

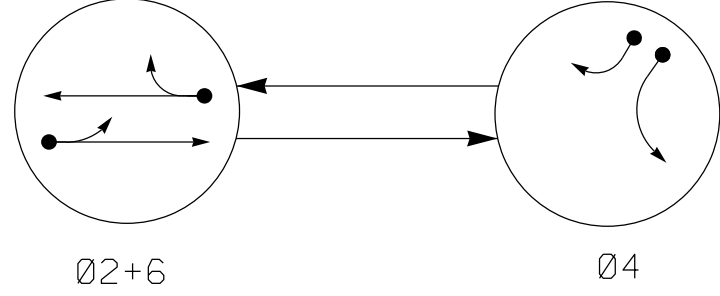
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2 Phase Fully Actuated Isolated

PHASING DIAGRAM



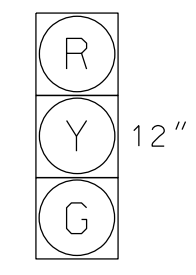
PHASING DIAGRAM DETECTION LEGEND

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

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

SIGNAL FACE I.D.

All Heads L.E.D.

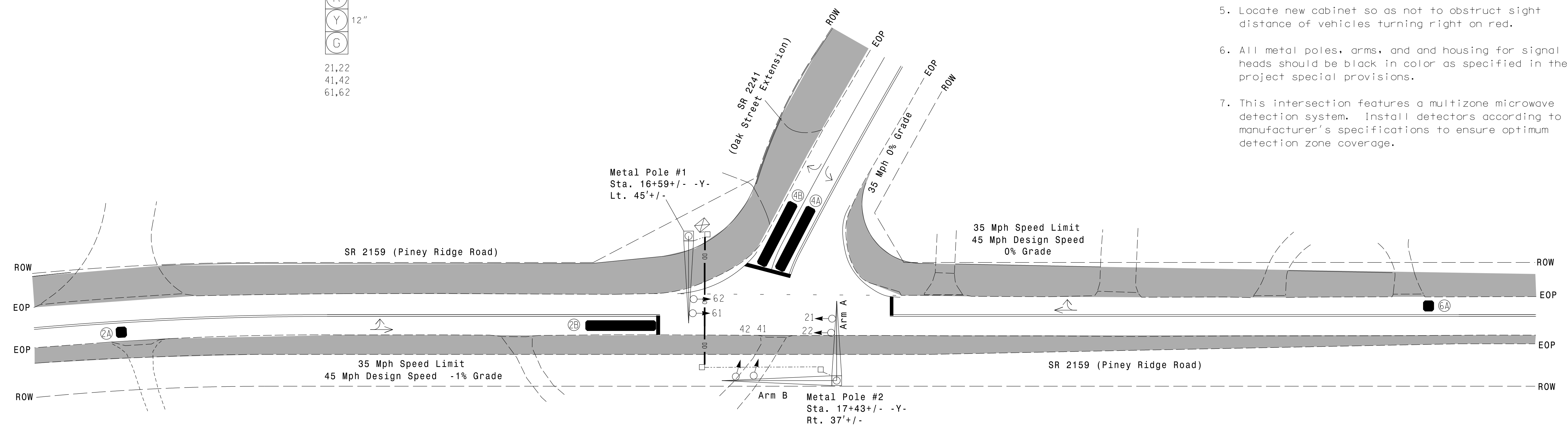


21,22
41,42
61,62

RADAR DETECTION SYSTEM		
FUNCTION	Sensor 1 (2A)	Sensor 2 (6A)
Channel	1	2
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	100-500	100-500
Enable Speed	Y	Y
Speed Range (mph)	35-100	35-100
Enable Estimated Time of Arrival	Y	Y
Estimate Time of Arrival (sec)	2.5-6.5	2.5-6.5

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	*	300	*	Y	2	Y	Y	-	-	-	-
2B	*	0	*	Y	2	Y	Y	2.0	5	-	-
4A	*	0	*	Y	4	Y	Y	-	3	-	-
4B	*	0	*	Y	4	Y	Y	-	15	-	-
6A	*	300	*	Y	6	Y	Y	-	-	-	-

* Multizone Microwave Detection Zones



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.
- All pavement markings are existing.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- All metal poles, arms, and and housing for signal heads should be black in color as specified in the project special provisions.
- This intersection features a multizone microwave detection system. Install detectors according to manufacturer's specifications to ensure optimum detection zone coverage.

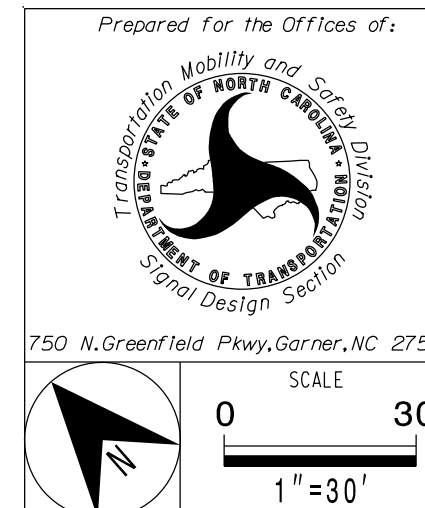
OASIS 2070 TIMING CHART			
FEATURE	PHASE		
	2	4	6
Min Green 1 *	12	7	12
Extension 1 *	6.0	2.0	6.0
Max Green 1 *	90	30	90
Yellow Clearance	4.6	3.0	4.5
Red Clearance	1.7	1.8	1.6
Red Revert	2.0	2.0	2.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	2.5	-	2.5
Max Variable Initial *	34	-	34
Time Before Reduction *	15	-	15
Time To Reduce *	30	-	30
Minimum Gap	3.0	-	3.0
Recall Mode	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	YELLOW
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

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

LEGEND	
PROPOSED	EXISTING
○ → Traffic Signal Head	● → Traffic Signal Head
→ Sign	→ Sign
▬ Multizone Microwave Detection	N/A
☒ Controller & Cabinet	☒ Controller & Cabinet
□ Junction Box	■ Junction Box
--- 2-in Underground Conduit	--- 2-in Underground Conduit
N/A Right of Way	--- Right of Way
→ Directional Arrow	→ Directional Arrow
☑ Metal Pole with Mastarm	☑ Metal Pole with Mastarm
— DD — Directional Drill	N/A
■ Construction Zone	N/A

NC Dept of Transportation
Division of Highways
Final Drawing Date: 1/12/2018
Designed by: R. N. Zinner
ITS & Signals Unit

Signal Upgrade-Temporary Design



SR 2159 (Piney Ridge Road) at SR 2241 (Oak Street Extension)	
Division 13 Rutherford County	Forest City
PLAN DATE: Dec. 2017	REVIEWED BY: J. L. Lewis
PREPARED BY: J. Ma	VHB PROJECT NO.: 38536.09
REVISIONS	INIT. DATE

