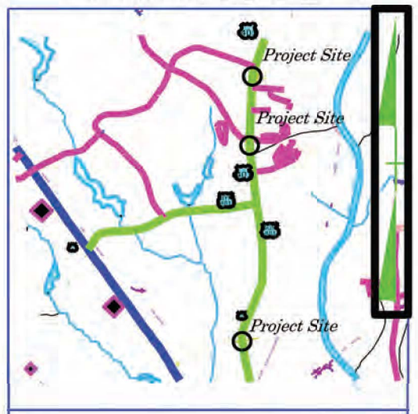
01/15/24

TIP PROJECT: HS-2406 C,D&F

CONTRACT: DF00524

See Sheet 1A For Index of Sheets



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

LOCATION: *US 401 AT TREETOP DRIVE*
US 401 AT NORTHGATE AND WENDY'S
US 401 AT LANGDON STREET AND COLONIAL DRIVE

TYPE OF WORK: *PEDESTRIAN SIGNAL, PAVEMENT MARKING AND SIGNAL UPGRADE*

N.C.	HS-2406C,D&F		II
HS-2406C	50978.1.4 50978.3.4	5097803 5097803	P.E. CON.
HS-2406D	50978.1.5 50978.3.5	5097804 5097804	P.E. CON.
HS-2406F	50978.1.7 50978.3.7	5097806 5097806	P.E. CON.

HS-2406F

HS-2406C

HS-2406D

Ramsey

McArthur Rd

Ramsey

BYP 401

401

401

BUS 401

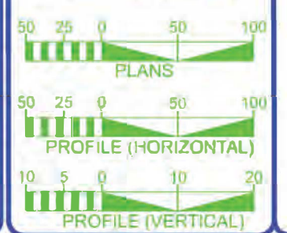
PROJECT SITE

PROJECT SITE

PROJECT SITE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



Prepared in the Office of:
DIVISION OF HIGHWAYS
431 TRANSPORTATION DR., FAYETTEVILLE NC 28301

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE
N/A

LETTING DATE
August 20, 2025

John B Gauthier
PROJECT ENGINEER

Cedrick Graham
PROJECT DESIGN ENGINEER

PROJECT CONTACT

DOT/nrmills1 - 7/25/2025

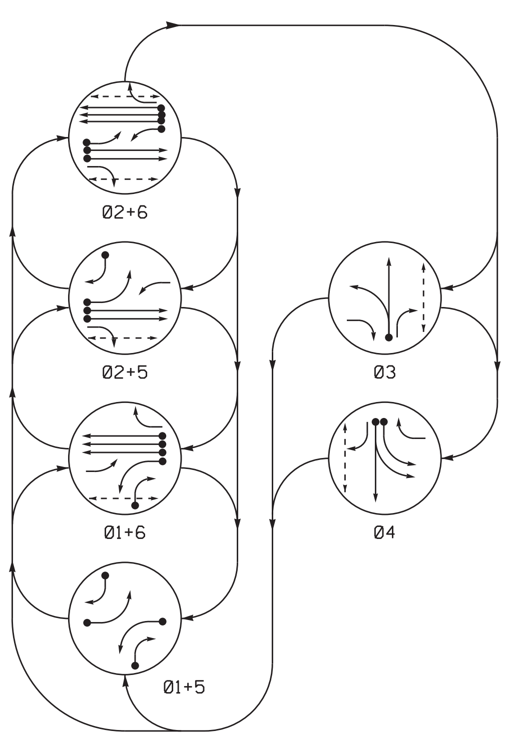
11/14/23

HS-2406C

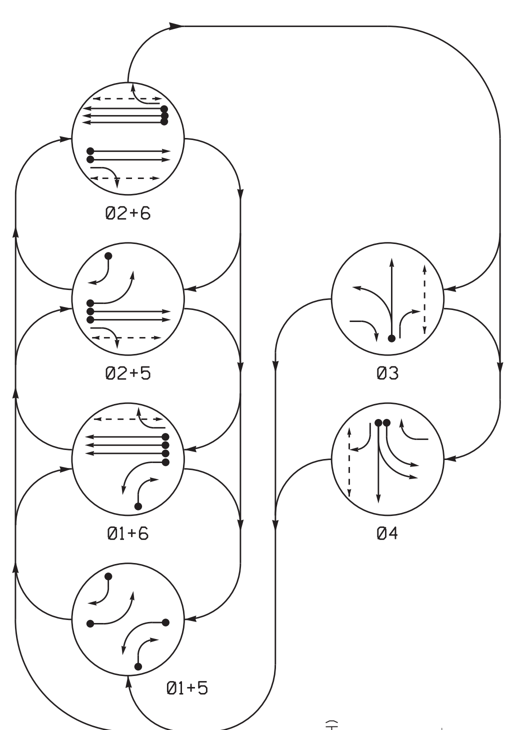
004

PROJECT REFERENCE NO.	SHEET NO.
HS-2406C	Sig.1.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	F/Y ←	F/Y ←	←R	←R	←R
21	R	R	G	G	R	R	R
22	R	R	G	G	R/→	R	R
31	R	R	R	R	G ←	R	R
32	R/→	R/→	R	R	G	R	R
41	←R	←R	←R	←R	←R	←	←R
42	R	R	R	R	R	G ←	R
43	R/→	R	R/→	R	R	G	R
51	←	F/Y ←	←	F/Y ←	←R	←R	←R
61, 63	R	G	R	G	R	R	R
62	R	G	R	G	R	R/→	R
P21,P22	DW	DW	W	W	DW	DW	DRK
P31,P32	DW	DW	DW	DW	W	DW	DRK
P41,P42	DW	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	←R	←R	←R	←R	←R
21	R	R	G	G	R	R	R
22	R	R	G	G	R/→	R	R
31	R	R	R	R	G ←	R	R
32	R/→	R/→	R	R	G	R	R
41	←R	←R	←R	←R	←R	←	←R
42	R	R	R	R	R	G ←	R
43	R/→	R	R/→	R	R	G	R
51	←	←R	←	←R	←R	←R	←R
61, 63	R	G	R	G	R	R	R
62	R	G	R	G	R	R/→	R
P21,P22	DW	DW	W	W	DW	DW	DRK
P31,P32	DW	DW	DW	DW	W	DW	DRK
P41,P42	DW	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DRK

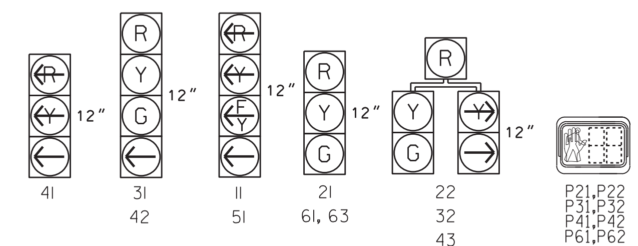
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING: CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	+5	2-4-2	-	1	* 15	-	X	-	X	-	-
					6**	3	-	X	-	X	X	-
1B	6X40	+5	2-4-2	-	1	15	-	X	-	X	-	-
2A,2B	6X6	300	5	-	2	-	-	X	X	X	-	-
3A	6X40	+5	2-4-2	-	3	3	-	X	-	X	-	-
4A	6X40	+5	2-4-2	-	4	-	-	X	-	X	-	-
4B	6X40	+5	2-4-2	-	4	-	-	X	-	X	-	-
5A	6X40	+5	2-4-2	-	5	* 15	-	X	-	X	-	-
					2**	3	-	X	-	X	X	-
5B	6X40	+5	2-4-2	-	5	15	-	X	-	X	-	-
6A,6B,6C	6X6	300	5	-	6	-	-	X	X	X	-	-

* Disable Delay During Alternate Phasing Operation.
** Disable Phase 2/6 Call For Loops 1A and 5A During Alternate Phasing Operation.

SIGNAL FACE I.D.

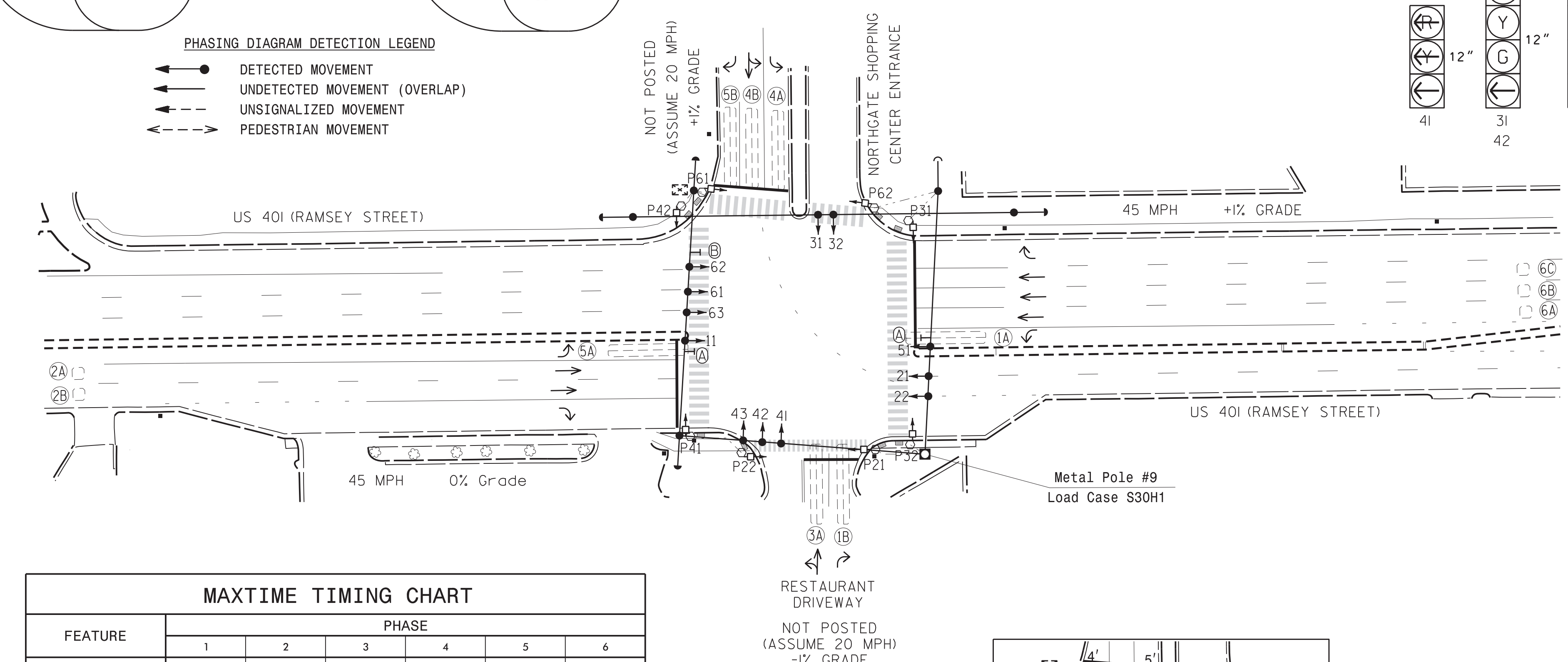
All Heads L.E.D.



6 Phase
Fully Actuated
Fayetteville Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. 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. Install new 2070LX controller in existing cabinet.
9. The Division Traffic Engineer will determine the hours of use for each phasing plan.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



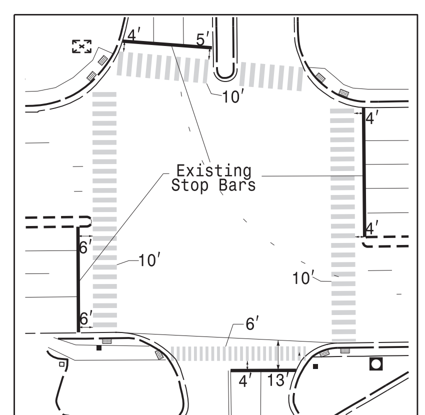
LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
(A)	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	(A)
(B)	Right Arrow "ONLY" Sign (R3-5R)	(B)
	Type II Signal Pedestal	

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Walk *	0	14	14	14	0	14
Ped Clear	0	17	27	29	0	21
Min Green *	7	12	7	7	7	12
Passage *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	25	90	15	30	25	90
Yellow Change	3.0	4.5	3.0	3.0	3.0	4.5
Red Clear	2.8	1.8	3.6	3.8	3.3	1.8
Added Initial *	–	2.0	–	–	–	2.0
Maximum Initial *	–	34	–	–	–	34
Time Before Reduction *	–	15	–	–	–	15
Time To Reduce *	–	45	–	–	–	45
Minimum Gap	–	3.0	–	–	–	3.0
Advance Walk	–	7	7	7	–	7
Non Lock Detector	X	–	X	X	X	–
Vehicle Recall	–	MIN 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.



Crosswalk Locations and Stop bar

Signal Upgrade Corr. File No. 06-23-72734

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 401 (Ramsey Street) at Northgate Shopping Center and Entrance to Wendy's

Division 6 Cumberland County Fayetteville

PLAN DATE:	April 2025	REVIEWED BY:	BMH
PREPARED BY:	Jeff Spence	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047646 BAILEY M HARDEN
DocuSigned by: Bailey Harden
DCEF3411623A425...
06/17/2025
DATE

SIG. INVENTORY NO. 06-0771

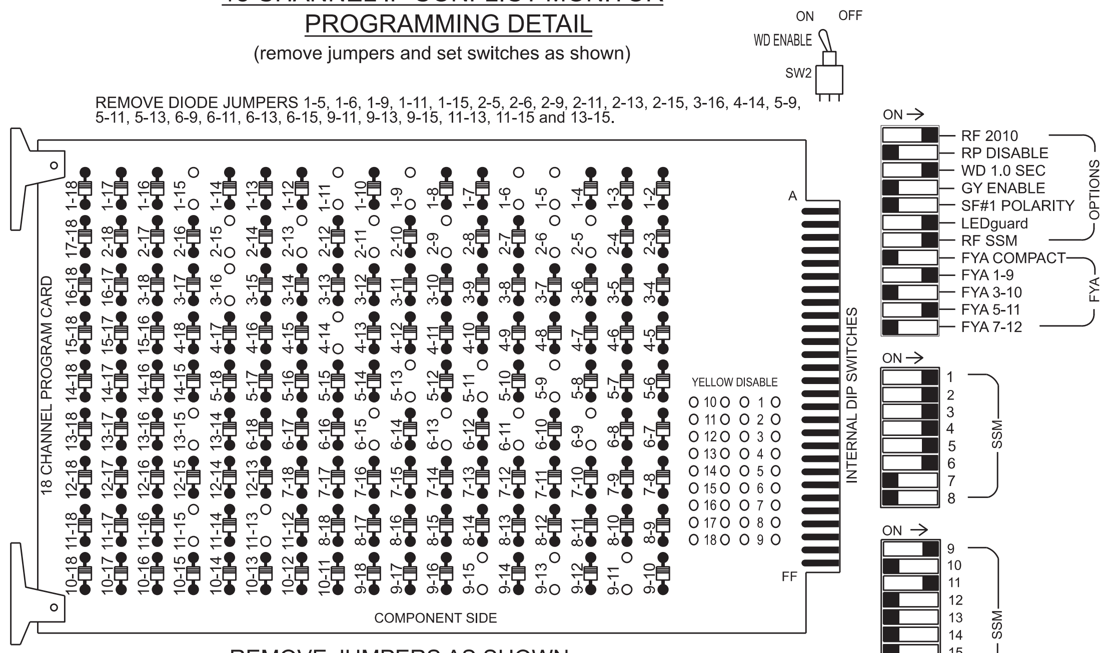
17-JUN-2025 11:41
jrspence

PROJECT REFERENCE NO.	SHEET NO.
HS-2406C	Sig.1.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 3-16, 4-14, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 9-11, 9-13, 9-15, 11-13, 11-15 and 13-15.



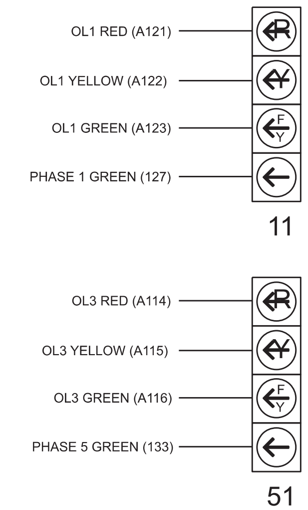
REMOVE JUMPERS AS SHOWN

NOTES:

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



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	3 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	32	21,22	P21, P22	31	32	22	41	42	43	62	P41, P42	51★	43	61,62, 63	P61, P62	NU	NU	P31, P32	11★	NU	NU	51★	NU	NU
RED	*		128		116	116			101	101			*		134										
YELLOW			129		117	117			102	102					135										
GREEN			130		118	118			103	103					136										
RED ARROW								101												A121			A114		
YELLOW ARROW		126					117	102			102			132						A122			A115		
FLASHING YELLOW ARROW																				A123			A116		
GREEN ARROW	127	127			118		118	103	103		103		133	133											
(hand)				113								104				119			110						
(walk)				115								106				121			112						

NU = Not Used

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

★See pictorial of head wiring in detail this sheet.

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, S3, S4, S5, S6, S7, S8, S9, S12, AUX S1, AUX S4
Phases Used.......................................1, 2, 2PED, 3, 3PED, 4, 4PED, 5, 6, 6PED
Overlap "1"...*
Overlap "2"...Not Used
Overlap "3"...*
Overlap "4"...Not Used

*See overlap programming detail on sheet 2

NOTES

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

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	Ø 1 1A	Ø 1 1B	Ø 2 2A,2B	SLOT EMPTY	Ø 3 3A	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED	NOT USED		NOT USED	Ø 4 4B						Ø4 PED DC ISOLATOR	Ø3 PED DC ISOLATOR	ST DC ISOLATOR
"J"	U	Ø 5 5A	Ø 5 5B	Ø 6 6A, 6B,6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	NOT USED											

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

FS = FLASH SENSE
ST = STOP TIME

! If present, remove jumpers from I1-W to J4-W and J1-W to I4-W on rear of input file.

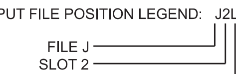
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15.0		X		X	
				-	29 ★	6	3.0		X		X	X
1B	TB2-5,6	I2U	39	1	2	1	15.0		X		X	
2A,2B	TB2-9,10	I3U	63	29	4	2			X	X	X	
3A	TB4-5,6	I5U	58	20	7	3	3.0		X		X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
4B	TB4-11,12	I6L	45	7	9	4			X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15.0		X		X	
				-	31 ★	2	3.0		X		X	X
5B	TB3-5,6	J2U	40	2	16	5	15.0		X		X	
6A,6B,6C	TB3-9,10	J3U	64	30	18	6			X	X	X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P31,P32	TB8-8,9	I13L	70	36	8	PED 3						

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

★ For the detectors to work as shown on the signal plan see the Detector Programming Detail for Alternate Phasing on Sheet 2 of this plan.

