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PROJECT REFERENCE NO.	SHEET NO.
U-5827	Sig-1.0
DESIGNED BY:	William J. Hamilton
APPROVED:	<i>William J. Hamilton</i>
DATE:	6-4-19
SEAL	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

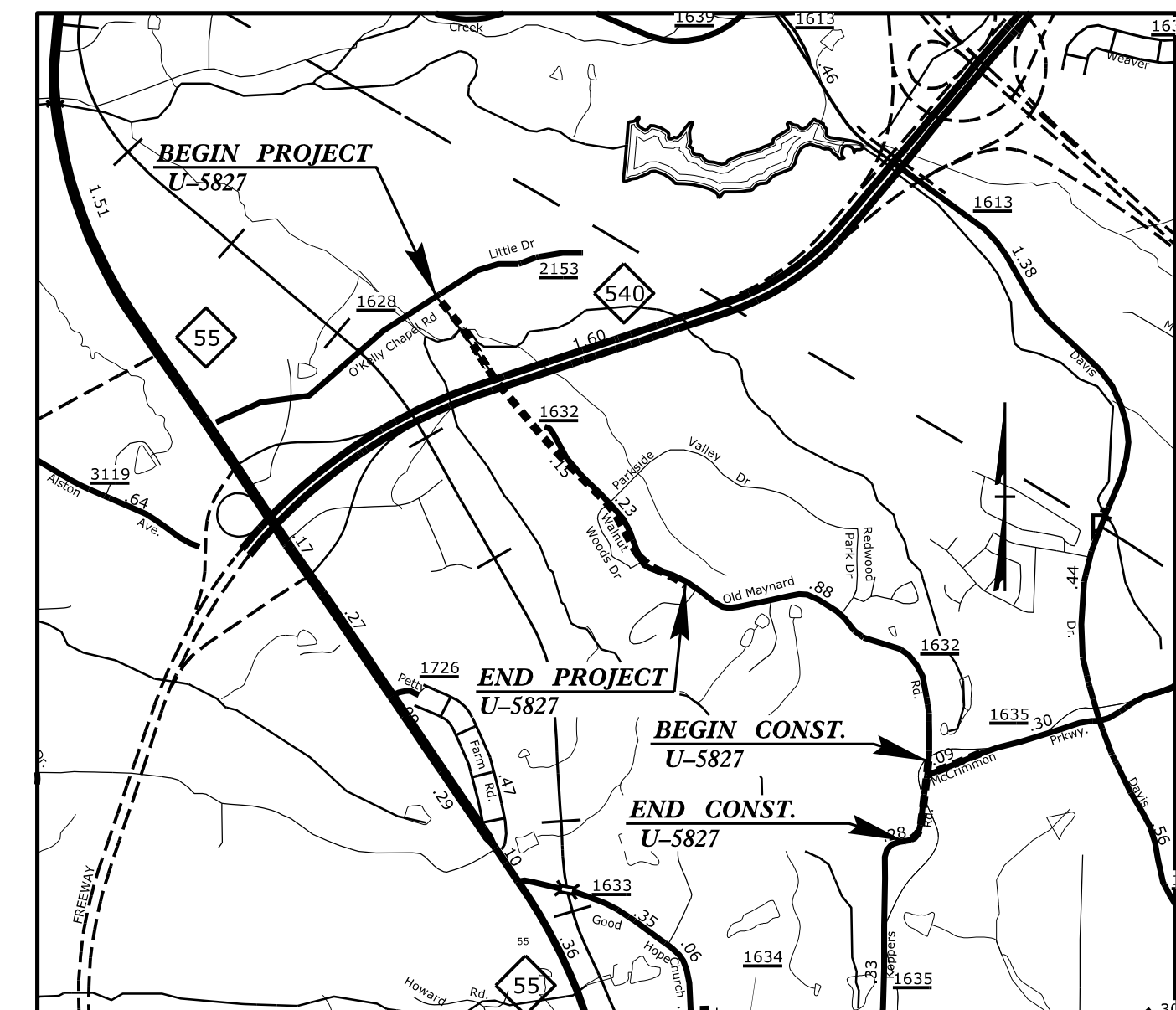
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