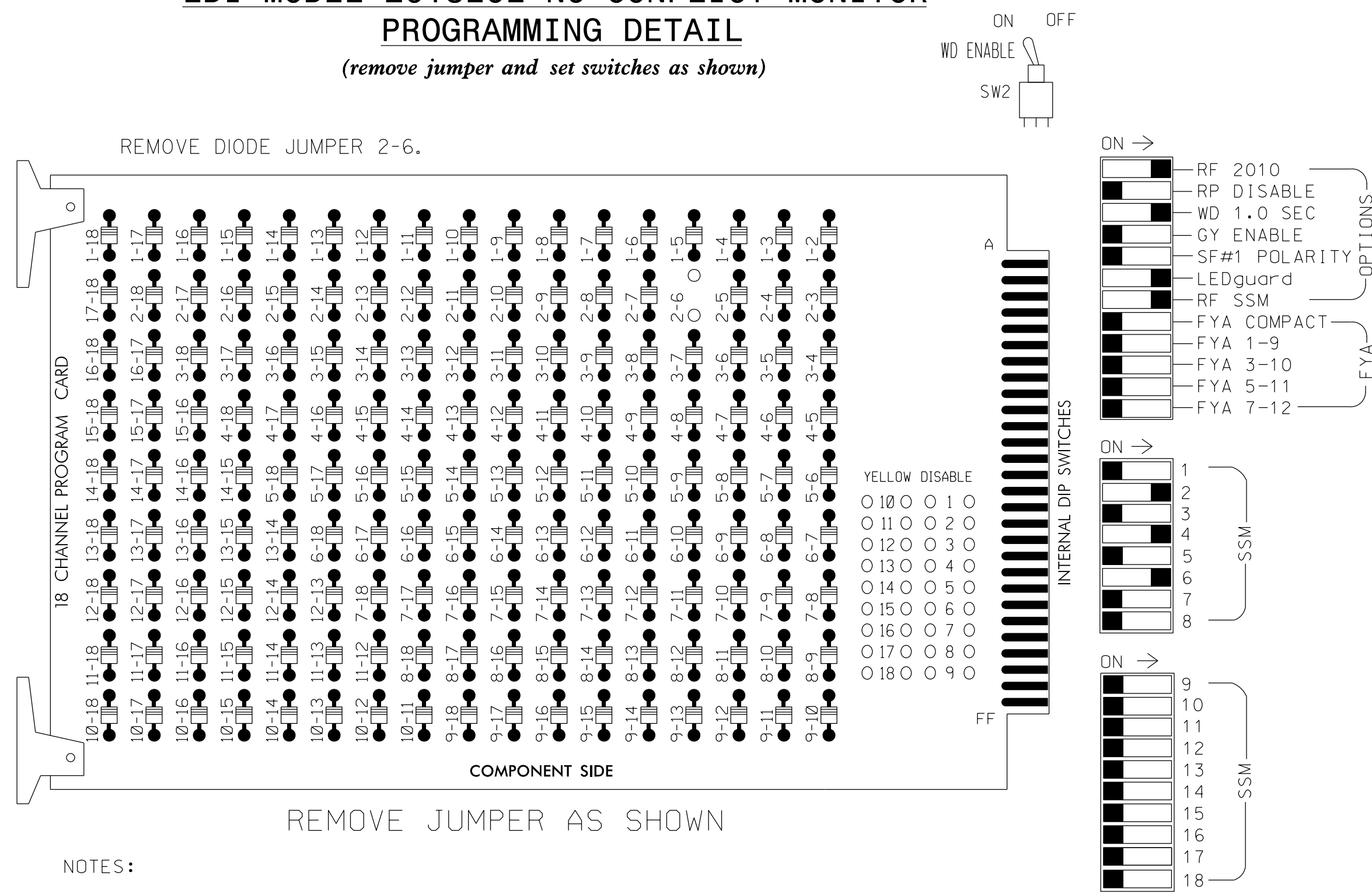
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SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
JIANXIN MA
2017.12.15
10:06:12 -05'00'

SIGNATURE DATE
SIG. INVENTORY NO. 13-1241T

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



NOTES:

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

NOTES

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

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	NU	NU	61,62	P61, P62	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134										
YELLOW		129			102			135										
GREEN		130			103			136										
RED ARROW																		
YELLOW ARROW																		
FLASHING YELLOW ARROW																		
GREEN ARROW																		

NU = Not Used

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,S8
 PHASES USED.....2,4,6
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

SPECIAL DETECTOR NOTE

Install a multizone microve detection zone 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.

NC Dept of Transportation
 Division of Highways
 Final Drawing Date: 1/12/2018
 ITS & Signals Unit
 (Signature: R. N. Zinner)

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 13-1241T
 DESIGNED: Dec. 2017
 SEALED: 12/15/2017
 REVISED: N/A

Electrical Detail-Temporary Design

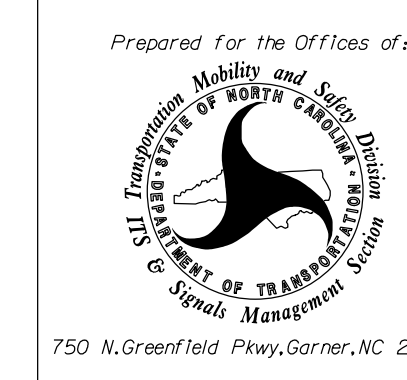
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ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 2159 (Piney Ridge Road) at SR 2241 (Oak Street Extension)

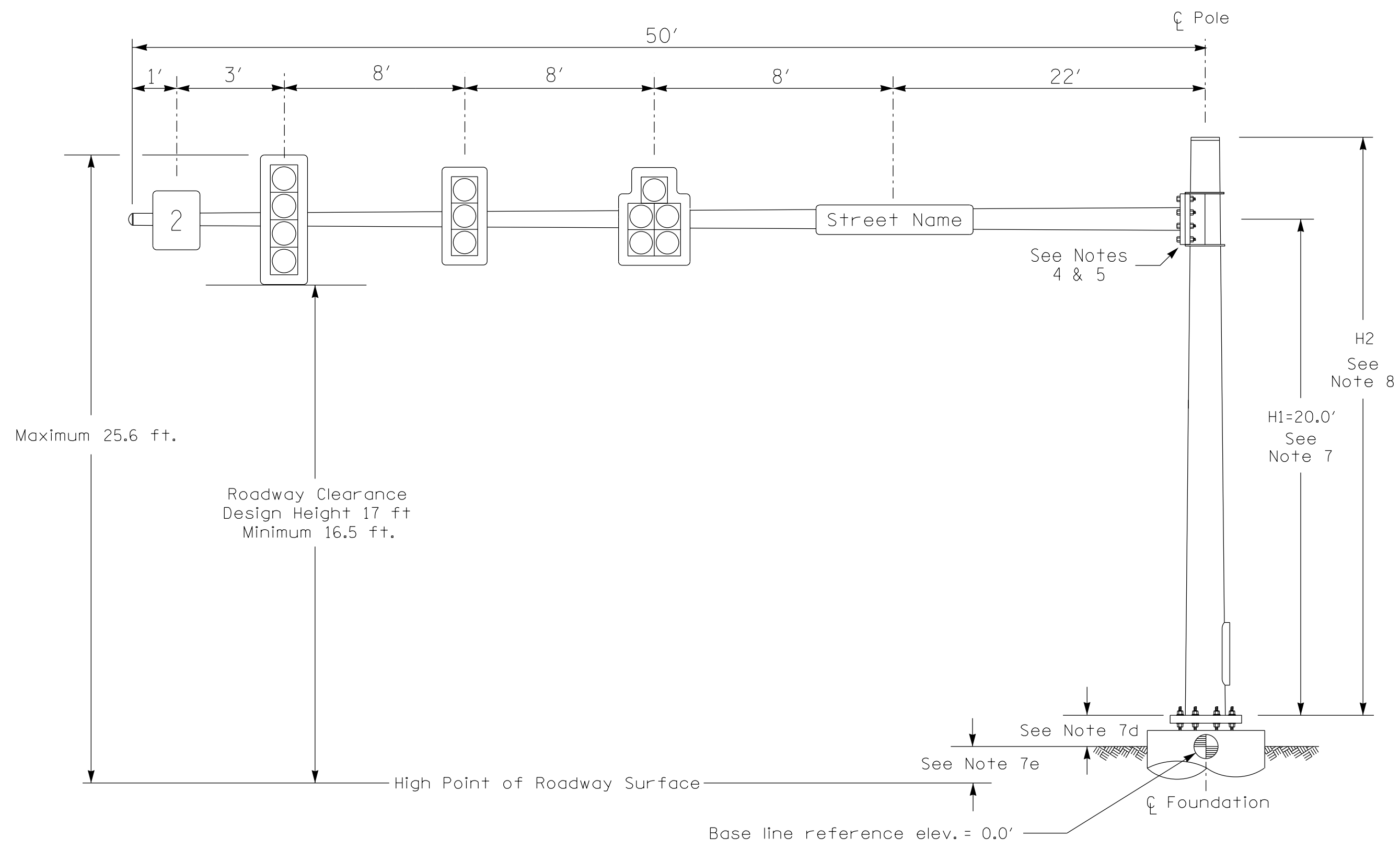
Prepared for the Offices of:
 Division 13 Rutherford County Forest City
 PLAN DATE: Dec. 2017 REVIEWED BY: J.L. Lewis
 PREPARED BY: J. Ma VHB PROJECT NO.: 38536.09

REVISIONS: _____ INIT. DATE _____

SEAL: 033108
 PROFESSIONAL ENGINEER
 JIANXIN MA
 2017.12.15
 SIGNATURE: _____ DATE: 10:09:55-05'00"
 SIG. INVENTORY NO. 13-1241T



