

6 Phase Fully Actuated (Isolated)

# NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night operation unless otherwise directed by the Engineer.
- Phase 1 and/or 5 may be lagged.
- The order of phase 3 an 4 may be reversed.
- Set all detector units to presence mode.

- This intersection uses video detection. Install detectors according to the manufacturer's instructions to schieve the desitred detection.
- Omit "walk" and flashing "Don't Walk" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Refer to Pavement Marking Plans for proposed stop bar locations
- 10. Reposition existing signal heads as shown on this

LEGEND

Curb Ramp

Pedestrian Signal Head

Type II Signal Pedestal

Video Detection Zone

Inductive Loop Detector Controller & Cabinet

Junction Box

Directional Arrow

Construction Zone

Wood Pole

Left Arrow "Only" Sign (R3-5L)

Combined Through and Left Arrow Sign (R3-6L)

Dual Turn and Through Arrow Sign (R3-19)

Right Arrow "Only" Sign (R3-5R)

Traffic Signal Head

Signal Pole with Sidewalk Guy

**EXISTING** 

N/A

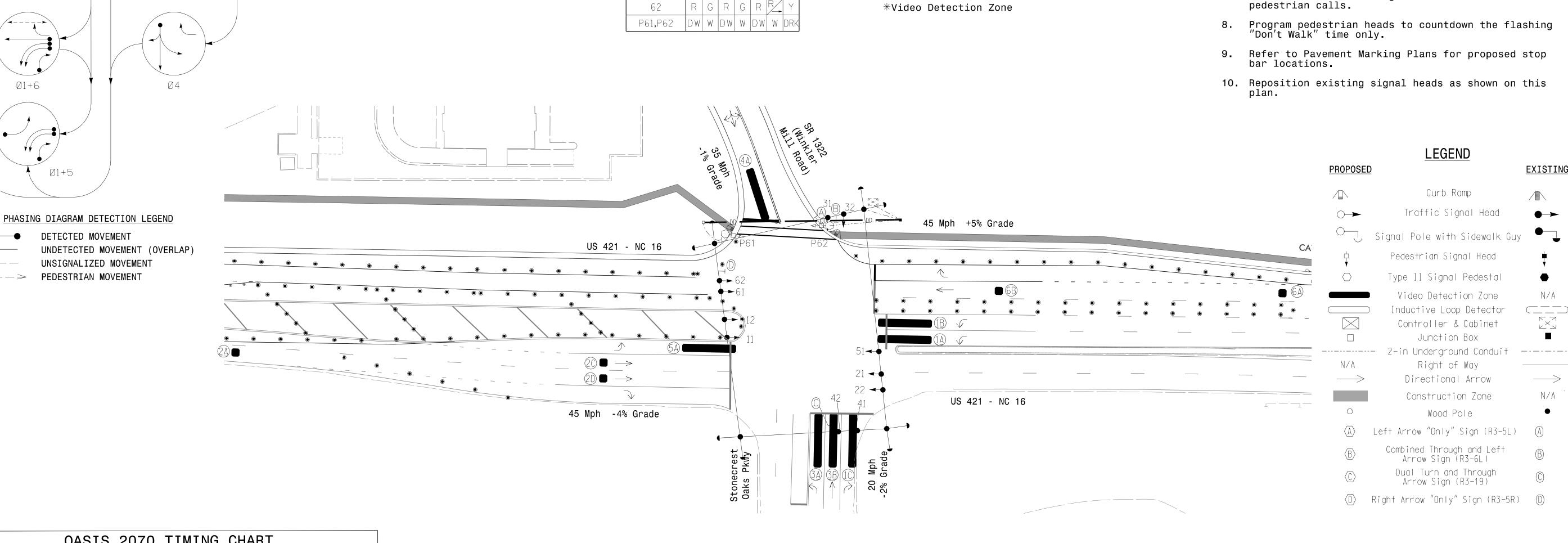


TABLE OF OPERATION

SIGNAL

FACE

2.2

31

3.2

4.2

61

PHASE

╾│<del></del>╾│<del>╕</del>┞│<del>╕</del>┞│<del>╕</del>┞

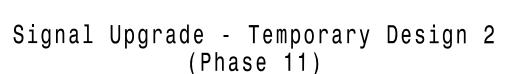
	OASIS	3 2070	TIMIN	G CHAR	Γ	
			PH	IASE		
FEATURE	1	2	3	4	5	6
Min Green 1 *	7	12	7	7	7	12
Extension 1	2.0	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	25	60	15	15	25	60
Yellow Clearance	3.0	4.9	3.0	3.8	3.0	4.1
Red Clearance	3.4	1.5	3.5	2.4	3.3	1.6
Walk 1 *	-	-	-	-	-	7
Don't Walk 1	-	-	-	-	-	18
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial*	_	-	-	-	_	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

PHASING DIAGRAM

02+5

SIGNAL FACE I.D.

All Heads L.E.D.



Prepared for the Offices of:

1"=40'

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

DETECTOR PROGRAMMING

( 일 STRETCH DELAY

INDUCTIVE LOOPS

(FT)

LOOP

1A,1B

2·A

2C, 2D

3 A

3B

44

5 A

6·A

6B

FROM

STOPBAR

+5

350

90

+5

300

90

US 421 - NC 16 SR 1322 (Winkler Mill Road)/ Stonecrest Oaks Pkwy

Divsion 11 Wilkes County REVIEWED BY: M.L. Stygles May 2023

750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: S.R. Chiluka REVIEWED BY:

SEAL 047250 INIT. DATE

VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

5/24/2023 II-I044T2 SIG. INVENTORY NO.

<sup>\*</sup> 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.

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 2. Enable simultaneous Gap-Out for all phases.
- 3. Program phases 2 and 6 for Startup In Green.
- 4. Program phase 6 for Startup Ped Call.
- 5. Program phase 2 and 6 for Yellow Flash.
- 6. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

### **EQUIPMENT INFORMATION**

CONTROLLER	. 2070
CABINET	.332 W/ AUX
SOFTWARE	ECONOLITE OASIS
CABINET MOUNT	BASE
OUTPUT FILE POSITIONS	.18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED	.S1,S2,S3,S4,S5,S6
PHASES USED	.1,2,3,4,5,6,6PED
OVERLAPS	NONE

PROJECT REFERENCE NO. SHEET NO. U-5312 Sig 9 3

						SI	[GN	AL	HE	AD	НО	OK-	-UP	CH	HAR	Т							
LOAD SWITCH NO.	S	51	S2	S2P		S3			S4		S4P	S5	S6	S6P	S7	S8	S8P	59	S1Ø	S11	S12	S13	S14
PHASE			2	2 PED		3			4		4 PED	5	6	PED 0	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11,12	32	21,22	NU	22	31	32	41	42	62	NU	51	61,62	P61, P62	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED			128			116	116	1Ø1	1Ø1				134										
YELLOW			129			117	117	102	102				135										
GREEN			130			118	118	103	1Ø3				136										
RED ARROW	125											131											
YELLOW ARROW	126	126			117					102		132											
GREEN ARROW	127	127			118	118		1Ø3		1Ø3		133											
*														119									
Ķ														121									
<b>*</b>														121									

NU = Not Used

### INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE U	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	SLOT	S L O T	S L O T	S L O T	SLOT	S L O T	Ø 6 PED  DC ISOLATOR	DC
<b>" "</b> L	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	NOT USED	ST DC ISOLATOR
FILE U	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T
"J" L	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y
	/ · 1 /	2A ET	C - I OC	פי חוא סו					1	1			CENCE	

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

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

SPECIAL DETECTOR NOTE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1044T2 DESIGNED: May 2023 SEALED: 5/24/2023

DETAILS FOR:

REVISED: N/A

Temporary Installation - Electrical Detail 1 of 1 (Phase 11) ELECTRICAL AND PROGRAMMING US 421 - NC 16



# SR 1322 (Winkler Mill Road) Stonecrest Oaks Pkwy

Division 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: M.L.Stygles PREPARED BY: S.R.Chiluka REVIEWED BY: J.Ma

INIT. DATE

# SEAL

SIGNATURES COMPLETED

SIG. INVENTORY NO. II-I044T2

5/23/2019 3:15:01 PM R:\Traffic\Signals schiluka

# ST = STOP TIME

# COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE CONNECTION & PROGRAMMING CHART

	OOP RMINAL	INPUT FILE POS	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	QUEUE	CALL	DELAY DURING GREEN
PED PUSH BUTTONS							NOTE:						
P61;P62 TE	B8-7,9	I13U	68	34	6	PED 6		_ DC ISOLA T FILE SLO					

INPUT FILE POSITION LEGEND: J2L

FILE J-SLOT 2 LOWER -

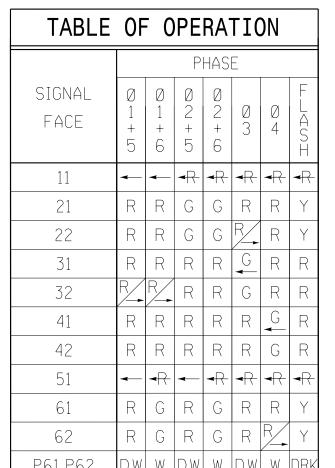
940 Main Campus Drive, Suite 500
Raleigh, NC 27606
919.829.0328
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL

# (Isolated) **NOTES**

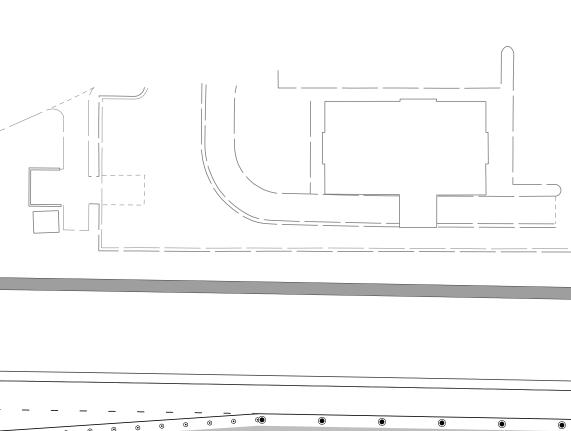
6 Phase

Fully Actuated

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night operation unless otherwise directed by the Engineer.
- 3. Phase 1 and/or 5 may be lagged.
- 4. The order of phase 3 an 4 may be reversed.
- 5. Set all detector units to presence mode.
- This intersection uses video detection. Install detectors according to the manufacturer's instructions to schieve the desitred detection.
- 7. Omit "walk" and flashing "Don't Walk" with no pedestrian calls.
- 8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- 9. Refer to Pavement Marking Plans for proposed stop bar locations.
- 10. Reposition existing signal heads as shown on this



DW| W |DW| W |DW| W |DF



SIGNAL FACE I.D.

All Heads L.E.D.

US 421 - NC 16 2B)■ ->

45 Mph -4% Grade

**LEGEND EXISTING PROPOSED** Curb Ramp Traffic Signal Head Signal Pole with Sidewalk Guy Video Detection Zone nductive Loop Detector

	Inductive Loop Detector Controller & Cabinet
	Junction Box
	- 2-in Underground Condui
N/A	Right of Way
$\longrightarrow$	Directional Arrow
	Construction Zone
0	Wood Pole
$\sqrt{\Lambda}$	Loft Arrow "Only" Sign (D3-

YELLOW

ON

Junction Box in Underground Conduit —-----Right of Way Directional Arrow Construction Zone Wood Pole

N/A

N/A

N/A

⟨A⟩ Left Arrow "Only" Sign (R3-5L) (A) Combined Through and Left

Arrow Sign (R3-6L) Dual Turn and Through Arrow Sign (R3-19)

Right Arrow "Only" Sign (R3-5R) 🔘 Drum Skinny Drum

**FEATURE** 2 12 Min Green 1 \* 2.0 2.0 2.0 2.0 2.0 2.0 Extension 1 25 25 60 15 Max Green 1 \* 3.0 3.0 3.8 3.0 4.1 Yellow Clearance 4.9 3.5 3.5 2.6 3.3 1.5 Red Clearance Walk 1 \* 18 -Don't Walk 1 Seconds Per Actuation Max Variable Initial\* \_ Time Before Reduction -Time To Reduce \* Minimum Gap MIN RECALL MIN RECALL Recall Mode

OASIS 2070 TIMING CHART

PHASE

\_

ON

ON

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

PEDESTRIAN MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

02+5

-dgn

2/14/2012 6:30:44 AM R:\Traffic\Signals\De schiluka

Vehicle Call Memory

Simultaneous Gap

**Dual Entry** 

VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL

SIGNATURES COMPLETED

SEAL

Signal Upgrade - Temporary Design 3 (Phase 12)



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

TURNS

\* | 90 | \* |\*| 6 |Y|Y

INDUCTIVE LOOPS

(FT)

LOOP

2 A

2B

3 A

4 A

5A

6B

FROM

STOPBAR

+5

90

+5 300

★ Video Detection Zone

 $\leftarrow$ 

US 421 - NC 16

DETECTOR PROGRAMMING

US 421 - NC 16 SR 1

	Divsion	11 Wilkes Co	unty	Wil	kesboro
	PLAN DATE:	May 2023	REVIEWED BY:	M.L. St	ygles
27529	PREPARED BY	: S.R. Chiluka	REVIEWED BY:	J. N	la
		REVISIONS		INIT.	DATE

322 (Wink	iler Mi	ill	Ro	ad)	7111111	SEAL
Wilkes Co	unty	V	Vilk	esboro		047250
May 2023	REVIEWED BY:	M.L.	Sty	ygles		MGINEE
S.R. Chiluka	REVIEWED BY:	J	. M	a	•	ATHA R C
REVISIONS		INI	т.	DATE	DocuSigned by:	
					SRC \( \text{S} \)	luka

5/24/2023 SIG. INVENTORY NO.

is shown. Min Green for all other phases should not be lower than 4 seconds

ON

YELLOW

ON

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 2. Enable simultaneous Gap-Out for all phases.
- 3. Program phases 2 and 6 for Startup In Green.
- 4. Program phase 6 for Startup Ped Call.
- 5. Program phase 2 and 6 for Yellow Flash.
- 6. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

### EQUIPMENT INFORMATION

CONTROLLER	.2070
CABINET	.332 W/ AUX
SOFTWARE	.ECONOLITE OASIS
CABINET MOUNT	.BASE
OUTPUT FILE POSITIONS	.18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED	.\$1,\$2,\$3,\$4,\$5,\$6
PHASES USED	.1,2,3,4,5,6,6PED
OVERLAPS	NONE

PROJECT REFERENCE NO. Sig.9.5 U-5312

S13 S14  OLD SPARE  NU NU		S11	S1Ø	S9												S						
	OLC OL				S8P	S8	S7	S6P	S6	S5	S4P		S4			S3		S2P	S2	\$1	C	LOAD SWITCH NO.
NU NU		SPARE	OLB	OLA	8 PED	8	7	6 PED	6	5	4 PED		4			3		2 PED	2	1		PHASE
	NU NI	NU	NU	NU	NU	NU	NU	P61, P62	61,62	51	NU	62	42	41	32	31	22	NU	21,22	32	11,12	SIGNAL HEAD NO.
									134				1Ø1	1Ø1	116	116			128			RED
									135				102	102	117	117			129			YELLOW
									136				103	1Ø3	118	118			130			GREEN
										131											125	RED ARROW
										132		102					117			126	126	YELLOW ARROW
										133		1Ø3		103		118	118			127	127	GREEN ARROW
								119														₩
								121														×
										132				103		118					126	GREEN  RED ARROW  YELLOW ARROW  GREEN ARROW

NU = Not Used

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

### COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

### INPUT FILE POSITION LAYOUT

controller. Ensure conflict monitor communicates with 2070.

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE U	S L O T E M P T Y	S L O T E M P T Y	S L O T E M P T Y	S L O T E M P T Y	S L O T E M P T Y	S L O T E M P T Y	SLOT EMPTY	S L O T E M P T Y	S L O T E M P T Y	SLOT EMPTY	S L O T E M P T Y	SLOT EMPTY	Ø 6 PED  DC ISOLATOR  NOT USED	DC
FILE U "J" L	S L O T E M P T Y	S L O T E M P T Y	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	S L O T E M P T Y	S L O T E M P T Y	S L O T E M P T Y	S L O T E M P T Y	SLOT EMPTY	S L O T E M P T Y

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	QUEUE	CALL	DELAY DURING GREEN
PED PUSH BUTTONS							NOTE:						
P61;P62	TB8-7,9	I13U	68	34	6	PED 6		L DC ISOLA JT FILE SLO					

INPUT FILE POSITION LEGEND: J2L

FILE J SLOT 2 LOWER

# SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1044T3

DESIGNED: May 2023 SEALED: 5/24/2023 REVISED: N/A

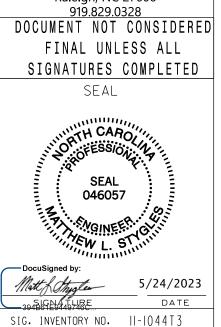
> Temporary Installation - Electrical Detail 1 of 1 (Phase 12)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 - NC 16 at SR 1322 (Winkler Mill Road) / Stonecrest Oaks Pkwy

Wilkes County Wilkesboro Division 11 REVIEWED BY: M.L.Stygles May 2023 REVIEWED BY: J.Ma

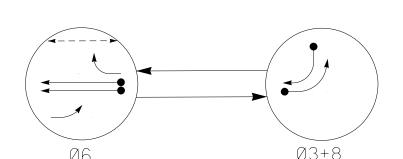
PLAN DATE: PREPARED BY: S.R.Chiluka REVISIONS INIT. DATE



940 Main Campus Drive, Suite 500 Raleigh, NC 27606

 $\bigcirc$  $\bigcap_{\mathbb{C}} \mathbb{C}$ 5/23/2019 3:15:01PM R:\Traffic\Signals\Desig schiluka

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



### PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT UNDETECTED MOVEMENT (OVERLAP)

UNSIGNALIZED MOVEMENT PEDESTRIAN MOVEMENT

# SIGNAL FACE I.D.

All Heads L.E.D.

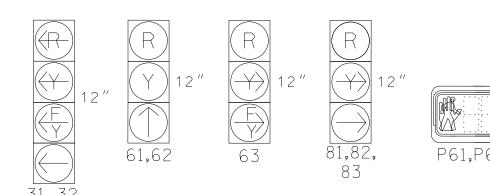


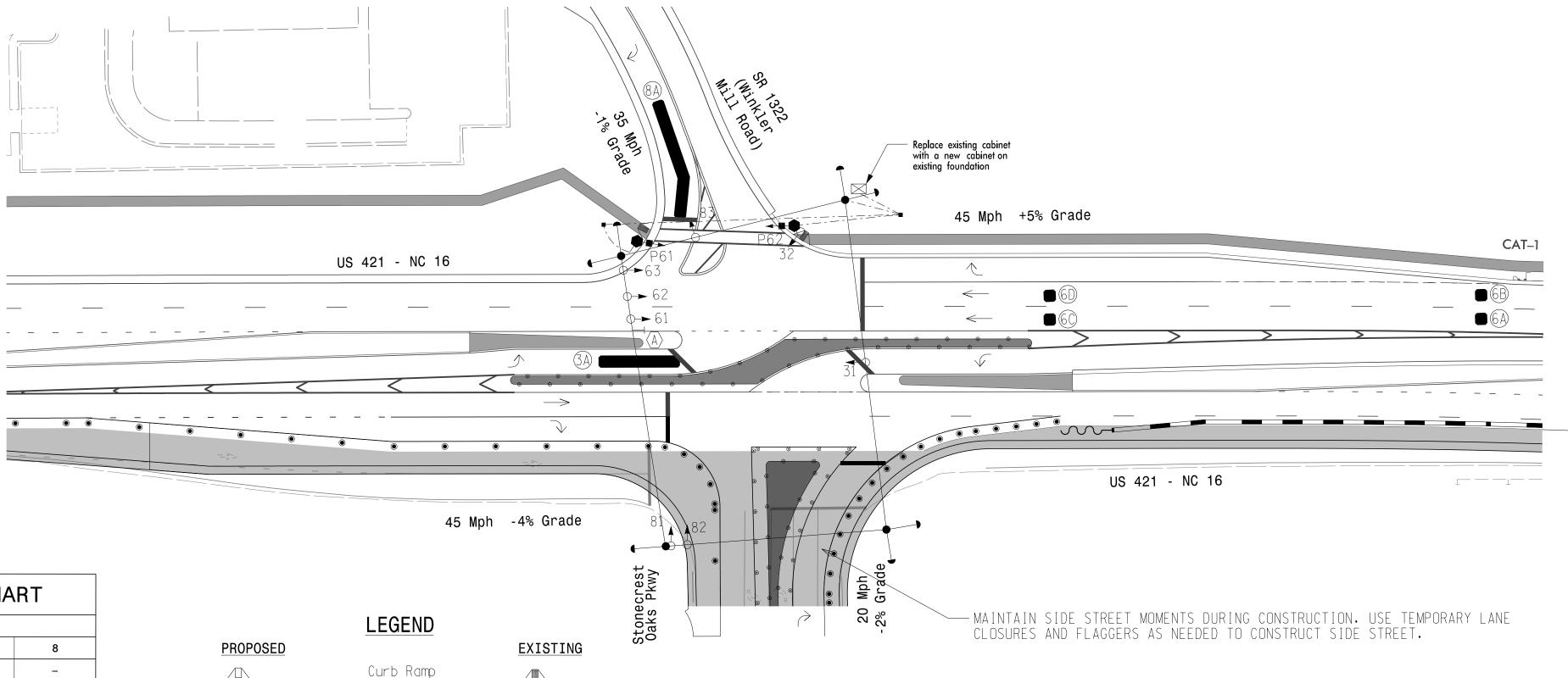
TABLE OF O	PER	ATI	ON
	Р	HAS	E
SIGNAL FACE	Ø 6	Ø 3 + 8	FLASI
31, 32	F	-	*
61,62	$\uparrow$	R	Y
63	F	R	<del>Y</del> >
81,82,83	R	-	R
P61,P62	W	DW	DRK

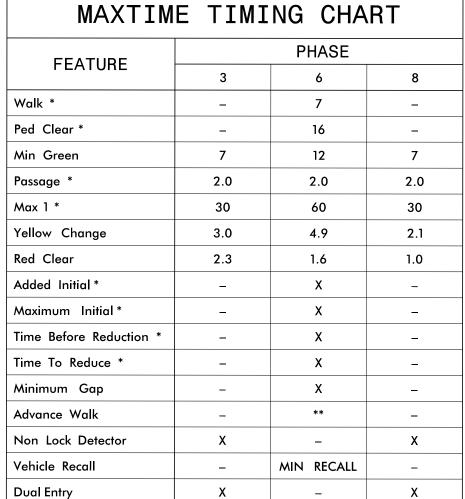
MAXTIME DETECTOR INSTALLATION CHART												
	DETECTOR						OGRAM	MI	NG			
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
3A	*	0	*	*	3	15.0	-	Χ	-	Χ	-	*
6A,6B	*	300	*	*	6	-	1.6	Χ	-	Χ	-	*
6C,6D	*	90	*	*	6	-	-	Χ	-	Χ	-	*
8A	*	0	*	*	8	15.0	-	Χ	-	Χ	-	*
* ∀Video	Detect	ion Zo	ne	•	•							

2 Phase Fully Actuated (Isolated)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night operation unless otherwise directed by the Engineer.
- 3. Set all detector units to presence mode.
- 4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- 5. This intersection uses video detection. Install detectors according to the manufacturer's instructions to schieve the desitred detection.
- 6. Omit "walk" and flashing "Don't Walk" with no pedestrian calls.
- 7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- 8. To provide a leading pedestrian interval on phase 2, program FYA heads 31, 32 and 63 to delay for 3 seconds after the start of the phase 6 walk interval. See electrical details.
- 9 Refer to Pavement Marking Plans for proposed stop bar locations





\* 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.

\* \* See note 8

Curb Ramp Traffic Signal Head Signal Pole with Sidewalk Guy Pedestrian Signal Head Type II Signal Pedestal N/A Video Detection Zone Inductive Loop Detector Controller & Cabinet Junction Box 2-in Underground Conduit -----N/A Right of Way Directional Arrow  $\longrightarrow$ Construction Zone N/A Wood Pole  $\bigcirc$ No Left Turn Sign (R3-2) Drum N/A Skinny Drum N/A

Signal Upgrade - Temporary Design 4 (Phase 13)



1"=40'

SR 1322 (Winkler Mill Road)

US 421 - NC 16

Divsion 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: M.L. Stygles

750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: S.R. Chiluka REVIEWED BY: INIT. DATE REVISIONS

TH CARO! 047250

5/24/2023 SRChiluka SIG. INVENTORY NO. ||-|04474

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SEAL

940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.

U-5312

Sig. 9.6

- 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. Program controller to start up in phase 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.

# **EQUIPMENT INFORMATION**

\*See overlap programming detail on sheet 2.

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,AUX S1,AUX S2,AUX S3
Phases Used	3,6,6 PED,8
Overlap "1"	
Overlap "2"	*
Overlap "3"	.NOT USED
Overlap "4"	.NOT USED
Overlap "5"	*
Overlap "7"	*

PROJECT REFERENCE NO. Sig.9.7 U-5312

	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	OL5	OL3	OL4	SPARE
SIGNAL HEAD NO.	32 <sup>*</sup>	NU	NU	<b>★</b> 31	NU	NU	NU	61,62	P61, P62	NU	81,82	NU	<b>32</b> ★	31 <sup>*</sup>	63 <sup>*</sup>	NU	NU	NU
RED								134			107				A111			
YELLOW	*			*	·		·	135	-					·	-		·	
GREEN																		
RED ARROW													A121	A124				
YELLOW ARROW									-		108		A122	A125	A112			
FLASHING YELLOW ARROW													A123	A126	A113			
GREEN ARROW	127			118	·			136			109			·	-			
₩									119									
<b>K</b>									121									

NU = Not Used

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

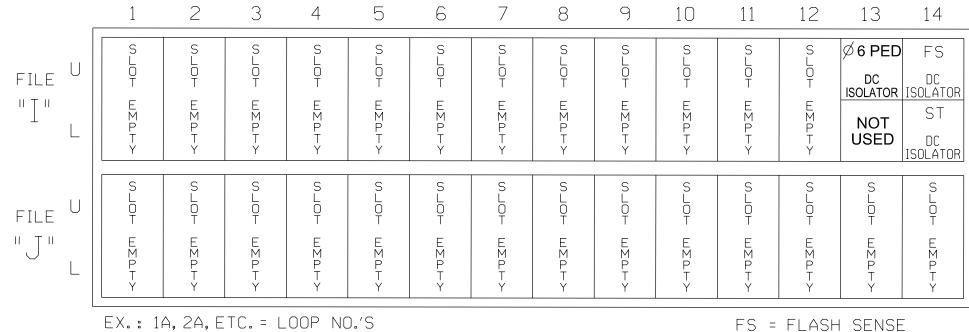
# INPUT FILE POSITION LAYOUT

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.

