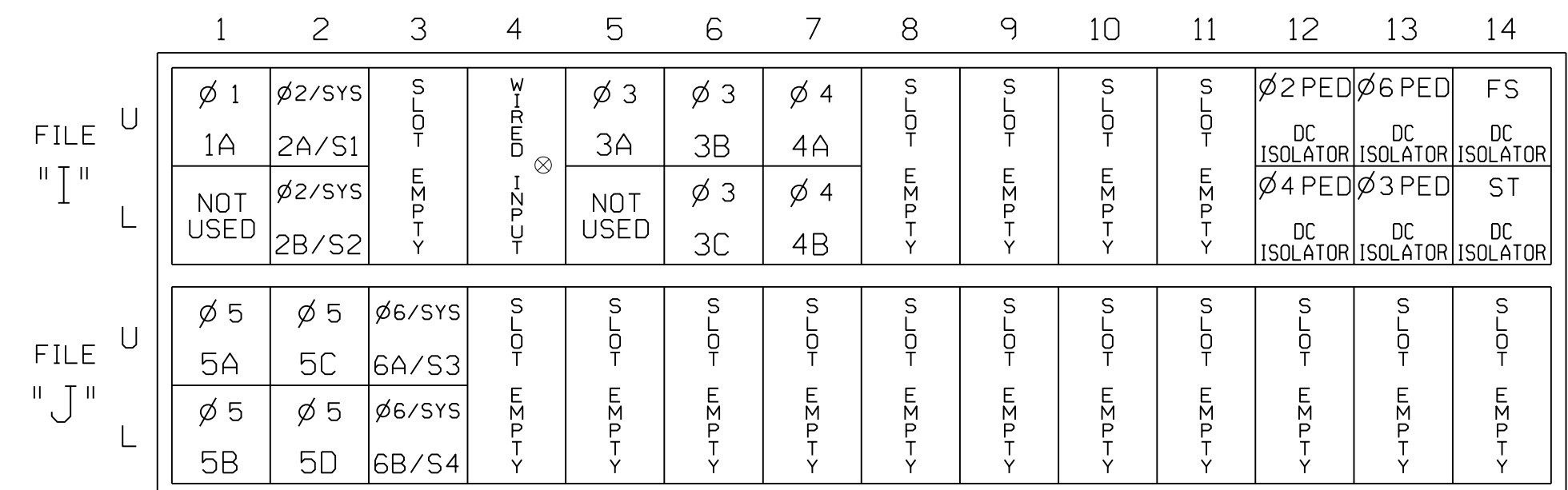
Table with columns for LOAD SWITCH NO., PHASE, SIGNAL HEAD NO., and various signal colors (RED, YELLOW, GREEN, etc.) mapped to terminals.

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

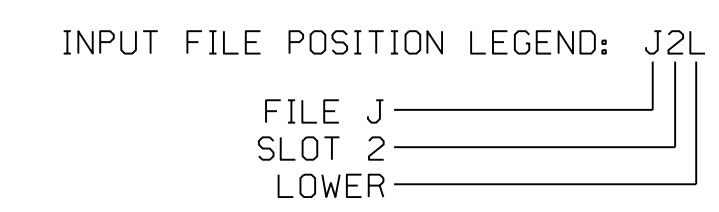
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

Table with columns for LOOP NO., LOOP TERMINAL, INPUT FILE POS., PIN NO., DETECTOR NO., NEMA PHASE, CALL, EXTEND TIME, DELAY TIME, ADDED INITIAL, DETECTOR TYPE.

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

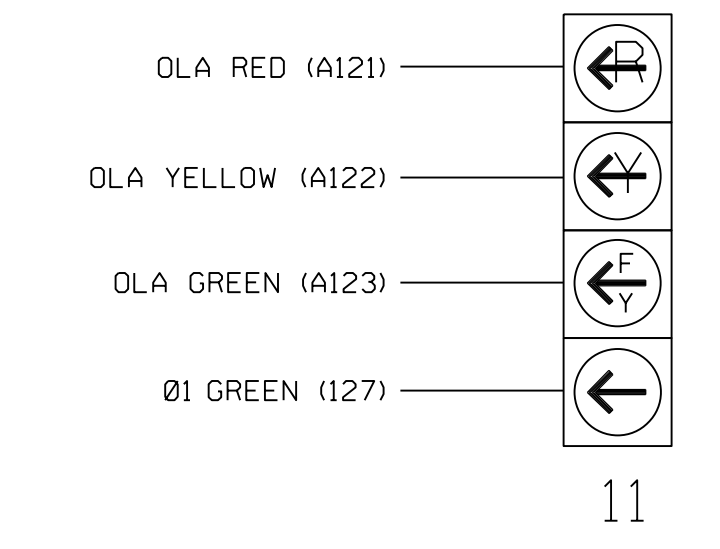
1 Add jumper from 11-W to J4-W, on rear of input file.
★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1689
DESIGNED: MAY 2022
SEALED: 3/24/2023
REVISED: N/A

FYA SIGNAL WIRING DETAIL

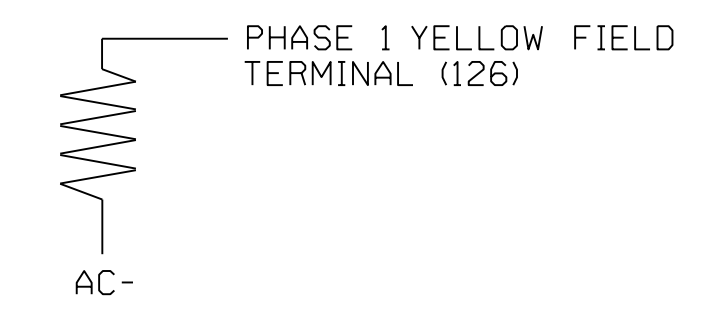
(wire signal head as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

Table with columns for ACCEPTABLE VALUES, VALUE (ohms), and WATTAGE.



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.

Final Design Electrical Detail - Sheet 1 of 3

Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606.

Professional Engineer Seal for Derrick Waller, State of North Carolina, License No. 042678.

Project information: SR 1100 (Brawley School Road) at SR 1116 (Talbert Road)/SR 2906 (Sunfish Drive). Division 12, Iredell County, Mooresville. Plan Date: May 2022.

Document status: DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED. Includes revision table and date 3/24/2023.

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

(program controller as shown)

IMPORTANT!

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

- From Main Menu select **8. UTILITIES**
- From UTILITIES Submenu select **1. COPY/CLEAR**
- 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
  
```

- From Main Menu select **6. DETECTORS**
- From DETECTOR Submenu select **2. VEHICLE DETECTOR SETUP**
- 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: N-NTCIP
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: G-GREEN EXTENSION/DELAY
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"

END PROGRAMMING

ECONOLITE ASC/3-2070 PED 3 PROGRAMMING ASSIGNMENT DETAIL

(program controller as shown)

- From Main Menu select **6. DETECTORS**
- 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

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

LD SWITCH ASSIGN												
PHASE												
/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	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

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **2. CONTROLLER**
- 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 Three Times

OVERLAP D

Select TMG VEH OVLP [D] and 'NORMAL'

```

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

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE 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 ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1689
 DESIGNED: MAY 2022
 SEALED: 3/24/2023
 REVISED: N/A

Final Design
Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL
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Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SR 1100 (Brawley School Road)
at SR 1116 (Talbert Road)/SR
2906 (Sunfish Drive)

Division 12 Iredell County Mooresville

PLAN DATE: May 2022 REVIEWED BY: E D Harris

PREPARED BY: D A Waller REVIEWED BY: R M Muncey

REVISIONS	INIT.	DATE

SEAL

SEAL 042678

DocuSigned by:
Derrick Waller 3/24/2023

SIG. INVENTORY NO. 12-1689

11:48:20 AM
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User: dwall118r

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 BIT 1.

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

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

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 BIT 1 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SF BIT 1: Modifies overlap parent phases for head 11 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.

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...[ *]
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  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  X  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
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 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
    
```

* The Action Plan number(s) are to be determined by the Division and/or City Traffic Engineer.

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 12-1689
 DESIGNED: MAY 2022
 SEALED: 3/24/2023
 REVISED: N/A

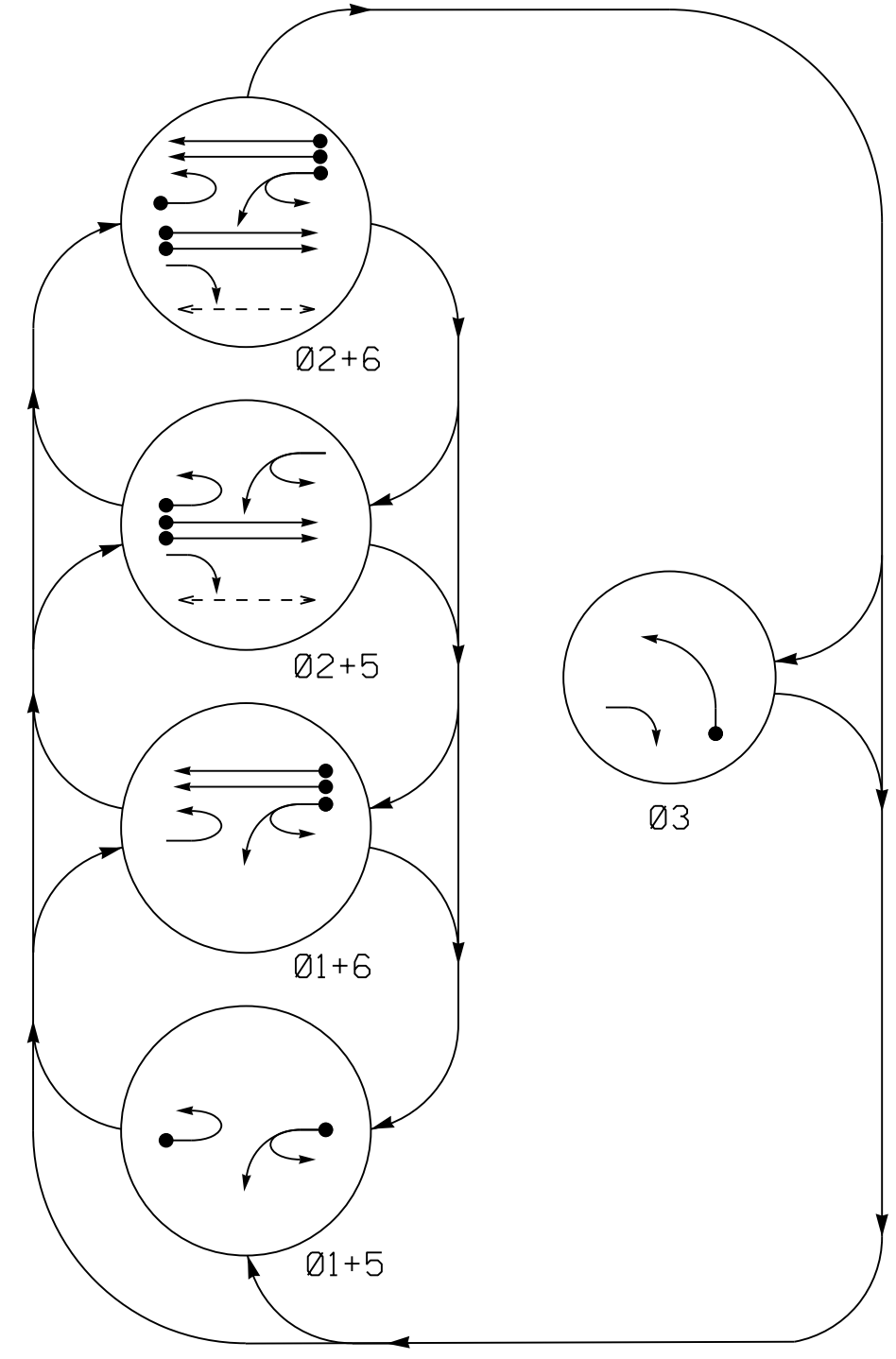
Final Design
 Electrical Detail - Sheet 3 of 3

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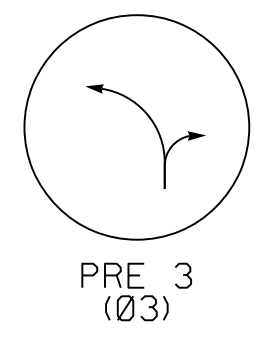
Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672	Prepared for the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	SR 1100 (Brawley School Road) at SR 1116 (Talbert Road)/SR 2906 (Sunfish Drive) Division 12 Iredell County Mooresville PLAN DATE: May 2022 REVIEWED BY: E D Harris PREPARED BY: D A Waller REVIEWED BY: R M Muncey	SEAL SEAL 042678 DERRICK A. WALLER ENGINEER
		REVISIONS INIT. DATE _____ _____ _____	DocuSigned by: Derrick Waller 3/24/2023 _____ _____ _____
		SIG. INVENTORY NO. 12-1689	

11:48:28 AM
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 User: daw111er

DEFAULT PHASING DIAGRAM



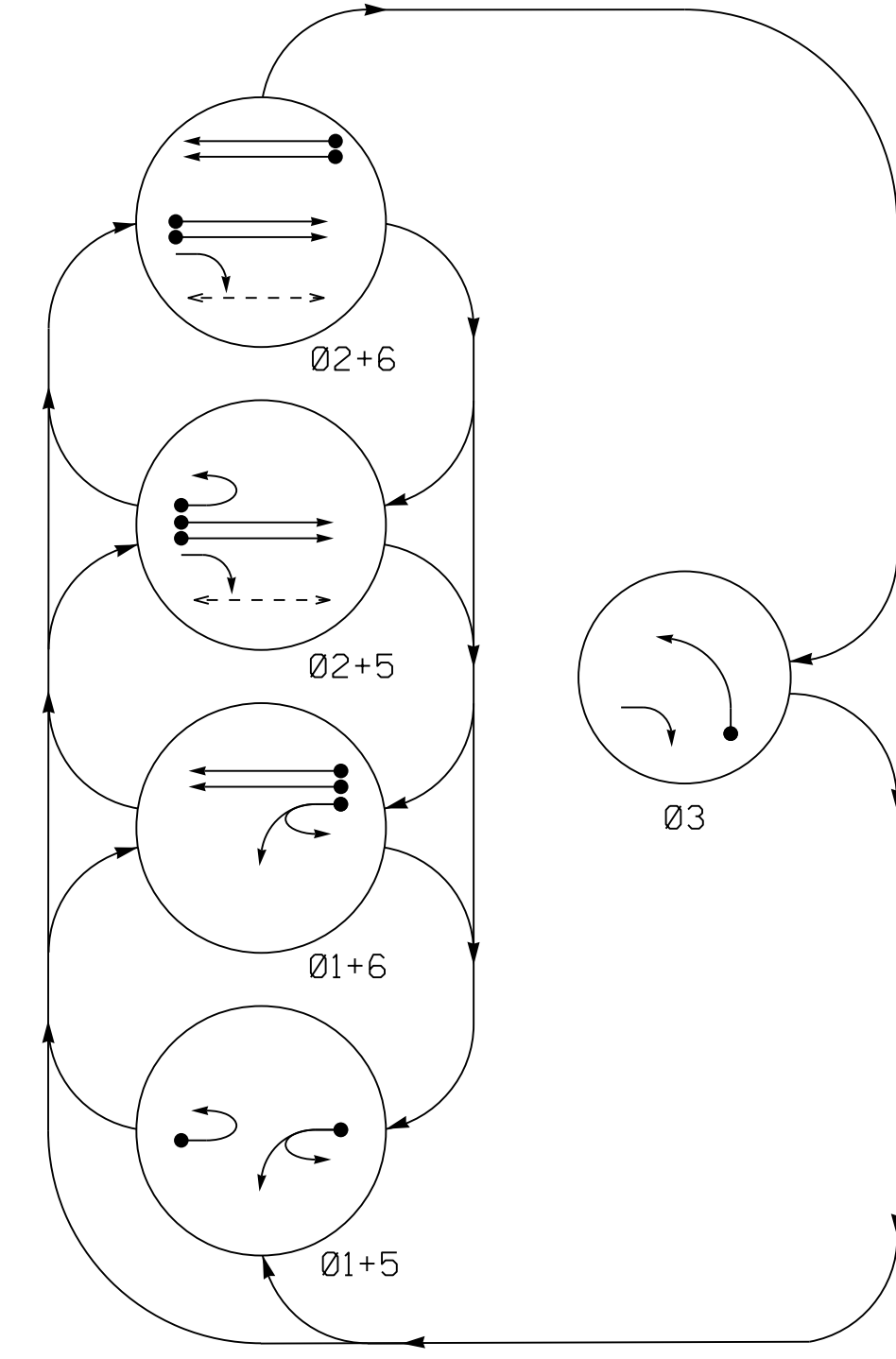
DEFAULT PHASING EV PREEMPT PHASES (Medium Priority)



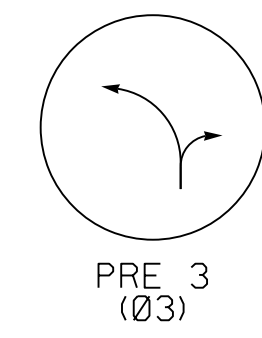
DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE						
	01+5	02+5	02+6	03	PRE 3	FLASH	DRK
11	←	←	←	←	←	←	←
21,22	R	R	G	G	R	R	Y
23	R	R	F	F	F	R	Y
31,32	R	R	R	R	G	G	R
51	←	←	←	←	←	←	←
61,62	R	G	R	G	R	R	Y
P21,P22	DW	DW	W	W	DW	DW	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING EV PREEMPT PHASES (Medium Priority)



ALTERNATE PHASING TABLE OF OPERATION

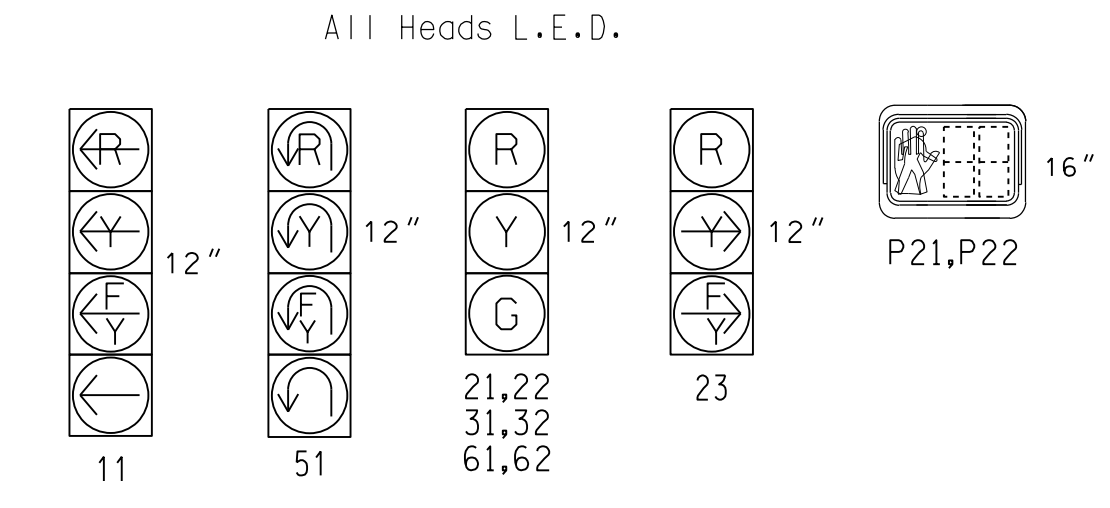
SIGNAL FACE	PHASE						
	01+5	02+5	02+6	03	PRE 3	FLASH	DRK
11	←	←	←	←	←	←	←
21,22	R	R	G	G	R	R	Y
23	R	R	F	F	F	R	Y
31,32	R	R	R	R	G	G	R
51	←	←	←	←	←	←	←
61,62	R	G	R	G	R	R	Y
P21,P22	DW	DW	W	W	DW	DW	DRK

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
1A	6X40	0	2-4-2	X	1	Yes	-	15*	-	N	-	X
					6#	Yes	-	-	-	G	-	X
2A	6X6	300	5	X	2	Yes	-	-	X	N	-	X
2B	6X6	300	5	X	2	Yes	-	-	X	N	-	X
3A	6X40	0	2-4-2	X	3	Yes	-	3	-	N	-	X
					5	Yes	-	15*	-	N	-	X
5A	6X40	0	2-4-2	X	2#	Yes	-	-	-	G	-	X
6A	6X6	300	5	X	6	Yes	-	-	X	N	-	X
6B	6X6	300	5	X	6	Yes	-	-	X	N	-	X

* Disable delay during Alternate Phasing operation.
 # Disable phase call for loop during Alternate Phasing operation.

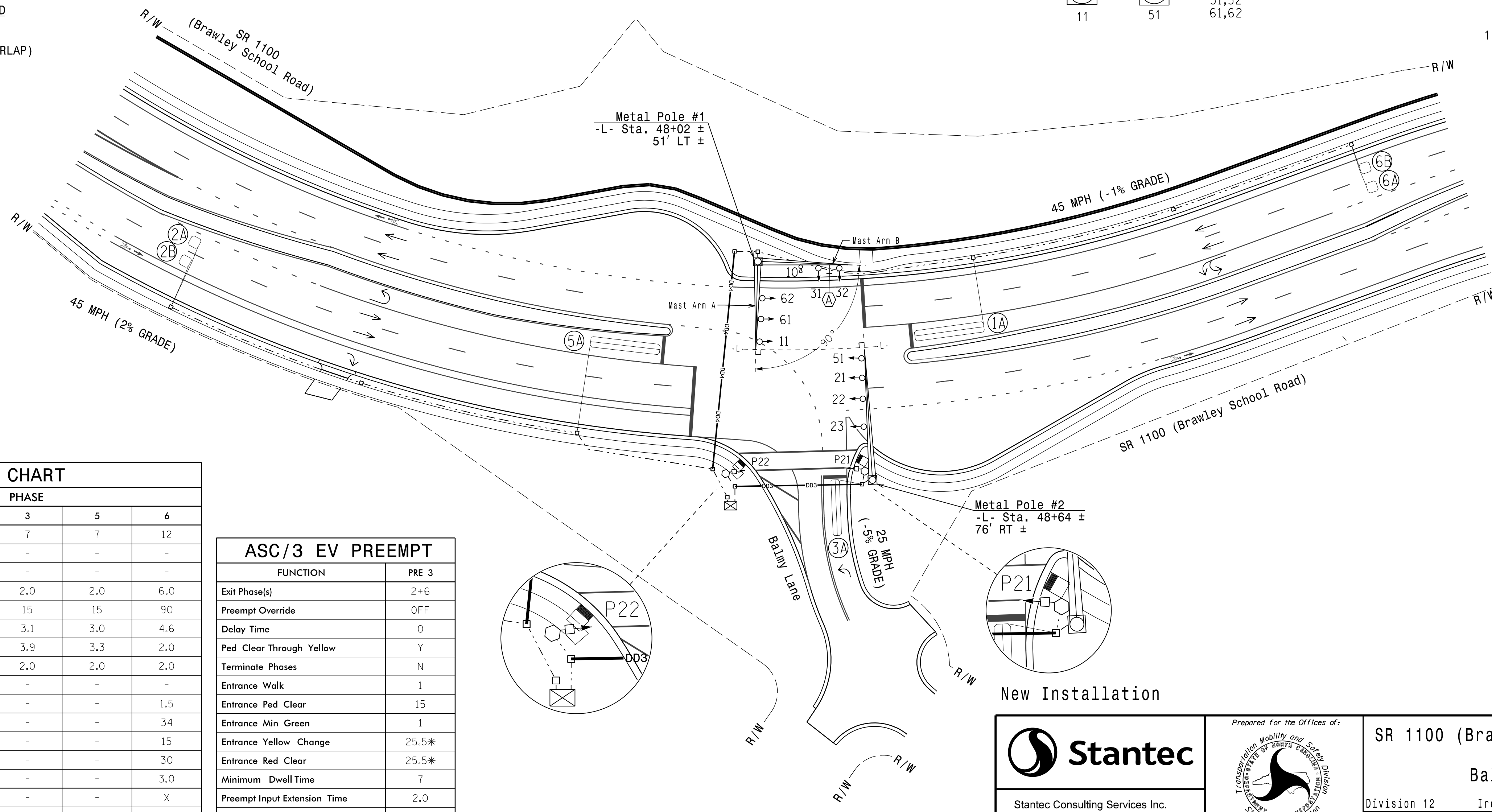
SIGNAL FACE I.D.



PHASING DIAGRAM DETECTION LEGEND

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

- 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 5 may be lagged.
 - Set all detector units to presence mode
 - Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
 - Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
 - Program pedestrian heads to countdown the flashing "Don't Walk" time only.
 - This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
 - Optical detector 10 calls PRE 3.
 - 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.



ASC/3 TIMING CHART

FEATURE	PHASE					
	1	2	3	5	6	
Min Green *	7	12	7	7	12	
Walk *	-	7	-	-	-	
Ped Clear	-	15	-	-	-	
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	
Max 1 *	15	90	15	15	90	
Yellow	3.0	4.6	3.1	3.0	4.6	
Red Clear	3.3	2.0	3.9	3.3	2.0	
Red Revert	2.0	2.0	2.0	2.0	2.0	
Actuations B4 Add *	-	-	-	-	-	
Seconds / Actuation *	-	1.5	-	-	1.5	
Max Initial *	-	34	-	-	34	
Time Before Reduction *	-	15	-	-	15	
Time To Reduce *	-	30	-	-	30	
Minimum Gap	-	3.0	-	-	3.0	
Locking Detector	-	X	-	-	X	
Recall Position	-	VEH. RECALL	-	-	VEH. RECALL	
Dual Entry	-	-	-	-	-	
Simultaneous Gap	X	X	X	X	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.

ASC/3 EV PREEMPT

FUNCTION	PRE 3
Exit Phase(s)	2+6
Preempt Override	OFF
Delay Time	0
Ped Clear Through Yellow	Y
Terminate Phases	N
Entrance Walk	1
Entrance Ped Clear	15
Entrance Min Green	1
Entrance Yellow Change	25.5*
Entrance Red Clear	25.5*
Minimum Dwell Time	7
Preempt Input Extension Time	2.0
Preempt Max Time	120
Exit Yellow Change	25.5*
Exit Red Clear	25.5*

* Time defaults to time used for phase during normal operation.

LEGEND

PROPOSED	EXISTING
○ Traffic Signal Head	● N/A
○ Modified Signal Head	○ N/A
○ Sign	○ N/A
○ Pedestrian Signal Head With Push Button & Sign	○ N/A
○ Signal Pole with Guy	○ N/A
○ Signal Pole with Sidewalk Guy	○ N/A
○ Inductive Loop Detector	○ N/A
○ Controller & Cabinet	○ N/A
○ Junction Box	○ N/A
○ 2-in Underground Conduit	○ N/A
○ Right of Way	○ N/A
○ Directional Arrow	○ N/A
○ Metal Pole with Mastarm	○ N/A
○ Directional Drill	○ N/A
○ Type II Signal Pedestal	○ N/A
○ Optical EVP Detector	○ N/A
○ Curb Ramps	○ N/A
○ Left Arrow "ONLY" Sign (R3-5L)	○ N/A

New Installation

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 Fax. (919) 851-7024
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Prepared for the Offices of:
 Transportation Mobility and Safety Division
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 Signal Design Section
 750 N. Greenfield Pkwy, Garner, NC 27526

SR 1100 (Brawley School Road) at Balmy Lane
 Division 12 Iredell County Mooresville
 PLAN DATE: May 2022 REVIEWED BY: E D Harris
 PREPARED BY: J. Hambright REVIEWED BY: R M Nuncney

SEAL
 PROFESSIONAL ENGINEER
 SEAL 042678
 DERRICK A. WALLER

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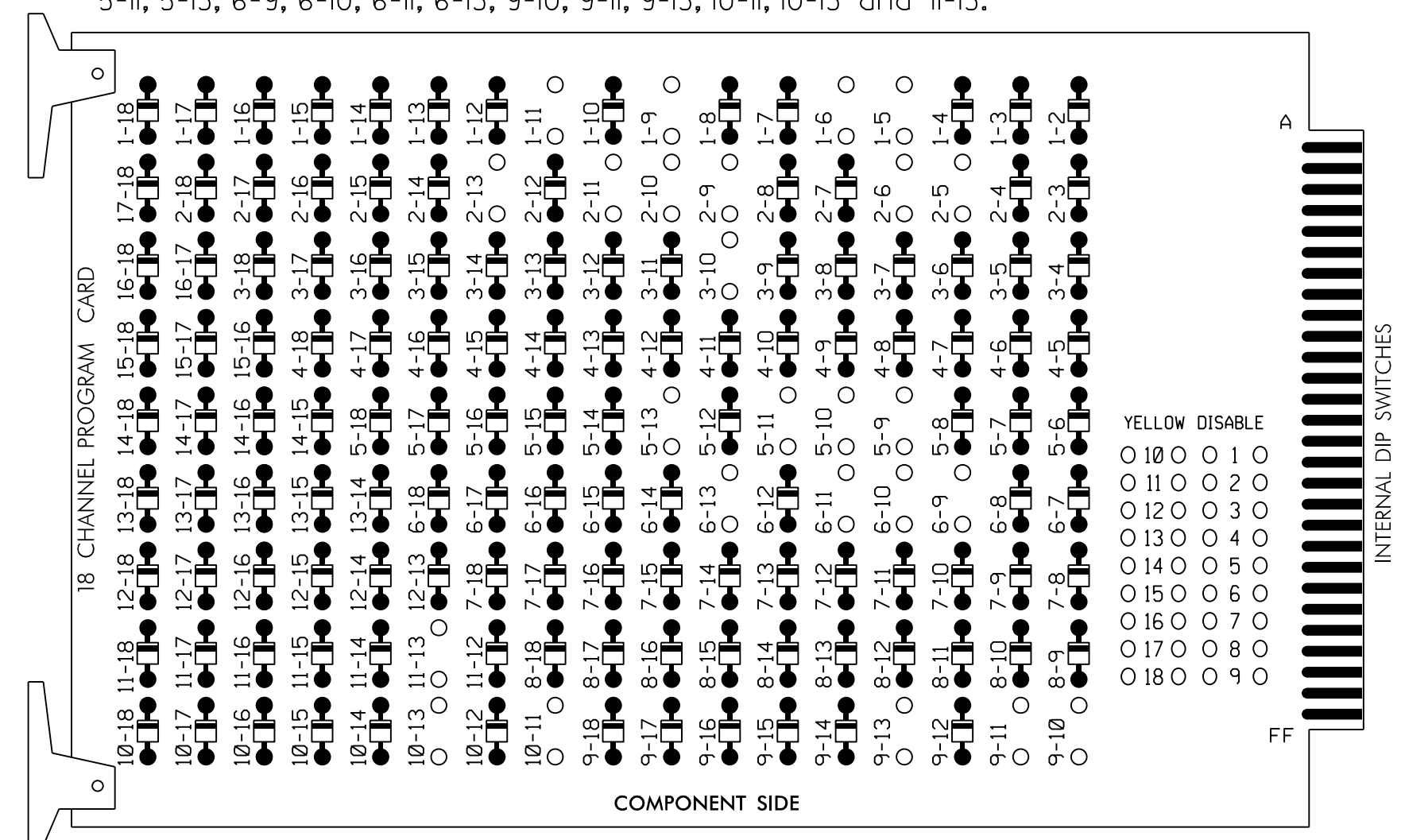
3/22/2023
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 User: dawall118r

DocuSigned by:
 Derrick Waller 3/22/2023
 DATE
 SIG. INVENTORY NO. 12-1897

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-10, 2-11, 2-13, 3-10, 5-9, 5-10, 5-11, 5-13, 6-9, 6-10, 6-11, 6-13, 9-10, 9-11, 9-13, 10-11, 10-13 and 11-13.



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.
- Integrate monitor with Ethernet network in cabinet.

■ = 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 Walk and 6 Green.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

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,S7,S8,AUX S1, AUX S2,AUX S4
 PHASES USED.....1,2,2PED,3,5,6
 OVERLAP "A".....*
 OVERLAP "B".....*
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED

* See overlap programming detail on sheet 2

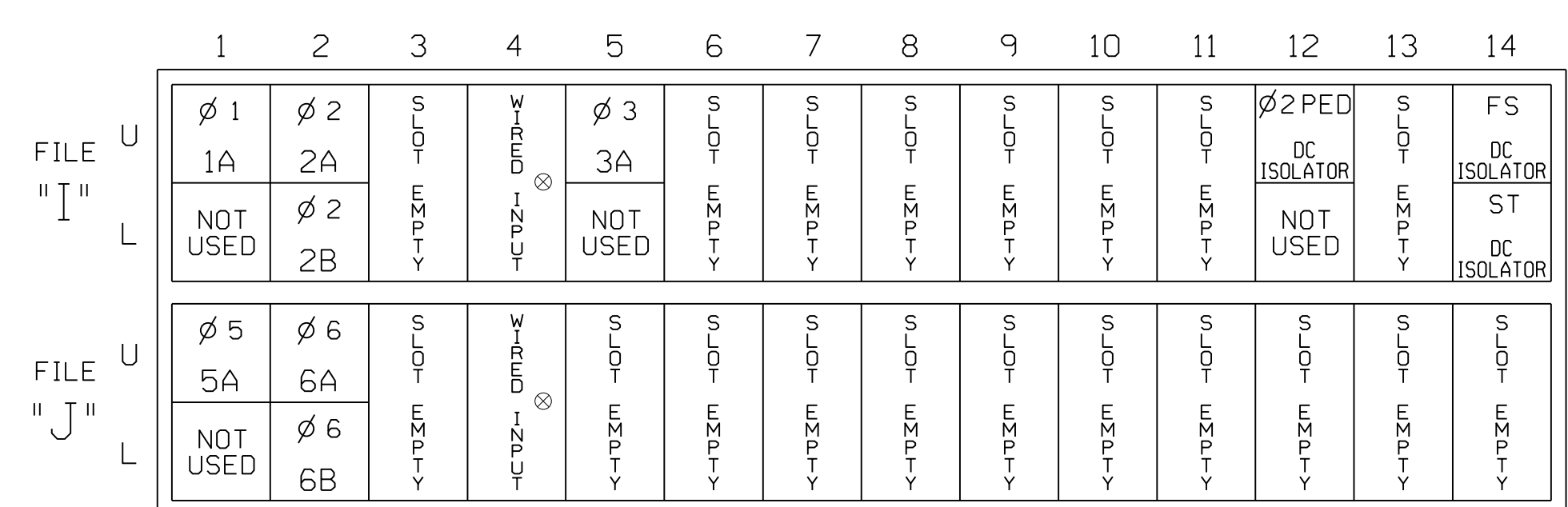
SIGNAL HEAD HOOK-UP CHART

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	P21, P22	31,32	NU	NU	51	61,62	NU	NU	NU	NU	11	23	NU	51	NU	NU
RED		128		116				134										
YELLOW	*	129		117			*	135										
GREEN		130		118				136										
RED ARROW													A121	A124		A114		
YELLOW ARROW													A122	A125		A115		
FLASHING YELLOW ARROW													A123	A126		A116		
GREEN ARROW	127							133										
Hand																		
Walker																		

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

INPUT FILE CONNECTION & PROGRAMMING CHART

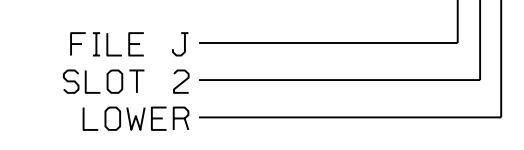
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A ¹	TB2-1,2	I1U	56	1 ★	1	YES		15		N
	-	J4U	48	26 ★	6	YES				G
2A	TB2-5,6	I2U	39	2	2	YES			X	N
2B	TB2-7,8	I2L	43	12	2	YES			X	N
3A	TB4-5,6	I5U	58	3	3	YES		3		N
5A ²	TB3-1,2	J1U	55	5 ★	5	YES		15		N
	-	I4U	47	22 ★	2	YES				G
6A	TB3-5,6	J2U	40	6	6	YES			X	N
6B	TB3-7,8	J2L	44	16	6	YES			X	N
PED PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2	PED				

NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOT 112.

- 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 2.

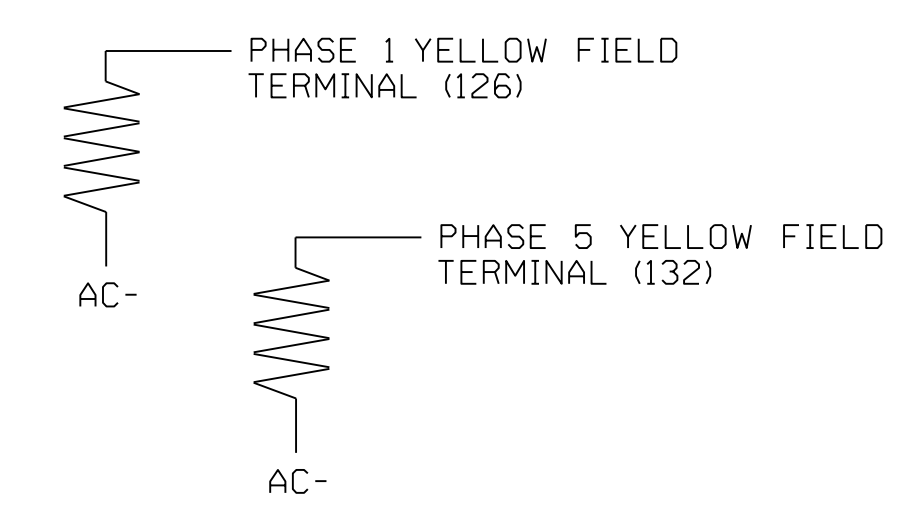
INPUT FILE POSITION LEGEND: J2L



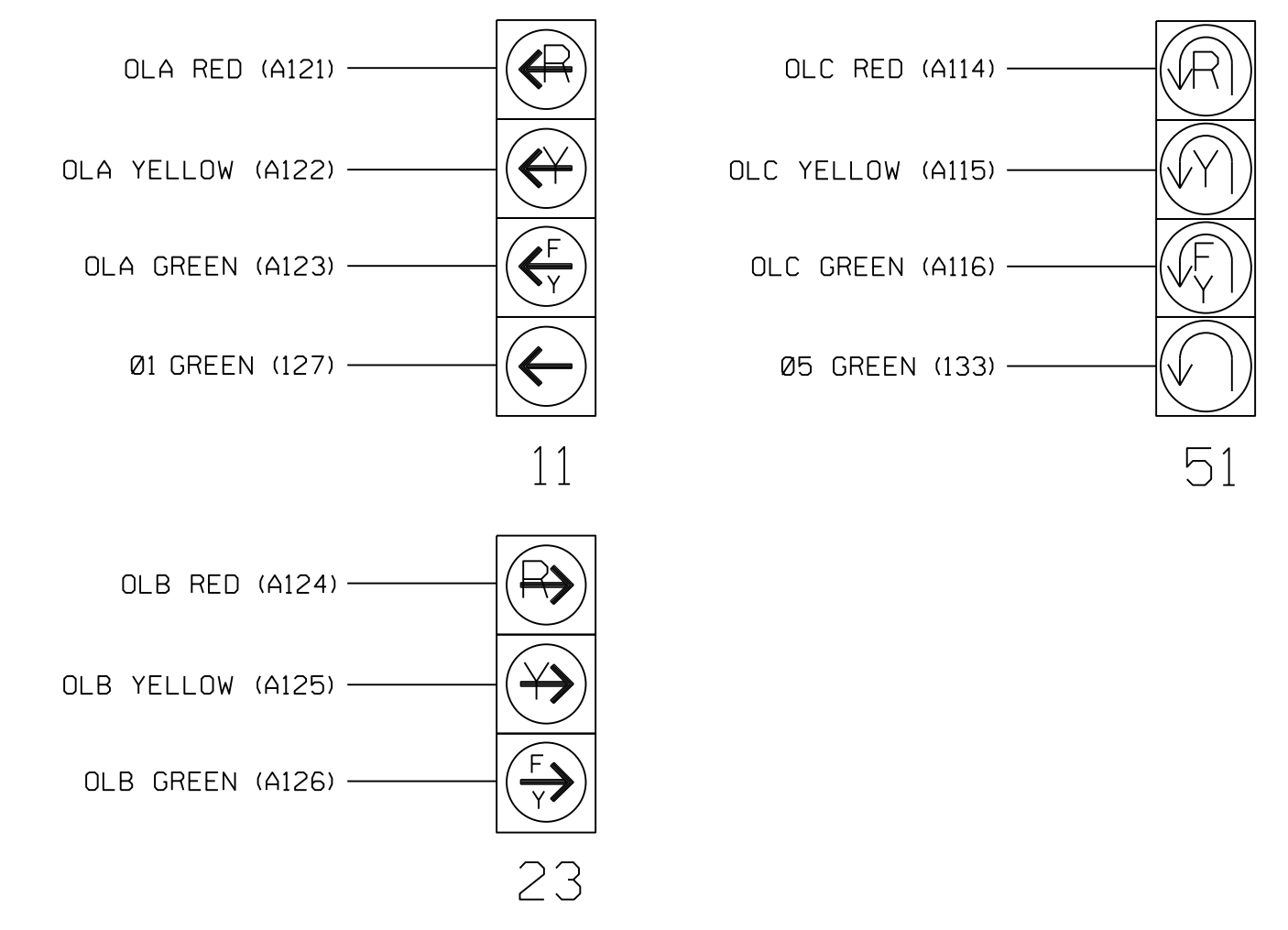
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1897
 DESIGNED: MAY 2022
 SEALED: 3/22/2023
 REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL (install resistors as shown below)

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



FYA SIGNAL WIRING DETAIL (wire signal heads as shown)



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.

Final Design
 Electrical Detail - Sheet 1 of 4

SR 1100 (Brawley School Road) at Balmy Lane
 Division 12 Iredell County Mooresville
 PLAN DATE: May 2022 REVIEWED BY: E D Harris
 PREPARED BY: D A Waller REVIEWED BY: R M Muncey

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Seal of Derrick Waller, Professional Engineer, License No. 042678, State of North Carolina. Date: 3/24/2023.

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

(program controller as shown)

IMPORTANT!

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

- From Main Menu select **8. UTILITIES**
- From UTILITIES Submenu select **1. COPY/CLEAR**
- 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
  
```

- From Main Menu select **6. DETECTORS**
- From DETECTOR Submenu select **2. VEHICLE DETECTOR SETUP**
- 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: N-NTCIP
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
  
```

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

```

VEH DETECTOR [26]  VEH DET PLAN [ 2 ]
TYPE: G-GREEN EXTENSION/DELAY
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
  
```

- Place cursor in VEH DETECTOR [] position and enter "5".
- Set delay time to "0".

```

VEH DETECTOR [ 5 ]  VEH DET PLAN [ 2 ]
TYPE: N-NTCIP
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... 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
  
```

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

```

VEH DETECTOR [22]  VEH DET PLAN [ 2 ]
TYPE: G-GREEN EXTENSION/DELAY
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
  
```

END PROGRAMMING

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **2. CONTROLLER**
- 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"

OVERLAP B

Select TMG VEH OVLP [B] and 'OTHER/ECONOLITE'

```

TMG VEH OVLP...[B] TYPE: OTHER/ECONOLITE
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . X X . . . . .
PROTECT . . . . .
PED PRTC . . . . .
NOT OVLP . . . . .
FLSH GRN . 1 1 . . . . .
LAG X PH . . . . .
LAG 2 PH . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0
  
```

Toggle Once

OVERLAP C

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

```

TMG VEH OVLP...[C] TYPE: ....PPLT FYA
PROTECTED LEFT TURN.... PHASE 5
OPPOSING THROUGH..... PHASE 6

FLASHING ARROW OUTPUT....CH11 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 5
  
```

NOTICE ACTION PLAN SF BIT "5"

END PROGRAMMING

3/17/2023 10:56 AM C:\Users\Traffic\OneDrive\Documents\Signal\12-1897.dgn User: dawillier

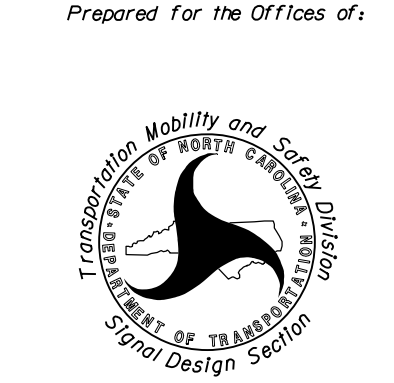
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1897
DESIGNED: MAY 2022
SEALED: 3/22/2023
REVISED: N/A

Final Design
Electrical Detail - Sheet 2 of 4



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License No. F-0672

Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

SR 1100 (Brawley School Road)
at
Balmy Lane

Division 12 Iredell County Mooresville

PLAN DATE: May 2022 REVIEWED BY: E D Harris
PREPARED BY: D A Waller REVIEWED BY: R M Muncey

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



DocuSigned by:
Derrick Waller 3/22/2023
DATE

SIG. INVENTORY NO. 12-1897

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 0 seconds.

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE 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.

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

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

```

ACTION PLAN... [ *]
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  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  X  .  .  .  X  .  .  .  (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 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .

```

* The Action Plan number(s) are to be determined by the Division and/or City Traffic Engineer.

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 12-1897
 DESIGNED: MAY 2022
 SEALED: 3/22/2023
 REVISED: N/A


Final Design
Electrical Detail - Sheet 3 of 4

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



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 Fax. (919) 851-7024
 www.stantec.com
 License No. F-0672

Prepared for the Offices of:



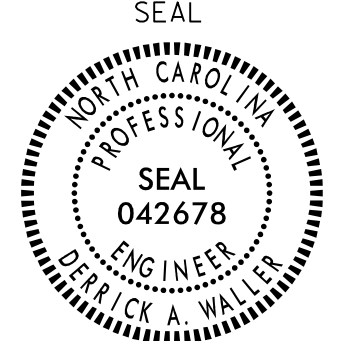
750 N. Greenfield Pkwy, Garner, NC 27529

SR 1100 (Brawley School Road)
 at
 Balmy Lane

Division 12 Iredell County Mooresville

PLAN DATE: May 2022 REVIEWED BY: E D Harris
 PREPARED BY: D A Waller REVIEWED BY: R M Muncey

REVISIONS	INIT.	DATE



DocuSigned by:
 Derrick Waller 3/22/2023
 DATE
 SIG. INVENTORY NO. 12-1897

3/21/2023 10:45:08 AM C:\Users\Traffic\OneDrive\Documents\Signal Design\12-1897.dgn User: dawillier

ECONOLITE ASC/3-2070 EMERGENCY VEHICLE PREEMPT PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **4. PREEMPTOR/TSP**
- From PREEMPTOR/TSP/SCP Submenu select **1. PREEMPT PLAN 1-10**

Place cursor in [] next to Preempt Plan and press 3. Then press the right cursor arrow and toggle the controller to YES. Next cursor down. This will select Emergency Vehicle Preempt #3.

```

PREEMPT PLAN [ 3]  ENABLE....YES
  VEH/PED 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
  OVERLAP A B C D E F G H I J K L M N O P
TRKCLR V . . . . .
TRKCLR O . . . . .
ENA TRL . . . . .
DWEL VEH . . X . . . . .
DWEL PED . . . . .
DWEL OLP . . . . .
CYC VEH . . . . .
CYC PED . . . . .
CYC OLP . . . . .
EXIT PH . X . . . X . . . . .
EXIT CAL . . . . .
SP FUNC . . . . .

