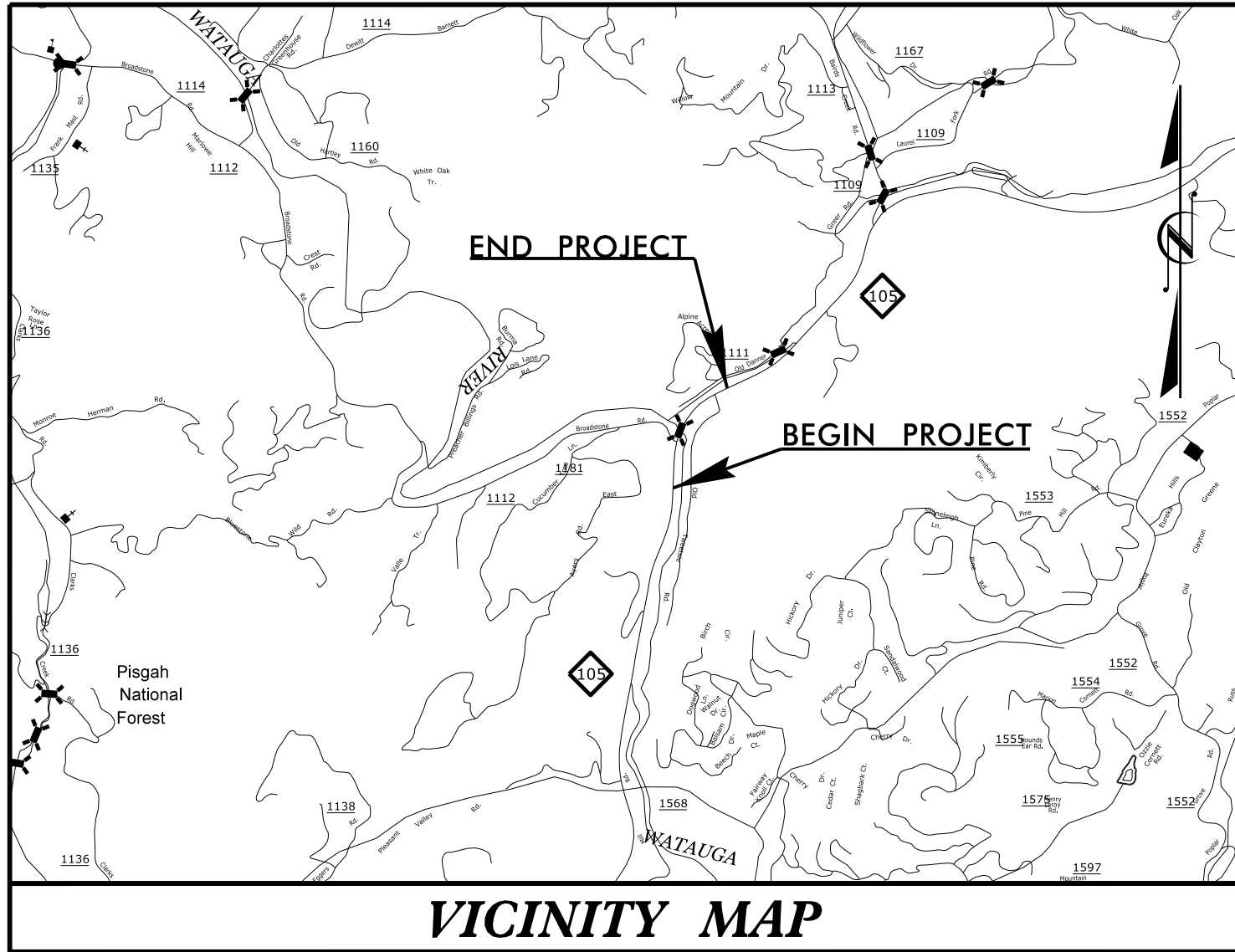


03 JUN 2019 14:54
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Project: R-2566BA

Project: R-2566BA



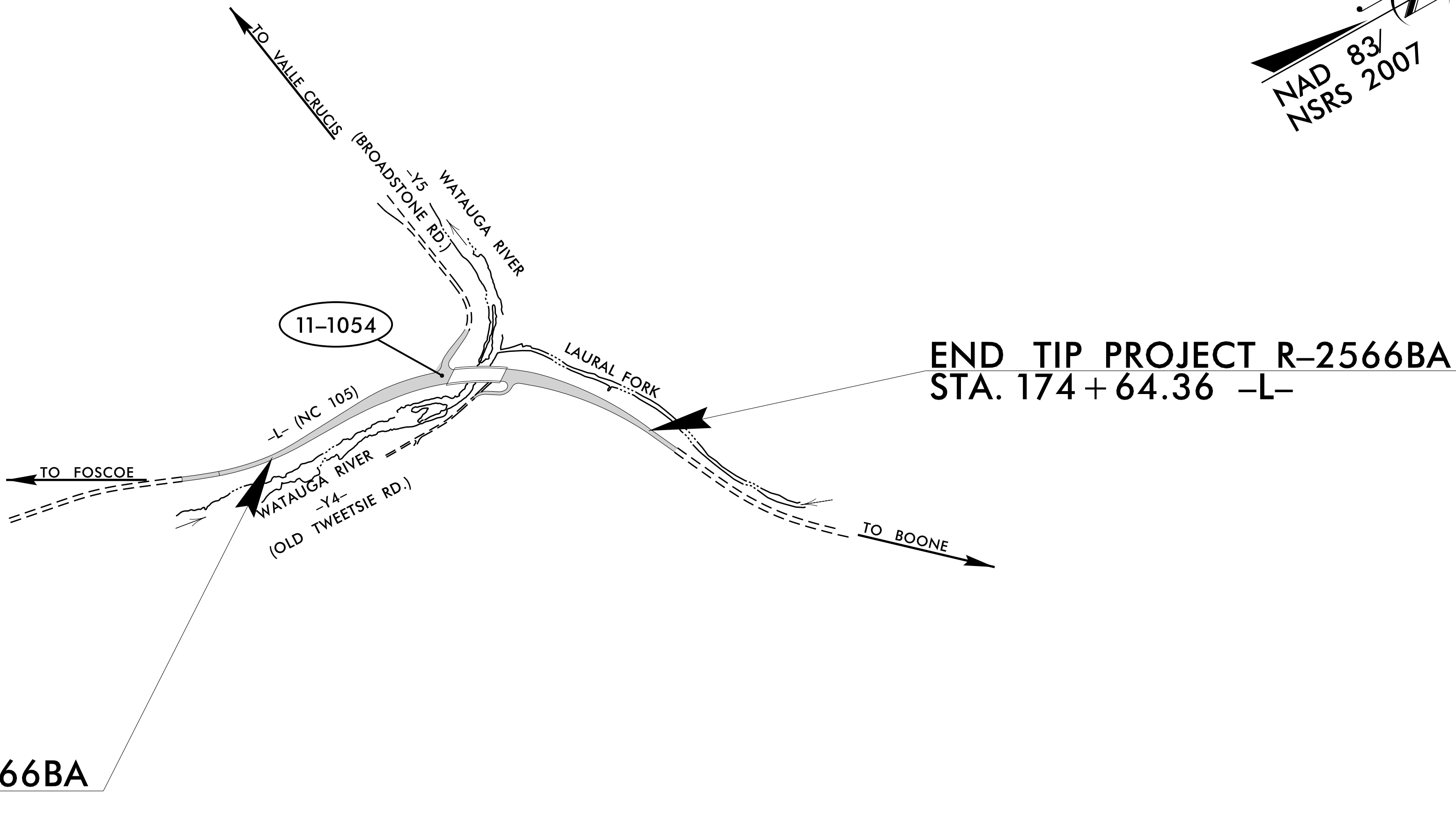
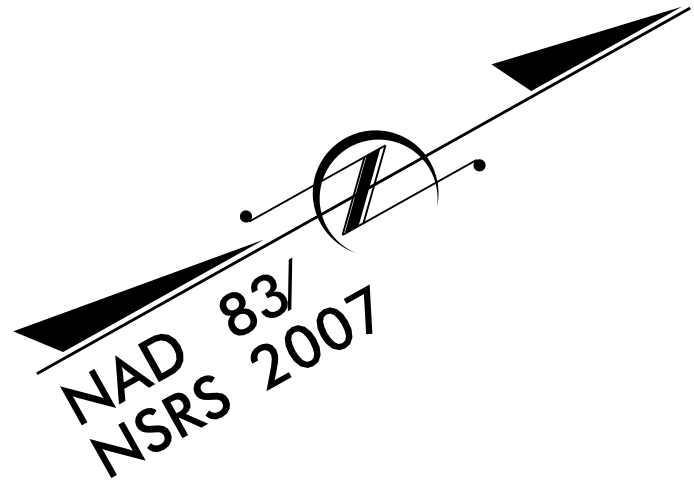
VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WATAUGA COUNTY

LOCATION: NC 105 AT SR 1112 (BROADSTONE RD.) IN BOONE

TYPE OF WORK: TRAFFIC SIGNALS



BEGIN TIP PROJECT R-2566BA
STA. 151+99.39 -L-

END TIP PROJECT R-2566BA
STA. 174+64.36 -L-

Index of Plans

Sheet #	Reference #	Location/Description
Sig. 1.0	-----	Title Sheet
Sig. 2.0-7.1	11-1054	NC 105 at SR 1112 (Broadstone Rd.)
Sig. 8.0	-----	Revised Standard Drawings
Sig. M1-M8	-----	Metal Pole Standard Drawings

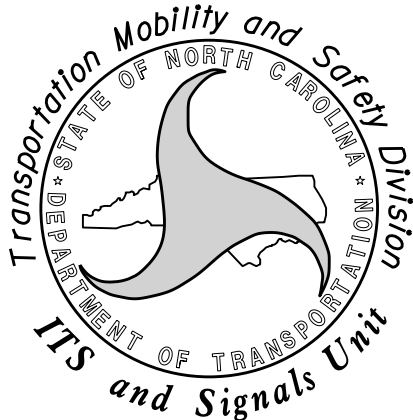
INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

Timothy J. Williams, PE - Western Region Signals Engineer
Keith Mims, PE - Signal Equipment Design Engineer
Neil Avery - Intelligent Transportation Systems Engineer

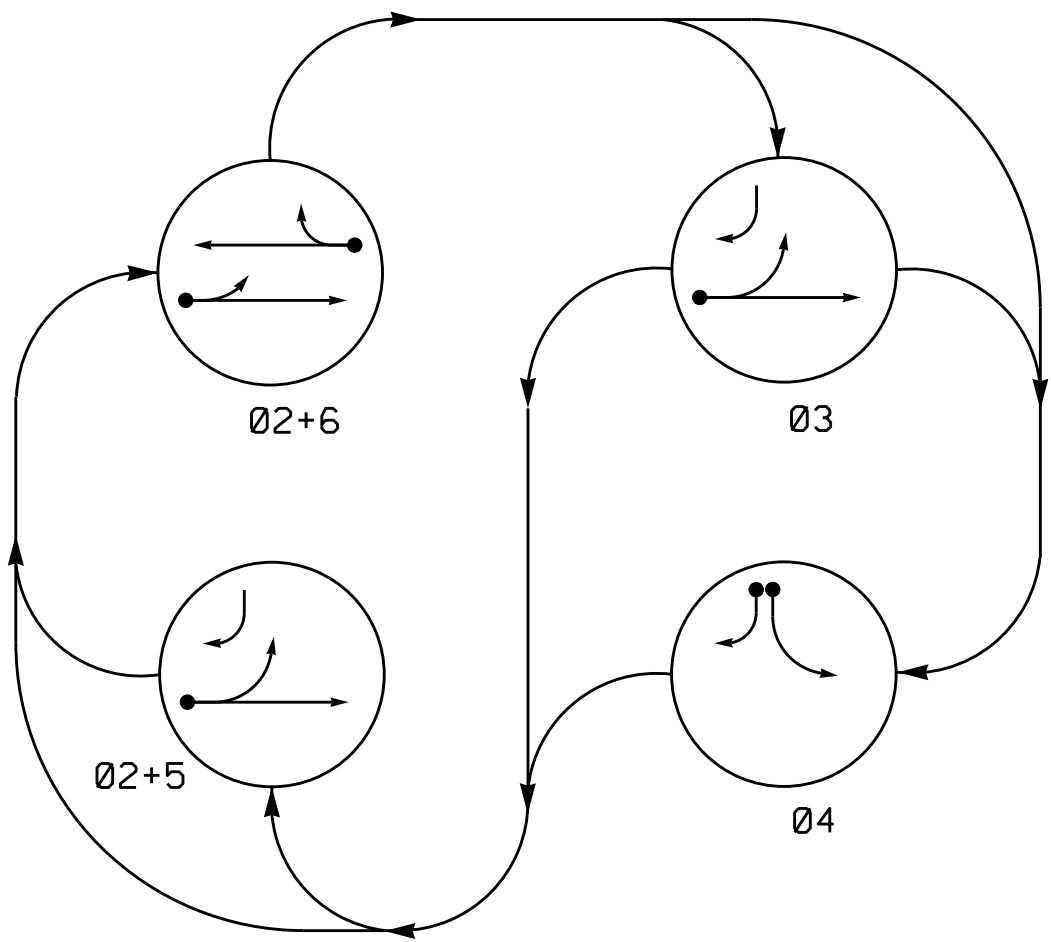
Refer to "Roadway Standard Drawings
NCDOT" dated January 2018 and
"Standard Specifications for Roads
and Structures" dated January 2018.

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



750 N. Greenfield Parkway, Garner, NC 27529

PHASING DIAGRAM



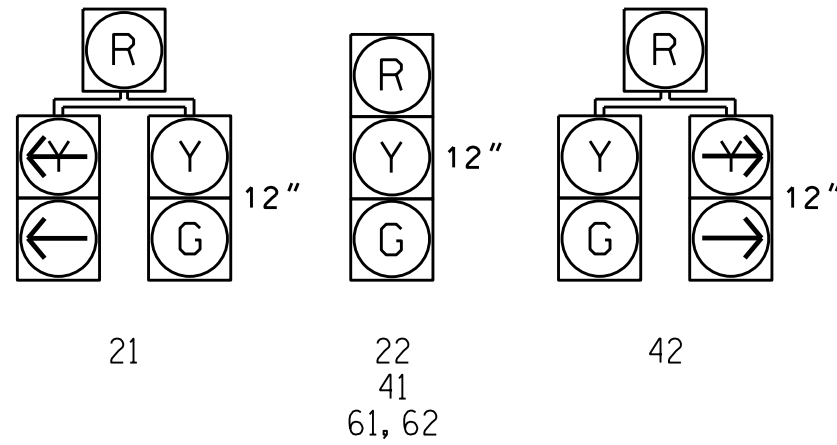
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE				
	Ø 2 + 5	Ø 2 + 6	Ø 3	Ø 4	FLASH
21	G	G	G	R	Y
22	G	G	G	R	Y
41	R	R	R	G	R
42	R	R	R	G	R
61, 62	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



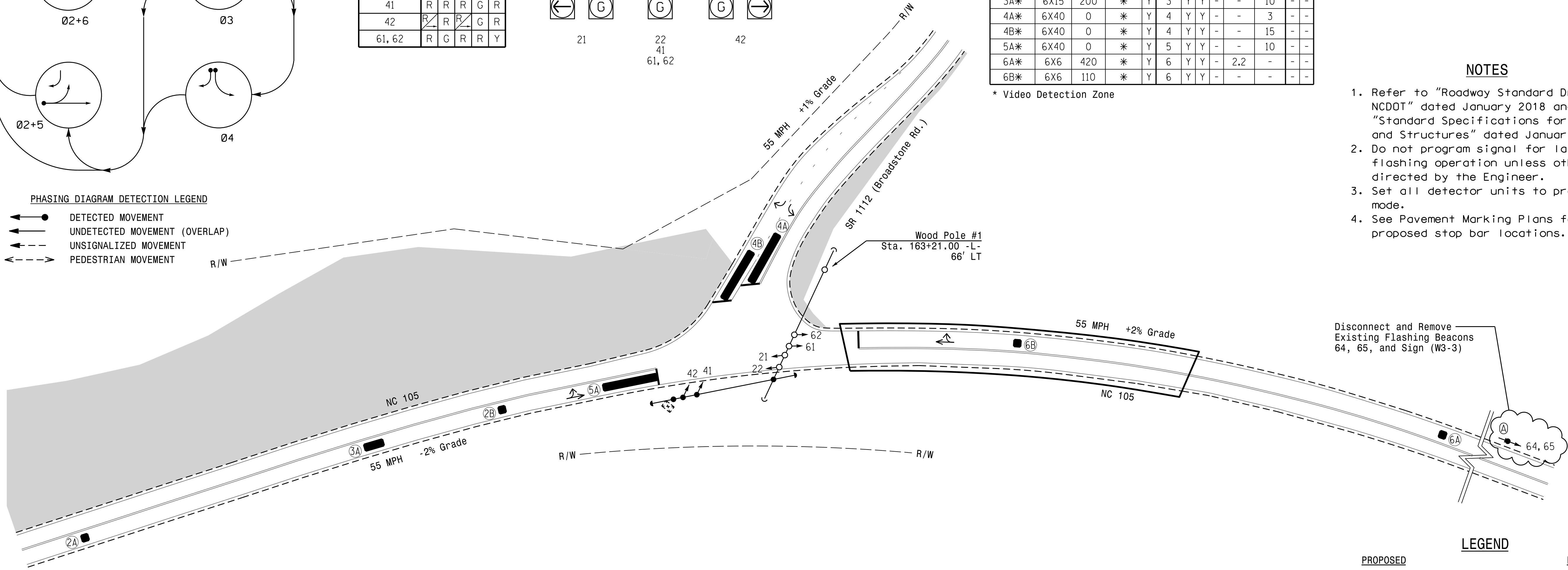
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART												
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURN	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A*	6X6	420	*	Y	2	Y	Y	-	2.2	-	-	-
2B*	6X6	110	*	Y	2	Y	Y	-	-	-	-	-
3A*	6X15	200	*	Y	3	Y	Y	-	-	10	-	-
4A*	6X40	0	*	Y	4	Y	Y	-	-	3	-	-
4B*	6X40	0	*	Y	4	Y	Y	-	-	15	-	-
5A*	6X40	0	*	Y	5	Y	Y	-	-	10	-	-
6A*	6X6	420	*	Y	6	Y	Y	-	2.2	-	-	-
6B*	6X6	110	*	Y	6	Y	Y	-	-	-	-	-

* Video Detection Zone

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.
- Set all detector units to presence mode.
- See Pavement Marking Plans for proposed stop bar locations.



Disconnect and Remove Existing Flashing Beacons 64, 65, and Sign (W3-3)

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 |
| Video Detection Zone | N/A |
| Construction Zone | N/A |

OASIS 2070L TIMING CHART

FEATURE	PHASE				
	2	3	4	5	6
Min Green 1 *	14	7	7	7	14
Extension 1 *	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	60	25	25	15	60
Yellow Clearance	5.4	5.4	3.0	3.0	5.4
Red Clearance	1.7	2.1	2.1	2.1	1.7
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

* 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 - Phase IA

Prepared in the Offices of:

Transportation Mobility and Safety Solutions

STATE OF NORTH CAROLINA

Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 105 at SR 1112 (Broadstone Rd.)

Division 11 Watauga County Boone

PLAN DATE: April 2019 REVIEWED BY: T.J. Williams

PREPARED BY: R.N. Zinser REVIEWED BY:

REVISIONS

INIT. DATE

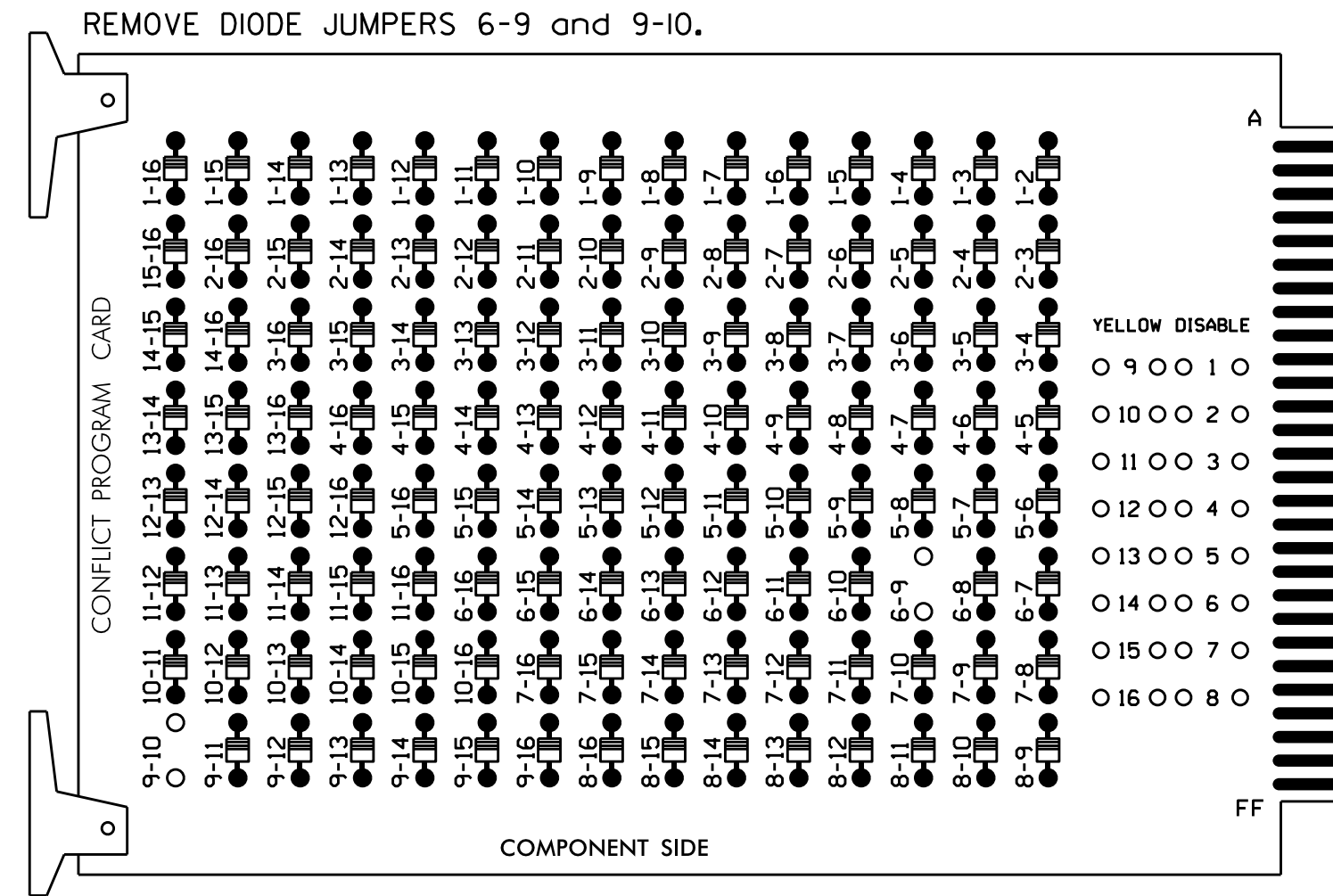
DocuSigned by: R. N. Zinser 5/16/2019

DATE

SIG. INVENTORY NO. II-1054T1

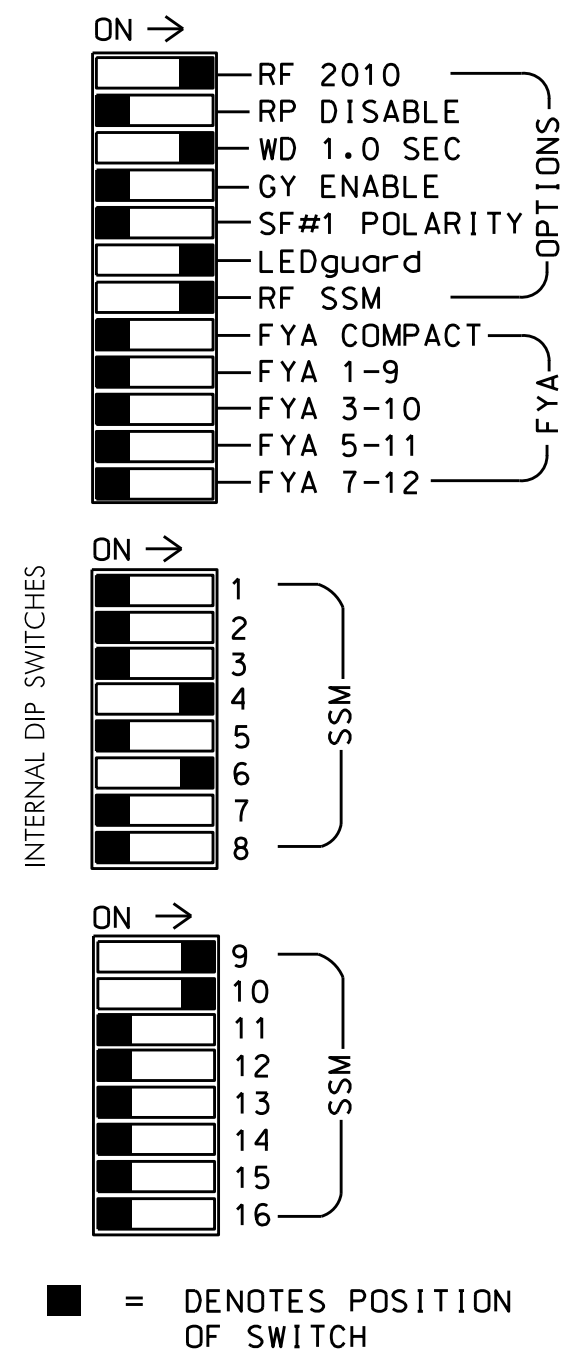
(remove jumpers and set switches as shown)

ON OFF
WD ENABLE
SW2



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.



1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.

3. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,2,3, 5,7,8,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phase 6 for Yellow Flash.

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	NC	NU	NC	41,42	NU	NC	61,62	NU	NU	NU	NU	21,22	21,42	NU	NU	NU	NU
RED					101			134					A121	*				
YELLOW					102			135					A122					
GREEN					103			136					A123					
RED ARROW																		
YELLOW ARROW														A125				
GREEN ARROW														A126				

NU = Not Used

NC = No Connection

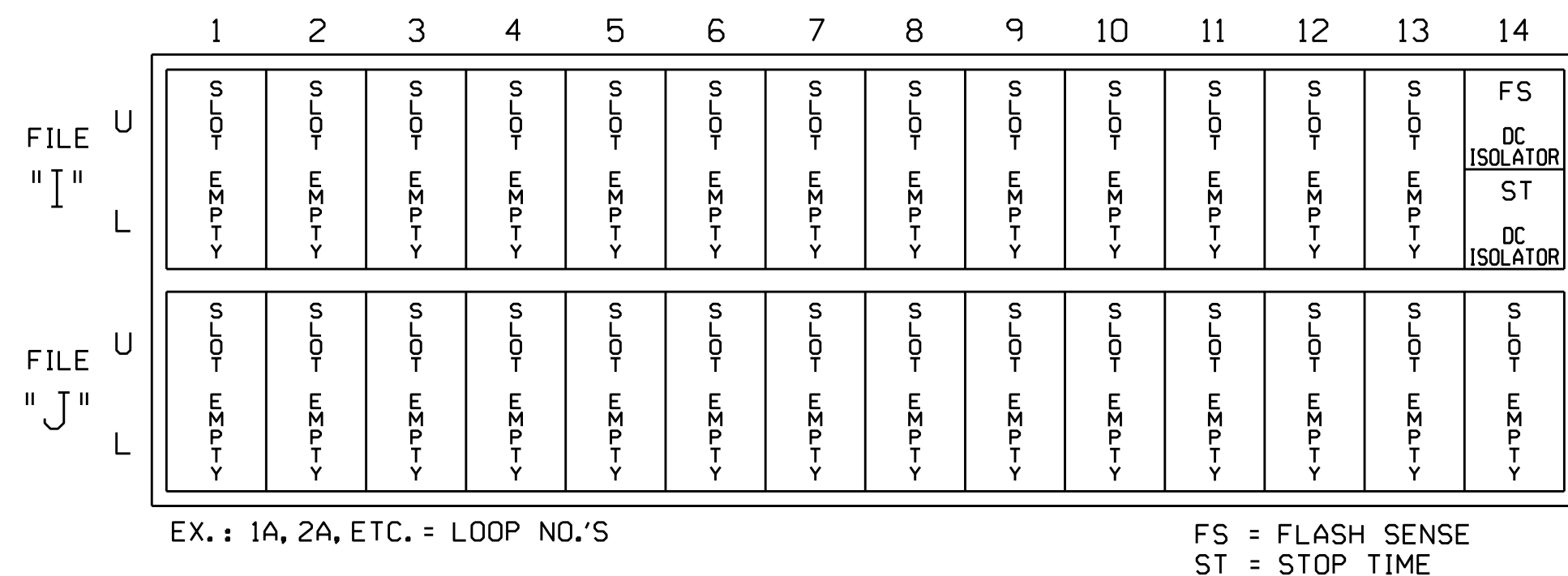
* Denotes install load resistor. See load resistor installation detail this sheet.

```
CONTROLLER.....2070
CABINET .....332
SOFTWARE .....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S4,S6,S9,S10
PHASES USED.....2,3,4,5,6
OVERLAP A.....2+3
OVERLAP B.....3+5
OVERLAP C.....NOT USED
OVERLAP B.....NOT USED
```

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

OVERLAP B RED FIELD
TERMINAL (A124)

(front view)



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

(program controller as shown below)

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

```

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

```

PRESS ' + '

```

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

```

OVERLAP PROGRAMMING COMPLETE

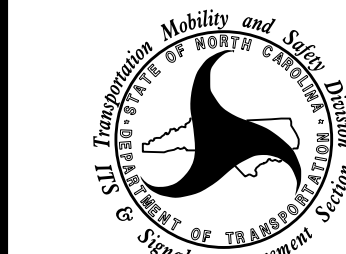
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-1054T1
DESIGNED: April 2019
SEALED: 05-16-19
REVISED: N/A

Electrical Detail - Temp. Design - Phase IA

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

SEAL

Prepared in the Offices of:



750 N. Greenfield Pkwy. Garner, NC 27529

NC 105
at
SR 1112 (Broadstone Rd.)

Division 11 Watauga County Boone

PLAN DATE: May 2019	REVIEWED BY:
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PREPARED BY: James Peterson	REVIEWED BY:
-----------------------------	--------------

REVISIONS	INIT.	DATE
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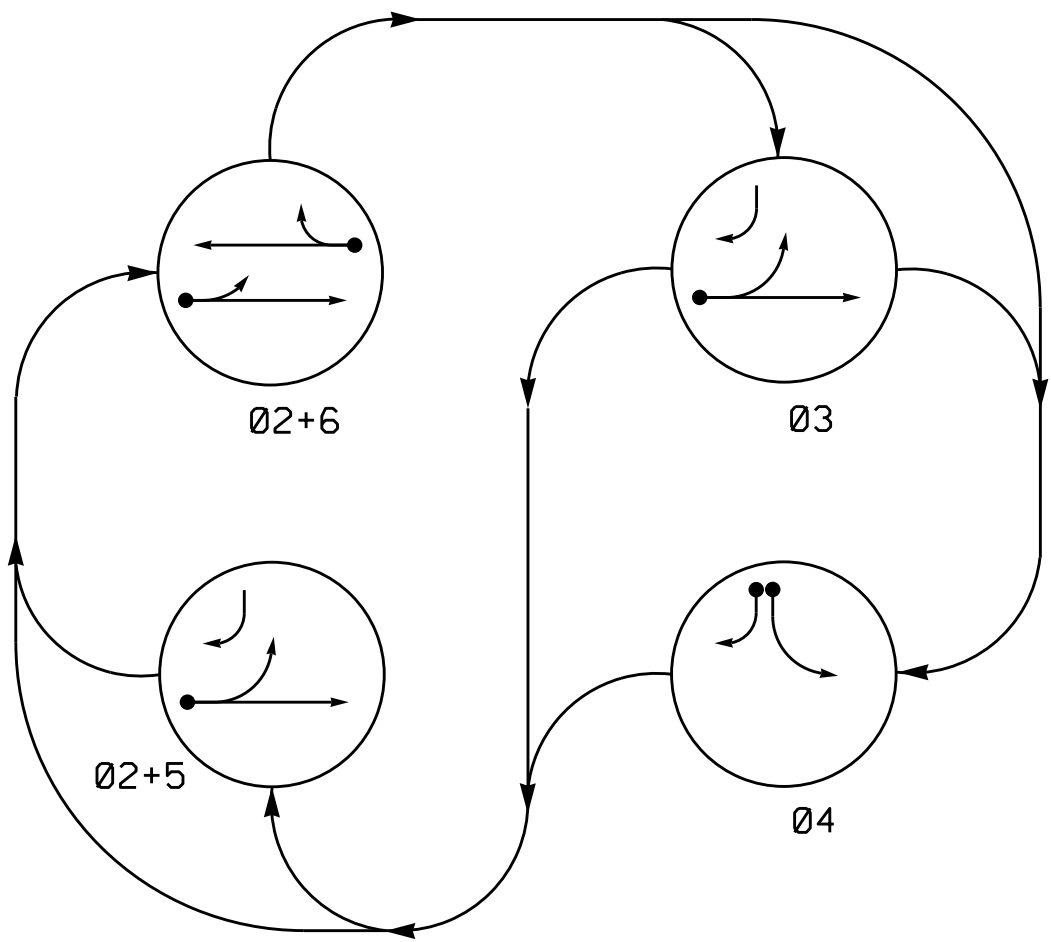
DocuSigned by
B. H. H. H.

Ryan W. Hough 5/30/2019

SIGNATURE	DATE
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SIG. INVENTORY NO. 11-1054T1

PHASING DIAGRAM



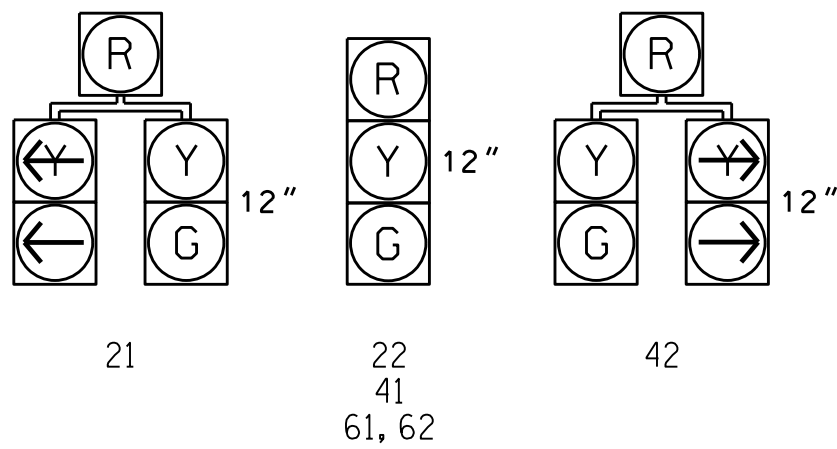
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE				
	Ø 2 + 5	Ø 2 + 6	Ø 3	Ø 4	FLASH
21	G	G	G	R	Y
22	G	G	G	R	Y
41	R	R	R	G	R
42	R	R	R	G	R
61, 62	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



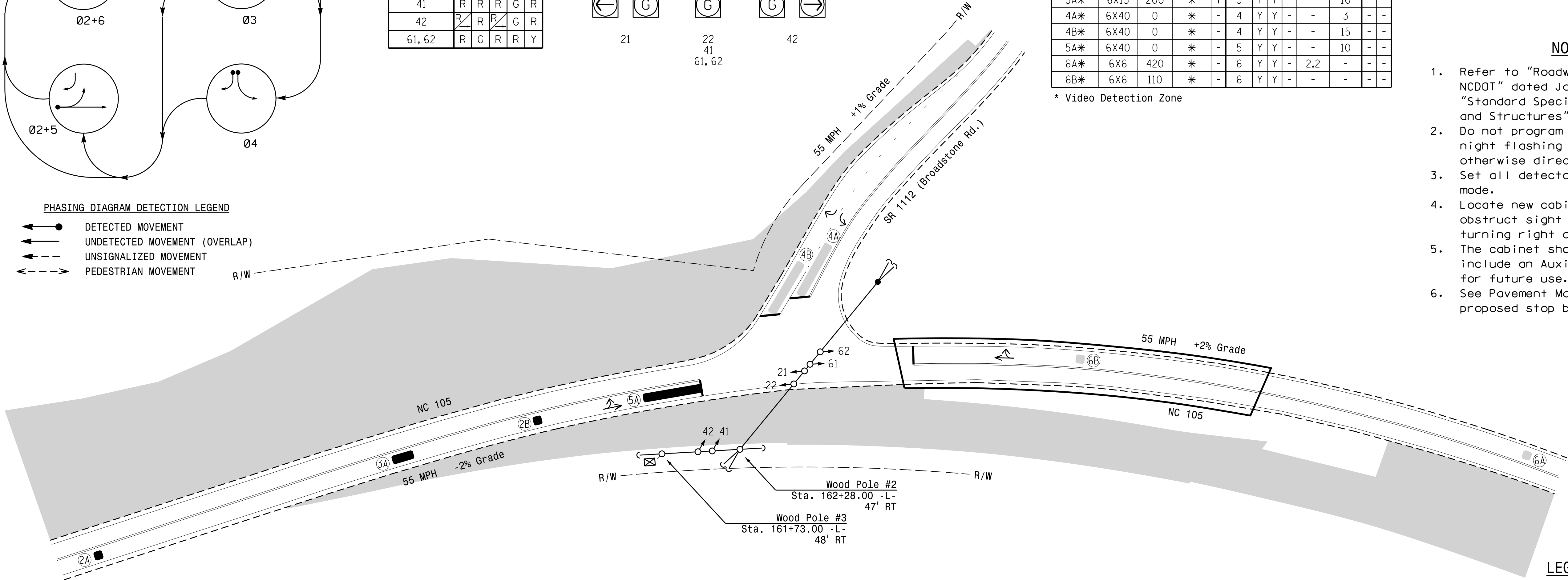
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART												
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A*	6X6	420	*	Y	2	Y	Y	-	2.2	-	-	-
2B*	6X6	110	*	Y	2	Y	Y	-	-	-	-	-
3A*	6X15	200	*	Y	3	Y	Y	-	-	10	-	-
4A*	6X40	0	*	-	4	Y	Y	-	-	3	-	-
4B*	6X40	0	*	-	4	Y	Y	-	-	15	-	-
5A*	6X40	0	*	-	5	Y	Y	-	-	10	-	-
6A*	6X6	420	*	-	6	Y	Y	-	2.2	-	-	-
6B*	6X6	110	*	-	6	Y	Y	-	-	-	-	-

* Video Detection Zone

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.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- The cabinet should be designed to include an Auxiliary Output file for future use.
- See Pavement Marking Plans for proposed stop bar locations.



OASIS 2070 TIMING CHART

FEATURE	PHASE				
	2	3	4	5	6
Min Green 1 *	14	7	7	7	14
Extension 1 *	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	60	25	25	15	60
Yellow Clearance	5.4	5.4	3.0	3.0	5.4
Red Clearance	1.7	2.1	2.1	2.1	1.7
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

* 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
 - N/A
 - Directional Arrow
 - Video Detection Zone
 - Construction Zone
- 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 - Phase IB

Prepared In the Offices of:

Transportation Mobility and Safety Division
DEPARTMENT OF TRANSPORTATION
SIGNAL DESIGN SECTION

750 N. Greenfield Pkwy, Garner, NC 27529

NC 105
at
SR 1112 (Broadstone Rd.)

Division 11 Watauga County Boone

PLAN DATE: April 2019 REVIEWED BY: T.J. Williams

PREPARED BY: R.N. Zinser REVIEWED BY:

REVISIONS

SCALE 0 40
1"=40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

SEAL 043914

ENGINEER RICHARD N. ZINSER

DocuSigned by: R. N. Zinser 5/16/2019

DATE

SIG. INVENTORY NO. II-1054T2

(remove jumpers and set switches as shown)

(remove jumpers and set switches as shown)



- NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 270 controller. Ensure conflict monitor communicates with 270.

(front view)



FS = FLASH SENSE
ST = STOP TIME

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

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for Startup In Green.
4. Program phase 6 for Yellow Flash.

```

CONTROLLER.....2070
CABINET .....332
SOFTWARE .....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED....S5,S8,AUX S1,AUX S2
PHASES USED.....2,3,4,5,6
OVERLAP A.....2+3
OVERLAP B.....3+5
OVERLAP C.....NOT USED
OVERLAP B.....NOT USED

```

(program controller as shown below)

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

```

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

```

PRESS ' + '

```

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

```

OVERLAP PROGRAMMING COMPLETE

SIGNAL HEAD HOOK-UP CHART

NU = Not Used
NC = No Connection

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

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

OVERLAP B RED FIELD
TERMINAL (A124)

AC-

(program controller as shown below)

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

```

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