(front view)



ST = STOP TIME

= DENOTES POSITION OF SWITCH

### 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	QUEUE	CALL	DELAY DURING GREEN
PED PUSH BUTTONS							NOTE: INSTAL	L DC ISOLA	TOR	INPUT FIL	E POSITI	ON LEGE	ND: J2L
P61;P62	TB8-7,9	I13U	68	34	6	PED 6	IN INPU	JT FILE SLO	T I13.				
											FILE J — SLOT 2 —		
											OWER —		

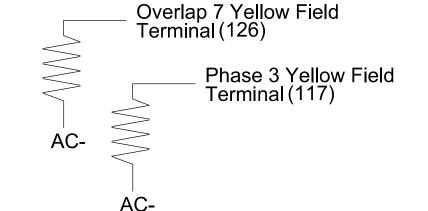
### SPECIAL DETECTOR NOTE

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

### 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)



THE SIGNAL DESIGN: 11-1044T4 SEALED: 5/24/2023 REVISED: N/A



Temporary Installation - Electrical Detail 1 of 2 (Phase 13)

DETAILS FOR: Prepared for the Offices of:

US 421 SR 1322 (Winkler Mill Road)

Division 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: J. Ma PREPARED BY: M.L. Stygles REVIEWED BY: S.R. Chiluka REVISIONS INIT. DATE

SEAL 046057 Matt Strigter 5/24/2023 DATE SIG. INVENTORY NO. ||-|04474

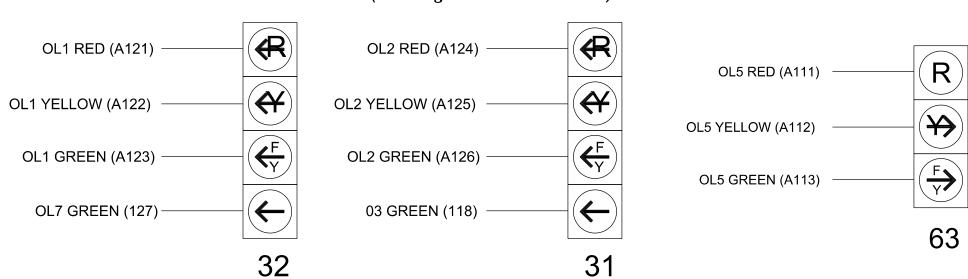
DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL

SIGNATURES COMPLETED

# FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR DESIGNED: May 2023

ELECTRICAL AND PROGRAMMING

# 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	5	7
Туре	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	Normal
Included Phases	6	6	6	3
Modifier Phases	3	3	4	j
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0
FYA Ped Delay	3.0	3.0	3.0	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**

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1044T4

DESIGNED: May 2023

SEALED: 5/24/2023

REVISED: N/A



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Temporary Installation - Electrical Detail 2 of 2 (Phase 13)

ELECTRICAL AND PROGRAMMING

Prepared for the Offices of:

Mobility and Capital Control of the Control of the

Mobility and Section Division Wolf of TRANSON SOLUTION TO PL

DETAILS FOR:

SR 1322 (Winkler Mill Road)

Division 11 Wilkes County Wilkesb

PLAN DATE: May 2023 REVIEWED BY: J. May

US 421

Division 11 Wilkes County Wilkesboro
PLAN DATE: May 2023 REVIEWED BY: J. Ma
PREPARED BY: M.L. Stygles REVIEWED BY: S.R. Chiluka
REVISIONS INIT. DATE

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Docusigned by:

Math thysic 5/24/2023

39484 RM A 3748 E. DATE

SIG. INVENTORY NO. ||-|04474

PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

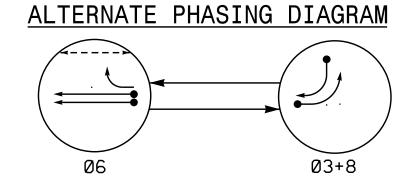
UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.

← − → PEDESTRIAN MOVEMENT



	DEFA	ULT	PH	A,	SIN	G		
	TABLE OF OPERATIO							
				Р	HAS	E		
	SIGN	IAL		)	Ø3			
	FAC	Έ	6	)	3 +	тПФОТ		
					8	о Н		
L	31,3	32	Ę	<u>-</u>	<b>-</b>	<del>≺</del>		
	61,6	52	1	`	R	Υ		
	63	}	FY	, <del>-</del>	R	ᅷ		
	81,82	,83	F	?		R		
	P61,F	°62	V	1	DW	DRK		

TABLE OF C		ASI	
TABLE OF C		HAS	
SIGNAL FACE	Ø6	\( \text{\$\pi\$} \)	FLGOI
31,32	<del>-R</del>	<b> </b>	<del>-</del> Y
61.62	$\uparrow$	R	Υ
63	F	R	<del>*</del>
81,82,83	R	_	R
P61,P62	W	DW	DRK

MAXTIME DETECTOR INSTALLATION CHART												
	DET		PF	ROGRAM	ΜI	NG						
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
ЗА	6X40	0	2-4-2	Χ	3	15.0*	ı	Χ	1	Χ	-	Х
6A	6X6	300	4	Χ	6	ı	ı	Χ	Χ	Χ	-	Χ
6B	6X6	300	4	Χ	6	ı	ı	Χ	Χ	Χ	1	Х
8A	6X40	0	2-4-2	Χ	8	15.0	-	Χ	-	Χ	-	Х
S1	6X6	200	5	Χ	-	-	-	-	-	-	-	Х
* Disable delay during alternate phasing operation												

# Wilkesboro Closed Loop System **NOTES**

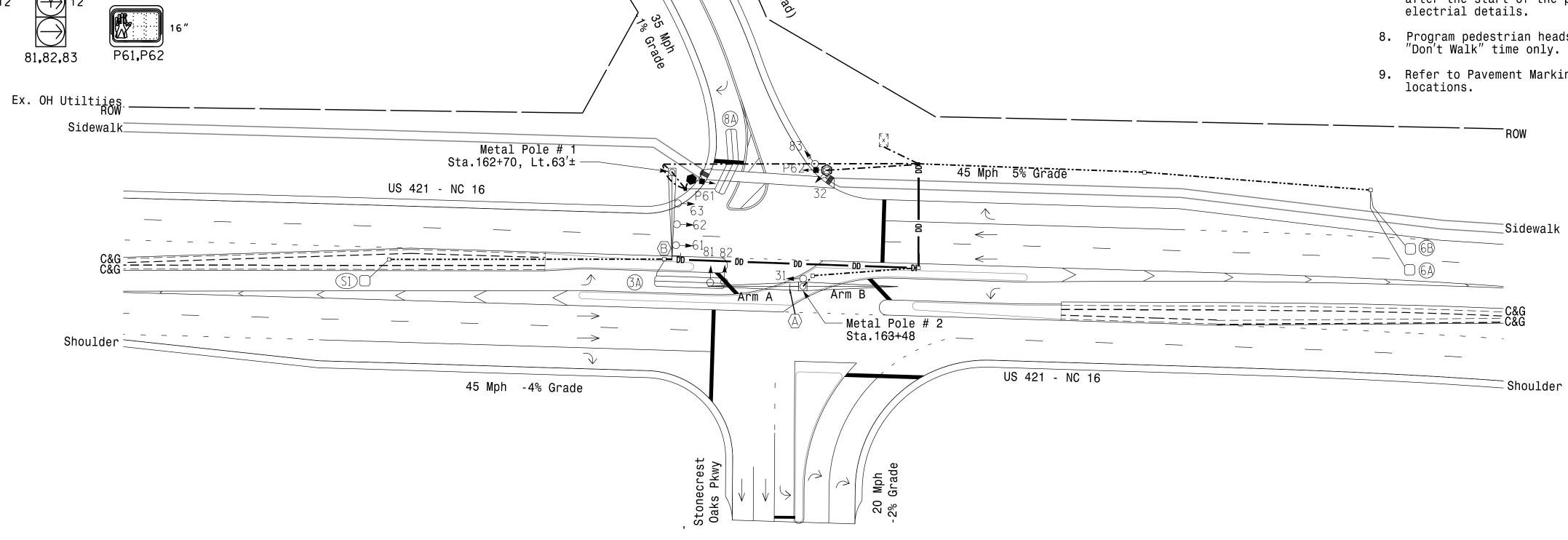
Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.

2 Phase

Fully Actuated

W/ Alternate Phasing Operation

- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 3. Set all detector units to presence mode.
- 4. The Division (Town) Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- 7. To provide a leading pedestrian interval on phase 6, program FYA heads 31, 32 and 63 to delay for 3 seconds after the start of the phase 6 walk interval. See electrial details.
- 8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- 9. Refer to Pavement Marking Plans for proposed stop bar



MAXTIME TIMING CHART								
FEATURE	PHASE							
FEATURE	3	6	8					
Walk *	_	7	_					
Ped Clear *	_	16	_					
Min Green	7	12	7					
Passage *	2.0	6.0	2.0					
Max 1 *	30	60	30					
Yellow Change	3.0	4.1	3.0					
Red Clear	2.3	1.6	2.1					
Added Initial *	-	1.5	_					
Maximum Initial *	-	34	_					
Time Before Reduction *	_	15	_					
Time To Reduce *	_	30	_					
Minimum Gap	-	3.4	_					
Advance Walk	-	**	-					
Non Lock Detector	Х	_	Х					
Vehicle Recall	-	MIN RECALL	_					
Dual Entry	х	_	Х					

* 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.

ension innes ioi	priuses	z unu	o lower ind	ii wildi is silowii.	,
all other phases	should	not be	lower than	4 seconds.	
See Note 7					

	LEGEND	
<u>PROPOSED</u>		<b>EXISTING</b>
$\bigcirc \longrightarrow$	Traffic Signal Head Sign	<b>←→</b>
0	Metal Pole with Mastarm	0
	Type II Signal Pedestal	•
$\bigotimes$	Type III Signal Pedestal	<b>↔</b>
	Inductive Loop Detector Controller & Cabinet	()
	Junction Box	
DD	2-in Underground Conduit Directional Drill Right of Way	N/A — — — — —
$\longrightarrow$	Directional Arrow	$\longrightarrow$
$\langle A \rangle$	No U Turn Sign (R3-4)	N/A
$\langle \mathbb{B} \rangle$	No Left Turn Sign (R3-2)	N/A
	Curb Ramp	

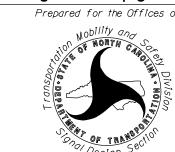


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

Signal Upgrade - Final Design

Prepared for the Offices of:



US 421 - NC 16 at SR 1322 (Winkler Mill Road)

		Divsion 1	1 Wilkes Co	unty	Wilkesboro		
90	Design Section	PLAN DATE:	May 2023	REVIEWED BY:	M. Sty	gles	
enfie	eld Pkwy,Garner,NC 27529	PREPARED BY:	S.R. Chiluka	REVIEWED BY:	J. M	a	
	SCALE		REVISIONS		INIT.	DATE	

047250

SIGNATURE SIG. INVENTORY NO.

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- 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. Program phases 3 and 8 for Dual Entry.
- 3. Program controller to start up in phase 6 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 Wilkesboro 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, AUX S1, AUX S2,
	AUX S3
Phases Used	3, 6, 6 PED, 8
Overlap "1"	*
Overlap "2"	*
Overlap "3"	*
Overlap "4"	NOT USED
Overlap "7"	*

\*See overlap programming detail on sheet 2.

# Sig.9.10 U-5312

			SIC	3NA	AL H	ΙEΑ	DH	00	K-U	PC	HA	RT					
S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
OL7	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	SPARE
<b>★</b> 32	NU	NU	31 <sup>*</sup>	NU	NU	NU	61,62	P61, P62	NU	81,82	NU	<b>32</b> ★	<b>★</b> 31	<b>★</b> 63	NU	NU	NU
							134			107				A111			
*			*				135										
				·								A121	A124				
										108		A122	A125	A112			
												A123	A126	A113			
127	·	·	118	·			136			109							
								119									
								121									
	1 OL7 32 *	1 2 OL7 2 32 NU *	1 2 13 OL7 2 PED 32 NU NU  *	S1 S2 S3 S4  1 2 13 3  OL7 2 PED 3  32 NU NU 31 **  * * * * *  * *  * *	S1 S2 S3 S4 S5  1 2 13 3 4  OL7 2 PED 3 4  32 NU NU 31 NU  * *	S1 S2 S3 S4 S5 S6  1 2 13 3 4 14  OL7 2 PED 3 4 PED  32 NU NU 31 NU NU  * * * * * * * * * * * * * * * * * * *	S1 S2 S3 S4 S5 S6 S7  1 2 13 3 4 14 5  OL7 2 PED 3 4 PED 5  32 NU NU 31 NU NU NU NU  * * * * * * * * * * * * * * * * * * *	S1 S2 S3 S4 S5 S6 S7 S8  1 2 13 3 4 14 5 6  OL7 2 PED 3 4 PED 5 6  32 NU NU 31 NU NU NU NU 61,62  * * * * * * * * * * * * * * * * * * *	S1       S2       S3       S4       S5       S6       S7       S8       S9         1       2       13       3       4       14       5       6       15         OL7       2       PED       3       4       PED       5       6       PED         32       NU       NU       NU       NU       NU       NU       NU       61,62       P61, P62         4       *       *       *       *       *       134       *         *       *       *       *       *       *       *       *       *         *	S1       S2       S3       S4       S5       S6       S7       S8       S9       S10         1       2       13       3       4       14       5       6       15       7         OL7       2       PED       3       4       PED       5       6       PED       7         32       NU       NU       NU       NU       NU       61,62       P61, P62       NU         **                  **	S1       S2       S3       S4       S5       S6       S7       S8       S9       S10       S11         1       2       13       3       4       14       5       6       15       7       8         OL7       2       2 PED       3       4       PED       5       6       PED       7       8         32       NU       NU       31       NU       NU       NU       61,62       P61, PED       NU       81,82	S1       S2       S3       S4       S5       S6       S7       S8       S9       S10       S11       S12         1       2       13       3       4       14       5       6       15       7       8       16         OL7       2       PED       3       4       PED       5       6       PED       7       8       PED         32*       NU       NU       NU       NU       61,62       P61, P62       NU       81,82       NU         **   <	1 2 13 3 4 14 5 6 15 7 8 16 9  OL7 2 PED 3 4 PED 5 6 PED 7 8 PED OL1  32 NU NU 31 NU NU NU NU 61,62 P61, P62 NU 81,82 NU 32   * 134 107  * 135	S1       S2       S3       S4       S5       S6       S7       S8       S9       S10       S11       S12       AUX S2         1       2       13       3       4       14       5       6       15       7       8       16       9       10         OL7       2       PED       3       4       PED       5       6       PED       7       8       PED       OL1       OL2         32       NU       NU       31       NU       NU       NU       81,82       NU       32       31         NU       NU       31       NU       NU       NU       81,82       NU       32       31         NU       134       107       107       107       100	S1       S2       S3       S4       S5       S6       S7       S8       S9       S10       S11       S12       AUX S1 AUX S2 S3         1       2       13       3       4       14       5       6       15       7       8       16       9       10       17         OL7       2       ped 3       4       ped 5       6       ped 7       8       ped OL1       OL2       OL5         32       NU       NU       NU       S1,82       NU       32       31       63         32       NU       NU       NU       S1,82       NU       32       31       63         32       NU       NU       NU       81,82       NU       32       31       63         32       NU       NU       NU       NU       81,82       NU       32       31       63         4       X       X       134       107       X       A111         **       X       X       135       X       A121       A124         X       X       X       X       X       X       X       X       X       X       X       X<	S1         S2         S3         S4         S5         S6         S7         S8         S9         S10         S11         S12         AUX S2         AUX S3         AUX S4           1         2         13         3         4         14         5         6         15         7         8         16         9         10         17         11           OL7         2         PED         3         4         PED         5         6         PED         7         8         PED         OL1         OL2         OL5         OL3           32*         NU         NU         31*         NU         NU         NU         81,82         NU         32*         31*         63*         NU           **         **         **         **         134         107         **         A111         **           **         **         **         135         **         **         A121 A124         **           **         **         **         **         **         **         **         A122 A125 A112         **           **         **         **         **         **         **         **	S1         S2         S3         S4         S5         S6         S7         S8         S9         S10         S11         S12         AUX S1         AUX S2         AUX S3         AUX S5           1         2         13         3         4         14         5         6         15         7         8         16         9         10         17         11         12           OL7         2         PED         3         4         PED         5         6         PED         7         8         PED         OL1         OL2         OL5         OL3         OL4           32*         NU         NU         31*         NU         NU         81,82         NU         32*         31*         63*         NU         NU           **         **         **         134         107         **         A111         **

### NU = Not Used

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

# INPUT FILE POSITION LAYOUT

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.

(front view)

	,	1	2	3	4	5	6	7	8	9	10	11	12	13	14
		S	S	S L	S L	Ø 3	S L	S L	S L	S	S L	S L	S L	Ø 6 PED	FS
FILE	U	O T	OT	Ō	O T	3A	O T	O T	Ō T	ÖT	Ö T	Ō T	Ö T	DC ISOLATOR	DC ISOLATOR
" "	ı	E M P	E M P	E M P	E M P	NOT	E M P	E M P	E M P	E M P	E M P	E M P	E M P T Y	NOT	ST
	L	Y	Y	T Y	T Y	USED	Y	T Y	T Y	Y	T Y	Y	Y	USED	DC ISOLATOR
		S L	Ø 6	S L	S L	S L	Ø 8	S L	S L	SYS. DET.	S L	S L	S L	S L	S L
FILE	U	O T	6A	O T	O T	O T	8A	P P	P	S1	O T	O T	P P	Ŏ T	우
"J"	ı	E M P	Ø 6	E M P	E M P	E M P	NOT	E M P	E M P	NOT	E M P	E M P	E M P	E M P	E M P
	_	Y	6B	Y	T Y	Y	USED	Y	T Y	USED	Y	T	Y	T	T
	l	EX.: 1A, 2A, ETC. = LOOP NO.'S  FS = FLASH SENSE													

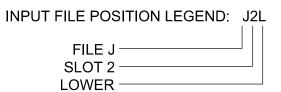
FS = FLASH SENSE ST = STOP TIME

= DENOTES POSITION OF SWITCH

### 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	QUEUE	CALL	DELAY DURING GREEN
3A	TB4-5,6	I5U	58	20	7	3	15		Х			Х	
6A	TB3-5,6	J2U	40	2	16	6			Х	Х		Х	
6B	TB3-7,8	J2L	44	6	17	6			Х	Х		Х	
8A	TB5-9,10	J6U	42	4	22	8	15		Х			Х	
<b>*</b> S1	TB7-9,10	J9U	59	21	27	SYS			Х			Х	
PED PUSH BUTTONS							NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.						
P61;P62	TB8-7,9	I13U	68	34	6	PED 6							

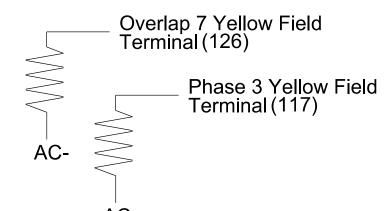
\*System detector only. Remove any assigned vehicle phase.



# 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: 11-1044 DESIGNED: May 2023 SEALED: 5/24/2023 REVISED: N/A



Electrical Detail - Sheet 1 of 2 ELECTRICAL AND PROGRAMMING

DETAILS FOR:

Prepared for the Offices of:

US 421 SR 1322 (Winkler Mill Road)

Division 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: J. Ma PREPARED BY: M.L. Stygles REVIEWED BY: S.R. Chiluka REVISIONS INIT. DATE

SEAL 046057 5/24/2023 DATE SIG. INVENTORY NO. ||-|044

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

# FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

OL2 RED (A124) OL1 RED (A121)  $\overline{\mathsf{R}}$ OL5 RED (A111) OL2 YELLOW (A125) OL1 YELLOW (A122) OL5 YELLOW (A112) OL1 GREEN (A123) OL2 GREEN (A126) OL5 GREEN (A113) OL7 GREEN (127) 03 GREEN (118) 63 32 31

# 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 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: Reduces delay time for phase 3 call on loop 3A 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.

# 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.

Platt Z		
Detector	Call Phase	Delay
7	3	<u>-</u>

# 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	5	7
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	Normal
Included Phases	6	6	6	3
Modifier Phases	3	3	÷	<u>-</u>
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0
FYA Ped Delay	3:0	3:0	3.0	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	5	7
Туре	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	Normal
Included Phases	÷	÷	6	3
Modifier Phases	3	3	÷	÷
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0:0
FYA Ped Delay	3.0	3.0	3.0	0.0

NOTICE INCLUDED PHASE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1044 DESIGNED: May 2023 SEALED: 5/24/2023 REVISED: N/A

Electrical Detail - Sheet 2 of 2 ELECTRICAL AND PROGRAMMING

DETAILS FOR: Prepared for the Offices of:

US 421 SR 1322 (Winkler Mill Road)

Division 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: J. Ma PREPARED BY: M.L. Stygles REVIEWED BY: S.R. Chiluka REVISIONS INIT. DATE

SEAL SIG. INVENTORY NO. ||-|044

940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

# PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT UNDETECTED MOVEMENT (OVERLAP)

UNSIGNALIZED MOVEMENT PEDESTRIAN MOVEMENT

# SIGNAL FACE I.D.

All Heads L.E.D.

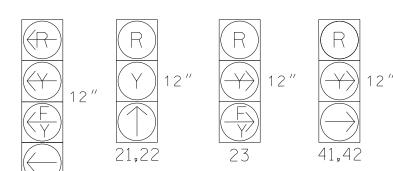


TABLE OF (	)PE	ΞR	ATI	ON
		Р	HAS	E
SIGNAL FACE		) 	Ø 4 + 7	FLASH
21,22	1	/	R	Υ
23	É	_	R	<del></del>
41,42	F	?	-	R
7:1	<b>-</b>	_	•	<b>*</b>

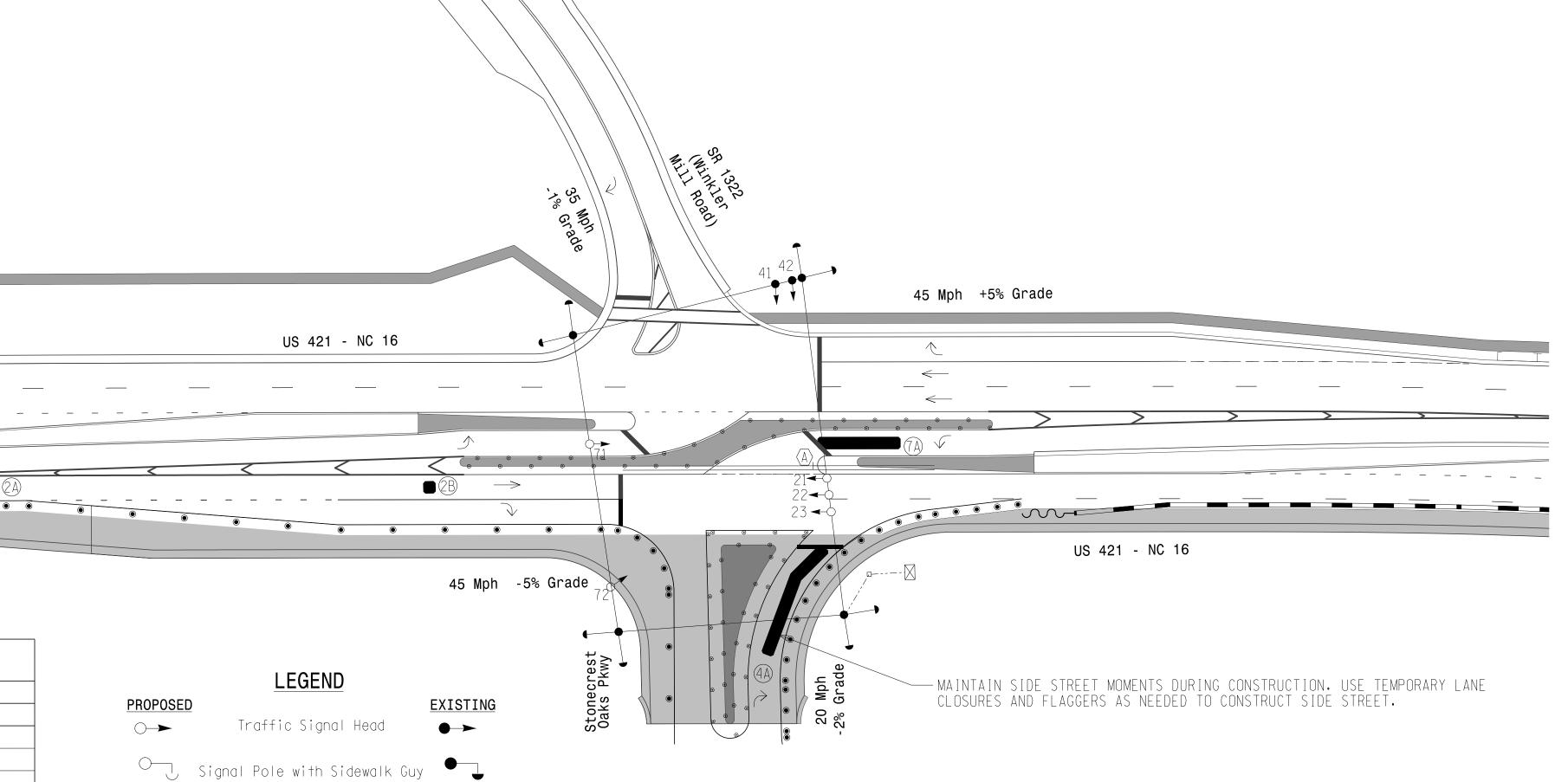
MAXTIME DETECTOR INSTALLATION CHART												
	DETECTOR					PF	ROGRAN	MI	NG			
L00P	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	*	300	*	*	2	1	1.6	Χ	-	Χ	1	*
2B	*	90	*	*	2	-	_	Χ	_	Χ	1	*
4A	*	0	*	*	4	15.0	-	Χ	-	Χ	1	*
7A	*	0	*	*	7	15.0	<u>-</u>	Χ	-	Χ	-	*

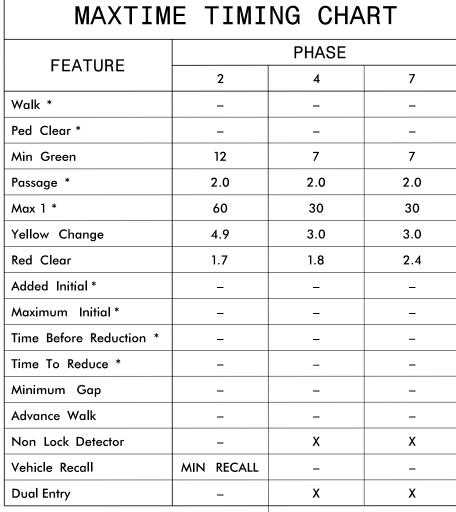
**\*Video Detection Zone** 

2 Phase Fully Actuated (Isolated)

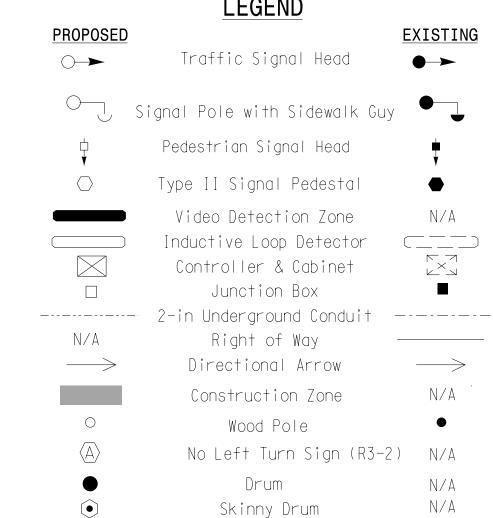
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night operation unless otherwise directed by the Engineer.
- 3. Set all detector units to presence mode.
- 4. This intersection uses video detection. Install detectors according to the manufacturer's instructions to schieve the desitred detection.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- 6. Refer to Pavement Marking Plans for proposed stop bar locations.