ENABLE... YESIPMT OVRIDE..INTERLOCK. NO
DET LOCK... XIDELAY..  OINHIBIT...  0
OVERRIDE FL. .IDURATION  OICLR-GRN... NO
TERM OLP.  NOIPC>YEL  YESITERM PH  NO
PED DARK.. NOITC RESRV  NOIDWELL FL  OFF
LINK PMT....OIX FLCOLR REDIXIT OPT.  OFF
X TMG PLN...OIRE-SERV..  OIFLT TYPE.HARD
FREE DUR PMTIR1 NOIR2 NOIR3 NOIR4 NO
--TIMING-----WALKIPED CLIMN GRI YELI RED
ENTRANCE TM.   11   151   1125.5125.5
-----MIN GRIEXT GRIMX GRI YELI RED
TRACK CLEAR   01   01   0125.5125.5
-----MIN DLIPMTEXTIMX TMI YELI RED
DWL/CYC-EXIT   71   2.01  120125.5125.5
PMT ACTIVE OUT..ON  PMT ACT DWELL...NO
OTHER - PRI PMT.OFF  NON-PRI PMT.....OFF
INH EXT TIME... 0.0  PED PR RETURN...OFF
PRIORITY RETURN.OFF  QUEUE DELAY.... OFF
COND DELAY.....OFF

PHASES      1  2  3  4  5  6  7  8
PR RTN%     0  0  0  0  0  0  0  0
PHASES     9 10 11 12 13 14 15 16
PR RTN%     0  0  0  0  0  0  0  0

```

PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

ECONOLITE ASC/3-2070 PREEMPT FILTERING PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **4. PREEMPTOR/TSP**
- From PREEMPTOR/TSP/SCP Submenu select **2. ENABLE PREEMPT FILTERING & TSP/SCP**