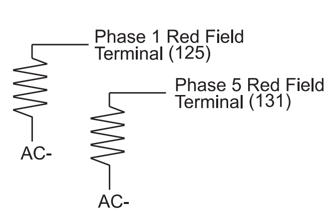
INPUT FILE POSITION LEGEND: J2L



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: 06-0771
DESIGNED: April 2025
SEALED: 06/17/2025
REVISED: N/A

Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared in the Offices of:

Transportation Mobility and Safety Division — ITS & Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

US 401 (Ramsey Street)
at
Northgate Shopping Center and Entrance to Wendy's

Division 6 Cumberland County Fayetteville

PLAN DATE: April 2025 REVIEWED BY:
PREPARED BY: Sarah Kirkpatrick REVIEWED BY:

REVISIONS INIT. DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

Signed by: Ryan W. Hough 06/18/2025
DATE

SIG. INVENTORY NO. 06-0771

17-JUN-2025 15:34
pw://ncdot-pw.bentley.com:ncdot-pw-01/Documents/NCDOT TSMD/Signal Design Section/Division 06/06-0771/Signals Management/060771_sm_ele_20250617.dgn
sgkirkpatrick

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	3
Type	FYA - 4 Section	FYA - 4 Section
Included Phases	2	6
Modifier Phases	1	5
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

PED 3 PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Detector Configuration >Pedestrian Detector

Plan 1

Detector	Descripton	Call Phase	Call Overlap
2		2	0
4		4	0
6		6	0
8		3	0

NOTICE PHASE 3 PED ASSIGNED TO DETECTOR 8 PED →

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

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

Channel Configuration

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

NOTICE PHASE 3 PED ASSIGNED TO CHANNEL 16 →

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

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.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0771
DESIGNED: April 2025
SEALED: 06/17/2025
REVISED: N/A

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	3
Type	FYA - 4 Section	FYA - 4 Section
Included Phases	-	-
Modifier Phases	1	5
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	0.0
29	0	-

5A

Detector	Call Phase	Delay
15	5	0.0
31	0	-

Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

US 401 (Ramsey Street)
at
Northgate Shopping Center and
Entrance to Wendy's

Division 6 Cumberland County Fayetteville

PLAN DATE: April 2025	REVIEWED BY:
PREPARED BY: Sarah Kirkpatrick	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH
Signed by: Ryan W. Hough
430320FAA2654C3...
06/18/2025
DATE

SIG. INVENTORY NO. 06-0771

17-JUN-2025 15:34
pw://ncdot-pw.bentley.com:ncdot-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division_06/06-0771/Signals Management/060771_sm_ele_20250617.dgn
sgkirkpatrick

PROJECT REFERENCE NO.	SHEET NO.
HS-2406C	Sig.1.3

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 11 and 51 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0771
DESIGNED: April 2025
SEALED: 06/17/2025
REVISED: N/A

Electrical Detail - Sheet 3 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 401 (Ramsey Street) at Northgate Shopping Center and Entrance to Wendy's

Division 6 | Cumberland County | Fayetteville

PLAN DATE: April 2025 | REVIEWED BY:

PREPARED BY: Sarah Kirkpatrick | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Engineering Branch
Traffic & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

Signed by: Ryan W. Hough 06/18/2025
4003207AA2654C3... DATE

SIG. INVENTORY NO. 06-0771

17-JUN-2025 15:34
D:\Projects\sbentley.com:ncdot-pw-01\Documents\NCDOT TSMD\Signal Design Section\Division_06\06-0771\Signals Management\060771_sm_ele_20250617.dgn
sgkirkpatrick

11/14/23

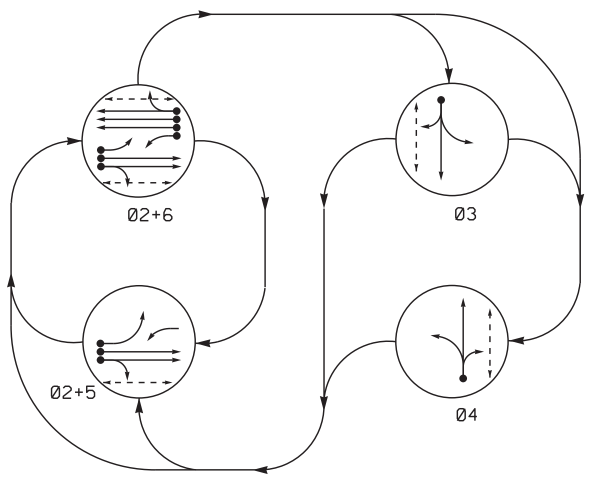
HS-24060
004

NOTE: USE 6' HIGH VIS. CROSSWALKS IN LIEU OF 10' AS SHOWN ON SIGNAL PLANS

FOR SIGNAL PLANS SEE SIG. 06-0250 SHEETS 1.0-1.2

PROJECT REFERENCE NO.	SHEET NO.
HS-2406D	Sig.1.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

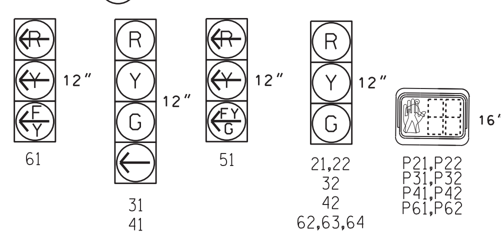
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø3	Ø4	FLASH
21,22	G	G	R	R	R
31	R	R	G ←	R	R
32	R	R	G	R	R
41	R	R	R	G ←	R
42	R	R	R	G	R
51	←	F/Y ←	←R	←R	←R
61	F/Y ←	F/Y ←	←R	←R	←R
62,63,64	R	G	R	R	R
P21,P22	W	W	DW	DW	DRK
P31,P32	DW	DW	W	DW	DRK
P41,P42	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

(F/Y) = Bimodal Section



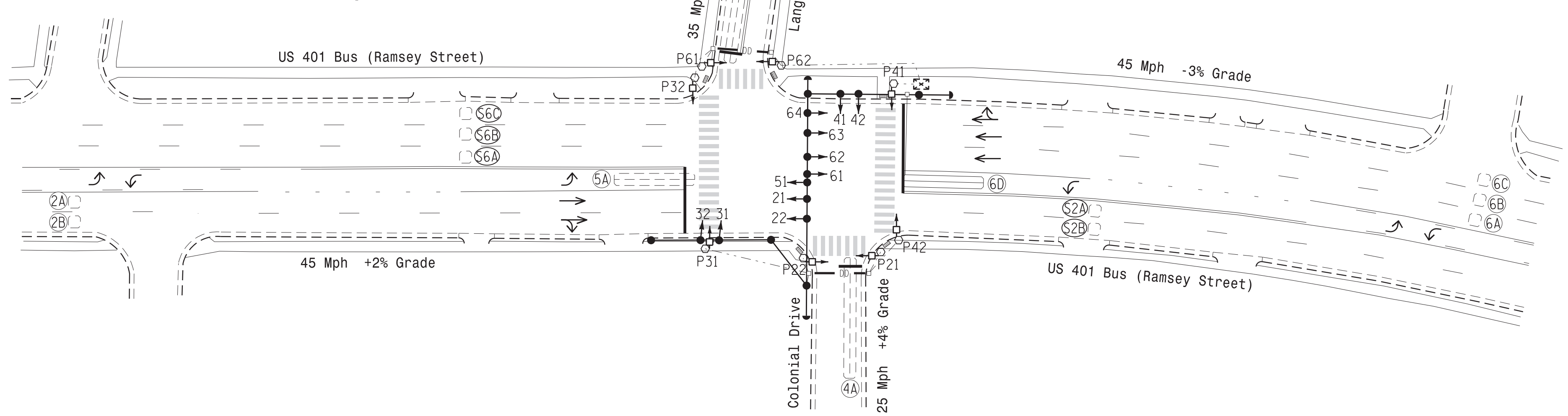
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING: CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A,2B	6X6	300	4	-	2	-	-	X	X	X	-	-
3A	6X60	+5	2-4-2	-	3	5	-	X	-	X	-	-
4A	6X60	+5	2-4-2	-	4	5	-	X	-	X	-	-
5A	6X40	+5	2-4-2	-	5	15	-	X	-	X	-	-
				-	2	3	-	X	-	X	X	-
6A,6B,6C	6X6	300	4	-	6	-	-	X	X	X	-	-
6D	6X40	0	2-4-2	X	6	3	-	X	-	X	X	-
S2A	6X6	+200	4	-	-	-	-	-	-	-	-	-
S2B	6X6	+200	4	-	-	-	-	-	-	-	-	-
S6A	6X6	+200	4	-	-	-	-	-	-	-	-	-
S6B	6X6	+200	4	-	-	-	-	-	-	-	-	-
S6C	6X6	+200	4	-	-	-	-	-	-	-	-	-

4 Phase
Fully Actuated
Fayetteville Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
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. Install new 2070LX controller in existing cabinet.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



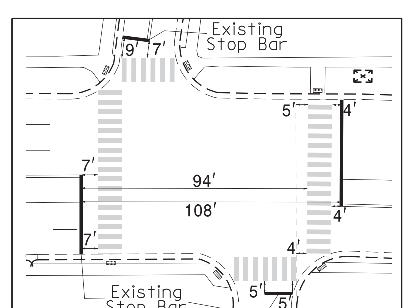
LEGEND

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

MAXTIME TIMING CHART

FEATURE	PHASE 2	3	4	5	6
Walk *	14	13	12	0	12
Ped Clear	8	18	18	0	5
Min Green *	12	7	7	7	12
Passage *	6.0	1.0	1.0	2.0	6.0
Max 1 *	60	25	15	15	60
Yellow Change	4.8	4.1	3.0	3.0	4.8
Red Clear	1.5	2.2	3.2	2.1	1.5
Added Initial *	2.0	–	–	–	2.0
Maximum Initial *	34	–	–	–	34
Time Before Reduction *	15	–	–	–	15
Time To Reduce *	30	–	–	–	30
Minimum Gap	3.0	–	–	–	3.0
Advance Walk	7	6	5	–	5
Non Lock Detector	–	X	X	X	–
Vehicle Recall	MIN 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.



Stop Bar and Crosswalk Locations

Signal Upgrade Corr. File No. 06-23-72736

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

US 401 Bus (Ramsey Street)
at
Langdon St / Colonial Drive

Division 6 Cumberland County Fayetteville

PLAN DATE:	April 2025	REVIEWED BY:	BMH
PREPARED BY:	Jeff Spence	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 047646 ENGINEER BAILEY M. HARDEN

DocuSigned by: Bailey Harden DCEF3411623A425...

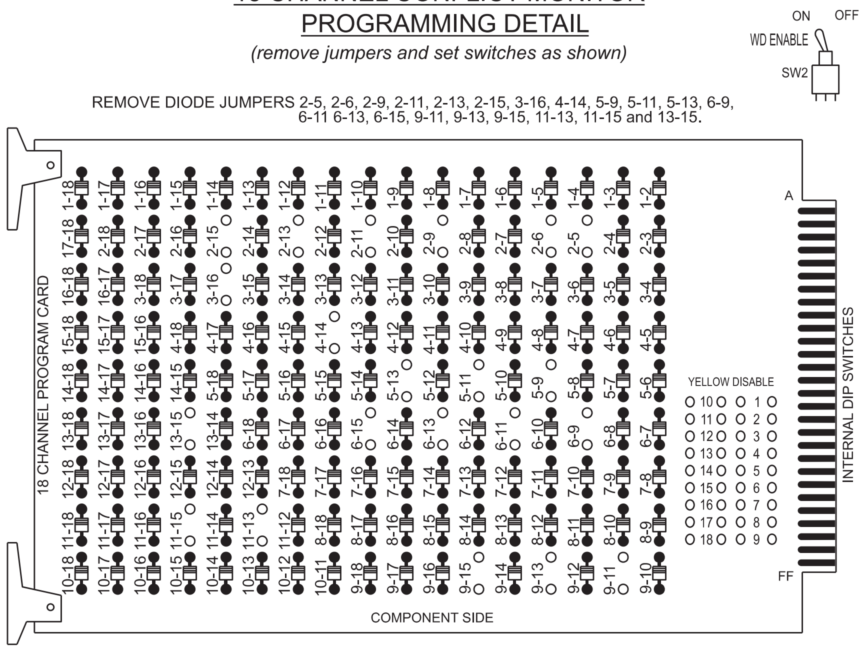
05/30/2025 DATE

SIG. INVENTORY NO. 06-0250

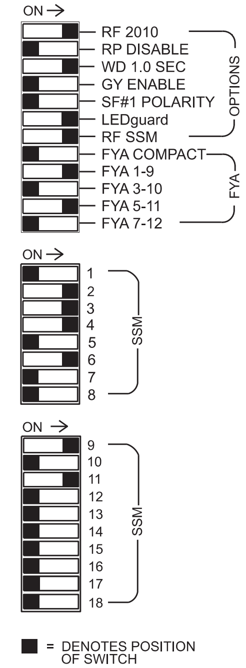
18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 3-16, 4-14, 5-9, 5-11, 5-13, 6-9, 6-11 6-13, 6-15, 9-11, 9-13, 9-15, 11-13, 11-15 and 13-15.



REMOVE JUMPERS AS SHOWN



NOTES:

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

NOTES

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

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software..Q-Free MAXTIME
Cabinet Mount.....................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used...........................S2, S3, S4, S5, S6, S7, S8, S9
S12, AUX S1, AUX S4
Phases Used.......................................2, 2PED, 3, 3PED, 4, 4PED, 5, 6, 6PED
Overlap "1"...*
Overlap "2"...Not Used
Overlap "3"...*
Overlap "4"...Not Used

*See overlap programming detail on sheet 2

PROJECT REFERENCE NO.	SHEET NO.
HS-2406D	Sig. 1.1

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S4	S5	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	3 PED #	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	P21, P22	31	32	41	42	P41, P42	51 ★	62,63 64	P61, P62	NU	NU	P31, P32	61 ★	NU	NU	51 ★	NU	NU
RED		128		116	116	101	101			134										
YELLOW		129		117	117	102	102		*	135										
GREEN		130		118	118	103	103			136										
RED ARROW															A121			A114		
YELLOW ARROW															A122			A115		
FLASHING YELLOW ARROW															A123			A116		
GREEN ARROW				118		103			133											
(Don't Walk symbol)			113					104			119			110						
(Walk symbol)			115					106			121			112						

NU = Not Used

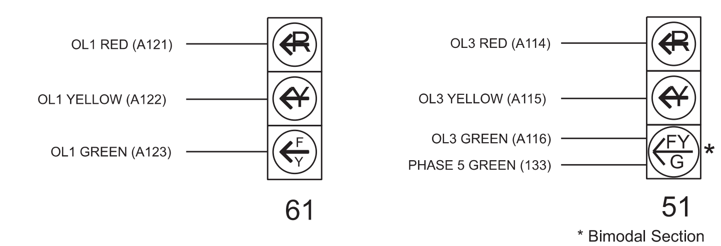
* Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail this sheet.

Loadswitch S12 has been reassigned. See Output Channel Configuration on sheet 2.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



* Bimodal Section

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	SLOT EMPTY	Ø 2 2A,2B	SLOT EMPTY	WIRED INPUT ⊗	Ø 3 3A	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S2A	SLOT EMPTY	SLOT EMPTY	Ø 2 PED DC ISOLATOR	Ø 6 PED DC ISOLATOR	FS DC ISOLATOR
"I"	L		NOT USED			NOT USED	NOT USED			SYS. DET. S2B			Ø 4 PED DC ISOLATOR	Ø 3 PED DC ISOLATOR	ST DC ISOLATOR
"J"	U	Ø 5 5A	Ø 6 6A 6B,6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S6C	SLOT EMPTY	SYS. DET. S6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
"J"	L	NOT USED	Ø 6 6D					NOT USED		SYS. DET. S6B					

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

FS = FLASH SENSE
ST = STOP TIME

Note:
Remove jumper from J1-W to I4-W, on rear of input file.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A,2B	TB2-5,6	I2U	39	1	2	2			X	X	X	
3A	TB4-5,6	I5U	58	20	7	3	5.0		X		X	
4A	TB4-9,10	I6U	41	3	8	4	5.0		X		X	
5A	TB3-1,2	J1U	55	17	15	5	15.0		X		X	
				-	31	2	3.0		X		X	X
6A,6B,6C	TB3-5,6	J2U	40	2	16	6			X	X	X	
6D	TB3-7,8	J2L	44	6	17	6	3.0		X		X	X
*S2A	TB6-9,10	I9U	60	22	13	SYS						
*S2B	TB6-11,12	I9L	62	24	14	SYS						
*S6A	TB7-9,10	J9U	59	21	27	SYS						
*S6B	TB7-11,12	J9L	61	23	28	SYS						
*S6C	TB7-1,2	J7U	66	32	24	SYS						
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P31,P32	TB8-8,9	I13L	70	36	8 #	PED 3						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						

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

*System detector only. Remove any assigned vehicle phase.

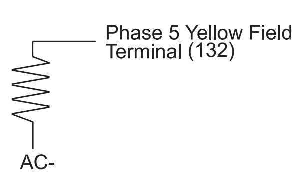
#See Ped Detector Programming Detail on sheet 2.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)



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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0250
DESIGNED: April 2025
SEALED: 05/30/2025
REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 401 Bus (Ramsey Street) at Langdon St / Colonial Drive

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

Division 6 Cumberland County Fayetteville

PLAN DATE: May 2025	REVIEWED BY:
PREPARED BY: Tim Langston	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce
A90CADFDBD4241D...
06/02/2025
DATE

SIG. INVENTORY NO. 06-0250

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	3
Type	FYA 4 - Section	FYA 4 - Section
Included Phases	2	6
Modifier Phases	-	5
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

NOTE: PHASE 3 PED REASSIGNED TO CH. 16 (channel 16)

PED DETECTOR PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Detector Configuration >Pedestrian Detector

Plan 1

Detector	Descripton	Call Phase	Call Overlap
2		2	0
4		4	0
6		6	0
8		3	0

NOTE CALL PHASE (detector 8)

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0250
DESIGNED: April 2025
SEALED: 05/30/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 401 Bus (Ramsey Street)
at
Langdon St / Colonial Drive

Division 6 Cumberland County Fayetteville

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

PLAN DATE: May 2025	REVIEWED BY:
PREPARED BY: Tim Langston	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

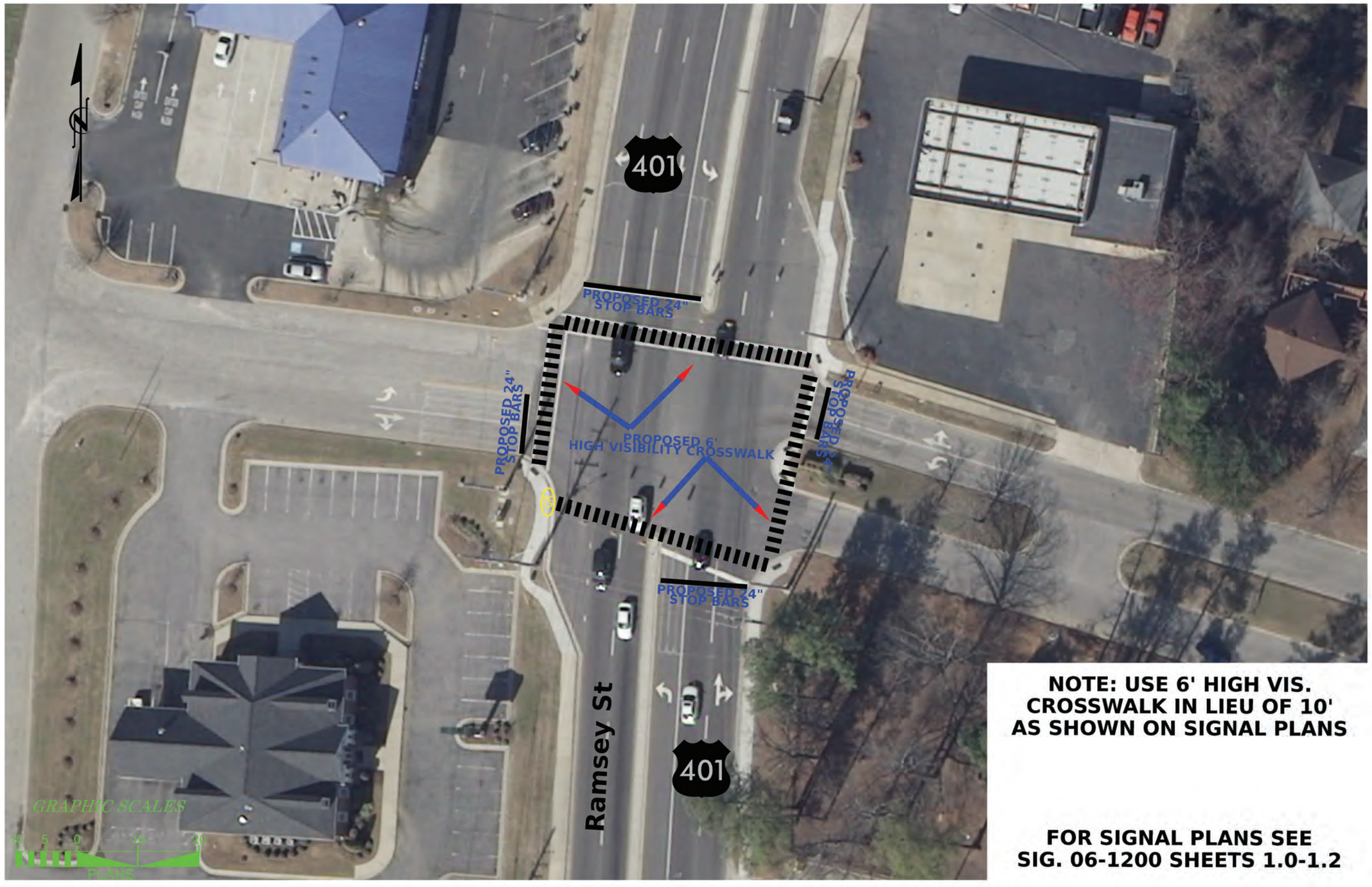
DocuSigned by:
D. Todd Joyce
A90CADFDBD4241D...
06/02/2025
DATE

SIG. INVENTORY NO. 06-0250

11/14/23

HS-2406F

004

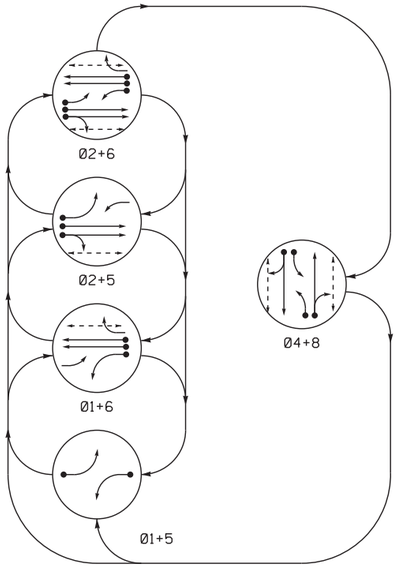


NOTE: USE 6' HIGH VIS. CROSSWALK IN LIEU OF 10' AS SHOWN ON SIGNAL PLANS

FOR SIGNAL PLANS SEE SIG. 06-1200 SHEETS 1.0-1.2

PROJECT REFERENCE NO.	SHEET NO.
HS-2406F	Sig.1.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

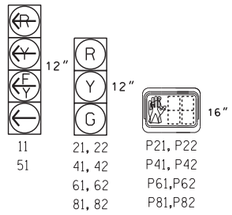
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	←	←	~~F Y~~	~~F Y~~	~~R~~	~~R~~
21,22	R	R	G	G	R	R
41,42	R	R	R	R	G	R
51	←	~~F Y~~	←	~~F Y~~	~~R~~	~~R~~
61,62	R	G	R	G	R	R
81,82	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



