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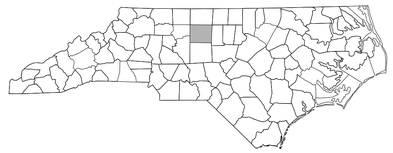
Project No.	Sheet No.
U–5841	Sig. 1.0

TIP Project: U–5841

CONTRACT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

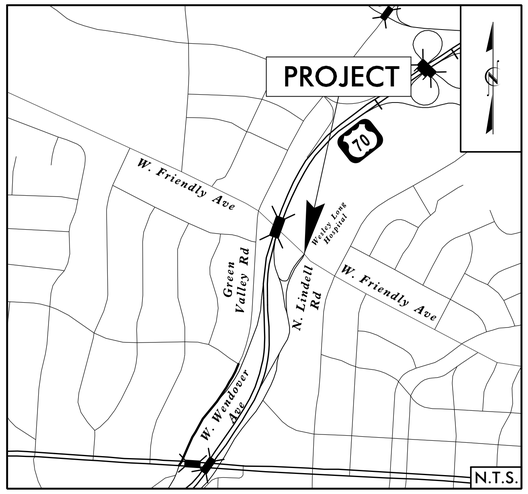
GUILFORD COUNTY

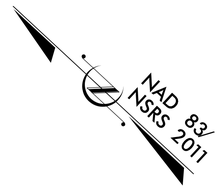


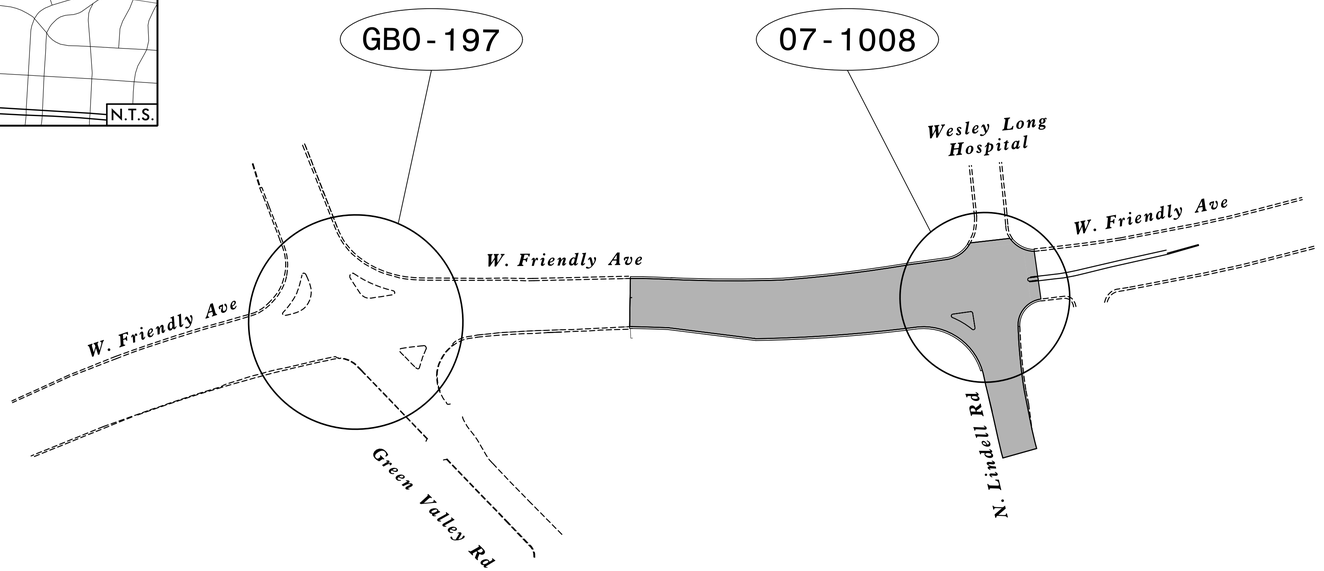
LOCATION: WEST FRIENDLY AVENUE FROM EAST OF GREEN VALLEY RD TO NORTH LINDELL RD IN GREENSBORO

TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS

Vicinity Map







XX-XXXX SIGNAL ID NUMBER

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stv
STV Engineers, Inc.
2151 Hawkins St., Suite 1400
Charlotte, NC 28203
(704) 372–1885
NC License Number F–0991

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

Index of Plans

Sheet #	Reference #	Location/Description
Sig. 1.0	--------	Title Sheet
Sig. 2.0–4.3	07–1008	W. Friendly Avenue at N. Lindell Road /Wesley Long Hospital
Sig. 5.0–7.5	GBO–197	W. Friendly Avenue at Green Valley Road
SCP 1–5	--------	Signal Communications Plans

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Contacts:
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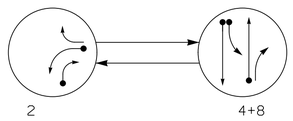
STV Engineers, Inc.
Contacts:
Trent M. Moody, P.E. – Senior Associate/Traffic Operations Manager
Brian Roth–Roffy, P.E. – Transportation Project Manager

DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY DIVISION
Transportation Systems Management & Operations Unit
750 N. Greenfield Parkway, Garner, NC 27529

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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 2.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

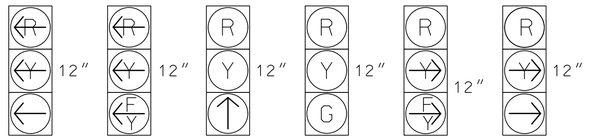
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 2	PHASE 4+8	PHASE FLASH
21,22	←	~~R~~	~~R~~
23	→	R	R
41	R	G	R
42	R	↑	R
43	F.Y.	F.Y.	R
81	~~R~~	F.Y.	~~R~~
82	R	G	R
83	R	↑	R

SIGNAL FACE I.D.

All Heads L.E.D.



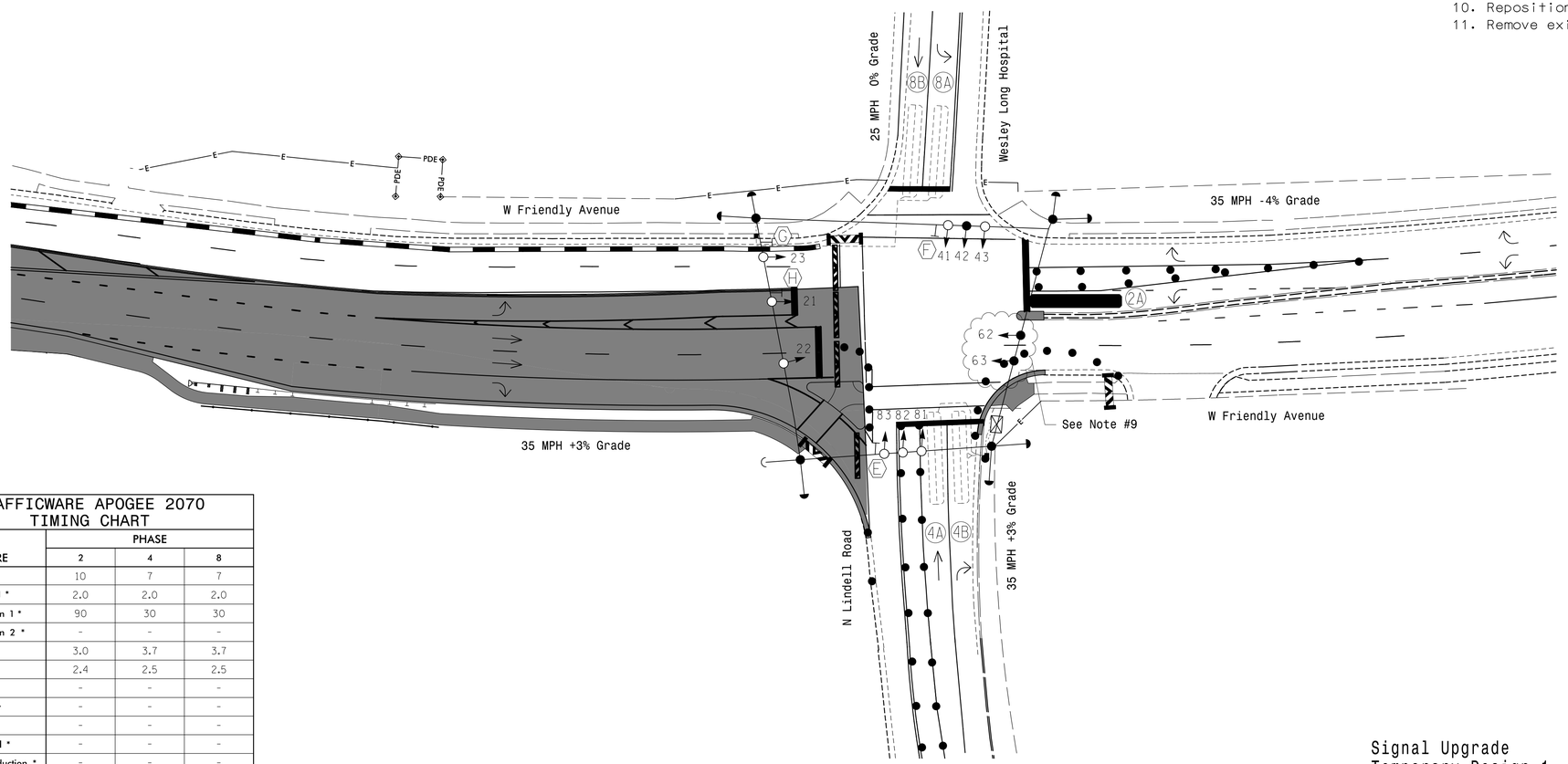
LOOP & DETECTOR UNIT INSTALLATION CHART
TRAFFICWARE APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP/ ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2A	6X40	0	✳	-	2	-	-	-	X	X	-	-	✳
4A	6X40	+5	2-4-2	-	4	-	-	-	X	X	-	-	X
4B	6X40	+5	2-4-2	-	2	-	-	-	X	X	-	-	X
8A	6X40	+5	2-4-2	-	8	-	-	-	X	X	-	-	X
8B	6X40	+5	2-4-2	-	8	-	-	-	X	X	-	-	X

✳ Video Detection Zone

2 Phase
Semi-Actuated
(Greensboro Signal System)
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024, "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. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Pavement markings are existing unless otherwise shown.
6. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Remove existing signal head numbered 61.
9. Bag and disconnect existing signal heads 62 and 63.
10. Reposition existing signal head numbered 42.
11. Remove existing R3-5L, R4-5R, and R10-12 signs.



TRAFFICWARE APOGEE 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 8
Min Green 1 *	10	7	7
Gap, Extension 1 *	2.0	2.0	2.0
Maximum Green 1 *	90	30	30
Maximum Green 2 *	-	-	-
Yellow Clear	3.0	3.7	3.7
Red Clear	2.4	2.5	2.5
Walk *	-	-	-
Pedestrian Clear	-	-	-
Added Initial *	-	-	-
Maximum Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MIN RECALL	-	-
Lock Calls	NO	NO	NO
Dual Entry	-	ON	ON
Simultaneous Gap	ON	ON	ON

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

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
○—	Signal Pole with Guy	●—
⊠	Controller & Cabinet	⊠
□	Junction Box	■
----------	2-in Underground Conduit	----------
N/A	Right of Way	————
→	Directional Arrow	→
▭	Inductive Loop Detector	▭
▬	Non-Intrusive Detection Zone	▬
▩	Construction Zone	N/A
▨	Construction Barricade	▨
• • •	Construction Zone Drums	• • •
(E)	No Right Turn Sign (R3-1)	(E)
(F)	No Left Turn Sign (R3-2)	(F)
(G)	Right Arrow "ONLY" Sign (R3-5R)	(G)
(H)	No Straight Through Sign (R3-27)	(H)

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Signal Upgrade
Temporary Design 1 - TMP Phase I, Step 2

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

W. Friendly Avenue
at
N. Lindell Road/Wesley Long Hospital

Division 7 Guilford County Greensboro

PLAN DATE: July 2026 REVIEWED BY: T.M. Moody
PREPARED BY: G. Whitehouse REVIEWED BY: B. Roth-Roffy

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

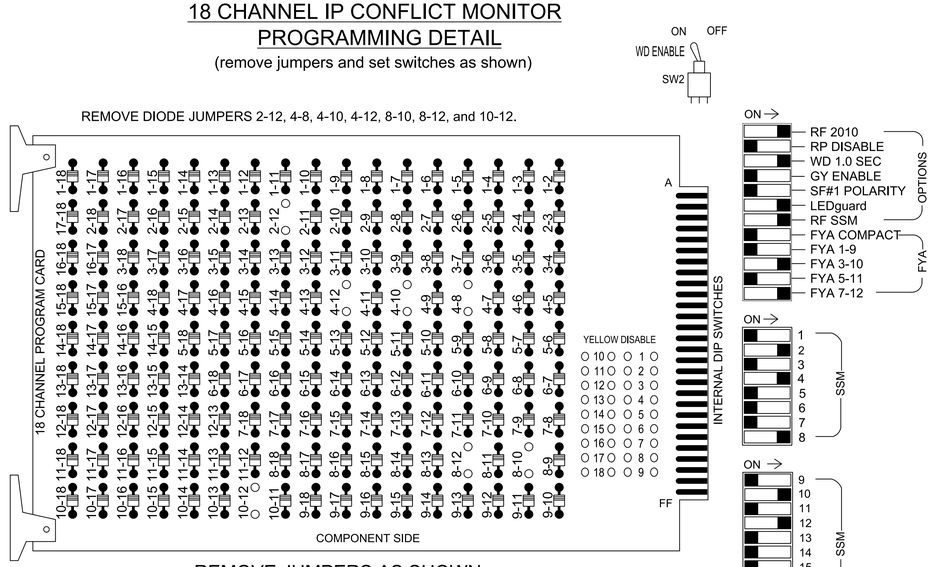
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9/21/2026
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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 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 Plans.
2. Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
3. Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "Init 2A" to MODE 5 (MM 1-8-9-3).
4. Program phase 2 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "RSt".
7. Ensure "InhFYARedSt" feature is set to "ON" and set "Start Red Time" to 6.0 seconds.
8. Ensure "Flash Mode" is set to "Channel" (MM 1-4-1).
9. Ensure all channels are programmed to flash red (MM 1-8-1).
10. Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:

FROM MAIN MENU->1->8->7 (I/O LOGIC)

Result	Src.Fcn		TimeOp	Time
I208	=	OI208	DLY	1

11. Program phases 4 and 8 for Dual Entry.
12. The cabinet and controller are part of the Greensboro Signal System.

PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 2.1

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2		S3	S4	S5		S6	S7	S8	S9	S10	S11		S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2		13	3	4		14	5	6	15	7	8		16	9	10	17	11	12	18
PHASE	1	2		2 PED	3	4		4 PED	5	6	6 PED	7	8		8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	23	NU	NU	41	42	NU	NU	NU	NU	NU	82	83	NU	NU	81 ★	NU	NU	43 ★	NU
RED			128			101	101						107	107						A101	
YELLOW						102	102						108	108							
GREEN							103						109								
RED ARROW		128															A124				
YELLOW ARROW		129	129														A125			A102	
FLASHING YELLOW ARROW																	A126			A103	
GREEN ARROW		130	130			103								109							

NU = Not Used

★ See pictorial of head wiring in detail below.

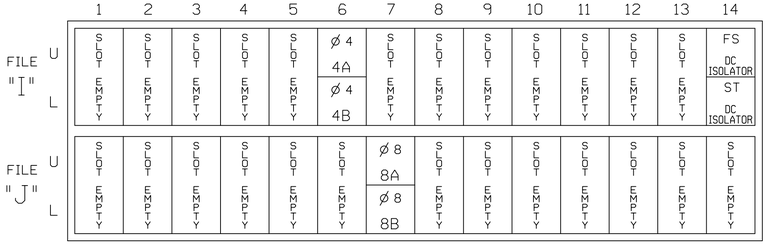
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
4A	TB4-9,10	I6U	41	8	4				X	X	
4B	TB4-11,12	I6L	45	9	2				X	X	
8A	TB7-1,2	J7U	66	24	8				X	X	
8B	TB7-3,4	J7L	79	25	8				X	X	

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....TRAFFICWARE APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S5,S11,AUX S2,AUX S5
PHASES USED.....2,4,8
OVERLAP A.....NOT USED
OVERLAP B.....*
OVERLAP C.....NOT USED
OVERLAP D.....*

* See Sheet 2 for Overlap Programming Detail.

SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection 2A. Perform installation according to the manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the signal design plans.

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

Signal Upgrade
Temporary Design 1 - TMP Phase I, Step 2
Electrical Detail - Sheet 1 of 2

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1008T1
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

STV Engineers, Inc.
2151 Hawkins St., Suite 1400
Charlotte, NC 28203
(704) 372-1885
NC License Number F-0991

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC Department of Transportation Traffic Engineering Branch Traffic Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

W. Friendly Avenue
at
N. Lindell Road/
Wesley Long Hospital

Division 7 | Guilford County | Greensboro

PLAN DATE: July 2026 | REVIEWED BY: T.W. Moody
PREPARED BY: G. Whitehouse | REVIEWED BY: B. Roth-Roffy

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

SIG. INVENTORY NO. 07-1008T1

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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 2.2

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS B, and D.*

(program controller as shown below)

*NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
      Lock Inhibit OFF
   Confl Lock Enable OFF
     Parent P Clrncs ON
Extra Included Phases OFF
  InhibitLockInterval ALWAYS
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  2
  then press Enter
```

```
          Overlap B-2
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
  Ovrlp B-2   Ps.....................
Included Ps    4  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap #  4
  then press Enter
```

```
          Overlap D-4
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
  Ovrlp D-4   Ps.....................
Included Ps    2  4  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

END OF OVERLAP PROGRAMMING DETAIL

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
                Channel & I/O
1.Chan  1-16  [4.Chan+  1-16] 7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
     Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
     Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   X   .   X   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1008T1
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

Signal Upgrade
Temporary Design 1 - TMP Phase I, Step 2
Electrical Detail - Sheet 2 of 2

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at
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Division 7 | Guilford County | Greensboro

PLAN DATE:	July 2026	REVIEWED BY:	T.M. Moody
PREPARED BY:	G. Whitehouse	REVIEWED BY:	B. Roth-Roffy

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

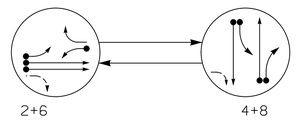
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U-5841	Sig. 3.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

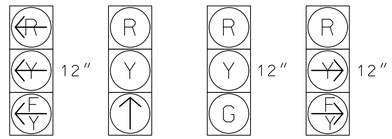
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 2+6	PHASE 4+8	FLASH
21,22	FY	R	R
23	FY	R	R
41	R	↑	R
42	R	G	R
43	R	FY	R
61	FY	R	R
62,63	G	R	R
81	R	FY	R
82	R	G	R
83	R	↑	R

SIGNAL FACE I.D.

All Heads L.E.D.



21, 22	41	42	23
61	83	62, 63	43
81		82	

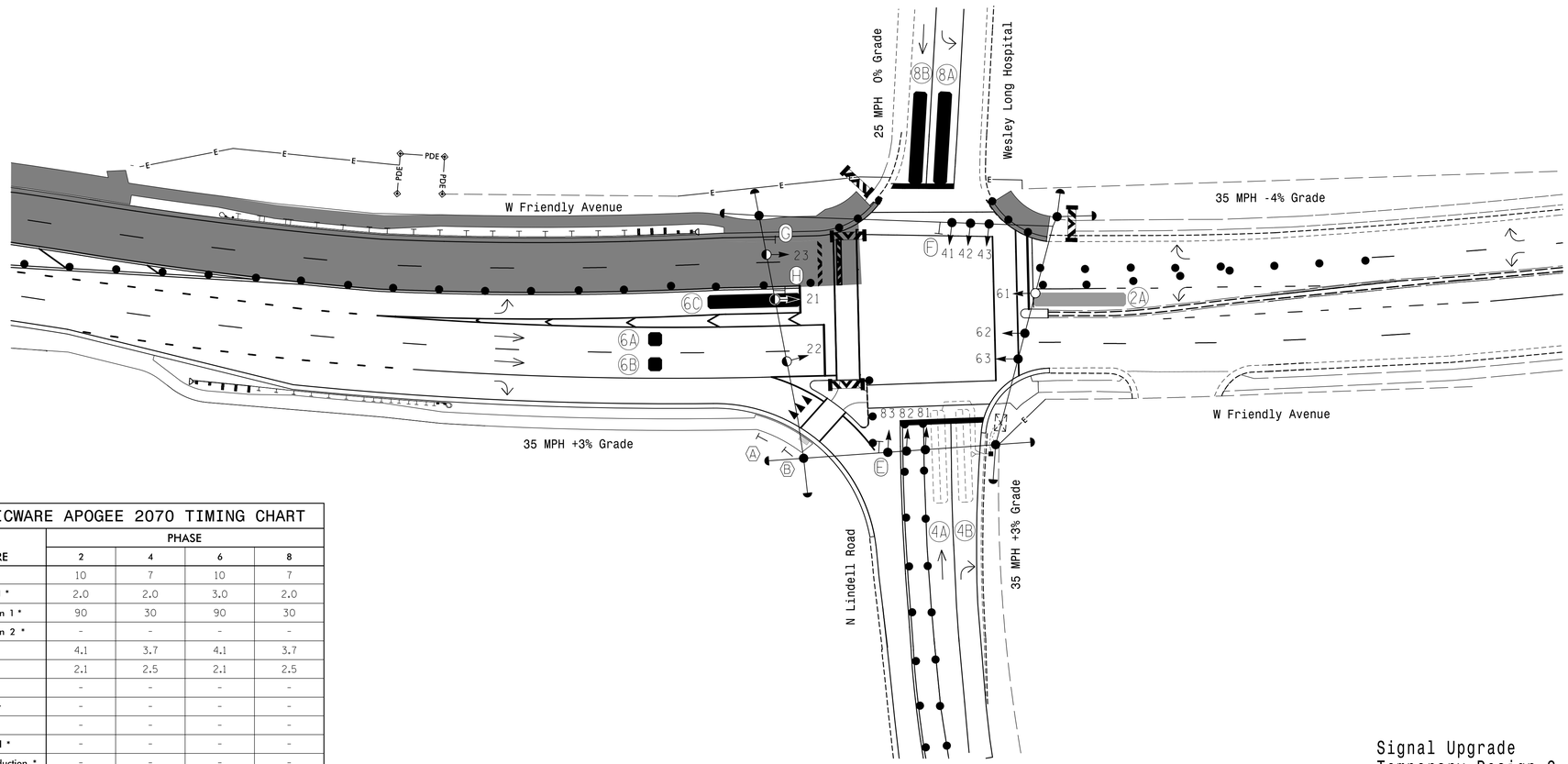
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INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP/ ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2A	6X40	0	✳	-	2	-	-	-	X	X	-	-	✳
4A	6X40	+5	2-4-2	-	4	-	-	-	X	X	-	-	-
4B	6X40	+5	2-4-2	-	4	-	15	-	X	X	-	-	-
6A, 6B	6X6	70	✳	X	6	-	-	-	X	X	-	-	✳
6C	6X40	0	✳	X	6	-	-	-	X	X	-	-	✳
8A	6X40	0	✳	X	8	-	3	-	X	X	-	-	✳
8B	6X40	0	✳	X	8	-	-	-	X	X	-	-	✳