```

PRESS ' + '

```

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

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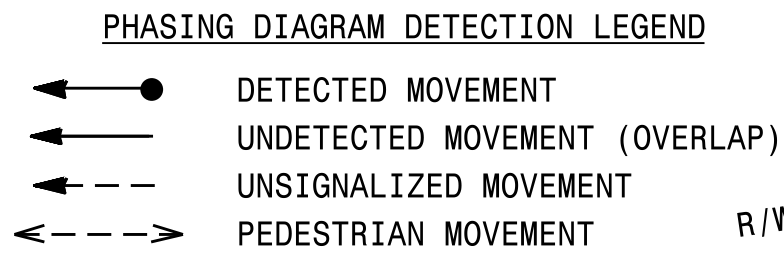
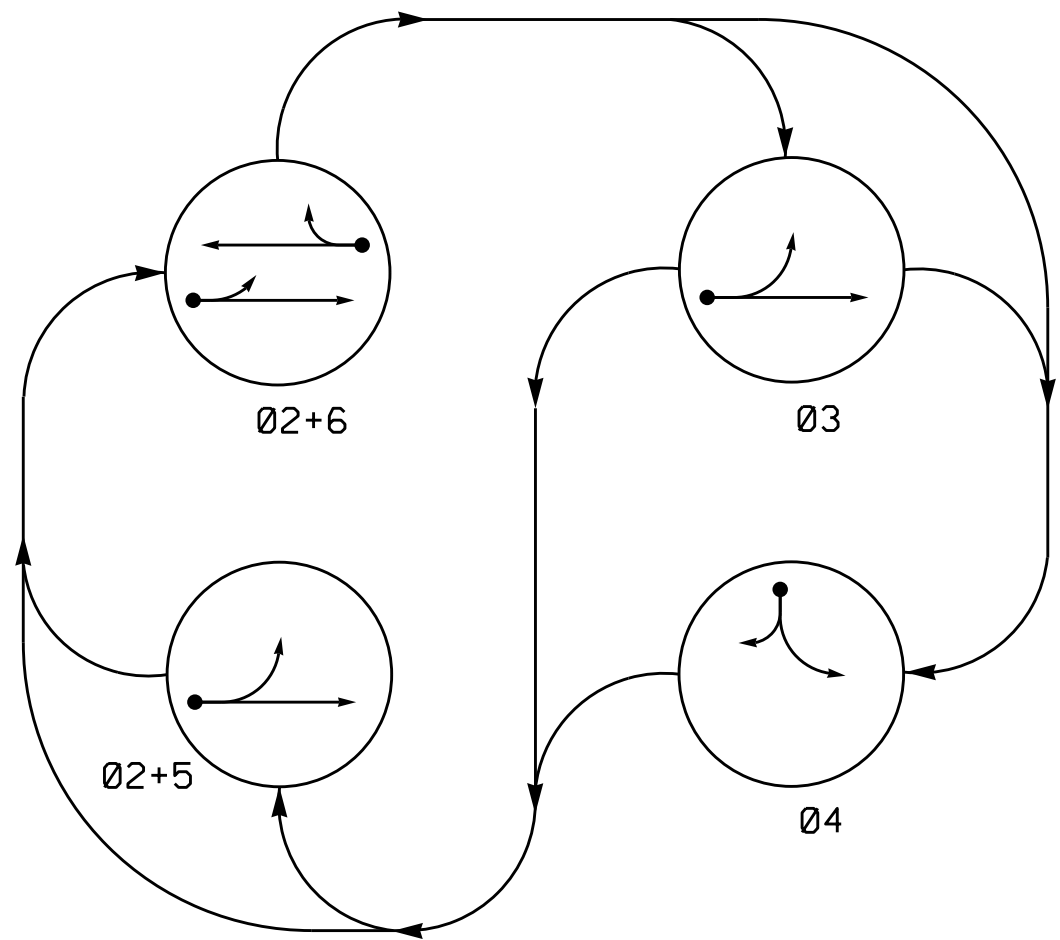
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-1054T2
DESIGNED: April 2019
SEALED: 05-16-19
REVISED: N/A

Electrical Detail - Temp. Design - Phase IB

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 105 at SR 1112 (Broadstone Rd.)	SEAL 																																	
Prepared in the Offices of:	Division 11 Watauga County Boone																																		
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">PLAN DATE: May 2019</td> <td style="width: 50%;">REVIEWED BY:</td> </tr> <tr> <td>PREPARED BY: James Peterson</td> <td>REVIEWED BY:</td> </tr> </table>		PLAN DATE: May 2019	REVIEWED BY:	PREPARED BY: James Peterson	REVIEWED BY:																													
PLAN DATE: May 2019	REVIEWED BY:																																		
PREPARED BY: James Peterson	REVIEWED BY:																																		
750 N. Greenfield Pkwy, Garner, NC 27529	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">REVISONS</th> <th style="width: 20%;">INIT.</th> <th style="width: 20%;">DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>		REVISONS	INIT.	DATE																														
REVISONS	INIT.	DATE																																	
DocuSigned by:  5/30/2019 4302702FA260563 DATE																																			
SIG. INVENTORY NO. 11-10547																																			

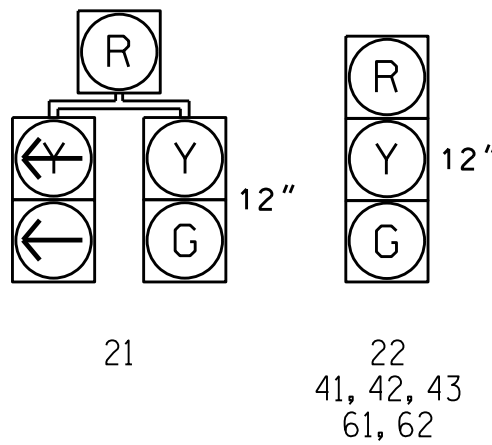
PHASING DIAGRAM



SIGNAL FACE	PHASE				
	Ø 2 + 5	Ø 2 + 6	Ø 3	Ø 4	FLASH
21	G	G	G	R	Y
22	G	G	G	R	Y
41, 42, 43	R	R	R	G	R
61, 62	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



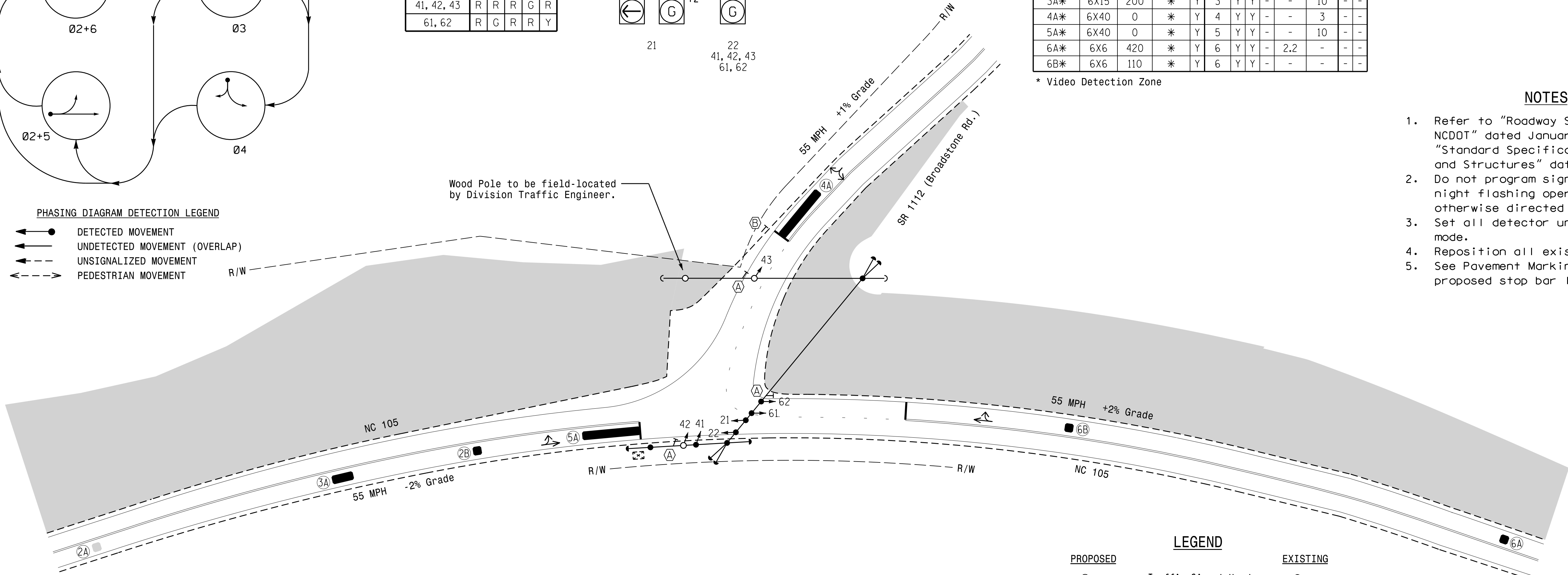
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART												
INDUCTIVE LOOPS				DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A*	6X6	420	*	-	2	Y	Y	-	2.2	-	-	-
2B*	6X6	110	*	Y	2	Y	Y	-	-	-	-	-
3A*	6X15	200	*	Y	3	Y	Y	-	-	10	-	-
4A*	6X40	0	*	Y	4	Y	Y	-	-	3	-	-
5A*	6X40	0	*	Y	5	Y	Y	-	-	10	-	-
6A*	6X6	420	*	Y	6	Y	Y	-	2.2	-	-	-
6B*	6X6	110	*	Y	6	Y	Y	-	-	-	-	-

* Video Detection Zone

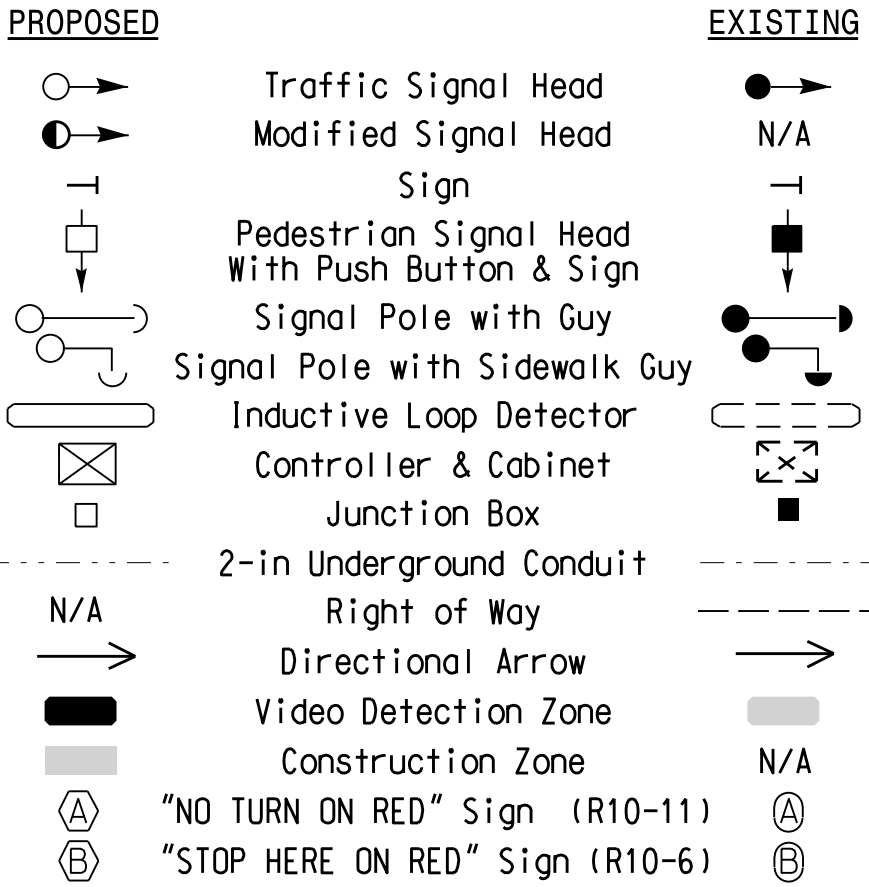
3 Phase
Fully Actuated
Isolated

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.
- Set all detector units to presence mode.
- Reposition all existing signal heads.
- See Pavement Marking Plans for proposed stop bar locations.



LEGEND



OASIS 2070 TIMING CHART

FEATURE	PHASE				
	2	3	4	5	6
Min Green 1 *	14	7	7	7	14
Extension 1 *	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	60	25	25	15	60
Yellow Clearance	5.4	5.4	3.0	3.0	5.4
Red Clearance	2.1	3.4	4.1	3.4	2.1
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

* 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 - Phase II

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 105
at
SR 1112 (Broadstone Rd.)
Division 11 Watauga County Boone
PLAN DATE: April 2019
PREPARED BY: R.N. Zinser
REVIEWED BY: T.J. Williams

750 N. Greenfield Pkwy, Garner, NC 27529
SCALE: 0 40
1"=40'

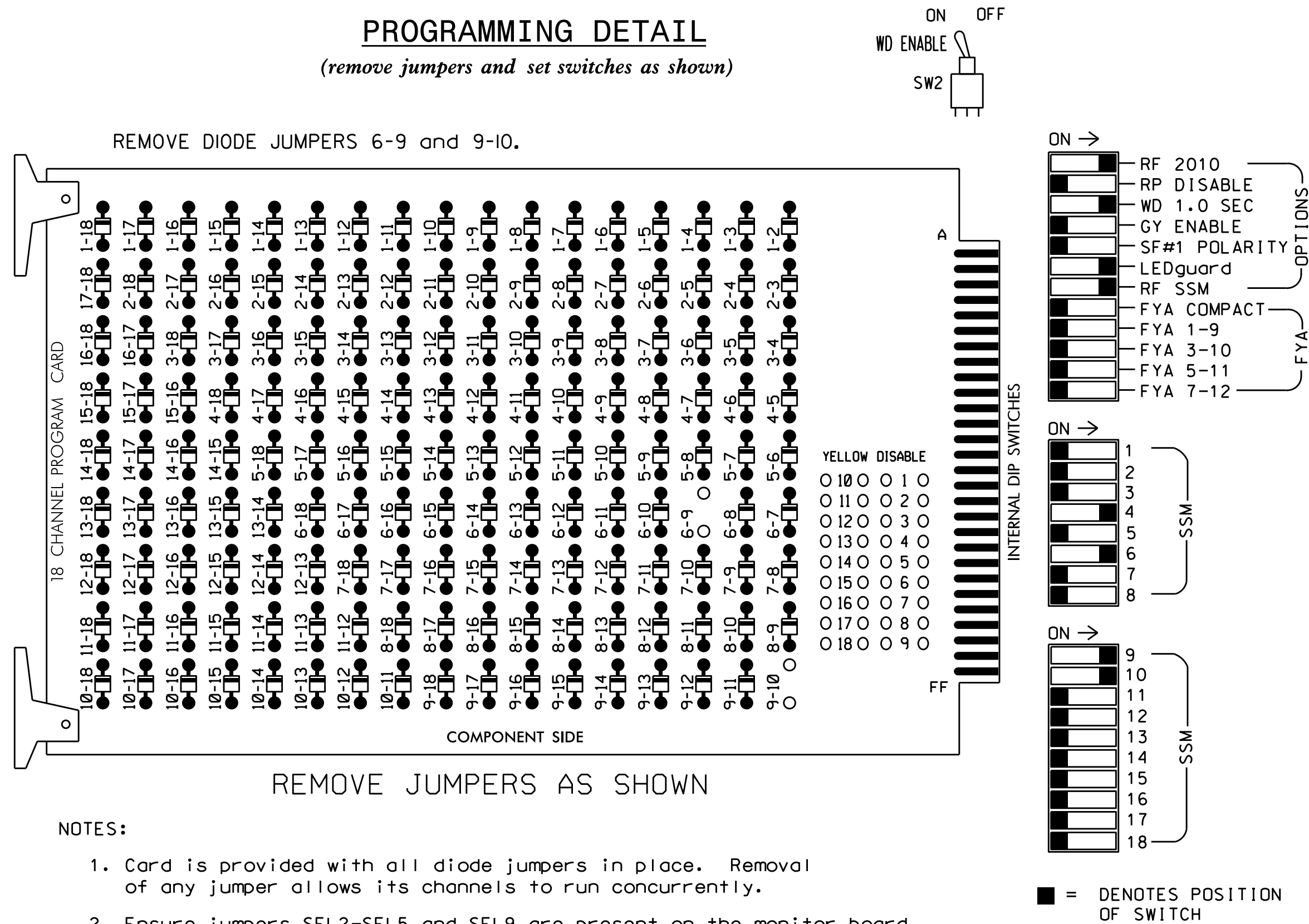
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL 043914
RICHARD N. ZINSER

DocuSigned by:
R. N. Zinser
5/16/2019
DATE
SIC. INVENTORY NO. II-1054T3

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 Startup In Green.
- Program phase 6 for Yellow Flash.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET332
SOFTWAREECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S5,S8,AUX S1,AUX S2
PHASES USED.....2,3,4,5,6
OVERLAP A.....2+3
OVERLAP B.....3+5
OVERLAP C.....NOT USED
OVERLAP B.....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	NC	NU	NC	41,42 43	NU	NC	61,62	NU	NU	NU	NU	21,22	21	NU	NU	NU	NU
RED					101			134					A121	*				
YELLOW					102			135					A122					
GREEN					103			136					A123					
RED ARROW																		
YELLOW ARROW														A125				
GREEN ARROW														A126				

NU = Not Used

NC = No Connection

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

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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

OVERLAP B RED FIELD TERMINAL (A124)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

PRESS '+'

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

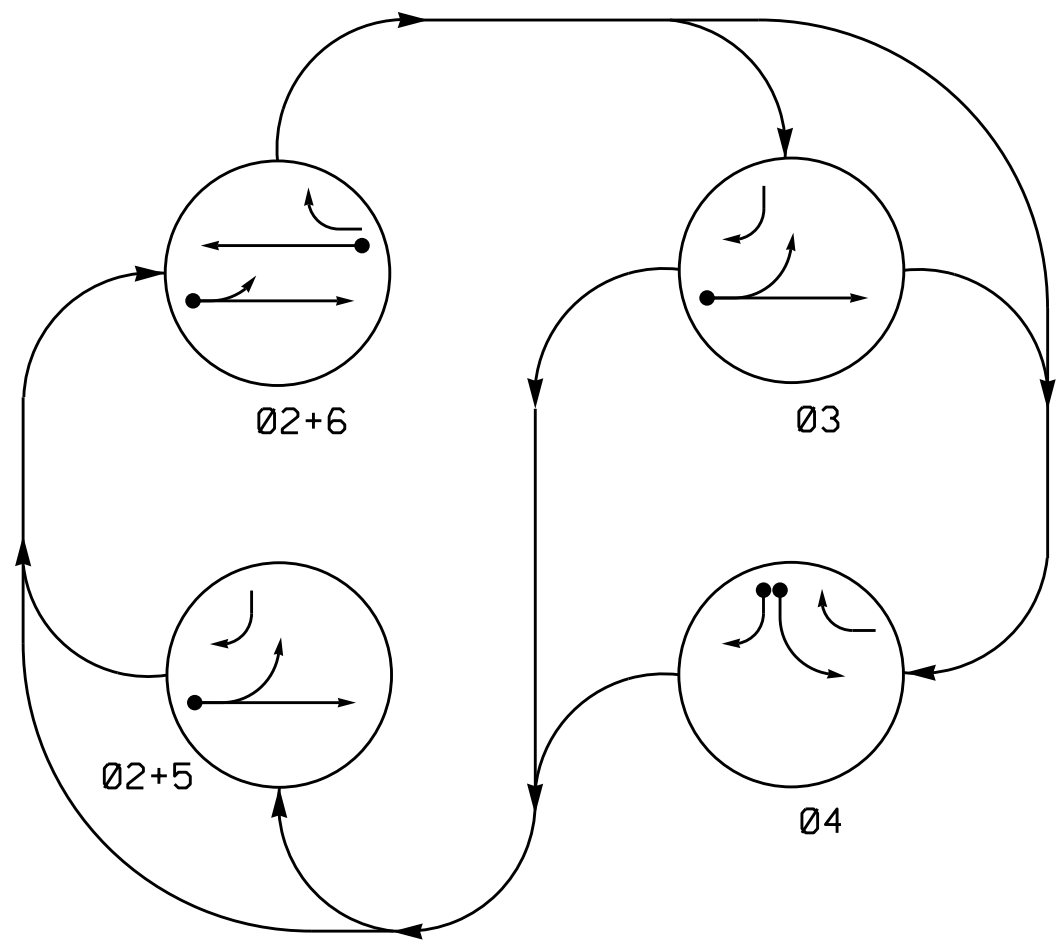
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1054T3
DESIGNED: April 2019
SEALED: 05-16-19
REVISED: N/A

Electrical Detail - Temp. Design - Phase II

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of: G.L. Transportation Mobility and Safety Division STATE OF NORTH CAROLINA Signal Management Section 750 N. Greenfield Pkwy, Garner, NC 27529	NC 105 at SR 1112 (Broadstone Rd.)		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL NORTH CAROLINA PROFESSIONAL ENGINEER RYAN W. HOUGH SEAL 036833 DocuSigned by: Ryan W. Hough 6/4/2019 430320FAA2854C3 DATE SIG. INVENTORY NO. 11-1054T3	
	Division 11	Watauga County		Boone
	PLAN DATE: May 2019	REVIEWED BY:		
	PREPARED BY: James Peterson	REVIEWED BY:		
REVISIONS		INIT.	DATE	

PHASING DIAGRAM



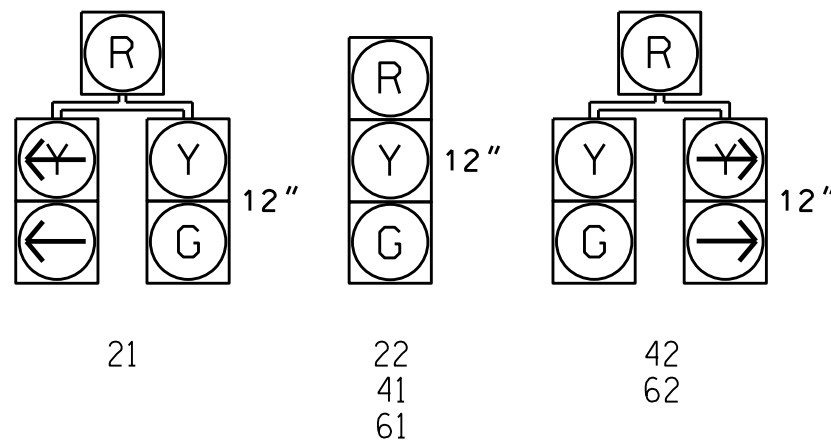
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE				
	02+5	02+6	03	04	FLASH
21	G	G	R	Y	
22	G	G	G	R	Y
41	R	R	R	G	R
42	R	R	R	G	R
61	R	G	R	R	Y
62	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



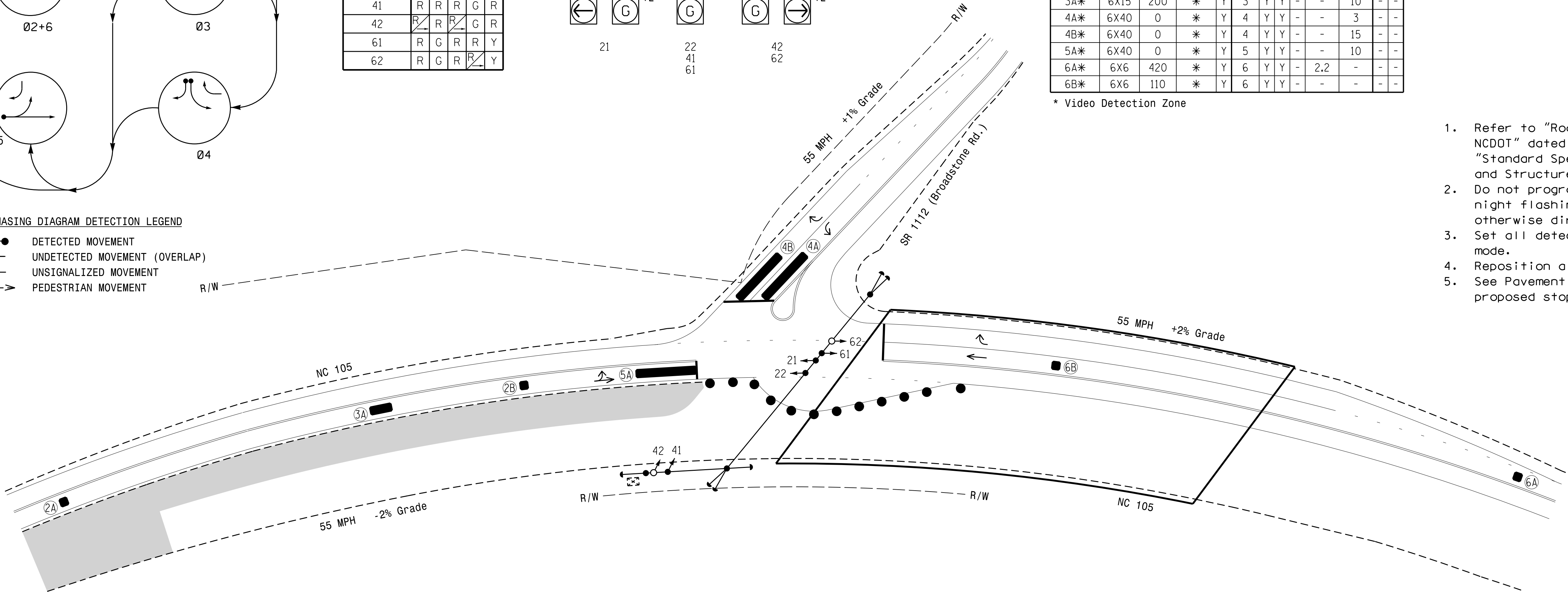
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART										
INDUCTIVE LOOPS					DETECTOR PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A*	6X6	420	*	Y	2	Y	Y	-	2.2	-
2B*	6X6	110	*	Y	2	Y	Y	-	-	-
3A*	6X15	200	*	Y	3	Y	Y	-	-	10
4A*	6X40	0	*	Y	4	Y	Y	-	-	3
4B*	6X40	0	*	Y	4	Y	Y	-	-	15
5A*	6X40	0	*	Y	5	Y	Y	-	-	10
6A*	6X6	420	*	Y	6	Y	Y	-	2.2	-
6B*	6X6	110	*	Y	6	Y	Y	-	-	-

* Video Detection Zone

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.
- Set all detector units to presence mode.
- Reposition all existing signal heads.
- See Pavement Marking Plans for proposed stop bar locations.



OASIS 2070 TIMING CHART

FEATURE	PHASE				
	2	3	4	5	6
Min Green 1 *	14	7	7	7	14
Extension 1 *	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	60	25	25	15	60
Yellow Clearance	5.4	5.4	3.0	3.0	5.4
Red Clearance	1.7	2.6	2.4	2.6	1.7
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

* 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
 - Right of Way
 - Directional Arrow
 - Video Detection Zone
 - Construction Zone
- 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 - Phase III

Prepared in the Offices of:

Transportation Mobility and Safety Division

STATE OF NORTH CAROLINA

Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 105
at
SR 1112 (Broadstone Rd.)

Division 11 Watauga County Boone

PLAN DATE: April 2019 REVIEWED BY: T.J. Williams

PREPARED BY: R.N. Zinser REVIEWED BY:

REVISIONS

SCALE 0 40 1"=40'

SEAL

PROFESSIONAL ENGINEER

SEAL 043914

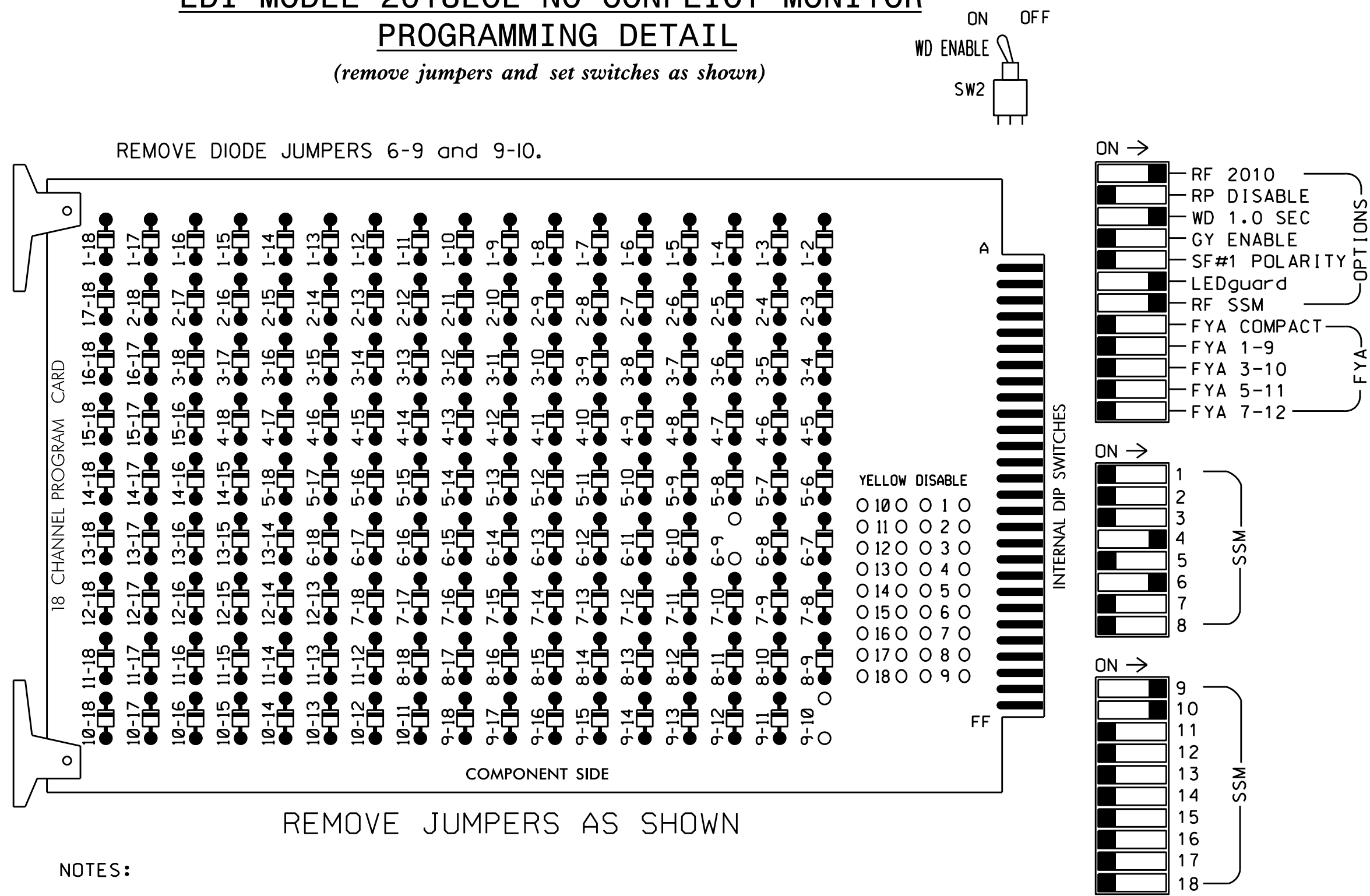
BOYARD N. ZINER

DocuSigned by: R. N. Zinser 5/16/2019

SIG. INVENTORY NO. II-1054T4

EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 Startup in Green.
- Program phase 6 for Yellow Flash.

EQUIPMENT INFORMATION

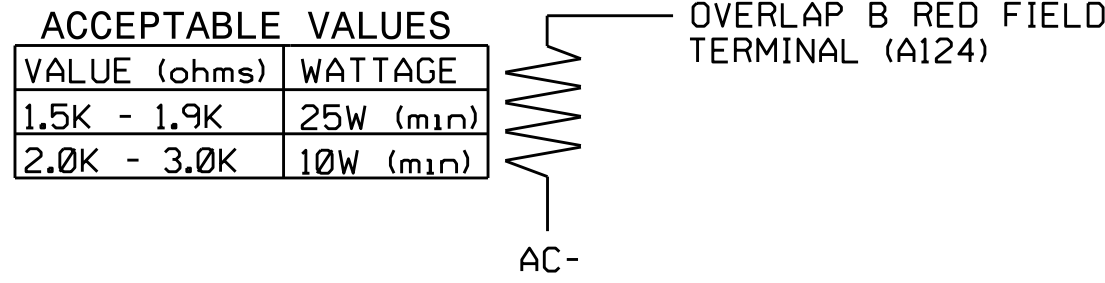
CONTROLLER.....2070
CABINET332
SOFTWAREECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S5,S8,AUX S1,AUX S2
PHASES USED.....2,3,4,5,6
OVERLAP A.....2+3
OVERLAP B.....3+5
OVERLAP C.....NOT USED
OVERLAP B.....NOT USED

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	NC	NU	NC	41,42	62	NU	NC	61,62	NU	NU	NU	21,22	21,42	NU	NU	NU	NU
RED					101				134				A121	*				
YELLOW					102				135				A122					
GREEN					103				136				A123					
RED ARROW																		
YELLOW ARROW					102								A125					
GREEN ARROW					103								A126					

NU = Not Used
NC = No Connection
* Denotes install load resistor. See load resistor installation detail this sheet.

LOAD RESISTOR
INSTALLATION DETAIL



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: : XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: : X
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

PRESS '+'

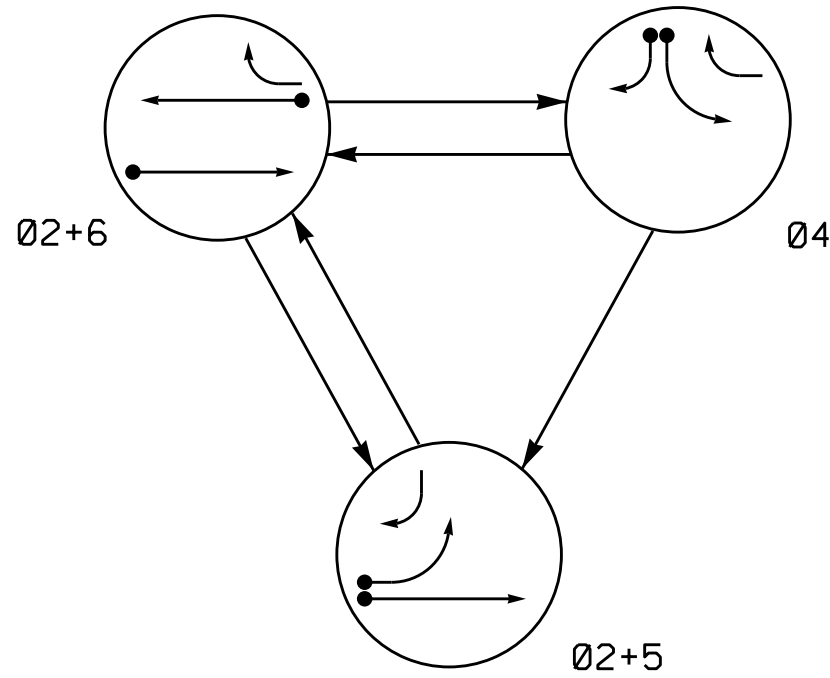
PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: : X X
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN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

OVERLAP PROGRAMMING COMPLETE

Electrical Detail - Temp. Design - Phase III

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 105 at SR 1112 (Broadstone Rd.)	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
Prepared In the Offices of:	Division 11 Watauga County Boone	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER RYAN W. HOUGH 036833
PLAN DATE: May 2019	REVIEWED BY:	DocuSigned by: Ryan W. Hough 5/30/2019 4303201FAA2684C3
PREPARED BY: James Peterson	REVIEWED BY:	SIG. INVENTORY NO. 11-1054T4
REVISIONS	INIT.	DATE

PHASING DIAGRAM



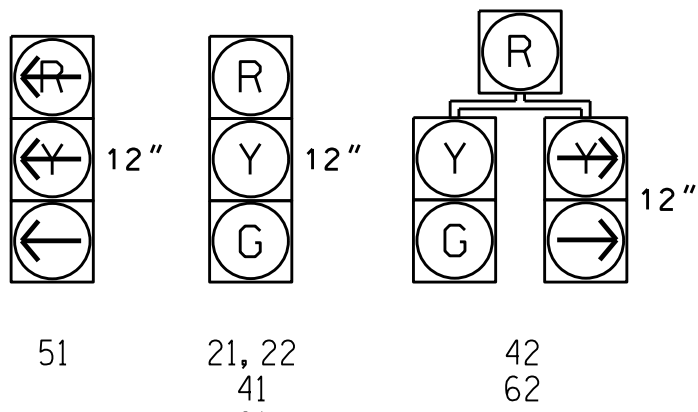
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	02+5	02+6	04	Foot
21, 22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	R	R	R	R
61	R	G	R	Y
62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



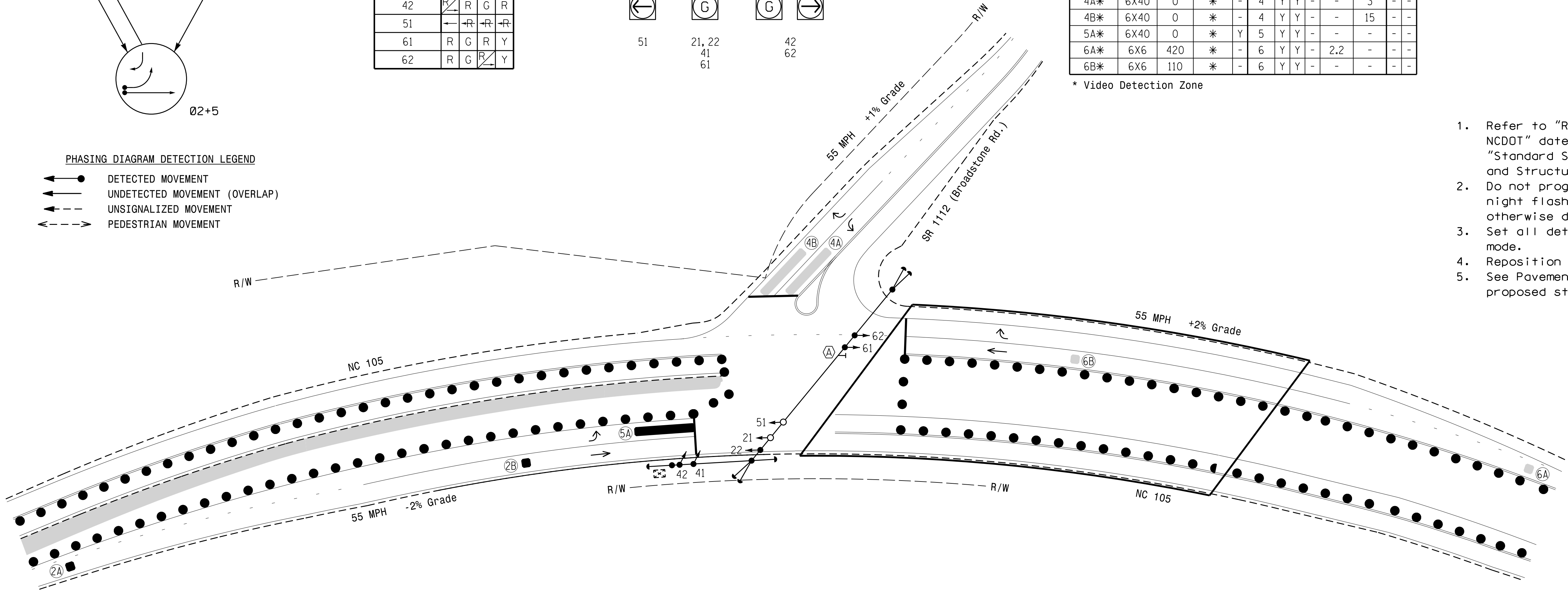
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART												
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A*	6X6	420	*	Y	2	Y	Y	-	2.2	-	-	-
2B*	6X6	110	*	Y	2	Y	Y	-	-	-	-	-
4A*	6X40	0	*	-	4	Y	Y	-	-	3	-	-
4B*	6X40	0	*	-	4	Y	Y	-	-	15	-	-
5A*	6X40	0	*	Y	5	Y	Y	-	-	-	-	-
6A*	6X6	420	*	-	6	Y	Y	-	2.2	-	-	-
6B*	6X6	110	*	-	6	Y	Y	-	-	-	-	-

* Video Detection Zone

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.
- Set all detector units to presence mode.
- Reposition all existing signal heads.
- See Pavement Marking Plans for proposed stop bar locations.



OASIS 2070 TIMING CHART

FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	14	7	7	14
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	60	25	15	60
Yellow Clearance	5.4	3.0	3.0	5.4
Red Clearance	1.7	3.3	3.5	1.7
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND

- | PROPOSED | | EXISTING |
|----------|-------------------------------------|----------|
| | Traffic Signal Head | |
| | Modified Signal Head | N/A |
| | Sign | |
| | Pedestrian Signal Head | |
| | Signal Pole with Push Button & Sign | |
| | Signal Pole with Guy | |
| | Signal Pole with Sidewalk Guy | |
| | Inductive Loop Detector | |
| | Controller & Cabinet | |
| | Junction Box | |
| | 2-in Underground Conduit | |
| | Right of Way | |
| | Directional Arrow | |
| | Video Detection Zone | |
| | Construction Zone | N/A |
| | No Left Turn Sign (R3-2) | |

Signal Upgrade - Temporary Design - Phase IV

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 105
at
SR 1112 (Broadstone Rd.)

Division 11 Watauga County Boone

PLAN DATE: April 2019 REVIEWED BY: T.J. Williams

PREPARED BY: R.N. Zinser REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER

SEAL 043914

RICHARD N. ZINER

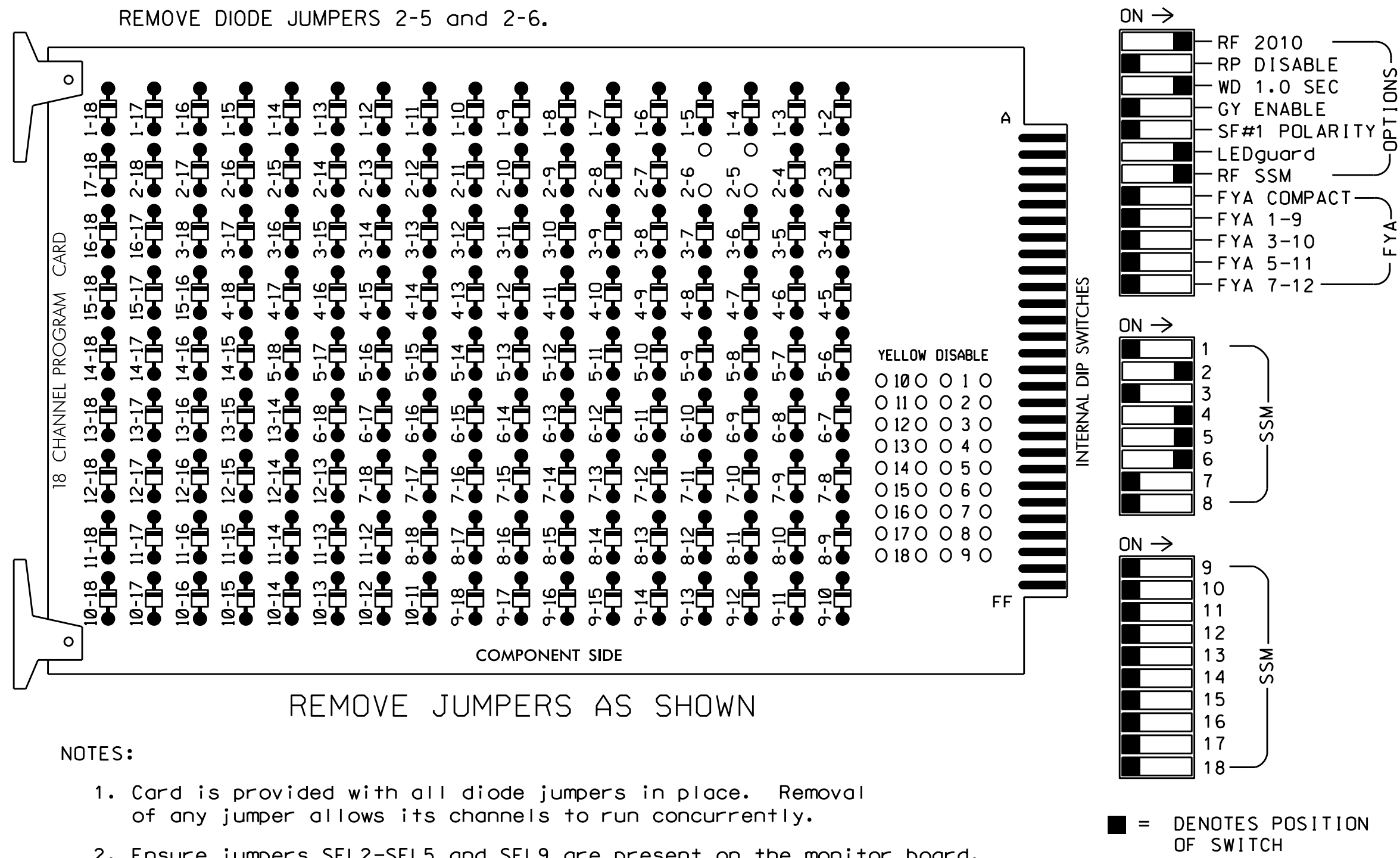
DocuSigned by: R. N. Ziner 5/16/2019

DATE

SIG. INVENTORY NO. II-1054T5

EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash.

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,S5,S7,S8

PHASES USED.....2,4,5,6

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	21,22	NU	NU	41,42	62	NU	42	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			101					134								
YELLOW		129			102					135								
GREEN		130			103					136								
RED ARROW									131									
YELLOW ARROW					102		132	132										
GREEN ARROW					103		133	133										

NU = Not Used

LOAD RESISTOR
INSTALLATION DETAIL

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

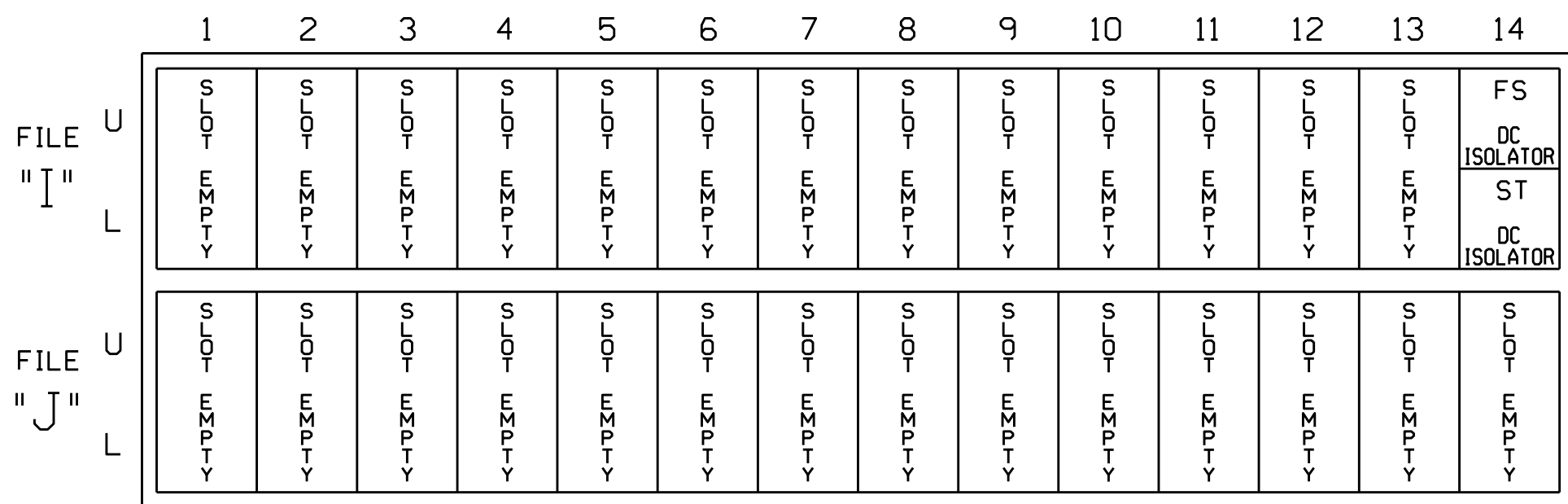
OVERLAP B RED FIELD
TERMINAL (A124)

AC-

REMOVE
(if present)

INPUT FILE POSITION LAYOUT

(front view)



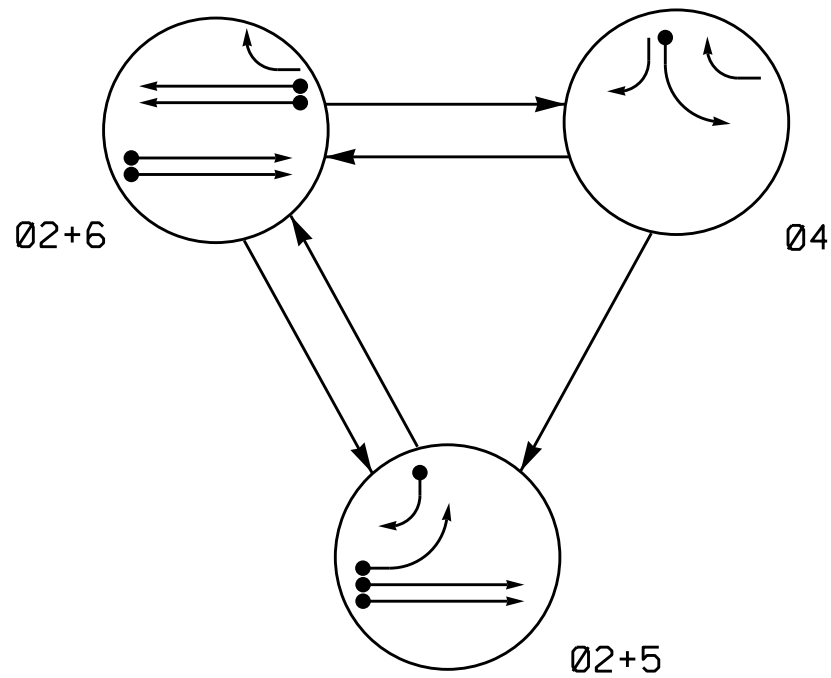
SPECIAL DETECTOR NOTE

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

Electrical Detail - Temp. Design - Phase IV

ELECTRICAL AND PROGRAMMING DETAILS FOR:		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared In the Offices of:		SEAL	
750 N. Greenfield Pkwy, Garner, NC 27529		NC 105 at SR 1112 (Broadstone Rd.)	
Division 11 Watauga County Boone		PLAN DATE: May 2019 REVIEWED BY:	
PREPARED BY: James Peterson		REVIEWED BY:	
REVISIONS		INIT. DATE	
DocuSigned by: Ryan W. Hough 430320FAA2684C3		5/30/2019 DATE	
SIG. INVENTORY NO. 11-1054T5			

PHASING DIAGRAM



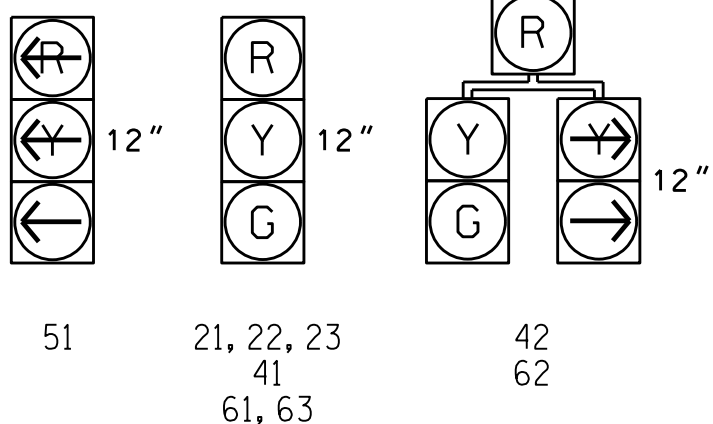
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	02+5	02+6	04	FLASH
21, 22, 23	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	R	R	R	R
61, 63	R	G	R	Y
62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

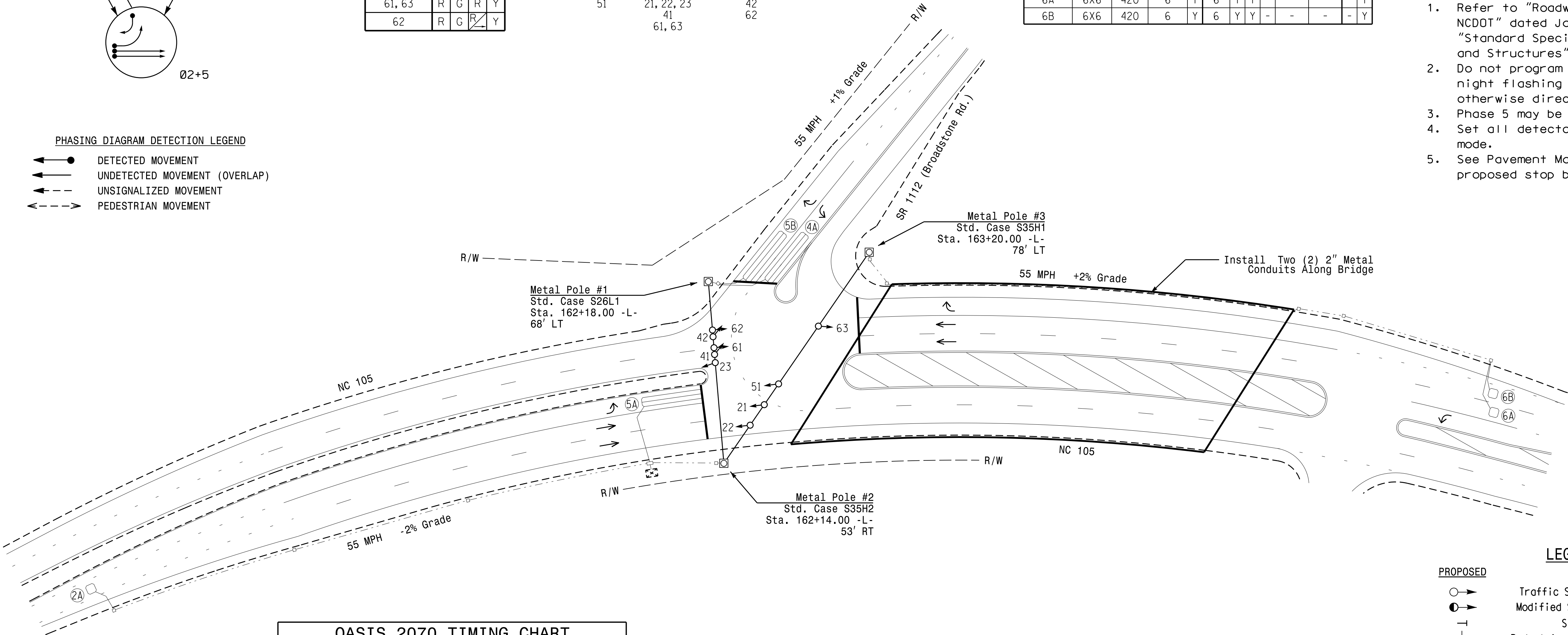


OASIS 2070 LOOP & DETECTOR INSTALLATION CHART											
INDUCTIVE LOOPS						DETECTOR PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP NEW CARD
2A	6X6	420	6	Y	2	Y	Y	-	-	-	- Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	3	- Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	- Y
5B	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	- Y
6A	6X6	420	6	Y	6	Y	Y	-	-	-	- Y
6B	6X6	420	6	Y	6	Y	Y	-	-	-	- Y

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.
- See Pavement Marking Plans for proposed stop bar locations.



OASIS 2070 TIMING CHART				
FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	14	7	7	14
Extension 1 *	6.0	2.0	2.0	6.0
Max Green 1 *	90	25	15	90
Yellow Clearance	5.4	3.0	3.0	5.4
Red Clearance	1.2	3.2	3.1	1.2
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	-	1.5
Max Variable Initial *	46	-	-	46
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.4	-	-	3.4
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

This plan supersedes the one signed and sealed on 5/16/2019.

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, Right of Way, Directional Arrow, Metal Strain Pole.
- 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 - Final Design

Prepared in the Offices of:

Transportation Mobility and Safety Solutions

750 N. Greenfield Pkwy, Garner, NC 27529

NC 105 at SR 1112 (Camp Broadstone Rd.)

Division 11 Watauga County Boone

PLAN DATE: October 2021 REVIEWED BY: T.J. Williams

PREPARED BY: R.N. Zinser REVIEWED BY:

REVISIONS

SCALE: 0 40 1"=40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

PROFESSIONAL ENGINEER

SEAL 043914

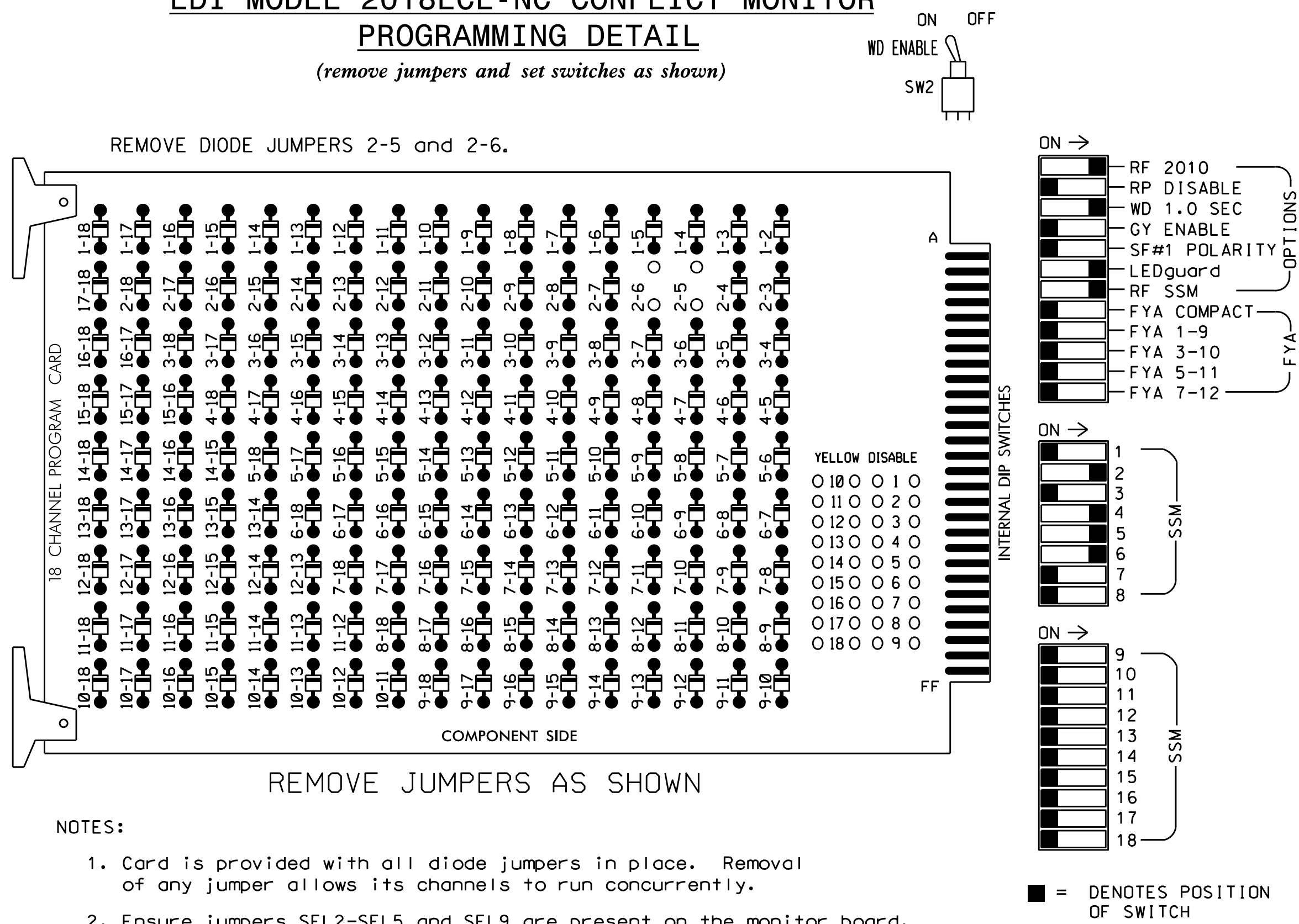
BOYD N. ZINER

DocuSigned by: R. N. Zinser 10/28/2021

SIG. INVENTORY NO. 11-1054

EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 2 and 6 for Yellow Flash.

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,S5,S7,S8
PHASES USED.....2,4,5,6
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	21,22 23	NU	NU	41,42 62	NU	42 51	61,62 63	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134										
YELLOW		129			102			135										
GREEN		130			103			136										
RED ARROW							131											
YELLOW ARROW					102		132	132										
GREEN ARROW					103		133	133										

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

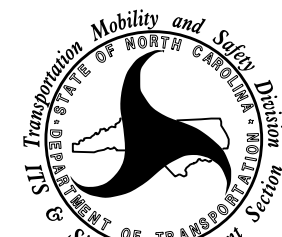
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-1054
DESIGNED: October 2021
SEALED: 10-28-21
REVISED: N/A

THIS ELECTRICAL DETAIL SUPERSEDES
THE DETAIL SEALED ON 5/30/2019.

Electrical Detail - Final Design

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared In the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

NC 105
at
SR 1112 (Camp Broadstone Rd.)

Division 11 Watauga County Boone

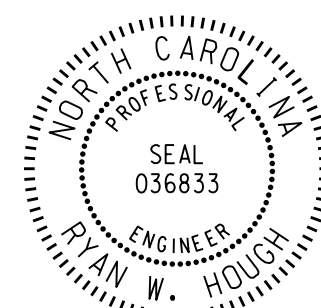
PLAN DATE: October 2021 REVIEWED BY:

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL



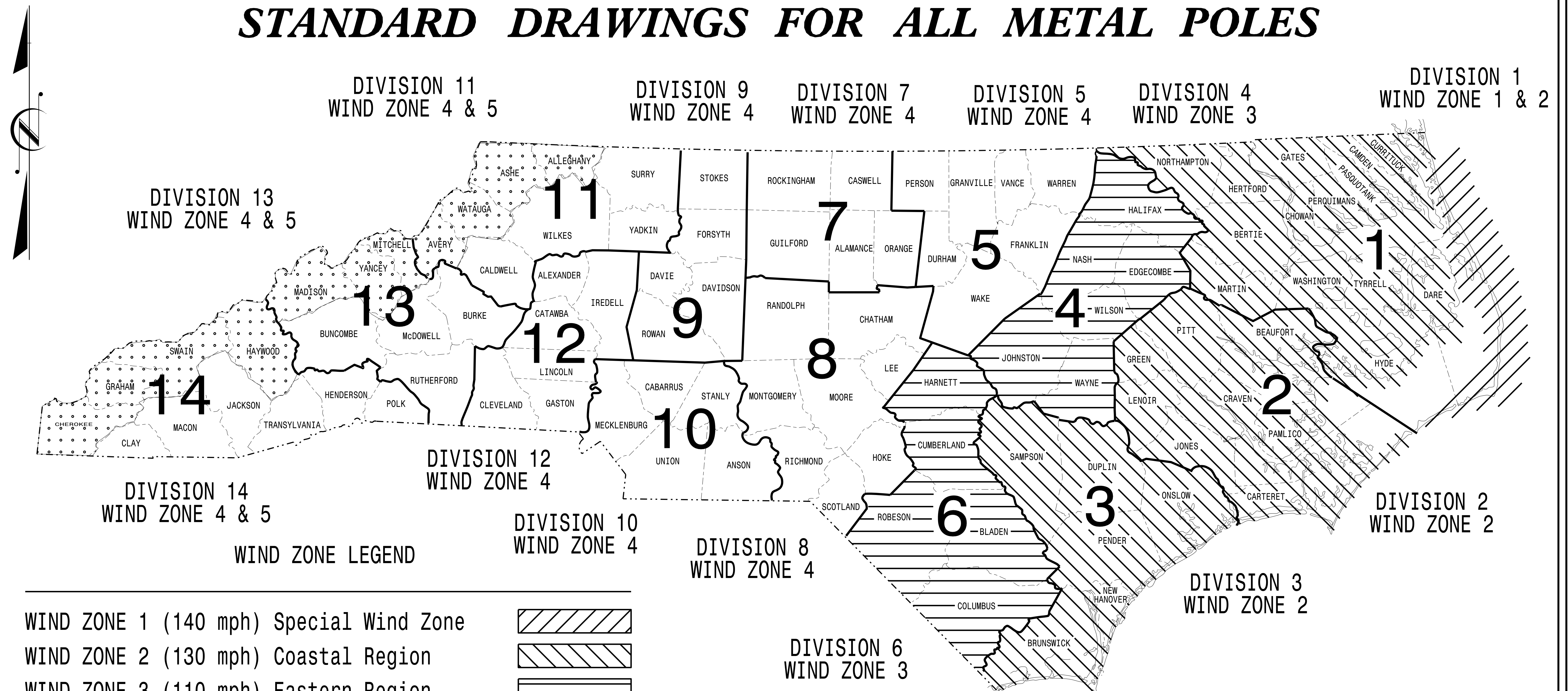
Signed by: Ryan W. Hough DATE: 10/28/2021

SIG. INVENTORY NO. 11-1054

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT I.D. NO.	SHEET NO.
R-2566BA	Sig.M1

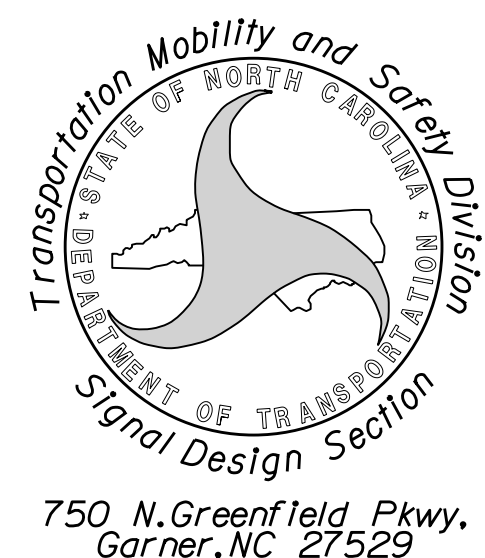
STANDARD DRAWINGS FOR ALL METAL POLES



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:



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:

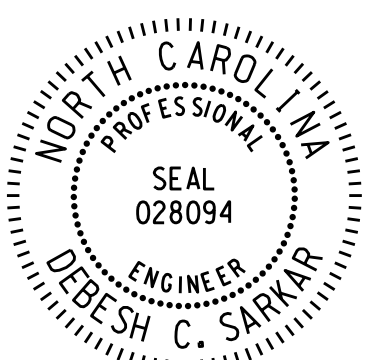
MOBILITY AND SAFETY DIVISION - ITS AND SIGNALS UNIT

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

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

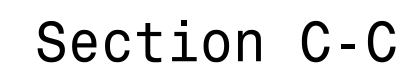
D.C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER

SEAL



DocuSigned by:
Debesh C. Sarkar
4486333

10/11/2017
DATE



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. _____

- 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.

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

Base Plate Template and Anchor Bolt Lock Plate Details



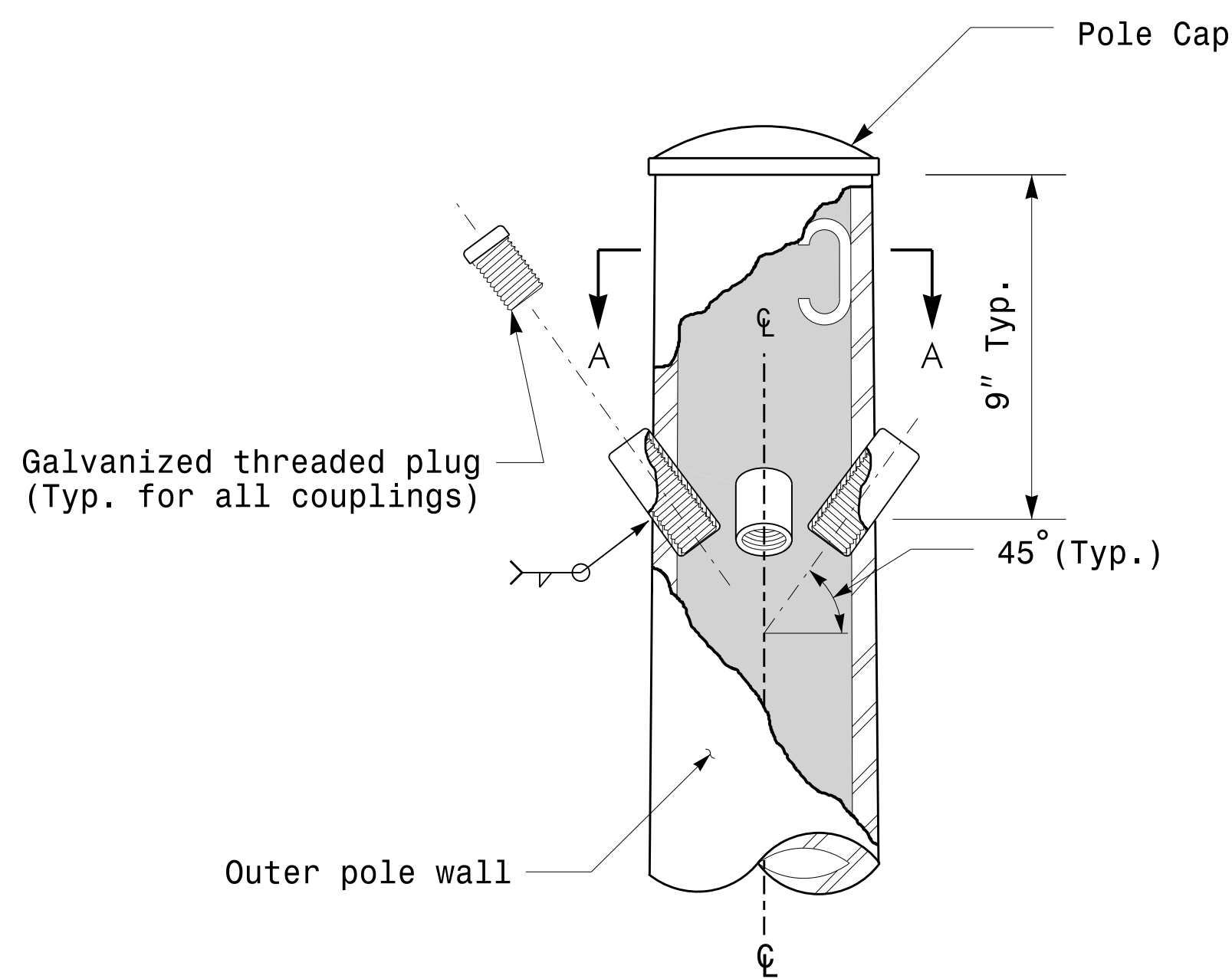
Typical Base Plate Detail

REVISIONS	INIT.	DATE
-----------	-------	------

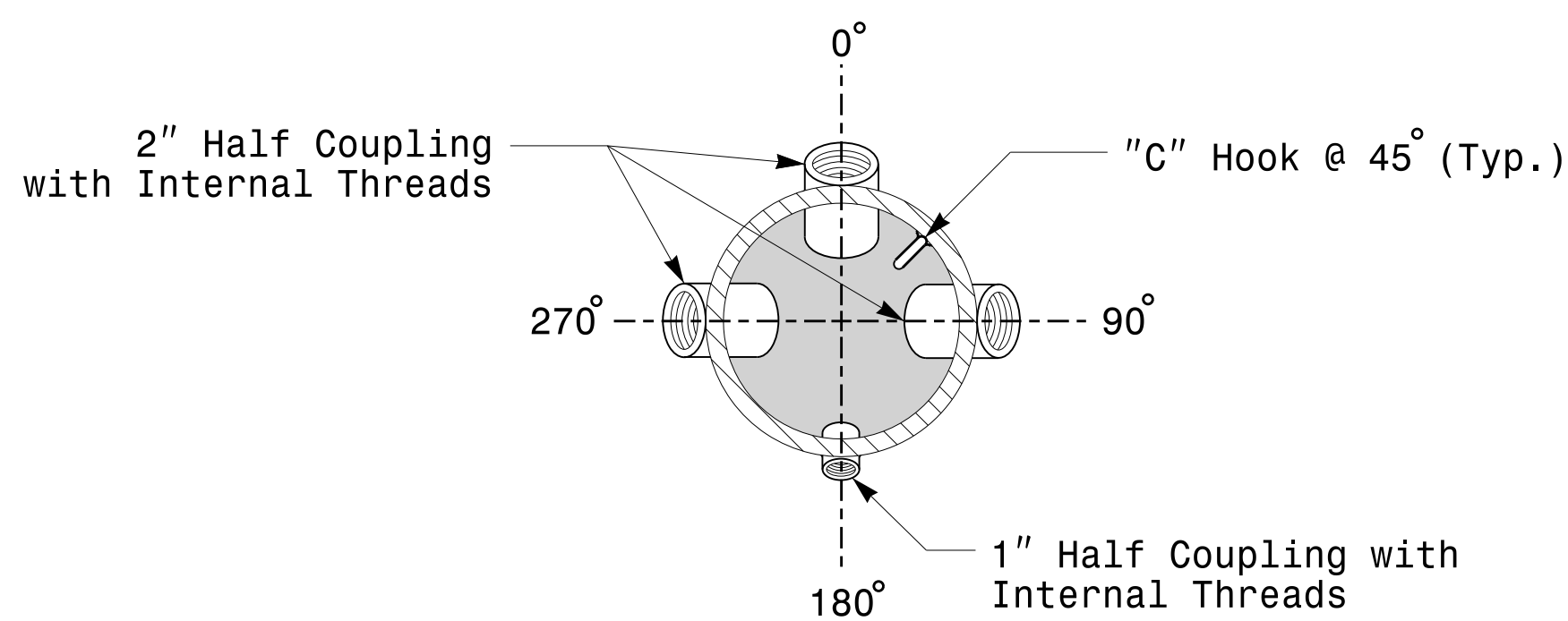


DocuSigned by:
Debesu C. Sarkar
44E92230

10/11/2017
DATE

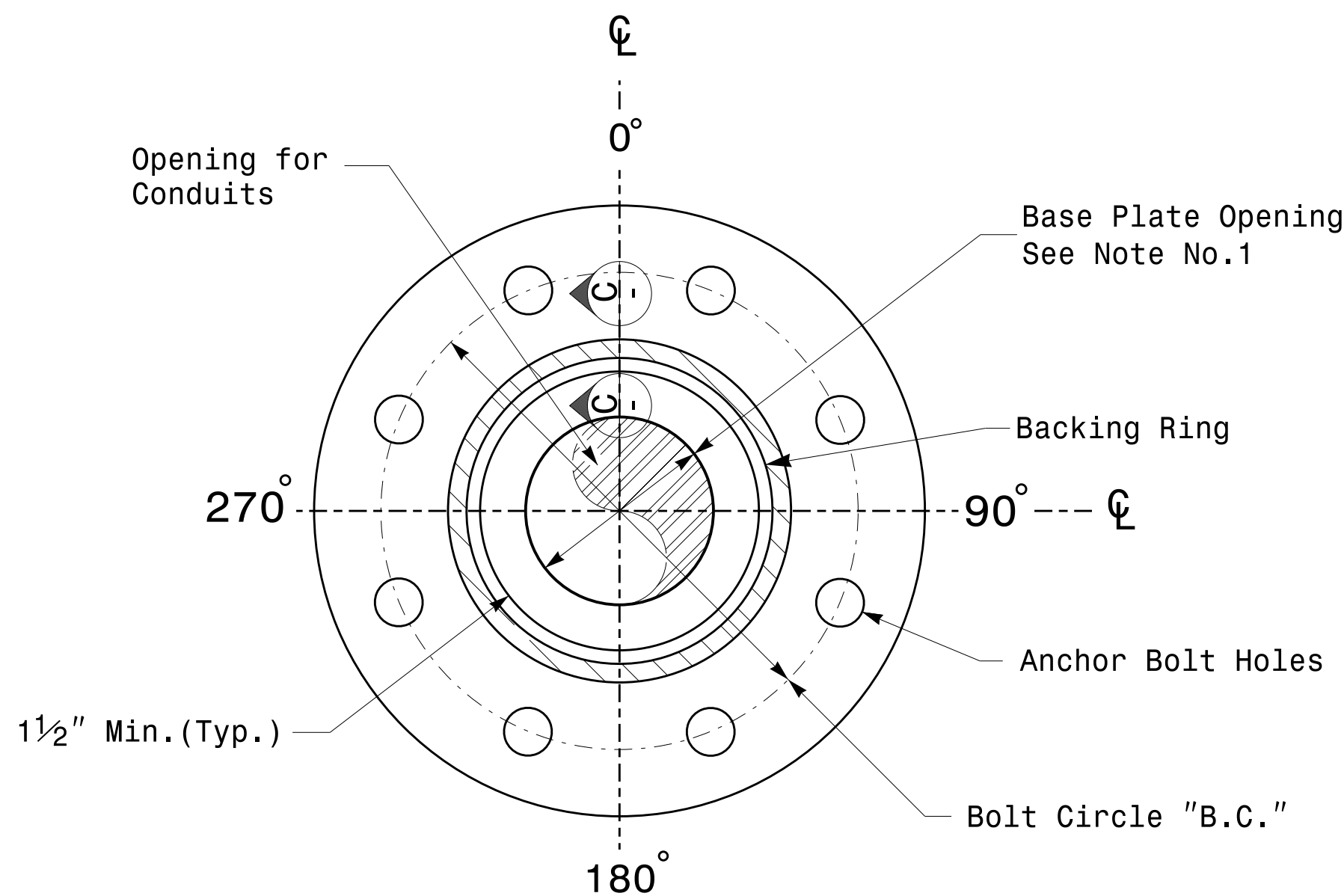


Cable Entrances at Top of Pole

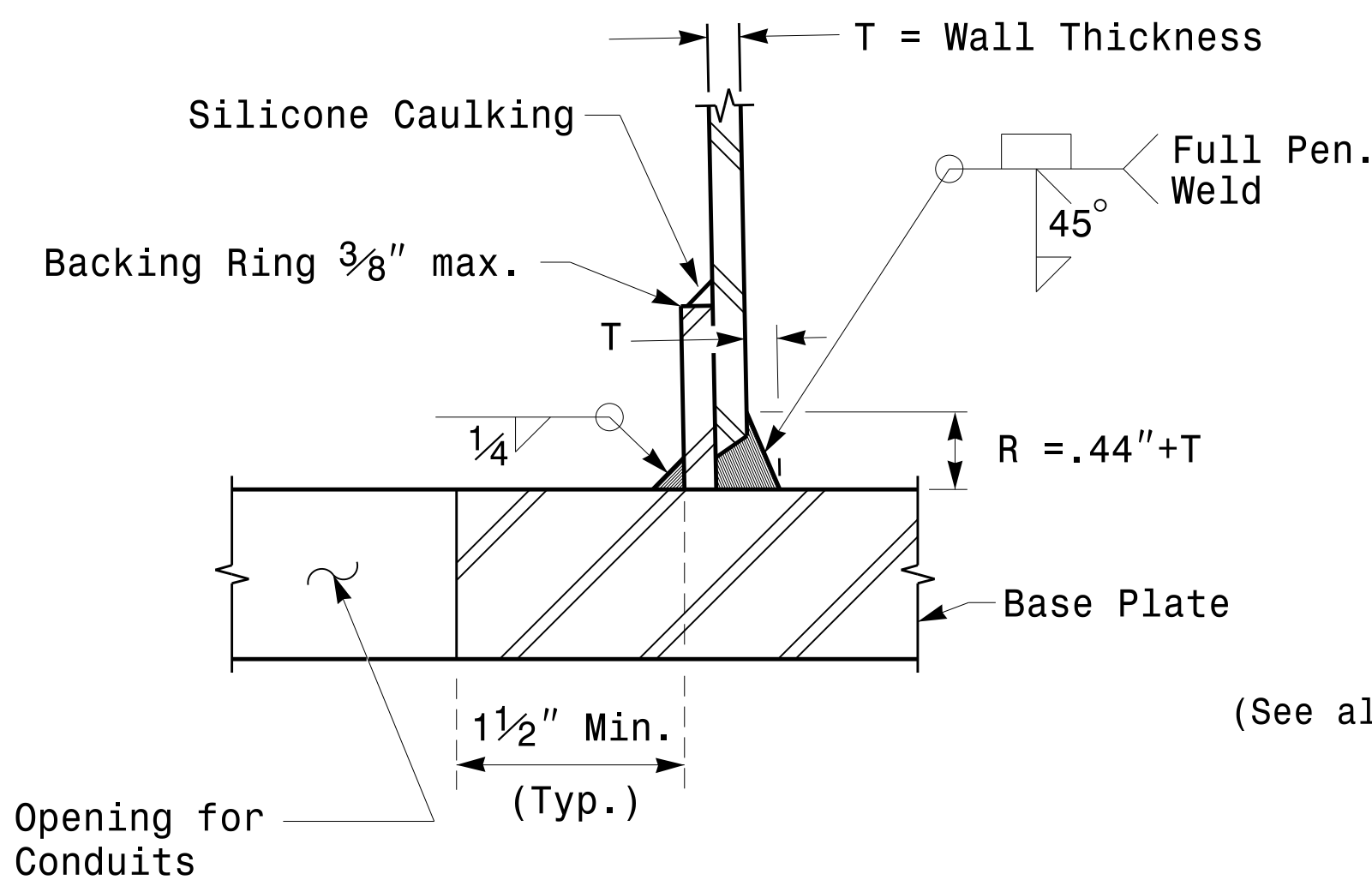


Section A-A

Radial Orientation for Factory Installed
Accessories at Top of Pole



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



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

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

Shaft I.D. Tag
(See drawing M2 for details)

Terminal Compartment
(See drawing M2 for details)

Anchor Bolt
(See also drawing M2 for details)

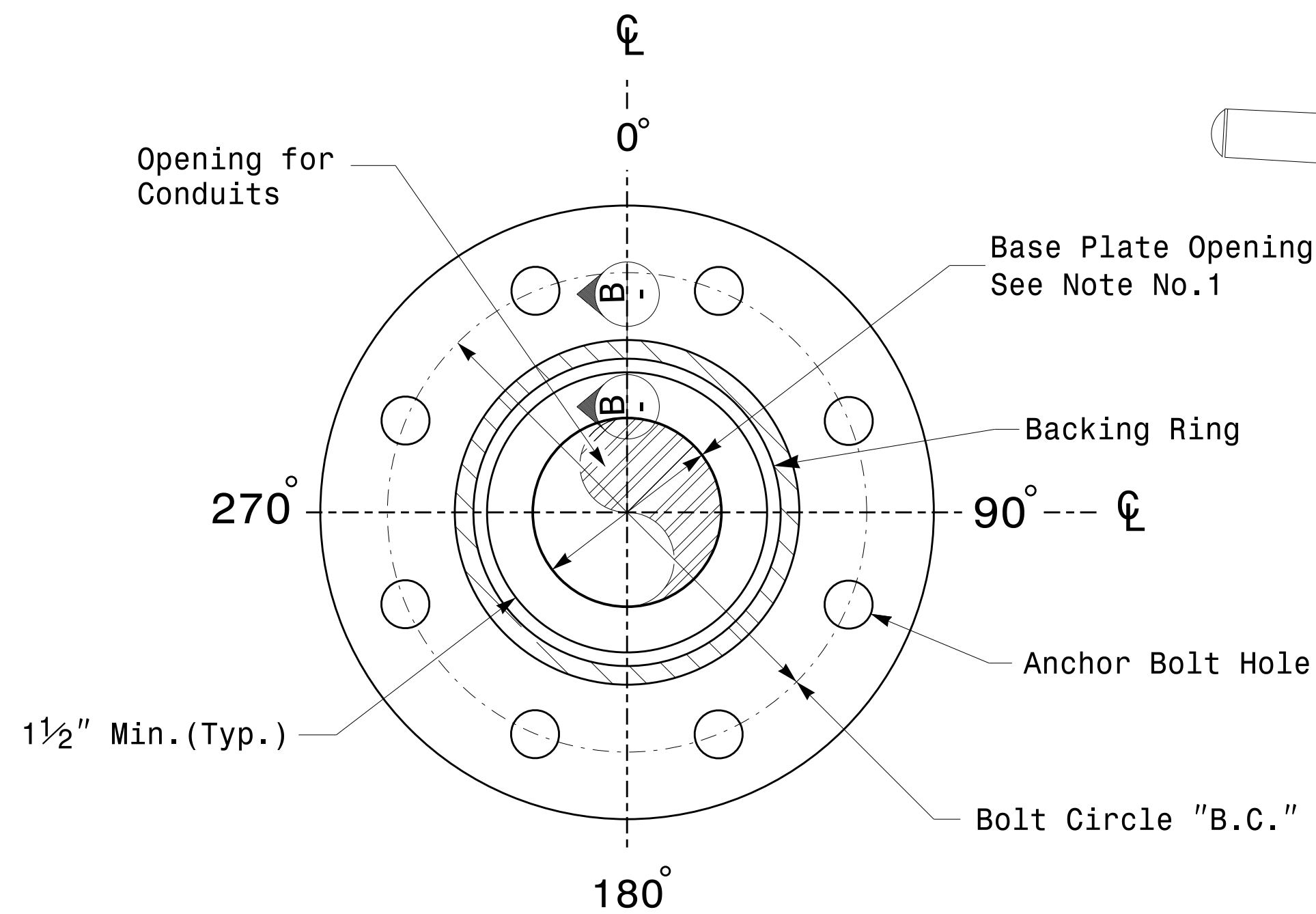
Monotube Strain Pole

	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	
SCALE 0 NA NONE					

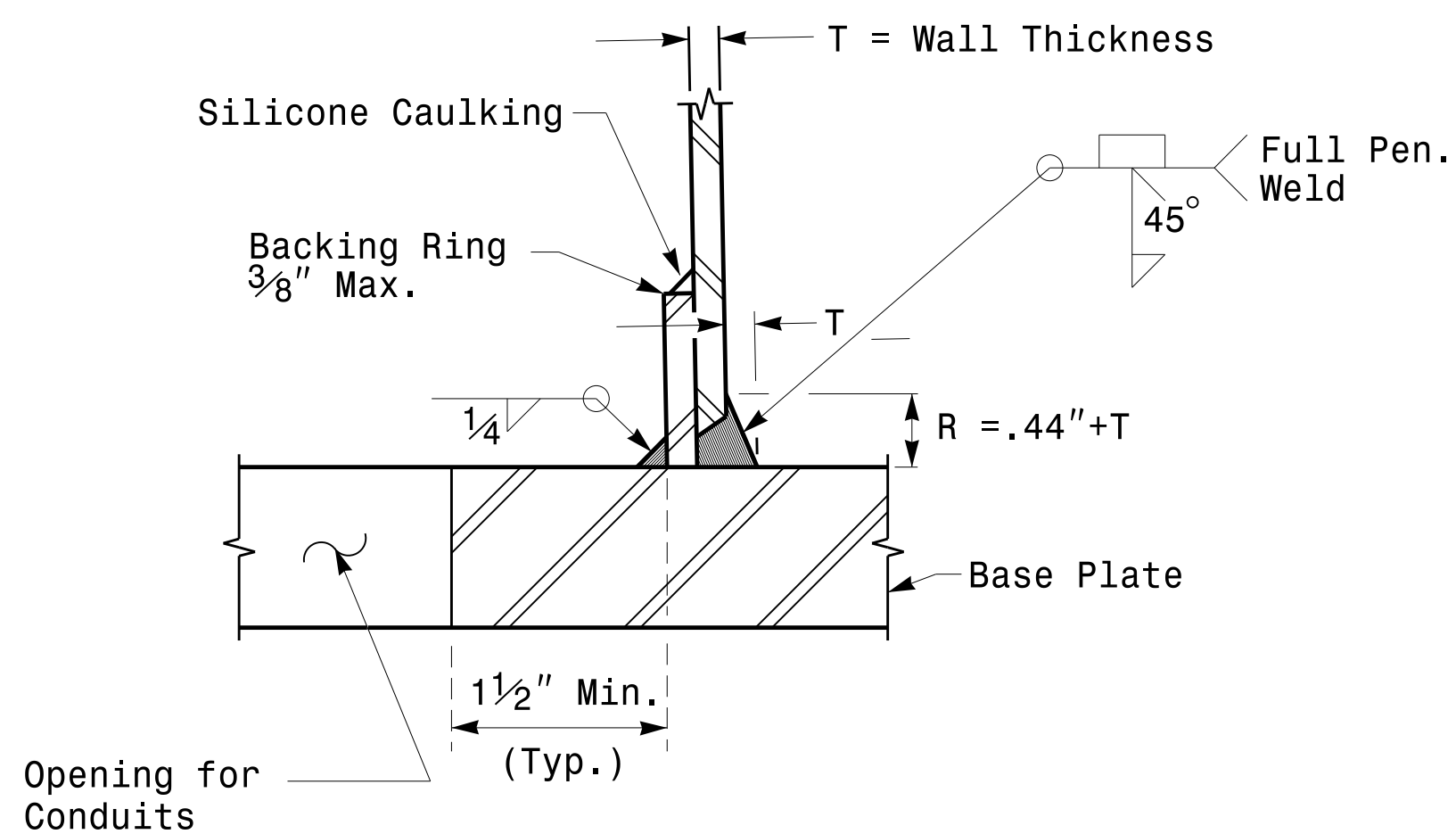
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Debesh C. Sarkar
4488E781818A74FURE

10/11/2017
DATE

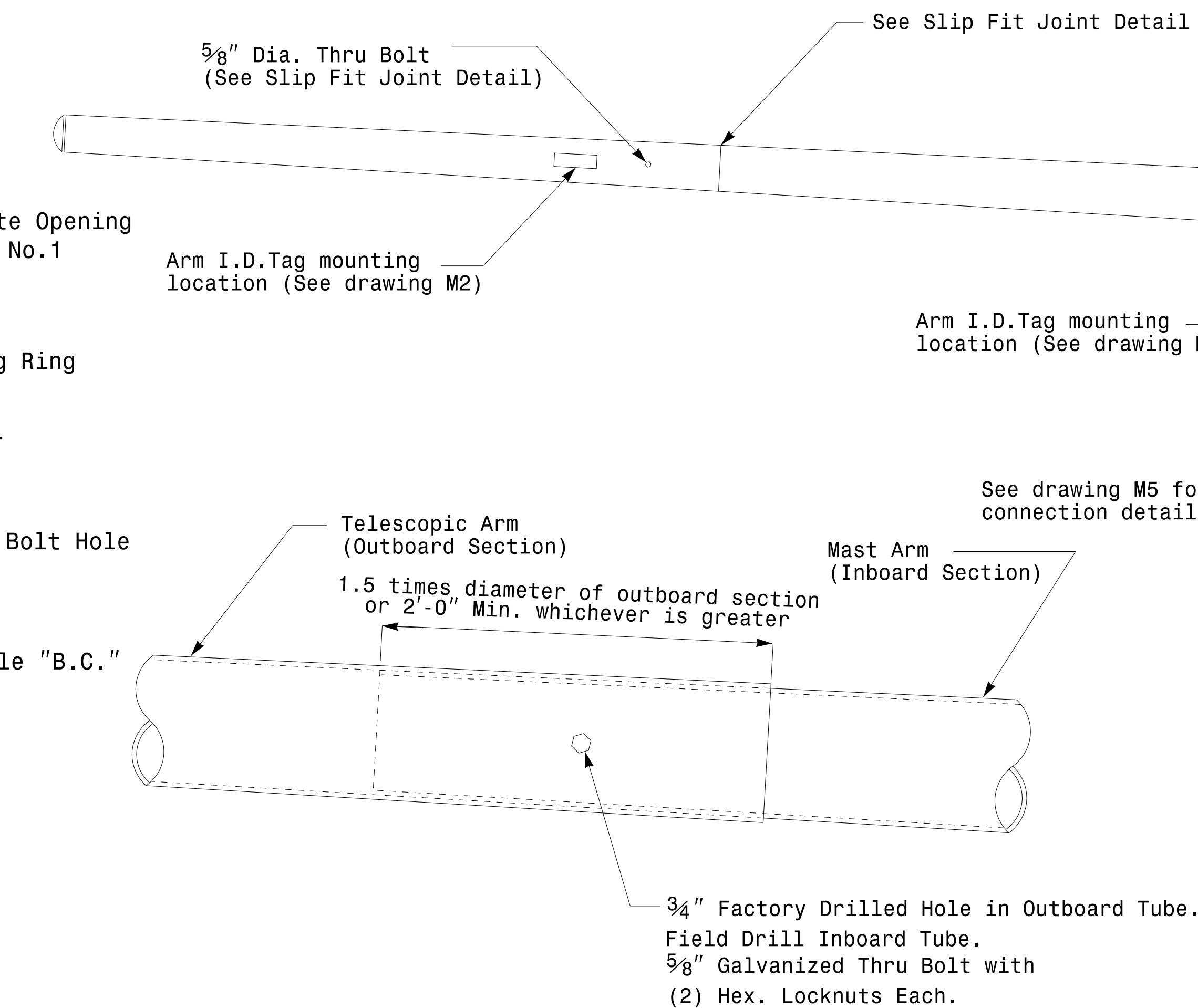
Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3½" but shall not be less than 8½".



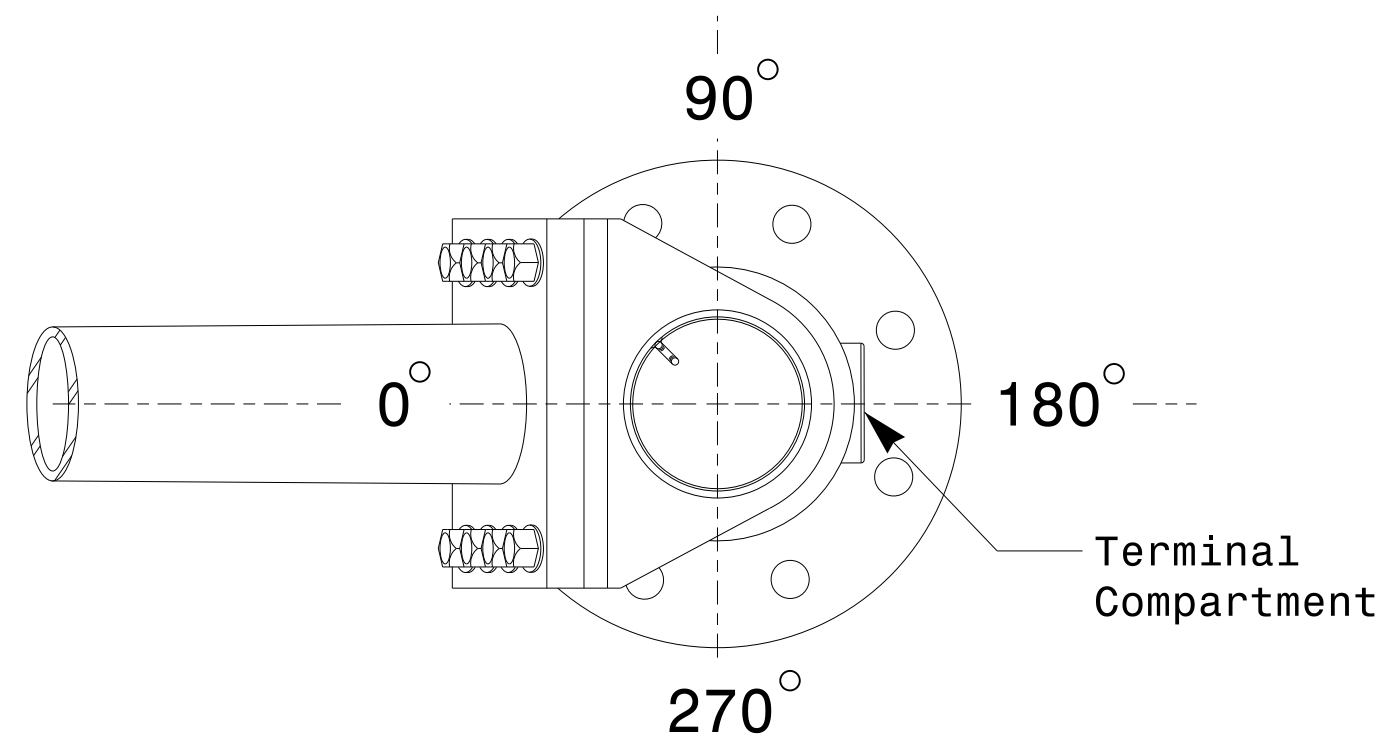
Section A-A
Pole Base Plate Details



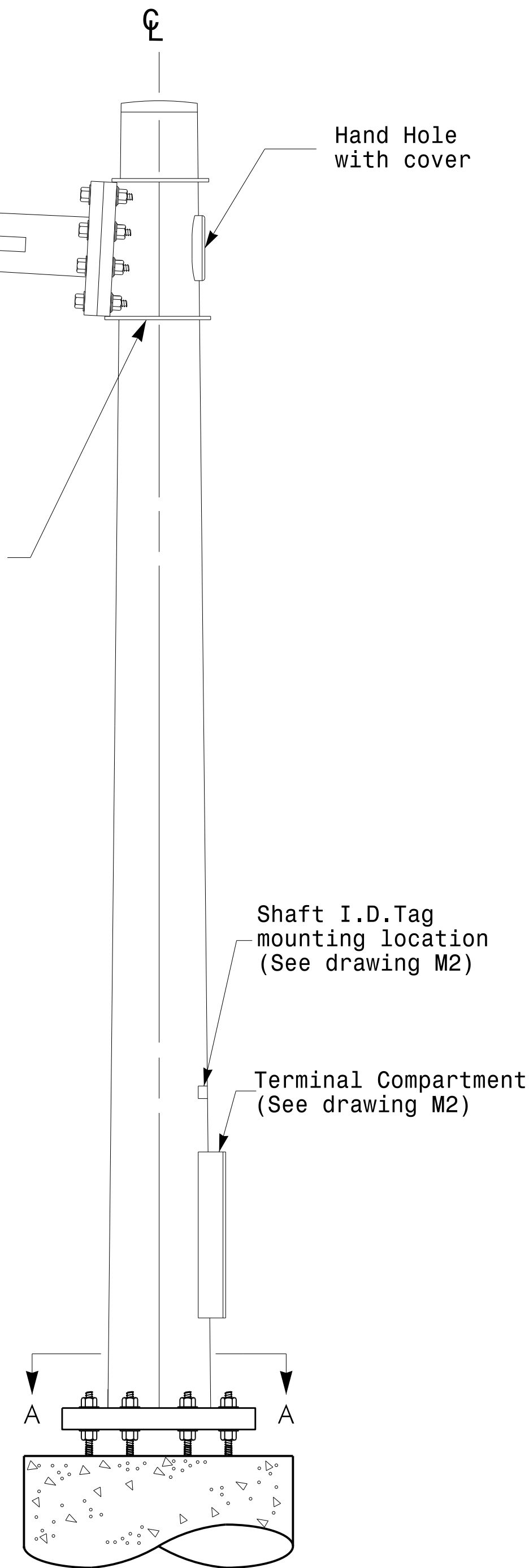
Section B-B
(Pole Attachment to Base Plate)
Full-Penetration
Groove Weld Detail



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation

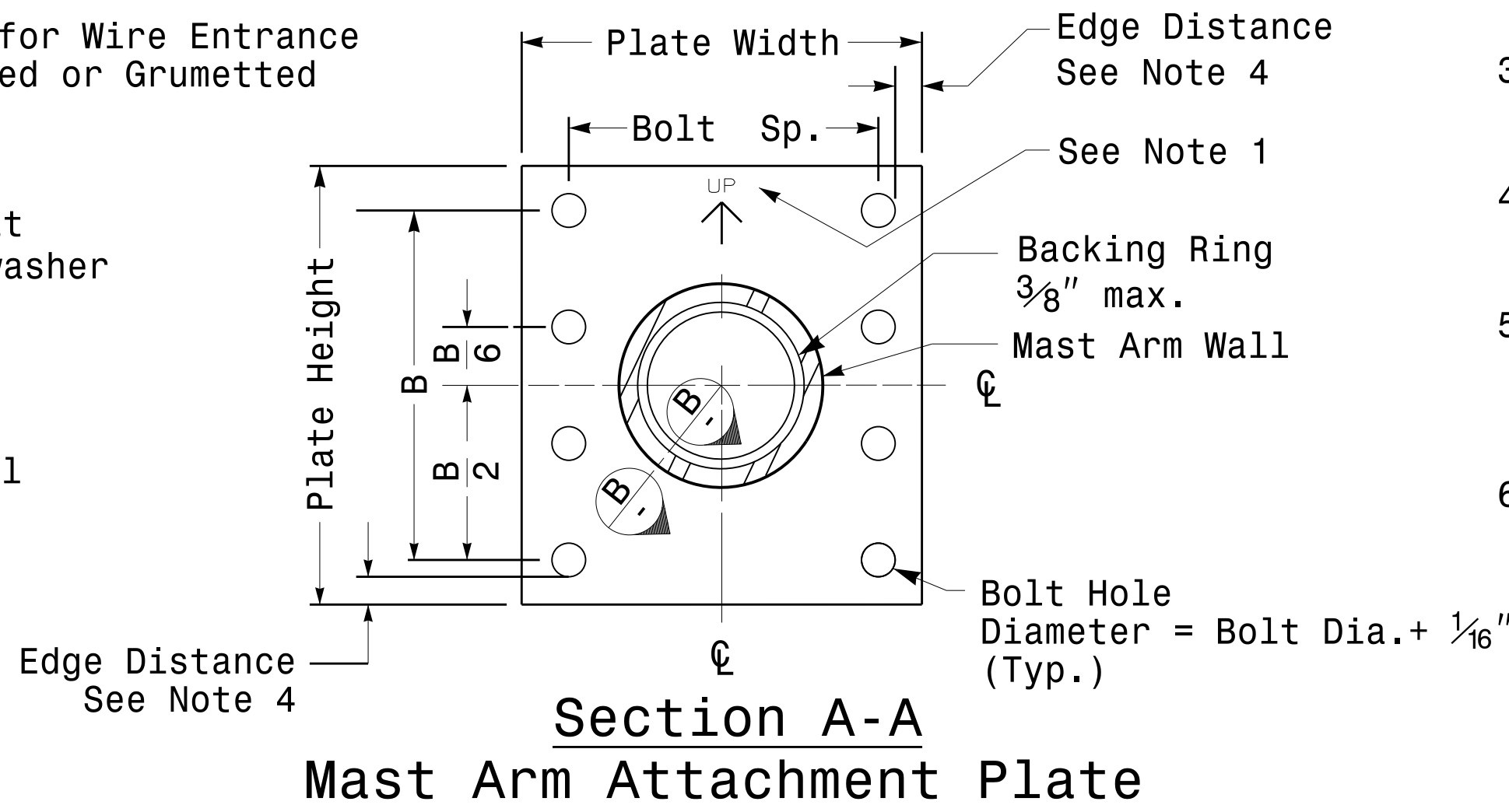
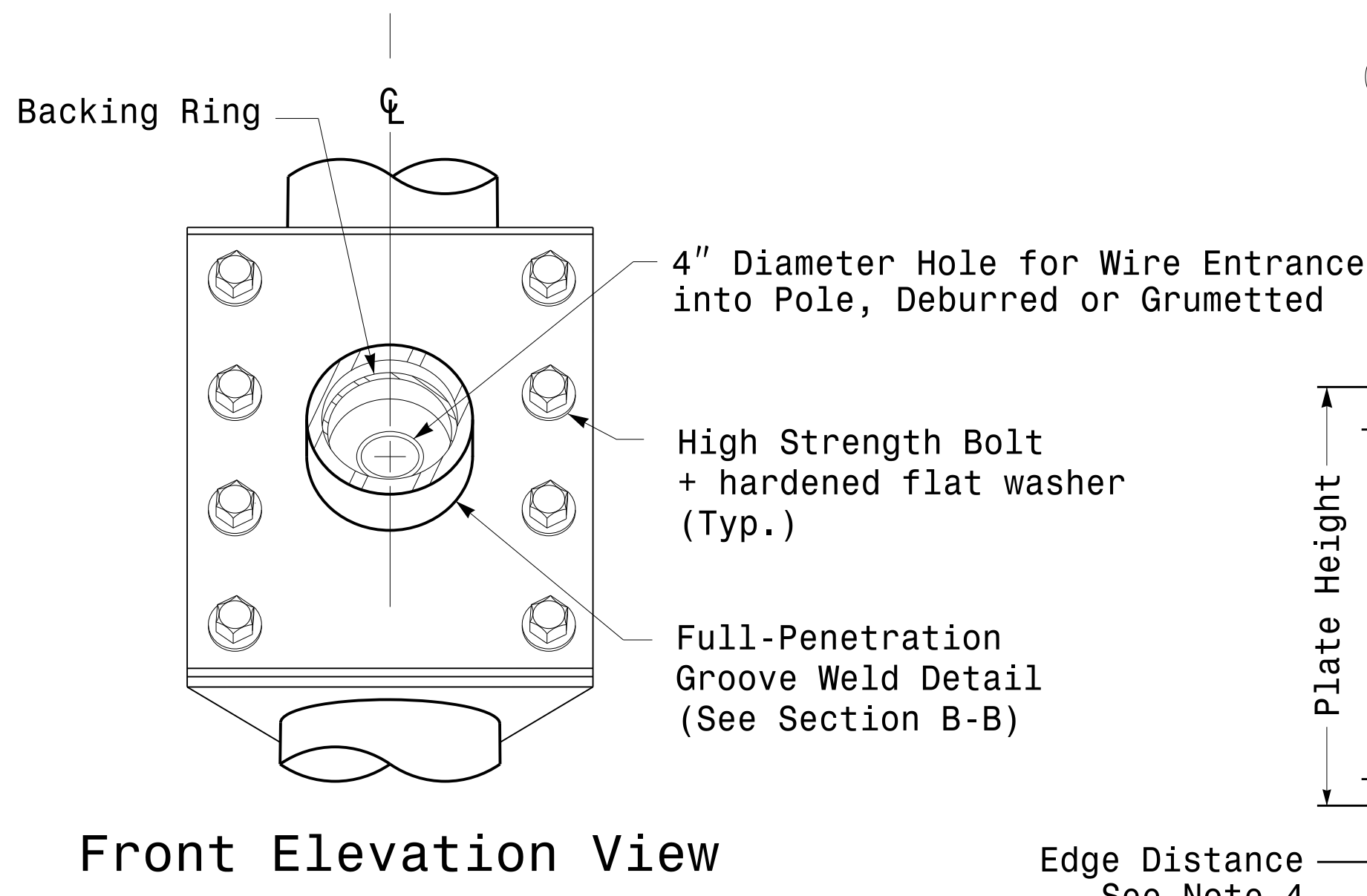
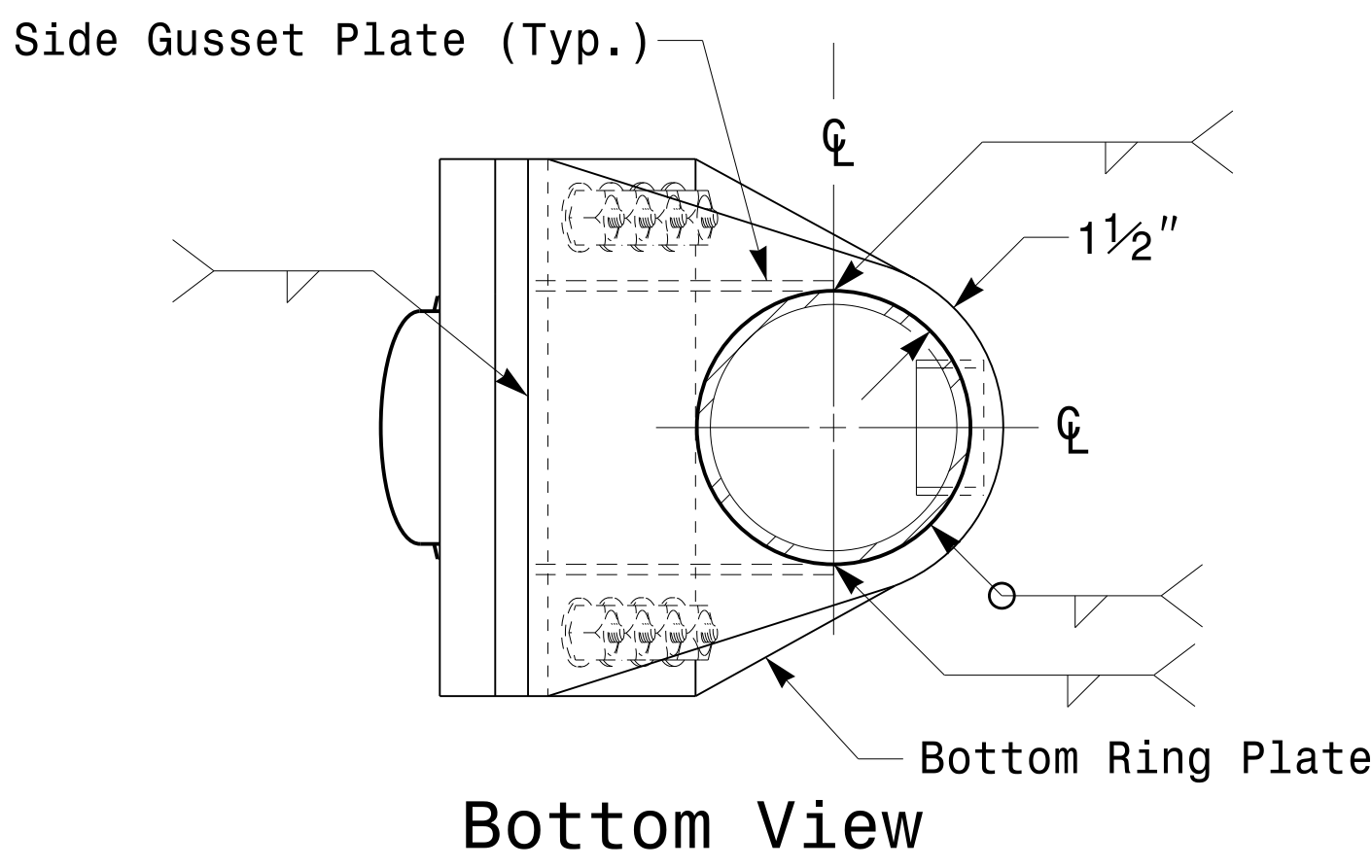
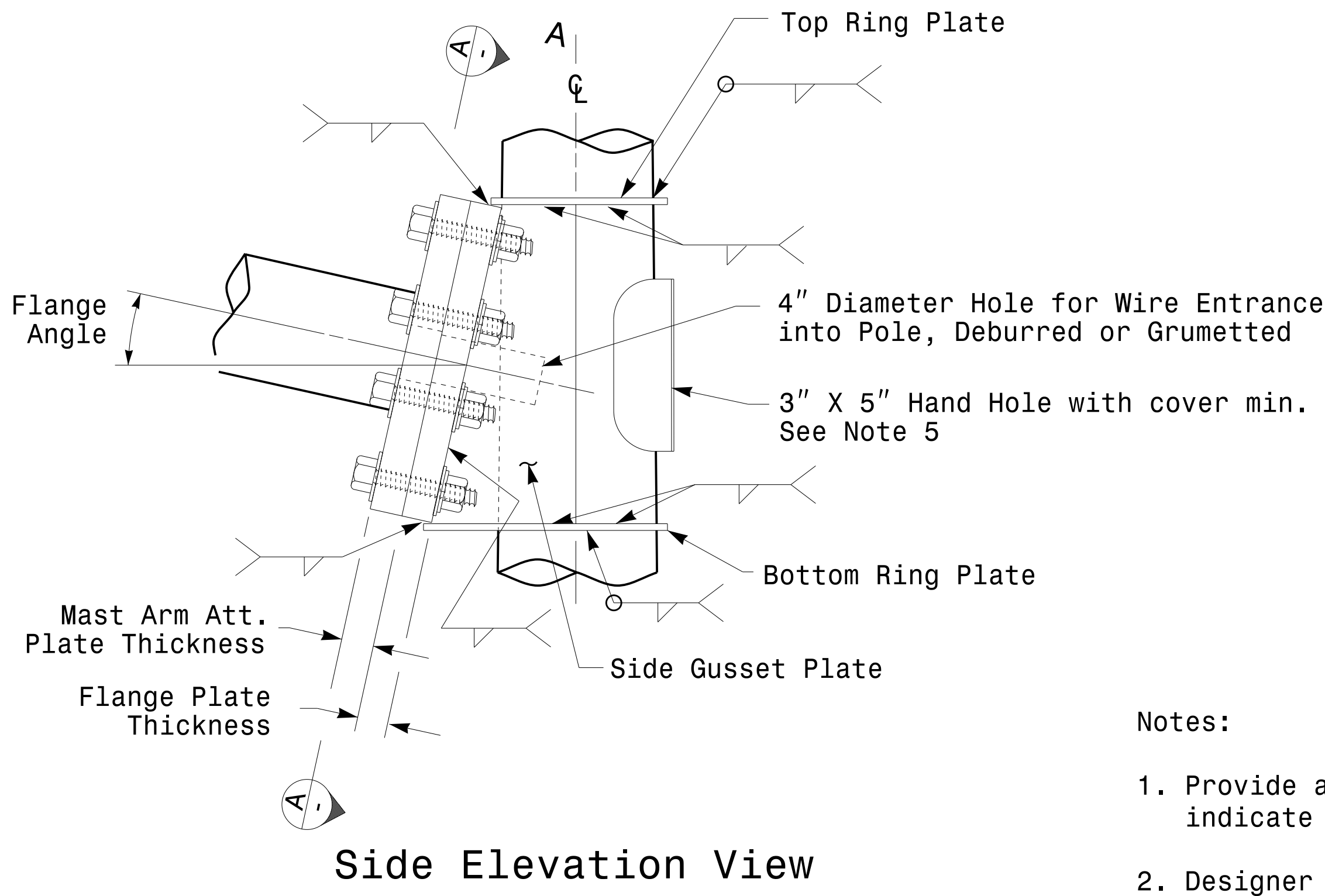
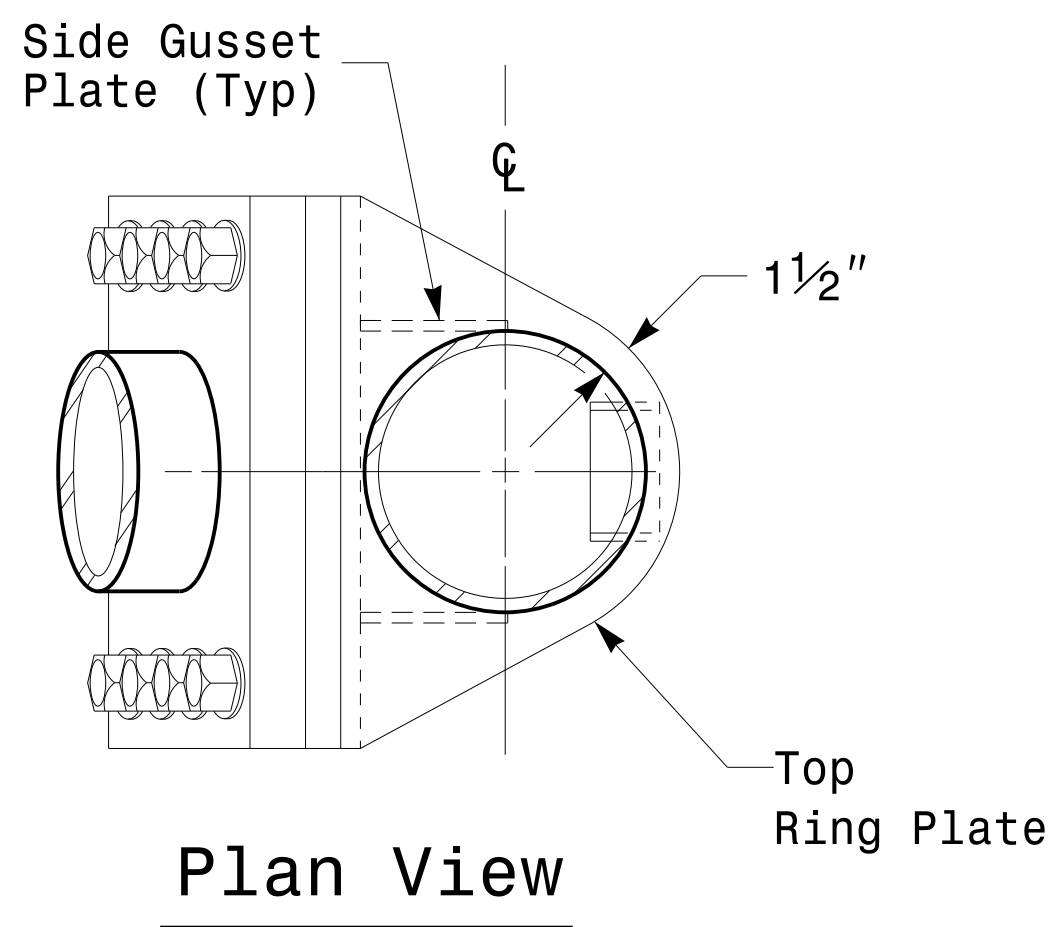


Mast Arm Pole

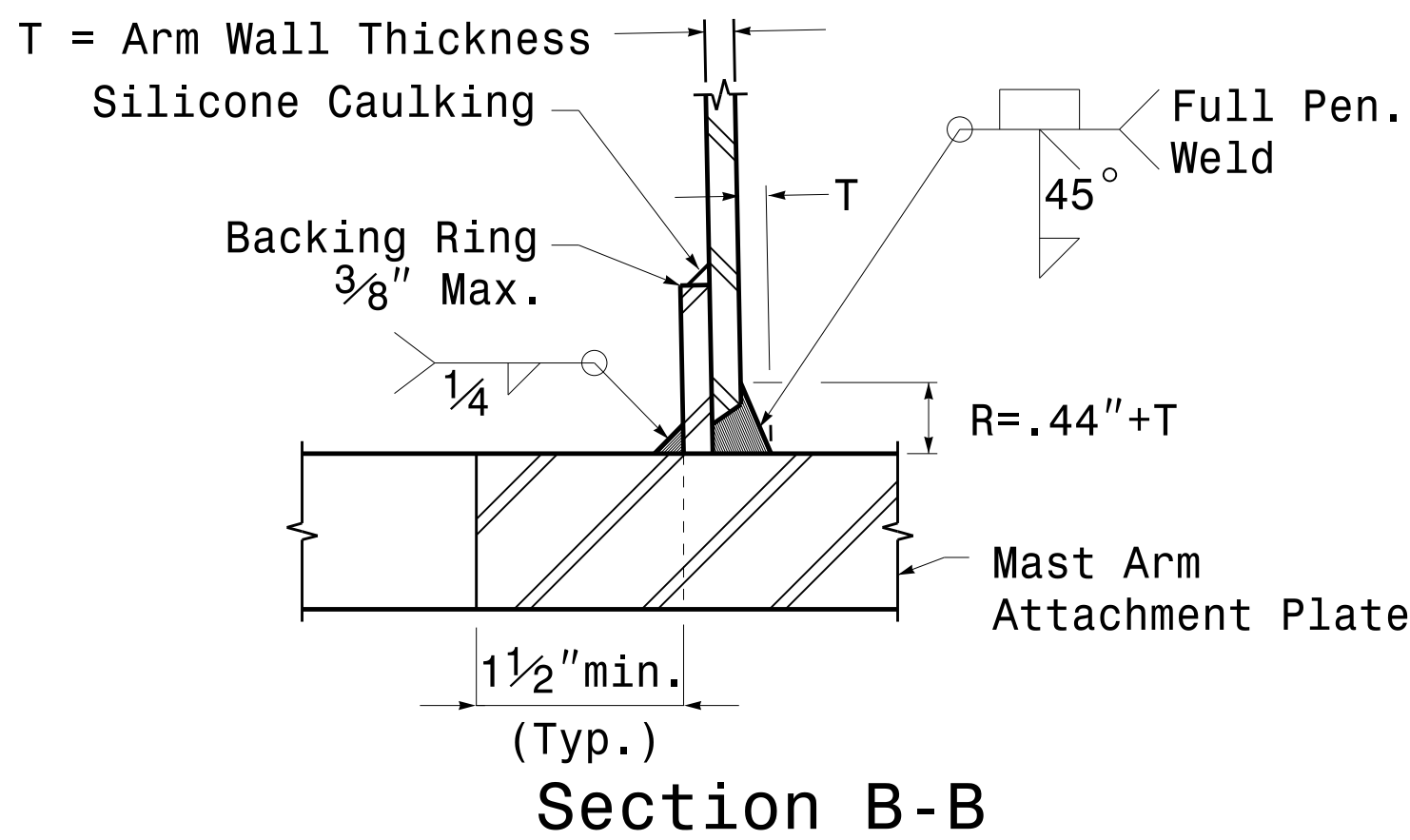
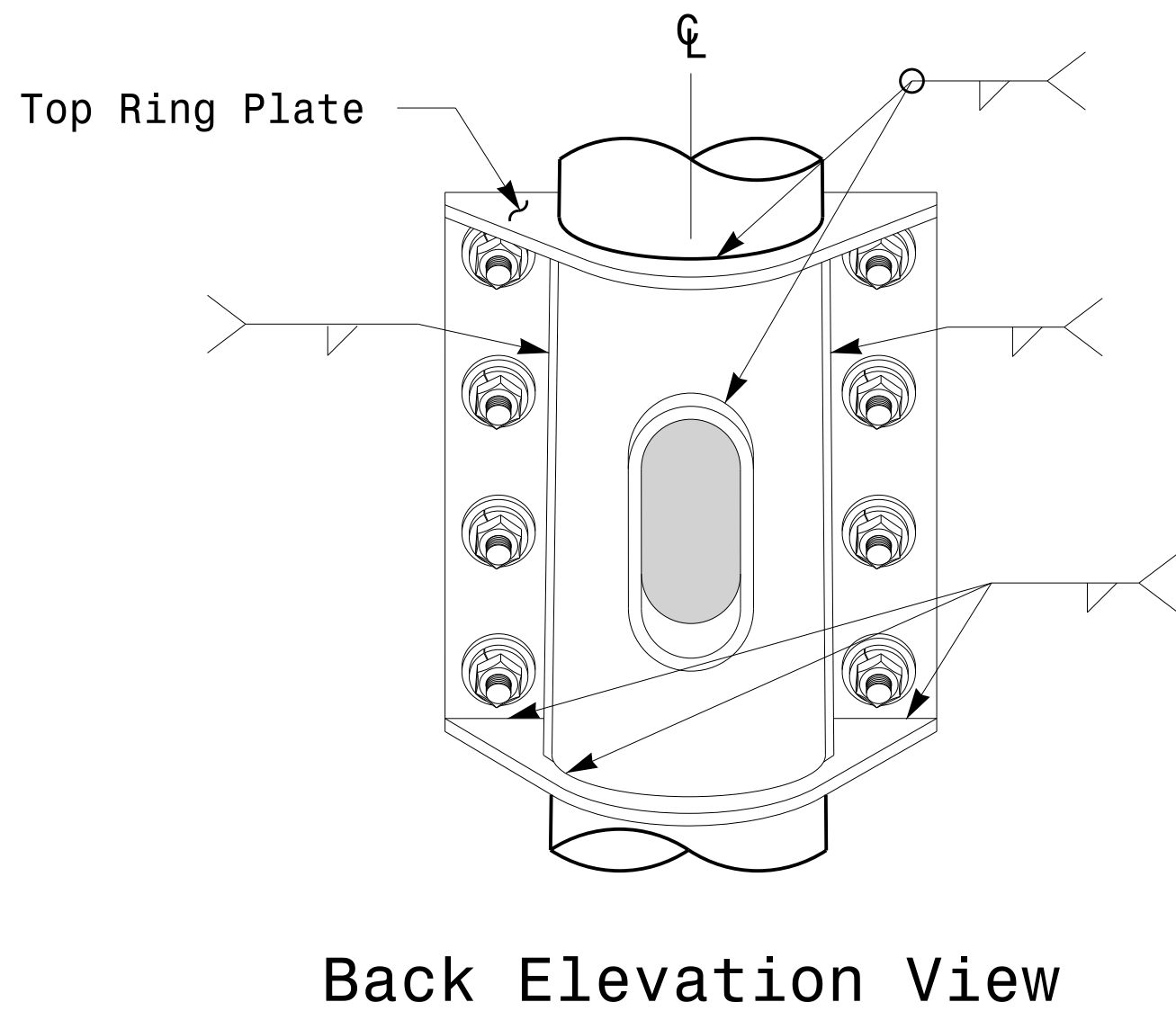
Prepared In the Offices of: Transportation Mobility and Safety Division NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Design Section 750 N. Greenfield Pkwy, Garner, NC 27529 SCALE 0 NA NONE	Typical Fabrication Details For Mast Arm Poles				SEAL NORTH CAROLINA PROFESSIONAL ENGINEER DANESH C. SARKAR SEAL 028094 DocuSigned by: Danesh C. Sarkar 44E93836 10/11/2017 DATE
	PLAN DATE:	OCTOBER 2017	DESIGNED BY:	K.C. DURIGON	
	PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR	
	REVISIONS	INIT.	DATE		

Welded Ring Stiffened Mast Arm Connection

PROJECT ID. NO.	SHEET NO.
R-2566BA	Sig.M5



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



Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

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

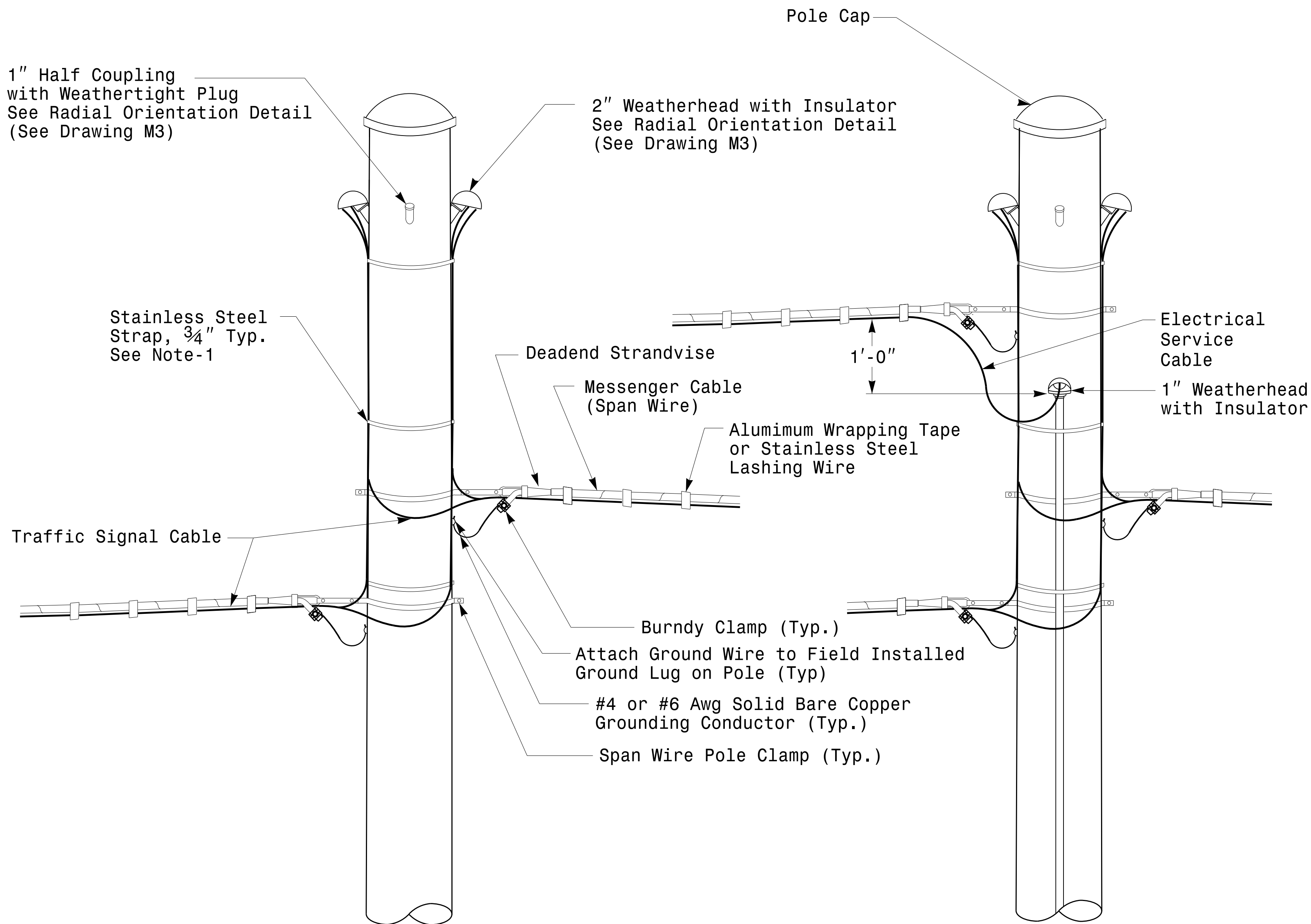
SCALE: 0 NA NONE

SEAL

Debesh C. Sarkar
10/11/2017
DATE

11-OCT-2017 08:35
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Design Section Eastern Region\115 Sig.M5.dgn
Connection Fabrication Detail is Mast Arm Poles.dgn
Author

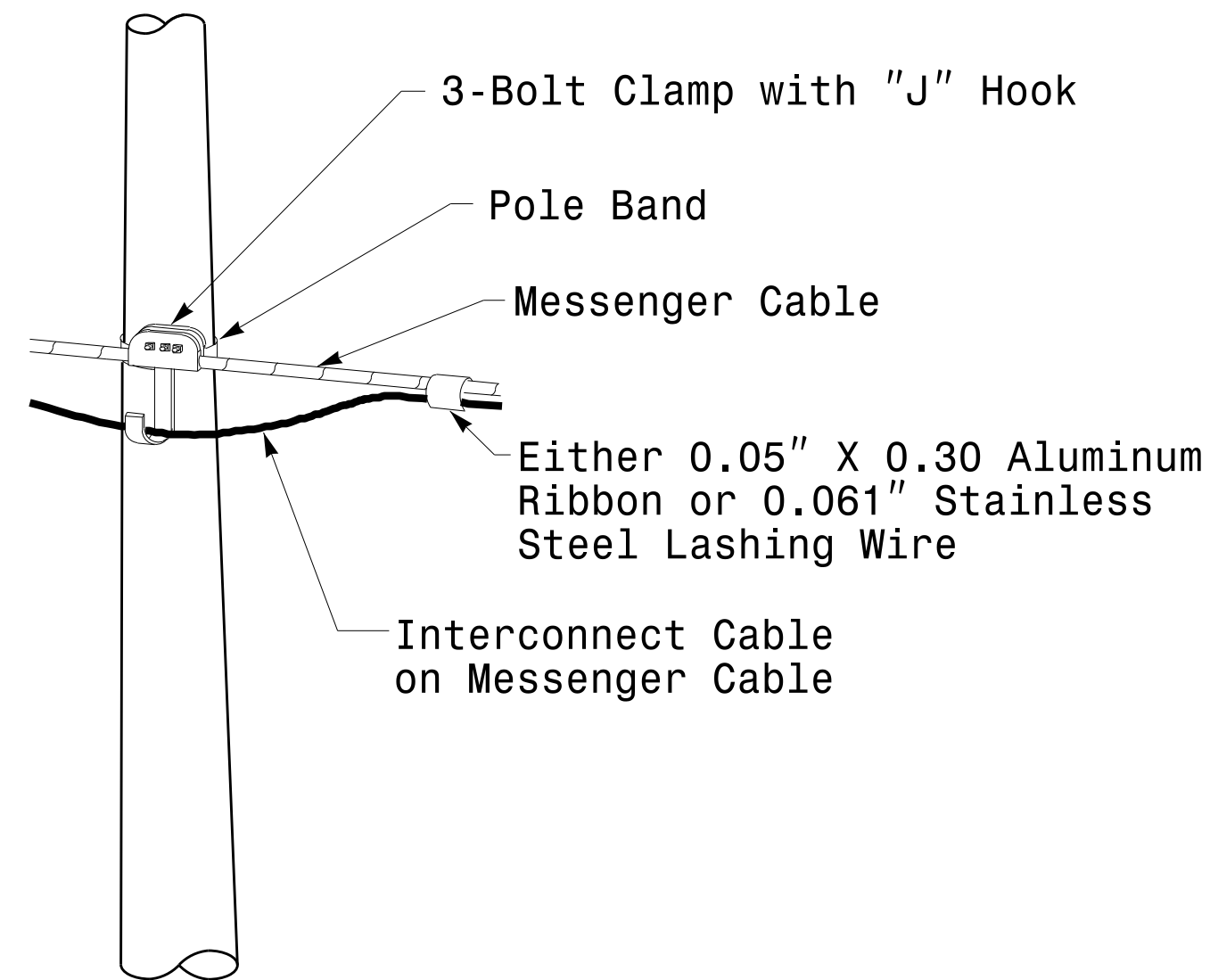
Fabrication Details – Mast Arm Connection



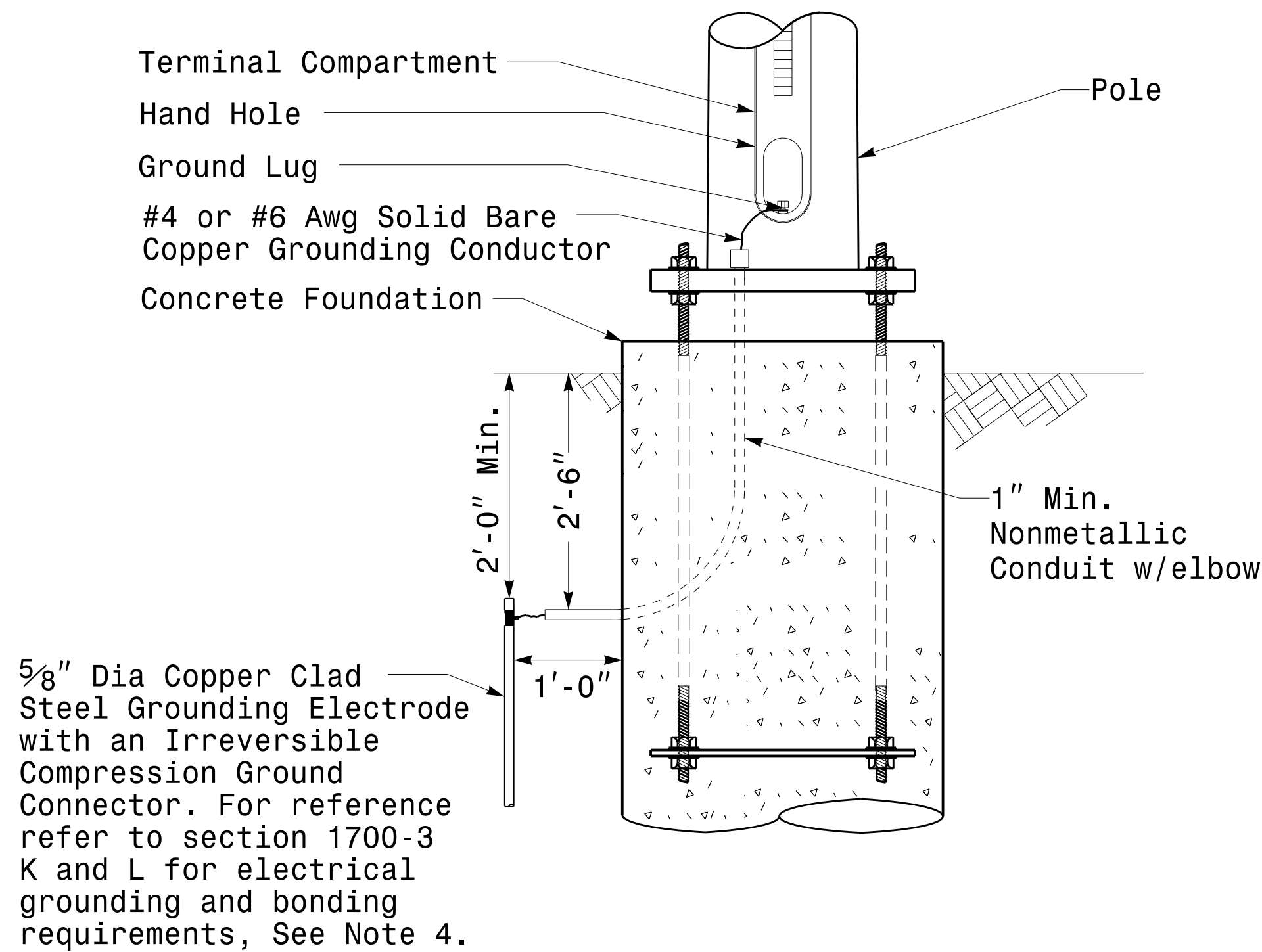
Strain Pole Attachments

NOTE:

1. Strap all signal cables to the side of the pole with 3/4" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 3'-0".
2. Provide minimum two spanwire pole clamps per pole.
3. It is prohibited to attach two span wires at one pole clamp.
4. For general requirements refer to NCDOT Standard Specifications for Roadway and Structures, January 2018.

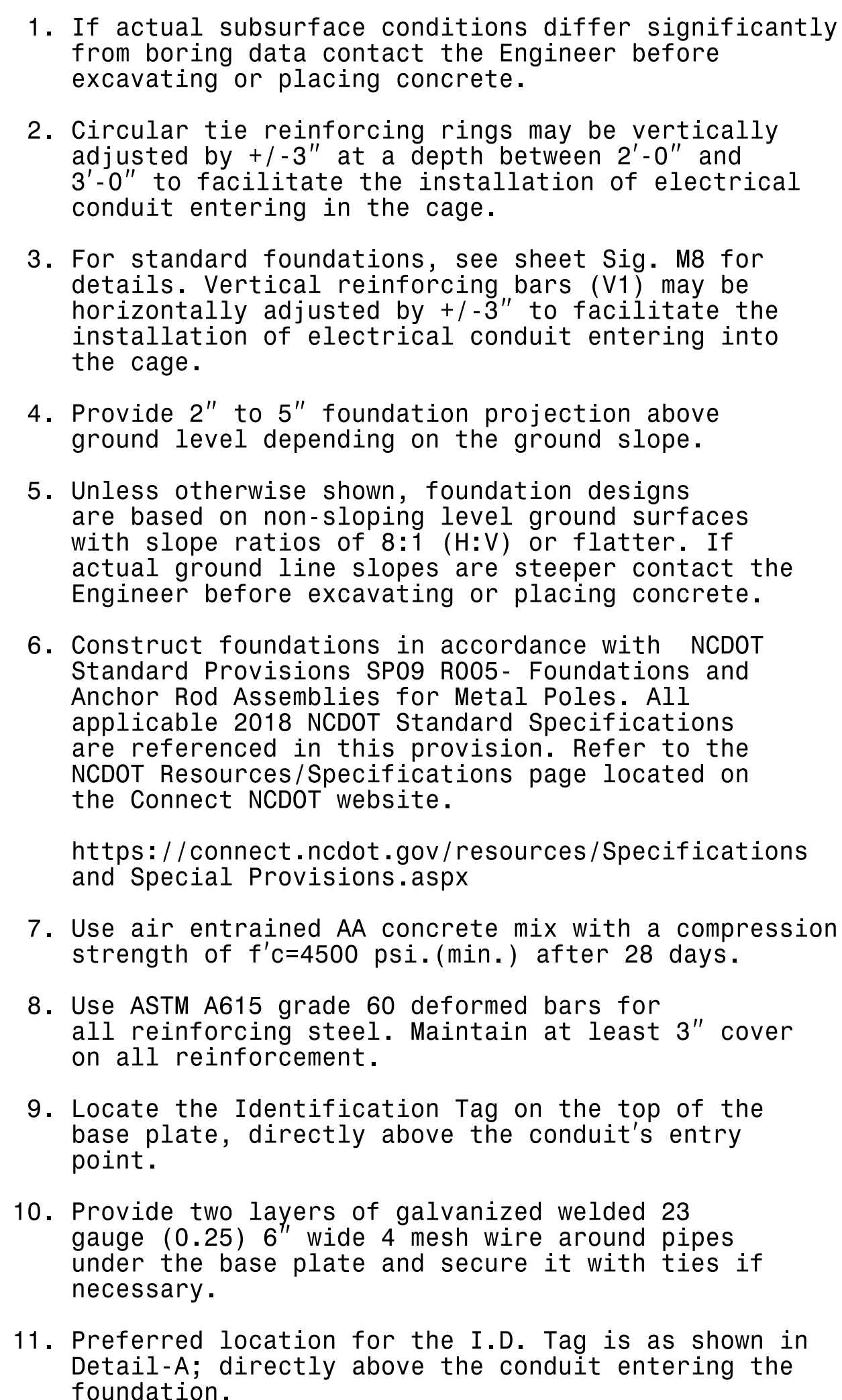
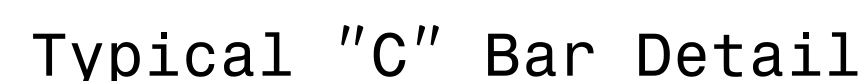


Attachment of Cable to Intermediate Metal Pole



Metal Pole Grounding Detail For Strain Pole and Mast Arm

Prepared In the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	Typical Fabrication Details For Strain Pole Attachments		SEAL 	
	PLAN DATE: OCTOBER 2017	DESIGNED BY: C.F. ANDREWS	DocuSigned by: 44E8E38A7A7A	
	PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR		
	REVISIONS	INIT.		
SCALE 0 NA NONE				10/11/2017 DATE

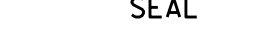


* See Note No. 2
** See Note No. 3



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

Detail-A

Prepared In the Offices of:  TRANSPORTATION DEPARTMENT OF NORTH CAROLINA SIGNAL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529	Construction Details For Foundations	SEAL 																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">PLAN DATE: OCTOBER 2018</td> <td style="width: 50%; padding: 5px;">DESIGNED BY: C. B. COGDELL</td> </tr> <tr> <td style="padding: 5px;">PREPARED BY: N. BITTING</td> <td style="padding: 5px;">REVIEWED BY: D. C. SARKAR</td> </tr> </table>	PLAN DATE: OCTOBER 2018	DESIGNED BY: C. B. COGDELL	PREPARED BY: N. BITTING	REVIEWED BY: D. C. SARKAR	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 30%; padding: 5px;">REV. NO.</th> <th style="width: 40%; padding: 5px;">COMMENTS</th> <th style="width: 15%; padding: 5px;">INIT.</th> <th style="width: 15%; padding: 5px;">DATE</th> </tr> <tr> <td style="text-align: center; padding: 5px;">1</td> <td style="padding: 5px;">Revised Foundation Top Details</td> <td style="text-align: center; padding: 5px;">N.B.</td> <td style="text-align: center; padding: 5px;">5/11/2015</td> </tr> <tr> <td style="height: 20px;"></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="height: 20px;"></td> <td></td> <td></td> <td></td> </tr> </table>		REV. NO.	COMMENTS	INIT.	DATE	1	Revised Foundation Top Details	N.B.	5/11/2015								
PLAN DATE: OCTOBER 2018	DESIGNED BY: C. B. COGDELL																					
PREPARED BY: N. BITTING	REVIEWED BY: D. C. SARKAR																					
REV. NO.	COMMENTS	INIT.	DATE																			
1	Revised Foundation Top Details	N.B.	5/11/2015																			
SCALE  0 1" NA NONF	DocuSigned by:  448BE32E SIGNATURE																					
	10/11/2017 DATE																					

SOIL CONDITION

PROJECT ID. NO.	SHEET NO.
R-2566BA	Sig.M8

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

General Notes:

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

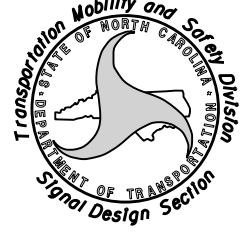
Foundation Selection:

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

Standard Strain Pole Foundation–All Soil Condition

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

Prepared In the Office of:



750 N. Greenfield Pkwy, Garner, NC 27529

Standard Strain Pole Foundation for All Soil Conditions

PLAN DATE: OCTOBER 2017

DESIGNED BY: C.B. COGDILL

PREPARED BY: N. BITTING

REVIEWED BY: D.C. SARKAR

REVISIONS

Changed "Foundation Depth" to "Drilled Pier Length" in Conc. Exp.

INITIALS

DATE

N.B.

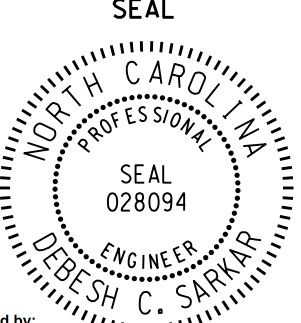
7/12/2015

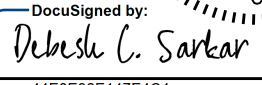
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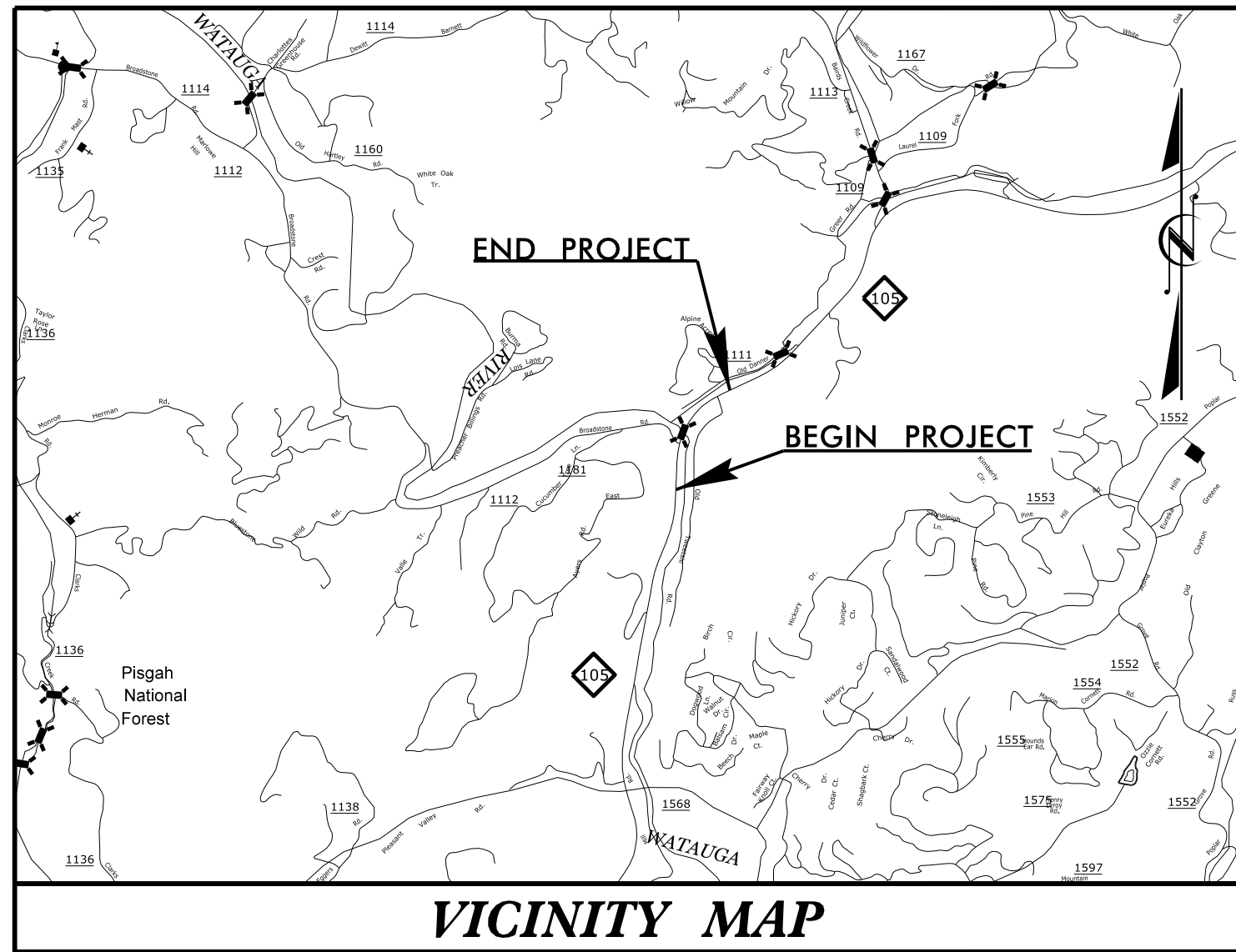
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10/11/2017

DATE

03 JUN 2019 14:54
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Project: R-2566BA

Project: R-2566BA



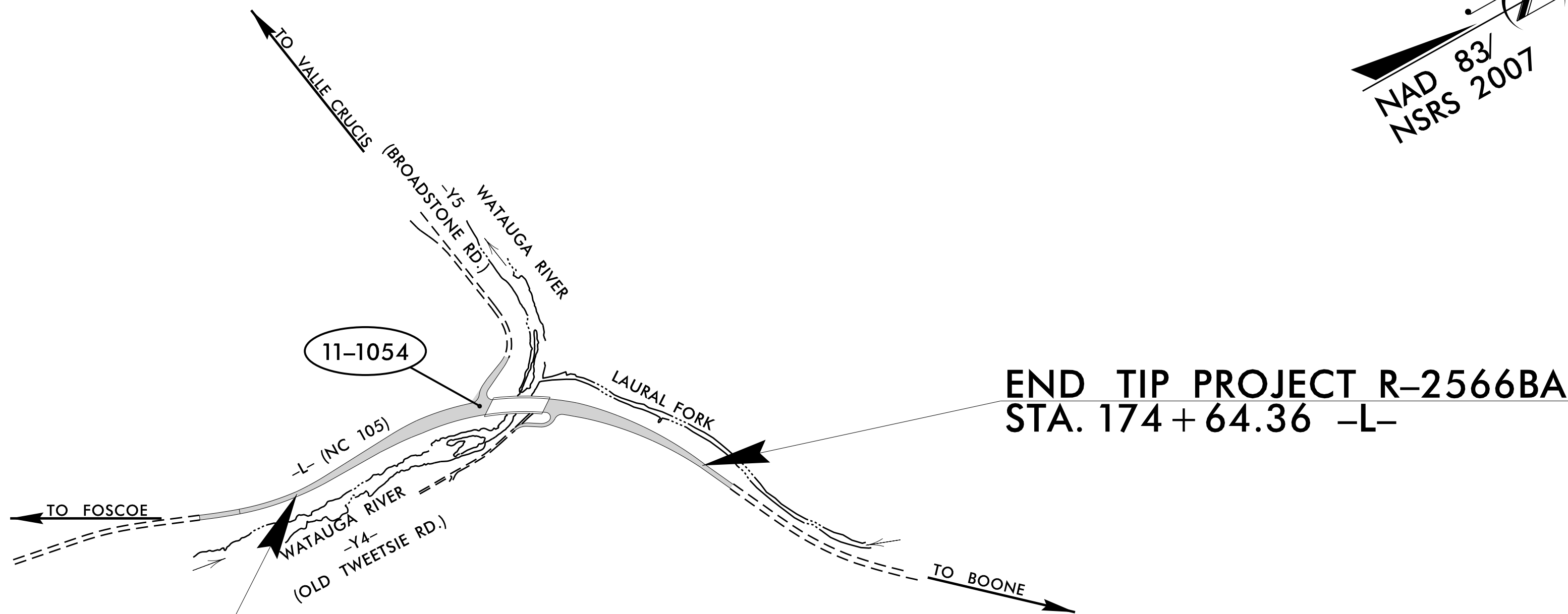
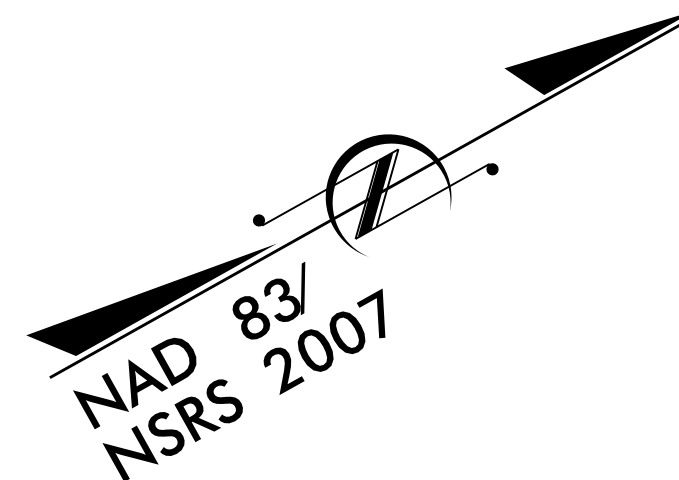
VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WATAUGA COUNTY

LOCATION: NC 105 AT SR 1112 (BROADSTONE RD.) IN BOONE

TYPE OF WORK: TRAFFIC SIGNALS



BEGIN TIP PROJECT R-2566BA
STA. 151+99.39 -L-

END TIP PROJECT R-2566BA
STA. 174+64.36 -L-

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

Index of Plans

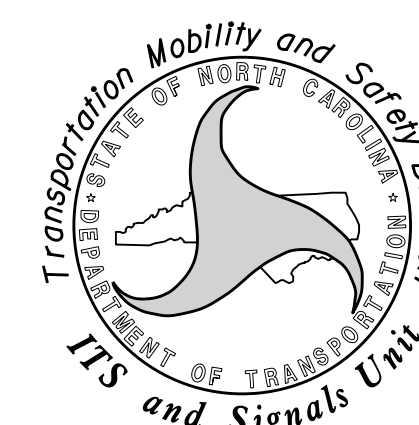
Sheet #	Reference #	Location/Description
Sig. 1.0	-----	Title Sheet
Sig. 2.0-7.1	11-1054	NC 105 at SR 1112 (Broadstone Rd.)
Sig. 8.0	-----	Revised Standard Drawings
Sig. M1-M8	-----	Metal Pole Standard Drawings

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

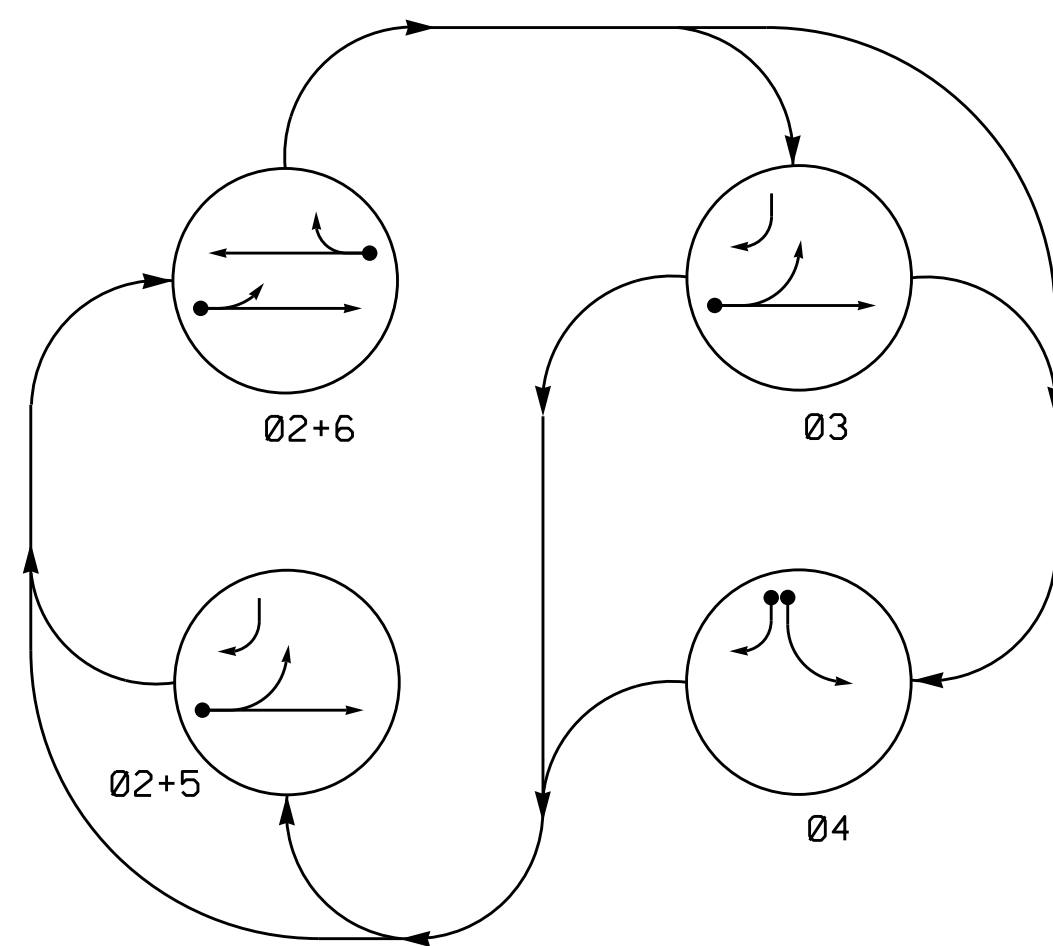
Timothy J. Williams, PE - Western Region Signals Engineer
Keith Mims, PE - Signal Equipment Design Engineer
Neil Avery - Intelligent Transportation Systems Engineer

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



750 N. Greenfield Parkway, Garner, NC 27529

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

