TIP PROJECT: U-4913A

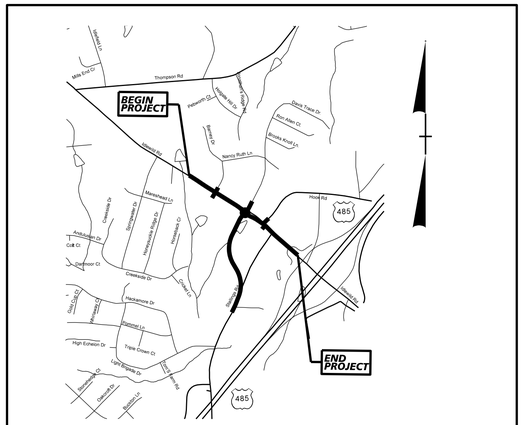
Project No.	Sheet No.
U-4913A	Sig. 1.0

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MECKLENBURG COUNTY

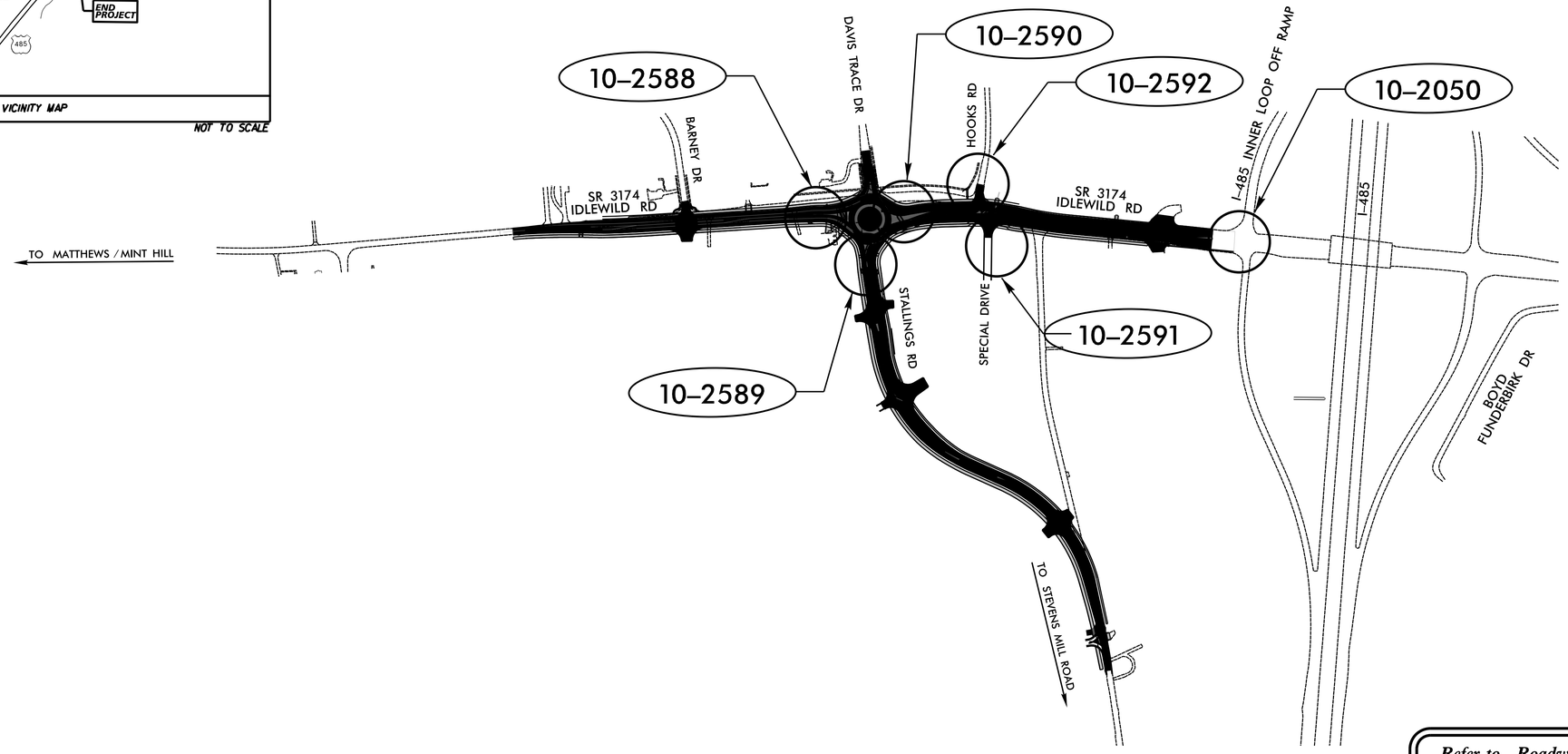
LOCATION: SR 3174 (IDLEWILD ROAD) FROM SR 3175 (STALLINGS ROAD) TO I-485.

TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS



VICINITY MAP

NOT TO SCALE



Refer to Roadway Standard Drawings NCDOT" dated January 2024 and Standard Specifications for Roads and Structures" dated January 2024.

Index of Plans

Sheet #	Reference #	Location/Description
Sig. 1.0	--------	Title Sheet
Sig. 2.0-2.2	10-2588	SR 3143 (Idlewild Road) Pedestrian Hybrid Beacon West of Stallings Road/Davis Trace Drive
Sig. 3.0-3.2	10-2590	SR 3143 (Idlewild Road) Pedestrian Hybrid Beacon East of Stallings Road/Davis Trace Drive
Sig. 4.0-4.2	10-2589	Stallings Road Pedestrian Hybrid Beacon South of 3143 (Idlewild Road)
Sig. 5.0-5.4	10-2592	SR 3143 (Idlewild Road) Westbound at Hooks Road
Sig. 6.0-6.4	10-2591	SR 3143 (Idlewild Road) Eastbound at Special Drive
Sig. 7.0-8.2	10-2050	SR 3143 (Idlewild Road) at I-485 Inner Loop Ramps
M1A - M9	--------	Standard Metal Pole Details
SCP 1.0-6.0	--------	Cable Routing Plans

T.S.M.O. UNIT CONTACT:

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WESTERN REGION SIGNALS ENGINEER

Keith M. Mims, P.E.
SIGNAL EQUIPMENT DESIGN ENGINEER

Gregg Green
SIGNAL COMMUNICATIONS PROJECT ENGINEER

PLANS PREPARED BY:

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Kevin P. Baumann, P.E.
TRAFFIC SIGNAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

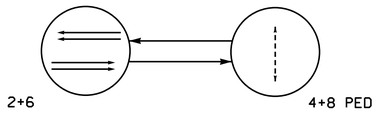
DocuSigned by:
5DC709A86BCB447...
5/12/2025
SIGNATURE: P.E.

Prepared for:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
TSMO UNIT
750 N.Greenfield Pkwy.Garner,NC 27529

5/11/2025 $TIME$ $USER$ $FILE$

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 2.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 2+6 DARK	ACTIVATION	STEADY YELLOW	ALL RED	4+8 PED WALK	4+8 PED CLEAR	FLASH
21, 22	DRK	F Y	Y	R	R	F R	Y
61, 62	DRK	F Y	Y	R	R	F R	Y
P41, P42	DW	DW	DW	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DW	DRK

*Alternating Flash
Y - Steady Yellow
FY - Flashing Yellow
R - Steady Red
FR - Flashing Red
DRK - Dark
W - Walk
DW - Don't Walk

SIGNAL FACE I.D.

All Heads L.E.D.

21, 22
61, 62

P41, P42
P81, P82

2 Phase
Semi-Actuated
Pedestrian Hybrid Beacon
(SR 3174/1501 (Idlewild Road) CLS)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
3. Enable Ped Clear During Red for phase 4 PED and phase 8 PED.
4. Locate the Pedestrian and Crosswalk advance signs (see Figure 1) in accordance with Table 2C-3 in Section 2C.04 of the 2023 MUTCD or as otherwise directed by the Engineer.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated system timing values supersede these values.

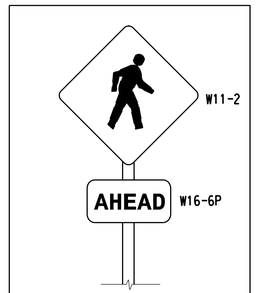
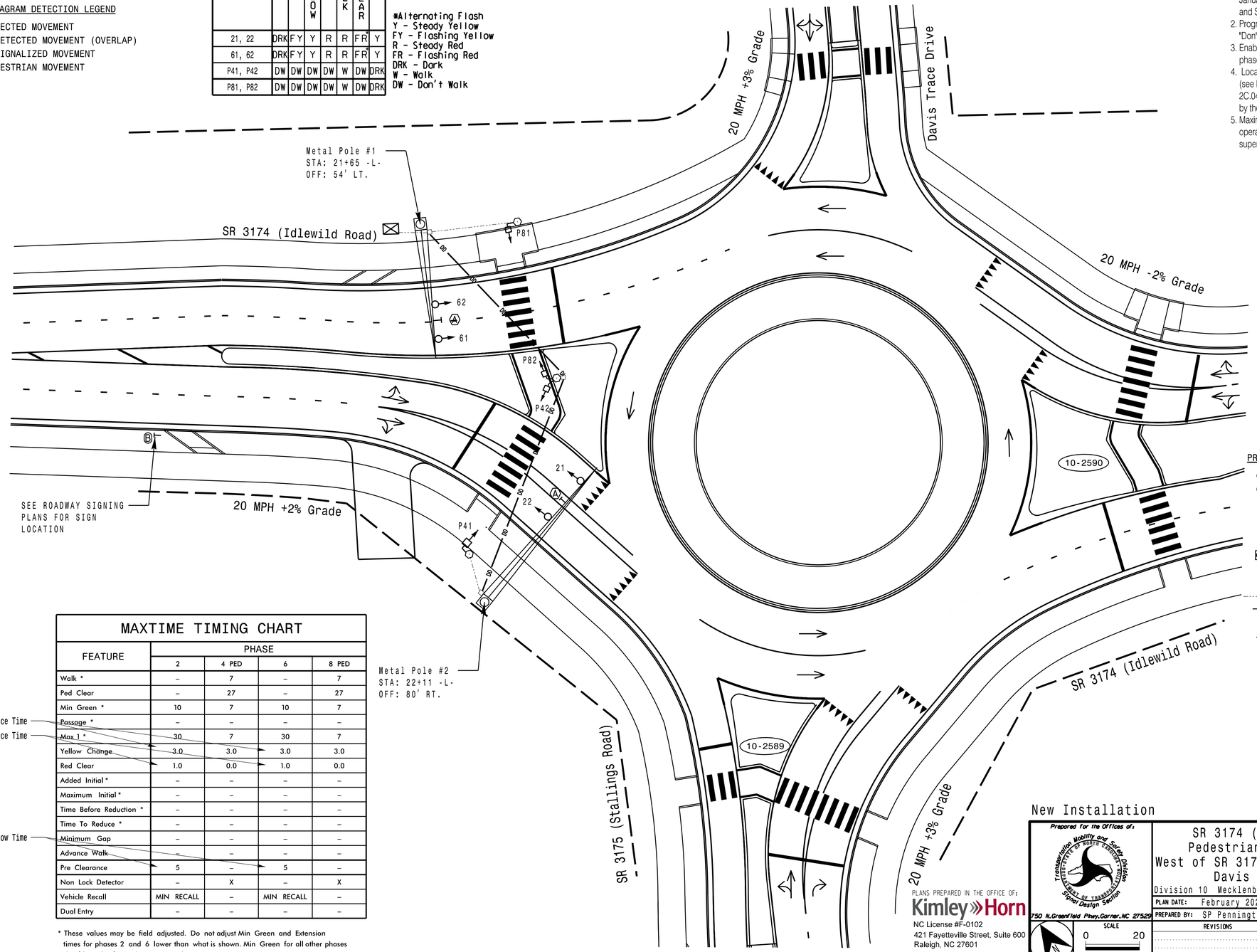


Figure 1



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Type II Signal Pedestal	
	Metal Pole with Mastarm	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
	Directional Drill	N/A
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
A	"STOP ON RED - YIELD ON FLASHING RED AFTER STOP" Sign (R10-23a)	A
B	Pedestrian Crossing Sign (W11-2) w/ "AHEAD" Plaque (W16-9P) (See Figure 1)	B

MAXTIME TIMING CHART

FEATURE	PHASE 2	4 PED	6	8 PED
Walk *	–	7	–	7
Ped Clear	–	27	–	27
Min Green *	10	7	10	7
Passage *	–	–	–	–
Max 1 *	30	7	30	7
Yellow Change	3.0	3.0	3.0	3.0
Red Clear	1.0	0.0	1.0	0.0
Added Initial *	–	–	–	–
Maximum Initial *	–	–	–	–
Time Before Reduction *	–	–	–	–
Time To Reduce *	–	–	–	–
Minimum Gap	–	–	–	–
Advance Walk	–	–	–	–
Pre Clearance	5	–	5	–
Non Lock Detector	–	X	–	X
Vehicle Recall	MIN RECALL	–	MIN RECALL	–
Dual Entry	–	–	–	–

Serves as Steady Yellow Clearance Time
Serves as All Red Clearance Time
Serves as Flashing Yellow Time

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

New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SR 3174 (Idlewild Road)
Pedestrian Hybrid Beacon
West of SR 3175 (Stallings Road)/
Davis Trace Drive

Division 10 Mecklenburg County Stallings

PLAN DATE:	February 2025	REVIEWED BY:	KP Baumann
PREPARED BY:	SP Pennington	REVIEWED BY:	

SCALE: 0 20, 1"=20'

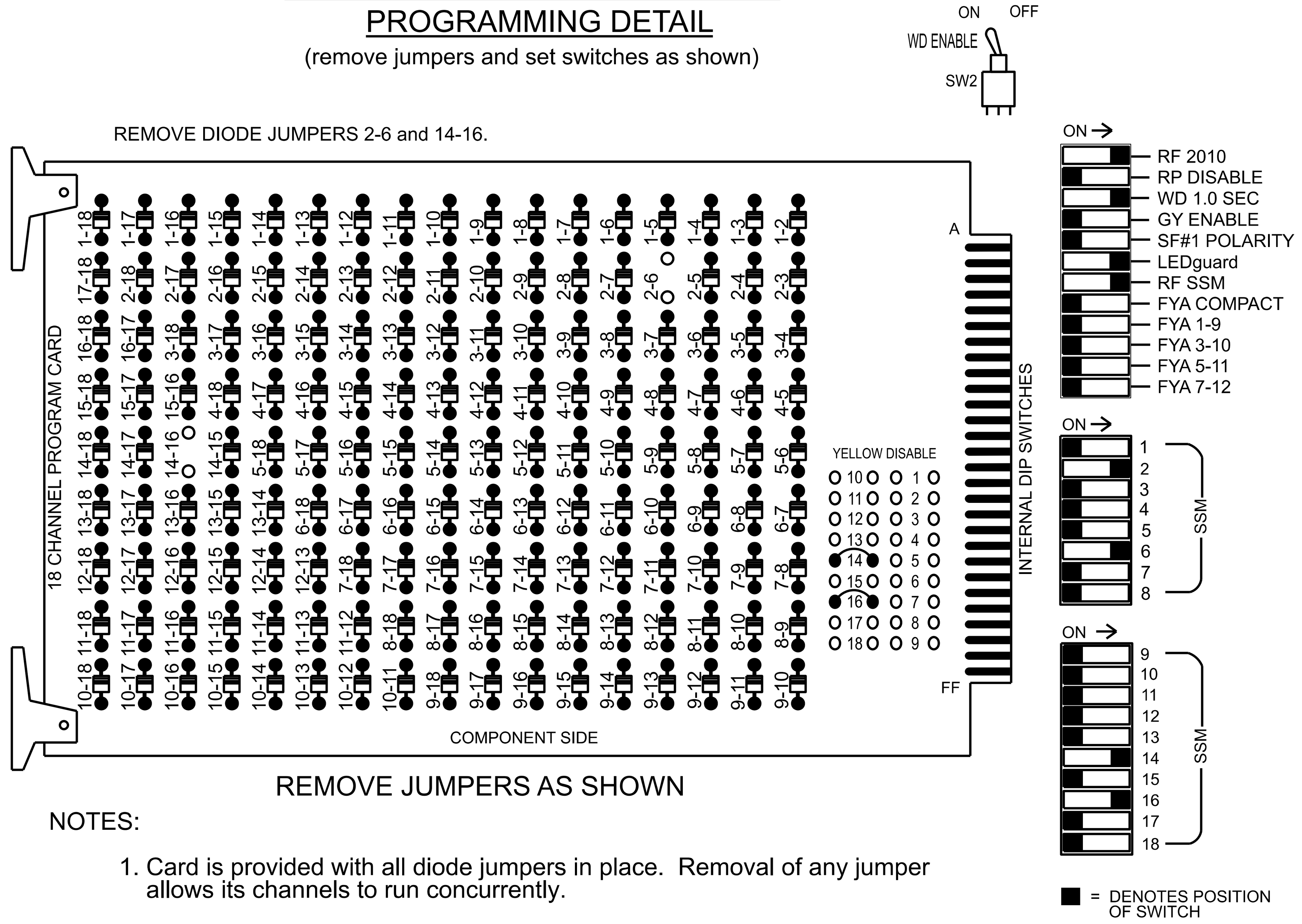
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044434 KEVIN P. BAUMANN
DocuSigned by: SIGNATURE
5/12/2025 DATE
SIG. INVENTORY NO. 10-2588

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 2.1

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 the 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.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
"I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	NOT USED	FS DC ISOLATOR
"I"	L												Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
"J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
"J"	L														

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
PED PUSH BUTTONS												
P41; P42	TB8-5,6	I12L	69	35	4	PED 4,8*						
P81; P82	TB8-8,9	I13L	70	36	8	PED 8,4*						

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

* FOR THE ABOVE DETECTORS TO CALL ANOTHER PHASE, SCROLL OVER AND ENTER SECOND PHASE IN "ADDITIONAL CALL PHASES" COLUMN.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

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 plan.
2. Install 332_NCDOT_HAWK_Default database onto controller.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. Program phases 4 and 8 for No Startup Veh Call and No Startup Ped Call.
5. Program phases 4 and 8 for Ped Clear During Red Clear.
6. The cabinet and controller are part of the SR 3174 / 1501 (Idlewild Road) Closed Loop System.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet..332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used.......................... S2, S6, S8, S12
Phases Used.......................................2, 4*, 4PED, 6, 8*, 8PED
Overlaps ....None

* Phase used for timing purposes only.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	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	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22 61,62	NU	NU	NC	P41, P42	NU	21,22 61,62	NU	NU	NC	P81, P82	NU	NU	NU	NU	NU	NU
RED		128						134										
YELLOW		129						*										
GREEN		*						*										
RED ARROW																		
YELLOW ARROW																		
FLASHING YELLOW ARROW																		
GREEN ARROW																		
(Don't Walk hand)						104						110						
(Walk person)						106						112						

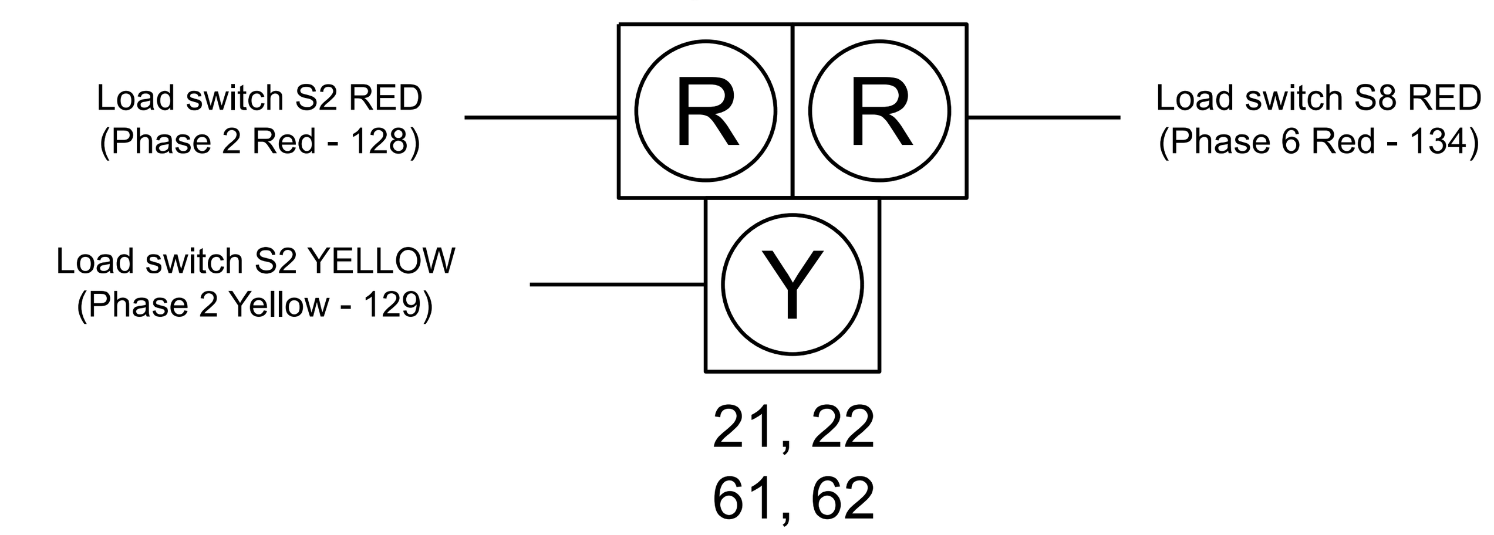
NU = Not Used
NC = No Connection
* Denotes install load resistor. See load resistor installation detail this sheet.

TIMING INTERVAL

PHASE 2+6 = DARK DISPLAY
PHASE 2+6 PRE CLEARANCE = FLASHING YELLOW DISPLAY
PHASE 2+6 YELLOW CHANGE = STEADY YELLOW DISPLAY
PHASE 2+6 RED CLEAR THROUGH 4+8 WALK = STEADY RED DISPLAY
PED 4+8 DON'T WALK = ALTERNATING FLASHING RED DISPLAY

SIGNAL HEAD WIRING DETAIL

(wire signal heads as shown)



OPERATIONAL NOTES

1. In order for the controller to perform the Pedestrian Hybrid Beacon (HAWK signal) sequence, the 332_NCDOT_HAWK_Default database must be installed on the controller.
2. The only Phase 6 load switch output that is being used drives one of the red signal faces of each signal head.
3. The Logic Processor flashes Phase 2 Yellow during the Phase 2 Pre-Clearance interval. Phase 2 Yellow drives the solid yellow signal face during the Phase 2 vehicle Yellow Change.
4. The Phase 2 and Phase 6 Red outputs drives the solid Red displays during the Phase 2 and 6 Red Clear and Ped 4 and 8 Walk interval. The Logic Processor flashes Phase 2 and 6 Red Outputs in a wig-wag pattern during Phase 4+8 Ped Clear interval.
5. The controller must be programmed for Ped Clear During Red Clear for Pedestrian Phases 4 and 8 so that Red displays continue to flash during Phases 4 and 8 Yellow Change and Red Clear.
6. Make sure that all Phase 2 and Phase 6 timings match each other and that all Phase 4 and Phase 8 timings match each other.
7. The Ped 4 push button is programmed to call Ped 4 and Ped 8. The Ped 8 push button is programmed to call Ped 8 and Ped 4.

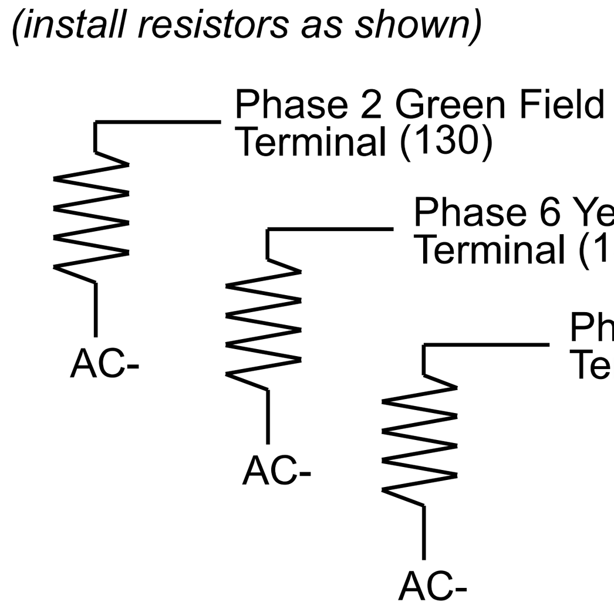
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES	
Value (ohms)	Wattage
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2588
DESIGNED: February 2025
SEALED: 05/12/2025
REVISED: N/A

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

SR 3174 (Idlewild Road)
Pedestrian Hybrid Beacon
West of SR 3175 (Stallings Road) /
Davis Trace Drive

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025	REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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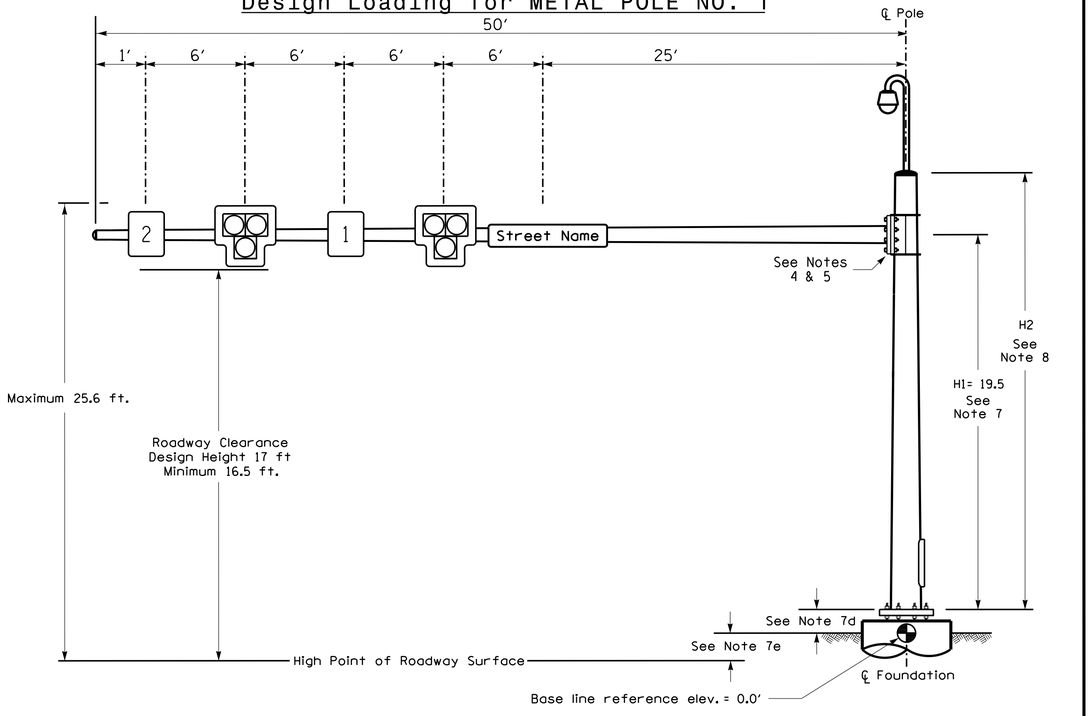
5/12/2025
DATE

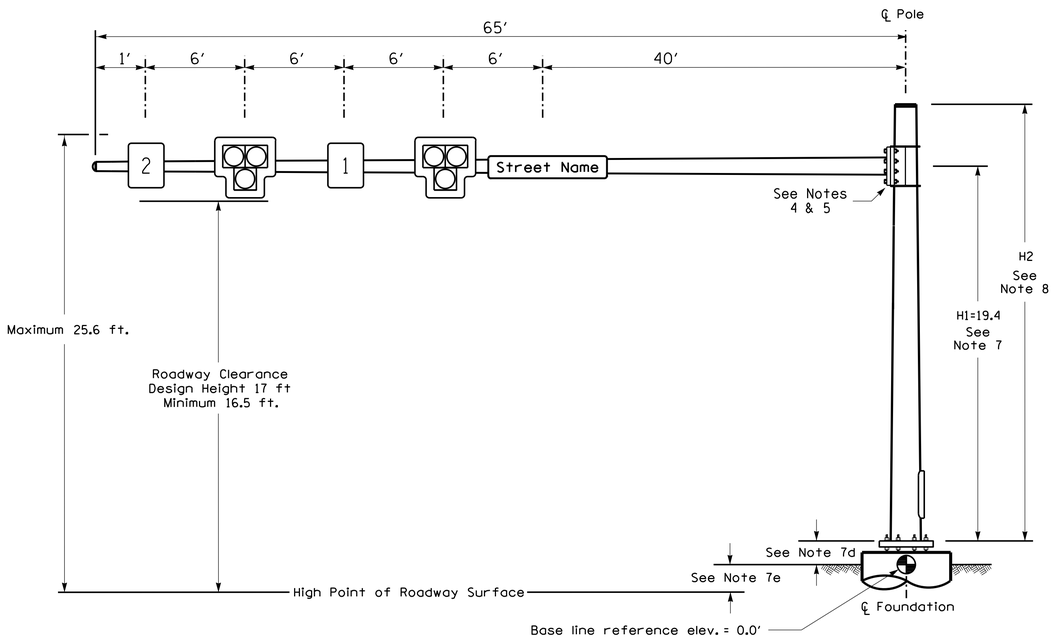
SIG. INVENTORY NO. 10-2588

Design Loading for METAL POLE NO. 1



Elevation View

Design Loading for METAL POLE NO. 2



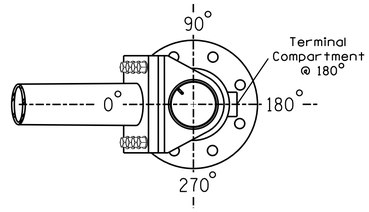
Elevation View

SPECIAL NOTE

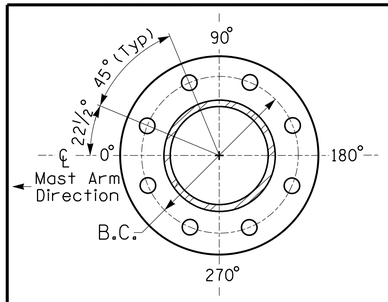
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.0 ft.	+0.9 ft.
Elevation difference at Edge of travelway or face of curb	+1.0 ft.	+0.2 ft.