Design Loading for METAL POLE NO. 1



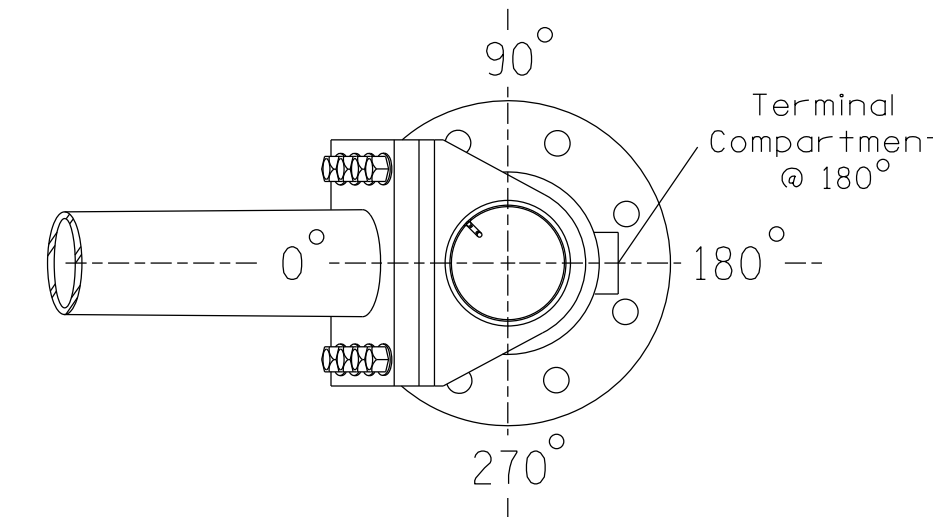
Elevation View

SPECIAL NOTE

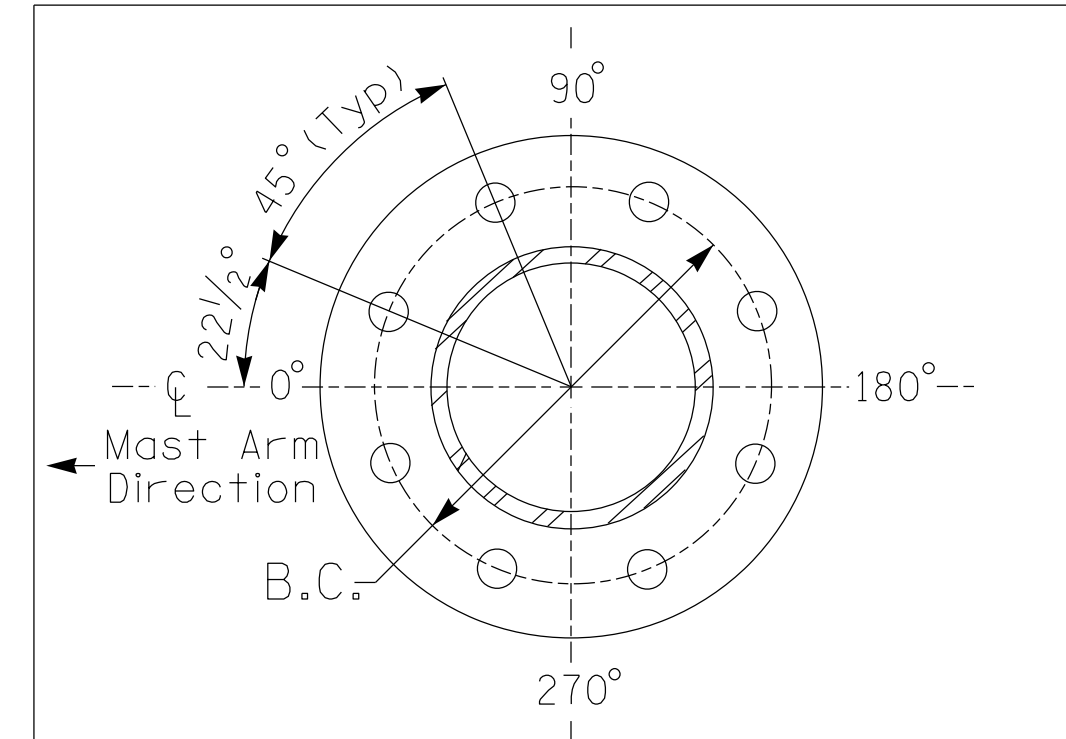
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+0.5 ft.
Elevation difference at Edge of travelway or face of curb	+0.2 ft.

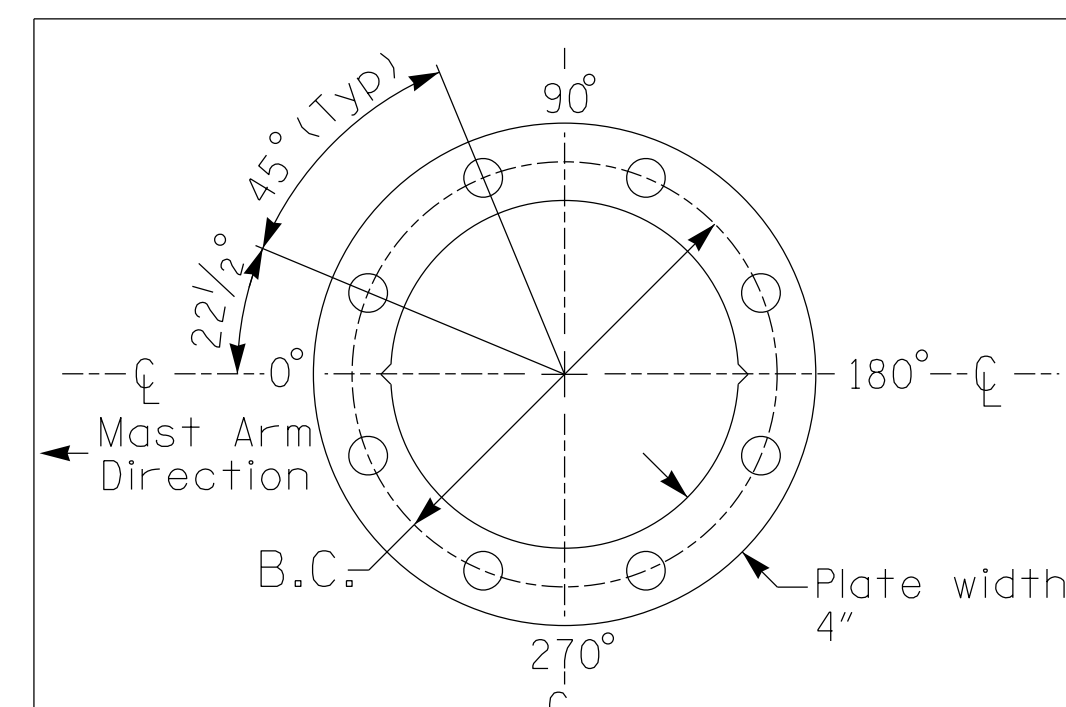


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



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

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
U-5883	Sig 1.2

MAST ARM LOADING SCHEDULE

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

NOTES

DESIGN REFERENCE MATERIAL

- Design the traffic signal structure and foundation in accordance with:
 - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
 - The 2018 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

DESIGN REQUIREMENTS

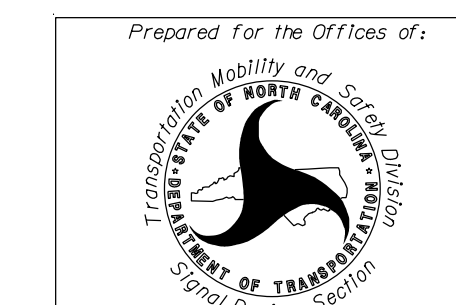
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the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

All metal poles and arms, pedestals, and signal head housings should be black in color as specified in the project special provisions.



940 Main Campus Drive, Suite 500
Raleigh, NC 27606
NC License No. C-3705
919.829.0328

NCDOT Wind Zone 4 (90 mph)



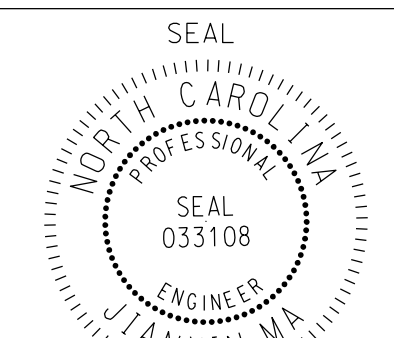
Prepared for the Offices of:
SR 2159 (Piney Ridge Road)
at
SR 2241 (Oak Street Extension)

Division 13 Rutherford County Forest City
PLAN DATE: Dec. 2017 REVIEWED BY: J. L. Lewis
PREPARED BY: J. Ma VHB PROJECT NO.: 38536.09