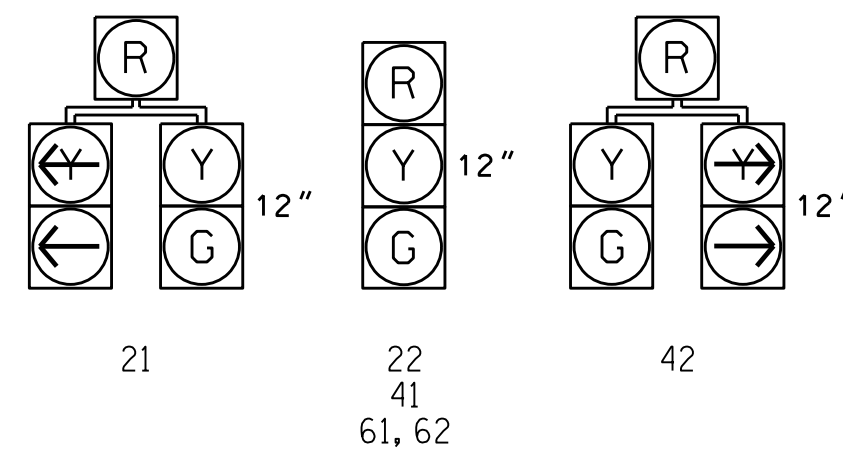
- | | |
|---|-------------------------------|
|  | DETECTED MOVEMENT |
|  | UNDETECTED MOVEMENT (OVERLAP) |
|  | UNSIGNALIZED MOVEMENT |
|  | PEDESTRIAN MOVEMENT |
- R/W

TABLE OF OPERATION

SIGNAL FACE	PHASE				
	0 2 + 5	0 2 + 6	0 3	0 4	F L A S H
21		G	G	R	Y
22	G	G	G	R	Y
41	G	R	R	G	R
42		R		G	R
61, 62	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

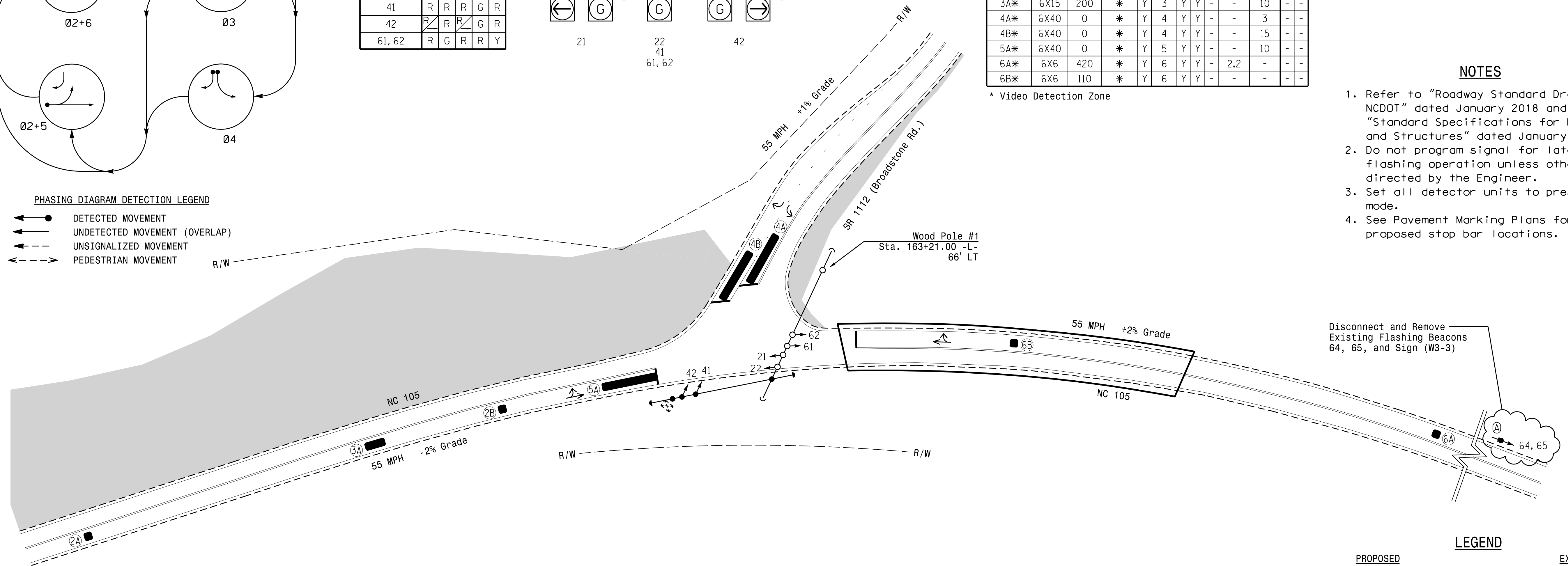
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A*	6X6	420	*	Y	2	Y	Y	-	2.2	-	-	-
2B*	6X6	110	*	Y	2	Y	Y	-	-	-	-	-
3A*	6X15	200	*	Y	3	Y	Y	-	-	10	-	-
4A*	6X40	0	*	Y	4	Y	Y	-	-	3	-	-
4B*	6X40	0	*	Y	4	Y	Y	-	-	15	-	-
5A*	6X40	0	*	Y	5	Y	Y	-	-	10	-	-
6A*	6X6	420	*	Y	6	Y	Y	-	2.2	-	-	-
6B*	6X6	110	*	Y	6	Y	Y	-	-	-	-	-

* Video Detection Zone

3 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. Set all detector units to presence mode.
4. See Pavement Marking Plans for proposed stop bar locations.



OASIS 2070L TIMING CHART

FEATURE	PHASE				
	2	3	4	5	6
Min Green 1 *	14	7	7	7	14
Extension 1 *	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	60	25	25	15	60
Yellow Clearance	5.4	5.4	3.0	3.0	5.4
Red Clearance	1.7	2.1	2.1	2.1	1.7
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

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

LEGEND

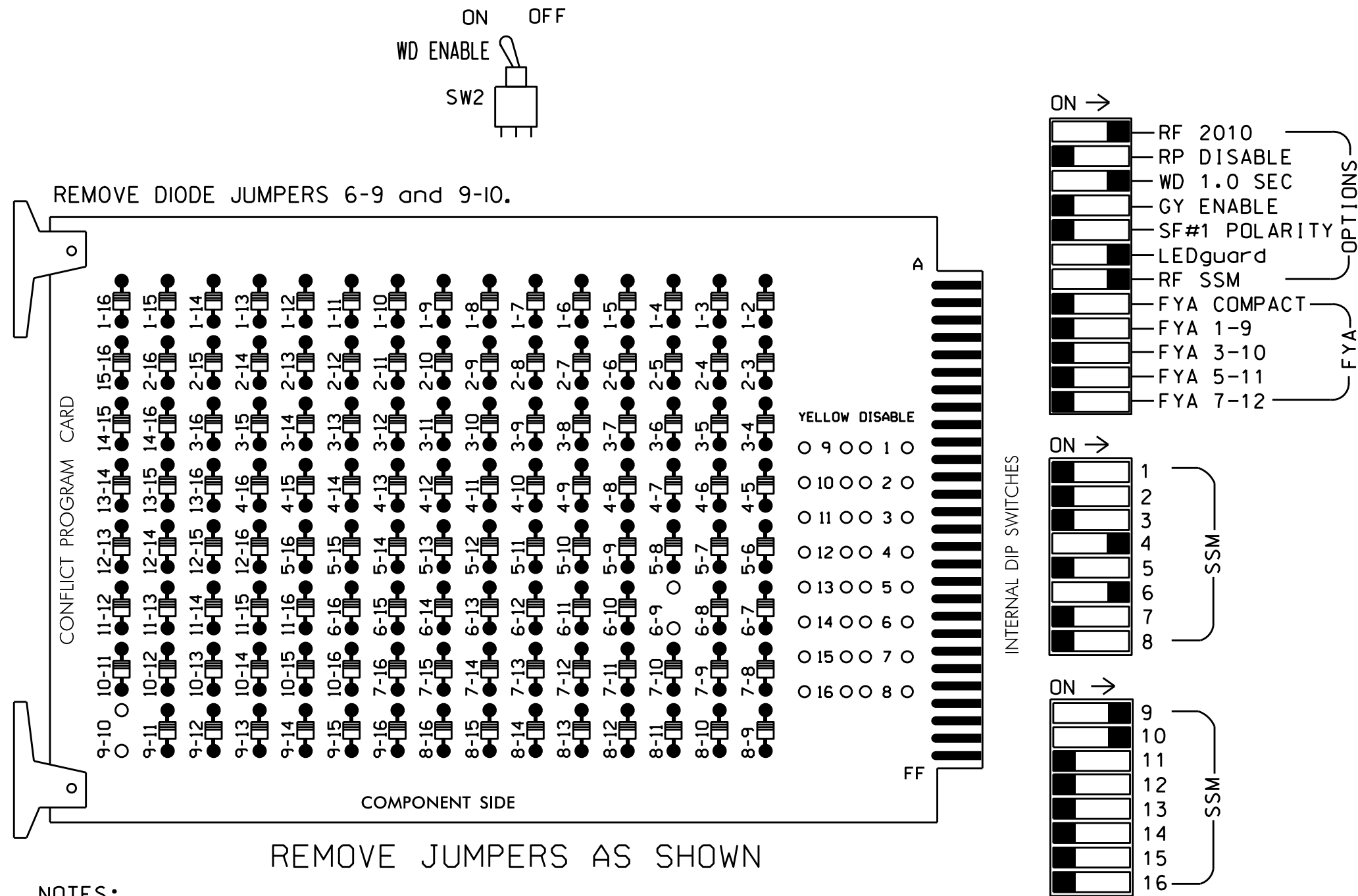
- | PROPOSED | | EXISTING |
|----------|---|----------|
| | Traffic Signal Head | |
| | Modified Signal Head | N/A |
| | Sign | |
| | Pedestrian Signal Head
With Push Button & Sign | |
| | Signal Pole With Guy | |
| | Signal Pole with Sidewalk Guy | |
| | Inductive Loop Detector | |
| | Controller & Cabinet | |
| | Junction Box | |
| ----- | 2-in Underground Conduit | ----- |
| N/A | Right of Way | ----- |
| | Directional Arrow | |
| | Video Detection Zone | |
| | Construction Zone | N/A |

Signal Upgrade - Temporary Design - Phase IA

Prepared In the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	NC 105 at SR 1112 (Broadstone Rd.)	SEAL 												
Division 11 Watauga County Boone														
PLAN DATE: April 2019	REVIEWED BY: T.J. Williams													
PREPARED BY: R.N. Zinser	REVIEWED BY:													
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REVISONS	INIT.	DATE												
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Drawn/Designed by: <u>R. N. Zinser</u> 5/16/2019 DATE FILE NUMBER: F1388073472248F DATE SIG. INVENTORY NO. 11-105471														

EDI MODEL 2010ECL-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.
- Make sure jumpers SEL2-SEL5 are present on the monitor board.

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.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,2,3, 5,7,8,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phase 6 for Yellow Flash.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	NC	NU	NC	41,42	NU	NC	61,62	NU	NU	NU	NU	21,22	21,42	NU	NU	NU	NU
RED					101			134					A121	*				
YELLOW					102			135					A122					
GREEN					103			136					A123					
RED ARROW																		
YELLOW ARROW														A125				
GREEN ARROW														A126				

NU = Not Used

NC = No Connection

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

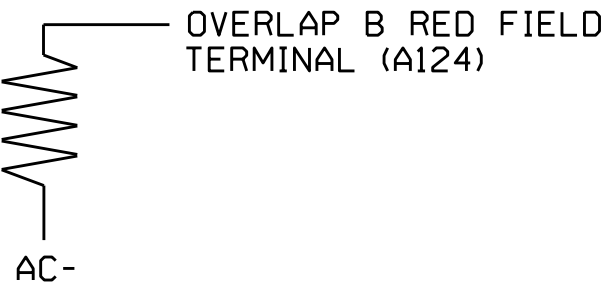
EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET332
SOFTWAREECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S4,S6,S9,S10
PHASES USED.....2,3,4,5,6
OVERLAP A.....2+3
OVERLAP B.....3+5
OVERLAP C.....NOT USED
OVERLAP B.....NOT USED

LOAD RESISTOR INSTALLATION DETAIL

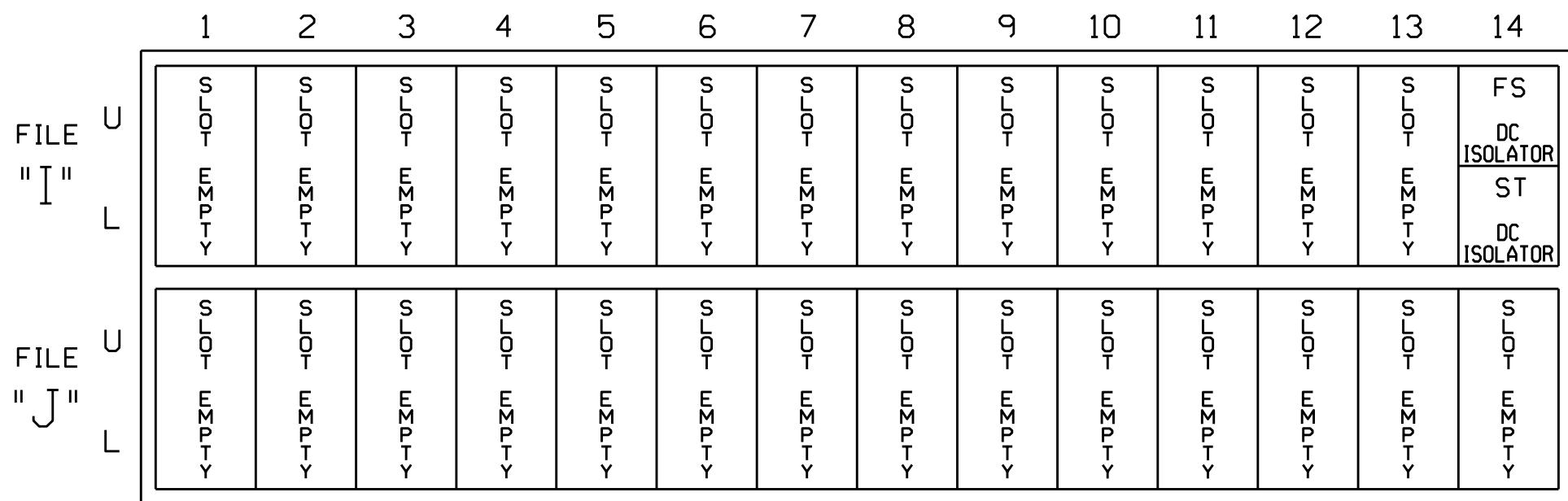
ACCEPTABLE VALUES

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



INPUT FILE POSITION LAYOUT

(front view)



SPECIAL DETECTOR NOTE

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

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS:: X X
VEH OVL NOT VEH::
VEH OVL NOT PED::
VEH OVL GRN EXT::
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH...N
GREEN EXTENSION (0-255 SEC).....N
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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-1054T1
DESIGNED: April 2019
SEALED: 05-16-19
REVISED: N/A

Electrical Detail - Temp. Design - Phase IA

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared In the Offices of:



750 N. Greenfield Hwy, Garner, NC 27529

NC 105
at
SR 1112 (Broadstone Rd.)

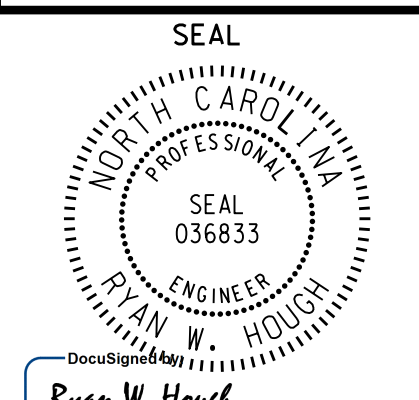
Division 11 Watauga County Boone

PLAN DATE: May 2019 REVIEWED BY:

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

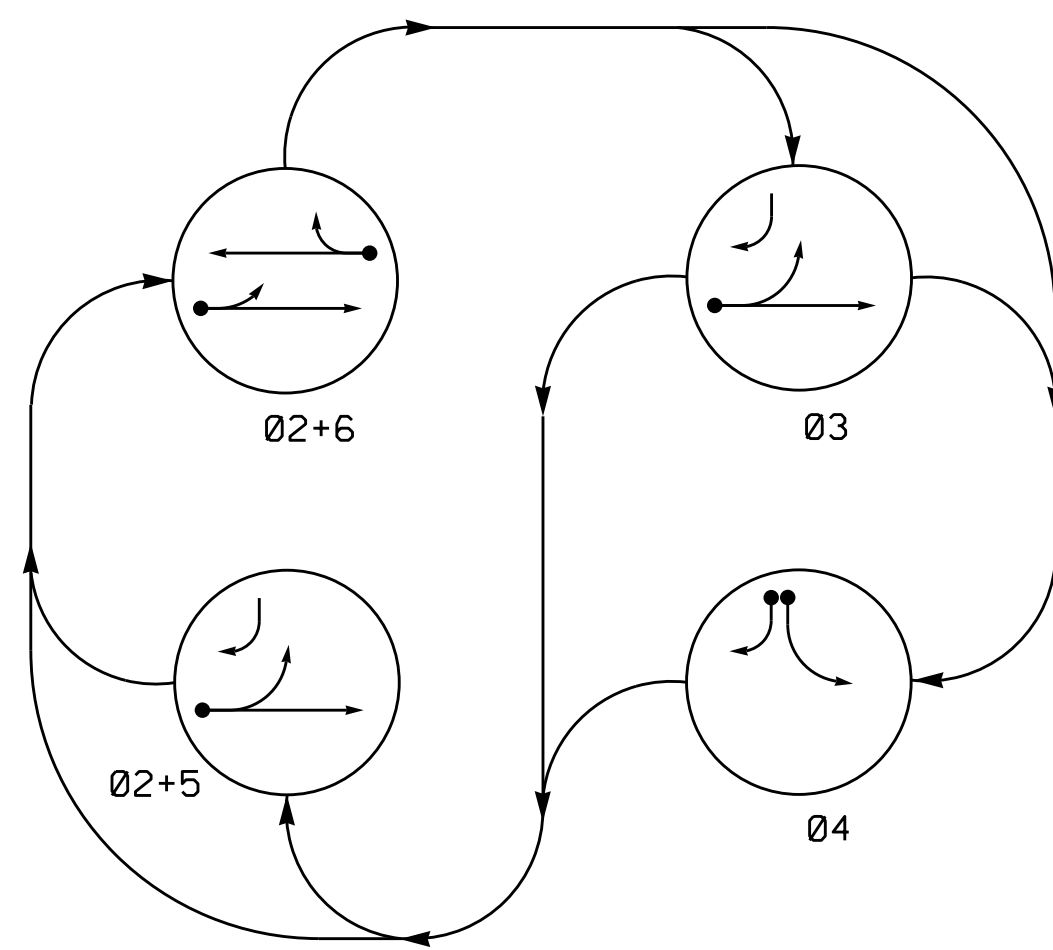


5/30/2019

SIGNATURE DATE

SIG. INVENTORY NO. 11-1054T1

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

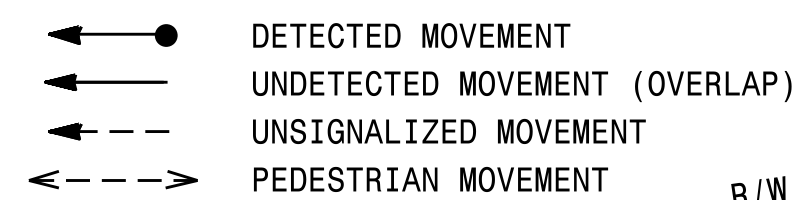
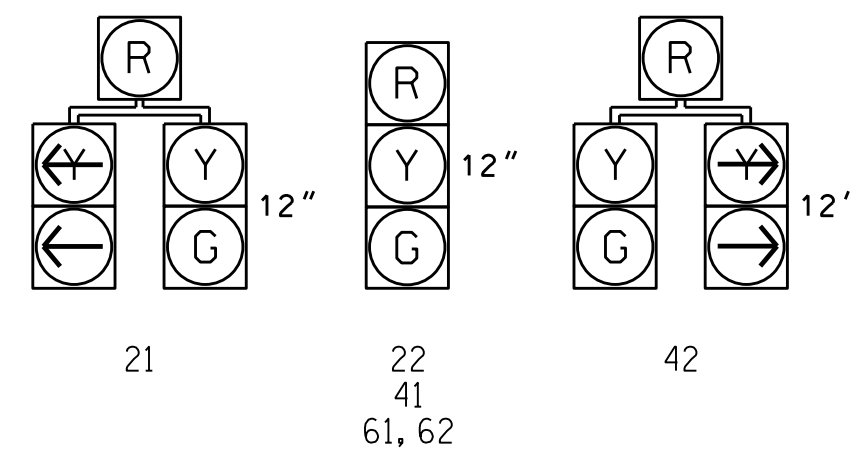


TABLE OF OPERATION						
SIGNAL FACE	PHASE					
	0 2 + 5	0 2 + 6	0 3	0 4	FLASH	
21		G		G	R	Y
22	G	G	G	R	R	Y
41	G	R	R	R	G	R
42				G	R	
61, 62	R	G	R	R	Y	

SIGNAL FACE I.D.

All Heads L.E.D.



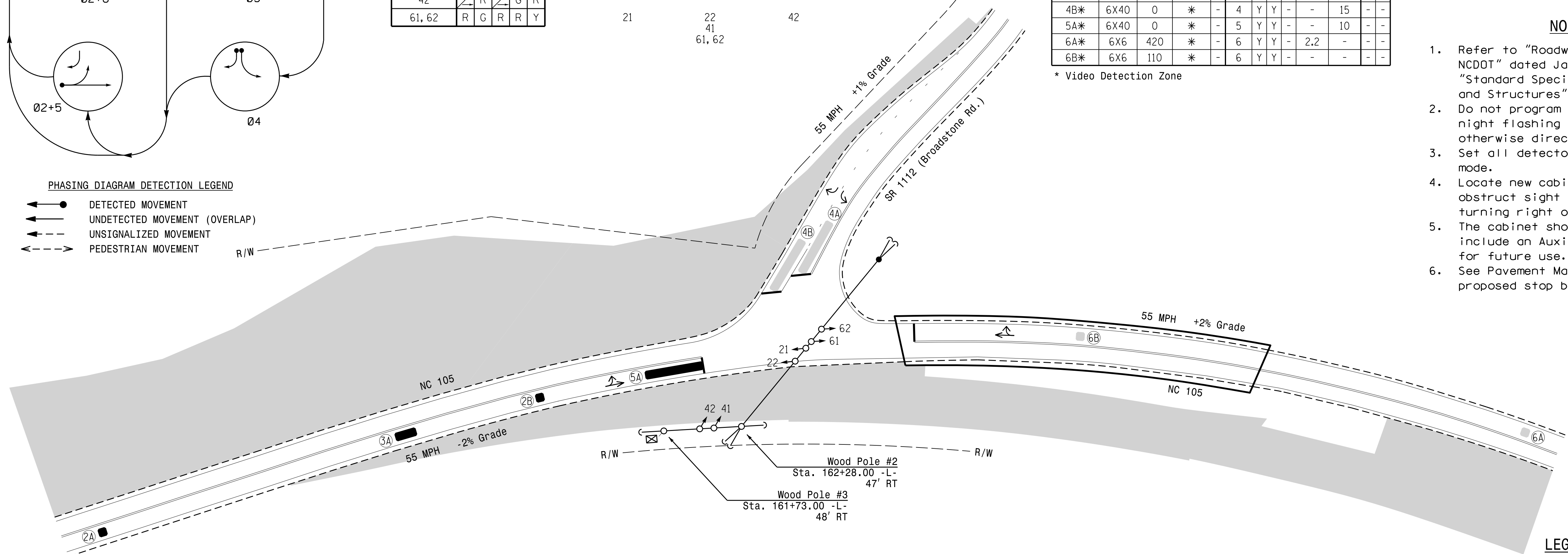
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART															
INDUCTIVE LOOPS						DETECTOR PROGRAMMING									
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW	LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM	LOOP	NEW	CARD
2A*	6X6	420	*	Y	-	2	Y	Y	-	2.2	-	-	-	-	-
2B*	6X6	110	*	Y	-	2	Y	Y	-	-	-	-	-	-	-
3A*	6X15	200	*	Y	3	Y	Y	Y	-	-	10	-	-	-	-
4A*	6X40	0	*	-	4	Y	Y	Y	-	-	3	-	-	-	-
4B*	6X40	0	*	-	4	Y	Y	Y	-	-	15	-	-	-	-
5A*	6X40	0	*	-	5	Y	Y	Y	-	-	10	-	-	-	-
6A*	6X6	420	*	-	6	Y	Y	Y	-	2.2	-	-	-	-	-
6B*	6X6	110	*	-	6	Y	Y	Y	-	-	-	-	-	-	-

* Video Detection Zone

3 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. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. The cabinet should be designed to include an Auxiliary Output file for future use.
6. See Pavement Marking Plans for proposed stop bar locations.

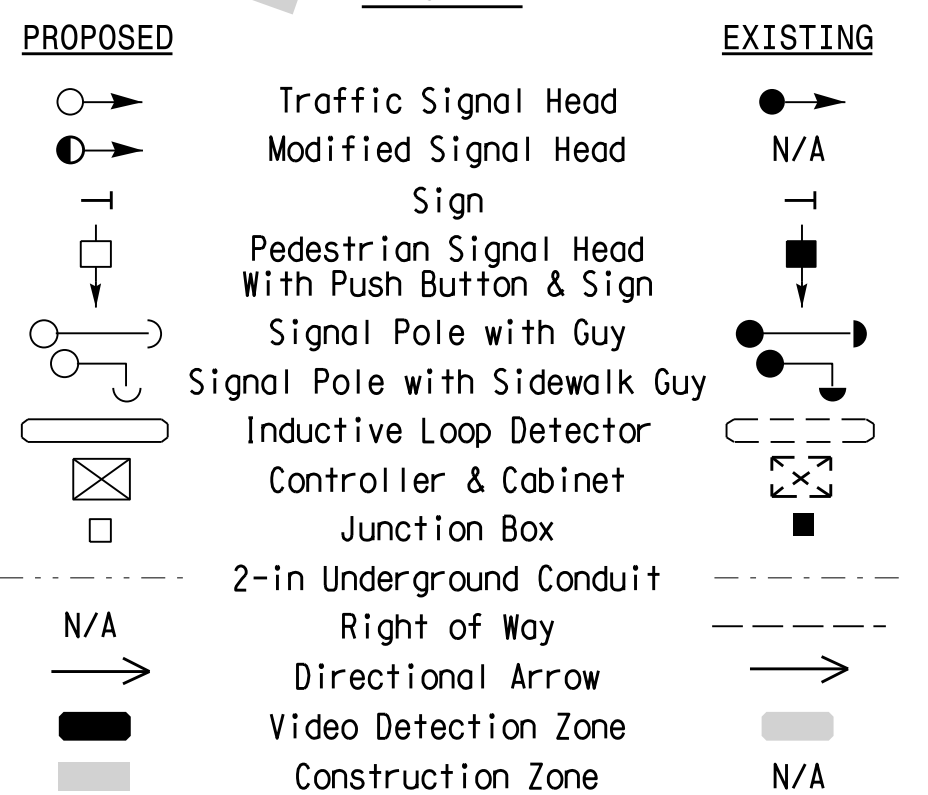


OASIS 2070 TIMING CHART

OASIS 2070 TIMING CHART					
FEATURE	PHASE				
	2	3	4	5	6
Min Green 1 *	14	7	7	7	14
Extension 1 *	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	60	25	25	15	60
Yellow Clearance	5.4	5.4	3.0	3.0	5.4
Red Clearance	1.7	2.1	2.1	2.1	1.7
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

* 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 - Phase IB

Prepared In The Office of:  Transportation Mobility and Safety Division DEPARTMENT OF TRANSPORTATION Signal Design Section 750 N. Greenfield Pkwy, Garner, NC 27529	NC 105 at SR 1112 (Broadstone Rd.)	 SEAL NORTH CAROLINA PROFESSIONAL ENGINEER RICHARD N. ZINSER 043914									
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; border: none;">Division 11</td> <td style="width: 33%; border: none;">Watauga County</td> <td style="width: 33%; border: none;">Boone</td> </tr> <tr> <td style="border: none;">PLAN DATE:</td> <td style="border: none;">April 2019</td> <td style="border: none;">REVIEWED BY: T.J. Williams</td> </tr> <tr> <td style="border: none;">PREPARED BY: R.W. Zinser</td> <td colspan="2" style="border: none;">REVIEWED BY:</td> </tr> </table>			Division 11	Watauga County	Boone	PLAN DATE:	April 2019	REVIEWED BY: T.J. Williams	PREPARED BY: R.W. Zinser	REVIEWED BY:	
Division 11	Watauga County	Boone									
PLAN DATE:	April 2019	REVIEWED BY: T.J. Williams									
PREPARED BY: R.W. Zinser	REVIEWED BY:										
 SCALE 0 40 1" = 40'	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%; padding: 5px;">REVISIONS</th> <th style="width: 20%; padding: 5px;">INIT.</th> <th style="width: 20%; padding: 5px;">DATE</th> </tr> </thead> <tbody> <tr> <td style="height: 100px;"></td> <td></td> <td></td> </tr> </tbody> </table>		REVISIONS	INIT.	DATE						
REVISIONS	INIT.	DATE									
<i>R. N. Zinser</i> P1386073172268F DocuSigned by: R. N. Zinser 5/16/2019 DATE SIG. INVENTORY NO. IL-105412											

(remove jumpers and set switches as shown)

(remove jumpers and set switches as shown)



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.

(front view)



FS = FLASH SENSE
ST = STOP TIME

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

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for Startup In Green.
4. Program phase 6 for Yellow Flash.