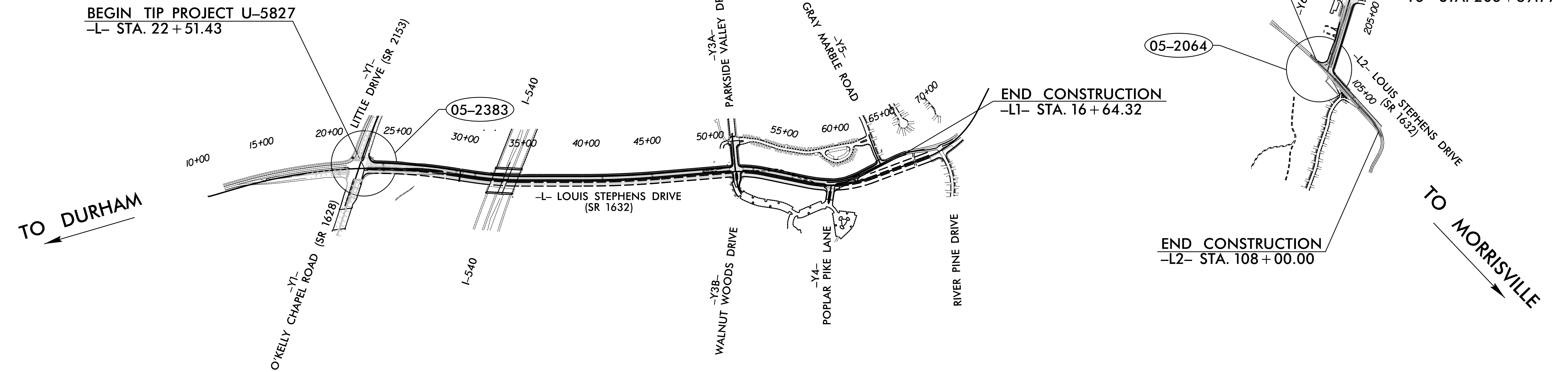
LOCATION: LOUIS STEPHENS DRIVE EXTENSION (SR 1632)
FROM O'KELLY CHAPEL ROAD (SR 1628)/LITTLE
DRIVE (SR 2153) IN RESEARCH TRIANGLE PARK
TO POPLAR PIKE LANE IN MORRISVILLE

TYPE OF WORK: TRAFFIC SIGNAL AND SIGNAL COMMUNICATIONS SIGNALS

TIP PROJECT: U-5827



VICINITY MAP



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

Prepared in the offices of:



RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
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PLANS PREPARED BY:

W. Jason Hamilton, P.E., PTOE – Project Manager

Nicholas E. Burns, P.E. – Project Engineer

Timothy S. Popelka, E.I. – Project Engineer

INDEX OF PLANS

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Sig. 2.0-2.2	05-2383	SR 1628 (O'Kelly Chapel Rd.)/SR 2153 (Little Dr.) at SR 1632/2153 (Louis Stephens Rd.)	
Sig. 3.0-3.2	05-2064	SR 1632 (Louis Stephens Dr.) at SR 1635 (McCrimmon Pkwy.)	
Sig. 4.0-4.1	-	-	Standard Plate Sheets
SCPI-SCP4	-	-	System Communication Plans