REVISIONS	INIT.	DATE

SCALE
0 N/A
N/A

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SIG. INVENTORY NO. 13-1241T

NC Dept of Transportation
Division of Highways

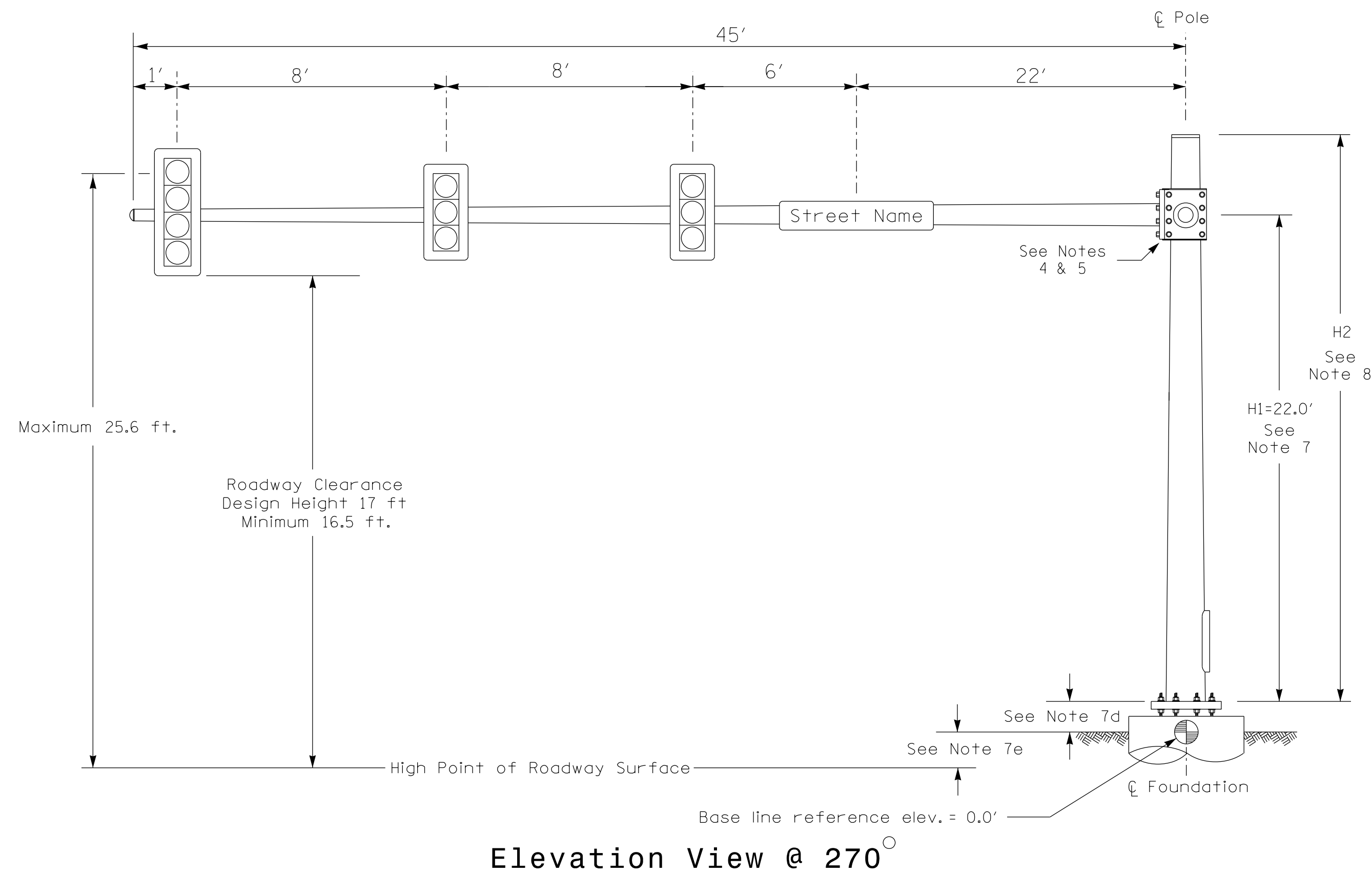
Final Drawing Date: 1/12/2018

DocuSigned by:
R. N. Zinner
F1388673472248F

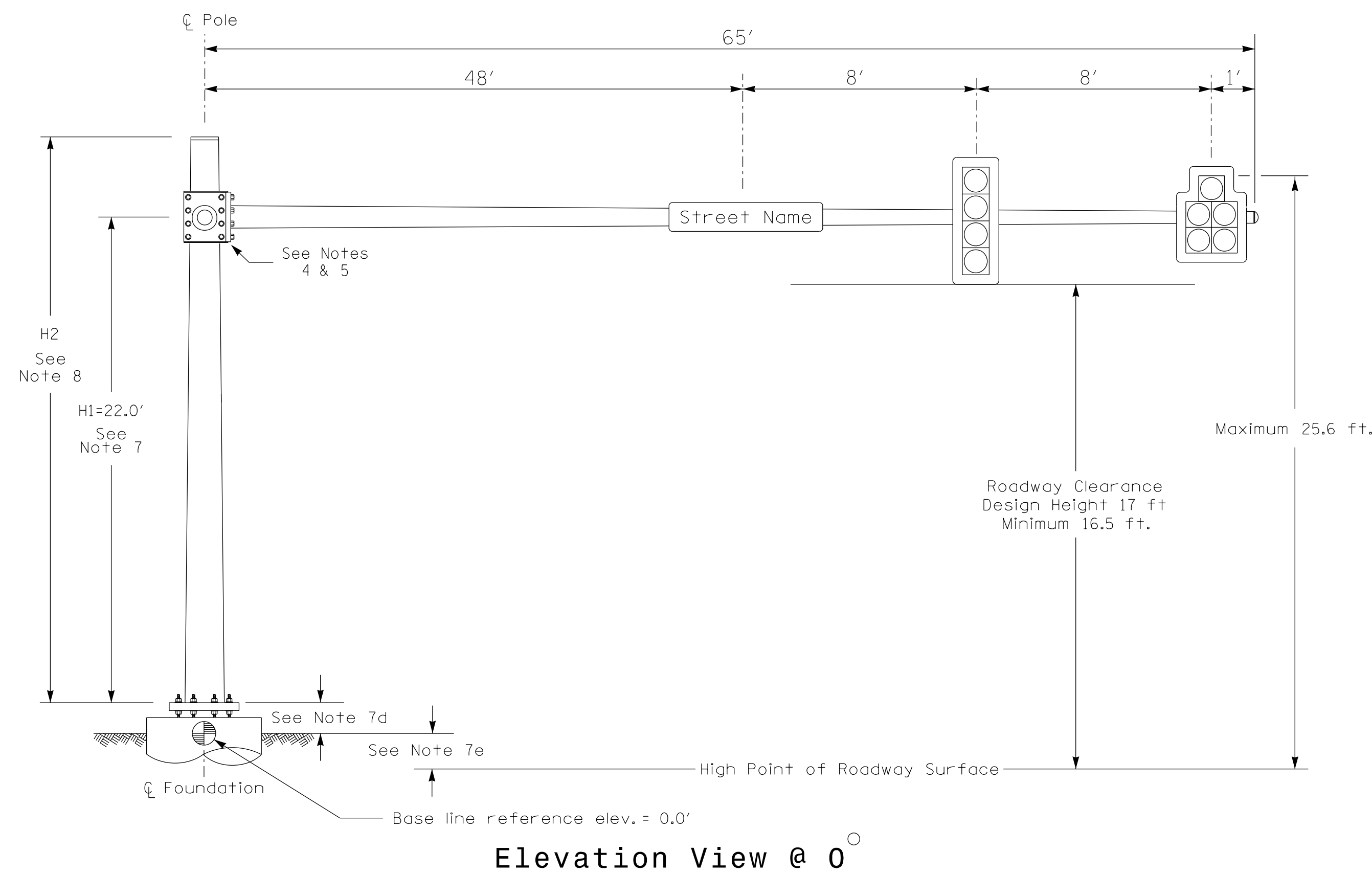
ITS & Signals Unit

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