✳ Video Detection Zone

2 Phase
Fully Actuated
(Greensboro Signal System)
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024, "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. Pavement markings are existing unless otherwise shown.
5. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Unbag and reconnect existing signal heads 62 and 63.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
○—	Signal Pole with Guy	●—
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·····	2-in Underground Conduit	·-·-·
N/A	Right of Way	— — —
→	Directional Arrow	→
▭	Inductive Loop Detector	▭
▬	Non-Intrusive Detection Zone	▬
▩	Construction Zone	N/A
▨	Construction Barricade	▨
• • •	Construction Zone Drums	• • •
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	Pedestrian Crossing Sign (W11-2) with Downward Diagonal Arrow Plaque (W16-7P)	Ⓑ
Ⓔ	No Right Turn Sign (R3-1)	Ⓔ
Ⓕ	No Left Turn Sign (R3-2)	Ⓕ
Ⓖ	Right Arrow "ONLY" Sign (R3-5R)	Ⓖ
Ⓗ	No Straight Through Sign (R3-27)	Ⓗ

TRAFFICWARE APOGEE 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Gap, Extension 1 *	2.0	2.0	3.0	2.0
Maximum Green 1 *	90	30	90	30
Maximum Green 2 *	-	-	-	-
Yellow Clear	4.1	3.7	4.1	3.7
Red Clear	2.1	2.5	2.1	2.5
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Lock Calls	NO	NO	YES	NO
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

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

STV Engineers, Inc.
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NC License Number F-0991

Signal Upgrade
Temporary Design 2 - TMP Phase II, Step 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

W. Friendly Avenue
at
N. Lindell Road/Wesley Long Hospital

Division 7 Guilford County Greensboro

PLAN DATE: July 2026 REVIEWED BY: T.M. Moody
PREPARED BY: G. Whitehouse REVIEWED BY: B. Roth-Roffy

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

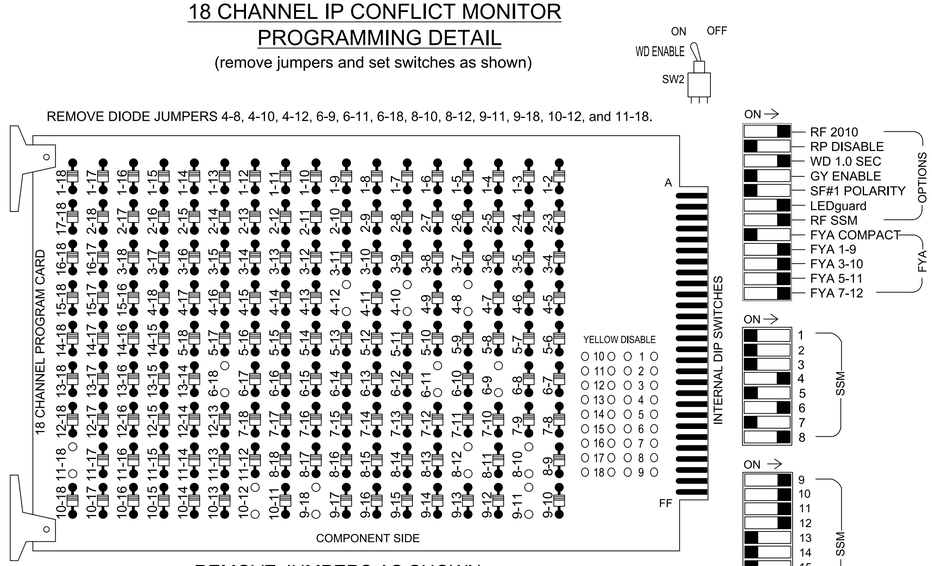
SIG. INVENTORY NO. 07-10081Z

9/21/2026
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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

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 in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
3. Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "Init 2A" to MODE 5 (MM 1-8-9-3).
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "RSt".
7. Ensure "InhFYARedSt" feature is set to "ON" and set "Start Red Time" to 6.0 seconds.
8. Ensure "Flash Mode" is set to "Channel" (MM 1-4-1).
9. Ensure all channels are programmed to flash red (MM 1-8-1).
10. Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:

FROM MAIN MENU->1->8->7 (I/O LOGIC)

Result	Src.Fcn		TimeOp	Time
I208	=	OI208	DLY	1

11. Program phases 4 and 8 for Dual Entry.
12. The cabinet and controller are part of the Greensboro Signal System.

PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 3.1

SIGNAL HEAD HOOK-UP CHART

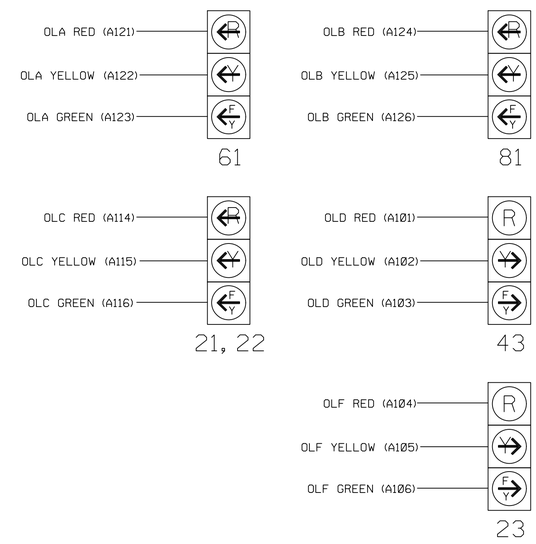
LOAD SWITCH NO.	S1	S2	S3	S4	S5		S6	S7	S8	S9	S10	S11		S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4		14	5	6	15	7	8		16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4		4 PED	5	6	6 PED	7	8		8 PED	OLA	OLB	OLE	OLC	OLD	OLF
SIGNAL HEAD NO.	NU	NC	NU	NU	41	42	NU	NU	62,63	NU	NU	82	83	NU	61 ★	81 ★	NU	21,22 ★	43 ★	23 ★
RED					101	101			134			107	107						A101	A104
YELLOW					102	102			135			108	108							
GREEN						103			136			109								
RED ARROW															A121	A124		A114		
YELLOW ARROW															A122	A125		A115	A102	A105
FLASHING YELLOW ARROW															A123	A126		A116	A103	A106
GREEN ARROW					103								109							

NU = Not Used
NC = Not Connected

★ See pictorial of head wiring in detail below.

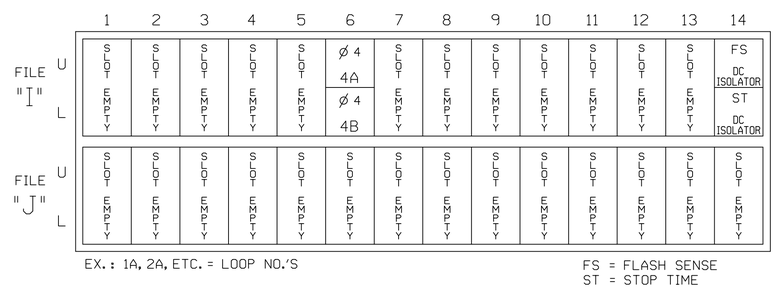
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
4A	TB4-9,10	I6U	41	8	4				X	X	
4B	TB4-11,12	I6L	45	9	4		15		X	X	

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detections 2A, 6A, 6B, 6C, 8A & 8B. Perform installation according to the manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the signal design plans.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....TRAFFICWARE APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S5,S8,S11,AUX S1,AUX S2, AUX S4,AUX S5,AUX S6
PHASES USED.....#2,4,6,8
OVERLAP A.....*
OVERLAP B.....*
OVERLAP C.....*
OVERLAP D.....*
OVERLAP E.....NOT USED
OVERLAP F.....*

* See Sheet 2 for Overlap Programming Detail.
# For Timing Purpose Only.

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1008T2
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

STV Engineers, Inc.
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(704) 372-1885
NC License Number F-0991

Signal Upgrade
Temporary Design 2 - TMP Phase II, Step 1
Electrical Detail - Sheet 1 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Traffic Engineering Branch - Traffic Signal Systems Section
NC Department of Transportation - Mobility and Safety Division
750 N.Greenfield Pkwy,Garner,NC 27529

W. Friendly Avenue
at
N. Lindell Road/
Wesley Long Hospital

Division 7 | Guilford County | Greensboro

PLAN DATE:	July 2026	REVIEWED BY:	T.W. Moody
PREPARED BY:	G. Whitehouse	REVIEWED BY:	B. Roth-Roffy

REVISIONS	INIT.	DATE

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SIG. INVENTORY NO. 07-1008T2

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#451:\\stvdfs\dfs\stvinc.com\3#DOPA#Vol13#Projects#4019518#4019518.0001#GL\Discipline Info#Traffic#Signals#2024 Standards Updates-Detour#Revised DGNs#071008-2026xxxxe-t2.dgn
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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 3.2

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A, B, C, D, and F*

(program controller as shown below)

*NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER
AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
        Lock Inhibit OFF
    Confl Lock Enable OFF
      Parent P Clrncs ON
Extra Included Phases OFF
  InhibitLockInterval ALWAYS
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  1
  then press Enter
```

```
Overlap A-1
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp A-1   Ps.....................
Included Ps    2  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap #  2
  then press Enter
```

```
Overlap B-2
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp B-2   Ps.....................
Included Ps    4  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap #  3
  then press Enter
```

```
Overlap C-3
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3   Ps.....................
Included Ps    6  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap #  4
  then press Enter
```

```
Overlap D-4
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp D-4   Ps.....................
Included Ps    4  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap #  6
  then press Enter
```

```
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp F-6   Ps.....................
Included Ps    2  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

END OF OVERLAP PROGRAMMING DETAIL

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1008T2
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

STV Engineers, Inc.
2151 Hawkins St., Suite 1400
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NC License Number F-0991

Signal Upgrade
Temporary Design 2 - TMP Phase II, Step 1
Electrical Detail - Sheet 2 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC Department of Transportation Traffic Engineering Branch Traffic Signals & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

W. Friendly Avenue
at
N. Lindell Road/
Wesley Long Hospital

Division 7 Guilford County

PLAN DATE:	July 2026	REVIEWED BY:	T.W. Moody
PREPARED BY:	G. Whitehouse	REVIEWED BY:	B. Roth-Roffy

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 3.3

FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The programming shown below enables the use of loadswitch AUX S6 for a right turn FYA overlap.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16 7.IO Logic
2.chan 17-24   5.chan+ 17-24 8.IO Viewer
3.Chan Parms  [6.IO Parms]   9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
Invert Rail Inputs: OFF
  EVP Ped Confirm: OFF
 Peer-Peer Timeout:   0
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16 7.IO Logic
2.chan 17-24   5.chan+ 17-24 8.IO Viewer
3.Chan Parms   6.IO Parms   [9.IO UserMap]
```

```
User I/O Maps
1. Inputs
2. Outputs
[3. Init Map]
```

```
Initialize User I/O Maps
Init ABC with: VIRCTL
   Init D with: NONE
  Init 2A with: MODE 5
Init TF BIUs with: NONE
```

SELECT MODE 5 →

PRESS "ESC"

```
User I/O Maps
1. Inputs
[2. Outputs]
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B  [5.FIO 2A]
3.NEMA C              9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	37	Ch13 Yellow	5-2	39	Ch15 Yellow
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	42	Ch18 Yellow	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	18	Ch18 Red	+6-2	66	Ch18 Green

OUTPUT PROGRAMMING COMPLETE

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-5	115	Not Used	42	Ch18 Yellow
6-1	115	Not Used	18	Ch18 Red
6-2	115	Not Used	66	Ch18 Green

Pin 6-1 (C1 pin 83) = Load Switch AUX S6-R
Pin 5-5 (C1 pin 100)= Load Switch AUX S6-Y
Pin 6-2 (C1 pin 84) = Load Switch AUX S6-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16 7.IO Logic
[2.chan 17-24] 5.chan+ 17-24 8.IO Viewer
3.Chan Parms   6.IO Parms    9.IO UserMap
```

→

```
          Chan.17..18..19..20..21..22..23..24
P/Olp#         1    6    5    7    0    0    0    0  ←
  Type       PED  OLP  PED  PED  VEH  VEH  VEH  VEH  ←
 Flash       DRK  RED  DRK  DRK  DRK  DRK  DRK  DRK  ←
Alt Hz         .    .    .    .    .    .    .    .
Dim Grn        .    .    .    .    .    .    .    .
Dim Yel        .    .    .    .    .    .    .    .
Dim Red+       .    .    .    .    .    .    .    .
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  [4.Chan+  1-16] 7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
          Chan.1...2...3...4...5...6...7...8 >
Flash Red      .   .   .   .   .   .   .   .
Flash Yel      .   .   .   .   .   .   .   .
Flash Grn      .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt      .   .   .   .   .   .   .   .
Olap Ovrd 0    0   0   0   0   0   0   0   0
```

→

```
          Chan.9..10..11..12..13..14..15..16
Flash Red      .   .   .   .   .   .   .   .
Flash Yel      .   .   .   .   .   .   .   .
Flash Grn X    X   X   X   .   .   .   .   ←
Inhibit Red Flash In
  Preempt      .   .   .   .   .   .   .   .
Olap Ovrd 0    0   0   0   0   0   0   0   0
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16 7.IO Logic
2.chan 17-24  [5.chan+ 17-24] 8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

→

```
          Chan.17..18..19..20..21..22..23..24
Flash Red      .   .   .   .   .   .   .   .
Flash Yel      .   .   .   .   .   .   .   .
Flash Grn      .   X   .   .   .   .   .   .  ←
Inhibit Red Flash In
  Preempt      .   .   .   .   .   .   .   .
Olap Ovrd 0    0   0   0   0   0   0   0   0
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1008T2
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

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Signal Upgrade
Temporary Design 2 - TMP Phase II, Step 1
Electrical Detail - Sheet 3 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

750 N.Greenfield Pkwy,Garner,NC 27529

W. Friendly Avenue
at
N. Lindell Road/
Wesley Long Hospital

Division 7 Guilford County

PLAN DATE:	July 2026	REVIEWED BY:	T.M. Moody
PREPARED BY:	G. Whitehouse	REVIEWED BY:	B. Roth-Roffy

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

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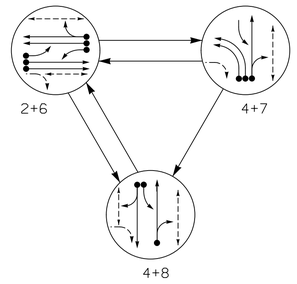
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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 4.0

3 Phase
Fully Actuated
(Greensboro Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

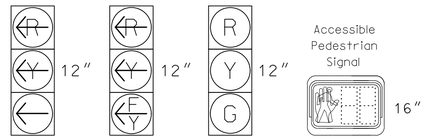
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 2+6	PHASE 4+7	PHASE 4+8	FLASH
21	FY	~~R~~	~~R~~	~~R~~
22, 23	G	R	R	R
41, 42	R	G	G	R
61	FY	~~R~~	~~R~~	~~R~~
62, 63	G	R	R	R
71, 72	~~R~~	←	~~R~~	~~R~~
81	~~R~~	FY	FY	~~R~~
82, 83	R	R	G	R
P21, P22	W	DW	DW	DRK
P41, P42	DW	DW	W	DRK
P61, P62	W	DW	DW	DRK
P81, P82	DW	W	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



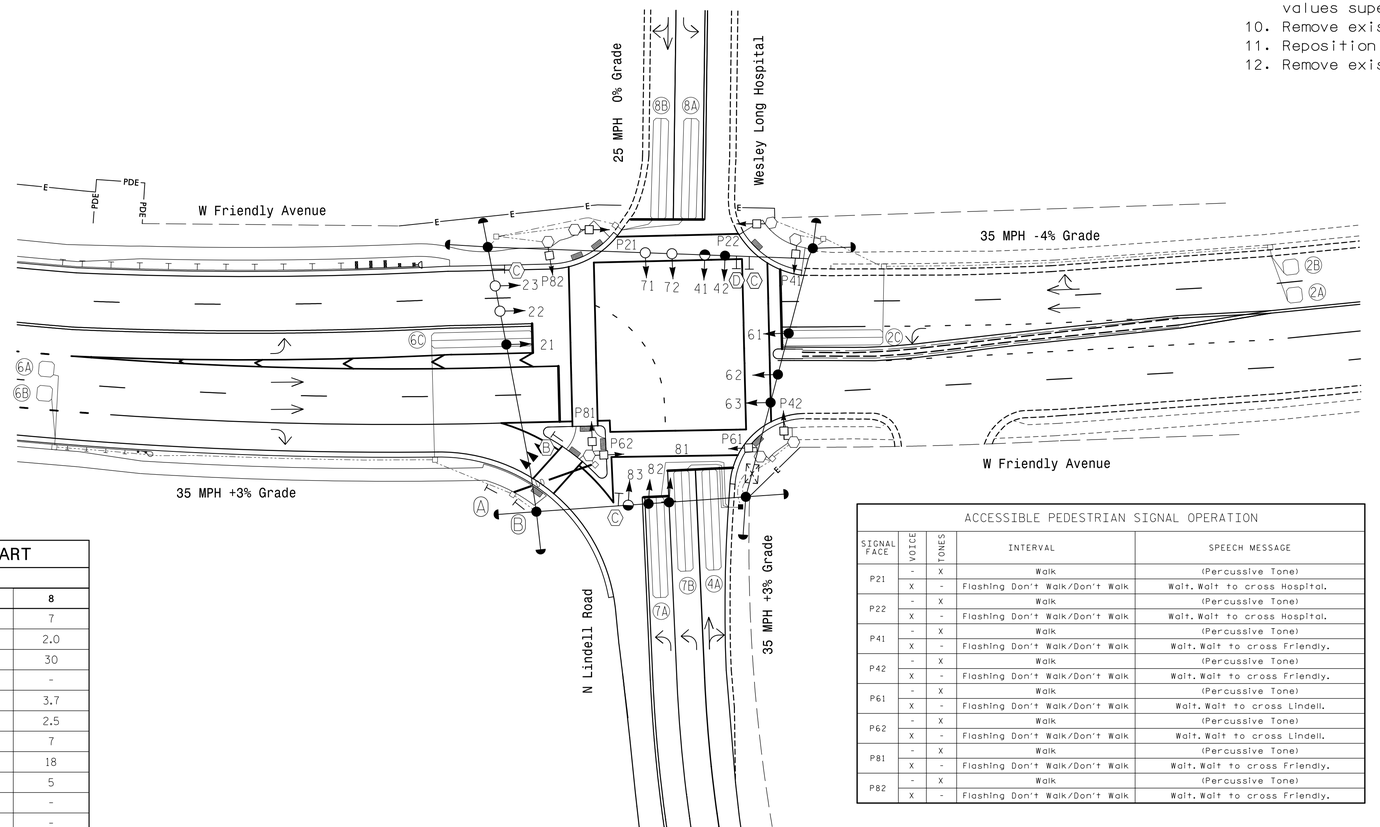
71, 72	21	22, 23	P21, P22
	61	41, 42	P41, P42
	81	62, 63	P61, P62
		82, 83	P81, P82

LOOP & DETECTOR UNIT INSTALLATION CHART
TRAFFICWARE APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2A	6X6	200	5	X	2	-	-	-	X	X	X	-	X
2B	6X6	200	5	X	2	-	-	-	X	X	X	-	X
2C	6X40	0	2-4-2	X	2	-	-	-	X	X	-	-	X
4A	6X40	0	2-4-2	X	4	-	10	-	X	X	-	-	X
6A	6X6	200	5	X	6	-	-	-	X	X	X	-	X
6B	6X6	200	5	X	6	-	-	-	X	X	X	-	X
6C	6X40	0	2-4-2	X	6	-	-	-	X	X	-	-	X
7A	6X40	0	2-4-2	X	7	-	3	-	X	X	-	-	X
7B	6X40	0	2-4-2	X	7	-	-	-	X	X	-	-	X
8A	6X40	0	2-4-2	X	8	-	3	-	X	X	-	-	X
8B	6X40	0	2-4-2	X	8	-	10	-	X	X	-	-	X

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024, "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 7 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. This intersection features accessble pedestrian signals utilizing percussive tone walk indications and/or speech messages.
8. Thirty days after implementation of the revised signal operation, sign D (R3-6R) may be removed at the discretion of the Regional Traffic Engineer.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Remove existing signal head numbered 43.
11. Reposition existing signal heads numbered 41 and 42.
12. Remove existing R3-1, R3-2, R3-5R, and R3-27 signs.



TRAFFICWARE APOGEE 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 7	PHASE 8
Min Green 1 *	10	7	10	7	7
Gap, Extension 1 *	5.0	2.0	5.0	2.0	2.0
Maximum Green 1 *	90	30	90	20	30
Maximum Green 2 *	-	-	-	-	-
Yellow Clear	4.1	3.7	4.1	3.0	3.7
Red Clear	2.2	2.5	2.2	2.8	2.5
Walk *	7	7	7	-	7
Pedestrian Clear	12	16	14	-	18
Green/Ped Delay	7	5	6	-	5
Added Initial *	1.5	-	1.5	-	-
Maximum Initial *	24	-	24	-	-
Time Before Reduction *	15	-	15	-	-
Time To Reduce *	30	-	30	-	-
Minimum Gap	3.0	-	3.0	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-	-
Lock Calls	YES	NO	YES	NO	NO
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

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

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P21	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Walt. Walt to cross Hospital.
P22	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Walt. Walt to cross Hospital.
P41	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Walt. Walt to cross Friendly.
P42	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Walt. Walt to cross Friendly.
P61	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Walt. Walt to cross Lindell.
P62	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Walt. Walt to cross Lindell.
P81	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Walt. Walt to cross Friendly.
P82	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk/Don't Walk	Walt. Walt to cross Friendly.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▭	Pedestrian Signal Head	■
○	Signal Pole with Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	— — —
→	Directional Arrow	→
⬡	Type II Signal Pedestal	⬢
— DD —	Directional Drill	N/A
N/A	Curb Ramp	◢
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	Pedestrian Crossing Sign (W11-2) with Downward Diagonal Arrow Plaque (W16-7P)	Ⓑ
Ⓒ	Right "TURNING VEHICLES" Yield "TO" Pedestrians Sign (R10-15R)	Ⓒ
Ⓓ	Combined Through and Right Arrow Sign (R3-6R)	Ⓓ

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NC License Number F-0991

Signal Upgrade - Final Design

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

W. Friendly Avenue
at
N. Lindell Road/Wesley Long Hospital

Division 7 Guilford County Greensboro

PLAN DATE: July 2026 REVIEWED BY: T.M. Moody
PREPARED BY: G. Whitehouse REVIEWED BY: B. Roth-Roffy

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

SIG. INVENTORY NO. 07-1008

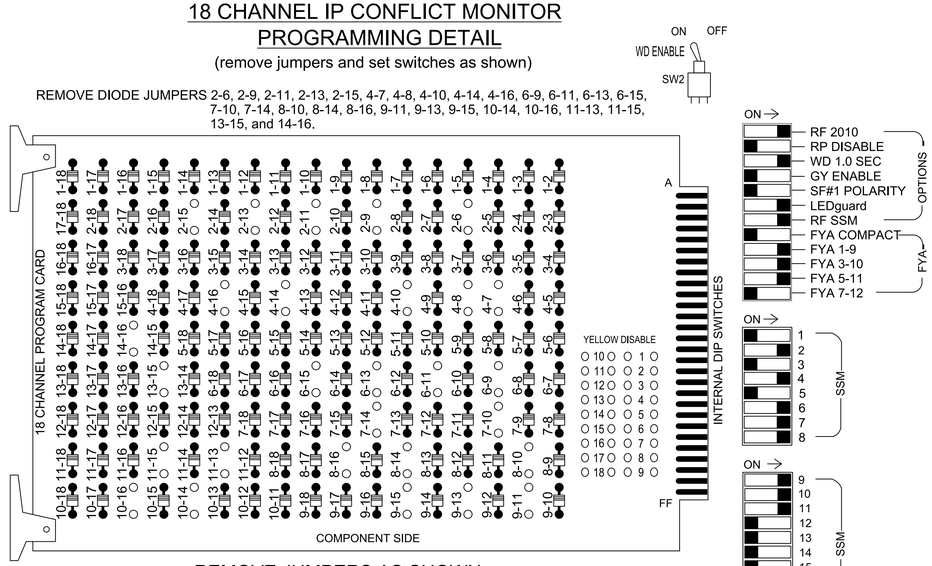
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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-6, 2-9, 2-11, 2-13, 2-15, 4-7, 4-8, 4-10, 4-14, 4-16, 6-9, 6-11, 6-13, 6-15, 7-10, 7-14, 8-10, 8-14, 8-16, 9-11, 9-13, 9-15, 10-14, 10-16, 11-13, 11-15, 13-15, and 14-16.



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 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 Plans.
2. Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
3. Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "Init 2A" to MODE 5 (MM 1-8-9-3).
4. Restore controller to factory default settings before programming per this electrical detail.
5. Program phases 2 and 6 for Start Up In Green.
6. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
7. Ensure "Local Flash Start" feature is set to "RSt".
8. Ensure "InhFYARedSt" feature is set to "ON" and set "Start Red Time" to 6.0 seconds.
9. Ensure "Flash Mode" is set to "Channel" (MM 1-4-1).
10. Ensure all channels are programmed to flash red (MM 1-8-1).
11. Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:

FROM MAIN MENU->1->8->7 (I/O LOGIC)