LEGEND

XX-XXXX TRAFFIC SIGNAL

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

Rob Ziemba, P.E. – Central Region Signals Engineer

D. Todd Joyce, P.E. – Signal Equipment Design Review Engineer

Gregg Green – Signal Communications Project Engineer

PHASING DIAGRAM

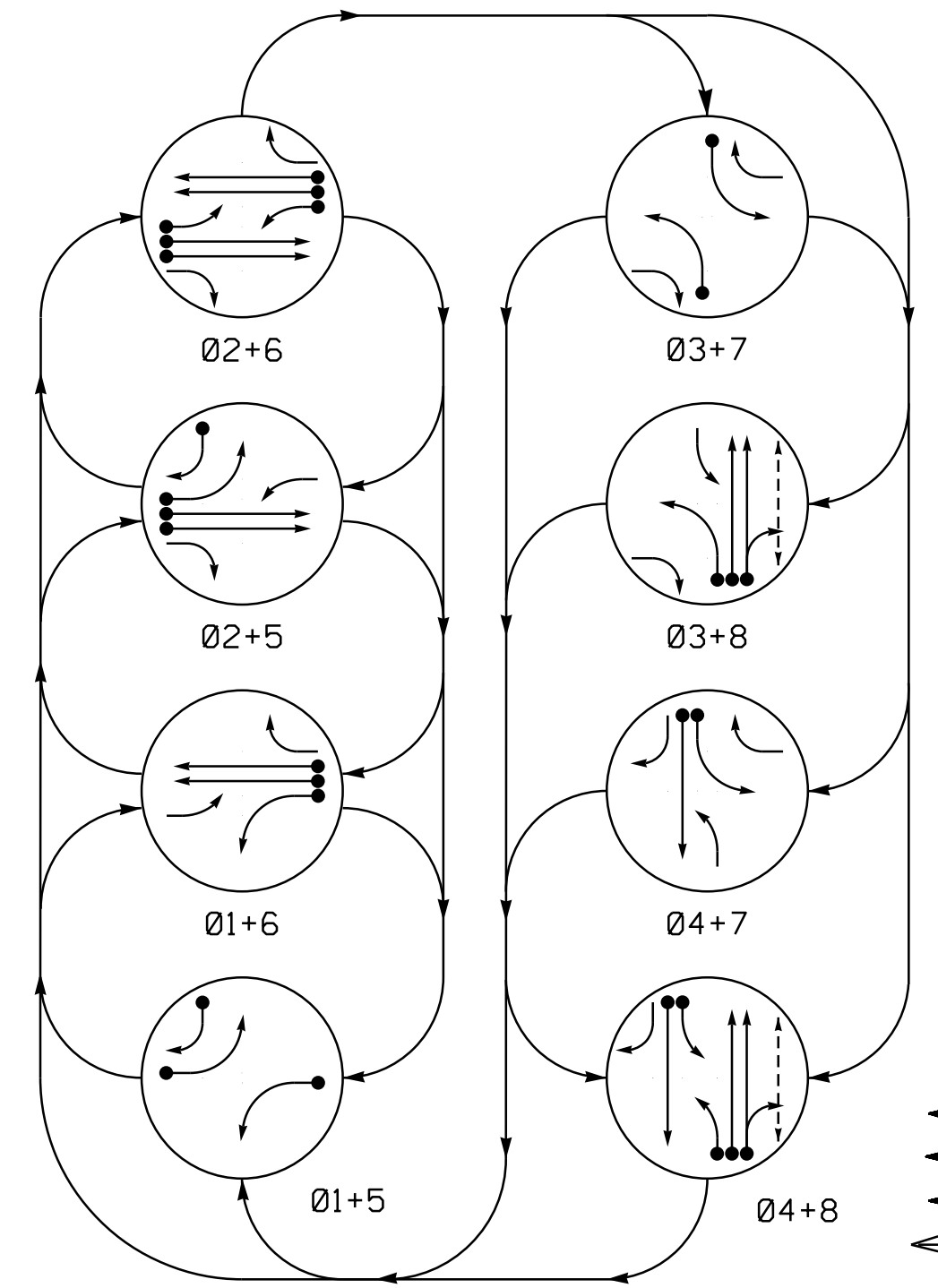
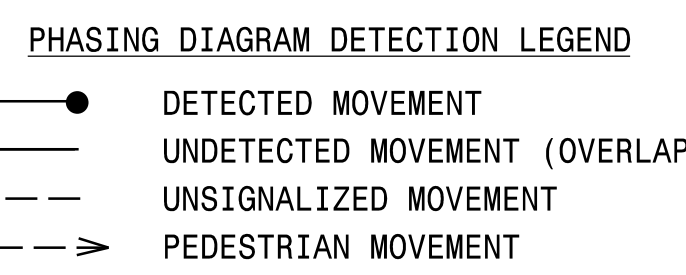


TABLE OF OPERATION table with columns for SIGNAL FACE, PHASE (01+5 to 04+8), and FLASH. It details the sequence of traffic movements for each phase.