```

ENABLE PREEMPT FILTERING & TSP/SCP
FILTERED      SOLID      PULSING
INPUT  1  ...BYPASSED..  ...BYPASSED..
        2  ...BYPASSED..  ...BYPASSED..
        3  ..PREEMPT  3.  ...BYPASSED..
        4  ..PREEMPT  4.  ...BYPASSED..
        5  ..PREEMPT  5.  ...BYPASSED..
        6  ..PREEMPT  6.  ...BYPASSED..
        7  ...BYPASSED..  ...BYPASSED..
        8  ...BYPASSED..  ...BYPASSED..
        9  ...BYPASSED..  ...BYPASSED..
       10 ...BYPASSED..  ...BYPASSED..

```

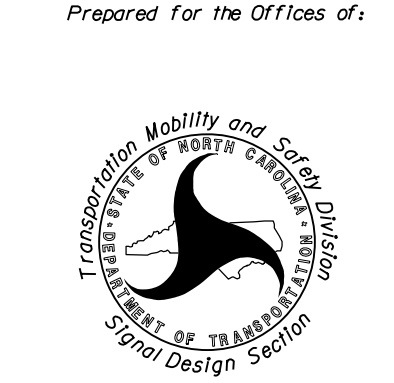
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1897
DESIGNED: MAY 2022
SEALED: 3/22/2023
REVISED: N/A

Final Design
Electrical Detail - Sheet 4 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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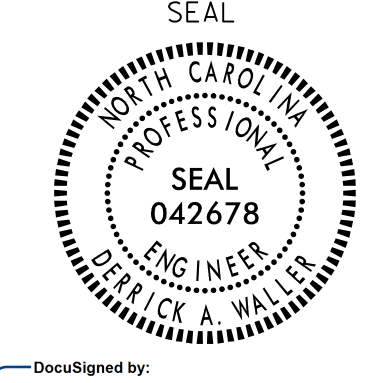
Prepared for the Offices of:
750 N. Greenfield Pkwy, Garner, NC 27529

SR 1100 (Brawley School Road)
at
Balmy Lane

Division 12 Iredell County Mooresville

PLAN DATE: May 2022	REVIEWED BY: E D Harris
PREPARED BY: D A Waller	REVIEWED BY: R M Muncey

REVISIONS	INIT.	DATE

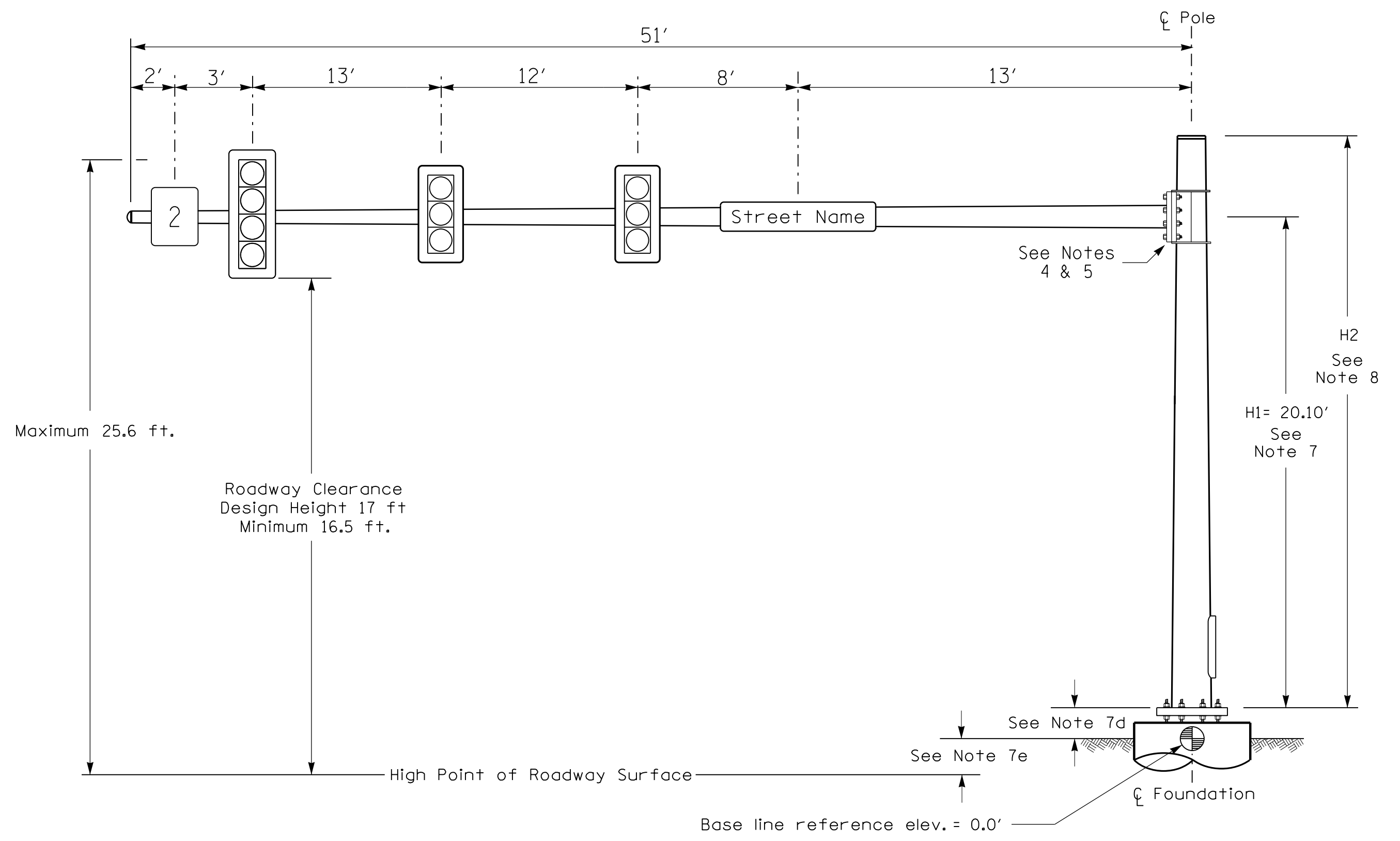


DocuSigned by:
Derrick Waller 3/22/2023

SIG. INVENTORY NO. 12-1897

2:14:17 PM
C:\Users\dwaller\OneDrive\Documents\Signal Design\3833C\Sig.dwg
User: dwaller

Design Loading for METAL POLE NO. 1 (Mast Arm "A")

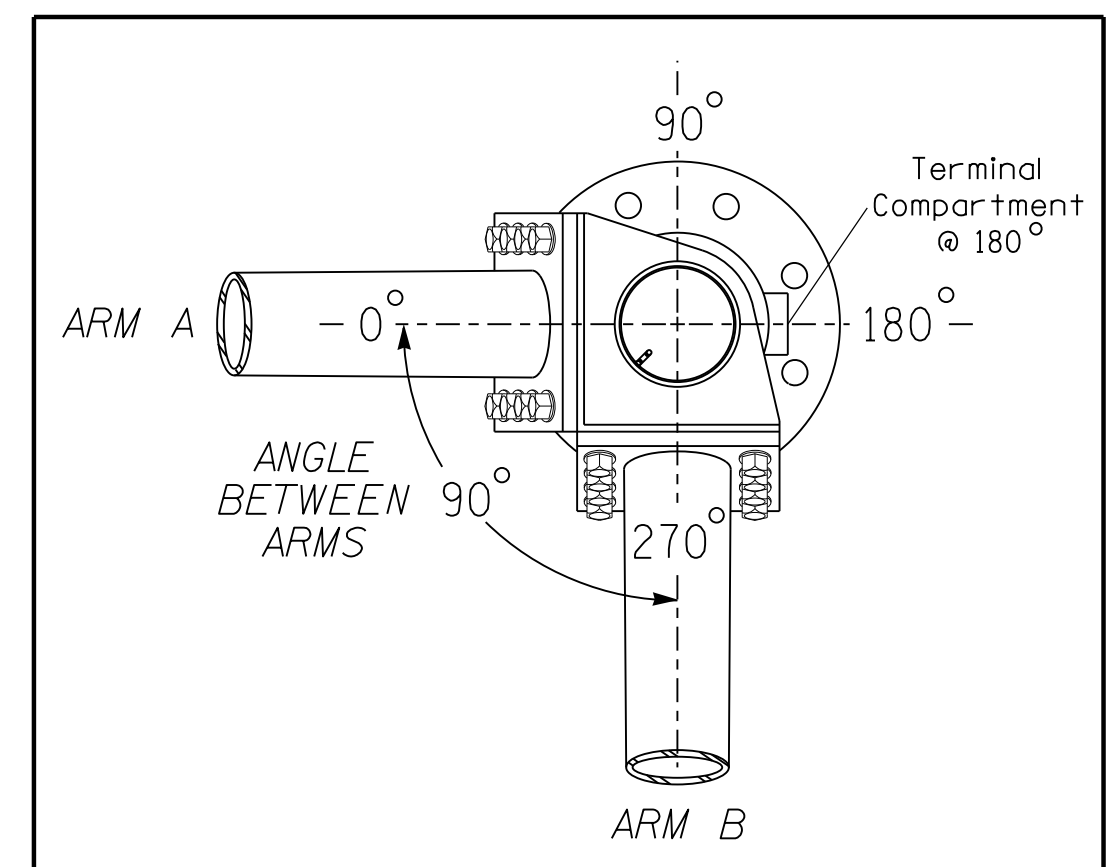


Elevation View

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

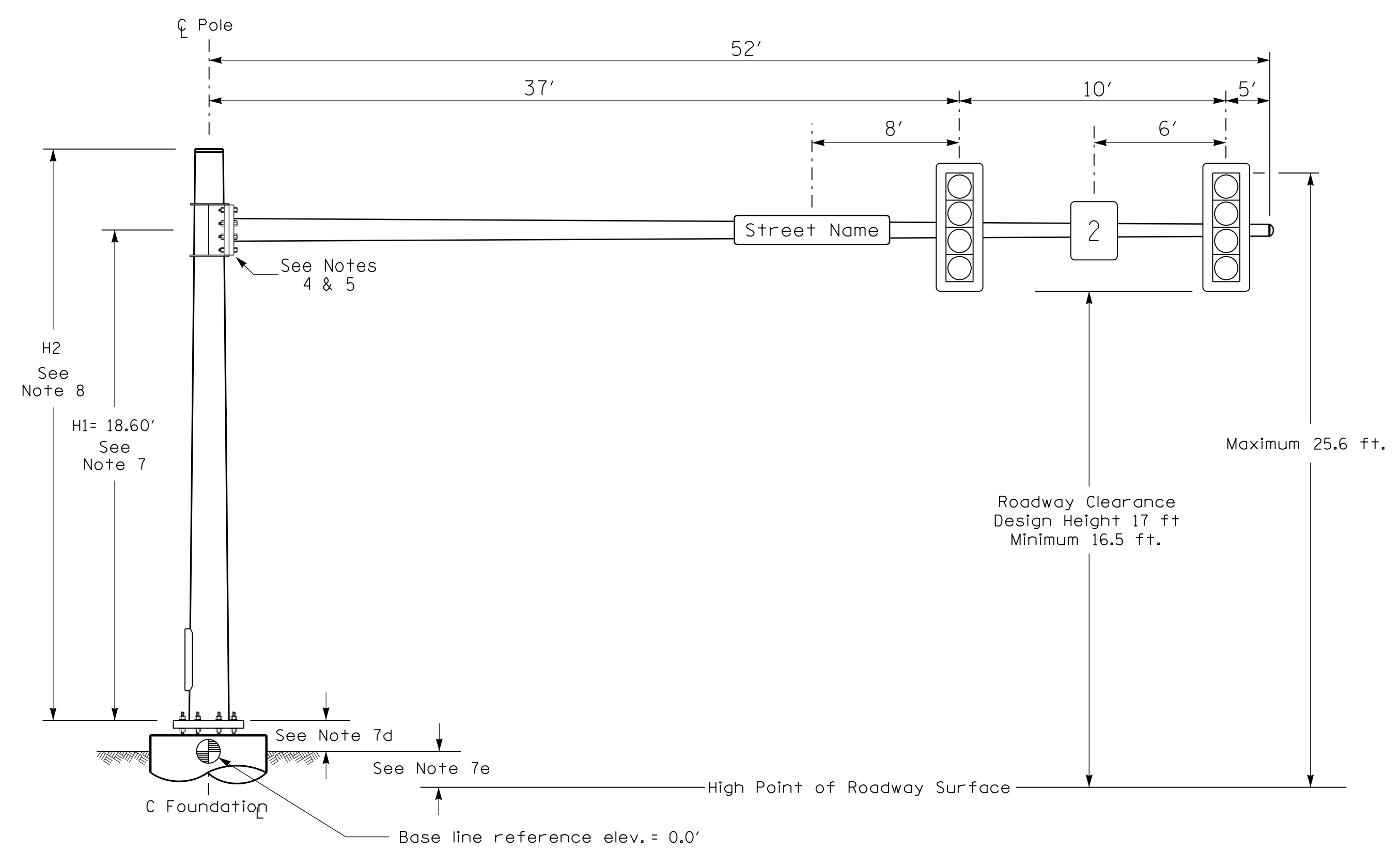
Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	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	+1.08 ft.	-0.48 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.

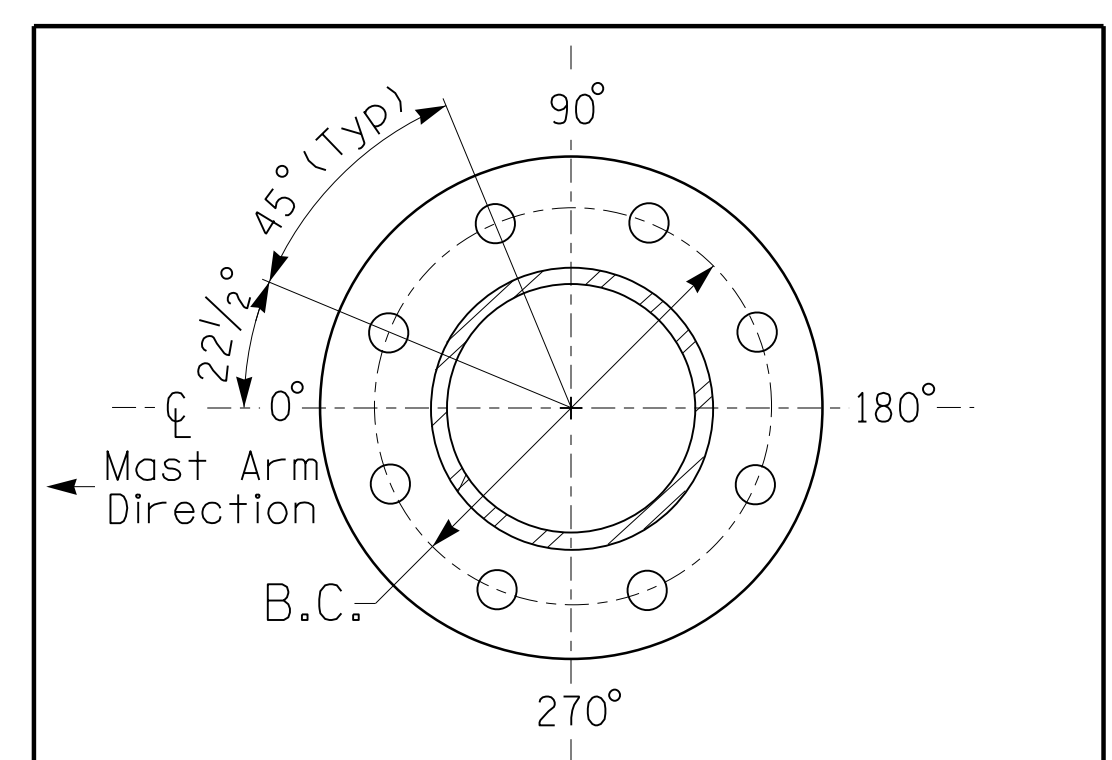


POLE RADIAL ORIENTATION

Design Loading for METAL POLE NO. 1 (Mast Arm "B")

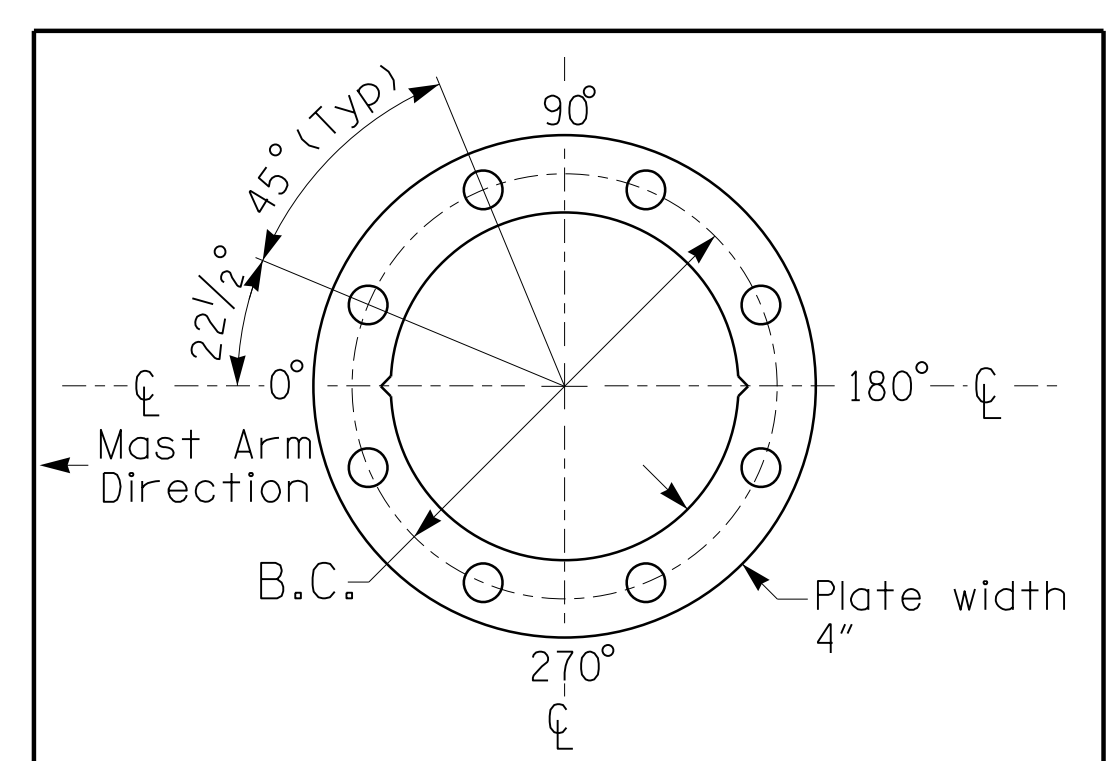


Elevation View



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
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	STREET NAME SIGN RIGID MOUNTED	12.0 S.F.	18.0" W X 96.0" L	27 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.

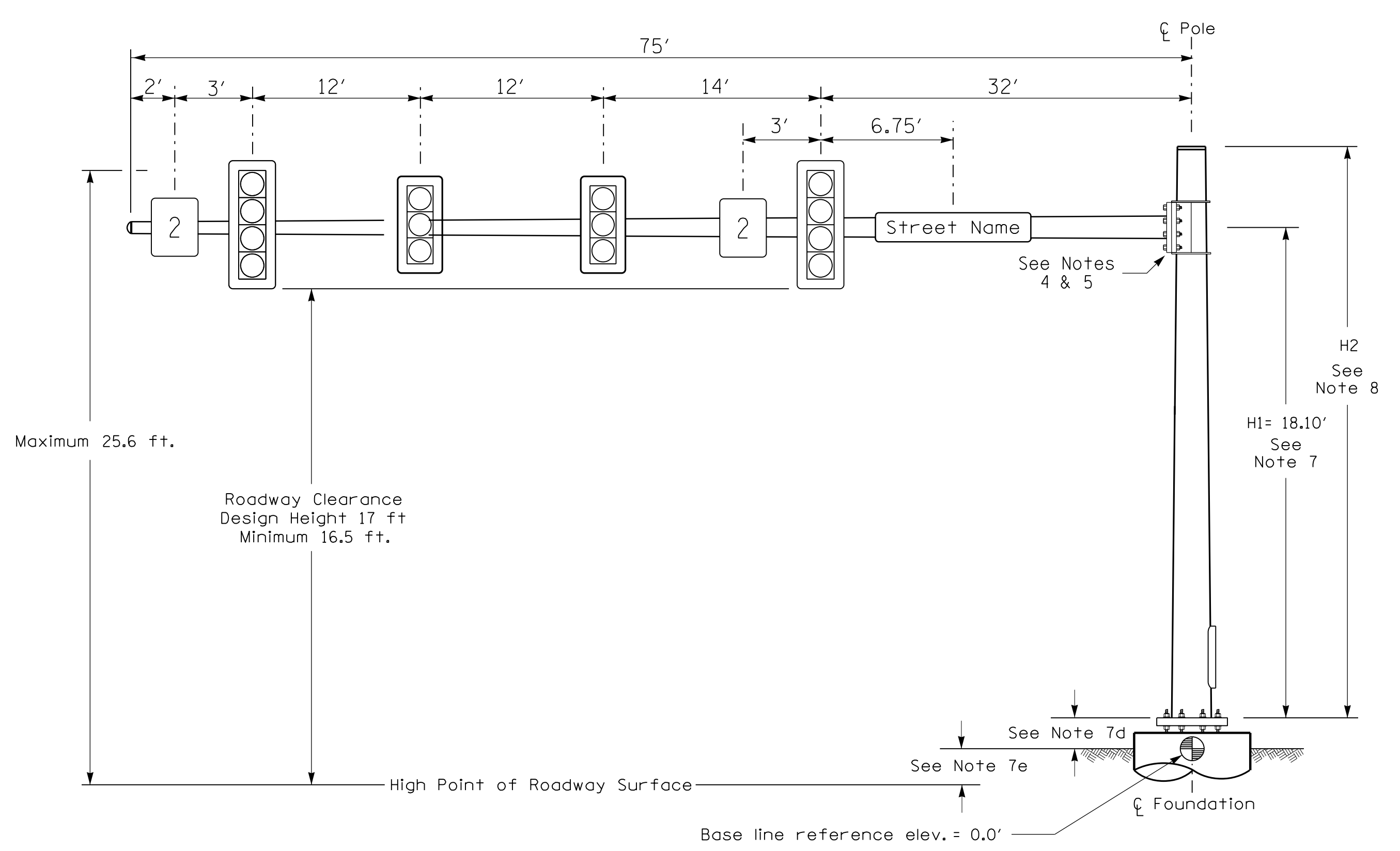
NCDOT Wind Zone 4 (90 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 1100 (Brawley School Road) at Balmy Lane	
	Division 12 Iredell County Mooresville PLAN DATE: May 2022 REVIEWED BY: E D Harris PREPARED BY: J Hambricht REVIEWED BY: R M Muncey	
SCALE 0 N/A N/A	REVISIONS INIT. DATE	DocuSigned by: Derrick Waller 3/22/2023 DATE SIG. INVENTORY NO. 12-1897

2:14:18 PM
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 User: daniel.lbr

Design Loading for METAL POLE NO. 2

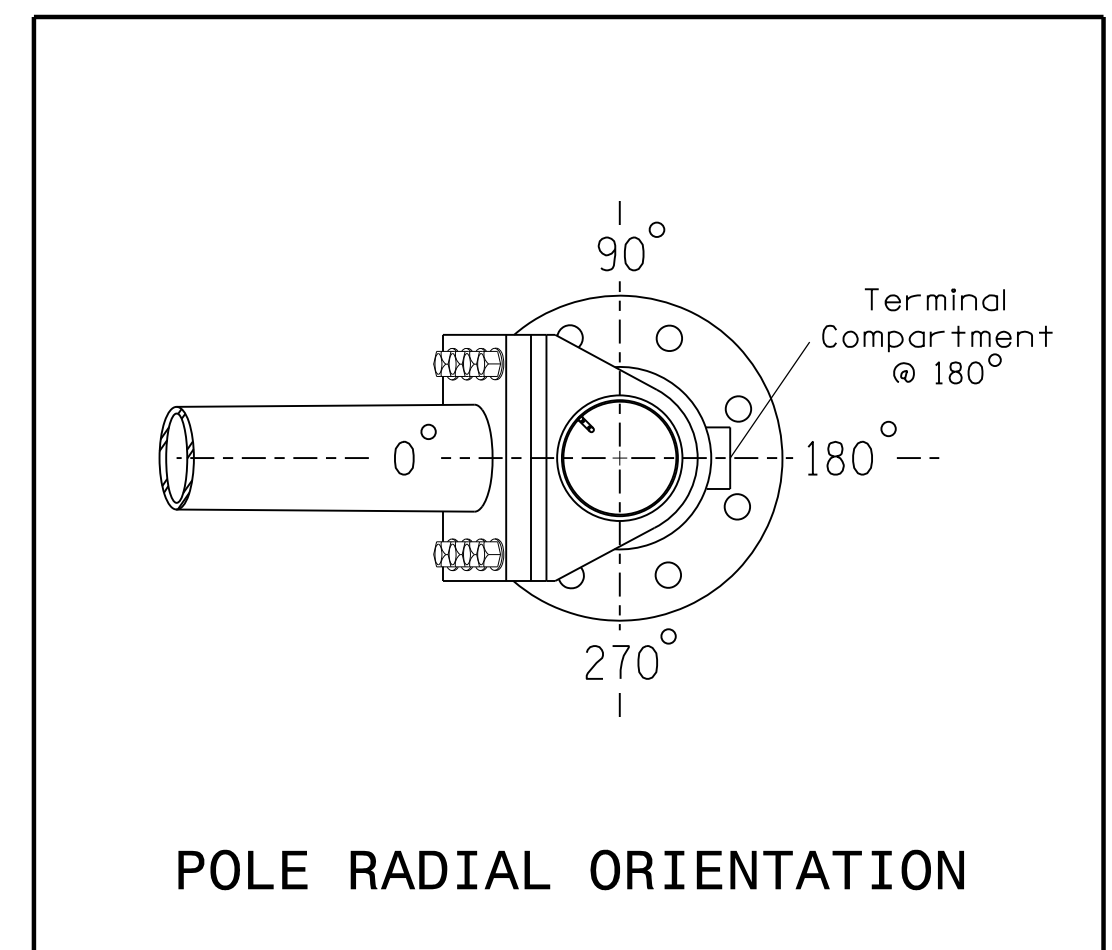


Elevation View

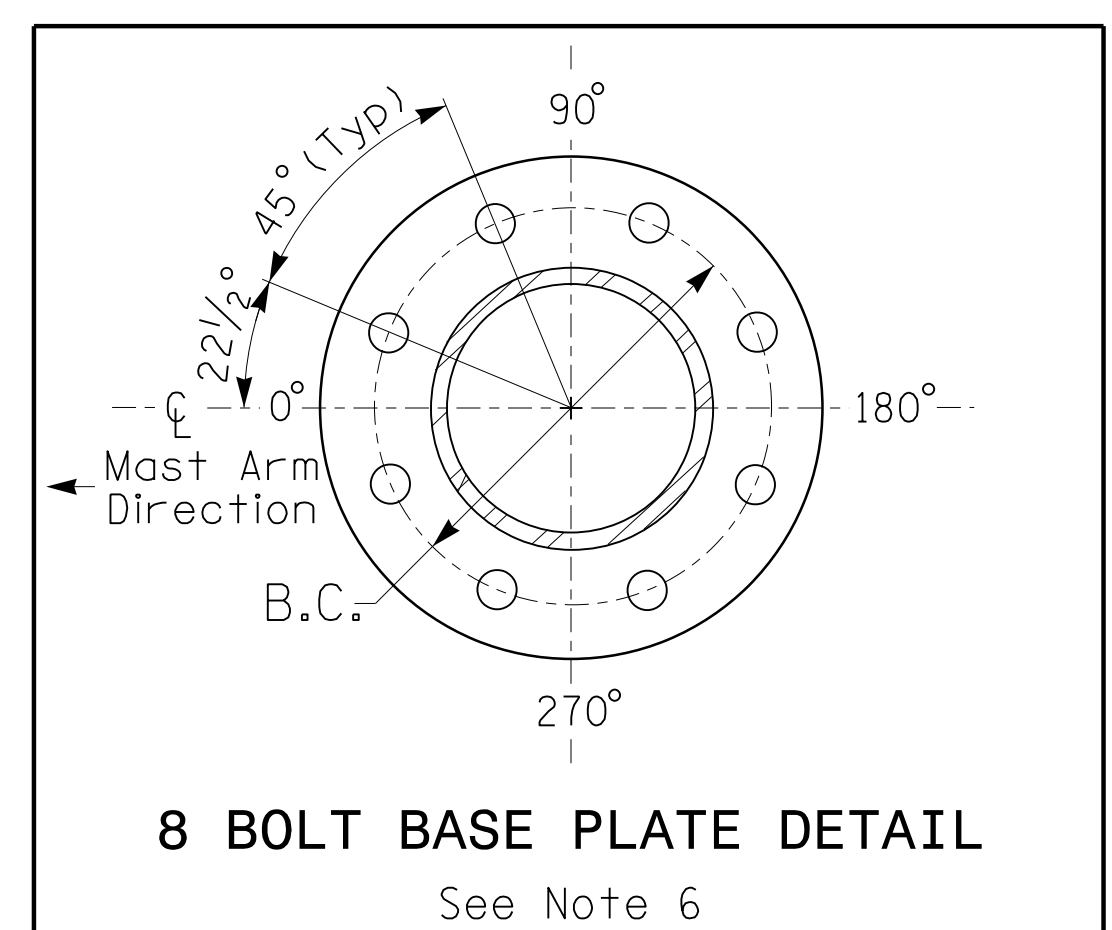
SPECIAL NOTE
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project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

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:		Pole 2
Baseline reference point at ϕ Foundation @ ground level		0.0 ft.
Elevation difference at High point of roadway surface		-0.99 ft.
Elevation difference at Edge of travelway or face of curb		+/-0.0 ft.

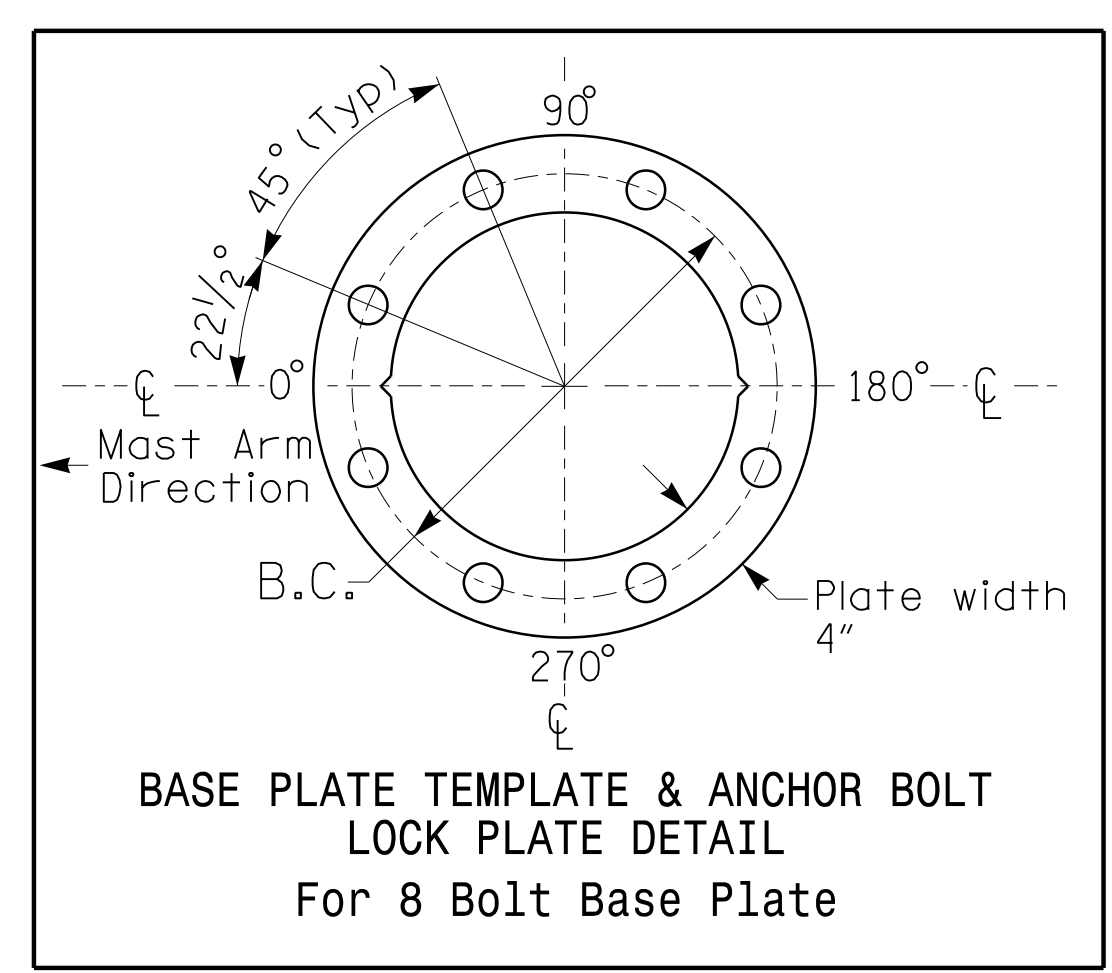


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



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

METAL POLE No. 2

PROJECT REFERENCE NO.	SHEET NO.
R-3833C	SIG-6.6

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	STREET NAME SIGN RIGID MOUNTED	12.0 S.F.	18.0" W X 96.0" L	27 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.
- 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.

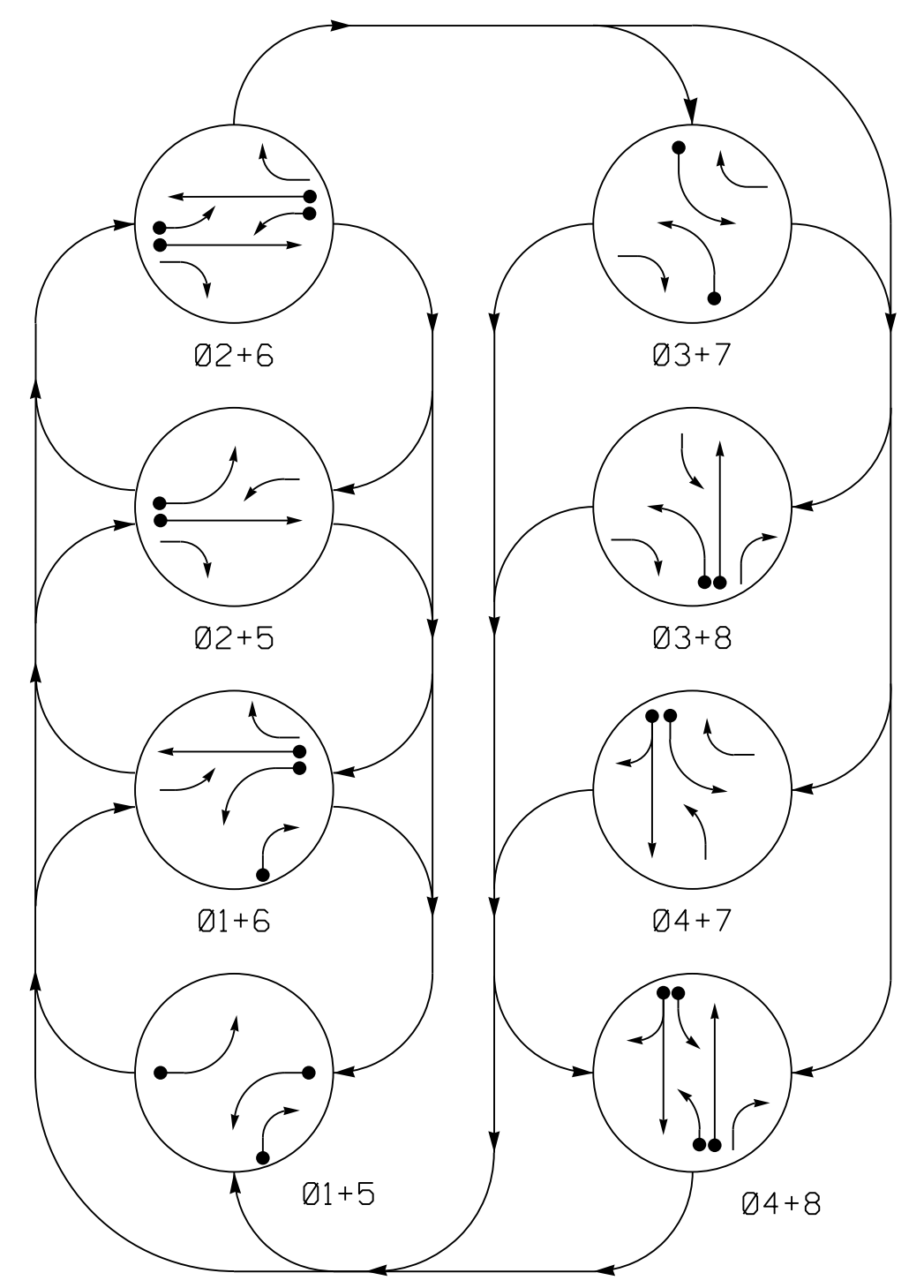
NCDOT Wind Zone 4 (90 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<p>Prepared For the Offices of: 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 1100 (Brawley School Road) at Balmy Lane</p> <p>Division 12 Iredell County Mooresville</p> <p>PLAN DATE: May 2022 REVIEWED BY: E D Harris</p> <p>PREPARED BY: J Hambright REVIEWED BY: R M Muncey</p>	
	<p>SCALE: 0 N/A</p>	

2:14:20 PM
 U:\Projects\12-1897\12-1897-Metal Pole\Loading\Diagram\Loading Diagram\Mast Arm\12-1897_Pole 2.dgn
 User: daniel.lbr

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

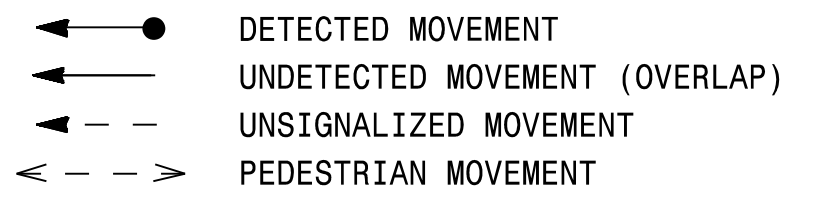
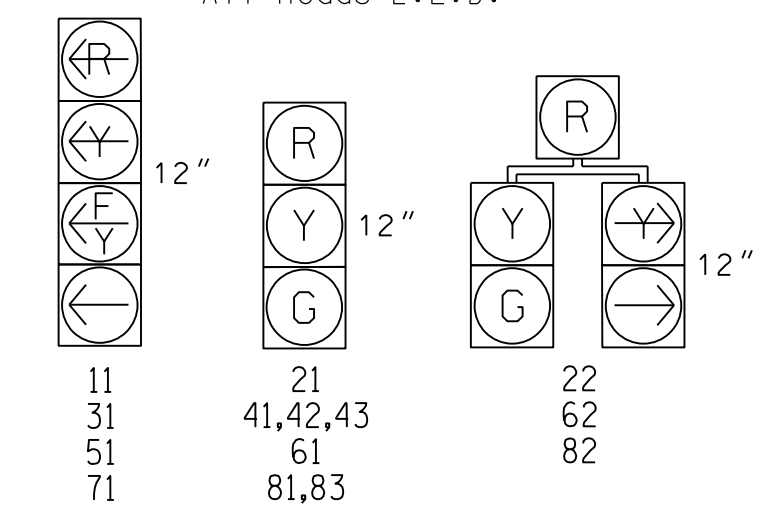


TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	02+5	02+6	03+7	03+8	04+7	04+8	F L H
11	←	←	←	←	←	←	←	Y
21	R	R	G	G	R	R	R	Y
22	R	R	G	G	R	R	R	Y
31	←	←	←	←	←	←	←	Y
41,42,43	R	R	R	R	R	R	G	R
51	←	←	←	←	←	←	←	Y
61	R	G	R	G	R	R	R	Y
62	R	G	R	G	R	R	R	Y
71	←	←	←	←	←	←	←	Y
81,83	R	R	R	R	R	G	R	R
82	R	R	R	R	R	G	R	R

SIGNAL FACE I.D.
All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

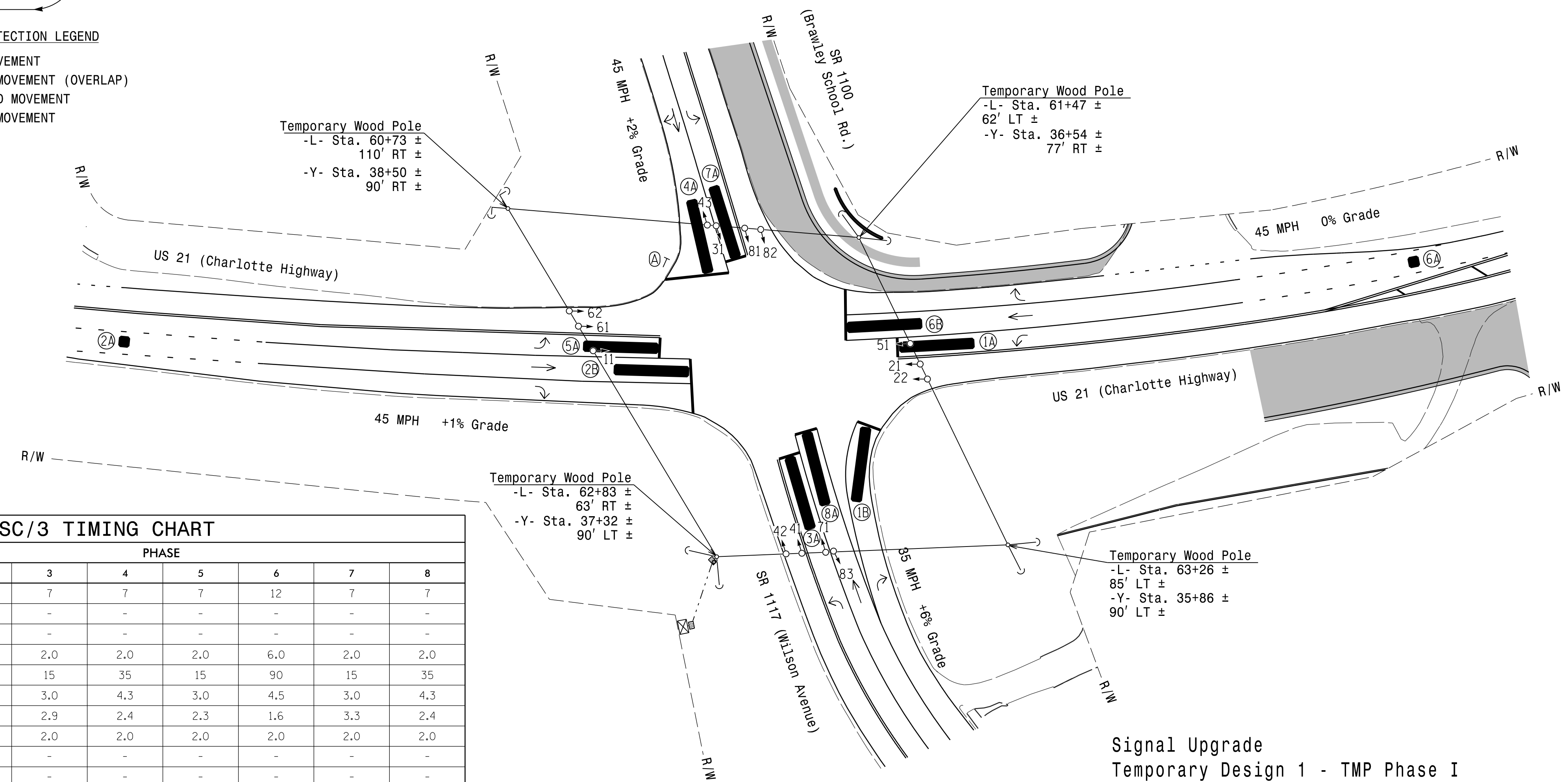
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	*	*	1	Yes	-	15	-	N	-	*
					6	Yes	-	3	-	G	-	*
1B	6X40	0	*	*	1	Yes	-	15	-	N	-	*
2A	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2B	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
3A	6X40	0	*	*	3	Yes	-	15	-	N	-	*
					8	Yes	-	3	-	N	-	*
4A	6X40	0	*	*	4	Yes	-	10	-	N	-	*
5A	6X40	0	*	*	5	Yes	-	15	-	N	-	*
6A	6X6	300	*	*	6	Yes	-	3	-	G	-	*
6B	6X40	0	*	*	6	Yes	2.0	5	-	G	-	*
7A	6X40	0	*	*	7	Yes	-	15	-	N	-	*
					4	Yes	-	3	-	N	-	*
8A	6X40	0	*	*	8	Yes	-	-	-	N	-	*

* Video Detection Area

8 Phase Fully Actuated Isolated

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.
- Phase 3 and/or phase 7 may be lagged.
- Set all detector units to presence mode.
- This intersection features a video detection system. Detectors should be placed to ensure the desired operation parameters are achieved.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.

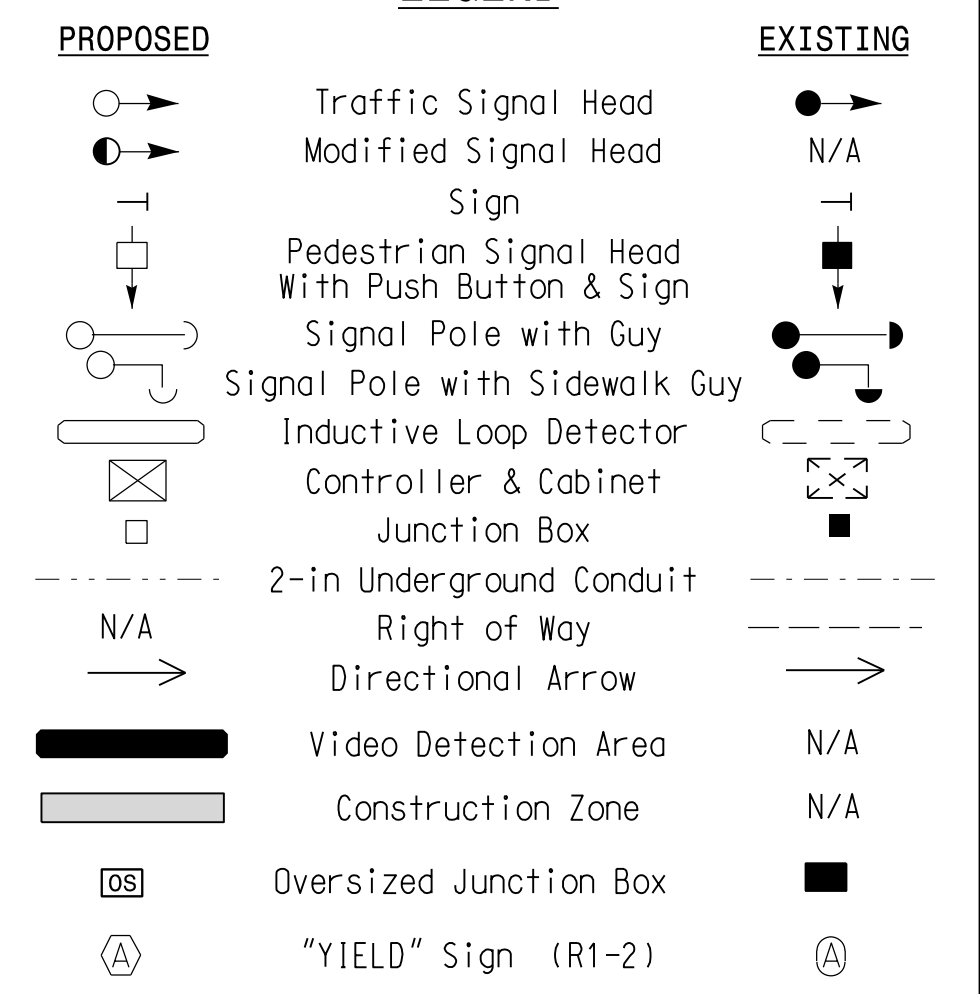


ASC/3 TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	-	-	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max I *	15	90	15	35	15	90	15	35
Yellow	3.0	4.5	3.0	4.3	3.0	4.5	3.0	4.3
Red Clear	2.8	1.6	2.9	2.4	2.3	1.6	3.3	2.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds / Actuation *	-	-	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	X	-	-	-	X
Simultaneous Gap	X	X	X	X	X	X	X	X

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

LEGEND



**Signal Upgrade
Temporary Design 1 - TMP Phase I**

Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road-Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
Signal Design Section
750 N. Greenfield Pkwy, Garner, NC 27526
SCALE: 0 40
1" = 40'

**US 21 (Charlotte Highway) at
SR 1100 (Brawley School Road)
/ SR 1117 (Wilson Avenue)**
Division 12 Iredell County Mooresville
PLAN DATE: May 2022 REVIEWED BY: E D Harris
PREPARED BY: J. Hambright REVIEWED BY: R M Nuncy

SEAL
PROFESSIONAL ENGINEER
SEAL
042678
DERRICK A. WALLER
DocuSigned by:
Derrick Waller
3/22/2023
DATE
SIG. INVENTORY NO. 12-136911

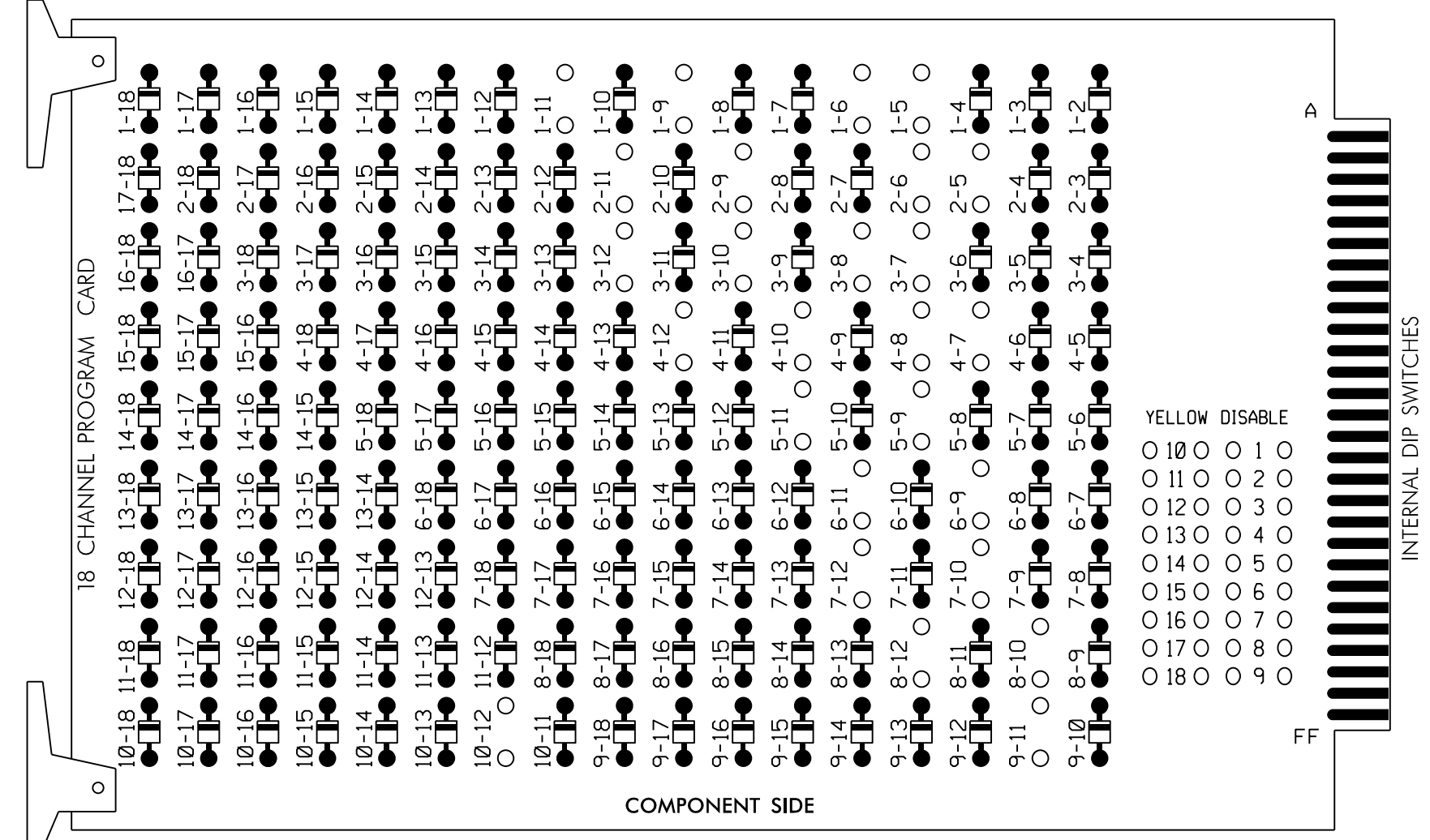
**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

3/22/2023 10:41:00 AM C:\Users\jhambrigt\Documents\Signal\Design\Temporary Design\SR-3833C.sif.gdsn-12-136911.dgn User: dawl118r

EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

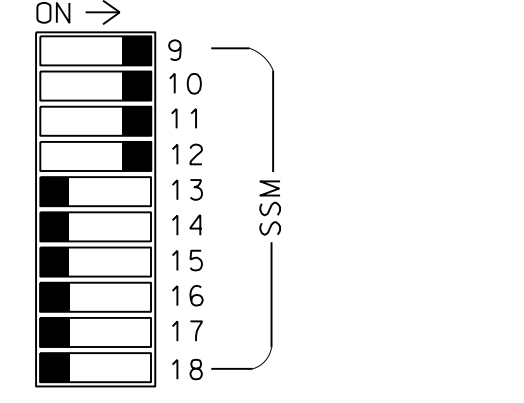
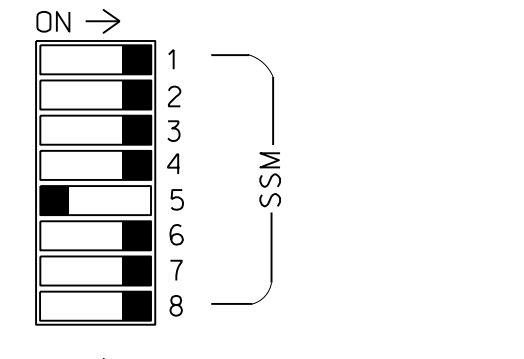
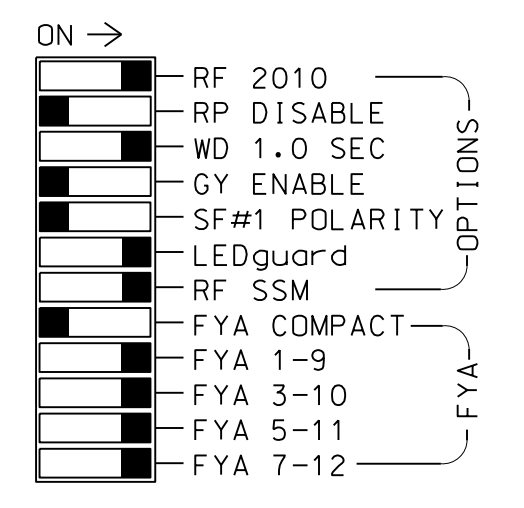
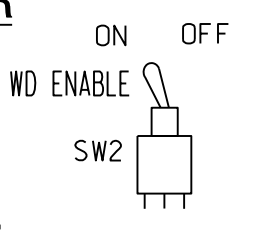
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11, and 10-12.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = 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.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 Green.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

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,S4,S5,S7,S8,S10,S11,
AUX S1,AUX S2,AUX S4,AUX S5
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAP "A".....*
OVERLAP "B".....*
OVERLAP "C".....*
OVERLAP "D".....*
* See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

Table with columns for Load Switch No., S1-S18, and AUX S1-S6. Rows include CMU Channel No., Phase, Signal Head No., Red Arrow, Yellow Arrow, Green Arrow, Red Arrow, Yellow Arrow, Flashing Yellow Arrow, Green Arrow.

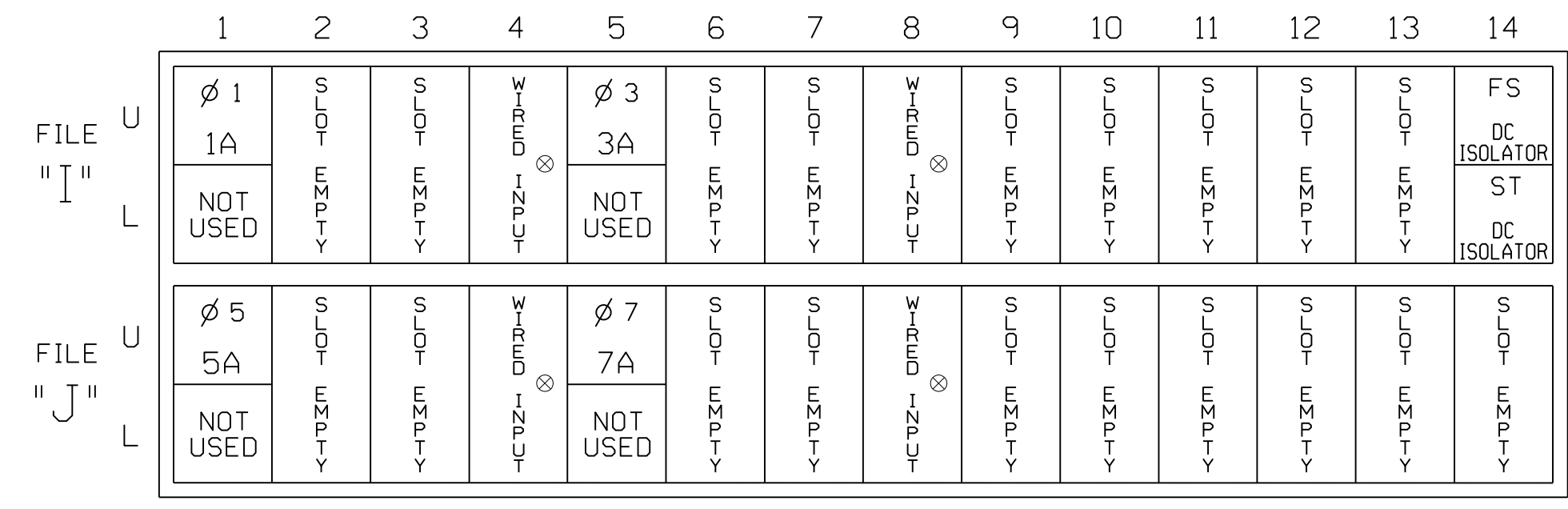
NU = Not Used

* 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

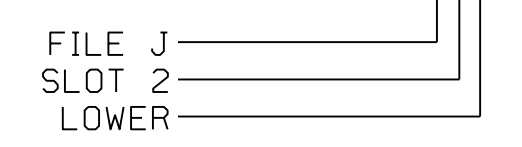
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

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.

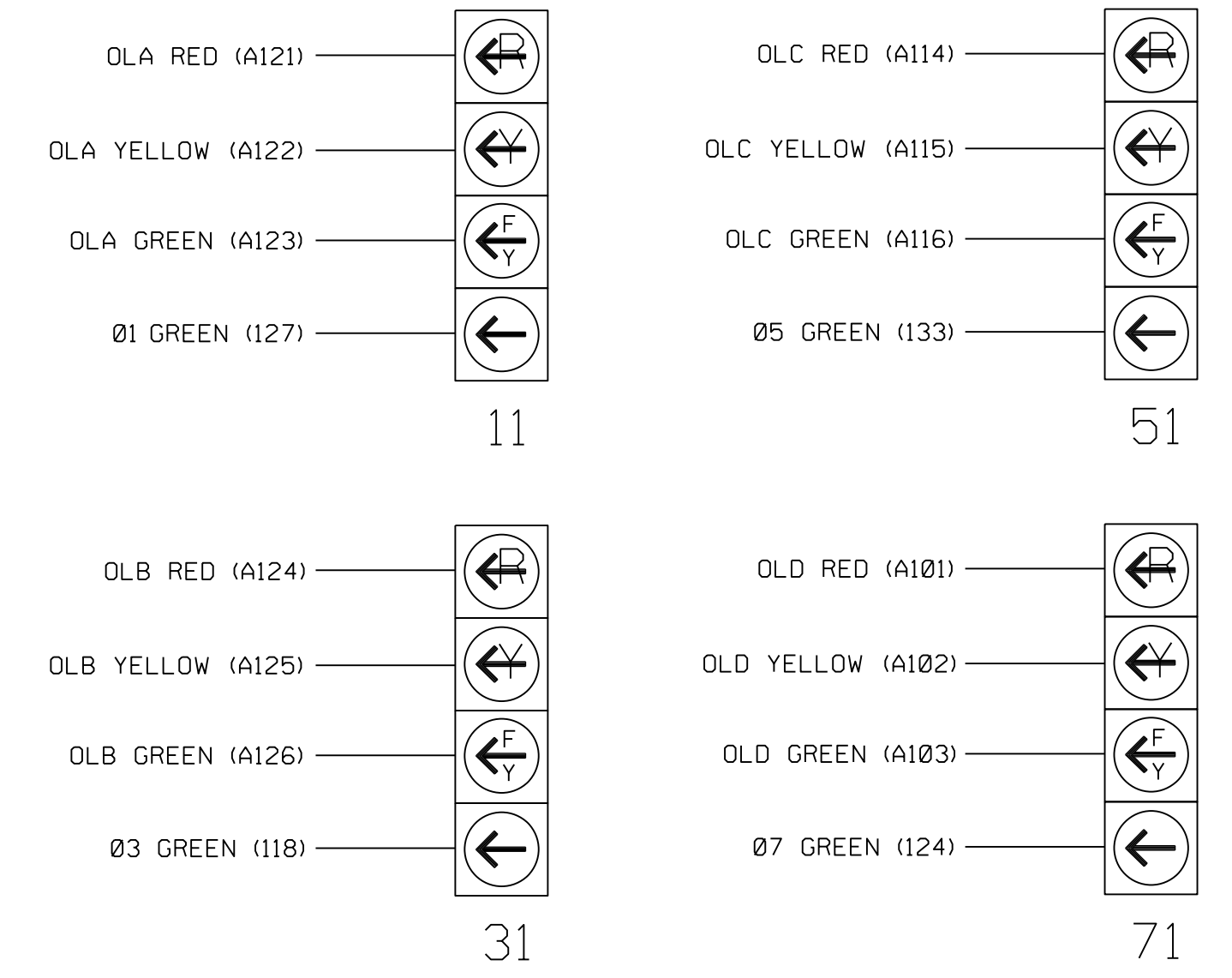
- 1 Add jumper from I1-W to J4-W, on rear of input file.
2 Add jumper from I5-W to J8-W, on rear of input file.
3 Add jumper from J1-W to I4-W, on rear of input file.
4 Add jumper from J5-W to I8-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

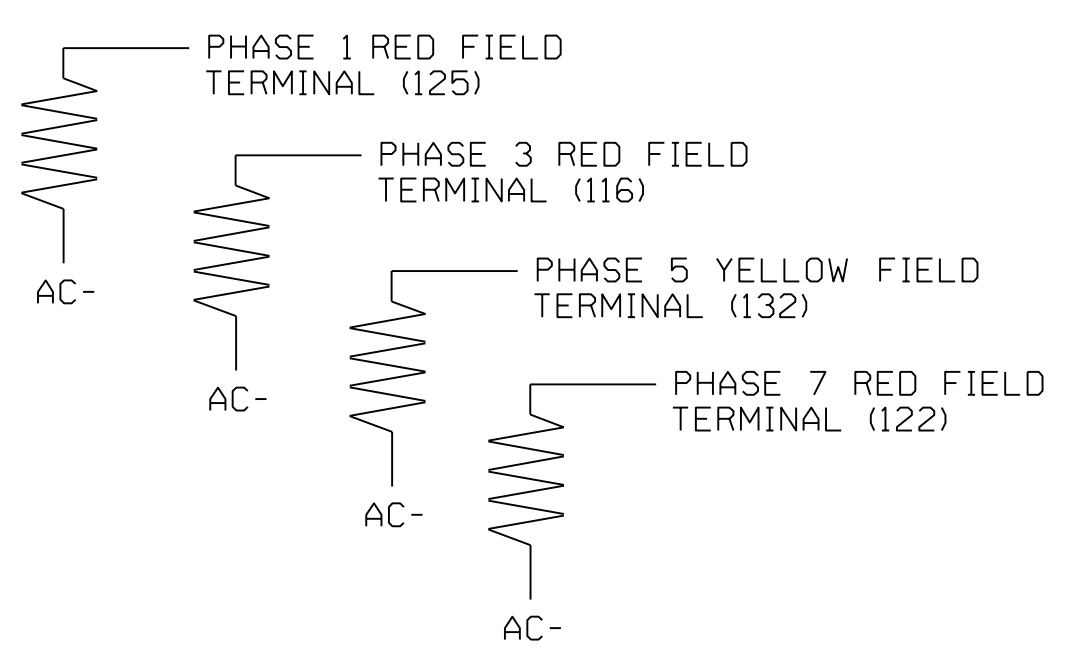


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1369T1
DESIGNED: MAY 2022
SEALED: 3/22/2023
REVISED: N/A

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).



SPECIAL DETECTOR NOTE

Install a temporary 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, 3A, 5A, and 7A, the equipment placement and slots reserved for wired inputs are typical for a NCDOT installation.

Temporary Design 1 - TMP Phase I Electrical Detail - Sheet 1 of 2

Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606.

North Carolina Professional Seal for Derrick A. Waller, License No. 042678.

Project location: US 21 (Charlotte Highway) at SR 1100 (Brawley School Road) / SR 1117 (Wilson Avenue). Prepared by: D A Waller, Reviewed by: R M Muncey.

Professional Engineer Seal for Derrick A. Waller, License No. 042678.

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

OVERLAP A

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

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

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

FLASHING ARROW OUTPUT.....CH9 ISOLATE

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

Toggle Once

OVERLAP B

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

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

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

FLASHING ARROW OUTPUT.....CH10 ISOLATE

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

Toggle Once

OVERLAP C

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

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

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

FLASHING ARROW OUTPUT.....CH11 ISOLATE

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

Toggle Once

OVERLAP D

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

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

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

FLASHING ARROW OUTPUT.....CH12 ISOLATE

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

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1369T1
DESIGNED: MAY 2022
SEALED: 3/22/2023
REVISED: N/A


Temporary Design 1 - TMP Phase I
Electrical Detail - Sheet 2 of 2

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Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

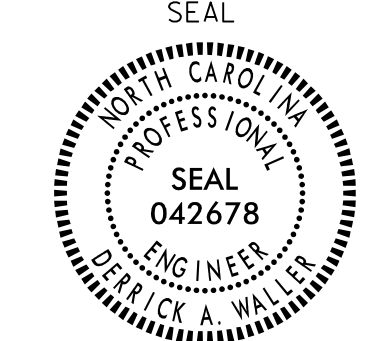
US 21 (Charlotte Highway) at
SR 1100 (Brawley School Road)
/ SR 1117 (Wilson Avenue)

Division 12 Iredell County Mooresville

PLAN DATE: May 2022	REVIEWED BY: E D Harris
PREPARED BY: D A Waller	REVIEWED BY: R M Muncey

REVISIONS	INIT.	DATE

SEAL



SEAL
042678
ENGINEER