```
Result Src.Fcn        TimeOp Time
I208   =  OI208       DLY      1
```

12. Program phases 4 and 8 for Dual Entry.
13. The cabinet and controller are part of the Greensboro Signal System.

PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 4.1

SIGNAL HEAD HOOK-UP CHART

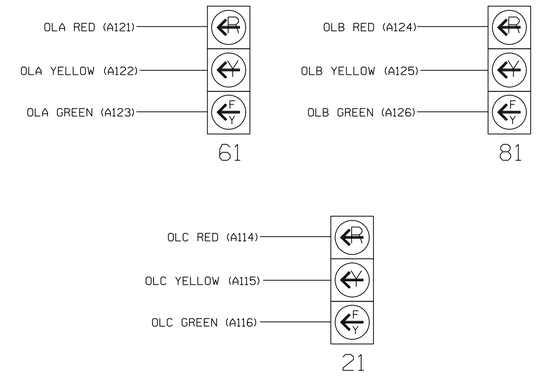
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	22,23	P21, P22	NU	41, 42	P41, P42	NU	62,63	P61, P62	71,72	82,83	P81, P82	61 ★	81 ★	NU	21 ★	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW										122			A121	A124		A114		
YELLOW ARROW										123			A122	A125		A115		
FLASHING YELLOW ARROW													A123	A126		A116		
GREEN ARROW										124								
✋			113			104			119			110						
🚶			115			106			121			112						

NU = Not Used

★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2 2A	Ø2 2C	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L		Ø2 2B	NOT USED			NOT USED						Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	Ø6 6C	SLOT EMPTY	SLOT EMPTY	Ø7 7A	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø6 6B	NOT USED			Ø7 7B	Ø8 8B							

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.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
2A	TB2-5,6	I2U	39	2	2				X	X	X
2B	TB2-7,8	I2L	43	3	2				X	X	X
2C	TB2-9,10	I3U	63	4	2				X	X	
4A	TB4-9,10	I6U	41	8	4		10		X	X	
6A	TB3-5,6	J2U	40	16	6				X	X	X
6B	TB3-7,8	J2L	44	17	6				X	X	X
6C	TB3-9,10	J3U	64	18	6				X	X	
7A	TB5-9,10	J6U	42	22	7		3		X	X	
7B	TB5-11,12	J6L	46	23	7				X	X	
8A	TB7-1,2	J7U	66	24	8		3		X	X	
8B	TB7-3,4	J7L	79	25	8		10		X	X	
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED						
P41,P62	TB8-5,6	I12L	69	PED 4	4 PED						
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED						
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED						

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

EQUIPMENT INFORMATION

```
CONTROLLER.............2070
CABINET................332 W/ AUX
SOFTWARE...............TRAFFICWARE APOGEE
CABINET MOUNT..........BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED......S2,S3,S5,S6,S8,S9,S10,S11,S12,
                        AUX S1,AUX S2,AUX S4
PHASES USED.............2,2PED,4,4PED,6,6PED,7,8,8PED
OVERLAP A..............*
OVERLAP B..............*
OVERLAP C..............*
OVERLAP D..............NOT USED
```

* See Sheet 2 and Sheet 3 for Overlap Programming Details.

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: 07-1008
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

stv
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NC License Number F-0991

Signal Upgrade - Final Design
Electrical Detail - Sheet 1 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC Department of Transportation — Transportation Mobility and Safety Division — Traffic Engineering Branch — Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

W. Friendly Avenue
at
N. Lindell Road/
Wesley Long Hospital

Division 7 | Guilford County | Greensboro

PLAN DATE:	July 2026	REVIEWED BY:	T.W. Moody
PREPARED BY:	G. Whitehouse	REVIEWED BY:	B. Roth-Roffy

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

SIG. INVENTORY NO. 07-1008

9/21/2026
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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 4.2

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A, B, C.*

(program controller as shown below)

*NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
Lock Inhibit OFF
Confl Lock Enable OFF
Parent P Clrncs ON
Extra Included Phases OFF
InhibitLockInterval ALWAYS
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  1
then press Enter
```

```
Overlap A-1
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp A-1   Ps.....................
Included Ps    2  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap #  2
then press Enter
```

```
Overlap B-2
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp B-2   Ps.....................
Included Ps    4  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap #  3
then press Enter
```

```
Overlap C-3
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp C-3   Ps.....................
Included Ps    6  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

END OF OVERLAP PROGRAMMING DETAIL

GREEN DELAY PROGRAMMING DETAIL FOR LEADING PEDESTRIAN INTERVAL OPERATION

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-1

```
Channel & I/O
1.Times      4.Ring,Start,Concur  7.Times+
2.Options    5.Call,Inh,Redirect  8.Copy
[3.Options+] 6.Alt Progs+         9.AdvWarn
```

PRESS "+" KEY ONCE

```
Options +        P..1..2..3..4..5..6..7.8 >
     Ped Delay   - .  .  .  .  .  .  .  .
Red Rest On Gap    .  .  .  .  .  .  .  .
  Conflicting P    0  0  0  0  0  0  0  0
Green/Ped Delay    0  7  0  5  0  6  0  5   <-
Omit Yel, Yel P    0  0  0  0  0  0  0  0
Ped Out/Ovrlp P    0  0  0  0  0  0  0  0
StartYel,Next P  + 0  0  0  0  0  0  0  0
```

CHANNEL & I/O PROGRAMMING COMPLETE

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that point in both directions of travel shall be installed if the median separates two parallel crosswalks.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1008
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

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Charlotte, NC 28203
(704) 372-1885
NC License Number F-0991

Signal Upgrade - Final Design
Electrical Detail - Sheet 2 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC Transportation Mobility and Safety Division
Traffic Engineering Branch
Traffic Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

W. Friendly Avenue
at
N. Lindell Road/
Wesley Long Hospital

Division 7 Guilford County

PLAN DATE:	July 2026	REVIEWED BY:	T.M. Moody
PREPARED BY:	G. Whitehouse	REVIEWED BY:	B. Roth-Roffy

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 4.3

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
                Channel & I/O
1.Chan  1-16  [4.Chan+  1-16] 7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
     Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
     Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn X   X   X   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1008
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

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Signal Upgrade - Final Design
Electrical Detail - Sheet 3 of 3

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W. Friendly Avenue
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Division 7 Guilford County

PLAN DATE:	July 2026	REVIEWED BY:	T.W. Moody
PREPARED BY:	G. Whitehouse	REVIEWED BY:	B. Roth-Roffy

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

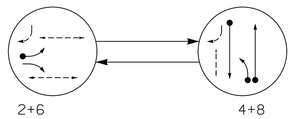
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9/21/2026
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LeonAR

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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 5.0

PHASING DIAGRAM



EV PREEMPT PHASES
(Medium Priority)



PHASING DIAGRAM DETECTION LEGEND

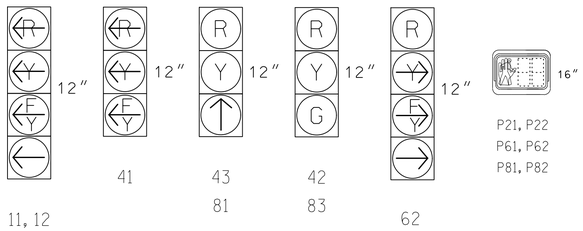
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 2+6	PHASE 4+8	PHASE PRE 3	PHASE FLASH
11,12	F Y	◄R	◄	◄R
41	◄R	F Y	◄R	◄R
42	R	G	R	R
43	R	↑	R	R
62	F Y	R	→	R
81	R	↑	R	R
83	R	G	R	R
P21, P22	W	DW	DW	DRK
P61, P62	W	DW	DW	DRK
P81, P82	DW	W	DW	DRK

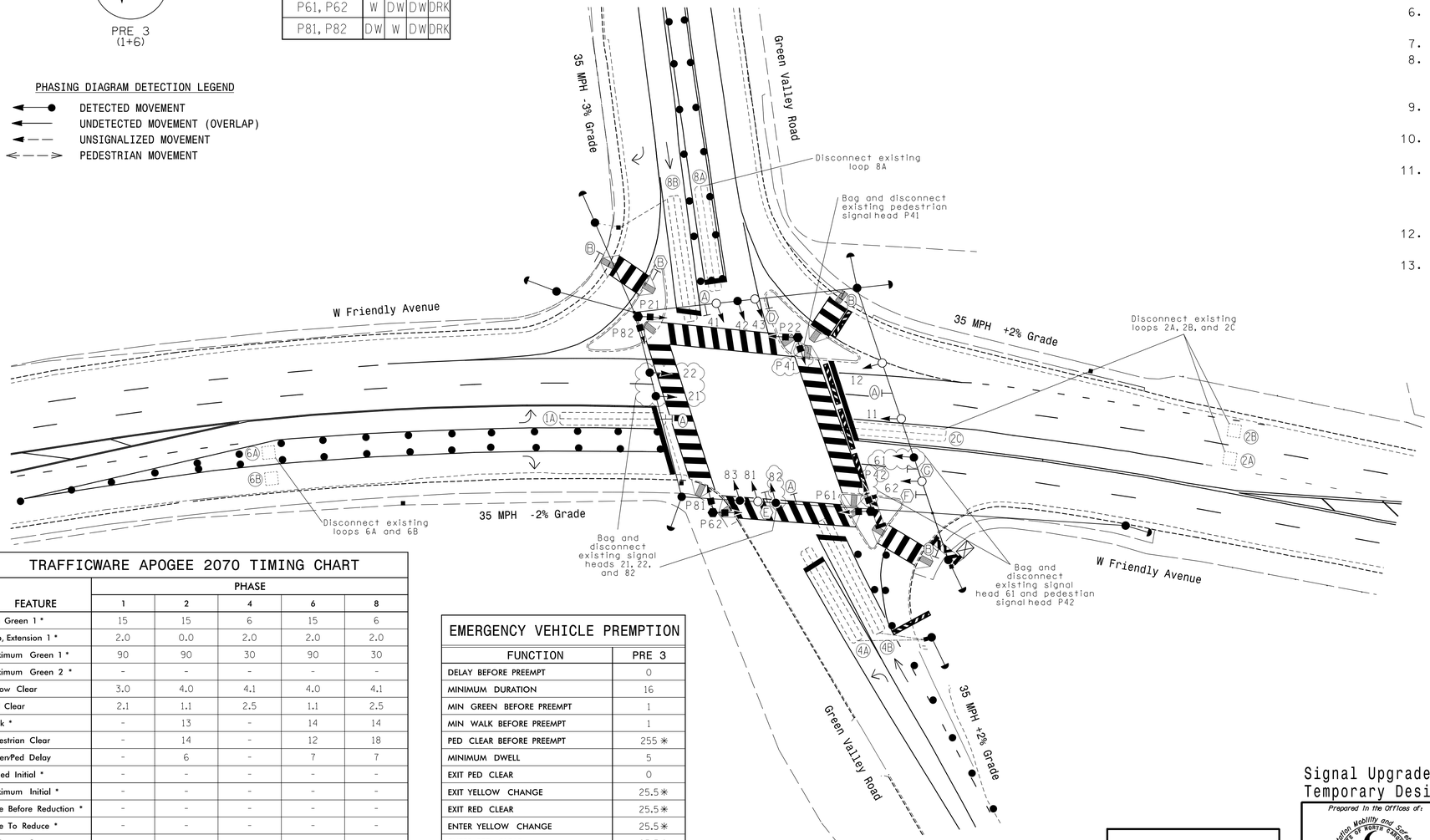
SIGNAL FACE I.D.

All Heads L.E.D.



LOOP & DETECTOR UNIT INSTALLATION CHART
TRAFFICWARE APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X50	+5	2-4-2	-	6	-	-	-	X	X	-	-	X
2A,2B	6X6	185	4	-	DISCONNECTED							-	-
2C	6X50	+5	2-4-2	-	DISCONNECTED							-	-
4A	6X50	+5	2-4-2	-	4	-	-	-	X	X	-	-	X
4B	6X60	+5	2-4-2	-	4	-	-	-	X	X	-	-	X
6A,6B	6X6	185	4	-	DISCONNECTED							-	-
8A	6X50	+5	2-4-2	-	DISCONNECTED							-	-
8B	6X60	+5	2-4-2	-	8	-	-	-	X	X	-	-	X



TRAFFICWARE APOGEE 2070 TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	15	15	6	15	6
Gap, Extension 1 *	2.0	0.0	2.0	2.0	2.0
Maximum Green 1 *	90	90	30	90	30
Maximum Green 2 *	-	-	-	-	-
Yellow Clear	3.0	4.0	4.1	4.0	4.1
Red Clear	2.1	1.1	2.5	1.1	2.5
Walk *	-	13	-	14	14
Pedestrian Clear	-	14	-	12	18
Green/Ped Delay	-	6	-	7	7
Added Initial *	-	-	-	-	-
Maximum Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL	-
Lock Calls	NO	NO	NO	NO	NO
Dual Entry	-	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

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

EMERGENCY VEHICLE PREMPTION

FUNCTION	PRE 3
DELAY BEFORE PREEMPT	0
MINIMUM DURATION	16
MIN GREEN BEFORE PREEMPT	1
MIN WALK BEFORE PREEMPT	1
PED CLEAR BEFORE PREEMPT	255 *
MINIMUM DWELL	5
EXIT PED CLEAR	0
EXIT YELLOW CHANGE	25.5 *
EXIT RED CLEAR	25.5 *
ENTER YELLOW CHANGE	25.5 *
ENTER RED CLEAR	25.5 *
ALL-RED B4 PREEMPT	OFF
LOCK INPUT	ON
OVERRIDE HIGHER # PREEMPT	OFF
EXIT PREEMPT TO	4+8

* Time defaults to time used for phase during normal operation.

2 Phase
Fully Actuated
(Greensboro Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024, "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. Locate new cabinet so as to not obstruct sight distance of vehicles turning right on red.
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. Pavement markings are existing unless otherwise shown.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Renumber existing signal heads 41, 42, 81, and 82 to 42, 82, and 83, respectively.
10. Reposition existing signal heads numbered 42, 82, and 83.
11. Bag and disconnect existing signal heads numbered 21, 22, 61, and 82, and existing pedestrian signal heads numbered P41 and P42, but retain for future use.
12. Disconnect existing loops 2A, 2B, 2C, 6A, and 8A, but retain for future use.
13. Abandon existing loops 2S1, 2S2, 6S1, and 6S2.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□	Pedestrian Signal Head	■
○	Signal Pole with Guy	●
⊠	Controller & Cabinet	⊠
□	Junction Box	■
⬡	Type II Signal Pedestal	⬢
·····	2-in Underground Conduit	·-·-·
N/A	Right of Way	———
→	Directional Arrow	→
▭	Inductive Loop Detector	▭
• • •	Construction Zone Drums	• • •
▨	Construction Barricade	▨
Ⓐ	Street Sign (D3-1) (By Others)	Ⓐ
Ⓑ	Pedestrian Crossing Sign (W11-2) with Downward Diagonal Arrow Plaque (W16-7P)	Ⓑ
Ⓓ	No Right Turn Sign (R3-1)	Ⓓ
Ⓔ	No Left Turn Sign (R3-2)	Ⓔ
Ⓕ	Right Arrow "ONLY" Sign (R3-5R)	Ⓕ
Ⓖ	No Straight Through Sign (R3-27)	Ⓖ

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Signal Upgrade
Temporary Design 1 - TMP Phase I, Step 2

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

W. Friendly Avenue at
Green Valley Road

Division 7 Guilford County Greensboro

PLAN DATE: July 2026 REVIEWED BY: T.W. Moody
PREPARED BY: G. Whitehouse REVIEWED BY: B. Roth-Roffy

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

SIG. INVENTORY NO. GBO-1971

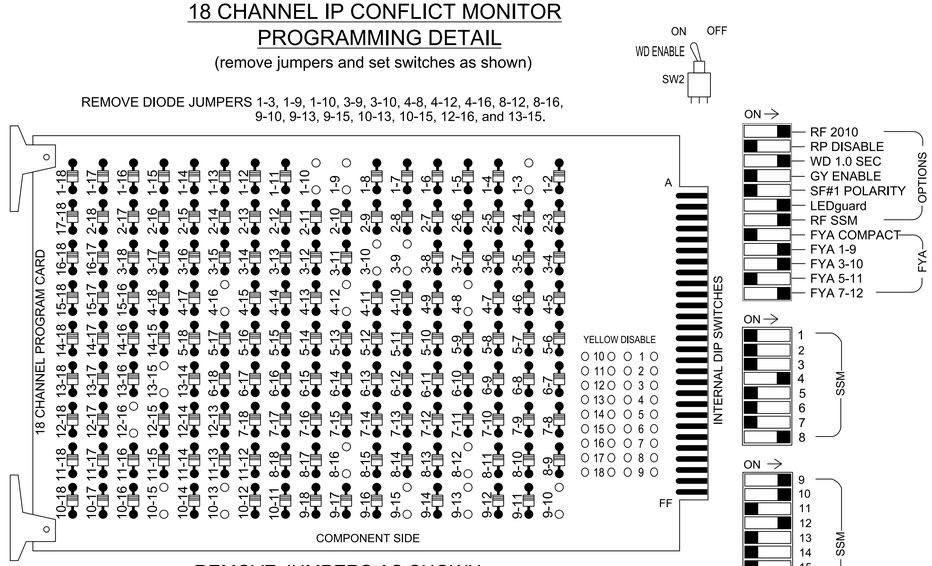
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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-3, 1-9, 1-10, 3-9, 3-10, 4-8, 4-12, 4-16, 8-12, 8-16, 9-10, 9-13, 9-15, 10-13, 10-15, 12-16, and 13-15.



■ = DENOTES POSITION OF SWITCH

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 Plans.
2. Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
3. Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "Init 2A" to MODE 5 (MM 1-8-9-3).
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "RS+".
7. Ensure "InhFYARedSt" feature is set to "ON" and set "Start Red Time" to 6.0 seconds.
8. Ensure "Flash Mode" is set to "Channel" (MM 1-4-1).
9. Ensure all channels are programmed to flash red (MM 1-8-1).
10. Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:

FROM MAIN MENU->1->8->7 (I/O LOGIC)

Result	Src.Fcn		TimeOp	Time
I208	=	OI208	DLY	1

11. Program phases 4 and 8 for Dual Entry.
12. The cabinet and controller are part of the Greensboro Signal System.

PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 5.1

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	OLG	4		4 PED	5	6	6 PED	7	8		8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11,12 ★	NC	P21, P22	62 ★	42	43	NU	NU	NC	P61, P62	NU	81	83	P81, P82	11,12 ★	62 ★	NU	NU	41 ★	NU
RED					101	101						107	107			A124				
YELLOW	✳			✳	102	102						108	108							
GREEN					103								109							
RED ARROW															A121				A101	
YELLOW ARROW															A122	A125			A102	
FLASHING YELLOW ARROW															A123	A126			A103	
GREEN ARROW	127			118		103						109								
✋			113							119				110						
🚶			115							121				112						

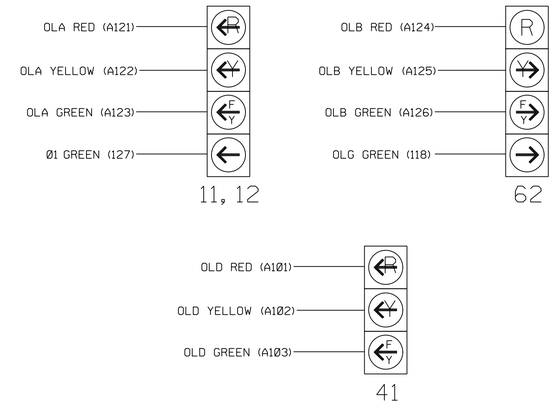
NU = Not Used
NC = Not Connected

✳ Denotes install load resistor. See load resistor installation detail on Sheet 2.

★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME
PRE3 = EV PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

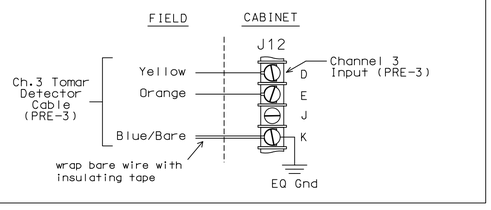
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
1A	TB2-1,2	I1U	56	1	6				X	X	
4A	TB4-9,10	I6U	41	8	4				X	X	
4B	TB4-11,12	I6L	45	9	4				X	X	
8B	TB5-11,12	J6L	46	23	8				X	X	
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED						
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED						
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED						

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

TYPICAL TOMAR FIELD WIRE DETAIL

(input file, rear view)



EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....TRAFFICWARE APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S3,S4,S5,S9,S11,S12,
AUX S1,AUX S2,AUX S5
PHASES USED.....✳✳1,#2,2PED,4,#6,6PED,8,8PED
OVERLAP A.....✳
OVERLAP B.....✳
OVERLAP C.....NOT USED
OVERLAP D.....✳
OVERLAP G.....✳

✳ See Sheet 2 for Overlap Programming Detail.
✳✳ USED DURING PREEMPT ONLY - DO NOT ENABLE PHASE 1.
For Timing Purposes Only.

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Charlotte, NC 28203
(704) 372-1885
NC License Number F-0991

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: GBO-197T1
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

Signal Upgrade
Temporary Design 1 - TMP Phase I, Step 2
Electrical Detail - Sheet 1 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

750 N.Greenfield Pkwy,Garner,NC 27529

W. Friendly Avenue at Green Valley Road

Division 7 | Guilford County | Greensboro

PLAN DATE: July 2026 | REVIEWED BY: T.W. Moody

PREPARED BY: G. Whitehouse | REVIEWED BY: B. Roth-Roffy

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
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SIG. INVENTORY NO. GBO-197T1

9/21/2026
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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 5.2

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A, B, D, and G.*

(program controller as shown below)

*NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
     Lock Inhibit OFF
  Confl Lock Enable OFF
    Parent P Clrncs ON
Extra Included Phases OFF
  InhibitLockInterval ALWAYS
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  1
  then press Enter
```

```
Overlap A-1
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
 Ovrlp A-1   Ps.....................
Included Ps    1  0  0  0  0  0  0  0
Modifier Ps    2  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap #  2
  then press Enter
```

```
Overlap B-2
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
 Ovrlp B-2   Ps.....................
Included Ps    1  0  0  0  0  0  0  0
Modifier Ps    6  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap #  4
  then press Enter
```

```
Overlap D-4
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp D-4   Ps.....................
Included Ps    8  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap #  7
  then press Enter
```

```
Overlap G-7
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

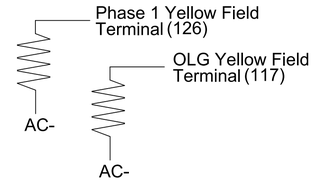
```
 Ovrlp G-7   Ps.....................
Included Ps    1  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