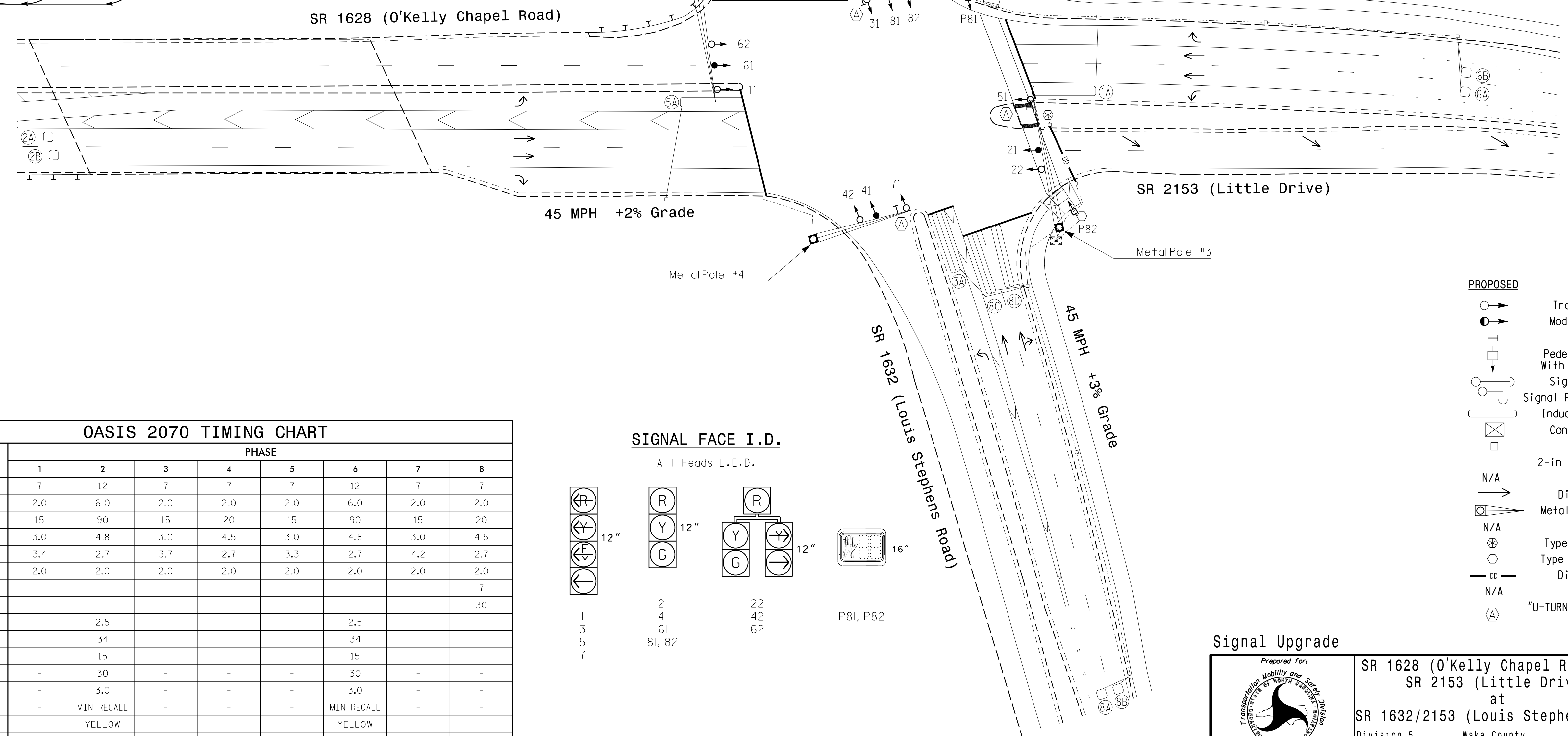


OASIS 2070 LOOP & DETECTOR INSTALLATION CHART table with columns for LOOP, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, PHASE, CALLING, EXTENSION, FULL TIME DELAY, STRETCH TIME, DELAY TIME, SYSTEM LOOP, and NEW CARD.