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

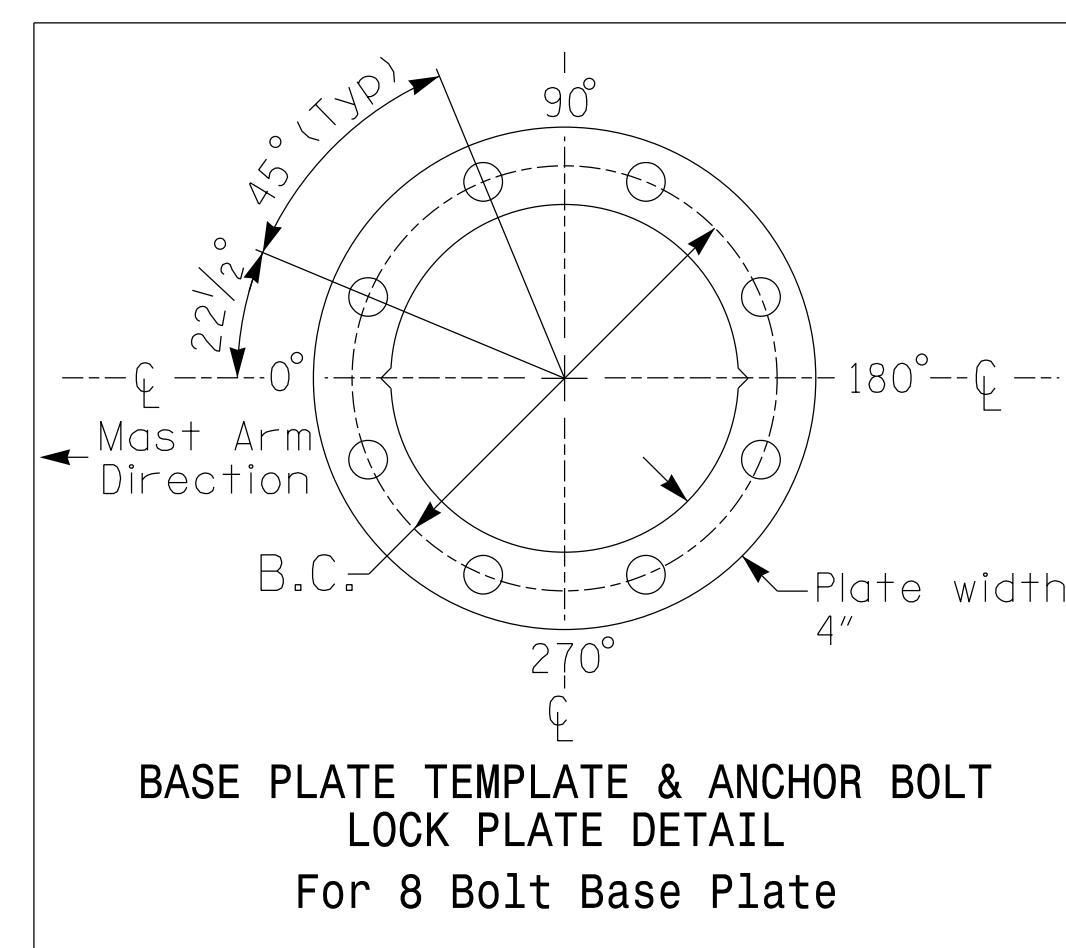
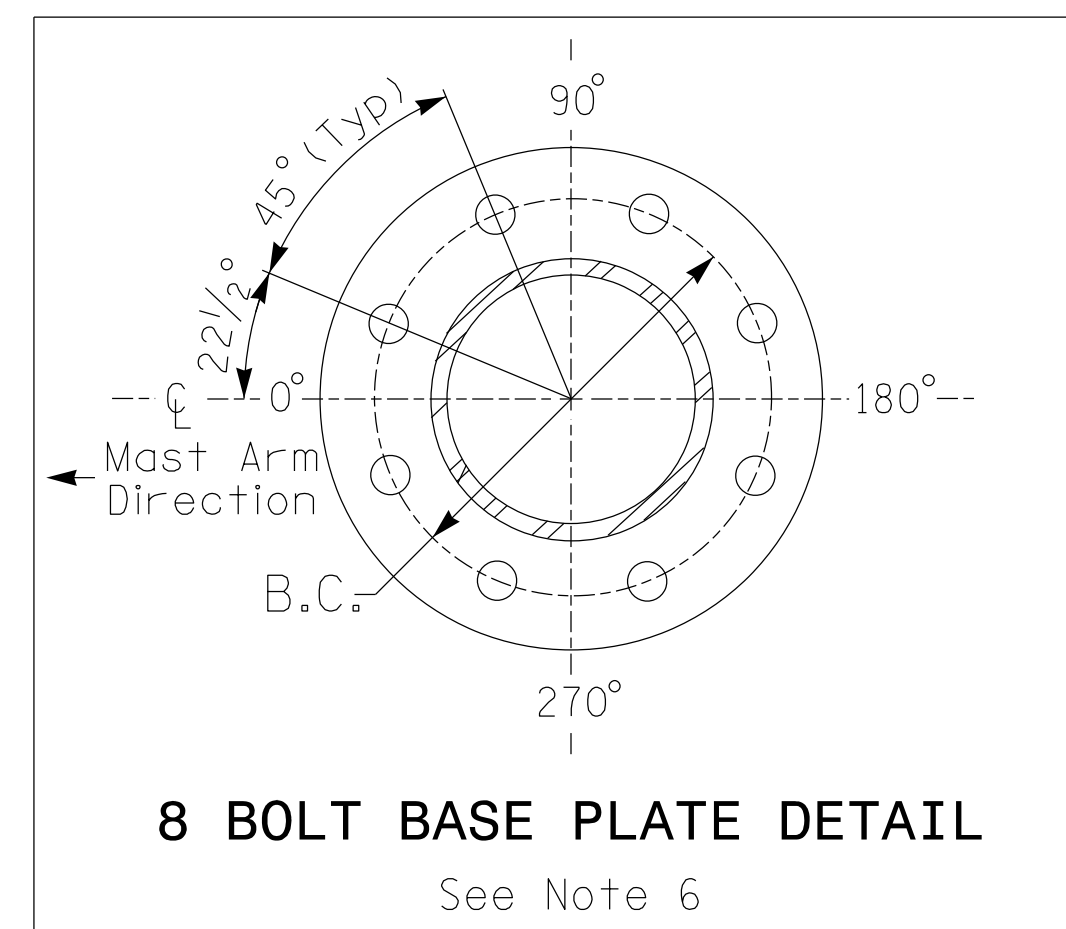
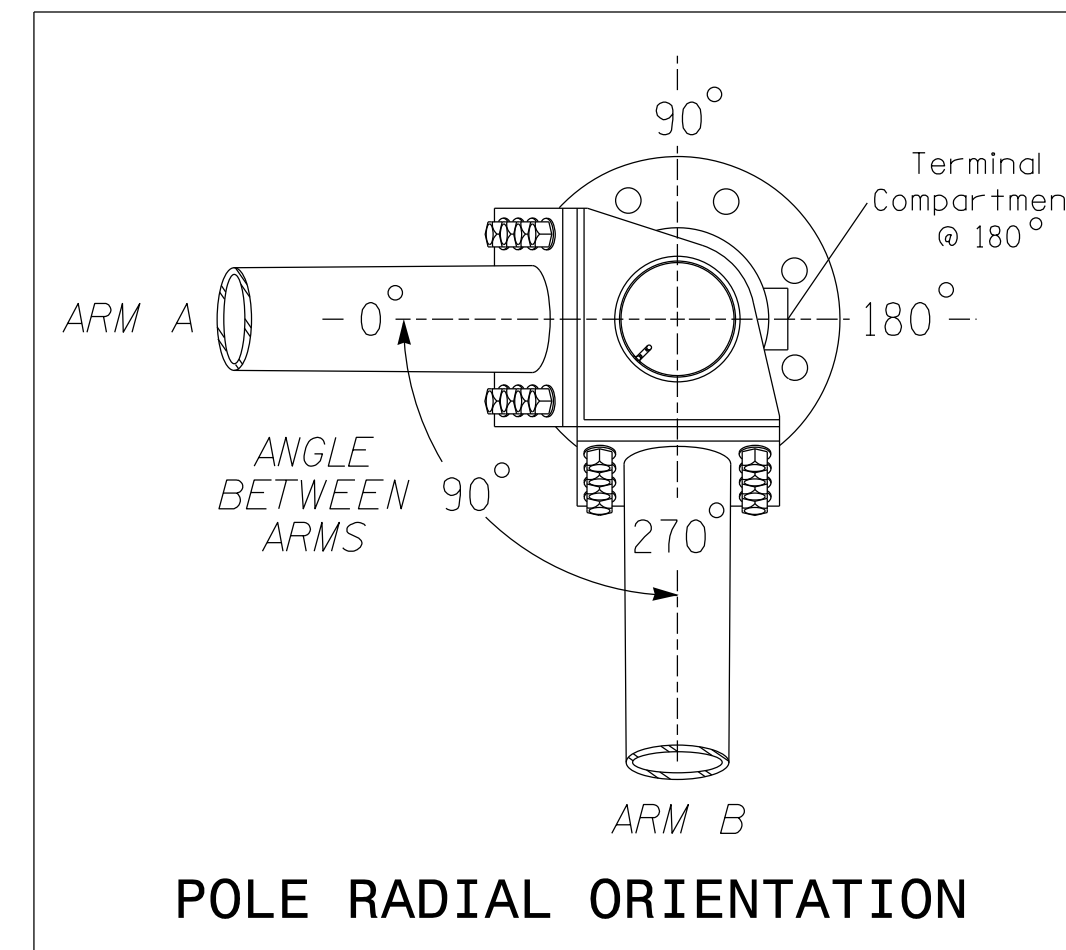


SPECIAL NOTE

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

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+2.2 ft.	+2.2 ft.
Elevation difference at Edge of travelway or face of curb	+1.2 ft.	+1.2 ft.