END OF OVERLAP PROGRAMMING DETAIL

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER OT INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

GREEN DELAY PROGRAMMING DETAIL FOR LEADING PEDESTRIAN INTERVAL OPERATION

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-1

```
Channel & I/O
1.Times      4.Ring,Start,Concur  7.Times+
2.Options    5.Call,Inh,Redirect  8.Copy
[3.Options+] 6.Alt Progs+         9.AdvWarn
```

PRESS "+" KEY ONCE

```
Options +          P..1..2..3..4..5..6..7.8 >
     Ped Delay     - .  .  .  .  .  .  .  .
Red Rest On Gap      .  .  .  .  .  .  .  .
  Conflicting P      0  0  0  0  0  0  0  0
Green/Ped Delay      0  6  0  0  0  7  0  7   ←
Omit Yel, Yel P      0  0  0  0  0  0  0  0
Ped Out/Ovrlp P      0  0  0  0  0  0  0  0
StartYel,Next P    + 0  0  0  0  0  0  0  0
```

[CHANNEL & I/O PROGRAMMING COMPLETE]

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: GBO-197T1
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

Signal Upgrade
Temporary Design 1 - TMP Phase I, Step 2
Electrical Detail - Sheet 2 of 4

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

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W. Friendly Avenue at Green Valley Road

Division 7 | Guilford County | Greensboro

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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 5.3

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
       T&F Biu Map: DEFAULT
Invert Rail Inputs: OFF
  EVP Ped Confirm: OFF
 Peer-Peer Timeout:   0
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
Initialize User I/O Maps
    Init ABC with: VIRCTL
      Init D with: NONE
     Init 2A with: MODE 5
Init TF BIUs with: NONE
```

SELECT MODE 5 →

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    5.FIO 2A
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	-4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	0	Unused	5-2	39	Ch15 Yellow
5-3	0	Unused	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	+6-2	115	Not Used

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	-6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	59	Ch11 Green
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	38	Ch14 Yellow	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	+7-8	37	Ch13 Yellow

OUTPUT PROGRAMMING COMPLETE

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-1	37	Ch13 Yellow.....	0	Unused
5-3	38	Ch14 Yellow.....	0	Unused

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
7-5	58	Ch10 Green	38	Ch14 Yellow
7-8	57	Ch9 Green	37	Ch13 Yellow

```
Pin 5-1 (C1 pin 35) = Load Switch S3-Y
Pin 5-3 (C1 pin 37) = Load Switch S6-Y
Pin 7-8 (C1 pin 99) = Load Switch AUX S1-G
Pin 7-5 (C1 pin 96) = Load Switch AUX S2-G
```

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

→

```
Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   X   X   .   .   ←
Flash Grn .   .   .   X   .   .   .   .   ←
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   1   2   0   0   ←
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output remapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL ASSIGN CHANNELS FOR OVERLAP G

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-8
THEN SELECT CHAN 1-16

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

```
Chan.1...2...3...4...5...6...7...8 >
P/Olp#    1   2   7   4   5   6   7   8
  Type  VEH VEH OLP VEH VEH VEH VEH VEH
 FLASH  RED RED RED RED RED RED RED RED
Alt Hz   X   .   X   .   X   .   .   X
Dim Grn  .   .   .   .   .   .   .   .
Dim Yel  .   .   .   .   .   .   .   .
Dim Red+ .   .   .   .   .   .   .   .
Fish Grn 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
Chan.9..10..11..12..13..14..15..16 >
P/Olp#    1   2   3   4   2   4   6   8
  Type  OLP OLP OLP OLP PED PED PED PED
 FLASH  RED RED RED RED DRK DRK DRK DRK
Alt Hz   X   .   X   .   .   .   .   .
Dim Grn  .   .   .   .   .   .   .   .
Dim Yel  .   .   .   .   .   .   .   .
Dim Red+ .   .   .   .   .   .   .   .
Fish Grn 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

CHANNEL & I/O PROGRAMMING COMPLETE

Signal Upgrade
Temporary Design 1 - TMP Phase I, Step 2
Electrical Detail - Sheet 3 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: GBO-197T1
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

STV Engineers, Inc.
2151 Hawkins St., Suite 1400
Charlotte, NC 28203
(704) 372-1885
NC License Number F-0991

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC Transportation Mobility and Safety Division Traffic Engineering Branch Traffic Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

W. Friendly Avenue at Green Valley Road

Division 7 | Guilford County | Greensboro

PLAN DATE:	July 2026	REVIEWED BY:	T.M. Moody
PREPARED BY:	G. Whitehouse	REVIEWED BY:	B. Roth-Roffy

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

SIG. INVENTORY NO. GBO-197T1

9/21/2026
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Docusign Envelope ID: 6500A714-C7D1-87E3-8297-F21086E37346

PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 5.4

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL FOR 'PRE 3'

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS

```
        Preemption Menu
[1.HiPriority]  4.LowPriority
2.Events
3.Sequences
```

ENTER PREEMPT #3

```
# 3              Preemption
[1.Times]          4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 3  Times   :    Begin     :      Other
  Delay     0   MinGrn    1    Track Grn    0
MinDura    16   MinWlk    1    Min Dwell    5
MaxPres     0   PedClr  255
```

PRESS "ESC"

```
# 3              Preemption
1.Times            4.Times+
[2.Phases]         5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 3              ---- Preempt Phases ----
Track Veh        0  0  0  0
DwellCyc Veh     1  6  0  0  0  0  0  0
DwellCyc(more)   0  0  0  0
DwellCyc (Ped)   0  0  0  0  0  0  0  0
Exit             4  8  0  0
```

PRESS "ESC"

```
# 3              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
[3.Options]        6.Options+     9.Init'Dwell
```

```
# 3       Preempt Options
                    Lock input ON
            Override Auto Flash OFF
  Override higher # preempt OFF
                 Flash in dwell OFF
           Link to preempt # 0
```

PRESS "ESC"

```
# 3              Preemption
1.Times            [4.Times+]
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 3 Preempt Times+     --- Exit --
                      Ped Clr    0
  Extend Dwell    0       Yel  0.0
   Return Max     0       Red  0.0
```

PRESS "ESC"

```
# 3              Preemption
1.Times            4.Times+
2.Phases           [5.Overlaps+]  8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 3              -- Preempt Overlaps+ --
      Track      0  0  0  0  0  0  0  0
     (more)      0  0  0  0
    DwellCyc     1  2  7  0  0  0  0  0
     (more)      0  0  0  0
```

PRESS "ESC"

```
# 3              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    [8.AdvTimes]
3.Options          6.Options+     9.Init'Dwell
```

```
# 3 AdvTimes
  AllRedB4Prmpt OFF     EnterYelChg 25.5
   ResetExtDwell OFF     EnterRedClr 25.5
ReservicePrempt OFF     TrackYelChg 25.5
        EndDwell OFF     TrackRedClr 25.5
  DynExitThresh    0                1111111
 DsblDwellCalls OFF  12345678  90123456
  +  ExitVehCall     ........  ........
```

PRESS "ESC"

```
# 3              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     [9.Init'Dwell]
```

```
# 3        --   Initial Dwell   --
Phases     0  0  0  0
Peds       0  0  0  0
Overlaps   0  0  0  0  0  0  0  0
  (more)   0  0  0  0  0  0  0  0
```

PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: GBO-197T1
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

Signal Upgrade
Temporary Design 1 - TMP Phase I, Step 2
Electrical Detail - Sheet 4 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STV Engineers, Inc.
2151 Hawkins St., Suite 1400
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NC License Number F-0991

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

750 N.Greenfield Pkwy,Garner,NC 27529

W. Friendly Avenue at Green Valley Road

Division 7 | Guilford County | Greensboro

PLAN DATE:	July 2026	REVIEWED BY:	T.W. Moody
PREPARED BY:	G. Whitehouse	REVIEWED BY:	B. Roth-Roffy

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

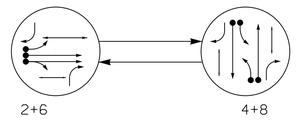
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9/21/2026
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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 6.0

PHASING DIAGRAM



EV PREEMPT PHASES
(Medium Priority)



PRE 3
(1+6)

PHASING DIAGRAM DETECTION LEGEND

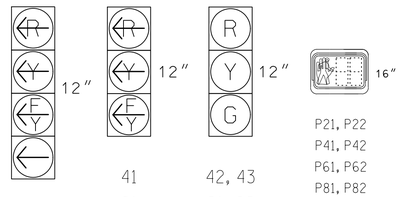
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 2+6	PHASE 4+8	PHASE PRE 3	PHASE FLASH
11	~~FY~~	~~R~~	←	~~R~~
41	~~R~~	~~FY~~	~~R~~	~~R~~
42, 43	R	G	R	R
61, 62	G	R	G	R
81	~~R~~	~~FY~~	~~R~~	~~R~~
82, 83	R	G	R	R
P21, P22	W	DW	DW	DRK
P41, P42	DW	W	DW	DRK
P61, P62	W	DW	DW	DRK
P81, P82	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



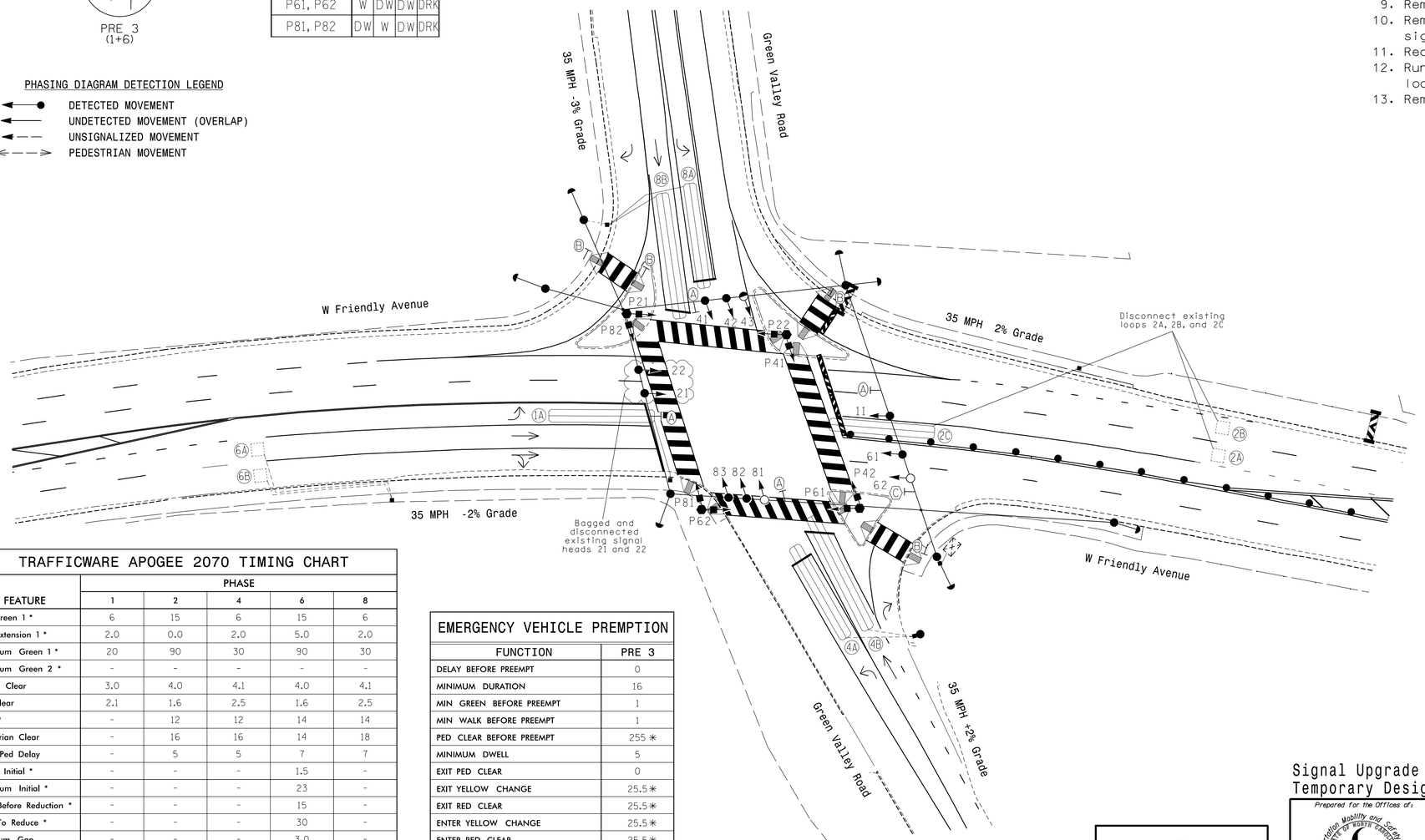
LOOP & DETECTOR UNIT INSTALLATION CHART
TRAFFICWARE APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X50	+5	2-4-2	-	6	-	-	-	X	X	-	-	-
2A,2B	6X6	185	4	-	DISCONNECTED							-	-
2C	6X50	+5	2-4-2	-	DISCONNECTED							-	-
4A	6X50	+5	2-4-2	-	4	-	-	-	X	X	-	-	-
4B	6X60	+5	2-4-2	-	4	-	-	-	X	X	-	-	-
6A *	6X6	185	4	-	6	-	-	-	X	X	X	-	X
6B *	6X6	185	4	-	6	-	-	-	X	X	X	-	X
8A	6X50	+5	2-4-2	-	8	-	5	-	X	X	-	-	-
8B	6X60	+5	2-4-2	-	8	-	-	-	X	X	-	-	-

* See Note 13

2 Phase
Fully Actuated
(Greensboro Signal System)
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024, "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 unless otherwise shown.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Remove existing signal head numbered 12.
9. Remove bag and reconnect existing signal heads 61 and 82.
10. Remove bag and reconnect existing pedestrian signal heads P41 and P42.
11. Reconnect existing loops 6A, 6B, and 8A.
12. Run additional lead-in cable for separated loops 6A and 6B.
13. Remove existing R3-1, R3-2, R3-5R, and R3-27 signs.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Controller & Cabinet	
	Junction Box	
	Type II Signal Pedestal	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Inductive Loop Detector	
	Construction Zone Drums	
	Construction Barricade	
Ⓐ	Street Sign (D3-1) (By Others)	Ⓐ
Ⓑ	Pedestrian Crossing Sign (W11-2) with Downward Diagonal Arrow Plaque (W16-7P)	Ⓑ
Ⓒ	Right "TURNING VEHICLES" Yield "TO" Pedestrians Sign (R10-15R)	Ⓒ

TRAFFICWARE APOGEE 2070 TIMING CHART

FEATURE	PHASE 1	2	4	6	8
Min Green 1 *	6	15	6	15	6
Gap, Extension 1 *	2.0	0.0	2.0	5.0	2.0
Maximum Green 1 *	20	90	30	90	30
Maximum Green 2 *	-	-	-	-	-
Yellow Clear	3.0	4.0	4.1	4.0	4.1
Red Clear	2.1	1.6	2.5	1.6	2.5
Walk *	-	12	12	14	14
Pedestrian Clear	-	16	16	14	18
Green/Ped Delay	-	5	5	7	7
Added Initial *	-	-	-	1.5	-
Maximum Initial *	-	-	-	23	-
Time Before Reduction *	-	-	-	15	-
Time To Reduce *	-	-	-	30	-
Minimum Gap	-	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	MIN RECALL	-
Lock Calls	YES	NO	NO	YES	NO
Dual Entry	-	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

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

EMERGENCY VEHICLE PREMPTION

FUNCTION	PRE 3
DELAY BEFORE PREEMPT	0
MINIMUM DURATION	16
MIN GREEN BEFORE PREEMPT	1
MIN WALK BEFORE PREEMPT	1
PED CLEAR BEFORE PREEMPT	255 *
MINIMUM DWELL	5
EXIT PED CLEAR	0
EXIT YELLOW CHANGE	25.5 *
EXIT RED CLEAR	25.5 *
ENTER YELLOW CHANGE	25.5 *
ENTER RED CLEAR	25.5 *
ALL-RED B4 PREEMPT	OFF
LOCK INPUT	ON
OVERRIDE HIGHER # PREEMPT	OFF
EXIT PREEMPT TO	2+6

* Time defaults to time used for phase during normal operation.

STV Engineers, Inc.
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(704) 372-1885
NC License Number F-0991

Signal Upgrade
Temporary Design 2 - TMP Phase II, Step 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

W. Friendly Avenue at Green Valley Road

Division 7 Guilford County Greensboro

PLAN DATE: July 2026 REVIEWED BY: T.W. Moody
PREPARED BY: G. Whitehouse REVIEWED BY: B. Roth-Roffy

REVISIONS	INIT.	DATE

SCALE 0 30 1"=30'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

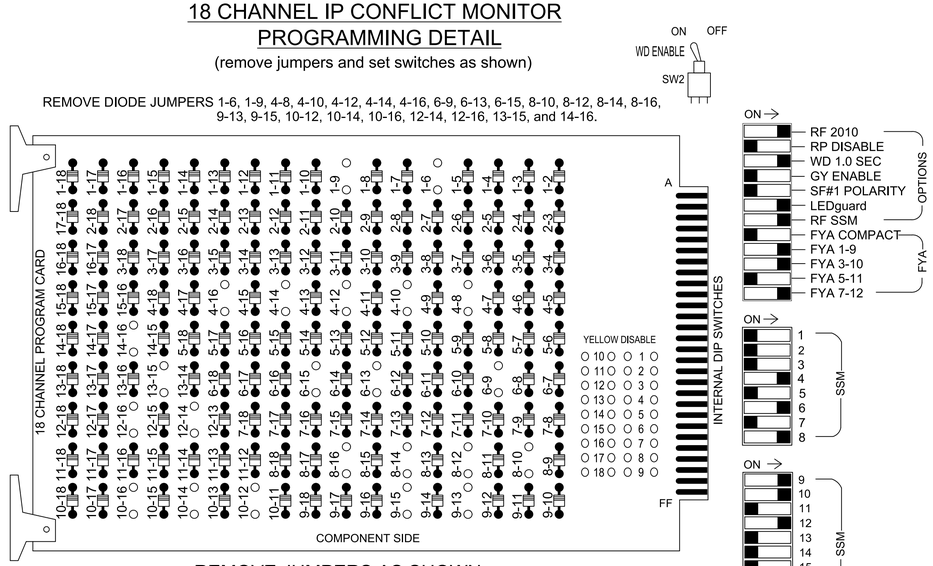
SIG. INVENTORY NO. GBO-19772

9/21/2026
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LeonaPR

Docusign Envelope ID: 6500A714-C7D1-87E3-8297-F21086E37346

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. 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. Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
3. Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "Init 2A" to MODE 5 (MM 1-8-9-3).
4. Restore the controller to Factory Default Settings before programming as per this electrical plan.
5. Program phases 2 and 6 for Start Up In Green.
6. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
7. Ensure "Local Flash Start" feature is set to "RSt".
8. Ensure "InhFYARedSt" feature is set to "ON" and set "Start Red Time" to 6.0 seconds.
9. Ensure "Flash Mode" is set to "Channel" (MM 1-4-1).
10. Ensure all channels are programmed to flash red (MM 1-8-1).
11. Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:

FROM MAIN MENU->1->8->7 (I/O LOGIC)

Result	Src.Fcn		TimeOp	Time
I208	=	OI208	DLY	1

12. Program phases 4 and 8 for Dual Entry.
13. The cabinet and controller are part of the Greensboro Signal System.

PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 6.1

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11 ★	NC	P21, P22	NU	42,43	P41, P42	NU	61,62	P61, P62	NU	82,83	P81, P82	11 ★	81 ★	NU	NU	41 ★	NU
RED					101			134			107							
YELLOW	✳				102			135			108							
GREEN					103			136			109							
RED ARROW													A121	A124			A101	
YELLOW ARROW													A122	A125			A102	
FLASHING YELLOW ARROW													A123	A126			A103	
GREEN ARROW	127																	
			113			104			119			110						
			115			106			121			112						

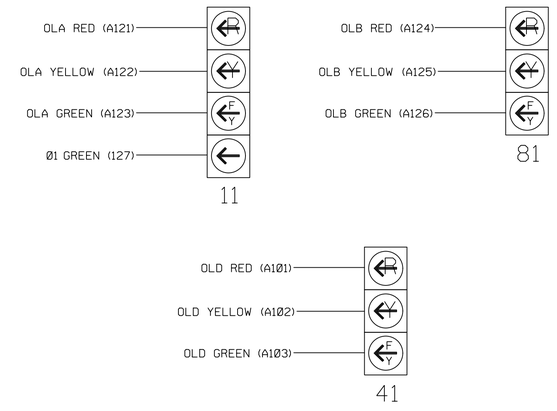
NU = Not Used
NC = Not Connected

✳ Denotes install load resistor. See load resistor installation detail on Sheet 2.

★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	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					Ø 3 4B						Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	CH. 3 PRE 3 Tomar	SLOT EMPTY	SLOT EMPTY
	L		Ø 6 6B				Ø 8 8B						NOT USED		

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

FS = FLASH SENSE
ST = STOP TIME
PRE3 = EV PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

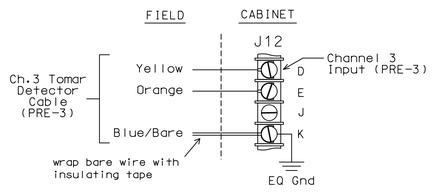
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
1A	TB2-1,2	I1U	56	1	6				X	X	
4A	TB4-9,10	I6U	41	8	4				X	X	
4B	TB4-11,12	I6L	45	9	4				X	X	
6A	TB3-5,6	J2U	40	16	6				X	X	X
6B	TB3-7,8	J2L	44	17	6				X	X	X
8A	TB5-9,10	J6U	42	22	8		5		X	X	
8B	TB5-11,12	J6L	46	23	8				X	X	
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED						
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED						
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED						
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED						

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

TYPICAL TOMAR FIELD WIRE DETAIL

(input file, rear view)



EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....TRAFFICWARE APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S3,S5,S6,S8,S9,S11,S12, AUX S1,AUX S2,AUX S5
PHASES USED.....**1,#2,2 PED,4,4 PED,6, 6 PED,8,8 PED
OVERLAP A.....*
OVERLAP B.....*
OVERLAP C.....NOT USED
OVERLAP D.....*

* See Sheet 2 for Overlap Programming Detail.
** USED DURING PREEMPT ONLY - DO NOT ENABLE PHASE 1.
# For Timing Purposes Only.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: GBO-197T2
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

Signal Upgrade
Temporary Design 2 - TMP Phase II, Step 1
Electrical Detail - Sheet 1 of 4

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STV Engineers, Inc.
2151 Hawkins St., Suite 1400
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(704) 372-1885
NC License Number F-0991

ELECTRICAL AND PROGRAMMING DETAILS FOR:

W. Friendly Avenue at Green Valley Road

Division 7 | Guilford County | Greensboro

PLAN DATE: July 2026 | REVIEWED BY: T.W. Moody
PREPARED BY: G. Whitehouse | REVIEWED BY: B. Roth-Roffy

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

SIG. INVENTORY NO. GBO-197T2

750 N.Greenfield Pkwy,Garner,NC 27529

9/21/2026
#4517@stvinc.com%3a%2fAAVol3%2fProjects%2f019518%2f019518.0001%2fD_Discipline Info%2fTraffic%2fSignals%2024 Standards Updates-Detour%2fRevised DGNs%2fGB0197-2026xxxxe-t2.dgn
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Docusign Envelope ID: 6500A714-C7D1-87E3-8297-F21086E37346

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A, B, and D*

(program controller as shown below)

*NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
Lock Inhibit OFF
Confl Lock Enable OFF
Parent P Clrncs ON
Extra Included Phases OFF
InhibitLockInterval ALWAYS
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap # 1
then press Enter
```

```
Overlap A-1
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
Ovrlp A-1   Ps.....................
Included Ps   1  0  0  0  0  0  0  0
Modifier Ps   2  0  0  0  0  0  0  0
Type:FYA-4    Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap # 2
then press Enter
```

```
Overlap B-2
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp B-2   Ps.....................
Included Ps   4  0  0  0  0  0  0  0
Modifier Ps   0  0  0  0  0  0  0  0
Type:NORMAL   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap # 4
then press Enter
```

```
Overlap D-4
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp D-4   Ps.....................
Included Ps   8  0  0  0  0  0  0  0
Modifier Ps   0  0  0  0  0  0  0  0
Type:NORMAL   Grn:  0  Yel: 3.5  Red: 1.5
```

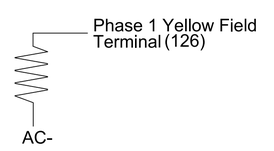
END OF OVERLAP PROGRAMMING DETAIL

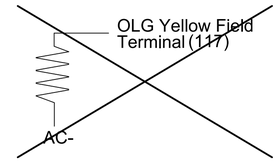
PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 6.2

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)





NOTE: REMOVE RESISTOR FROM OLG YELLOW FIELD TERMINAL (117).