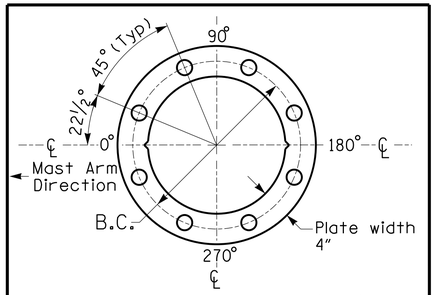


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

METAL POLES No. 1 and 2

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 2.2

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9 S.F.	36.0"W X 36.0"L	75 LBS
1	SIGN RIGID MOUNTED	5.0 S.F.	24.0"W X 30.0"L	11 LBS
2	SIGN RIGID MOUNTED	4.5 S.F.	36.0"W X 18.0"L	10 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS
	CCTV CAMERA ℄ POLE-MOUNTED	1.6 S.F.	12.0"W X 74.4"L	45 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2024 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

2. 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.
3. Design all signal supports using force ratios that do not exceed 0.9.
4. 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.
5. 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.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. 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.
9. 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.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

NCDOT Wind Zone 5 (110 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 3174 (Idlewild Road)
Pedestrian Hybrid Beacon
West of SR 3175 (Stallings Road)/ Davis Trace Drive

Division 10 Mecklenburg County Stallings

PLAN DATE:	February 2025	REVIEWED BY:	KP Baumann
PREPARED BY:	SP Pennington	REVIEWED BY:	

SCALE 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by: 5DC709A86BCB447...
5/12/2025
SIGNATURE DATE

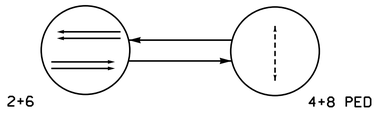
SIG. INVENTORY NO. 10-2588

5/13/2025 12:56:24 PM susan.pennington K:\METAL_TPTO\...S\GNALS\W011036730_U-4913A#64 - Signal Design#ORD#2.2 U-4913A_10-2588-2025#p.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 3.0

2 Phase
Semi-Actuated
Pedestrian Hybrid Beacon
SR 3174/1501 (Idlewild Road) CLS

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION							
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21, 22	DRK	FY	Y	R	R	FR*	Y
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P41, P42	DW	DW	DW	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DW	DRK

*Alternating Flash
Y - Steady Yellow
FY - Flashing Yellow
R - Steady Red
FR - Flashing Red
DRK - Dark
W - Walk
DW - Don't Walk

SIGNAL FACE I.D.

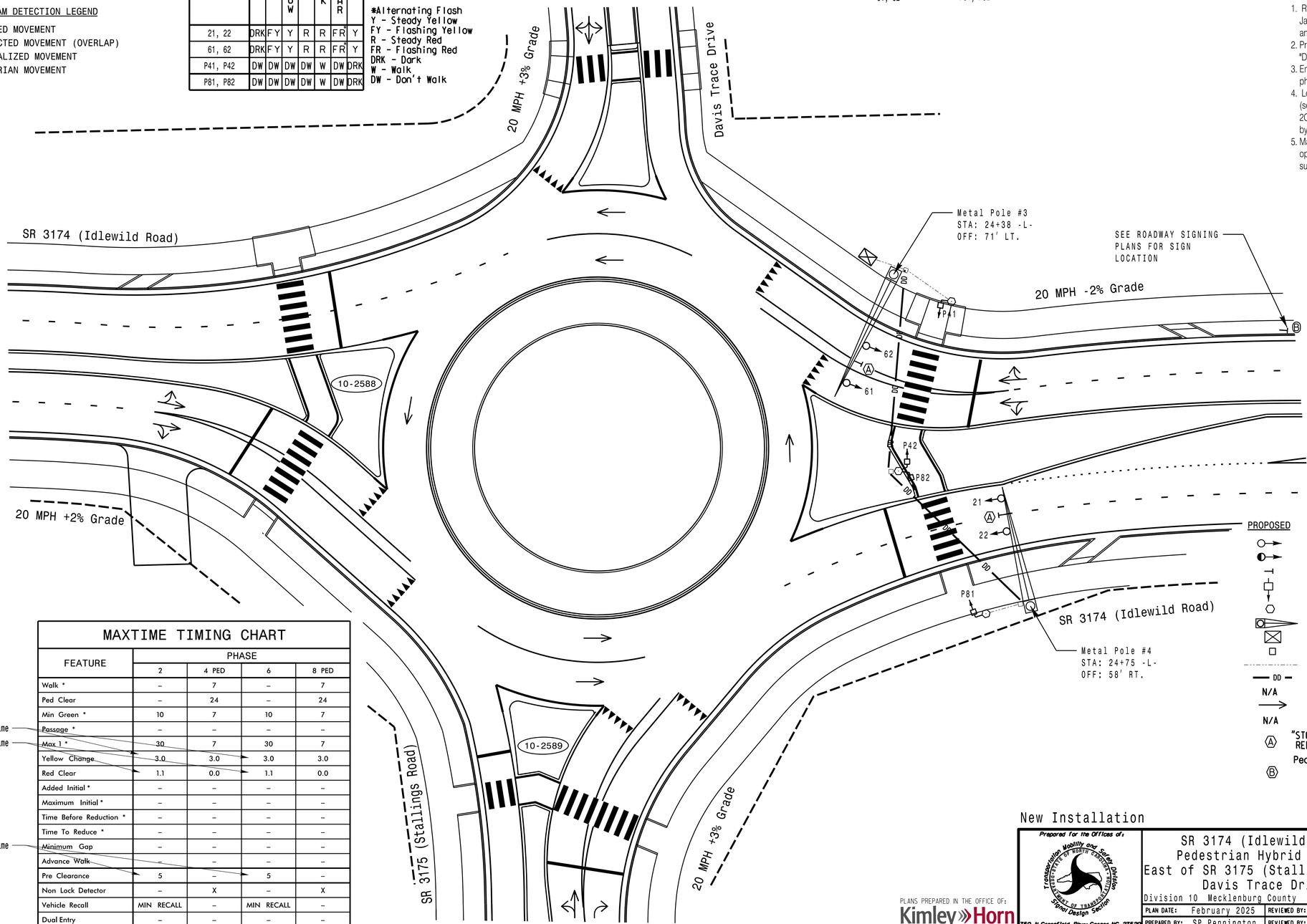
All Heads L.E.D.

21, 22
61, 62

P41, P42
P81, P82

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
3. Enable Ped Clear During Red for phase 4 PED and phase 8 PED.
4. Locate the Pedestrian and Crosswalk advance signs (see Figure 1) in accordance with Table 2C-3 in Section 2C.04 of the 2023 MUTCD or as otherwise directed by the Engineer.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated system timing values supersede these values.



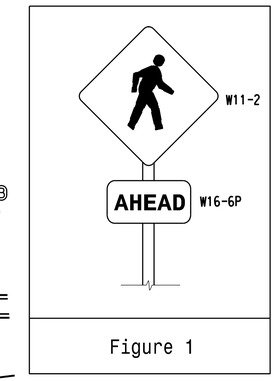


Figure 1

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Type II Signal Pedestal	
	Metal Pole with Mastarm	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
DD	Directional Drill	N/A
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
A	"STOP ON RED - YIELD ON FLASHING RED AFTER STOP" Sign (R10-23a)	A
B	Pedestrian Crossing Sign (W11-2) w/ "AHEAD" Plaque (W16-9P) (See Figure 1)	B

MAXTIME TIMING CHART

FEATURE	PHASE 2	4 PED	6	8 PED
Walk *	–	7	–	7
Ped Clear	–	24	–	24
Min Green *	10	7	10	7
Passage *	–	–	–	–
Max 1 *	30	7	30	7
Yellow Change	3.0	3.0	3.0	3.0
Red Clear	1.1	0.0	1.1	0.0
Added Initial *	–	–	–	–
Maximum Initial *	–	–	–	–
Time Before Reduction *	–	–	–	–
Time To Reduce *	–	–	–	–
Minimum Gap	–	–	–	–
Advance Walk	–	–	–	–
Pre Clearance	5	–	5	–
Non Lock Detector	–	X	–	X
Vehicle Recall	MIN RECALL	–	MIN RECALL	–
Dual Entry	–	–	–	–

Serves as Steady Yellow Clearance Time
Serves as All Red Clearance Time
Serves as Flashing Yellow Time

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

New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 3174 (Idlewild Road)
Pedestrian Hybrid Beacon
East of SR 3175 (Stallings Road)/
Davis Trace Drive
Division 10 Mecklenburg County Stallings

PLAN DATE:	February 2025	REVIEWED BY:	KP Baumann
PREPARED BY:	SP Pennington	REVIEWED BY:	

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
Docusigned by: SDC709A865C8447
5/12/2025
SIGNATURE DATE
SIG. INVENTORY NO. 10-2590

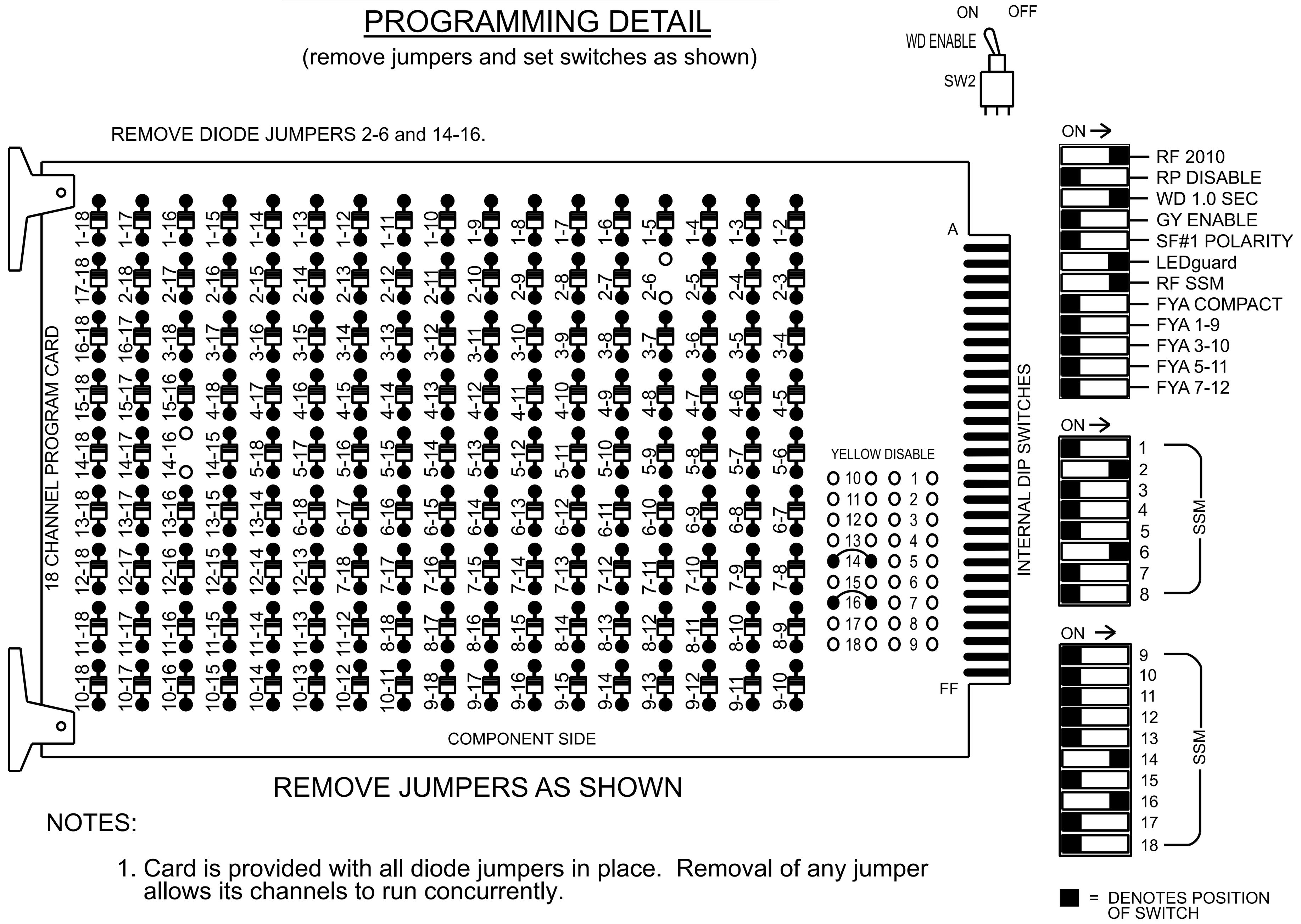
PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

5/9/2025 11:23:27 AM susan.pennington K:\RAL_TPTO_SIGNALS\011036730 U-4913A\64 - Signal Design\MDRD\3.0 U-4913A_10-2590-2025g.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 3.1

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 the 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 plan.
2. Install 332_NCDOT_HAWK_Default database onto controller.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. Program phases 4 and 8 for No Startup Veh Call and No Startup Ped Call.
5. Program phases 4 and 8 for Ped Clear During Red Clear.
6. The cabinet and controller are part of the SR 3174 / 1501 (Idlewild Road) Closed Loop System.

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	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22 61,62	NU	NU	NC	P41, P42	NU	21,22 61,62	NU	NU	NC	P81, P82	NU	NU	NU	NU	NU	NU
RED		128						134										
YELLOW		129						*										
GREEN		*						*										
RED ARROW																		
YELLOW ARROW																		
FLASHING YELLOW ARROW																		
GREEN ARROW																		
✋						104						110						
🚶						106						112						

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

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount.....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used........................... S2, S6, S8, S12
Phases Used.......................................2, 4*, 4PED, 6, 8*, 8PED
Overlaps ....None

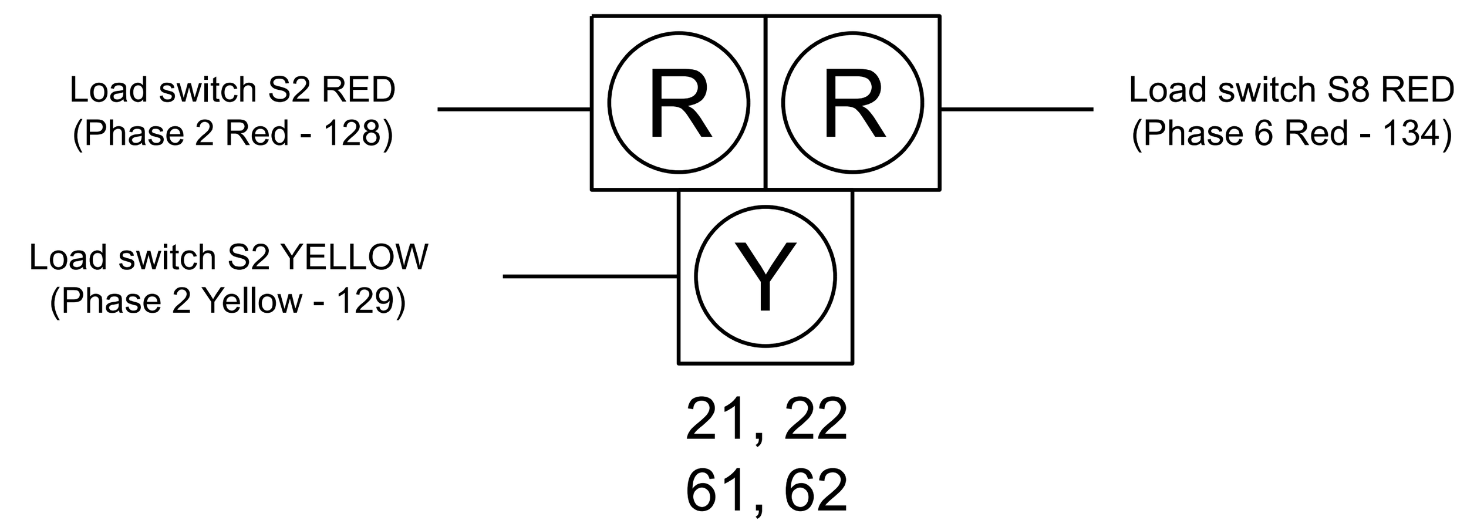
* Phase used for timing purposes only.

TIMING INTERVAL

PHASE 2+6 = DARK DISPLAY
PHASE 2+6 PRE CLEARANCE = FLASHING YELLOW DISPLAY
PHASE 2+6 YELLOW CHANGE = STEADY YELLOW DISPLAY
PHASE 2+6 RED CLEAR THROUGH 4+8 WALK = STEADY RED DISPLAY
PED 4+8 DON'T WALK = ALTERNATING FLASHING RED DISPLAY

SIGNAL HEAD WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
"I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	NOT USED	FS DC ISOLATOR
	L												Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
"J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
PED PUSH BUTTONS												
P41; P42	TB8-5,6	I12L	69	35	4	PED 4,8*						
P81; P82	TB8-8,9	I13L	70	36	8	PED 8,4*						

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

* FOR THE ABOVE DETECTORS TO CALL ANOTHER PHASE, SCROLL OVER AND ENTER SECOND PHASE IN "ADDITIONAL CALL PHASES" COLUMN.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

OPERATIONAL NOTES

1. In order for the controller to perform the Pedestrian Hybrid Beacon (HAWK signal) sequence, the 332_NCDOT_HAWK_Default database must be installed on the controller.
2. The only Phase 6 load switch output that is being used drives one of the red signal faces of each signal head.
3. The Logic Processor flashes Phase 2 Yellow during the Phase 2 Pre-Clearance interval. Phase 2 Yellow drives the solid yellow signal face during the Phase 2 vehicle Yellow Change.
4. The Phase 2 and Phase 6 Red outputs drives the solid Red displays during the Phase 2 and 6 Red Clear and Ped 4 and 8 Walk interval. The Logic Processor flashes Phase 2 and 6 Red Outputs in a wig-wag pattern during Phase 4+8 Ped Clear interval.
5. The controller must be programmed for Ped Clear During Red Clear for Pedestrian Phases 4 and 8 so that Red displays continue to flash during Phases 4 and 8 Yellow Change and Red Clear.
6. Make sure that all Phase 2 and Phase 6 timings match each other and that all Phase 4 and Phase 8 timings match each other.
7. The Ped 4 push button is programmed to call Ped 4 and Ped 8. The Ped 8 push button is programmed to call Ped 8 and Ped 4.

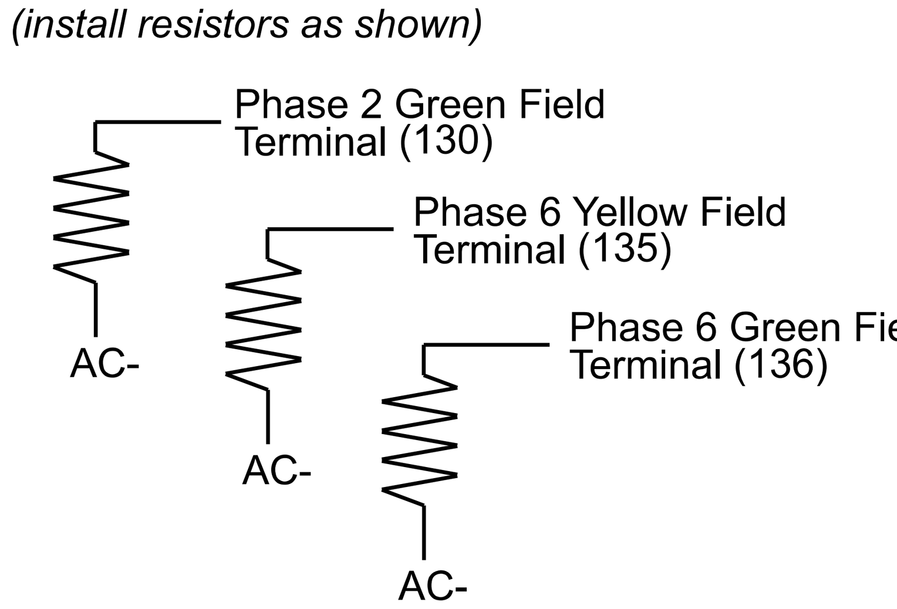
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES	
Value (ohms)	Wattage
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2590
DESIGNED: February 2025
SEALED: 05/12/2025
REVISED: N/A

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 3174 (Idlewild Road)
Pedestrian Hybrid Beacon
East of SR 3175 (Stallings Road) /
Davis Trace Drive

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025 REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington REVIEWED BY:

REVISIONS	INIT.	DATE

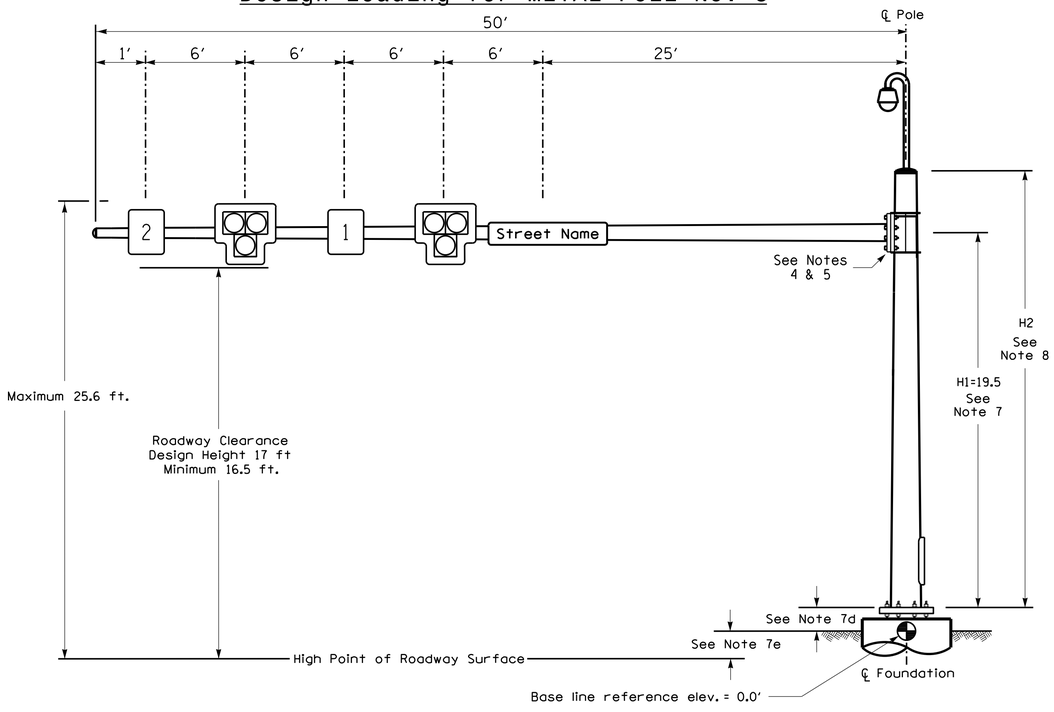
Prepared for the Offices of: Transportation Mobility and Safety Division, State of North Carolina Department of Transportation, ITS & Signals Management Section
750 N.Greenfield Pkwy.Garner,NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by:
5DC709A86BCB447...
5/12/2025
DATE

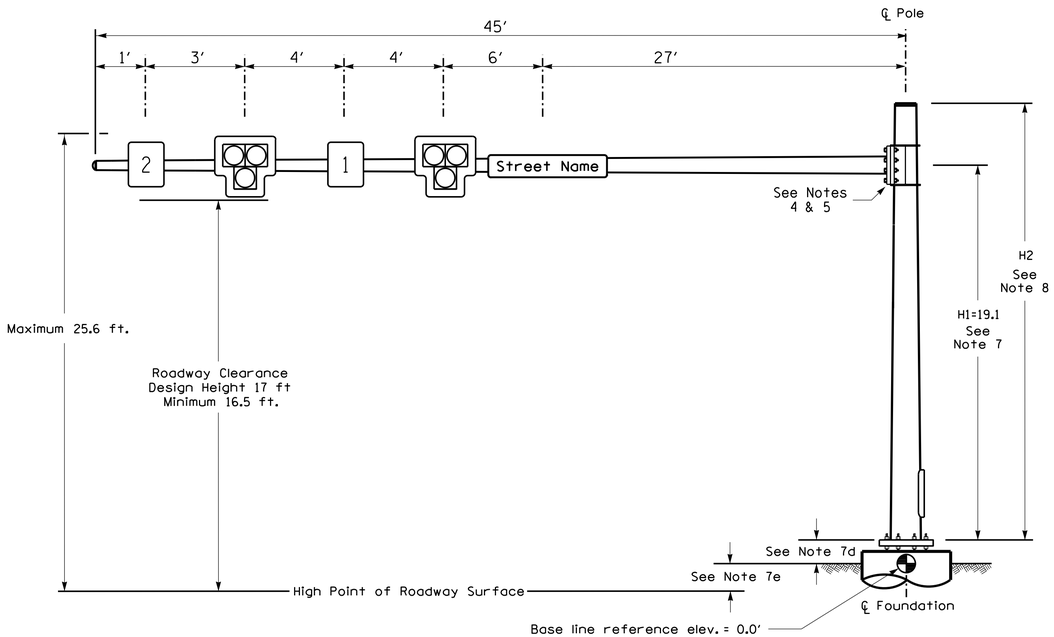
SIG. INVENTORY NO. 10-2590

Design Loading for METAL POLE NO. 3



Elevation View

Design Loading for METAL POLE NO. 4



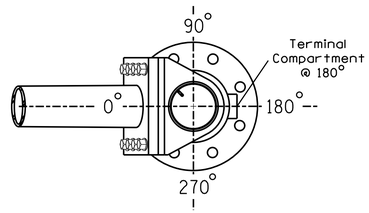
Elevation View

SPECIAL NOTE

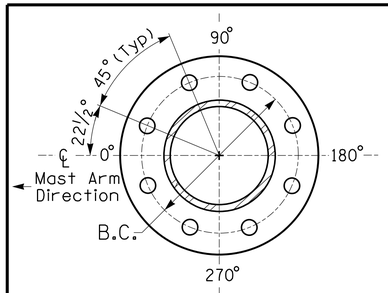
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 3	Pole 4
Baseline reference point at ℄ Foundation @ ground level ⊕	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.0 ft.	+0.6 ft.
Elevation difference at Edge of travelway or face of curb	+0.4 ft.	+0.3 ft.