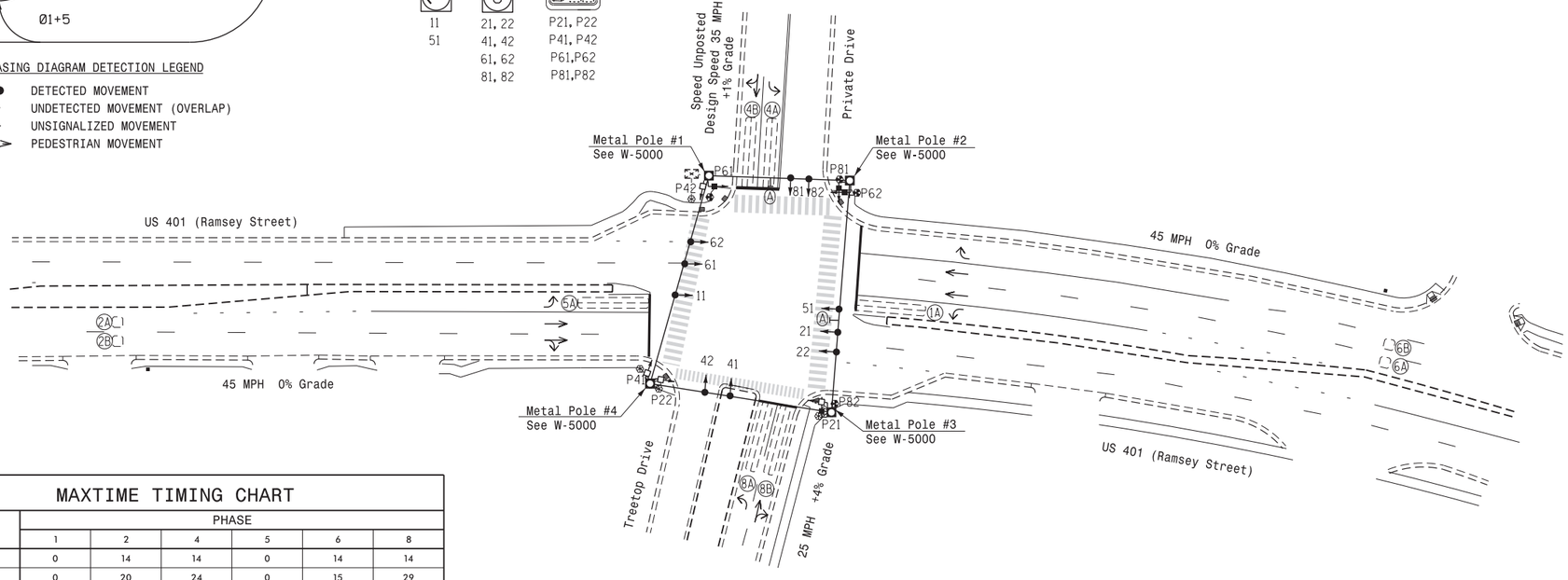
MAXTIME DETECTOR INSTALLATION CHART

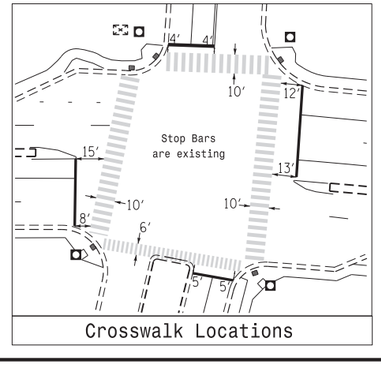
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15	-	X	-	X	-	-
				-	6	3	-	X	-	X	X	-
2A	6X6	300	5	-	2	-	-	X	X	X	-	-
2B	6X6	300	5	-	2	-	-	X	X	X	-	-
4A	6X40	0	2-4-2	-	4	3	-	X	-	X	-	-
4B	6X40	0	2-4-2	-	4	10	-	X	-	X	-	-
5A	6X40	0	2-4-2	-	5	15	-	X	-	X	-	-
				-	2	3	-	X	-	X	X	-
6A	6X6	300	5	-	6	-	-	X	X	X	-	-
6B	6X6	300	5	-	6	-	-	X	X	X	-	-
8A	6X40	+5	2-4-2	-	8	3	-	X	-	X	-	-
8B	6X40	+5	2-4-2	-	8	10	-	X	-	X	-	-

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	0	14	14	0	14	14
Ped Clear	0	20	24	0	15	29
Min Green *	7	12	7	7	12	7
Passage *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	20	90	20	20	90	20
Yellow Change	3.0	4.5	3.8	3.0	4.5	3.8
Red Clear	3.1	1.7	3.0	3.2	1.7	3.0
Added Initial *	–	1.5	–	–	1.5	–
Maximum Initial *	–	34	–	–	34	–
Time Before Reduction *	–	15	–	–	15	–
Time To Reduce *	–	30	–	–	30	–
Minimum Gap	–	3.0	–	–	3.0	–
Advance Walk	–	7	7	–	7	7
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X
Simultaneous Start	–	–	X	–	–	X

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





Crosswalk Locations

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
⊠	Metal Strain Pole	■
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
-·-·-·-	2-in Underground Conduit	-·-·-·-
N/A	Right of Way	———
→	Directional Arrow	→
N/A	Wheelchair Ramp	
Ⓐ	"Street Name" Sign	Ⓐ
⊛	Type I Pushbutton Post	⊛

5 Phase
Fully Actuated
Fayetteville Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
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. Install new 2070LX controller in existing cabinet.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

Signal Upgrade Corr.File No. 06-24-72735

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 401 (Ramsey Street)
at
Treetop Drive/Private Drive

Division 6 Cumberland County Fayetteville

PLAN DATE: April 2025 REVIEWED BY: BMH
PREPARED BY: Jeff Spence REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 047646 ENGINEER BAILEY M. HARDEN

DocuSigned by: Bailey Harden DCEF3411623A425...
05/30/2025
DATE

SIG. INVENTORY NO. 06-1200

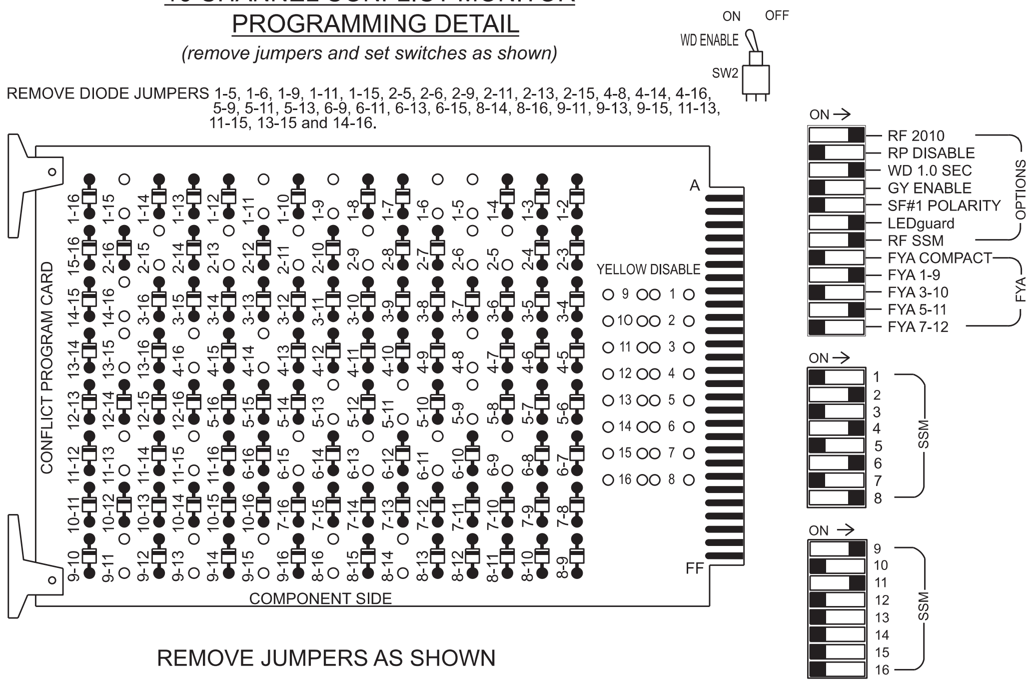
30-MAY-2025 09:48
S:#TISGUM15 Signals#Signal Design Section#Eastern Region#Div-06#06-1200#06120O.sig.dsn_2025mmdd.dgn
bhar den

PROJECT REFERENCE NO.	SHEET NO.
HS-2406F	Sig. 1.1

16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 4-8, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 8-14, 8-16, 9-11, 9-13, 9-15, 11-13, 11-15, 13-15 and 14-16.



REMOVE JUMPERS AS SHOWN

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1, 3, 5, 7, 10, 12, 13, 14, 15 and 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Program phases 4 and 8 for Simultaneous Start.
5. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
6. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
7. The cabinet and controller are part of the Fayetteville Signal System.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used...........................S1, S2, S2P, S4, S4P, S5, S6, S6P, S8, S8P, S9, S12
Phases Used.......................................1, 2, 2PED, 4, 4PED, 5, 6, 6PED, 8, 8PED
Overlap "1"..*
Overlap "2"..Not Used
Overlap "3"..*
Overlap "4"..Not Used

*See overlap programming detail on sheet 2

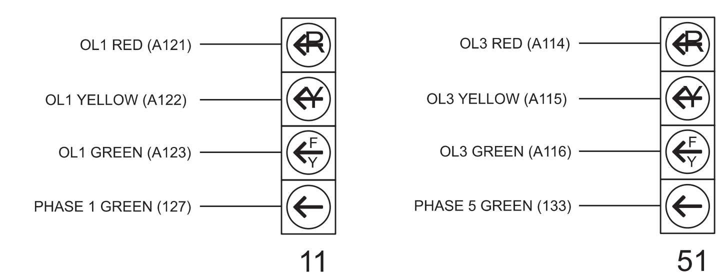
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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.	11★	21,22	P21, P22	NU	41,42	P41, P42	51★	61,62	P61, P62	NU	81,82	P81, P82	11★	NU	NU	51★	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127						133											
(Don't Walk)			113			104			119			110						
(Walk)			115			106			121			112						

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

EX. : 1A, 2A, ETC. = LOOP NO.'S
Note:
Remove jumpers from I1-W to J4-W and J1-W to I4-W, on rear of input file.

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1	1	15.0		X		X	
				-	29	6	3.0		X		X	X
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4	3.0		X		X	
4B	TB4-11,12	I6L	45	7	9	4	10.0		X		X	
5A	TB3-1,2	J1U	55	17	15	5	15.0		X		X	
				-	31	2	3.0		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8	3.0		X		X	
8B	TB7-1,2	J7U	66	32	24	8	10.0		X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

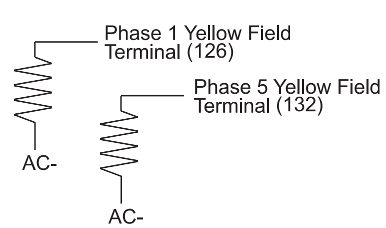
NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1200
DESIGNED: April 2025
SEALED: 05/30/2025
REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 401 (Ramsey Street)
at
Treetop Drive / Private Drive

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

Division 6 Cumberland County Fayetteville

PLAN DATE:	May 2025	REVIEWED BY:	
PREPARED BY:	Tim Langston	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce
A90CADFDBD4241D...
06/02/2025
DATE

SIG. INVENTORY NO. 06-1200

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	3
Type	FYA 4 - Section	FYA 4 - Section
Included Phases	2	6
Modifier Phases	1	5
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1200
DESIGNED: April 2025
SEALED: 05/30/2025
REVISED: N/A

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:

US 401 (Ramsey Street)
at
Treetop Drive / Private Drive

Division 6 Cumberland County Fayetteville

PLAN DATE: May 2025 REVIEWED BY:
PREPARED BY: Tim Langston REVIEWED BY:

REVISIONS	INIT.	DATE

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce
A90CADFDBD4241D...
06/02/2025
DATE

SIG. INVENTORY NO. 06-1200

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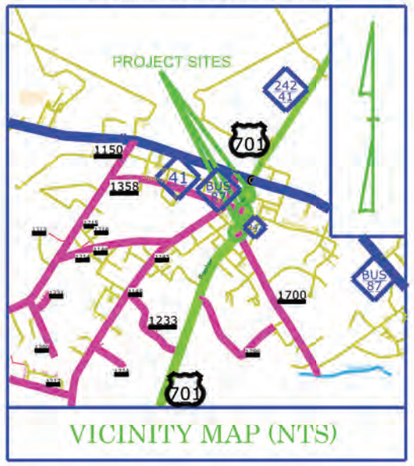
tslangston

01/16/24

TIP PROJECT: HS-2406E

CONTRACT: DF00524

See Sheet 1A For Index of Sheets



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

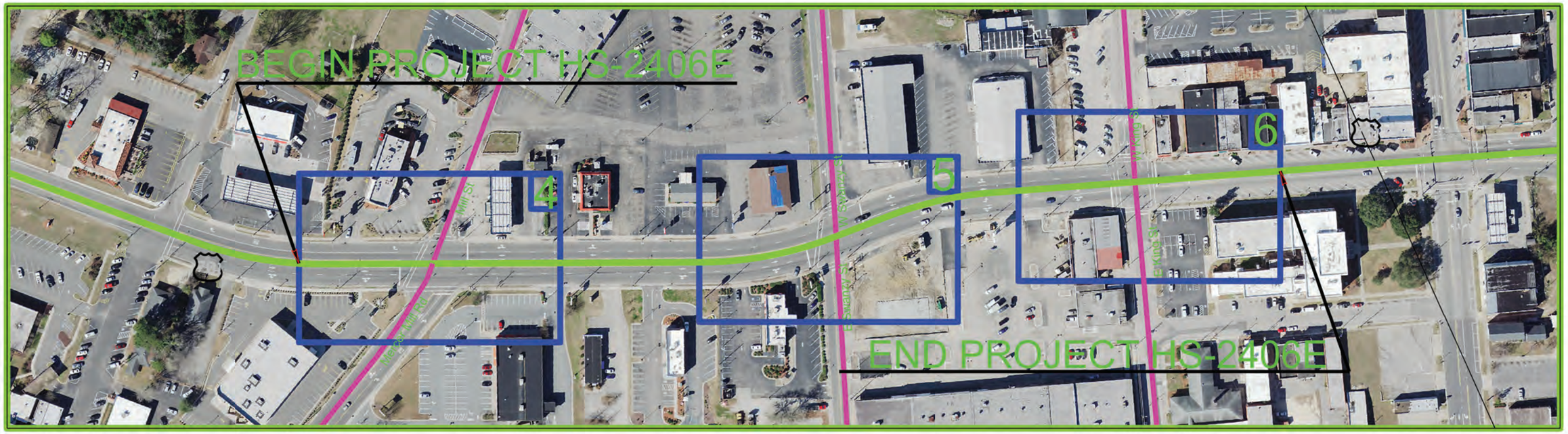
BLADEN COUNTY

LOCATION: *US 701 AT SR1806 (MERCER MILL ROAD),*
US 701 AT SWANZY STREET STREET,
AND US 701 AT KING STREET

TYPE OF WORK: *PEDESTRIAN SIGNAL,*
PAVEMENT MARKING,
AND SIGNAL UPGRADE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2406E	1	

STATE PROJECT NO.	F. A. PROJECT NO.	DESCRIPTION
50978.1.6	5097805	P.E.
50978.3.6	5097805	CON



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT HS-2406E = 0.120 MILES

Prepared in the Office of:
DIVISION OF HIGHWAYS
431 TRANSPORTATION DR., FAYETTEVILLE NC 28301