8 Phase Fully Actuated (Isolated)

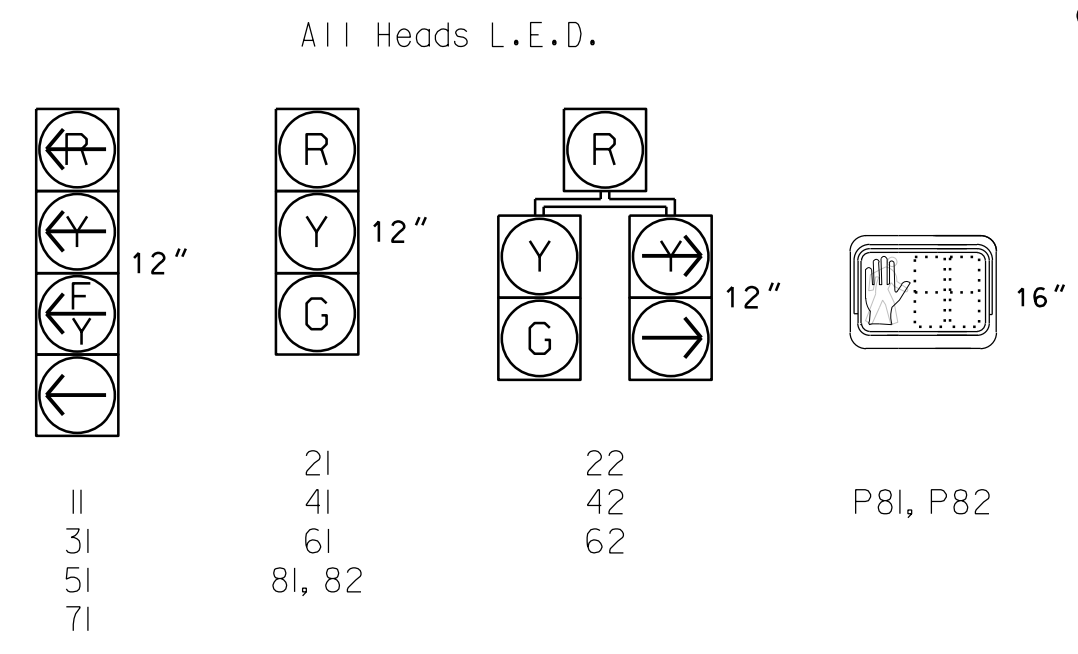
NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Relabel loop 2C as 5A, 4B as 7A, 4C as 4B, 4D as 5B and 4E as 5C respectively.



OASIS 2070 TIMING CHART table with columns for FEATURE and PHASE (1-8). It lists timing parameters such as Min Green, Extension, Max Green, Yellow Clearance, Red Clearance, Red Revert, Walk, Don't Walk, Seconds Per Actuation, Max Variable Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Recall Mode, Vehicle Call Memory, Dual Entry, and Simultaneous Gap.

SIGNAL FACE I.D.



LEGEND table defining symbols for PROPOSED and EXISTING features: Traffic Signal Head, Modified Signal Head, Sign, Pedestrian Signal Head, Signal Pole with Guy, Signal Pole with Sidewalk Guy, Inductive Loop Detector, Controller & Cabinet, Junction Box, 2-in Underground Conduit, Right of Way, Directional Arrow, Metal Pole with Mastarm, Curb Ramp, Type I Pushbutton Post, Type II Signal Pedestal, Directional Drill, Guardrail, and 'U-TURN YIELD TO RIGHT TURN' Sign.