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER OT INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

GREEN DELAY PROGRAMMING DETAIL FOR LEADING PEDESTRIAN INTERVAL OPERATION

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-1

```
Channel & I/O
1.Times      4.Ring,Start,Concur  7.Times+
2.Options    5.Call,Inh,Redirect  8.Copy
[3.Options+] 6.Alt Progs+         9.AdvWarn
```

PRESS "+" KEY ONCE

```
Options +        P..1..2..3..4..5..6..7.8 >
     Ped Delay   - .  .  .  .  .  .  .  .
Red Rest On Gap    .  .  .  .  .  .  .  .
  Conflicting P    0  0  0  0  0  0  0  0
Green/Ped Delay    0  5  0  5  0  7  0  7
Omit Yel, Yel P    0  0  0  0  0  0  0  0
Ped Out/Ovrlp P    0  0  0  0  0  0  0  0
StartYel,Next P  + 0  0  0  0  0  0  0  0
```

CHANNEL & I/O PROGRAMMING COMPLETE

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: GBO-197T2
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

Signal Upgrade
Temporary Design 2 - TMP Phase II, Step 1
Electrical Detail - Sheet 2 of 4

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2151 Hawkins St., Suite 1400
Charlotte, NC 28203
(704) 372-1885
NC License Number F-0991

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC Transportation Mobility and Safety Division, Traffic Engineering Branch, Traffic Signal Systems Section, Department of Transportation, State of North Carolina

750 N.Greenfield Pkwy,Garner,NC 27529

W. Friendly Avenue at Green Valley Road

Division 7 | Guilford County | Greensboro

PLAN DATE: July 2026 | REVIEWED BY: T.M. Moody

PREPARED BY: G. Whitehouse | REVIEWED BY: B. Roth-Roffy

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

SIG. INVENTORY NO. GBO-197T2

9/21/2026
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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 6.3

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
       T&F Biu Map: DEFAULT
Invert Rail Inputs: OFF
  EVP Ped Confirm: OFF
 Peer-Peer Timeout:   0
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
Initialize User I/O Maps
   Init ABC with: VIRCTL
     Init D with: NONE
    Init 2A with: MODE 5
Init TF BIUs with: NONE
```

SELECT MODE 5 →

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    5.FIO 2A
3.NEMA C                 9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	-4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	0	Unused	5-2	39	Ch15 Yellow
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	+6-2	115	Not Used

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	-6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	59	Ch11 Green
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	+7-8	37	Ch13 Yellow

OUTPUT PROGRAMMING COMPLETE

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-1	37	Ch13 Yellow.....	0	Unused

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
7-8	57	Ch9 Green	37	Ch13 Yellow

Pin 5-1 (C1 pin 35) = Load Switch S3-Y
Pin 7-8 (C1 pin 99) = Load Switch AUX S1-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

	Chan.1	2	3	4	5	6	7	8 >
Flash Red	.	.	.	.	.	.	.	.
Flash Yel	.	.	.	.	.	.	.	.
Flash Grn	.	.	.	.	.	.	.	.
Inhibit Red Flash In								
Preempt	.	.	.	.	.	.	.	.
Olap Ovrd	0	0	0	0	0	0	0	0

	Chan.9	10	11	12	13	14	15	16
Flash Red	.	.	.	.	.	.	.	.
Flash Yel	.	.	.	.	X	.	.	.
Flash Grn	.	X	.	X	.	.	.	.
Inhibit Red Flash In								
Preempt	.	.	.	.	.	.	.	.
Olap Ovrd	0	0	0	0	1	0	0	0

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output remapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: GBO-197T2
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

Signal Upgrade
Temporary Design 2 - TMP Phase II, Step 1
Electrical Detail - Sheet 3 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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STV Engineers, Inc.
2151 Hawkins St., Suite 1400
Charlotte, NC 28203
(704) 372-1885
NC License Number F-0991

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

750 N.Greenfield Pkwy,Garner,NC 27529

W. Friendly Avenue at Green Valley Road

Division 7 | Guilford County | Greensboro

PLAN DATE:	July 2026	REVIEWED BY:	T.M. Moody
PREPARED BY:	G. Whitehouse	REVIEWED BY:	B. Roth-Roffy

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

SIG. INVENTORY NO. GBO-197T2

9/21/2026
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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 6.4

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL FOR 'PRE 3'

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS

```
        Preemption Menu
1.HiPriority  4.LowPriority
2.Events
3.Sequences
```

ENTER PREEMPT #3

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3  Times   :   Begin     :     Other
  Delay    0   MinGrn    1   Track Grn   0
MinDura   16   MinWlk    1   Min Dwell   5
MaxPres    0   PedClr   255
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3          ---- Preempt Phases ----
Track Veh      0  0  0  0
DwellCyc Veh   1  6  0  0  0  0  0  0
DwellCyc(more) 0  0  0  0
DwellCyc (Ped) 0  0  0  0  0  0  0  0
Exit           2  6  0  0
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3      Preempt Options
                  Lock input ON
          Override Auto Flash OFF
Override higher # preempt OFF
             Flash in dwell OFF
       Link to preempt # 0
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3 Preempt Times+    --- Exit --
                    Ped Clr    0
  Extend Dwell    0     Yel  0.0
   Return Max     0     Red  0.0
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3          -- Preempt Overlaps+ --
      Track    0  0  0  0  0  0  0  0
     (more)    0  0  0  0
    DwellCyc   1  0  0  0  0  0  0  0
     (more)    0  0  0  0
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3      Preempt Options +
Enable ON                  Pattern   0
  Type EMERG   Skip Track if Overide OFF
Output DELAY             Coord+Preempt  OFF
                         Volt Mon Flash  OFF
Lnk Aft Dwel OFF         Return Max/Min  MAX
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3 AdvTimes
  AllRedB4Prmpt OFF    EnterYelChg 25.5
  ResetExtDwell OFF    EnterRedClr 25.5
ReservicePrempt OFF    TrackYelChg 25.5
      EndDwell  OFF    TrackRedClr 25.5
 DynExitThresh    0              1111111
DsblDwellCalls OFF  12345678  90123456
 +  ExitVehCall     ........  ........
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3       --   Initial Dwell   --
Phases    0  0  0  0
Peds      0  0  0  0
Overlaps  0  0  0  0  0  0  0  0
  (more)  0  0  0  0  0  0  0  0
```

PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: GBO-197T2
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

Signal Upgrade
Temporary Design 2 - TMP Phase II, Step 1
Electrical Detail - Sheet 4 of 4

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

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W. Friendly Avenue at Green Valley Road

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PLAN DATE:	July 2026	REVIEWED BY:	T.W. Moody
PREPARED BY:	G. Whitehouse	REVIEWED BY:	B. Roth-Roffy

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

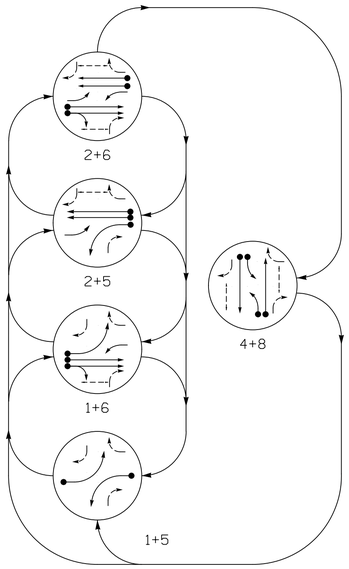
SIG. INVENTORY NO. GBO-197T2

9/21/2026
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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 7.0

DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

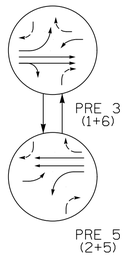
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

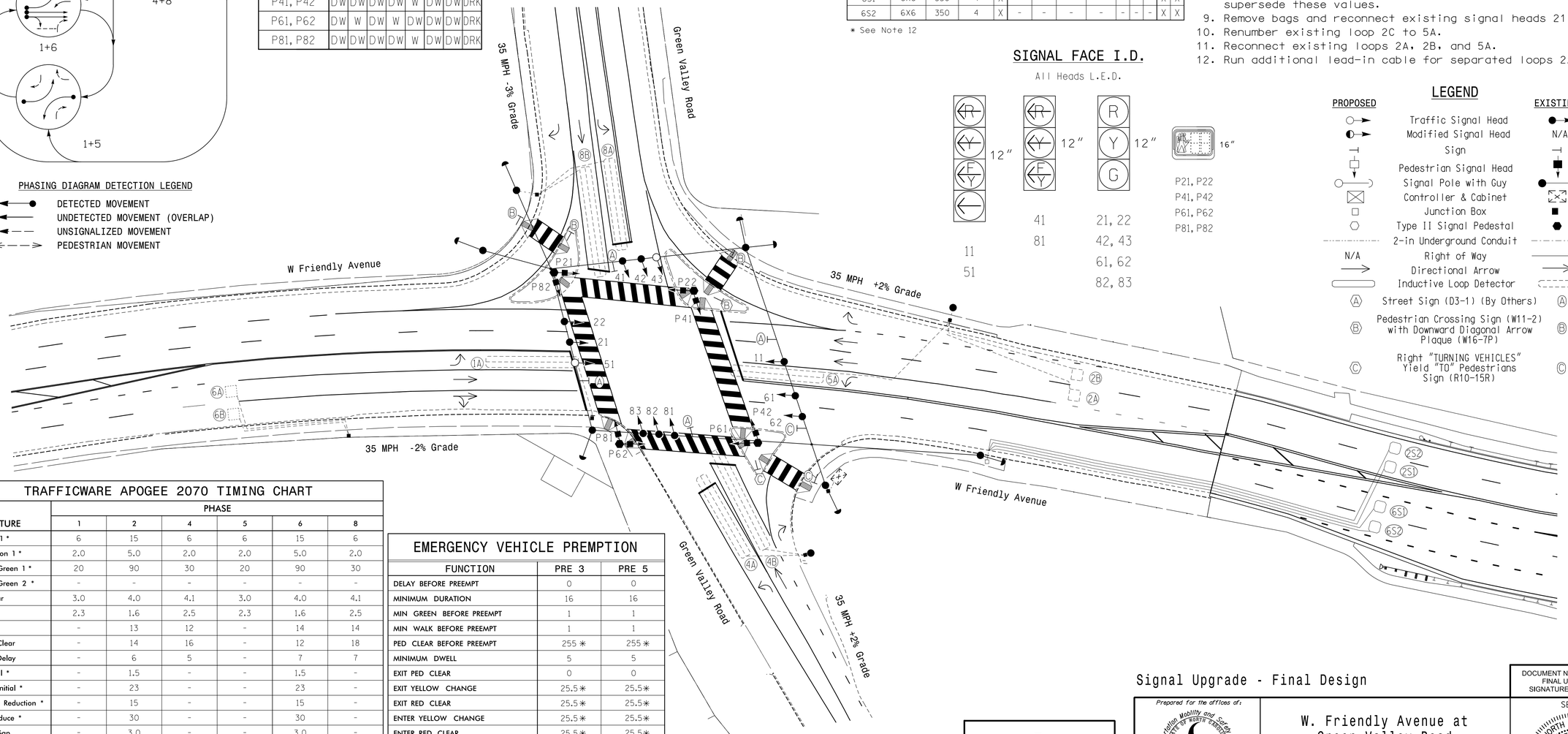
TABLE OF OPERATION

SIGNAL FACE	PHASE 1+5	1+6	2+5	2+6	4+8	PRE 3	PRE 5	FLASH
11	←●	←	←F/Y	F/Y	←R	←	F/Y	←R
21, 22	R	R	G	G	R	R	G	R
41	~~←R~~	~~←R~~	~~←R~~	~~←R~~	~~F/Y~~	~~←R~~	~~←R~~	~~←R~~
42, 43	R	R	R	R	G	R	R	R
51	←	F/Y	←	F/Y	←R	F/Y	←	←R
61, 62	R	G	R	G	R	G	R	R
81	~~←R~~	~~←R~~	~~←R~~	~~←R~~	~~F/Y~~	~~←R~~	~~←R~~	~~←R~~
82, 83	R	R	R	R	G	R	R	R
P21, P22	DW	DW	W	W	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	W	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	W	DW	DW	DRK

EV PREEMPT PHASES

(Medium Priority)





LOOP & DETECTOR UNIT INSTALLATION CHART

TRAFFICWARE APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X50	+5	2-4-2	-	1	-	15	-	X	X	-	-	-
2A*	6X6	185	4	-	2	-	-	-	X	X	X	-	X
2B*	6X6	185	4	-	2	-	-	-	X	X	X	-	X
4A	6X50	+5	2-4-2	-	4	-	3	-	X	X	-	-	-
4B	6X60	+5	2-4-2	-	4	-	-	-	X	X	-	-	-
5A	6X50	+5	2-4-2	-	5	-	15	-	X	X	-	-	X
6A	6X6	185	4	-	6	-	-	-	X	X	X	-	-
6B	6X6	185	4	-	6	-	-	-	X	X	X	-	-
8A	6X50	+5	2-4-2	-	8	-	3	-	X	X	-	-	-
8B	6X60	+5	2-4-2	-	8	-	-	-	X	X	-	-	-
2S1	6X6	350	4	X	-	-	-	-	-	-	-	X	X
2S2	6X6	350	4	X	-	-	-	-	-	-	-	X	X
6S1	6X6	350	4	X	-	-	-	-	-	-	-	X	X
6S2	6X6	350	4	X	-	-	-	-	-	-	-	X	X

* See Note 12

SIGNAL FACE I.D.

All Heads L.E.D.

11
51

41
81

21, 22
42, 43
61, 62
82, 83

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

5 Phase
Fully Actuated
(Greensboro Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024, "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 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. Pavement markings are existing unless otherwise shown.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Remove bags and reconnect existing signal heads 21 and 22.
10. Renumber existing loop 2C to 5A.
11. Reconnect existing loops 2A, 2B, and 5A.
12. Run additional lead-in cable for separated loops 2A and 2B.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⊡	Pedestrian Signal Head	■
○	Signal Pole with Guy	●
⊠	Controller & Cabinet	⊠
□	Junction Box	■
⬡	Type II Signal Pedestal	⬢
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	———
→	Directional Arrow	→
▭	Inductive Loop Detector	▭
Ⓐ	Street Sign (D3-1) (By Others)	Ⓐ
Ⓑ	Pedestrian Crossing Sign (W11-2) with Downward Diagonal Arrow Plaque (W16-7P)	Ⓑ
Ⓒ	Right "TURNING VEHICLES" Yield "TO" Pedestrians Sign (R10-15R)	Ⓒ

TRAFFICWARE APOGEE 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	6	15	6	6	15	6
Gap, Extension 1 *	2.0	5.0	2.0	2.0	5.0	2.0
Maximum Green 1 *	20	90	30	20	90	30
Maximum Green 2 *	-	-	-	-	-	-
Yellow Clear	3.0	4.0	4.1	3.0	4.0	4.1
Red Clear	2.3	1.6	2.5	2.3	1.6	2.5
Walk *	-	13	12	-	14	14
Pedestrian Clear	-	14	16	-	12	18
GreenPed Delay	-	6	5	-	7	7
Added Initial *	-	1.5	-	-	1.5	-
Maximum Initial *	-	23	-	-	23	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Lock Calls	NO	YES	NO	NO	YES	NO
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

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

EMERGENCY VEHICLE PREMPTION

FUNCTION	PRE 3	PRE 5
DELAY BEFORE PREEMPT	0	0
MINIMUM DURATION	16	16
MIN GREEN BEFORE PREEMPT	1	1
MIN WALK BEFORE PREEMPT	1	1
PED CLEAR BEFORE PREEMPT	255 *	255 *
MINIMUM DWELL	5	5
EXIT PED CLEAR	0	0
EXIT YELLOW CHANGE	25.5 *	25.5 *
EXIT RED CLEAR	25.5 *	25.5 *
ENTER YELLOW CHANGE	25.5 *	25.5 *
ENTER RED CLEAR	25.5 *	25.5 *
ALL-RED B4 PREEMPT	OFF	OFF
LOCK INPUT	ON	ON
OVERRIDE HIGHER # PREEMPT	OFF	OFF
EXIT PREEMPT TO	2+6	2+6

* Time defaults to time used for phase during normal operation.

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NC License Number F-0991

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

W. Friendly Avenue at Green Valley Road

Division 7 Guilford County Greensboro

PLAN DATE: July 2026 REVIEWED BY: T.M. Moody

PREPARED BY: G. Whitehouse REVIEWED BY: B. Roth-Roffy

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL
SEAL 040329
ENGINEER
TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

SIG. INVENTORY NO. GBD-197

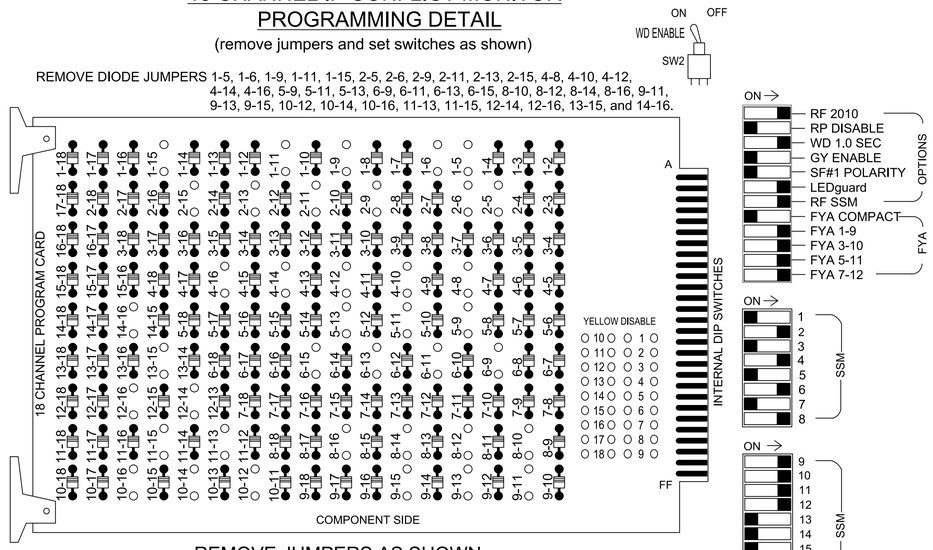
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Leonar

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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, 4-8, 4-10, 4-12, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 8-10, 8-12, 8-14, 8-16, 9-11, 9-13, 9-15, 10-12, 10-14, 10-16, 11-13, 11-15, 12-14, 12-16, 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 Plans.
2. Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
3. Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "Init 2A" to MODE 5 (MM 1-8-9-3).
4. Restore the controller to Factory Default Settings before programming as per this electrical plan.
5. Program phases 2 and 6 for Start Up In Green.
6. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
7. Ensure "Local Flash Start" feature is set to "RSt".
8. Ensure "InhFYARedSt" feature is set to "ON" and set "Start Red Time" to 6.0 seconds.
9. Ensure "Flash Mode" is set to "Channel" (MM 1-4-1).
10. Ensure all channels are programmed to flash red (MM 1-8-1).
11. Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:

FROM MAIN MENU->1->8->7 (I/O LOGIC)

Result Src.Fcn		TimeOp Time
I208	= 01208	DLY 1

12. Program phases 4 and 8 for Dual Entry.
13. The cabinet and controller are part of the Greensboro Signal System.

PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 7.1

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11 ★	21,22	P21, P22	NU	42,43	P41, P42	51 ★	61,62	P61, P62	NU	82,83	P81, P82	11 ★	81 ★	NU	51 ★	41 ★	NU
RED		128			101			134			107							
YELLOW	✳	129			102		✳	135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127						133											
✋			113			104			119			110						
🚶			115			106			121			112						

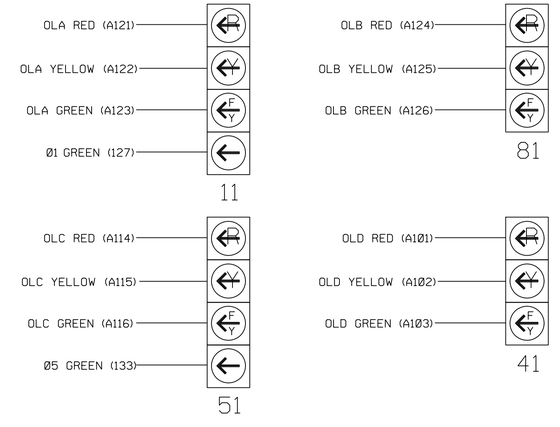
NU = Not Used

✳ Denotes install load resistor. See load resistor installation detail on Sheet 2.

★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. 2S1	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	Ø2 2B	EMPTY	EMPTY	EMPTY	Ø3 4B	EMPTY	EMPTY	SYS. DET. 2S2	EMPTY	EMPTY	Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SYS. DET. 6S1	SLOT EMPTY	SLOT EMPTY	CH. 3 PRE 3 Tomar	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B	EMPTY	EMPTY	EMPTY	Ø8 8B	EMPTY	EMPTY	SYS. DET. 6S2	EMPTY	EMPTY	CH. 4 PRE 5 Tomar	EMPTY	EMPTY

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

FS = FLASH SENSE
ST = STOP TIME
PRE3,5 = EV PREEMPTS

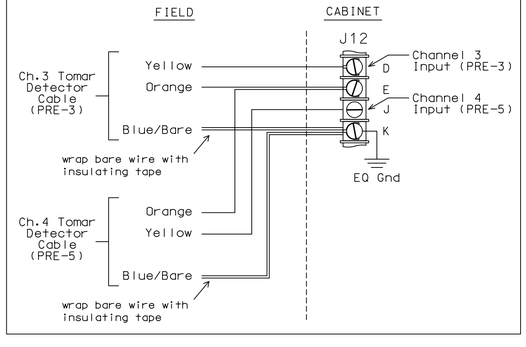
EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....TRAFFICWARE APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S3,S5,S6,S7,S8,S9,S11, S12,AUX S1,AUX S2,AUX S4,AUX S5
PHASES USED.....1,2,2 PED,4,4 PED,5,6,6 PED,8, 8 PED
OVERLAP A.....✳
OVERLAP B.....✳
OVERLAP C.....✳
OVERLAP D.....✳

✳ See Sheet 2 for Overlap Programming Detail.