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
N/A

LETTING DATE:
August 20, 2025

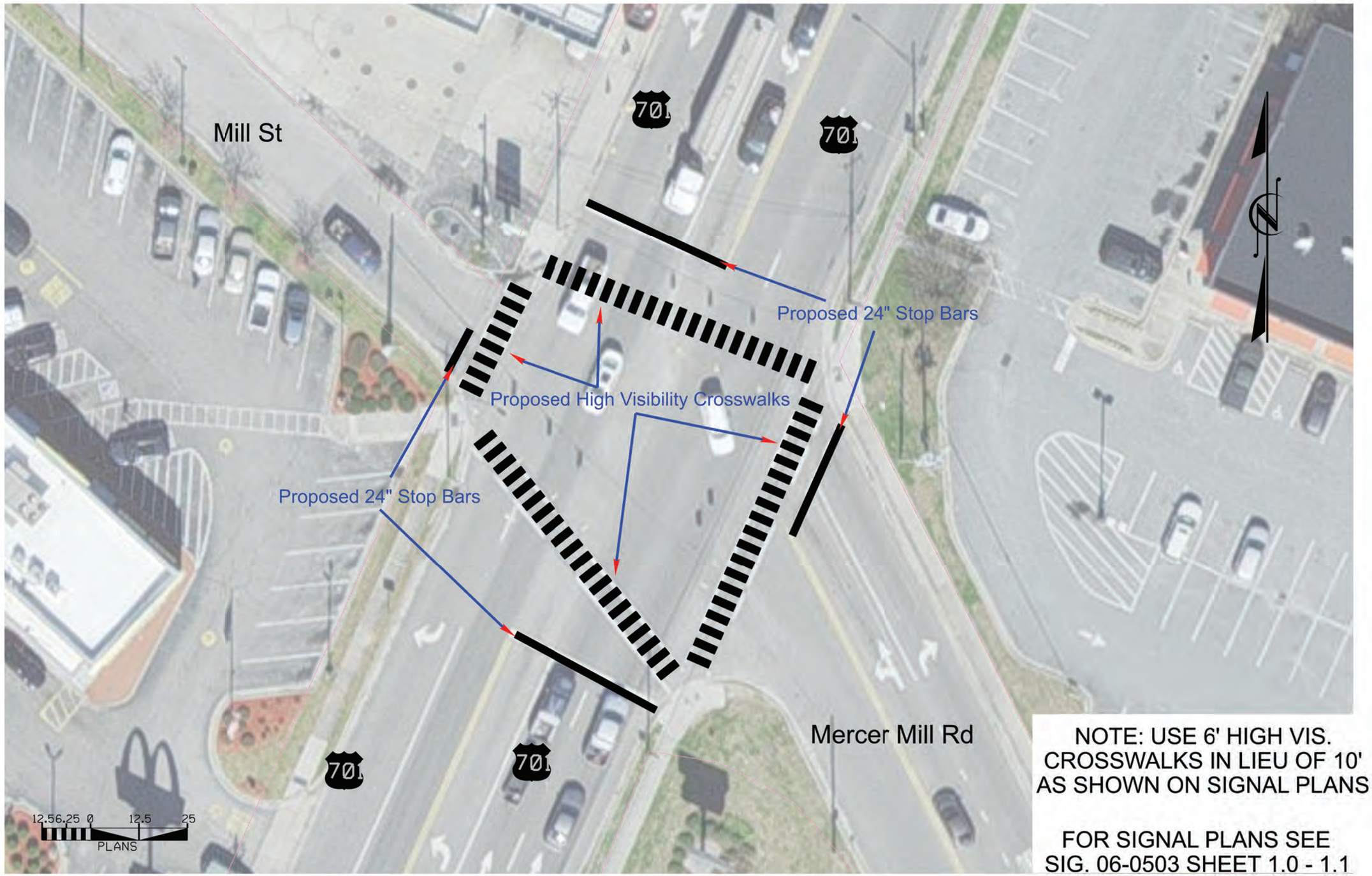
JOHN GAUTHIER
PROJECT ENGINEER

JASON HATFIELD
PROJECT DESIGN ENGINEER

$$$-USER_NAME-$$$ - $$$-DATE-$$$

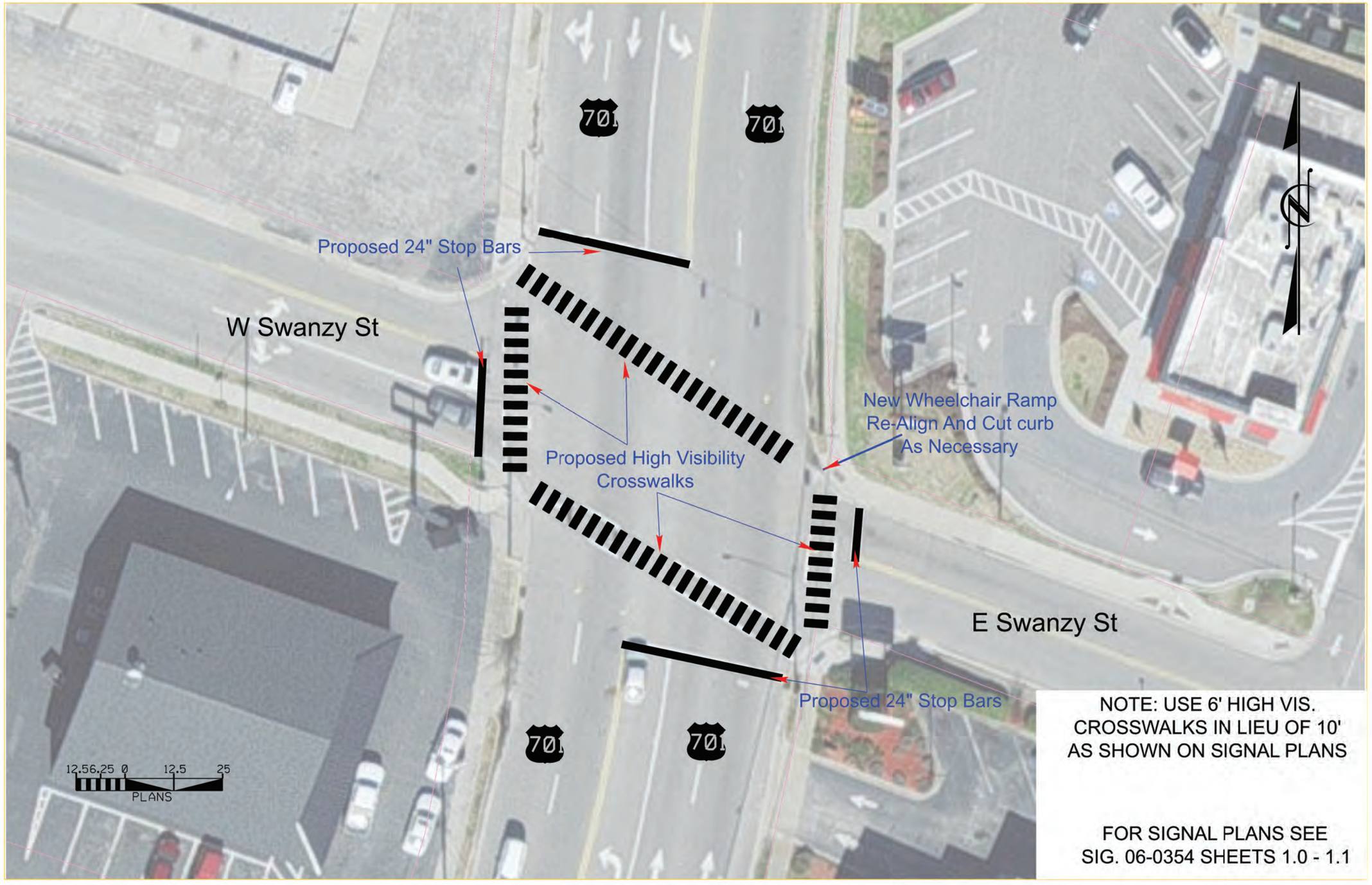
5/26/20

HS-240GE
004



NOTE: USE 6' HIGH VIS. CROSSWALKS IN LIEU OF 10' AS SHOWN ON SIGNAL PLANS

FOR SIGNAL PLANS SEE SIG. 06-0503 SHEET 1.0 - 1.1

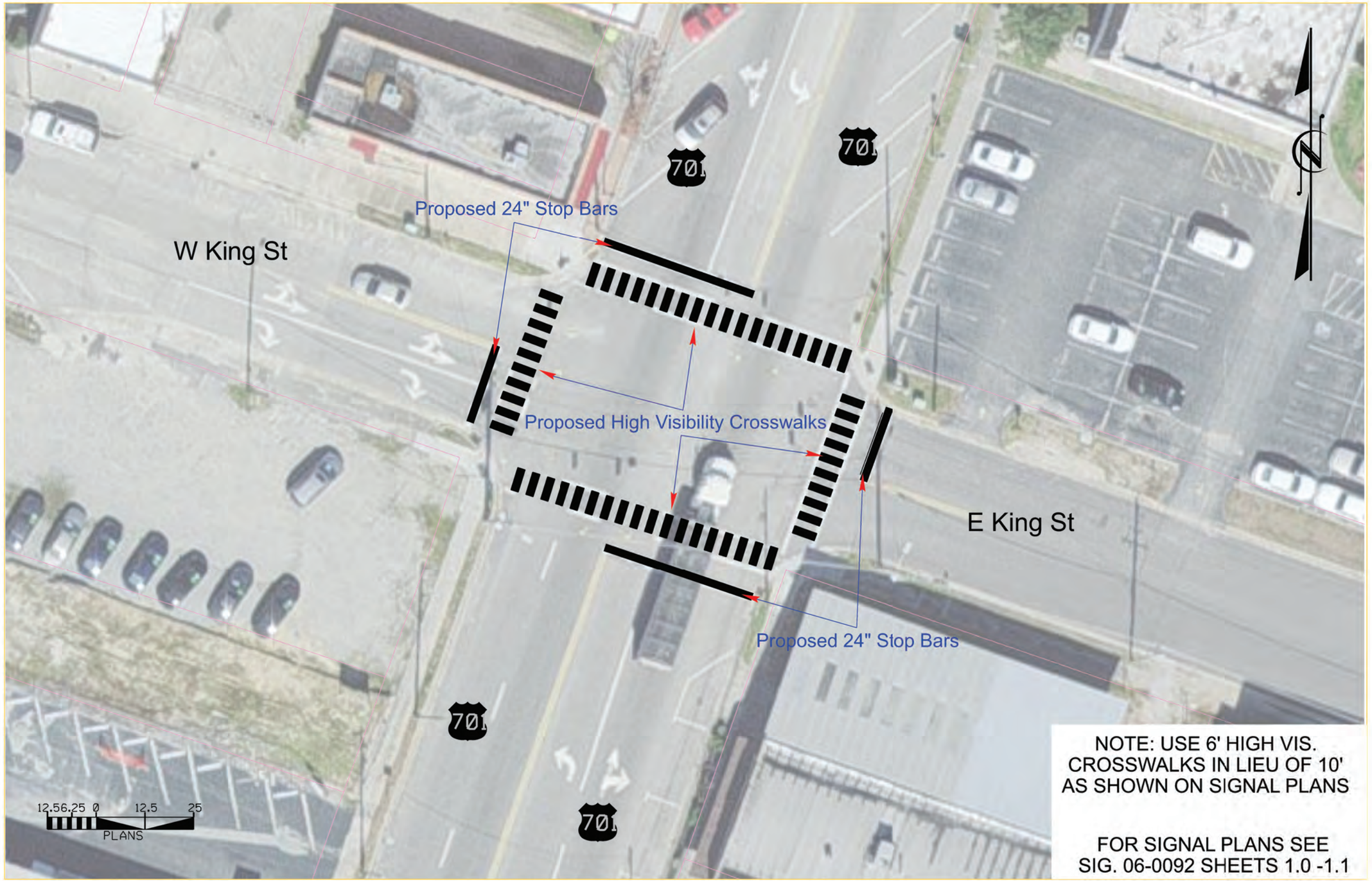


NOTE: USE 6' HIGH VIS. CROSSWALKS IN LIEU OF 10' AS SHOWN ON SIGNAL PLANS

FOR SIGNAL PLANS SEE SIG. 06-0354 SHEETS 1.0 - 1.1

5/26/20

HS-2406E
006

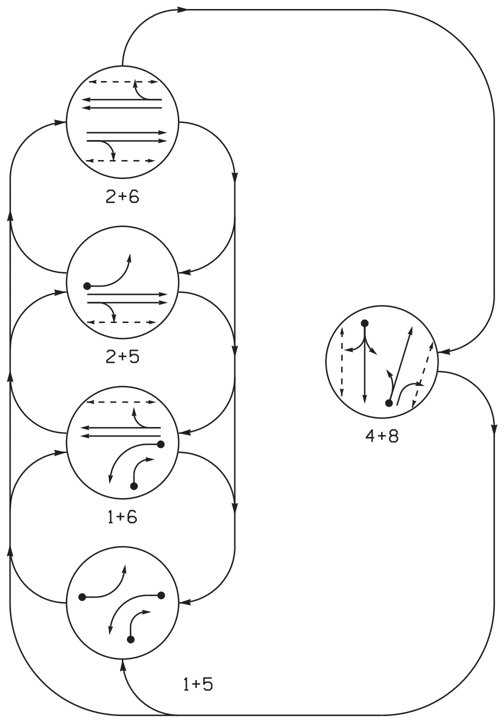


NOTE: USE 6' HIGH VIS. CROSSWALKS IN LIEU OF 10' AS SHOWN ON SIGNAL PLANS

FOR SIGNAL PLANS SEE SIG. 06-0092 SHEETS 1.0 -1.1

PROJECT REFERENCE NO.	SHEET NO.
HS-2406E	Sig. 1.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

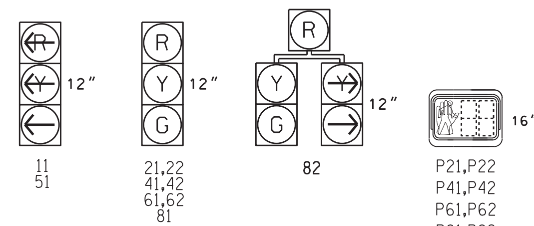
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 1+5	1+6	2+5	2+6	4+8	FLASH
11	←	←	←R	←R	←R	←R
21,22	R	R	G	G	R	R
41,42	R	R	R	R	G	R
51	←	←R	←	←R	←R	←R
61,62	R	G	R	G	R	R
81	R	R	R	R	G	R
82	R/→	R/→	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



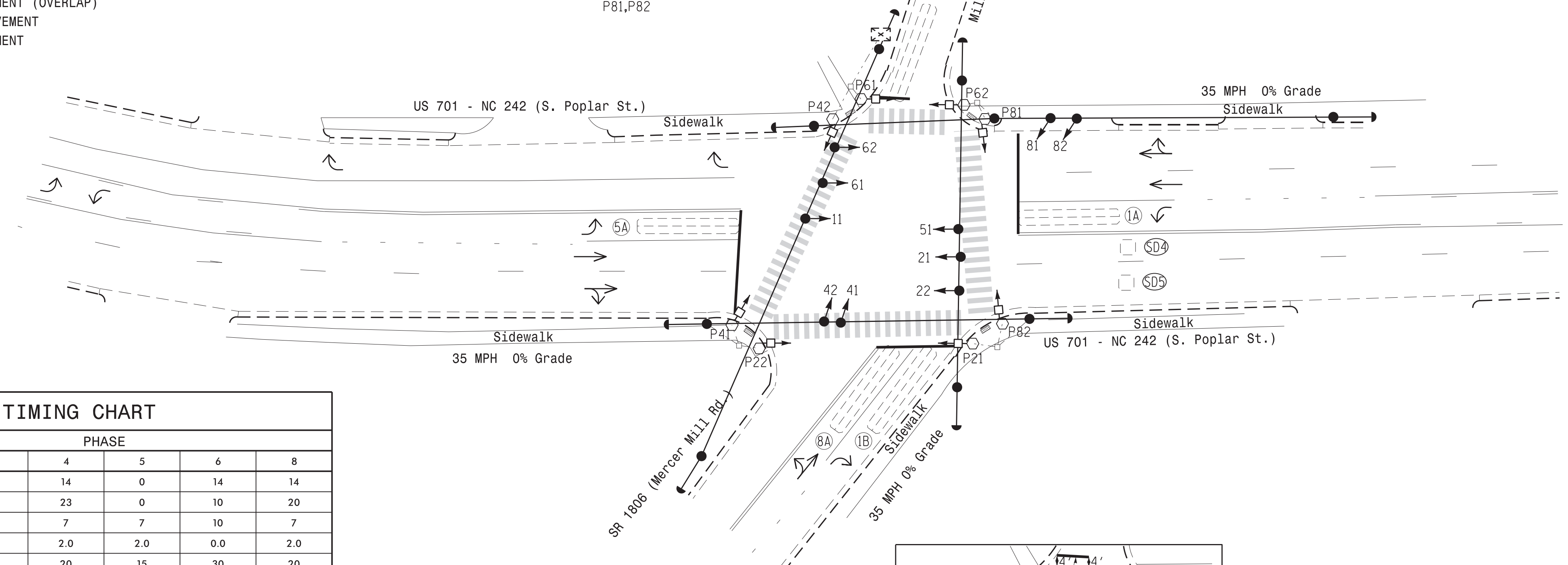
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING: CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	3	-	X	-	X	-	-
1B	6X40	0	2-4-2	-	1	15	-	X	-	X	-	-
4A	6X40	0	2-4-2	-	4	5	-	X	-	X	-	-
5A	6X40	0	2-4-2	-	5	3	-	X	-	X	-	-
8A	6X40	0	2-4-2	-	8	3	-	X	-	X	-	-
SD4	6X6	+150	4	-	-	-	-	-	-	-	-	-
SD5	6X6	+150	4	-	-	-	-	-	-	-	-	-

5 Phase
Semi-Actuated
US 701 & NC 87 Business
D06-07_Elizabethtown

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
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. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



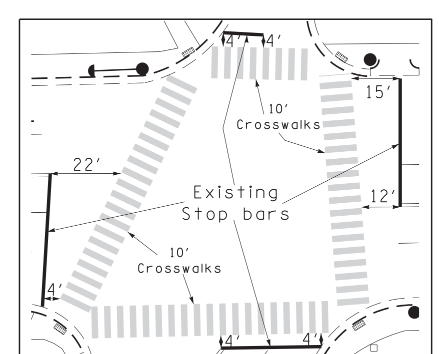
LEGEND

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

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	0	14	14	0	14	14
Ped Clear	0	22	23	0	10	20
Min Green *	7	10	7	7	10	7
Passage *	2.0	0.0	2.0	2.0	0.0	2.0
Max 1 *	20	30	20	15	30	20
Yellow Change	3.0	3.8	3.8	3.0	3.8	3.8
Red Clear	2.3	1.9	1.8	2.8	1.9	1.8
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	7	7	–	7	7
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MAX RECALL	–	–	MAX RECALL	–
Dual Entry	–	–	X	–	–	X
Simultaneous Start	–	–	X	–	–	X

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



Crosswalk Locations

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 701 - NC 242 (Poplar St.) at SR 1805 (Mercer Mill Rd.)/ Mill Street

Division 6 Bladen County Elizabethtown

PLAN DATE:	February 2025	REVIEWED BY:	BMH
PREPARED BY:	Jeff Spence	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE 0 30
1" = 30'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 047646 ENGINEER BAILEY M. HARDEN

DocuSigned by: Bailey Harden
DCEF3411623A425...
04/08/2025
DATE

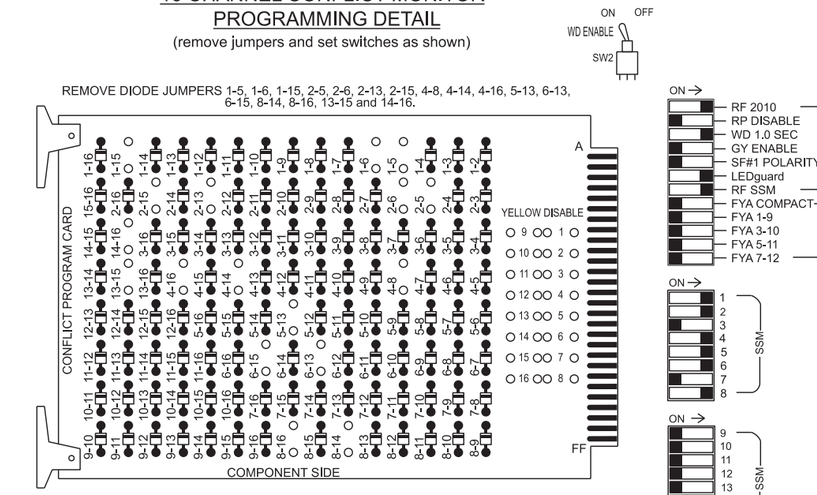
SIG. INVENTORY NO. 06-0503

07-APR-2025 12:03
S:*ITS Signals*Signal Design Section*Eastern Region*Div-06*06-0503*060503_sig_dsn_2025mod.dgn
jrspence

PROJECT REFERENCE NO.	SHEET NO.
HS-2406E	Sig.1.1

16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 8 for Dual Entry and Simultaneous Start.
3. Program controller to start up in phase 2 Green No Walk and 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 D06-17_Elizabethtown System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
CMU CHANNEL NO.	1		2	13	3	4	14	5	6	15	7	8	16
PHASE	1		2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	82	21,22	P21, P22	NU	41,42	P41, P42	51	61,62	P61, P62	NU	81,82	P81, P82
RED			128			101			134			107	
YELLOW			129			102			135			108	
GREEN			130			103			136			109	
RED ARROW	125							131					
YELLOW ARROW	126	126						132					
GREEN ARROW	127	127						133					
✋				113			104			119			110
🚶				115			106			121			112

NU = Not Used

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....336
Software.....Q-Free MAXTIME
Cabinet Mount.....Pole
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S1, S2, S2P, S4, S4P, S5, S6, S6P, S8, S8P
Phases Used.....1, 2, 2PED, 4, 4PED, 5, 6, 6PED, 8, 8PED
Overlap "1".....Not Used
Overlap "2".....Not Used
Overlap "3".....Not Used
Overlap "4".....Not Used

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters	
StartUp Clearance Hold	
6	

Unit Flash Parameters	
All Red Flash Exit Time	
6	

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	Ø 1 1A	SLOT EMPTY	SLOT EMPTY	Ø 4 4A	Ø 5 5A	SLOT EMPTY	SYS. DET. SD4	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 2 PED DC ISOLATOR	Ø 6 PED DC ISOLATOR	FS DC ISOLATOR
L	Ø 1 1B			NOT USED	NOT USED		SYS. DET. SD5	NOT USED				Ø 4 PED DC ISOLATOR	Ø 8 PED DC ISOLATOR	ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB21-1,2	I1U	56	18	1	1	3.0		X		X	
1B	TB23-1,2	I1L	47	9	6	1	15.0		X		X	
4A	TB21-7,8	I4U	41	3	8	4	5.0		X		X	
5A	TB21-9,10	I5U	55	17	15	5	3.0		X		X	
*SD4	TB21-13,14	I7U	57	19	21	SYS						
*SD5	TB23-13,14	I7L	50	12	26	SYS						
8A	TB22-1,2	I8U	42	4	22	8	3.0		X		X	
PED PUSH BUTTONS												
P21,P22	TB22-9,10	I12U	67	33	2	PED 2						
P41,P42	TB24-9,10	I12L	69	35	4	PED 4						
P61,P62	TB22-11,12	I13U	68	34	6	PED 6						
P81,P82	TB24-11,12	I13L	70	36	8	PED 8						

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

*System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0503
DESIGNED: February 2025
SEALED: 04/08/2025
REVISED: N/A

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 701 - NC 242 (Poplar St.) at SR 1805 (Mercer Mill Rd.)/ Mill Street

Division 6 | Bladen County | Elizabethtown

PLAN DATE: March 2025 | REVIEWED BY:

PREPARED BY: Sarah Kirkpatrick | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Engineering Branch
Traffic Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

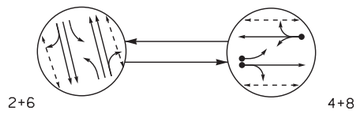
Signed by: Ryan W. Hough 04/09/2025
430320FAA2654C3... DATE

SIG. INVENTORY NO. 06-0503

9-APR-2025 01:20
pw://pwncdot-pw01.bentley.com:ncdot-pw01/Documents/NCDOT TSMD/Signal Design Section/Division_06/06-0503/Signals Management/060503_sm.ale.20250409.dgn
sgkirkpatrick

PROJECT REFERENCE NO.	SHEET NO.
HS-2406E	Sig.1.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION			
SIGNAL FACE	PHASE 2+6	PHASE 4+8	PHASE FLASH
21,22	G	R	R
41,42	R	G	R
61,62	G	R	R
81,82	R	G	R
P21,P22	W	DW	DRK
P41,P42	DW	W	DRK
P61,P62	W	DW	DRK
P81,P82	DW	W	DRK

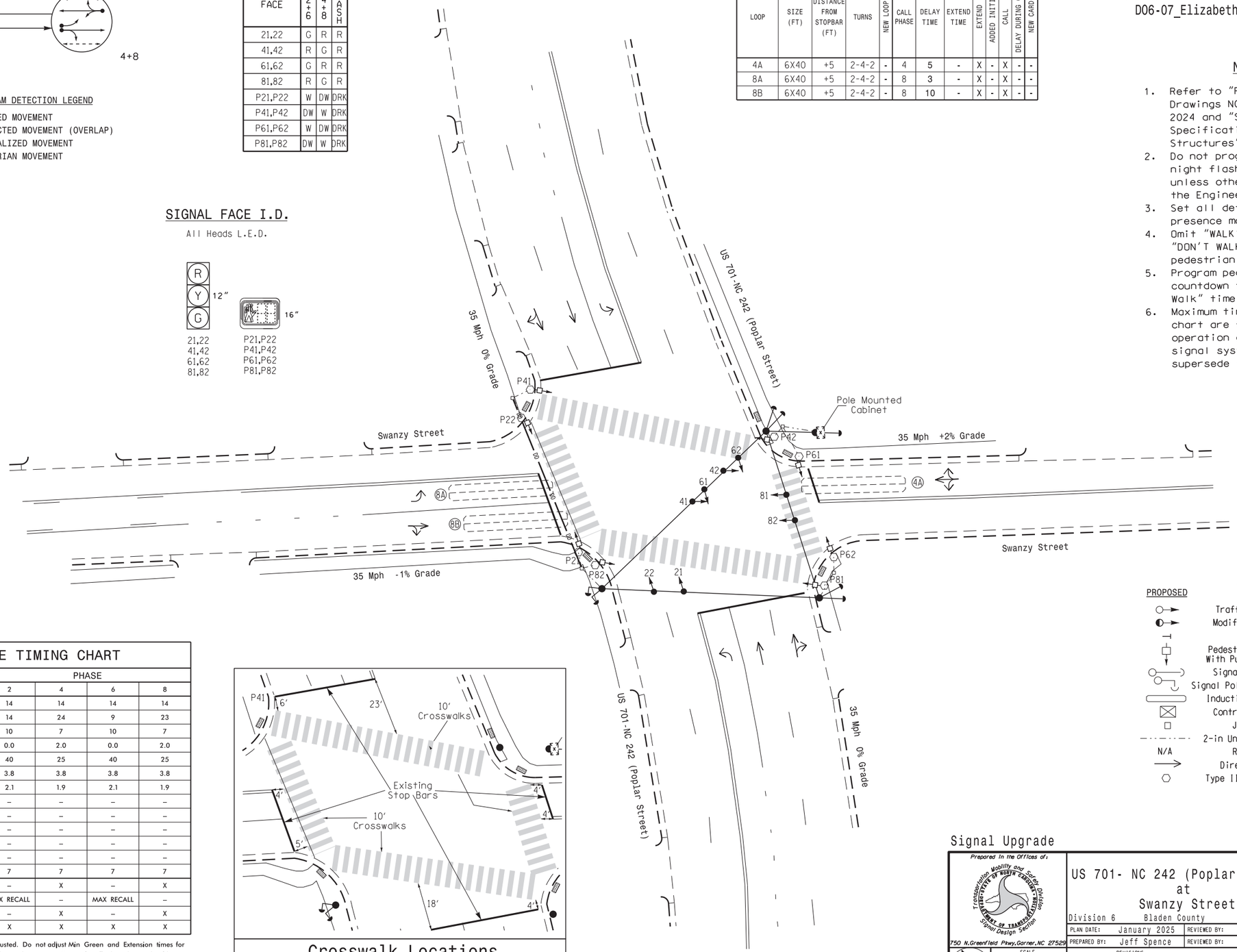
SIGNAL FACE I.D.

All Heads L.E.D.