Signal Upgrade

RAMEY KEMP ASSOCIATES, INC. logo and contact information: 5000 Parkington Plaza, Suite 100, Raleigh, North Carolina 27609, 919-872-2115, Fax: 919-872-2116, www.rameykemp.com

Professional Engineer seal for William J. Hamilton, State of North Carolina, License No. 32396.

Project title block: SR 1628 (O'Kelly Chapel Road) and SR 2153 (Little Drive) at SR 1632/2153 (Louis Stephens Road). Includes Division 5, Wake County, RTP, and dates: PLAN DATE: June 2019, REVIEWED BY: WJ Hamilton, PREPARED BY: TS Popelka, RKA PROJ. NO.: 15268 (040).

Professional Engineer seal for William J. Hamilton, State of North Carolina, License No. 32396, dated 6-4-19.

* 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.

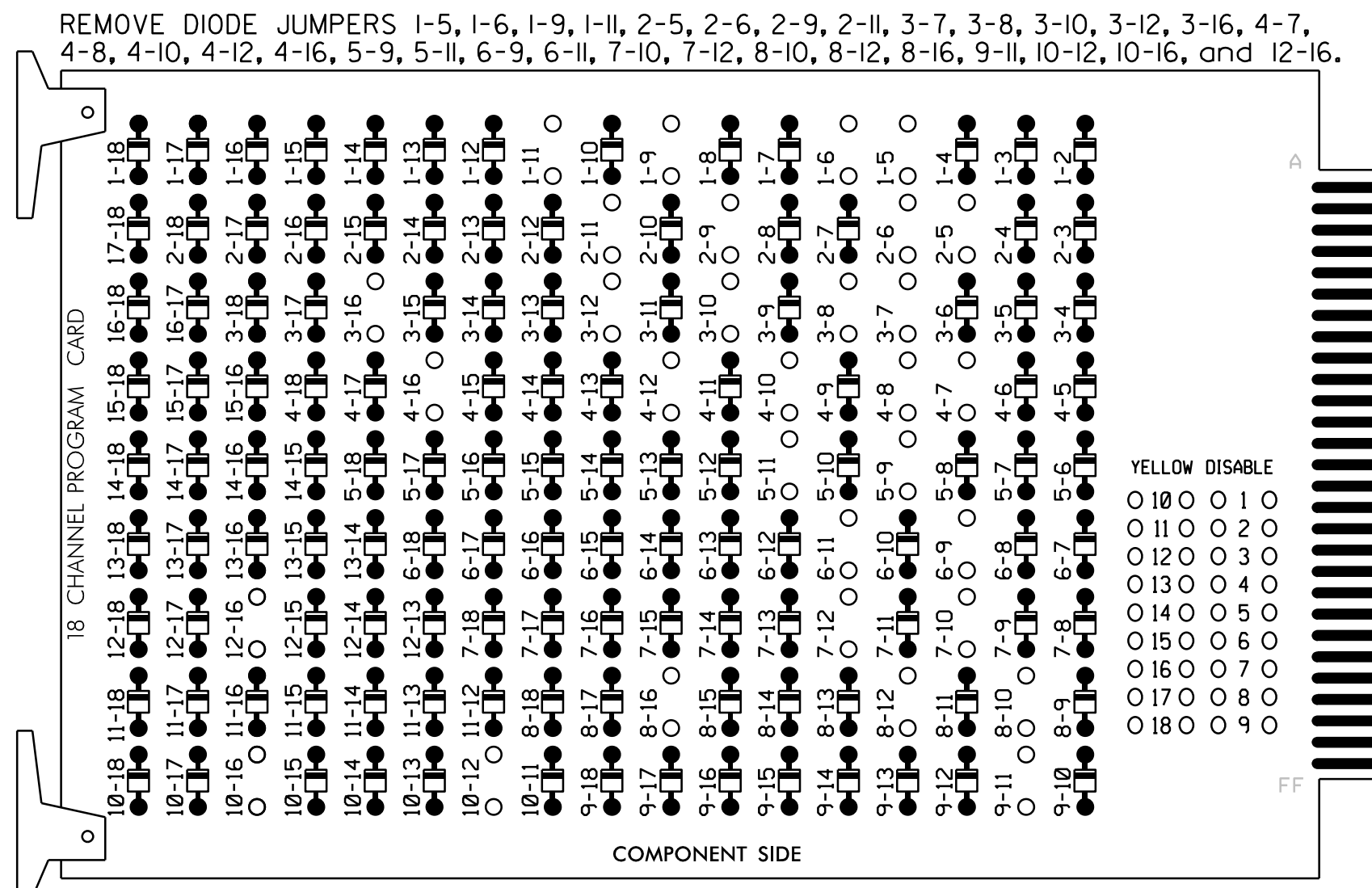
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SIG. INVENTORY NO. 05-2383