\* 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 - Temporary Design 1(Phase 13)



US 421 - NC 16 Stonecrest Oaks Pkwy

Divsion 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: M.L. Stygles

750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: S.R. Chiluka REVIEWED BY: INIT. DATE REVISIONS 1"=40'

SEAL CARO! 047250

940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.

U-5312

Sig. 9.12

SIG. INVENTORY NO. 11-146571

2011 9:38:53 AM -affic\Signals\

- 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. 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.

# **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,S5,S7,S10,AUX S4,AUX S5,AUX S6
Phases Used	2, 4, 7
Overlap "1"	
Overlap "2"	NOT USED
Overlap "3"	*
Overlap "4"	. <b>.</b> *
Overlap "6"	<b>*</b>
Overlap "7"	* ··
*See overlap programming detail on	sheet 2.

PROJECT REFERENCE NO. SHEET NO. Sig.9.13

	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 PÉD	OL1	OL2	SPARE		OL4	OL6
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	<b>72</b> ★	NU	NU	<b>7</b> 1	NU	NU	NU	NU	NU	<b>7</b> 2★	<b>7</b> 1	23
RED		128			101							-			-			A104
YELLOW		129		·		·	*			*		-	-	·	-			
GREEN																		
RED ARROW	·						-				·		·	·	-	A114	A101	
YELLOW ARROW					102		-								-	A115	A102	A105
FLASHING YELLOW ARROW																A116	A103	A106
GREEN ARROW		130			103	٠	133			124								·

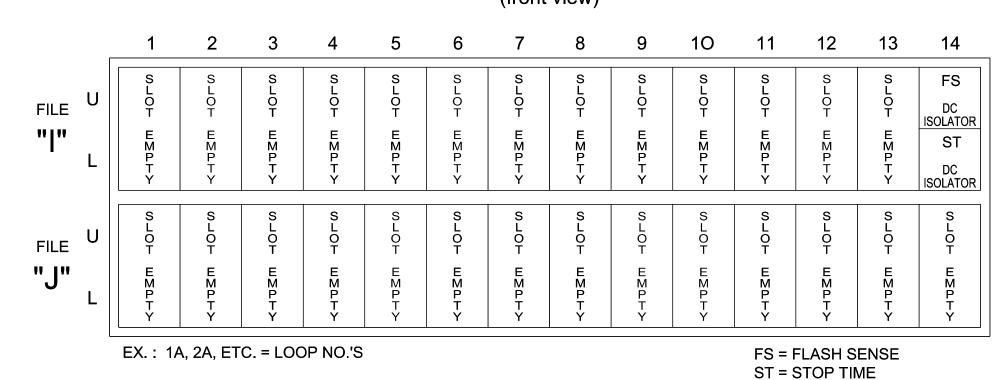
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

### INPUT FILE POSITION LAYOUT

(front view)



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.

# SPECIAL DETECTOR NOTE

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

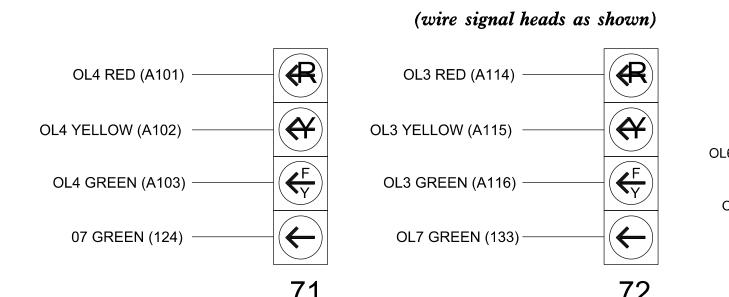
# LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

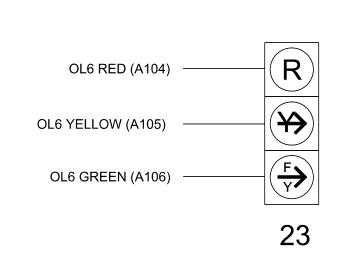
ACCEPTABLE VALUES
Value (ohms) Wattage
1.5K - 1.9K 25W (min)
2.0K - 3.0K 10W (min)

Overlap 7 Yellow Field Terminal (132)

Phase 7 Yellow Field Terminal (123)



FYA SIGNAL WIRING DETAIL



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-1465
DESIGNED: May 2023
SEALED: 5/24/2023
REVISED: N/A

Temporary Installation - Electrical Detail 1 of 2 (Phase 13)

Prepared for the Offices of:

US 421 at Stonecrest Oaks Pkwy

CHILLIAN CONTRACTOR				_		
Divisi	Division	11 Wilkes Co	unty	Wilkesbor		
Tron I noise	PLAN DATE:	May 2023	May 2023 REVIEWED BY:		a	
T. C.	PREPARED BY:	S.R. Chiluka				
Sinals Management		REVISIONS				
Managen						
750 N.Greenfield Pkwy,Garner,NC 27529						

VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

ORDER

SEAL

O46057

DOCUMENT NOT CONSIDERED

# 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		Χ	X	1
	2	Phase Vehicle	2	Х			2
	3	Phase Vehicle	3		Χ	Χ	3
ASSIGN .	4	Phase Vehicle	4		Х		4
CHANNEL 5 TO	5	Overlap	7		Х		5
OVERLAP 7	6	Phase Vehicle	6	Х		Х	6
	7	Phase Vehicle	7		Х		7
	8	Phase Vehicle	8		X	Х	8
	9	Overlap	1	Х		Х	9
	10	Overlap	2	·	X	Х	10
	11	Overlap	3	Х			11
	12	Overlap	4	Х			12
	13	Phase Ped	2			-	13
	14	Phase Ped	4	·			14
	15	Phase Ped	6				15
	16	Phase Ped	8			-	16
	17	Overlap	5		Х	Х	17
	18	Overlap	6	Χ			18

# MAXTIME OVERLAP PROGRAMMING DETAIL

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

# Overlap Plan 1

Overlap	3	4	6	7
Туре	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	Normal
ncluded Phases	2	2	2	7
Modifier Phases	7	7	÷	÷
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1465 DESIGNED: May 2023 SEALED: 5/24/2023 REVISED: N/A



### Temporary Installation - Electrical Detail 2 of 2 (Phase 13)

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

US 421 Stonecrest Oaks Pkwy

Division PLAN DATE:	11 Wilkes C May 2023	REVIEWED BY:	J. M	kesboro 2
TLAN DATE.	Way 2023	WEALEMED DI.	U . IVI	a
PREPARED BY:	M.L. Stygles	REVIEWED BY:	S.R. Chi	iluka
	REVISIONS		INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL Math Strycler 5/24/2023
39566184764RE... DATE SIG. INVENTORY NO. ||-|465T|

PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

← - - > PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.

21,22

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

12"

41,42

ALTERNATE PHASING TABLE OF OPERATION							
	Р	HAS	E				
SIGNAL FACE	Ø2	Ø 4 7	FLANI				
21,22	1	R	Υ				
23	₩	R	<del>-Y-</del>				
41,42	R	<b>—</b>	R				
71,72	₩	<b>—</b>	<del>-Υ</del>				

MAXTIME DETECTOR INSTALLATION CHART												
	DET	ECTOR				PF	OGRAN	ΜI	NG			
L00P	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	300	5	Χ	2		ı	Χ	Χ	Χ	1	Χ
2B	6X6	300	5	Χ	2		ı	Χ	Χ	Χ	-	Χ
4A	6X40	0	2-4-2	Χ	4	15.0	1	Χ	ı	Χ	-	Χ
4B	6X40	0	2-4-2	Χ	4	15.0	-	Χ	-	Χ	-	Χ
7A	6X40	0	2-4-2	Χ	7	15.0*	-	Χ		Χ	-	Χ
S1	6X6	200	3	Χ	-			1	1	1	•	Χ

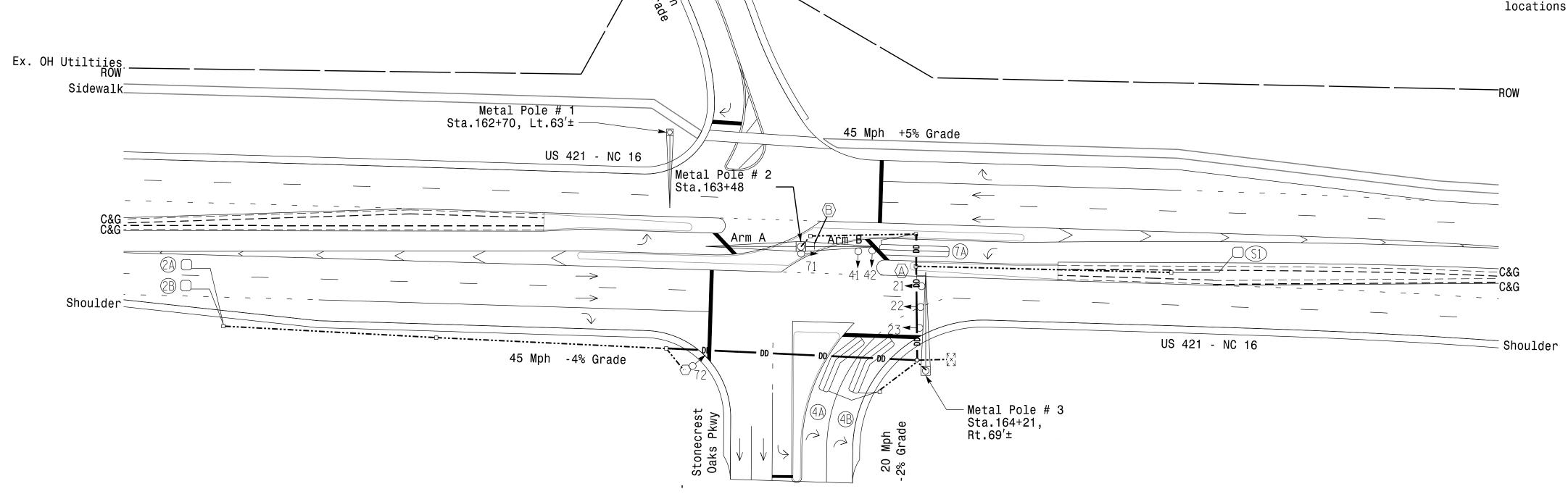
\* Disable delay during alternate phasing operation

# Sig.9.15 U-5312

# 2 Phase Fully Actuated W/ Alternate Phasing Operation Wilkesboro Closed Loop System

### **NOTES**

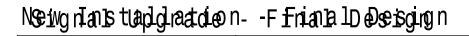
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 3. Set all detector units to presence mode.
- 4. The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Refer to Pavement Marking Plans for proposed stop bar locations.

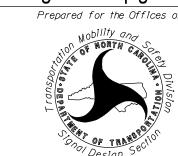


MAXTIME TIMING CHART						
FEATURE		PHASE				
FEATURE	2	4	7			
Walk *	-	-	_			
Ped Clear *	_	_	_			
Min Green	12	7	7			
Passage *	6.0	2.0	2.0			
Max 1 *	60	30	30			
Yellow Change	4.9	3.0	3.0			
Red Clear	1.9	1.9	2.6			
Added Initial *	1.5	_	_			
Maximum Initial *	34	_	_			
Time Before Reduction *	15	_	_			
Time To Reduce *	30	_	_			
Minimum Gap	3.4	_	_			
Advance Walk	_	_	_			
Non Lock Detector	_	Х	Х			
Vehicle Recall	MIN RECALL	_	_			
Dual Entry	_	Х	Х			

\* 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.

PROPOSED	<u>LEGEND</u>	EXISTING
<u> </u>		
$\rightarrow$	Traffic Signal Head Sign	$\rightarrow$
0	Metal Pole with Mastarm	0
	Inductive Loop Detector Controller & Cabinet Junction Box	
— DD —	2-in Underground Conduit  Directional Drill  Right of Way	N/A
	Directional Arrow	
	No Left Turn Sign (R3-2)	N/A
$\langle \mathbb{B} \rangle$	No U-Turn Sign (R3-4)	N/A





US 421 - NC 16 Stonecrest Oaks Pkwy

Divsion 11 Wilkes County		Wilkesboro		
Ono/Design Section	PLAN DATE: May 2023 REVIEWED BY:	M. Sty	gles	
N.Greenfield Pkwy, Garner, NC 2752	PREPARED BY: S.R. Chiluka REVIEWED BY:	J. N	la	
SCALE	REVISIONS	INIT.	DATE	
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				

SEAL 047250

VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO.

2023 8:27:14 AM affic\Signals\Design\Si

- 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. 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 Wilkesboro Closed Loop System.

# **EQUIPMENT INFORMATION**

\*See overlap programming detail on sheet 2.

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,S5,S7,S10,AUX S4,AUX S5,
	AUX S6
Phases Used	2, 4, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	*
Overlap "4"	*
Overlap "6"	*
Overlap "7"	

# Sig.9.16 U-5312

				SI	GNA	L H	ΙEΑ	DΗ	00	K-U	PC	HA	RT					
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	1.7	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	OL7	6	6 PED	7	8	8 PED	OL1	OL2	SPARE		OL4	OL6
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	<b>★</b> 72	NU	NU	<b>7</b> 1	NU	NU	NU	NU	NU	<b>7</b> 2★	<b>7</b> 1	23
RED		128			101													A104
YELLOW		129					*		-	*	·	-		·	-			
GREEN								,										
RED ARROW													·	·		A114	A101	
YELLOW ARROW					102											A115	A102	A105
FLASHING YELLOW ARROW							·									A116	A103	A106
GREEN ARROW		130			103		133	·		124			·	·				

### NU = Not Used

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

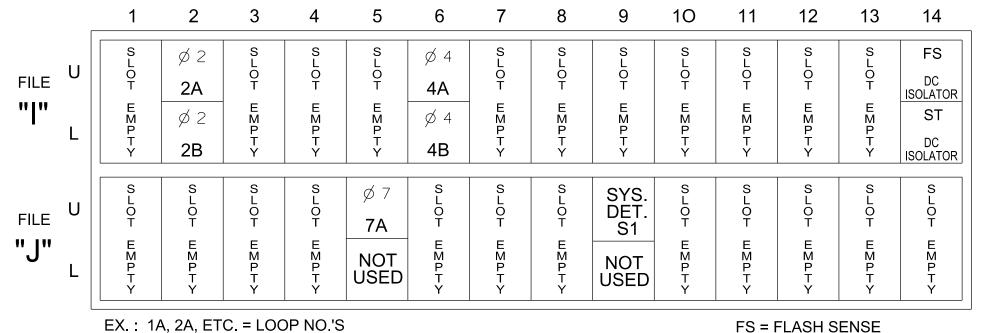
# INPUT FILE POSITION LAYOUT

# (front view)

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.

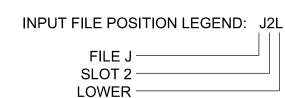


FS = FLASH SENSE ST = STOP TIME

# INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.		DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	QUEUE	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			Х	Χ		Х	
2B	TB2-7,8	I2L	43	5	3	2			Х	Χ		Х	
4A	TB4-9,10	I6U	41	3	8	4	15		Х			Х	
4B	TB4-11,12	I6L	45	7	9	4			Х			Х	
7A	TB5-5,6	J5U	57	19	21	7	15		Х			Х	
<b>*</b> S1	TB7-9,10	J9U	59	21	27	SYS			Х			Х	

\*System detector only. Remove any assigned vehicle phase.



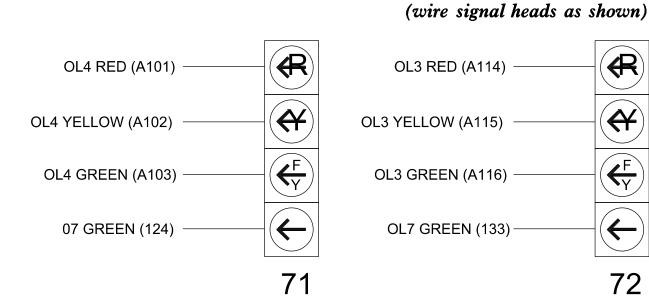
FYA SIGNAL WIRING DETAIL

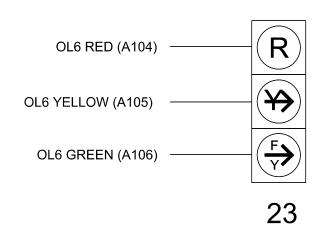
# LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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

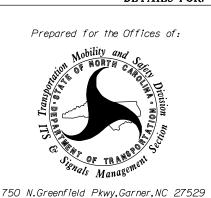
Overlap 7 Yellow Field Terminal (132) Phase 7 Yellow Field Terminal (123) AC-





THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1465 DESIGNED: May 2023 SEALED: 5/24/2023 REVISED: N/A

Electrical Detail - Sheet 1 of 2 ELECTRICAL AND PROGRAMMING DETAILS FOR:



US 421 Stonecrest Oaks Pkwy

Division 11 Wilkes County Wilkesboro MaY 2023 REVIEWED BY: J. Ma PREPARED BY: M.L. Stygles REVIEWED BY: S.R. Chiluka REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL 046057 Matt & Stroler 5/24/2023 DATE

SIG. INVENTORY NO.

VHB Engineering NC, P.C. (C-3705)

940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

# 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 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.

# 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	Х	1
	2	Phase Vehicle	2	Х			2
	3	Phase Vehicle	3		Х	Х	3
ASSIGN	4	Phase Vehicle	4		Х		4
CHANNEL 5 TO	5	Overlap	7		Х		5
OVERLAP 7	6	Phase Vehicle	6	Х		Х	6
	7	Phase Vehicle	7		Х		7
	8	Phase Vehicle	8		Х	Х	8
	9	Overlap	1	Х		Х	9
	10	Overlap	2	·	Х	Х	10
	11	Overlap	3	Х			11
	12	Overlap	4	Х			12
	13	Phase Ped	2			·	13
	14	Phase Ped	4	·		·	14
	15	Phase Ped	6	·			15
	16	Phase Ped	8	·			16
	17	Overlap	5		Х	Х	1.7
	18	Overlap	6	Х			18

# MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

rallelli raiailleleis							
Pattern	Veh Det Plan	Overlap Plan					
*	2	2					

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

# 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.

7A

riaii Z		
Detector	Call Phase	Delay
21	7	<u> </u>

# 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	6	7
Туре	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	Normal
Included Phases	2	2	2	7
Modifier Phases	7	7	4	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0:0	0.0
Trail Red	0.0	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	6	7	
Туре	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	Normal	
Included Phases	<u>-</u>	÷	2	7	NOTICE INCLUDED PHASE
Modifier Phases	7	7	÷	÷	
Trail Green	0	0	0	0	
Trail Yellow	0.0	0.0	0.0	0.0	
Trail Red	0.0	0.0	0.0	0.0	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1465 DESIGNED: May 2023 SEALED: 5/24/2023 REVISED: N/A

940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328 DOCUMENT NOT CONSIDERED

Electrical Detail - Sheet 2 of 2 ELECTRICAL AND PROGRAMMING

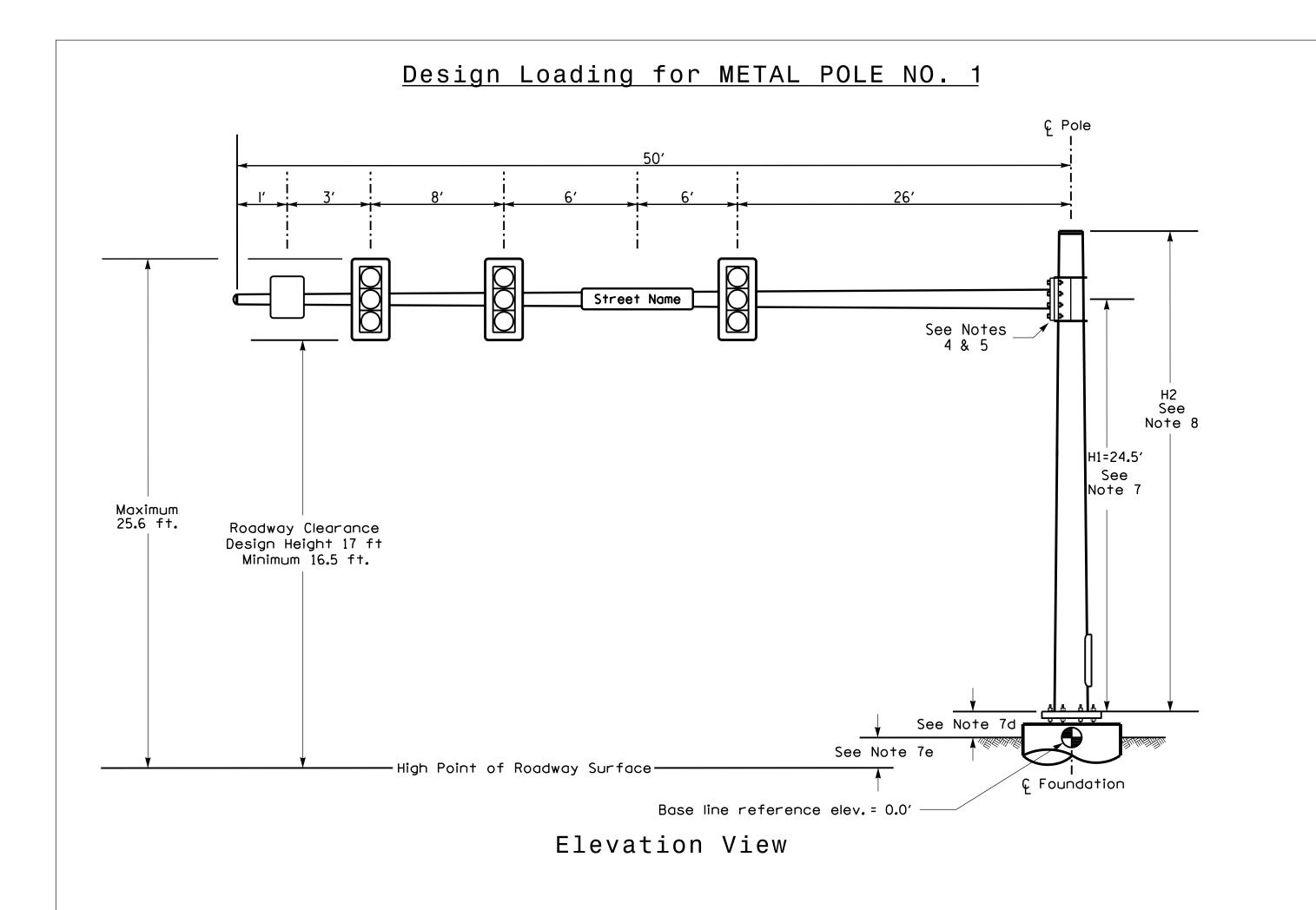
DETAILS FOR: Prepared for the Offices of:

US 421 Stonecrest Oaks Pkwy

			-	
Division	11 Wilkes C	ounty	Wilk	esboro
PLAN DATE:	MaY 2023	REVIEWED BY:	J. Ma	a
PREPARED BY:	M.L. Stygles	REVIEWED BY:	S.R. Chi	luka
	REVISIONS		INIT.	DATE

SEAL 5/24/2023 DATE SIG. INVENTORY NO.

FINAL UNLESS ALL SIGNATURES COMPLETED

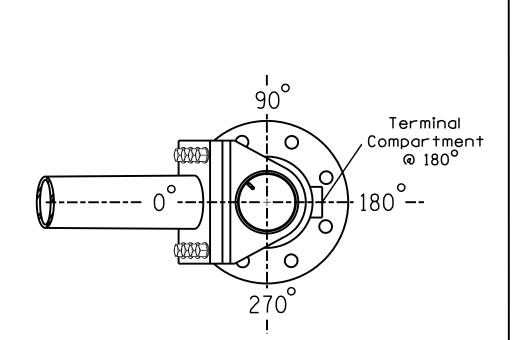


# SPECIAL NOTE

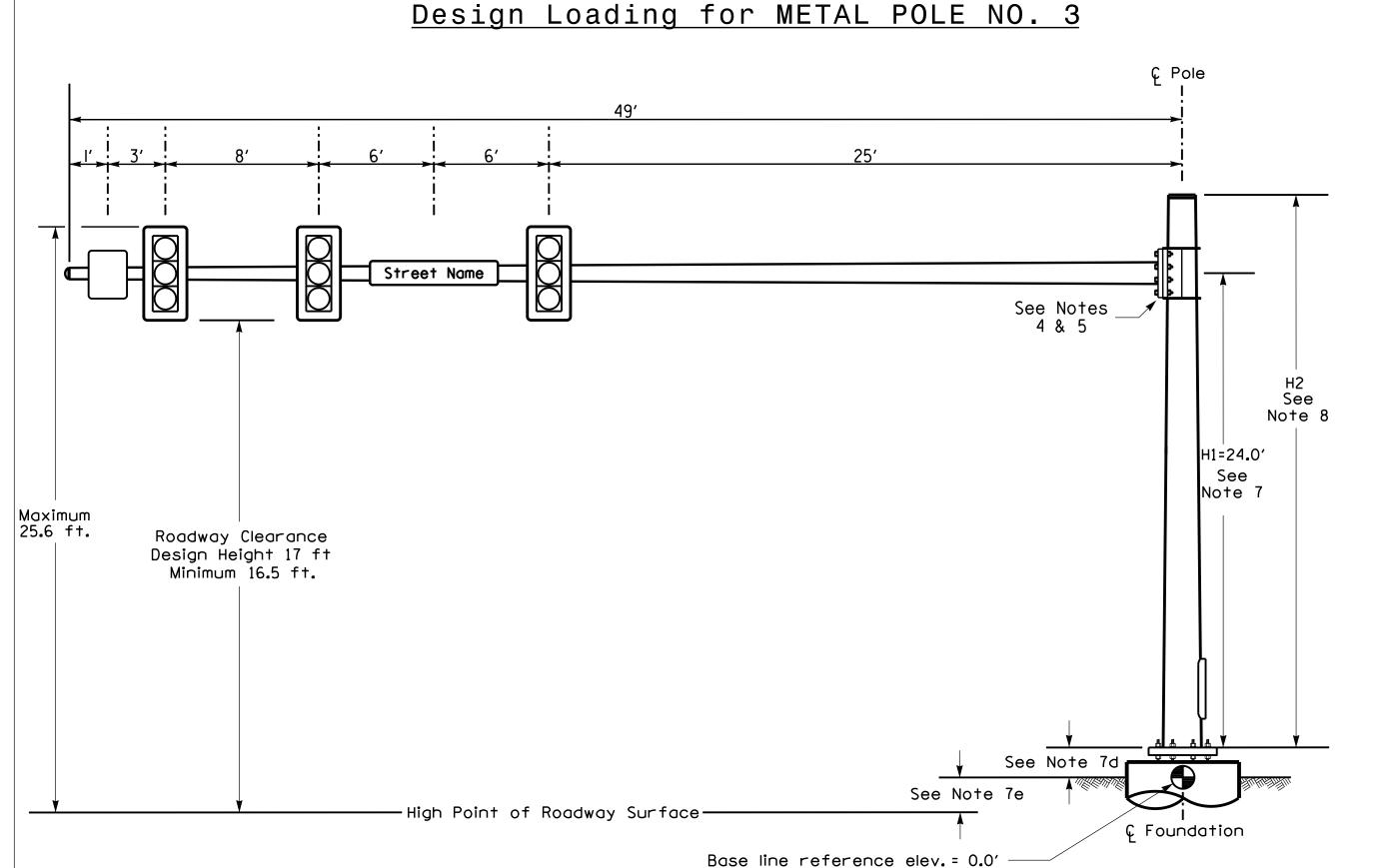
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

# Elevation Data for Mast Arm Attachment (H1)

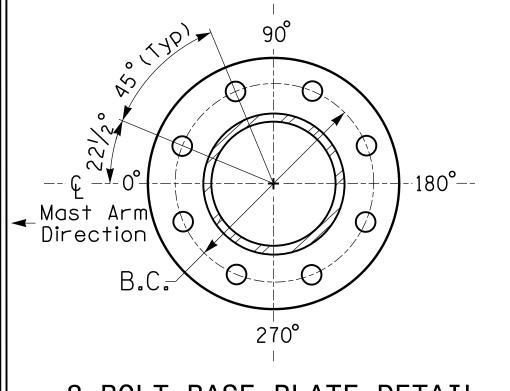
Elevation Differences for:	Pole 1	Pole 3
Baseline reference point at ¿ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+3.8 ft.	+3.1 ft.
Elevation difference at Edge of travelway or face of curb	+3.4 ft.	+2.5 ft.