TYPICAL TOMAR FIELD WIRE DETAIL

(input file, rear view)



INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
1A	TB2-1,2	I1U	56	1	1		15		X	X	
2A	TB2-5,6	I2U	39	2	2				X	X	X
2B	TB2-7,8	I2L	43	3	2				X	X	X
4A	TB4-9,10	I6U	41	8	4		3		X	X	
4B	TB4-11,12	I6L	45	9	4				X	X	
✳2S1	TB6-9,10	I9U	60	13	SYS						
✳2S2	TB6-11,12	I9L	62	14	SYS						
5A	TB3-1,2	J1U	55	5	5		15		X	X	
6A	TB3-5,6	J2U	40	16	6				X	X	X
6B	TB3-7,8	J2L	44	17	6				X	X	X
8A	TB5-9,10	J6U	42	22	8		3		X	X	
8B	TB5-11,12	J6L	46	23	8				X	X	
✳6S1	TB7-9,10	J9U	59	27	SYS						
✳6S2	TB7-11,12	J9L	61	28	SYS						

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE
PED PUSH BUTTONS					
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED

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

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NC License Number F-0991

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: GBO-197
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

Signal Upgrade - Final Design
Electrical Detail - Sheet 1 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

750 N.Greenfield Pkwy.Garner,NC 27529

W. Friendly Avenue at Green Valley Road

Division 7 | Guilford County | Greensboro

PLAN DATE: July 2026 | REVIEWED BY: T.W. Moody

PREPARED BY: G. Whitehouse | REVIEWED BY: B. Roth-Roffy

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

SIG. INVENTORY NO. GBO-197

9/21/2026
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OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A, B, C, and D.*

(program controller as shown below)

*NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
Lock Inhibit OFF
Confl Lock Enable OFF
Parent P Clrncs ON
Extra Included Phases OFF
InhibitLockInterval ALWAYS
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  1
then press Enter
```

```
Overlap A-1
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
Ovrlp A-1   Ps.....................
Included Ps   1  0  0  0  0  0  0  0
Modifier Ps   2  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap #  2
then press Enter
```

```
Overlap B-2
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp B-2   Ps.....................
Included Ps   4  0  0  0  0  0  0  0
Modifier Ps   0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap #  3
then press Enter
```

```
Overlap C-3
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
Ovrlp C-3   Ps.....................
Included Ps   5  0  0  0  0  0  0  0
Modifier Ps   6  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Enter Overlap #  4
then press Enter
```

```
Overlap D-4
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp D-4   Ps.....................
Included Ps   8  0  0  0  0  0  0  0
Modifier Ps   0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

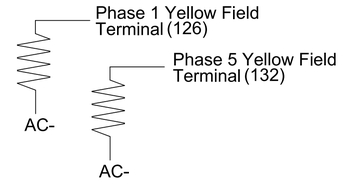
END OF OVERLAP PROGRAMMING DETAIL

PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 7.2

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)



FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER OT INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

GREEN DELAY PROGRAMMING DETAIL FOR LEADING PEDESTRIAN INTERVAL OPERATION

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-1

```
Channel & I/O
1.Times      4.Ring,Start,Concur  7.Times+
2.Options    5.Call,Inh,Redirect  8.Copy
[3.Options+] 6.Alt Progs+         9.AdvWarn
```

PRESS "+" KEY ONCE

```
Options +          P..1..2..3..4..5..6..7.8 >
     Ped Delay     -  .  .  .  .  .  .  .  .
Red Rest On Gap       .  .  .  .  .  .  .  .
  Conflicting P       0  0  0  0  0  0  0  0
Green/Ped Delay       0  6  0  5  0  7  0  7
Omit Yel, Yel P       0  0  0  0  0  0  0  0
Ped Out/Ovrlp P       0  0  0  0  0  0  0  0
StartYel,Next P    +  0  0  0  0  0  0  0  0
```

CHANNEL & I/O PROGRAMMING COMPLETE

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: GBO-197
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

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Signal Upgrade - Final Design
Electrical Detail - Sheet 2 of 5

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PLAN DATE: July 2026 | REVIEWED BY: T.M. Moody
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DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

SIG. INVENTORY NO. GBO-197

9/21/2026
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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 7.3

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
Invert Rail Inputs: OFF
  EVP Ped Confirm: OFF
 Peer-Peer Timeout:   0
```

SELECT USER MODE →

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
Initialize User I/O Maps
    Init ABC with: VIRCTL
      Init D with: NONE
     Init 2A with: MODE 5
Init TF BIUs with: NONE
```

SELECT MODE 5 →

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    5.FIO 2A
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	-4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	0	Unused	5-2	0	Unused
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	+6-2	115	Not Used

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	-6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	39	Ch15 Yellow
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	+7-8	37	Ch13 Yellow

OUTPUT PROGRAMMING COMPLETE

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-1	37	Ch13 Yellow.....	0	Unused
5-2	39	Ch15 Yellow.....	0	Unused

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
6-8	59	Ch11 Green	39	Ch15 Yellow
7-8	57	Ch9 Green	37	Ch13 Yellow

```
Pin 5-1 (C1 pin 35) = Load Switch S3-Y
Pin 5-2 (C1 pin 36) = Load Switch S9-Y
Pin 7-8 (C1 pin 99) = Load Switch AUX S1-G
Pin 6-8 (C1 pin 90) = Load Switch AUX S4-G
```

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
Chan.1...2...3...4...5...6...7...8 >
Flash Red .  .  .  .  .  .  .  .
Flash Yel .  .  .  .  .  .  .  .
Flash Grn .  .  .  .  .  .  .  .
Inhibit Red Flash In
  Preempt .  .  .  .  .  .  .  .
Olap Ovrd 0  0  0  0  0  0  0  0
```

```
Chan.9..10..11..12..13..14..15..16
Flash Red .  .  .  .  .  .  .  .
Flash Yel .  .  .  .  X  .  X  .
Flash Grn .  X  .  X  .  .  .  .
Inhibit Red Flash In
  Preempt .  .  .  .  .  .  .  .
Olap Ovrd 0  0  0  0  1  0  3  0
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output remapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: GBO-197
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

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2151 Hawkins St., Suite 1400
Charlotte, NC 28203
(704) 372-1885
NC License Number F-0991

Signal Upgrade - Final Design
Electrical Detail - Sheet 3 of 5

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

W. Friendly Avenue at Green Valley Road

Division 7 | Guilford County | Greensboro

PLAN DATE: July 2026 | REVIEWED BY: T.M. Moody
PREPARED BY: G. Whitehouse | REVIEWED BY: B. Roth-Roffy

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

SIG. INVENTORY NO. GBO-197

NC Transportation Mobility and Safety Division
NC DEPARTMENT OF TRANSPORTATION
Traffic Engineering Branch
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

9/21/2026
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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 7.4

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL FOR 'PRE 3'

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS

```
        Preemption Menu
1.HiPriority  4.LowPriority
2.Events
3.Sequences
```

ENTER PREEMPT #3

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3  Times   :    Begin     :     Other
  Delay    0   MinGrn    1   Track Grn   0
MinDura   16   MinWlk    1   Min Dwell   5
MaxPres    0   PedClr   255
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3          ---- Preempt Phases ----
Track Veh      0  0  0  0
DwellCyc Veh   1  6  0  0  0  0  0  0
DwellCyc(more) 0  0  0  0
DwellCyc (Ped) 0  0  0  0  0  0  0  0
Exit           2  6  0  0
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3      Preempt Options
                    Lock input ON
            Override Auto Flash OFF
  Override higher # preempt OFF
              Flash in dwell OFF
         Link to preempt # 0
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3 Preempt Times+    --- Exit --
                     Ped Clr    0
  Extend Dwell    0      Yel  0.0
   Return Max     0      Red  0.0
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3          -- Preempt Overlaps+ --
      Track     0  0  0  0  0  0  0  0
     (more)     0  0  0  0
    DwellCyc    1  3  0  0  0  0  0  0
     (more)     0  0  0  0
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3      Preempt Options +
Enable ON                    Pattern   0
  Type EMERG   Skip Track if Overide OFF
Output DELAY             Coord+Preempt  OFF
                         Volt Mon Flash  OFF
                         Return Max/Min  MAX
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3 AdvTimes
  AllRedB4Prmpt OFF    EnterYelChg 25.5
  ResetExtDwell OFF    EnterRedClr 25.5
ReservicePrempt OFF    TrackYelChg 25.5
      EndDwell  OFF    TrackRedClr 25.5
 DynExitThresh    0              1111111
DsblDwellCalls OFF  12345678  90123456
 +  ExitVehCall     ........  ........
```

PRESS "ESC"

```
# 3              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 3       --   Initial Dwell   --
Phases    0  0  0  0
Peds      0  0  0  0
Overlaps  0  0  0  0  0  0  0  0
  (more)  0  0  0  0  0  0  0  0
```

PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: GBO-197
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

STV Engineers, Inc.
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Charlotte, NC 28203
(704) 372-1885
NC License Number F-0991

Signal Upgrade - Final Design
Electrical Detail - Sheet 4 of 5

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

W. Friendly Avenue at
Green Valley Road

Division 7 | Guilford County | Greensboro

PLAN DATE: July 2026	REVIEWED BY: T.W. Moody
PREPARED BY: G. Whitehouse	REVIEWED BY: B. Roth-Roffy

REVISIONS	INIT.	DATE

750 N.Greenfield Pkwy,Garner,NC 27529

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NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
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SIG. INVENTORY NO. GBO-197

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PROJECT REFERENCE NO.	SHEET NO.
U-5841	Sig. 7.5

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL FOR 'PRE 5'

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS

```
          Preemption Menu
1.HiPriority  4.LowPriority
2.Events
3.Sequences
```

ENTER PREEMPT #5

```
# 5              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+   8.AdvTimes
3.Options        6.Options+    9.Init'Dwell
```

```
# 5  Times   :   Begin     :     Other
  Delay    0   MinGrn    1   Track Grn   0
MinDura   16   MinWlk    1   Min Dwell   5
MaxPres    0   PedClr   255
```

PRESS "ESC"

```
# 5              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+   8.AdvTimes
3.Options        6.Options+    9.Init'Dwell
```

```
# 5              ---- Preempt Phases ----
Track Veh        0  0  0  0
DwellCyc Veh     2  5  0  0  0  0  0  0
DwellCyc(more)   0  0  0  0
DwellCyc (Ped)   0  0  0  0  0  0  0  0
Exit             2  6  0  0
```

PRESS "ESC"

```
# 5              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+   8.AdvTimes
3.Options        6.Options+    9.Init'Dwell
```

```
# 5      Preempt Options
                    Lock input ON
              Override Auto Flash OFF
      Override higher # preempt OFF
                  Flash in dwell OFF
            Link to preempt # 0
```

PRESS "ESC"

```
# 5              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+   8.AdvTimes
3.Options        6.Options+    9.Init'Dwell
```

```
# 5 Preempt Times+     --- Exit --
                     Ped Clr    0
  Extend Dwell    0      Yel  0.0
   Return Max     0      Red  0.0
```

PRESS "ESC"

```
# 5              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+   8.AdvTimes
3.Options        6.Options+    9.Init'Dwell
```

```
# 5                -- Preempt Overlaps+ --
       Track      0  0  0  0  0  0  0  0
        (more)    0  0  0  0
       DwellCyc   1  3  0  0  0  0  0  0
        (more)    0  0  0  0
```

PRESS "ESC"

```
# 5              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+   8.AdvTimes
3.Options        6.Options+    9.Init'Dwell
```

```
# 5      Preempt Options +
Enable ON                    Pattern   0
  Type EMERG   Skip Track if Overide OFF
Output DELAY             Coord+Preempt  OFF
                         Volt Mon Flash  OFF
                         Return Max/Min  MAX
```

PRESS "ESC"

```
# 5              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+   8.AdvTimes
3.Options        6.Options+    9.Init'Dwell
```

```
# 5 AdvTimes
  AllRedB4Prmpt OFF     EnterYelChg 25.5
   ResetExtDwell OFF    EnterRedClr 25.5
ReservicePrempt OFF     TrackYelChg 25.5
        EndDwell OFF    TrackRedClr 25.5
  DynExitThresh    0                1111111
 DsblDwellCalls OFF  12345678  90123456
  +  ExitVehCall     ........  ........
```

PRESS "ESC"

```
# 5              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+   8.AdvTimes
3.Options        6.Options+    9.Init'Dwell
```