DERICK A. WALLER

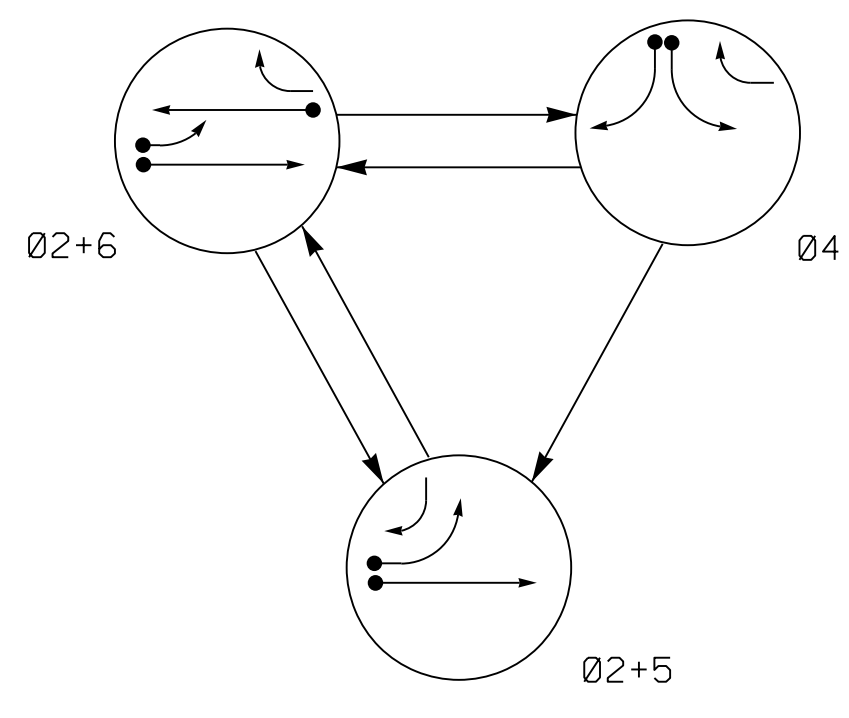
DocuSigned by:
Derrick Waller 3/22/2023

DATE
DATE
DATE

SIG. INVENTORY NO. 12-1369T1

2:11:41 PM
C:\Users\dwaller\Documents\Signal Design\Temporary Design\12-1369T1.dgn
User: dwaller

PHASING DIAGRAM



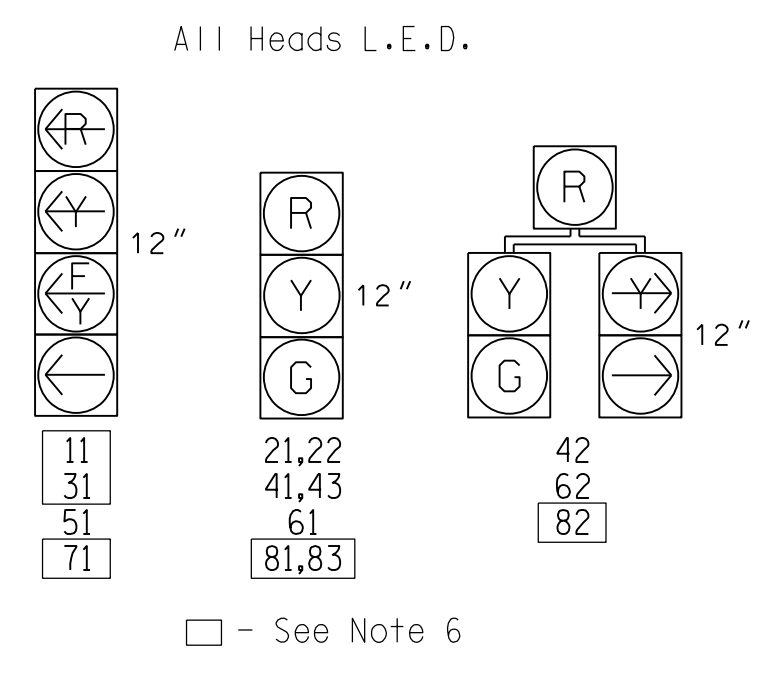
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	Ø 2 + 5	Ø 2 + 6	Ø 4	F_L C H T
21,22	G	G	R	Y
41,43	R	R	G	R
42		R	G	R
51			R	Y
61	R	G	R	Y
62	R	G		Y

SIGNAL FACE I.D.



ASC/3 DETECTOR INSTALLATION CHART

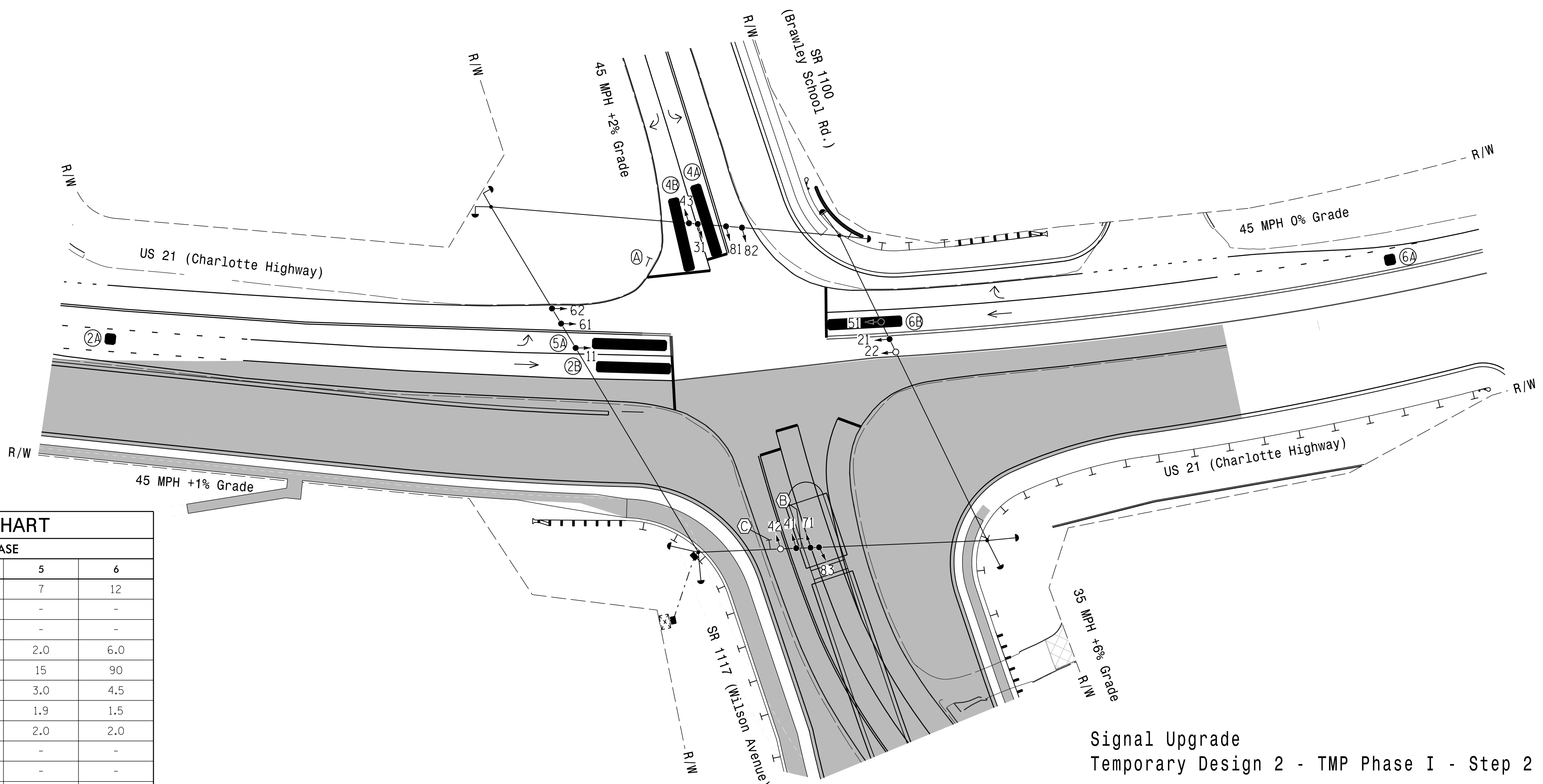
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	*	*	2	Yes	-	-	-	N	-	*
2B	6X40	0	*	*	2	Yes	2.0	5	-	G	-	*
4A	6X40	0	*	*	4	Yes	-	3	-	N	-	*
4B	6X40	0	*	*	4	Yes	-	15	-	N	-	*
5A	6X40	0	*	*	5	Yes	-	15	-	N	-	*
6A	6X6	300	*	*	2	Yes	-	-	-	G	-	*
6B	6X40	0	*	*	6	Yes	2.0	5	-	G	-	*

* Video Detection Area

3 Phase Fully Actuated Isolated

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 5 may be lagged.
- Set all detector units to presence mode.
- This intersection features a video detection system. Detectors should be placed to ensure the desired operation parameters are achieved.
- Disconnect and cover existing signal heads 11, 31, 71, 81, 82, and 83.
- Reposition existing signal heads 21, 41, and 51.



ASC/3 TIMING CHART

FEATURE	PHASE			
	2	4	5	6
Min Green *	12	7	7	12
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Veh. Extension *	6.0	2.0	2.0	6.0
Max 1 *	90	35	15	90
Yellow	4.5	3.0	3.0	4.5
Red Clear	1.5	2.8	1.9	1.5
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.0	-	-	3.0
Locking Detector	X	-	-	X
Recall Position	VEH. RECALL	-	-	VEH. RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

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

LEGEND

PROPOSED	EXISTING
	N/A
N/A	
	N/A
	N/A

Signal Upgrade
 Temporary Design 2 - TMP Phase I - Step 2

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 www.stantec.com
 License No. F-0672

750 N. Greenfield Pkwy, Garner, NC 27526
 SCALE
 0 40
 1" = 40'

US 21 (Charlotte Highway) at
 SR 1100 (Brawley School Road)
 / SR 1117 (Wilson Avenue)

Division 12 Iredell County Mooresville
 PLAN DATE: May 2022 REVIEWED BY: E D Harris
 PREPARED BY: J. Hambrick REVIEWED BY: R M Muncey

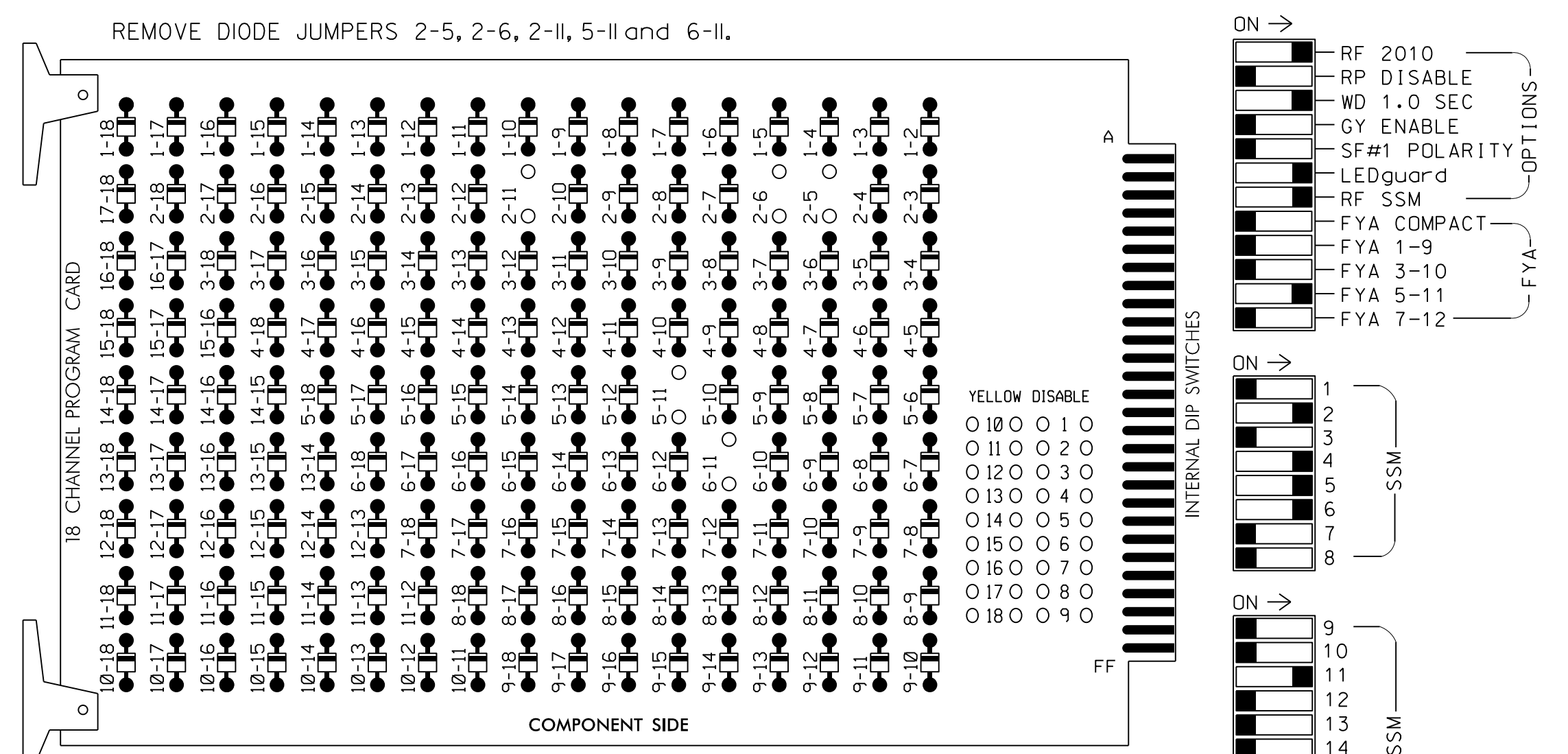
REVISIONS	INIT.	DATE

Derrick Waller 3/24/2023
 SIG. INVENTORY NO. 12-136912

3/24/2023 PM
 User: dawl118r

EDI MODEL 2018ECLip-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.
- Return controller to Factory Defaults before programming per this electrical detail.
- Program controller to start up in phase 2 Green and 6 Green.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

SIGNAL HEAD HOOK-UP CHART

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

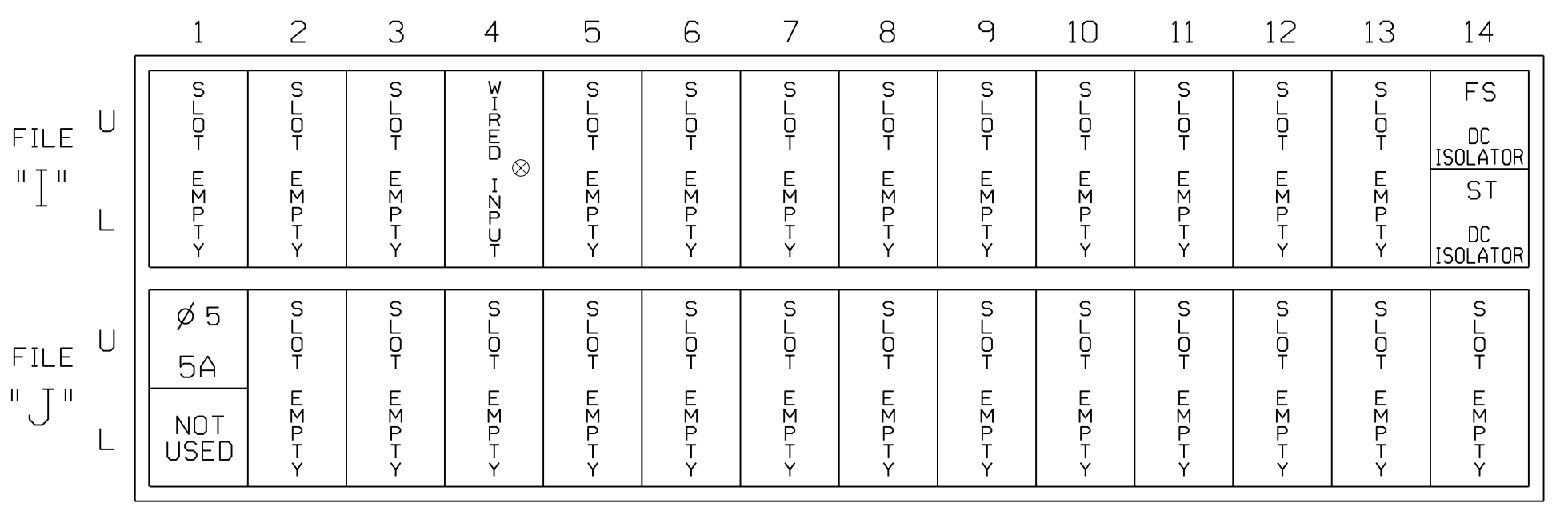
NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail this sheet.

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,S5,S7,S8,AUX S4
 PHASES USED.....2,4,5,6
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED
 * See overlap programming detail below

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

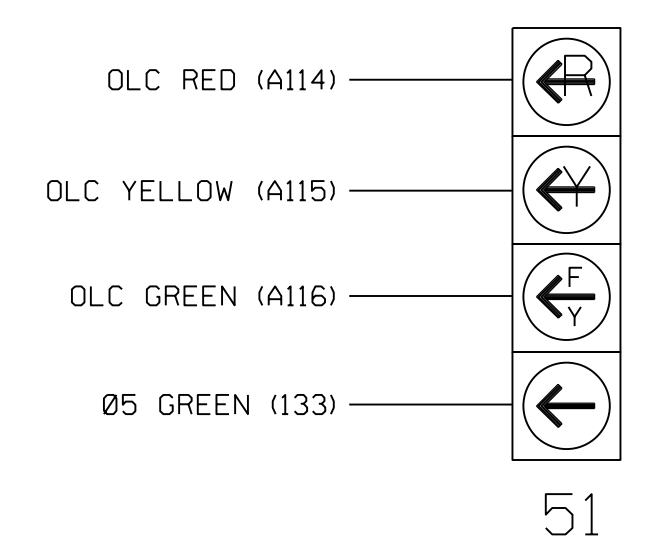
ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **2. CONTROLLER**
 - From CONTROLLER Submenu select **2. VEHICLE OVERLAPS**
- 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

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



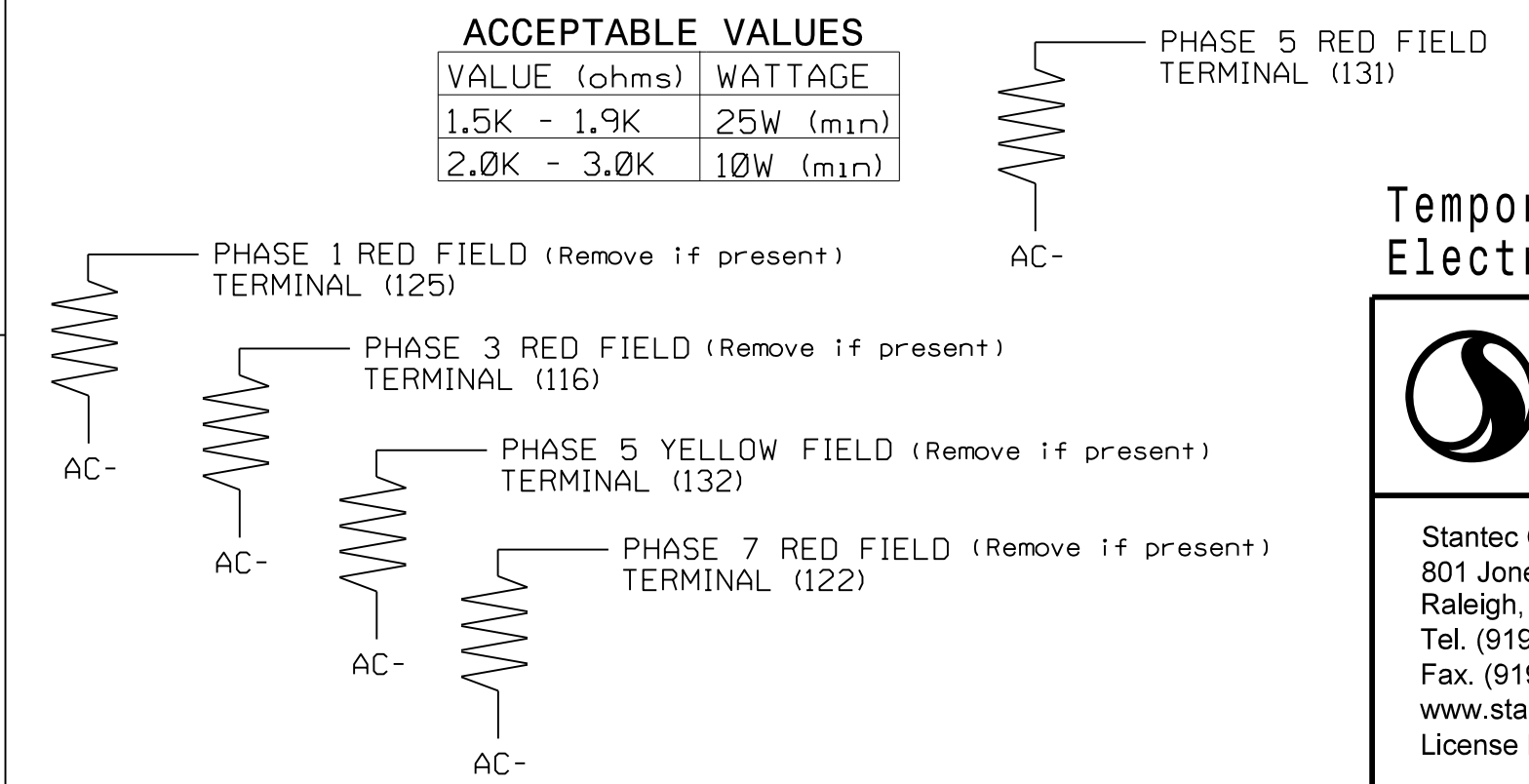
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
5A ¹	TB3-1,2	J1U	55	5 ★	5	YES		15		N
	-	J4U	47	22 ★	2	YES				G

¹Add jumper from J1-W to J4-W, on rear of input file. INPUT FILE POSITION LEGEND: J2L

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)



Temporary Design 2 - TMP Phase I - Step 2
 Electrical Detail - Sheet 1 of 1

US 21 (Charlotte Highway) at SR 1100 (Brawley School Road) / SR 1117 (Wilson Avenue)

Division 12 Iredell County Mooresville

PLAN DATE: May 2022	REVIEWED BY: E D Harris
PREPARED BY: D A Waller	REVIEWED BY: R M Muncey

Revisions table with columns for REVISIONS, INIT., and DATE.

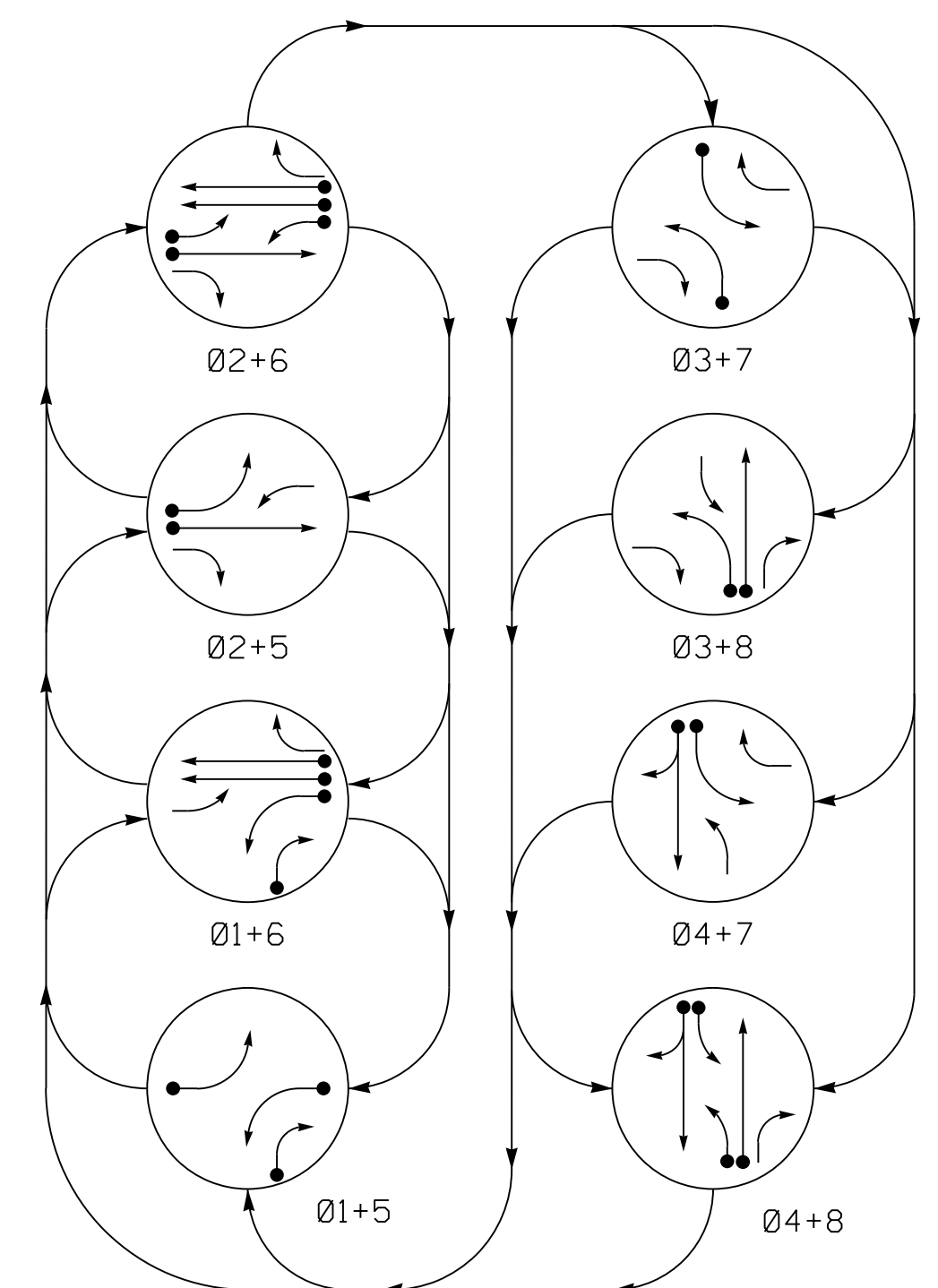
Seal of the State of North Carolina, Professional Engineer, Derrick A. Waller, License No. 042678.

DocuSigned by: Derrick Waller 3/24/2023

Inventory No. 12-136972

12-136972.dgn
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 User: dwall118

PHASING DIAGRAM



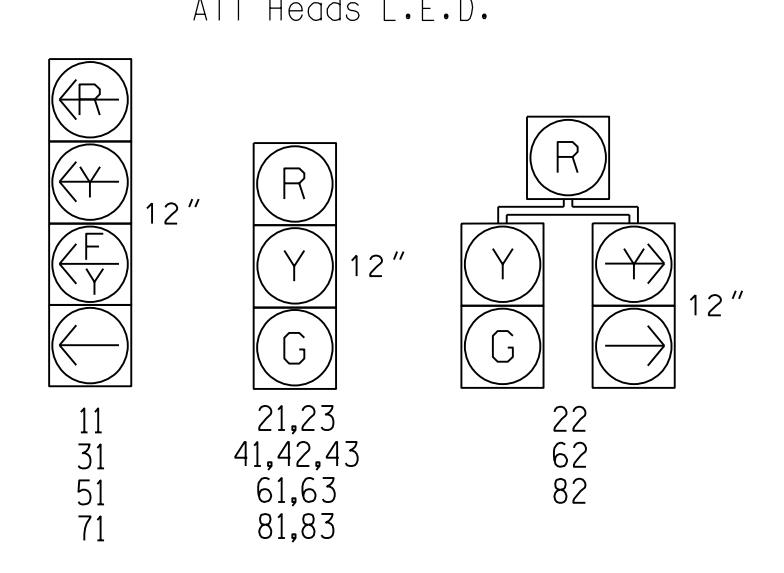
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

Table with columns: SIGNAL FACE, PHASE (01+5 to 04+8, FLASH), and signal face configurations for various signal heads (11, 21, 23, 22, 31, 41, 42, 43, 51, 61, 63, 71, 81, 83, 82).

SIGNAL FACE I.D.



ASC/3 DETECTOR INSTALLATION CHART

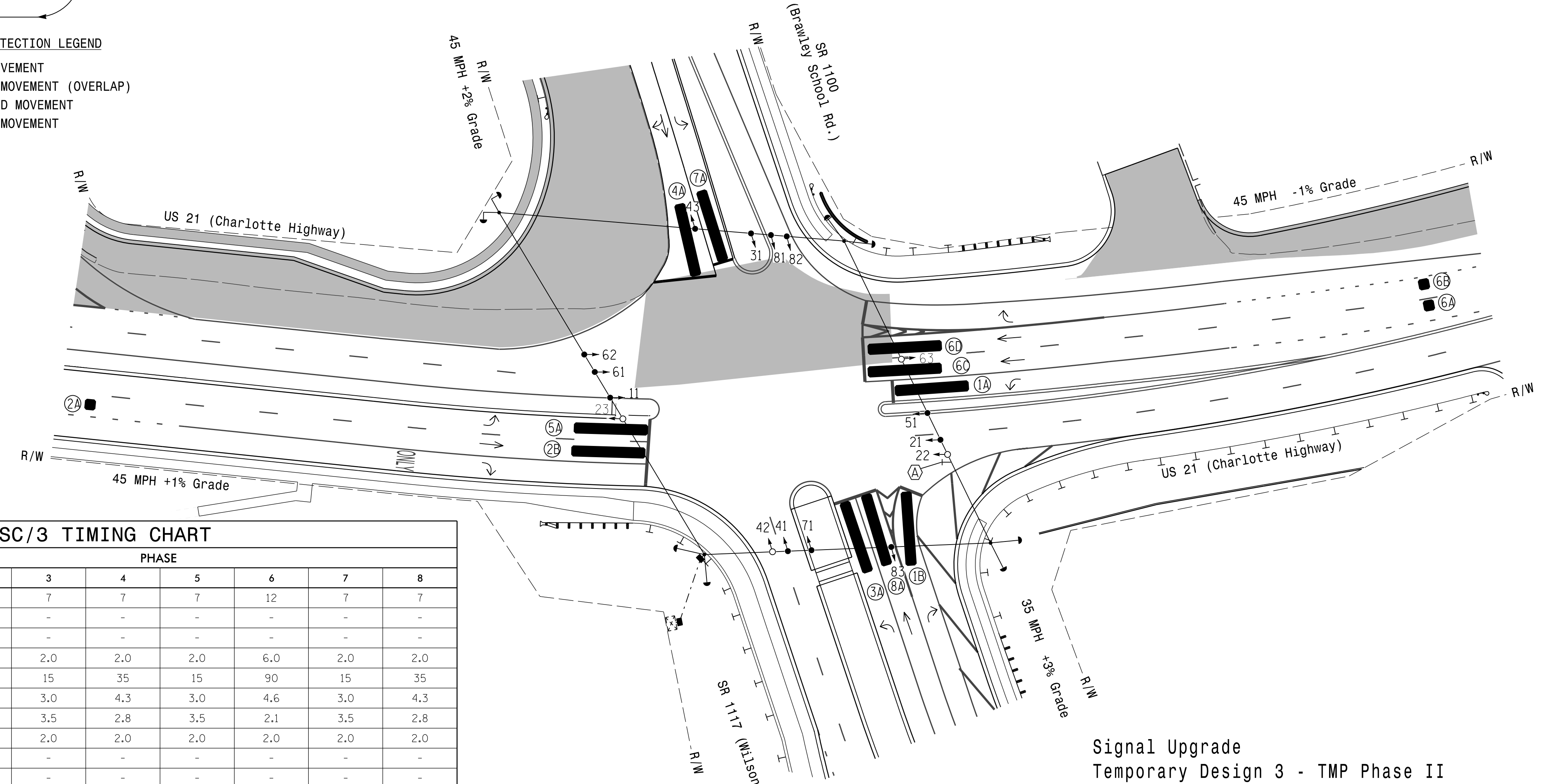
Table with columns: LOOP, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, PHASE, CALLING, EXTEND TIME, DELAY TIME, USE ADDED INITIAL, TYPE, SYSTEM LOOP, NEW CARD. Rows include loops 1A through 8A.

* Video Detection Area

8 Phase Fully Actuated Isolated

NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018...
2. Do not program signal for late night flashing operation...
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. This intersection features a video detection system.
7. Reconnect and uncover signal heads 11, 31, 71, 81, 82, and 83.
8. Reposition existing signal heads 11, 21, 22, 31, 41, 51, 61, 62, 81, 82, and 83. Install new signal heads 23, 42, and 63.



ASC/3 TIMING CHART

Table with columns: FEATURE, PHASE (1-8), and timing values for various features like Min 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.

* 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: Traffic Signal Head, Modified Signal Head, Sign, Pedestrian Signal Head With Push Button & Sign, Signal Pole with Guy, Signal Pole with Sidewalk Guy, Inductive Loop Detector, Controller & Cabinet, Junction Box, 2-in Underground Conduit, Directional Arrow, Video Detection Area, Construction Zone, Oversized Junction Box, Right Arrow "ONLY" Sign (R3-5R).
EXISTING: N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A.

Signal Upgrade Temporary Design 3 - TMP Phase II

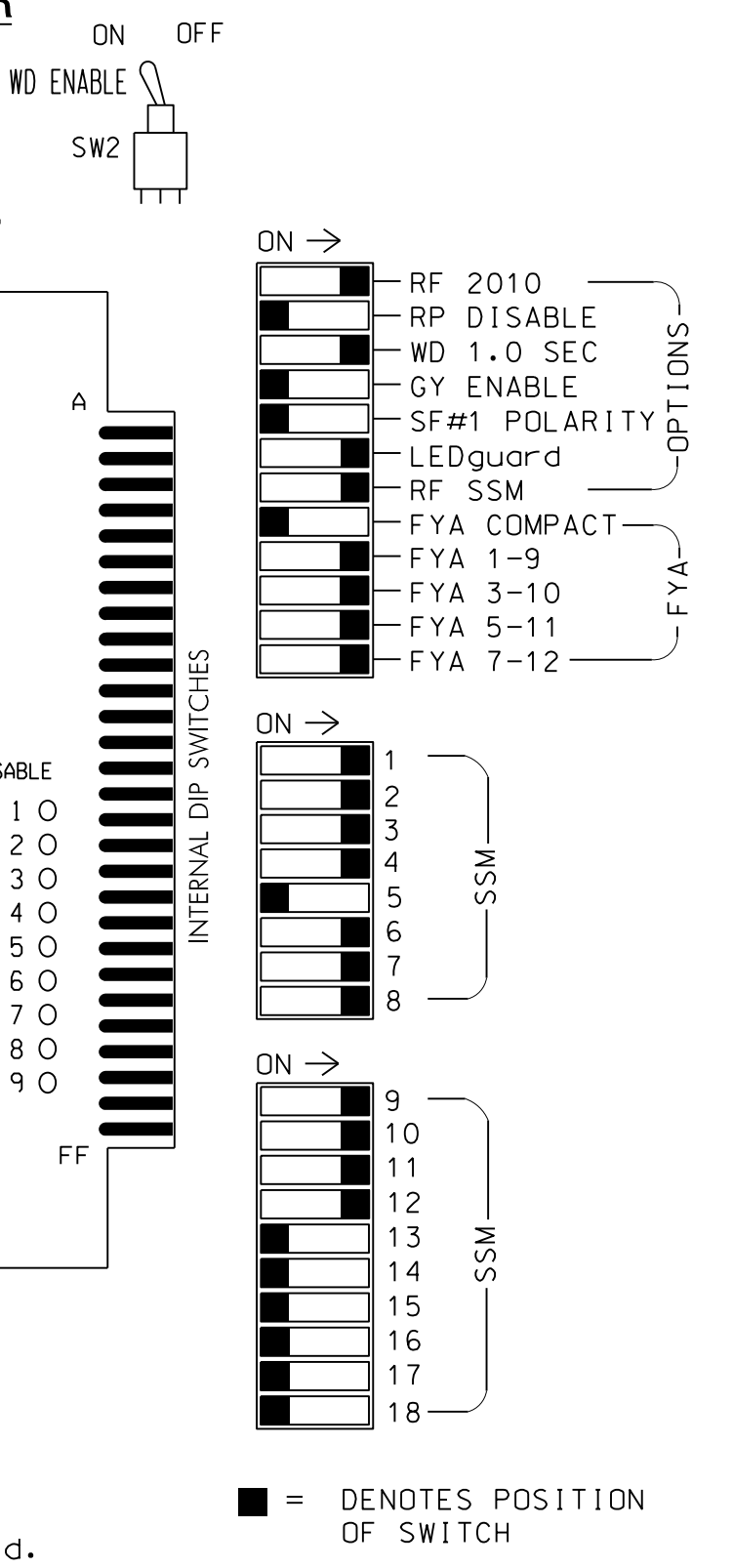
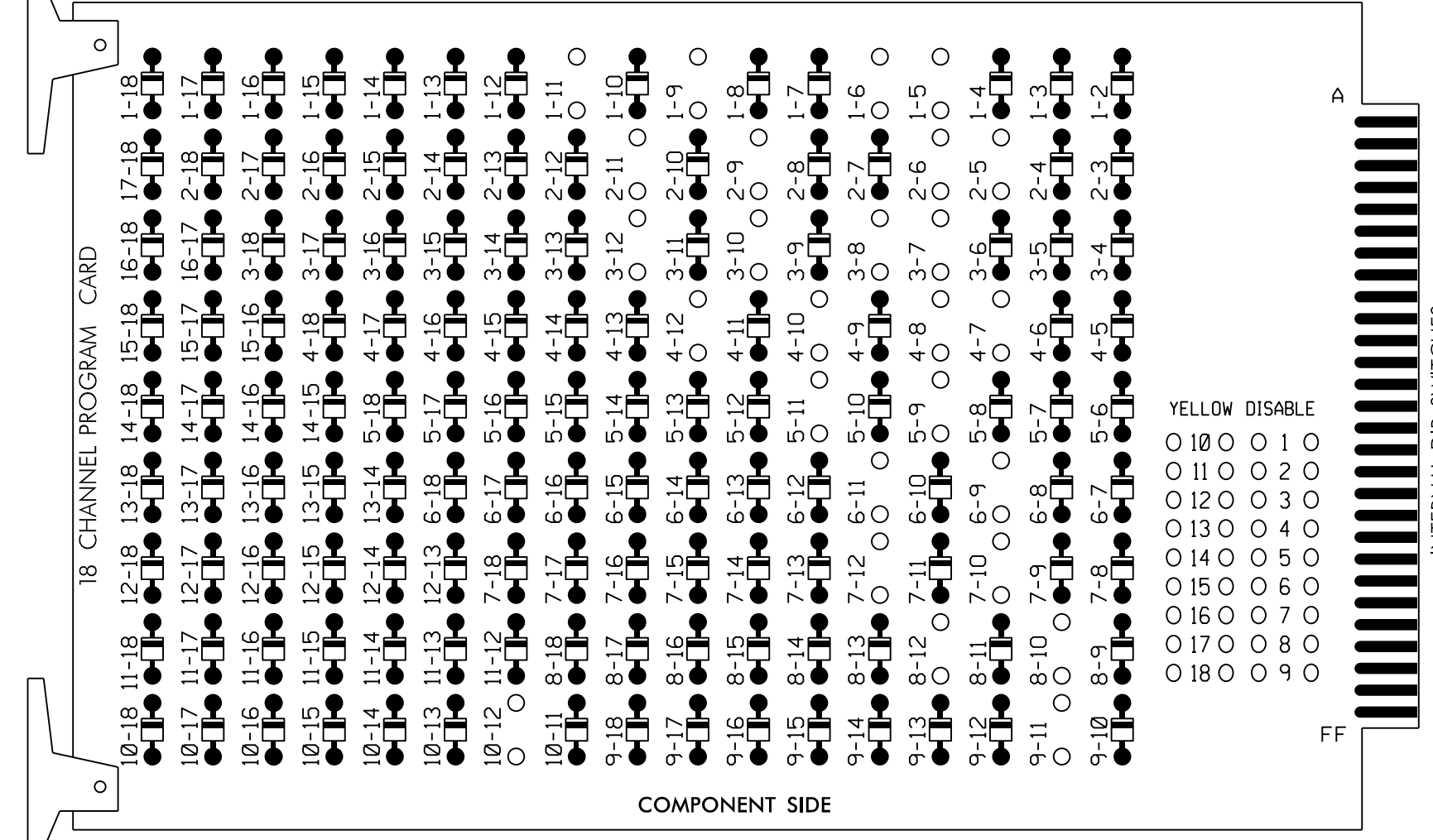
Project information including Stantec logo, project location (US 21 at SR 1100 / SR 1117), dates (May 2022), and professional seals for engineers and surveyors.

3/24/2022 10:51 AM User: lawl118

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 Green.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

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,S4,S5,S7,S8,S10,S11,
AUX S1,AUX S2,AUX S4,AUX S5
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAP "A".....*
OVERLAP "B".....*
OVERLAP "C".....*
OVERLAP "D".....*
* See overlap programming detail on sheet 2

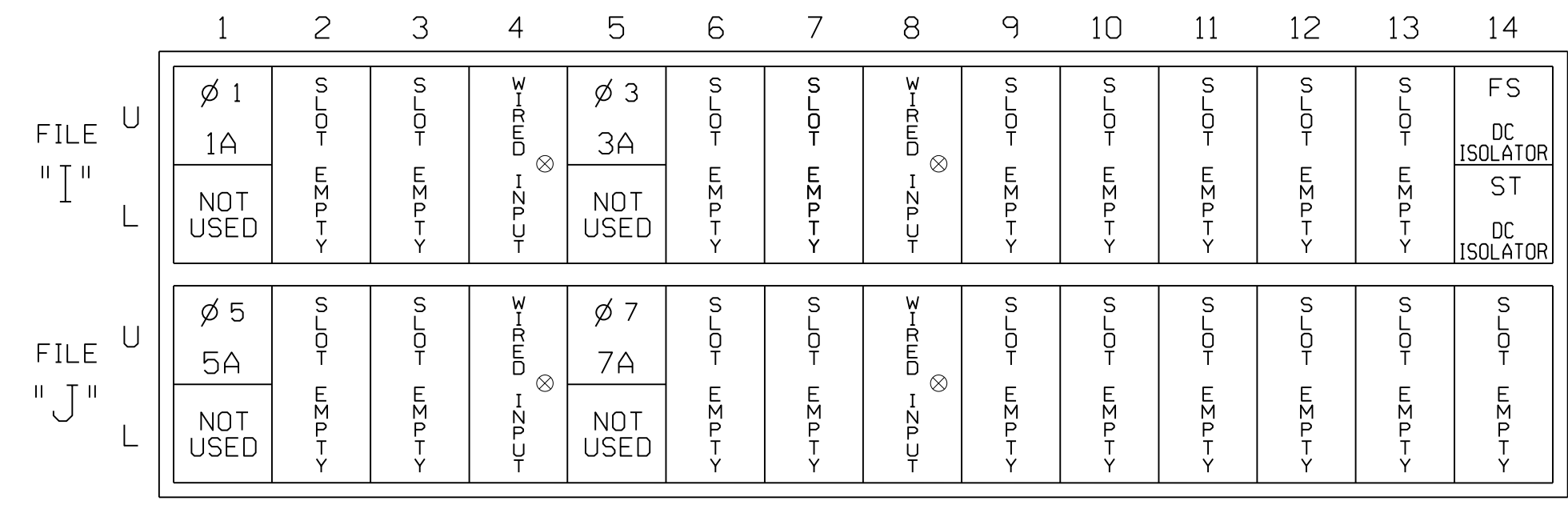
SIGNAL HEAD HOOK-UP CHART

Table with columns for Load Switch No., S1-S12, AUX S1-S6, and Signal Head No. (RED, YELLOW, GREEN, RED ARROW, YELLOW ARROW, FLASHING YELLOW ARROW, GREEN ARROW).

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

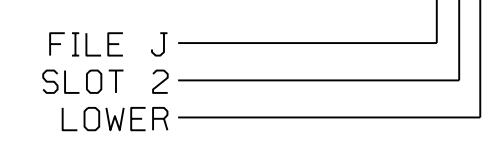
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

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.

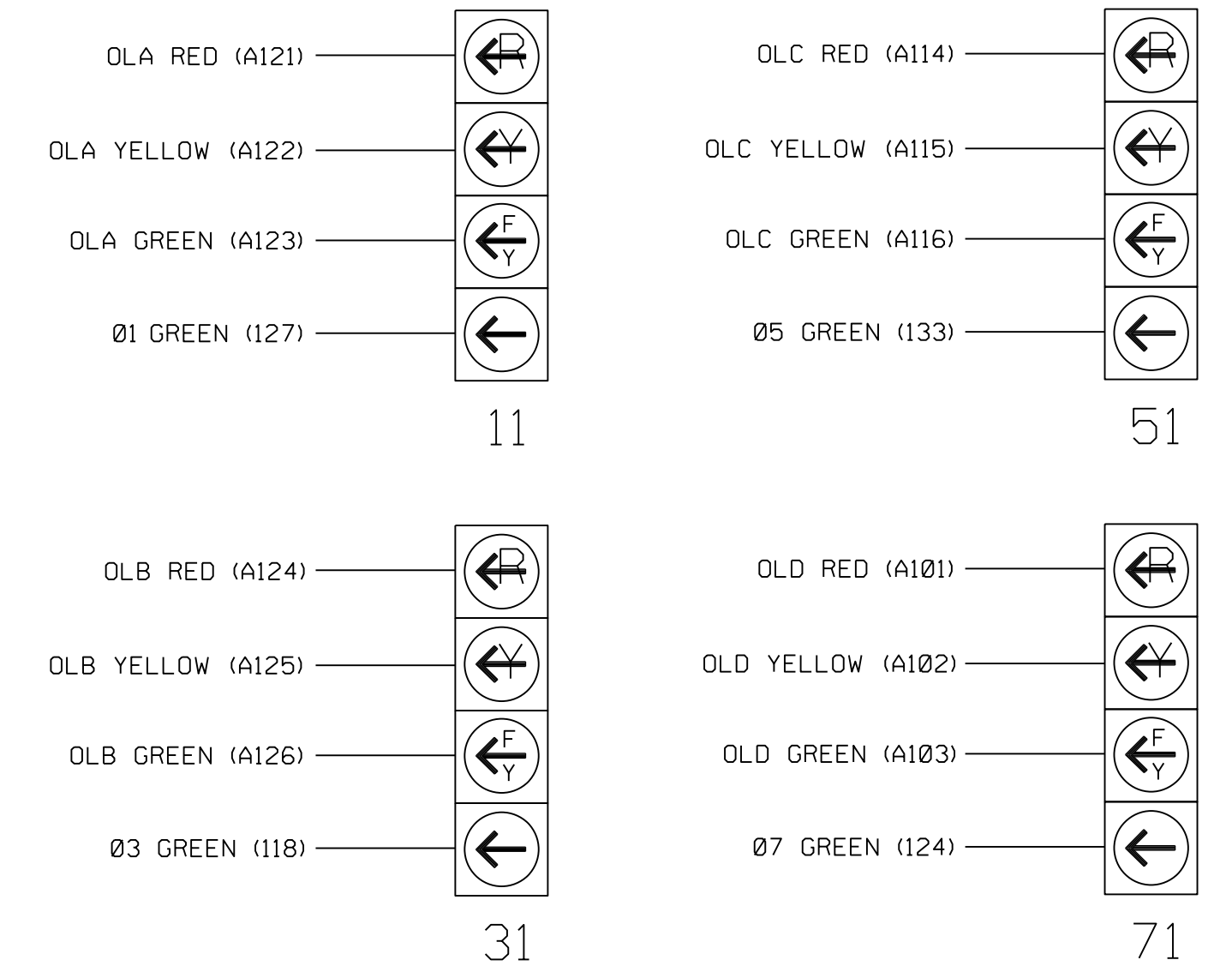
- 1 Add jumper from I1-W to J4-W, on rear of input file.
2 Add jumper from I5-W to J8-W, on rear of input file.
3 Add jumper from J1-W to I4-W, on rear of input file.
4 Add jumper from J5-W to I8-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

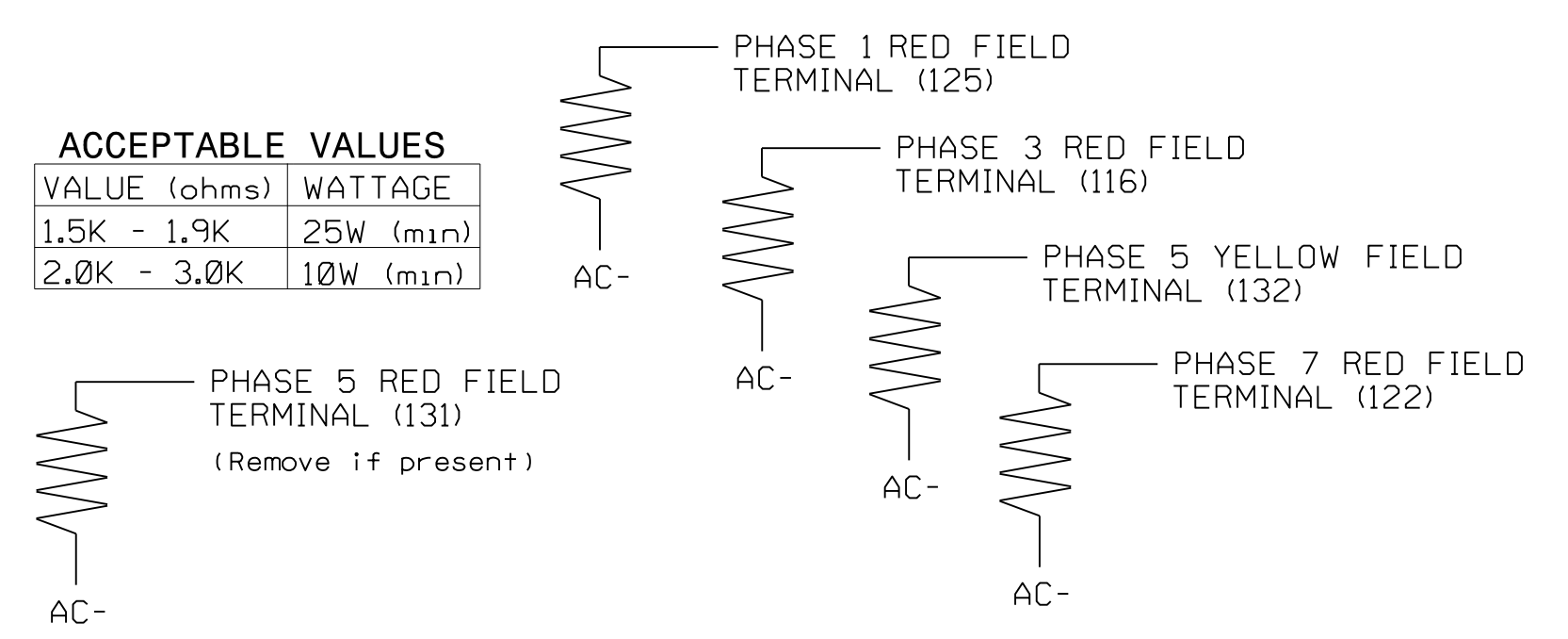


Table with columns: VALUE (ohms), WATTAGE. Values: 1.5K - 1.9K (25W min), 2.0K - 3.0K (10W min).

SPECIAL DETECTOR NOTE

Install a temporary 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, 3A, 5A, and 7A, the equipment placement and slots reserved for wired inputs are typical for a NCDOT installation.

Temporary Design 3 - TMP Phase II Electrical Detail - Sheet 1 of 2

Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606.

Professional Engineer Seal for Derrick Waller, License No. F-0672.

Project information: US 21 (Charlotte Highway) at SR 1100 (Brawley School Road) / SR 1117 (Wilson Avenue). Prepared by: D A Waller, Reviewed by: E D Harris, R M Muncey.

Professional Engineer Seal for Derrick Waller, License No. F-0672, dated 3/24/2023.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1369T3
DESIGNED: MAY 2022
SEALED: 3/24/2023
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

OVERLAP A

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

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

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

FLASHING ARROW OUTPUT.....CH9 ISOLATE

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

Toggle Once

OVERLAP B

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

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

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

FLASHING ARROW OUTPUT.....CH10 ISOLATE

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

Toggle Once

OVERLAP C

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

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

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

FLASHING ARROW OUTPUT.....CH11 ISOLATE

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

Toggle Once

OVERLAP D

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

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

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

FLASHING ARROW OUTPUT.....CH12 ISOLATE

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

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

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

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


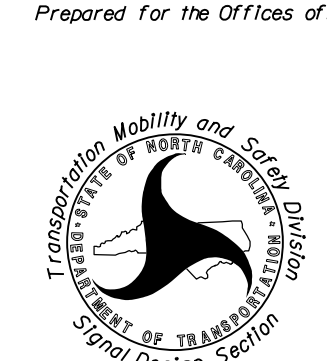
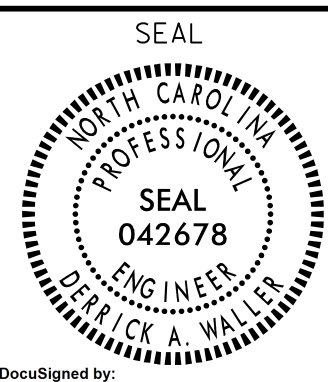
THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1369T3
DESIGNED: MAY 2022
SEALED: 3/24/2023
REVISED: N/A

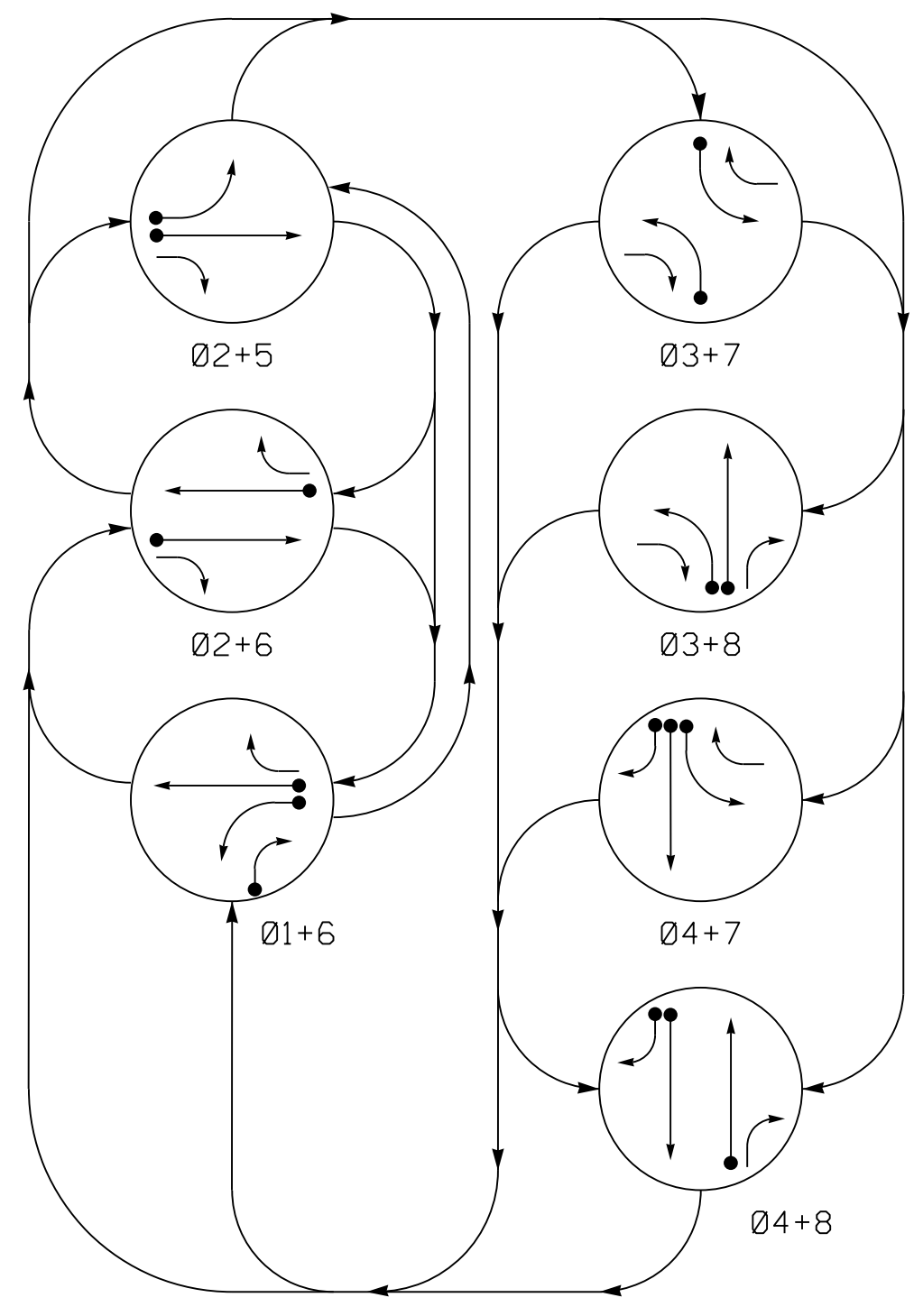
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Temporary Design 3 - TMP Phase II
Electrical Detail - Sheet 2 of 2

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

 <p>Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672</p>		<p>US 21 (Charlotte Highway) at SR 1100 (Brawley School Road) / SR 1117 (Wilson Avenue)</p> <p>Division 12 Iredell County Mooresville</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>PLAN DATE: May 2022</td> <td>REVIEWED BY: E D Harris</td> </tr> <tr> <td>PREPARED BY: D A Waller</td> <td>REVIEWED BY: R M Muncey</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	PLAN DATE: May 2022	REVIEWED BY: E D Harris	PREPARED BY: D A Waller	REVIEWED BY: R M Muncey	REVISIONS	INIT.	DATE							 <p>DocuSigned by: Derrick Waller 3/24/2023</p> <p>SIG. INVENTORY NO. 12-1369T3</p>
PLAN DATE: May 2022	REVIEWED BY: E D Harris															
PREPARED BY: D A Waller	REVIEWED BY: R M Muncey															
REVISIONS	INIT.	DATE														

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

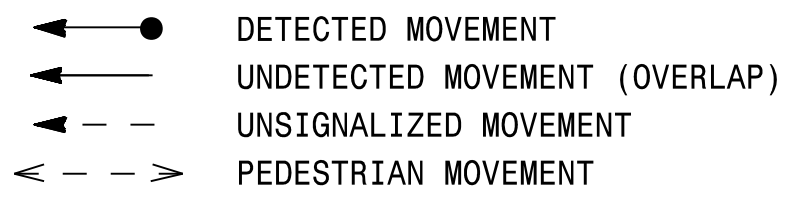
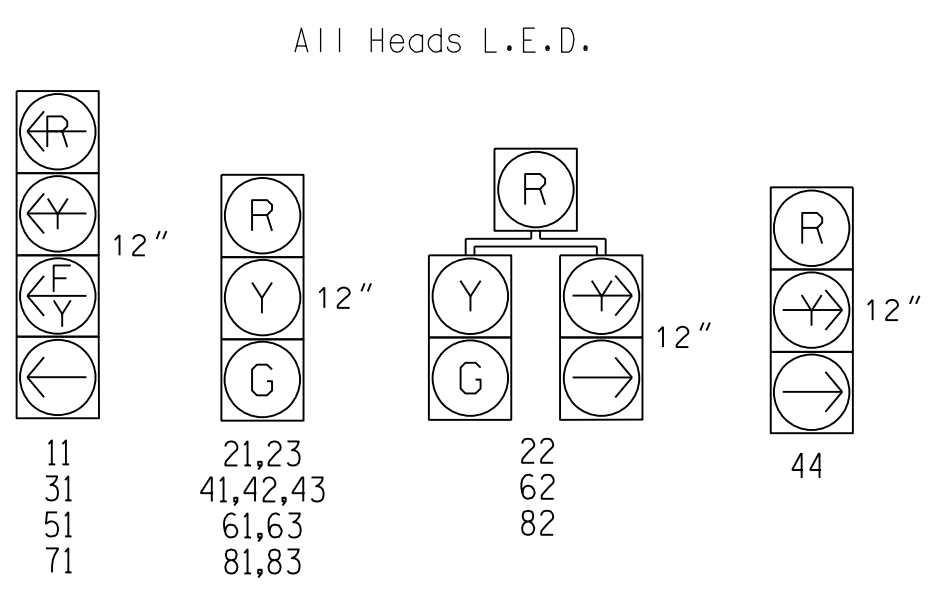


TABLE OF OPERATION