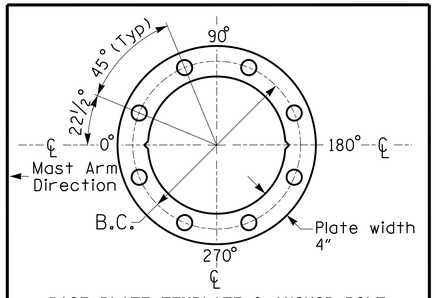


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

METAL POLES No. 3 and 4

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 3.2

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9 S.F.	36.0"W X 36.0"L	75 LBS
1	SIGN RIGID MOUNTED	5.0 S.F.	24.0"W X 30.0"L	11 LBS
2	SIGN RIGID MOUNTED	4.5 S.F.	36.0"W X 18.0"L	10 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS
	CCTV CAMERA ℄ POLE-MOUNTED	1.6 S.F.	12.0"W X 74.4"L	45 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2024 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

2. 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.
3. Design all signal supports using force ratios that do not exceed 0.9.
4. 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.
5. 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.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. 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.
9. 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.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

NCDOT Wind Zone 5 (110 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 3143 (Idlewild Road)
Pedestrian Hybrid Beacon
East of SR 3175 (Stallings Road)/ Davis Trace Drive

Division 10 Mecklenburg County Stallings

PLAN DATE:	February 2025	REVIEWED BY:	KP Baumann
PREPARED BY:	SP Pennington	REVIEWED BY:	

SCALE: 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by: 5DC709A86BC8447...
5/12/2025
SIGNATURE DATE

SIG. INVENTORY NO. 10-2590

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susan.pennington
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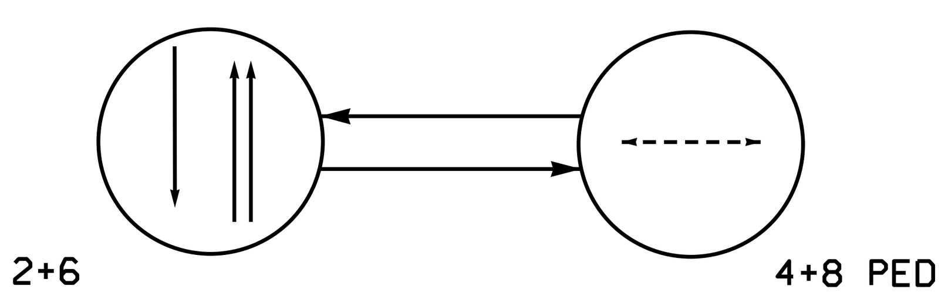
5/13/2025

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 4.0

PHASING DIAGRAM



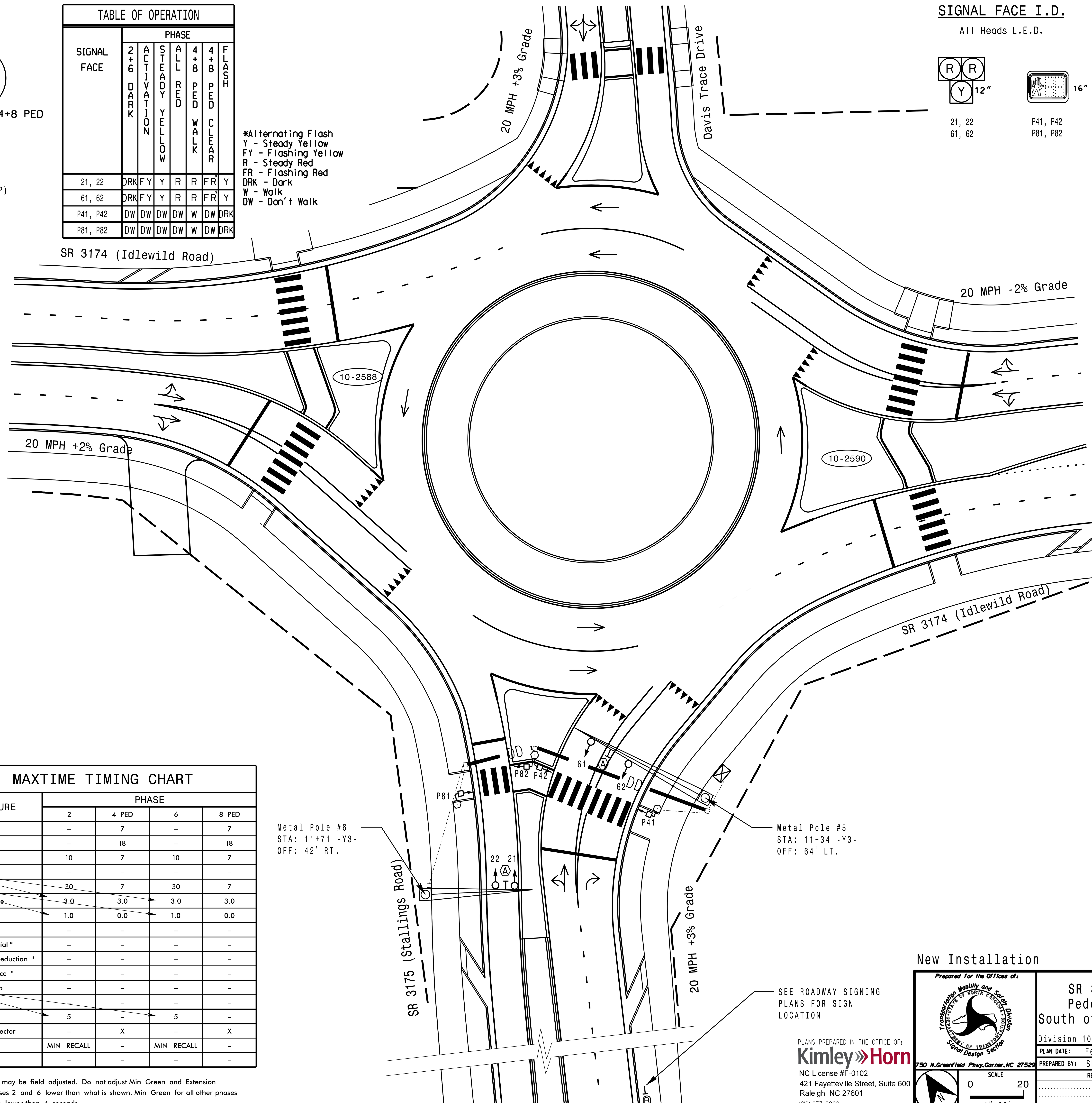
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE: 2+6 DARK	ACTIVATION	STEADY YELLOW	ALL RED	4+8 PED WALK	4+8 PED CLEAR	FLASH
21, 22	DRK	FY	Y	R	R	FR*	Y
61, 62	DRK	FY	Y	R	R	FR*	Y
P41, P42	DW	DW	DW	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DW	DRK

*Alternating Flash
Y - Steady Yellow
FY - Flashing Yellow
R - Steady Red
FR - Flashing Red
DRK - Dark
W - Walk
DW - Don't Walk



MAXTIME TIMING CHART

FEATURE	PHASE 2	4 PED	6	8 PED
Walk *	–	7	–	7
Ped Clear	–	18	–	18
Min Green *	10	7	10	7
Passage *	–	–	–	–
Max 1 *	30	7	30	7
Yellow Change	3.0	3.0	3.0	3.0
Red Clear	1.0	0.0	1.0	0.0
Added Initial *	–	–	–	–
Maximum Initial *	–	–	–	–
Time Before Reduction *	–	–	–	–
Time To Reduce *	–	–	–	–
Minimum Gap	–	–	–	–
Advance Walk	–	–	–	–
Pre Clearance	5	–	5	–
Non Lock Detector	–	X	–	X
Vehicle Recall	MIN RECALL	–	MIN RECALL	–
Dual Entry	–	–	–	–

Serves as Steady Yellow Clearance Time
Serves as All Red Clearance Time
Serves as Flashing Yellow Time

* 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 FACE I.D.

All Heads L.E.D.

12"   16"

21, 22 / 61, 62   P41, P42 / P81, P82

2 Phase
Semi-Actuated
Pedestrian Hybrid Beacon
SR 3174/1501 (Idlewild Road) CLS

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
3. Enable Ped Clear During Red for phase 4 PED and phase 8 PED.
4. Locate the Pedestrian and Crosswalk advance signs (see Figure 1) in accordance with Table 2C-3 in Section 2C.04 of the 2023 MUTCD or as otherwise directed by the Engineer.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated system timing values supersede these values.

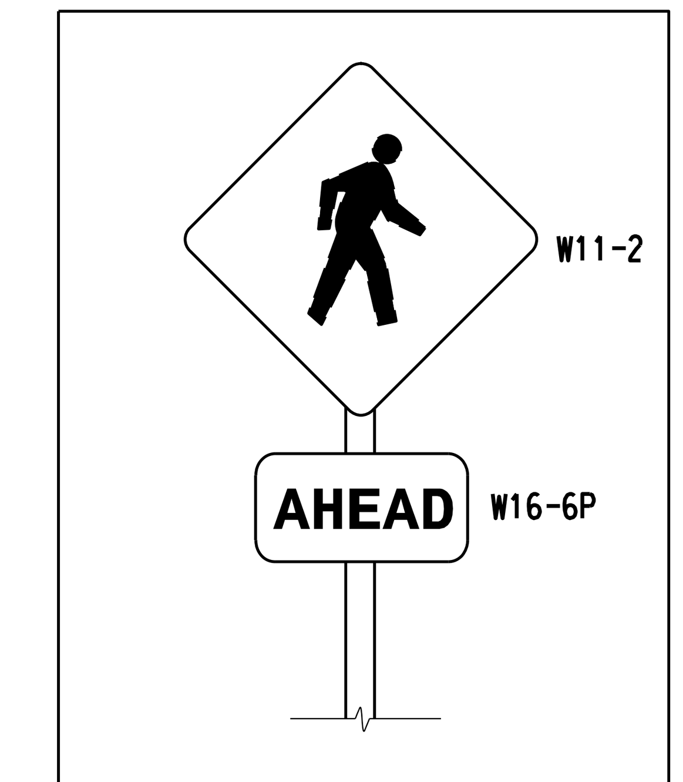


Figure 1

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Type II Signal Pedestal	
	Metal Pole with Mastarm	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
— DD —	Directional Drill	N/A
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
Ⓐ	"STOP ON RED - YIELD ON FLASHING RED AFTER STOP" Sign (R10-23a)	Ⓐ
Ⓑ	Pedestrian Crossing Sign (W11-2) w/ "AHEAD" Plaque (W16-9P) (See Figure 1)	Ⓑ

New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of: Transportation Mobility and Safety Division, Signal Design Section, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SR 3175 (Stallings Road) Pedestrian Hybrid Beacon South of SR 3174 (Idlewild Road)

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025	REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington	REVIEWED BY:

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by: 5DC709A86BCB447...
SIGNATURE 5/12/2025 DATE

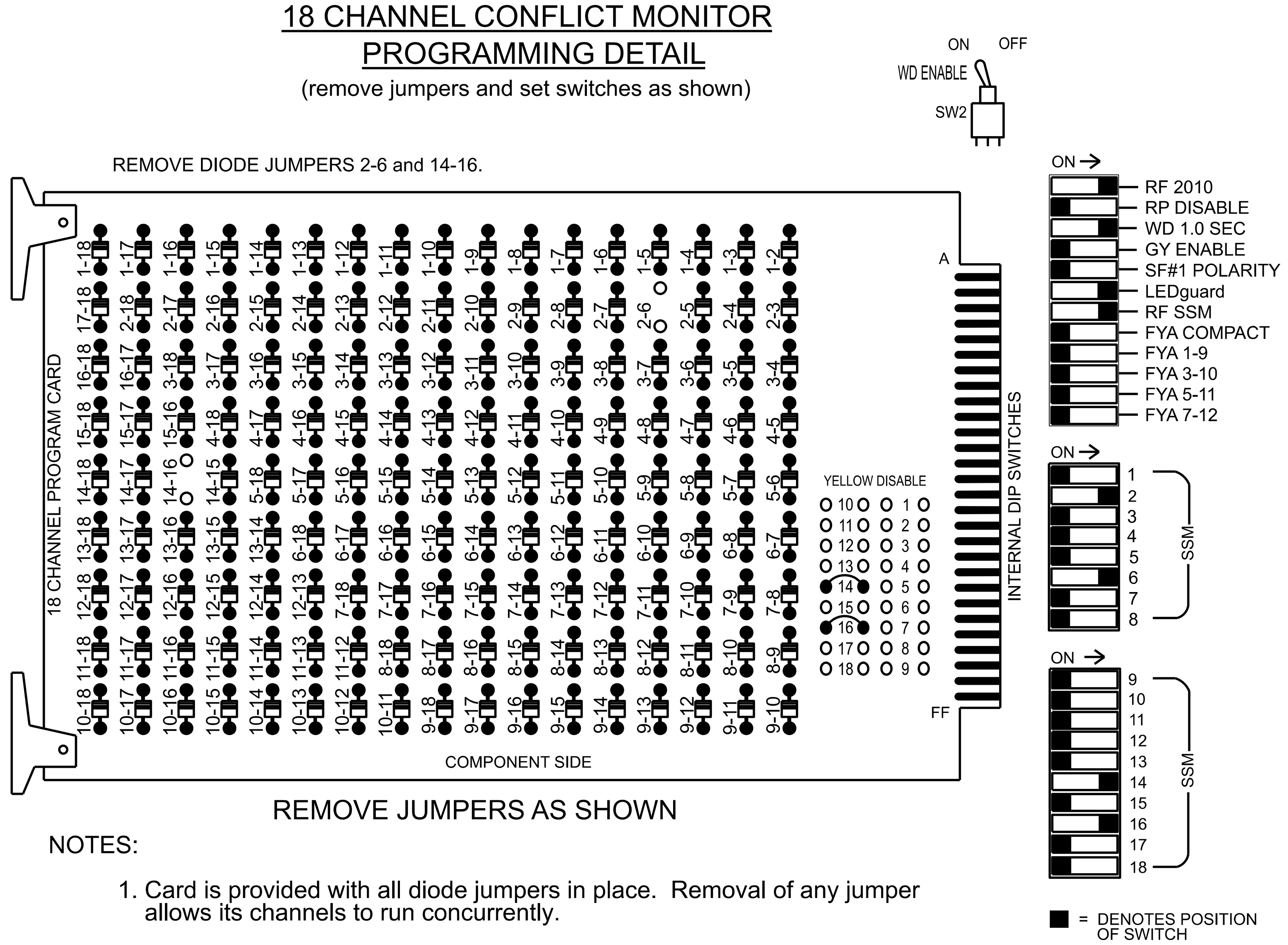
SIG. INVENTORY NO. 10-2589

5/9/2025 11:25:15 AM susan.pennington K:\RAL_TPTO_SIGNALS\011036730 U-4913A\S4 - Signal Design\ORD\4.1 U-4913A_10-2589-2025e.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 4.1

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 the 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 plan.
2. Install 332_NCDOT_HAWK_Default database onto controller.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. Program phases 4 and 8 for No Startup Veh Call and No Startup Ped Call.
5. Program phases 4 and 8 for Ped Clear During Red Clear.
6. The cabinet and controller are part of the SR 3174 / 1501 (Idlewild Road) Closed Loop System.

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	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22 61,62	NU	NU	NC	P41, P42	NU	21,22 61,62	NU	NU	NC	P81, P82	NU	NU	NU	NU	NU	NU
RED		128						134										
YELLOW		129						*										
GREEN		*						*										
RED ARROW																		
YELLOW ARROW																		
FLASHING YELLOW ARROW																		
GREEN ARROW																		
(Don't Walk hand)						104						110						
(Walk person)						106						112						

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

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used.......................... S2, S6, S8, S12
Phases Used.......................................2, 4*, 4PED, 6, 8*, 8PED
Overlaps ....None

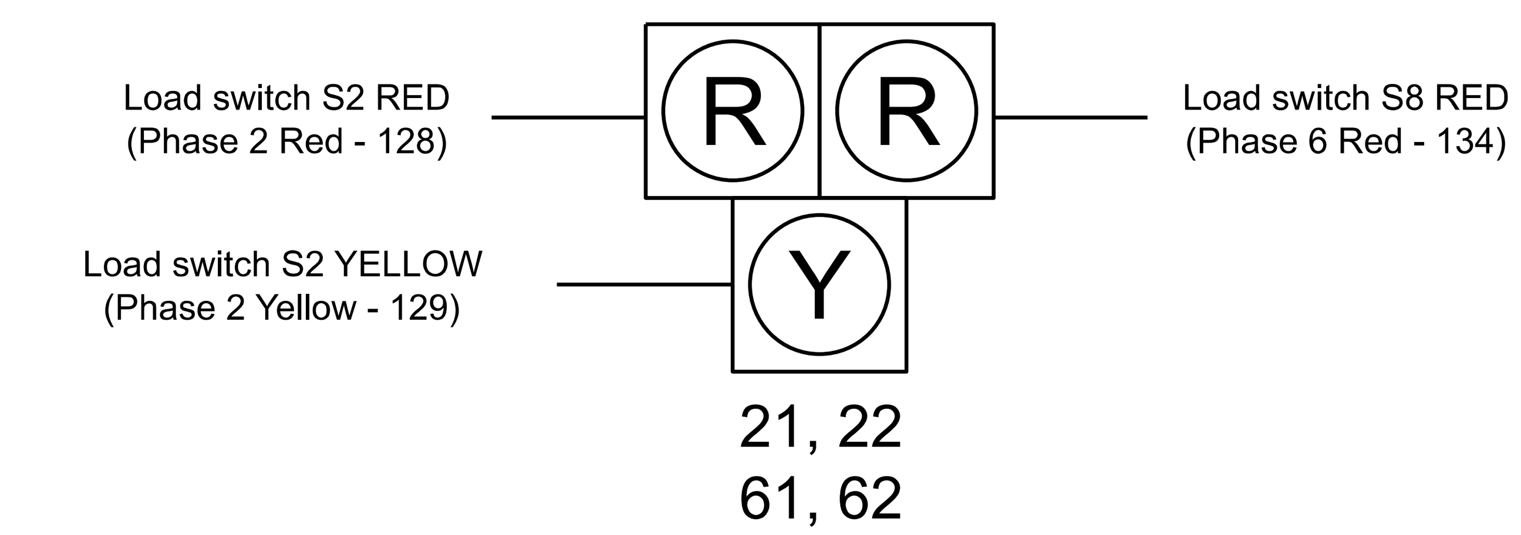
* Phase used for timing purposes only.

TIMING INTERVAL

PHASE 2+6 = DARK DISPLAY
PHASE 2+6 PRE CLEARANCE = FLASHING YELLOW DISPLAY
PHASE 2+6 YELLOW CHANGE = STEADY YELLOW DISPLAY
PHASE 2+6 RED CLEAR THROUGH 4+8 WALK = STEADY RED DISPLAY
PED 4+8 DON'T WALK = ALTERNATING FLASHING RED DISPLAY

SIGNAL HEAD WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	NOT USED	FS DC ISOLATOR
	L												Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
PED PUSH BUTTONS												
P41; P42	TB8-5,6	I12L	69	35	4	PED 4,8*						
P81; P82	TB8-8,9	I13L	70	36	8	PED 8,4*						

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

* FOR THE ABOVE DETECTORS TO CALL ANOTHER PHASE, SCROLL OVER AND ENTER SECOND PHASE IN "ADDITIONAL CALL PHASES" COLUMN.

INPUT FILE POSITION LEGEND: J2L
- FILE J
- SLOT 2
- LOWER

OPERATIONAL NOTES

1. In order for the controller to perform the Pedestrian Hybrid Beacon (HAWK signal) sequence, the 332_NCDOT_HAWK_Default database must be installed on the controller.
2. The only Phase 6 load switch output that is being used drives one of the red signal faces of each signal head.
3. The Logic Processor flashes Phase 2 Yellow during the Phase 2 Pre-Clearance interval. Phase 2 Yellow drives the solid yellow signal face during the Phase 2 vehicle Yellow Change.
4. The Phase 2 and Phase 6 Red outputs drives the solid Red displays during the Phase 2 and 6 Red Clear and Ped 4 and 8 Walk interval. The Logic Processor flashes Phase 2 and 6 Red Outputs in a wig-wag pattern during Phase 4+8 Ped Clear interval.
5. The controller must be programmed for Ped Clear During Red Clear for Pedestrian Phases 4 and 8 so that Red displays continue to flash during Phases 4 and 8 Yellow Change and Red Clear.
6. Make sure that all Phase 2 and Phase 6 timings match each other and that all Phase 4 and Phase 8 timings match each other.
7. The Ped 4 push button is programmed to call Ped 4 and Ped 8. The Ped 8 push button is programmed to call Ped 8 and Ped 4.

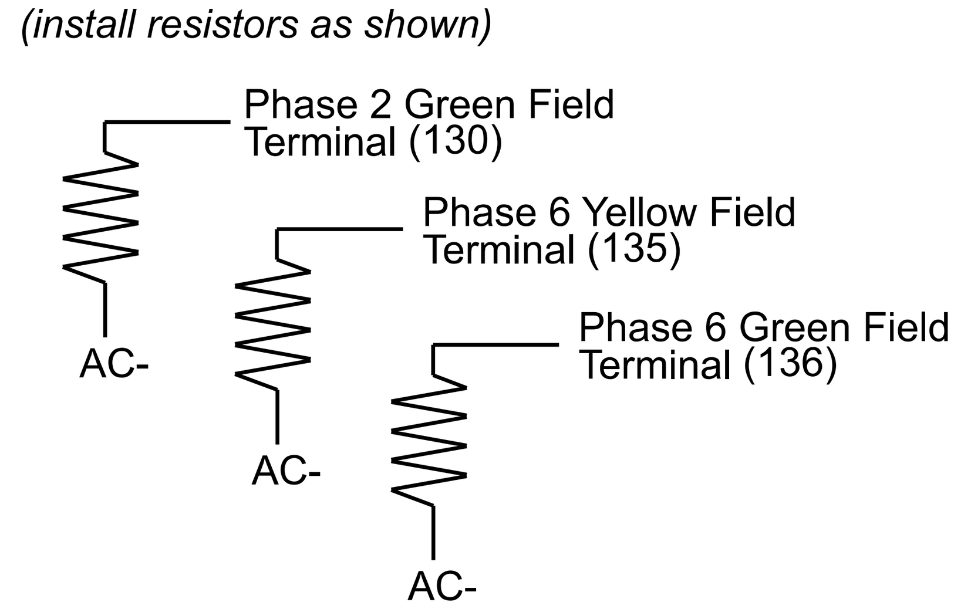
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES	
Value (ohms)	Wattage
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2589
DESIGNED: February 2025
SEALED: 05/12/2025
REVISED: N/A

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of: Transportation Mobility and Safety Division, ITS & Signals Management Section, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy.Garner,NC 27529

SR 3175 (Stallings Road)
Pedestrian Hybrid Beacon
South of SR 3174 (Idlewild Road)

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025	REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

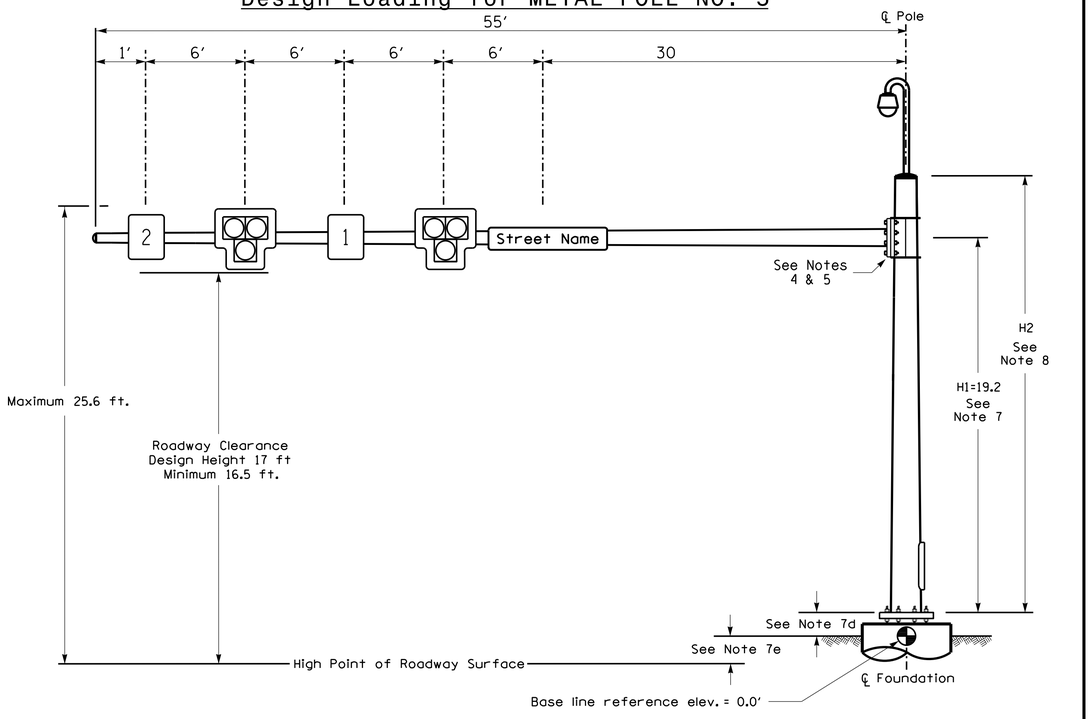
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 5DC709A86BCB447... 5/12/2025 DATE

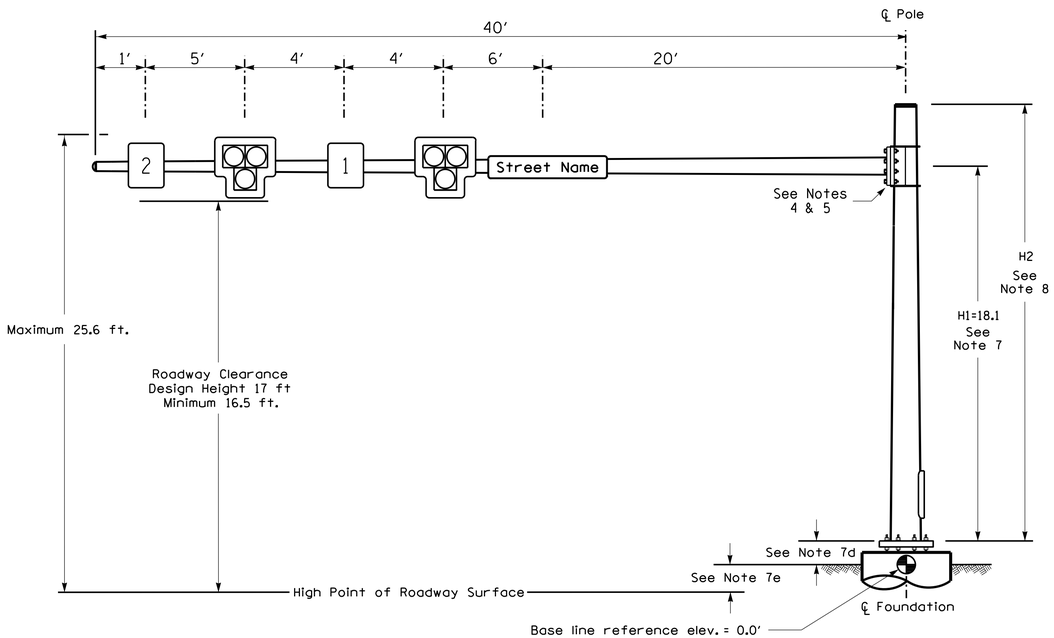
SIG. INVENTORY NO. 10-2589

Design Loading for METAL POLE NO. 5



Elevation View

Design Loading for METAL POLE NO. 6



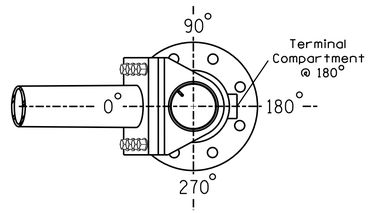
Elevation View

SPECIAL NOTE

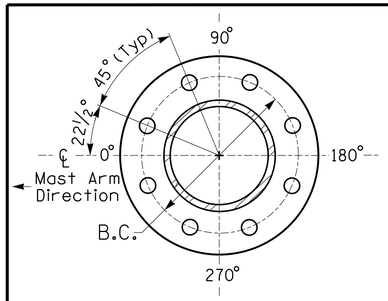
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 5	Pole 6
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.7 ft.	-0.4 ft.
Elevation difference at Edge of travelway or face of curb	+1.3 ft.	-0.3 ft.