MAST ARM LOADING SCHEDULE

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

NOTES

DESIGN REFERENCE MATERIAL

- Design the traffic signal structure and foundation in accordance with:
 - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
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 - The 2018 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

DESIGN REQUIREMENTS

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

All metal poles and arms, pedestals, and signal head housings should be black in color as specified in the project special provisions.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 1/12/2018
ITS & Signals Unit

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Raleigh, NC 27606
NC License No. C-3705
919.829.0328

NCDOT Wind Zone 4 (90 mph)

Prepared for the Offices of:
SR 2159 (Piney Ridge Road)
at
SR 2241 (Oak Street Extension)
Division 13 Rutherford County Forest City
PLN DATE: Dec. 2017 REVIEWED BY: J. L. Lewis
PREPARED BY: J. Ma VHB PROJECT NO.: 38536.09

REVISIONS	INIT.	DATE

SCALE: 0 N/A

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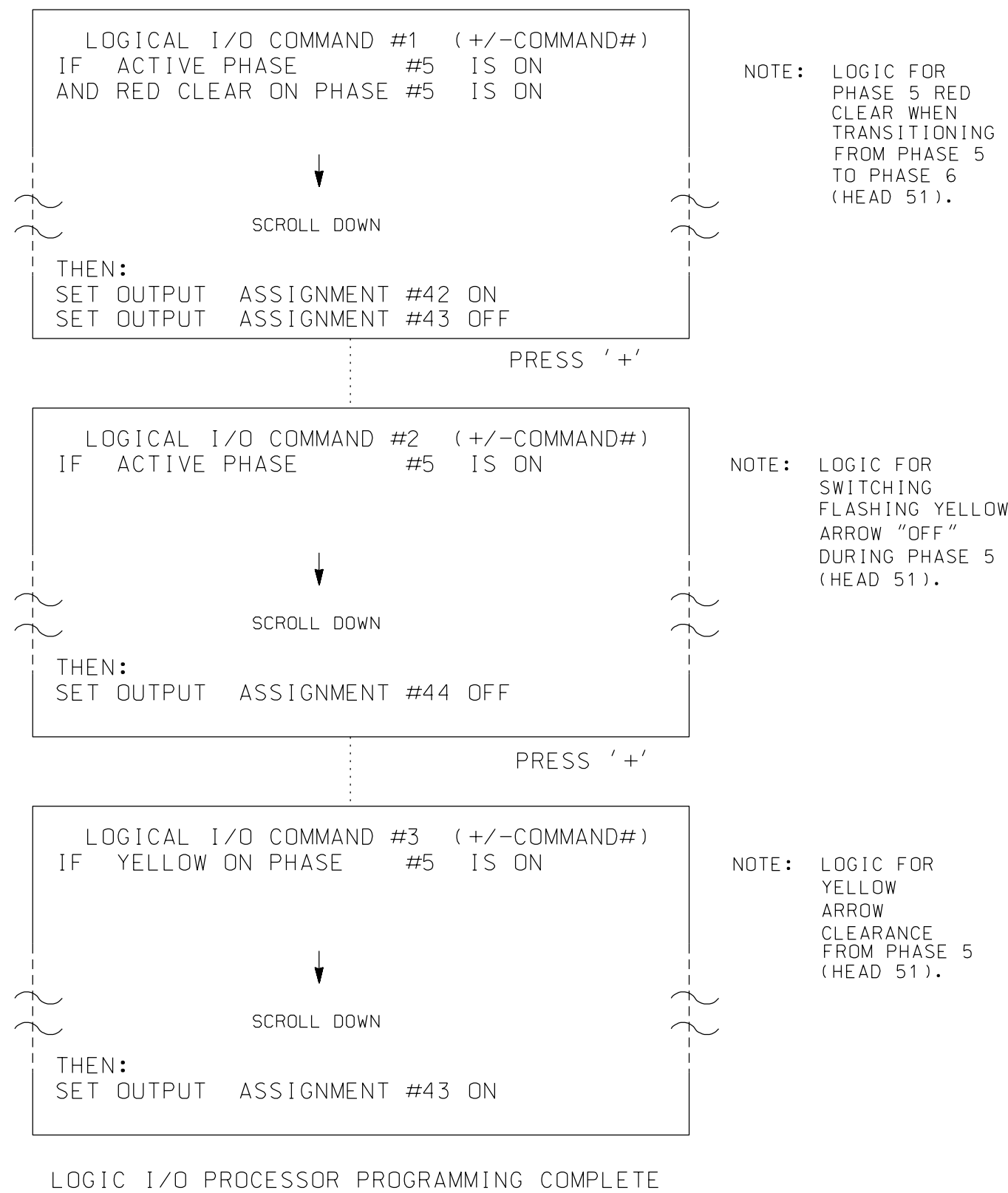
Jianxin Ma
2017.12.15
10:12:46 -05'00"

12/15/2017 11:58:36 AM U:\58833.Dwg S:\TOS\Tech\Signal Plans\Signal Pole Loading.dgn User: jmo

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



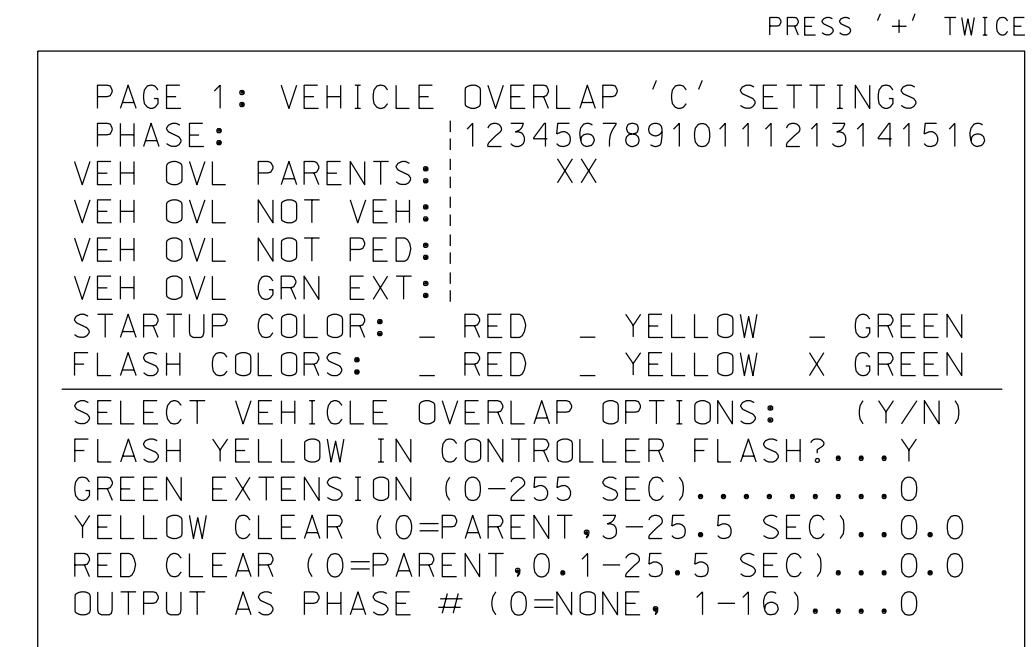
OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(program controller as shown below)