Table with columns: SIGNAL FACE, PHASE (Ø1+6, Ø2+5, Ø2+6, Ø3+7, Ø3+8, Ø4+7, Ø4+8), and FLASH. Rows list signal faces 11, 21,23, 22, 31, 41, 42,43, 44, 51, 61,63, 62, 71, 81, 83, 82.

SIGNAL FACE I.D.



ASC/3 DETECTOR INSTALLATION CHART

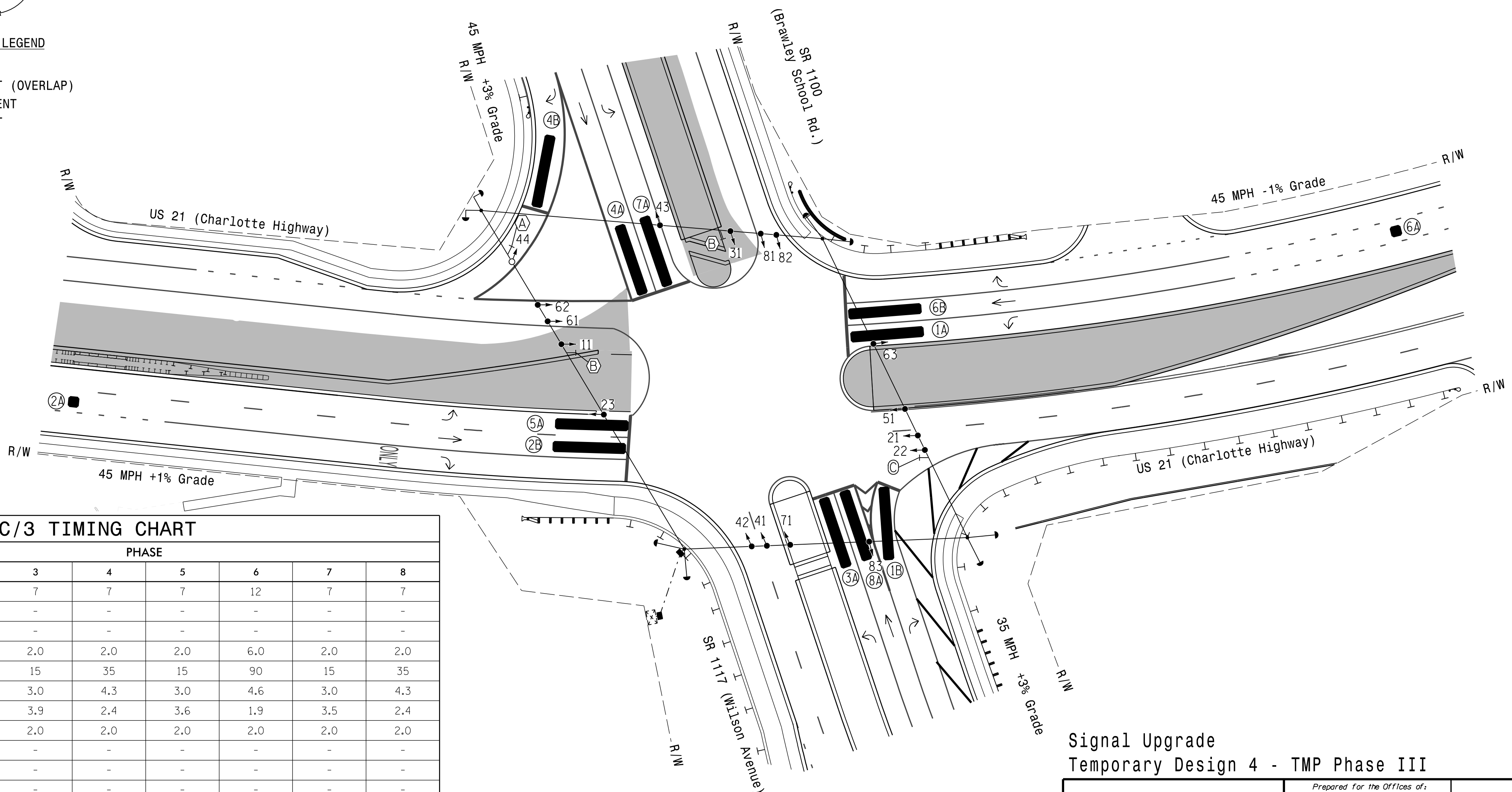
Table with columns: LOOP, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, PHASE, CALLING, EXTEND TIME, DELAY TIME, USE ADDED INITIAL, TYPE, SYSTEM LOOP, NEW CARD. Rows list detector loops 1A through 8A.

* Video Detection Area

7 Phase Fully Actuated Isolated

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 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. This intersection features a video detection system. Detectors should be placed to ensure the desired operation parameters are achieved.
7. Reposition existing signal heads 11,31,41,42,43,61,62,63,71,81, & 82.

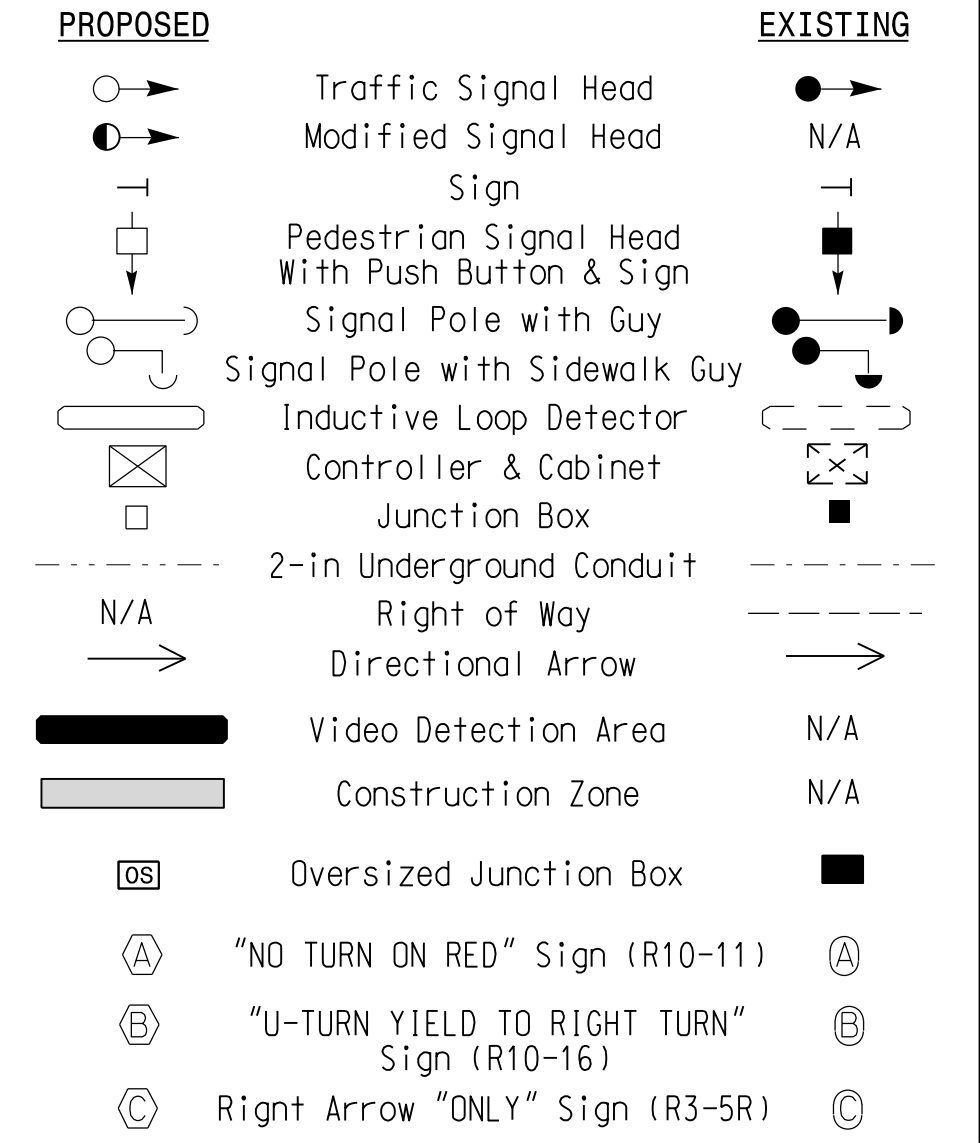


ASC/3 TIMING CHART

Timing chart table with columns: FEATURE, PHASE (1-8), and values for Min 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.

* 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 4 - TMP Phase III

Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606.

Professional Engineer Seal for J. Hambright, State of North Carolina, License No. 27528.

Project title: US 21 (Charlotte Highway) at SR 1100 (Brawley School Road) / SR 1117 (Wilson Avenue). Includes plan date (May 2022), reviewed by (E D Harris), and prepared by (J. Hambright).

Professional Engineer Seal for Derrick Waller, State of North Carolina, License No. 042678.

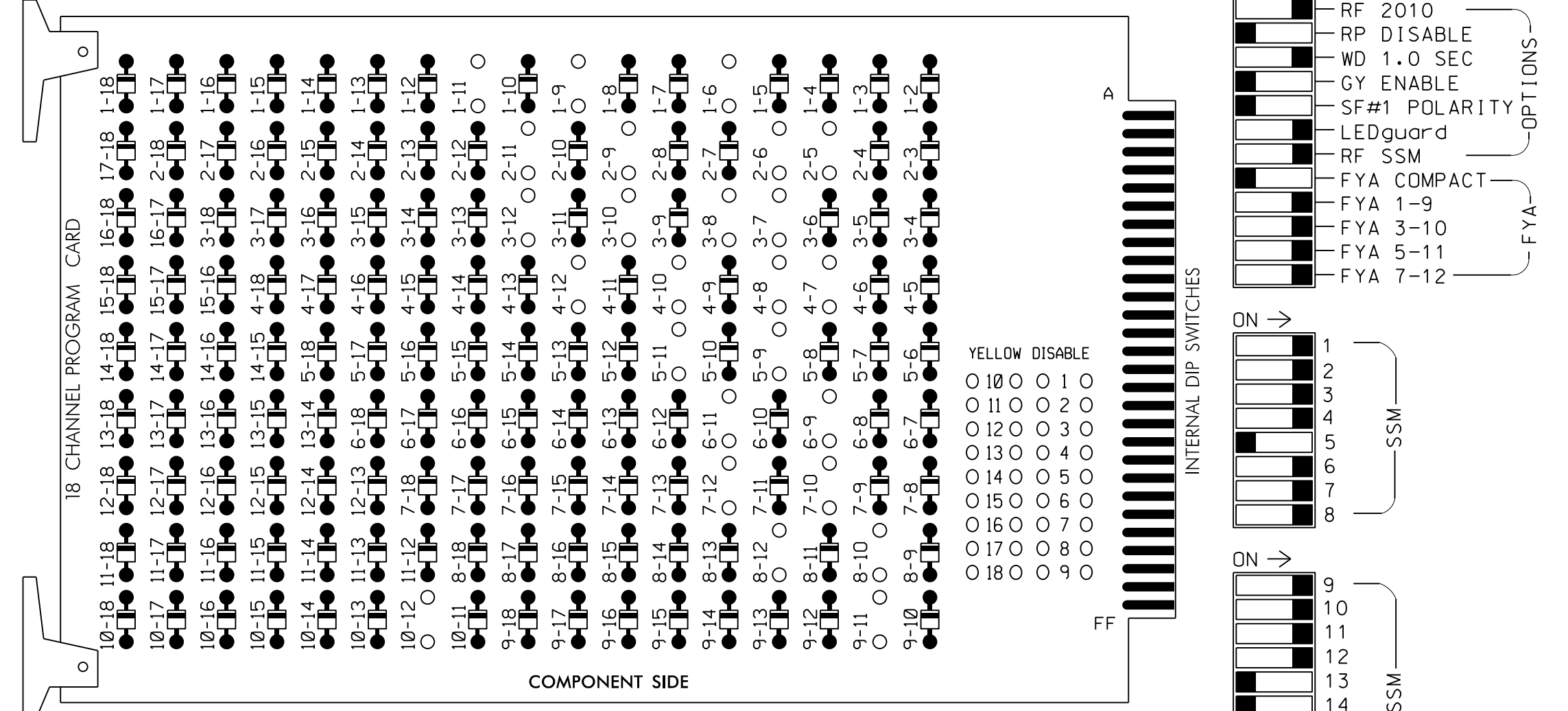
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

3/22/2023, 10:11:00 AM, User: dawallier

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 Green.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

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,S4,S5,S7,S8,S10,S11,
AUX S1,AUX S2,AUX S4,AUX S5
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAP "A".....*
OVERLAP "B".....*
OVERLAP "C".....*
OVERLAP "D".....*
* See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

Table with columns for Load Switch No., S1-S12, AUX S1-S6, and Signal Head No. (RED, YELLOW, GREEN, RED ARROW, YELLOW ARROW, FLASHING YELLOW ARROW, GREEN ARROW).

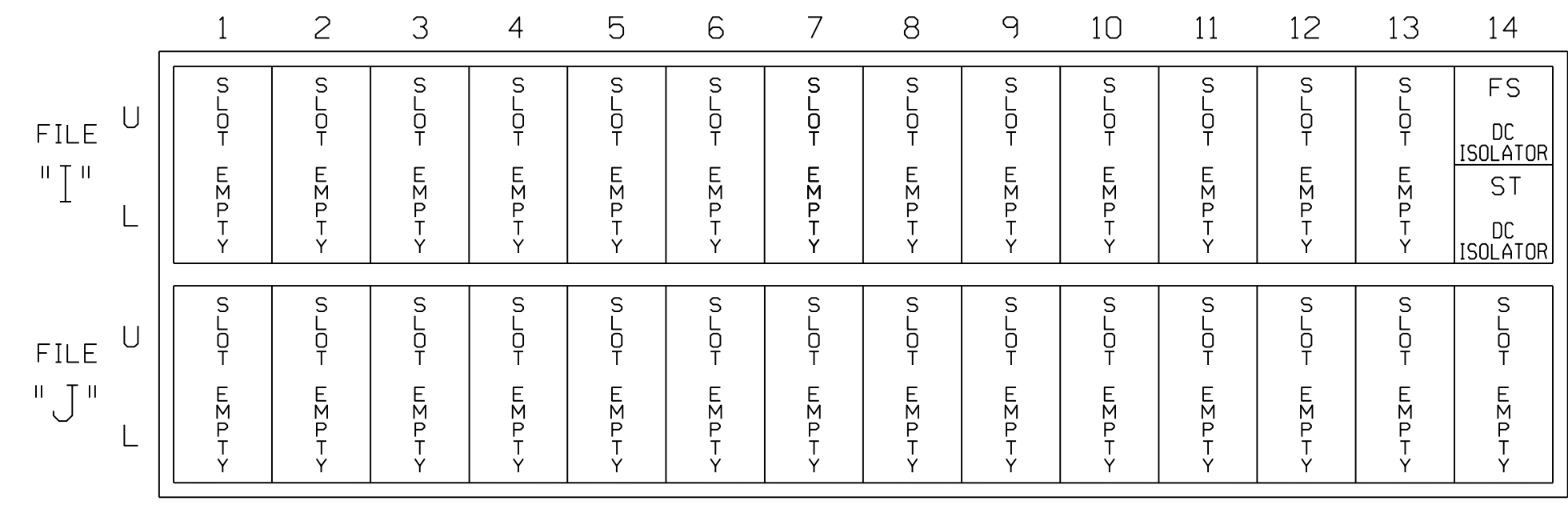
NU = Not Used

* 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

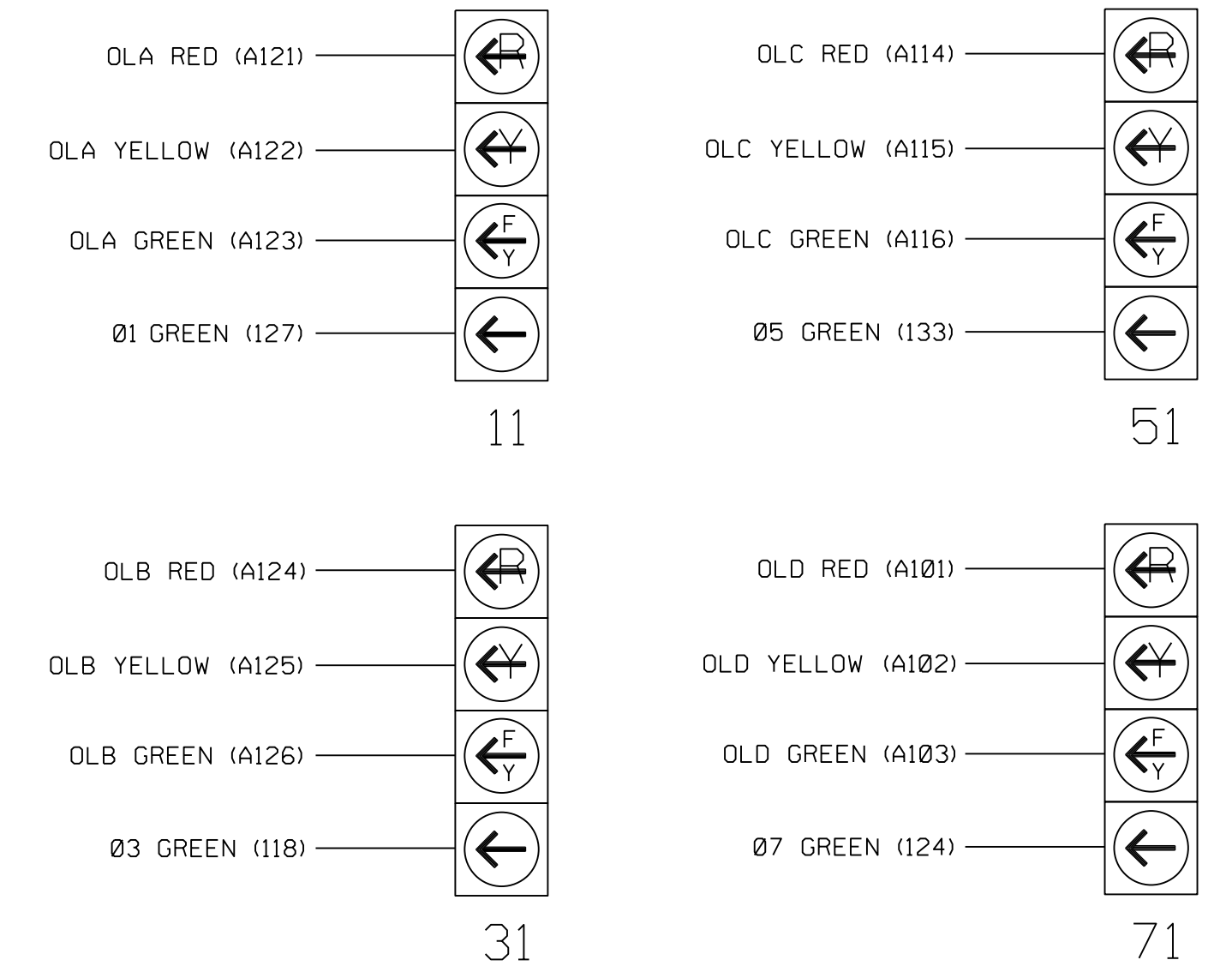
FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

For all detector zones, install a temporary 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.

FYA SIGNAL WIRING DETAIL

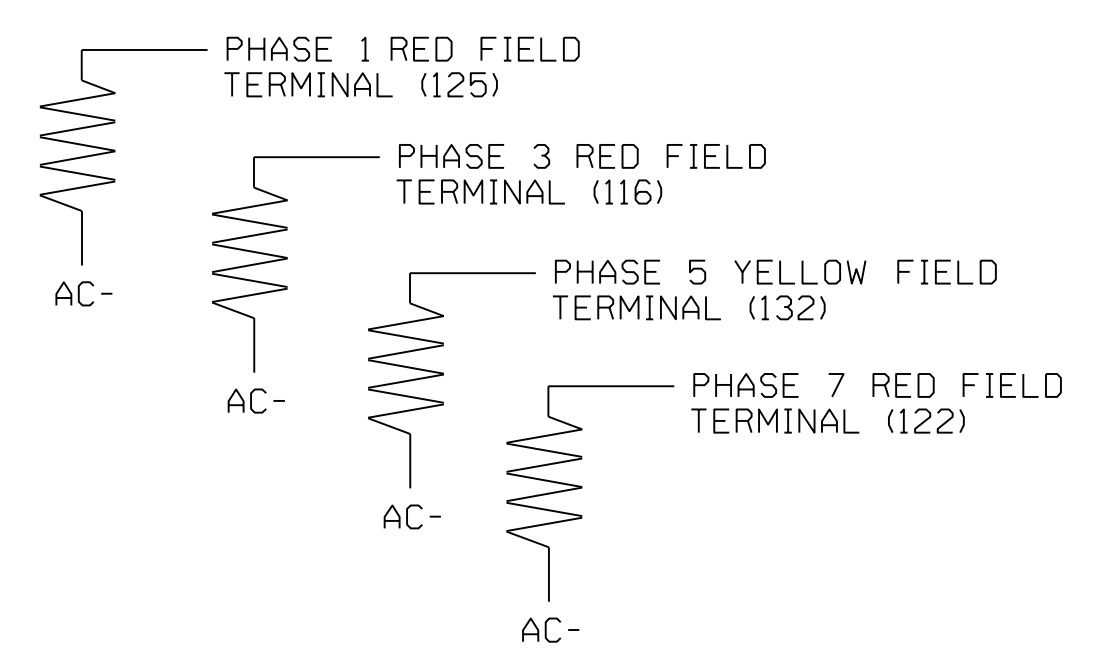
(wire signal heads as shown)



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).



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

Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606.

Professional Engineer Seal for Derrick A. Waller, License No. F-0672.

Project information: US 21 (Charlotte Highway) at SR 1100 (Brawley School Road) / SR 1117 (Wilson Avenue). Division 12, Iredell County, Mooresville. Plan Date: May 2022. Prepared by: D A Waller.

Professional Engineer Seal for Derrick A. Waller, License No. F-0672, dated 3/22/2023.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1369T4
DESIGNED: MAY 2022
SEALED: 3/22/2023
REVISED: N/A

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

OVERLAP A

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

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

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

FLASHING ARROW OUTPUT.....CH9 ISOLATE

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

Toggle Once

OVERLAP B

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

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

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

FLASHING ARROW OUTPUT.....CH10 ISOLATE

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

Toggle Once

OVERLAP C

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

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

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

FLASHING ARROW OUTPUT.....CH11 ISOLATE

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

Toggle Once

OVERLAP D

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

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

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

FLASHING ARROW OUTPUT.....CH12 ISOLATE

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

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1369T4
DESIGNED: MAY 2022
SEALED: 3/22/2023
REVISED: N/A

Temporary Design 4 - TMP Phase III
Electrical Detail - Sheet 2 of 2

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



Stantec Consulting Services Inc.
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License No. F-0672

Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529


US 21 (Charlotte Highway) at
SR 1100 (Brawley School Road)
/ SR 1117 (Wilson Avenue)

Division 12 Iredell County Mooresville

PLAN DATE: May 2022	REVIEWED BY: E D Harris
PREPARED BY: D A Waller	REVIEWED BY: R M Muncey

REVISIONS	INIT.	DATE

SEAL



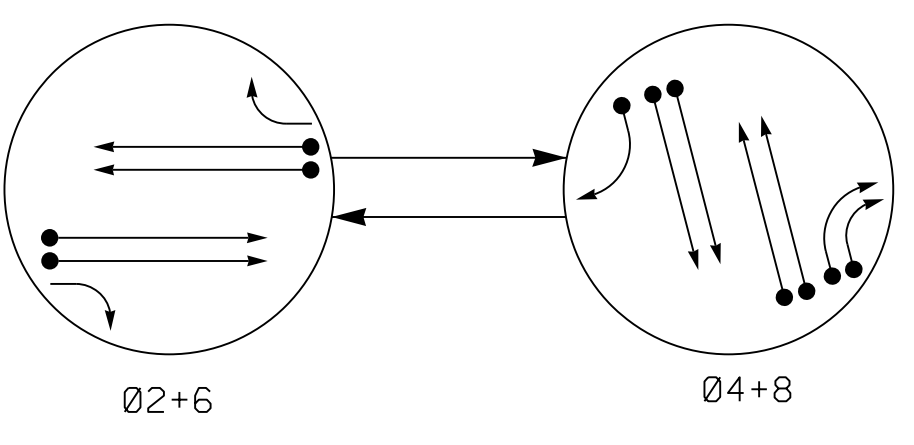
DocuSigned by:
Derrick Waller 3/22/2023

DATE

SIG. INVENTORY NO. 12-1369T4

3/21/2023 10:42 AM
C:\Users\dwaller\OneDrive\Documents\Signal Design\Temporary Design\4-3833C\Sig.ele.12_1369T4.dgn
User: dwaller

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

EV PREEMPT PHASES
(Medium Priority)

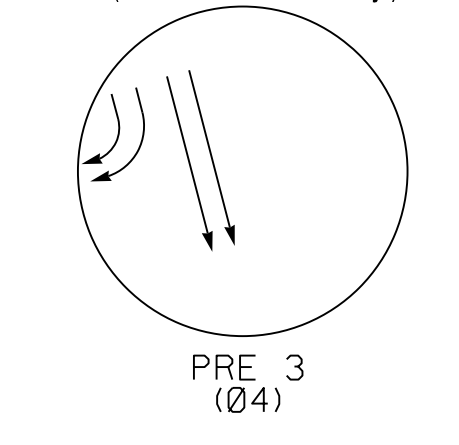
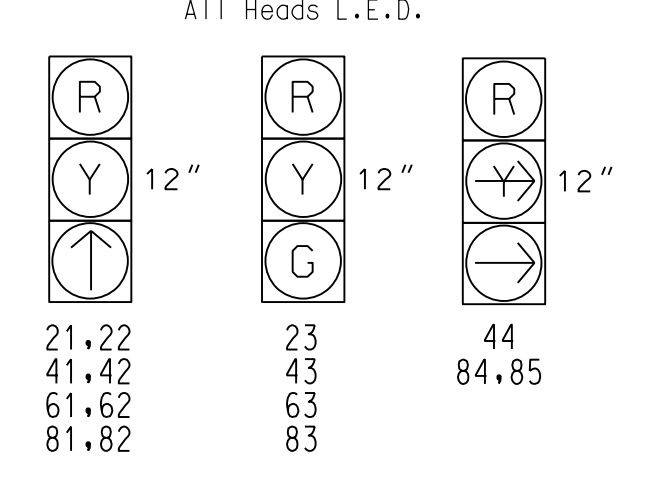


TABLE OF OPERATION

SIGNAL FACE	PHASE				FLASH
	02+6	04+8	PRE 3		
21,22	↑	R	R	Y	
23	G	R	R	Y	
41,42	R	↑	↑	R	
43	R	G	G	R	
44	R	→	→	R	
61,62	↑	R	R	Y	
63	G	R	R	Y	
81,82	R	↑	R	R	
83	R	G	R	R	
84,85	R	→	R	R	

SIGNAL FACE I.D.
All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING						SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE		
2A	6X6	300	*	X	2	Yes	-	-	-	N	-	*
2B	6X6	300	*	X	2	Yes	-	-	-	N	-	*
2C	6X40	0	*	X	2	Yes	2.0	5	-	G	-	*
2D	6X40	0	*	X	2	Yes	2.0	5	-	G	-	*
4A	6X40	0	*	X	4	Yes	-	-	-	N	-	*
4B	6X40	0	*	X	4	Yes	-	-	-	N	-	*
4C	6X40	0	*	X	4	Yes	-	-	-	N	-	*
6A	6X6	300	*	X	6	Yes	-	-	-	N	-	*
6B	6X6	300	*	X	6	Yes	-	-	-	N	-	*
6C	6X40	0	*	X	6	Yes	2.0	5	-	G	-	*
6D	6X40	0	*	X	6	Yes	2.0	5	-	G	-	*
8A	6X40	0	*	X	8	Yes	-	-	-	N	-	*
8B	6X40	0	*	X	8	Yes	-	-	-	N	-	*
8C	6X40	0	*	X	8	Yes	-	-	-	N	-	*
8D	6X40	0	*	X	8	Yes	-	-	-	N	-	*

* Video Detection Area

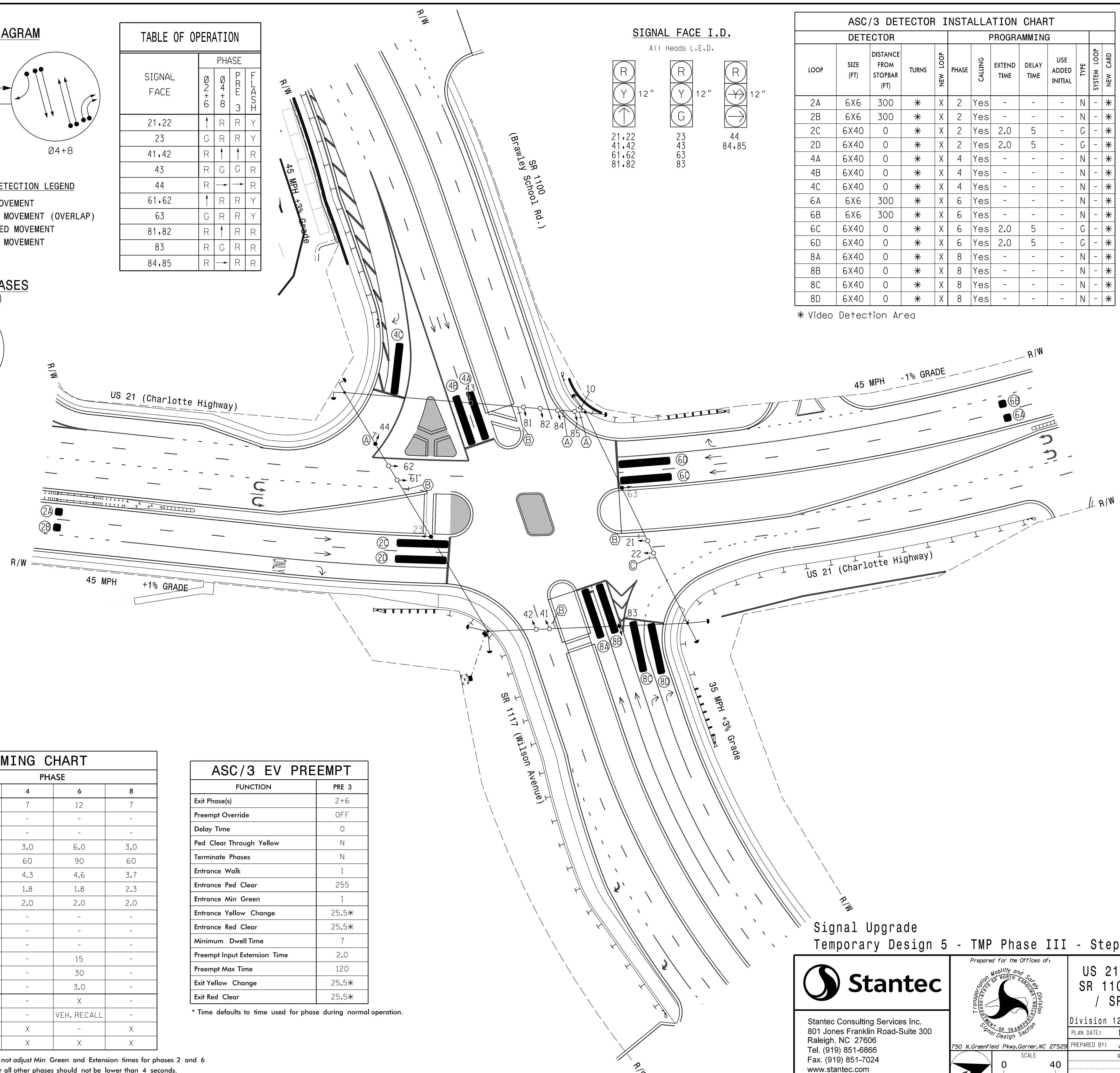
2 Phase Fully Actuated Isolated

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.
- This intersection features a video detection system. Detectors should be placed to ensure the desired operation parameters are achieved.
- Optical detector 10 calls PRE 3.
- Reposition existing signal head 44.

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
○ → Modified Signal Head	○ → N/A
○ → Pedestrian Signal Head With Push Button & Sign	○ → N/A
○ → Signal Pole with Guy	○ → N/A
○ → Signal Pole with Sidewalk Guy	○ → N/A
□ → Inductive Loop Detector	□ → N/A
□ → Controller & Cabinet	□ → N/A
□ → Junction Box	□ → N/A
--- 2-in Underground Conduit	--- N/A
N/A Right of Way	--- N/A
→ Directional Arrow	→ N/A
▬ Video Detection Area	▬ N/A
▬ Construction Zone	▬ N/A
○ Optical EVP Detector	○ N/A
⊠ Oversized Junction Box	⊠ N/A
(A) "NO TURN ON RED" Sign (R10-11)	(A) N/A
(B) No Left/U-Turn Sign (R3-18)	(B) N/A
(C) Right Arrow "ONLY" Sign (R3-5R)	(C) N/A



ASC/3 TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Min Green *	12	7	12	7
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Veh. Extension *	6.0	3.0	6.0	3.0
Max 1 *	90	60	90	60
Yellow	4.4	4.3	4.6	3.7
Red Clear	1.9	1.8	1.8	2.3
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds / Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Locking Detector	X	-	X	-
Recall Position	VEH, RECALL	-	VEH, RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

ASC/3 EV PREEMPT

FUNCTION	PRE 3
Exit Phase(s)	2+6
Preempt Override	OFF
Delay Time	0
Ped Clear Through Yellow	N
Terminate Phases	N
Entrance Walk	1
Entrance Ped Clear	255
Entrance Min Green	1
Entrance Yellow Change	25.5*
Entrance Red Clear	25.5*
Minimum Dwell Time	7
Preempt Input Extension Time	2.0
Preempt Max Time	120
Exit Yellow Change	25.5*
Exit Red Clear	25.5*

* Time defaults to time used for phase during normal operation.

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

**Signal Upgrade
Temporary Design 5 - TMP Phase III - Step 2**

US 21 (Charlotte Highway) at SR 1100 (Brawley School Road) / SR 1117 (Wilson Avenue)

Division 12 Iredell County Mooresville

PLAN DATE: May 2022 REVIEWED BY: E D Harris

PREPARED BY: J. Hambricht REVIEWED BY: R M Huncy

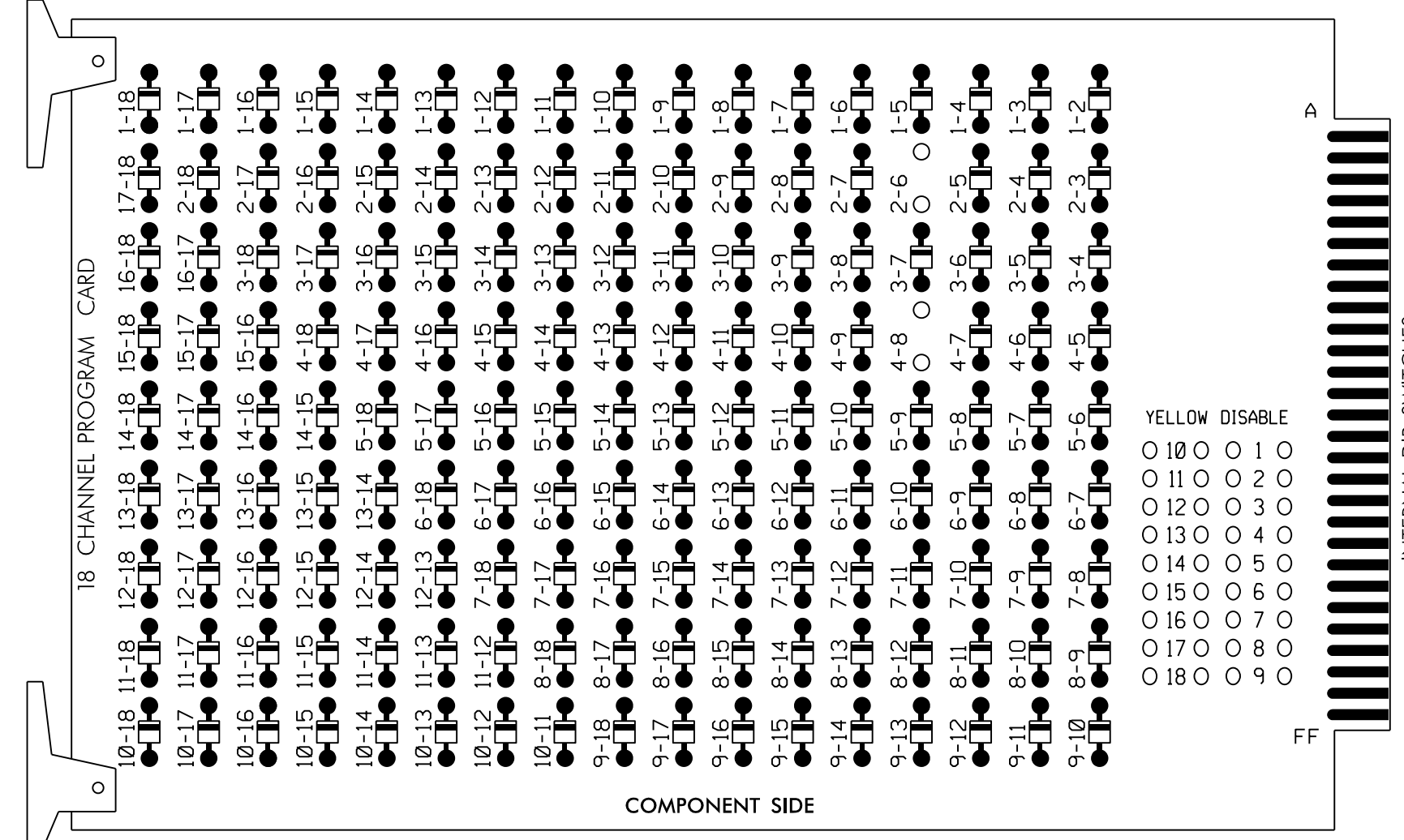
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3/22/2023 10:11:11 AM C:\Users\jhambricht\OneDrive\Documents\Signal Design\3833C_Sig_08n_12-136915.dgn User: daniel.lbr

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-6 and 4-8.



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.
- 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.
- Return controller to Factory Defaults before programming per this electrical detail.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

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,S5,S8,S11
 PHASES USED.....2,4,6,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

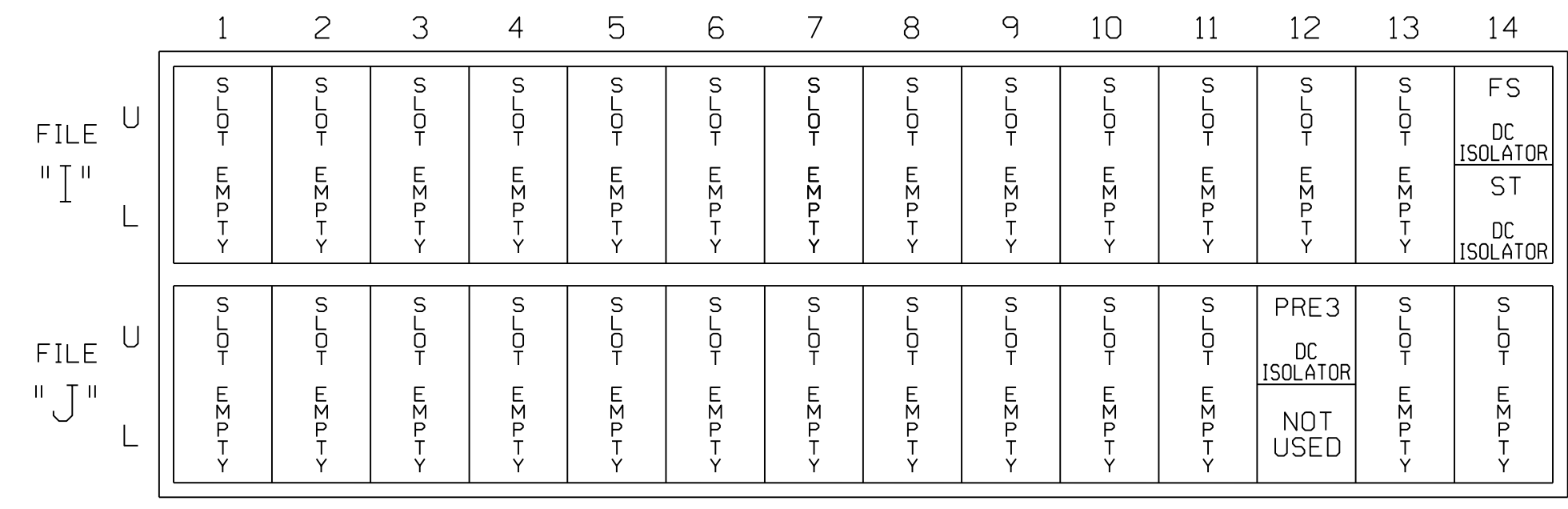
SIGNAL HEAD HOOK-UP CHART

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	23	NU	NU	41,42	43	44	NU	NU	61,62	63	NU	NU	81,82	83	84,85	NU	NU	NU	NU	NU	NU	NU
RED		128	128		101	101	101			134	134				107	107	107							
YELLOW		129	129		102	102				135	135				108	108								
GREEN			130			103					136					109								
RED ARROW																								
YELLOW ARROW						102										108								
GREEN ARROW		130			103	103		136			109	109												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME
 PRE = PREEMPT

SPECIAL DETECTOR NOTE

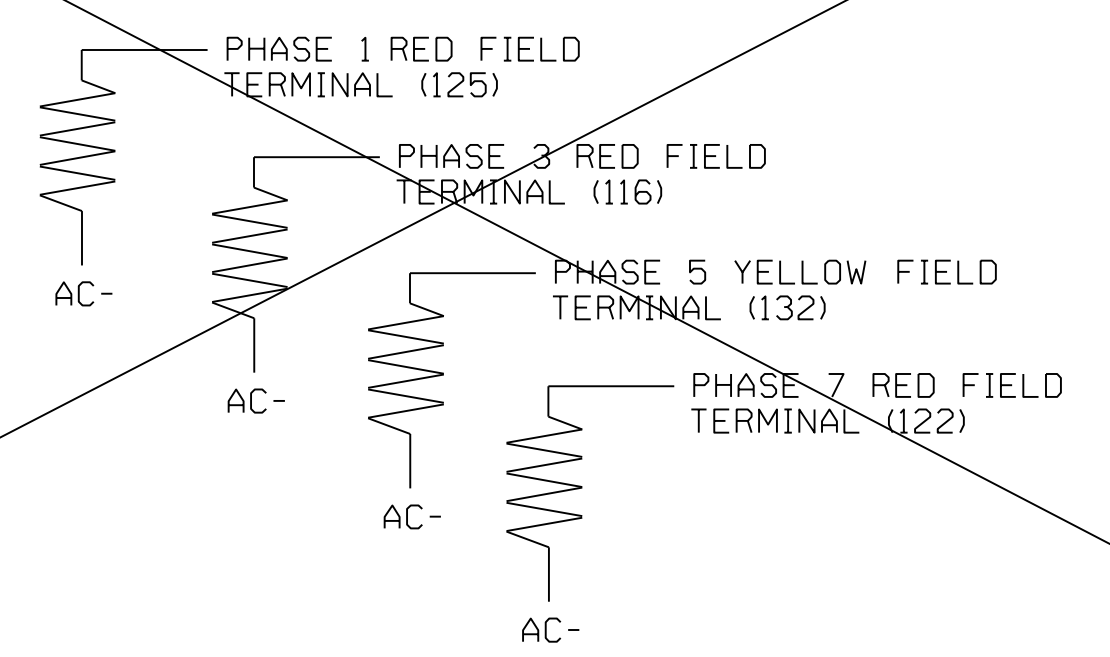
For all detector zones, install a temporary video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1369T5
 DESIGNED: MAY 2022
 SEALED: 3/22/2023
 REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



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

Stantec
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Prepared for the Offices of:

 Transportation Mobility and Safety Division
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 Signal Design Section
 750 N. Greenfield Pkwy, Garner, NC 27529

US 21 (Charlotte Highway) at
 SR 1100 (Brawley School Road)
 / SR 1117 (Wilson Avenue)
 Division 12 Iredell County Mooresville
 PLAN DATE: May 2022 REVIEWED BY: E D Harris
 PREPARED BY: D A Waller REVIEWED BY: R M Muncey

SEAL

 SEAL 042678
 DERRICK A. WALLER
 PROFESSIONAL ENGINEER
 DocuSigned by:
 Derrick Waller 3/22/2023
 DATE
 SIG. INVENTORY NO. 12-1369T5

ECONOLITE ASC/3-2070 EMERGENCY VEHICLE PREEMPT PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select
- From PREEMPTOR/TSP/SCP Submenu select

Place cursor in [] next to Preempt Plan and press 3. Then press the right cursor arrow and toggle the controller to YES. Next cursor down. This will select Emergency Vehicle Preempt #3.