21,22
41,42
61,62
81,82

P21,P22
P41,P42
P61,P62
P81,P82

MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
4A	6X40	+5	2-4-2	-	4	5	-	X	-	X	-	-
8A	6X40	+5	2-4-2	-	8	3	-	X	-	X	-	-
8B	6X40	+5	2-4-2	-	8	10	-	X	-	X	-	-



LEGEND

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

2 Phase
Semi-Actuated
US 701 & NC 87 Business
D06-07_Elizabethtown

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
5. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

MAXTIME TIMING CHART				
FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Walk *	14	14	14	14
Ped Clear	14	24	9	23
Min Green *	10	7	10	7
Passage *	0.0	2.0	0.0	2.0
Max 1 *	40	25	40	25
Yellow Change	3.8	3.8	3.8	3.8
Red Clear	2.1	1.9	2.1	1.9
Added Initial *	–	–	–	–
Maximum Initial *	–	–	–	–
Time Before Reduction *	–	–	–	–
Time To Reduce *	–	–	–	–
Minimum Gap	–	–	–	–
Advance Walk	7	7	7	7
Non Lock Detector	–	X	–	X
Vehicle Recall	MAX RECALL	–	MAX RECALL	–
Dual Entry	–	X	–	X
Simultaneous Start	X	X	X	X

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

Crosswalk Locations

Signal Upgrade

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

US 701- NC 242 (Poplar Street)
at
Swanzy Street

Division 6 Bladen County Elizabethtown

PLAN DATE:	January 2025	REVIEWED BY:	BMH
PREPARED BY:	Jeff Spence	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE 0 20 1"=20'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 047646 ENGINEER BAILEY M. HARDEN

DocuSigned by: Bailey Harden DCEF5411B234425...
04/09/2025
DATE

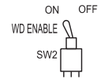
SIG. INVENTORY NO. 06-0354

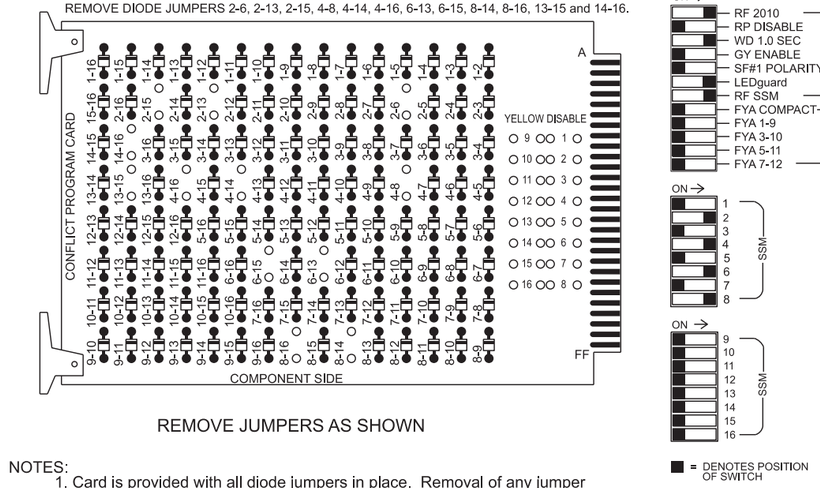
08-APR-2025 14:31
S:\Traffic\Signals\Signal Design Section\Eastern Region\Div-06\06-0354\06035 4_sig_dsn_2025mmdd.dgn
jrspence

PROJECT REFERENCE NO.	SHEET NO.
HS-2406E	Sig.1.1

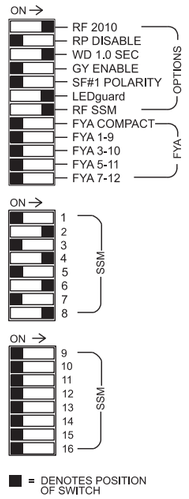
16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)





REMOVE JUMPERS AS SHOWN



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

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
4A	TB21-7,8	I4U	41	3	8	4	5.0		X		X	
8A	TB22-1,2	I8U	42	4	22	8	3.0		X		X	
8B	TB24-1,2	I8L	46	8	23	8	10.0		X		X	
PED PUSH BUTTONS												
P21,P22	TB22-9,10	I12U	67	33	2	PED 2						
P41,P42	TB24-9,10	I12L	69	35	4	PED 4						
P61,P62	TB22-11,12	I13U	68	34	6	PED 6						
P81,P82	TB24-11,12	I13L	70	36	8	PED 8						

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

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program phases 2, 4, 6 and 8 for Simultaneous Start.
4. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the D06-07_Elizabethtown System.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....336
Software.....Q-Free MAXTIME
Cabinet Mount.....Pole
Output File Positions.....12
Load Switches Used.....S2, S2P, S4, S4P, S6, S6P, S8, S8P
Phases Used.....2, 2PED, 4, 4PED, 6, 6PED, 8, 8PED
Overlap "1".....Not Used
Overlap "2".....Not Used
Overlap "3".....Not Used
Overlap "4".....Not Used

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
FLASHING YELLOW ARROW												
GREEN ARROW												
✋			113			104			119			110
🚶			115			106			121			112

NU = Not Used

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

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

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0354
DESIGNED: January 2025
SEALED: 04/09/2025
REVISED: N/A

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 701-NC 242 (S. Popular Street) at Swanzy Street

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Traffic Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

Division 6 | Bladen County | Elizabethtown

PLAN DATE: March 2025 | REVIEWED BY:

PREPARED BY: Sarah Kirkpatrick | REVIEWED BY:

REVISIONS	INIT.	DATE

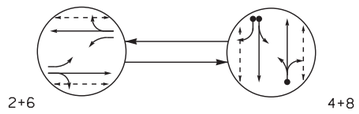
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

Signed by: Ryan W. Hough 04/09/2025
430320FAA2654C3... DATE

SIG. INVENTORY NO. 06-0354

PROJECT REFERENCE NO.	SHEET NO.
	Sig.1.0

PHASING DIAGRAM



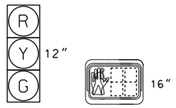
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION			
SIGNAL FACE	PHASE 2+6	PHASE 4+8	PHASE FLASH
21,22	G	R	R
41,42	R	G	R
61,62	G	R	R
81,82	R	G	R
P21,P22	W	DW	DRK
P41,P42	DW	W	DRK
P61,P62	W	DW	DRK
P81,P82	DW	W	DRK

SIGNAL FACE I.D.

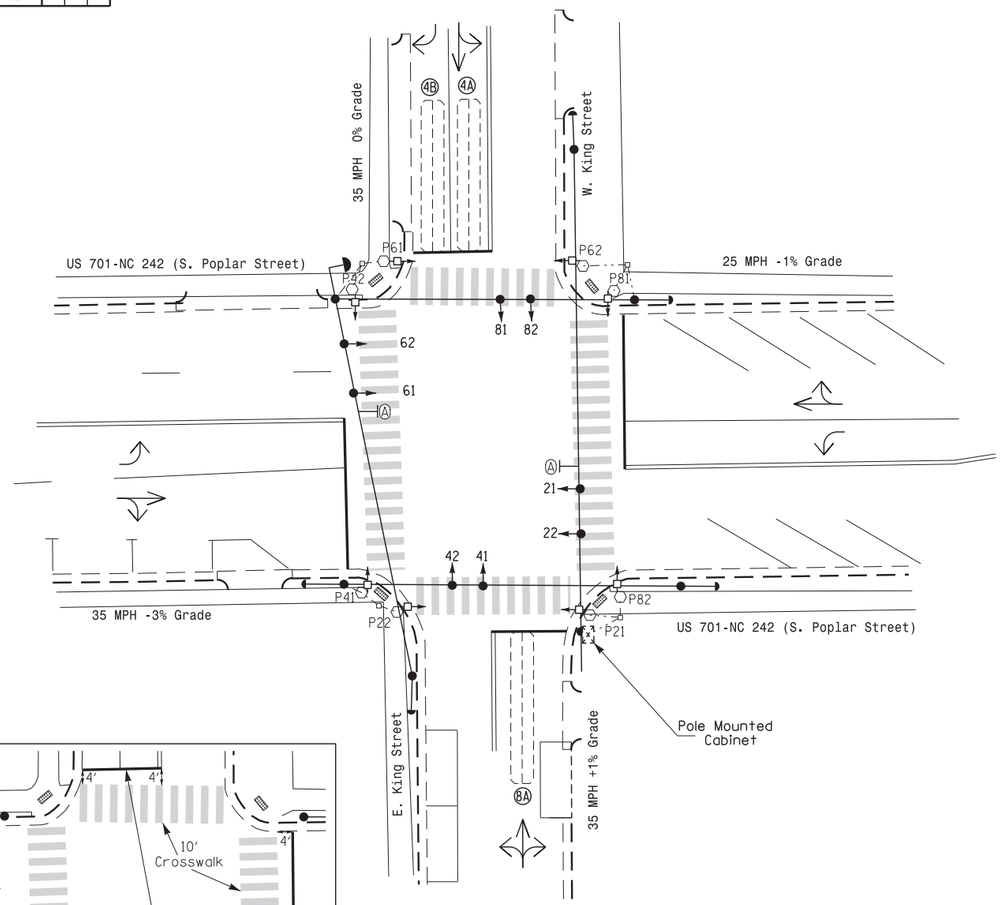
All Heads L.E.D.



21,22
41,42
61,62
81,82

P21,P22
P41,P42
P61,P62
P81,P82

MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
4A	6X40	0	2-4-2	-	4	3	-	X	-	X	-	-
4B	6X40	0	2-4-2	-	4	15	-	X	-	X	-	-
8A	6X40	0	2-4-2	-	8	5	-	X	-	X	-	-



2 Phase
Semi-Actuated
US 701 & NC 87 Business
D06-07_Elizabethtown

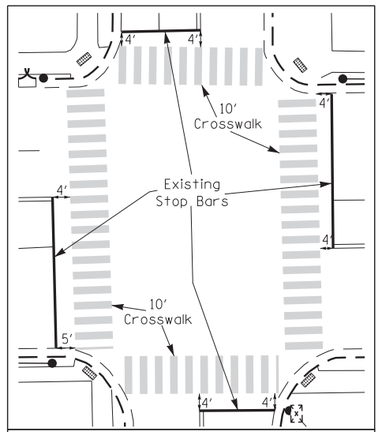
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
5. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Walk *	14	14	13	14
Ped Clear	12	19	11	19
Min Green *	10	7	10	7
Passage *	0.0	2.0	0.0	2.0
Max 1 *	35	20	35	20
Yellow Change	4.1	3.8	4.1	3.8
Red Clear	1.7	1.8	1.7	1.8
Added Initial *	–	–	–	–
Maximum Initial *	–	–	–	–
Time Before Reduction *	–	–	–	–
Time To Reduce *	–	–	–	–
Minimum Gap	–	–	–	–
Advance Walk	7	7	6	7
Non Lock Detector	–	X	–	X
Vehicle Recall	MAX RECALL	–	MAX RECALL	–
Dual Entry	–	X	–	X
Simultaneous Start	X	X	X	X

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



Crosswalk Locations

LEGEND

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

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 701-NC 242 (S. Poplar Street)
at
W. King Street / E. King Street

Division 6 | Bladen County | Elizabethtown

PLAN DATE: January 2025 | REVIEWED BY: BMH
PREPARED BY: Jeff Spence | REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 20 1" = 20'

NORTH CAROLINA PROFESSIONAL SEAL 047646 ENGINEER BAILEY M. HARDEN

DocuSigned by: Bailey Harden 04/22/2025
DCEF3411623A425...

SIG. INVENTORY NO. 06-0092

22-APR-2025 14:21
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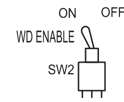
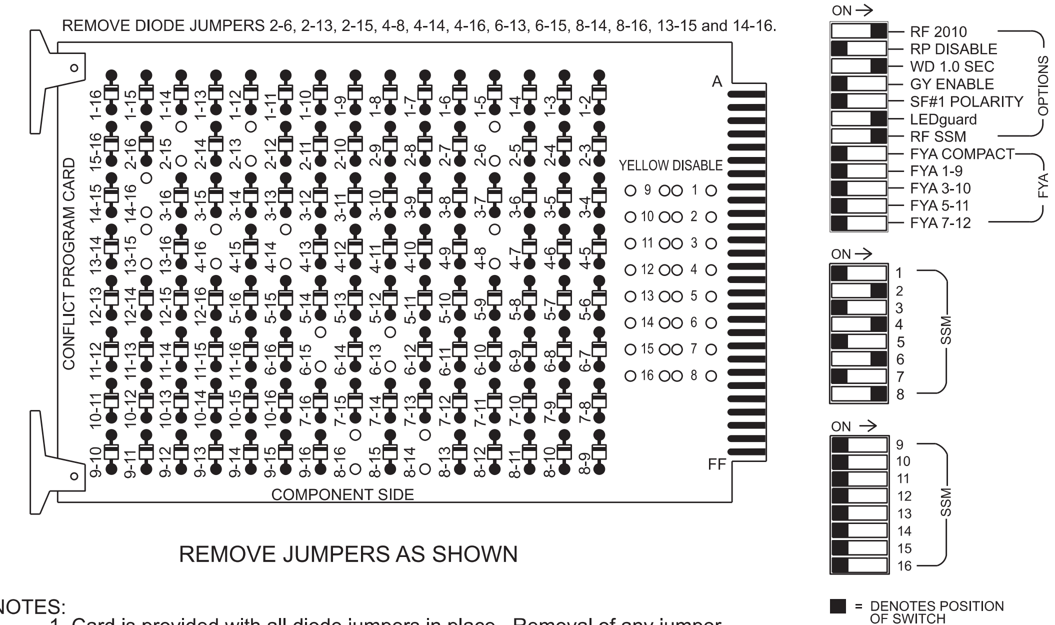
jrspence

PROJECT REFERENCE NO.	SHEET NO.
	Sig.1.1

16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)





REMOVE JUMPERS AS SHOWN

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program phases 2, 4, 6 and 8 for Simultaneous Start.
4. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the D06-07_Elizabethtown System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
FLASHING YELLOW ARROW												
GREEN ARROW												
(Don't Walk hand)			113			104			119			110
(Walk person)			115			106			121			112

NU = Not Used

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...336
Software...Q-Free MAXTIME
Cabinet Mount....................................Pole
Output File Positions..........................12
Load Switches Used...........................S2, S2P, S4, S4P, S6, S6P, S8, S8P
Phases Used.......................................2, 2PED, 4, 4PED, 6, 6PED, 8, 8PED
Overlap "1"..Not Used
Overlap "2"..Not Used
Overlap "3"..Not Used
Overlap "4"..Not Used

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"

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

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

FS = FLASH SENSE
ST = STOP TIME

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

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

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
4A	TB21-7,8	I4U	41	3	8	4	3.0		X		X	
4B	TB23-7,8	I4L	45	7	9	4	15.0		X		X	
8A	TB22-1,2	I8U	42	4	22	8	5.0		X		X	
PED PUSH BUTTONS												
P21,P22	TB22-9,10	I12U	67	33	2	PED 2						
P41,P42	TB24-9,10	I12L	69	35	4	PED 4						
P61,P62	TB22-11,12	I13U	68	34	6	PED 6						
P81,P82	TB24-11,12	I13L	70	36	8	PED 8						

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0092
DESIGNED: January 2025
SEALED: 04/22/2025
REVISED: N/A

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 701-NC 242 (S. Popular Street)
at
W. King Street / E. King Street

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

Division 6 Bladen County Elizabethtown

PLAN DATE: March 2025	REVIEWED BY:
PREPARED BY: Sarah Kirkpatrick	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

Signed by:
Ryan W. Hough
430320FAA2654C3...
04/23/2025
DATE

SIG. INVENTORY NO. 06-0092

01/15/24

TIP PROJECT: HS-2406O

CONTRACT: DF00524

VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

LOCATION: *US 401 (SKIBO ROAD) AT SR 1400 (CLIFFDALE ROAD).*

TYPE OF WORK: *REVISE TRAFFIC SIGNAL, AND INSTALL CROSSWALKS, AND PEDESTRIAN SIGNAL HEADS.*

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2406O	1	

STATE PROJECT NO.	F. A. PROJ. NO.	DESCRIPTION
50978.1.16	5097815	P.E.
50978.3.16	5097815	CON.

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

Prepared in the Office of:
DIVISION OF HIGHWAYS
431 Transportation Dr., Fayetteville, NC 28306

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: N/A

LETTING DATE: August 20, 2025

John B. Gauthier
PROJECT ENGINEER

Nathaniel R Mills
PROJECT DESIGN ENGINEER

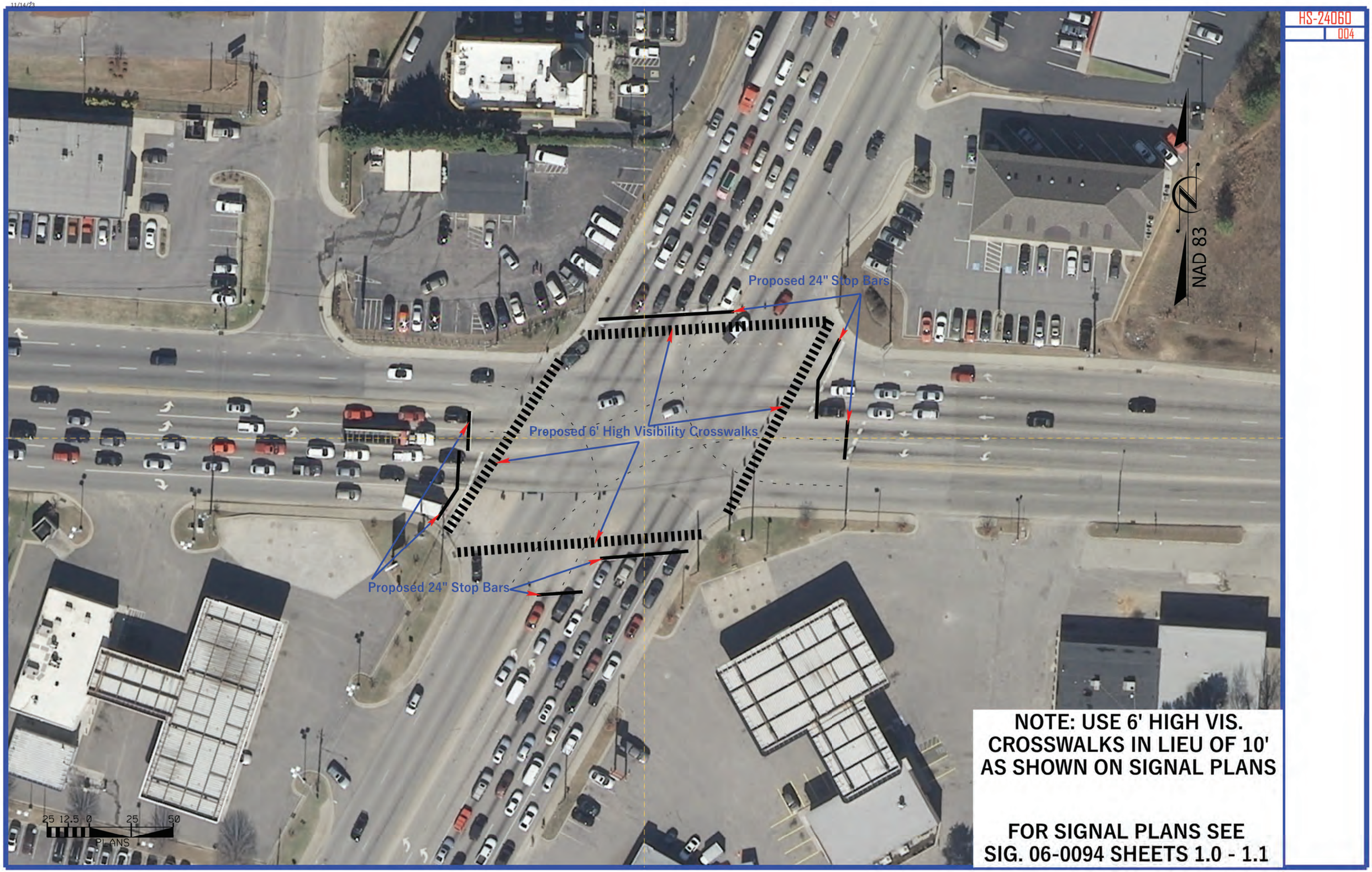
NCDOT CONTACT

$$$-USER NAME-$$$ - $$$-DATE-$$$

11/14/23

HS-24060

004



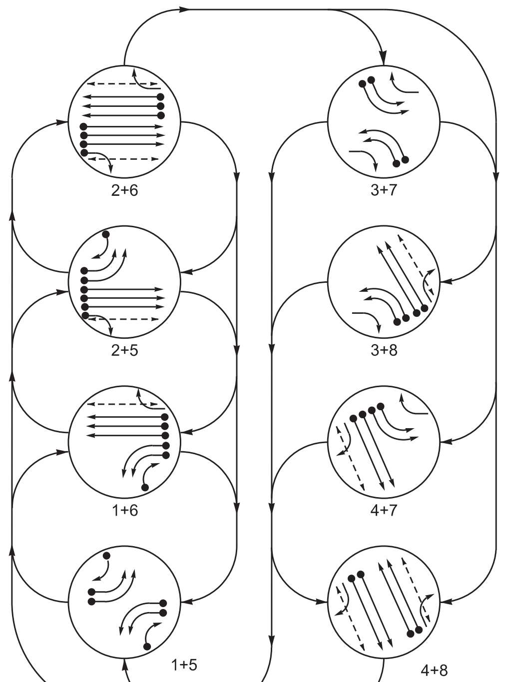
NOTE: USE 6' HIGH VIS. CROSSWALKS IN LIEU OF 10' AS SHOWN ON SIGNAL PLANS

FOR SIGNAL PLANS SEE SIG. 06-0094 SHEETS 1.0 - 1.1

PROJECT REFERENCE NO.	SHEET NO.
HS-2406O	Sig. 1.0

8 Phase
Fully Actuated
Fayetteville Signal System

PHASING DIAGRAM

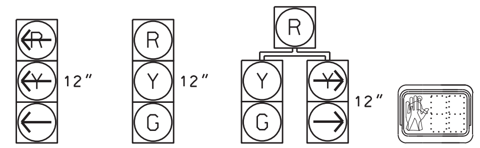


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



11, 12 31, 32, 33 51, 52 71, 72, 73	21, 22 41 61, 62 81	23 42 63 82	P21,P22 P41,P42 P61,P62 P81,P82

TABLE OF OPERATION

SIGNAL FACE	PHASE 1+5	1+6	2+5	2+6	3+7	3+8	4+7	4+8	FLASH
11,12	←	←	←R	←R	←R	←R	←R	←R	←R
21,22	R	R	G	G	R	R	R	R	R
23	R	R	G	G	R/→	R/→	R	R	R
31,32,33	←R	←R	←R	←R	←	←	←R	←R	←R
41	R	R	R	R	R	R	G	G	R
42	R/→	R	R/→	R	R	R	G	G	R
51,52	←	←R	←	←R	←R	←R	←R	←R	←R
61,62	R	G	R	G	R	R	R	R	R
63	R	G	R	G	R/→	R	R/→	R	R
71,72,73	←R	←R	←R	←R	←	←R	←	←R	←R
81	R	R	R	R	R	G	R	G	R
82	R/→	R/→	R	R	R	G	R	G	R
P21,P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41,P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81,P82	DW	DW	DW	DW	DW	W	DW	W	DRK