POLE RADIAL ORIENTATION

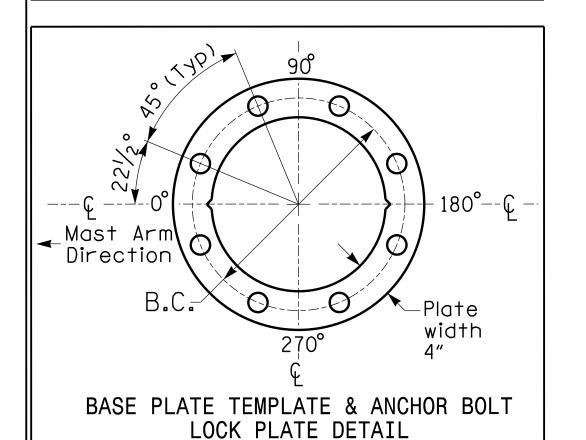


**Elevation View** 



BASE PLATE DETAIL

See Note 6



For 8 Bolt Base Plate

### METAL POLE No. 1 and 3

	MAST ARM LOADING SC	HEDU	LE	
LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25 <b>.</b> 5" W X 52 <b>.</b> 5" L	60 LBS
	SIGN RIGID MOUNTED	9.0 S.F.	36.0" W X 36.0" L	20 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

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

### DESIGN REQUIREMENTS

- 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 stress 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
- 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. Signalheads 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 leveland 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 signalheads 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.



DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL

SIGNATURES COMPLETED

SEAL

U-5312

Sig. 9.18

NCDOT Wind Zone 4 (90 mph)

US 421 - NC 16 SR 1322 (Winkler Mill Rd)/ Stonecrest Oaks Pkwy

Divsion 11 Wilkes County May 2023 REVIEWED BY: M. Stygles 29 PREPARED BY: S.R. Chiluka REVIEWED BY: J. Ma

047250 Wilkesboro

SIGNATURE SIG. INVENTORY NO. 11-1044/1465

750 N.Greenfield Pkwy,Garner,NC 2752 INIT. DATE REVISIONS

10/31/2022 8:48:46 AM R:\Traffic\Signals\Design schiluka

### SPECIAL NOTE

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

# Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at ¿ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+2.0 ft.	-1 ft.
Elevation difference at Edge of travelway or face of curb	+0.5 ft.	-1 ft.

**ANGLE** 

ARMS

BETWEEN 180

Terminal Compartment

์ด 180°

ARM B

# MAST ARM LOADING SCHEDULE LOADING SYMBOL RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE STREET NAME SIGN RIGID MOUNTED STREET NAME SIGN RIGID MOUNTED 16.0 S.F. 24.0" W 96.0" L 36 LBS

METAL POLE No. 2

### <u>NOTES</u>

### DESIGN REFERENCE MATERIAL

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

### The province incoming of the coordinate of the province of the

### <u>DESIGN REQUIREMENTS</u>

- 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 stress 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  $\times$  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.

    Signal beads are rigidly mounted and vertically centered on the mast ar
- b. Signalheads 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 leveland 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.



DOCUMENT NOT CONSIDERED

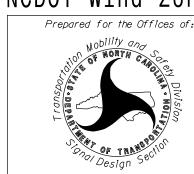
FINAL UNLESS ALL

SIGNATURES COMPLETED

U-5312

Sig.9.19

NCDOT Wind Zone 4 (90 mph)



at
SR 1322 (Winkler Mill Road)/
Stonecrest Oaks Pkwy

US 421

Divsion 11 Wilkes County Wilkesboro
PLAN DATE: May 2023 REVIEWED BY: M. Stygles
PREPARED BY: S.R. Chiluka REVIEWED BY: J. Ma

REVISIONS

Road) /
Wy
Wilkesboro
I. Stygles
J. Ma
INIT. DATE
SEAL
047250

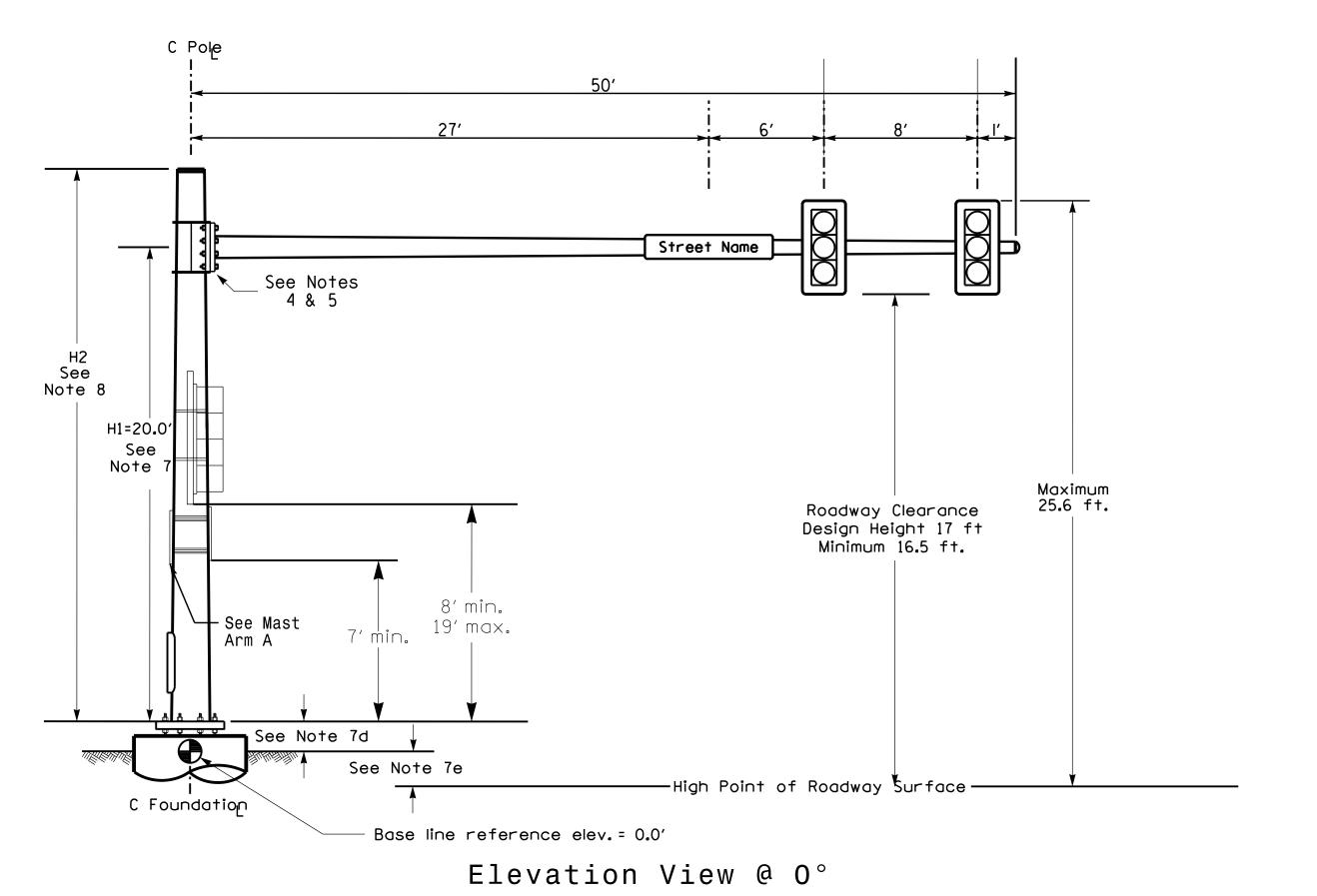
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F (24.4)

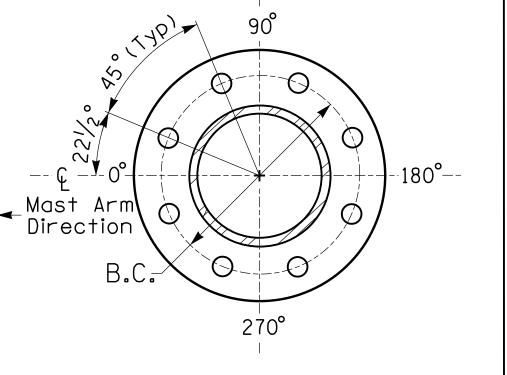
SRCHOLKA
SIGNATURE

# Design Loading for METAL POLE NO. 2 (Arm B)

Elevation View @ 180°



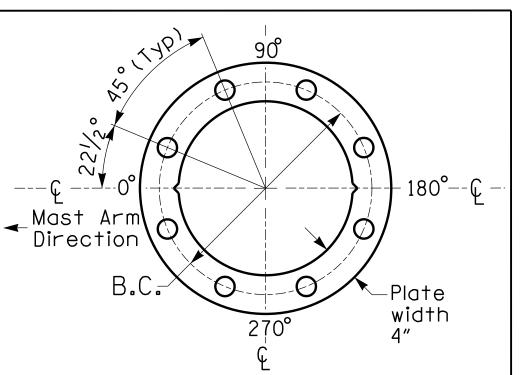
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POLE RADIAL ORIENTATION

8 BOLT BASE PLATE DETAIL

See Note 6

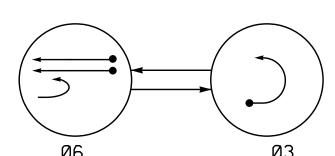


BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

Sig.10.0

# DEFAULT PHASING DIAGRAM



DETECTED MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.

← − − > PEDESTRIAN MOVEMENT

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

		-
03	Ø6	

Shoulder

<u>ALTERNATE</u>	PHASING DIAGRAM	
Ø6	Ø3	

US 421 - NC 16

ALTERNATE	PH	4SI	NG
TABLE OF O	PER	ATI	ON
	Р	HAS	E
SIGNAL	03	90	F
FACE	3	6	LGOI
31,32	$\bigcap$	(R)	M
61,62	R	1	Υ

DEFAULT PHASING

TABLE OF OPERATION

SIGNAL

FACE

31,32

61,62

PHASE

Metal Pole #1

45 Mph -4% Grade

Sta.171+21±,Lt.89±

MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR PROGRAMMING												
L00P	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
3A	6X40	0	2-4-2	Х	3	15.0*	-	Χ	_	Χ	-	Χ
6A	6X6	300	4	Х	6	-	-	Χ	Χ	Χ	-	Χ
6B	6X6	300	4	Х	6	-	-	Χ	Χ	Χ	1	Χ
S1	6X6	200	4	Х	-	-	-	-	-	-	-	Χ

\* Disable delay during alternate phasing.

# 2 Phase Fully Actuated W/ Alternate Phasing Operation Wilkesboro Closed Loop System

### **NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 3. Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values

MAXTIME T	IMING	CHART		
FEATURE	PH	ASE		
PEATURE	3	6		
Walk *	_	_		
Ped Clear *	_	_		
Min Green	7	12		
Passage *	2.0	6.0		
Max 1 *	30	60		
Yellow Change	3.0	4.9		
Red Clear	3.1	1.1		
Added Initial *	_	1.5		
Maximum Initial *	_	34		
Time Before Reduction *	_	15		
Time To Reduce *	_	30		
Minimum Gap	_	3.4		
Advance Walk	_	_		
Non Lock Detector	Х	_		
Vehicle Recall	_	MIN RECALL		
Dual Entry	_	_		

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

LEGEND **PROPOSED EXISTING** Traffic Signal Head **-**Metal Pole with Mastarm Type II Signal Pedestal Sign Inductive Loop Detector Controller & Cabinet 2-in Underground Conduit -----N/A Right of Way  $\longrightarrow$ Directional Arrow Directional Drill N/A "Stop Here on Red" Sign (R10-6) (A) No Left Turn Sign (R3-2)



US 421 - NC 16

VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

New Installation - Final Design



US 421-NC 16 at SR 1322 (Winkler Milll Rd)/ Stonecrest Oaks Pkwy East U-Turn

	Divsion 11		Wilkes C	ounty	Wilk	kesboro
	PLAN DATE:	May	y 2023	REVIEWED BY:	M. Sty	gles
27529	PREPARED BY:	S.R.	Chiluka	REVIEWED BY:	J. W	la
		DEVICIO	NC		TALLE	DATE

SIG. INVENTORY NO. ||-|469

047250 — DocuSigned by: SRChilluka

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

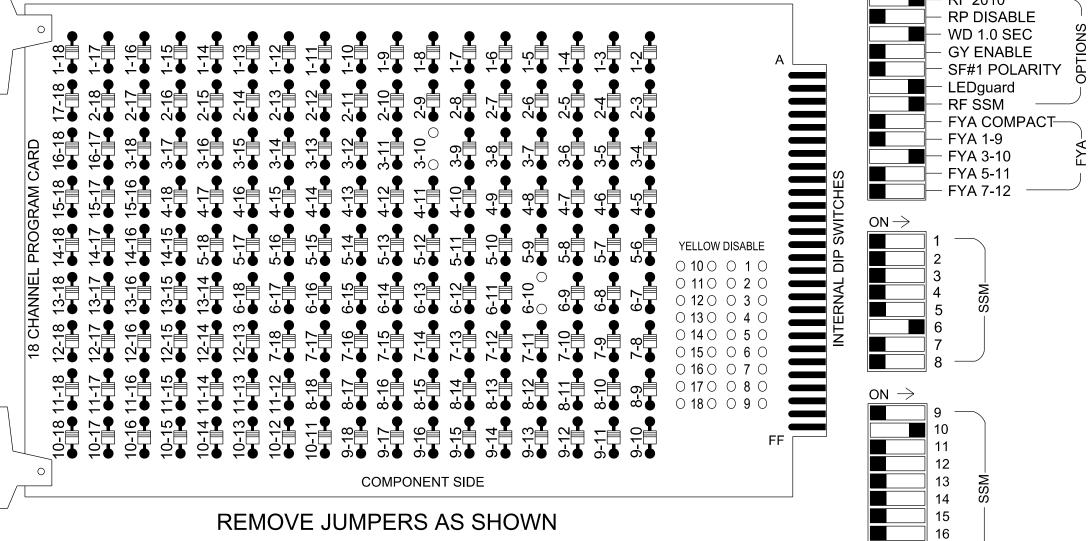
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### 18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 3-10 and 6-10.



ON OFF

\_\_\_\_ 17

= DENOTES POSITION OF SWITCH

WD ENABLE (

# 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. Program controller to start up in phase 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 Wilkesboro 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	S4, S8, AUX S2
Phases Used	3,6
Overlap "1"	NOT USED
Overlap "2"	*
Overlap "3"	NOT USED
Overlap "4"	NOT USED

\*See overlap programming detail on sheet 2.

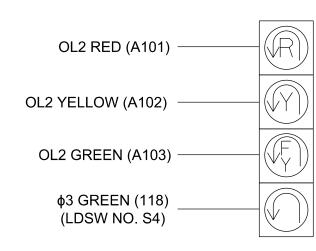
				SIC	3NA	۱ علا	ΙΕΑ	DH	00	K-U	PC	HA	RT					
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	NU	NU	31,32	NU	NU	NU	61,62	NU	NU	NU	NU	NU	<b>★</b> 31,32	NU	NU	NU	NU
RED								134										
YELLOW				*				135		٠							-	
GREEN	٠				٠			136				-					-	
RED ARROW	,				,									A124		٠		
YELLOW ARROW			·						·	·	·			A125			-	
FLASHING YELLOW ARROW									·					A126				
GREEN ARROW				118														
						•								•				•

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)



### NOTES:

- 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

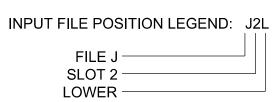
(front view
-------------

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 3  3A  NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1 NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPT>	FS DC ISOLATOR ST DC
FILE U	S L O T E M P T Y	Ø 6 6A Ø 6 6B	SLOT EMPTY	S L O T E M P T Y	SLOT EMPTY	SLOT EMPTY	S L O T E M P T Y	S L O T E M P T Y	S L O T E M P T Y	SLOT EMPTY	S L O T E M P T Y	S L O T E M P T Y	S LOT E MPTY	S L O T E M P P T Y

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	QUEUE	CALL	DELAY DURING GREEN
3A	TB4-5,6	I5U	58	20	7	3	15		Х			Х	
<b>*</b> S1	TB6-9,10	I9U	60	22	13	SYS			Х			Х	
6A	TB3-5,6	J2U	40	2	16	6			Х	Х		Х	
6B	TB3-7,8	J2L	44	6	17	6			Х	Х		Х	

\*System detector only. Remove any assigned vehicle phase.



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1469 DESIGNED: May 2023 SEALED: 5/24/2023 REVISED: N/A

Electrical Detail Sheet 1 of 2
ELECTRICAL AND PROGRAMMING

DETAILS FOR: Prepared for the Offices of:

US 421-NC 16 at SR 1322 (Winkler Mill Rd)/ Stonecrest Oaks Pkwy East U-Turn

Division 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: M. L. Stygles PREPARED BY: S. R. Chiluka REVIEWED BY: J. Ma INIT. DATE REVISIONS

SEAL 5/24/2023

SIG. INVENTORY NO. ||-|469

940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

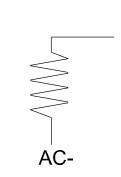
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

# 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)

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



Phase 3 (LDSW NO. S4) Yellow Field Terminal (117)

FS = FLASH SENSE

ST = STOP TIME

# 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	2
Туре	FYA 4 - Section
Included Phases	6
Modifier Phases	3
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	2	
Туре	FYA 4 - Section	
Included Phases	<u>-</u>	NOTICE INCLUDED PHASE
Modifier Phases	3	
Trail Green	0	
Trail Yellow	0.0	
Trail Red	0.0	

# MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 7A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Plan 2

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.

3A

Detector	Call Phase	Delay
7	3	<u>.</u>

# 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.

# 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 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: Reduces delay time for phase 3

call on loop 3A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1469 DESIGNED: May 2023 SEALED: 5/24/2023 REVISED: N/A



Electrical Detail Sheet 2 of 2

ELECTRICAL AND PROGRAMMING

Prepared for the Offices of:

US 421-NC 16 at SR 1322 (Winkler Mill Rd)/ Stonecrest Oaks Pkwy East U-Turn

Division 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: M. L. Stygles PREPARED BY: S. R. Chiluka REVIEWED BY: J. Ma

INIT. DATE REVISIONS

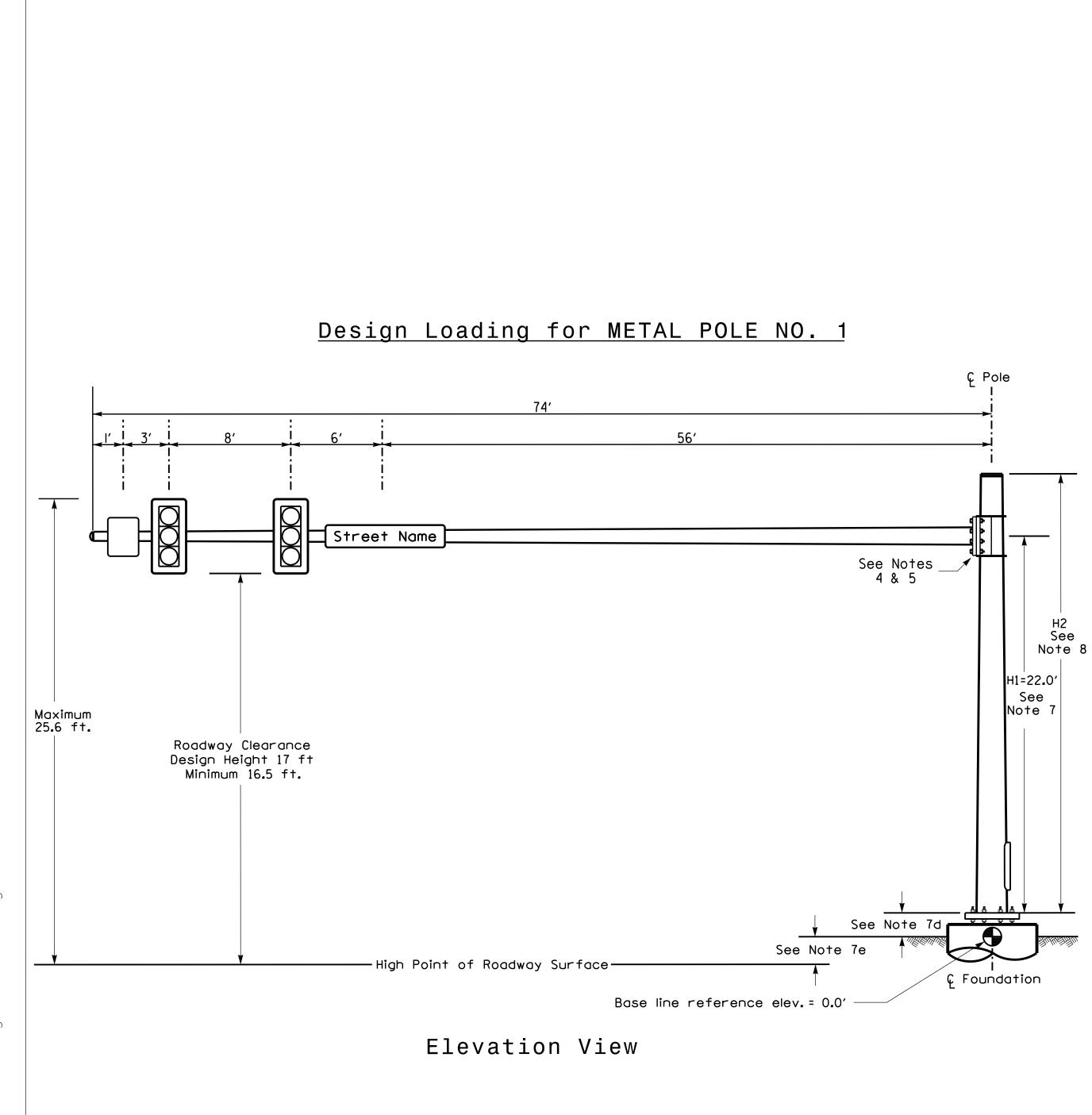
046057 Matt & Strigter DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

750 N.Greenfield Pkwy,Garner,NC 27529

SIG. INVENTORY NO. ||-|469

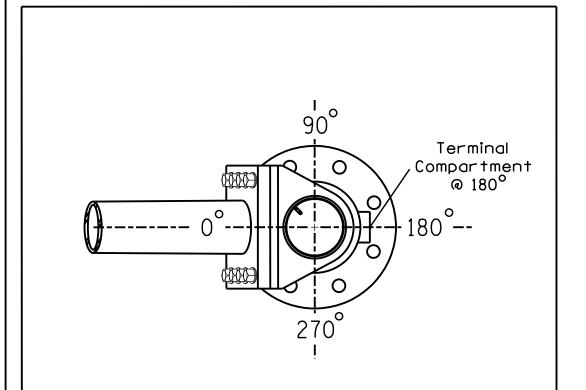


### SPECIAL NOTE

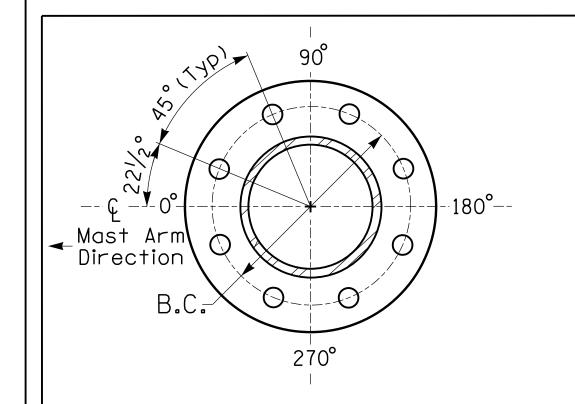
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

# Elevation Data for Mast Arm Attachment (H1)

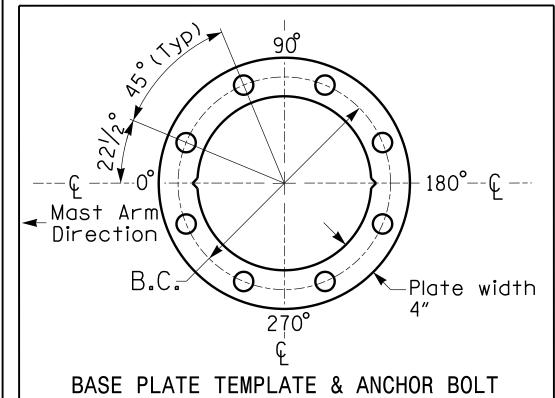
Elevation Differences for:	Pole 1
Baseline reference point at & Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+1.8 ft.
Elevation difference at Edge of travelway or face of curb	+1.8 ft.