```

PREEMPT PLAN [ 3 ]   ENABLE...YES
VEH/PED 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
OVERLAP A B C D E F G H I J K L M N O P
TRKCLR V . . . . .
TRKCLR O . . . . .
ENA TRL . . . . .
DWEL VEH . . . X . . . . .
DWEL PED . . . . .
DWEL OLP . . . . .
CYC VEH . . . . .
CYC PED . . . . .
CYC OLP . . . . .
EXIT PH . X . . . X . . . . .
EXIT CAL . . . . .
SP FUNC . . . . .

ENABLE... YESIPMT OVRIDE.. IINTERLOCK. NO
DET LOCK... XIDELAY.. 0 IINHIBIT... 0
OVERIDE FL. . IDURATION 0ICLR-GRN... NO
TERM OLP. NOIPC>YEL NOITERM PH NO
PED DARK.. NOITC RESRV NOIDWELL FL OFF
LINK PMT....OIX FLCOLR REDIXIT OPT. OFF
X TMG PLN...OIRE-SERV.. 0IFLT TYPE.HARD
FREE DUR PMTIR1 NOIR2 NOIR3 NOIR4 NO
--TIMING----WALKIPED CLIMN GRI YELI RED
ENTRANCE TM. 11 2551 1125.5125.5
-----MIN GRIEXT GRIMX GRI YELI RED
TRACK CLEAR 01 01 0125.5125.5
-----MIN DLIPMTEXTIMX TMI YELI RED
DWL/CYC-EXIT 71 2.01 120125.5125.5
PMT ACTIVE OUT..ON PMT ACT DWELL...NO
OTHER - PRI PMT.OFF NON-PRI PMT....OFF
INH EXT TIME... 0.0 PED PR RETURN...OFF
PRIORITY RETURN.OFF QUEUE DELAY.... OFF
COND DELAY.....OFF
PHASES 1 2 3 4 5 6 7 8
PR RTN% 0 0 0 0 0 0 0 0
PHASES 9 10 11 12 13 14 15 16
PR RTN% 0 0 0 0 0 0 0 0

```

PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

ECONOLITE ASC/3-2070 PREEMPT FILTERING PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select
- From PREEMPT/TSP/SCP Submenu select

```

ENABLE PREEMPT FILTERING & TSP/SCP
FILTERED SOLID PULSING
INPUT 1 ...BYPASSED.. ...BYPASSED..
      2 ...BYPASSED.. ...BYPASSED..
      3 ..PREEMPT 3. ...BYPASSED..
      4 ..PREEMPT 4. ...BYPASSED..
      5 ..PREEMPT 5. ...BYPASSED..
      6 ..PREEMPT 6. ...BYPASSED..
      7 ...BYPASSED.. ...BYPASSED..
      8 ...BYPASSED.. ...BYPASSED..
      9 ...BYPASSED.. ...BYPASSED..
     10 ...BYPASSED.. ...BYPASSED..

```

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1369T5 DESIGNED: MAY 2022 SEALED: 3/22/2023 REVISED: N/A

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

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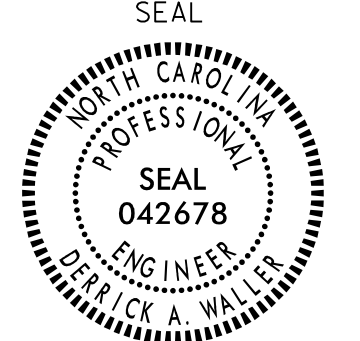
Prepared for the Offices of:
750 N. Greenfield Pkwy, Garner, NC 27529

US 21 (Charlotte Highway) at SR 1100 (Brawley School Road) / SR 1117 (Wilson Avenue)

Division 12 Iredell County Mooresville

PLAN DATE: May 2022	REVIEWED BY: E D Harris
PREPARED BY: D A Waller	REVIEWED BY: R M Muncey

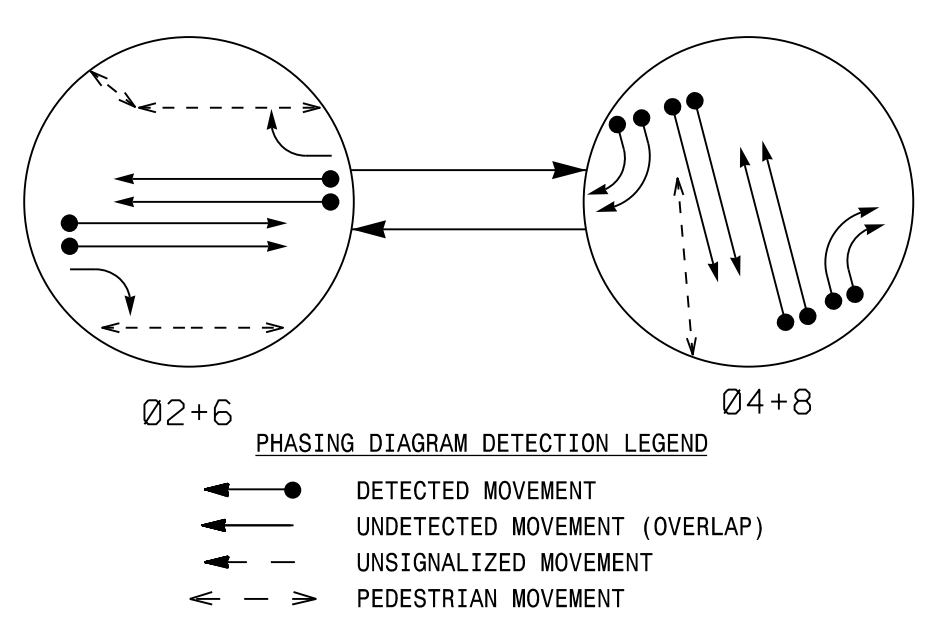
REVISIONS	INIT.	DATE



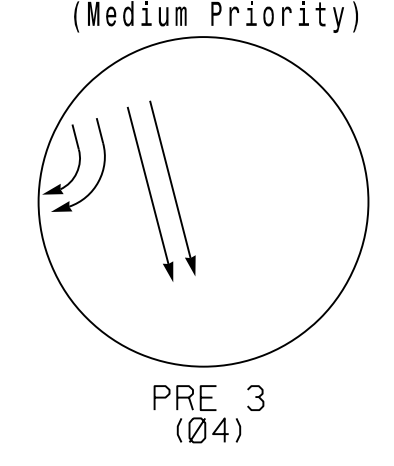
DocuSigned by:
Derrick Waller 3/22/2023
DATE
SIG. INVENTORY NO. 12-1369T5

3/21/2023 10:58 AM C:\Users\TAWALLER\Documents\Temporary Design\12-1369T5.dgn User: tawall118r

PHASING DIAGRAM



EV PREEMPT PHASES (Medium Priority)



SIGNAL FACE I.D.

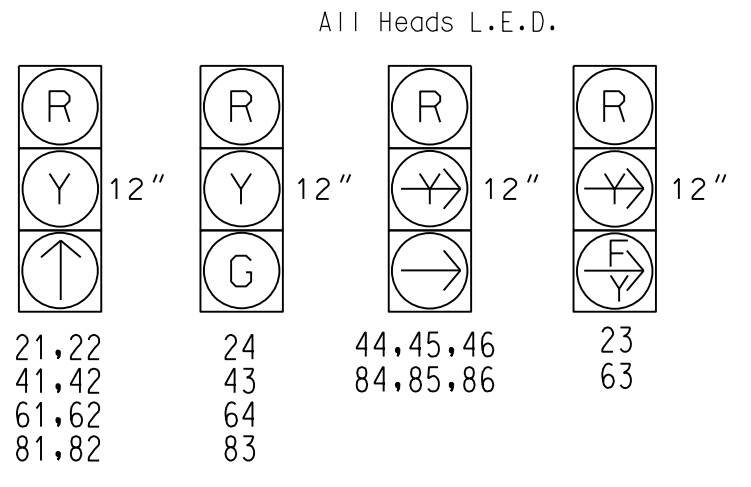


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+6	04+8	P	F
21,22	↑	R	R	Y
23	↓	R	R	Y
24	G	R	R	Y
41,42	R	↑	↑	R
43	R	G	G	R
44,45,46	R	→	→	R
61,62	↑	R	R	Y
63	↓	R	R	Y
64	G	R	R	Y
81,82	R	↑	R	R
83	R	G	R	R
84,85,86	R	→	R	R
P21, P22, P23, P24	W	DW	DW	DRK
P41, P42, P43, P44	DW	W	DW	DRK
P61, P62, P63, P64, P65, P66	W	DW	DW	DRK

ASC/3 TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Min Green *	12	7	12	7
Walk *	7	7	7	0
Ped Clear	29	25	23	0
Veh. Extension *	6.0	3.0	6.0	3.0
Max I *	90	60	90	60
Yellow	4.4	4.3	4.6	3.7
Red Clear	2.6	3.0	2.2	3.3
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds / Actuation *	1.5	-	1.5	-
Max Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Locking Detector	X	-	X	-
Recall Position	VEH. RECALL	-	VEH. RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

* 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.

ASC/3 DETECTOR INSTALLATION CHART

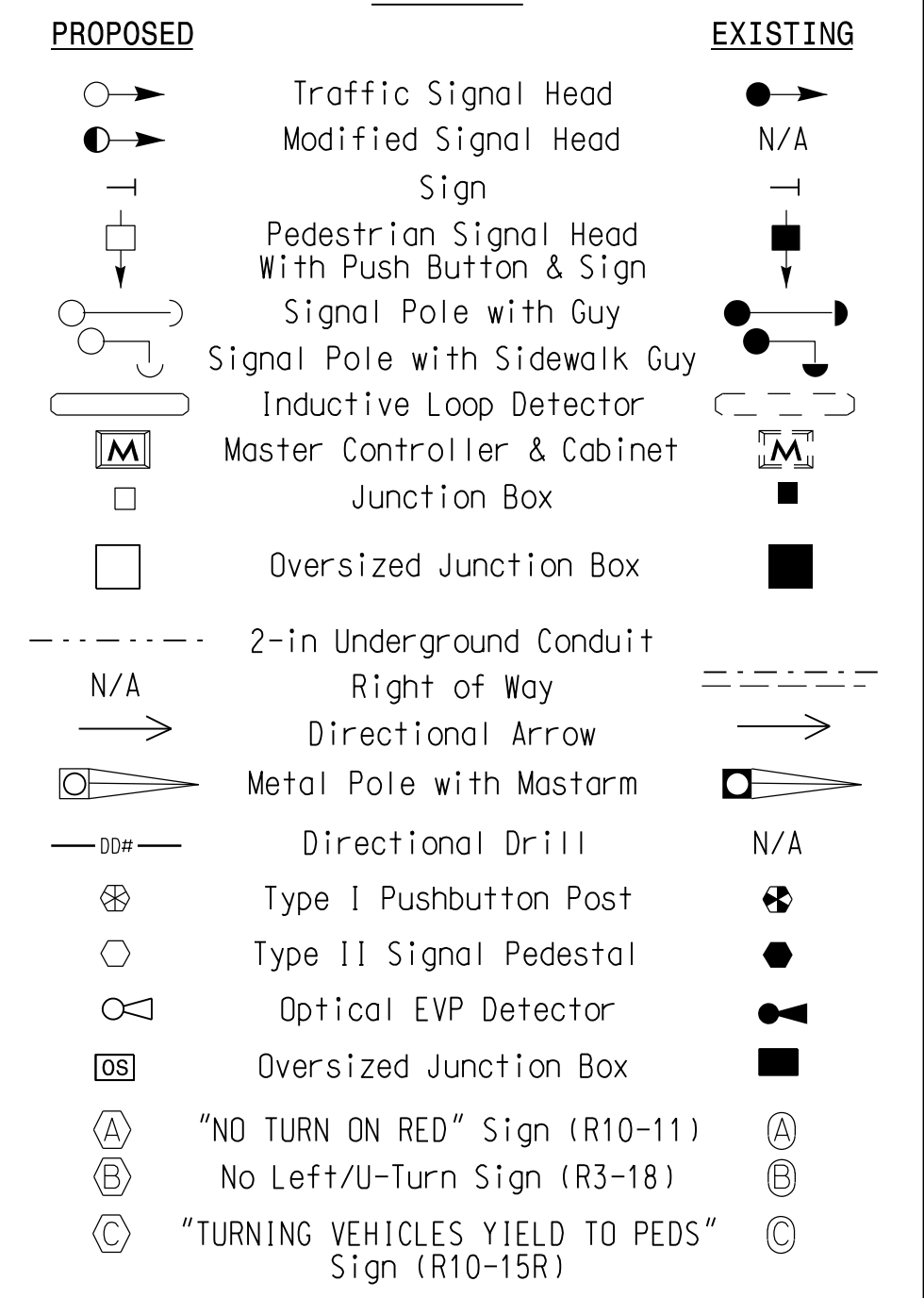
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	SYSTEM LOOP	NEW CARD	
2A	6X6	300	6	X	2	Yes	-	-	X	N	-	X
2B	6X6	300	6	X	2	Yes	-	-	X	N	-	X
4A	6X40	0	2-4-2	X	4	Yes	-	-	-	N	-	X
4B	6X40	0	2-4-2	X	4	Yes	-	-	-	N	-	X
4C	6X40	0	2-4-2	X	4	Yes	-	-	-	N	-	X
4D	6X40	0	2-4-2	X	4	Yes	-	-	-	N	-	X
6A	6X6	300	6	X	6	Yes	-	-	X	N	-	X
6B	6X6	300	6	X	6	Yes	-	-	X	N	-	X
8A	6X40	0	2-4-2	X	8	Yes	-	-	-	N	-	X
8B	6X40	0	2-4-2	X	8	Yes	-	-	-	N	-	X
8C	6X40	0	2-4-2	X	8	Yes	-	-	-	N	-	X
8D	6X40	0	2-4-2	X	8	Yes	-	-	-	N	-	X

2 Phase Fully Actuated with Emergency Vehicle Preemption Signal System 11210

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.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- Optical detector 10 calls PRE 3.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND



ASC/3 EV PREEMPT

FUNCTION	PRE 3
Exit Phase(s)	2+6
Preempt Override	OFF
Delay Time	0
Ped Clear Through Yellow	Y
Terminate Phases	N
Entrance Walk	1
Entrance Ped Clear	15
Entrance Min Green	1
Entrance Yellow Change	25.5*
Entrance Red Clear	25.5*
Minimum Dwell Time	7
Preempt Input Extension Time	2.0
Preempt Max Time	120
Exit Yellow Change	25.5*
Exit Red Clear	25.5*

* Time defaults to time used for phase during normal operation.

Signal Upgrade - Final Design

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Prepared for the Offices of:
Transportation Mobility and Safety Division
North Carolina Department of Transportation
Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27526

SCALE: 0 40
1" = 40'

US 21 (Charlotte Highway) at SR 1100 (Brawley School Road) / SR 1117 (Wilson Avenue)

Division 12 Iredell County Mooresville

PLAN DATE: May 2022 REVIEWED BY: E D Harris

PREPARED BY: J Hanbright REVIEWED BY: R M Muncy

REVISIONS: _____

INITIALS: _____ DATE: _____

SEAL

Derrick Waller
Professional Engineer
No. 042678

DocuSigned by:
Derrick Waller
3/22/2023

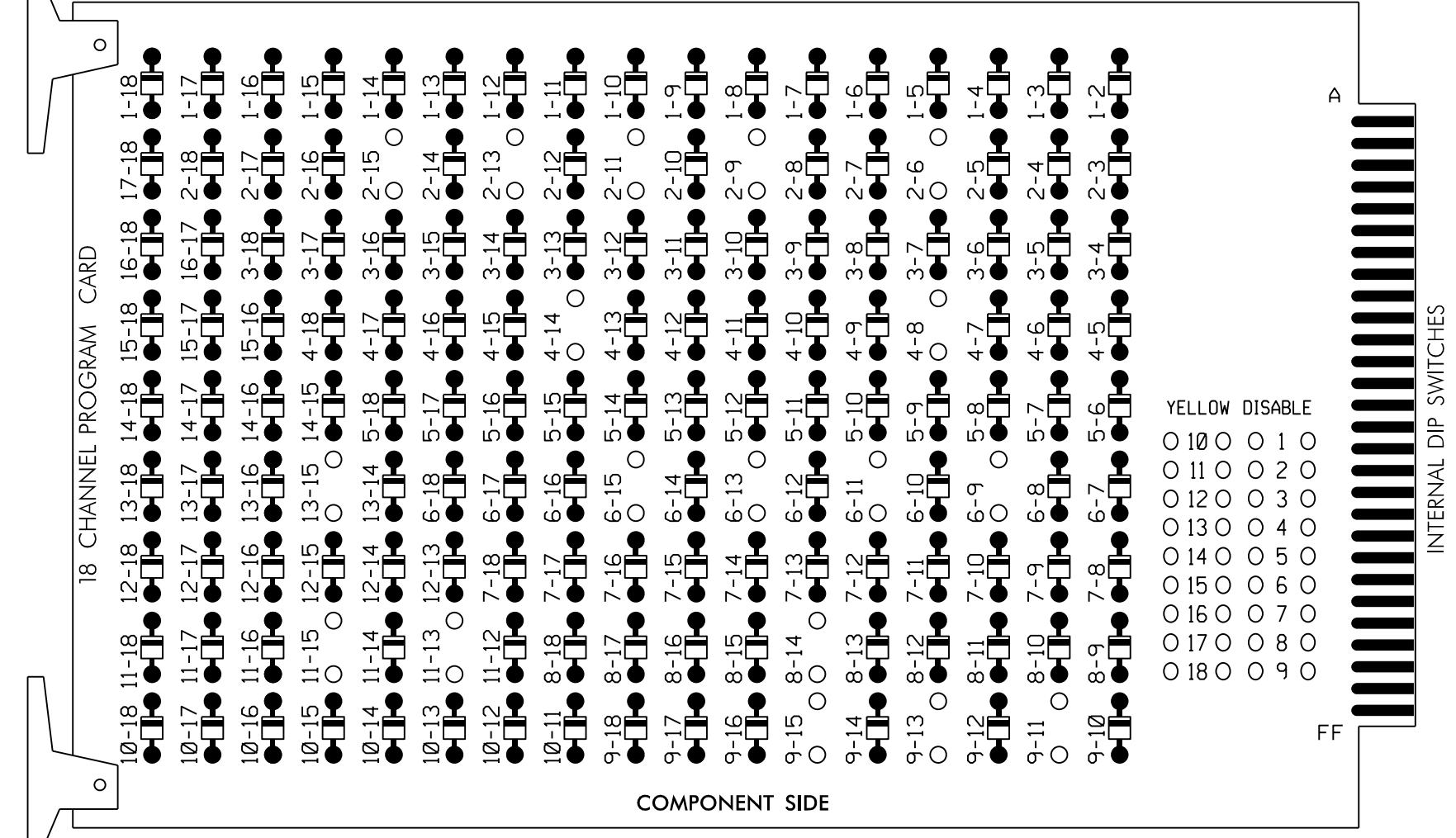
SIG. INVENTORY NO. 12-1369

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-6, 2-9, 2-11, 2-13, 2-15, 4-8, 4-14, 6-9, 6-11, 6-13, 6-15, 8-14, 9-11, 9-13, 9-15, 11-13, 11-15, and 13-15.



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.
- Integrate monitor with Ethernet network in cabinet.

■ = 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 phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Walk and 6 Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

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,S5,S6,S8,S9,S11,
 AUX S1,AUX S4
 PHASES USED.....2,2PED,4,4PED,6,6PED,8
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED
 * See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

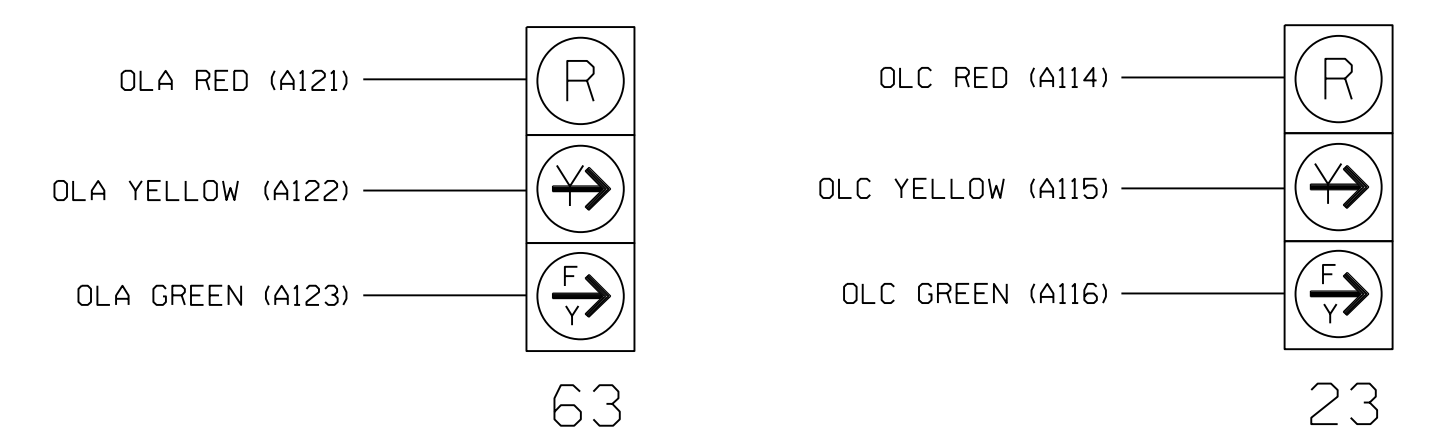
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6						
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18						
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE						
SIGNAL HEAD NO.	NU	21,22	24	P21,P22 P23,P24	NU	41,42	43	44,45 46	P41,P42 P43,P44	61,62	64	P61,P62 P63,P64 P65,P66	NU	81,82	83	84,85 86	NU	63	NU	NU	23	NU	NU	
RED		128	128		101	101	101			134	134			107	107	107								
YELLOW		129	129		102	102				135	135			108	108									
GREEN			130		103					136					109									
RED ARROW																								
YELLOW ARROW						102									108									
FLASHING YELLOW ARROW																								
GREEN ARROW		130			103	103				136				109	109									
Hand							113			104														
Walking																								

NU = Not Used

* See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	S	∅ 2	S	S	S	∅ 4	∅ 4	S	S	S	S	∅ 2PED	∅ 6PED	FS
L	2A	2A	2B	4A	4C	∅ 4	∅ 4	∅ 4 PED	DC ISOLATOR	NOT USED	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	ST
U	S	∅ 6	S	S	S	∅ 8	∅ 8	S	S	S	PRE3	S	S	S
L	6A	6A	6B	8A	8C	∅ 8	∅ 8	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR

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

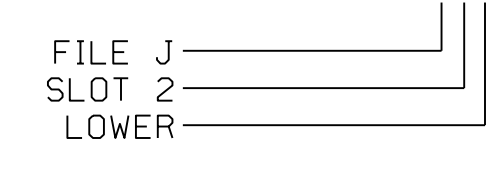
FS = FLASH SENSE
 ST = STOP TIME
 PRE = PREEMPT

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			X	N
2B	TB2-7,8	I2L	43	12	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES				N
4B	TB4-11,12	I6L	45	14	4	YES				N
4C	TB6-1,2	I7U	65	34	4	YES				N
4D	TB6-3,4	I7L	78	44	4	YES				N
6A	TB3-5,6	J2U	40	6	6	YES			X	N
6B	TB3-7,8	J2L	44	16	6	YES			X	N
8A	TB5-9,10	J6U	42	8	8	YES				N
8B	TB5-11,12	J6L	46	18	8	YES				N
8C	TB7-1,2	J7U	66	38	8	YES				N
8D	TB7-3,4	J7L	79	48	8	YES				N

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

INPUT FILE POSITION LEGEND: J2L



Final Design
 Electrical Detail - Sheet 1 of 2

US 21 (Charlotte Highway) at SR 1100 (Brawley School Road) / SR 1117 (Wilson Avenue)

Division 12 Iredell County Mooresville

PLAN DATE: May 2022 REVIEWED BY: E D Harris

PREPARED BY: D A Waller REVIEWED BY: R M Muncey

REVISIONS: _____ INIT. DATE

DocuSigned by: *Derrick Waller* 3/22/2023

SIG. INVENTORY NO. 12-1369

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042678 DERRICK A. WALLER

3:15:44 PM U:\Projects\cns1\gms\gms\electrical\Detail\3833C.slg.dwg User: dwall118

ECONOLITE ASC/3-2070 EMERGENCY VEHICLE PREEMPT PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **4. PREEMPTOR/TSP**
- From PREEMPTOR/TSP/SCP Submenu select **1. PREEMPT PLAN 1-10**

Place cursor in [] next to Preempt Plan and press 3. Then press the right cursor arrow and toggle the controller to YES. Next cursor down. This will select Emergency Vehicle Preempt #3.

```

PREEMPT PLAN [ 3 ]   ENABLE....YES
VEH/PED 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
OVERLAP A B C D E F G H I J K L M N O P
TRKCLR V . . . . .
TRKCLR O . . . . .
ENA TRL . . . . .
DWEL VEH . . . X . . . . .
DWEL PED . . . . .
DWEL OLP . . . . .
CYC VEH . . . . .
CYC PED . . . . .
CYC OLP . . . . .
EXIT PH . X . . . X . . . . .
EXIT CAL . . . . .
SP FUNC . . . . .

```

```

ENABLE... YESIPMT OVRIDE..IINTERLOCK. NO
DET LOCK... XIDELAY.. 0IINHIBIT... 0
OVERIDE FL. .IDURATION 0ICLR-GRN... NO
TERM OLP. NOIPC>YEL YESITERM PH NO
PED DARK.. NOITC RESRV NOIDWELL FL OFF
LINK PMT...0IX FLCOLR REDIEXIT OPT. OFF
X TMG PLN...0IRE-SERV.. 0IFLT TYPE.HARD
FREE DUR PMTIR1 NOIR2 NOIR3 NOIR4 NO
--TIMING----WALKIPED CLIMN GRI YELI RED
ENTRANCE TM. 11 151 1125.5125.5
-----MIN GRIEXT GRIMX GRI YELI RED
TRACK CLEAR 01 01 0125.5125.5
-----MIN DLIPMTEXTIMX TMI YELI RED
DWL/CYC-EXIT 71 2.01 120125.5125.5
PMT ACTIVE OUT..ON PMT ACT DWELL...NO
OTHER - PRI PMT.OFF NON-PRI PMT.....OFF
INH EXT TIME... 0.0 PED PR RETURN...OFF
PRIORITY RETURN.OFF QUEUE DELAY.... OFF
COND DELAY.....OFF
PHASES 1 2 3 4 5 6 7 8
PR RTN% 0 0 0 0 0 0 0 0
PHASES 9 10 11 12 13 14 15 16
PR RTN% 0 0 0 0 0 0 0 0

```

PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **2. CONTROLLER**
- From CONTROLLER Submenu select **2. VEHICLE OVERLAPS**

OVERLAP A

Select TMG VEH OVLP [A] and 'OTHER/ECONOLITE'

```

TMG VEH OVLP...[A] TYPE:OTHER/ECONOLITE
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . X . . . . .
PROTECT . . . . .
PED PRTC . . . . .
NOT OVLP . . . . .
FLSH GRN . 1 . . . . .
LAG X PH . . . . .
LAG 2 PH . . . . .
LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0

```

Toggle Twice

OVERLAP C

Select TMG VEH OVLP [C] and 'OTHER/ECONOLITE'

```

TMG VEH OVLP...[C] TYPE:OTHER/ECONOLITE
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . . . X . . . . .
PROTECT . . . . .
PED PRTC . . . . .
NOT OVLP . . . . .
FLSH GRN . . . . . 1 . . . . .
LAG X PH . . . . .
LAG 2 PH . . . . .
LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0

```

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

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

- 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.

ECONOLITE ASC/3-2070 PREEMPT FILTERING PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **4. PREEMPTOR/TSP**
- From PREEMPT/TSP/SCP Submenu select **2. ENABLE PREEMPT FILTERING & TSP/SCP**