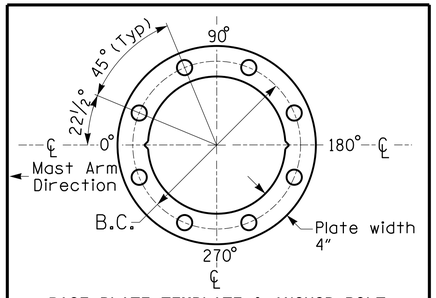


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

METAL POLES No. 5 and 6

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 4.2

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9 S.F.	36.0"W X 36.0"L	75 LBS
1	SIGN RIGID MOUNTED	5.0 S.F.	24.0"W X 30.0"L	11 LBS
2	SIGN RIGID MOUNTED	4.5 S.F.	36.0"W X 18.0"L	10 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS
	CCTV CAMERA ℄ POLE-MOUNTED	1.6 S.F.	12.0"W X 74.4"L	45 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2024 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

2. 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.
3. Design all signal supports using force ratios that do not exceed 0.9.
4. 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.
5. 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.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. 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.
9. 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.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

PLANS PREPARED IN THE OFFICE OF:
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NC License #F-0102
421 Fayetteville Street, Suite 600
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NCDOT Wind Zone 5 (110 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 3175 (Stallings Road)
Pedestrian Hybrid Beacon
South of SR 3174 (Idlewild Road)

Division 10 Mecklenburg County Stallings

PLAN DATE:	February 2025	REVIEWED BY:	KP Baumann
PREPARED BY:	SP Pennington	REVIEWED BY:	

SCALE 0 N/A N/A

REVISIONS	INIT.	DATE

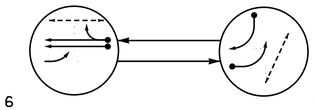
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by: 5DC709A86BC8447...
5/12/2025
SIGNATURE DATE

SIG. INVENTORY NO. 10-2589

5/13/2025 12:56:45 PM susan.pennington K:\#DAL_TPTO#_S\GNALS\#01103G730 U-4913A#54 - Signal Design#DD#4.2 U-4913A_10-2589-2025#p.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 5.0

DEFAULT PHASING DIAGRAM



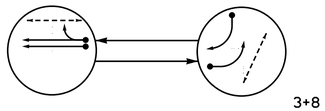
PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 6	PHASE 3+8	PHASE FLASH
31, 32	FY	—	R
61	↑	R	R
62	G	R	R
81, 82	R	→	R
P61, P62	W	DW	DRK
P81, P82	DW	W	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 6	PHASE 3+8	PHASE FLASH
31, 32	R	—	R
61	↑	R	R
62	G	R	R
81, 82	R	→	R
P61, P62	W	DW	DRK
P81, P82	DW	W	DRK

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR: ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	PROGRAMMING: CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
3A✱	6X40	0	✱	X	3	15.0*	-	X	-	X	-	-
8A✱	6X40	0	✱	X	8	15.0	-	X	-	X	-	-

* Disable delay during Alternate Phasing Operation.
✱ Microwave Detection Zone

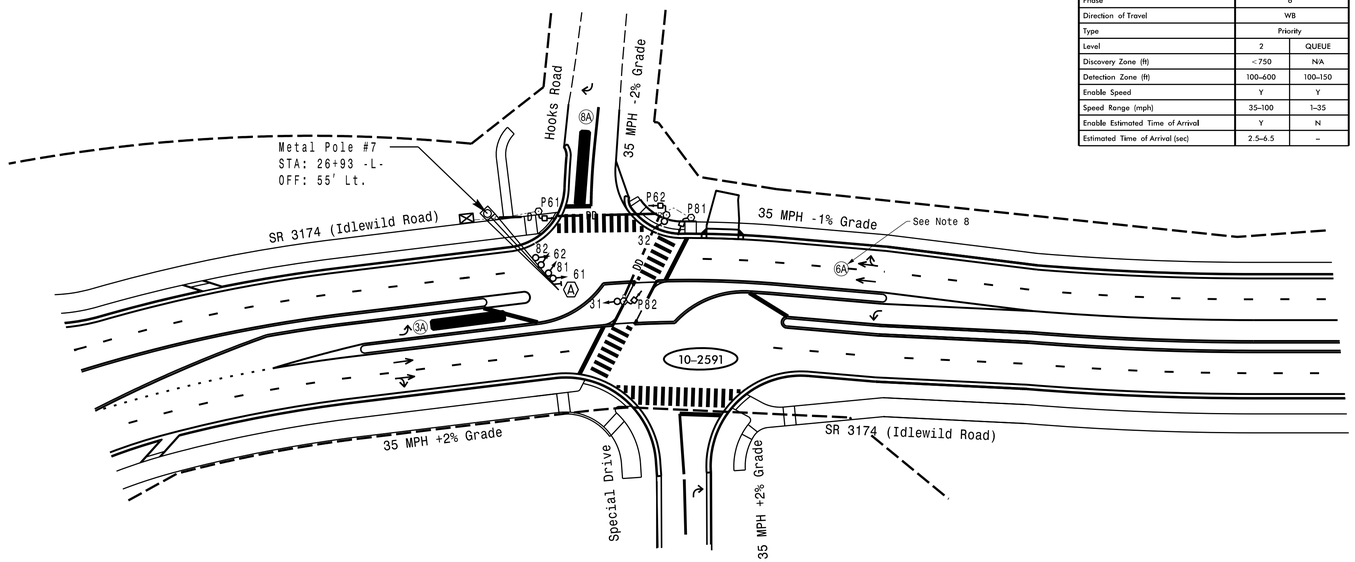
Advance Microwave Detection

FUNCTION	Sensor 1 (6A)	
Channel	1	
Phase	6	
Direction of Travel	WB	
Type	Priority	
Level	2	QUEUE
Discovery Zone (ft)	< 750	N/A
Detection Zone (ft)	100–600	100–150
Enable Speed	Y	Y
Speed Range (mph)	35–100	1–35
Enable Estimated Time of Arrival	Y	N
Estimated Time of Arrival (sec)	2.5–6.5	–

2 Phase
Fully Actuated w/
Alternate Phasing
SR 3174/1501(Idlewild Road) CLS

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Set all detector units to presence mode.
3. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
5. Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
6. The Division Traffic Engineer will determine the hours of use for each phasing plan.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.



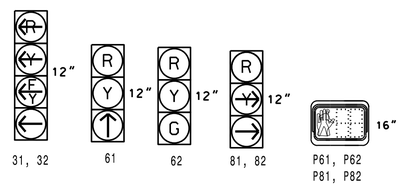
MAXTIME TIMING CHART

FEATURE	PHASE 3	PHASE 6	PHASE 8
Walk *	–	14	7
Ped Clear	–	10	5
Min Green *	7	10	7
Passage *	2.0	3.0	2.0
Max 1 *	25	90	25
Yellow Change	3.0	3.9	3.0
Red Clear	2.1	1.5	2.1
Added Initial *	–	–	–
Maximum Initial *	–	–	–
Time Before Reduction *	–	–	–
Time To Reduce *	–	–	–
Minimum Gap	–	–	–
Advance Walk	–	7	–
Non Lock Detector	X	–	X
Vehicle Recall	–	MIN RECALL	–
Dual Entry	X	–	X

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

SIGNAL FACE I.D.

All Heads L.E.D.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
⬡	Type II Signal Pedestal	⬢
▭	Metal Pole with Mastarm	▭
▬	Non-Intrusive Detection Zone	▬
⊠	Controller & Cabinet	⛶
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
DD	Directional Drill	N/A
N/A	Right of Way	- - - - -
→	Directional Arrow	→
N/A	Curb Ramp	♿
Ⓐ	No Left Turn Sign (R3-2)	Ⓐ

New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SR 3174 (Idlewild Road)
Westbound at
Hooks Road

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025 REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by: 5DC709A86BC8447
5/12/2025
SIGNATURE DATE
SIG. INVENTORY NO. 10-2592

PLANS PREPARED IN THE OFFICE OF:
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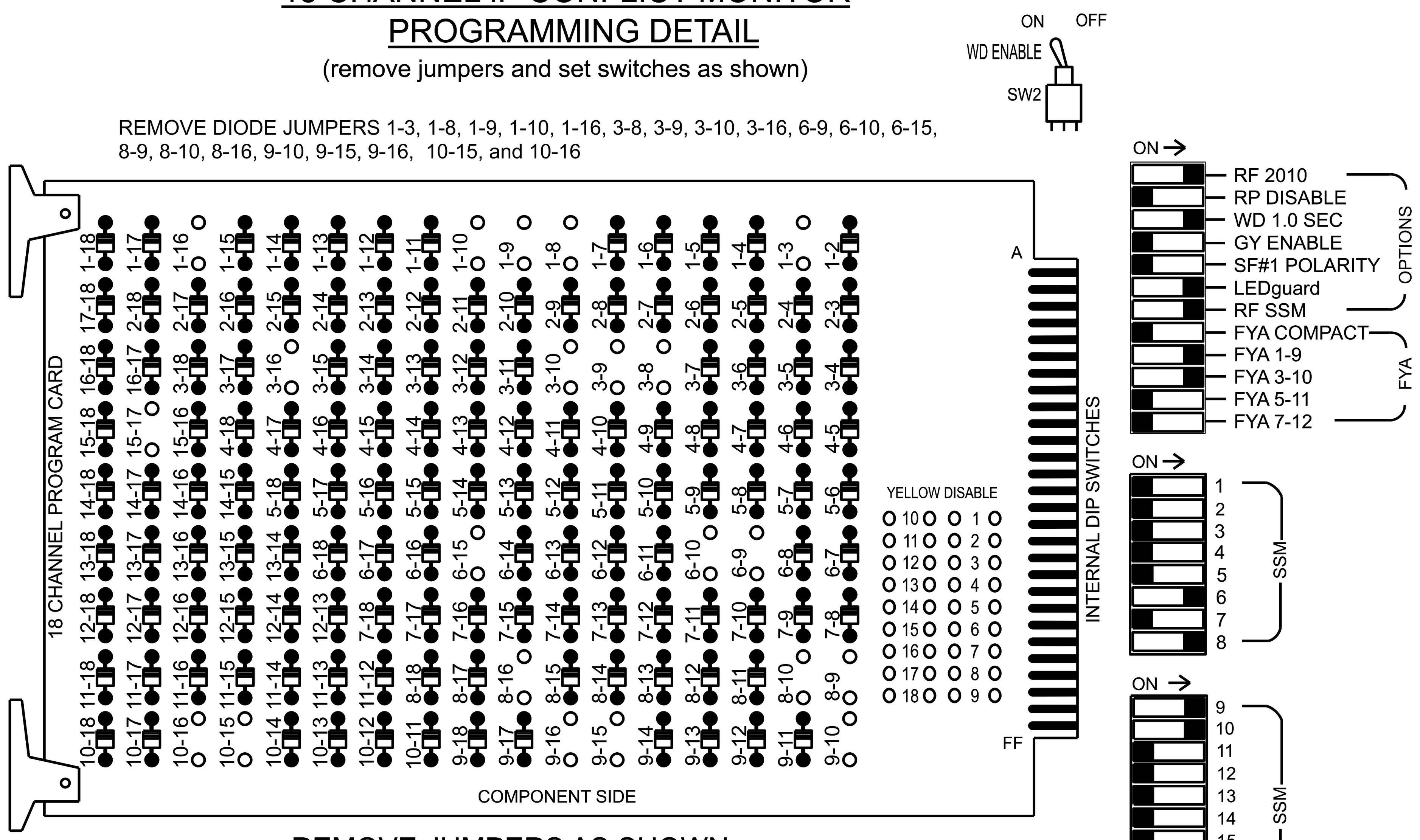
750 N.Greenfield Pkwy.Garner,NC 27529

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 5.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-3, 1-8, 1-9, 1-10, 1-16, 3-8, 3-9, 3-10, 3-16, 6-9, 6-10, 6-15, 8-9, 8-10, 8-16, 9-10, 9-15, 9-16, 10-15, and 10-16



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 the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 6 Green No Walk.
3. Program phases 3 and 8 for Dual Entry.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
5. The cabinet and controller are part of the SR 3174 / 1501 (Idlewild Road) Closed Loop System.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software..Q-Free MAXTIME
Cabinet Mount.....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S1, S4, S8, S9, S11, S12, AUX S1 AUX S2
Phases Used..3, 6, 6PED, 8, 8PED
Overlap "1"...*
Overlap "2"...*
Overlap "3"...Not Used
Overlap "4"...Not Used
Overlap "7"...*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8		S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6		15	7	8	16	9	10	17	11	12	18
PHASE	OL7	2	2 PED	3	4	4 PED	5	6		6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	32★	NU	NU	31★	NU	NU	NU	61	62	P61, P62	NU	81,82	P81, P82	32★	31★	NU	NU	NU	NU
RED	·							134	134			107		·		·			·
YELLOW	*			*				135	135					·		·			·
GREEN	·			·				·	136					·		·			·
RED ARROW	·			·				·	·					A121	A124				
YELLOW ARROW	·			·				·	·			108		A122	A125				
FLASHING YELLOW ARROW	·			·				·	·					A123	A126				
GREEN ARROW	127			118				136	·			109		·					
(Don't Walk)	·			·				·	·	119			110	·					
(Walk)	·			·				·	·	121			112	·					

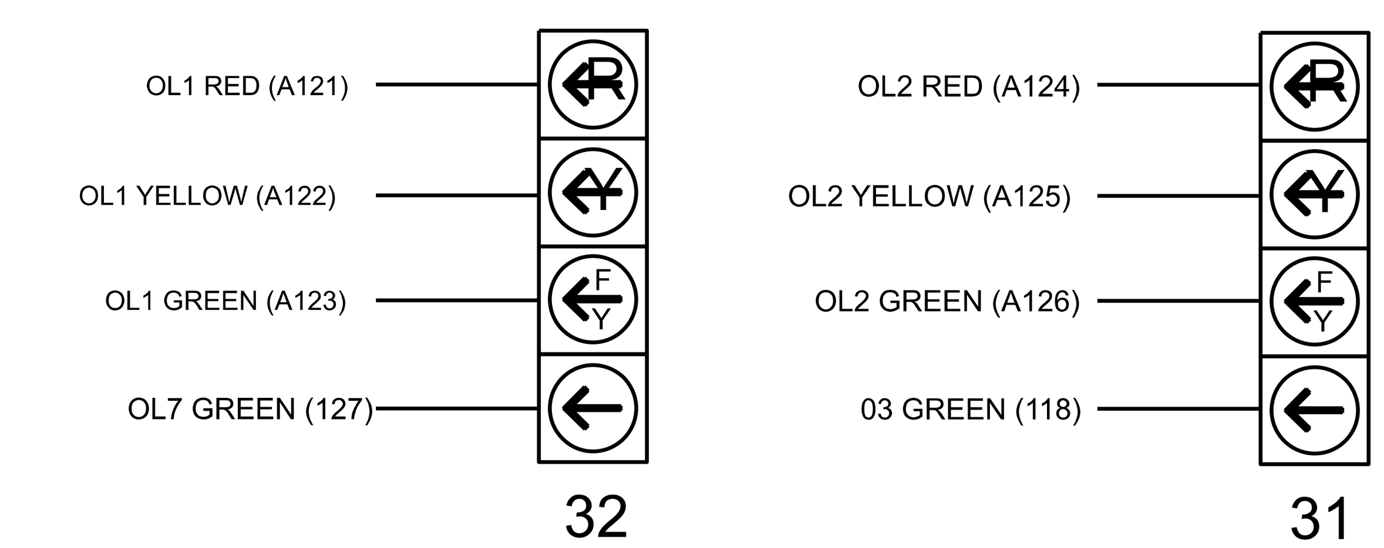
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 3 3A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
"I"	L					NOT USED								Ø8 PED DC ISOLATOR	ST DC ISOLATOR
"J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
"J"	L														

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
3A	TB4-5,6	I5U	58	20	7 ★	3	15.0		X		X	
PED PUSH BUTTONS												
P61;P62	TB8-7,9	I13U	68	34	6	PED 6						
P81;P82	TB8-8,9	I13L	70	36	8	PED 8						

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.

★ For the detector to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

SPECIAL DETECTOR NOTE

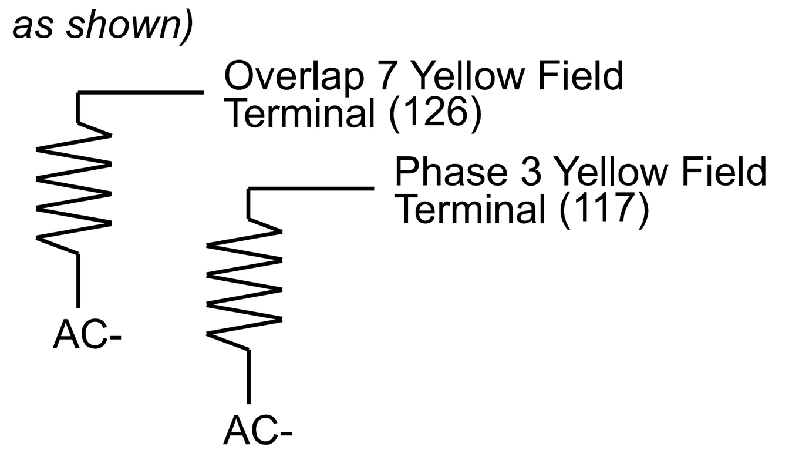
Install a multi-zone microwave detection system for all vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For zone 3A, inputs associated with typical detector slot for an NCDOT installation is compatible with time of day instructions located on sheet 2 of the electrical detail.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES	
Value (ohms)	Wattage
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters	Unit Flash Parameters
StartUp Clearance Hold	All Red Flash Exit Time
6	6

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2592
DESIGNED: February 2025
SEALED: 05/12/2025
REVISED: N/A

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
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Raleigh, NC 27601
(919) 677-2000

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division, ITS & Signals Management Section — State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

SR 3174 (Idlewild Road)
Westbound at
Hooks Road

Division 10 | Mecklenburg County | Stallings

PLAN DATE: February 2025	REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by:
5DC709A86BCB447...
5/12/2025
DATE

SIG. INVENTORY NO. 10-2592

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 5.2

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	7
Type	FYA 4 - Section	FYA 4 - Section	Normal
Included Phases	6	6	3
Modifier Phases	-	3	-
Modifier Overlaps	7	-	-
Trail Green	0	0	0
Trail Yellow	0:0	0:0	0:0
Trail Red	0:0	0:0	0:0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	7
Type	FYA 4 - Section	FYA 4 - Section	Normal
Included Phases	-	-	3
Modifier Phases	-	3	-
Modifier Overlaps	7	-	-
Trail Green	0	0	0
Trail Yellow	0:0	0:0	0:0
Trail Red	0:0	0:0	0:0

← NOTICE INCLUDED PHASES

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 3A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

Plan 2

	Detector	Call Phase	Delay
3A	7	3	0

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

* The Pattern number(s) are to be determined by the Division Traffic Engineer.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phases for heads 31 and 32 to run protected turns only.

VEH DET PLAN 2: Reduce delay time for phase 3 call on loop 3A to 0 seconds.

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

NOTICE OVERLAP 7 ASSIGNED TO CHANNEL 1 →

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Overlap	7	·	X	X	1
2	Phase Vehicle	2	·	X	·	2
3	Phase Vehicle	3	·	X	X	3
4	Phase Vehicle	4	·	X	·	4
5	Phase Vehicle	5	·	X	·	5
6	Phase Vehicle	6	·	X	X	6
7	Phase Vehicle	7	·	X	·	7
8	Phase Vehicle	8	·	X	X	8
9	Overlap	1	·	X	X	9
10	Overlap	2	·	X	X	10
11	Overlap	3	·	X	·	11
12	Overlap	4	·	X	·	12
13	Phase Ped	2	·	·	·	13
14	Phase Ped	4	·	·	·	14
15	Phase Ped	6	·	·	·	15
16	Phase Ped	8	·	·	·	16
17	Overlap	5	·	X	X	17
18	Overlap	6	·	X	·	18

NOTICE: FLASH RED

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2592
DESIGNED: February 2025
SEALED: 05/12/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 2

PLANS PREPARED IN THE OFFICE OF:
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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 3174 (Idlewild Road)
Westbound at
Hooks Road

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025	REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington	REVIEWED BY:

REVISIONS	INIT.	DATE

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SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by:
5DC709A86BCB447...
5/12/2025
DATE

SIG. INVENTORY NO. 10-2592

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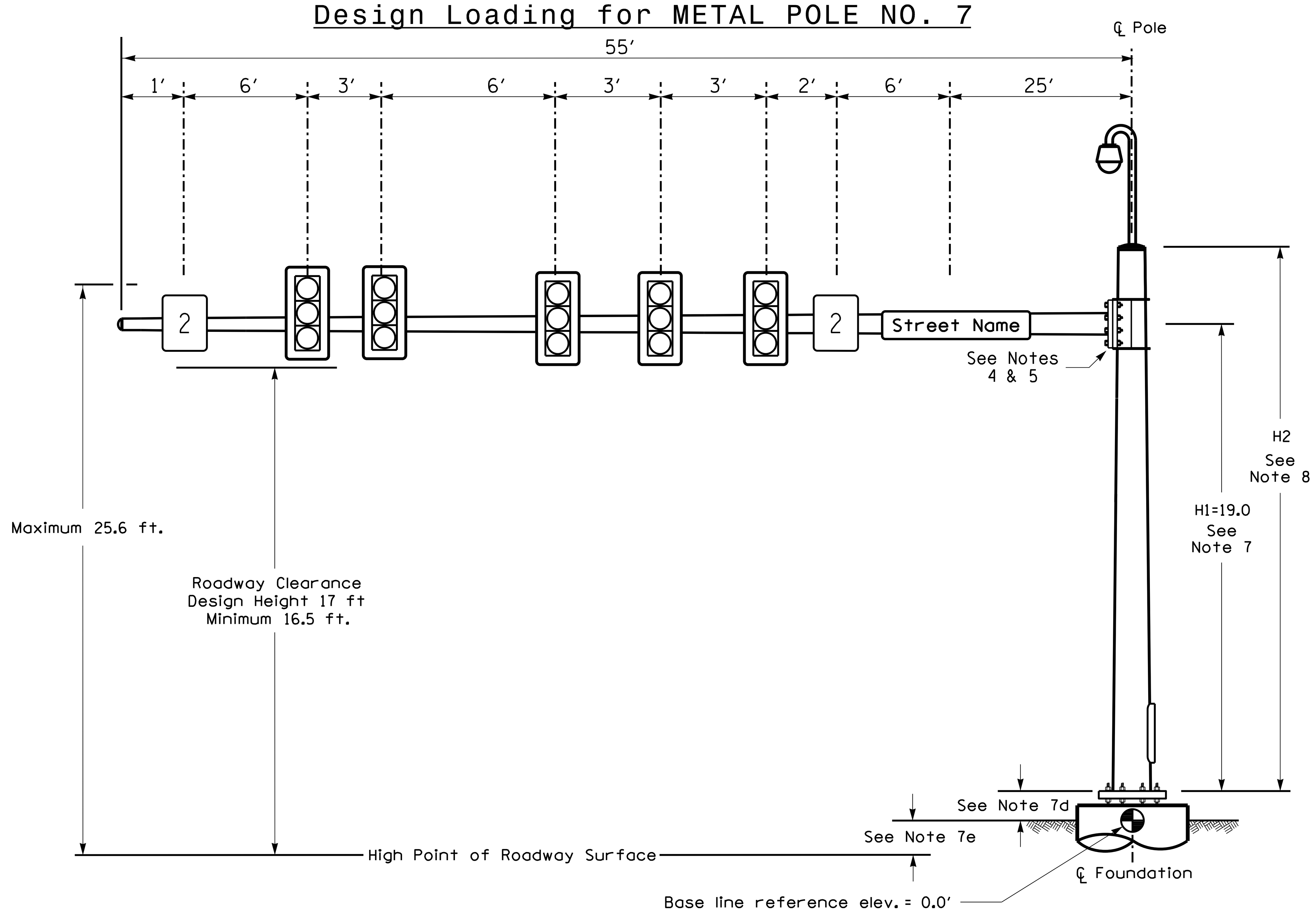
METAL POLE No. 7

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 5.3

Design Loading for METAL POLE NO. 7



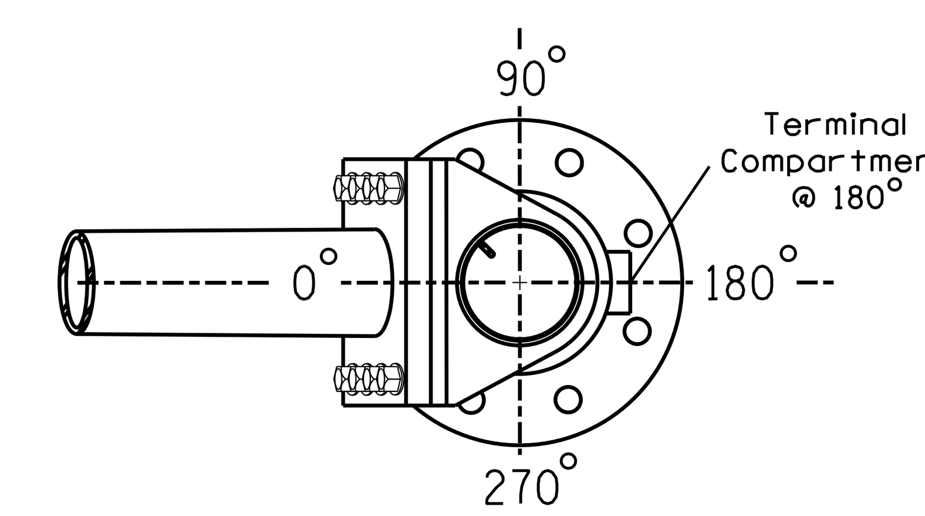
Elevation View

SPECIAL NOTE

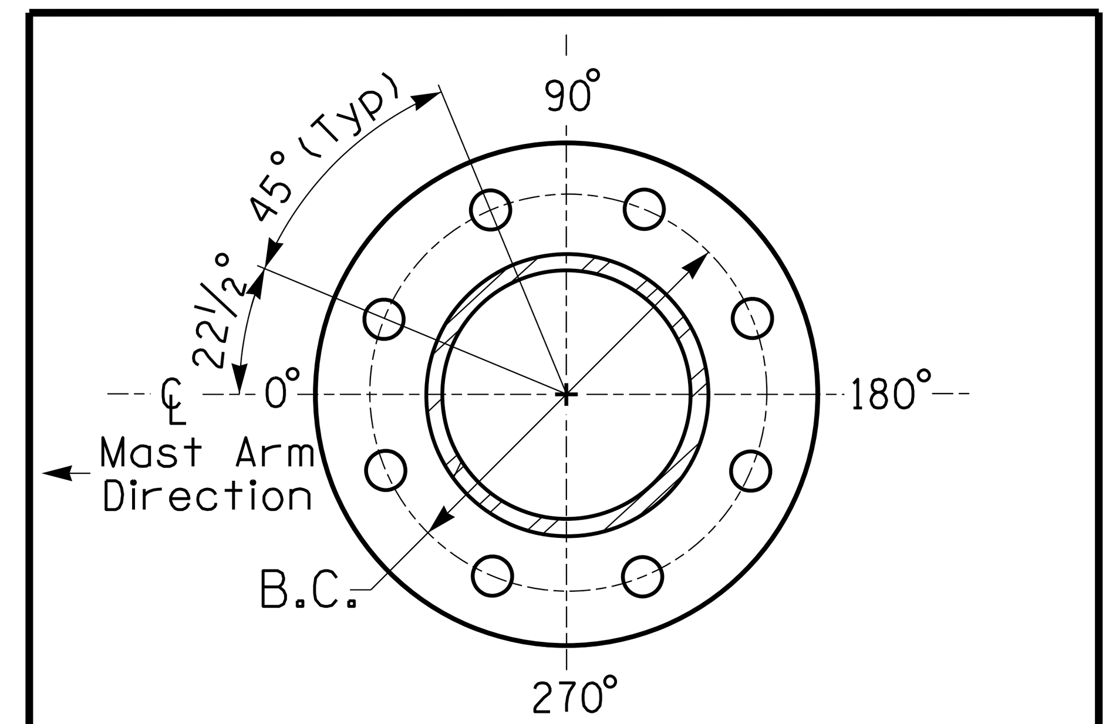
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 7	
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	0.0 ft.	
Elevation difference at Edge of travelway or face of curb	+0.4 ft.	