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL See Note 6



# METAL POLE No. 1

	MAST ARM LOADING SC	HEDU	LE	
LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25 <b>.</b> 5" W X 52 <b>.</b> 5" L	60 LBS
	SIGN RIGID MOUNTED	9.0 S.F.	36.0" W X 36.0" L	20 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0"L	36 LBS

### <u>NOTES</u>

### DESIGN REFERENCE MATERIAL

- 1. Design the traffic signal structure and foundation in accordance with:
- The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
- The 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
- The 2018 NCDOT Roadway Standard Drawings.
- The traffic signal project plans and special provisions.
- The NCDOT "MetalPole 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 stress 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
- 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. Signalheads 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 leveland the high point of the roadway.
- 8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the followina:
- 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 signalheads 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.



DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL

SIGNATURES COMPLETED

U-5312

Sig.10.3

NCDOT Wind Zone 4 (90 mph)

Prepared for the Offices of:

US 421-NC 16 at Winkler Mill Rd East U-Turn

Divsion 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: M. Stygles

750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: S.R. Chiluka REVIEWED BY: J. Ma INIT. DATE REVISIONS

SEAL 047250

5RChiluka SIGNATURE SIG. INVENTORY NO. |- |469

LOCK PLATE DETAIL For 8 Bolt Base Plate

10/31/2022 8:48:46 AM R:\Traffic\Signals\Desigr schiluka

PROJECT REFERENCE NO.

Sig. 11.0 U-5312

**EXISTING** 

N/A

N/A

× J

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3 Phase Fully Actuated (Isolated)

# **NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night operation unless otherwise directed by the Engineer.
- 3. Phase 5 may be lagged.
- 4. Set all detector units to presence mode.
- 5. This intersection uses video detection. Install detectors according to the manufacturer's instructions to schieve the desitred detection.
- 6. Refer to Pavement Marking Plans for proposed stop bar locations.

TABLE OF OPERATION PHASING DIAGRAM SIGNAL FACE 21, 22 41,42,43 51, 52 61,62

I	NDUCTI	VE LOC	)PS	DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	*	300	*	*	2	Υ	Υ	-	1.6	-	-	*
2B	*	90	*	*	2	Υ	Υ	-	-	-	-	*
4 A	*	0	*	*	4	Υ	Υ	-	-	3	-	*
5A	*	0	*	*	5	Υ	Υ	-	-	_	-	*
5B	*	0	*	*	5	Υ	Υ	_	-	_	-	*
6A,6B	*	300	*	*	6	Υ	Υ	-	1.6	-	-	*
6C,6D	*	90	*	*	6	Υ	Υ	_	_	_	-	*

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

st Video Detection Zone

PHASE

r | r | g | f

 $\mathsf{R} \mid \uparrow \mid \mathsf{R} \mid `$ 

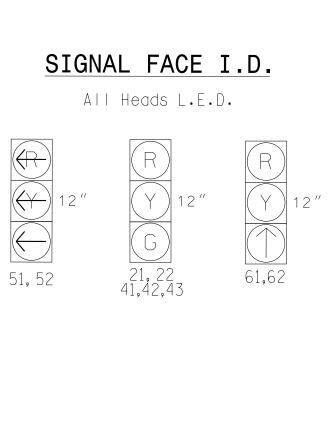
PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

UNSIGNALIZED MOVEMENT

 $<\!\!\!<\!\!\!--\!\!\!>$  PEDESTRIAN MOVEMENT



OASIS	2070	TIMING	G CHAR	Γ
		PH	ASE	
FEATURE	2	4	5	6
Min Green 1 *	12	7	7	12
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	45	25	15	45
Yellow Clearance	4.9	3.0	3.0	4.5
Red Clearance	1.3	3.2	2.9	1.5
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECAL
Vehicle Call Memory	YELLOW	-	_	YELLOW
Dual Entry	-	_	_	_

\* 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.

	PROPOSED	LEGEND
35 mph to 80 Grade		Signal Pole with Guy Signal Pole with Sidewalk Guy Traffic Signal Head Sign Pedestrian Signal Head With Push Button & Sign
Us 421 Business  B B B B B B B B B B B B B B B B B B		Inductive Loop Detector Video Detection Zone Construction Zone Controller & Cabinet Junction Box
Sta. 176+45±, Rt. 45±  Sta. 176+45±, Rt. 45±  Sta. 176+45±, Rt. 45±  Sta. 176+45±, Rt. 45±	——————————————————————————————————————	2-in Underground Conduit Right of Way Temporary Construction Easement Directional Arrow Type II Signal Pedestal Yield Sign (R1-2)
Sta.176+45±,Rt.45±  45 mph   1.5% Grade		No Right Turn (R3-1) No U Turn Sign (R3-4) Left Arrow "Only" Sign (R3-5L) Drum Skinny Drum
Sta.177+40±,Rt.84±		

(B) (C) Left Arrow "Only" Sign (R3-5L) Drum N/A Skinny Drum N/A

New Installation - Temporary Design 1 (Phase 1)



US 421 US 421 Business

Divsion 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: M.L. Stygles 750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: S.R. Chiluka REVIEWED BY:

1"=40'

INIT. DATE



VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

SRChiluk 5/26/2023

||/17/20|| 9:38:53 AM R:\Traffic\Signals\Desia schiluka

Simultaneous Gap

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 2. Enable simultaneous Gap-Out for all phases.
- 3. Program phases 2 and 6 for Startup In Green.
- 4. Program phase 2 and 6 for Yellow Flash.
- 5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

# EQUIPMENT INFORMATION

SOFTWARE......ECONOLITE OASIS CABINET MOUNT.....BASE OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX) LOAD SWITCHES USED......\$2,\$4,\$5,\$6 PHASES USED...........2,4,5,6 OVERLAPS.....NONE

U-5312 Sig 11 1

	SIGNAL HEAD HOOK-UP CHART																	
LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S1Ø	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42 43	NU	51,52	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			1Ø1			134										
YELLOW		129			102			135										
GREEN		130			103													
RED ARROW							131											
YELLOW ARROW							132											
GREEN ARROW							133	136										

NU = Not Used

### INPUT FILE POSITION LAYOUT

(front view)

4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

5/23/2019 3:15:01PM R:\Traffic\Signals\Design\Sig schiluka

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file U	SLOT EMPTY	SLOT EMPTY	SLOT EXPTY	SLOT EXPTY	SLOT EMPTY	SLOT EXPTY	SLOT EXPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR ST DC
FILE U	SLOT EMPTY	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	SLOT EXPTY	SLOT EXPTY	SLOT EXPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	SLOT EMPTY	S L O T E M P T Y
,	EX.: 1	A, 2A, E	TC. = L	.00P N(	D.'S						FS = ST =		SENS TIME	E

# SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1146T1

DESIGNED: May 2023 SEALED: 5/26/2023 REVISED: N/A

Temporary Installation - Electrical Detail 1 of 1 (Phase 1)



# US 421 US 421 Business

Division	11 Wilkes	County	Will	kesboro
PLAN DATE:	May 2023	REVIEWED BY:	M.L.Styg	les
PREPARED BY:	S.R.Chiluka	REVIEWED BY:	J.Ma	
	REVISIONS		INIT.	DATE

SIGNATURES COMPLETED SEAL SIG. INVENTORY NO. II-II46TI

940 Main Campus Drive, Suite 500
Raleigh, NC 27606
919.829.0328
DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL

ELECTRICAL AND PROGRAMMING

**EXISTING** 

N/A N/A

× N

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 $\bigcirc$ 

 $^{\otimes}$ 

N/A

N/A

PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

← − → PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

TABLE OF	0PI	ERA	TIO	N
		PHA	4SE	
SIGNAL FACE	Ø 2 + 5	Ø 2 + 6	Ø 4	FLASH
21, 22	G	G	R	Υ
41,42,43	R	R	G	R
51, 52	•	<b>→</b>	<b>→</b>	<b>~</b> Y
61, 62	R	$\uparrow$	R	Y

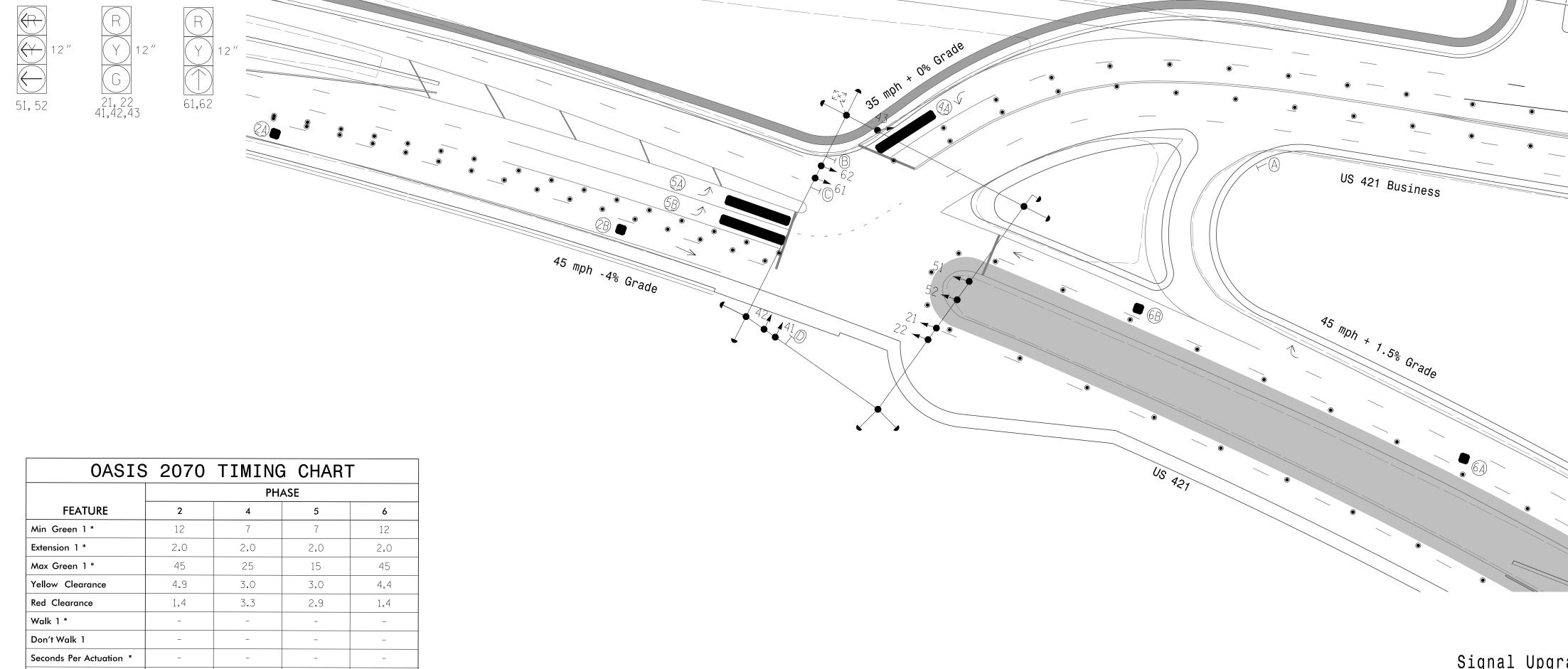
OASIS	2070	LOOP	& DET	EC	TOR	IN	ST	AL	LATIC	ON CH	AR	Т
II	NDUCTI	VE LOC	)PS		DET	ECT	OR	ΡI	ROGRAI	MMING		
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	*	300	*	*	2	Υ	Υ	-	1.6	-	-	*
2B	*	90	*	*	2	Υ	Υ	-	_	_	-	*
4A	*	0	*	*	4	Υ	Υ	_	_	3	-	*
5A	*	0	*	*	5	Υ	Υ	-	_	_	-	*
5B	*	0	*	*	5	Υ	Υ	_	-	-	-	*
6A	*	300	*	*	6	Υ	Υ	-	1.6	-	-	*
6B	*	90	*	*	6	Υ	Υ	_	-	-	-	*

★Video Detection Zone

# 3 Phase Fully Actuated (Isolated)

# **NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night operation unless otherwise directed by the Engineer.
- 3. Phase 5 may be lagged.
- 4. Set all detector units to presence mode.
- This intersection uses video detection. Install detectors according to the manufacturer's instructions to schieve the desitred detection.
- Refer to Pavement Marking Plans for proposed stop bar locations.
- 7. Reposition existing signal heads as shown on the plans.



Signal Pole with Guy Signal Pole with Sidewalk Guy Traffic Signal Head Sign

LEGEND

**PROPOSED** 

Pedestrian Signal Head With Push Button & Sign Inductive Loop Detector Video Detection Zone Construction Zone Controller & Cabinet

Junction Box 2-in Underground Conduit Right of Way Temporary Construction Easement

Directional Arrow

Type II Signal Pedestal Yield Sign (R1-2) No Right Turn (R3-1) No left Turn Sign (R3-2)

Left Arrow "Only" Sign (R3-5L) Drum Skinny Drum

VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

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SEAL

Signal Upgrade - Temporary Design 2 (Phase 2)



US 421 US 421 Business

Divsion 11 Wilkes County Wilkesboro REVIEWED BY: M.L. Stygles May 2023

750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: S.R. Chiluka REVIEWED BY: 1"=40'

047250

INIT. DATE SIG. INVENTORY NO. 11-1146T2

Max Variable Initial \*

Time To Reduce \*

Vehicle Call Memory

Simultaneous Gap

be lower than 4 seconds.

Minimum Gap

Recall Mode

Dual Entry

Time Before Reduction

MIN RECALL

YELLOW

\* 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

-

-

-

\_

MIN RECALL

YELLOW

-

ON

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 2. Enable simultaneous Gap-Out for all phases.
- 3. Program phases 2 and 6 for Startup In Green.
- 4. Program phase 2 and 6 for Yellow Flash.
- 5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

### EQUIPMENT INFORMATION

SOFTWARE......ECONOLITE OASIS CABINET MOUNT.....BASE OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX) LOAD SWITCHES USED.....S2,S4,S5,S6 PHASES USED...........2,4,5,6 OVERLAPS.....NONE

U-5312 Sig.11.3

	SIGNAL HEAD HOOK-UP CHART																	
LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S1Ø	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42 43	NU	51,52	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			1Ø1			134										
YELLOW		129			102			135										
GREEN		130			103													
RED ARROW							131											
YELLOW ARROW							132											
GREEN ARROW							133	136										

NU = Not Used

# INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file U "I" L	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ЯДОН Ш <u>Х</u> РНҮ	SLOT EMPTY	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	%LOF ⊞∑₽FY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR
FILE U	SLOT EMPTY	S LOT E M P T Y	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY FS =	SLOT EMPTY FLASH	SLOT EMPTY	S L O T E M P T Y
												STOP		_

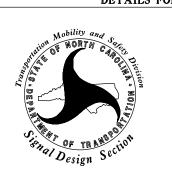
# SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1146T2 DESIGNED: May 2023 SEALED: 5/26/2023

Temporary Installation - Electrical Detail 1 of 1 (Phase 2)

ELECTRICAL AND PROGRAMMING DETAILS FOR:



US 421 US 421 Business

Division	11 Wilkes	County	Wilk	kesboro
PLAN DATE:	May 2023	REVIEWED BY:	M.L.Styg	Les
PREPARED BY:	S.R.Chiluka	REVIEWED BY:	J.Ma	
	REVISIONS		INIT.	DATE

SIGNATURES COMPLETED SEAL 5/26/2023 SIG. INVENTORY NO. II-II46T2

 $\bigcirc \ominus$ 5/23/2019 3:15:01PM R:\Traffic\Signals\Design\Sigr schiluka

750 N.Greenfield Pkwy,Garner,NC 27529

REVISED: N/A

VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500
Raleigh, NC 27606
919.829.0328
DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL

**EXISTING** 

N/A

N/A

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\_\_\_\_\_

N/A

 $\longrightarrow$ 

N/A

N/A

LEGEND

Signal Pole with Guy

Signal Pole with Sidewalk Guy

Traffic Signal Head Sign

Pedestrian Signal Head With Push Button & Sign

Inductive Loop Detector

Video Detection Zone

Construction Zone

Controller & Cabinet

Junction Box 2-in Underground Conduit

Right of Way

Temporary Construction Easement

Directional Arrow

Type II Signal Pedestal

Yield Sign (R1-2) No Right Turn (R3-1)

No left Turn Sign (R3-2)

Left Arrow "Only" Sign (R3-5L) Drum

Skinny Drum

# 3 Phase Fully Actuated (Isolated)

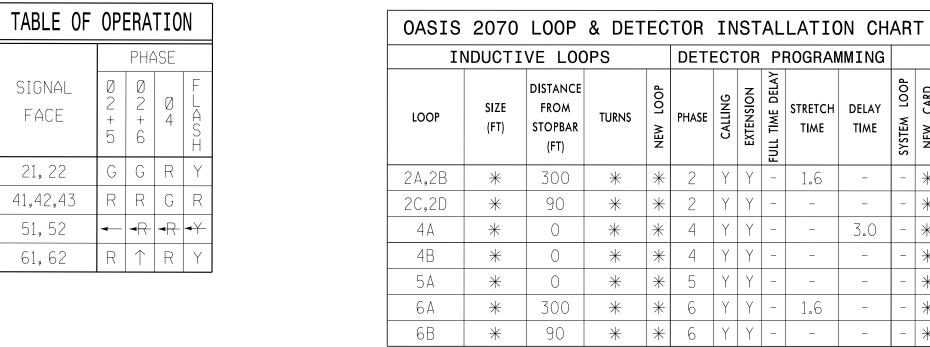
### NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night operation unless otherwise directed by the Engineer.
- 3. Phase 5 may be lagged.
- 4. Set all detector units to presence mode.
- This intersection uses video detection. Install detectors according to the manufacturer's instructions to schieve the desitred detection.
- 6. Refer to Pavement Marking Plans for proposed stop bar locations

**PROPOSED** 

 $\bigcirc$ 

7. Reposition existing signal heads as shown on the



SIGNAL

FACE

21, 22

41,42,43

51, 52

61, 62

\* Video Detection Zone

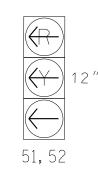
### PHASING DIAGRAM DETECTION LEGEND

PHASING DIAGRAM

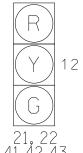
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- $<\!\!--\!\!>$  PEDESTRIAN MOVEMENT

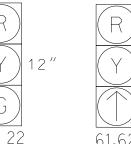
# SIGNAL FACE I.D.

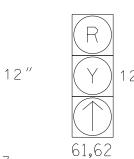
All Heads L.E.D.

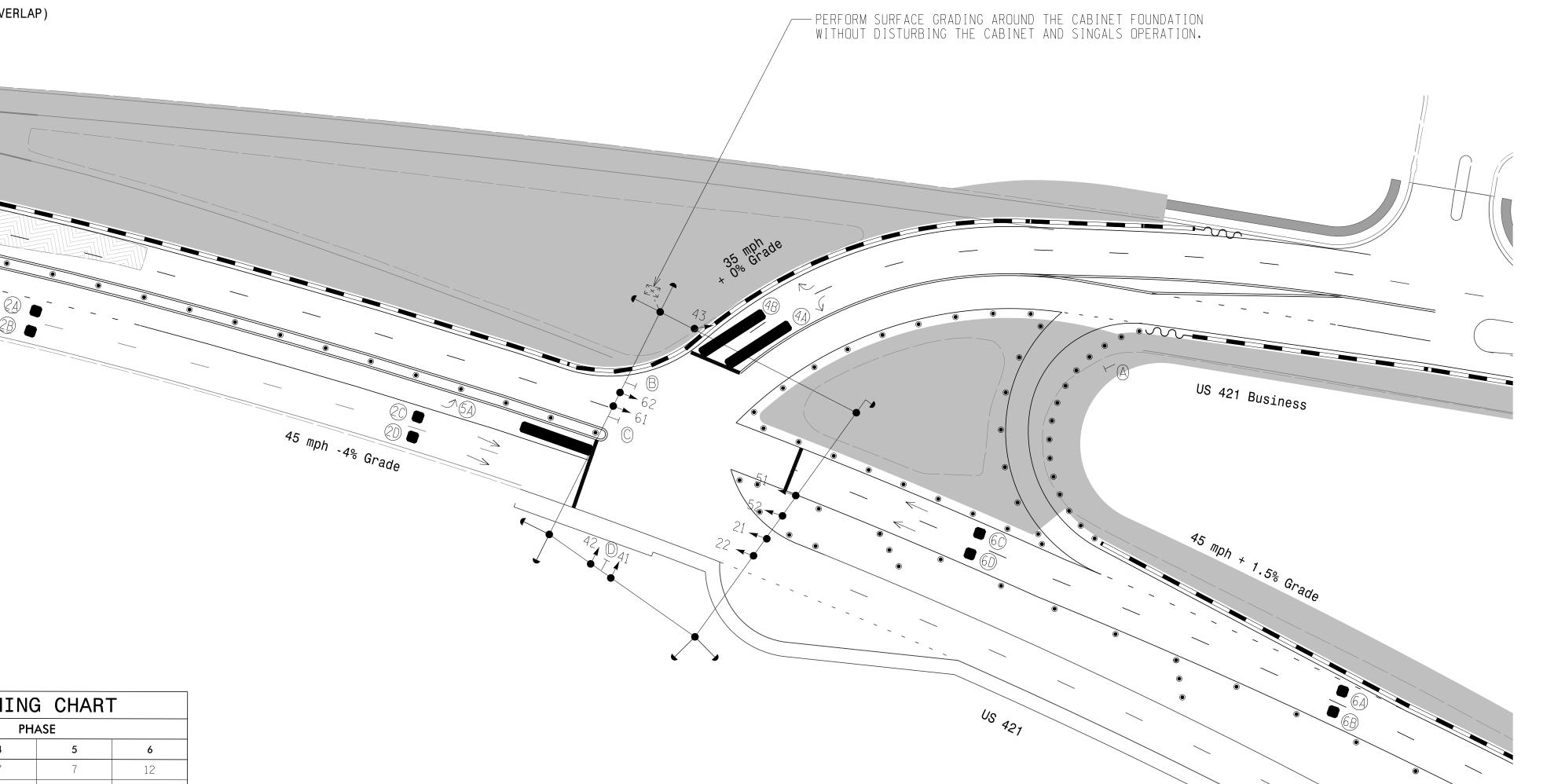


2011 9:38:53 AM qffic\Signals\









OASIS	2070	TIMING	G CHAR	Γ
		PH	ASE	
FEATURE	2	4	5	6
Min Green 1 *	12	7	7	12
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	45	25	15	45
Yellow Clearance	4.9	3.0	3.0	4.4
Red Clearance	1.4	3.2	2.4	1.6
Walk 1 *	-	-	-	-
Don't Walk 1	-	_	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	_	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	=	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Upgrade - Temporary Design 3 (Phase 3)



US 421 US 421 Business

Divsion 11 Wilkes County Wilkesboro REVIEWED BY: M.L. Stygles May 2023

750 N.Greenfield Pkwy,Garner,NC 27529 PREPARED BY: S.R. Chiluka REVIEWED BY: INIT. DATE



VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO.

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 2. Enable simultaneous Gap-Out for all phases.
- 3. Program phases 2 and 6 for Startup In Green.
- 4. Program phase 2 and 6 for Yellow Flash.
- 5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

### EQUIPMENT INFORMATION

CONTROLLER...........2070 SOFTWARE......ECONOLITE OASIS CABINET MOUNT.....BASE OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX) LOAD SWITCHES USED.....S2,S4,S5,S6 OVERLAPS.....NONE

U-5312 Sig 11.5

	SIGNAL HEAD HOOK-UP CHART																	
LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S1Ø	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42 43	NU	51,52	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			1Ø1			134										
YELLOW		129			102			135										
GREEN		130			103													
RED ARROW							131											
YELLOW ARROW							132											
GREEN ARROW							133	136										

NU = Not Used

# INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE U	S L O T	SLOT	SLOT	SLOH	SLOT	S L O T	SLOT	SLOT	S L O T	SLOT	SLOT	S L O T	S L O T	FS DC ISOLATOR
"I" L	E M P T Y	E M P T Y	E M P T Y	EMPTY	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	EMPTY	E M P T Y	E M P T Y	ST DC ISOLATOR
file U	SLOT	S L O T	SLOT	SLOT	S L O T	S L O T	SLOT	SLOT	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T
" J " L	E M P T Y	E M P T Y	EMPTY	EMPHY	EMPTY	E M P T Y	EMPTY	EMPTY	E M P T Y	EMPTY	E M P T Y	EMPTY	E M P T Y	E M P T
	EX.: 1	A, 2A, E	TC. = L	00P N0	).′S						FS =	FLASH	SENS	 E

ST = STOP TIME

# SPECIAL DETECTOR NOTE

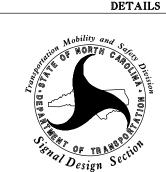
Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1146T3 DESIGNED: May 2023

SEALED: 5/24/2023 REVISED: N/A

### Temporary Installation - Electrical Detail 1 of 1 (Phase 3)

ELECTRICAL AND PROGRAMMING DETAILS FOR:



# US 421 US 421 Business

Division	11 Wilkes	County	Will	kesboro
PLAN DATE:	May 2023	REVIEWED BY:	M.L.Styg	les
PREPARED BY:	S.R.Chiluka	REVIEWED BY:	J.Ma	
	REVISIONS		INIT.	DATE

5/24/2023 SIG. INVENTORY NO. 11-1146T3

VHB Engineering NC, P.C. (C-3705)

940 Main Campus Drive, Suite 500
Raleigh, NC 27606
919.829.0328
DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL

SIGNATURES COMPLETED

SEAL

 $\overset{\ominus}{\cap}$ 5/23/2019 3:15:01PM R:\Traffic\Signals\Design\Sig schiluka

750 N.Greenfield Pkwy,Garner,NC 27529

**EXISTING** 

• >

N/A

N/A

\_-----

N/A

 $\bigcirc$ 

 $\bigcirc$ 

N/A

N/A

TABLE OF	0PI	ERA	TIO	N
		PHA	4SE	
SIGNAL FACE	Ø2+5	Ø 2 + 6	Ø 4	FLASH
21, 22	G	G	R	Υ
41,42,43	R	R	G	R
51, 52	<b>—</b>	<b>→</b> R	₩	<b>∢</b> Y
61, 62	R	$\uparrow$	R	Y

OASIS	2070	LOOP	& DET	EC	TOR	I١	IST	AL	LATIO	ON CH	AR	Т
II	NDUCTI	VE LOC	)PS		DETI	ECT	OR	PI	ROGRAI	MMING		
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A,2B	*	300	*	*	2	Υ	Υ	-	1.6	-	-	*
2C,2D	*	90	*	*	2	Υ	Υ	_	_	_	-	*
4 A	*	0	*	*	4	Υ	Υ	_	-	_	_	*
4B	*	0	*	*	4	Υ	Υ	_	-	_	_	*
5A	*	0	*	*	5	Υ	Υ	_	-	_	-	*
5B	*	0	*	*	5	Υ	Υ	-	-	-	-	*
6A,6B	*	300	*	*	6	Υ	Υ	-	1.6	_	-	*
6C,6D	*	90	*	*	6	Υ	Υ	_	_	_	_	*

st Video Detection Zone

# 3 Phase Fully Actuated (Isolated)

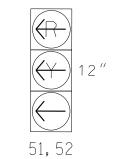
# **NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night operation unless otherwise directed by the Engineer.
- 3. Phase 5 may be lagged.
- 4. Set all detector units to presence mode.
- This intersection uses video detection. Install detectors according to the manufacturer's instructions to schieve the desitred detection.
- Refer to Pavement Marking Plans for proposed stop bar locations.
- 7. Reposition existing signal heads as shown on the plans.