```

ENABLE PREEMPT FILTERING & TSP/SCP
FILTERED SOLID PULSING
INPUT 1 ...BYPASSED... ..BYPASSED..
2 ...BYPASSED... ..BYPASSED..
3 ..PREEMPT 3. ...BYPASSED..
4 ..PREEMPT 4. ...BYPASSED..
5 ..PREEMPT 5. ...BYPASSED..
6 ..PREEMPT 6. ...BYPASSED..
7 ...BYPASSED... ..BYPASSED..
8 ...BYPASSED... ..BYPASSED..
9 ...BYPASSED... ..BYPASSED..
10 ...BYPASSED... ..BYPASSED..

```

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1369
 DESIGNED: MAY 2022
 SEALED: 3/22/2023
 REVISED: N/A


Final Design Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

US 21 (Charlotte Highway) at SR 1100 (Brawley School Road) / SR 1117 (Wilson Avenue)

Division 12 Iredell County Mooresville

PLAN DATE: May 2022 REVIEWED BY: E D Harris

PREPARED BY: D A Waller REVIEWED BY: R M Muncey

REVISIONS	INIT.	DATE



DocuSigned by: **Derrick Waller** 3/22/2023

SIGNATURE DATE

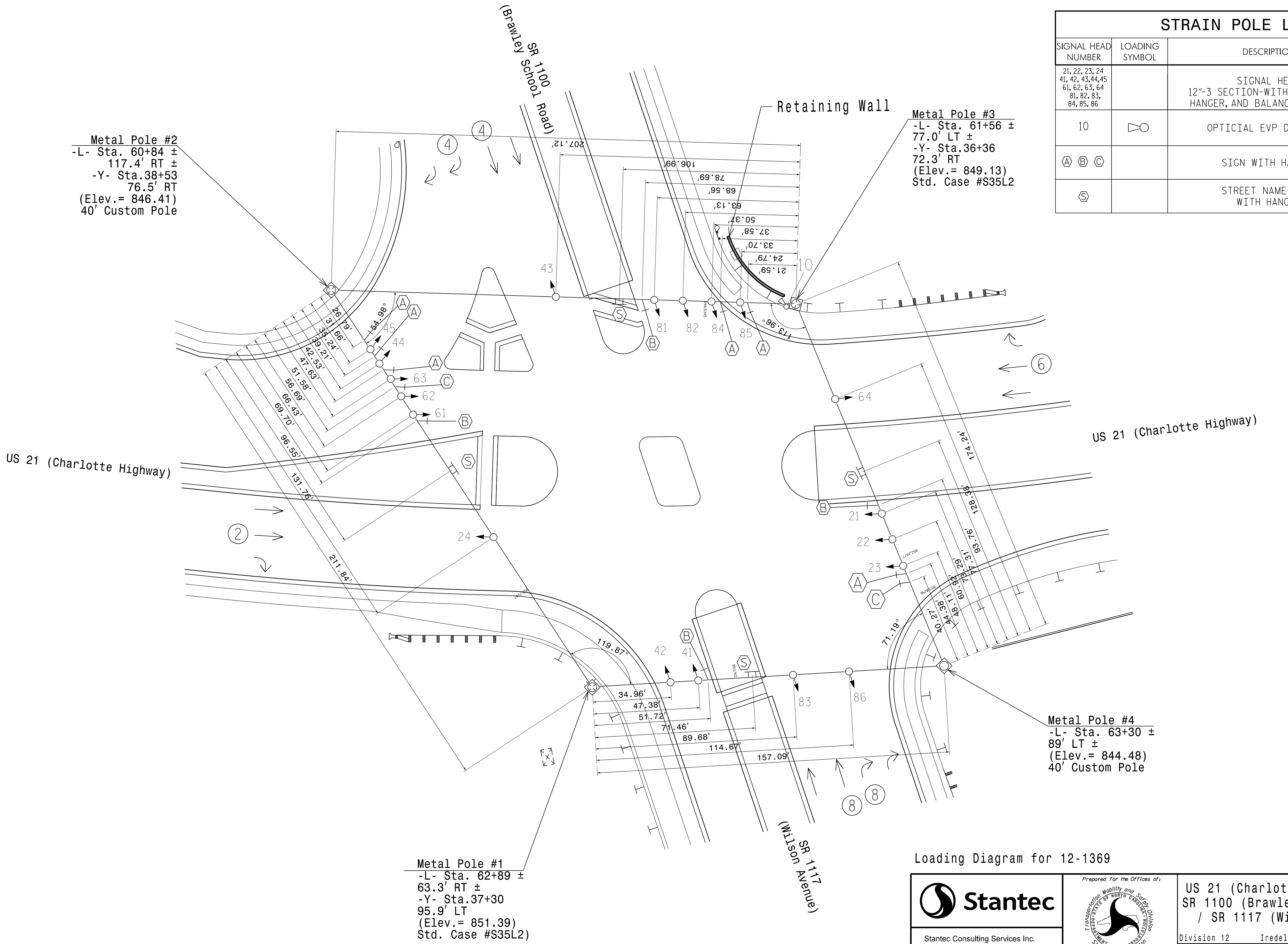
SIG. INVENTORY NO. 12-1369

2/16/21 PM D:\Projects\3833C\Sig.dgn User: dwall11

Design Loading for METAL STRAIN POLES

STRAIN POLE LOADING SCHEDULE

SIGNAL HEAD NUMBER	LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
21, 22, 23, 24 41, 42, 43, 44, 45 61, 62, 63, 64 81, 82, 83, 84, 85, 86		SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE, HANGER, AND BALANCE ADJUSTER	9.5 S.F.	25.5" W X 53.5" L	56 LBS
10	⊗	OPTICAL EVP DETECTOR	0.25 S.F.	4.75" W X 12.0" L X 7.13" H	1.2 LBS
A B C		SIGN WITH HANGER	7.5 S.F.	30.0" W X 36.0" L	14 LBS
S		STREET NAME SIGN WITH HANGER	16.0 S.F.	24.0" W X 96.0" L	36 LBS



Metal Pole #2
 -L- Sta. 60+84 ±
 117.4' RT ±
 -Y- Sta. 38+53
 76.5' RT
 (Elev.= 846.41)
 40' Custom Pole

Metal Pole #3
 -L- Sta. 61+56 ±
 77.0' LT ±
 -Y- Sta. 36+36
 72.3' RT
 (Elev.= 849.13)
 Std. Case #S35L2

Metal Pole #4
 -L- Sta. 63+30 ±
 89' LT ±
 (Elev.= 844.48)
 40' Custom Pole

Metal Pole #1
 -L- Sta. 62+89 ±
 63.3' RT ±
 -Y- Sta. 37+30
 95.9' LT
 (Elev.= 851.39)
 Std. Case #S35L2

Loading Diagram for 12-1369

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 License No. F-0672

Prepared for the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27526
 SCALE: 0 N/A

**US 21 (Charlotte Highway) at
 SR 1100 (Brawley School Road)
 / SR 1117 (Wilson Avenue)**
 Division 12 Iredell County Mooresville
 PLAN DATE: May 2022 REVIEWED BY: E D Harris
 PREPARED BY: J Hanbright REVIEWED BY: R M Muncey

REVISIONS	INIT.	DATE

SEAL

 DocuSigned by:
 Derrick Waller
 DATE: 3/22/2023
 SIG. INVENTORY NO. 12-1369

3/22/2023
 U:\Traffic\cns\gna\15405\Metal_Poles\Strain_Pole_Analysis\SR-3833C...Strain_Pole>Loading Data_12-1369.dgn
 User: daw1118r

SPECIAL NOTE

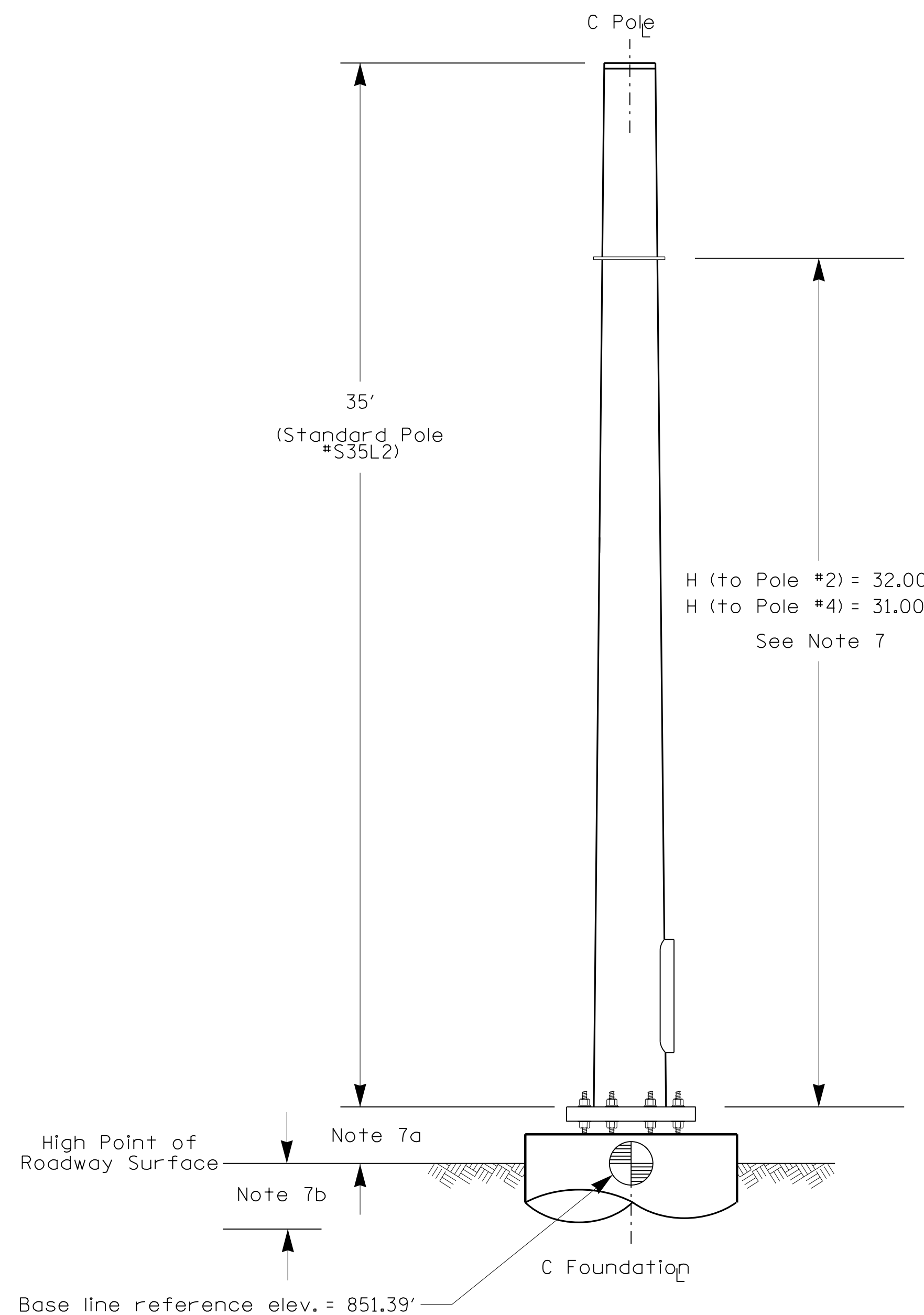
The contractor is responsible for verifying that the attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting finalshop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Span Wire Attachment (H1)		
Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at C Foundation @ ground level	851.39 ft.	
Elevation difference at high point of roadway surface to Pole #2	+ 1.34 ft.	
Elevation difference at high point of roadway surface to Pole #4	+ 2.53 ft.	
Baseline reference point at C Foundation @ ground level		846.41 ft.
Elevation difference at high point of roadway surface to Pole #1		+ 6.32 ft.
Elevation difference at high point of roadway surface to Pole #3		+ 2.12 ft.

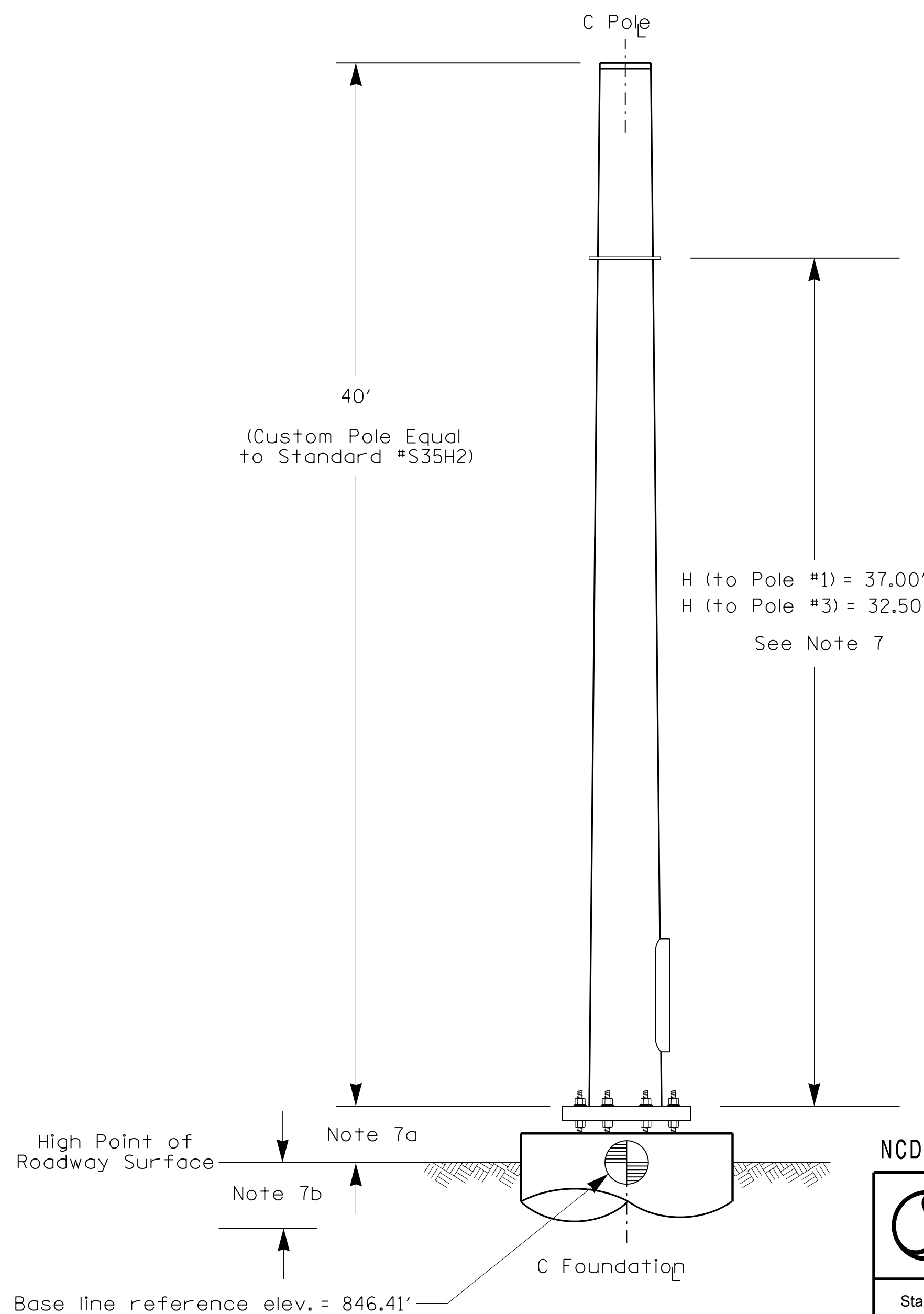
STRAIN POLE LOADING SCHEDULE					
SIGNAL HEAD NUMBER	LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
21, 22, 23, 24 41, 42, 43, 44, 45 61, 62, 63, 64 81, 82, 83, 84, 85, 86		SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE, HANGER, AND BALANCE ADJUSTER	9.5 S.F.	25.5"W X 53.5"L	56 LBS
A B C		SIGN WITH HANGER	7.5 S.F.	30.0"W X 36.0"L	14 LBS
S		STREET NAME SIGN WITH HANGER	16.0 S.F.	24.0"W X 96.0"L	36 LBS

NOTE: SEE SHEET SIG-X.X FOR INTERSECTION LOADING DIAGRAM

Elevation View - Strain Pole #1



Elevation View - Strain Pole #2



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

- Fabricate Metal Strain Poles #1 & #2 using design loadings shown. The contractor may revise attachment heights and radial orientations of wire entrances with the approval of the Engineer. Any modifications to the original location of accessories must be reflected on the shop drawings when they are submitted for review and approval.
- All signal heads are to be tethered at the bottom of the signal head housing.
- Design a drilled pier foundation that conforms to the requirements of ITSS Project Special Provisions (Version 18.2) included with and as part of these plans.
- Comply with NEC code 230.2(E) concerning service equipment disconnect.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The attachment height (H1) shown is based on the following design assumptions:
 - 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 below the spans between adjacent pole attachment points.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the 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 attachment heights shown will allow for 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)

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Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
SIGNAL DESIGN SECTION

750 N. Greenfield Pkwy, Garner, NC 27526

SCALE: 0 N/A Not to Scale

US 21 (Charlotte Highway) at
SR 1100 (Brawley School Road) /
SR 1117 (Wilson Avenue)

Division 12 Iredell County Mooresville

PLAN DATE: May 2022 REVIEWED BY: E D Harris

PREPARED BY: J Hanbright REVIEWED BY: R M Nuncey

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:
Patrick A. Walker 3/22/2023

SIG. INVENTORY NO. 12-1369

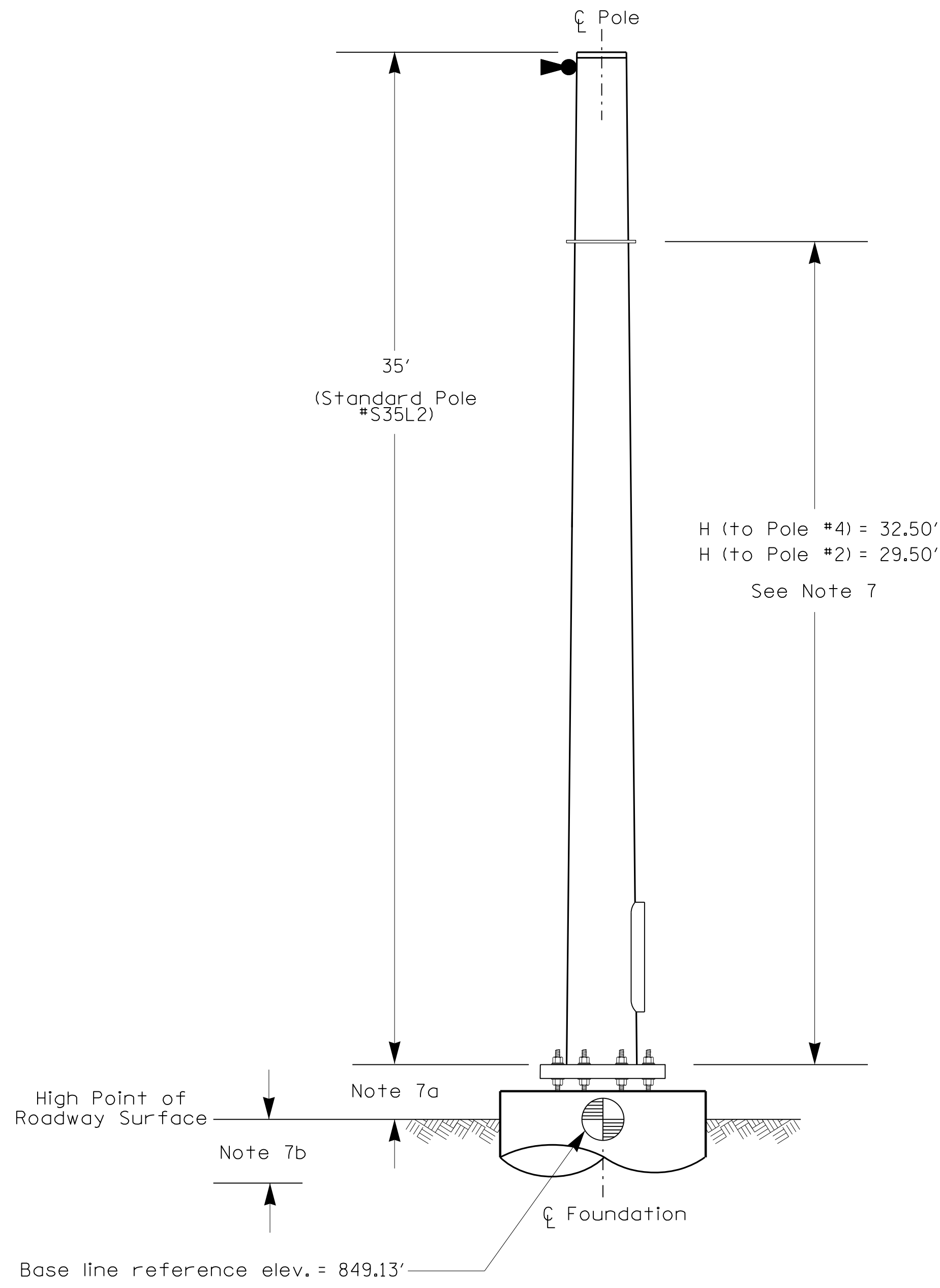
3/22/2023
 U:\Projects\2023\Signal\Traffic\Signal\Metal Poles\Strain Pole Analysis\SR-3833C - Strain Poles 1 and 2.dgn
 User: daw1118r

SPECIAL NOTE		
The contractor is responsible for verifying that the 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 Span Wire Attachment (H1)		
Elevation Differences for:	Pole 3	Pole 4
Baseline reference point at ϕ Foundation @ ground level \oplus	849.13 ft.	
Elevation difference at high point of roadway surface to Pole #4	+ 3.90 ft.	
Elevation difference at high point of roadway surface to Pole #2	- 0.60 ft.	
Baseline reference point at ϕ Foundation @ ground level \oplus		
		844.48 ft.
Elevation difference at high point of roadway surface to Pole #3		+ 8.55 ft.
Elevation difference at high point of roadway surface to Pole #1		+ 9.44 ft.

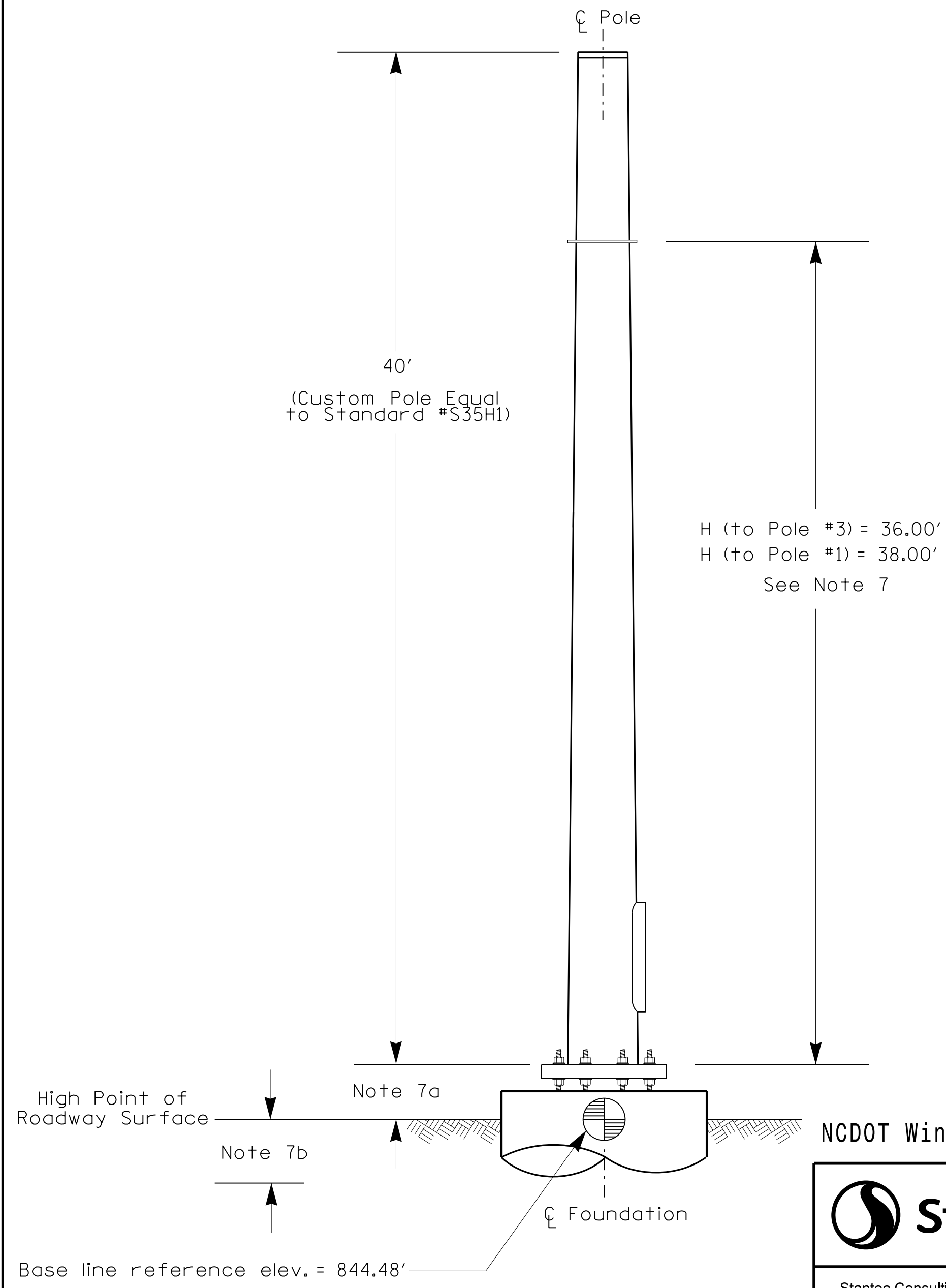
STRAIN POLE LOADING SCHEDULE					
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10		OPTICAL EVP DETECTOR	0.25 S.F.	4.75" W X 12.0" L 7.13" H	1.2 LBS
A B C		SIGN WITH HANGER	7.5 S.F.	30.0" W X 36.0" L	14 LBS
S		STREET NAME SIGN WITH HANGER	16.0 S.F.	24.0" W X 96.0" L	36 LBS

NOTE: SEE SHEET SIG-X.X FOR INTERSECTION LOADING DIAGRAM

Elevation View - Strain Pole #3



Elevation View - Strain Pole #4



NCDOT Wind Zone 4 (90 mph)

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.
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 - 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

- Fabricate Metal Strain Poles #3 & #4 using design loadings shown. The contractor may revise attachment heights and radial orientations of wire entrances with the approval of the Engineer. Any modifications to the original location of accessories must be reflected on the shop drawings when they are submitted for review and approval.
- All signal heads are to be tethered at the bottom of the signal head housing.
- Design a drilled pier foundation that conforms to the requirements of ITSS Project Special Provisions (Version 18.2) included with and as part of these plans.
- Comply with NEC code 230.2(E) concerning service equipment disconnect.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The attachment height (H1) shown is based on the following design assumptions:
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- The contractor is responsible for verifying that the attachment heights shown will allow for 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.

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Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27526

SCALE: 0 N/A

US 21 (Charlotte Highway) at
SR 1100 (Brawley School Road) /
SR 1117 (Wilson Avenue)

Division 12 Iredell County Mooresville

PLAN DATE: May 2022 REVIEWED BY: E D Harris

PREPARED BY: J Hanbright REVIEWED BY: R M Nuncey

REVISIONS	INIT.	DATE

SEAL

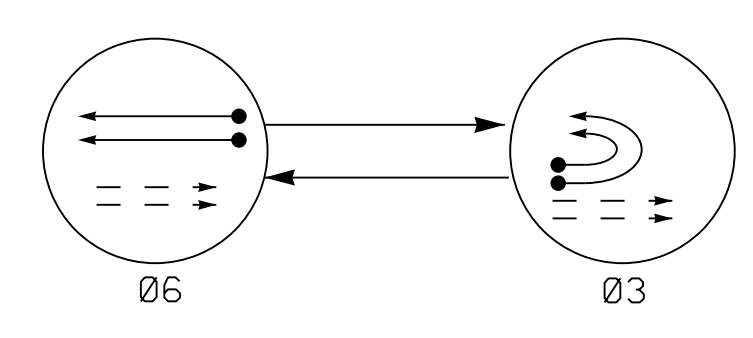
PROFESSIONAL ENGINEER
SEAL 042678
DERRICK A. WALLER

DocuSigned by:
Derrick Waller 3/22/2023

SIG. INVENTORY NO. 12-1369

3/22/2023
 U:\Projects\2022\Signal\Drawings\Metal Poles\Strain Pole Analysis\SR-3833C - Strain Pole_12-1369-Poles_3 and 4.dgn
 User: daw1118r

PHASING DIAGRAM



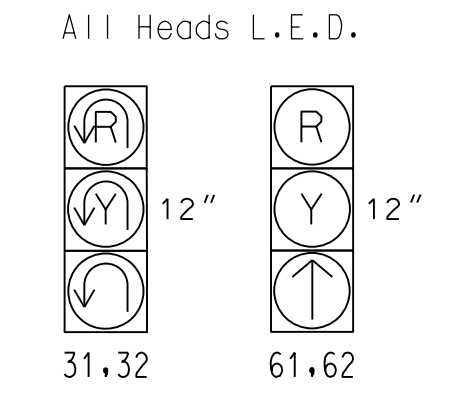
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	06	03	FLASH
31,32	R	Y	R
61,62	↑	R	Y

SIGNAL FACE I.D.



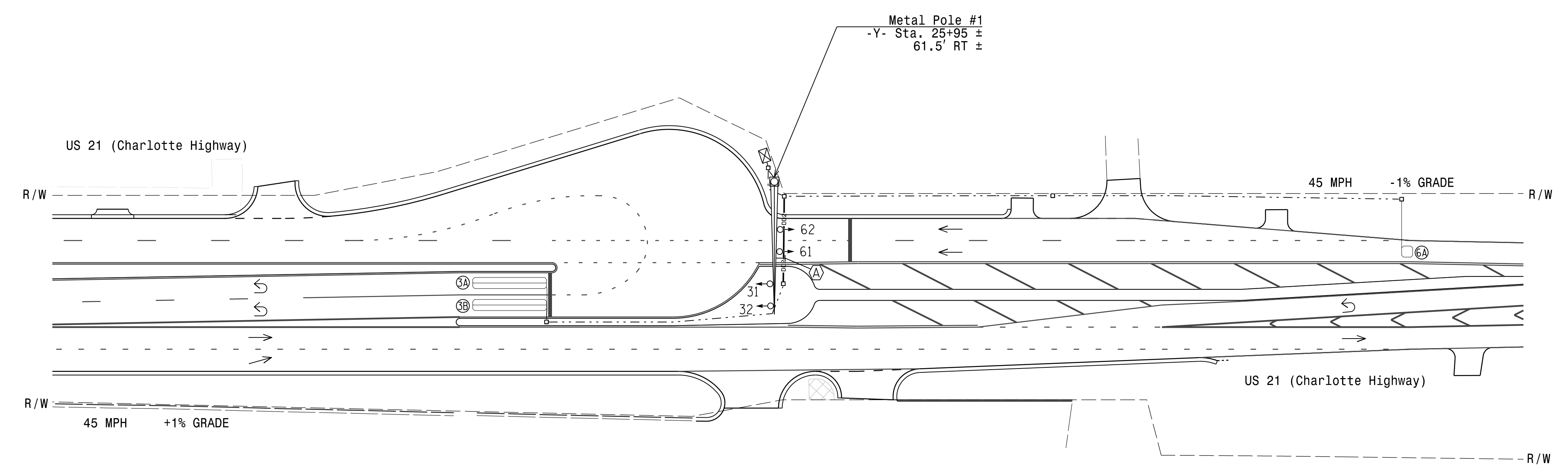
ASC/3 DETECTOR INSTALLATION CHART

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
3A	6X40	0	2-4-2	X	3	Yes	-	-	-	N	-	X
3B	6X40	0	2-4-2	X	3	Yes	-	-	-	N	-	X
6A	6X6	300	5	X	6	Yes	-	-	X	N	-	X

2 Phase Fully Actuated Signal System 11210

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.



LEGEND

PROPOSED	EXISTING
○► Traffic Signal Head	●► N/A
◐► Modified Signal Head	◐► N/A
⊥ Sign	⊥ N/A
⊥ Pedestrian Signal Head With Push Button & Sign	⊥ N/A
○ Signal Pole with Guy	● Signal Pole with Guy
○ Signal Pole with Sidewalk Guy	● Signal Pole with Sidewalk Guy
⊠ Inductive Loop Detector	⊠ Existing Inductive Loop Detector
□ Controller & Cabinet	□ Existing Controller & Cabinet
□ Junction Box	□ Existing Junction Box
- - - 2-in Underground Conduit	- - - Existing 2-in Underground Conduit
N/A Right of Way	- - - Existing Right of Way
→ Directional Arrow	→ Existing Directional Arrow
○ Metal Pole with Mastarm	○ Existing Metal Pole with Mastarm
—DD— Directional Drill	N/A
○ Type II Signal Pedestal	● Existing Type II Signal Pedestal
⊠ No Left Turn Sign (R3-2)	⊠ Existing No Left Turn Sign (R3-2)

ASC/3 TIMING CHART

FEATURE	PHASE	
	3	6
Min Green *	7	12
Walk *	-	-
Ped Clear	-	-
Veh. Extension *	2.0	6.0
Max I *	30	60
Yellow	3.0	4.6
Red Clear	5.1	2.5
Red Revert	2.0	2.0
Actuations B4 Add *	-	-
Seconds / Actuation *	-	2.5
Max Initial *	-	34
Time Before Reduction *	-	15
Time To Reduce *	-	30
Minimum Gap	-	3.0
Locking Detector	-	X
Recall Position	-	VEH. RECALL
Dual Entry	-	-
Simultaneous Gap	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.

New Installation

<p>Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672</p>		<p>US 21 (Charlotte Highway) at US 21 NB U-Turn to US 21 SB</p>					
		<p>Division 12 Iredell County Mooresville</p> <p>PLAN DATE: May 2022 REVIEWED BY: E D Harris</p> <p>PREPARED BY: J. Hambricht REVIEWED BY: R M Muncey</p>	<p>REVISIONS</p> <table border="1"> <tr> <th>NO.</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	INIT.	DATE	
NO.	INIT.	DATE					

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 1" = 40'

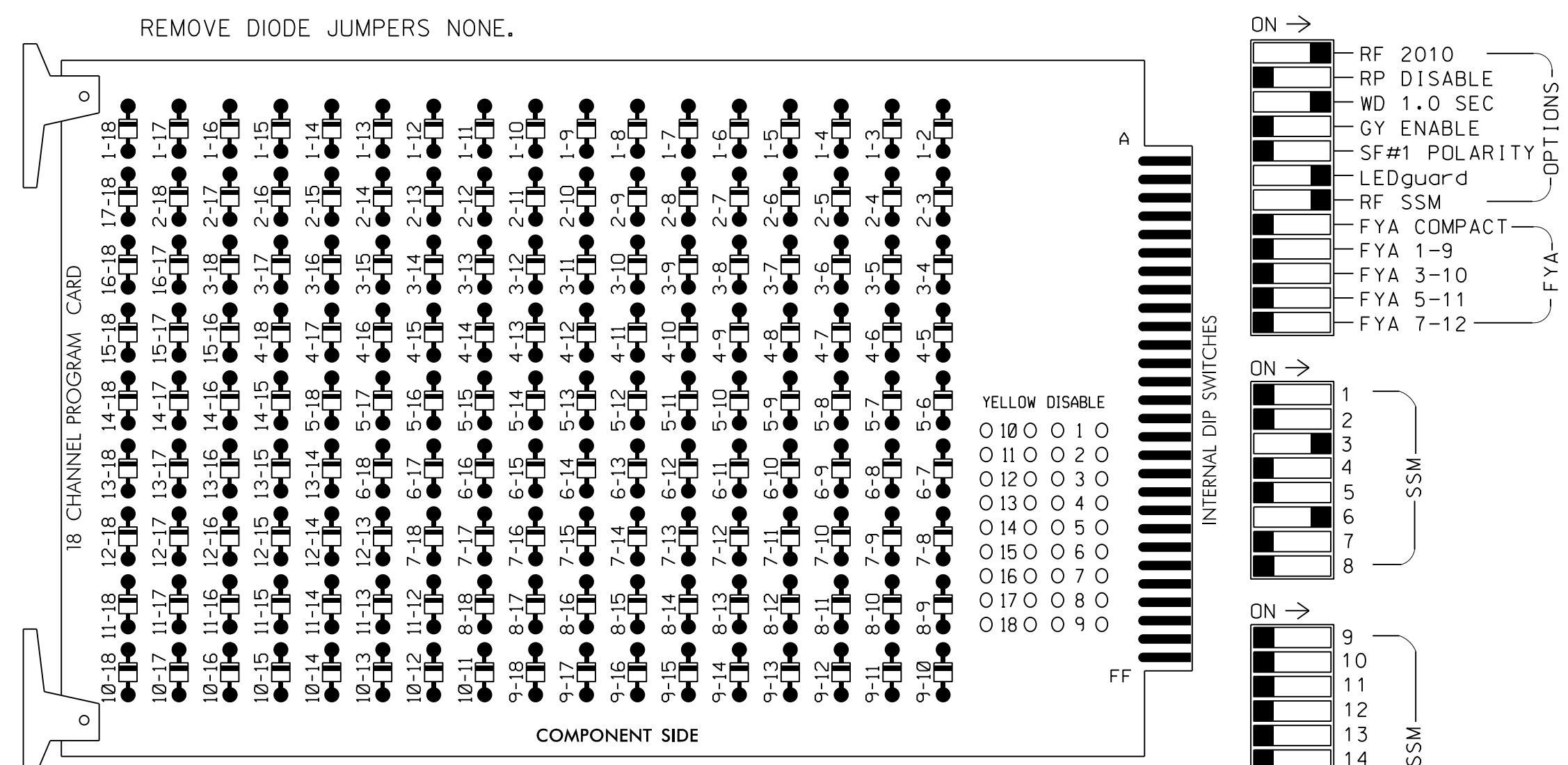
DocuSigned by: **Derrick Waller** 3/22/2023

SIG. INVENTORY NO. 12-1898

3/22/2023
 C:\Users\dwaller\OneDrive\Documents\Signal Design\12-1898.dgn
 User: dwaller

EDI MODEL 2018ECLip-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.
- Program controller to start up in phase 6 Green.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

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.....S4,S8
 PHASES USED.....3,6
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