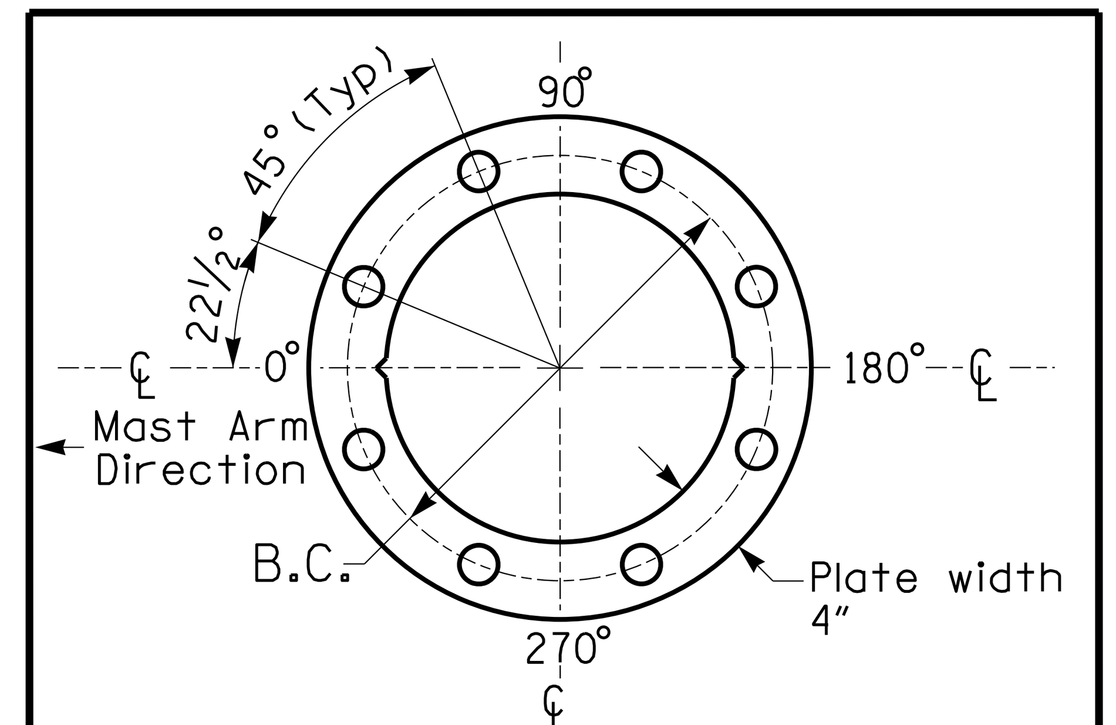


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
(signal head)	RIGID MOUNTED SIGNAL HEAD 8″-3 SECTION-WITH BACKPLATE	6.4 S.F.	22.0″W X 42.0″L	43 LBS
2	SIGN RIGID MOUNTED	4.5 S.F.	36.0″W X 18.0″L	10 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0″W X 96.0″L	36 LBS
(camera)	CCTV CAMERA ℄ POLE-MOUNTED	1.6 S.F.	12.0″W X 74.4″L	45 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2024 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

2. 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.
3. Design all signal supports using force ratios that do not exceed 0.9.
4. 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.
5. 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.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. 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.
9. 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.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

PLANS PREPARED IN THE OFFICE OF:
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NCDOT Wind Zone 5 (110 mph)

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

750 N.Greenfield Pkwy.Garner,NC 27529

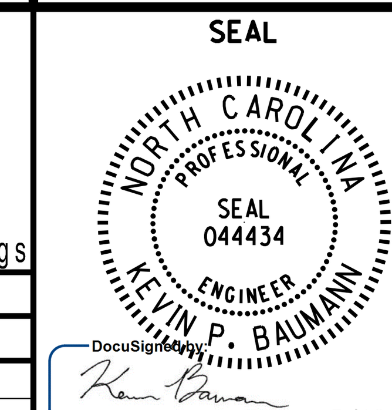
SR 3174 (Idlewild Road)
Westbound at
Hooks Road

Division 10 Mecklenburg County Stallings

PLAN DATE:	February 2025	REVIEWED BY:	KP Baumann
PREPARED BY:	SP Pennington	REVIEWED BY:	

SCALE	REVISIONS	INIT.	DATE
0 N/A — N/A			

SEAL



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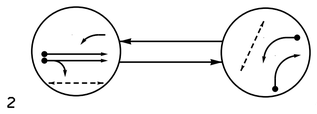
SIGNATURE	DATE
	5/12/2025

SIG. INVENTORY NO. 10-2592

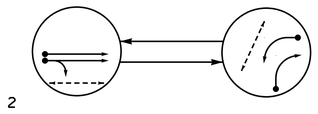
PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 6.0

DEFAULT PHASING DIAGRAM



DEFAULT TABLE OF OPERATION			
SIGNAL FACE	PHASE 2	PHASE 4+7	FLASH
21	↑	R	R
22	G	R	R
41, 42	R	—	R
71, 72	~~F Y~~	—	~~R~~
P21,P22	W	DW	DRK
P41,P42	DW	W	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE TABLE OF OPERATION			
SIGNAL FACE	PHASE 2	PHASE 4+7	FLASH
21	↑	R	R
22	G	R	R
41, 42	R	—	R
71, 72	~~R~~	—	~~R~~
P21,P22	W	DW	DRK
P41,P42	DW	W	DRK

PHASING DIAGRAM DETECTION LEGEND

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

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
4A✱	6X40	0	✱	X	4	15.0	-	X	-	X	-	-
7A✱	6X40	0	✱	X	7	15.0*	-	X	-	X	-	-

* Disable delay during Alternate Phasing Operation.
✱ Microwave Detection Zone

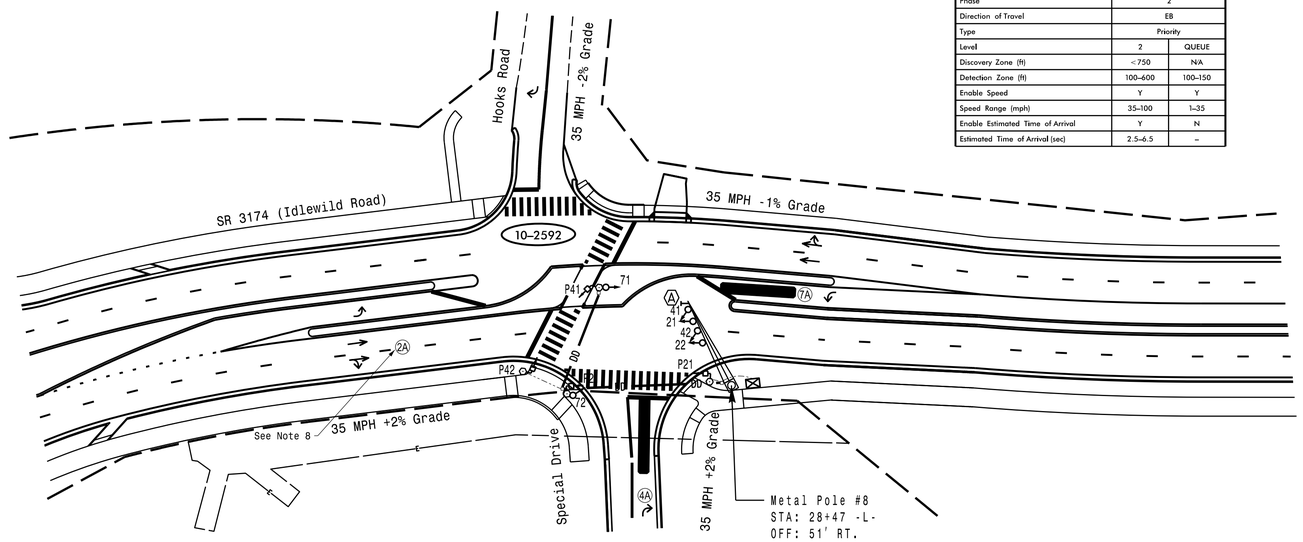
2 Phase Fully Actuated w/ Alternate Phasing SR 3174/1501(Idlewild Road) CLS

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Set all detector units to presence mode.
3. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
5. Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
6. The Division Traffic Engineer will determine the hours of use for each phasing plan.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

Advance Microwave Detection

FUNCTION	Sensor 1 (2A)	
Channel	1	
Phase	2	
Direction of Travel	EB	
Type	Priority	
Level	2	QUEUE
Discovery Zone (ft)	<750	N/A
Detection Zone (ft)	100–600	100–150
Enable Speed	Y	Y
Speed Range (mph)	35–100	1–35
Enable Estimated Time of Arrival	Y	N
Estimated Time of Arrival (sec)	2.5–6.5	–



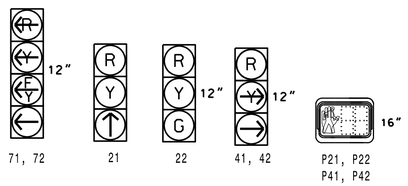
MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 7
Walk *	14	7	–
Ped Clear	17	6	–
Min Green *	10	7	7
Passage *	3.0	2.0	2.0
Max 1 *	90	25	25
Yellow Change	3.7	3.0	3.0
Red Clear	1.9	2.4	2.4
Added Initial *	–	–	–
Maximum Initial *	–	–	–
Time Before Reduction *	–	–	–
Time To Reduce *	–	–	–
Minimum Gap	–	–	–
Advance Walk	7	–	–
Non Lock Detector	–	X	X
Vehicle Recall	MIN RECALL	–	–
Dual Entry	–	X	X

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

SIGNAL FACE I.D.

All Heads L.E.D.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□	Pedestrian Signal Head With Push Button & Sign	■
⬡	Type II Signal Pedestal	⬢
○▭	Metal Pole with Mastarm	●▭
▬	Non-Intrusive Detection Zone	▬
⊠	Controller & Cabinet	⛶
□	Junction Box	■
----	2-in Underground Conduit	----
—DD—	Directional Drill	N/A
N/A	Right of Way	——
N/A	Permanent Easement	—E—
→	Directional Arrow	→
N/A	Curb Ramp	⩚
Ⓐ	No Left Turn Sign (R3-2)	Ⓐ

New Installation

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Prepared for the Offices of: Transportation Mobility and Safety Division, North Carolina Department of Transportation, Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 3174 (Idlewild Road) Eastbound at Special Drive

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025 REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by: 5DC70A4B9BC8447...
5/12/2025
SIGNATURE DATE

SIG. INVENTORY NO. 10-2591

PLANS PREPARED IN THE OFFICE OF:
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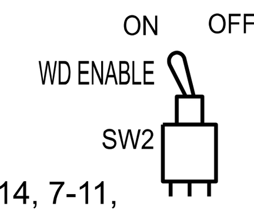
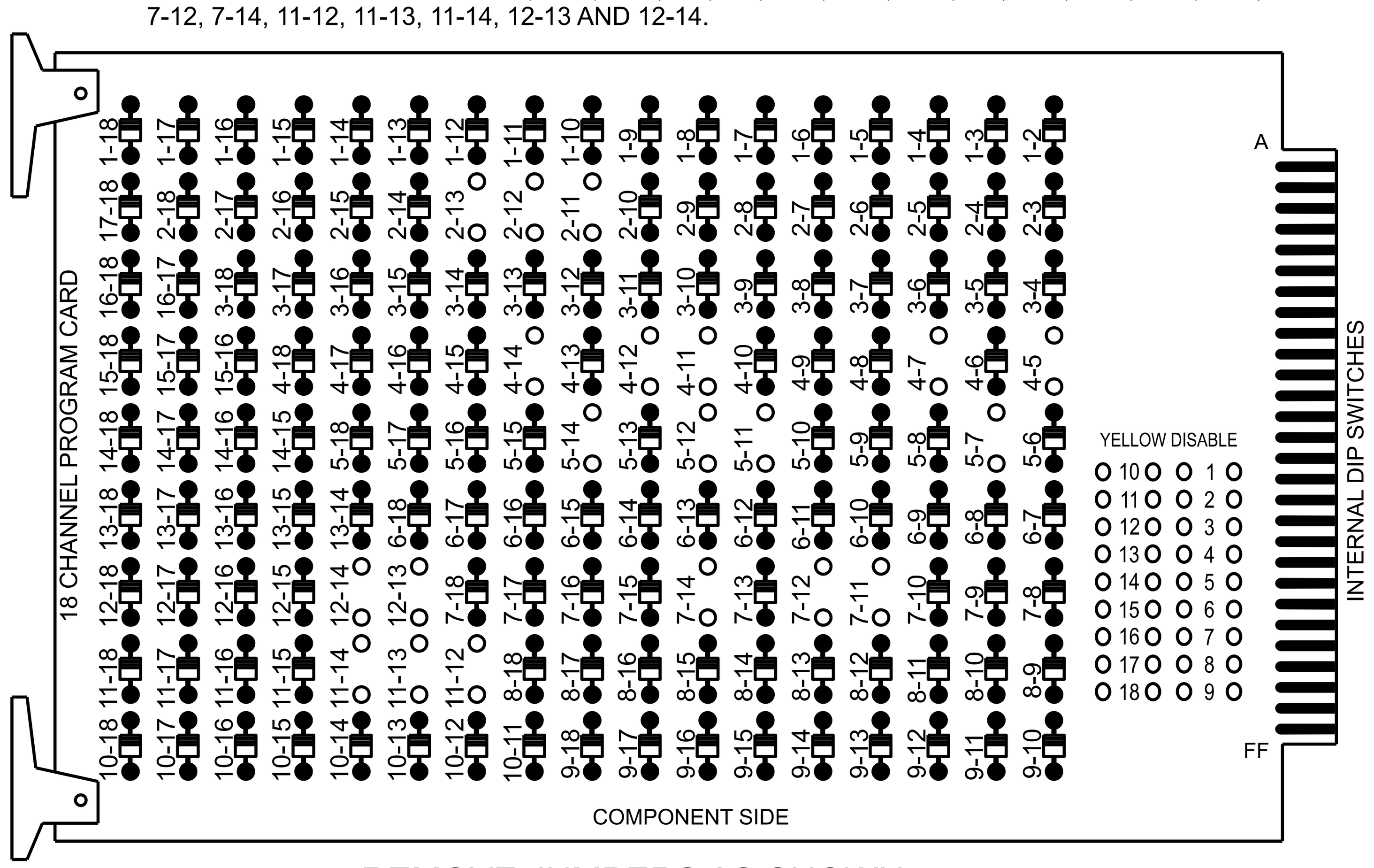
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

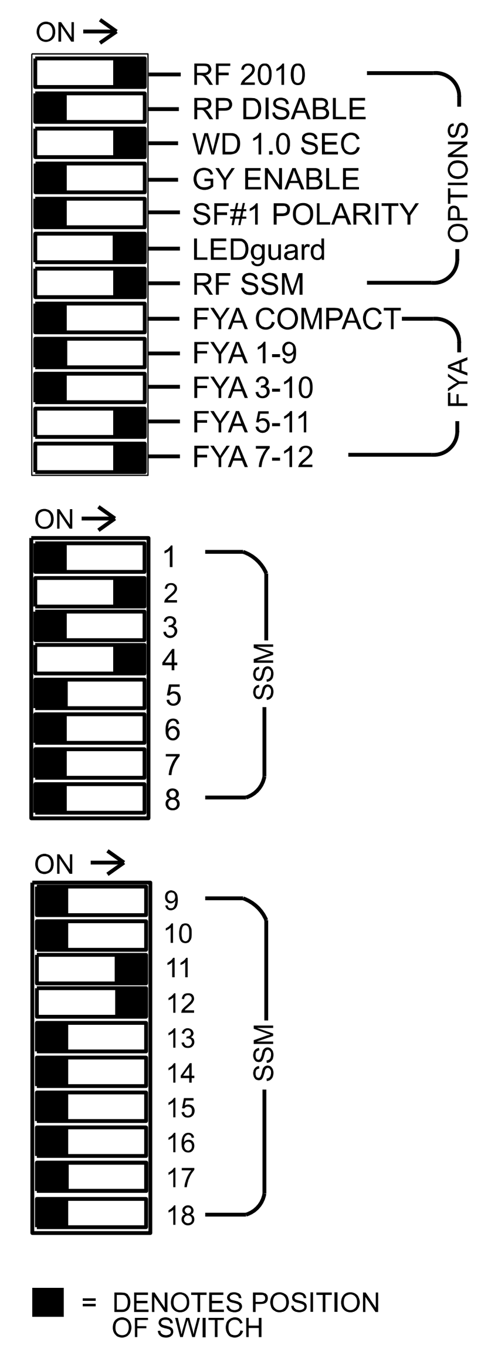
(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-11, 2-12, 2-13, 4-5, 4-7, 4-11, 4-12, 4-14, 5-7, 5-11, 5-12, 5-14, 7-11, 7-12, 7-14, 11-12, 11-13, 11-14, 12-13 AND 12-14.





REMOVE JUMPERS AS SHOWN



NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all heads vehicle load switches in the output file. The installer shall verify that signal flash in accordance with the signal plan.
2. Program phases 4 and 7 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
5. The cabinet and controller are part of the SR 3174 / 1501 (Idlewild Road) Closed Loop System

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet..332 w/ Aux
Software..Q-Free MAXTIME
Cabinet Mount..................................Base
Output File Positions.........................18 With Aux. Output File
Load Switches Used..........................S2, S3, S5, S6, S7, S10, AUX S4, AUX S5
Phases Used......................................2, 2PED, 4, 4PED, 7
Overlap "1"..NOT USED
Overlap "2"..NOT USED
Overlap "3"..*
Overlap "4"..*
Overlap "7"..*

*See overlap programming detail on sheet 2.

SIGNAL HEAD HOOK-UP CHART

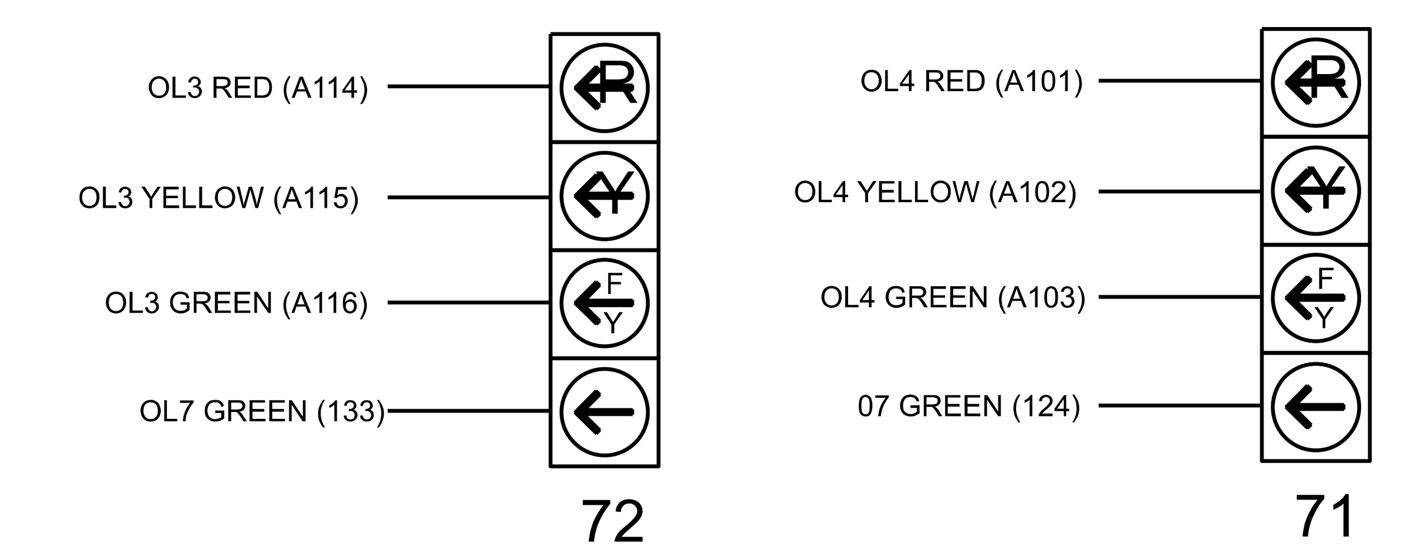
LOAD SWITCH NO.	S1	S2		S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2		13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2		2 PED	3	4	4 PED	OL7	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21	22	P21, P22	NU	41,42	P41, P42	72★	NU	NU	71★	NU	NU	NU	NU	NU	72★	71★	NU
RED		128	128			101													
YELLOW		129	129					*			*								
GREEN			130																
RED ARROW																	A114	A101	
YELLOW ARROW						102											A115	A102	
FLASHING YELLOW ARROW																	A116	A103	
GREEN ARROW		130				103		133			124								
(Don't Walk hand)				113			104												
(Walk person)				115			106												

NU = Not Used
NC = No Connection

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	SLOT EMPTY	FS DC ISOLATOR
	L												Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 7 7A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L					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 POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
7A	TB5-5,6	J5U	57	19	21 ★	7	15.0		X		X	
PED PUSH BUTTONS												
P21;P22	TB8-4,6	I12U	67	33	2	PED 2						
P41;P42	TB8-5,6	I12L	69	35	4	PED 4						

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

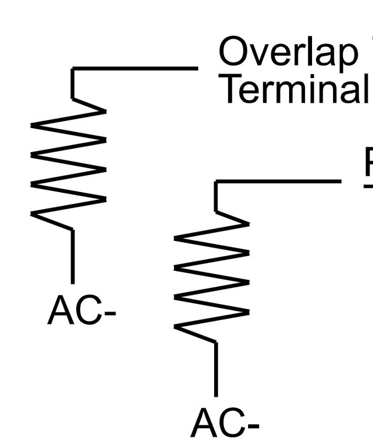
★ For the detectors to work as shown on the signal design plan, see the Detector Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES	
Value (ohms)	Wattage
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



SPECIAL DETECTOR NOTE

Install a multi-zone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For zone 7A, inputs associated with typical detector slot for an NCDOT installation is compatible with time of day instructions located on sheet 2 of the electrical detail.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2591
DESIGNED: February 2025
SEALED: 05/12/2025
REVISED: N/A

Electrical Detail - Sheet 1 of 3

PLANS PREPARED IN THE OFFICE OF:
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NC License #F-0102
421 Fayetteville Street, Suite 600
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(919) 677-2000

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N.Greenfield Pkwy.Garner.NC 27529

SR 3174 (Idlewild Road)
Eastbound at
Special Drive

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025	REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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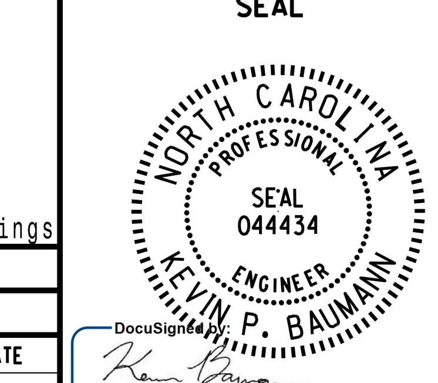

5/12/2025
DATE

SIG. INVENTORY NO. 10-2591

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 6.2

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	3	4	7
Type	FYA 4 - Section	FYA 4 - Section	Normal
Included Phases	2	2	7
Modifier Phases	-	7	-
Modifier Overlaps	7	-	-
Trail Green	0	0	0
Trail Yellow	0:0	0:0	0:0
Trail Red	0:0	0:0	0:0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	3	4	7
Type	FYA 4 - Section	FYA 4 - Section	Normal
Included Phases	-	-	7
Modifier Phases	-	7	-
Modifier Overlaps	7	-	-
Trail Green	0	0	0
Trail Yellow	0:0	0:0	0:0
Trail Red	0:0	0:0	0:0

NOTICE INCLUDED PHASE

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 7A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

Plan 2

	Detector	Call Phase	Delay
7A	21	7	0

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

NOTICE OVERLAP 7 ASSIGNED TO CHANNEL 5

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1	·	X	X	1
2	Phase Vehicle	2	·	X	·	2
3	Phase Vehicle	3	·	X	X	3
4	Phase Vehicle	4	·	X	·	4
5	Overlap	7	·	X	·	5
6	Phase Vehicle	6	·	X	X	6
7	Phase Vehicle	7	·	X	·	7
8	Phase Vehicle	8	·	X	X	8
9	Overlap	1	·	X	X	9
10	Overlap	2	·	X	X	10
11	Overlap	3	·	X	·	11
12	Overlap	4	·	X	·	12
13	Phase Ped	2	·	·	·	13
14	Phase Ped	4	·	·	·	14
15	Phase Ped	6	·	·	·	15
16	Phase Ped	8	·	·	·	16
17	Overlap	5	·	X	X	17
18	Overlap	6	·	X	·	18

NOTICE: FLASH RED

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2591
DESIGNED: February 2025
SEALED: 05/12/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 3174 (Idlewild Road)
Eastbound at
Special Drive

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025 REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section
750 N.Greenfield Pkwy.Garner.NC 27529

PLANS PREPARED IN THE OFFICE OF:
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NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by:
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5/12/2025
DATE

SIG. INVENTORY NO. 10-2591

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phases for heads 71 and 72 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 7 call on loop 7A to 0 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2591
DESIGNED: February 2025
SEALED: 05/12/2025
REVISED: N/A

Electrical Detail - Sheet 3 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 3174 (Idlewild Road)
Eastbound at
Special Drive

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025	REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington	REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of:
Transportation Mobility and Safety Division · State of North Carolina · Department of Transportation · ITS & Signals Management Section
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PLANS PREPARED IN THE OFFICE OF:
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NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
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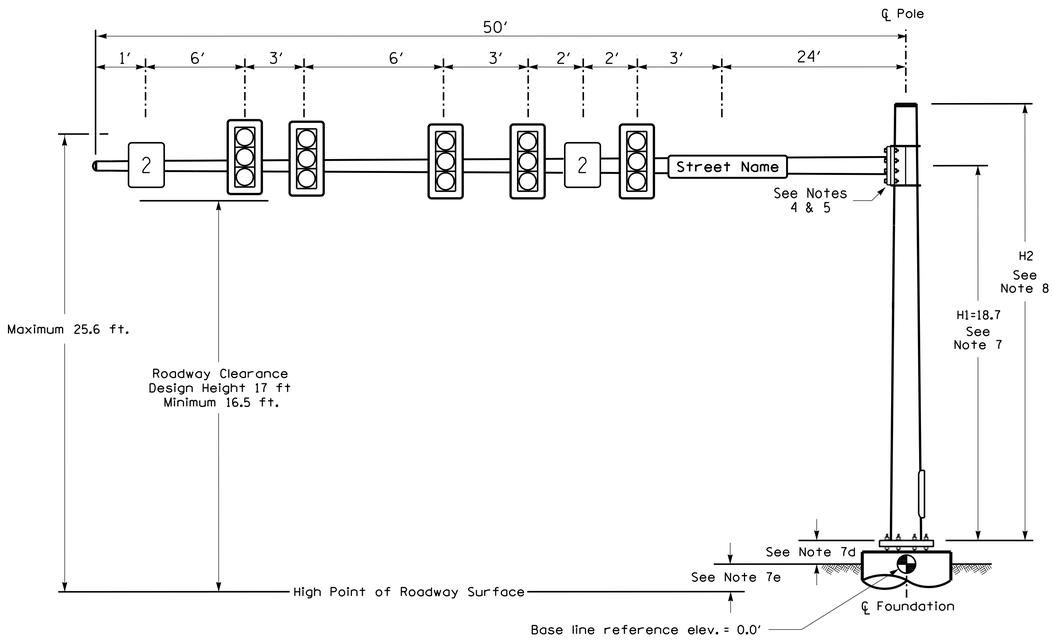
5/12/2025
DATE

SIG. INVENTORY NO. 10-2591

METAL POLE No. 8

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 6.4

Design Loading for METAL POLE NO. 8



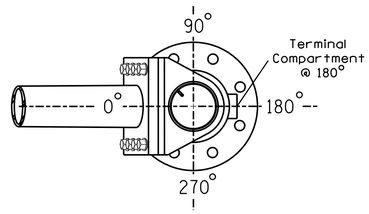
Elevation View

SPECIAL NOTE

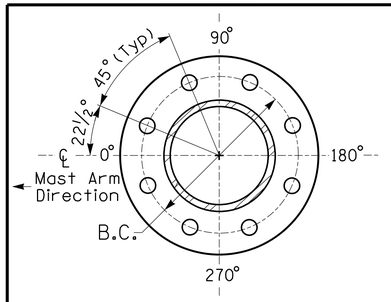
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 8	
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	-0.3 ft.	
Elevation difference at Edge of travelway or face of curb	-0.4 ft.	