# SIGNAL FACE I.D.

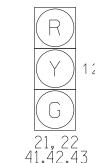
 $<\!\!\!<\!\!\!--\!\!\!>$  PEDESTRIAN MOVEMENT

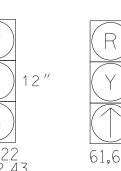
All Heads L.E.D.



17/20|| 9:38:53 AM \Traffic\Signals\D

Simultaneous Gap



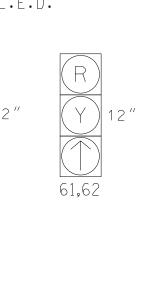


PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

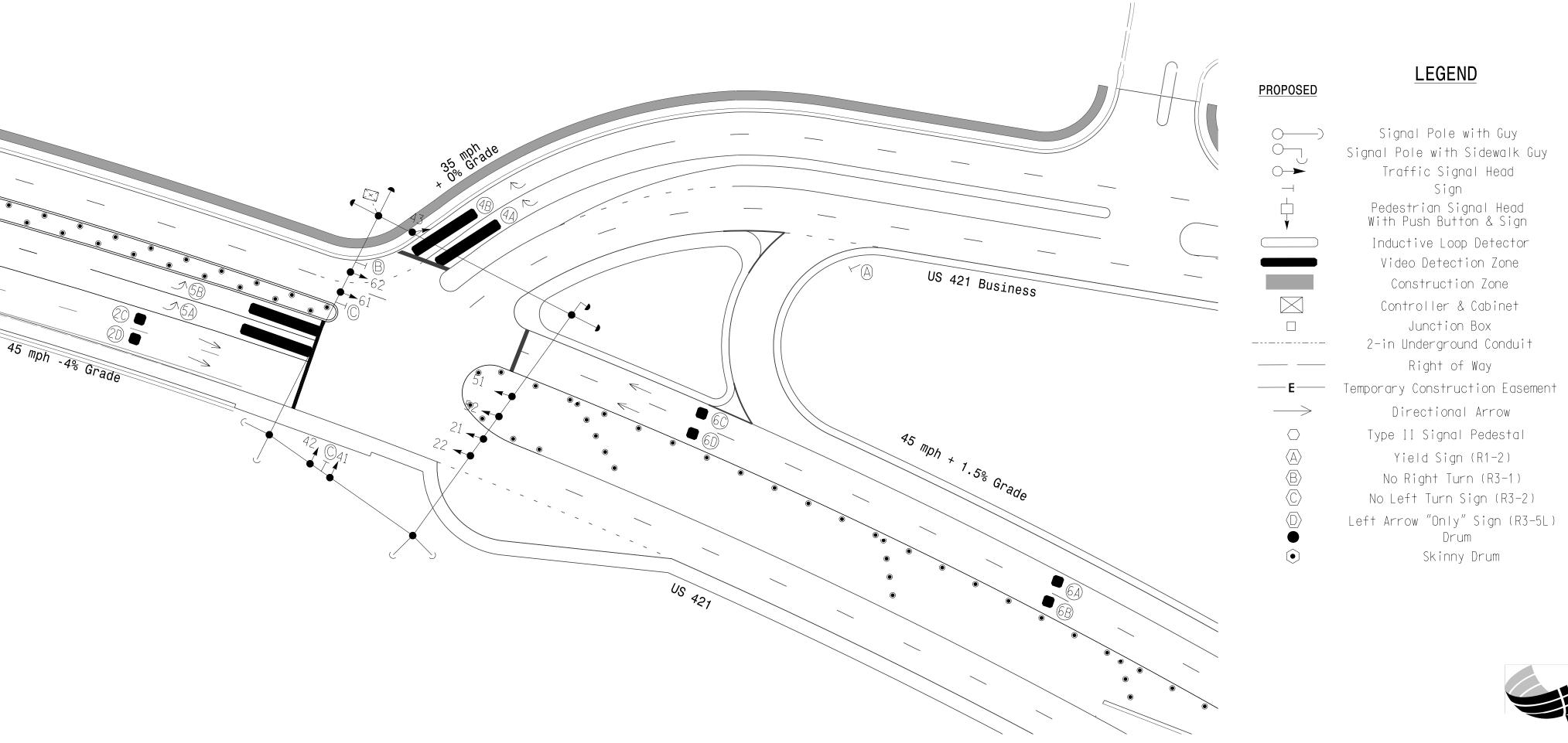
UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)



OASIS	2070	TIMING	CHAR	Γ
		PHA	\SE	
FEATURE	2	4	5	6
Min Green 1 *	12	7	7	12
Extension 1 *	2.0	2.0	2.0	2.0
Max Green 1 *	45	25	15	45
Yellow Clearance	4.9	3.0	3.0	4.4
Red Clearance	1.4	2.3	2.8	1.6
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	_	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-

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





Signal Upgrade - Temporary Design 4 (Phase 4)



US 421 US 421 Business

Divsion 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: M.L. Stygles INIT. DATE

750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: S.R. Chiluka REVIEWED BY: 1"=40'

SEAL 047250

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 11-1146 T 4

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 2. Enable simultaneous Gap-Out for all phases.
- 3. Program phases 2 and 6 for Startup In Green.
- 4. Program phase 2 and 6 for Yellow Flash.
- 5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

### EQUIPMENT INFORMATION

OVERLAPS.....NONE

CONTROLLER...........2070 SOFTWARE.....ECONOLITE OASIS CABINET MOUNT.....BASE OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX) LOAD SWITCHES USED.....S2,S4,S5,S6

SIGNAL HEAD HOOK-UP CHART S1 S2 S2P S3 S4 S4P S5 S6 S6P S7 S8 S8P S9 S10 S11 S12 S13 S14 1 2 PED 3 4 PED 5 6 PED 7 8 PED OLA OLB SPARE OLC OLD SPARE 
 NU
 21,22
 NU
 NU
 41,42 43
 NU
 51,52
 61,62
 NU
 NU
 NU
 128 101 RED 134 129 102 135 YELLOW 1Ø3 130 GREEN 131 ARROW YELLOW

NU = Not Used

ARROW

GREEN ARROW

# INPUT FILE POSITION LAYOUT

(front view)

4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

ſ	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file U "I" L	WHOT EXPTY	SLOT EXPTY	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	WHOH HZRHY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR				
file <sup>U</sup> "J" L	WHOH EXPHY	SLOT EXPTY	SLOT EMPTY	SLOT EXPTY	SLOT EXPTY	SLOT EXPTY	SLOT EXPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY				
	EX.: 1A, 2A, ETC. = LOOP NO.'S FS = FLASH SENSE							E						

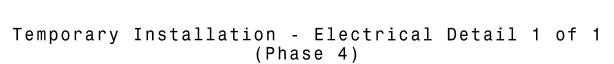
# SPECIAL DETECTOR NOTE

ST = STOP TIME

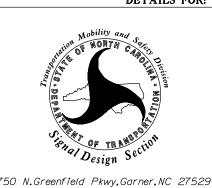
Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1146T4

DESIGNED: May 2023 SEALED: 5/24/2023 REVISED: N/A



ELECTRICAL AND PROGRAMMING



		US	421	
			at	
	US	421	Business	
4.4		wan.		14

Division	11 Wilkes	County	Will	kesboro
PLAN DATE:	May 2023	REVIEWED BY:	M.L.Styg	les
PREPARED BY:	S.R.Chiluka	REVIEWED BY:	J.Ma	
	REVISIONS		INIT.	DATE

SIGNATURES COMPLETED SEAL 5/24/2023 SIG. INVENTORY NO. ||-||46T4

VHB Engineering NC, P.C. (C-3705)

940 Main Campus Drive, Suite 500
Raleigh, NC 27606
919.829.0328
DOCUMENT NOT CONSIDERED

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Mill Rd.dgn

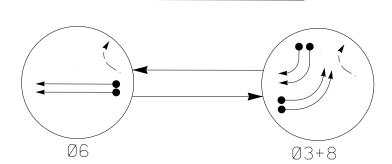
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U-5312

Sig.11.7

132 133 | 136

### PHASING DIAGRAM



PHASING	DIAGRAM	DETECTION	LEGEND

81,82,83

<b>←</b>	DETECTED MOVEMENT
◀	UNDETECTED MOVEMENT (OVERLAP)

<b>◄</b> — —	UNSIGNALIZED MOVEMENT
<>	PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.

	Р	HAS	E
SIGNAL FACE	Ø6	Ø3+ 8	FLAST
31,32	F	-	*
61,62	$\uparrow$	R	Υ
81,82,83	R	-	R

TABLE OF OPERATION

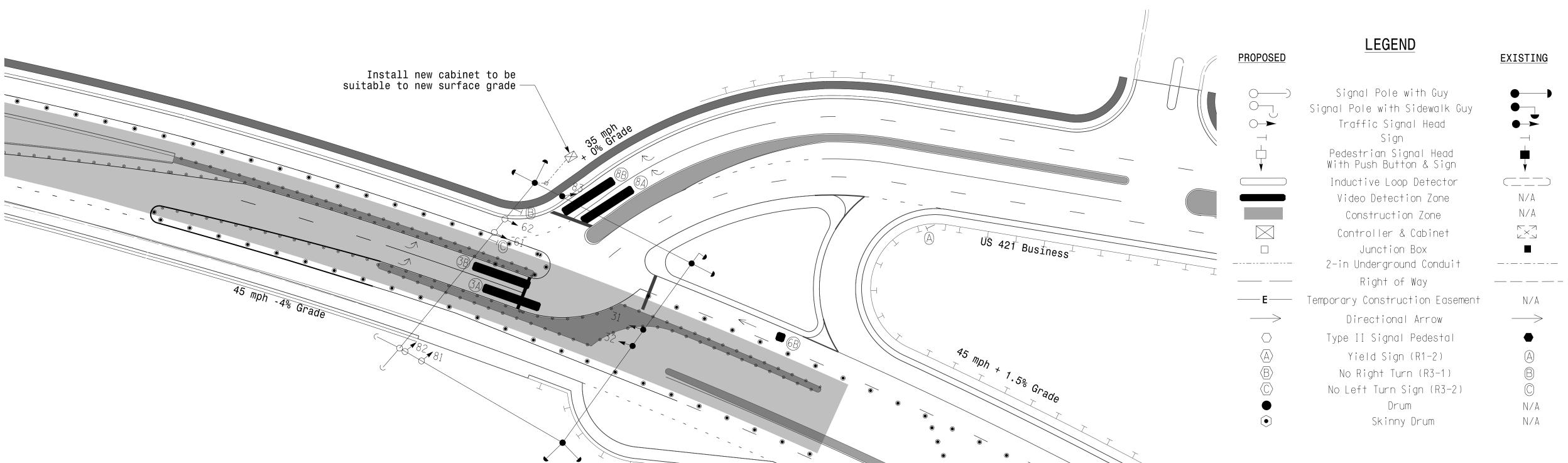
	MAXTIME DETECTOR INSTALLATION CHART											
	DET	ECTOR				PF	ROGRAM	IMI	NG			
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
3A	*	0	*	*	3	-	-	Χ	-	Χ	-	*
3B	*	0	*	*	3	-	-	Χ	-	Χ	-	*
6A	*	300	*	*	6	-	1.6	Χ	-	Χ	-	*
6B	*	90	*	*	6	-	-	Χ	-	Χ	-	*
8A	*	0	*	*	8	15.0	-	Χ	-	Χ	-	*
8B	*	0	*	*	8	15.0	-	Χ	-	Χ	_	*

★Video Detection Zone

# 3 Phase Fully Actuated (Isolated)

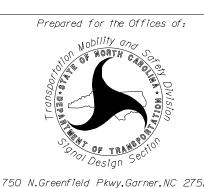
# **NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night operation unless otherwise directed by the Engineer.
- 3. Set all detector units to presence mode.
- 4. This intersection uses video detection. Install detectors according to the manufacturer's instructions to schieve the desitred detection.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Refer to Pavement Marking Plans for proposed stop bar locations.
- 7. Reposition existing signal heads as shown on the plans.



MAXTIM	E TIMI	NG CHA	\RT					
FEATURE	PHASE							
FEATURE	3	6	8					
Walk *	_	_	_					
Ped Clear *	_	_	_					
Min Green	7	12	7					
Passage *	2.0	2.0	2.0					
Max 1 *	30	60	30					
Yellow Change	3.0	4.4	3.0					
Red Clear	2.4	1.3	1.4					
Added Initial *	_	_	_					
Maximum Initial *	_	_	_					
Time Before Reduction *	_	_	_					
Time To Reduce *	_	_	_					
Minimum Gap	_	_	_					
Advance Walk	_	_	_					
Non Lock Detector	Х	_	Х					
Vehicle Recall	_	MIN RECALL	_					
Dual Entry	Х	_	Х					

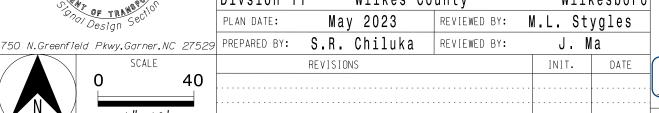
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green Signal Upgrade - Temporary Design 5 (Phase 12)



1"=40'

US 421 US 421 Business

Divsion 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: M.L. Stygles



047250

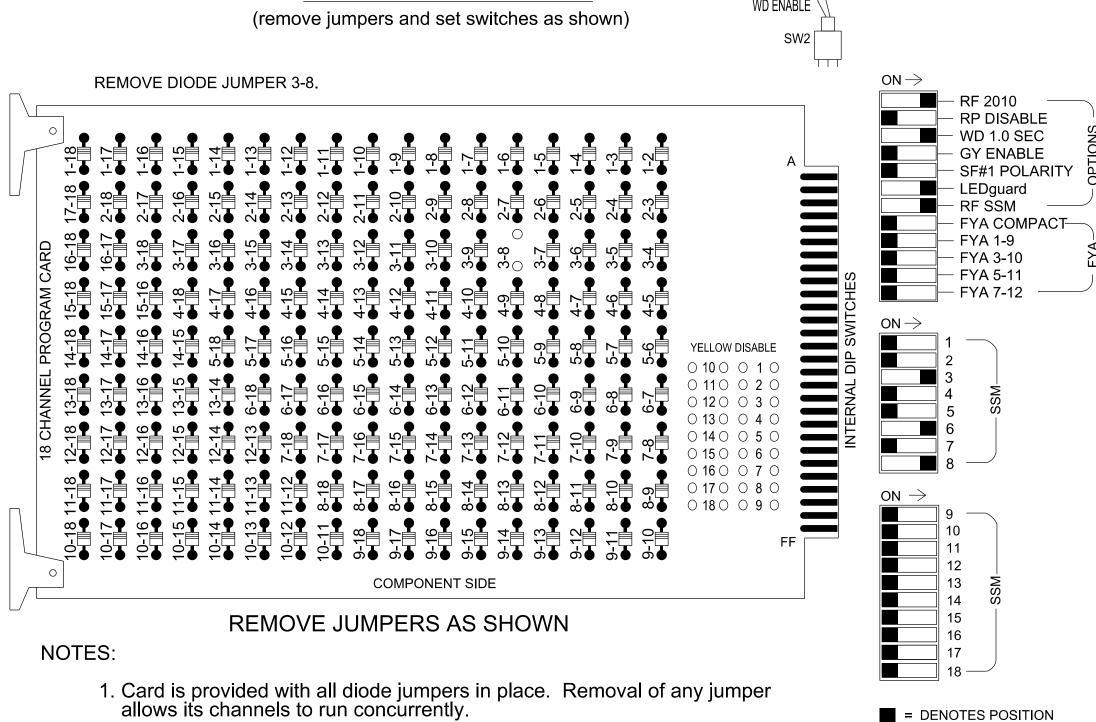
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SEAL

17/2011 9:38:53 AM NTraffic\Signals

for all other phases should not be lower than 4 seconds.



- 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. Program phases 3 and 8 for Dual Entry.
- 3. Program controller to start up in phase 6 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.

### **EQUIPMENT INFORMATION**

Controller	332 w/ Aux Q-Free MAXTIME Base 18 With Aux. Output File
Phases Used  Overlap "1"  Overlap "2"  Overlap "3"  Overlap "4"	NOT USED NOT USED NOT USED

U - 5312	Sig.11
ROJECT REFERENCE NO.	SHEET N

	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	NU	NU	31,32	NU	NU	NU	61,62 63	NU	NU	81,82 83	NU	NU	NU	NU	NU	NU	NU
RED								134			107							
YELLOW								135								-		
GREEN																		
RED ARROW				116														
YELLOW ARROW				117							108							
FLASHING YELLOW ARROW																		
GREEN ARROW				118				136		·	109						·	
*																		
×																		

### NU = Not Used

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

### INPUT FILE POSITION LAYOUT

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.

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
ILE	U	S L OT	S L O T	FS DC ISOLATOR											
'I''	L	E M P T Y	ST DC ISOLATOR												
ILE	U	S L O T													
J"	L	E M P T Y													
		EX.: 1	A, 2A, ET	C. = LOC	P NO.'S							FS = I	FLASH S	ENSE	

FS = FLASH SENSE ST = STOP TIME

= DENOTES POSITION OF SWITCH

# SPECIAL DETECTOR NOTE

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

> THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1146T5

DESIGNED: May 2023 SEALED: 5/26/2023 REVISED: N/A



Temporary Installation - Electrical Detail 1 of 1 (Phase 12)

ELECTRICAL AND PROGRAMMING



US 421 US 421 Business

	Division	11	Wilkes	County	Wil	kesboro
	PLAN DATE:	Ma	y 2023	REVIEWED BY:	M.L.Styg	les
	PREPARED BY:	S.	R Chiluka	REVIEWED BY:	J.Ma	
		REVIS	IONS		INIT.	DATE
9						

SIGNATURES COMPLETED SEAL 5/26/2023 SIG. INVENTORY NO. 11-1146T5

FINAL UNLESS ALL

5/23/2019 3:15:01PM R:\Traffic\Signals\Design\Sig schiluka

Sig.11.10

U-5312

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 3. Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Refer to Pavement Marking Plans for proposed stop bar locations.

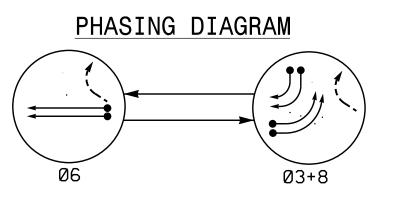


TABLE OF OPERATION

31,32

61,62

81,82,83

PHASE

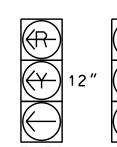
### PHASING DIAGRAM DETECTION LEGEND

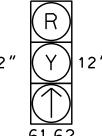
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT

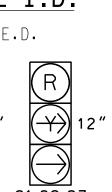
 $<\!\!--\!\!>$  PEDESTRIAN MOVEMENT

### SIGNAL FACE I.D.

All Heads L.E.D.

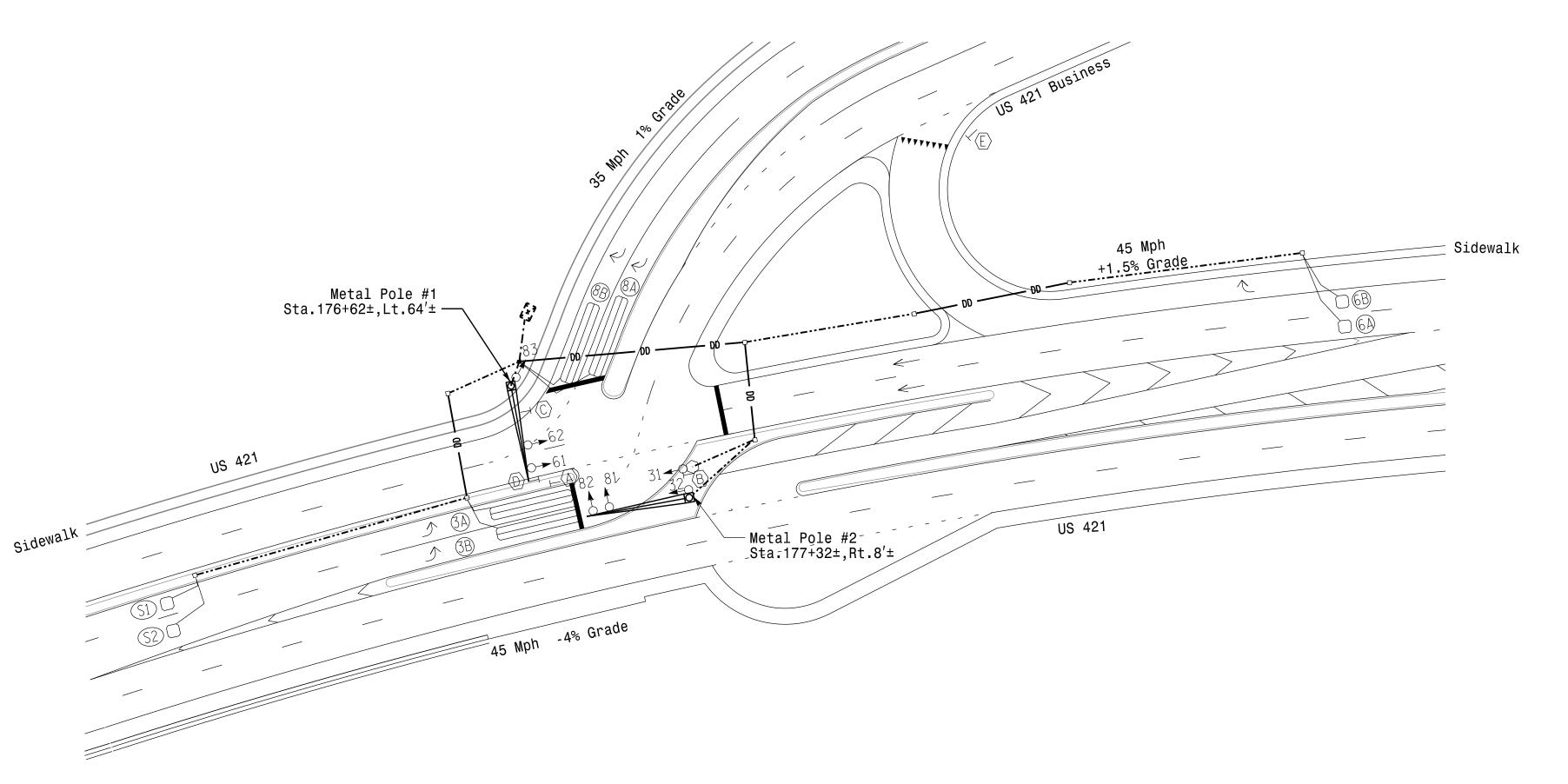






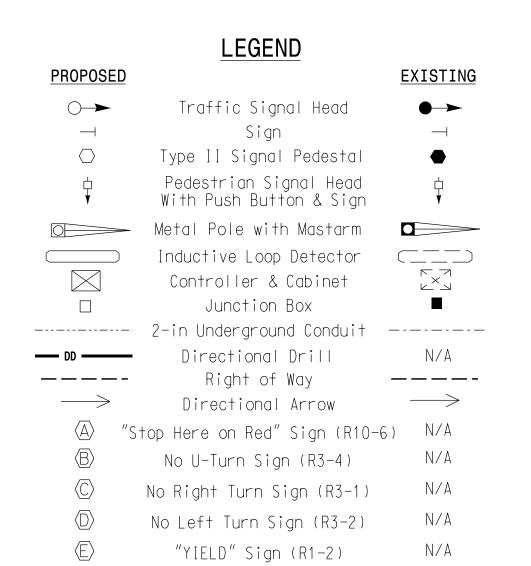
MAXTIME DETECTOR INSTALLATION CHART												
	DET	CTOR				PF	ROGRAM	MI	NG			
L00P	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
ЗА	6X40	0	2-4-2	Х	3	15.0*	-	Χ	-	Χ	-	Χ
3B	6X40	0	2-4-2	Х	3	15.0*	-	Χ	_	Х	_	Χ
6A	6X6	300	5	Х	6	-	-	Χ	Х	Х	-	Χ
6B	6X6	300	5	Х	6	-	-	Χ	Х	Х	-	Χ
8A	6X40	0	2-4-2	Х	8	15.0	-	Χ	-	Х	-	Χ
8B	6X40	0	2-4-2	Х	8	15.0	•	Χ	-	Х	-	Χ
S1	6X6	200	3	Х	-	-	-	-	-	Х	-	-
S2	6X6	200	3	Х	-	-	-	_	_	_	_	-
Disable delay during alternate phasing operation												

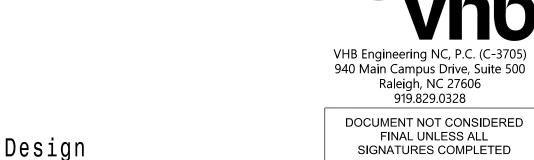
Disable delay during alternate phasing operation



MAXTIM	E TIMI	NG CHA	.RT
FEATURE		PHASE	
FEATURE	3	6	8
Walk *	_	_	_
Ped Clear *	_	_	-
Min Green	7	12	7
Passage *	2.0	6.0	2.0
Max 1 *	30	60	30
Yellow Change	3.0	4.4	3.0
Red Clear	2.4	1.3	1.8
Added Initial *	_	1.5	-
Maximum Initial *	_	34	-
Time Before Reduction *	_	15	-
Time To Reduce *	_	30	_
Minimum Gap	_	3.4	_
Advance Walk	_	_	-
Non Lock Detector	Х	_	Х
Vehicle Recall	_	MIN RECALL	-
Dual Entry	Х	-	Х

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





Signal Upgrade - Final Design



US 421 US 421 Business

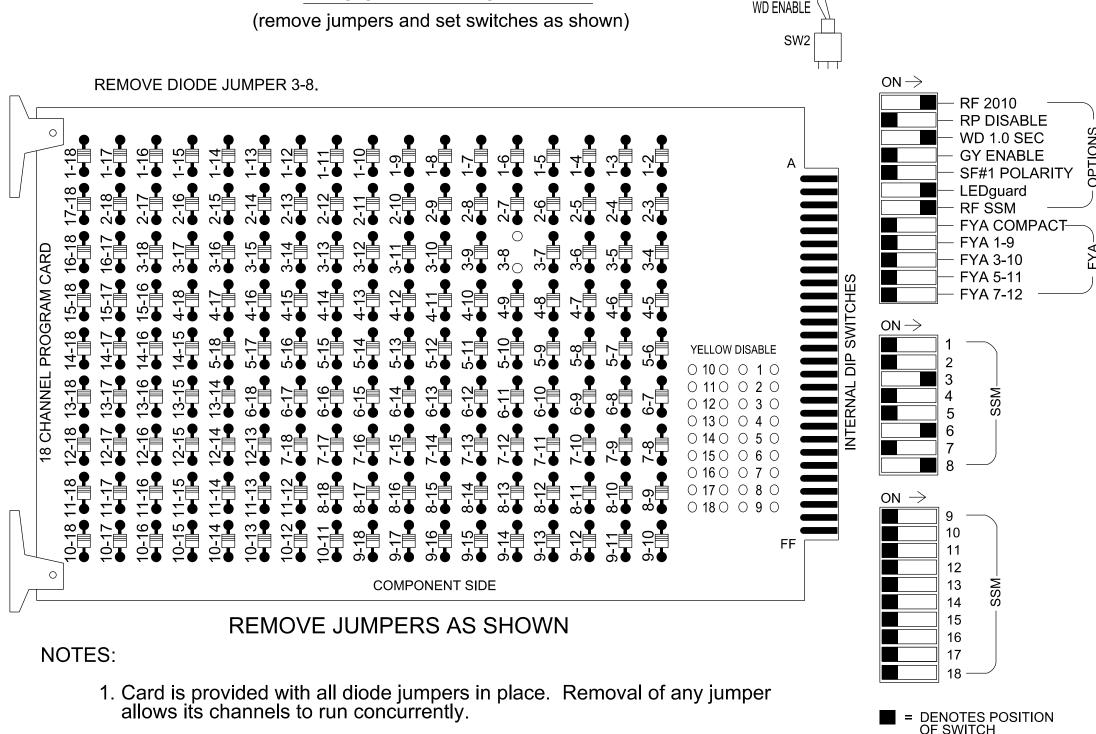
	Divsion 11 Wilkes County	Wilkesboro	
On OF TRAME Section	PLAN DATE: May 2023 REVIEWED BY	: M. Stygles	
O N.Greenfield Pkwy,Garner,NC 27529	PREPARED BY: S.R. Chiluka REVIEWED BY	: J. Ma	
SCALE	REVISIONS	INIT. DATE	$\int_{C}$
$\blacksquare$ $\setminus$ 0 10			. `

SIG. INVENTORY NO. 11-1146

SEAL

047250

NCDOT /25/2023 |2:16:18 PM \vhb.com\gbl\proj\R chiluka



- 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. Program phases 3 and 8 for Dual Entry.
- 3. Program controller to start up in phase 6 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 Wilkesboro Closed Loop System.