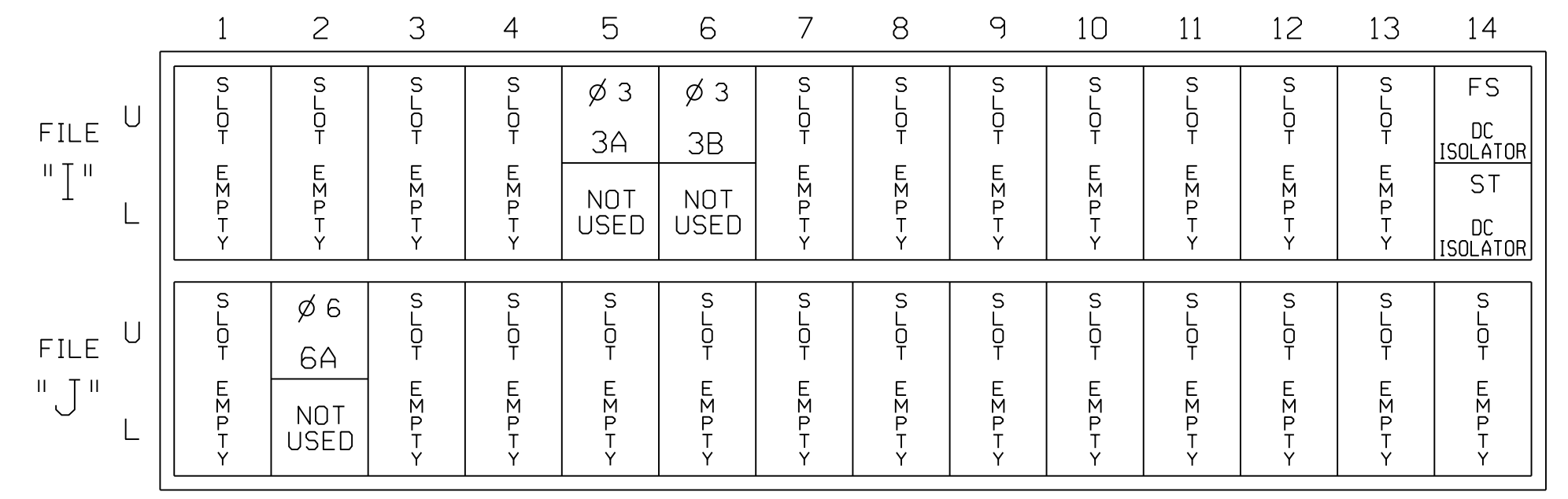
SIGNAL HEAD HOOK-UP CHART

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	NU	NU	31,32	NU	NU	NU	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED								134										
YELLOW								135										
GREEN																		
RED ARROW				116														
YELLOW ARROW				117														
GREEN ARROW				118				136										

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



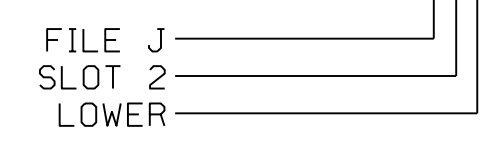
EX.: 1A, 2A, ETC. = LOOP NO.'S

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
3A	TB4-5,6	15U	58	3	3	YES				N
3B	TB4-9,10	16U	41	4	3	YES				N
6A	TB3-5,6	J2U	40	6	6	YES			X	N

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1898
 DESIGNED: MAY 2022
 SEALED: 3/22/2023
 REVISED: N/A

Final Design
 Electrical Detail - Sheet 1 of 1

US 21 (Charlotte Highway)
 at
 US 21 NB U-Turn to US 21 SB

Division 12 Iredell County Mooresville

PLAN DATE: May 2022 REVIEWED BY: E D Harris
 PREPARED BY: D A Waller REVIEWED BY: R M Muncey

REVISIONS	INIT.	DATE

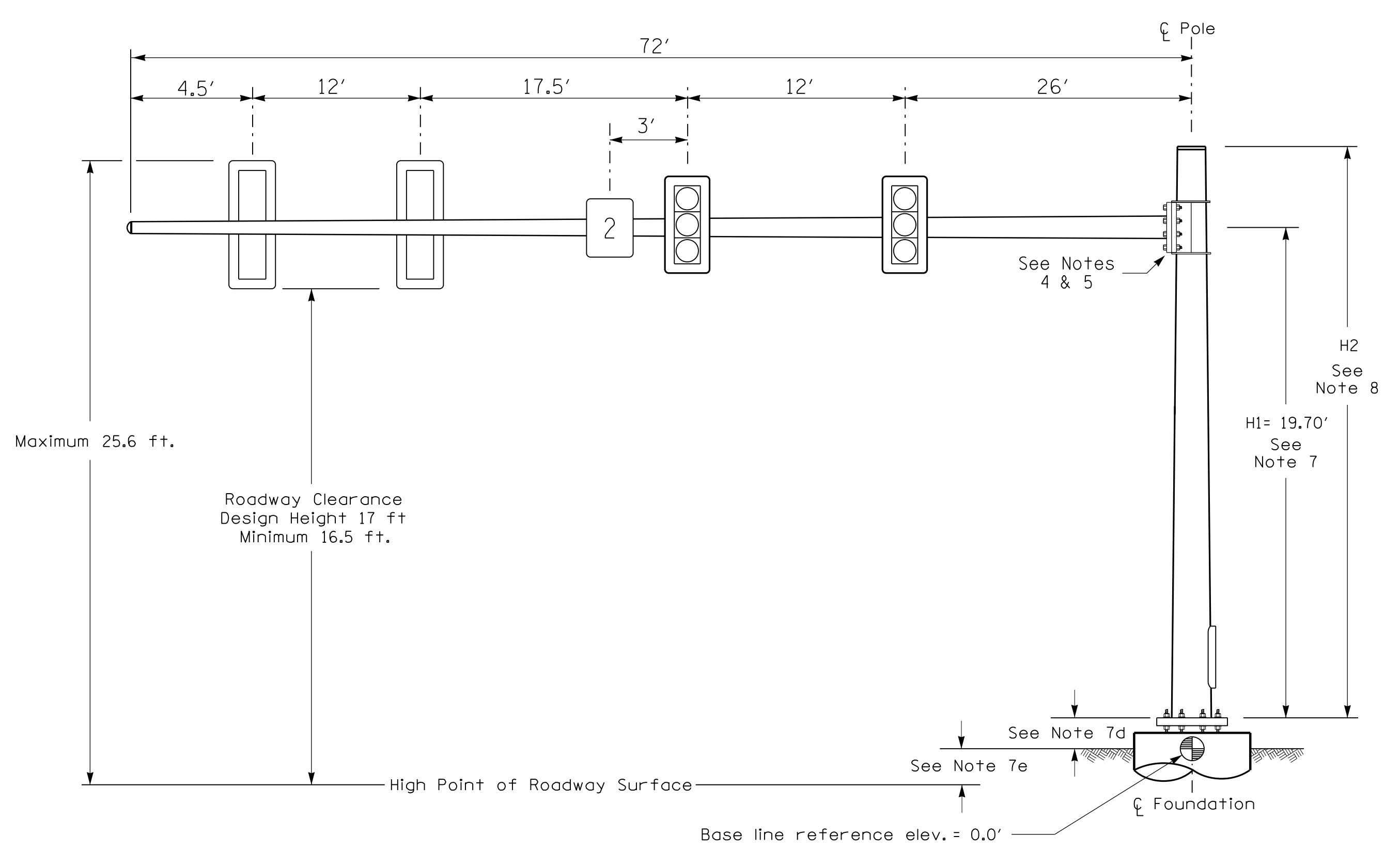
SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 042678
 DERRICK A. WALLER

DocuSigned by:
 Derrick Waller 3/22/2023
 DATE

SIG. INVENTORY NO. 12-1898

3/17/22 PM
 U:\Projects\2022\12-1898\EDM\Detail\EDI Model 2018ECLip-NC Conflict Monitor.dgn
 User: dawaller

Design Loading for METAL POLE NO. 1



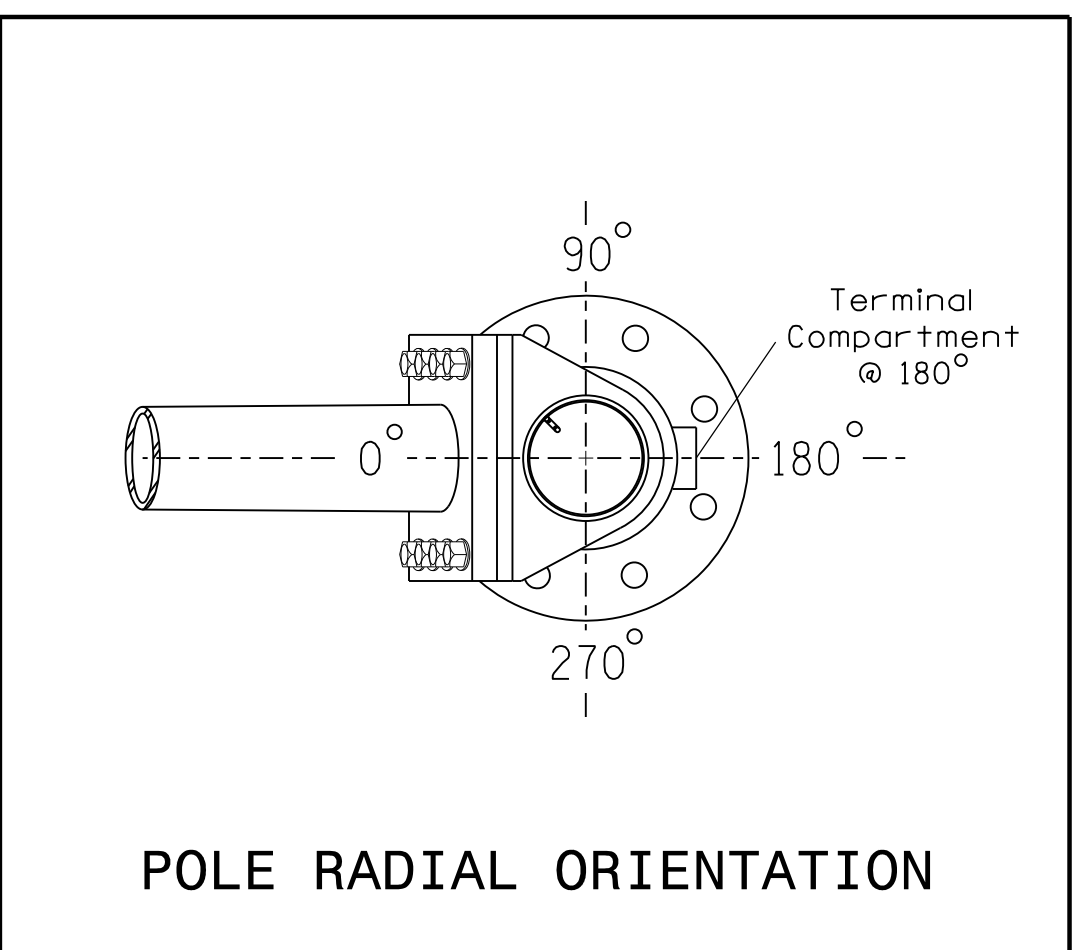
Elevation View

SPECIAL NOTE

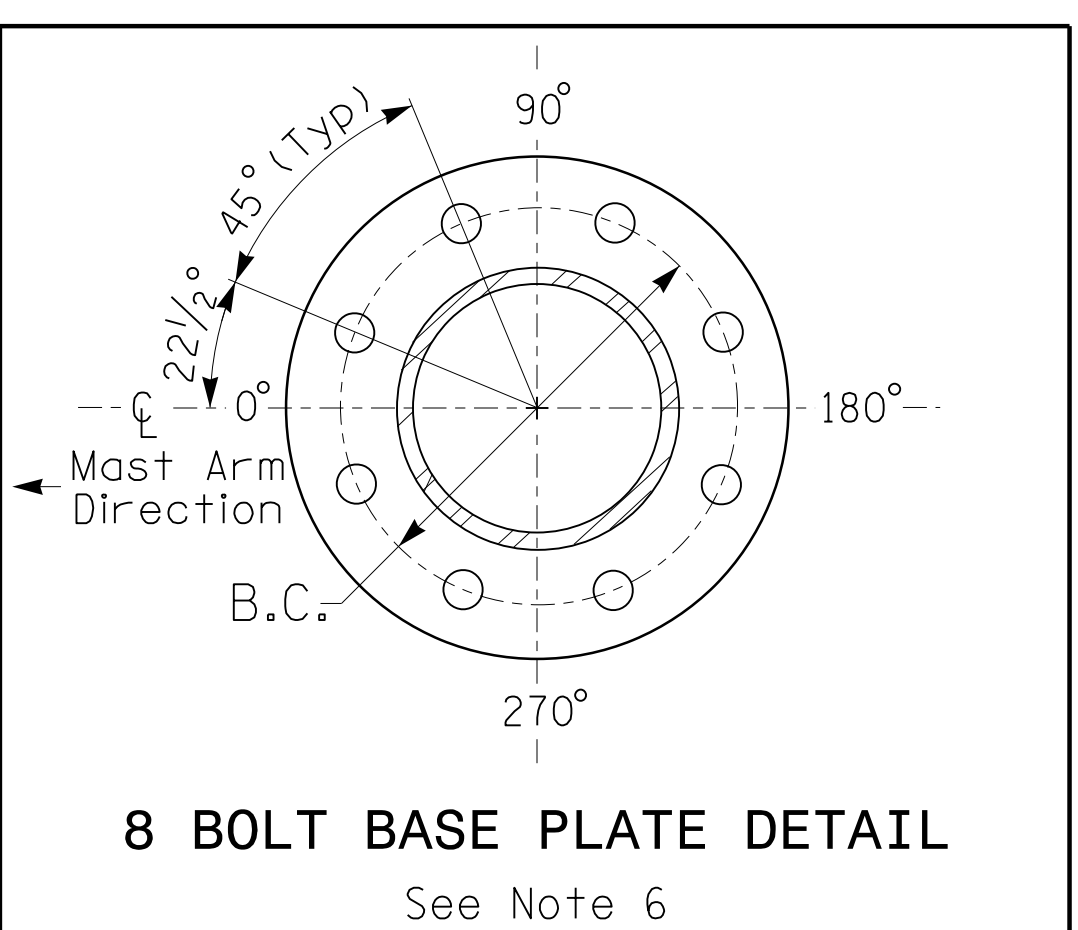
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+0.69 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.

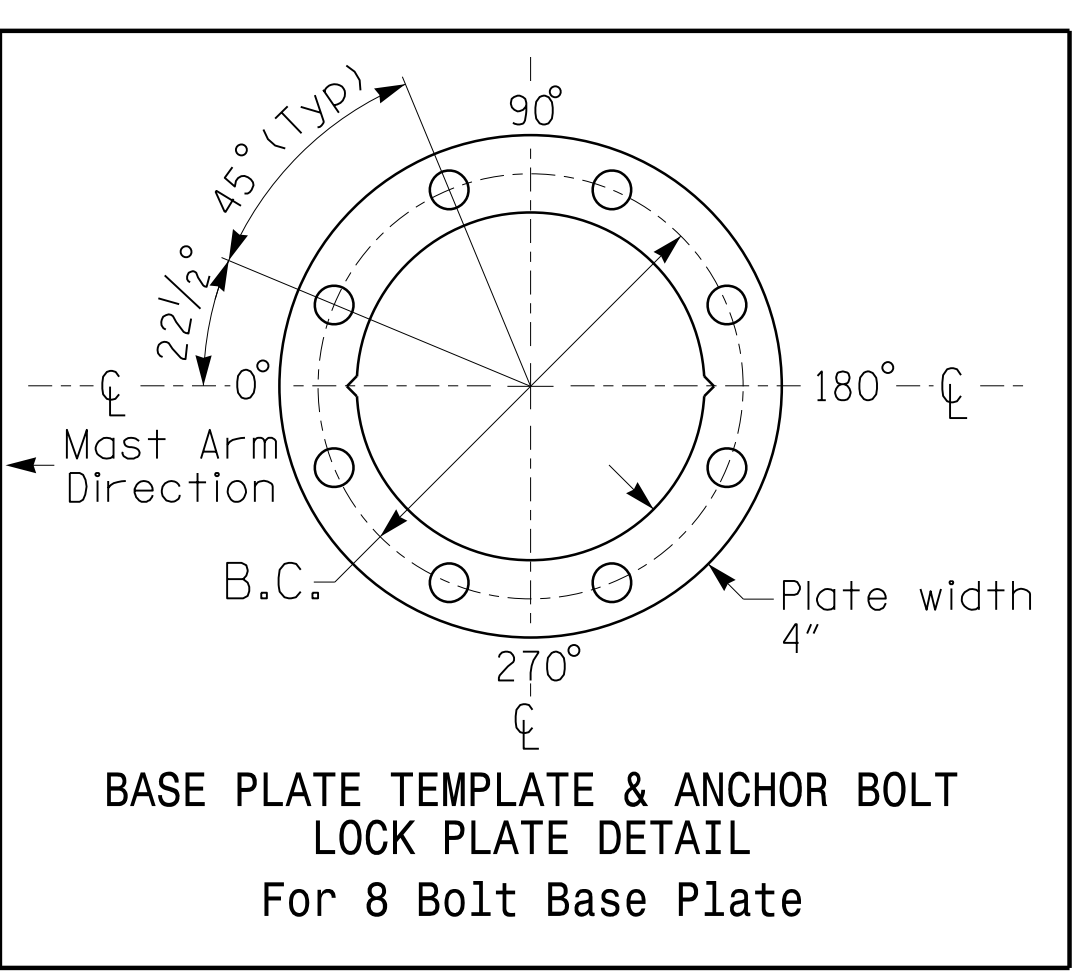


POLE RADIAL ORIENTATION



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
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	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.
- 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)

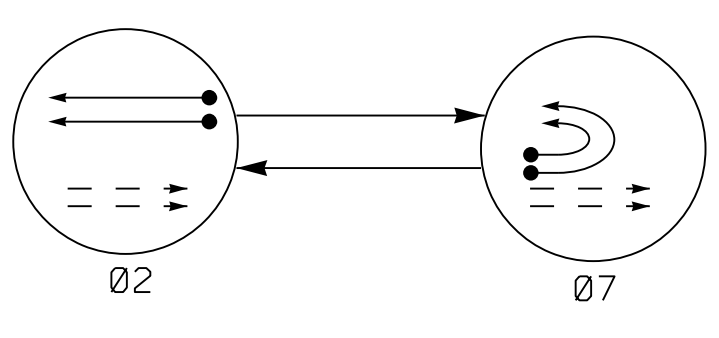
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<p>Prepared For the Offices of: Transportation Mobility and Safety Division NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Design Section</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>US 21 (Charlotte Highway) at US 21 NB U-Turn to US 21 SB</p>		
	<p>Division 12 Iredell County Mooresville</p> <p>PLAN DATE: May 2022 REVIEWED BY: E D Harris</p> <p>PREPARED BY: J Hambright REVIEWED BY: R M Muncey</p>		
<p>SCALE</p> <p>0 N/A</p> <p>N/A</p>	<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>

2:17:24 PM U:\Projects\Signal\Metal Pole\Load\loading Diagrams\loading Mast Arm_12-1898_Pole 3.dgn User: dawillbr

DocuSigned by: Derrick Waller 3/22/2023 3:22:23 PM SIG. INVENTORY NO. 12-1898

PHASING DIAGRAM



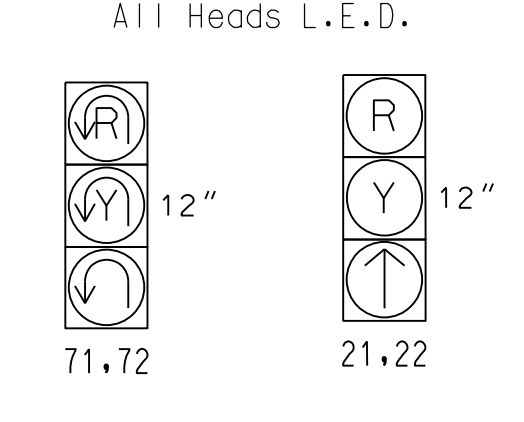
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

Table with columns: SIGNAL FACE, PHASE (02, 07, F L S H), and signal indicators.

SIGNAL FACE I.D.



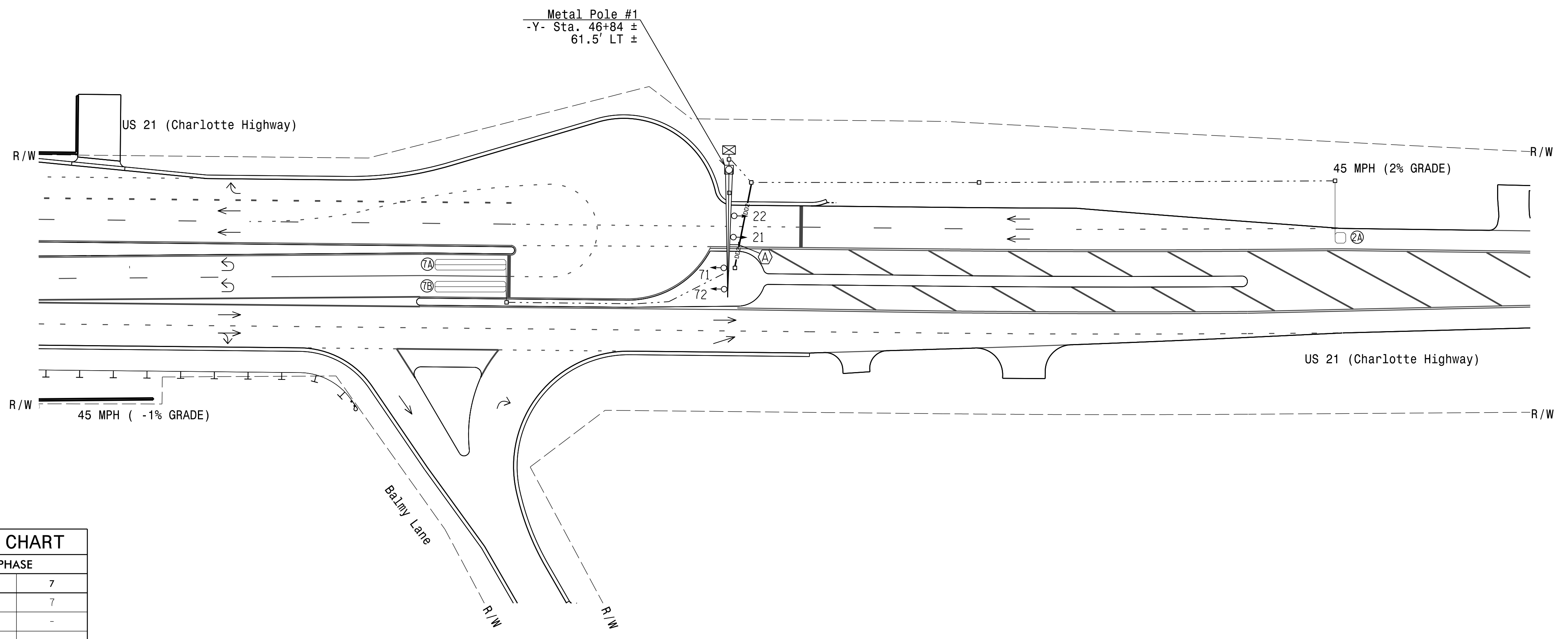
ASC/3 DETECTOR INSTALLATION CHART

Table with columns: LOOP, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, PHASE, CALLING, EXTEND TIME, DELAY TIME, USE ADDED INITIAL, TYPE, SYSTEM LOOP, NEW CARD.

2 Phase Fully Actuated Signal System 11210

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. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

- PROPOSED: Traffic Signal Head, Pedestrian Signal Head, Inductive Loop Detector, etc.
EXISTING: Modified Signal Head, Signal Pole with Guy, etc.

ASC/3 TIMING CHART

Timing chart table with columns: FEATURE, PHASE 2, PHASE 7. Rows include Min Green, Walk, Ped Clear, Veh. Extension, 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.

New Installation

Stantec logo and contact information: Stantec Consulting Services Inc., 801 Jones Franklin Road-Suite 300, Raleigh, NC 27606.

Professional Engineer seal for J. Hambricht, State of North Carolina, License No. 042678.

Project information: US 21 (Charlotte Highway) at US 21 SB U-Turn to US 21 NB, Iredell County, Moore'sville, NC. Prepared by J. Hambricht, reviewed by E.D. Harris and R.M. Nuncey.

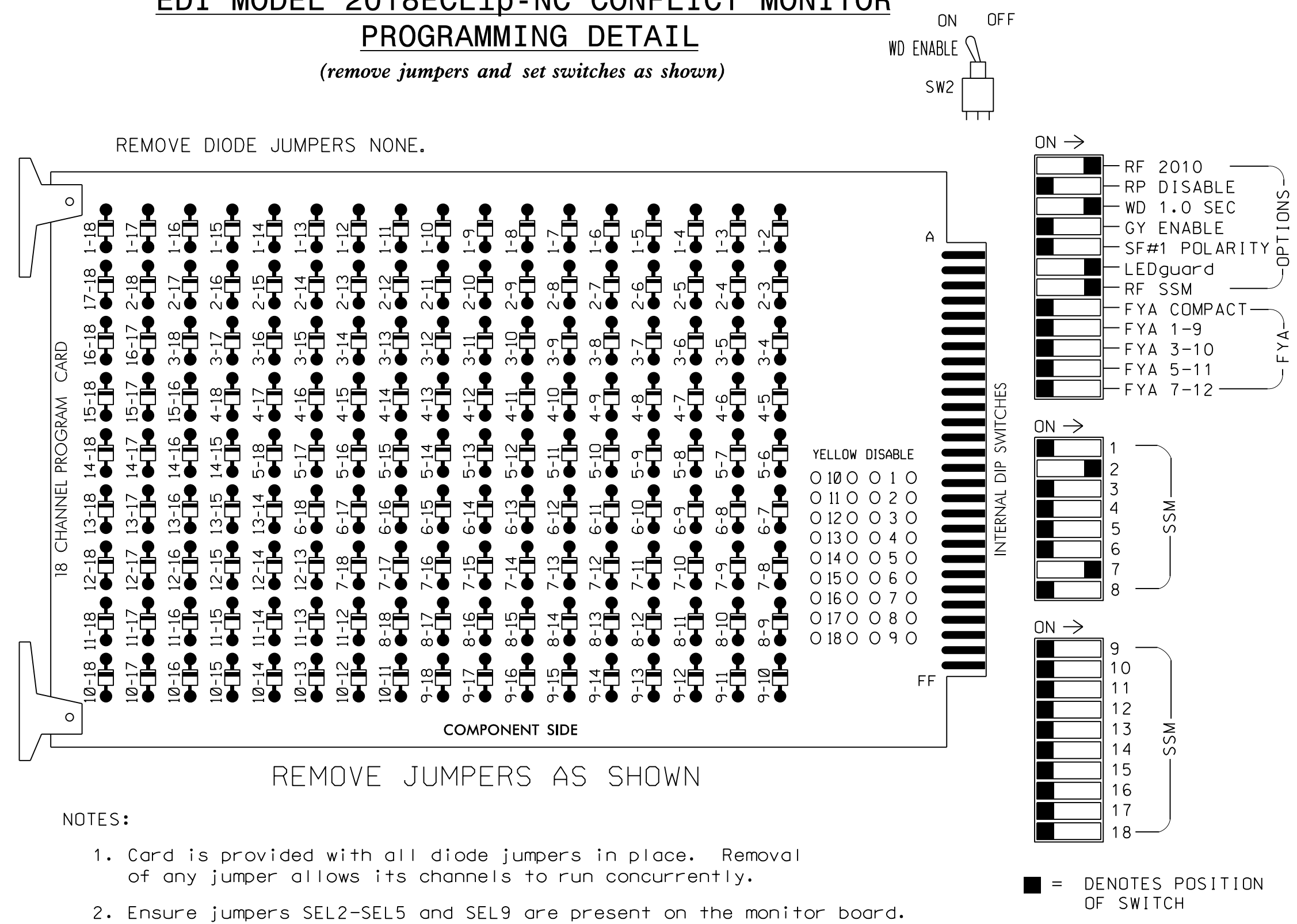
Professional Engineer seal for Derrick Waller, State of North Carolina, License No. 042678.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

3/22/2023 10:41:11 AM Traffic:cas:gnal:sdas:gnas:gnal Desi:gn:et:inal Desi:gn:et:3833C.as:ig:den:12-1899.dgn User:dwil118r

EDI MODEL 2018ECLip-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.
- Program controller to start up in phase 2 Green.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

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,S10
 PHASES USED.....2,7
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

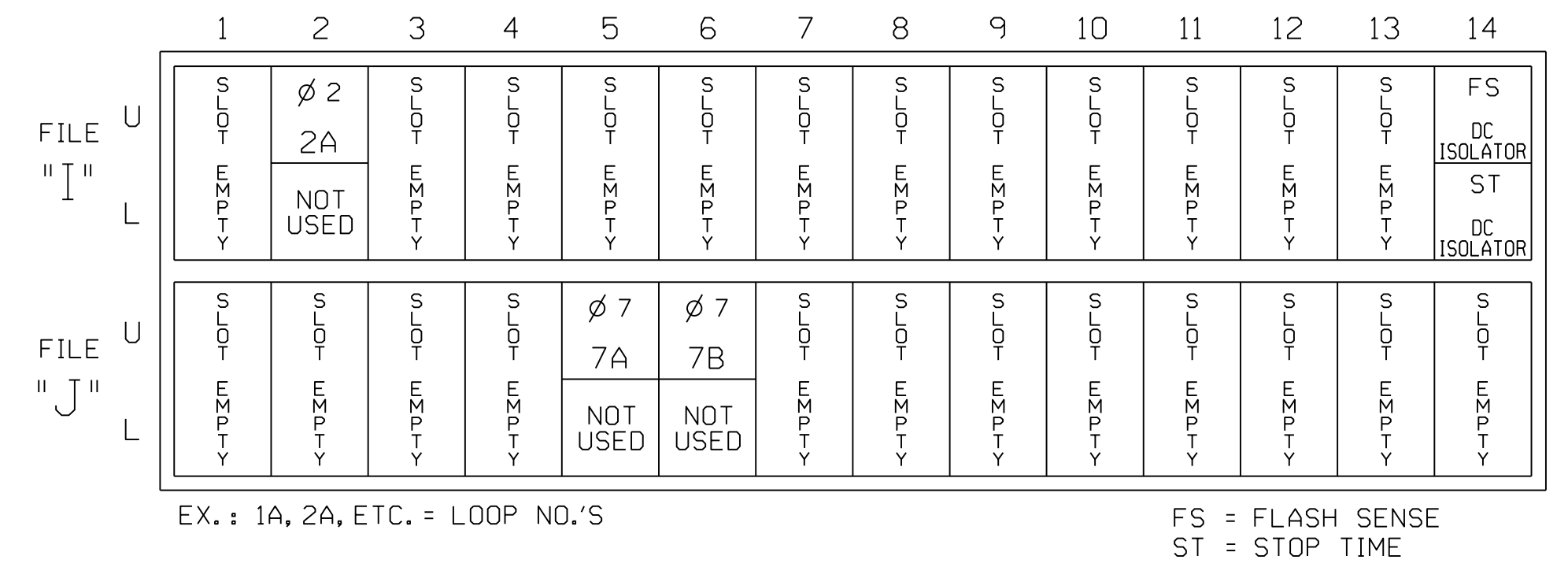
SIGNAL HEAD HOOK-UP CHART

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	NU	NU	71,72	NU	NU	NU	NU	NU	NU	NU	NU
RED		128																
YELLOW		129																
GREEN																		
RED ARROW										128								
YELLOW ARROW										129								
GREEN ARROW		130								124								

NU = Not Used

INPUT FILE POSITION LAYOUT

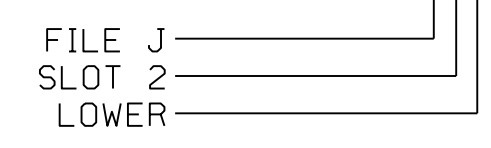
(front view)



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			X	N
7A	TB5-5,6	J5U	57	7	7	YES				N
7B	TB5-9,10	J6U	42	8	7	YES				N

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1899
 DESIGNED: MAY 2022
 SEALED: 3/22/2023
 REVISED: N/A

Final Design
 Electrical Detail - Sheet 1 of 1

US 21 (Charlotte Highway) at US 21 SB U-Turn to US 21 NB

Division 12 Iredell County Mooresville

PLAN DATE: May 2022	REVIEWED BY: E D Harris
PREPARED BY: D A Waller	REVIEWED BY: R M Muncey

REVISIONS	INIT.	DATE

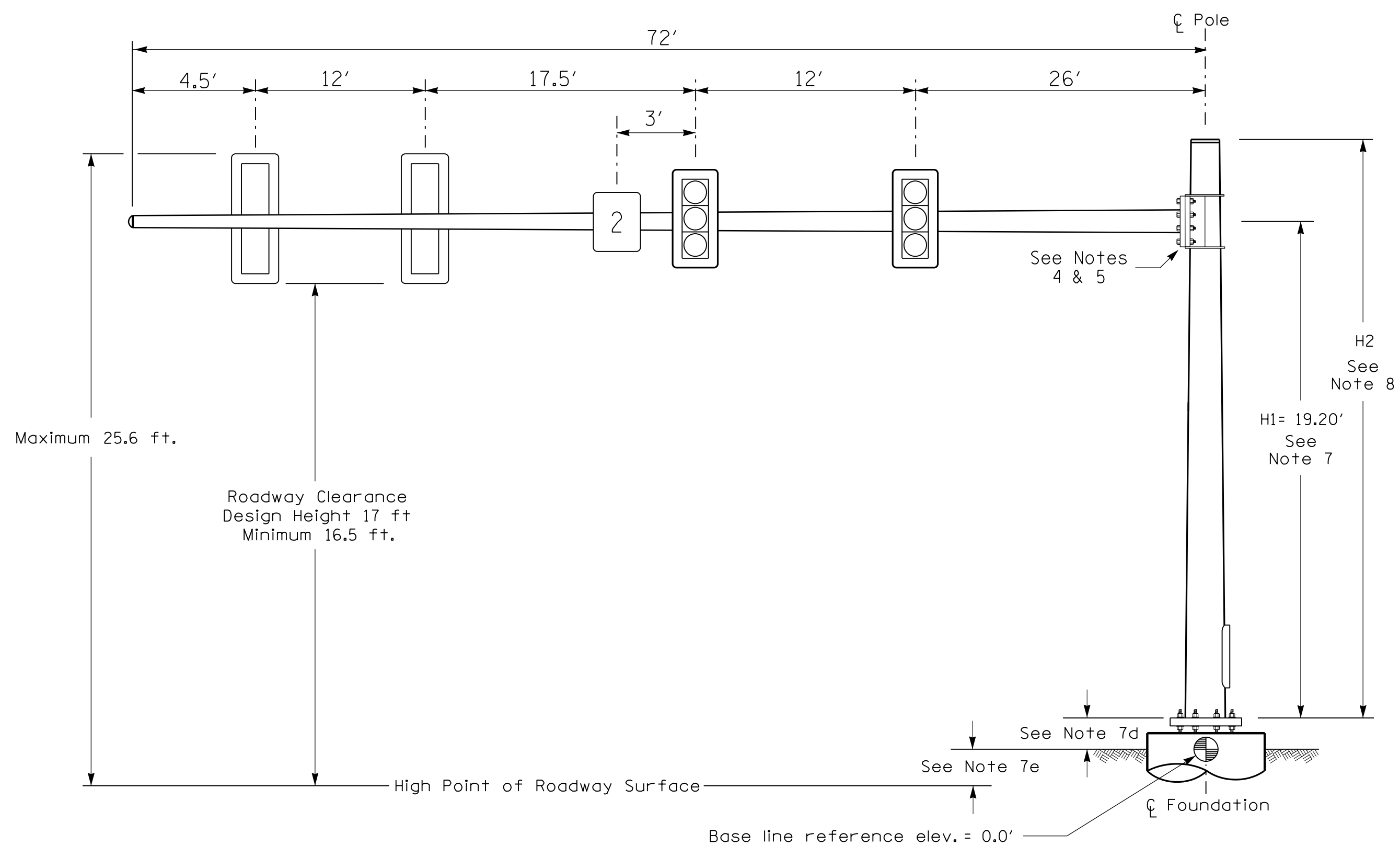
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by: **Derrick Waller** 3/22/2023

SIG. INVENTORY NO. 12-1899

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Design Loading for METAL POLE NO. 1



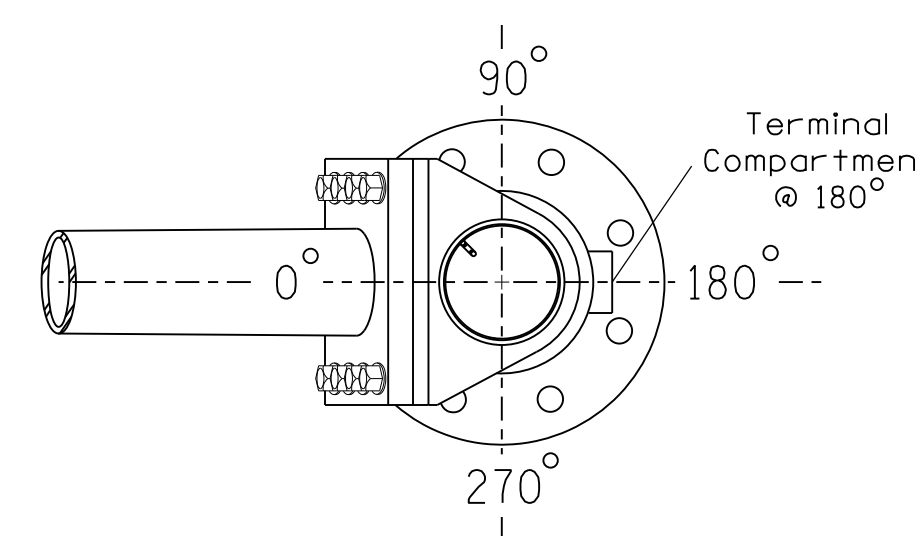
Elevation View

SPECIAL NOTE

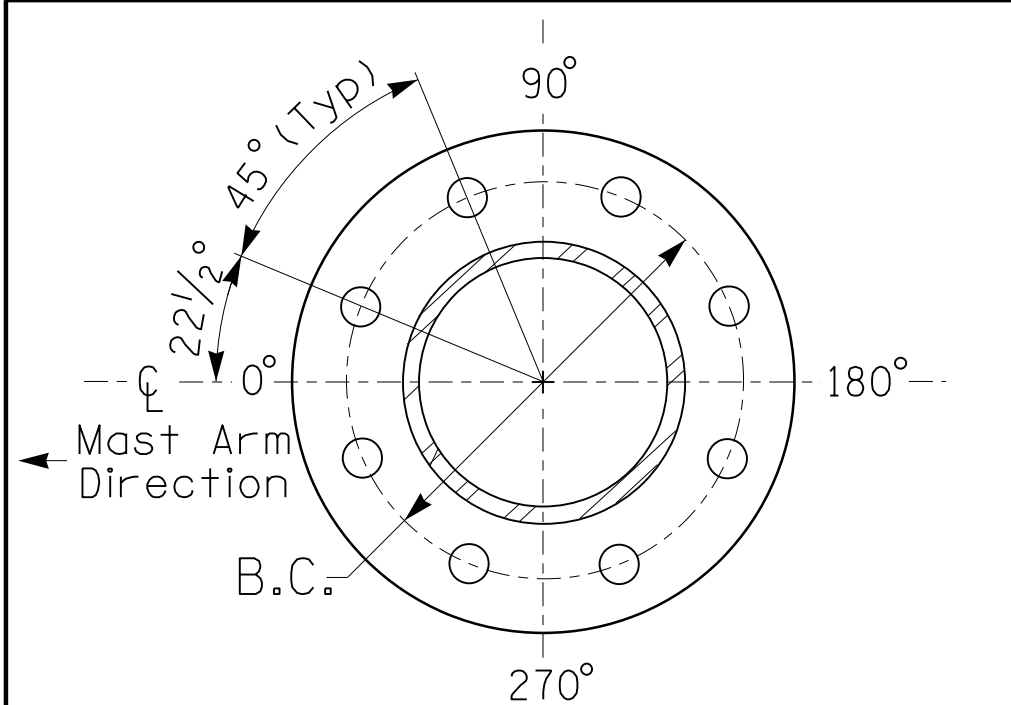
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:		Pole 1
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Elevation difference at High point of roadway surface		+0.11 ft.
Elevation difference at Edge of travelway or face of curb		+/-0.0 ft.

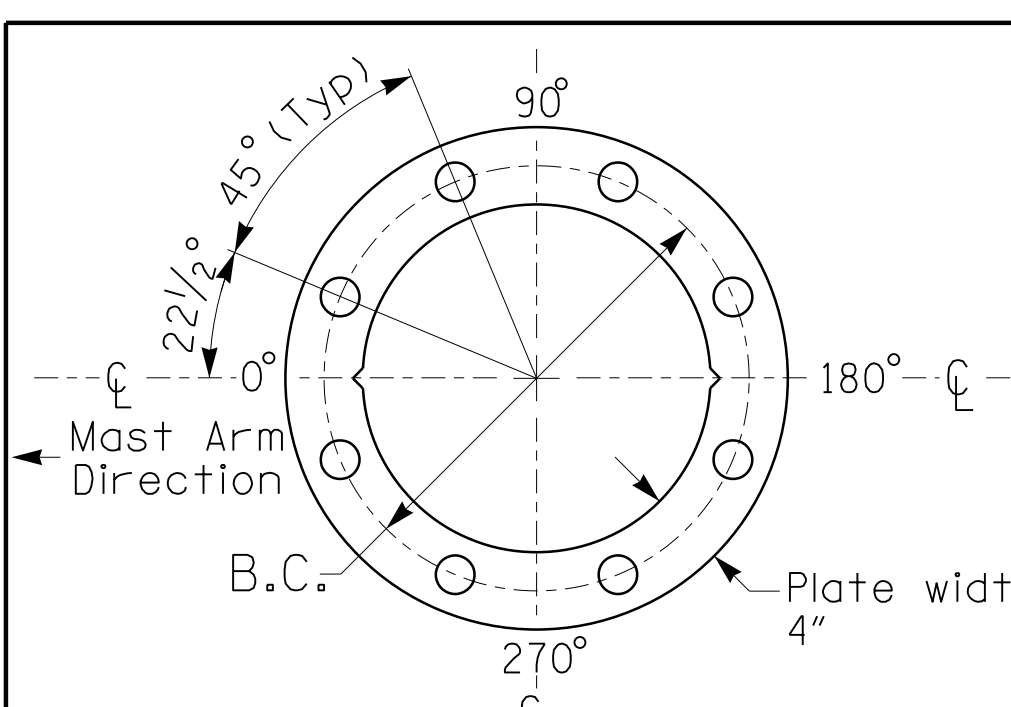


POLE RADIAL ORIENTATION



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
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
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	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.
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DESIGN REQUIREMENTS

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NCDOT Wind Zone 4 (90 mph)

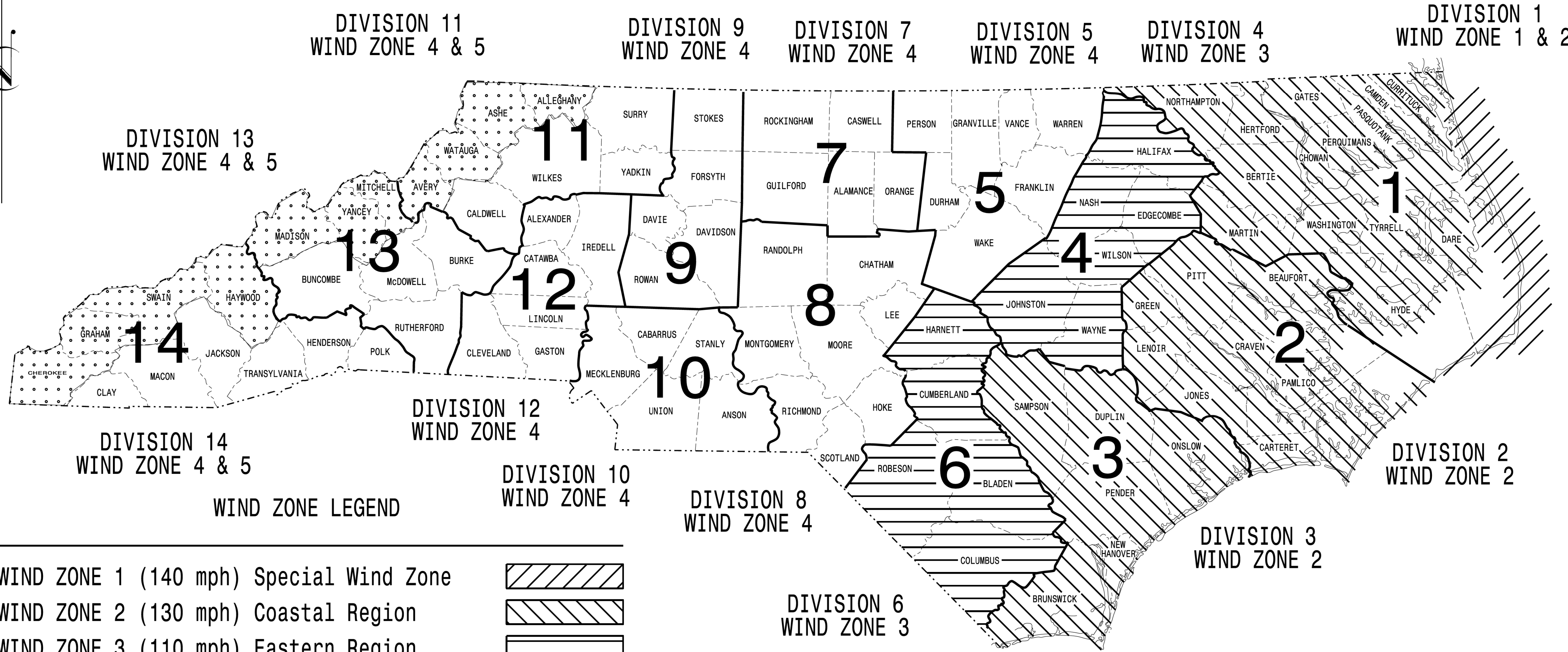
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

 Prepared for the Offices of: Transportation Mobility and Safety Division NORTH CAROLINA DEPARTMENT OF TRANSPORTATION SIGNAL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529	US 21 (Charlotte Highway) at US 21 SB U-Turn to US 21 NB		
	Division 12 Iredell County Mooresville		
	PLAN DATE: May 2022	REVIEWED BY: E D Harris	
	PREPARED BY: J Hambright	REVIEWED BY: R M Muncey	
SCALE 0 N/A N/A	REVISIONS _____ _____ _____	INIT. DATE _____ _____ _____	DocuSigned by: 3/22/2023 DATE _____ DATE _____ SIG. INVENTORY NO. 12-1899

**STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS**

PROJECT I.D. NO. R-3833C	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*

INDEX OF PLANS

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

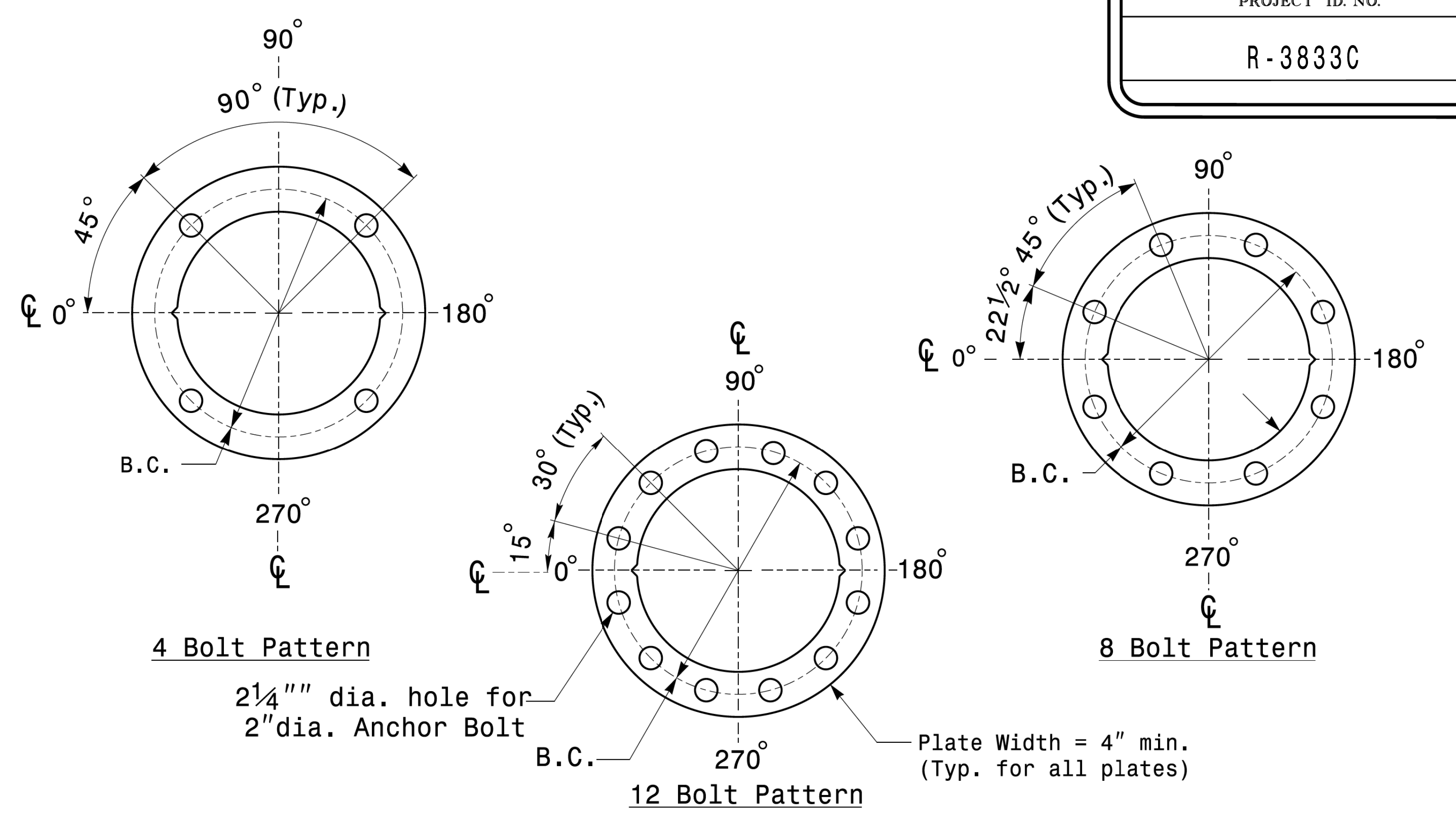
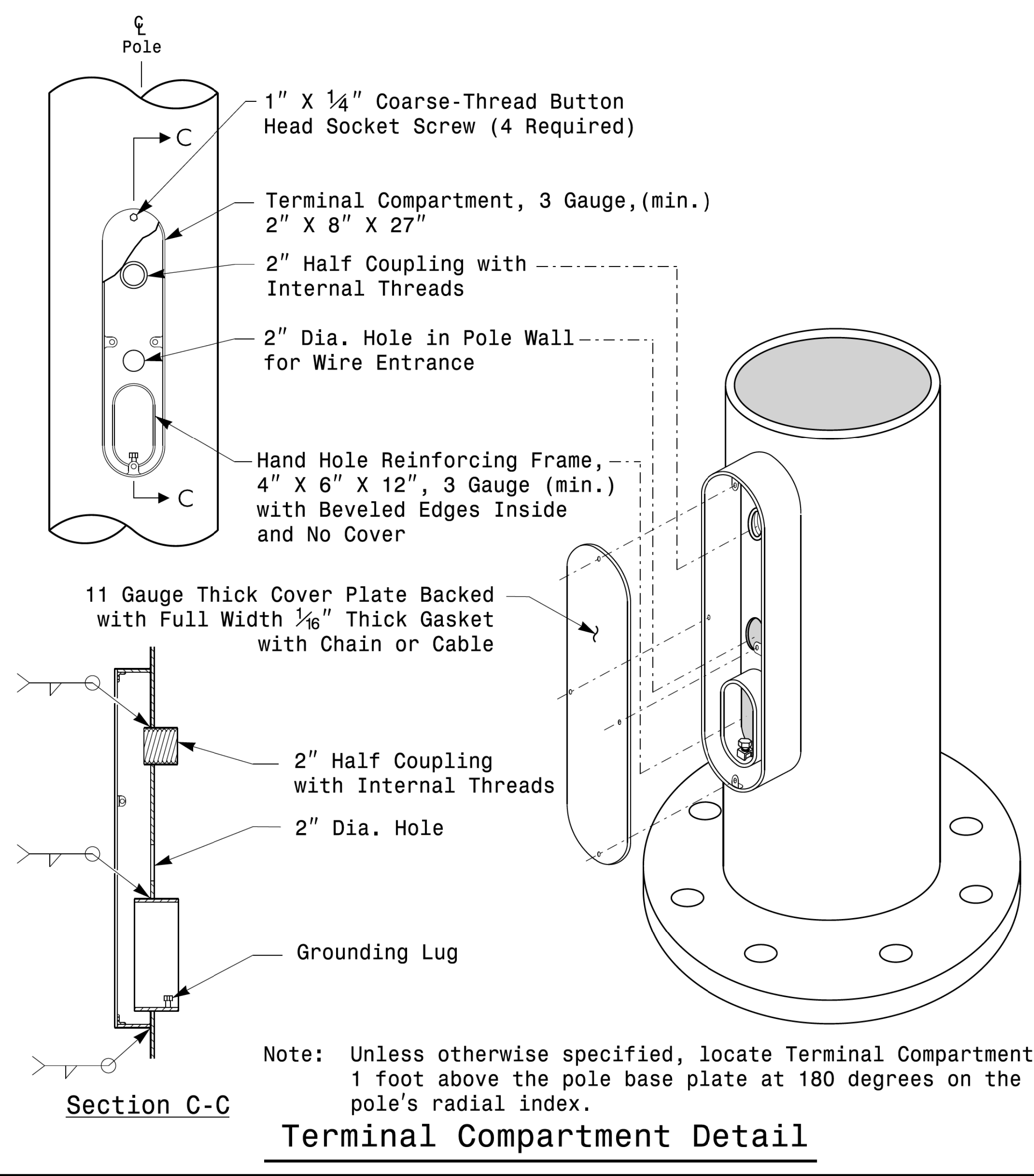
J. P. GALLOWAY, P.E. - STATE SIGNALS ENGINEER

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

SEAL

DocuSigned by:
Debesh C. Sarkar
SIGNATURE

10/11/2017
DATE



Construct Templates and Plates from 1/4" min. thick Steel. Galvanizing is not required.

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. _____	_____

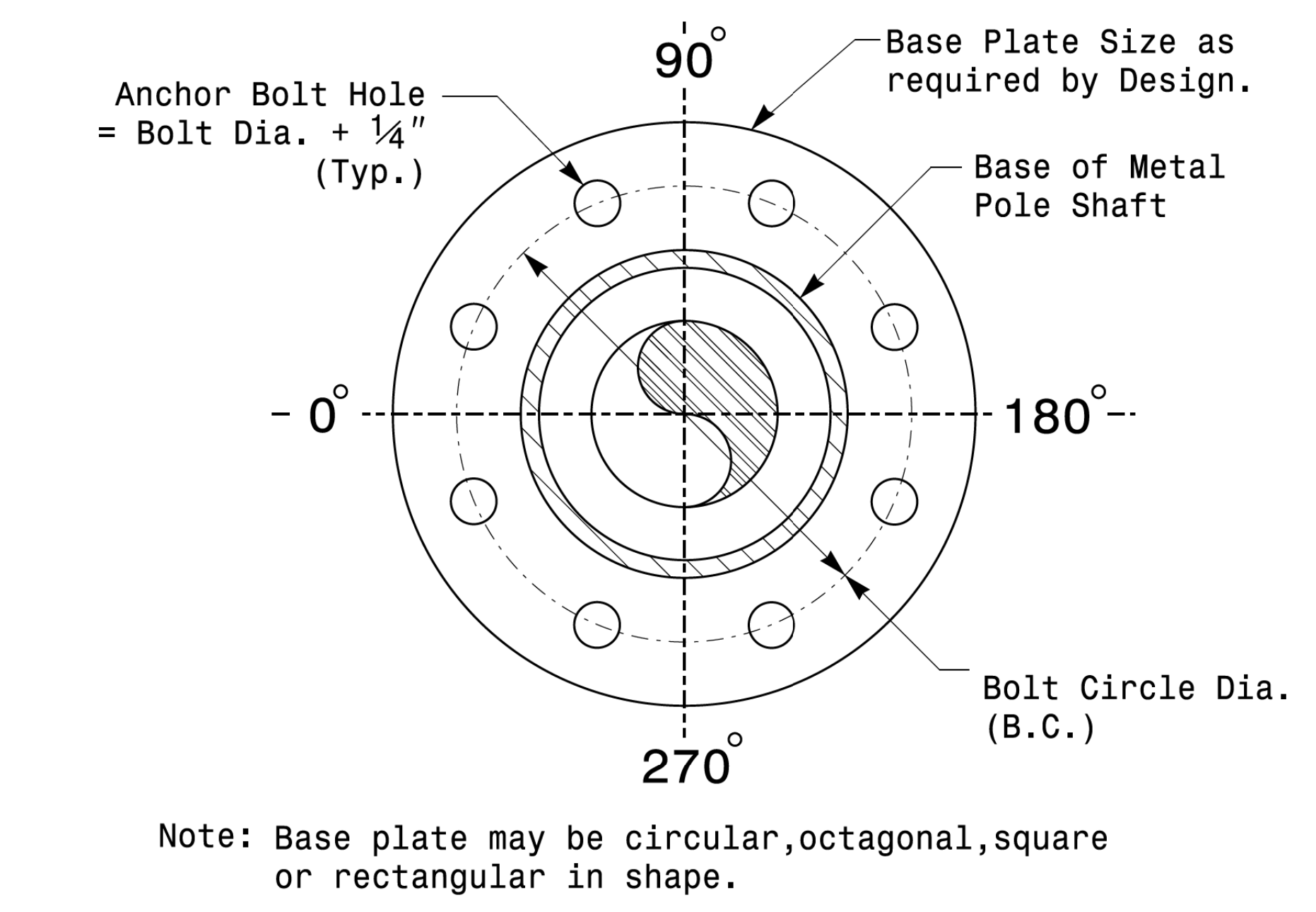
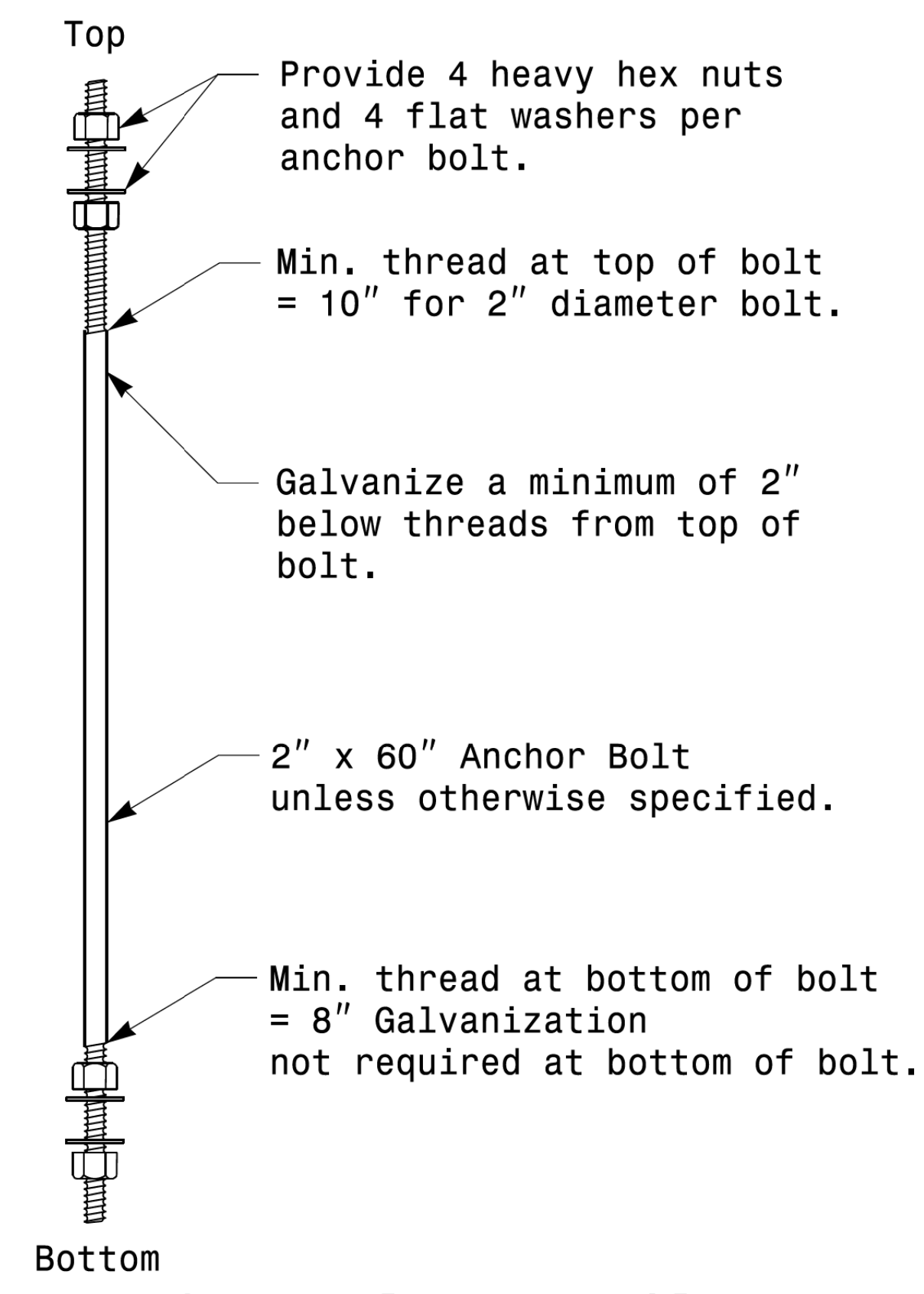
MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	_____
NCDOT SIG. INV. NO. _____	_____
NCDOT POLE NO. _____	_____

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

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

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

Identification Tag Details



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

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

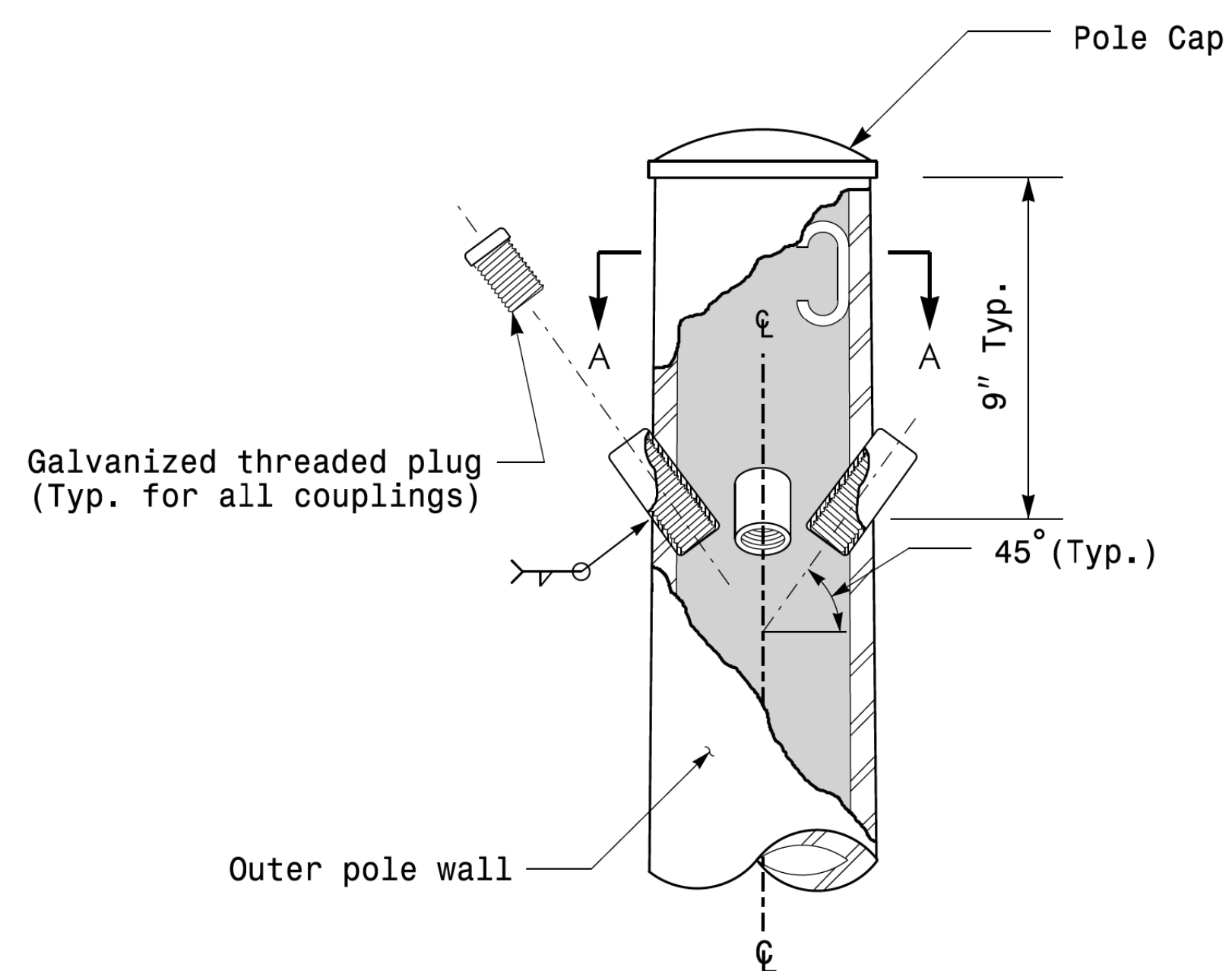
SEAL

Designed by: Deshi C. Sarkar

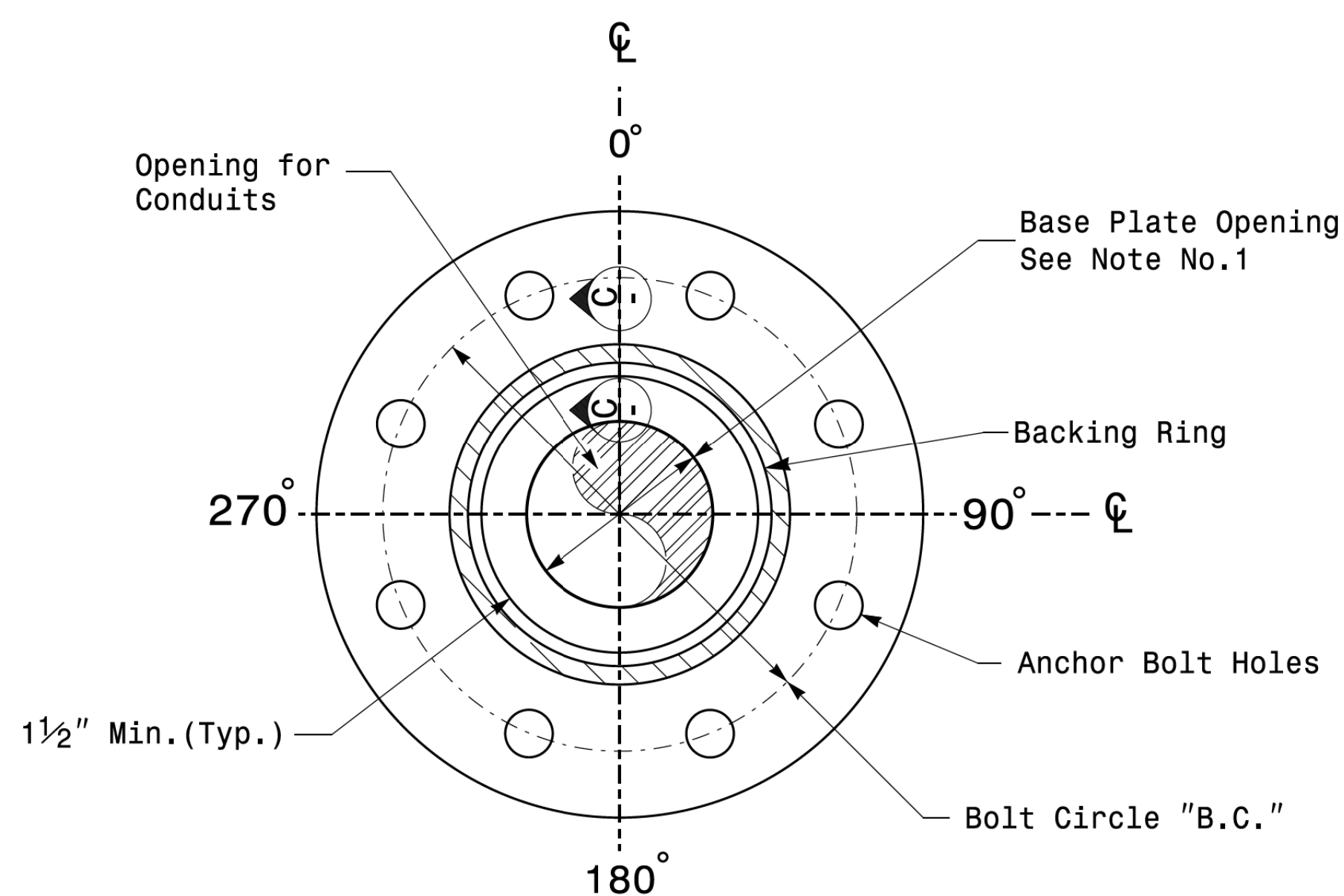
DATE: 10/11/2017

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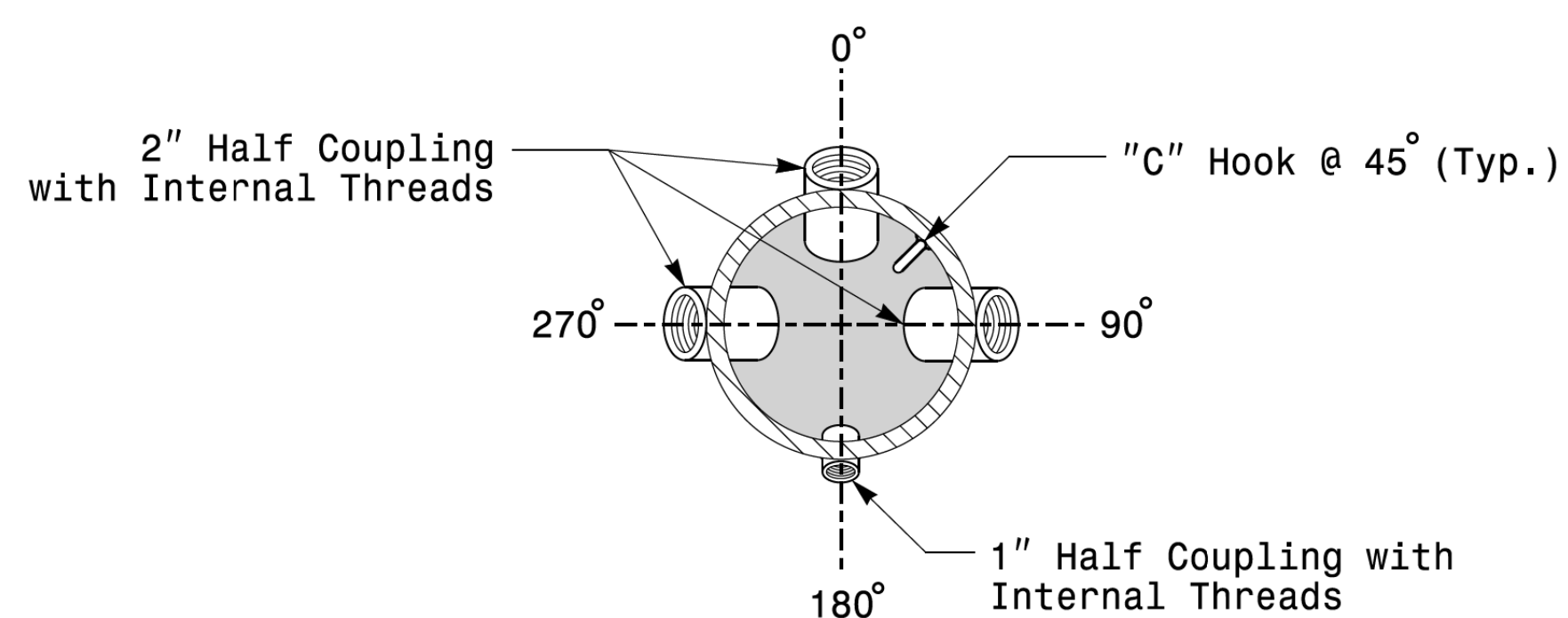
Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



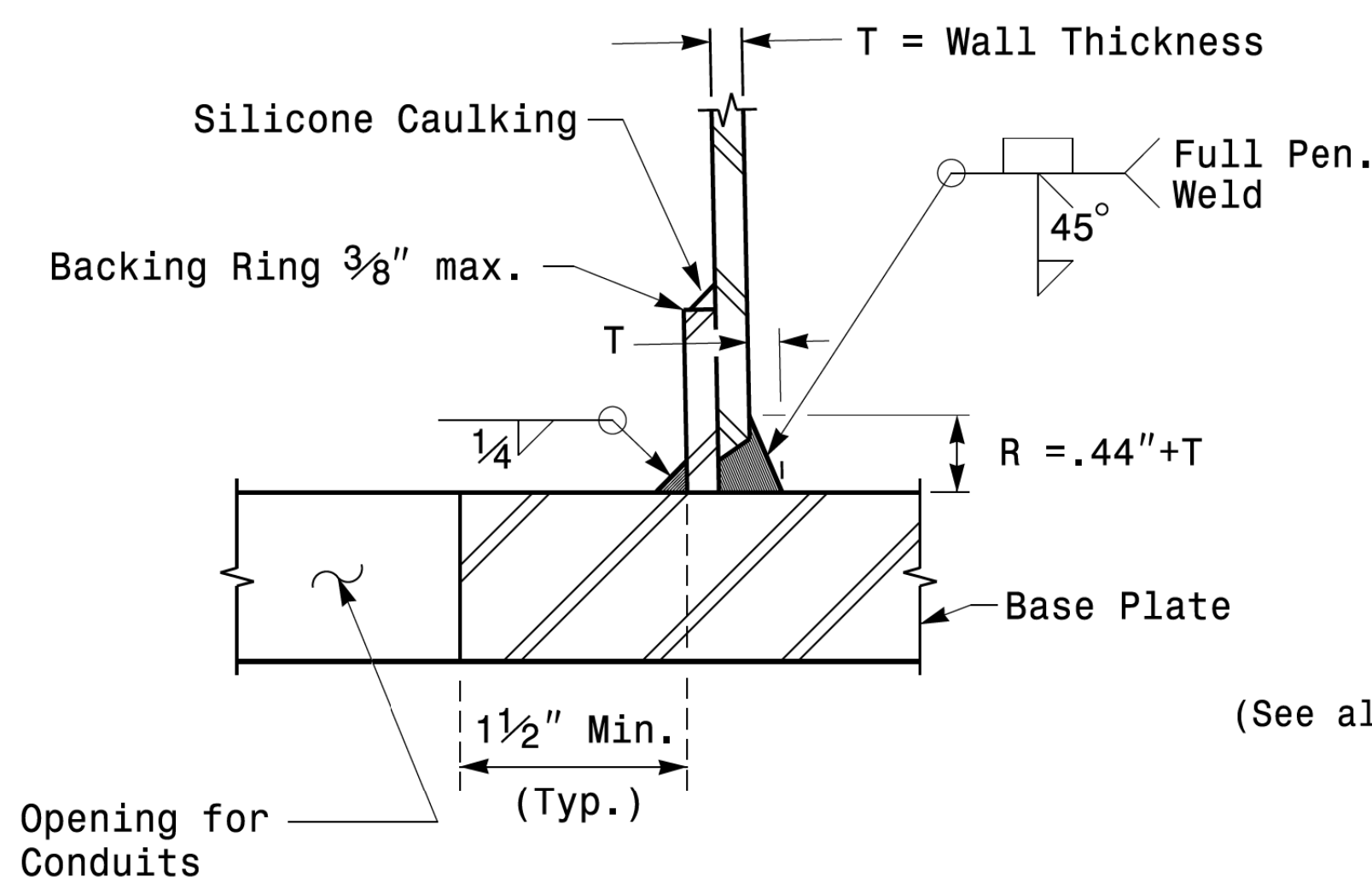
Cable Entrances at Top of Pole



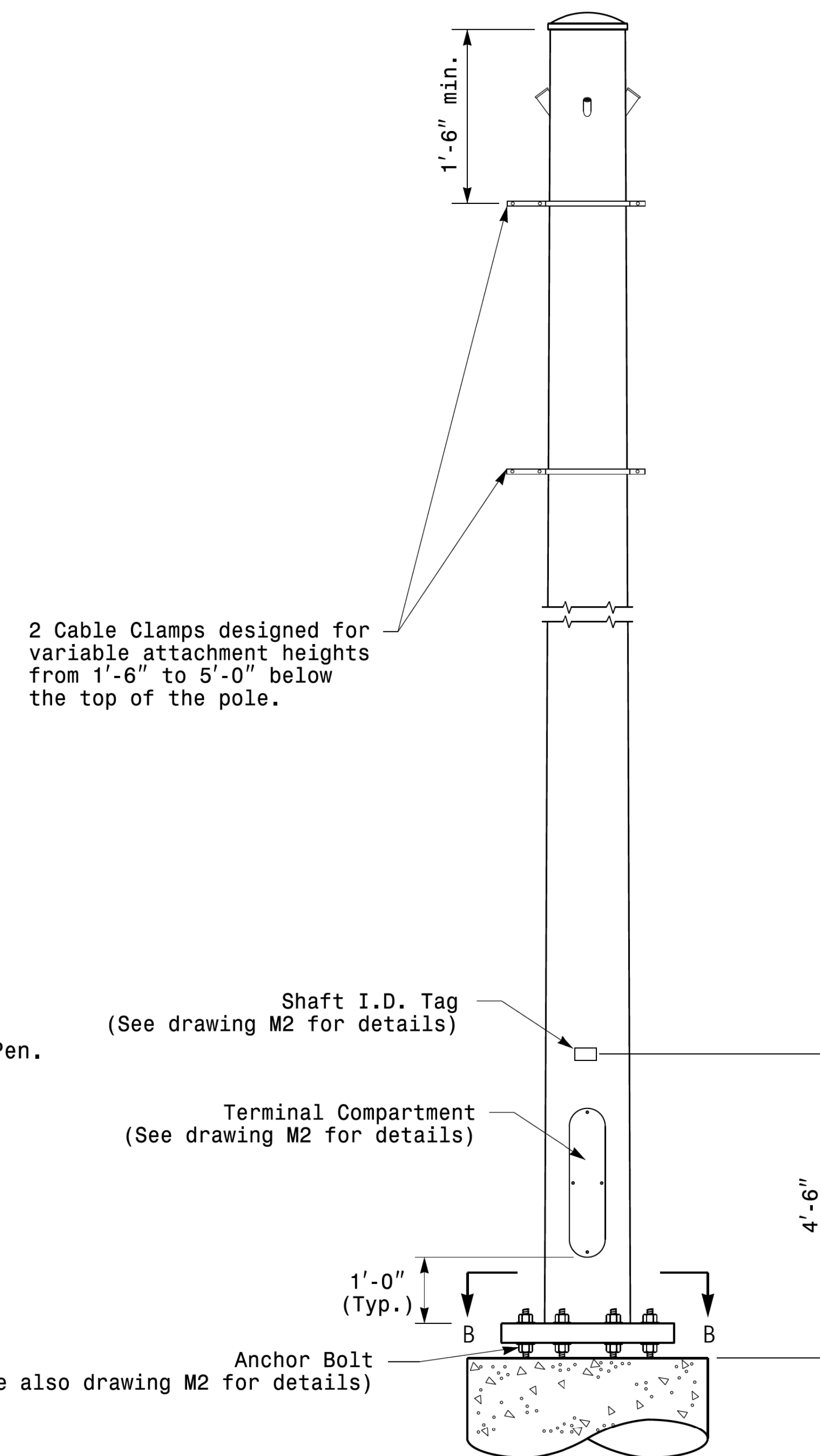
Section B-B
Pole Base Plate Details
(8 and 12 Bolt Pattern)



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

2 Cable Clamps designed for variable attachment heights from 1'-6" to 5'-0" below the top of the pole.

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 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

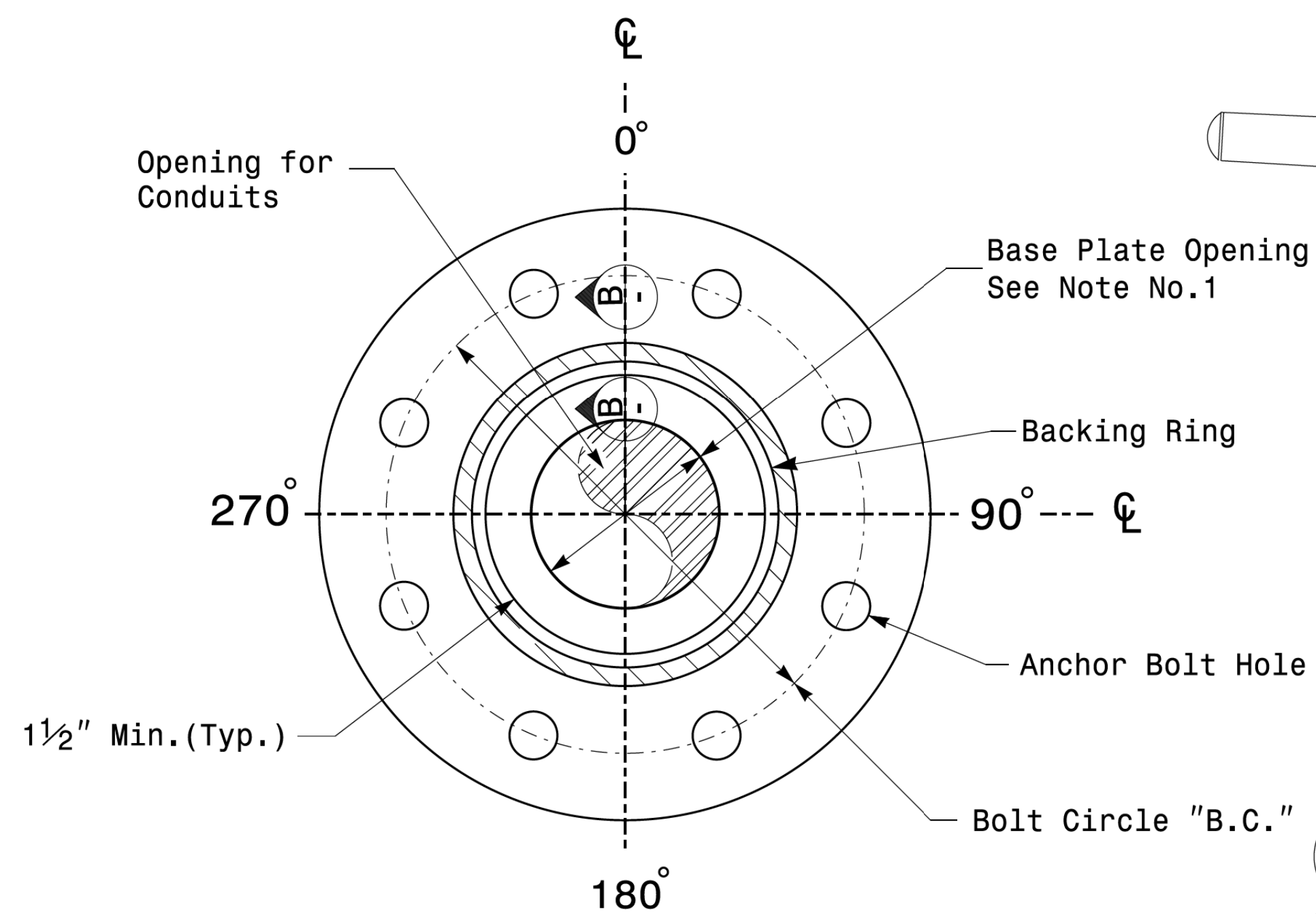
10/11/2017

DATE

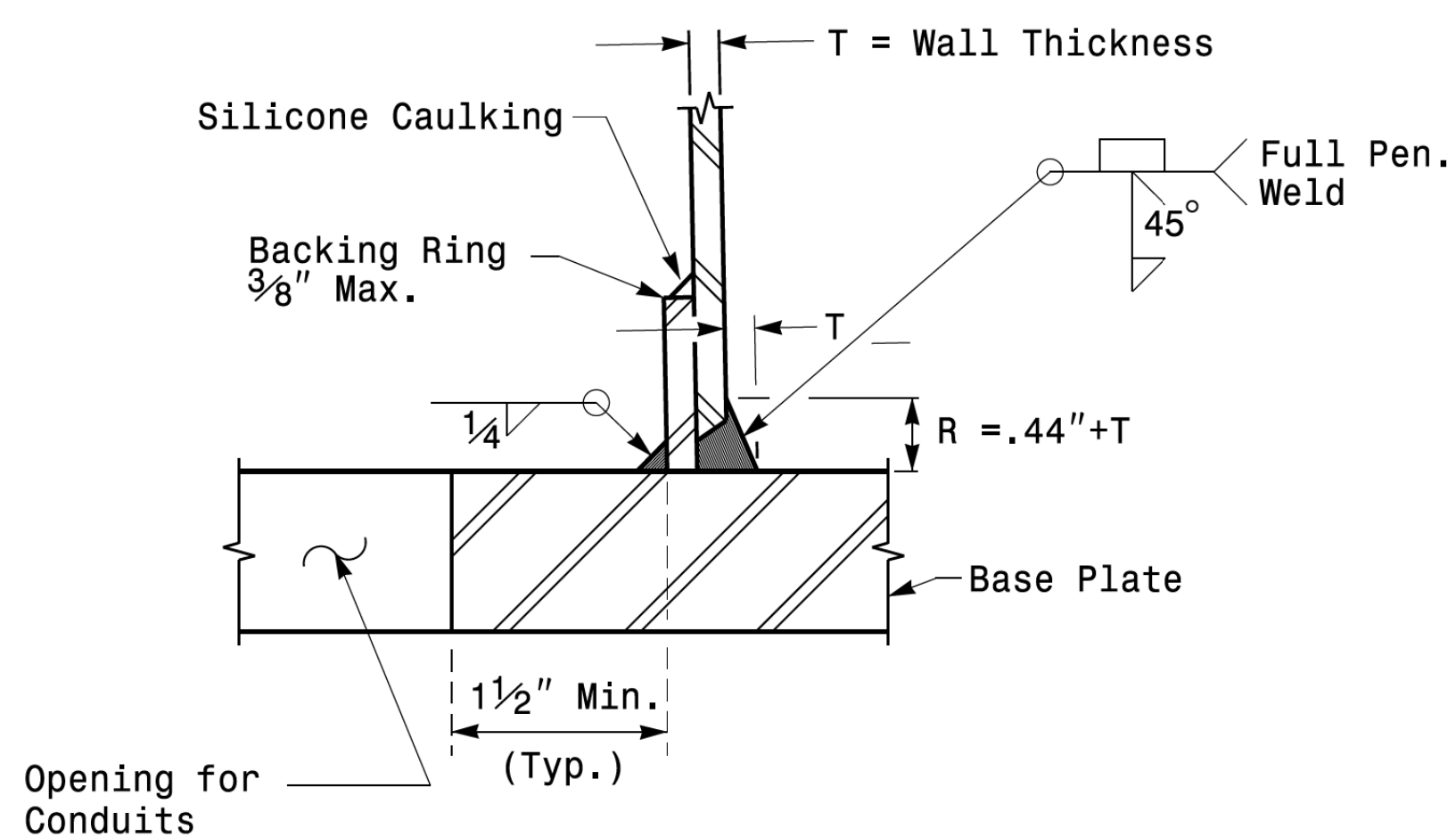
Fabrication Details – Strain Poles

11-01-2017 08:25 P:\13560\115 Signal\sig1 Design Section\Eastern Region\13560\115\2014 Sig.M3 Std. Fabrication Details-Strain Poles.dgn

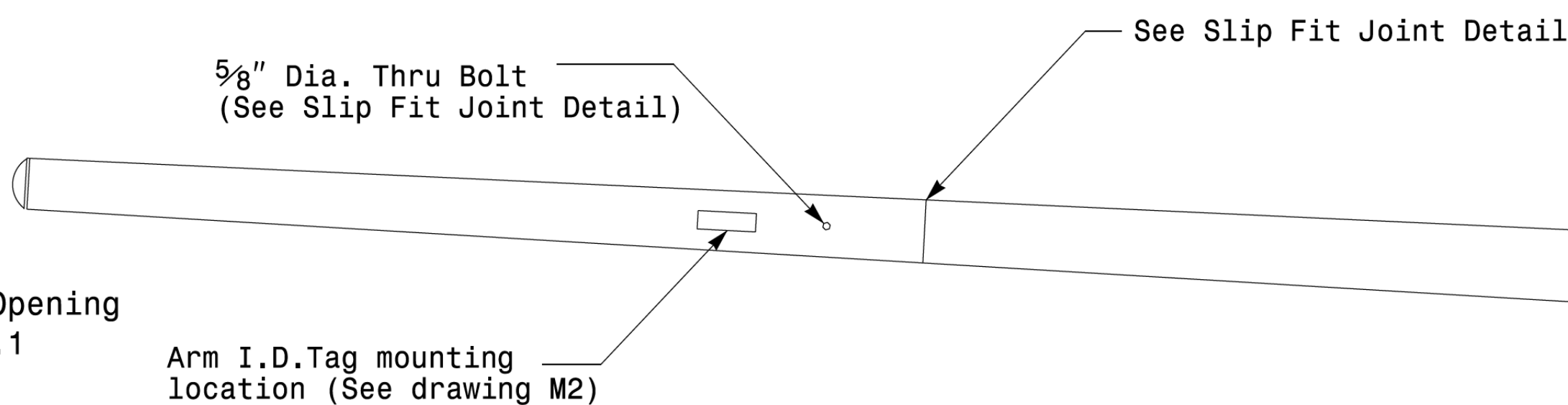
Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



Section A-A
Pole Base Plate Details



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

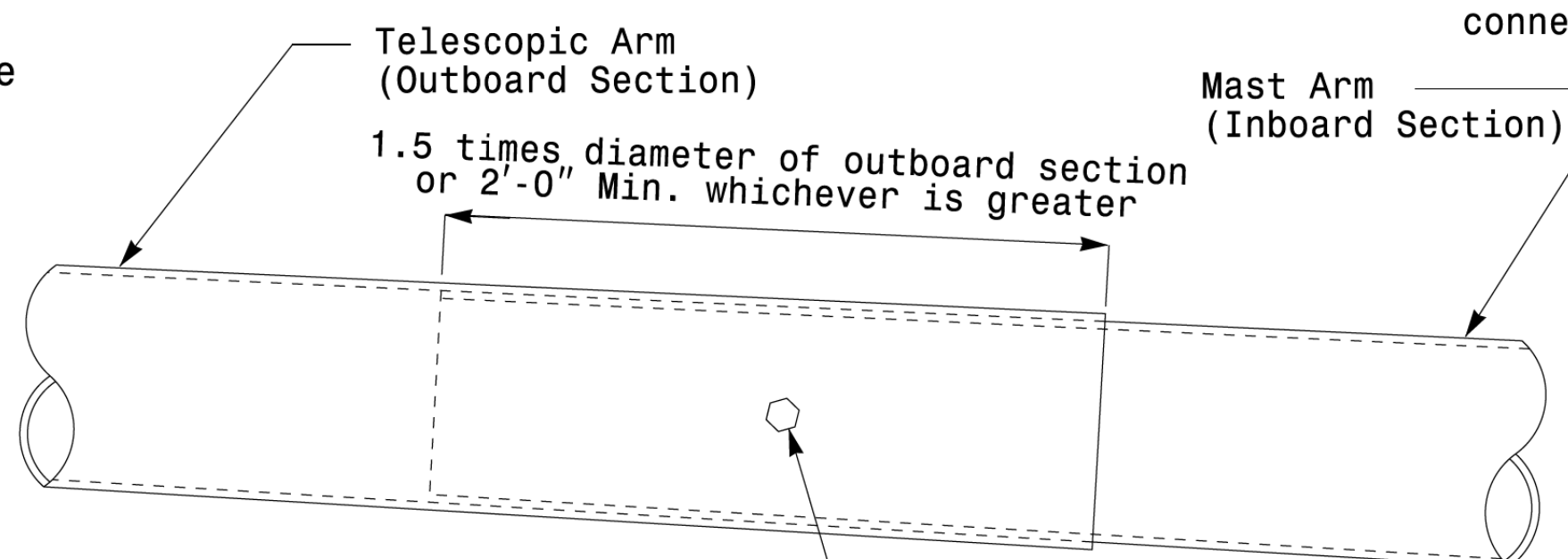


5/8" Dia. Thru Bolt
(See Slip Fit Joint Detail)

See Slip Fit Joint Detail

Arm I.D. Tag mounting location (See drawing M2)

Arm I.D. Tag mounting location (See drawing M2)



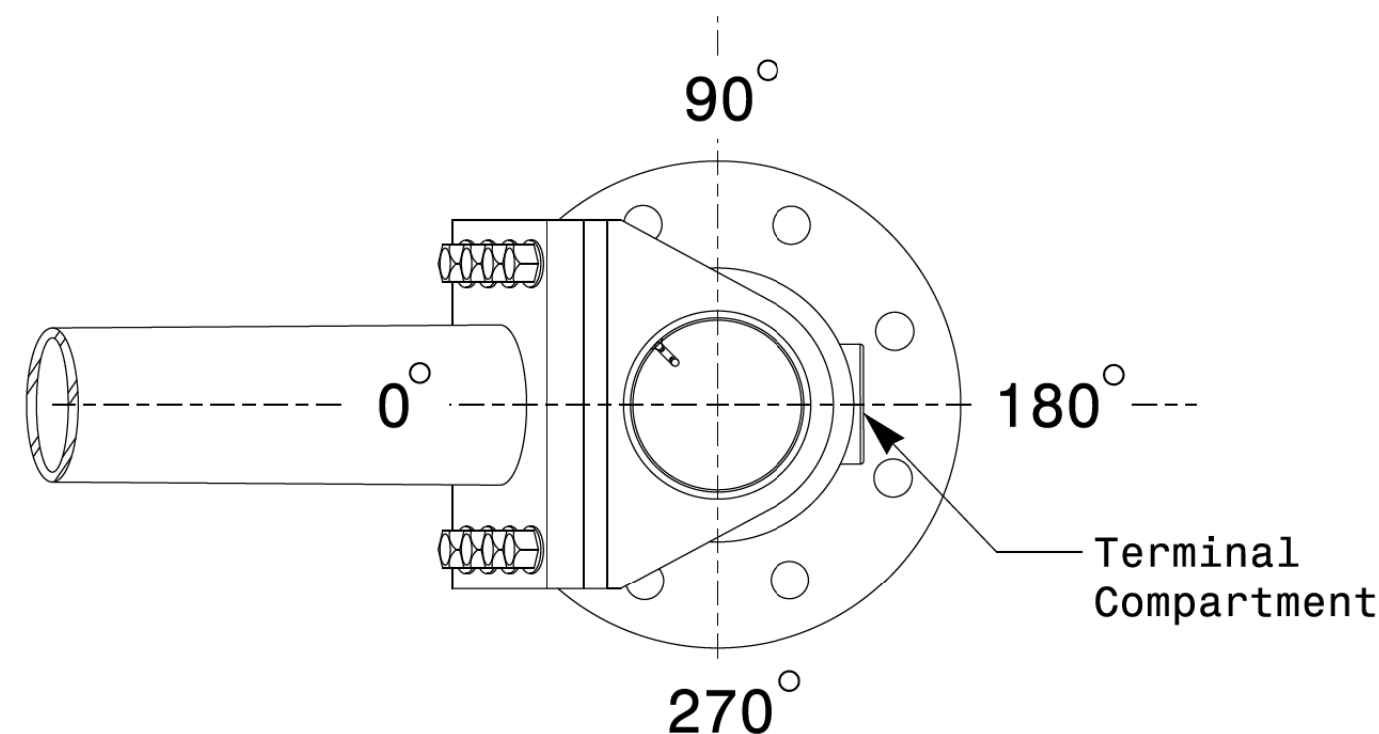
Telescopic Arm (Outboard Section)

Mast Arm (Inboard Section)

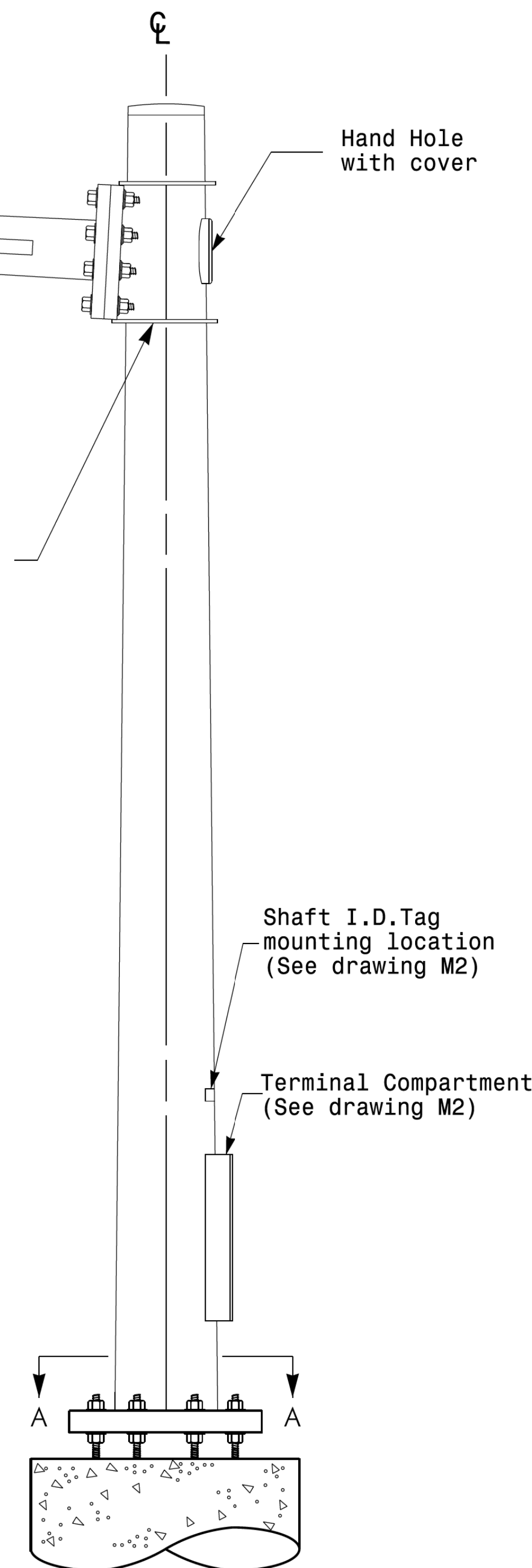
1.5 times diameter of outboard section or 2'-0" Min. whichever is greater

3/4" Factory Drilled Hole in Outboard Tube. Field Drill Inboard Tube. 5/8" Galvanized Thru Bolt with (2) Hex. Locknuts Each.

Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation



Mast Arm Pole

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 NA NONE

Typical Fabrication Details For Mast Arm 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: Dinesh C. Sarkar

10/11/2017

DATE

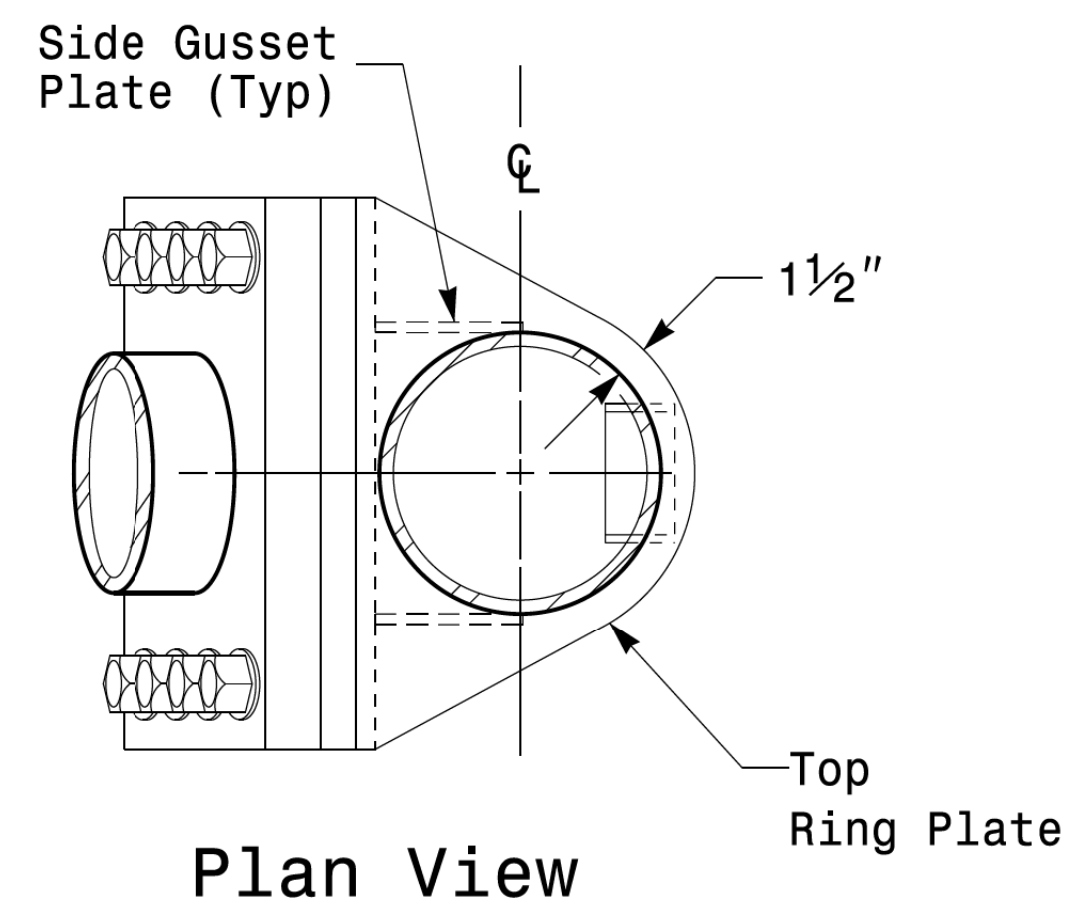
Fabrication Details - Mast Arm Poles

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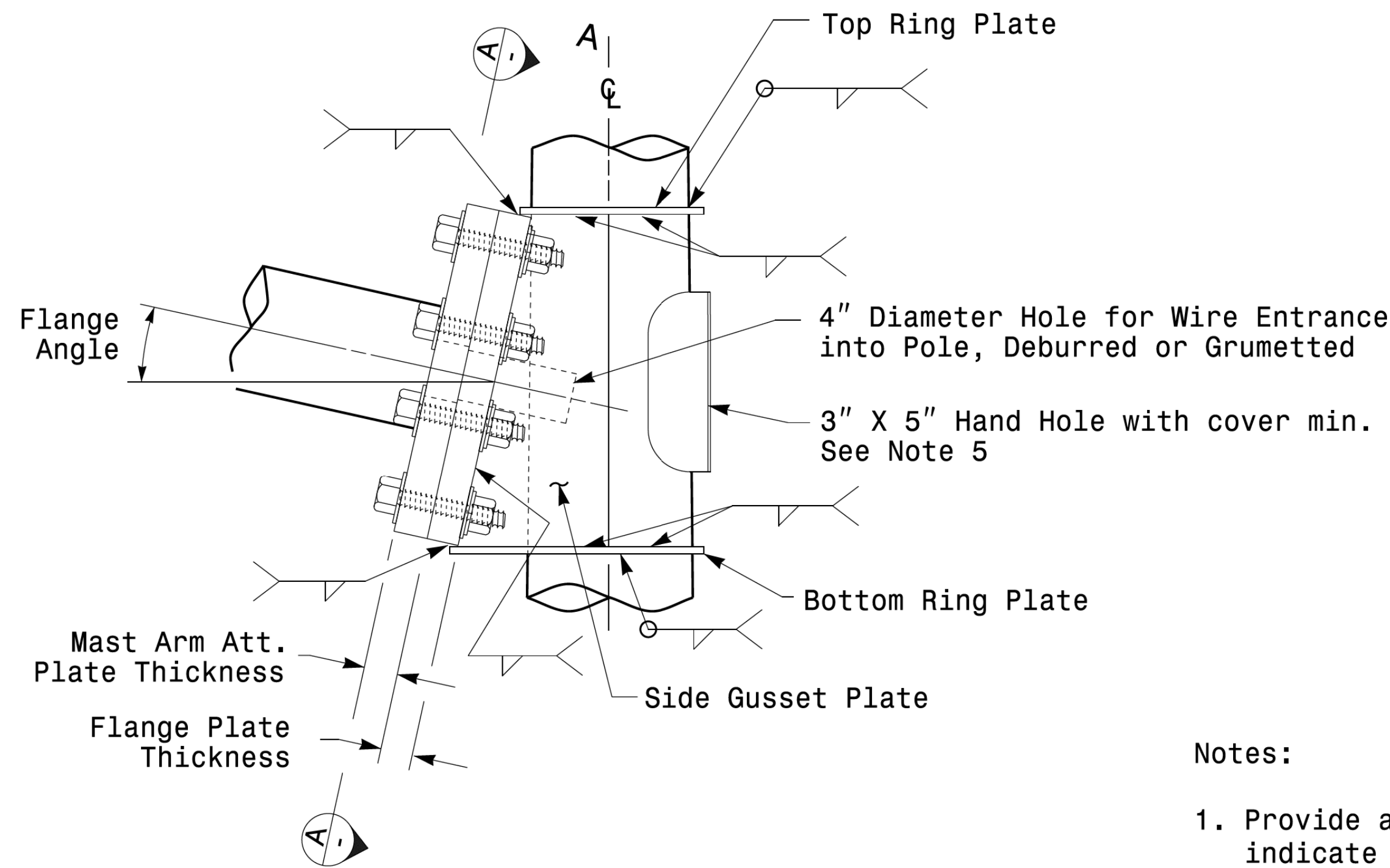
Welded Ring Stiffened Mast Arm Connection

PROJECT ID. NO. SHEET NO.

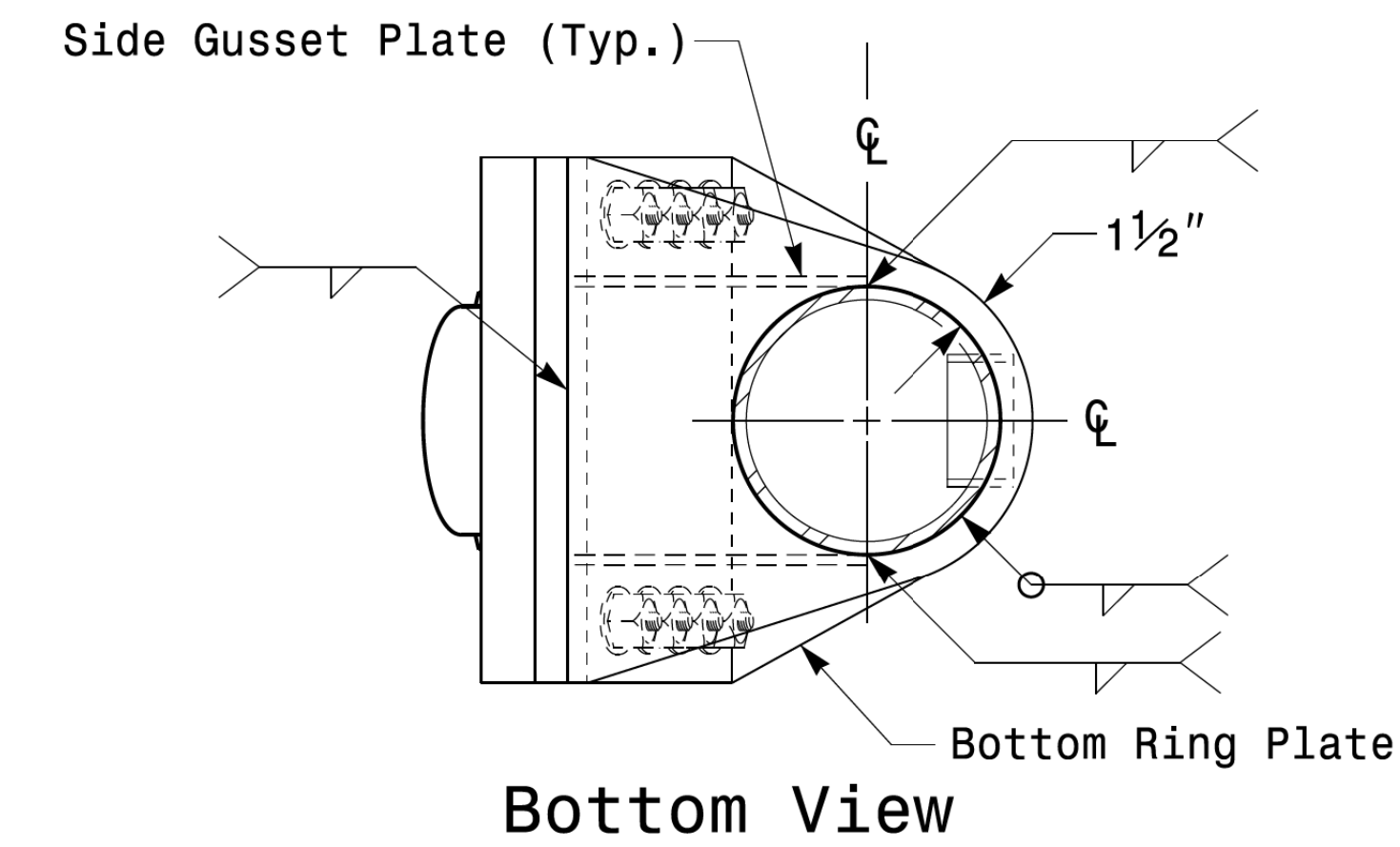
R-3833C Sig.M5



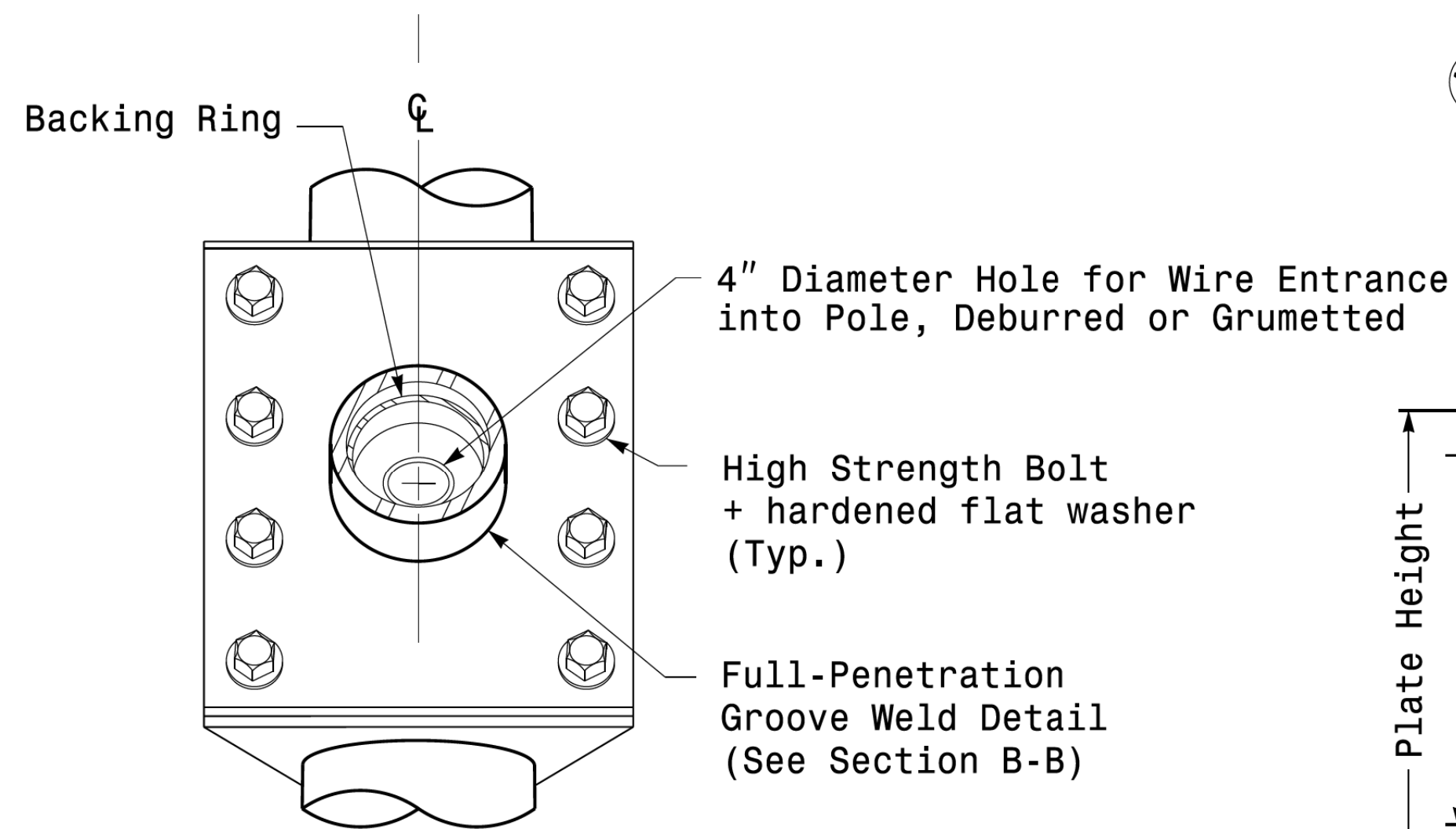
Plan View



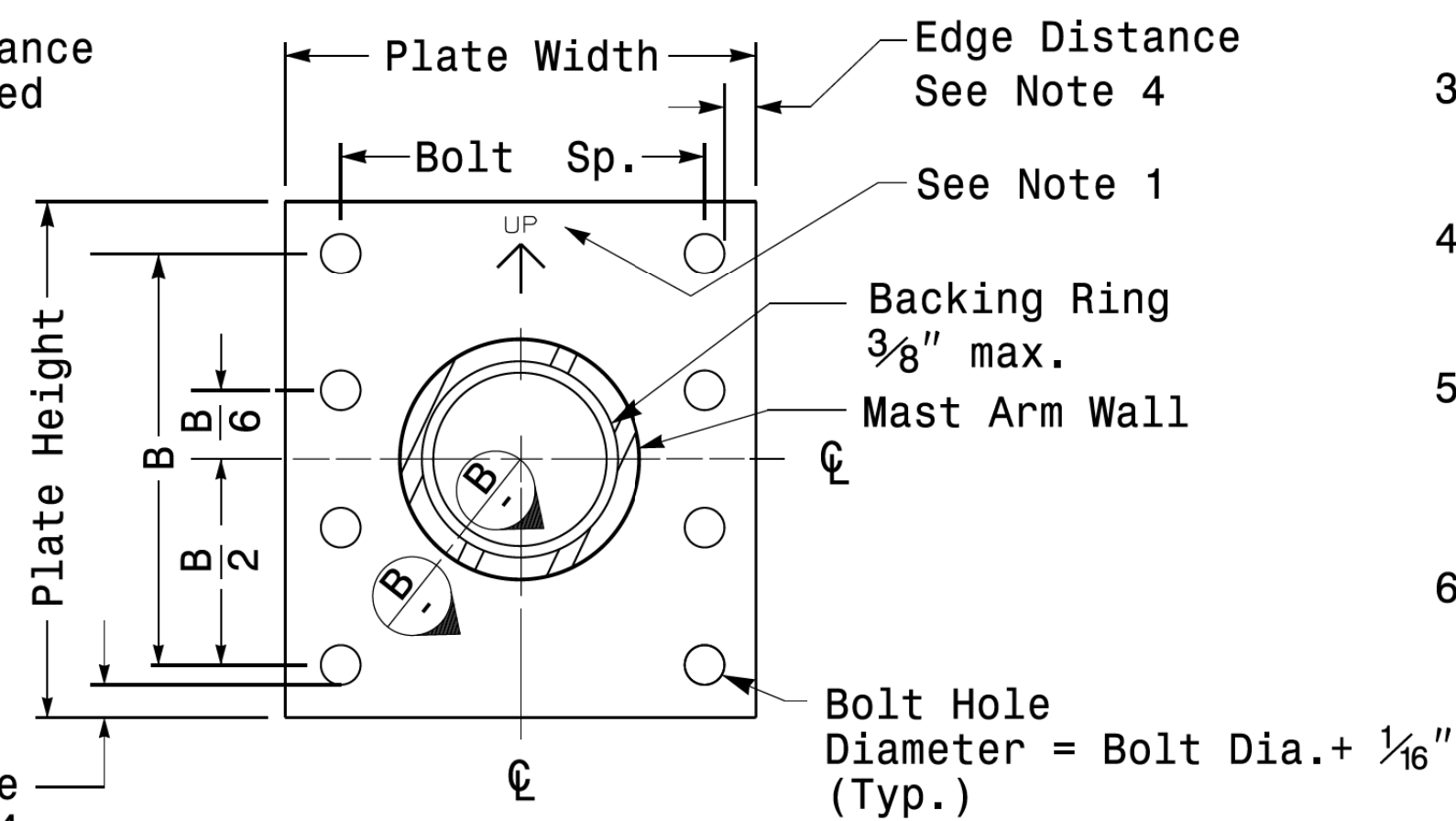
Side Elevation View



Bottom View



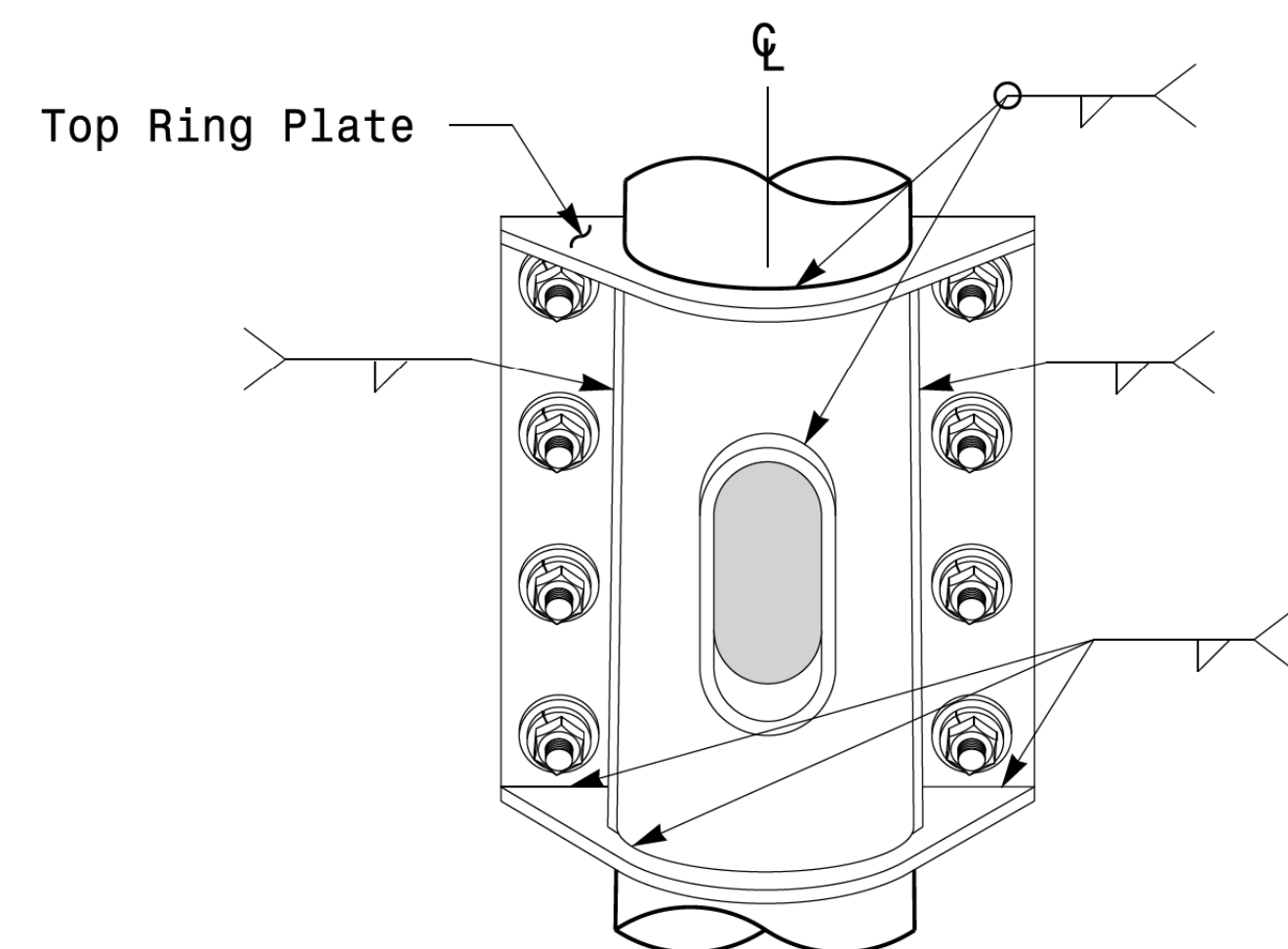
Front Elevation View



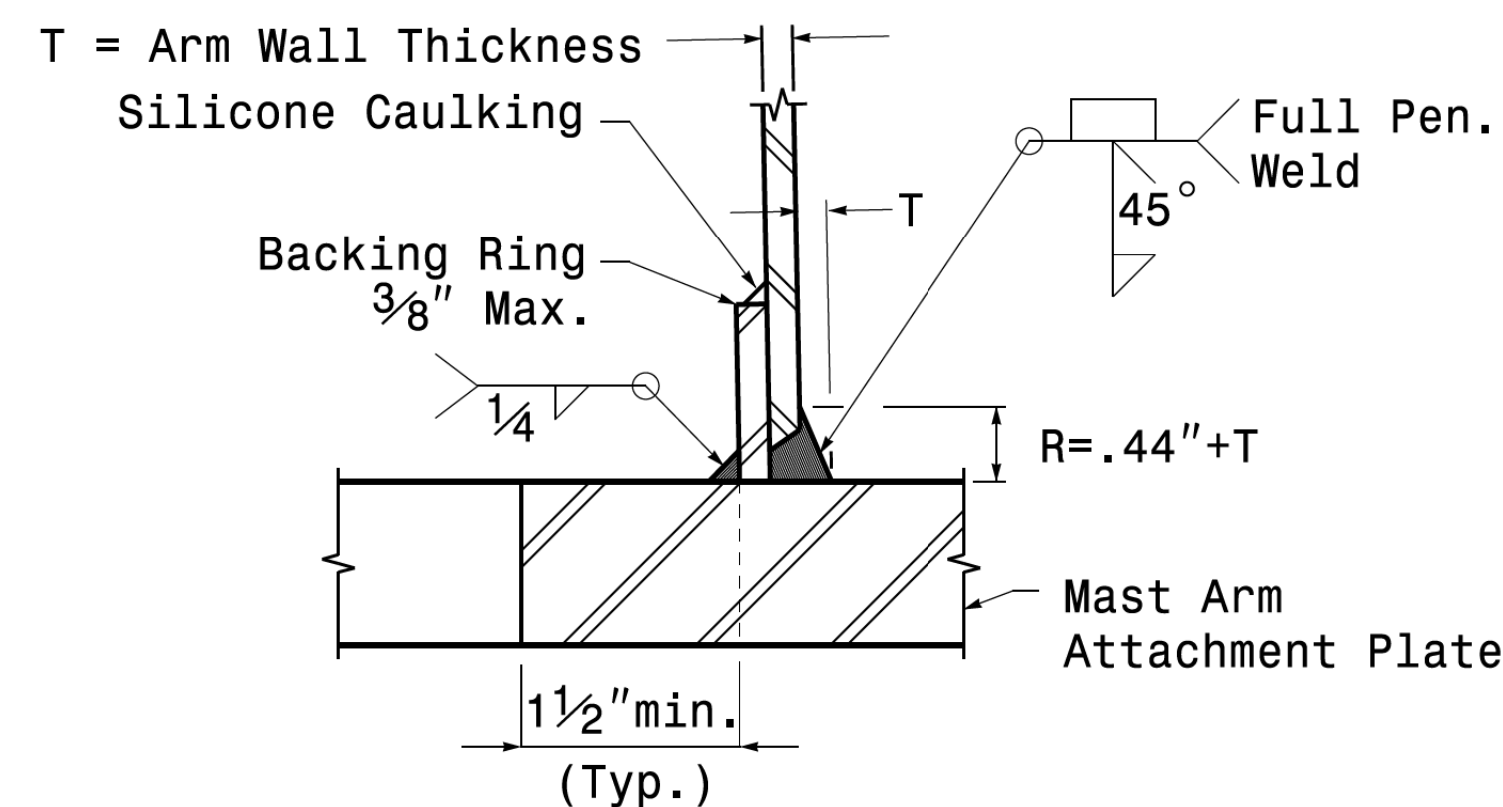
Section A-A Mast Arm Attachment Plate

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.



Back Elevation View



Section B-B Full-Penetration Groove Weld Detail

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

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

Described by: D.C. Sarkar

10/11/2017 DATE

Fabrication Details - Mast Arm Connection

11-01-2017 08:35 P:\TSS\DWTS Signal\sig1 Design Section\Eastern Region\m5 Sheets\2016\2014 Sig.M5 Std. Connection Fabrication Detail\Mast Arm Pole.dgn