MAXTIME DETECTOR INSTALLATION CHART

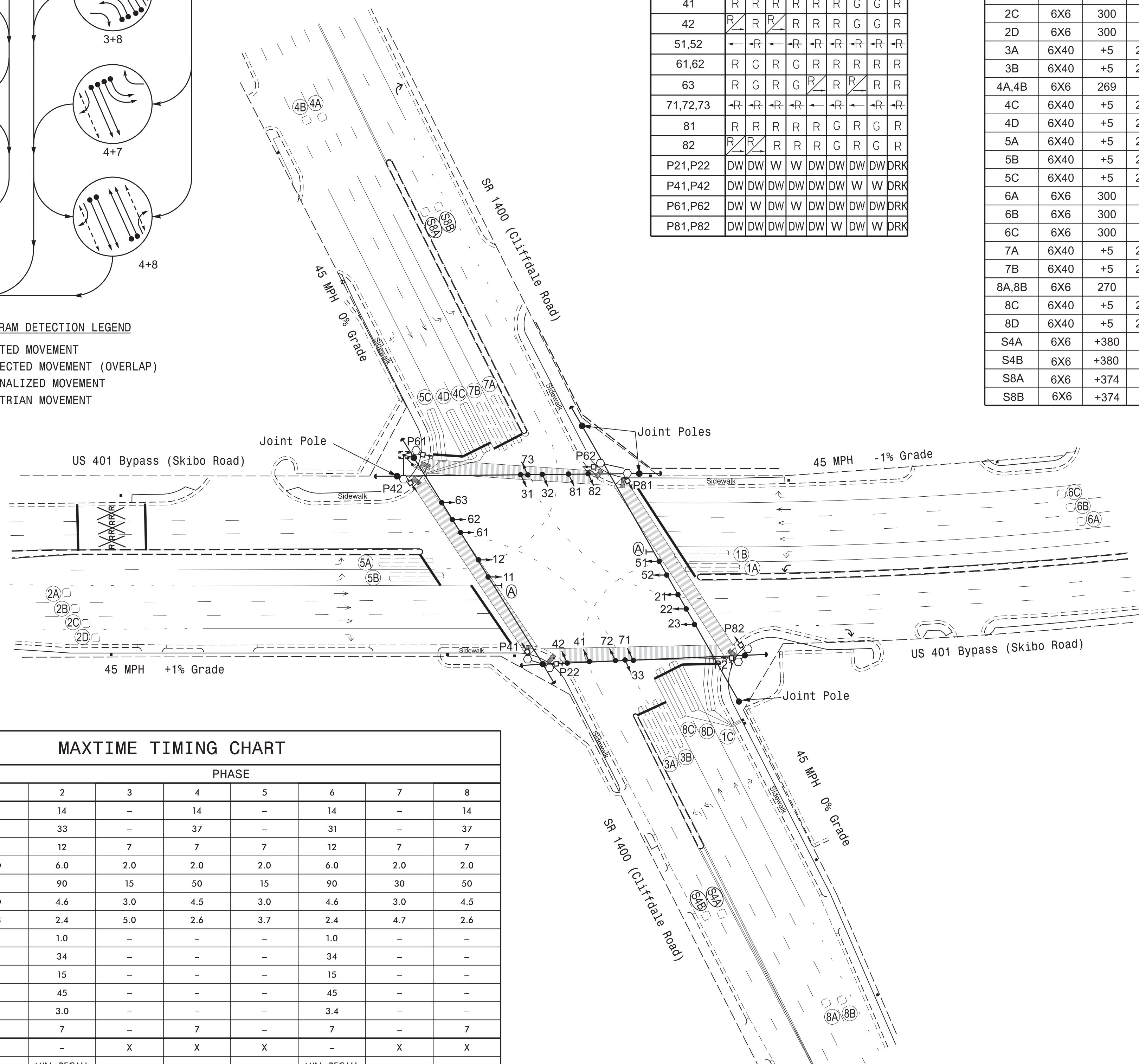
DETECTOR: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING: CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	+5	2-4-2	-	1	-	-	X	-	X	-	-
1B	6X40	+5	2-4-2	-	1	-	-	X	-	X	-	-
1C	6X40	+5	2-4-2	X	1	20	-	X	-	X	-	-
2A	6X6	300	4	-	2	-	-	X	X	X	-	-
2B	6X6	300	4	-	2	-	-	X	X	X	-	-
2C	6X6	300	4	-	2	-	-	X	X	X	-	-
2D	6X6	300	4	-	2	-	-	X	X	X	-	-
3A	6X40	+5	2-4-2	-	3	-	-	X	-	X	-	-
3B	6X40	+5	2-4-2	-	3	-	-	X	-	X	-	-
4A,4B	6X6	269	4	-	4	-	2.0	X	-	-	-	-
4C	6X40	+5	2-4-2	X	4	-	-	X	-	X	-	-
4D	6X40	+5	2-4-2	X	4	-	-	X	-	X	-	-
5A	6X40	+5	2-4-2	-	5	-	-	X	-	X	-	-
5B	6X40	+5	2-4-2	-	5	-	-	X	-	X	-	-
5C	6X40	+5	2-4-2	X	5	20	-	X	-	X	-	-
6A	6X6	300	4	-	6	-	-	X	X	X	-	-
6B	6X6	300	4	-	6	-	-	X	X	X	-	-
6C	6X6	300	4	-	6	-	-	X	X	X	-	-
7A	6X40	+5	2-4-2	-	7	-	-	X	-	X	-	-
7B	6X40	+5	2-4-2	-	7	-	-	X	-	X	-	-
8A,8B	6X6	270	4	-	8	-	2.0	X	-	-	-	-
8C	6X40	+5	2-4-2	X	8	-	-	X	-	X	-	-
8D	6X40	+5	2-4-2	X	8	-	-	X	-	X	-	-
S4A	6X6	+380	4	-	-	-	-	-	-	-	-	-
S4B	6X6	+380	4	-	-	-	-	-	-	-	-	-
S8A	6X6	+374	4	-	-	-	-	-	-	-	-	-
S8B	6X6	+374	4	-	-	-	-	-	-	-	-	-

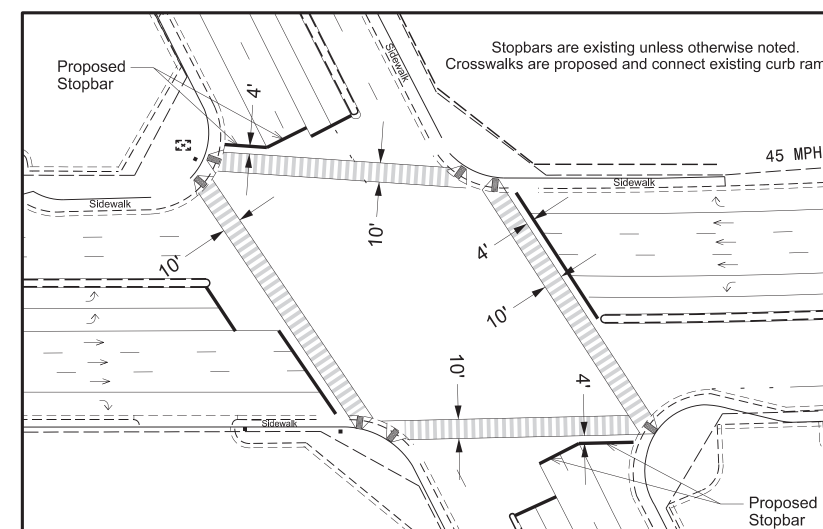
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Install new 2070LX controller in existing cabinet.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
X-UC	2-in Underground Conduit	UC
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
	Type II Signal Pedestal	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ





Proposed Stopbar and Crosswalk Inset

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Walk *	–	14	–	14	–	14	–	14
Ped Clear *	–	33	–	37	–	31	–	37
Min Green	7	12	7	7	7	12	7	7
Passage *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max 1 *	20	90	15	50	15	90	30	50
Yellow Change	3.0	4.6	3.0	4.5	3.0	4.6	3.0	4.5
Red Clear	3.3	2.4	5.0	2.6	3.7	2.4	4.7	2.6
Added Initial *	–	1.0	–	–	–	1.0	–	–
Maximum Initial *	–	34	–	–	–	34	–	–
Time Before Reduction *	–	15	–	–	–	15	–	–
Time To Reduce *	–	45	–	–	–	45	–	–
Minimum Gap	–	3.0	–	–	–	3.4	–	–
Advance Walk	–	7	–	7	–	7	–	7
Non Lock Detector	X	–	X	X	X	–	X	X
Vehicle Recall	–	MIN 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.

Signal Upgrade - Corr. File No. 06-24-001

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 401 (Skibo Road) at SR 1400 (Cliffdale Road)

Division 6 Cumberland County Fayetteville

PLAN DATE:	May 2025	REVIEWED BY:	BHM
PREPARED BY:	KGP, Jr.	REVIEWED BY:	

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

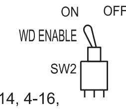
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 047646 ENGINEER BAILEY M. HARDEN

DocuSigned by: Bailey Harden 06/13/2025 DATE
DCEF3411623A425...

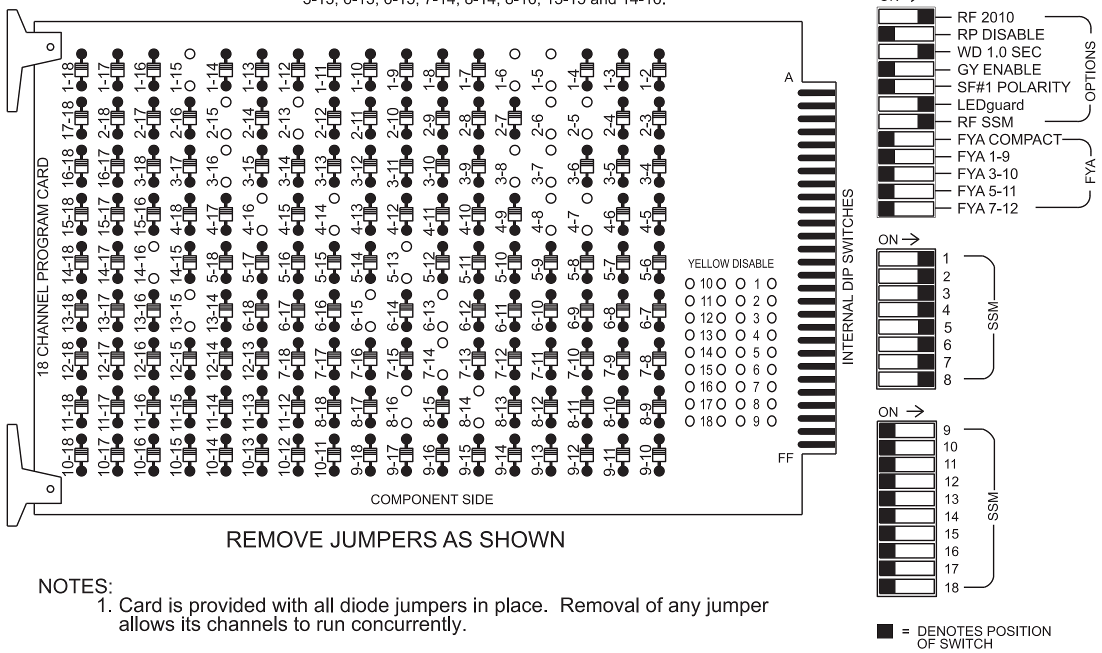
SIG. INVENTORY NO. 06-0094

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 3-7, 3-8, 3-16, 4-7, 4-8, 4-14, 4-16, 5-13, 6-13, 6-15, 7-14, 8-14, 8-16, 13-15 and 14-16.



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

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

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software..Q-Free MAXTIME
Cabinet Mount.....................................Base
Output File Positions...........................12
Load Switches Used.............................S1, S2, S3, S4, S5, S6, S7, S8, S9 S10, S11, S12
Phases Used...1, 2, 2PED, 3, 4, 4PED, 5, 6, 6PED, 7, 8, 8PED
Overlap "1"..Not Used
Overlap "2"..Not Used
Overlap "3"..Not Used
Overlap "4"..Not Used

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4		S5	S6	S7		S8	S9	S10		S11	S12
CMU CHANNEL NO.	1		2	13	3		4	14	5		6	15	7		8	16
PHASE	1		2	2 PED	3		4	4 PED	5		6	6 PED	7		8	8 PED
SIGNAL HEAD NO.	11,12	82	21,22, 23	P21, P22	31,32, 33	23	41,42	P41, P42	51,52	42	61,62, 63	P61, P62	71,72, 73	63	81,82	P81, P82
RED			128				101				134				107	
YELLOW			129				102				135				108	
GREEN			130				103				136				109	
RED ARROW	125				116				131				122			
YELLOW ARROW	126	126			117	117			132	132			123	123		
GREEN ARROW	127	127			118	118			133	133			124	124		
(Don't Walk hand)				113				104				119				110
(Walk person)				115				106				121				112

NU = Not Used

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

★See pictorial of head wiring in detail this sheet.

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	Ø 1 1A	Ø 1 1B	Ø 2 2A	Ø 2 2C	Ø 3 3A	Ø 3 3B	Ø 4 4A,4B	Ø 4 4D	SYS. DET. S4A	SLOT EMPTY	SLOT EMPTY	Ø 2 PED DC ISOLATOR	Ø 6 PED DC ISOLATOR	FS DC ISOLATOR
"I"	L	NOT USED	Ø 1 1C	Ø 2 2B	NOT USED	NOT USED	Ø 2 2D	Ø 4 4C	NOT USED	SYS. DET. S4B			Ø 4 PED DC ISOLATOR	Ø 8 PED DC ISOLATOR	ST DC ISOLATOR
"J"	U	Ø 5 5A	Ø 5 5B	Ø 6 6A	Ø 6 6C	Ø 7 7A	Ø 7 7B	Ø 8 8A,8B	Ø 8 8D	SYS. DET. S8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
"J"	L	NOT USED	Ø 5 5C	Ø 6 6B	NOT USED	NOT USED	NOT USED	Ø 8 8C	NOT USED	SYS. DET. S8B					

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1	1			X		X	
1B	TB2-5,6	I2U	39	1	2	1			X		X	
1C	TB2-7,8	I2L	43	5	3	1	20.0		X		X	
2A	TB2-9,10	I3U	63	29	4	2			X		X	
2B	TB2-11,12	I3L	76	42	5	2			X		X	
2C	TB4-1,2	I4U	47	9	6	2			X		X	
2D	TB4-11,12	I6L	45	7	9	2			X		X	
3A	TB4-5,6	I5U	58	20	7	3			X		X	
3B	TB4-9,10	I6U	41	3	8	3			X		X	
4A,4B	TB6-1,2	I7U	65	31	10	4		2.0	X			
4C	TB6-3,4	I7L	78	44	11	4			X		X	
4D	TB6-5,6	I8U	49	11	12	4			X		X	
5A	TB3-1,2	J1U	55	17	15	5			X		X	
5B	TB3-5,6	J2U	40	2	16	5			X		X	
5C	TB3-7,8	J2L	44	6	17	5	20.0		X		X	
6A	TB3-9,10	J3U	64	30	18	6			X		X	
6B	TB3-11,12	J3L	77	43	19	6			X		X	
6C	TB5-1,2	J4U	48	10	20	6			X		X	
7A	TB5-5,6	J5U	57	19	21	7			X		X	
7B	TB5-9,10	J6U	42	4	22	7			X		X	
8A,8B	TB7-1,2	J7U	66	32	24	8		2.0	X			
8C	TB7-3,4	J7L	79	45	25	8			X		X	
8D	TB7-5,6	J8U	50	12	26	8			X		X	
*S4A	TB6-9,10	I9U	60	22	13	SYS						
*S4B	TB6-11,12	I9L	62	24	14	SYS						
*S8A	TB7-9,10	J9U	59	21	27	SYS						
*S8B	TB7-11,12	J9L	61	23	28	SYS						
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

*System detector only. Remove any assigned vehicle phase.

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

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0094
DESIGNED: May 2025
SEALED: 06/13/2025
REVISED: N/A

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 401 (Skibo Road)
at
SR 1400 (Cliffdale Road)

Division 6 Cumberland County Fayetteville

PLAN DATE: May 2025 REVIEWED BY:

PREPARED BY: Sarah Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

Signed by: Ryan W. Hough 06/13/2025
430320FAA2654C3...
DATE

SIG. INVENTORY NO. 06-0094

01/15/24

TIP PROJECT: HS-2406P

CONTRACT: DF00524

See Sheet 1A For Index of Sheets

VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

LOCATION: *US 401 BUS (ROBESON STREET) AT SR 1168 (WHITFIELD STREET)*

TYPE OF WORK: *INSTALL HIGH-VISIBILITY CROSSWALK AND PEDESTRIAN SIGNAL HEADS*

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2406P	1	

FEDERAL NO.	STATE NO.	DESCRIPTION
50978.1.17	5097816	PE
50978.3.17	5097816	CON

PROJECT SITE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

Prepared in the Office of:
DIVISION OF HIGHWAYS
431 Transportation Dr, Fayetteville, NC 28306

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: N/A

LETTING DATE: August 20, 2025

JOHN GAUTHIER
PROJECT ENGINEER

JASON HATFIELD
PROJECT DESIGN ENGINEER

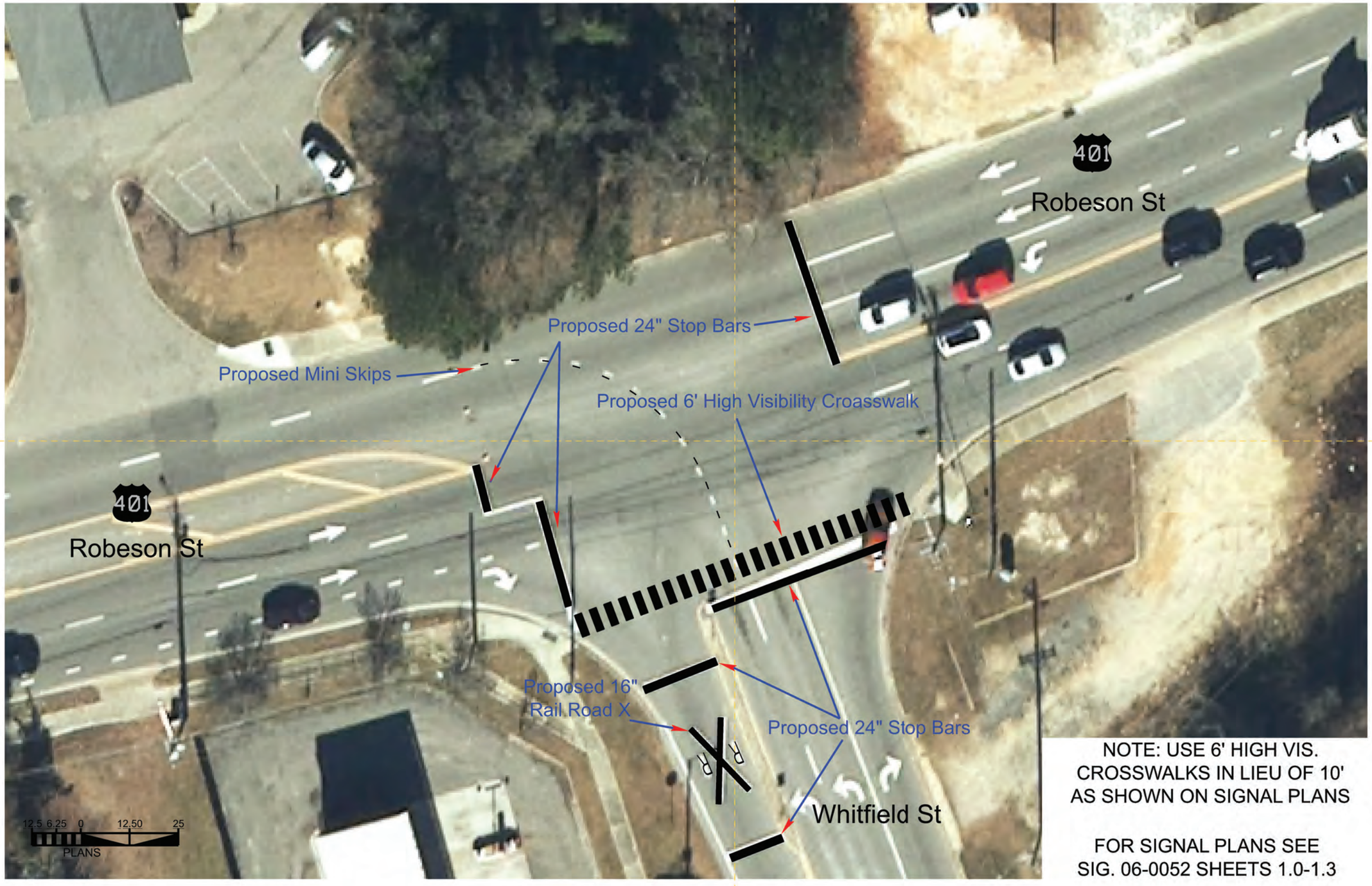
SIGNATURE

$$$-USER NAME-$$$ - $$$-DATE-$$$

11/14/23

HS-2406P

004

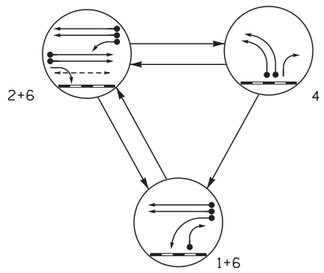


NOTE: USE 6' HIGH VIS. CROSSWALKS IN LIEU OF 10' AS SHOWN ON SIGNAL PLANS

FOR SIGNAL PLANS SEE SIG. 06-0052 SHEETS 1.0-1.3

PROJECT REFERENCE NO.	SHEET NO.
HS-2406P	Sig. 1.0

PHASING DIAGRAM



RAIL PREEMPT PHASES
(High Priority)

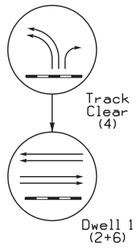


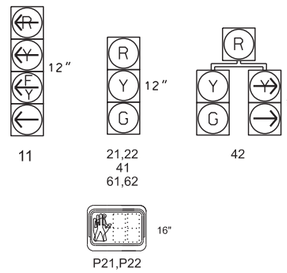
TABLE OF OPERATION

SIGNAL FACE	PHASE 1+6	2+6	4	RR CLEAR	RR DWELL	02&6	FLASH
11	←	F	R	R	R	R	R
21,22	R	G	R	R	G	R	
41	R	R	G	G	R	R	
42	R	R	G	G	R	R	
61,62	G	G	R	R	G	R	
P21,P22	DW	W	DW	DW	DW	DRK	
Sign D	OFF	OFF	OFF	ON	ON	*	

* See Note 8

SIGNAL FACE I.D.