# **EQUIPMENT INFORMATION**

Controllor	2070LV
Controller	
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S3, S8, S11
Phases Used	3, 6, 8,
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED

Sig.11.11 U-5312

				SIC	3NA	\L H	ΙΕΑ	D H	00	K-U	IP C	НА	RT					
LOAD SWITCH NO.	S1	S2	S3	S4	<b>S</b> 5	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 PÉD	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	NU	NU	31,32	NU	NU	NU	61,62 63	NU	NU	81,82 83	NU	NU	NU	NU	NU	NU	NU
RED								134			107		-					
YELLOW								135			-		-			-		
GREEN			,							,							,	
RED ARROW				116		·								·		-		
YELLOW ARROW				117							108					-		
FLASHING YELLOW ARROW									·					·				
GREEN ARROW				118			,	136			109					-		
*																		
*																		

### NU = Not Used

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

### INPUT FILE POSITION LAYOUT

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.

(front view)

	,	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ILE	U L	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	<ul><li>Ø 3</li><li>3A</li><li>Ø 3</li><li>3B</li></ul>	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1 SYS. DET. S2	SLOT EMPTY	010F EXPF>	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR
LE J"	U	SLOT EMP	Ø 6 <b>6A</b> Ø 6	S L O T E M	S L O T E M	S L O T E M P	Ø 8 <b>8A</b> Ø 8	S L O T E M	S L O T E M	S L O T E M	S L O T E M P	огот прь	огон шдь	S L O T E	SLOT EMP
O	L	Y	6B	P T Y	P T Y	Y	8B	P T Y	P T Y	P T Y	P T Y	T Y	FLASH S	ENSE	P T Y

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	QUEUE	CALL	DELAY DURING GREEN
3A	TB4-5,6	I5U	58	20	7	3	15		Х			Х	
3 <del>B</del>	TB4÷9,10	I5L	41	3	4	3			X			Χ	
<b>*</b> S1	TB6-9,10	<b>1</b> 9U	60	22	13	SYS			Х		Х		
<b>*</b> S2	TB6-11,12	I9L	62	24	14	SYS			Х		Х		
6A	TB3-5,6	J2U	40	2	16	6			Х			Х	
6B	TB3-7,8	J2L	44	6	17	6			Х		Х		
8A	TB5-9,10	J6U	42	4	22	8	15		Х			Х	
8B	TB5-11,12	J6L	46	8	23	8	15		Х			Х	

\*System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND: J2L

FILE J — SLOT 2 -LOWER -

> THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1146 DESIGNED: May 2023 SEALED: 5/26/2023 REVISED: N/A

# VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

Electrical Detail Sheet 1 of 1 ELECTRICAL AND PROGRAMMING

DETAILS FOR:

Prepared for the Offices of:

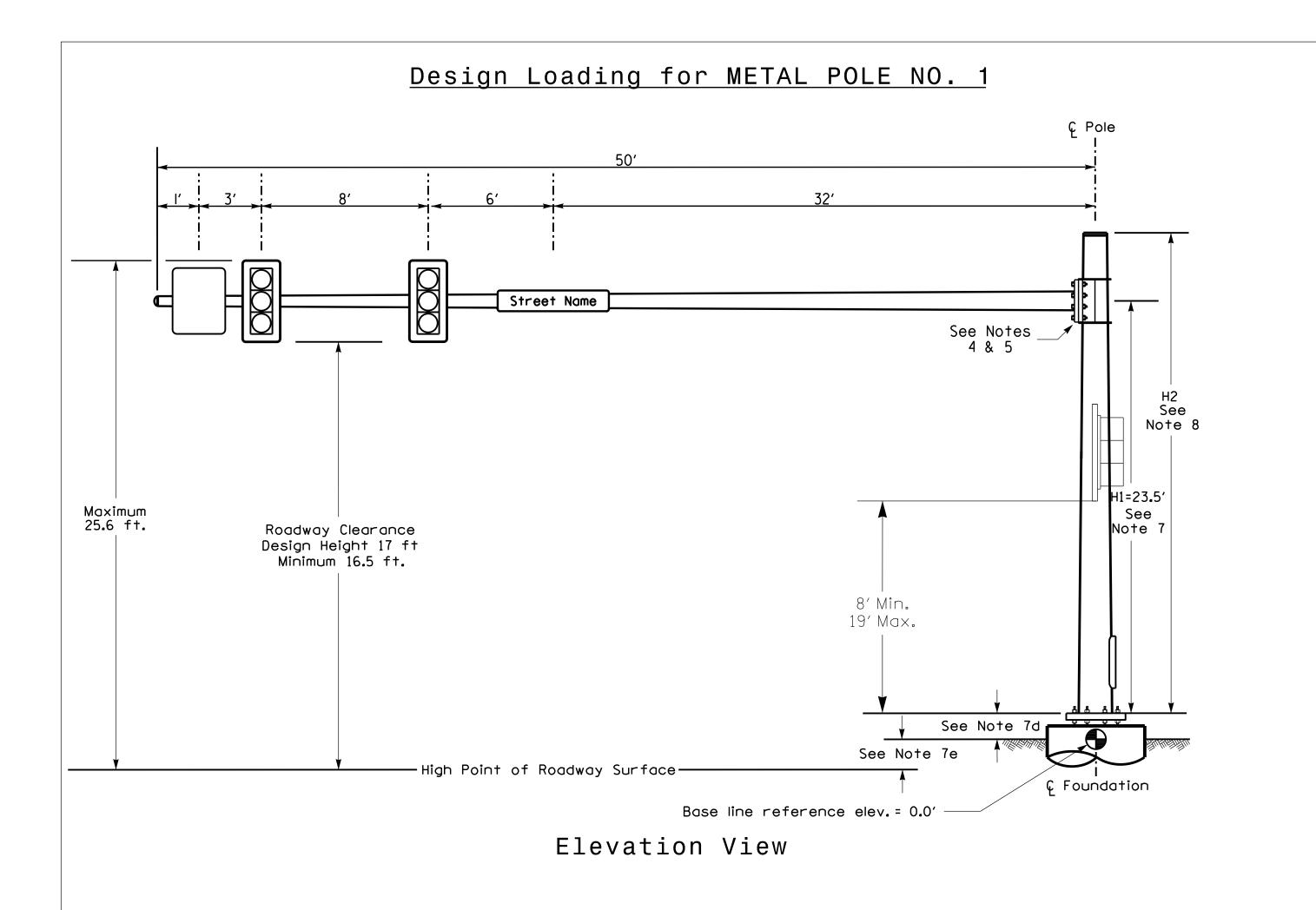
US 421 US 421 Business

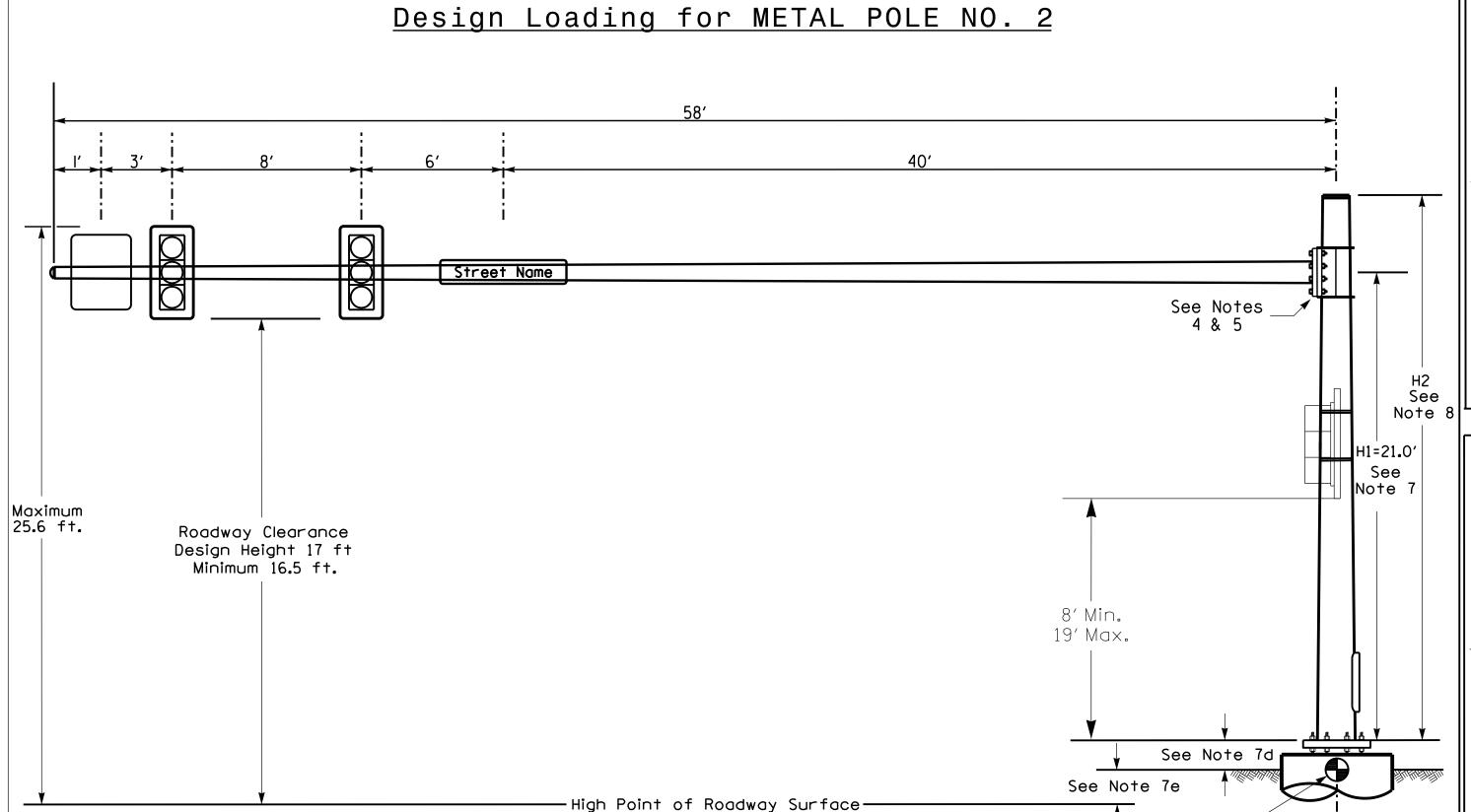
Division 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: M. L. Stygles PREPARED BY: S. R. Chiluka | REVIEWED BY: REVISIONS INIT. DATE

SEAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO.





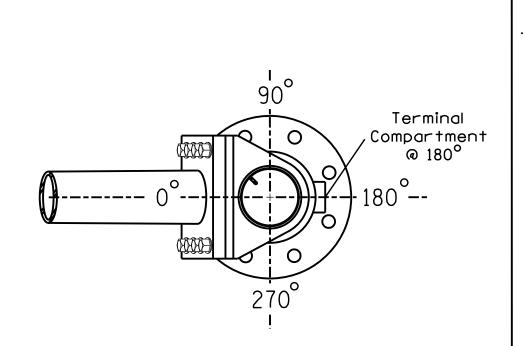
10/31/2022 8:48:46 AM R:\Traffic\Signals\D( schiluka

# SPECIAL NOTE

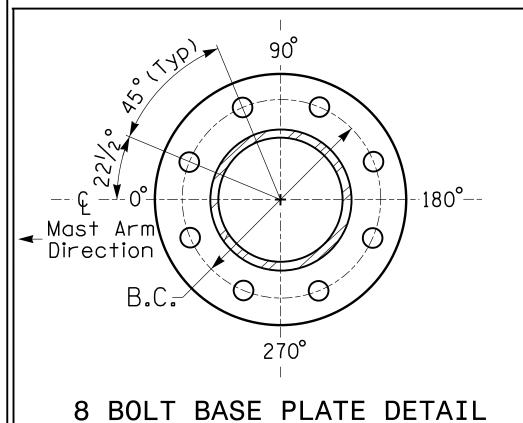
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available ∥project survey data.

# Elevation Data for Mast Arm Attachment (H1)

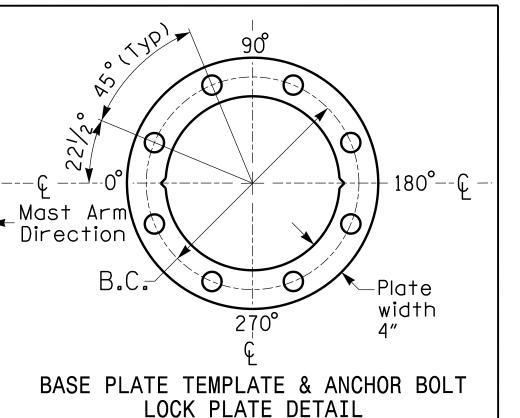
Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at © Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+3 f†.	+0.74 ft.
Elevation difference at Edge of travelway or face of curb	+1.0 ft.	+0.2 ft.



POLE RADIAL ORIENTATION



See Note 6



For 8 Bolt Base Plate

€ Foundation

Base line reference elev. = 0.0'

Elevation View @ 360°

### METAL POLE No. 1 and 2

	MAST ARM LOADING SC	HEDU	LE	
loading Symbol	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0"L	36 LBS
	SIGN RIGID MOUNTED	9.0 S.F.	36.0" W X 36.0" L	20 LBS

### **NOTES**

### DESIGN REFERENCE MATERIAL

- 1. Design the traffic signalstructure and foundation in accordance with:
- The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
- The 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
- The 2018 NCDOT Roadway Standard Drawings.
- The traffic signal project plans and special provisions.
- The NCDOT "Metal Pole Standards" located at the following NCDOT website:

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

# DESIGN REQUIREMENTS

- 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 stress 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. Signalheads 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 leveland 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 signalheads 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.



U-5312

Sig 11 12



# US 421 US 421 Business

Wilkesboro May 2023 REVIEWED BY: M. Stygles J. Ma

750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: S.R. Chiluka REVIEWED BY: INIT. DATE REVISIONS



DOCUMENT NOT CONSIDERED

FINAL UNLESS ALL

SIGNATURES COMPLETED

5/24/2023 SRChiluka SIGNATURE SIG. INVENTORY NO. ||-||46

NCDOT Wind Zone 4 (90 mph)

Divsion 11 Wilkes County

PHASING DIAGRAM

02+6

02+5

01+6

01+5

 $<\!\!<\!\!--\!\!>$  PEDESTRIAN MOVEMENT

PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

UNSIGNALIZED MOVEMENT

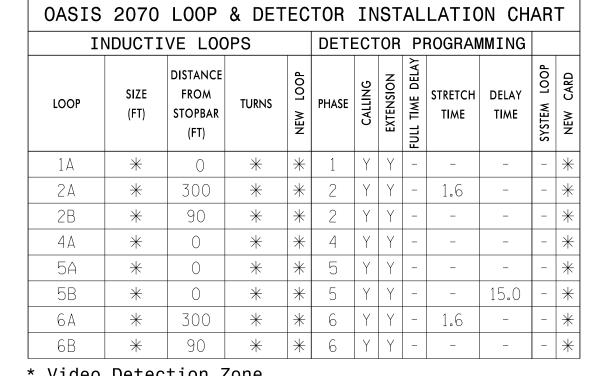
UNDETECTED MOVEMENT (OVERLAP)

PROJECT REFERENCE NO. Sig.12.0 U-5312

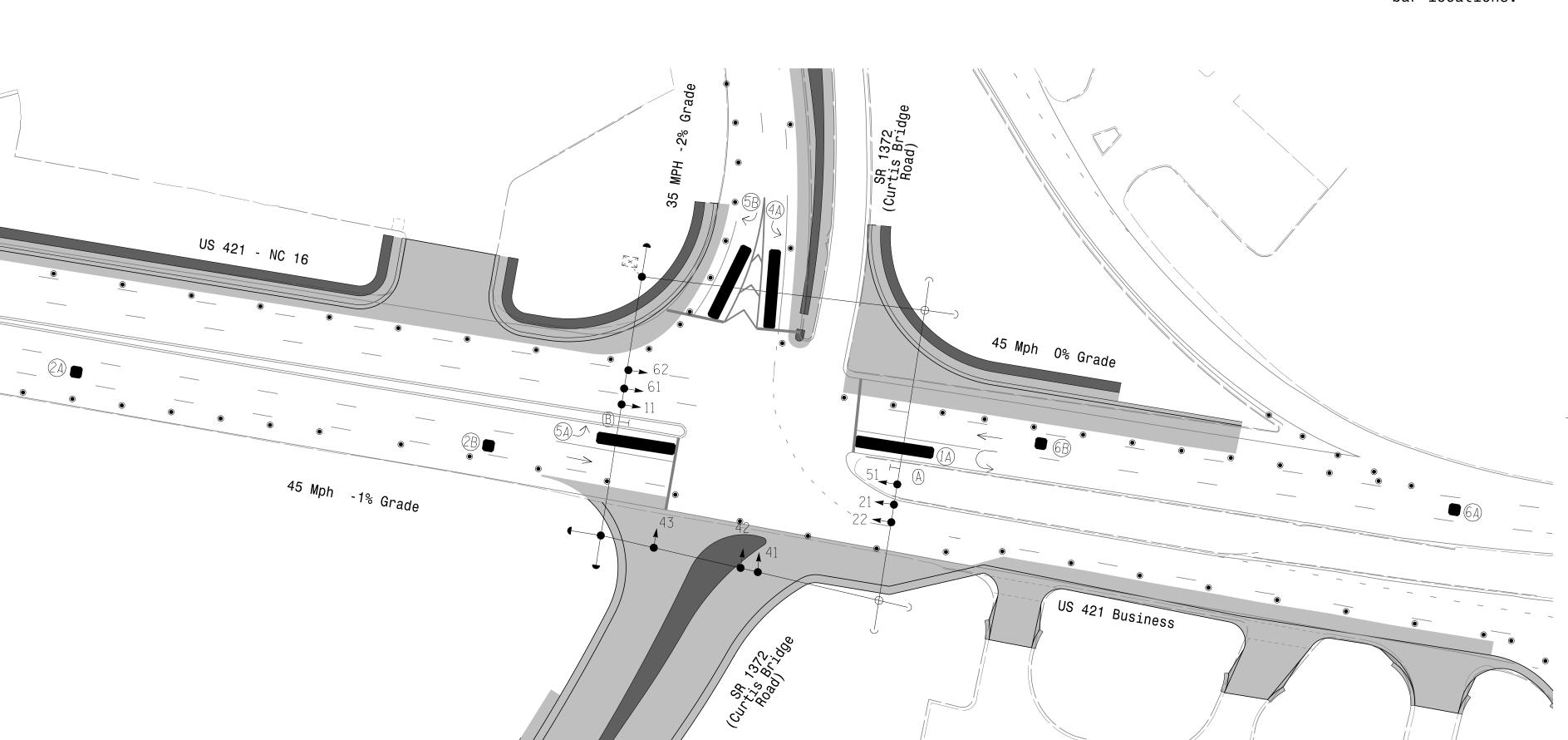
5 Phase Fully Actuated (Isolated)

# NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night operation unless otherwise directed by the Engineer.
- 3. Phase 1 and/or Phase 5 may be lagged.
- 4. Set all detector units to presence mode.
- This intersection uses video detection. Install detectors according to the manufacturer's instructions to schieve the desitred detection.
- 6. Refer to Pavement Marking Plans for proposed stop bar locations.



\* Video Detection Zone



43

SIGNAL FACE I.D.

All Heads L.E.D.

TABLE OF OPERATION

SIGNAL

FACE

21, 22

41,42

43

61, 62

PHASE

 $\rightarrow R \rightarrow R \rightarrow F$ 

	—	Sign	$\neg$	
	$\downarrow$	Pedestrian Signal Head	<b>‡</b>	
	$\bigcirc$	Type II Signal Pedestal	•	
	N/A	Video Detection Zone Inductive Loop Detector Controller & Cabinet Junction Box - 2-in Underground Conduit — Right of Way Directional Arrow	N/A	
_		Construction Zone	N/A	
	$\circ$	Wood Pole	•	
_		Drum	N/A	
	•	Skinny Drum	N/A	
	(A) (B)	"LEFT TURN SIGNAL" Sign (R10-10L) "U TURN SIGNAL" Sign	(A) (B)	

LEGEND

Traffic Signal Head

Signal Pole with Sidewalk Guy

**EXISTING** 

0.	ASIS 2	070 TI	MING C	HART	
			PHASE		
FEATURE	1	2	4	5	6
Min Green 1 *	7	12	7	7	12
Extension 1 *	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	15	45	25	20	45
Yellow Clearance	3.0	4.6	3.0	3.0	4.5
Red Clearance	3.4	1.3	3.3	3.2	1.4
Walk 1 *	=	-	=	_	=
Don't Walk 1	-	-	=	-	-
Seconds Per Actuation *	_	_	-	_	-
Max Variable Initial *	-	-	-	_	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	=	-	-
Recall Mode	-	MIN RECALL	=	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6

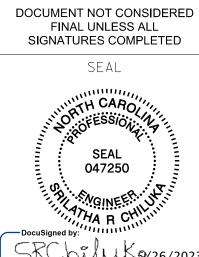
New Installation - Temporary Design 1(Phase 1)



US 421 Business Curtis Bridge Road

Divsion 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: M.L. Stygles

750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: S.R. Chiluka REVIEWED BY:



VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

lower than what is shown. Min Green for all other phases should not be lower than 4 seconds

ON OFF

- RP DISABLE

- GY ENABLE

— SF#1 POLARITY 📮

─ FYA COMPACT──

— WD 1.0 SEC

\_**I** LEDguard RF SSM

— FYA 1-9

FYA 7-12

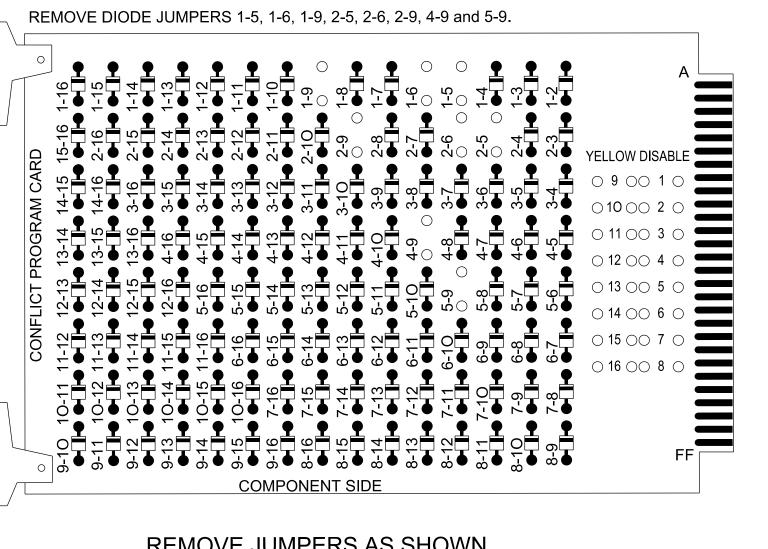
13

= DENOTES POSITION OF SWITCH

- FYA 3-10 - FYA 5-11

WD ENABLE 🚫

SW2



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.