```
# 5        --   Initial Dwell   --
Phases     0  0  0  0
Peds       0  0  0  0
Overlaps   0  0  0  0  0  0  0  0
  (more)   0  0  0  0  0  0  0  0
```

PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: GBO-197
DESIGNED: JULY 2026
SEALED: 9/23/2026
REVISED: N/A

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Charlotte, NC 28203
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Signal Upgrade - Final Design
Electrical Detail - Sheet 5 of 5

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

W. Friendly Avenue at
Green Valley Road

Division 7 | Guilford County | Greensboro

PLAN DATE:	July 2026	REVIEWED BY:	T.W. Moody
PREPARED BY:	G. Whitehouse	REVIEWED BY:	B. Roth-Roffy

REVISIONS	INIT.	DATE

750 N.Greenfield Pkwy,Garner,NC 27529

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NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
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9/21/2026
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PROJECT REFERENCE NO.	SHEET NO.
U-5841	SCP 1

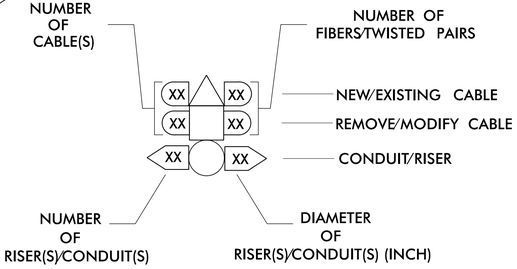
1. INSTALL COAX CABLE
2. INSTALL ETHERNET CABLE
3. EXISTING ETHERNET (OR COAX) CABLE
4. INSTALL SMFO CABLE
5. EXISTING SMFO CABLE
6. INSTALL FIBER OPTIC DROP CABLE
7. INSTALL TRACER WIRE
8. TRENCH
9. INSTALL PVC CONDUIT
10. INSTALL RIGID, GALVANIZED STEEL CONDUIT
11. INSTALL RIGID, GALVANIZED STEEL RISER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

LEGEND

- FO — NEW FIBER OPTIC COMMUNICATIONS CABLE
- TWIST PR — NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXI — EXISTING COMMUNICATIONS CABLE
- REM — EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- DD — NEW DIRECTIONAL DRILLED CONDUIT
- B&J — NEW BORED AND JACKED CONDUIT
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- S — AERIAL SPLICE ENCLOSURE
- S — SPLICE ENCLOSURE
- S — EXISTING SPLICE ENCLOSURE
- NEW METAL POLE
- EXISTING METAL POLE
- EXISTING CCTV ASSEMBLY
- NEW CCTV ASSEMBLY
- NEW STANDARD GUY ASSEMBLY
- NEW SIDEWALK GUY ASSEMBLY
- NEW CABLE STORAGE RACKS (SNOW SHOES)
- EXISTING CABLE STORAGE RACK (SNOW SHOE)
- EXISTING CONTROLLER AND CABINET
- NEW CCTV CABINET
- S — EXISTING SPLICE CABINET
- S — NEW SPLICE CABINET
- XX–XXXX — SIGNAL INVENTORY NUMBER
- SP — SIGNAL POLE
- FLAT PANEL ANTENNA (SINGLE)
- YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
- YAGI ANTENNA (SINGLE)
- OMNI ANTENNA

CONSTRUCTION NOTE SYMBOLOGY KEY

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



ATTACHMENT POINT:

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

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

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

CITY OF GREENSBORO SIGNAL SYSTEM CONSTRUCTION NOTES

Division 7 | Guilford County | Greensboro

PLAN DATE:	July 2026	REVIEWED BY:	T.M. Moody
PREPARED BY:	R.L. Aristondo	REVIEWED BY:	B. Roth-Roffy

SCALE: NONE

REVISIONS	INIT.	DATE

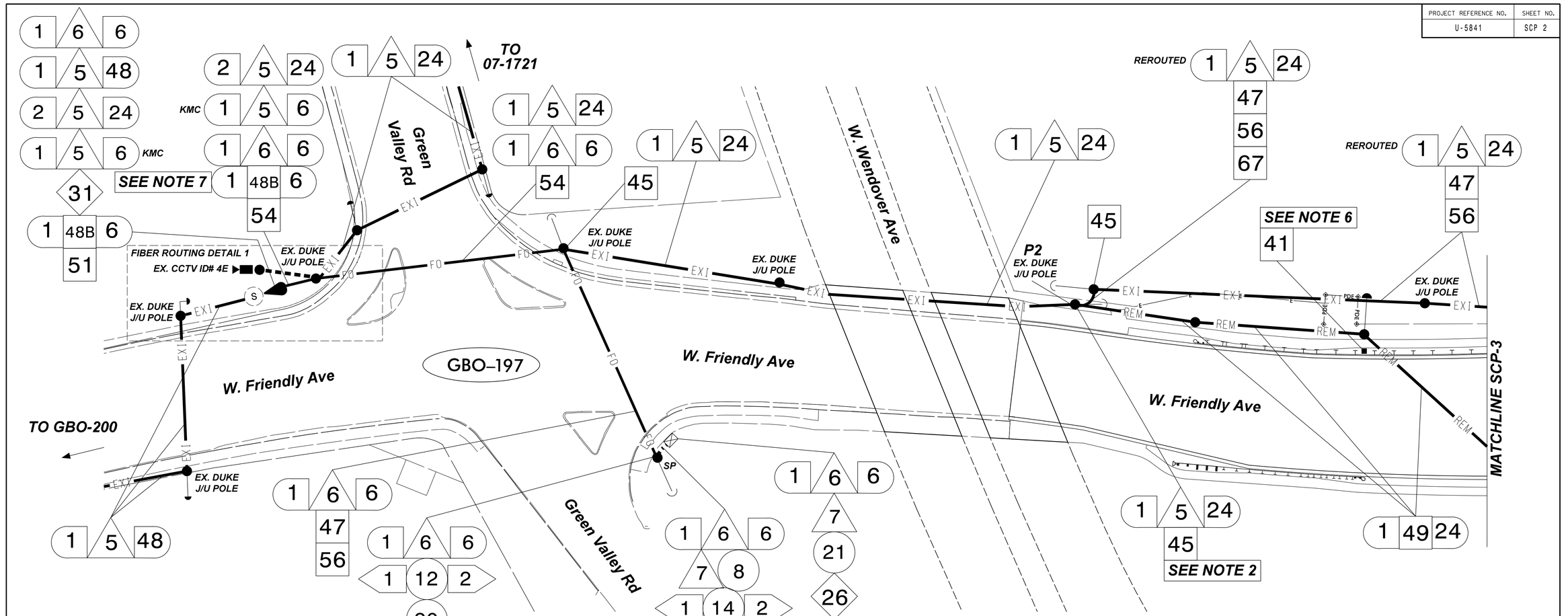
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody — 9/23/2026
AREA SIGNATURE — DATE

CADD FILE NAME: U-5841_SCP_01

Docusign Envelope ID: 6500A714-C7D1-87E3-8297-F21086E37346

PROJECT REFERENCE NO.	SHEET NO.
U-5841	SCP 2



NOTES:

1. FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF GREENSBORO ENGINEERING MANAGER AT 336–433–7218 TO ARRANGE FOR THE CITY TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE ENGINEERING MANAGER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL

2. DISCONNECT 24–FIBER CABLE FROM EXISTING SPLICE ENCLOSURE, DELASH, AND BACKPULL EXISTING 24 FIBER CABLE FROM POLE "P1" TO POLE "P2" AND REROUTE TO NEW POLE LINE AS SHOWN. STORE ANY REMAINING 24–FIBER CABLE. REMOVE EXISTING MESSENGER CABLE WHERE EXISTING 6 FIBER DROP IS NOT PRESENT FROM P2 TO P3.

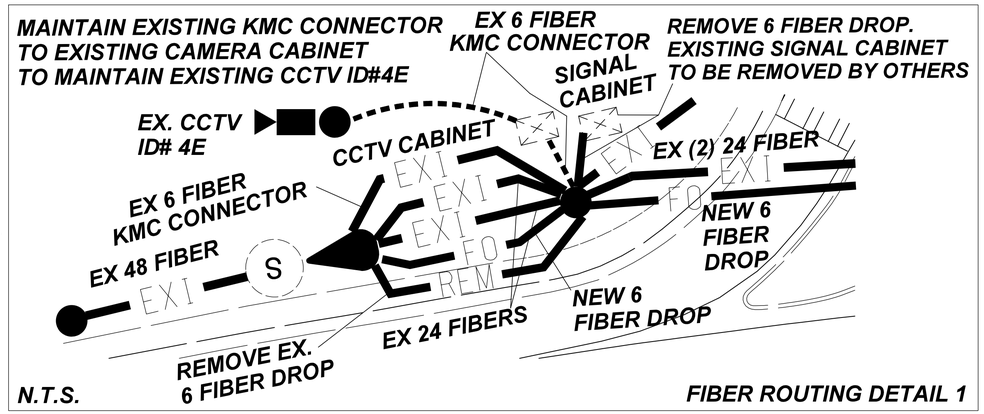
3. BACKPULL THE EXISTING 6–FIBER DROP CABLE FROM THE EXISTING CABINET TO THE TOP OF THE POLE. REROUTE THE NEW 6 FIBER DROP CABLE TO THE NEW CABINET LOCATED ON THE SOUTHEAST CORNER OF W. FRIENDLY AVE @ GREEN VALLEY RD AS SHOWN.

4. ONCE RELOCATED 24 FIBER CABLE HAS BEEN INSTALLED AND OPERATIONAL, PROVIDE A FINAL COMMUNICATION RUN TO ENSURE CONFORMITY PRIOR TO DIVISION 7 TRAFFIC SERVICES APPROVAL.

5. ALL NCDOT ATTACHMENTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

6. REMOVE EXISTING JUNCTION BOX AND BACKFILL WITH APPROVED MATERIAL.

7. REMOVE EXISTING 6 FIBER DROP HEADING TO EXISTING SIGNAL CABINET (TO BE REMOVED BY OTHERS) ON NORTHWEST CORNER. RUN NEW 6 FIBER DROP TO THE PROPOSED SIGNAL CABINET LOCATION ON SOUTHEAST CORNER.



TMP Phase I

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STV Engineers, Inc.
2151 Hawkins St., Suite 1400
Charlotte, NC 28203
(704) 372-1885
NC License Number F-0991

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

CITY OF GREENSBORO SIGNAL SYSTEM CABLE ROUTING PLANS

Division 7 | Guilford County | Greensboro

PLAN DATE:	July 2026	REVIEWED BY:	T.M. Moody
PREPARED BY:	R.L. Aristondo	REVIEWED BY:	B. Roth-Roffy

SCALE: N/A

REVISIONS	INIT.	DATE

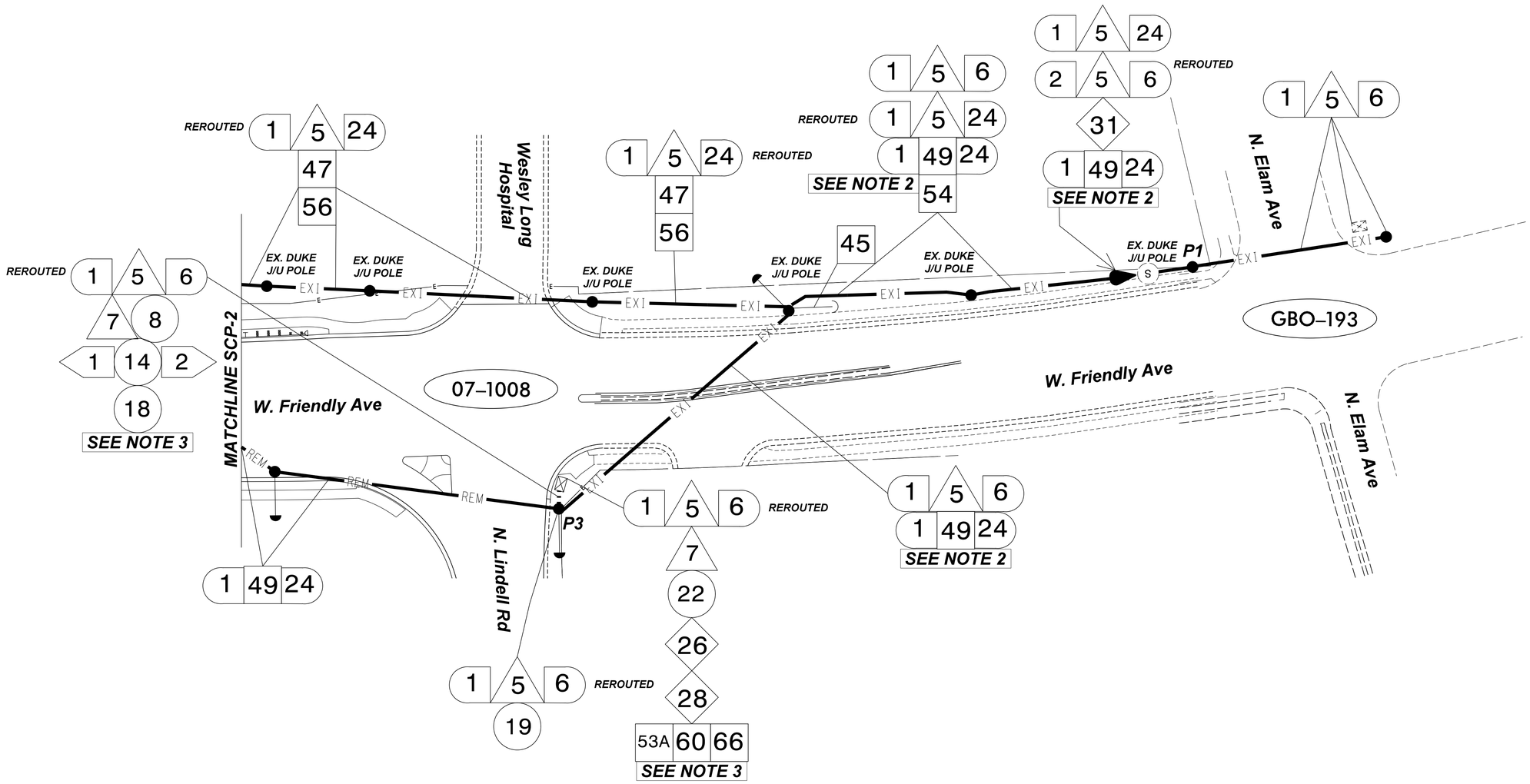
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

CADD FILE NAME: U-5841_SCP_02

Docusign Envelope ID: 6500A714-C7D1-87E3-8297-F21086E37346

PROJECT REFERENCE NO.	SHEET NO.
U-5841	SCP 3



NOTES:

1. FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF GREENSBORO ENGINEERING MANAGER AT 336–433–7218 TO ARRANGE FOR THE CITY TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE ENGINEERING MANAGER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL

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4. ONCE RELOCATED 24 FIBER CABLE HAS BEEN INSTALLED AND OPERATIONAL, PROVIDE A FINAL COMMUNICATION RUN TO ENSURE CONFORMITY PRIOR TO DIVISION 7 TRAFFIC SERVICES APPROVAL.

5. ALL NCDOT ATTACHMENTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

TMP Phase I

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Transportation Mobility and Safety Division
Traffic Engineering Branch
750 N.Greenfield Pkwy,Garner,NC 27529

CITY OF GREENSBORO SIGNAL SYSTEM CABLE ROUTING PLANS

Division 7 Guilford County Greensboro

PLAN DATE: July 2026 REVIEWED BY: T.M. Moody
PREPARED BY: R.L. Aristondo REVIEWED BY: B. Roth-Roffy

SCALE: N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
ASE4...SIGNATURE DATE

CADD FILE NAME: U-5841_SCP_03

Docusign Envelope ID: 6500A714-C7D1-87E3-8297-F21086E37346

PROJECT REFERENCE NO.	SHEET NO.
U-5841	SCP 4

GREEN VALLEY RD AT W. FRIENDLY AVE

SIG. INV. GBO–197
CCTV–4E

COLOR CODE TIA/EIA 598–C

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

LEGEND

X = FUSION SPLICE INDIVIDUAL FIBER
E = EXISTING SPLICE
C = CAP AND SEAL

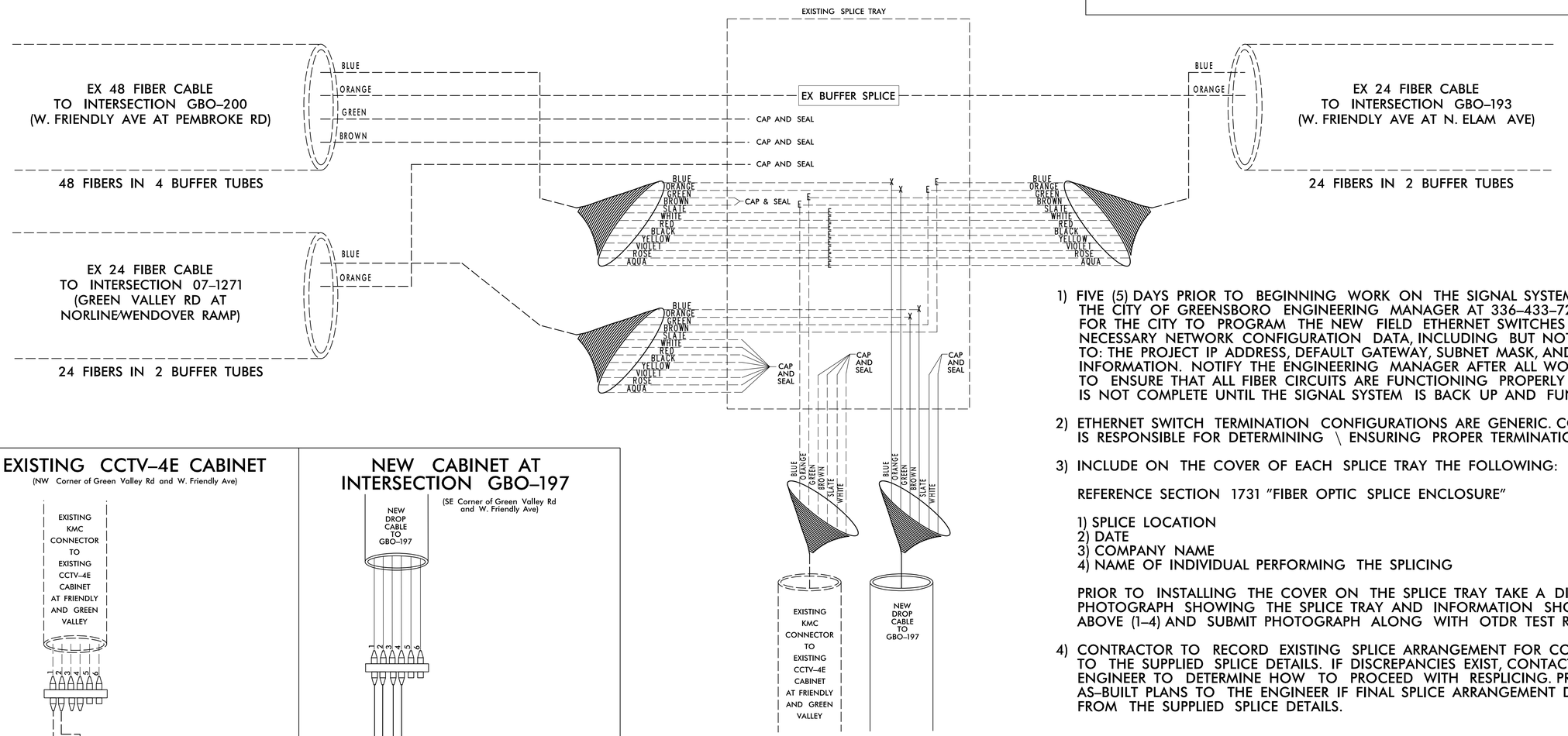
EXPRESS = EXPRESS ENTIRE BUFFER TUBE /FIBERS THROUGH WITHOUT CUTTING

BUFFER SPLICE = SPLICE ALL FIBERS IN BUFFER TUBE COLOR TO COLOR

EX BUFFER SPLICE = EXISTING BUFFER TUBE SPLICE COLOR TO COLOR

NOTES

1. UNUSED FIBERS LEFT COILED AND STORED IN SPLICE TRAY
2. UNUSED BUFFER TUBES LEFT COILED AND STORED IN SPLICE ENCLOSURE



EXISTING CCTV–4E CABINET

(NW Corner of Green Valley Rd and W. Friendly Ave)

NEW CABINET AT INTERSECTION GBO–197

(SE Corner of Green Valley Rd and W. Friendly Ave)

1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF GREENSBORO ENGINEERING MANAGER AT 336–433–7218 TO ARRANGE FOR THE CITY TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK, AND VLAN ID INFORMATION. NOTIFY THE ENGINEERING MANAGER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND FUNCTIONAL.

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

3) INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING:

REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

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

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

4) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS–BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

TMP Phase I

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Transportation Mobility and Safety Division
Traffic Engineering Branch
Traffic Signal Systems Section
750 N.Greenfield Pkwy,Garner,NC 27529

CITY OF GREENSBORO
SIGNAL SYSTEM
SPLICE DETAIL

Division 7 Guilford County Greensboro

PLAN DATE: July 2026 | REVIEWED BY: T.M. Moody
PREPARED BY: R.L. Aristondo | REVIEWED BY: B. Roth-Roffy

SCALE: N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

CADD FILE NAME: U-5841_SCP_04

Docusign Envelope ID: 6500A714-C7D1-87E3-8297-F21086E37346

PROJECT REFERENCE NO.	SHEET NO.
U-5841	SCP 5

N. ELAM AVE AT W. FRIENDLY AVE

SIG. INV. GBO–193
SIG. INV. 07–1008

COLOR CODE TIA/EIA 598–C	
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

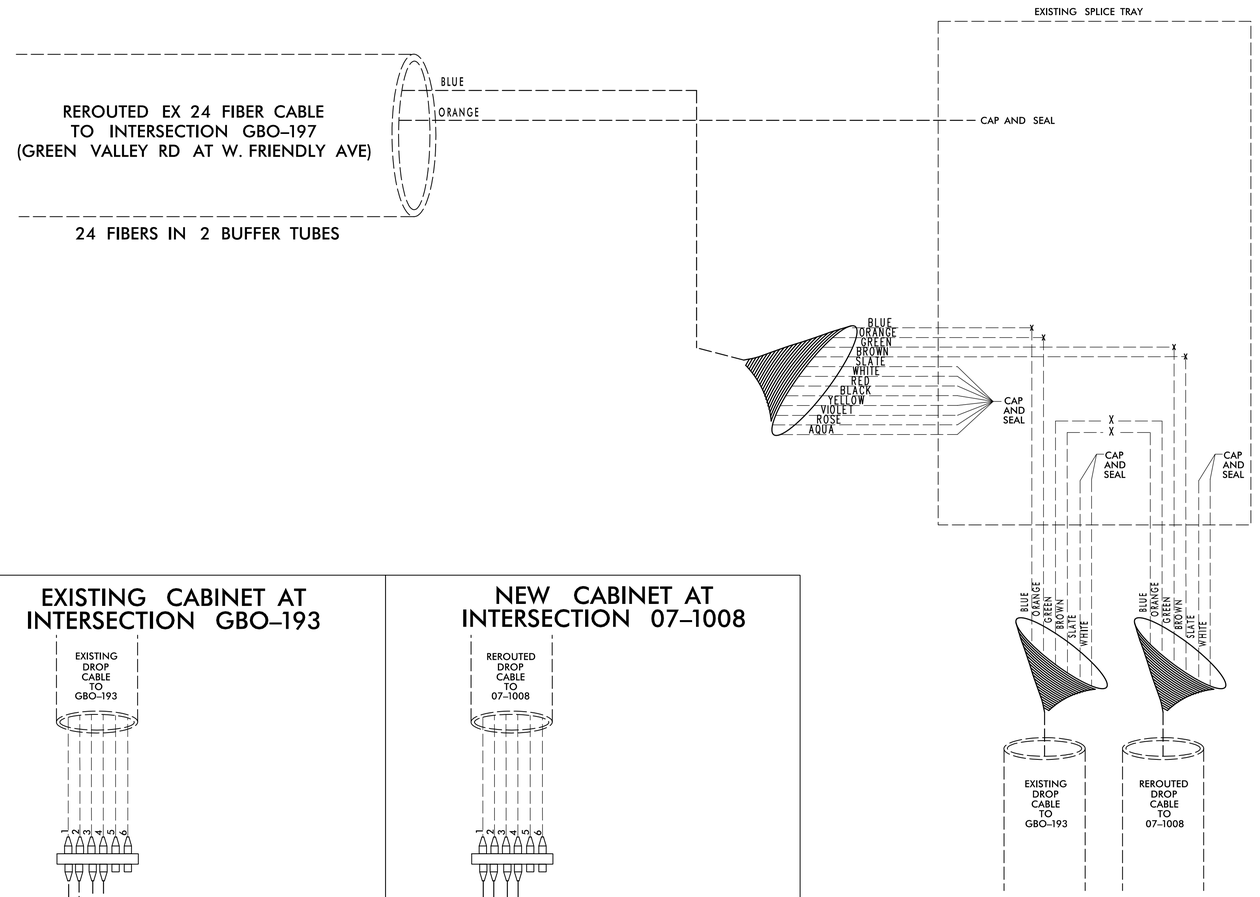
LEGEND

X = FUSION SPLICE INDIVIDUAL FIBER
E = EXISTING SPLICE
C = CAP AND SEAL

EXPRESS	=	EXPRESS ENTIRE BUFFER TUBE /FIBERS THROUGH WITHOUT CUTTING
BUFFER SPLICE	=	SPLICE ALL FIBERS IN BUFFER TUBE COLOR TO COLOR
EX BUFFER SPLICE	=	EXISTING BUFFER TUBE SPLICE COLOR TO COLOR

NOTES

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2. UNUSED BUFFER TUBES LEFT COILED AND STORED IN SPLICE ENCLOSURE



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TMP Phase I

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NC License Number F-0991

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

CITY OF GREENSBORO
SIGNAL SYSTEM
SPLICE DETAIL

Division 7 Guilford County Greensboro

PLAN DATE: July 2026 REVIEWED BY: T.M. Moody
PREPARED BY: R.L. Aristondo REVIEWED BY: B. Roth-Roffy

SCALE: N/A

REVISIONS	INIT.	DATE

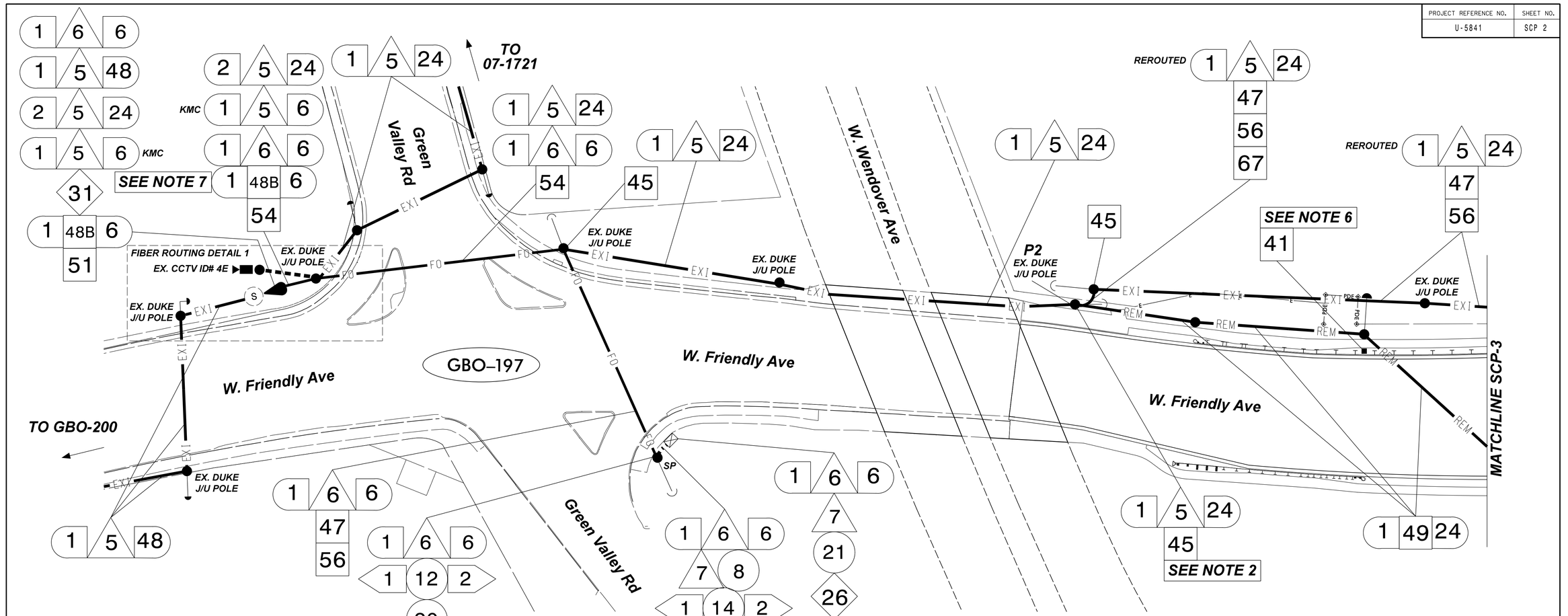
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

CADD FILE NAME: U-5841_SCP_05

Docusign Envelope ID: 6500A714-C7D1-87E3-8297-F21086E37346

PROJECT REFERENCE NO.	SHEET NO.
U-5841	SCP 2



NOTES:

1. FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF GREENSBORO ENGINEERING MANAGER AT 336–433–7218 TO ARRANGE FOR THE CITY TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE ENGINEERING MANAGER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL

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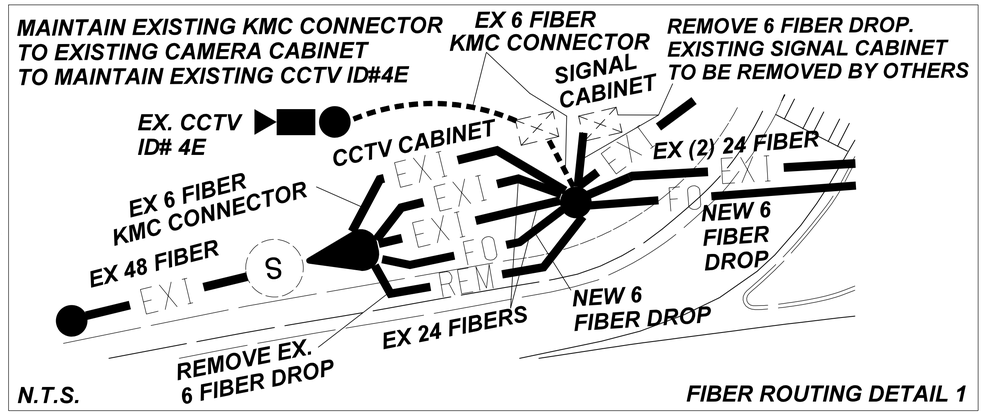
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4. ONCE RELOCATED 24 FIBER CABLE HAS BEEN INSTALLED AND OPERATIONAL, PROVIDE A FINAL COMMUNICATION RUN TO ENSURE CONFORMITY PRIOR TO DIVISION 7 TRAFFIC SERVICES APPROVAL.

5. ALL NCDOT ATTACHMENTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

6. REMOVE EXISTING JUNCTION BOX AND BACKFILL WITH APPROVED MATERIAL.

7. REMOVE EXISTING 6 FIBER DROP HEADING TO EXISTING SIGNAL CABINET (TO BE REMOVED BY OTHERS) ON NORTHWEST CORNER. RUN NEW 6 FIBER DROP TO THE PROPOSED SIGNAL CABINET LOCATION ON SOUTHEAST CORNER.



TMP Phase I

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Integrated Mobility and Congestion Management Unit
Intelligent Transportation Systems Section
750 N.Greenfield Pkwy,Garner,NC 27529

CITY OF GREENSBORO SIGNAL SYSTEM CABLE ROUTING PLANS

Division 7 | Guilford County | Greensboro

PLAN DATE:	July 2026	REVIEWED BY:	T.M. Moody
PREPARED BY:	R.L. Aristondo	REVIEWED BY:	B. Roth-Roffy

SCALE: N/A

REVISIONS	INIT.	DATE

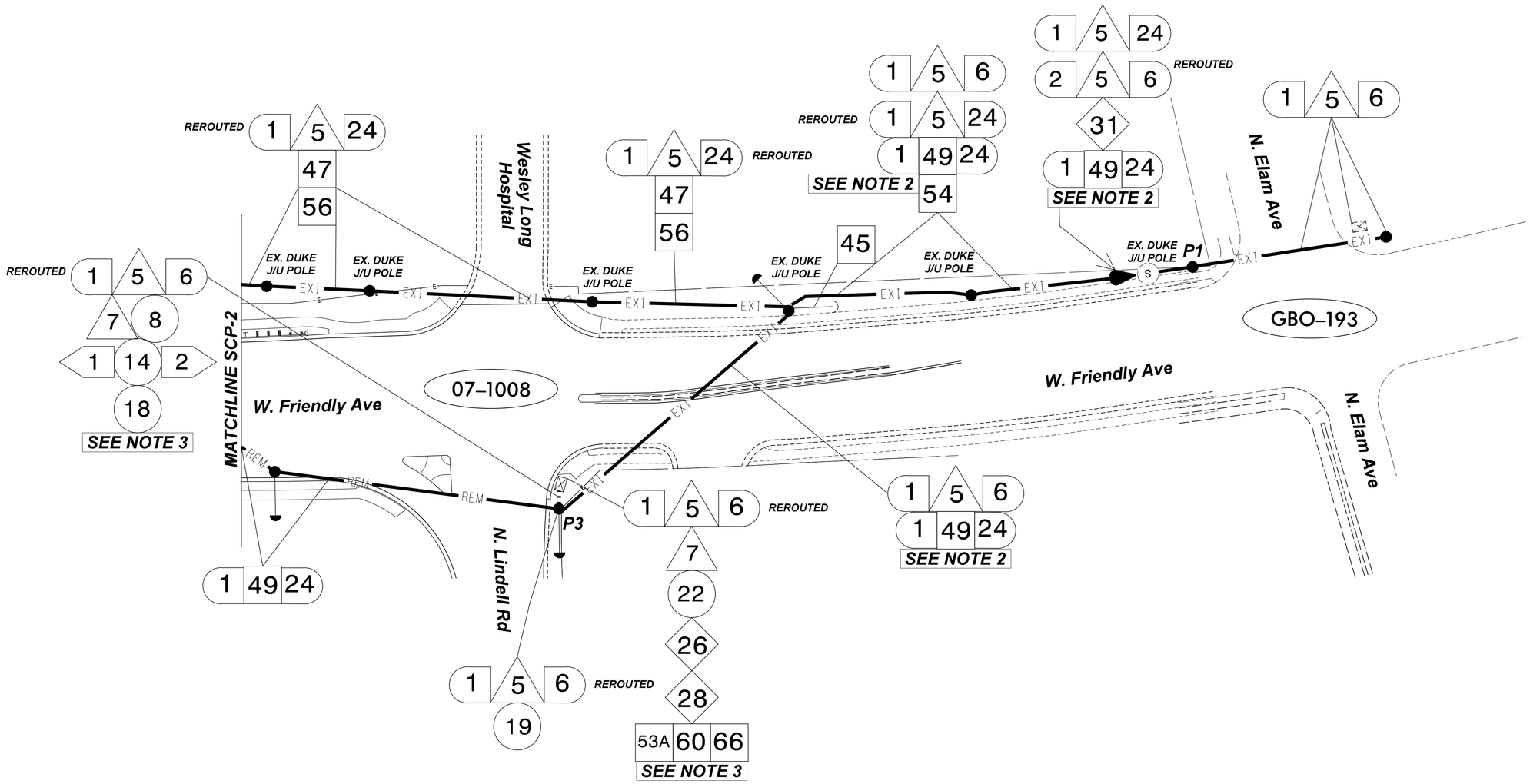
SEAL
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DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

CADD FILE NAME: U-5841_SCP_02

Docusign Envelope ID: 6500A714-C7D1-87E3-8297-F21086E37346

PROJECT REFERENCE NO.	SHEET NO.
U-5841	SCP 3



NOTES:

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5. ALL NCDOT ATTACHMENTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

TMP Phase I

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Transportation Mobility and Safety Division
Traffic Engineering Branch
750 N.Greenfield Pkwy,Garner,NC 27529

CITY OF GREENSBORO SIGNAL SYSTEM CABLE ROUTING PLANS

Division 7 Guilford County Greensboro

PLAN DATE: July 2026 REVIEWED BY: T.M. Moody
PREPARED BY: R.L. Aristondo REVIEWED BY: B. Roth-Roffy

SCALE: N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
ASE4...SIGNATURE DATE

CADD FILE NAME: U-5841_SCP_03

Docusign Envelope ID: 6500A714-C7D1-87E3-8297-F21086E37346

PROJECT REFERENCE NO.	SHEET NO.
U-5841	SCP 4

GREEN VALLEY RD AT W. FRIENDLY AVE

SIG. INV. GBO–197
CCTV–4E

COLOR CODE TIA/EIA 598–C

(1) BLUE
(2) ORANGE
(3) GREEN
(4) BROWN
(5) SLATE
(6) WHITE
(7) RED
(8) BLACK
(9) YELLOW
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LEGEND

X = FUSION SPLICE INDIVIDUAL FIBER
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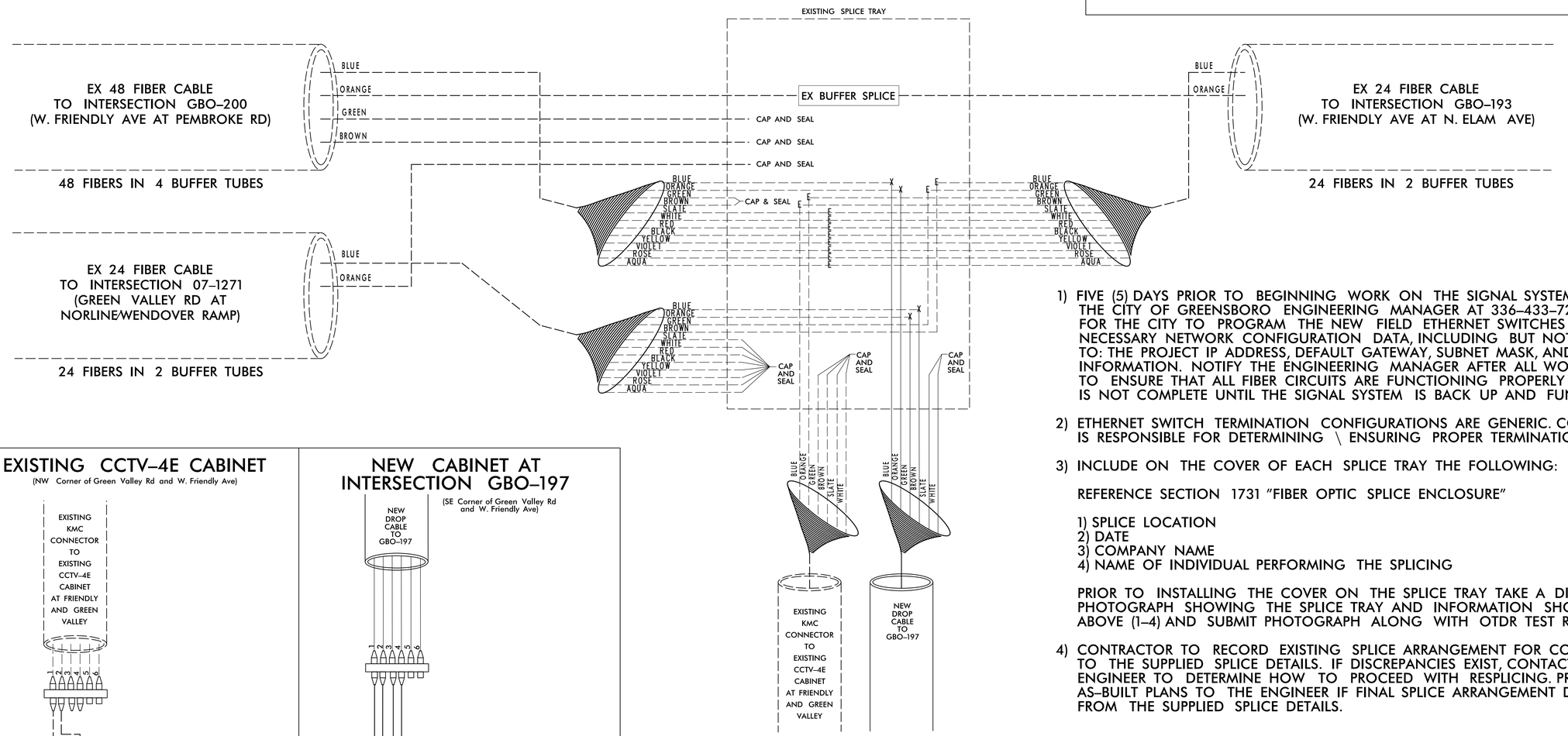
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EX BUFFER SPLICE = EXISTING BUFFER TUBE SPLICE COLOR TO COLOR

NOTES

1. UNUSED FIBERS LEFT COILED AND STORED IN SPLICE TRAY
2. UNUSED BUFFER TUBES LEFT COILED AND STORED IN SPLICE ENCLOSURE



EXISTING CCTV–4E CABINET

(NW Corner of Green Valley Rd and W. Friendly Ave)

NEW CABINET AT INTERSECTION GBO–197

(SE Corner of Green Valley Rd and W. Friendly Ave)

1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF GREENSBORO ENGINEERING MANAGER AT 336–433–7218 TO ARRANGE FOR THE CITY TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK, AND VLAN ID INFORMATION. NOTIFY THE ENGINEERING MANAGER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND FUNCTIONAL.

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

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4) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS–BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

TMP Phase I

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Traffic Engineering Branch
Traffic Signal Systems Section
750 N.Greenfield Pkwy,Garner,NC 27529

CITY OF GREENSBORO
SIGNAL SYSTEM
SPLICE DETAIL

Division 7 Guilford County Greensboro

PLAN DATE: July 2026 | REVIEWED BY: T.M. Moody
PREPARED BY: R.L. Aristondo | REVIEWED BY: B. Roth-Roffy

SCALE: N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

CADD FILE NAME: U-5841_SCP_04

Docusign Envelope ID: 6500A714-C7D1-87E3-8297-F21086E37346

PROJECT REFERENCE NO.	SHEET NO.
U-5841	SCP 5

N. ELAM AVE AT W. FRIENDLY AVE

SIG. INV. GBO–193
SIG. INV. 07–1008

COLOR CODE TIA/EIA 598–C	
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

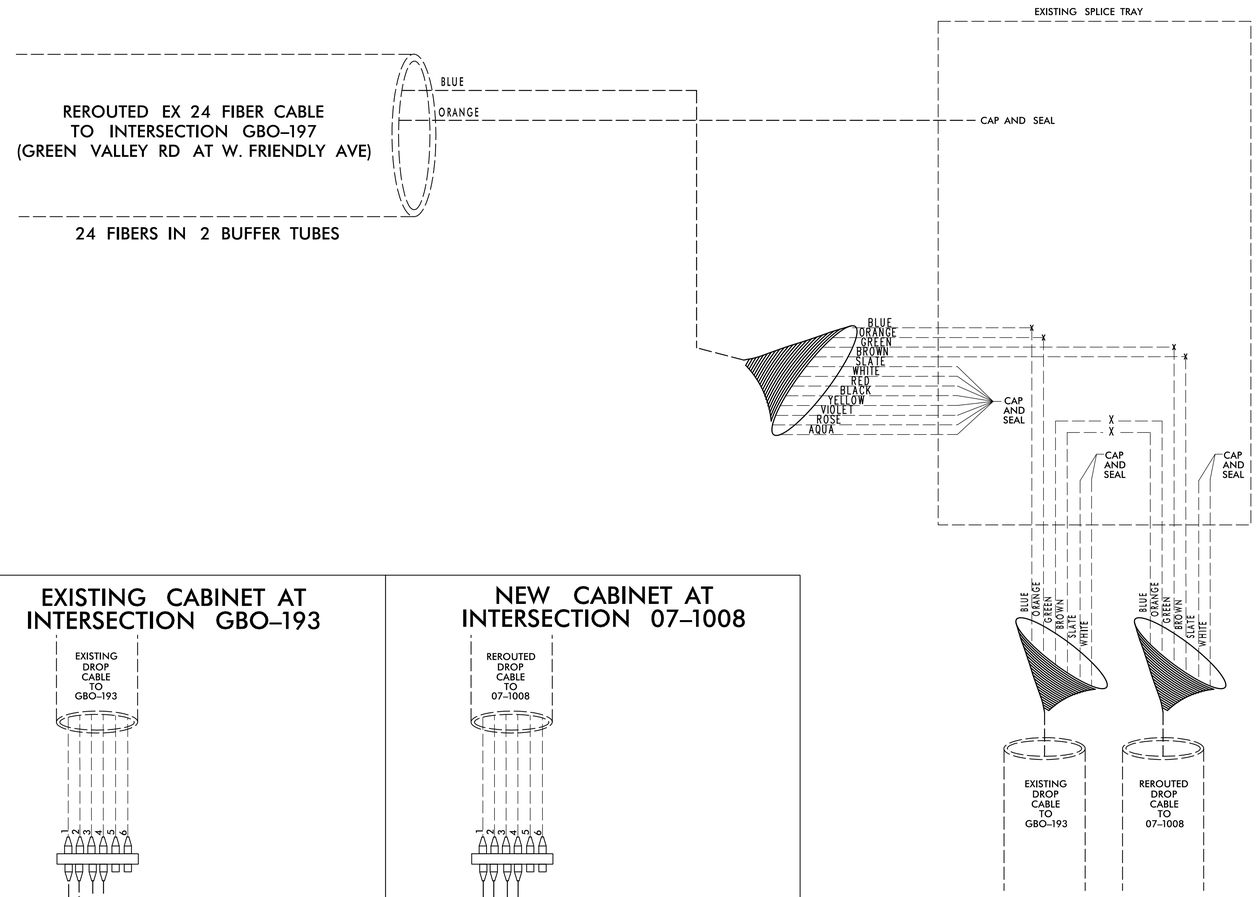
LEGEND

X = FUSION SPLICE INDIVIDUAL FIBER
E = EXISTING SPLICE
C = CAP AND SEAL

EXPRESS	=	EXPRESS ENTIRE BUFFER TUBE /FIBERS THROUGH WITHOUT CUTTING
BUFFER SPLICE	=	SPLICE ALL FIBERS IN BUFFER TUBE COLOR TO COLOR
EX BUFFER SPLICE	=	EXISTING BUFFER TUBE SPLICE COLOR TO COLOR

NOTES

1. UNUSED FIBERS LEFT COILED AND STORED IN SPLICE TRAY
2. UNUSED BUFFER TUBES LEFT COILED AND STORED IN SPLICE ENCLOSURE



1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF GREENSBORO ENGINEERING MANAGER AT 336–433–7218 TO ARRANGE FOR THE CITY TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK, AND VLAN ID INFORMATION. NOTIFY THE ENGINEERING MANAGER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND FUNCTIONAL.

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

3) INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING:

   REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

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

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

4) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS–BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

TMP Phase I

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STV Engineers, Inc.
2151 Hawkins St., Suite 1400
Charlotte, NC 28203
(704) 372-1885
NC License Number F-0991

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

CITY OF GREENSBORO
SIGNAL SYSTEM
SPLICE DETAIL

Division 7 Guilford County Greensboro

PLAN DATE: July 2026 REVIEWED BY: T.M. Moody
PREPARED BY: R.L. Aristondo REVIEWED BY: B. Roth-Roffy

SCALE: N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 040329 ENGINEER TRENT M. MOODY

DocuSigned by: Trent Moody 9/23/2026
SIGNATURE DATE

CADD FILE NAME: U-5841_SCP_05

TIP PROJECT: U-5841

T.I.P. NO.	SHEET NO.
U–5841	UO–1

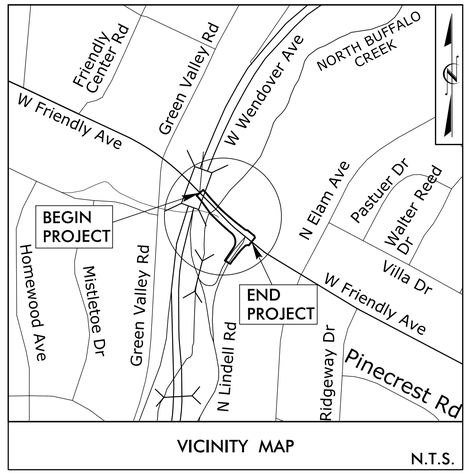
NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET IS DONE BY OTHERS.
NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

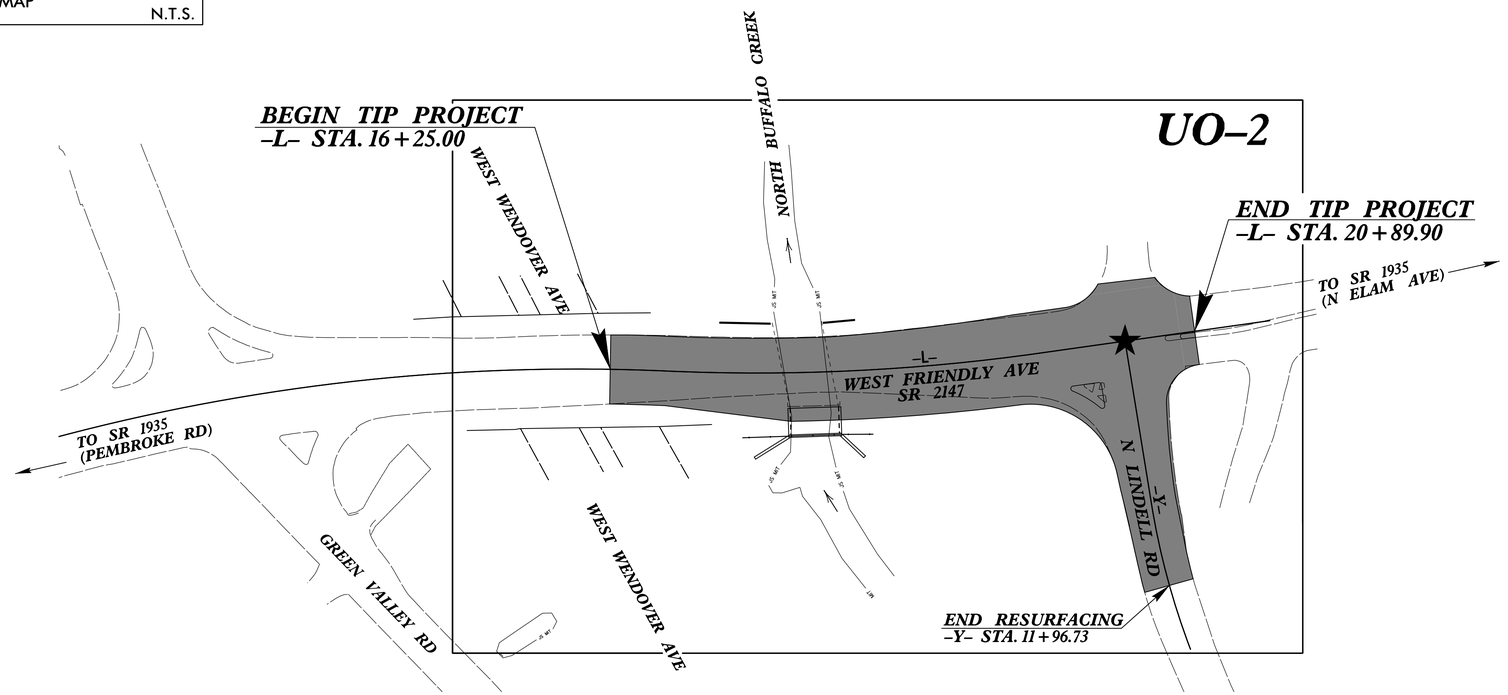
UTILITIES BY OTHERS PLANS
GUILFORD COUNTY

LOCATION: SR 2147 WEST FRIENDLY AVENUE FROM EAST OF GREEN VALLEY RD TO NORTH LINDELL RD IN GREENSBORO

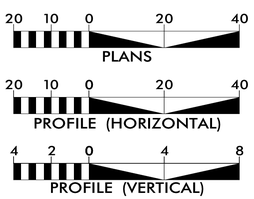
TYPE OF WORK: POWER, COMMUNICATIONS, & GAS







GRAPHIC SCALES



INDEX OF SHEETS

SHEET NO.:	DESCRIPTION:
UO–1	TITLE SHEET
UO–2	UBO PLAN SHEET

UTILITY OWNERS WITH CONFLICTS

(A) POWER DISTRIBUTION – DUKE ENERGY
(B) GAS – PIEDMONT NATURAL GAS
(C) COMMUNICATIONS – AT&T
(D) COMMUNICATIONS – SPECTRUM/CHARTER
(E) COMMUNICATIONS – SEGRA
(F) COMMUNICATIONS – VERIZON

PREPARED IN THE OFFICE OF:

STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

TREVER REEVES PROJECT UTILITY COORDINATOR

DIVISION OF HIGHWAYS
DIVISION 7
PO BOX 14996
1584 YANCEYVILLE ST
GREENSBORO NC 27415-4996
PHONE (919) 707-6690
FAX (919) 250-4151

SUZANA MATTA, PE DIVISION 7 PROJECT ENGINEER

JAMES YATES, PE DIVISION 7 UTILITY ENGINEER

$$$$$$$$$$SYSTIME$$$$$$$$$$
$$$$$$$$$$DGN$$$$$$$$$$
$$$$$$$$$$USERNAME$$$$$$$$$$

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
U-5841	U0-2

UTILITIES BY OTHERS

NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.

NA 2011

DUKE REMOVED OH LINE
DUKE, CHARTER, SIGNAL OH LINE
SIGNAL FIBER TO BE RELOCATED (SEE NOTE 4)
DUKE POWER POLE
DUKE, CHARTER, SIGNAL OH LINE
DUKE POWER POLE
DUKE POWER POLE
CHARTER PEDESTAL
VERIZON EXISTING UG LINE
PNG 4" STEEL GAS MAIN REMAINED (SEE NOTE 2)
DUKE POWER POLE
DUKE, CHARTER, SIGNAL OH LINE
DUKE POWER POLE
CHARTER HH & UG LINE
DUKE & SIGNAL OH LINE
SEGRA ABANDONED UG LINE
PROP O/H POW LINES
PROP O/H POW TEL & FO LINES
BEGIN RET.WALL #1 WITH HANDRAIL +11.06, 39.10'
END RET.WALL #1 WITH HANDRAIL +52.06, 38.52'
BEGIN RET.WALL #2 WITH HANDRAIL +95.06, 38.36'
END RET.WALL #2 WITH HANDRAIL +20.65, 39.62'
150' SHIFT TAPER LT.
REMOVE EXIST GUARDRAIL
PROP 5' SIDEWALK
PROP 2'-6" C&G
25' GR SPAN SECTION
TEMP. SHORING
REMOVE EXIST GUARDRAIL
RETAIN EXIST. CONC. ARCH CULVERT
PROP 6' SIDEWALK
PROP HANDRAIL
100' BAY TAPER RT
PROP. CONC. ARCH CULVERT EXTENSION STA. 17+87.00 23' X 18.5', SKEW = 79°
W FRIENDLY AVE
BEGIN C&G +25.00, 27.20
BEGIN C&G +25.00, 27.50
PROP UG (TEL) TEL CABLES
-L- POT Sta. 20+34.9
-Y- POT Sta. 10+00.00
END C&G +17.59, 45.67
BEGIN C&G +63.90, 44.80
END C&G +89.90, 28.23
END C&G +89.90, 26.55
BEGIN C&G +63.90, 53.70
END C&G +97.12, 25.54 (-Y-)
PC Sta. 11+30.50
POT Sta. 21+50
PROP MONO ISLAND
TYPE 2A
TYPE 1A
TYPE 4
PNG CAPPED 4" STEEL GAS MAIN (SEE NOTE 2)
AT&T ABANDONED
PNG UNDERGROUND GAS LINE REMAINED (SEE NOTE 1)
VERIZON UG LINE SUPPORTED IN PLACE
SEGRA UG LINE (SEE NOTE 3)
VERIZON LOWERED UG LINE IN PLACE
SIGNAL FIBER TO BE RELOCATED (SEE NOTE 4)
PNG CAPPED 4" STEEL GAS MAIN (SEE NOTE 2)
VERIZON HH
SEGRA RELOCATED HH
SIGNAL FIBER OH LINE (SEE NOTE 4)
DUKE & CHARTER OH LINE
SIGNAL FIBER TO BE RELOCATED (SEE NOTE 4)
20 INCH, PCCP
8" DIP
36" DIP
6 INCH, CIP
EXISTING R/W
S 37° 52' 50.0" W
S 50° 55' 45" E
94.00'
34.00'

NOTES:

1. PNG EXISTING GAS MAIN (SOUTH SIDE OF ROAD) TO BE SUSPENDED AND WORKED AROUND AT PROPOSED CATCH BASIN BEWTEEN WENDOVER AVE AND N BUFFALO CREEK.
2. PNG EXISTING 4" STEEL GAS MAIN (NORTH SIDE OF ROAD) TO BE CAPPED AND ABANDONED OVER CULVERT. EXISTING GAS MAIN EAST AND WEST OF CAPS REMAINED.
3. SEGRA TO MOVE THEIR UG LINE TO SAME ELEVATION AS GAS LINE WITH ~1' HORIZONTAL SEPARATION. TO BE SUSPENDED AND WORKED AROUND.
4. SIGNAL FIBER TO BE RELOCATED UNDER CONTRACT.