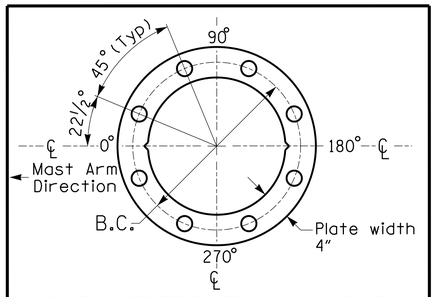


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 8"-3 SECTION-WITH BACKPLATE	6.4 S.F.	22.0"W X 42.0"L	43 LBS
2	SIGN RIGID MOUNTED	4.5 S.F.	36.0"W X 18.0"L	10 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2024 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

2. 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.
3. Design all signal supports using force ratios that do not exceed 0.9.
4. 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.
5. 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.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. 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.
9. 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.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

PLANS PREPARED IN THE OFFICE OF:
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NCDOT Wind Zone 5 (110 mph)

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Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 3174 (Idlewild Road) Eastbound at Special Drive

Division 10 Mecklenburg County Stallings

PLAN DATE:	February 2025	REVIEWED BY:	KP Baumann
PREPARED BY:	SP Pennington	REVIEWED BY:	

SCALE 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
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5/12/2025
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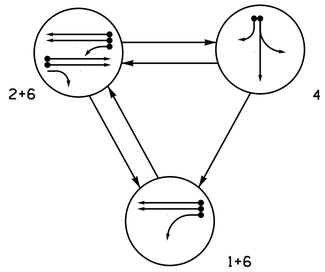
PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 7.0

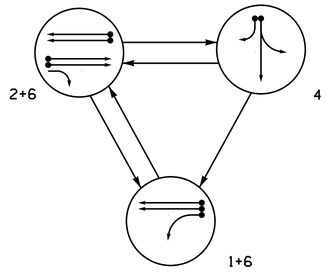
DEFAULT PHASING DIAGRAM



DEFAULT TABLE OF OPERATION

SIGNAL FACE	PHASE 1+6	PHASE 2+6	PHASE 4	FLASH
11	←	~~Y~~	~~R~~	~~R~~
21	R	↑	R	R
22	R	G	R	R
41,42	R	R	G	R
61	G	G	R	R
62	↑	↑	R	R

ALTERNATE PHASING DIAGRAM



ALTERNATE TABLE OF OPERATION

SIGNAL FACE	PHASE 1+6	PHASE 2+6	PHASE 4	FLASH
11	←	~~R~~	~~R~~	~~R~~
21	R	↑	R	R
22	R	G	R	R
41,42	R	R	G	R
61	G	G	R	R
62	↑	↑	R	R

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A ✱	6X40	0	✱	-	1	15.0*	-	X	-	X	-	-
					6	3.0	-	X	-	X	X	-
4A ✱	6X40	0	✱	-	4		-	X	-	X	-	-
4B ✱	6X40	0	✱	-	4	15.0	-	X	-	X	-	-

* Reduce delay to 3 seconds during Alternate Phasing Operation.
✱ Microwave Detection Zone

3 Phase
Fully Actuated w/
Alternate Phasing
SR 3174/1501 (Idlewild Road) CLS

NOTES

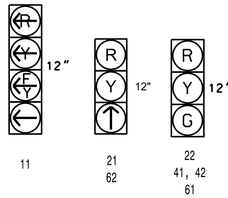
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Phase 1 may be lagged.
3. Set all detector units to presence mode.
4. The Division Traffic Engineer will determine the hours of use for each phasing plan.
5. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

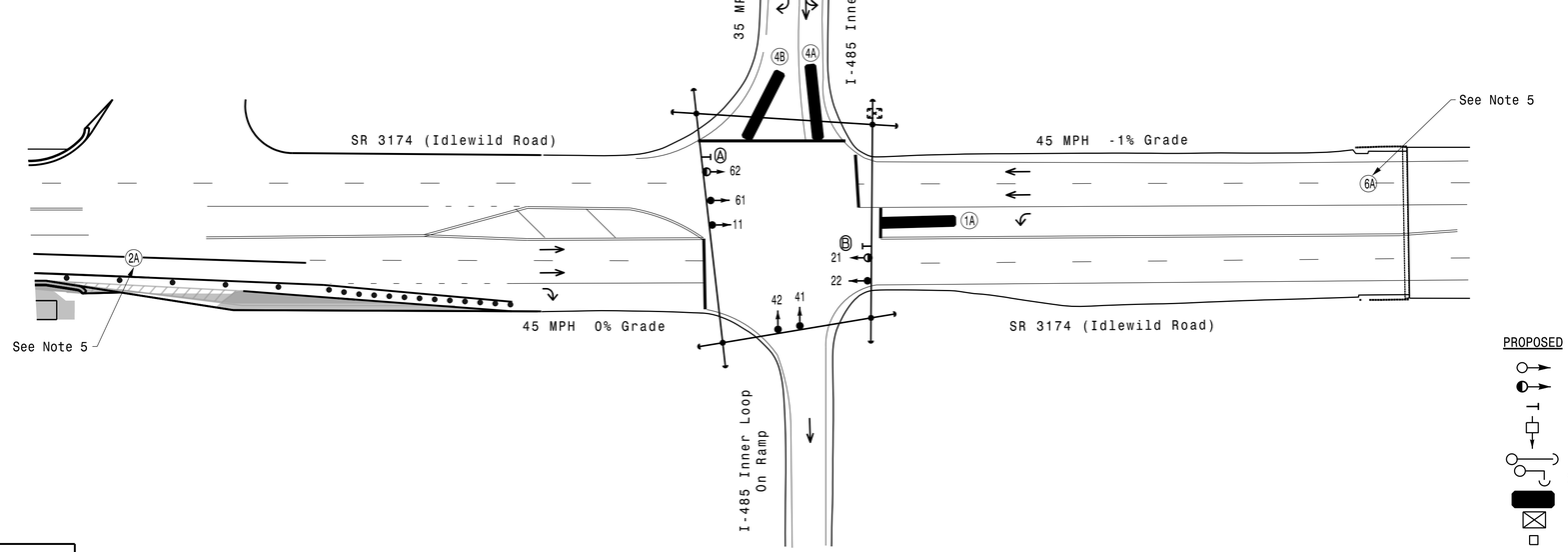
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.





MAXTIME TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Walk *	–	–	–	–
Ped Clear	–	–	–	–
Min Green *	7	12	7	12
Passage *	2.0	6.0	2.0	6.0
Max 1 *	20	90	25	90
Yellow Change	3.0	4.6	3.8	4.6
Red Clear	2.6	1.1	1.7	1.1
Added Initial *	–	1.5	–	1.5
Maximum Initial *	–	34	–	34
Time Before Reduction *	–	15	–	15
Time To Reduce *	–	30	–	30
Minimum Gap	–	3.0	–	3.0
Advance Walk	–	–	–	–
Non Lock Detector	X	–	X	–
Vehicle Recall	–	MIN RECALL	–	MIN RECALL
Dual Entry	–	–	–	–

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

Advance Microwave Detection

FUNCTION	Sensor 1 (2A)		Sensor 2 (6A)	
Channel	1		1	
Phase	2		6	
Direction of Travel	EB		WB	
Type	Priority		Priority	
Level	2	QUEUE	2	QUEUE
Discovery Zone (ft)	<750	N/A	<750	N/A
Detection Zone (ft)	100–600	100–150	100–600	100–150
Enable Speed	Y	Y	Y	Y
Speed Range (mph)	35–100	1–35	35–100	1–35
Enable Estimated Time of Arrival	Y	N	Y	N
Estimated Time of Arrival (sec)	2.5–6.5	–	2.5–6.5	–

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	
	Non-Intrusive Detection Zone	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
(A)	No Right Turn Sign (R3-1)	(A)
(B)	No Left Turn Sign (R3-2)	(B)
	Construction Zone	
	Construction Barrel	

Signal Upgrade - Temporary Design

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Prepared For the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 3174 (Idlewild Road)
at
I-485 Inner Loop Ramps

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025 REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044434 KEVIN P. BAUMANN
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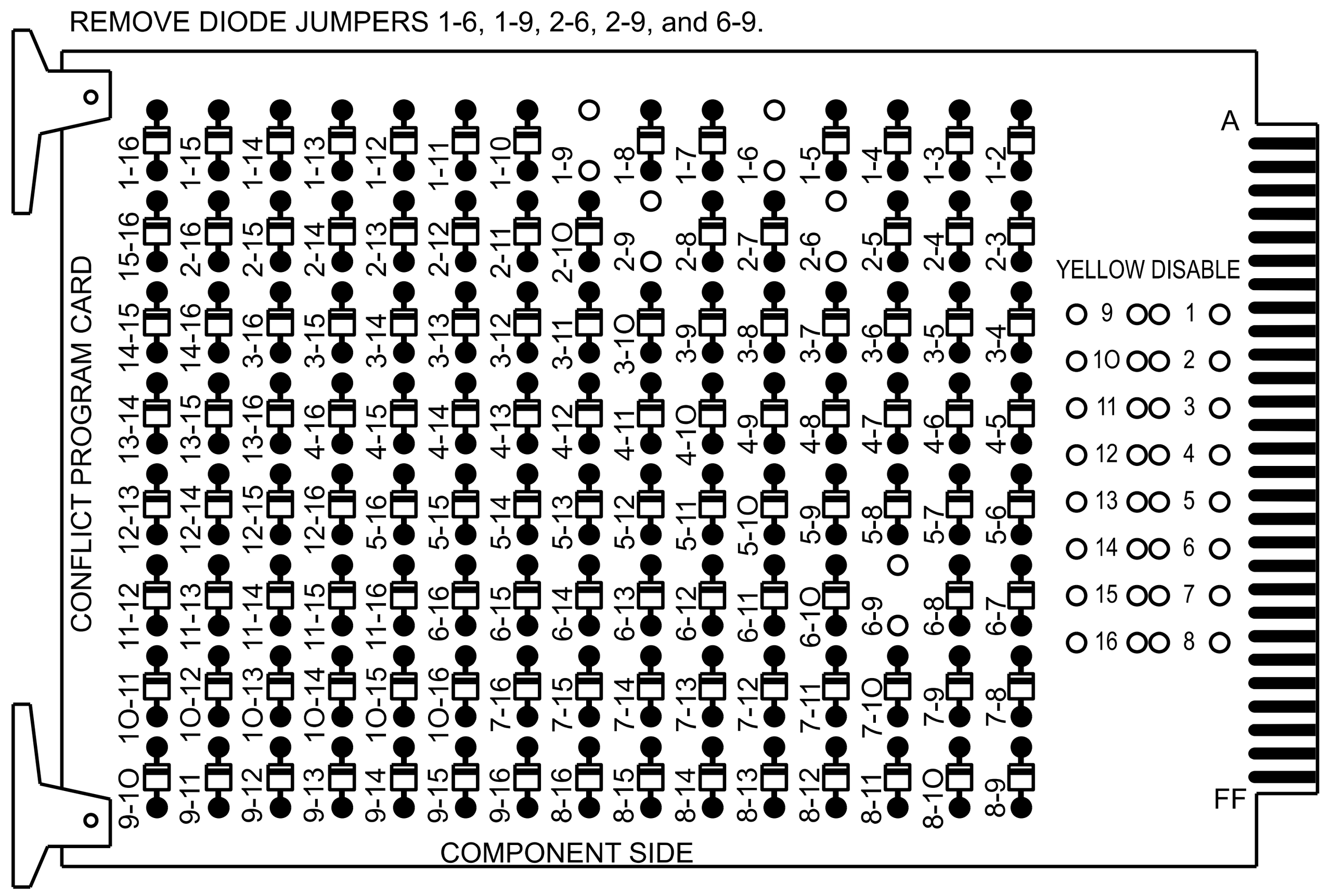
5/12/2025
SIGNATURE DATE
SIG. INVENTORY NO. 10-2050T

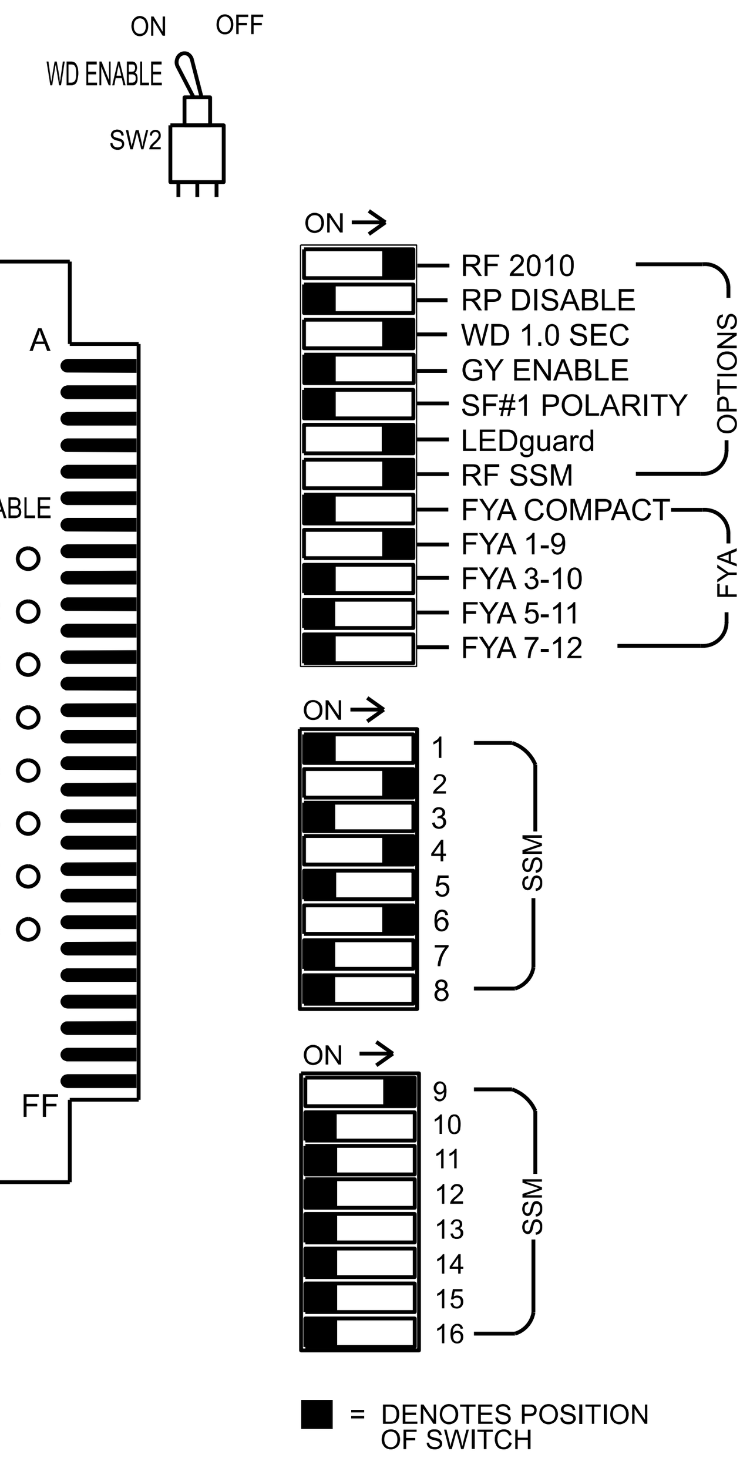
PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6, 1-9, 2-6, 2-9, and 6-9.





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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the SR 3174 / 1501 (Idlewild Road) Closed Loop System.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used...........................S1, S2, S4, S6, S9
Phases Used.......................................1, 2, 4, 6
Overlap "1"..*
Overlap "2"..Not Used
Overlap "3"..Not Used
Overlap "4"..Not Used

*See overlap programming detail on sheet 2

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	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21	22	NU	NU	41;42	NU	NU	61	62	NU	NU	NU	NU	11★	NU	NU	NU	NU	NU
RED		128	128			101			134	134										
YELLOW	*	129	129			102			135	135										
GREEN			130			103			136											
RED ARROW															A121					
YELLOW ARROW															A122					
FLASHING YELLOW ARROW															A123					
GREEN ARROW	127	130								136										
(hand symbol)																				
(walk symbol)																				

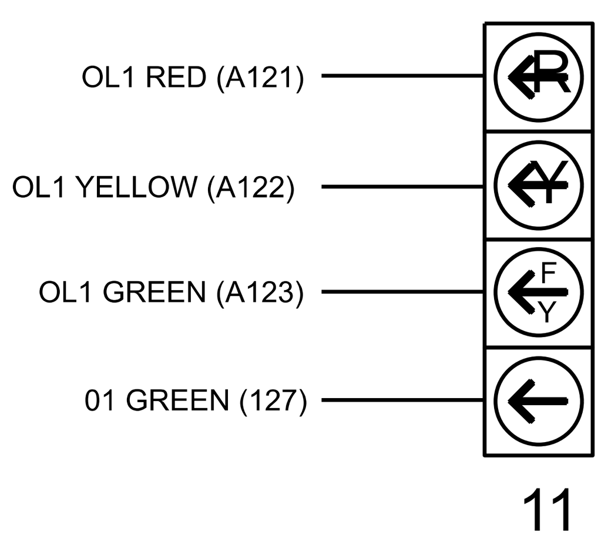
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1★	1	15.0		X		X	
				-	29★	6	3.0		X		X	X

★ For the detectors to work as shown on the signal design plan, see the Detector Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SPECIAL DETECTOR NOTE

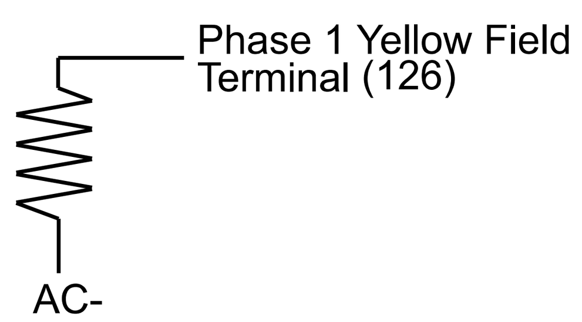
Install a multi-zone microwave detection system for all vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For zone 1A, inputs associated with typical detector slot for an NCDOT installation is compatible with time of day instructions located on sheet 2 of the electrical detail.

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

ACCEPTABLE VALUES	
Value (ohms)	Wattage
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2050T
DESIGNED: February 2025
SEALED: 05/12/2025
REVISED: N/A

Temporary Signal Design
Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 3174 (Idlewild Road)
at
I-485 Inner Loop Ramps

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025 | REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington | REVIEWED BY:

REVISIONS	INIT.	DATE

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared for the Offices of:
Transportation Mobility and Safety Division, ITS & Signals Management Section
State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044434 KEVIN P. BAUMANN
DocuSigned by: 5DC709A86BCB447...
5/12/2025
DATE

SIG. INVENTORY NO. 10-2050T

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 7.2

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1
Type	FYA 4 - Section
Included Phases	2
Modifier Phases	1
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0:0
Trail Red	0:0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1
Type	FYA 4 - Section
Included Phases	- ← NOTICE INCLUDED PHASE
Modifier Phases	1
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0:0
Trail Red	0:0

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 1A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

Plan 2

	Detector	Call Phase	Delay
1A	1	1	3:0
	29	0	0

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1	·	X	X	1
2	Phase Vehicle	2	·	X	·	2
3	Phase Vehicle	3	·	X	X	3
4	Phase Vehicle	4	·	X	·	4
5	Phase Vehicle	5	·	X	·	5
6	Phase Vehicle	6	·	X	X	6
7	Phase Vehicle	7	·	X	·	7
8	Phase Vehicle	8	·	X	X	8
9	Overlap	1	·	X	X	9
10	Overlap	2	·	X	X	10
11	Overlap	3	·	X	·	11
12	Overlap	4	·	X	·	12
13	Phase Ped	2	·	·	·	13
14	Phase Ped	4	·	·	·	14
15	Phase Ped	6	·	·	·	15
16	Phase Ped	8	·	·	·	16
17	Overlap	5	·	X	X	17
18	Overlap	6	·	X	·	18

NOTICE: FLASH RED

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phases for head 11 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2050T
DESIGNED: February 2025
SEALED: 05/12/2025
REVISED: N/A

Temporary Signal Design
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division – State of North Carolina Department of Transportation – ITS & Signals Management Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 3174 (Idlewild Road)
at
I-485 Inner Loop Ramps

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025 REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington REVIEWED BY:

REVISIONS	INIT.	DATE

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

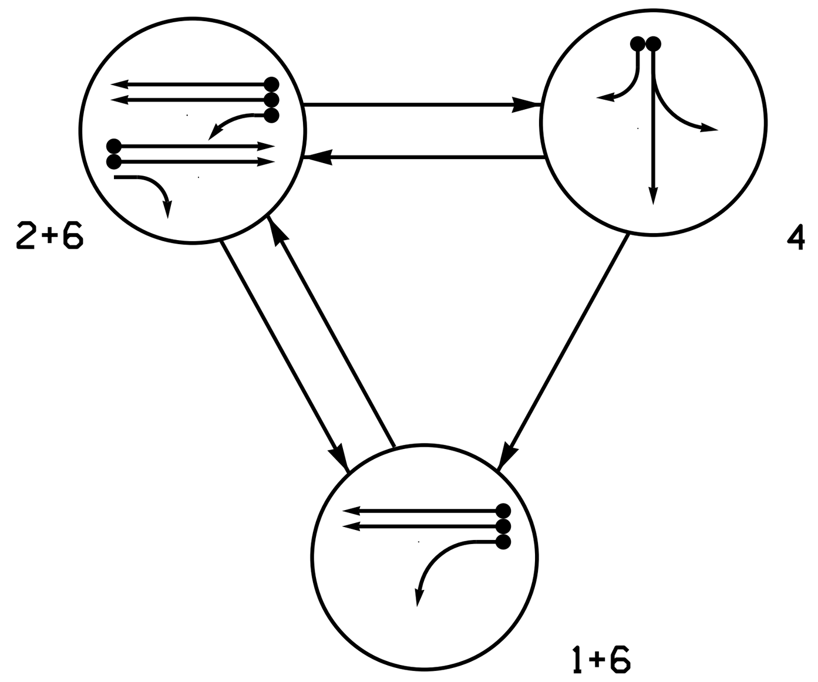
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by:
5DC709A86BCB447...
5/12/2025
DATE

SIG. INVENTORY NO. 10-2050T

5/9/2025 11:33:01 AM susan.pennington K:\RAL_TPTO_SIGNALS\011036730 U-4913A\S4 - Signal Design\ORD\7.1 U-4913A_102050-2025eT.dgn

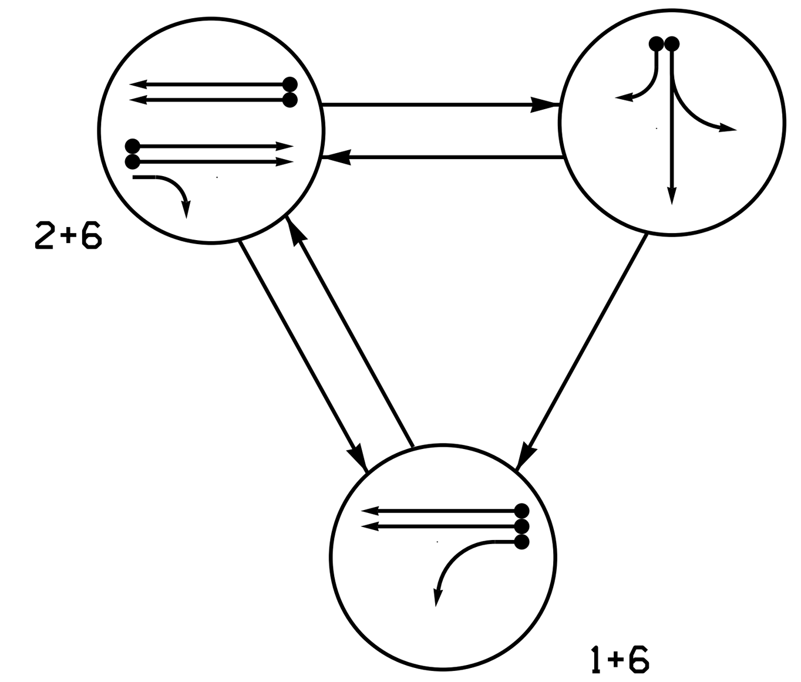
PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 8.0

DEFAULT PHASING DIAGRAM



DEFAULT TABLE OF OPERATION				
SIGNAL FACE	PHASE			
	1+6	2+6	4	FLASH
11	←	←F/Y	←R	←R
21	R	↑	R	R
22	R	G	R	R
41,42	R	R	G	R
61	G	G	R	R
62	↑	↑	R	R

ALTERNATE PHASING DIAGRAM



ALTERNATE TABLE OF OPERATION				
SIGNAL FACE	PHASE			
	1+6	2+6	4	FLASH
11	←	←R	←R	←R
21	R	↑	R	R
22	R	G	R	R
41,42	R	R	G	R
61	G	G	R	R
62	↑	↑	R	R

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A ✱	6X40	0	✱	X	1	15.0*	-	X	-	X	-	-
					6	3.0	-	X	-	X	X	-
4A ✱	6X40	0	✱	X	4	-	-	X	-	X	-	-
4B ✱	6X40	0	✱	X	4	15.0	-	X	-	X	-	-

* Reduce delay to 3 seconds during Alternate Phasing Operation.
✱ Microwave Detection Zone

3 Phase Fully Actuated w/ Alternate Phasing SR 3174/1501 (Idlewild Road) CLS

NOTES

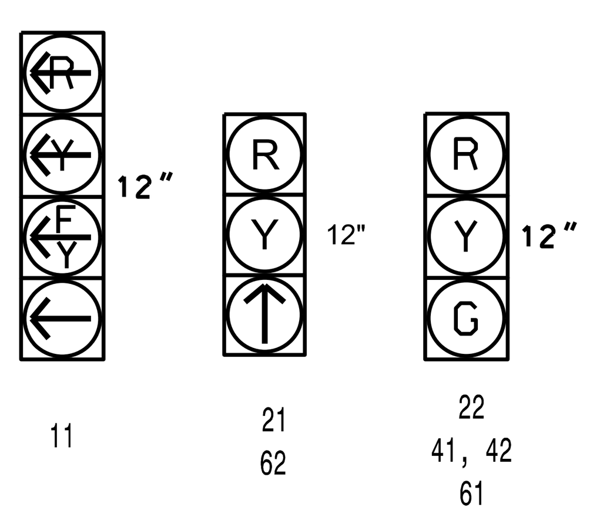
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Phase 1 may be lagged.
3. Set all detector units to presence mode.
4. The Division Traffic Engineer will determine the hours of use for each phasing plan.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

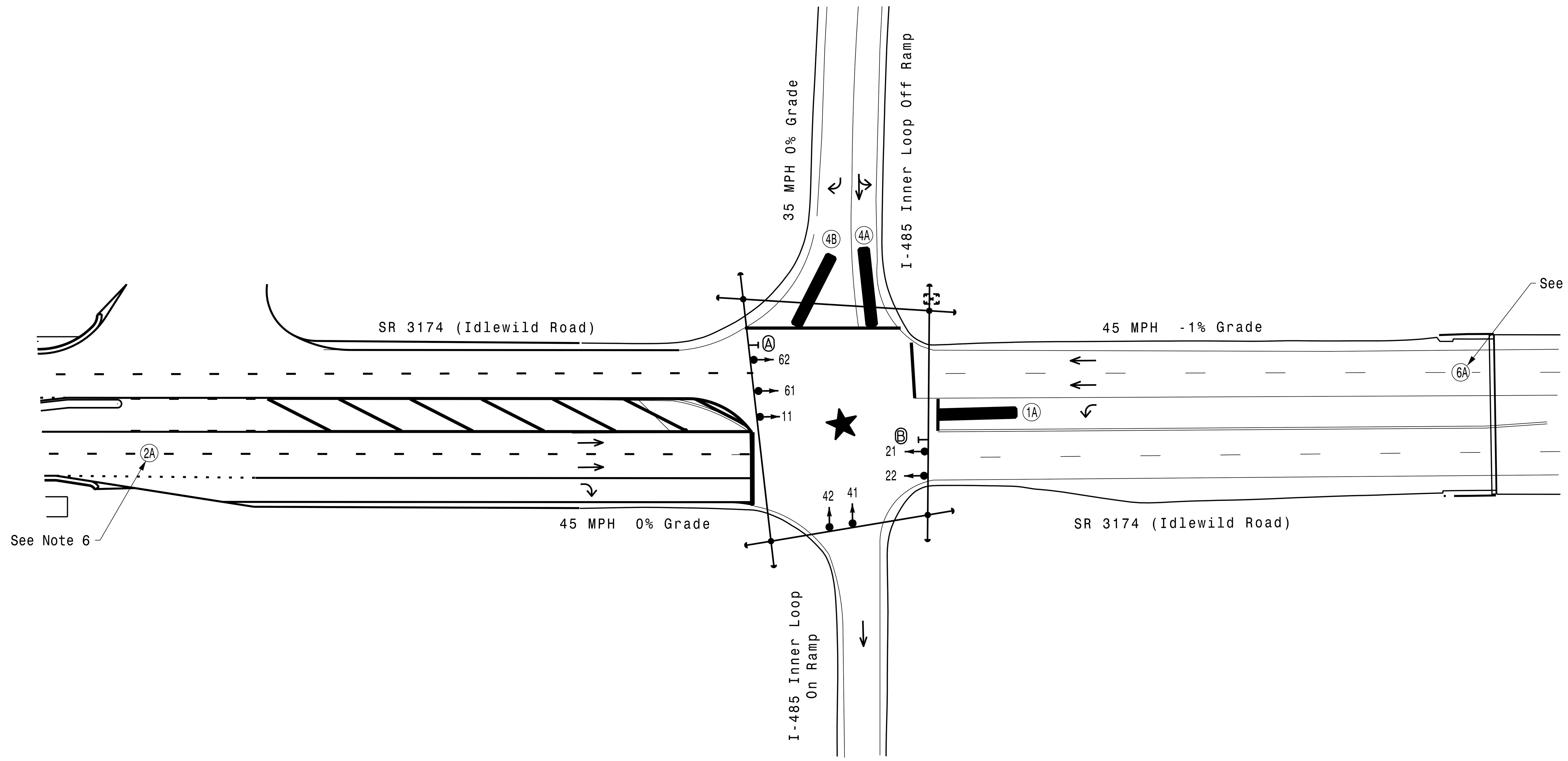
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.