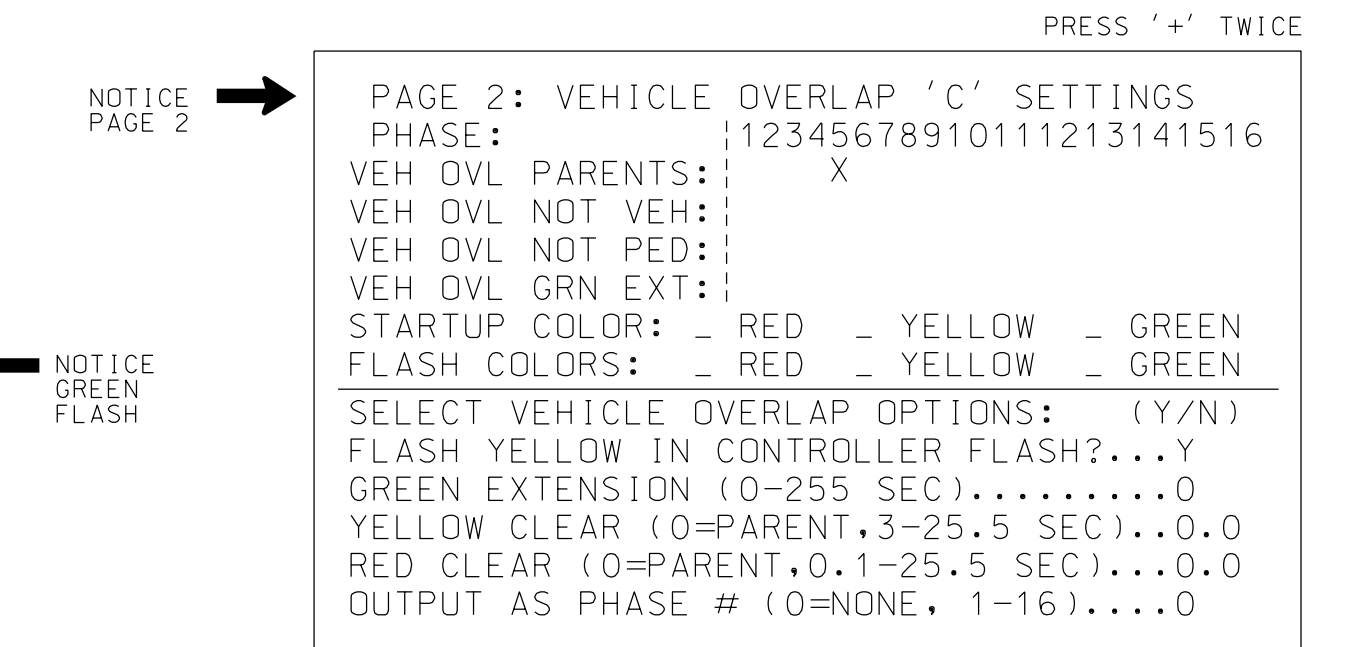
FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).



OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING - PAGE 2

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS). PRESS 'NEXT' TO ADVANCE TO PAGE 2.



BACKUP PROTECTION NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

NC Dept of Transportation
Division of Highways
Final Drawing Date: 1/12/2018
DocuSigned by:
R. N. Zinner
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ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-1241
DESIGNED: Dec. 2017
SEALED: 12/15/2017
REVISED: N/A

Electrical Detail-Final Design-Sheet 2 of 4

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ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SR 2159 (Piney Ridge Road)
at
SR 2241 (Oak Street Extension)

Division 13 Rutherford County Forest City
 PLAN DATE: Dec. 2017 REVIEWED BY: J.L. Lewis
 PREPARED BY: J. Ma VHB PROJECT NO.: 38536.09

REVISIONS	INIT.	DATE

SEAL

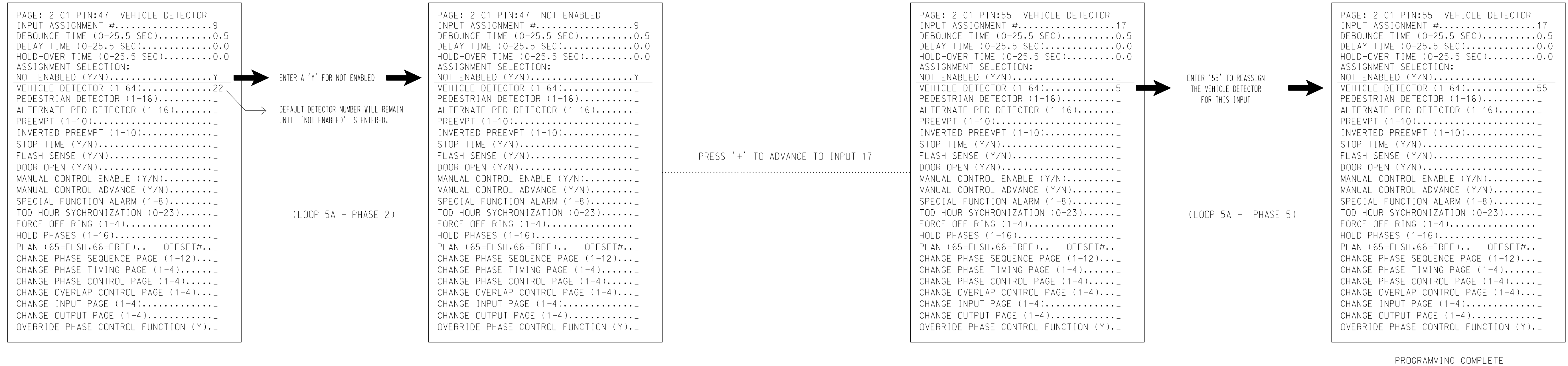
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 2017.12.15
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 SIGNATURE DATE
 SIG. INVENTORY NO. 13-1241

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 5A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #9 (DETECTOR 22) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 2 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 55 TO INPUT #17 SO THAT THE DELAY ON LOOP 5A CAN BE REDUCED FROM 15 SECONDS TO 3 SECONDS.

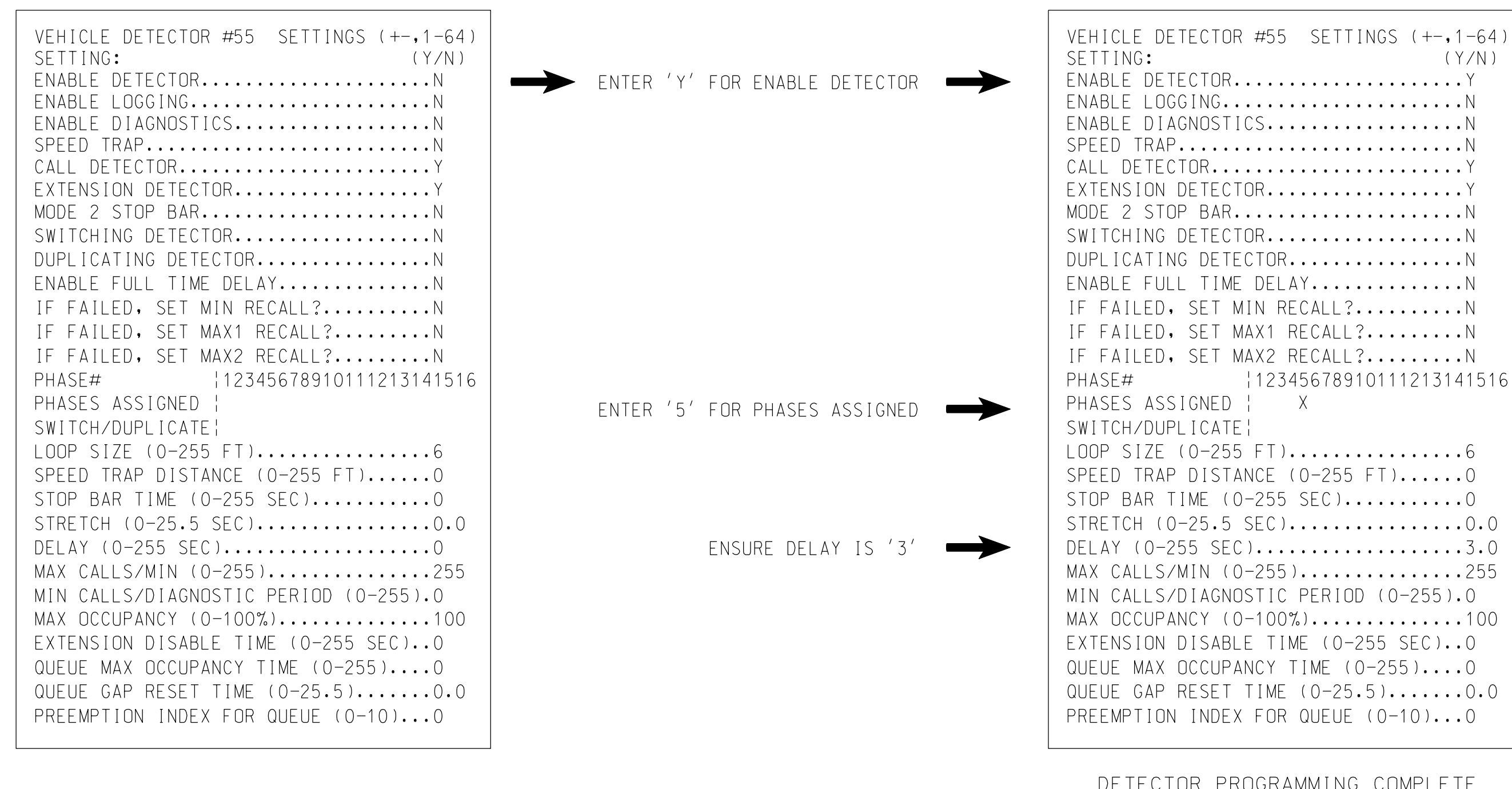
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 9 IS REACHED.



SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 5A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #55.



NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

NC Dept of Transportation
Division of Highways

Final Drawing Date: 1/12/2018

ITS & Signals Unit

DocuSigned by:
R. N. Zinner
F138973472248F...