All Heads L.E.D.



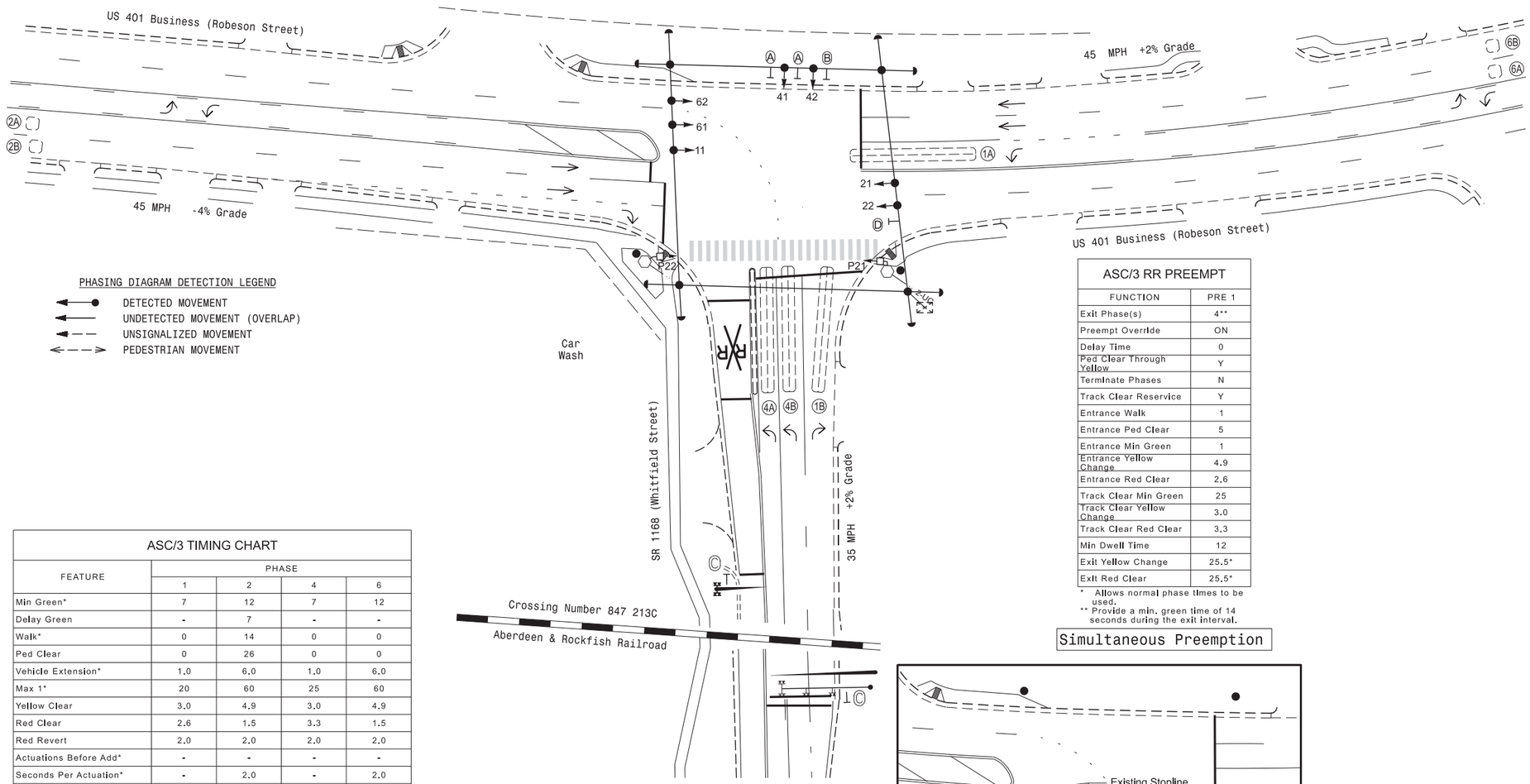
ASC/3 DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X60	+5	2-4-2	-	1	Yes	-	15	-	N	-	-
					6	Yes	-	3	-	G	-	-
1B	6X60	+5	2-4-2	-	1	Yes	-	15	-	N	-	-
2A,2B	6X6	300	4	-	2	Yes	-	-	X	N	-	-
4A	6X60	+5	2-4-2	-	4	Yes	-	-	-	N	-	-
4B	6X60	+5	2-4-2	-	4	Yes	-	-	-	N	-	-
6A,6B	6X6	300	4	-	6	Yes	-	-	X	N	-	-

3 Phase
Fully Actuated
with Railroad Preemption
Fayetteville Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current TSMO Design Manual and submit a Plan of Record to the Signal Design Section.
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. Ensure flashing operation does not alter operation of blankout signs.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



PHASING DIAGRAM DETECTION LEGEND

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

ASC/3 TIMING CHART

FEATURE	PHASE 1	2	4	6
Min Green*	7	12	7	12
Delay Green	-	7	-	-
Walk*	0	14	0	0
Ped Clear	0	26	0	0
Vehicle Extension*	1.0	6.0	1.0	6.0
Max 1*	20	60	25	60
Yellow Clear	3.0	4.9	3.0	4.9
Red Clear	2.6	1.5	3.3	1.5
Red Revert	2.0	2.0	2.0	2.0
Actuations Before Add*	-	-	-	-
Seconds Per Actuation*	-	2.0	-	2.0
Max Initial*	-	34	-	34
Time Before Reduction*	-	15	-	15
Time To Reduce*	-	30	-	30
Minimum Gap	-	3.0	-	3.0
Locking Detector	-	X	-	X
Recall Position	-	VEH. RECALL	-	VEH. RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

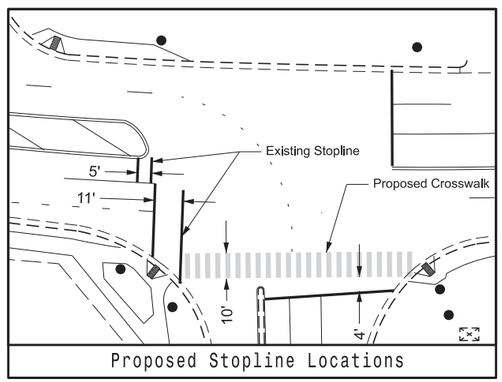
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

ASC/3 RR PREEMPT

FUNCTION	PRE 1
Exit Phase(s)	4**
Preempt Override	ON
Delay Time	0
Ped Clear Through Yellow	Y
Terminate Phases	N
Track Clear Reservice	Y
Entrance Walk	1
Entrance Ped Clear	5
Entrance Min Green	1
Entrance Yellow Change	4.9
Entrance Red Clear	2.6
Track Clear Min Green	25
Track Clear Yellow Change	3.0
Track Clear Red Clear	3.3
Min Dwell Time	12
Exit Yellow Change	25.5*
Exit Red Clear	25.5*

* Allows normal phase times to be used.
** Provide a min. green time of 14 seconds during the exit interval.

Simultaneous Preemption



Proposed Stopline Locations

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
N/A	Fence	
	Directional Arrow	
N/A	Wheelchair Ramp	
N/A	Railroad Tracks	
	Railroad Gate	N/A
	Railroad Cantilever	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	"DO NOT STOP ON TRACKS" Sign (R8-8)	Ⓒ
Ⓓ	"NO RIGHT TURN - TRAIN" L.E.D. Blankout Sign	Ⓓ

Signal Upgrade - Corr. File No. 06-24-002

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 401 Business (Robeson St.) at SR 1168 (Whitfield St.)

Division 6 Cumberland County Fayetteville

PLAN DATE: April 2025 REVIEWED BY: BMH
PREPARED BY: KGP, Jr. REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 047646 ENGINEER BAILEY M. HARDEN
DocuSigned by: Bailey Harden DCEF3411623A425...
05/12/2025
DATE

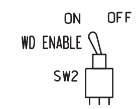
SIG. INVENTORY NO. 06-0052

6-MAY-2025 12:20
pw://dotpw.bentley.com:dot-pw-01/Documents/NCDOT TSMO/Signal Design Section/Division_06/06-0052/Signal Design/06-0052/060052_sig_dsn_2025mods.dgn
kgpeedin

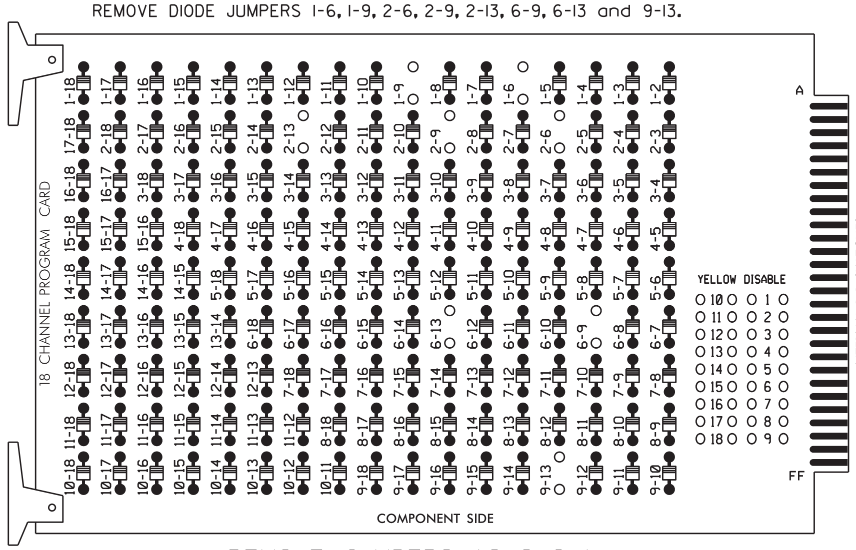
PROJECT REFERENCE NO.	SHEET NO.
HS-2406P	Sig. 1.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

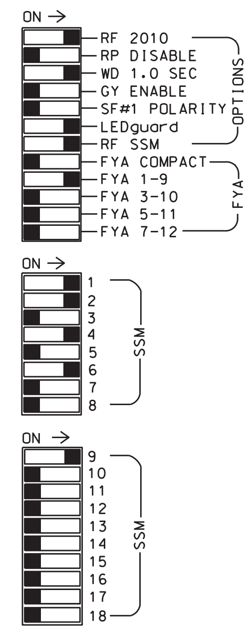
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-6, 1-9, 2-6, 2-9, 2-13, 6-9, 6-13 and 9-13.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all 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 volume density operation.
4. Program controller to start up in phase 2 Green and 6 Green.
5. The cabinet and controller are part of the Fayetteville Signal System.

EQUIPMENT INFORMATION

CONTROLLER.............2070
CABINET................332 W/AUX
SOFTWARE...............ECONOLITE ASC/3-2070
CABINET MOUNT..........BASE
OUTPUT FILE POSITIONS...18 WITH AUX OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S3,S5,S8,AUX S1
PHASES USED............1,2,2 PED,4,6
OVERLAP "A"............✳
OVERLAP "B"............NOT USED
OVERLAP "C"............NOT USED
OVERLAP "D"............NOT USED

✳ See overlap programming detail below.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	42	21,22	P21, P22	NU	41,42	NU	NU	61,62	NU	NU	NU	NU	11★	NU	NU	NU	NU	NU
RED		✳	128			101			134										
YELLOW			129			102			135										
GREEN			130			103			136										
RED ARROW														A121					
YELLOW ARROW		126												A122					
FLASHING YELLOW ARROW														A123					
GREEN ARROW	127	127																	
(Don't Walk hand)				113															
(Walk person)				115															

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)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2PED DC ISOLATOR	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2A,2B				Ø4 4B						NOT USED		ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A,6B	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
	L		NOT USED												NOT USED

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

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE
ST = STOP TIME
PRE1 = RR PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A [1]	TB2-1,2	I1U	56	1	1	YES		15		N
	-	J4U	48	26	6	YES		3		G
1B	TB2-5,6	I2U	39	2	1	YES		15		N
2A,2B	TB2-7,8	I2L	43	12	2	YES			X	N
4A	TB4-9,10	I6U	41	4	4	YES				N
4B	TB4-11,12	I6L	45	14	4	YES				N
6A,6B	TB3-5,6	J2U	40	6	6	YES			X	N
PED PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED					

NOTE:
INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.

[1] Add jumper from I1-W to J4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

OVERLAP A

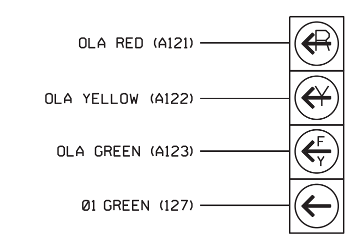
Select TMG VEH OVLP [A] and 'PPLT FYA'

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

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

FLASHING ARROW OUTPUT.....CH9   ISOLATE

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

END PROGRAMMING

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)

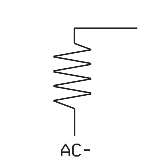


LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

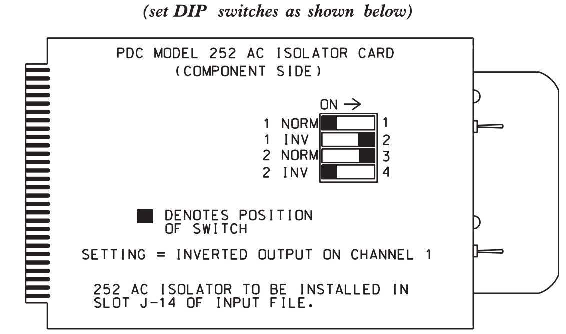
ACCEPTABLE VALUES

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



PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0052
DESIGNED: April 2025
SEALED: 5/12/2025
REVISED: N/A

Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 401 Business (Robeson St.) at SR 1168 (Whitfield St.)

Division 6 | Cumberland County | Fayetteville

PLAN DATE: April 2025	REVIEWED BY:
PREPARED BY: Zarrar Zafar	REVIEWED BY:

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031001 D. TODD JOYCE

DocuSigned by: D. Todd Joyce 05/15/2025
DATE
SIG. INVENTORY NO. 06-0052

14-MAY-2025 12:09
S:\ITS&SU\ITS Signals\Workgroups\Sig Man\Zafar\Plans\Division 6\060052\06052_sm_ele_2025mmdd.dgn
zzafar

PROJECT REFERENCE NO.	SHEET NO.
HS-2406P	Sig. 1.2

ECONOLITE ASC/3-2070 RAILROAD PREEMPT PROGRAMMING DETAIL

(program controller as shown)

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

Place cursor in [ ] next to Preempt Plan and press 1. Then press the right cursor arrow and toggle the controller to YES. Next cursor down. This will select Railroad Preempt #1.

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

ENABLE... YES|PMT OVRIDE.X||INTERLOCK. NO
DET LOCK... X|DELAY..    0||INHIBIT...  0
OVERIDE FL. .|DURATION   0|CLR-GRN... NO
TERM OLP.  NO|PC>YEL   YES|TERM PH    NO
PED DARK.. NO|TC RESRV YES|DWELL FL  OFF
LINK PMT....0|X FLCOLR RED|EXIT OPT. XPH
X TMG PLN...2|RE-SERV..  0|FLT TYPE.HARD
FREE DUR PMT|R1  NO|R2  NO|R3  NO|R4  NO
--TIMING-----WALK|PED CLR|MN GR|YEL|RED
ENTRANCE TM.   1|   5|   1| 4.9| 2.6
----------MIN GR|EXT GR|MX GR|YEL|RED
TRACK CLEAR   25|   0|   0| 3.0| 3.3
----------MIN DLI|PMTEXT|IMX TM|YEL|RED
DWL/CYC-EXIT  12|ı 0.0|   0|25.5|25.5
PMT ACTIVE OUT..ON   PMT ACT DWELL...NO
OTHER - PRI PMT.OFF  NON-PRI PMT.....OFF
INH EXT TIME... 0.0  PED PR RETURN...OFF
PRIORITY RETURN.OFF  QUEUE DELAY.... OFF
COND DELAY......OFF
PHASES     1   2   3   4   5   6   7   8
PR RTN%    0   0   0   0   0   0   0   0
PHASES     9  10  11  12  13  14  15  16
PR RTN%    0   0   0   0   0   0   0   0
```

NOTICE X TMG PLN 2 ✱→

← ✱ NOTICE 'XPH'

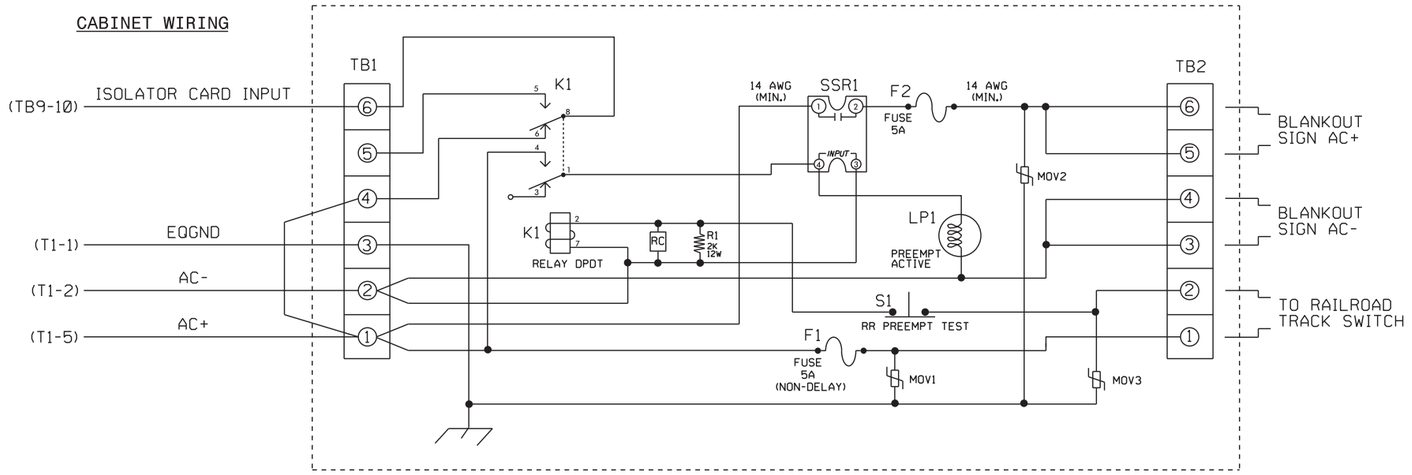
✱ NOTE: To ensure Phase 4 has 14 sec of Min Green time during the exit interval, do the following only after all controller Timing Plan 1 phase data has been entered:

1. From Main Menu select [8. UTILITIES]
2. From UTILITIES Submenu select [1. COPY/CLEAR]
3. Copy FROM Timing Plan 1 TO Timing Plan 2
4. From Main Menu select [2. CONTROLLER]
5. From CONTROLLER Submenu select [1. TIMING PLANS]
6. Select Timing Plan 2 and enter 14 for MIN GRN for Phase 4

END PROGRAMMING

RAILROAD PREEMPTION WIRING DETAIL

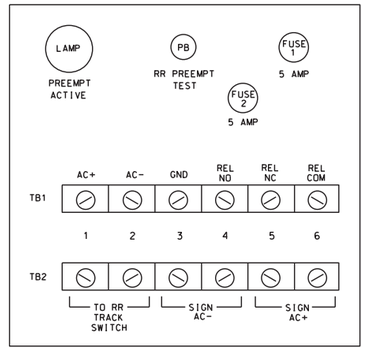
(wire as shown below)



NOTES

1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a DPDT with 120VAC coil with octal base.
3. Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.
4. AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card as shown on the detail on sheet 1.
5. IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0052
DESIGNED: April 2025
SEALED: 5/12/2025
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 401 Business (Robeson St.) at SR 1168 (Whitfield St.)

Division 6 Cumberland County Fayetteville

Prepared in the Offices of:

NC Department of Transportation, Mobility and Safety Division, Traffic Engineering Branch, Signals Management Section

750 N.Greenfield Pkwy.Garner,NC 27529

PLAN DATE: April 2025	REVIEWED BY:
PREPARED BY: Zarrar Zafar	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce A90CADFDBD0e241D.. 05/15/2025 DATE

SIG. INVENTORY NO. 06-0052

PROJECT REFERENCE NO.	SHEET NO.
HS-2406P	Sig. 1.3

ASC/3 FLASH SENSE INPUT CONTROL FOR RED-RED FLASH

*The NCDOT default database is programmed to addresss Yellow-Red flash. Logic Statement 100 must be modified as shown when running Red-Red flash.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

Change the "LP" to 100 and move the cursor down. Delete the two "CTR-SET" statements by moving the cursor over them and hitting the "C" key. then hit "ENTER". select "LP SET CIB ON". hit "ENT". and then set the number to 427.