```

CONTROLLER.....2070
CABINET .....332
SOFTWARE .....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED....S5,S8,AUX S1,AUX S2
PHASES USED.....2,3,4,5,6
OVERLAP A.....2+3
OVERLAP B.....3+5
OVERLAP C.....NOT USED
OVERLAP B.....NOT USED

```

(program controller as shown below)

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

```

PAGE 1:  VEHICLE OVERLAP 'A' SETTINGS
PHASE:      12345678901011213141516
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

```

PRESS ' + '

```

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

```

OVERLAP PROGRAMMING COMPLETE

SIGNAL HEAD HOOK-UP CHART

NU = Not Used

NC = No Connection

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

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

OVERLAP B RED FIELD
TERMINAL (A124)

AC-

(program controller as shown below)

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

```

PAGE 1:  VEHICLE OVERLAP 'A' SETTINGS
PHASE:      12345678901011213141516
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

```

PRESS ' + '

```

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

```

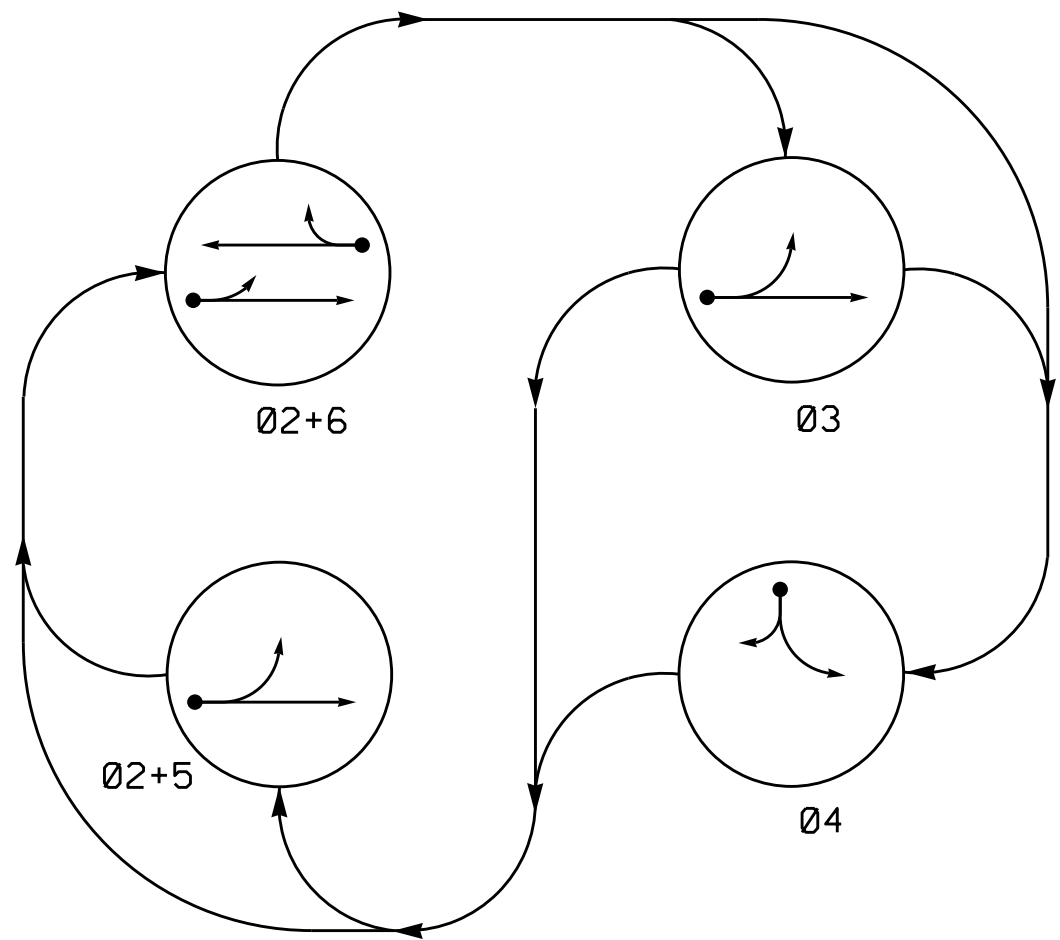
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-1054T2
DESIGNED: April 2019
SEALED: 05-16-19
REVISED: N/A

Electrical Detail - Temp. Design - Phase IB

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 105 at SR 1112 (Broadstone Rd.)	SEAL 																								
Prepared in the Offices of:	Division 11 Watauga County Boone																									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">PLAN DATE: May 2019</td> <td style="width: 50%;">REVIEWED BY:</td> </tr> <tr> <td>PREPARED BY: James Peterson</td> <td>REVIEWED BY:</td> </tr> </table>		PLAN DATE: May 2019	REVIEWED BY:	PREPARED BY: James Peterson	REVIEWED BY:																				
PLAN DATE: May 2019	REVIEWED BY:																									
PREPARED BY: James Peterson	REVIEWED BY:																									
750 N. Greenfield Pkwy, Garner, NC 27529	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">REVISIONS</td> <td style="width: 20%;">INIT.</td> <td style="width: 20%;">DATE</td> </tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table>		REVISIONS	INIT.	DATE																					
REVISIONS	INIT.	DATE																								
DocuSigned by:  5/30/2019 4302702AF260563 DATE																										
SING. INVENTORY NO. 11-10547																										

PHASING DIAGRAM



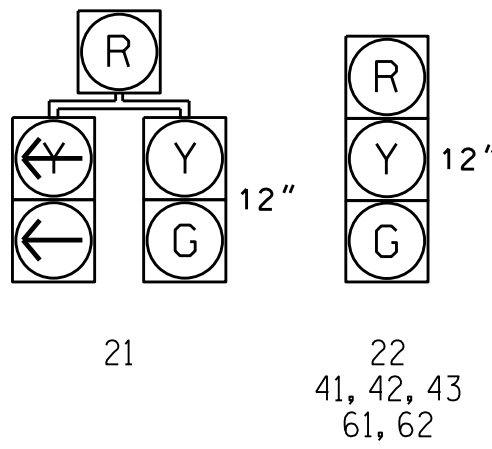
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE				
	Ø 2 + 5	Ø 2 + 6	Ø 3	Ø 4	FLASH
21	G	G	G	R	Y
22	G	G	G	R	Y
41, 42, 43	R	R	R	G	R
61, 62	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



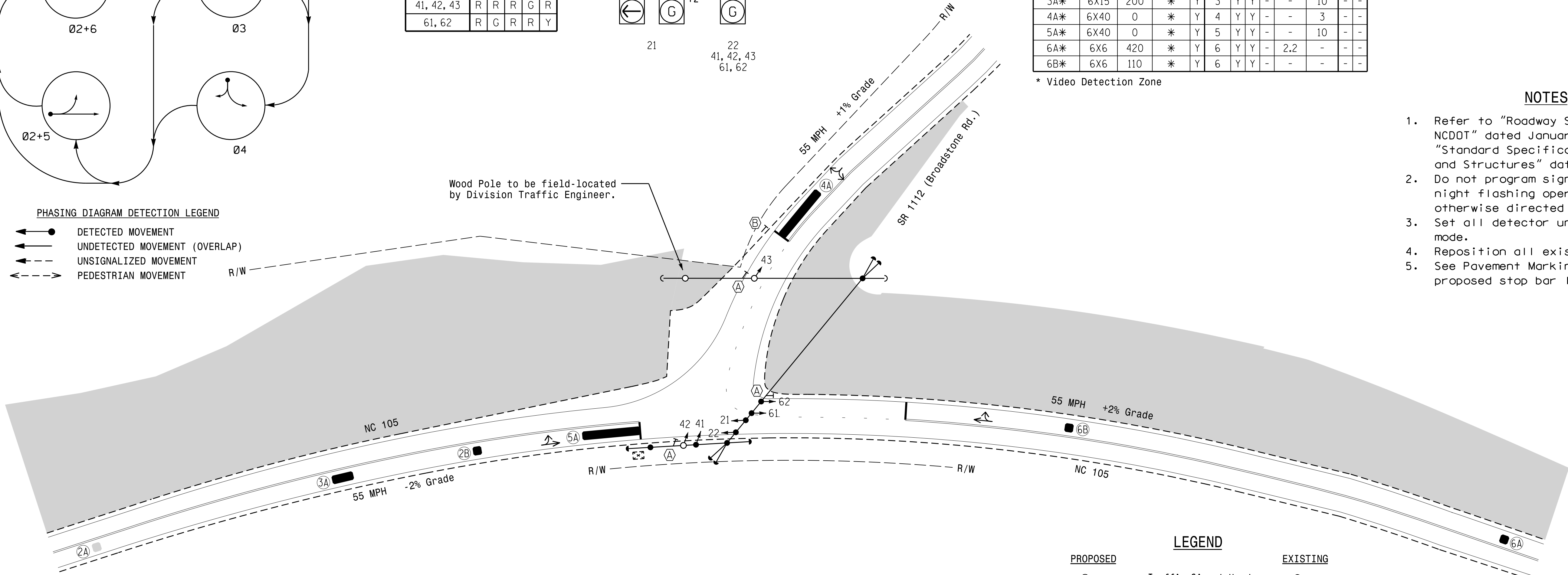
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART												
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A*	6X6	420	*	-	2	Y	Y	-	2.2	-	-	-
2B*	6X6	110	*	Y	2	Y	Y	-	-	-	-	-
3A*	6X15	200	*	Y	3	Y	Y	-	-	10	-	-
4A*	6X40	0	*	Y	4	Y	Y	-	-	3	-	-
5A*	6X40	0	*	Y	5	Y	Y	-	-	10	-	-
6A*	6X6	420	*	Y	6	Y	Y	-	2.2	-	-	-
6B*	6X6	110	*	Y	6	Y	Y	-	-	-	-	-

* Video Detection Zone

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.
- Set all detector units to presence mode.
- Reposition all existing signal heads.
- See Pavement Marking Plans for proposed stop bar locations.



OASIS 2070 TIMING CHART

FEATURE	PHASE				
	2	3	4	5	6
Min Green 1 *	14	7	7	7	14
Extension 1 *	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	60	25	25	15	60
Yellow Clearance	5.4	5.4	3.0	3.0	5.4
Red Clearance	2.1	3.4	4.1	3.4	2.1
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

* 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.

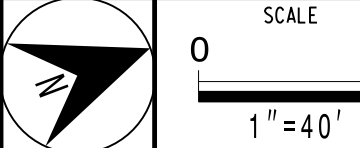
LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	N/A
	Modified Signal Head	N/A
	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
	Video Detection Zone	N/A
	Construction Zone	N/A
	"NO TURN ON RED" Sign (R10-11)	A
	"STOP HERE ON RED" Sign (R10-6)	B

Signal Upgrade - Temporary Design - Phase II



750 N. Greenfield Pkwy, Garner, NC 27529



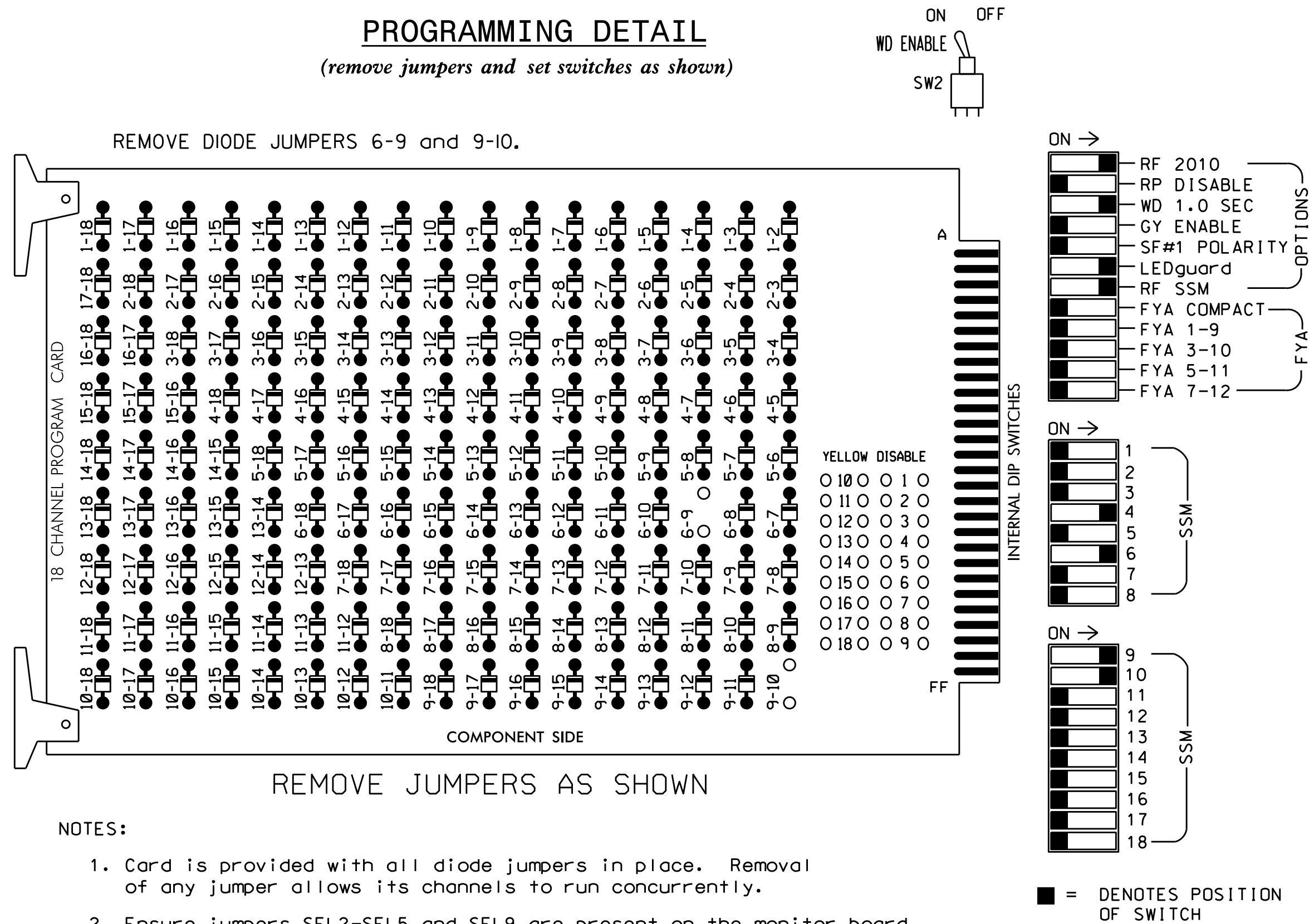
NC 105 at SR 1112 (Broadstone Rd.)	
Division 11 Watauga County	Boone
PLAN DATE: April 2019	REVIEWED BY: T.J. Williams
PREPARED BY: R.N. Zinser	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL	DATE
SEAL 043914	5/16/2019
ENGINEER	DATE
RICHARD N. ZINSER	DATE
SIG. INVENTORY NO. II-1054T3	

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 Startup In Green.
- Program phase 6 for Yellow Flash.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET332
SOFTWAREECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S5,S8,AUX S1,AUX S2
PHASES USED.....2,3,4,5,6
OVERLAP A.....2+3
OVERLAP B.....3+5
OVERLAP C.....NOT USED
OVERLAP B.....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	NC	NU	NC	41,42 43	NU	NC	61,62	NU	NU	NU	NU	21,22	21	NU	NU	NU	NU
RED					101			134					A121	*				
YELLOW					102			135					A122					
GREEN					103			136					A123					
RED ARROW																		
YELLOW ARROW														A125				
GREEN ARROW														A126				

NU = Not Used

NC = No Connection

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

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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

OVERLAP B RED FIELD TERMINAL (A124)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

PRESS '+'

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

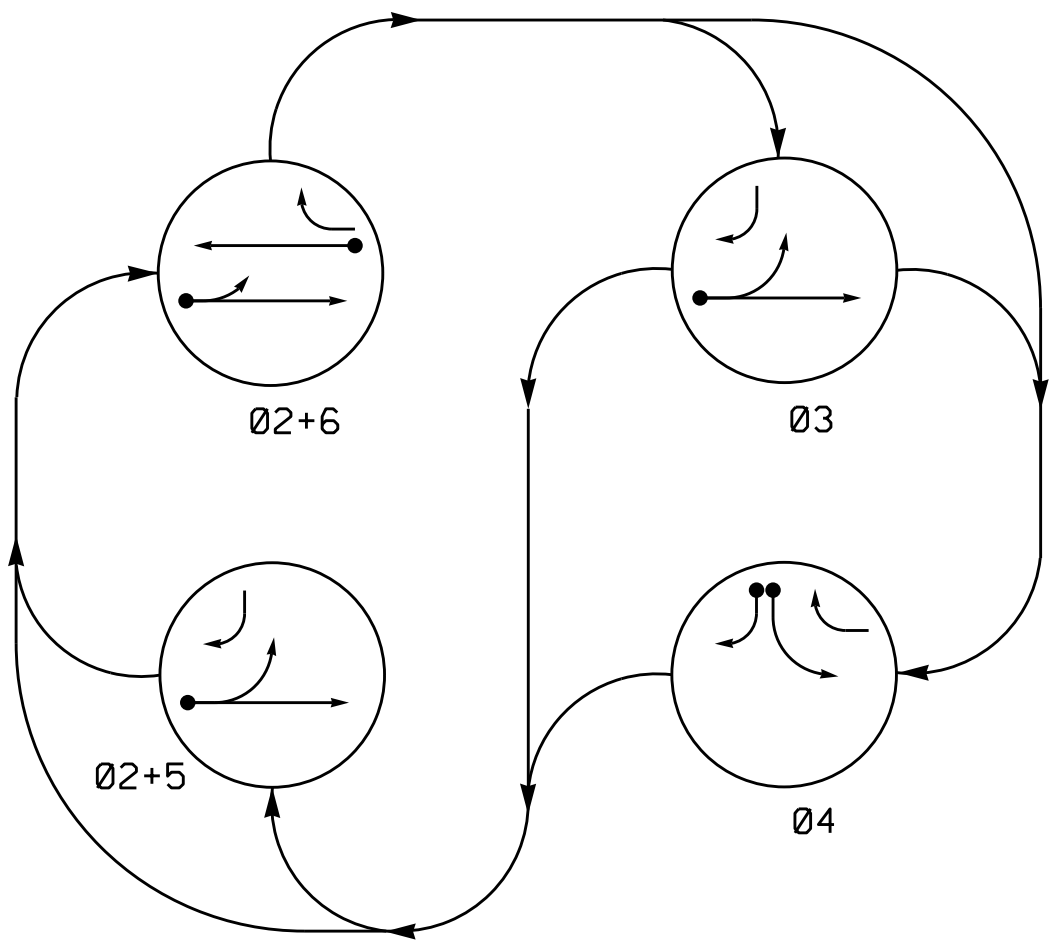
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1054T3
DESIGNED: April 2019
SEALED: 05-16-19
REVISED: N/A

Electrical Detail - Temp. Design - Phase II

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of: G.L. Transportation Mobility and Safety Division STATE OF NORTH CAROLINA Department of Transportation Signal Management Section 750 N. Greenfield Pkwy, Garner, NC 27529	NC 105 at SR 1112 (Broadstone Rd.)		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL NORTH CAROLINA PROFESSIONAL ENGINEER RYAN W. HOUGH SEAL 036833 DocuSigned by: Ryan W. Hough 6/4/2019 430320FAA2854C3 DATE SIG. INVENTORY NO. 11-1054T3	
	Division 11	Watauga County		Boone
	PLAN DATE: May 2019	REVIEWED BY:		
	PREPARED BY: James Peterson	REVIEWED BY:		
REVISIONS		INIT.	DATE	

PHASING DIAGRAM



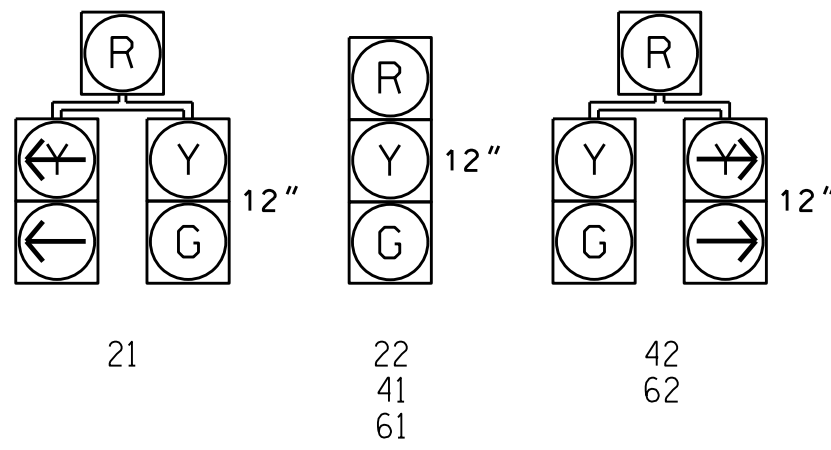
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE				
	02+5	02+6	03	04	FLASH
21	G	G	R	Y	
22	G	G	G	R	Y
41	R	R	R	G	R
42	R	R	R	G	R
61	R	G	R	R	Y
62	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



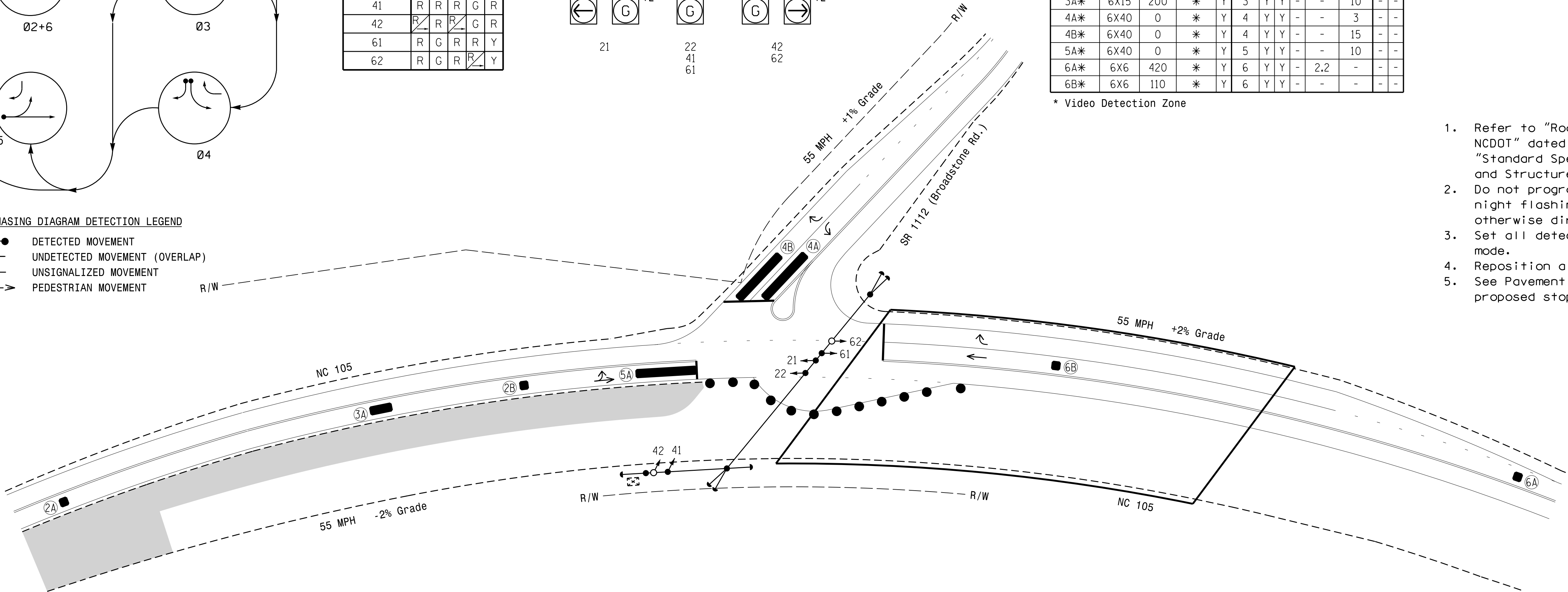
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART												
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A*	6X6	420	*	Y	2	Y	Y	-	2.2	-	-	-
2B*	6X6	110	*	Y	2	Y	Y	-	-	-	-	-
3A*	6X15	200	*	Y	3	Y	Y	-	-	10	-	-
4A*	6X40	0	*	Y	4	Y	Y	-	-	3	-	-
4B*	6X40	0	*	Y	4	Y	Y	-	-	15	-	-
5A*	6X40	0	*	Y	5	Y	Y	-	-	10	-	-
6A*	6X6	420	*	Y	6	Y	Y	-	2.2	-	-	-
6B*	6X6	110	*	Y	6	Y	Y	-	-	-	-	-

* Video Detection Zone

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.
- Set all detector units to presence mode.
- Reposition all existing signal heads.
- See Pavement Marking Plans for proposed stop bar locations.



OASIS 2070 TIMING CHART

FEATURE	PHASE				
	2	3	4	5	6
Min Green 1 *	14	7	7	7	14
Extension 1 *	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	60	25	25	15	60
Yellow Clearance	5.4	5.4	3.0	3.0	5.4
Red Clearance	1.7	2.6	2.4	2.6	1.7
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

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

LEGEND

- | PROPOSED | EXISTING |
|-------------------------|-------------------------------|
| Traffic Signal Head | Modified Signal Head |
| Sign | Sign |
| Pedestrian Signal Head | Signal Pole with Guy |
| Signal Pole with Guy | Signal Pole with Sidewalk Guy |
| Inductive Loop Detector | Controller & Cabinet |
| Junction Box | 2-in Underground Conduit |
| Right of Way | Directional Arrow |
| Video Detection Zone | Construction Zone |

Signal Upgrade - Temporary Design - Phase III

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

0 40 SCALE 1"=40'

NC 105 at SR 1112 (Broadstone Rd.)

Division 11 Watauga County Boone

PLAN DATE: April 2019 REVIEWED BY: T.J. Williams

PREPARED BY: R.N. Zinser REVIEWED BY:

REVISIONS INIT. DATE

SEAL

PROFESSIONAL ENGINEER

SEAL 043914

R. N. Zinser

5/16/2019

SIG. INVENTORY NO. II-1054T4

(remove jumpers and set switches as shown)

(remove jumpers and set switches as shown)



- NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 270 controller. Ensure conflict monitor communicates with 270.

(front view)



FS = FLASH SENSE
ST = STOP TIME

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

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for Startup In Green.
4. Program phase 6 for Yellow Flash.

```
CONTROLLER.....2070
CABINET .....332
SOFTWARE .....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED....S5,S8,AUX S1,AUX S2
PHASES USED.....2,3,4,5,6
OVERLAP A.....2+3
OVERLAP B.....3+5
OVERLAP C.....NOT USED
OVERLAP B.....NOT USED
```

(program controller as shown below)

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

```

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT: X
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,1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0

```

PRESS ' + '

```

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

```

OVERLAP PROGRAMMING COMPLETE

SIGNAL HEAD HOOK-UP CHART

NU = Not Used
NC = No Connection

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

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

OVERLAP B RED FIELD
TERMINAL (A124)

AC-

(program controller as shown below)

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

```

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT: X
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)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0.0

```

PRESS ' + '

```

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

```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-1054T4
DESIGNED: April 2019
SEALED: 05-16-19
REVISED: N/A

Electrical Detail - Temp. Design - Phase III

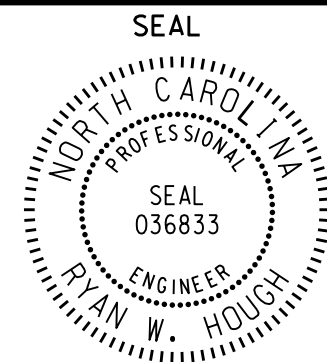
NC 105
at
SR 1112 (Broadstone Rd.)

Division 11 Watauga County Boone

PLAN DATE: May 2019	REVIEWED BY:
---------------------	--------------

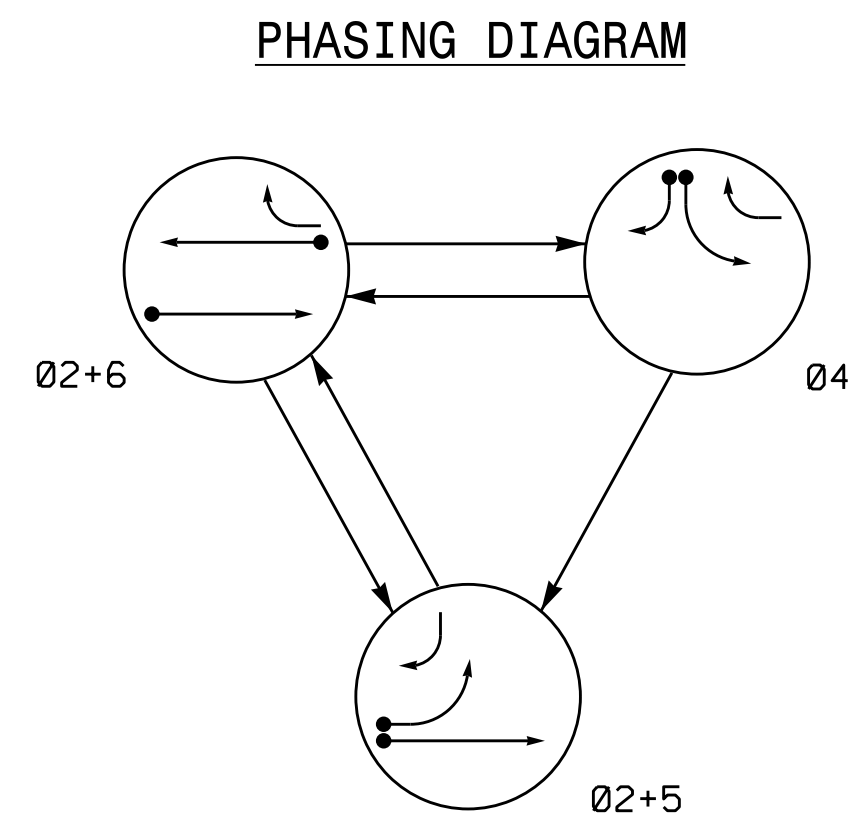
REVISIONS	INIT.	DATE
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**DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED**



DocuSigned by:
D. A. M. 5/20/2019

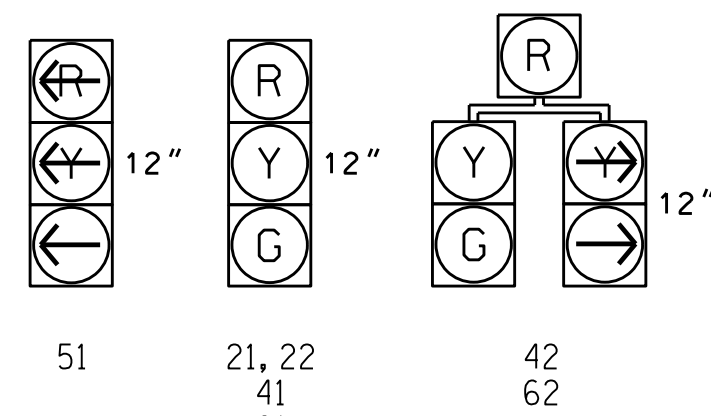
SIC INVENTORY NO 11-1054T4



SIGNAL FACE	PHASE			
	0 2 + 5	0 2 + 6	0 4	F L O W
21, 22	G	G	R	Y
41	R	R	G	R
42		R	G	R
51				
61	R	G	R	Y
62	R	G		Y



All Heads L.E.D.



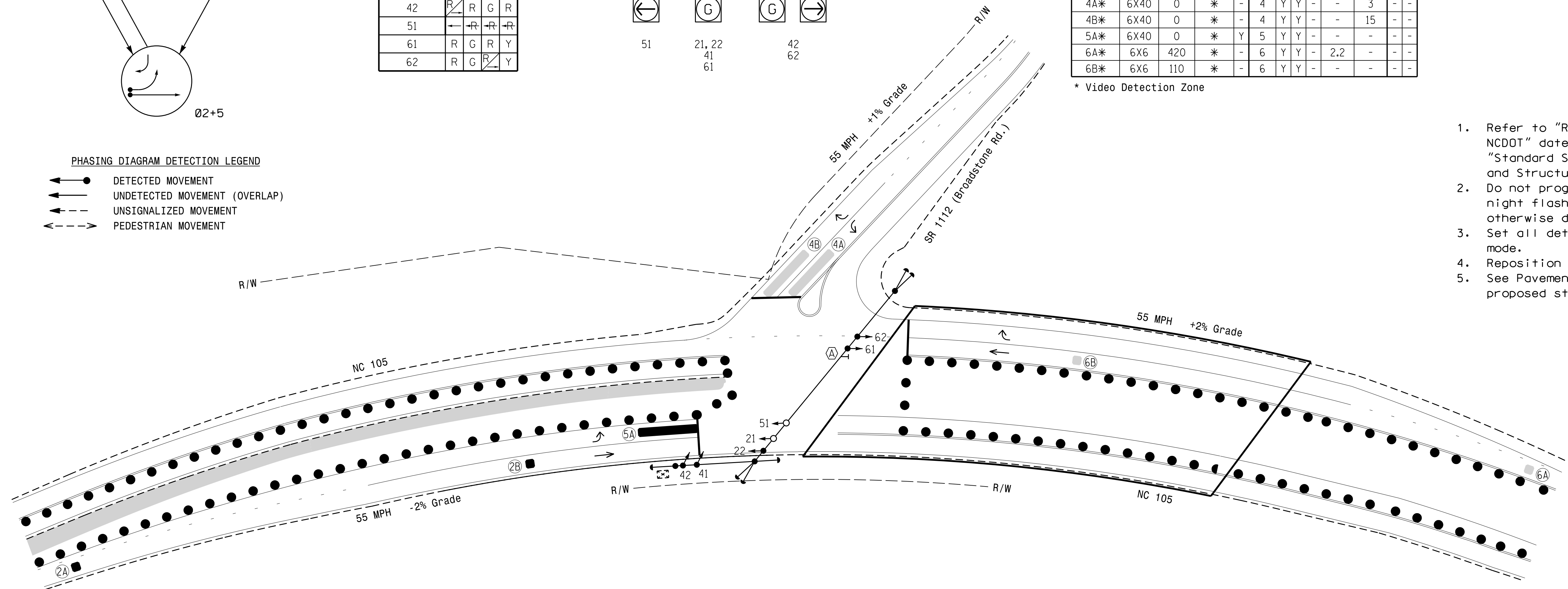
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART											
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A*	6X6	420	*	Y	2	Y	Y -	2.2	-	-	-
2B*	6X6	110	*	Y	2	Y	Y -	-	-	-	-
4A*	6X40	0	*	-	4	Y	Y -	-	3	-	-
4B*	6X40	0	*	-	4	Y	Y -	-	15	-	-
5A*	6X40	0	*	Y	5	Y	Y -	-	-	-	-
6A*	6X6	420	*	-	6	Y	Y -	2.2	-	-	-
6B*	6X6	110	*	-	6	Y	Y -	-	-	-	-

* Video Detection Zone

3 Phase
Fully Actuated
Isolated

NOTES

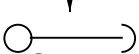
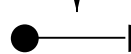
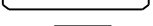
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Reposition all existing signal heads.
5. See Pavement Marking Plans for proposed stop bar locations.



OASIS 2070 TIMING CHART				
FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	14	7	7	14
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	60	25	15	60
Yellow Clearance	5.4	3.0	3.0	5.4
Red Clearance	1.7	3.3	3.5	1.7
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND

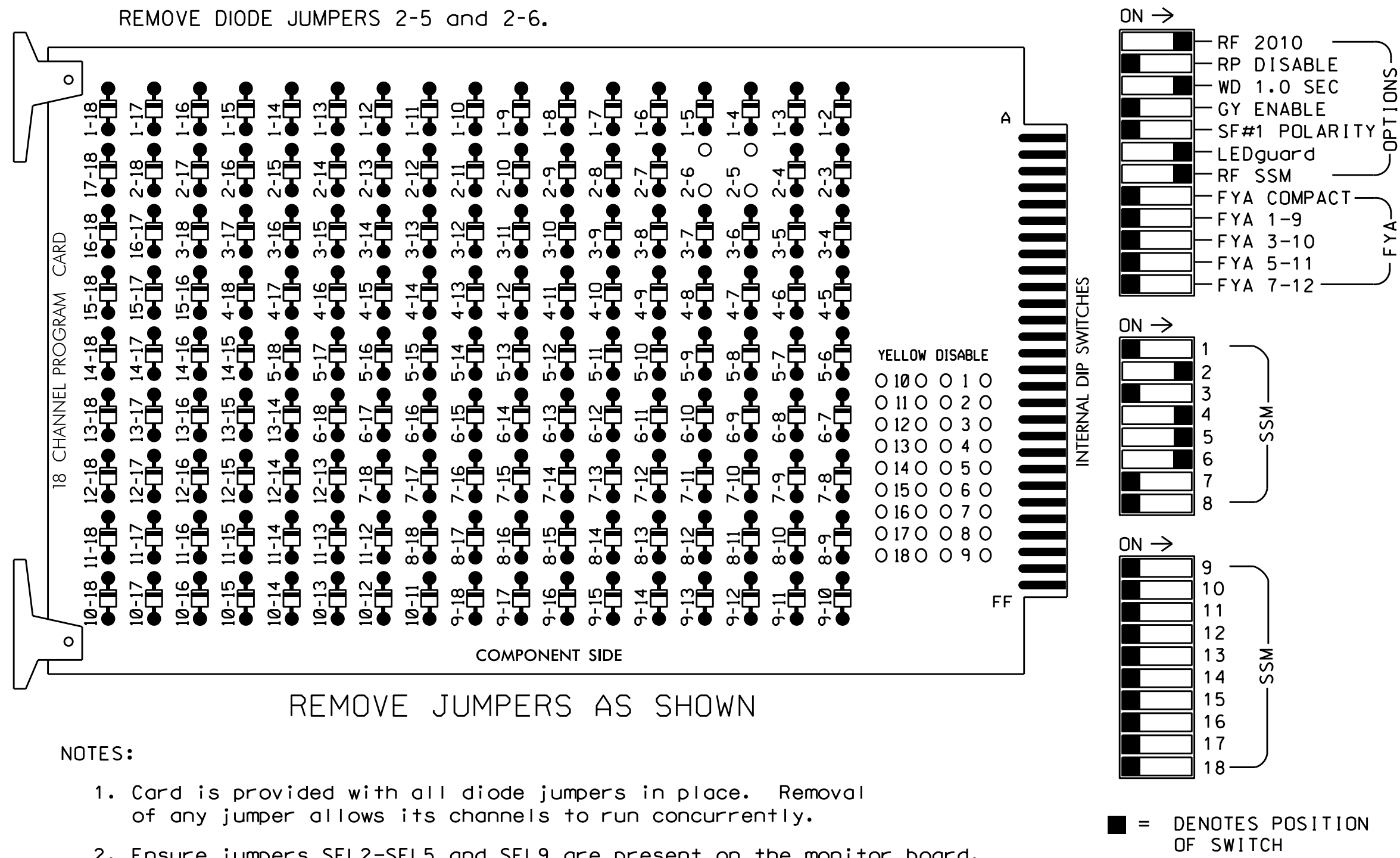
PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
-----	2-in Underground Conduit	-----
N/A	Right of Way	-----
	Directional Arrow	
	Video Detection Zone	
	Construction Zone	N/A
	No Left Turn Sign (R3-2)	

Signal Upgrade - Temporary Design - Phase IV

Prepared In The Offices of:  TRANSPORTATION MOBILITY AND SAFETY DIVISION DEPARTMENT OF TRANSPORTATION SYMBOL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529	NC 105 at SR 1112 (Broadstone Rd.)	SEAL 																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Division 11</td> <td style="width: 33%;">Watauga County</td> <td style="width: 33%;">Boone</td> </tr> <tr> <td>PLAN DATE:</td> <td>April 2019</td> <td>REVIEWED BY: T.J. Williams</td> </tr> <tr> <td>PREPARED BY: R.N. Zinser</td> <td colspan="2">REVIEWED BY:</td> </tr> </table>			Division 11	Watauga County	Boone	PLAN DATE:	April 2019	REVIEWED BY: T.J. Williams	PREPARED BY: R.N. Zinser	REVIEWED BY:																									
Division 11	Watauga County	Boone																																	
PLAN DATE:	April 2019	REVIEWED BY: T.J. Williams																																	
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	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">REVISIONS</th> <th style="width: 20%;">INIT.</th> <th style="width: 20%;">DATE</th> </tr> </thead> <tbody> <tr><td style="height: 20px;"> </td><td> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td><td> </td></tr> </tbody> </table>		REVISIONS	INIT.	DATE																														
REVISIONS	INIT.	DATE																																	
DocuSigned by:  R. N. Zinser 5/16/2019 F:\1880734172\2486 DATE SIG. INVENTORY NO. 11-105415																																			

EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash.

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,S5,S7,S8
PHASES USED.....2,4,5,6
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	21,22	NU	NU	41,42	62	NU	42	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			101					134								
YELLOW		129			102					135								
GREEN		130			103					136								
RED ARROW									131									
YELLOW ARROW					102		132	132										
GREEN ARROW					103		133	133										

NU = Not Used

LOAD RESISTOR
INSTALLATION DETAIL

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

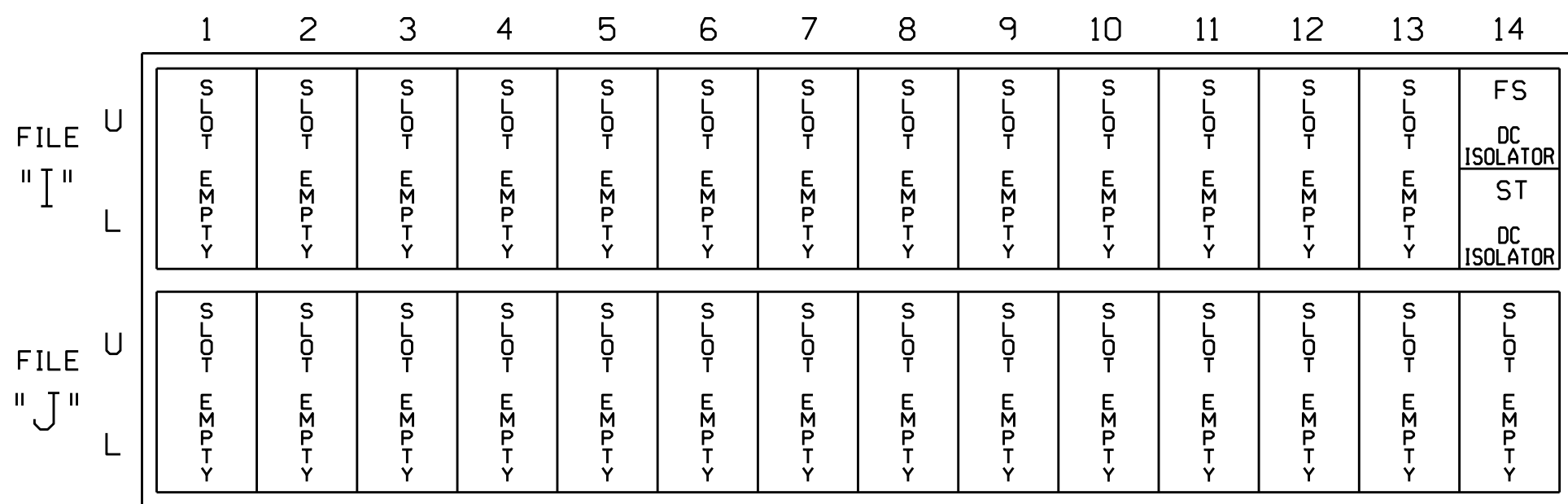
OVERLAP B RED FIELD
TERMINAL (A124)

AC-

REMOVE
(if present)

INPUT FILE POSITION LAYOUT

(front view)



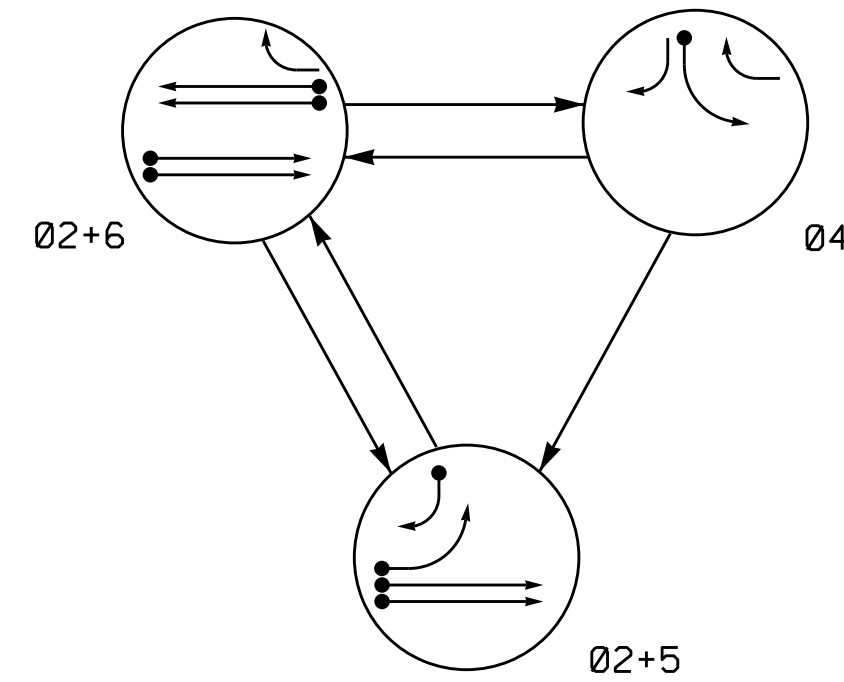
SPECIAL DETECTOR NOTE

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

Electrical Detail - Temp. Design - Phase IV

ELECTRICAL AND PROGRAMMING DETAILS FOR:		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared In the Offices of:		SEAL	
750 N. Greenfield Pkwy, Garner, NC 27529		NC 105 at SR 1112 (Broadstone Rd.)	
Division 11 Watauga County Boone		PLAN DATE: May 2019 REVIEWED BY:	
PREPARED BY: James Peterson		REVIEWED BY:	
REVISIONS		INIT. DATE	
		DocuSigned by: Ryan W. Hough 430320FAA2684C3	
		5/30/2019	
		DATE	
		SIG. INVENTORY NO. 11-1054T5	

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

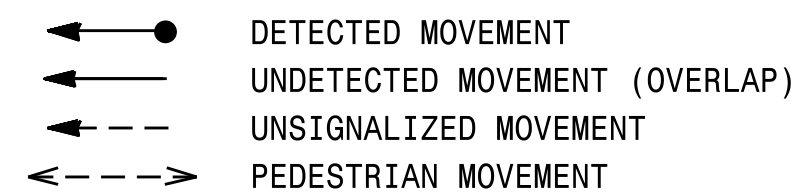
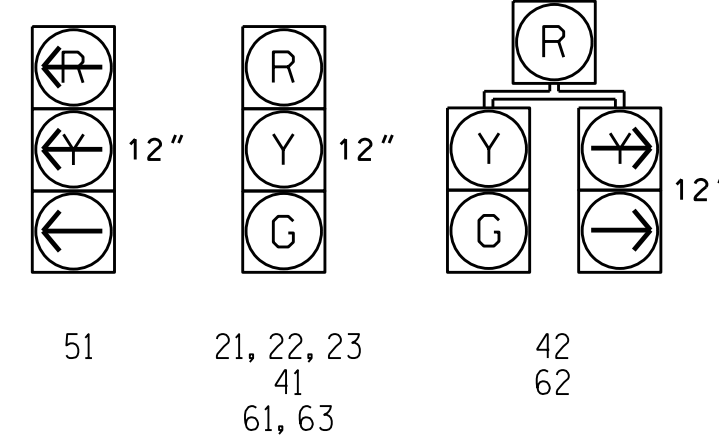


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	0 2 + 5	0 2 + 6	0 4	F L E S H
21, 22, 23	G	G	R	Y
41		R	G	R
42	R →	R	G	R
51	←	←	←	←
61, 63	R	G	R	Y
62	R	G	R ↘	Y

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

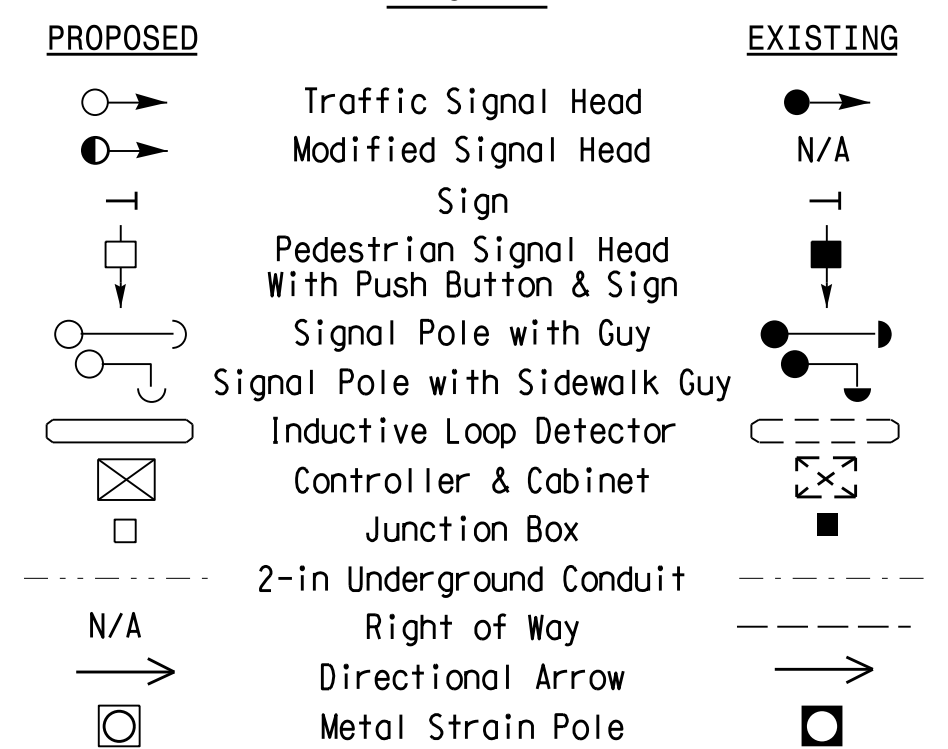
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	420	6	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	3	-	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	-	Y
5B	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	Y
6A	6X6	420	6	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	420	6	Y	6	Y	Y	-	-	-	-	Y

3 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 5 may be lagged.
4. Set all detector units to presence mode.
5. See Pavement Marking Plans for proposed stop bar locations.

LEGEND

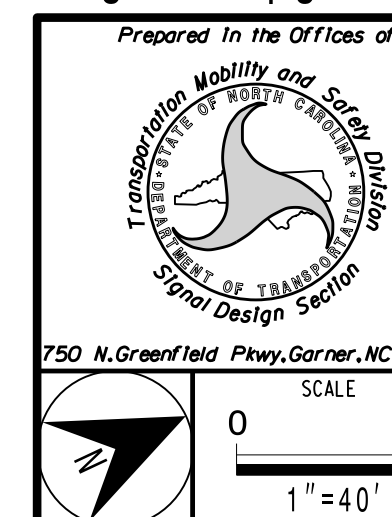


OASIS 2070 TIMING CHART

FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	14	7	7	14
Extension 1 *	6.0	2.0	2.0	6.0
Max Green 1 *	90	25	15	90
Yellow Clearance	5.4	3.0	3.0	5.4
Red Clearance	1.2	3.2	3.1	1.2
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	-	1.5
Max Variable Initial *	46	-	-	46
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.4	-	-	3.4
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Upgrade - Final Design



NC 105
at
SR 1112 (Camp Broadstone Rd.)

Division 11 Watauga County Boone

PLAN DATE:	April 2019	REVIEWED BY:	T.J. Williams
------------	------------	--------------	---------------

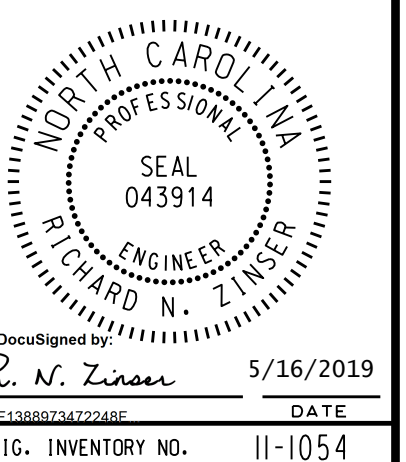
PREPARED BY: R.N. Zinser	REVIEWED BY:
--------------------------	--------------

REVISIONS	INIT.	DATE

[illegible]

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

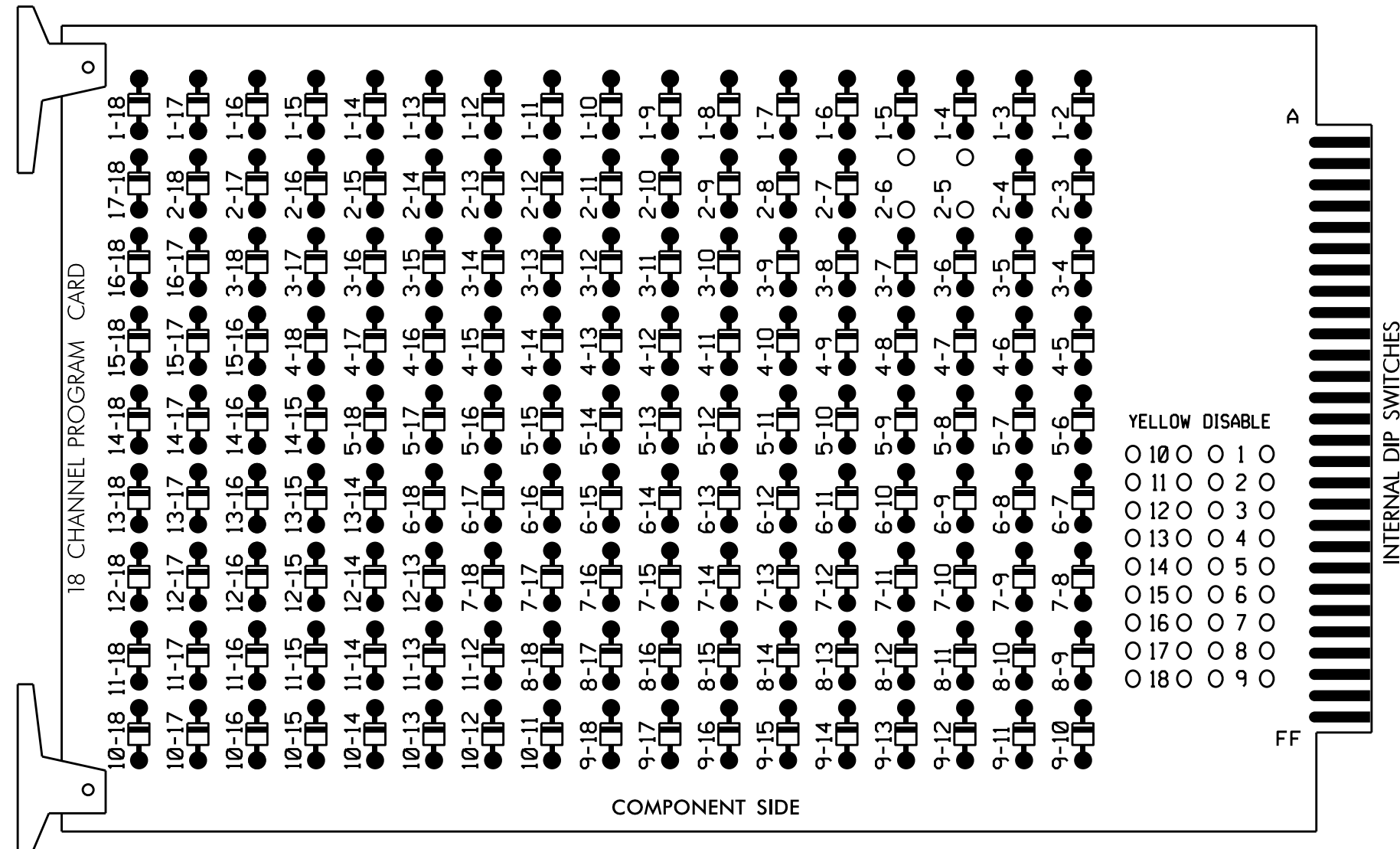
SEAL



(remove jumpers and set switches as shown)

(remove jumpers and set switches as shown)

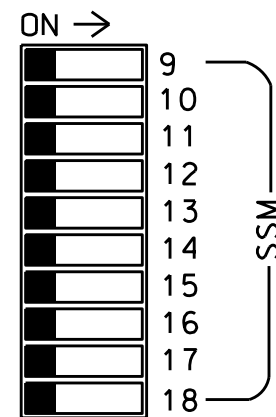
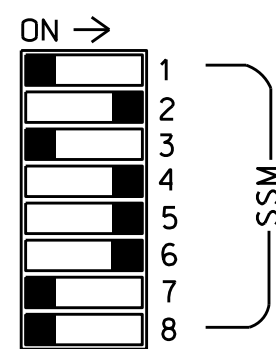
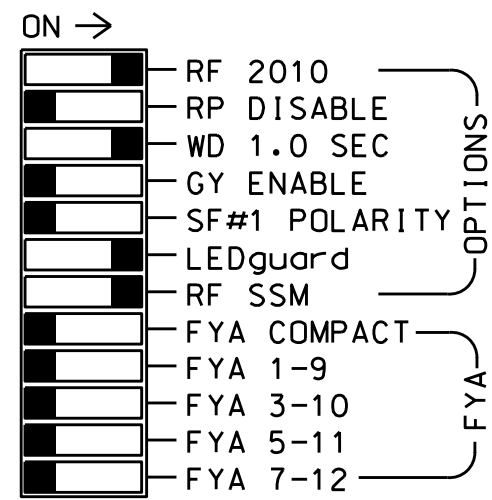
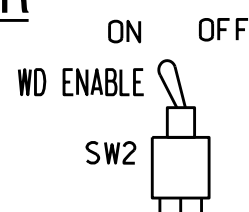
REMOVE DIODE JUMPERS 2-5 and 2-6.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = DENOTES POSITION
OF SWITCH

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Startup In Green.
5. Program phases 2 and 6 for Yellow Flash.

EQUIPMENT INFORMATION

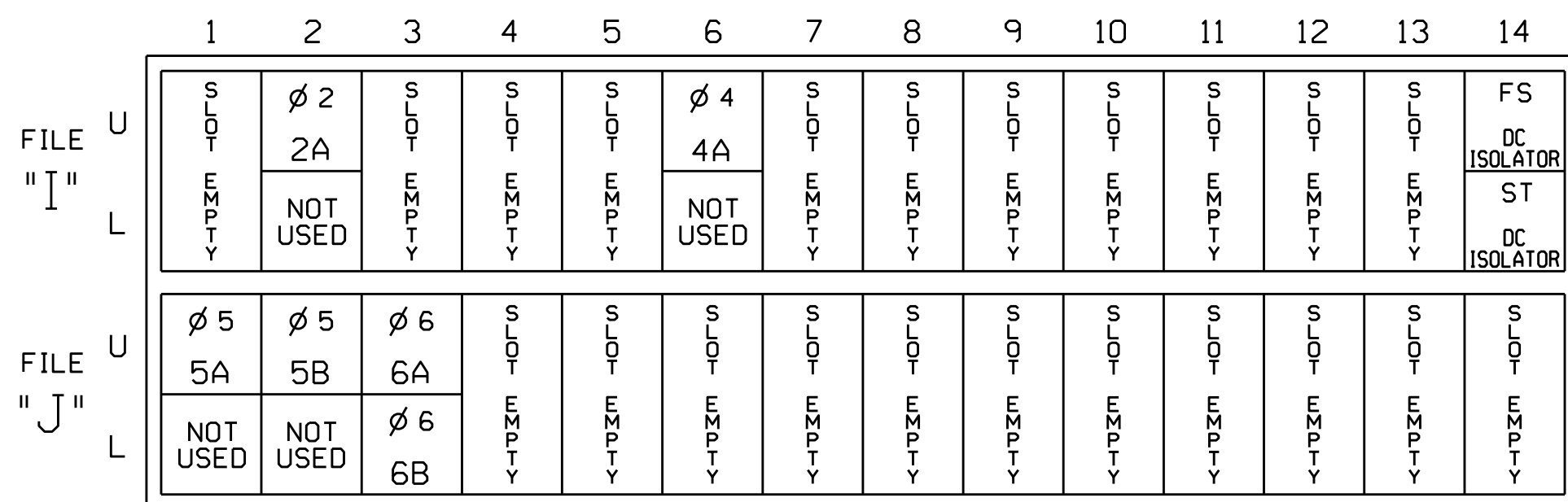
```