MAXTIME TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Walk *	–	–	–	–
Ped Clear	–	–	–	–
Min Green *	7	12	7	12
Passage *	2.0	6.0	2.0	6.0
Max 1 *	20	90	25	90
Yellow Change	3.0	4.6	3.8	4.6
Red Clear	2.6	1.1	1.7	1.1
Added Initial *	–	1.5	–	1.5
Maximum Initial *	–	34	–	34
Time Before Reduction *	–	15	–	15
Time To Reduce *	–	30	–	30
Minimum Gap	–	3.0	–	3.0
Advance Walk	–	–	–	–
Non Lock Detector	X	–	X	–
Vehicle Recall	–	MIN RECALL	–	MIN RECALL
Dual Entry	–	–	–	–

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

Advance Microwave Detection

FUNCTION	Sensor 1 (2A)		Sensor 2 (6A)	
Channel	1		1	
Phase	2		6	
Direction of Travel	EB		WB	
Type	Priority		Priority	
Level	2	QUEUE	2	QUEUE
Discovery Zone (ft)	<750	N/A	<750	N/A
Detection Zone (ft)	100–600	100–150	100–600	100–150
Enable Speed	Y	Y	Y	Y
Speed Range (mph)	35–100	1–35	35–100	1–35
Enable Estimated Time of Arrival	Y	N	Y	N
Estimated Time of Arrival (sec)	2.5–6.5	–	2.5–6.5	–

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	
	Non-Intrusive Detection Zone	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
(A)	No Right Turn Sign (R3-1)	(A)
(B)	No Left Turn Sign (R3-2)	(B)

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of: Transportation Mobility and Safety Division, State of North Carolina Department of Transportation, Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SCALE 0 40 1"=40'

SR 3174 (Idlewild Road) at I-485 Inner Loop Ramps

Division 10 Mecklenburg County Stallings

PLAN DATE:	February 2025	REVIEWED BY:	KP Baumann
PREPARED BY:	SP Pennington	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044434 KEVIN P. BAUMANN

DocuSigned by: 5DC709A86BCB447...
SIGNATURE DATE 5/12/2025

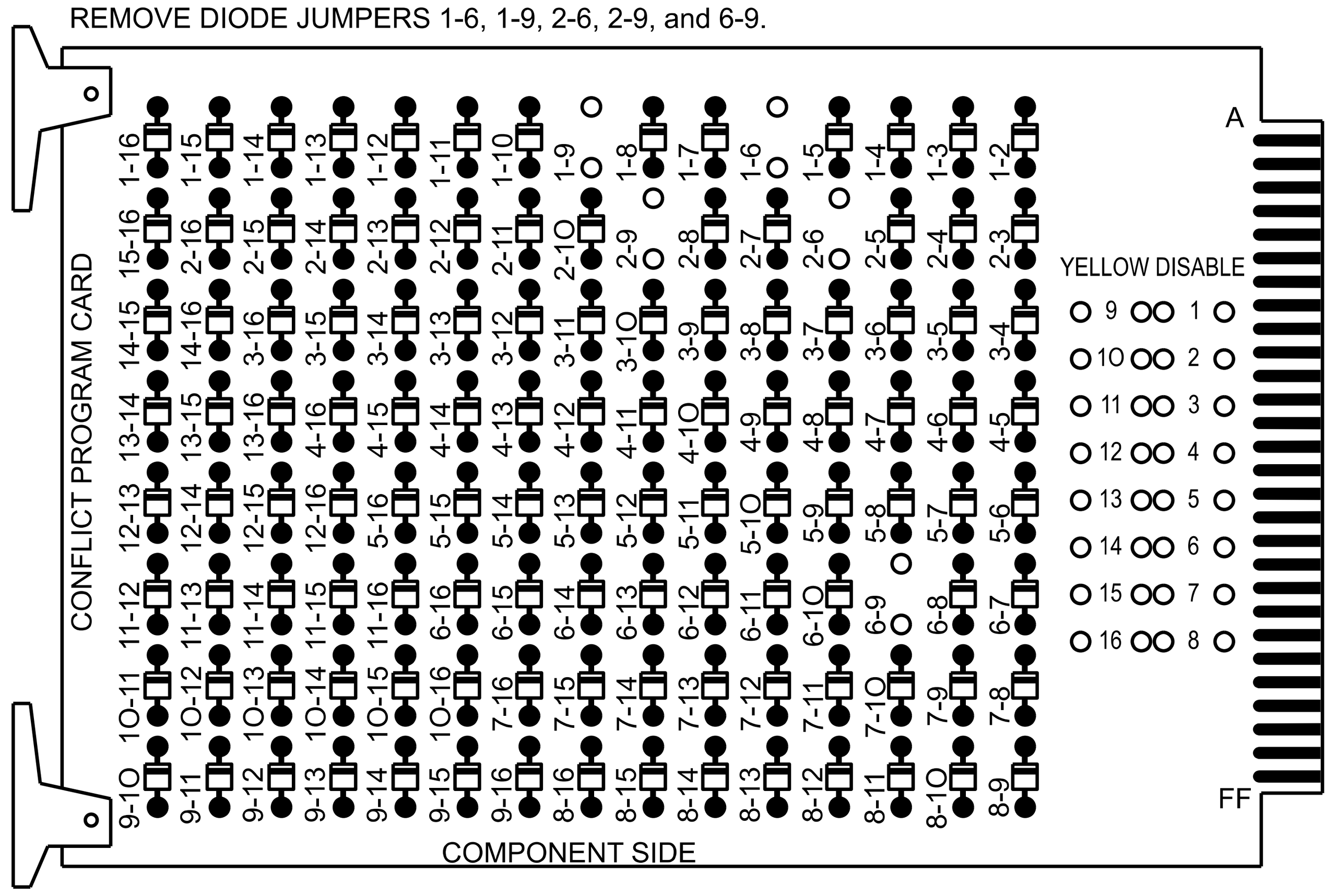
SIG. INVENTORY NO. 10-2050

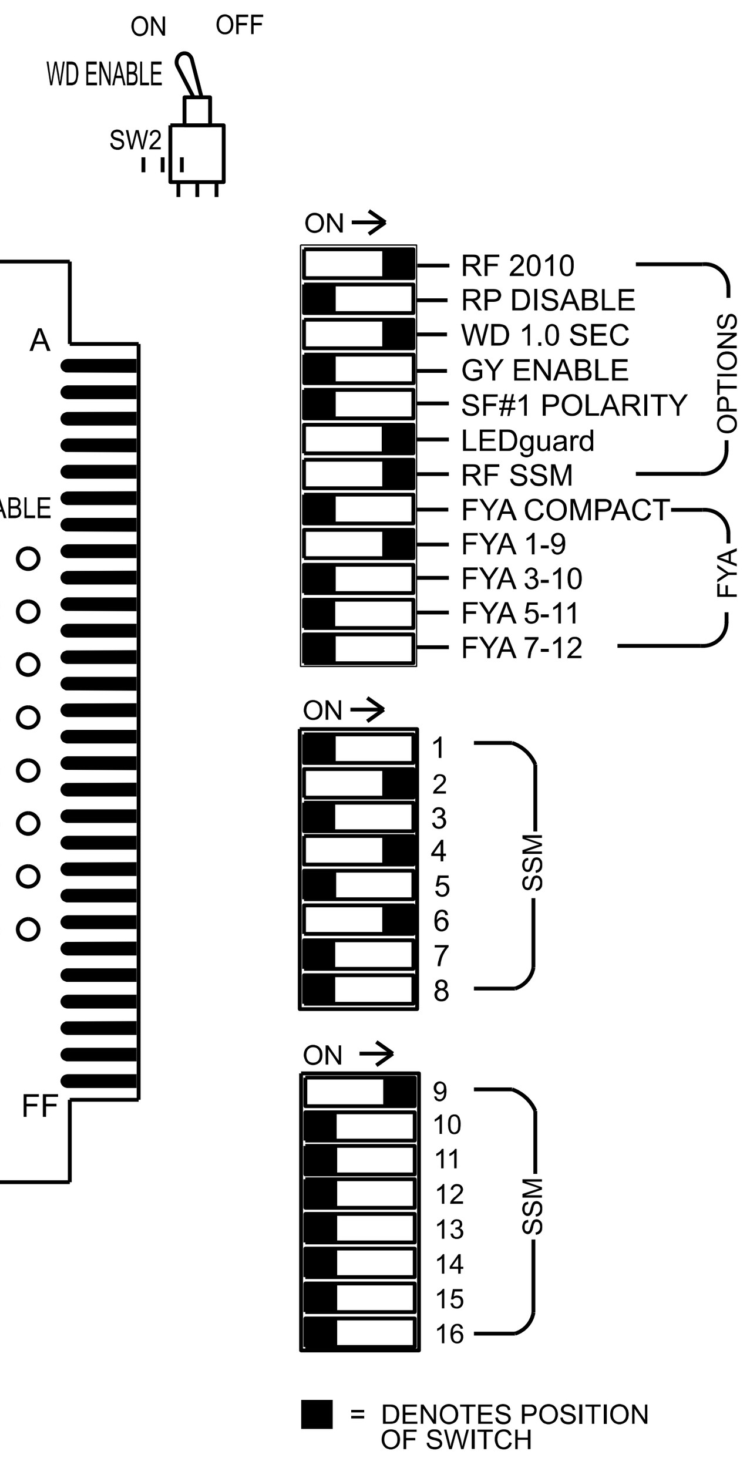
PROJECT REFERENCE NO.	SHEET NO.
U-4913A	Sig. 8.1

16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6, 1-9, 2-6, 2-9, and 6-9.





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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the SR 3174 / 1501 (Idlewild Road) Closed Loop System.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S1, S2, S4, S6, S9
Phases Used.......................................1, 2, 4, 6
Overlap "1"..*
Overlap "2"..Not Used
Overlap "3"..Not Used
Overlap "4"..Not Used

*See overlap programming detail on sheet 2

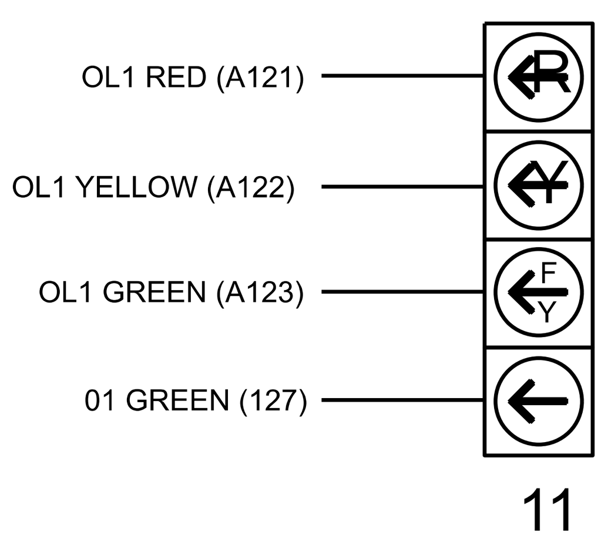
SIGNAL HEAD HOOK-UP CHART

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	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21	22	NU	NU	41;42	NU	NU	61	62	NU	NU	NU	NU	11★	NU	NU	NU	NU	NU
RED	·	128	128			101			134	134					·					
YELLOW	*	129	129			102			135	135					·					
GREEN	·	·	130			103			136	·					·					
RED ARROW	·	·													A121					
YELLOW ARROW	·	·													A122					
FLASHING YELLOW ARROW	·	·													A123					
GREEN ARROW	127	130								136					·					
(DON'T WALK symbol)	·	·													·					
(WALK symbol)	·	·													·					

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

FYA SIGNAL WIRING DETA

(wire signal head as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1★	1	15.0		X		X	
				-	29★	6	3.0		X		X	X

★ For the detectors to work as shown on the signal design plan, see the Detector Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SPECIAL DETECTOR NOTE

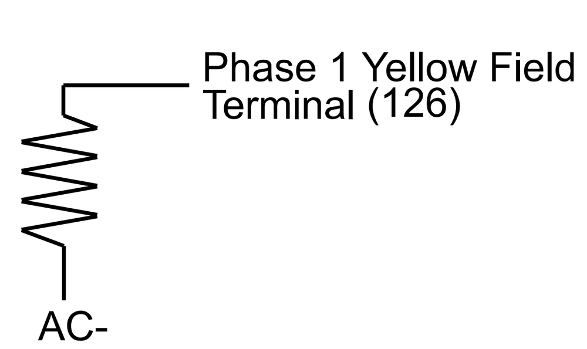
Install a multi-zone microwave detection system for all vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For zone 1A, inputs associated with typical detector slot for an NCDOT installation is compatible with time of day instructions located on sheet 2 of the electrical detail.

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

ACCEPTABLE VALUES	
Value (ohms)	Wattage
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2050
DESIGNED: February 2025
SEALED: 05/12/2025
REVISED: N/A

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 3174 (Idlewild Road)
at
I-485 Inner Loop Ramps

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025 REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
State of North Carolina Department of Transportation
750 N.Greenfield Pkwy.Garner,NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
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SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by:
5DC709A86BCB447...
5/12/2025
DATE

SIG. INVENTORY NO. 10-2050

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1
Type	FYA 4 - Section
Included Phases	2
Modifier Phases	1
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0.0
Trail Red	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1
Type	FYA 4 - Section
Included Phases	-
Modifier Phases	1
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0.0
Trail Red	0.0

NOTICE INCLUDED PHASE

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 1A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

Plan 2

	Detector	Call Phase	Delay
1A	1	1	3.0
	29	0	0

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1	-	X	X	1
2	Phase Vehicle	2	-	X	-	2
3	Phase Vehicle	3	-	X	X	3
4	Phase Vehicle	4	-	X	-	4
5	Phase Vehicle	5	-	X	-	5
6	Phase Vehicle	6	-	X	X	6
7	Phase Vehicle	7	-	X	-	7
8	Phase Vehicle	8	-	X	X	8
9	Overlap	1	-	X	X	9
10	Overlap	2	-	X	X	10
11	Overlap	3	-	X	-	11
12	Overlap	4	-	X	-	12
13	Phase Ped	2	-	-	-	13
14	Phase Ped	4	-	-	-	14
15	Phase Ped	6	-	-	-	15
16	Phase Ped	8	-	-	-	16
17	Overlap	5	-	X	X	17
18	Overlap	6	-	X	-	18

NOTICE: FLASH RED

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phases for head 11 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2050
DESIGNED: February 2025
SEALED: 05/12/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 3174 (Idlewild Road)
at
I-485 Inner Loop Ramps

Division 10 Mecklenburg County Stallings

PLAN DATE: February 2025	REVIEWED BY: KP Baumann
PREPARED BY: SP Pennington	REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of:
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ITS & Signals Management Section
State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

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SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by:
5DC709A86BCB447...
5/12/2025
DATE

SIG. INVENTORY NO. 10-2050

5/9/2025 11:34:37 AM susan.pennington K:\RAL_TPTO_SIGNALS\011036730 U-4913A\S4 - Signal Design\ORD\8.1 U-4913A_102050-2025e.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	SCP-1

1. INSTALL COAX CABLE
2. INSTALL ETHERNET CABLE
3. EXISTING ETHERNET (OR COAX) CABLE
4. INSTALL SMFO CABLE
5. EXISTING SMFO CABLE
6. INSTALL FIBER OPTIC DROP CABLE
7. INSTALL TRACER WIRE
8. TRENCH
9. INSTALL PVC CONDUIT
10. INSTALL RIGID, GALVANIZED STEEL CONDUIT
11. INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12. INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
13. INSTALL OUTER–DUCT POLYETHYLENE CONDUIT
14. INSTALL POLYETHYLENE CONDUIT
15. DIRECTIONAL DRILL CONDUIT
16. BORE AND JACK CONDUIT
17. INSTALL CABLE(S) IN EXISTING CONDUIT
18. INSTALL CABLE(S) IN NEW CONDUIT
19. INSTALL CABLE(S) IN EXISTING RISER
20. INSTALL CABLE(S) IN NEW RISER
21. INSTALL CABLE(S) IN EXISTING CONDUIT STUB–OUTS
22. INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
23. INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
24. INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
25. INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
26. INSTALL NEW ETHERNET EDGE SWITCH
27. INSTALL NEW FIBER OPTIC TRANSCEIVER
28. INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPLICE CABLE IN CABINET
29. INSTALL UNDERGROUND SPLICE ENCLOSURE
30. INSTALL AERIAL SPLICE ENCLOSURE
31. MODIFY EXISTING INTERCONNECT CENTER /SPLICE ENCLOSURE
32. INSTALL POLE MOUNTED SPLICE CABINET
33. INSTALL BASE MOUNTED SPLICE CABINET
34. INSTALL CABINET FOUNDATION
35. INSTALL CCTV CAMERA POLE MOUNTED CABINET
36. INSTALL CCTV CAMERA ASSEMBLY
37. INSTALL CCTV CAMERA WOOD POLE
38. INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
39. INSTALL JUNCTION BOX
40A. INSTALL OVERSIZED JUNCTION BOX
40B. INSTALL SPECIAL OVERSIZED JUNCTION BOX (36″ x 24″ x 24″)
41. REMOVE EXISTING JUNCTION BOX
42. INSTALL WOOD POLE
43. REMOVE EXISTING WOOD POLE
44. INSTALL AERIAL GUY ASSEMBLY
45. INSTALL STANDARD GUY ASSEMBLY
46. INSTALL SIDEWALK GUY ASSEMBLY
47. INSTALL MESSENGER CABLE
48A. REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
48B. REMOVE EXISTING COMMUNICATIONS CABLE
49. BACK PULL EXISTING COMMUNICATIONS CABLE
50. INSTALL CELL MODEM AND ANTENNA
51. INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
52A. INSTALL DELINEATOR MARKER
52B. INSTALL JUNCTION BOX MARKER
53A. STORE 20 FEET OF COMMUNICATIONS CABLE
53B. STORE 50 FEET OF EACH COMMUNICATIONS CABLE
54. LASH CABLE(S) TO EXISTING COMMUNICATIONS CABLE
55. LASH CABLE(S) TO EXISTING MESSENGER CABLE
56. LASH CABLE(S) TO NEW MESSENGER CABLE
57. MODIFY EXISTING ELECTRICAL SERVICE
58. INSTALL NEW ELECTRICAL SERVICE
59. INSTALL NEW EQUIPMENT CABINET DISCONNECT
60. BOND TRACER WIRE TO EQUIPMENT GROUND BUS
61. DO NOT BOND TRACER WIRE TO EQUIPMENT GROUND BUS
62. BOND RISER AND MESSENGER CABLE TO POLE GROUND
63. BOND RISER TO POLE GROUND
64. BOND MESSENGER CABLE TO POLE GROUND
65. INSTALL HEAT SHRINK TUBING RETROFIT KIT
66. INSTALL MOLDABLE DUCT SEAL
67. SLACK SPAN

LEGEND

- NEW FIBER OPTIC COMMUNICATIONS CABLE
- EXISTING COMMUNICATIONS CABLE
- EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- NEW DIRECTIONAL DRILLED CONDUIT

NEW		EXISTING
	OVERSIZED JUNCTION BOX	
	WOOD POLE	
S	AERIAL SPLICE ENCLOSURE	S
S	UNDERGROUND SPLICE ENCLOSURE	S
	METAL POLE	
	CCTV ASSEMBLY	
	STANDARD GUY ASSEMBLY	
	SIDEWALK GUY ASSEMBLY	
	CABLE STORAGE RACKS (SNOW SHOES)	
	SIGNAL/EQUIPMENT CABINET	
S	SPLICE CABINET	S
	FLAT PANEL ANTENNA (SINGLE)	
	YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION	
	YAGI ANTENNA (SINGLE)	
	OMNI ANTENNA	
SP	SIGNAL POLE	SP
XX–XXXX	SIGNAL INVENTORY NUMBER	XX–XXXX

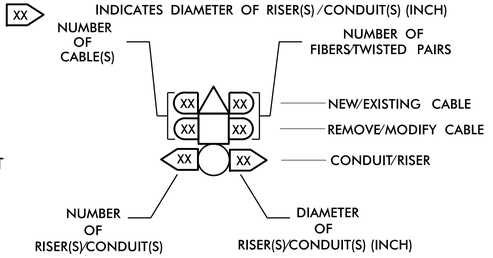
ATTACHMENT POINT:

- XX″/SS / YYY — DISTANCE ABOVE (IN)/ATTACHMENT POINT REFERENCE POINT
- YYY / XX″/SS — REFERENCE POINT DISTANCE BELOW (IN)/ATTACHMENT POINT

"SS"	REFERENCE LOCATION
FS =	FRONT SIDE OF POLE
BS =	BACK SIDE OF POLE

CONSTRUCTION NOTE SYMBOLOGY KEY

- XX — INDICATES NUMBER OF CABLES, LOOPS, ETC.
- XX — INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
- XX — INDICATES NUMBER OF RISER(S)/CONDUIT(S)
- XX — INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)



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PLANS PREPARED IN THE OFFICE OF:
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421 Fayetteville Street, Suite 600
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(919) 677-2000

Prepared for the Offices of:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Integrated Mobility and Safety Division
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

D10-24_Matthews/Stallings

Construction Notes

Division 10 Mecklenburg County Stallings

PLAN DATE: March 2025 REVIEWED BY: KW Smith

PREPARED BY: SP Pennington REVIEWED BY:

SCALE: 0 N.T.S.

REVISIONS	INIT.	DATE

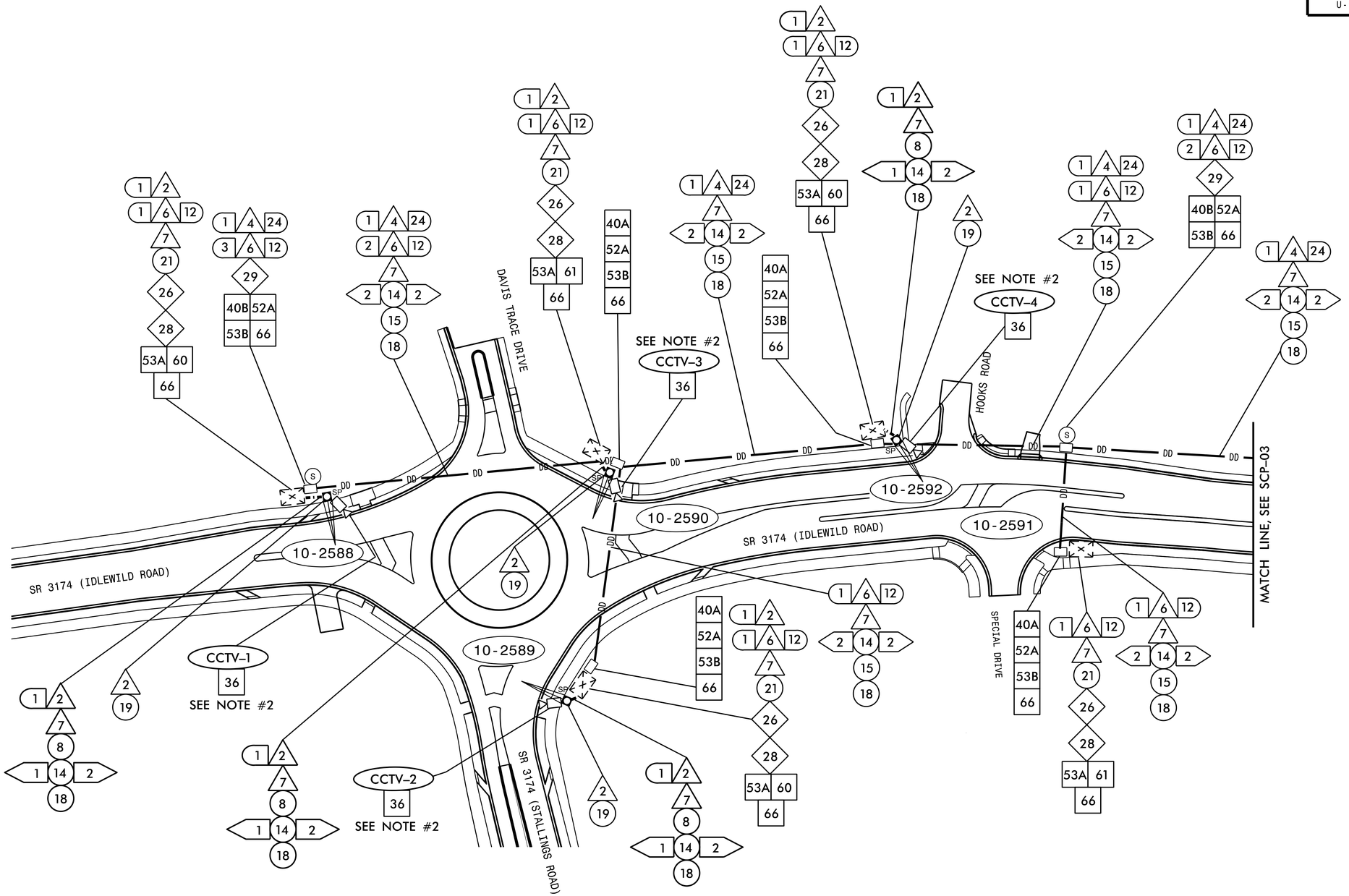
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 0686E0483B0440F... 5/12/2025
SIGNATURE DATE

CADD Filename:

5/9/2025
K:\RAL_TPTO_SIGNALS\0I0036730 U-4913A\SS - Cable Routing\U4913A- SCPL.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	SCP-2



NOTES:

1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT CONTACT THE DIVISION TRAFFIC ENGINEER, AT 704-983-4400 TO ARRANGE FOR THE DIVISION TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN INFORMATION. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) MOUNT NEW CCTV CAMERA ON EXISTING METAL POLE A MINIMUM OF 12″ BELOW MAST ARM. ROUTE ETHERNET CABLE FROM CAMERA INTO METAL POLE USING NEW ENTRANCES AND ROUTE CABLE TO SIGNAL CABINET IN NEW CONDUIT.

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

D10-24_Matthews/Stallings

Communications Cable and Conduit Routing Plan

Division 10 Mecklenburg County Stallings

PLAN DATE: March 2025	REVIEWED BY: KW Smith
PREPARED BY: SP Pennington	REVIEWED BY:

SCALE: 0 N.T.S.

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith 0E68E04B3B0440F...
SIGNATURE 5/12/2025 DATE

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5/9/2025
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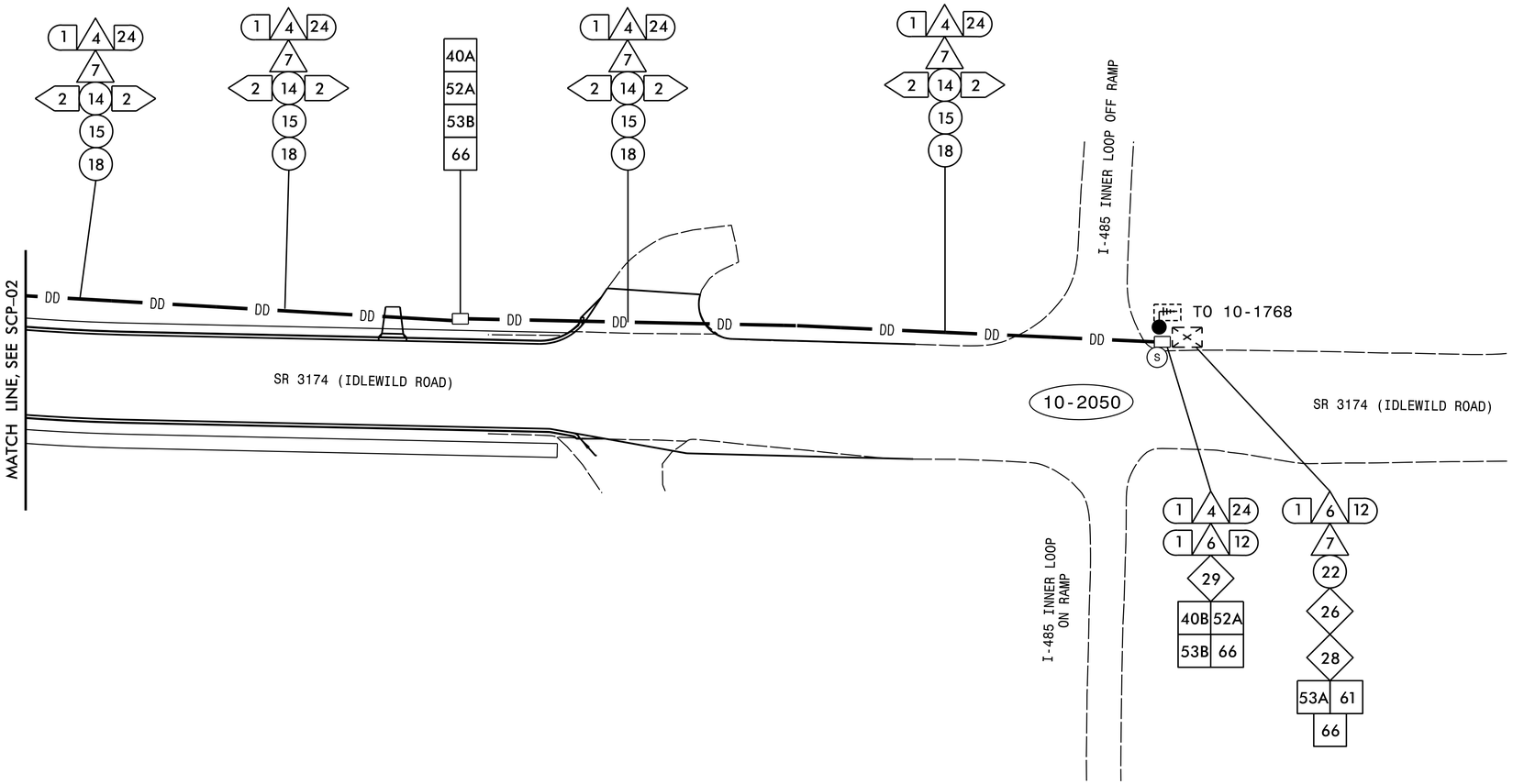
PROJECT REFERENCE NO.	SHEET NO.
U-4913A	SCP-3



NOTES:

1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT CONTACT THE DIVISION TRAFFIC ENGINEER, AT 704-983-4400 TO ARRANGE FOR THE DIVISION TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN INFORMATION. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

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Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

D10-24_Matthews/Stallings

Communications Cable and Conduit Routing Plan

Division 10 Mecklenburg County Stallings

PLAN DATE: March 2025 REVIEWED BY: KW Smith

PREPARED BY: SP Pennington REVIEWED BY:

SCALE 0 N.T.S.