```
LP#:100  COPY FROM:100  ACTIVE: M   FALSE
IF   LP CIB CODE ON                  331  F

THEN LP  DELAY FOR          1.0 SECONDS
     LP  SET CIB ON         427

ELSE
```

THIS STATEMENT IS USED TO CONTROL THE FLASH SENSE INPUT WHEN RUNNING RED-RED FLASH OPERATION.

Hit "ESC". then 1 for "LOGIC STATEMENT CONTROL". next verify that LP#100 is ENABLED.

END PROGRAMMING

ECONOLITE ASC/3-2070 STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select [2. CONTROLLER]
2. From CONTROLLER Submenu select [5. START/FLASH]

```
START/FLASH DATA
------START UP---------------------------
         1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
PHASE      G       G
         A B C D E F G H I J K L M N O P
OVERLAP  X X X X X X X X X X X X X X X X
FLASH>MON. NO FL TIME..  0 ALL RED...  6
PWR START SEQ..  1 MUTCD> YES    Y- G: NO
```

Scroll down on this screen and set "Exit Fl" to Green "G"

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.

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING DETAIL FOR LEADING PED INTERVAL (DELAYED GREEN)

(program controller as shown)

The following logic processor configuration holds the FYA's on signal heads 11 red for the duration of the delayed green time (leading ped interval) when serving a ped call on the opposing through phase.

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [2. LOGIC STATEMENTS]

ENTER A "1" IN THE LP# FIELD. PRESS 'ENTER'. AND PROGRAM AS SHOWN.

```
LP#:   1  COPY FROM:   1  ACTIVE:  M   (T/F)
IF     PED ON PH WALK        2     IS    ON
AND    VEH GREEN ON PH       2     IS    OFF
ELSE
THEN   SIG SET OLP RED       1           ON
       SIG SET OLP YELLOW    1           OFF
       SIG SET OVLP GREEN    1           OFF
```

HOLD SIGNAL HEAD 11 FYA RED DURING THE PHASE 2 DELAYED GREEN TIME (LEADING PED INTERVAL)

1. From Main Menu select [1. CONFIGURATION]
2. From CONFIGURATION Submenu select [8. LOGIC PROCESSOR]
3. From the LOGIC PROCESSOR Submenu select [1. LOGIC STATEMENT CONTROL]

ENABLE LOGIC PROCESSOR STATEMENTS 1-4 BY POSITIONING THE CURSOR OVER THE FIELDS SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE THEM .

```
LOGIC STATEMENT CONTROL
          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
LP 1-15   E . . . . . . . . . . . . . . .
LP 16-30  . . . . . . . . . . . . . . . .
LP 31-45  . . . . . . . . . . . . . . . .
LP 46-60  . . . . . . . . . . . . . . . .
LP 61-75  . . . . . . . . . . . . . . . .
LP 76-90  . . . . . . . . . . . . . . . .
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0052
DESIGNED: April 2025
SEALED: 5/12/2025
REVISED: N/A

Electrical Detail - Sheet 3 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 401 Business (Robeson St.)
at
SR 1168 (Whitfield St.)

Division 6 | Cumberland County | Fayetteville

PLAN DATE: April 2025 | REVIEWED BY:
PREPARED BY: Zarrar Zafar | REVIEWED BY:

REVISIONS | INIT. | DATE

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

SEAL — North Carolina Professional Engineer, SEAL 031001, D. Todd Joyce

DocuSigned by: D. Todd Joyce 05/15/2025 DATE

SIG. INVENTORY NO. 06-0052

14-MAY-2025 12:11
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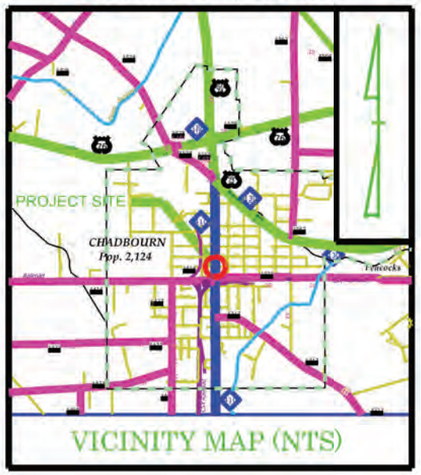
zzafar

01/16/24

TIP PROJECT: HS-2406Q

CONTRACT: DF00524

See Sheet 1A For Index of Sheets



VICINITY MAP (NTS)

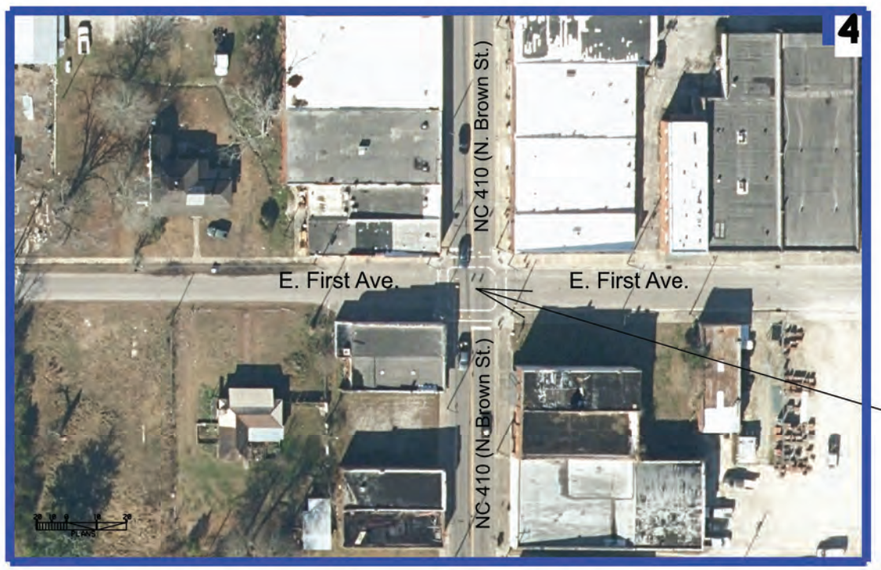
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

COLUMBUS COUNTY

LOCATION: *NC 410 (BROWN STREET) AT FIRST AVENUE*

TYPE OF WORK: *PEDESTRIAN SIGNAL, PAVEMENT MARKING, AND SIGNAL UPGRADE*

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2406Q	II	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
50978.1.18	5097817	P.E.
50978.3.18	5097817	CON



PROJECT SITE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

Prepared in the Office of:
DIVISION OF HIGHWAYS
431 TRANSPORTATION DR., FAYETTEVILLE NC 28301

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: N/A

LETTING DATE: August 20, 2025

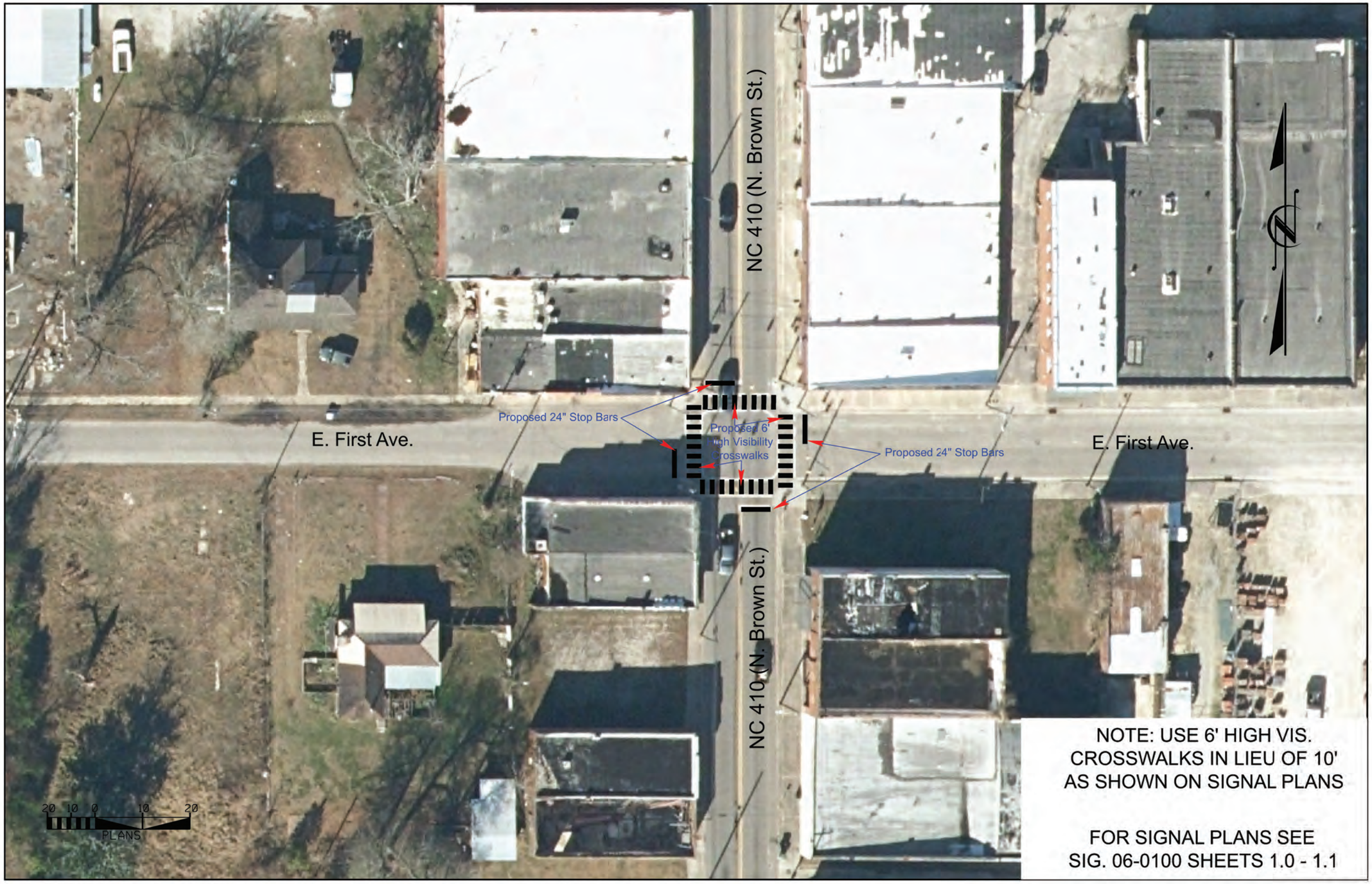
JOHN GAUTHIER
PROJECT ENGINEER

JASON HATFIELD
PROJECT DESIGN ENGINEER

SIGNATURE

$$$-USER NAME-$$$ - $$$-DATE-$$$

HS-2406Q
004

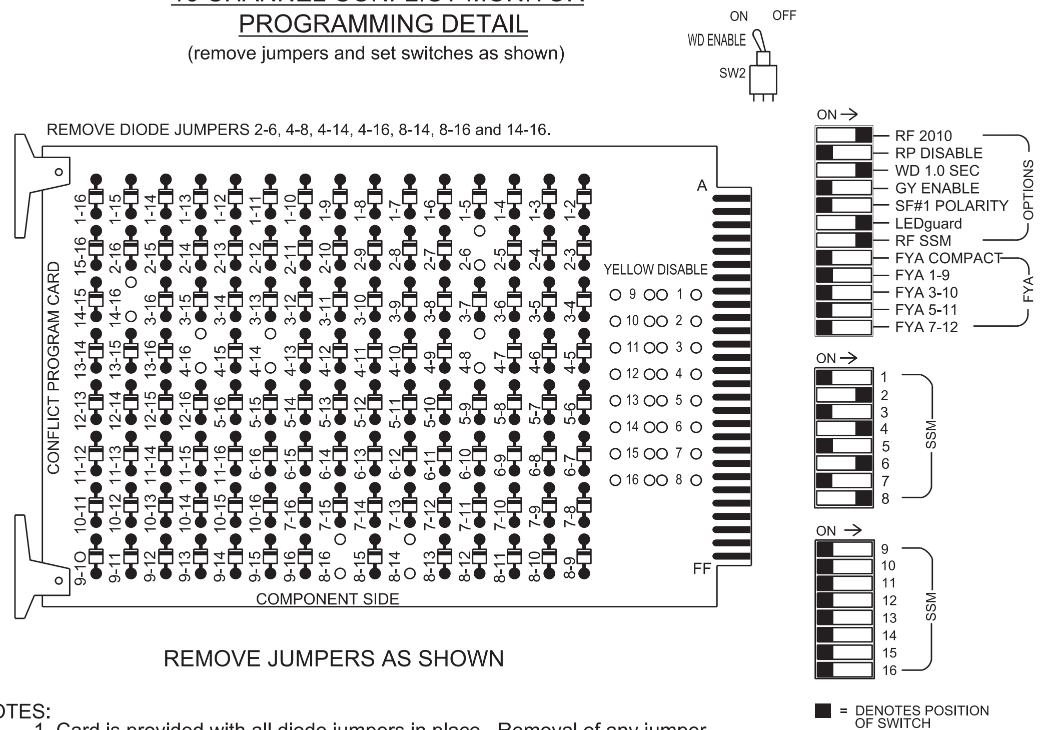


NOTE: USE 6' HIGH VIS. CROSSWALKS IN LIEU OF 10' AS SHOWN ON SIGNAL PLANS

FOR SIGNAL PLANS SEE SIG. 06-0100 SHEETS 1.0 - 1.1

16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
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 1, 3, 5, 7, 9, 10, 11, 12, 13, 14, 15 & 16 to AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry and Simultaneous Start.
4. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the US 74-76 NC 130-410 CLS. Signal System #: D06-26_Chadbourn

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet..336
Software..Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used...........................S2, S4, S4P, S6, S8, S8P
Phases Used.......................................2, 4, 4PED, 6, 8, 8PED
Overlap "1"..Not Used
Overlap "2"..Not Used
Overlap "3"..Not Used
Overlap "4"..Not Used

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	P41, P42	NU	61,62	NU	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
FLASHING YELLOW ARROW												
GREEN ARROW												
(Don't Walk hand)						104						110
(Walk person)						106						112

NU = Not Used

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"		1	2	3	4	5	6	7	8	9	10	11	12	13	14
	U	SLOT EMPTY	Ø 2 2A	SLOT EMPTY	Ø 4 4A	SLOT EMPTY	Ø 6 6A	NOT USED	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	NOT USED	FS DC ISOLATOR
	L		NOT USED		NOT USED		NOT USED	SYS. DET. S01	NOT USED				Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB21-3,4	I2U	39	1	2	2			X		X	
4A	TB21-7,8	I4U	41	3	8	4	5.0		X		X	
6A	TB21-11,12	I6U	40	2	16	6			X		X	
*S01	TB23-13,14	I7L	50	12	26	SYS						
8A	TB22-1,2	I8U	42	4	22	8	5.0		X		X	
PED PUSH BUTTONS												
P41,P42	TB24-9,10	I12L	69	35	4	PED 4						
P81,P82	TB24-11,12	I13L	70	36	8	PED 8						

*System detector only. Remove any assigned vehicle phase.

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

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0100
DESIGNED: July 2024
SEALED: 08/15/2024
REVISED: N/A

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

NC 410 (N. Brown Street)
at
E. First Avenue

Division 6 Columbus County Chadbourn

PLAN DATE: August 2024 REVIEWED BY:
PREPARED BY: Sarah Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

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

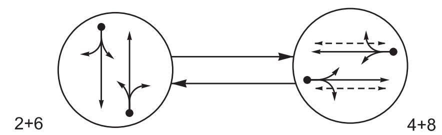
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036833 RYAN W. HOUGH

Signed by: Ryan W. Hough 08/15/2024
DATE

SIG. INVENTORY NO. 06-0100

PROJECT REFERENCE NO.	SHEET NO.
Ped Heads	Sig 1

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

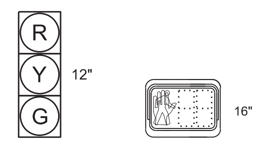
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	2+6	4+8	FLASH
21, 22	G	R	R
41, 42	R	G	R
61, 62	G	R	R
81, 82	R	G	R
P41, P42	DW	W	DRK
P81, P82	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



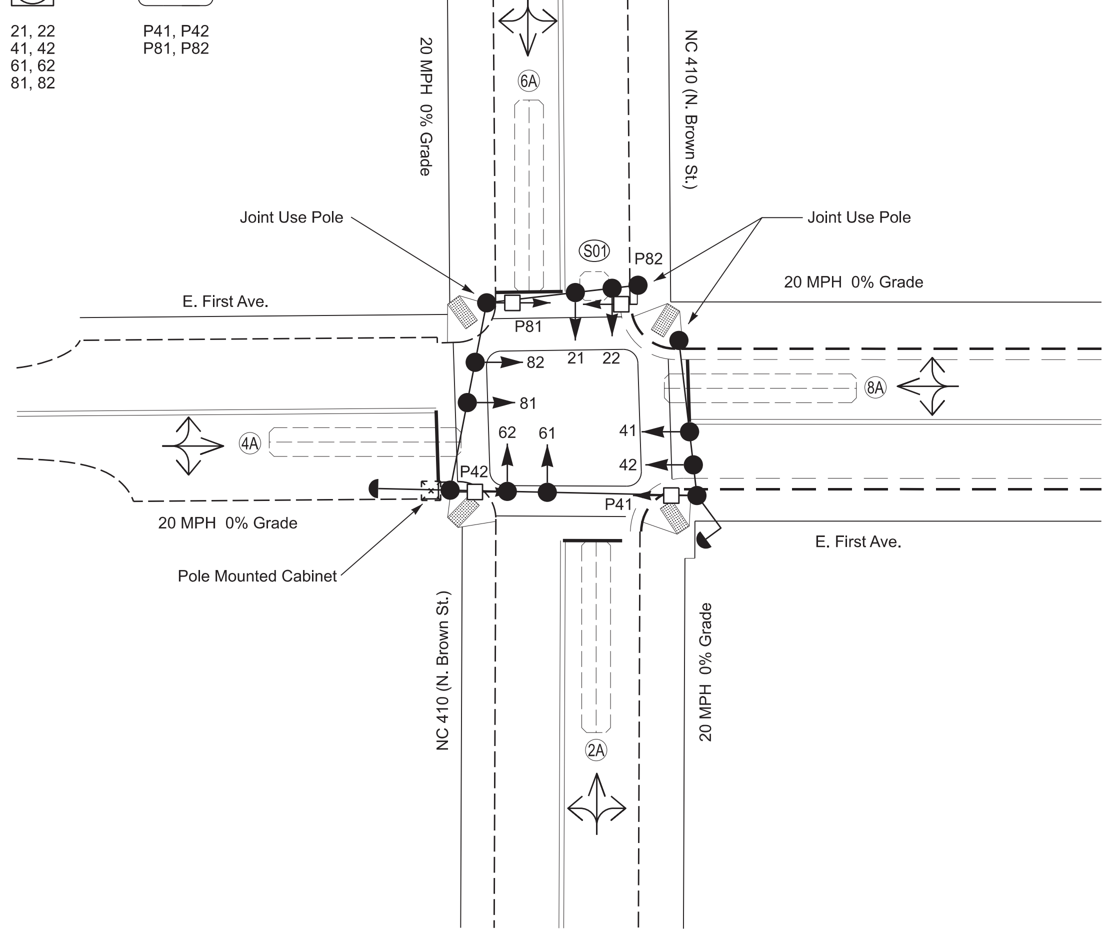
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X40	0	2-4-2	-	2	-	-	X	-	X	-	-
4A	6X40	+5	2-4-2	-	4	5.0	-	X	-	X	-	-
6A	6X40	0	2-4-2	-	6	-	-	X	-	X	-	-
8A	6X40	+5	2-4-2	-	8	5.0	-	X	-	X	-	-
S01	6X6	50 ±	EXIST	-	-	-	-	-	-	-	-	-

2 Phase
Fully Actuated
(US 74-76 - NC 130-410 CLS)
Signal System #: D06-26_Chadbourn

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
5. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
X-UC	2-in Underground Conduit	UC
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Walk *	-	12	-	12
Ped Clear	-	7	-	7
Min Green *	10	7	10	7
Passage *	3.0	2.0	3.0	2.0
Max 1 *	35	20	35	20
Yellow Change	3.0	3.0	3.0	3.0
Red Clear	1.4	1.6	1.4	1.6
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	-	5	-	5
Non Lock Detector	X	X	X	X
Vehicle Recall	MIN RECALL	-	MIN RECALL	-
Dual Entry	-	X	-	X

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Signal Upgrade

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

NC 410 (N. Brown Street) at E. First Avenue

Division 6 — Columbus County — Chadbourn

PLAN DATE:	July 2024	REVIEWED BY:	
PREPARED BY:	J.A. Lohr	REVIEWED BY:	

SCALE 0 20
1"=20'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 026486 ROBERT J. ZIEMBA

DocuSigned by:
1B9B4B66274A494...
08/15/2024
DATE

SIG. INVENTORY NO. 06-0100