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S5,S7,S8
PHASES USED.....2,4,5,6
OVERLAP 'A'.....NOT USED
OVERLAP 'B'.....NOT USED
OVERLAP 'C'.....NOT USED
OVERLAP 'D'.....NOT USED

```

INPUT FILE POSITION LAYOUT

(front view)



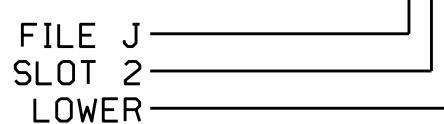
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L

[illegible]

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-1054
DESIGNED: April 2019
SEALED: 05-16-19
REVISED: N/A

Electrical Detail - Final Design

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

REAL

NC 105
at
SR 1112 (Camp Broadstone Rd.)

Division 11 Watauga County Boone

PLAN DATE: May 2019	REVIEWED BY:
---------------------	--------------

REVISIONS	INIT.	DATE
-----------	-------	------

DocuSigned by:
Ryan W. Hough 5/30/2019

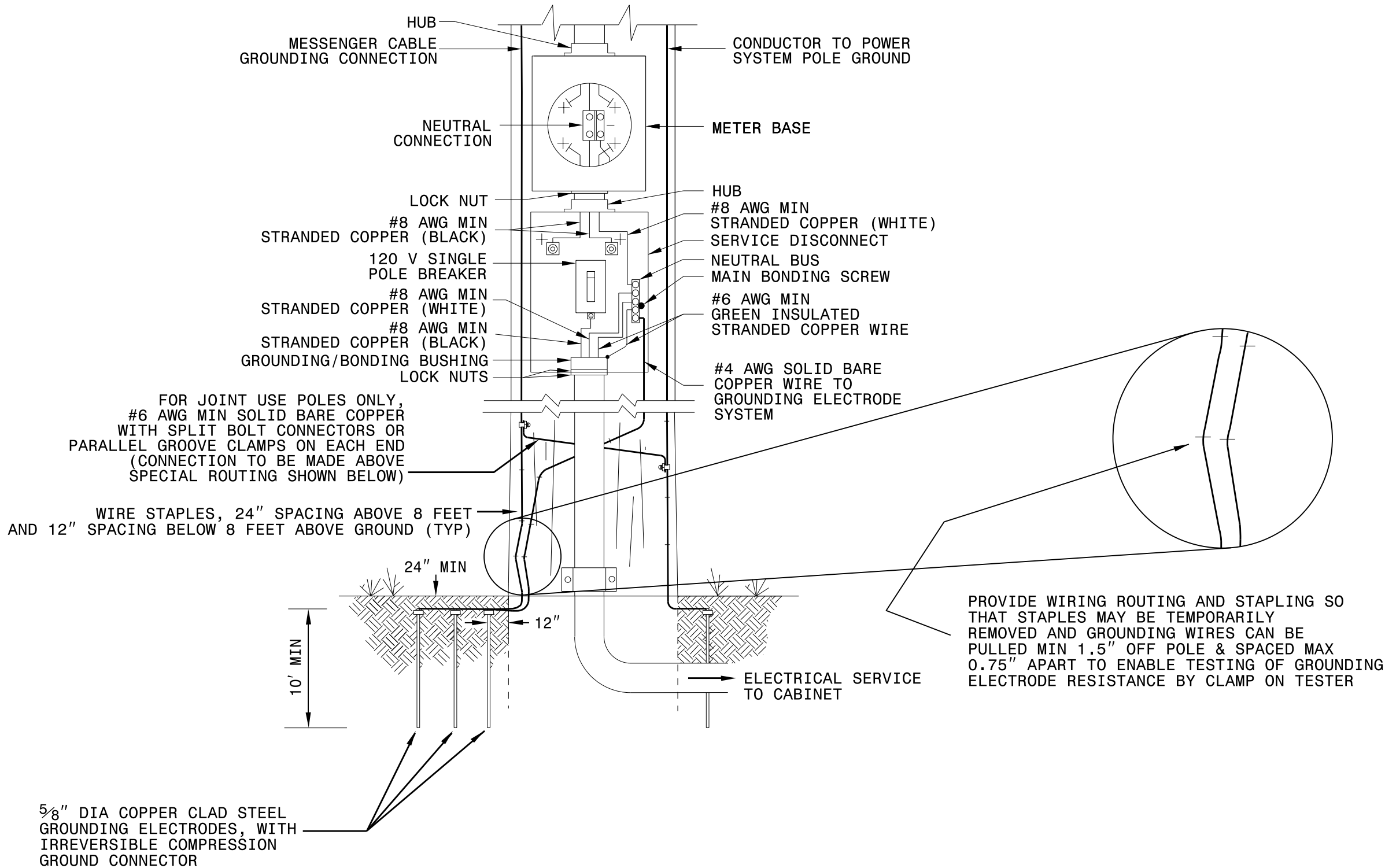
SIG. INVENTORY NO. 11-1054

160-MAY-2019 09:57
*111054_sm_ele_XXX.dgn
itpeterson

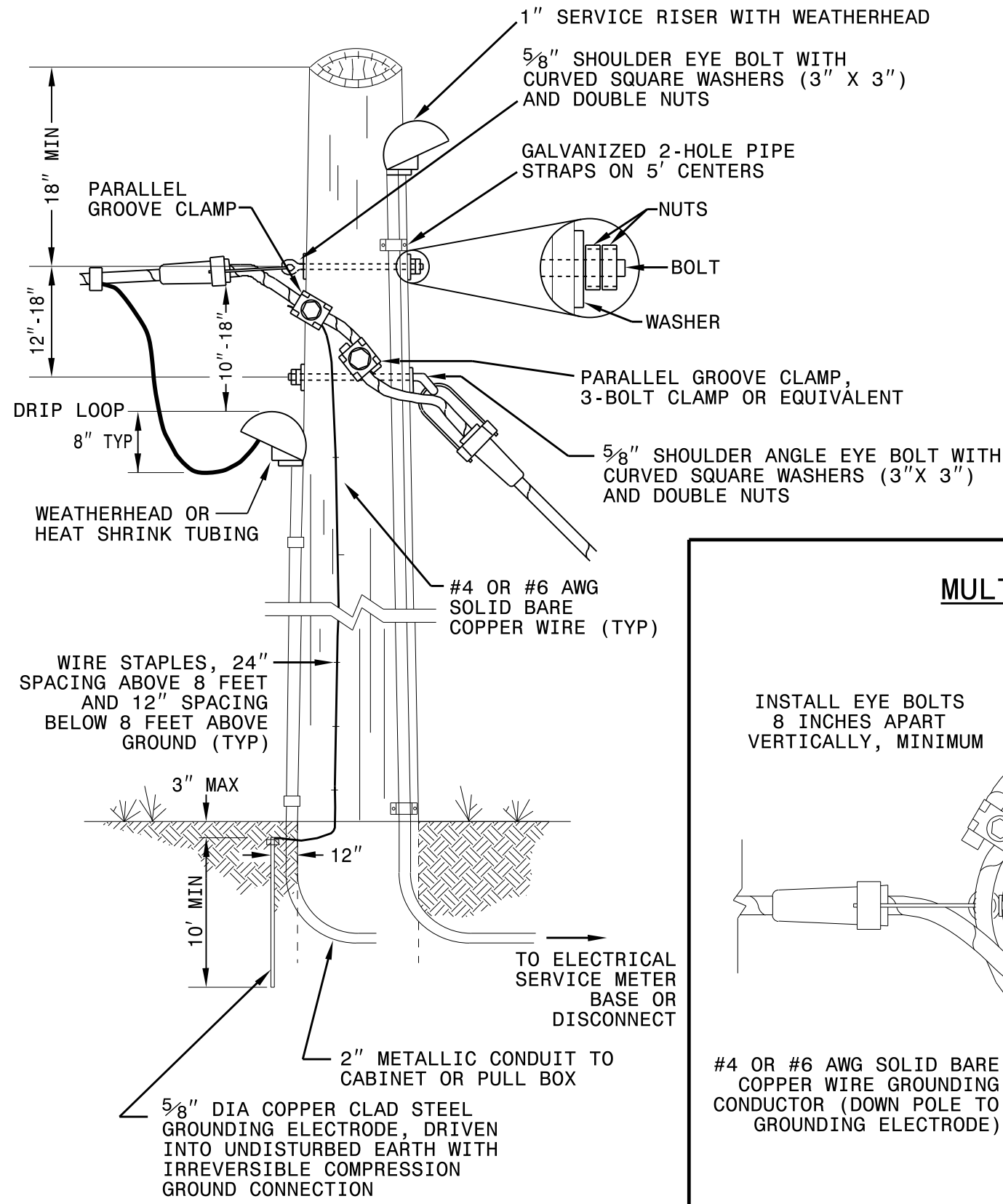
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR
ELECTRICAL SERVICE GROUNDING
GROUNDING AND BONDING

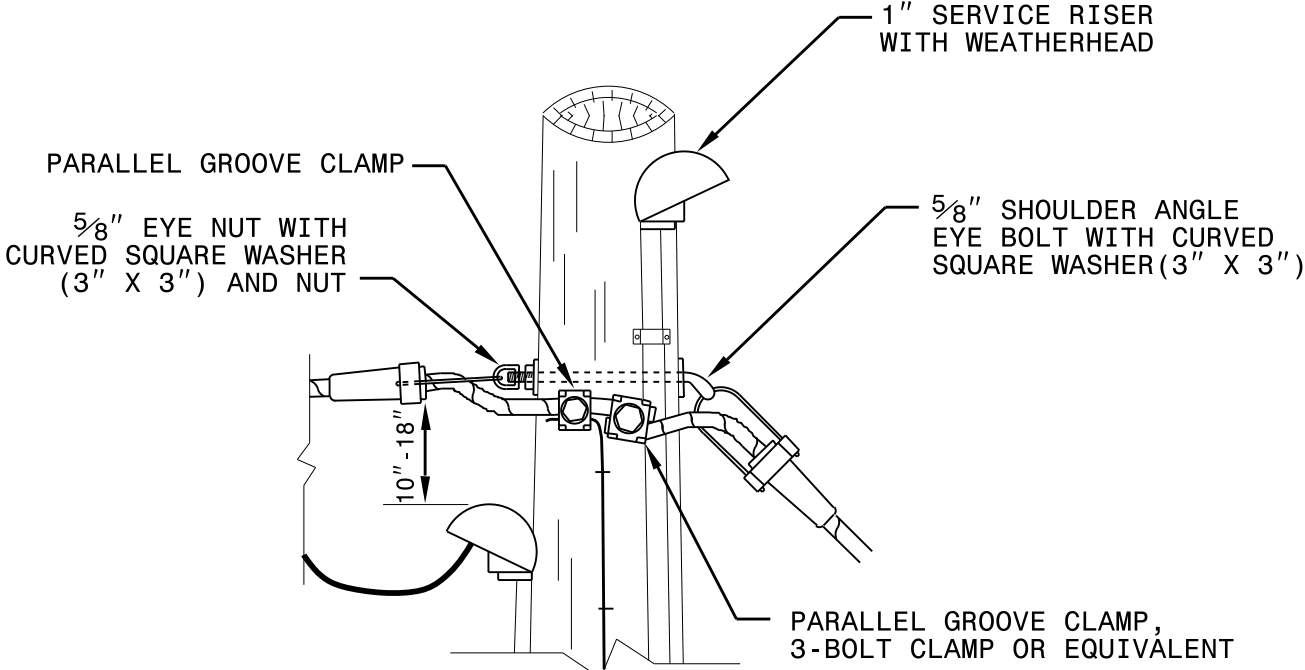
SHEET 1 OF 1
1700D01



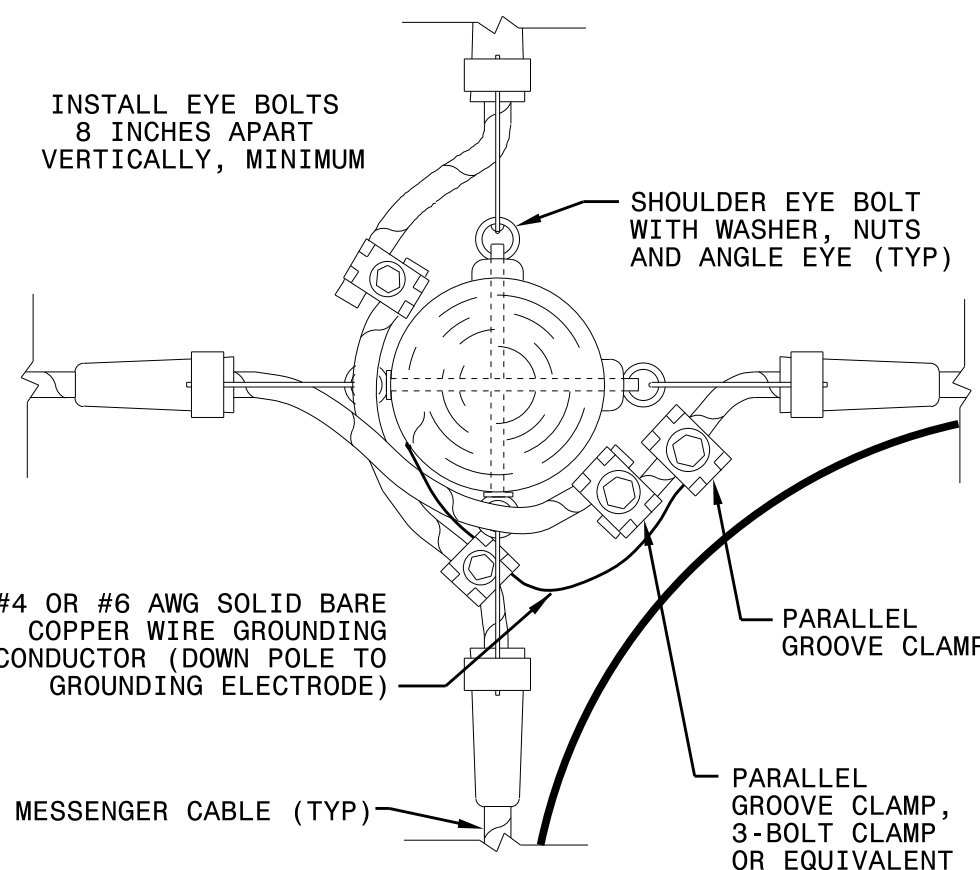
TWO-BOLT METHOD (PREFERRED)



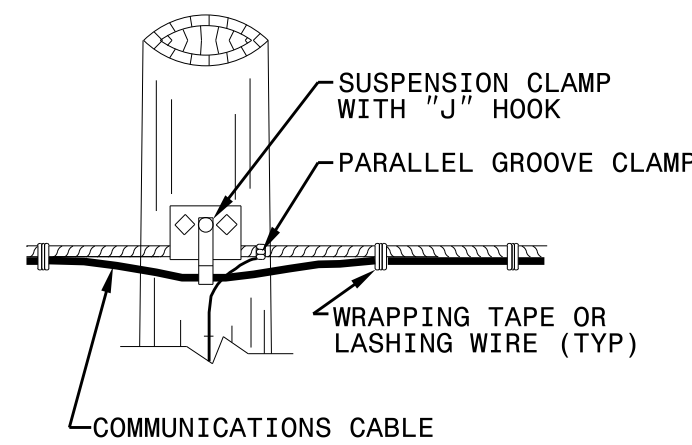
ONE-BOLT METHOD



MULTIPLE SPANS



COMMUNICATIONS CABLE AT INTERMEDIATE POLE



NOTE

FOR CONNECTING MESSENGER TO MESSENGER, USE PARALLEL GROOVE CLAMP, 3-BOLT CLAMP OR EQUIVALENT. FOR CONNECTING COPPER WIRE TO MESSENGER, USE PARALLEL GROOVE CLAMP.

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

ENGLISH STANDARD DRAWING FOR
WOOD POLES
METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1
1720D01

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

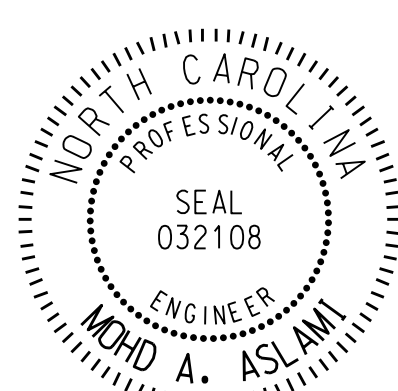
See Plate for Title

Prepared in the Offices of:



750 N. Greenfield Parkway
Garner, NC 27529

SEAL



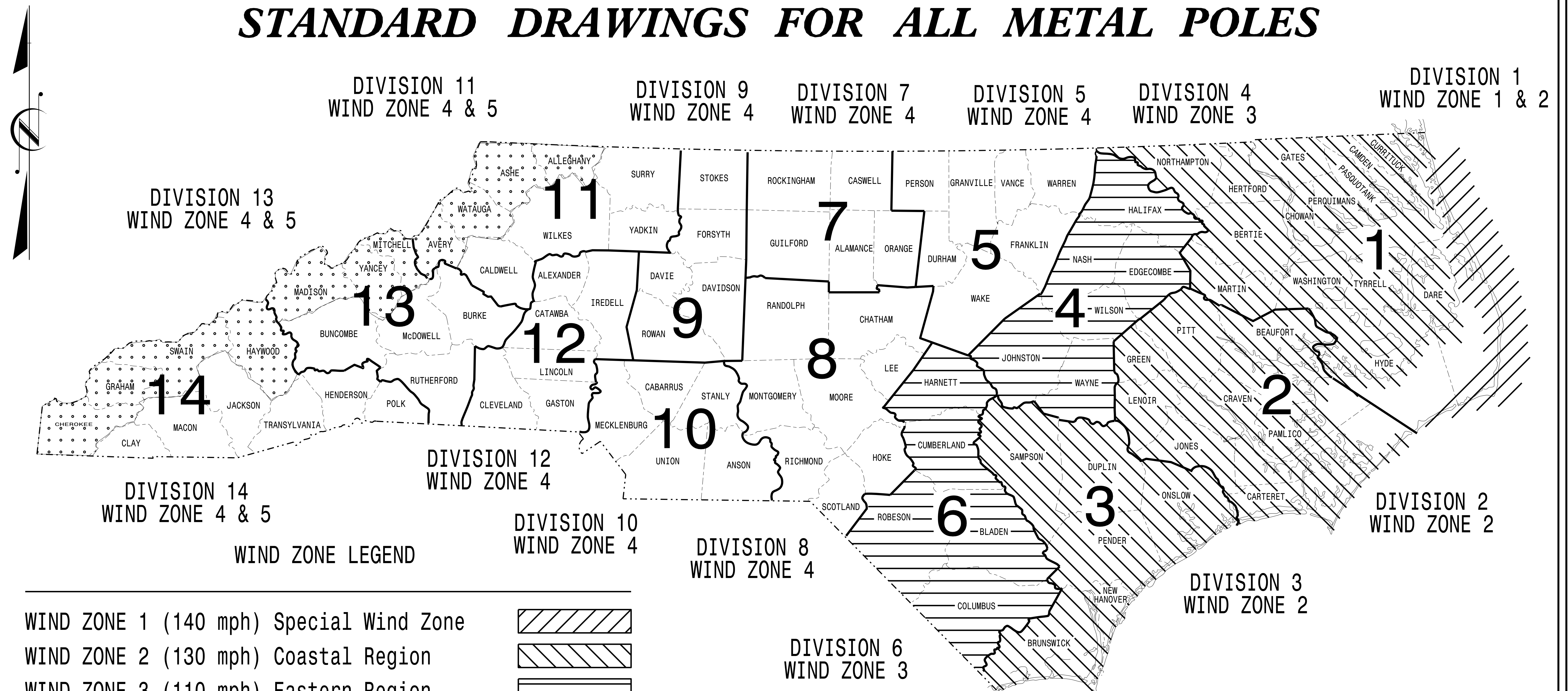
DocuSigned by:
Mohd. Aslami

10/11/2017
DATE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

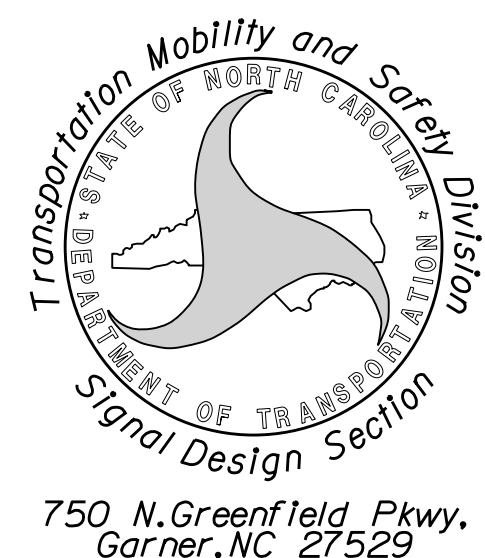
PROJECT I.D. NO.	SHEET NO.
R-2566BA	Sig.M1

STANDARD DRAWINGS FOR ALL METAL POLES



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

Prepared In the Offices of:



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:

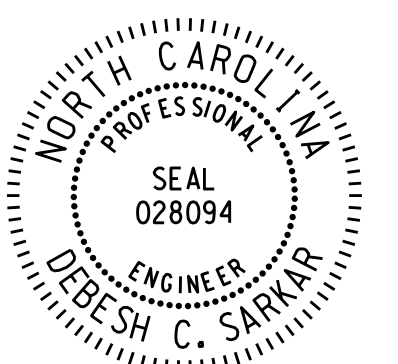
MOBILITY AND SAFETY DIVISION - ITS AND SIGNALS UNIT

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

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

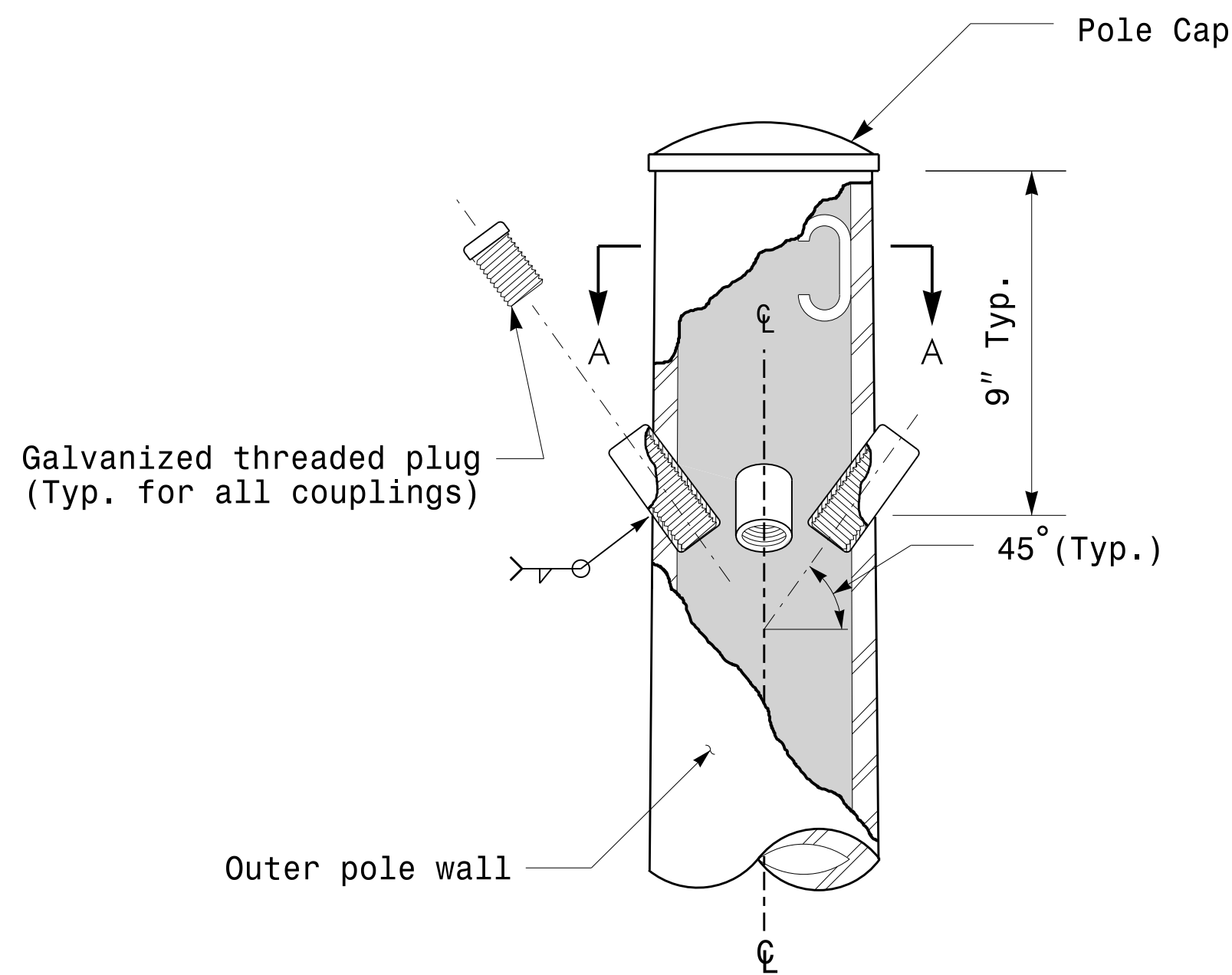
D.C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER

SEAL

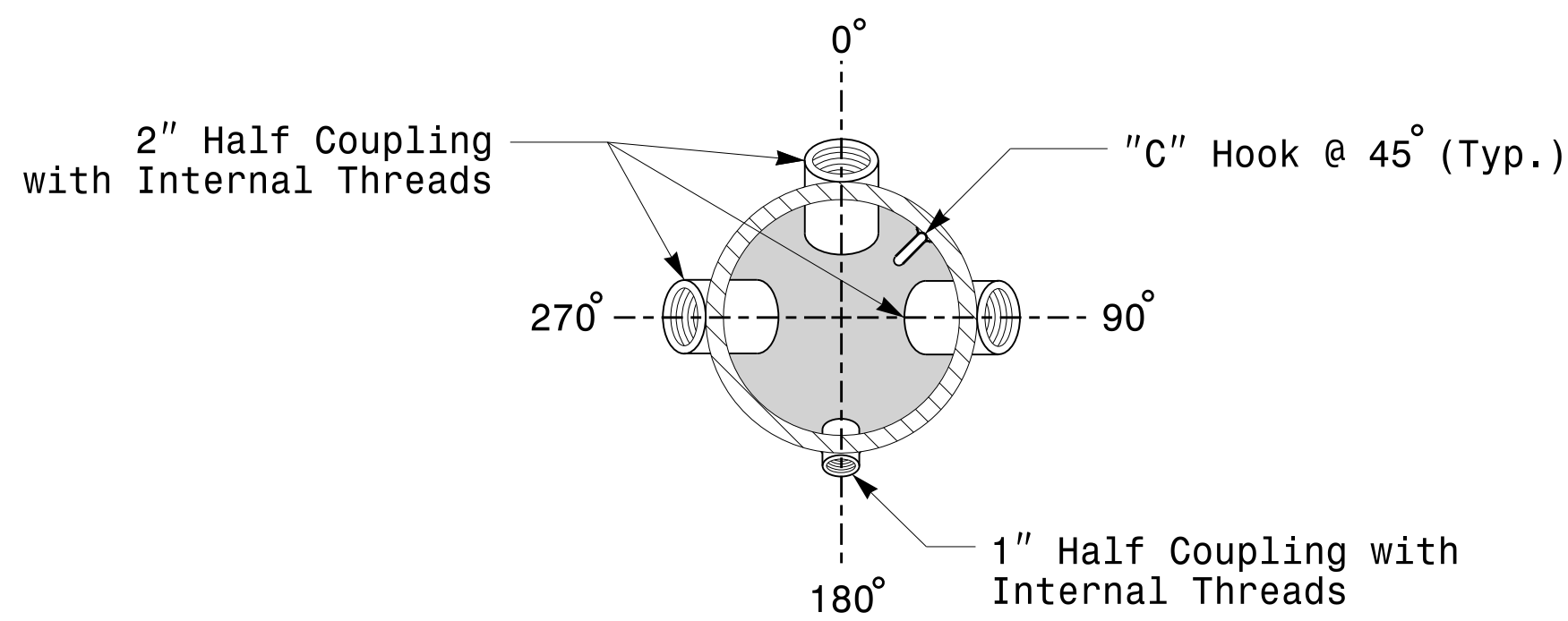


DecSigned by:
Debesh C. Sarkar
4486333
SIGNATURE

10/11/2017
DATE

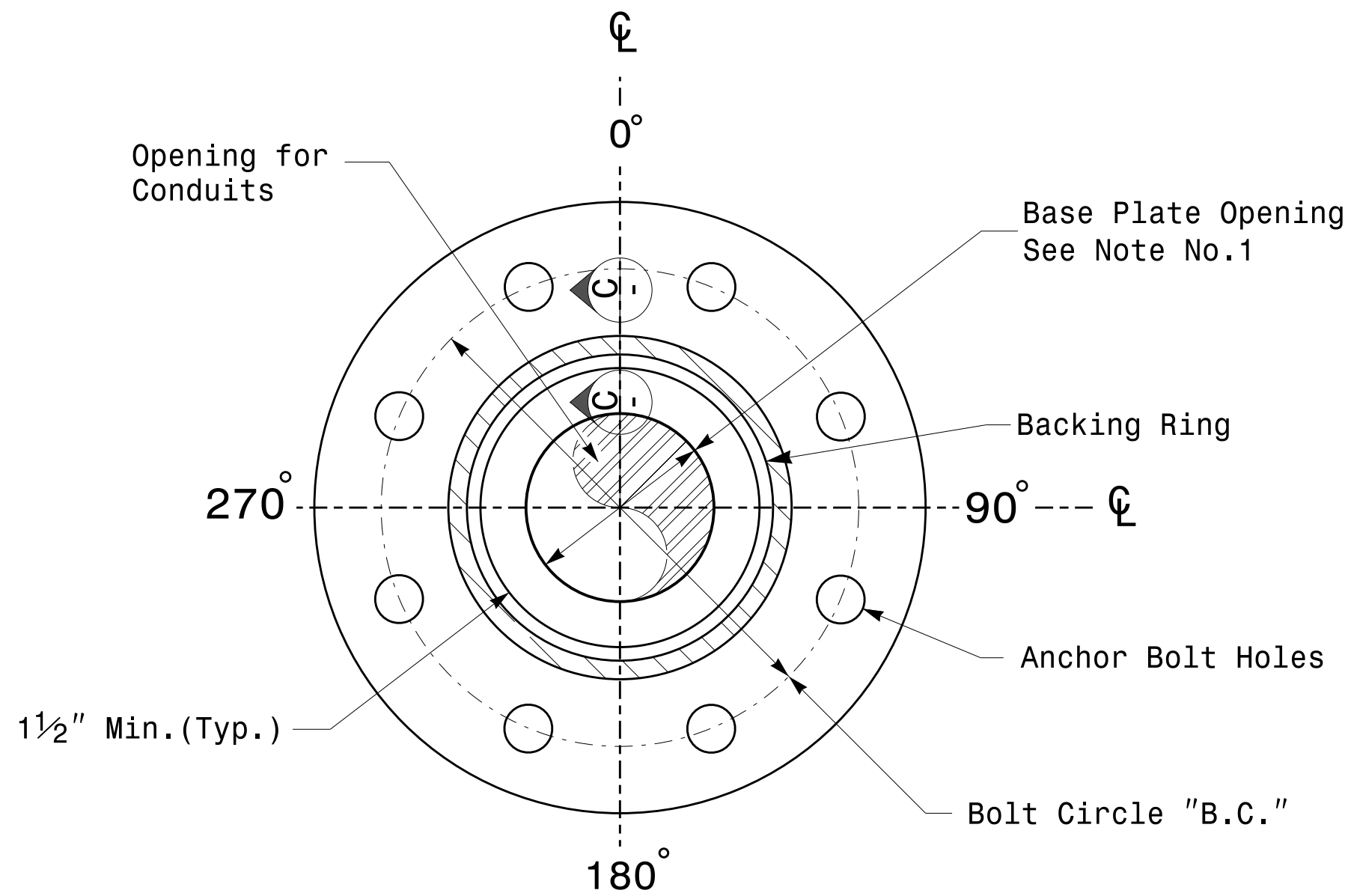


Cable Entrances at Top of Pole

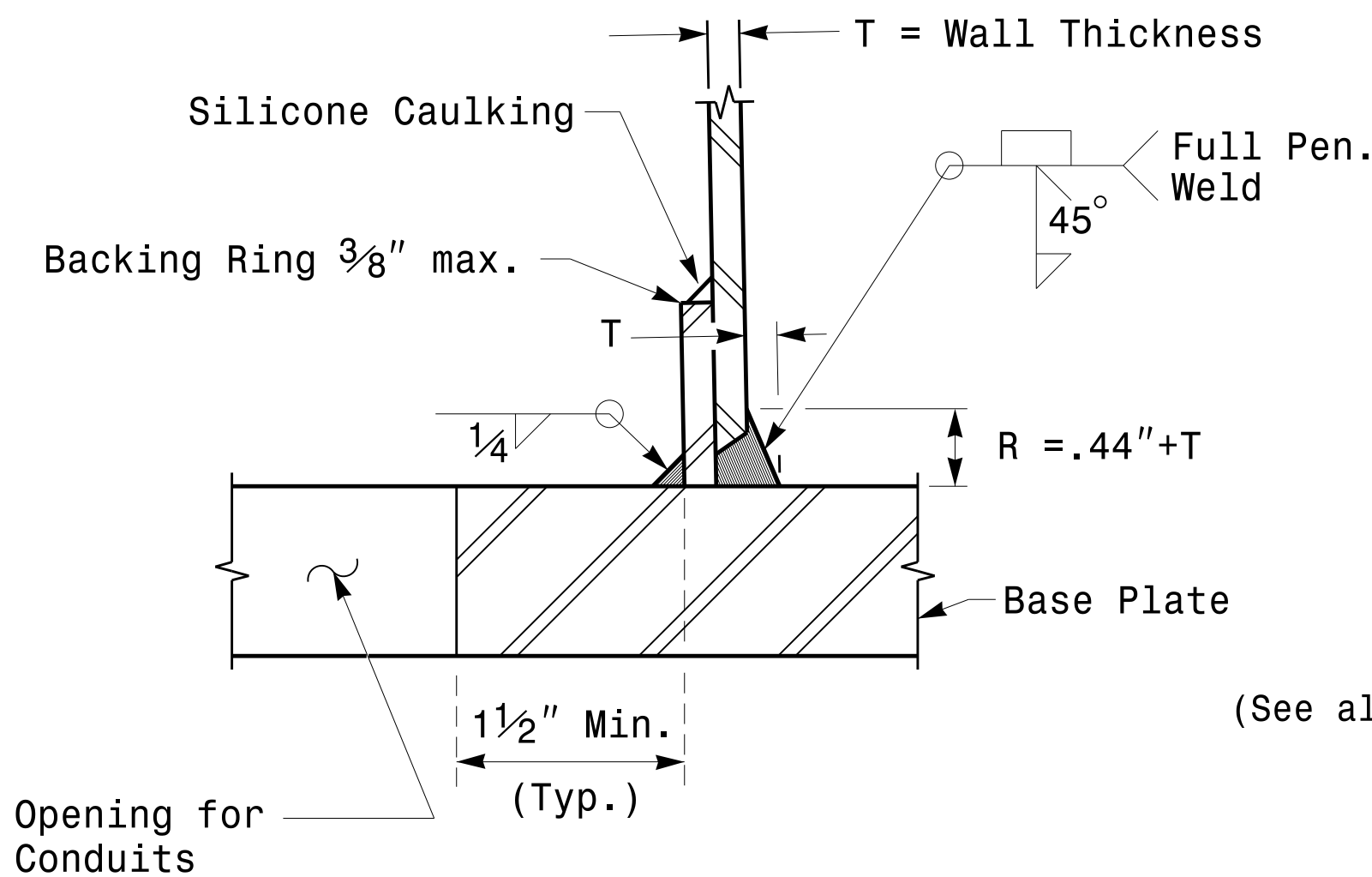


Section A-A

Radial Orientation for Factory Installed
Accessories at Top of Pole



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



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

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

Shaft I.D. Tag
(See drawing M2 for details)

Terminal Compartment
(See drawing M2 for details)

Anchor Bolt
(See also drawing M2 for details)

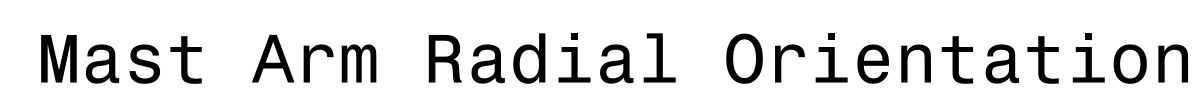
Monotube Strain Pole

	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	
SCALE 0 NA NONE					

DocuSigned by:
Debesh C. Sarkar
4488E781818A74FURE

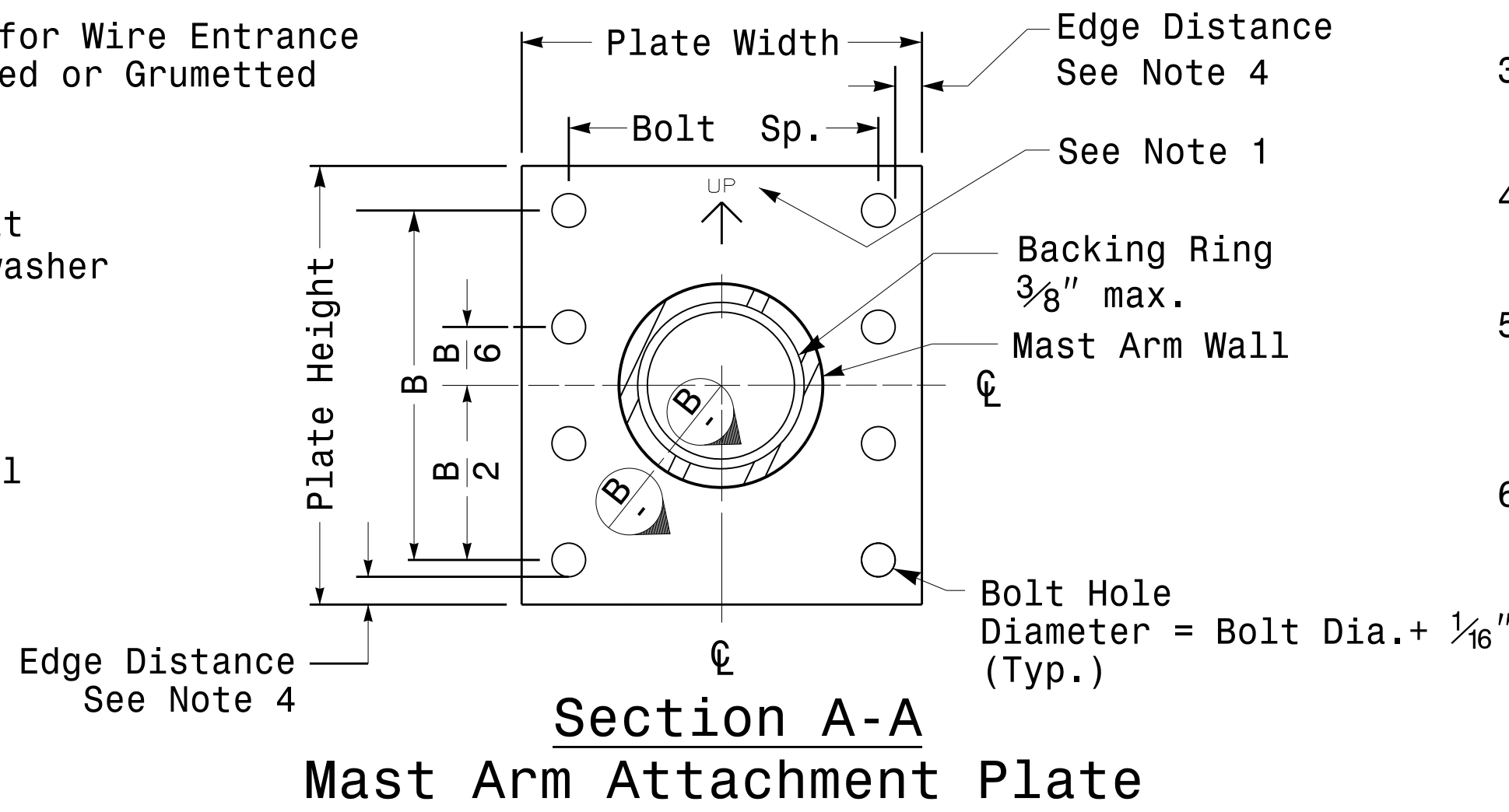
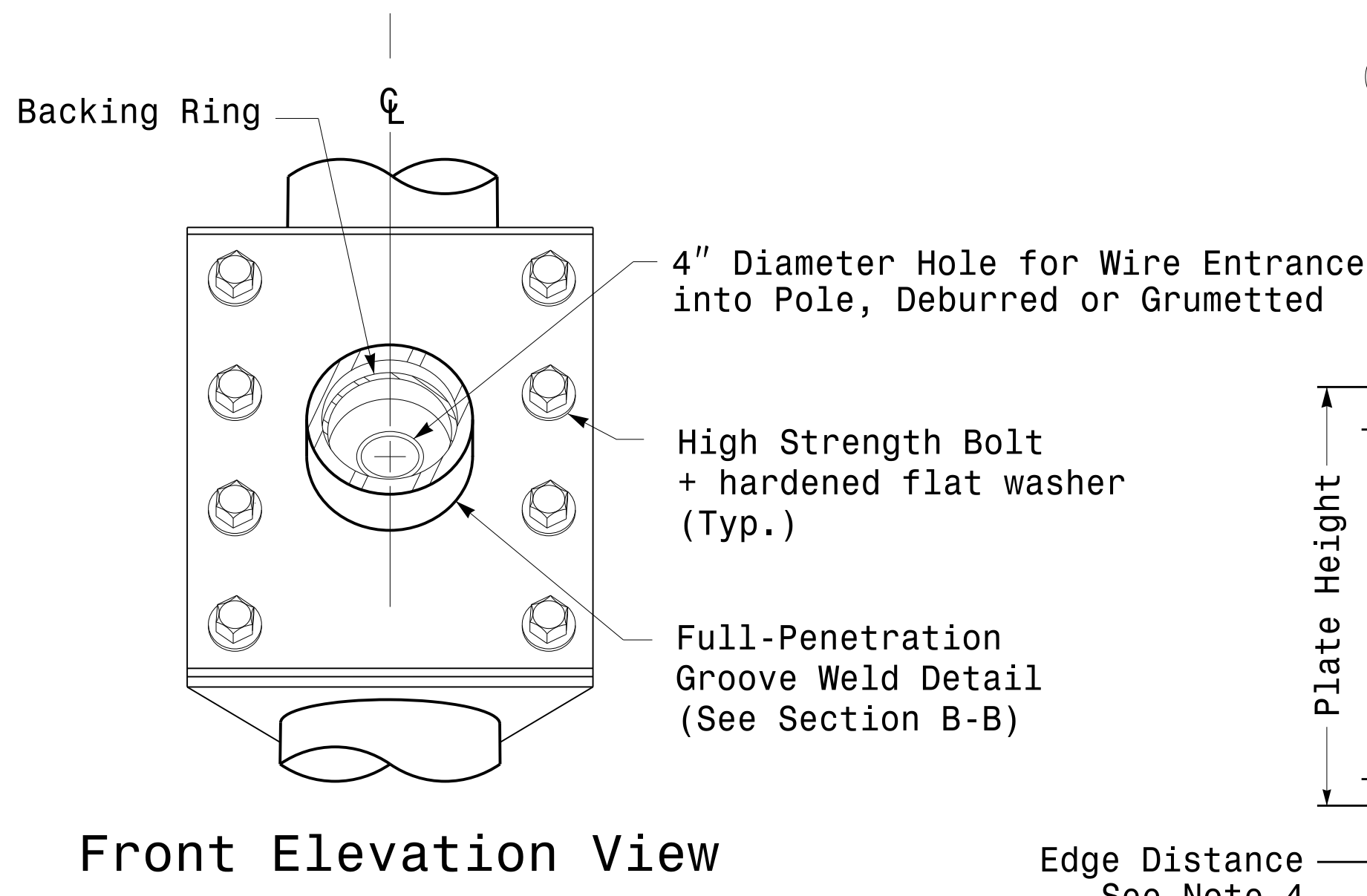
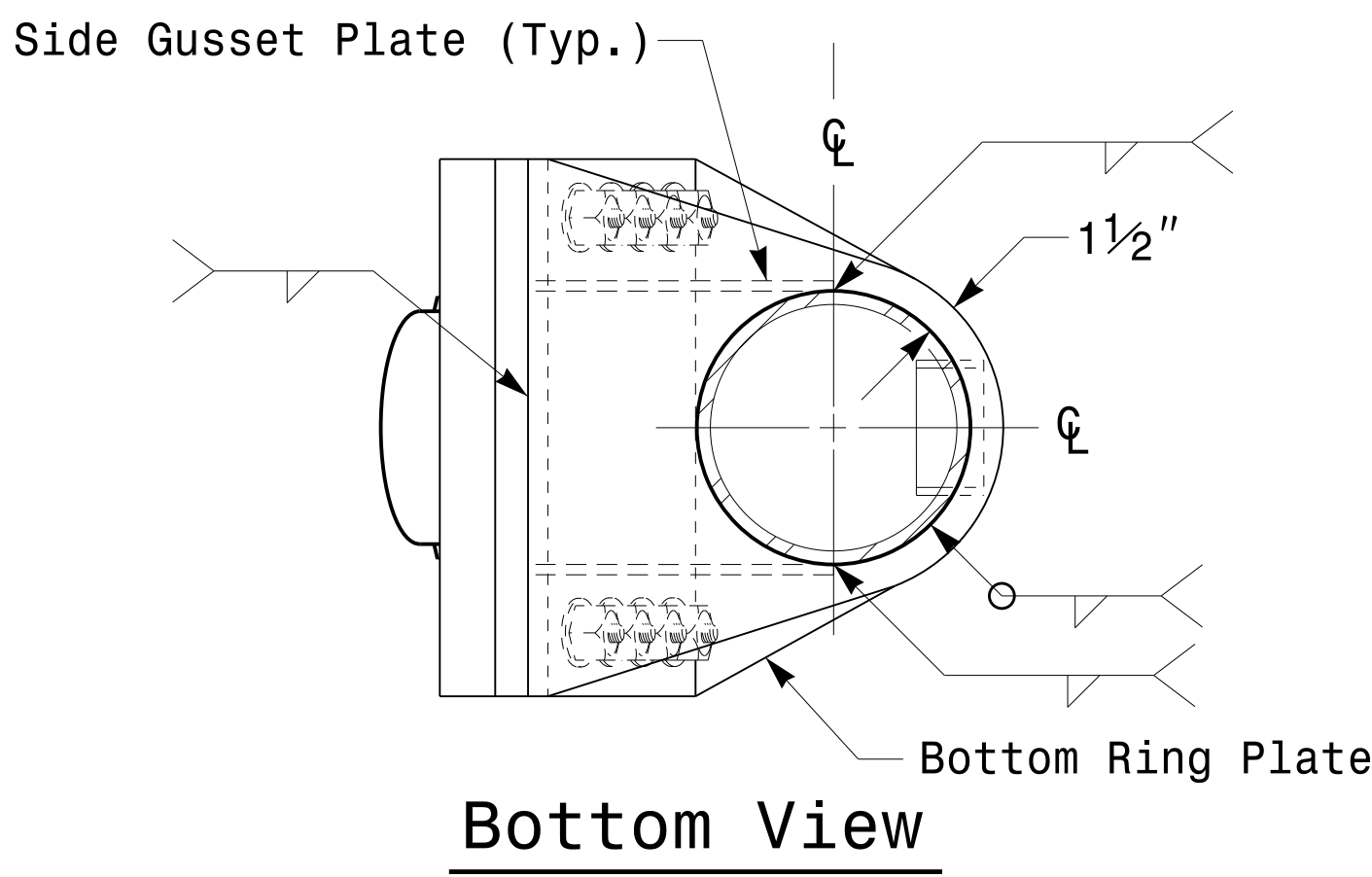
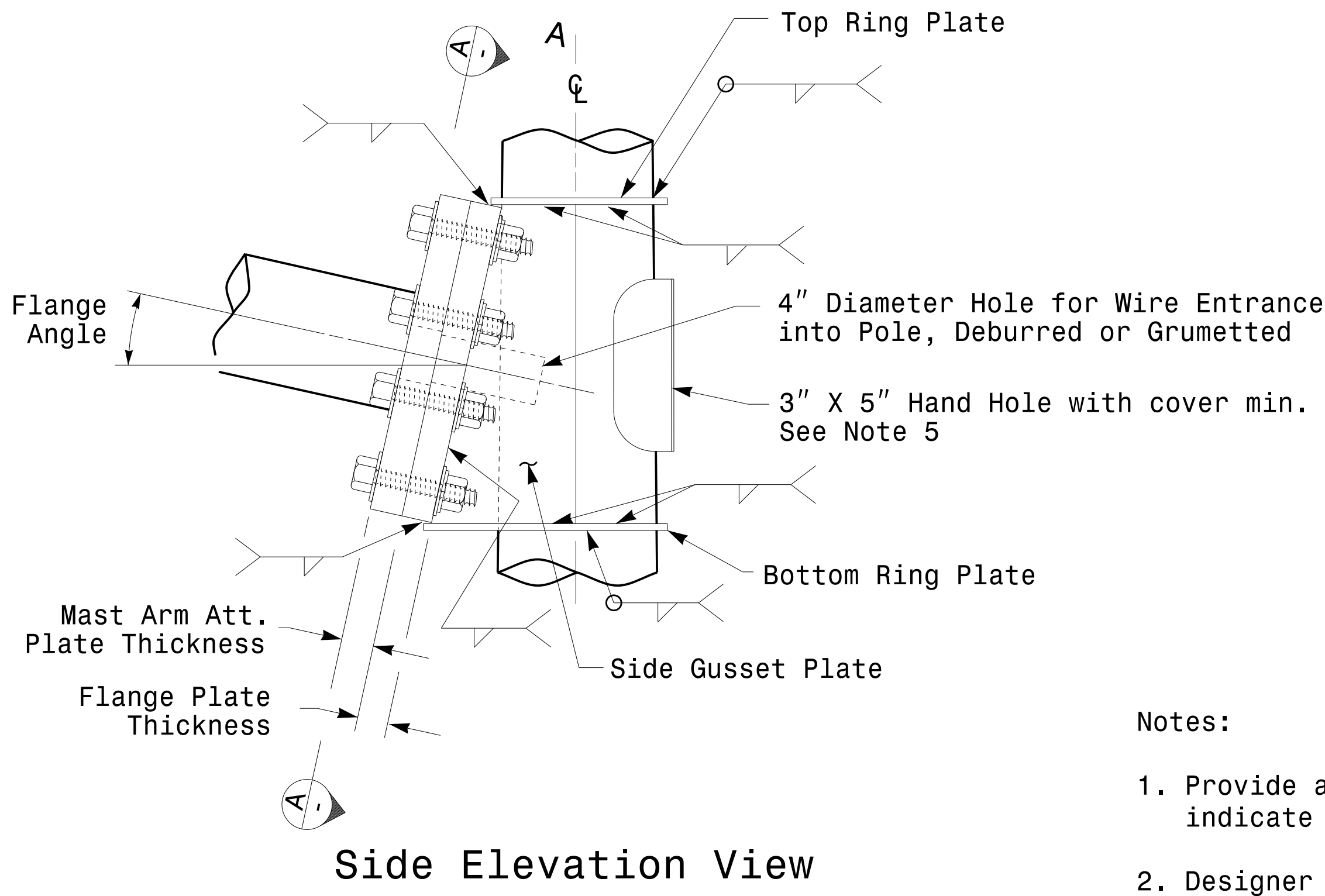
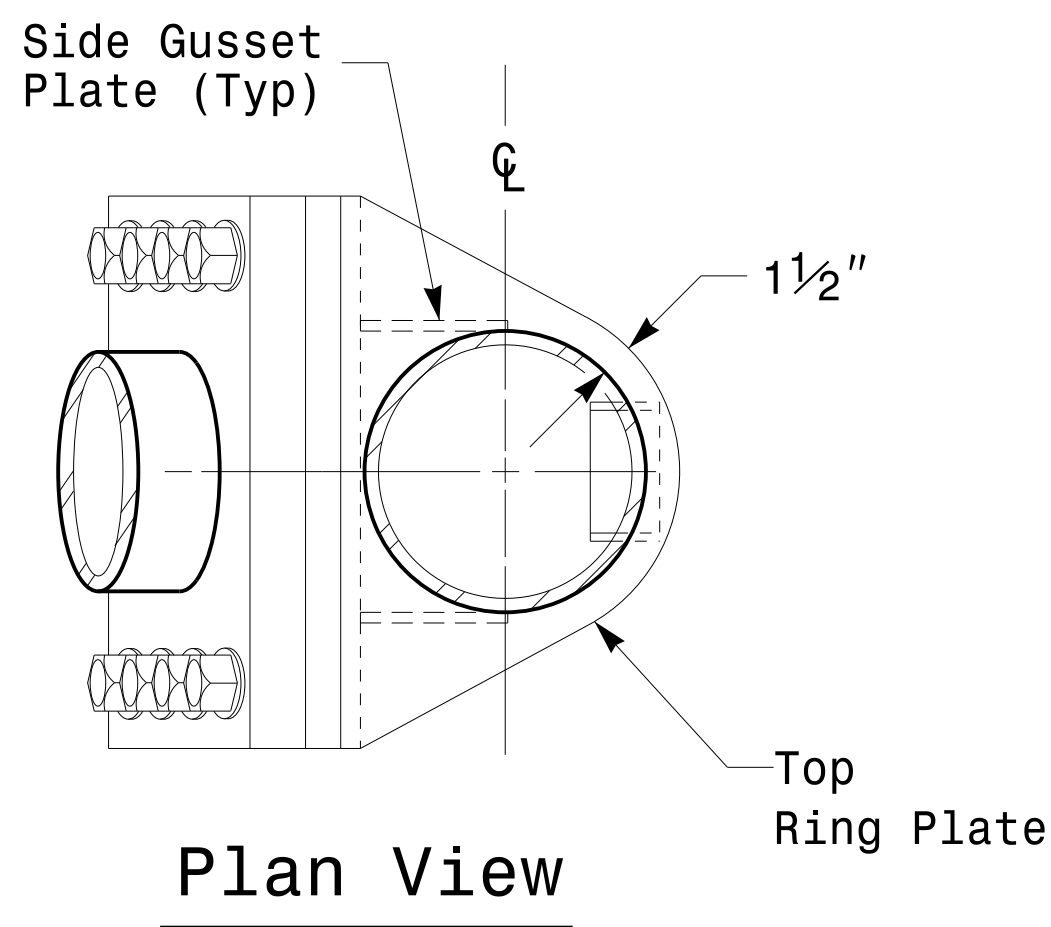
10/11/2017
DATE

1. Opening in pole base plate shall be equal to pole base inside diameter minus $3\frac{1}{2}$ " but shall not be less than $8\frac{1}{2}$ ".

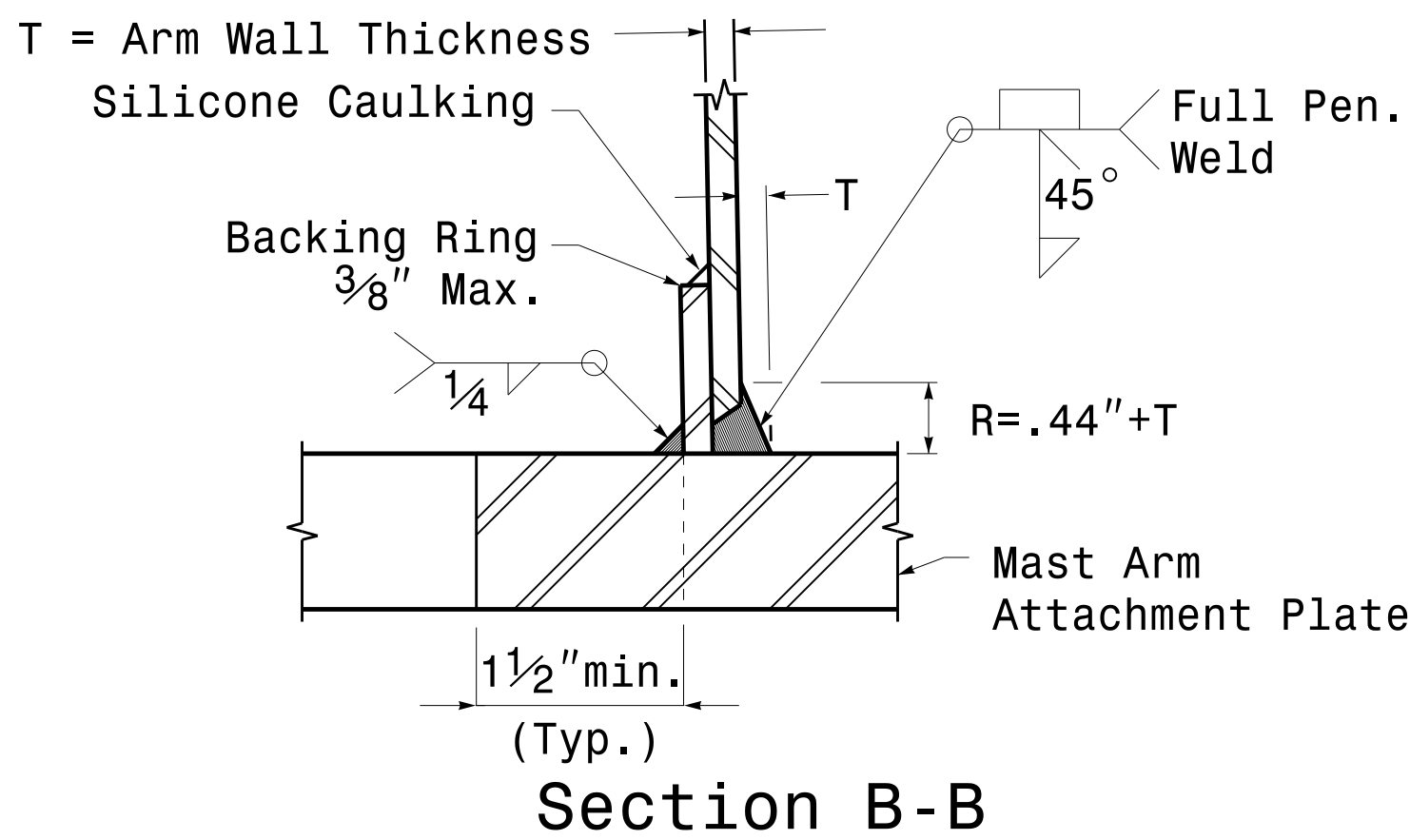
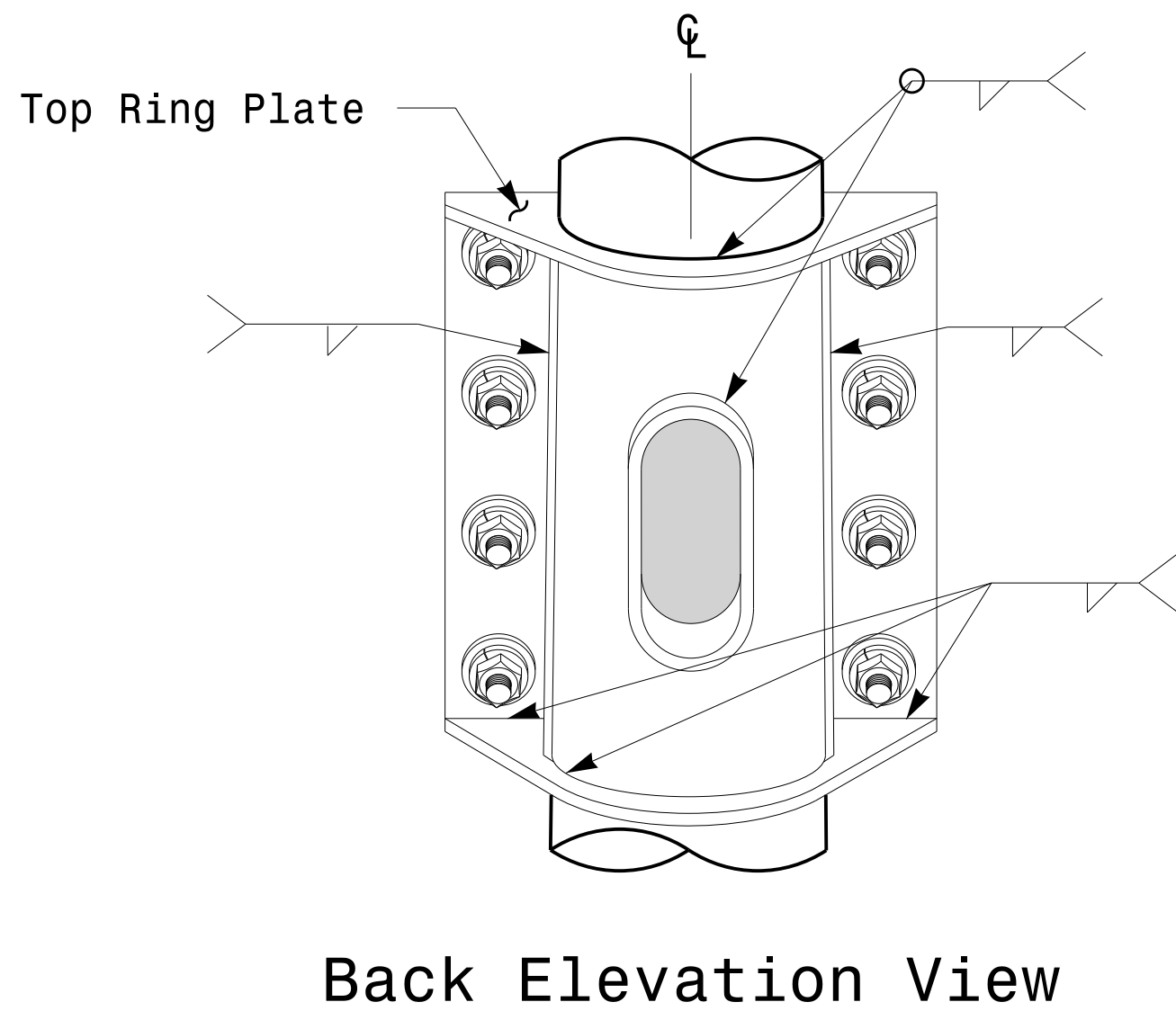


Welded Ring Stiffened Mast Arm Connection

PROJECT ID. NO.	SHEET NO.
R-2566BA	Sig.M5



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



Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

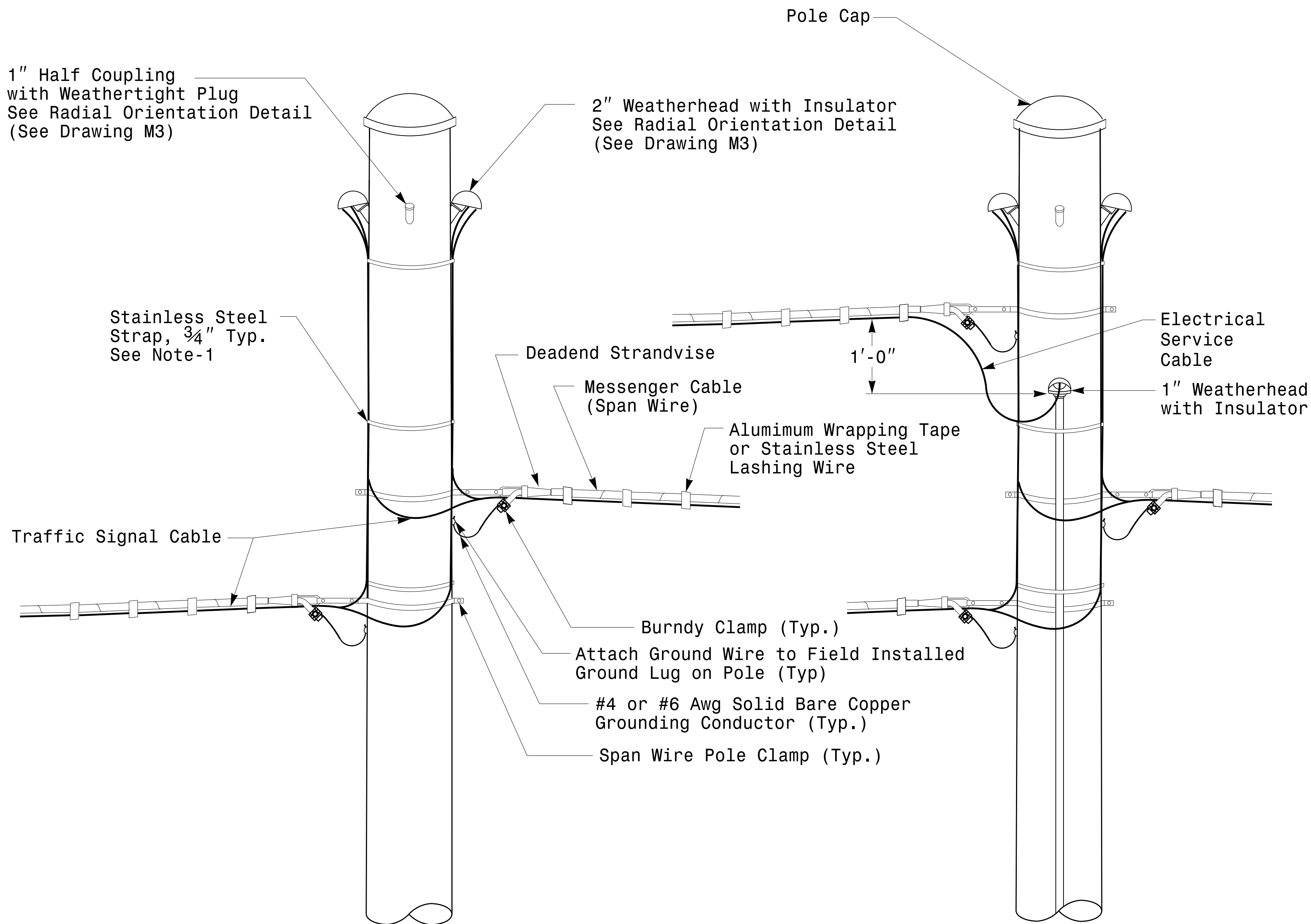
Typical Fabrication Details
For
Mast Arm Connection To Pole

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

SCALE: 0 NA NONE

SEAL

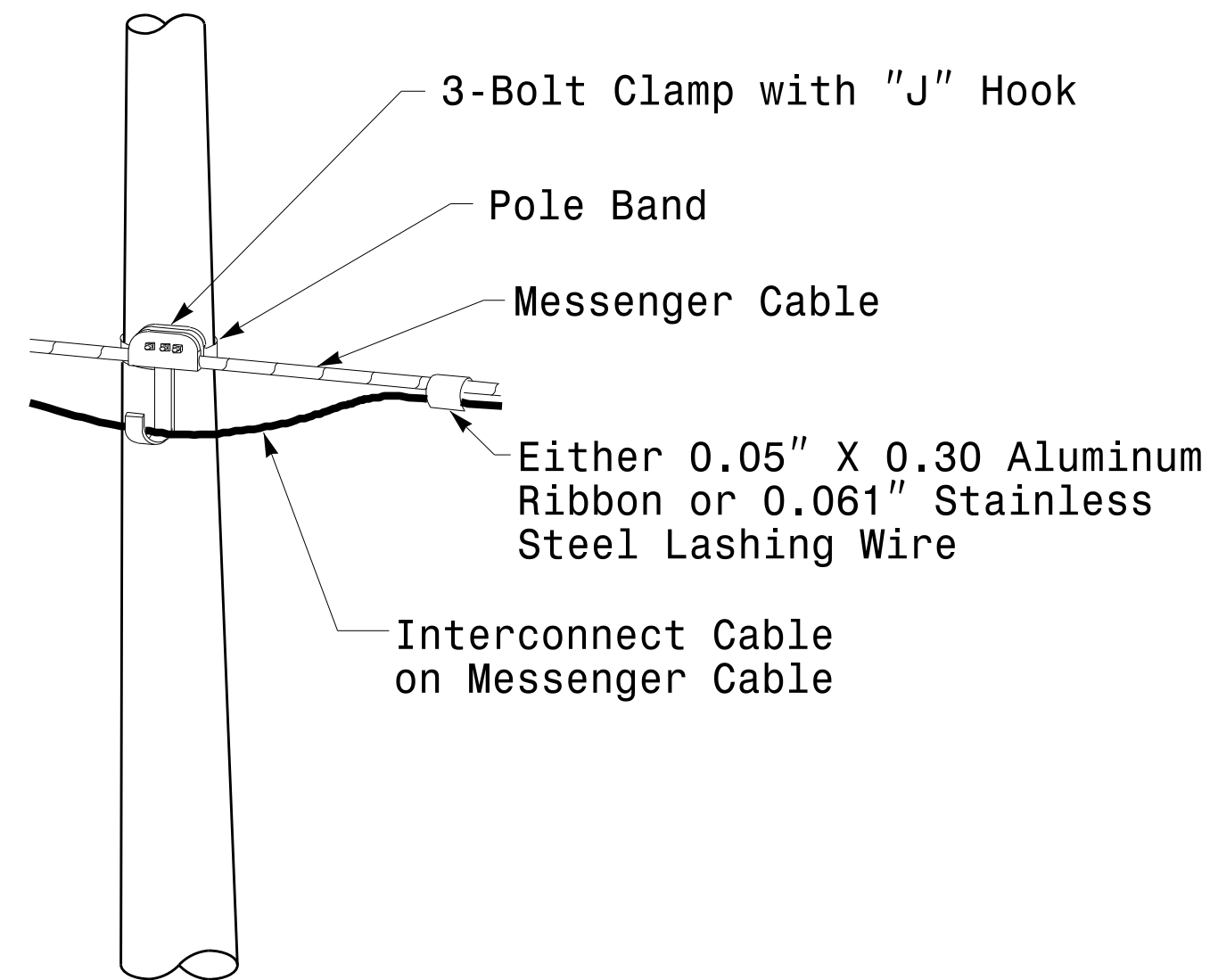
Debesh C. Sarkar
10/11/2017
DATE



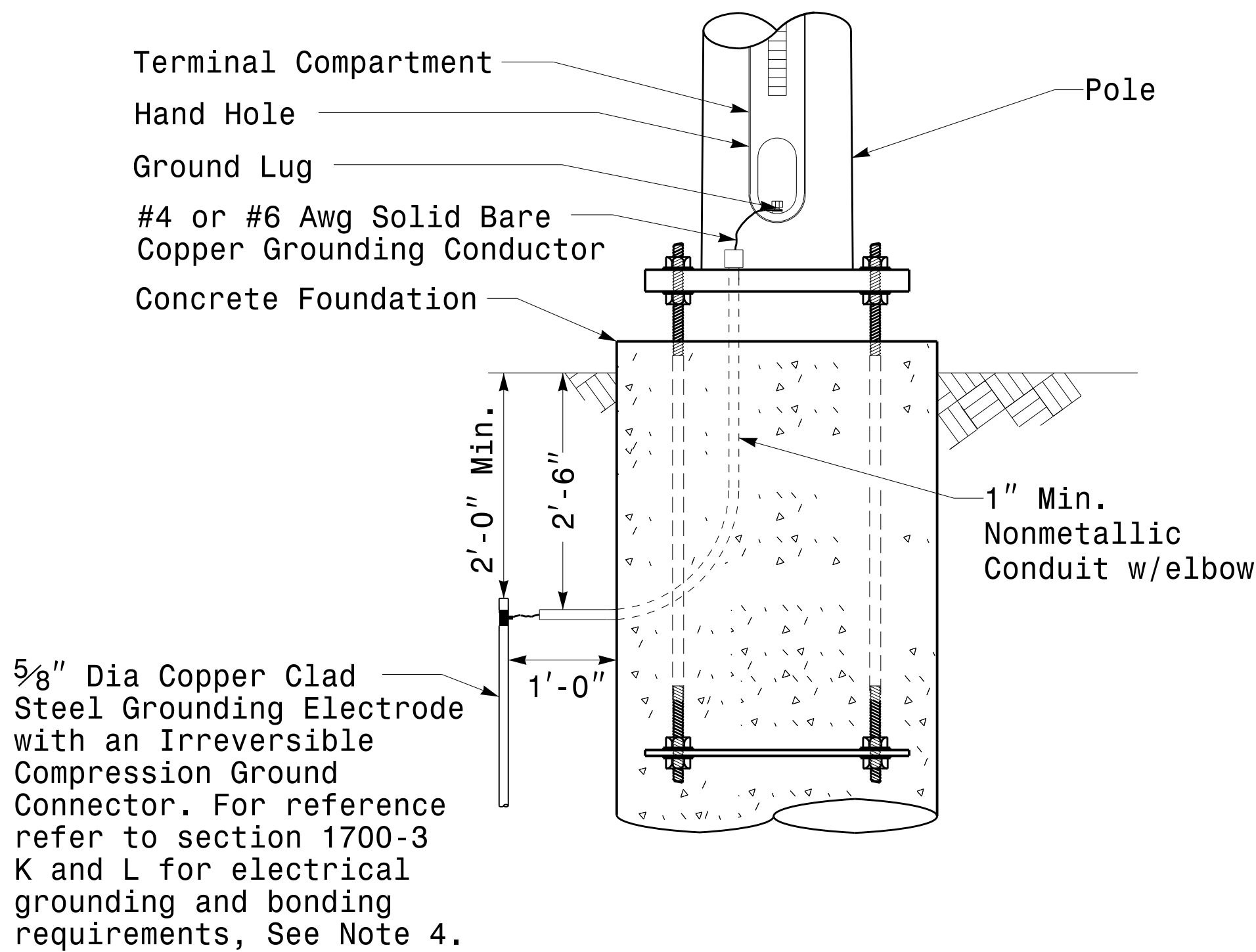
Strain Pole Attachments

NOTE:

1. Strap all signal cables to the side of the pole with 3/4" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 3'-0".
2. Provide minimum two spanwire pole clamps per pole.
3. It is prohibited to attach two span wires at one pole clamp.