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030472 KEVIN W. SMITH

DocuSigned by: Kevin Smith 0686E0483B0445F... 5/12/2025
SIGNATURE DATE

CADD Filename:

5/9/2025
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NEW UNDERGROUND SPLICE ENCLOSURE AT SR 3174 (IDLEWILD ROAD) AT DAVIS TRACE DRIVE /SR 3175 (STALLINGS ROAD)

SIG ID 10–2588; CCTV–1
SIG ID 10–2589; CCTV–2
SIG ID 10–2590; CCTV–3

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	SCP-4

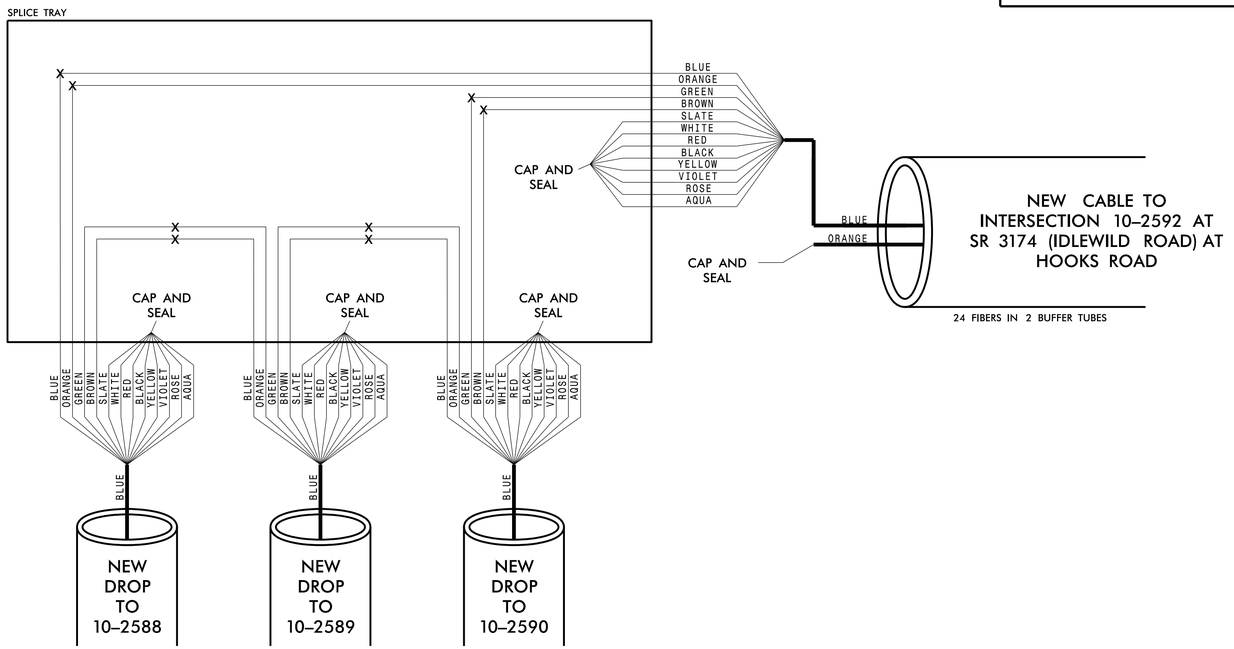
COLOR CODE TIA/EIA 598–C

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

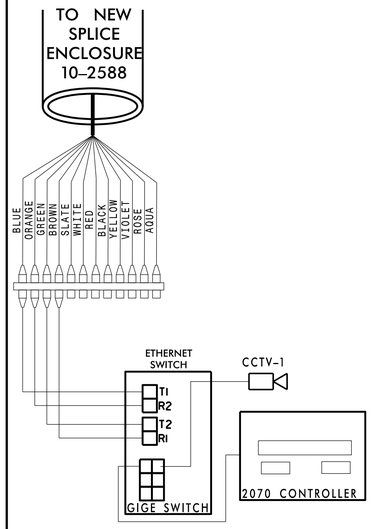
LEGEND

X – FUSION SPLICE INDIVIDUAL FIBER
O – EXISTING SPLICE
□ – EXPRESS INDIVIDUAL FIBER

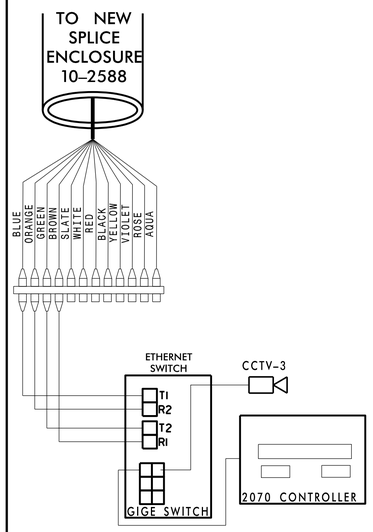
EXPRESS – EXPRESS ENTIRE BUFFER TUBE
SPLICE – SPLICE ENTIRE BUFFER TUBE OR MAINTAIN IF EXISTING EXPRESSED



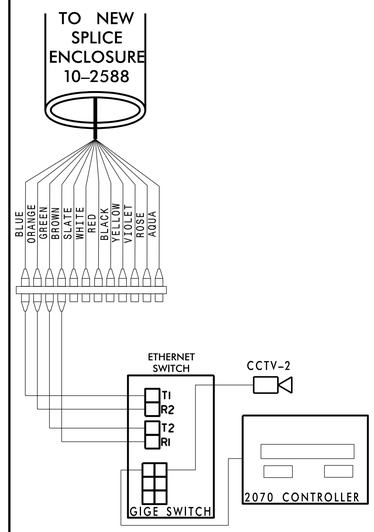
CABINET AT INTERSECTION 10–2588



CABINET AT INTERSECTION 10–2590



CABINET AT INTERSECTION 10–2589



NOTES:

1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT CONTACT THE DIVISION TRAFFIC ENGINEER, AT 704-983-4400 TO ARRANGE FOR THE DIVISION TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN INFORMATION. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) PROVIDE AS-BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS.

4) INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING: REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

   1) SPLICE LOCATION
   2) DATE
   3) COMPANY NAME
   4) NAME OF INDIVIDUAL PERFORMING THE SPLICING

PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

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PLANS PREPARED IN THE OFFICE OF:
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Prepared for the Offices of:
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750 N. Greenfield Pkwy., Garner, NC 27529

D10-24_Matthews/Stallings

Splice Detail

Division 10 Mecklenburg County Stallings

PLAN DATE: March 2025 REVIEWED BY: KW Smith
PREPARED BY: SP Pennington REVIEWED BY:

SCALE 0 N.T.S.

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith
0685E04B3B0440F...
SIGNATURE 5/12/2025 DATE

CADD Filename:

5/9/2025
K:\RAL_TPTO_SIGNALS\0I036730 U-4913A\SS - Cable Routing\U4913A- SCP4.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	SCP-5

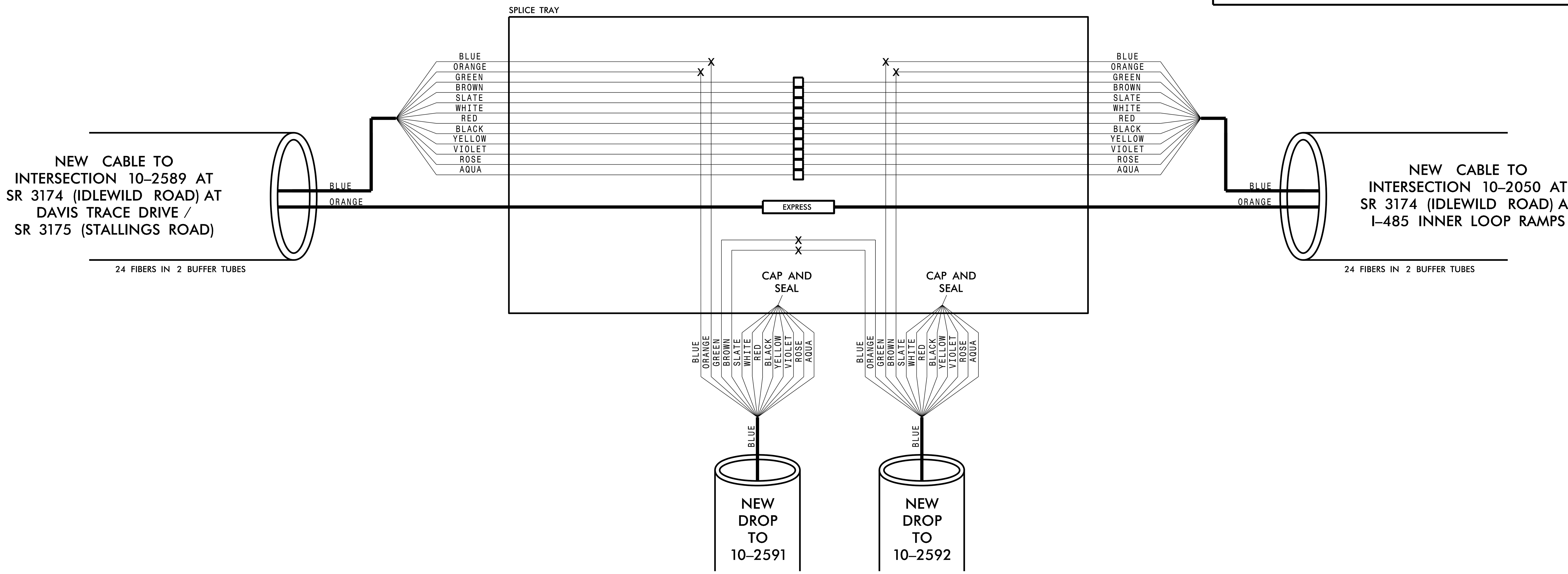
NEW UNDERGROUND SPLICE ENCLOSURE AT SR 3174 (IDLEWILD ROAD) AT HOOKS ROAD SIG ID 10–2591 SIG ID 10–2592; CCTV–4

COLOR CODE TIA/EIA 598–C

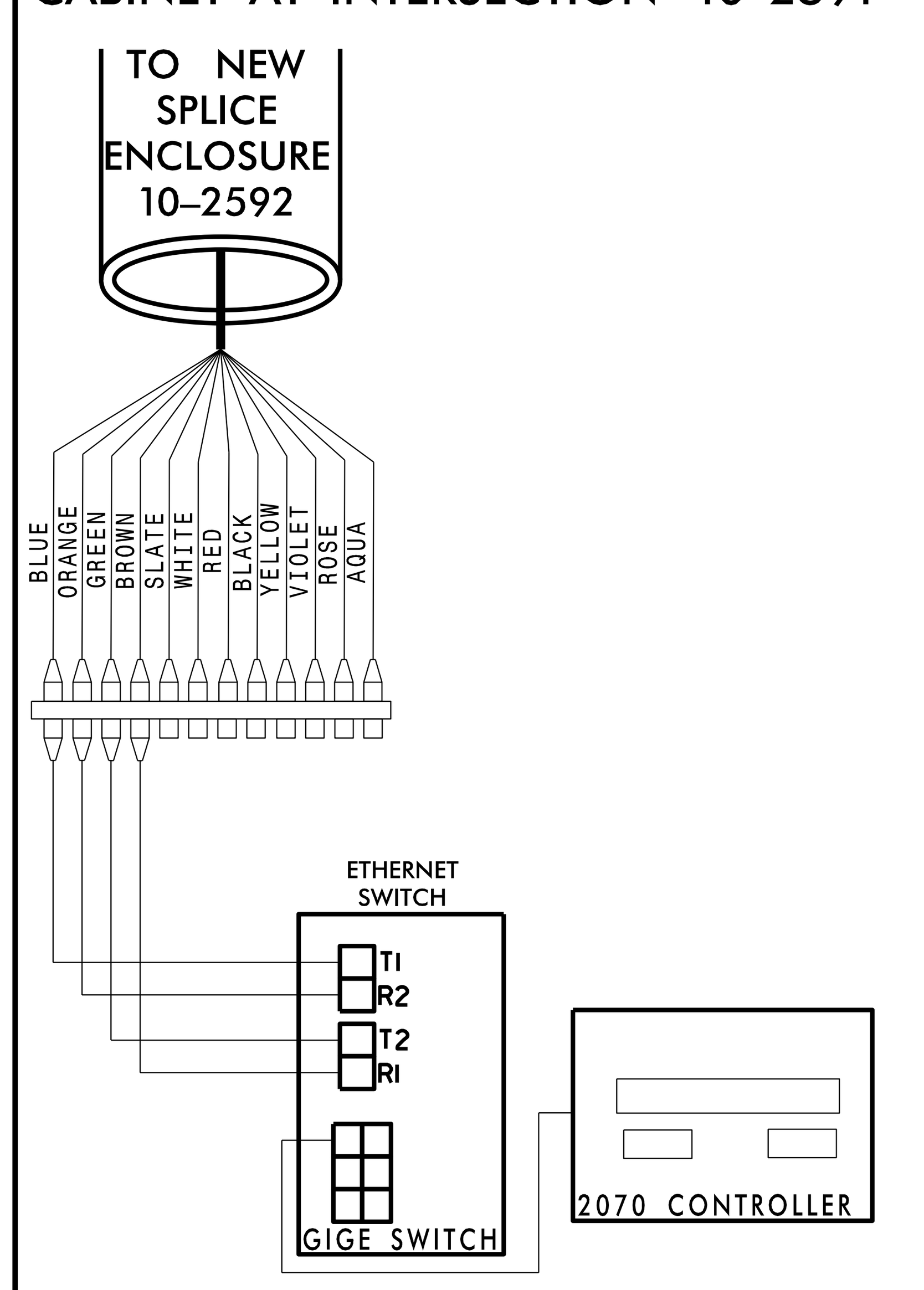
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND

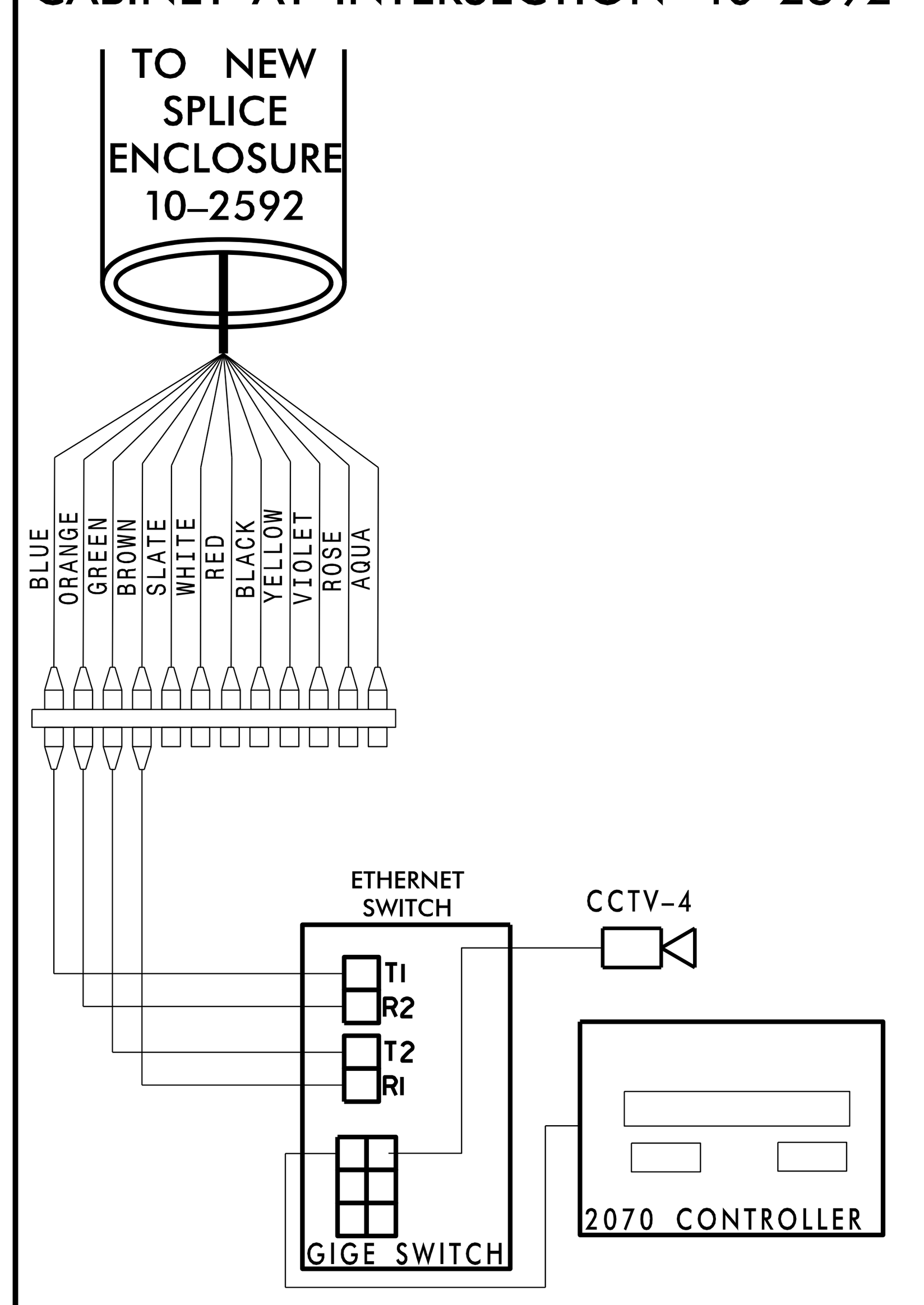
- X – FUSION SPLICE INDIVIDUAL FIBER
- O – EXISTING SPLICE
- ☐ – EXPRESS INDIVIDUAL FIBER
- [EXPRESS] EXPRESS ENTIRE BUFFER TUBE
- [SPLICE] SPLICE ENTIRE BUFFER TUBE OR MAINTAIN IF EXISTING EXPRESSED



CABINET AT INTERSECTION 10–2591



CABINET AT INTERSECTION 10–2592



NOTES:

1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT CONTACT THE DIVISION TRAFFIC ENGINEER, AT 704-983-4400 TO ARRANGE FOR THE DIVISION TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN INFORMATION. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) PROVIDE AS-BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS.

4) INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING: REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

   1) SPLICE LOCATION
   2) DATE
   3) COMPANY NAME
   4) NAME OF INDIVIDUAL PERFORMING THE SPLICING

   PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared for the Offices of:
Transportation Mobility and Safety Division
State of North Carolina · Department of Transportation
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE: 0 — N.T.S.

D10-24_Matthews/Stallings

Splice Detail

Division 10 Mecklenburg County Stallings

PLAN DATE: March 2025	REVIEWED BY: KW Smith
PREPARED BY: SP Pennington	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH

DocuSigned by: Kevin Smith
0686E04B3B0440F...
SIGNATURE: Kevin Smith DATE: 5/12/2025

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
U-4913A	SCP-6

NEW UNDERGROUND SPLICE ENCLOSURE AT SR 3174 (IDLEWILD ROAD) AT I–485 INNER LOOP RAMPS SIG ID 10–2050

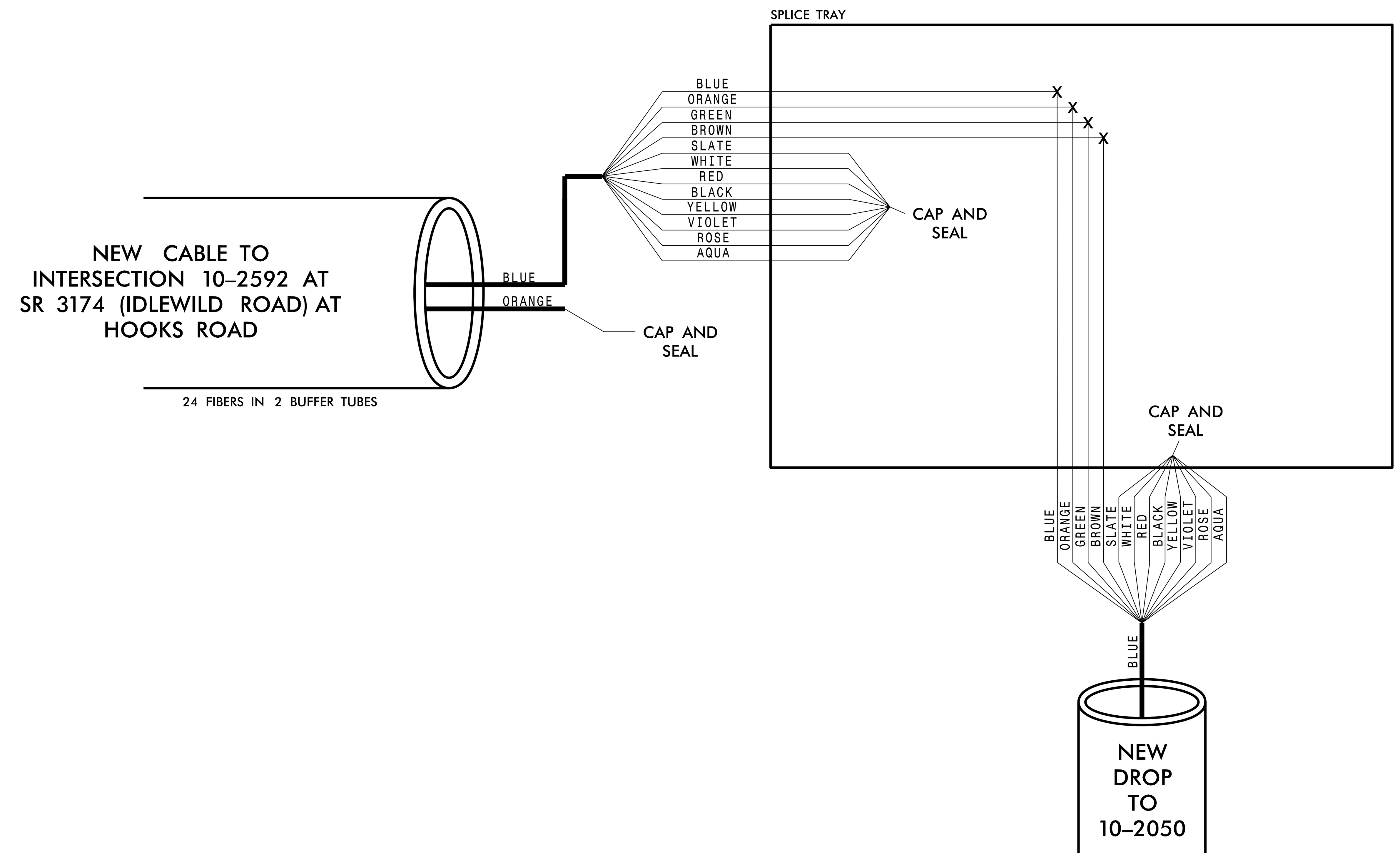
COLOR CODE TIA/EIA 598–C

(1) BLUE
(2) ORANGE
(3) GREEN
(4) BROWN
(5) SLATE
(6) WHITE
(7) RED
(8) BLACK
(9) YELLOW
(10) VIOLET
(11) ROSE
(12) AQUA

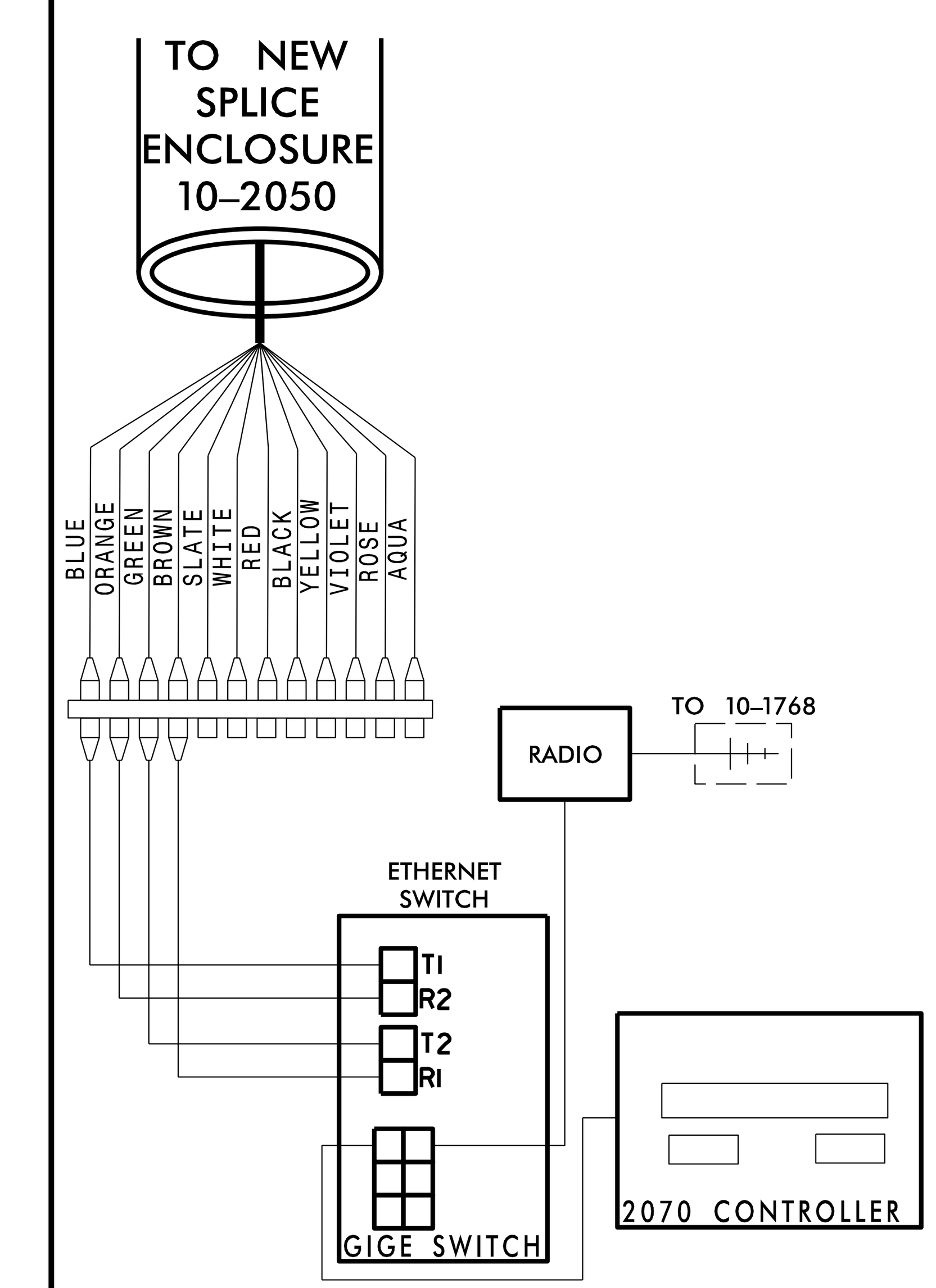
LEGEND

X – FUSION SPLICE INDIVIDUAL FIBER
O – EXISTING SPLICE
☐ – EXPRESS INDIVIDUAL FIBER

EXPRESS – EXPRESS ENTIRE BUFFER TUBE
SPLICE – SPLICE ENTIRE BUFFER TUBE OR MAINTAIN IF EXISTING EXPRESSED



CABINET AT INTERSECTION 10–2050



NOTES:

1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT CONTACT THE DIVISION TRAFFIC ENGINEER, AT 704-983-4400 TO ARRANGE FOR THE DIVISION TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN INFORMATION. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) PROVIDE AS-BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS.

4) INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING: REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

   1) SPLICE LOCATION
   2) DATE
   3) COMPANY NAME
   4) NAME OF INDIVIDUAL PERFORMING THE SPLICING

   PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

5/9/2025
K:\RAL_TPTO_SIGNALS\011036730 U-4913A\S5 - Cable Routing\U4913A- SCP6.dgn

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Splice Detail

Division 10 Mecklenburg County Stallings

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