<sup>⊗</sup> Wired Input - Do not populate slot with detector card

### NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,7, 8,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- 3. Enable Simultaneous Gap-Out for all phases.
- 4. Program phases 2 and 6 for Start Up In Green.
- 5. Program phases 2 and 6 for Yellow Flash.
- 6. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

# **EQUIPMENT INFORMATION**

SOFTWARE..... CONOLITE OASIS CABINET MOUNT.....BASE

OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)

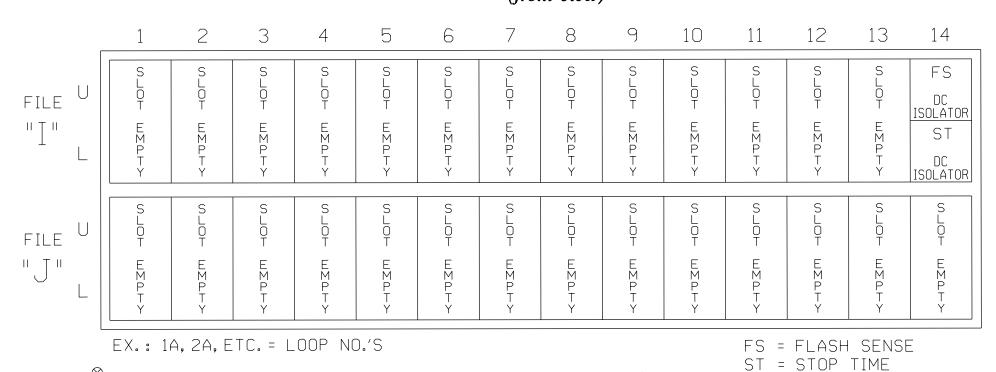
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S9 

OVERLAP A.....4+5

OVERLAP B.....NOT USED OVERLAP C.....NOT USED OVERLAP D.....NOT USED

# INPUT FILE POSITION LAYOUT

### (front view)



# SPECIAL DETECTOR NOTE

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

U - 5312	Sig.1
PROJECT REFERENCE NO.	SHEET

	SIGNAL HEAD HOOK-UP CHART																	
LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S1Ø	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	NU	NU	43	NU	NU	NU	NU	NU
RED		128			1Ø1			134					A121					
YELLOW		129						135										
GREEN		13Ø						136										
RED ARROW	125						131											
YELLOW ARROW	126				102		132						A122					
GREEN ARROW	127				1Ø3		133						A123					

NU = Not Used

FLASH NOTE: rewire OLA to flash on Flasher Unit #2, Circuit #2.

### OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN:11-0944T1

DESIGNED: May 2023 SEALED: 5/26/2023 REVISED: N/A

Temporary Installation - Electrical Detail 1 of 1 (Phase 1)

ELECTRICAL AND PROGRAMMING DETAILS FOR:



Us 421 Business Curtis Bridge Road

Divsion 11	Milkes Co	unty	Wil	kesboro
PLAN DATE:	May 2023	REVIEWED BY:	M. Sty	gles
PREPARED BY:	S.R. Chiluka	REVIEWED BY:	J. N	la
	REVISIONS		INIT.	DATE

FINAL UNLESS ALL SIGNATURES COMPLETED SEAL

940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

DOCUMENT NOT CONSIDERED

SIG. INVENTORY NO. 11-0944T1

5/23/2019 3:15:01 PM R:\*Traffic\*Signals\*De schiluka

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

 $<\!\!--\!\!>$  PEDESTRIAN MOVEMENT

Ø4

02+6

02+5

01+6

### NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night operation unless otherwise directed by the Engineer.
- 3. Phase 1 and/or Phase 5 may be lagged
- 4. Set all detector units to presence mode.
- This intersection uses video detection. Install detectors according to the manufacturer's instructions to schieve the desitred detection.
- 6. Refer to Pavement Marking Plans for proposed stop bar locations.
- 7. Reposition existing signal heads as shown on this

LEGEND

Traffic Signal Head

Signal Pole with Sidewalk Guy

Pedestrian Signal Head

Type II Signal Pedestal

Video Detection Zone

Inductive Loop Detector Controller & Cabinet

Junction Box

Right of Way Directional Arrow

Construction Zone

Wood Pole Drum

Skinny Drum

"U TURN SIGNAL" Sign

"LEFT TURN SIGNAL" Sign (R10-10L) (A)

2-in Underground Conduit -----

**EXISTING** 

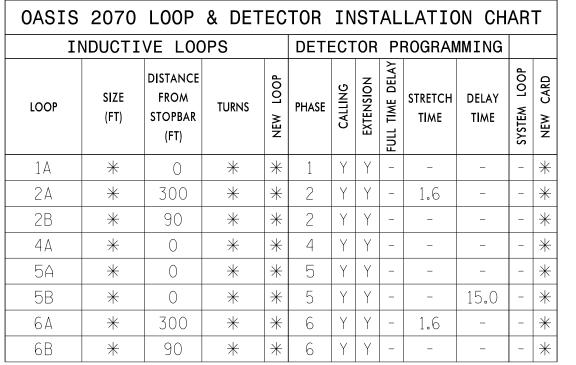
**-**

N/A

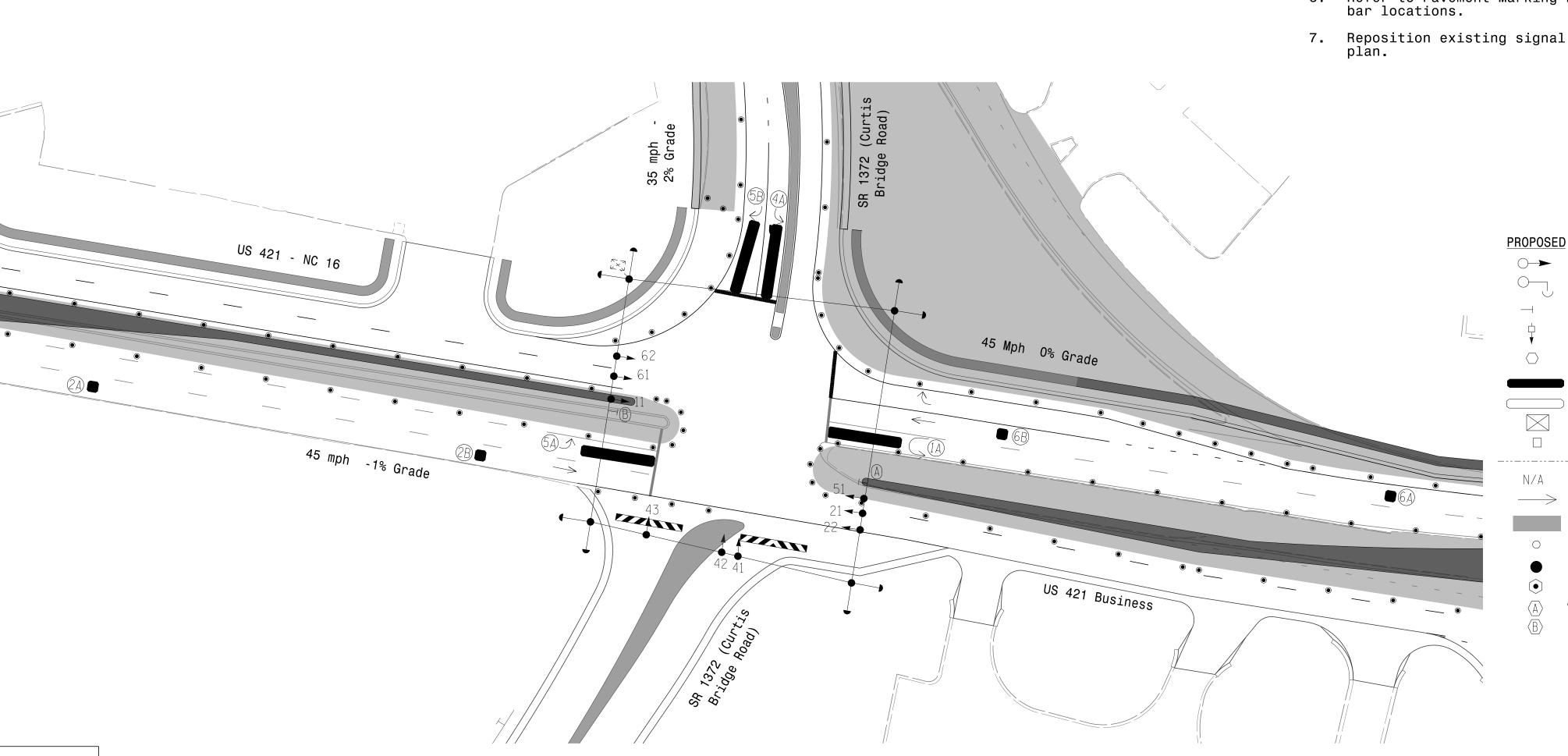
N/A

N/A

N/A



\*Video Detection Zone



43,44

SIGNAL FACE I.D.

All Heads L.E.D.

41,42

TABLE OF OPERATION

SIGNAL

FACE

21, 22

41,42

43

61, 62

PHASE

6 5 6

←│<del></del>←│<del>∢</del>尺│<del>∢</del>尺│<del>∢</del>尺

R | R | R | **←** |

 $\rightarrow$  R  $\rightarrow$  R  $\rightarrow$  F

-|-R|--|-R|-R|-R

O	ASIS 2	070 TI	MING C	HART	
			PHASE		
FEATURE	1	2	4	5	6
Min Green 1 *	7	12	7	7	12
Extension 1 *	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	15	45	25	20	45
Yellow Clearance	3.0	4.6	3.0	3.0	4.5
Red Clearance	4.2	1.4	3.5	3.3	1.1
Walk 1 *	-	-	-	_	_
Don't Walk 1	-	_	-	_	_
Seconds Per Actuation *	-	_	-	_	_
Max Variable Initial *	-	-	-	_	-
Time Before Reduction *	-	-	-	_	-
Time To Reduce *	-	-	-	_	-
Minimum Gap	-	-	-	_	_
Recall Mode	-	MIN RECALL	-	_	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

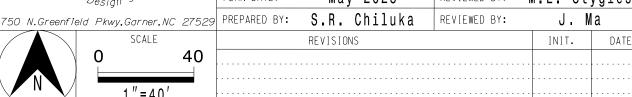
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds

Signal Upgrade - Temporary Design 2(Phase 2)



US 421 Business Curtis Bridge Road

Divsion 11 Wilkes County Wilkesboro REVIEWED BY: M.L. Stygles May 2023



SEAL 047250

VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SRChiluko/26/2023

# 16 CHANNEL CONFLICT MONITOR ON OFF PROGRAMMING DETAIL WD ENABLE 🚫 (remove jumpers and set switches as shown) SW2 ☐ REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 2-5, 2-6, 2-9, 4-9 and 5-9. - RP DISABLE ── WD 1.0 SEC - GY ENABLE ☐ SF#1 POLARITY **■** LEDguard RF SSM FYA COMPACT— — FYA 1-9 - FYA 3-10 - FYA 5-11 — FYA 7-12 **COMPONENT SIDE** 13 REMOVE JUMPERS AS SHOWN

### NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- 2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,7, 8,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- 3. Enable Simultaneous Gap-Out for all phases.
- 4. Program phases 2 and 6 for Start Up In Green.
- 5. Program phases 2 and 6 for Yellow Flash.
- 6. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

# EQUIPMENT INFORMATION

CONTROLLER20	70
CABINET	2 W/ AUX OUTPUT FILE
SOFTWAREEC	ONOLITE OASIS
CABINET MOUNTBA	SE
OUTPUT FILE POSITIONS18	(12-STD, 6-AUX)
LOAD SWITCHES USEDS1	, \$2, \$4, \$5, \$6, \$9
PHASES USED	2,4,5,6
OVERLAP A4+	5
OVERLAP BNC	T USED
OVERLAP CNC	TUSED

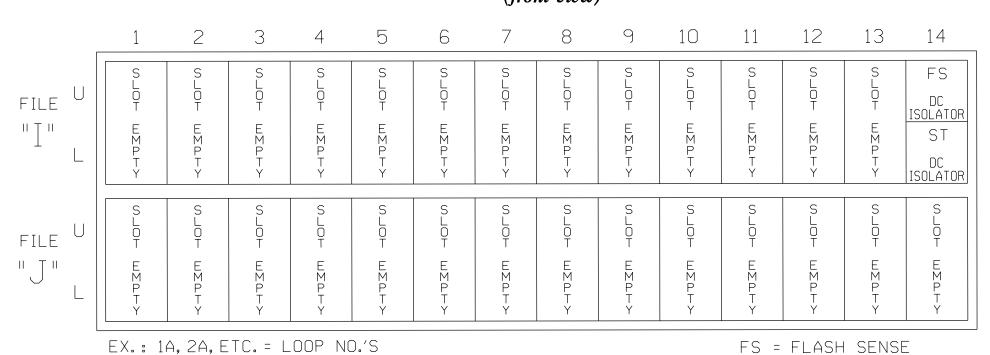
OVERLAP D.....NOT USED

# INPUT FILE POSITION LAYOUT

= DENOTES POSITION OF SWITCH

ST = STOP TIME

(front view)



<sup>⊗</sup> Wired Input - Do not populate slot with detector card

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:

# SPECIAL DETECTOR NOTE

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

U-5312	Sig.
PROJECT REFERENCE NO.	SHEET

	SIGNAL HEAD HOOK-UP CHART																	
LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S1Ø	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	NU	NU	43,44	NU	NU	NU	NU	NU
RED		128			1Ø1			134					A121					
YELLOW		129						135										
GREEN		130						136										
RED ARROW	125						131											
YELLOW ARROW	126				102		132						A122					
GREEN ARROW	127				1Ø3		133						A123					

NU = Not Used

FLASH NOTE: rewire OLA to flash on Flasher Unit #2, Circuit #2.

### OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN:11-0944T2

DESIGNED: May 2023 SEALED: 5/26/2023 REVISED: N/A



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

Temporary Installation - Electrical Detail 1 of 1 (Phase 1)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

Us 421 Business Curtis Bridge Road

Divsion 11 Wilkes County Wilkesboro May 2023 REVIEWED BY: M. Stygles PLAN DATE: PREPARED BY: S.R. Chiluka REVIEWED BY: J. Ma REVISIONS INIT. DATE

5/26/2023 DATE SIG. INVENTORY NO. 11-0944T2

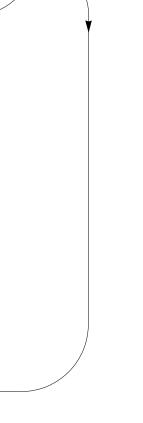
750 N.Greenfield Pkwy, Garner, NC 27529

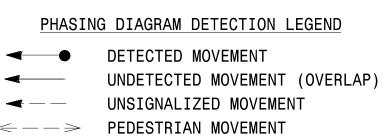
6 Phase Fully Actuated (Isolated)

### **NOTES**

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- 2. Do not program signal for late night operation unless otherwise directed by the Engineer.
- 3. Set all detector units to presence mode.
- 4. This intersection uses video detection. Install detectors according to the manufacturer's instructions to schieve the desitred detection.
- 5. Omit "walk" and flashing "Don't Walk" with no pedestrian calls.
- 6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- 7. To provide a leading pedestrian interval on phase 2, program FYA heads 51 and 22 to delay for 3 seconds after the start of the phase 6 walk interval. See electrical details.
- Refer to Pavement Marking Plans for proposed stop bar locations
- Reposition existing signal heads as shown on the

	DFT	ECTOR		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,1B	*	0	*	*	1	-	-	Χ	-	Χ	-	*
1C	*	0	*	*	1	15.0	-	Χ	-	Χ	-	*
1D	*	0	*	*	1	15.0	-	Χ	-	Χ	-	*
2A	*	300	*	*	2	-	1.6	Χ	Χ	Χ	_	*
2B	*	90	*	*	2	-	-	Χ	Χ	Χ	_	*
4A	*	0	*	*	4	÷	<u>-</u>	Χ		Χ	_	*
4B	*	0	*	*	4	_	-	Χ	Χ	Χ	-	*
4C	*	0	*	*	4	_	_	Χ	Χ	Χ	-	*
5A	*	0	*	*	5	15.0	<u>-</u>	Χ	-	Χ	-	*
5B	*	0	*	*	5	15.0	_	Χ	-	Χ	-	*
6A,6B	*	300	*	*	6	-	1.6	Χ	Χ	Χ	-	*
6C,6D	*	90	*	*	6	-	_	Х	Х	Х	_	*





PHASING DIAGRAM

02+5

**│**●●●

04

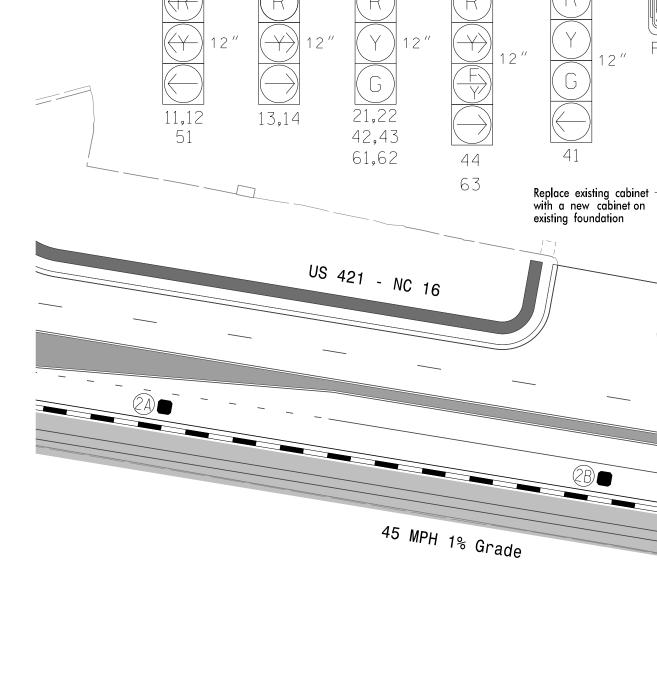


TABLE OF OPERATION

FACE

11, 12

13,14

44

61, 62

6.3

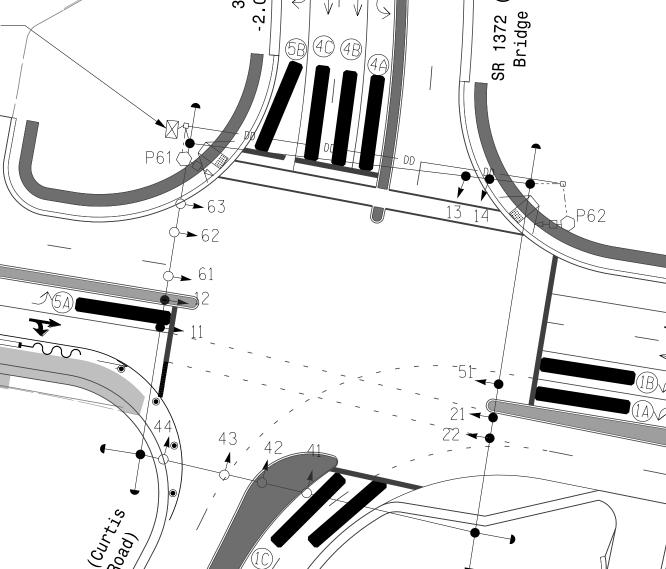
PHASE

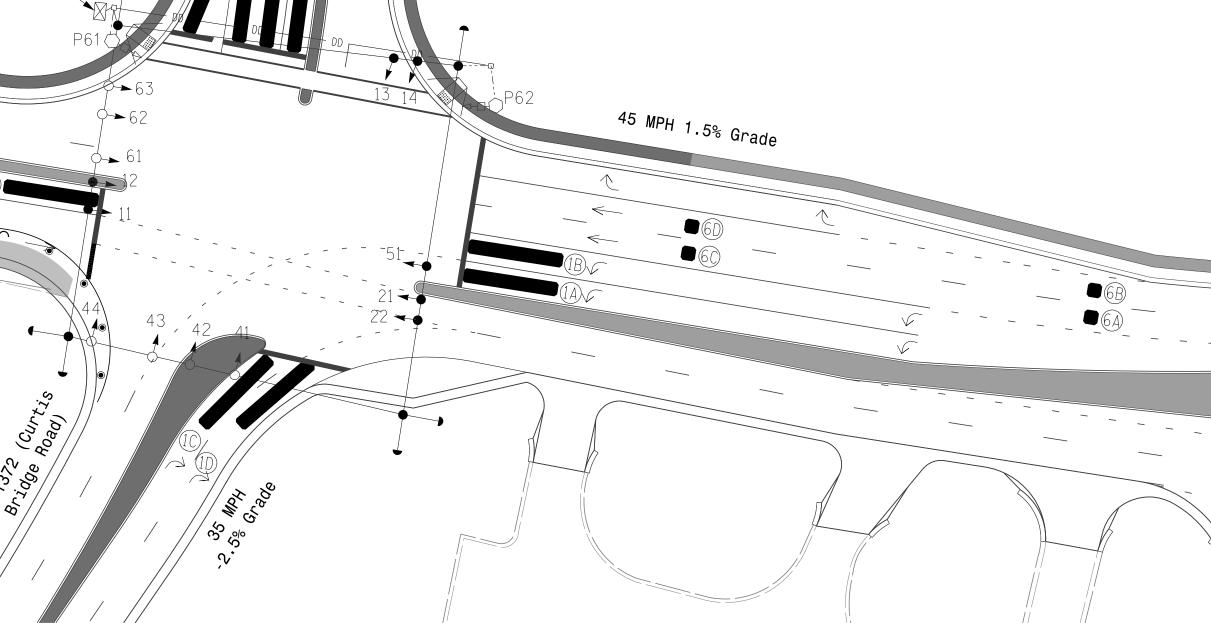
| R | R | R | G | F

|<del>-R|-R|-R|-R|--|-R</del>

SIGNAL FACE I.D.

All Heads L.E.D.





	MAXTIM	E TIMI	NG CHA	RT	
FEATURE			PHA	ASE	
TEATONE	1	2	4	5	6
Walk *	-	_	_	_	7
Ped Clear *	-	_	_	_	32
Min Green	7	12	7	7	12
Passage *	2.0	2.0	2.0	2.0	2.0
Max 1 *	30	60	30	30	60
Yellow Change	3.0	4.6	3.8	3.0	4.5
Red Clear	3.5	1.5	2.4	3.5	1.8
Added Initial *	-	2.5	_	_	1.5
Maximum Initial *	_	34	_	_	34
Time Before Reduction *	_	15	_	_	15
Time To Reduce *	_	30	_	_	30
Minimum Gap	_	3.4	_	_	3.4
Advance Walk	-	_	_	_	**
Non Lock Detector	Х	_	Х	Х	_
Vehicle Recall	_	MIN RECALL	_	_	MIN RECALL

\* 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.

\* \* See note 7

	LEGEND	
PROPOSED		<u>EXISTING</u>
	Curb Ramp Signal Pole with Guy Signal Pole with Sidewalk Guy Traffic Signal Head	
	Type II Signal Pedestal Sign Pedestrian Signal Head With Push Button & Sign	
	Inductive Loop Detector Video Detection Zone Construction Zone Controller & Cabinet Junction Box	N/A N/A
	JUNGTI OH BOX	

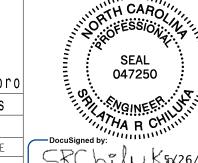
2-in Underground Conduit





US 421 Business Curtis Bridge Road

Divsion 11 Wilkes County Wilkesboro REVIEWED BY: M.L. Stygles May 2023 750 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: S.R. Chiluka REVIEWED BY:



940 Main Campus Drive, Suite 500 Raleigh, NC 27606 919.829.0328

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

Dual Entry

INIT.

# 18 CHANNEL CONFLICT MONITOR ON PROGRAMMING DETAIL (remove jumpers and set switches as shown) SW2 ☐ - RF 2010 RP DISABLE ■— WD 1.0 SEC - GY ENABLE - SF#1 POLARITY LEDguard - RF SSM - FYA COMPACT-– FYA 1-9 – FYA 3-10 – FYA 5-11 FYA 7-12 COMPONENT SIDE ] 15 REMOVE JUMPERS AS SHOWN NOTES:

# 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. Program controller to start up in phase 2 Green No Walk and phase 6
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

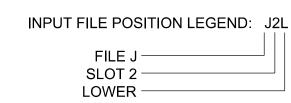
# **EQUIPMENT INFORMATION**

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S1,S2,S4,S5,S7,S8,S9,S10,AUXS2,
	AUXS5
Phases Used	1,2,4,5,6,6PED
Overlap "1"	NOT USED
Overlap "2"	*
Overlap "3"	NOT USED
Overlap "4"	*
Overlap "7"	*
Ovorlan "8"	*

\*See overlap programming detail on sheet 2.

# 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	QUEUE	CALL	DELAY DURING GREEN	
PED PUSH BUTTONS							NOTE:							
P61,P62	TB8-7,9	I13U	68	34	6	PED 6	INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.							



= DENOTES POSITION OF SWITCH

Ø6 PED FS

DC

NOT USED

DC DC ISOLATOR

ST

DC ISOLATOR

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

INPUT FILE POSITION LAYOUT

(front view)

# LOAD RESISTOR INSTALLATION DETAIL

Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.

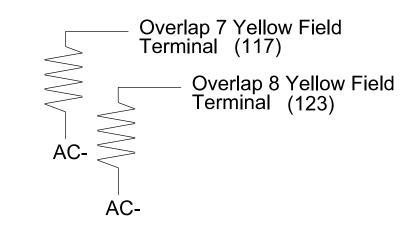
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.

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.

(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 video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans. U-5312

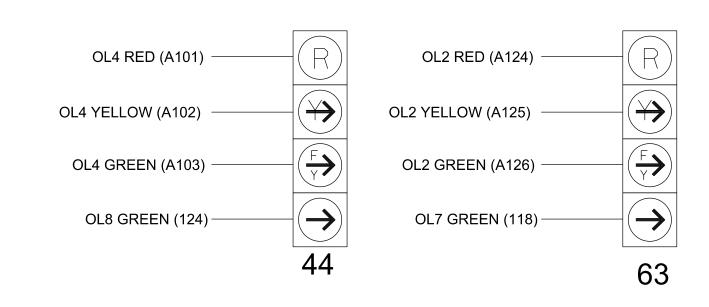
				S	IGN	<b>IAL</b>	HE	EAD	НС	OK	- UF	C	HAF	RТ					
LOAD SWITCH NO.	S1	S2	S3	S4	S5		S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4		14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	PED	OL7	4		4 PED	5	6	6 PED	OL8	8	8 PED	OL1		SPARE	OL3	OL4	SPAR
SIGNAL HEAD NO.	11,12, 13,14	21,22	NU	63 <sup>*</sup>	41	42,43	NU	51	61,62	P61, P62	<b>★</b> 44	NU	NU	NU	63 <sup>*</sup>	NU	NU	<b>★</b> 44	NU
RED		128			101	101			134						A124			A101	
YELLOW		129		*	102	102			135		*								
GREEN		130			103	103			136										
RED ARROW	125							131											
YELLOW ARROW	126							132							A125			A102	
FLASHING YELLOW ARROW															A126			A103	
GREEN ARROW	127			118	103			133			124								
₩										119									
Ķ										121									

NU = Not Used

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

# FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-0944T3 DESIGNED: May 2023 SEALED: 5/26/2023 REVISED: N/A

|Temporary Installation - Electrical Detail 1 of 2 (Phase 3)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 SR 1372 (Curtis Bridge Rd)

Division 11 Wilkes County Wilkesboro REVIEWED BY: M.L.Stygles May 2023 PREPARED BY: S.R.Chiluka REVIEWED BY: J.Ma REVISIONS INIT. DATE

5/26/2023

VHB Engineering NC, P.C. (C-3705)

940 Main Campus Drive, Suite 500
Raleigh, NC 27606
919.829.0328
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SIGNATURES COMPLETED

SEAL

SIG. INVENTORY NO. 11-0944T3