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 13-1241

DESIGNED: Dec. 2017

SEALED: 12/15/2017

REVISED: N/A

Electrical Detail-Final Design-Sheet 3 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
Division of Transportation, Mobility and Safety, Division of Signal Management, State of North Carolina

SR 2159 (Piney Ridge Road) at SR 2241 (Oak Street Extension)

Division 13 Rutherford County Forest City

PLAN DATE: Dec. 2017 REVIEWED BY: J.L. Lewis

PREPARED BY: J. Ma VHB PROJECT NO.: 38536.09

REVISIONS INIT. DATE

Signature: J. Ma Date: 2017.12.15

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SIG. INVENTORY NO. 13-1241

940 Main Campus Drive, Suite 500
Raleigh, NC 27606
NC License No. C-3705
919.829.0328

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

<u>PHASING</u>	<u>INPUTS PAGE</u>	<u>OVERLAPS PAGE</u>
ACTIVE PAGES REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	1
ACTIVE PAGES REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAPS PAGE 2: Modifies overlap parent phases for head 51 to run protected turn only.

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

NC Dept of Transportation
Division of Highways
Final Drawing Date: 1/12/2018
DocuSigned by:
R. N. Zinner
F1388973472248F...
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-1241
DESIGNED: Dec. 2017
SEALED: 12/15/2017
REVISED: N/A

Electrical Detail-Final Design-Sheet 4 of 4

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ELECTRICAL AND PROGRAMMING
DETAILS FOR:
Prepared for the Offices of:
 DEPARTMENT OF TRANSPORTATION AND SAFETY
750 N. Greenfield Pkwy, Garner, NC 27529

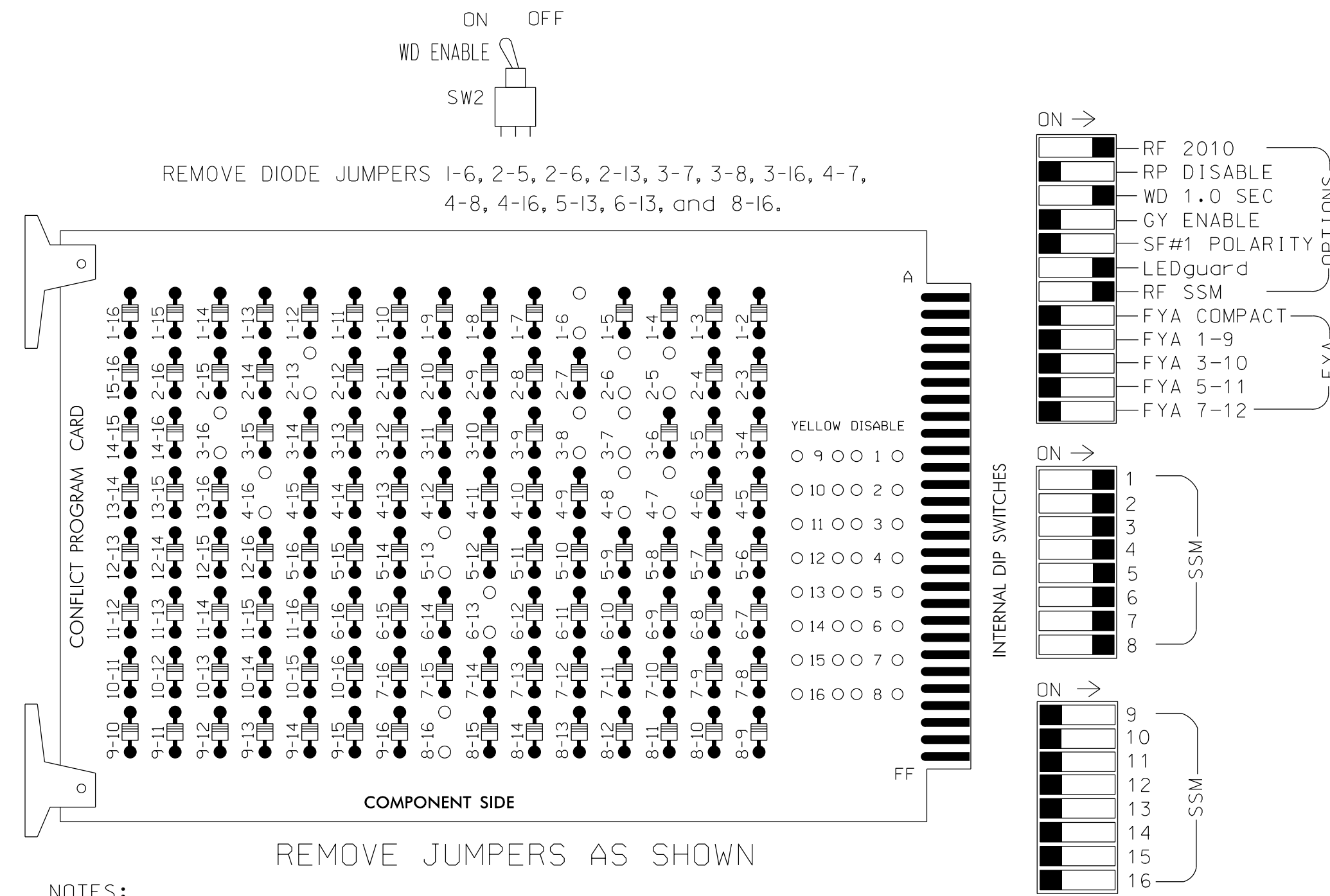
SR 2159 (Piney Ridge Road)
at
SR 2241 (Oak Street Extension)

Division 13	Rutherford County	Forest City
PLAN DATE: Dec. 2017	REVIEWED BY: J.L. Lewis	
PREPARED BY: J. Ma	VHB PROJECT NO.: 38536.09	
REVISIONS	INIT.	DATE

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SIG. INVENTORY NO. 13-1241

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
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on used monitor channels, tie unused red monitor inputs 9,10, 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 Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 8 for 'STARTUP PED CALL'.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the Oak Street Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET.....332
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S5,S6,S7,S8,S8P
 PHASES USED.....1,2,2PED,3,4,5,6,7,8,8PED
 OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	
SIGNAL HEAD NO.	11	82	21,22	P21, P22	31,32	41,42 43	NU	51,52	61,62 63	NU	71	81,82 83	P81, P82
RED		128			101			134			107		
YELLOW		129			102			135			108		
GREEN		130			103			136			109		
RED ARROW	125			116			131			122			
YELLOW ARROW	126	126		117			132			123			
GREEN ARROW	127	127		118			133			124			
				113								110	
				115								112	

NU = Not Used

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
L	1A	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A
U	NOT USED	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
L	2B	3B	4B	5B	6B	7B	8B	9B	10B	11B	12B	13B	14B	
U	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14				
L	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A				
U	NOT USED	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14				
L	6A	7A	8A	9A	10A	11A	12A	13A	14A					

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

FS = FLASH SENSE
 ST = STOP TIME

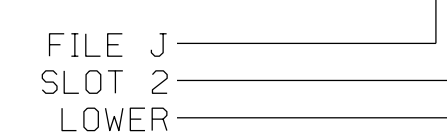
INPUT FILE CONNECTION & PROGRAMMING CHART

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
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			15
1B	TB5-11,12	J6L	46	8	18	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-9,10	I6U	41	3	4	3	Y	Y			
3B	TB4-11,12	I6L	45	7	14	3	Y	Y			
4A	TB6-1,2	I7U	65	27	34	4		Y		2.4	
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			
6A	TB3-7,8	J2L	44	6	16	6	Y	Y			
6B	TB3-9,10	J3U	64	26	36	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

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

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

INPUT FILE POSITION LEGEND: J2L



PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
 SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1 NEXT: PAGES)						
RNG	LEAD	BARRIER 1	X-LAG;LEAD	BARRIER 2	X-LAG	
1	1	2	0	0	3	4
2	0	6	0	5	7	8
3	0	0	0	0	0	0
4	0	0	0	0	0	0

NC Dept of Transportation
 Division of Highways
 Final Drawing Date: 1/12/2018
 IT&S and Signals Unit

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 13-0143
 DESIGNED: Dec. 2017
 SEALED: 12/15/2017
 REVISED: N/A

Electrical Detail

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US 74 Alternate at SR 2241 (Oak Street)/ SR 2241 (Oak Street Extension)

Division 13 Rutherford County Forest City

PLAN DATE: Dec. 2017 REVIEWED BY: J.L. Lewis
 PREPARED BY: J. Ma VHB PROJECT NO.: 38536.09

REVISIONS: INIT. DATE

Prepared for the Offices of:
 N.C. Department of Transportation
 Mobility and Safety Laboratory
 750 N. Greenfield Pkwy, Garner, NC 27529

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