4. For general requirements refer to NCDOT Standard Specifications for Roadway and Structures, January 2018.

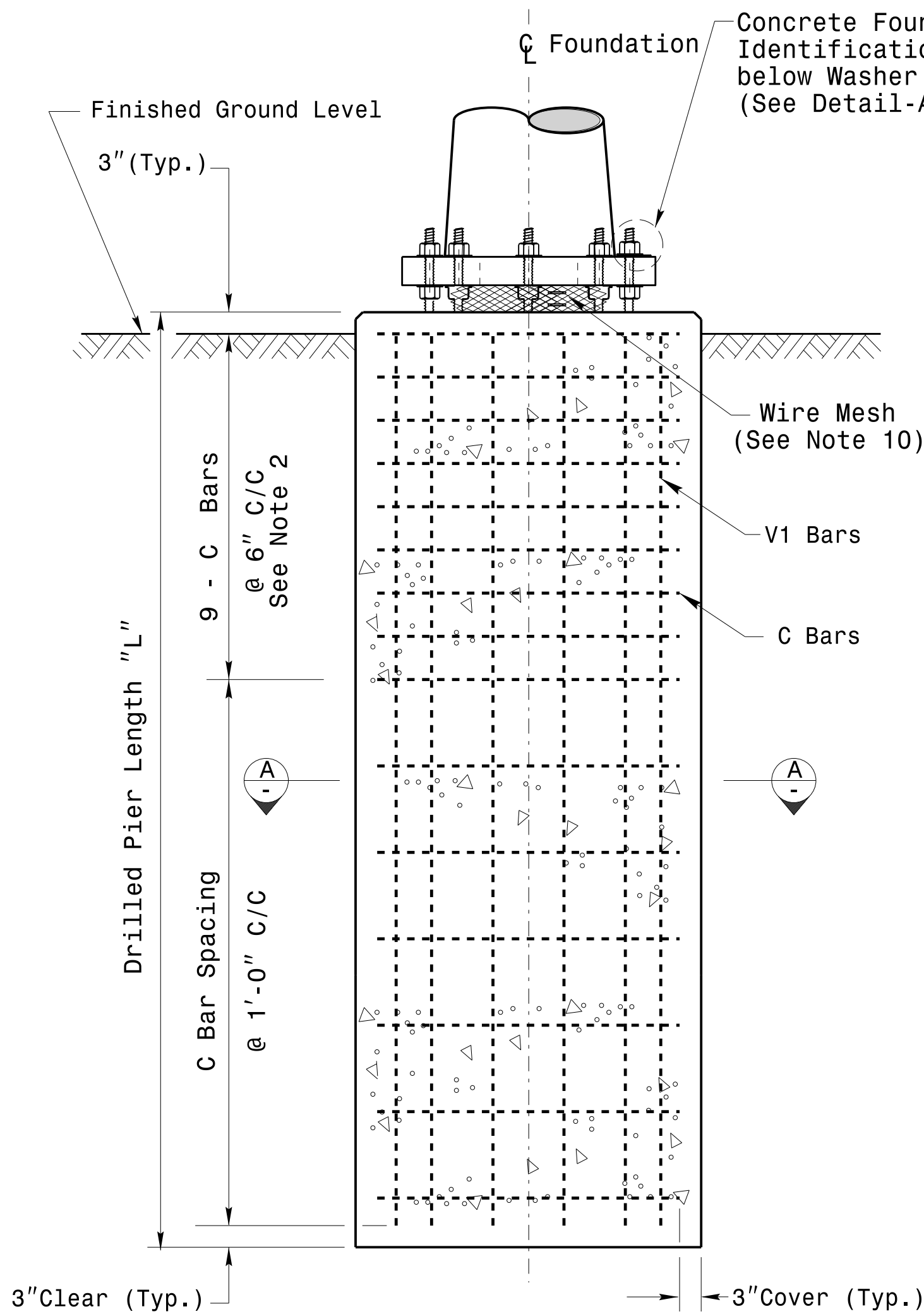


Attachment of Cable to Intermediate Metal Pole

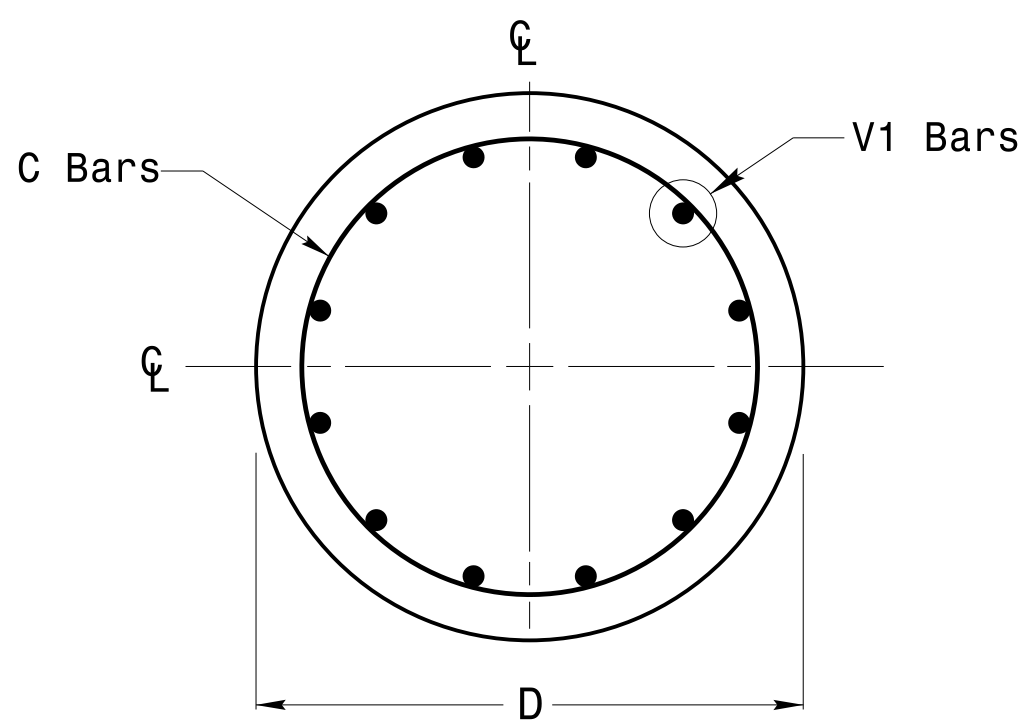


Metal Pole Grounding Detail For Strain Pole and Mast Arm

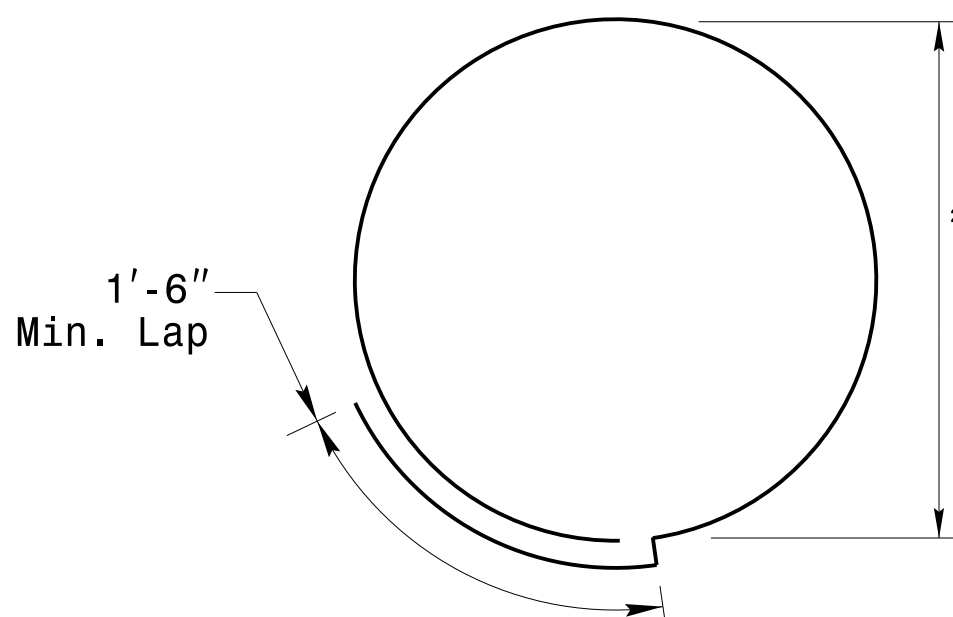
Prepared In the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	Typical Fabrication Details For Strain Pole Attachments		SEAL								
	PLAN DATE: OCTOBER 2017 DESIGNED BY: C.F. ANDREWS PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR	REVISIONS <table><tr><th>INIT.</th><th>DATE</th></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr></table>	INIT.	DATE							DocuSigned by: D. Sarkar 10/11/2017
INIT.	DATE										



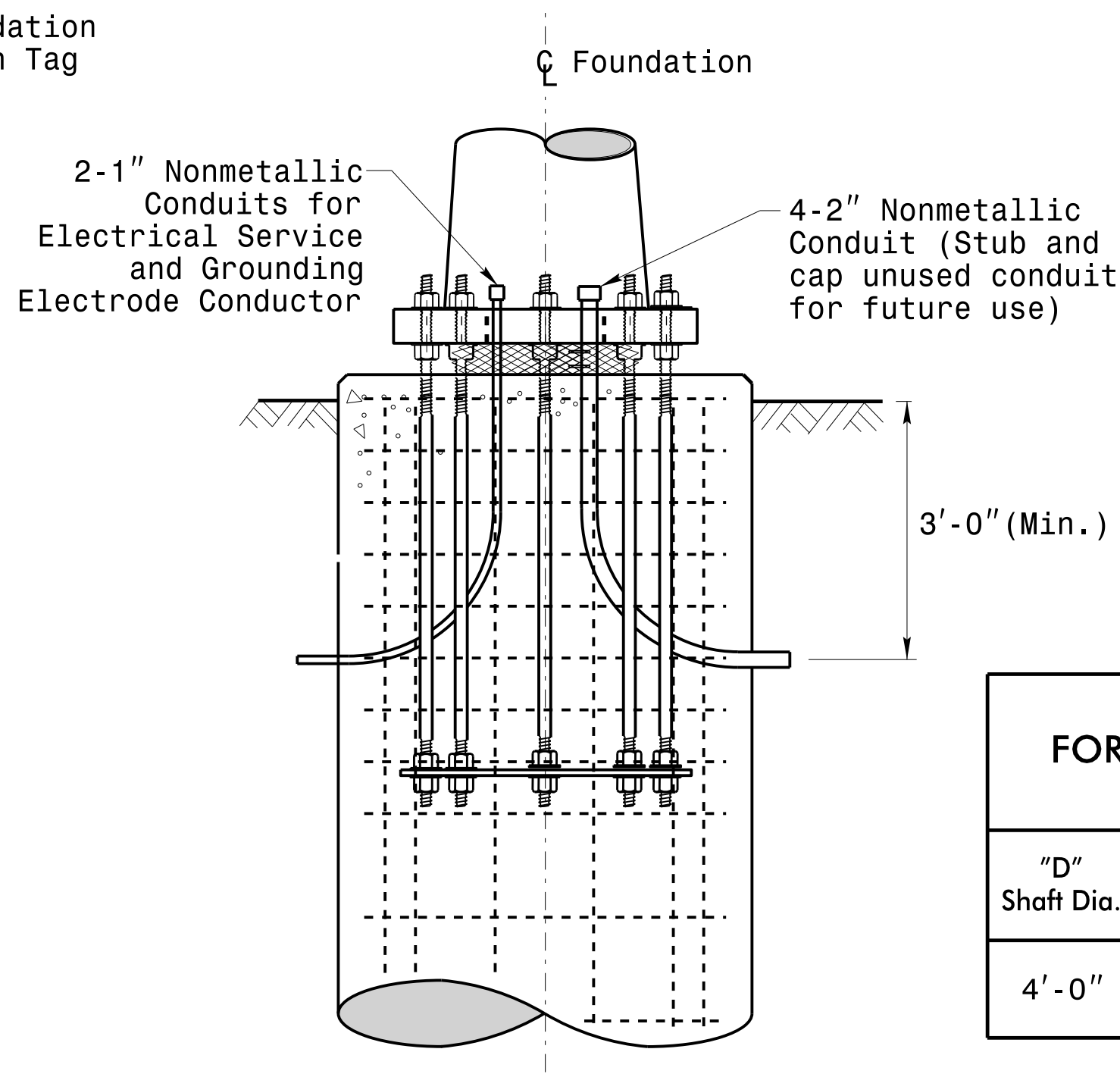
Concrete Shaft Elevation



Section A-A



Typical "C" Bar Detail



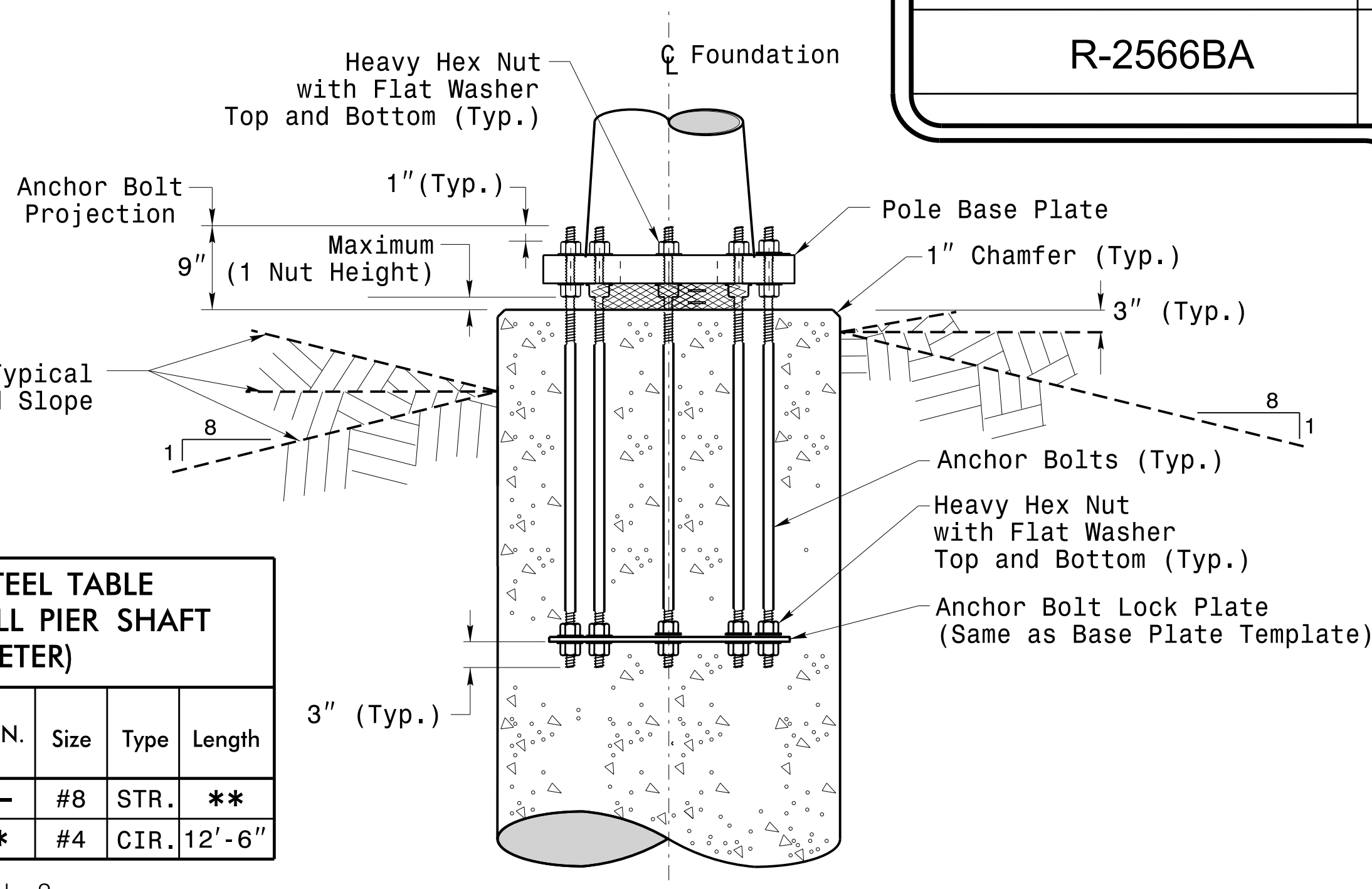
Typical Foundation Conduit Details

General Notes:

- If actual subsurface conditions differ significantly from boring data contact the Engineer before excavating or placing concrete.
- Circular tie reinforcing rings may be vertically adjusted by +/-3" at a depth between 2'-0" and 3'-0" to facilitate the installation of electrical conduit entering in the cage.
- For standard foundations, see sheet Sig. M8 for details. Vertical reinforcing bars (V1) may be horizontally adjusted by +/-3" to facilitate the installation of electrical conduit entering into the cage.
- Provide 2" to 5" foundation projection above ground level depending on the ground slope.
- Unless otherwise shown, foundation designs are based on non-sloping level ground surfaces with slope ratios of 8:1 (H:V) or flatter. If actual ground line slopes are steeper contact the Engineer before excavating or placing concrete.
- Construct foundations in accordance with NCDOT Standard Provisions SP09 R005- Foundations and Anchor Rod Assemblies for Metal Poles. All applicable 2018 NCDOT Standard Specifications are referenced in this provision. Refer to the NCDOT Resources/Specifications page located on the Connect NCDOT website.
[https://connect.ncdot.gov/resources/Specifications and Special Provisions.aspx](https://connect.ncdot.gov/resources/Specifications%20and%20Special%20Provisions.aspx)
- Use air entrained AA concrete mix with a compression strength of f'c=4500 psi.(min.) after 28 days.
- Use ASTM A615 grade 60 deformed bars for all reinforcing steel. Maintain at least 3" cover on all reinforcement.
- Locate the Identification Tag on the top of the base plate, directly above the conduit's entry point.
- Provide two layers of galvanized welded 23 gauge (0.25) 6" wide 4 mesh wire around pipes under the base plate and secure it with ties if necessary.
- Preferred location for the I.D. Tag is as shown in Detail-A; directly above the conduit entering the foundation.

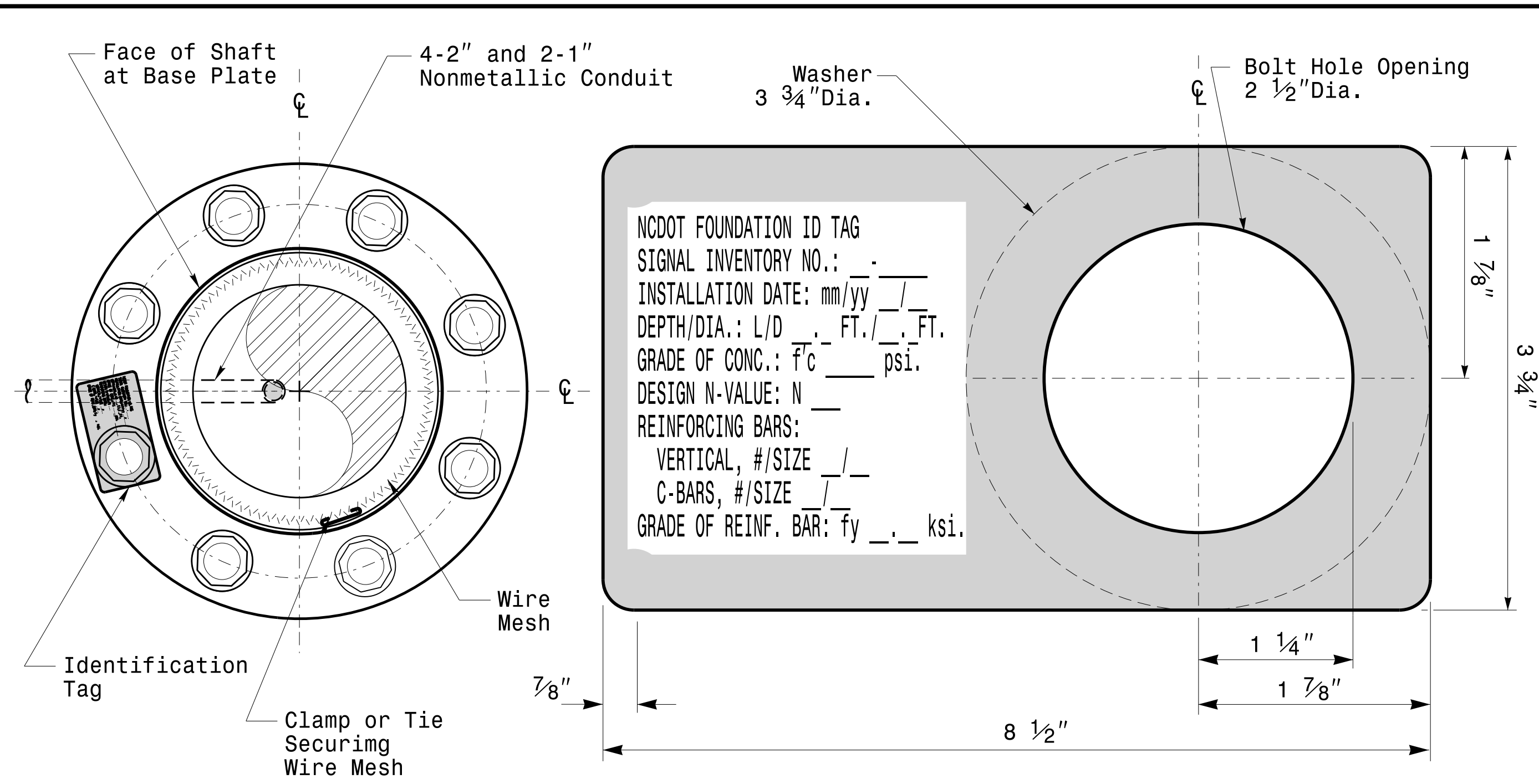
REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (4'-0" DIAMETER)						
"D" Shaft Dia.	Conc. Volume (cu. yds.)	Bar Name	MIN.	Size	Type	Length
4'-0"	.465 x L	V1	—	#8	STR.	**
		C	*	#4	CIR.	12'-6"

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



Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Concrete Foundation Identification Tag Details

Detail-A

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

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

Construction Details For Foundations
PLAN DATE: OCTOBER 2018
DESIGNED BY: C.B. COGDILL
PREPARED BY: N. BITTING
REVIEWED BY: D.C. SARKAR
REV. NO. 1
COMMENTS Revised Foundation Tag Details
INIT. N.B.
DATE 5/11/2015

SEAL
NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL 028094
DIPESH C. SARKAR
DocuSigned by:
Dipesh C. Sarkar
44EB3251C8A7EURE
10/11/2017
DATE

SOIL CONDITION

PROJECT ID. NO.	SHEET NO.
R-2566BA	Sig.M8

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

General Notes:

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

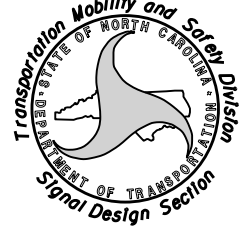
Foundation Selection:

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

Standard Strain Pole Foundation–All Soil Condition

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

Prepared In the Office of:



750 N. Greenfield Pkwy, Garner, NC 27529

SCALE

0 NA

NONE

Standard Strain Pole Foundation for All Soil Conditions

PLAN DATE: OCTOBER 2017

DESIGNED BY: C.B. COGDILL

PREPARED BY: N. BITTING

REVIEWED BY: D.C. SARKAR

REVISIONS

Changed "Foundation Depth" to "Drilled Pier Length" in Conc. Exp.

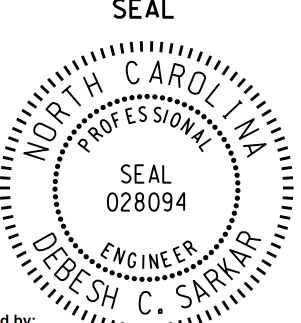
INIT.

DATE

N.B.

7/12/2015

SEAL



DocuSigned by: D. C. Sarkar

10/11/2017

DATE