EDI MODEL 2018ECL-NC CONFLICT MONITOR

PROGRAMMING DETAIL

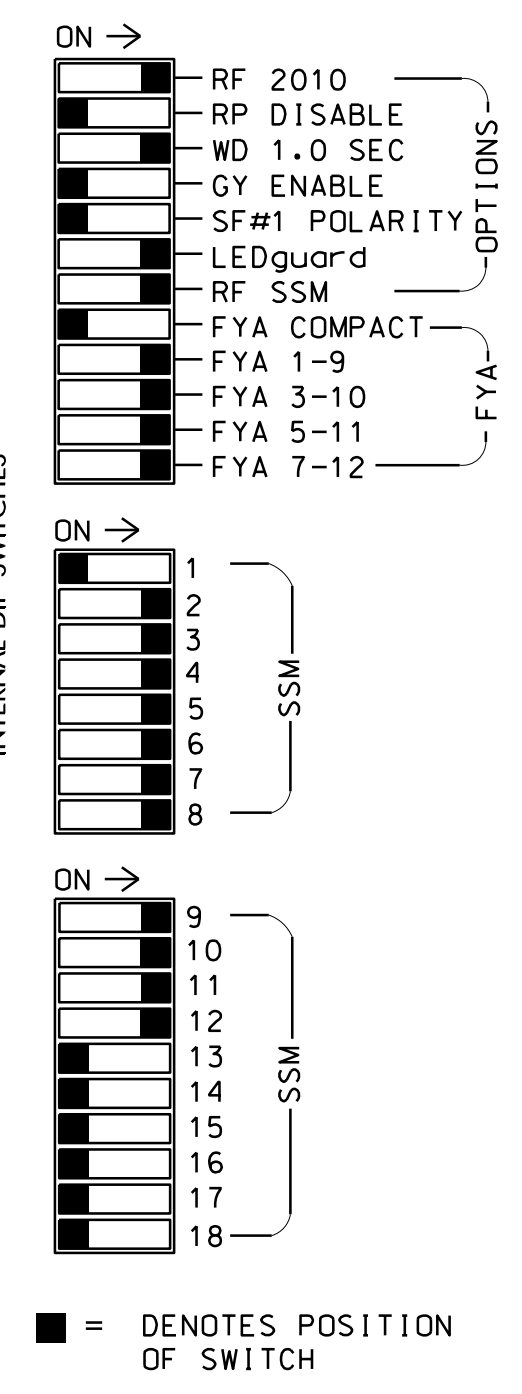
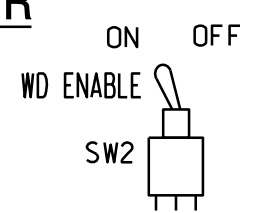
(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Startup In Green.
- Program phase 8 for Startup Ped Call.
- Program phases 2 and 6 for Yellow Flash and overlaps 1 and 2 as Wag Overlaps.

EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11,S12,
 AUX S1,AUX S2,AUX S4,AUX S5
 PHASES USED.....1,2,3,4,5,6,7,8,8PED
 OVERLAP "A".....1+2
 OVERLAP "B".....3+4
 OVERLAP "C".....5+6
 OVERLAP "D".....7+8

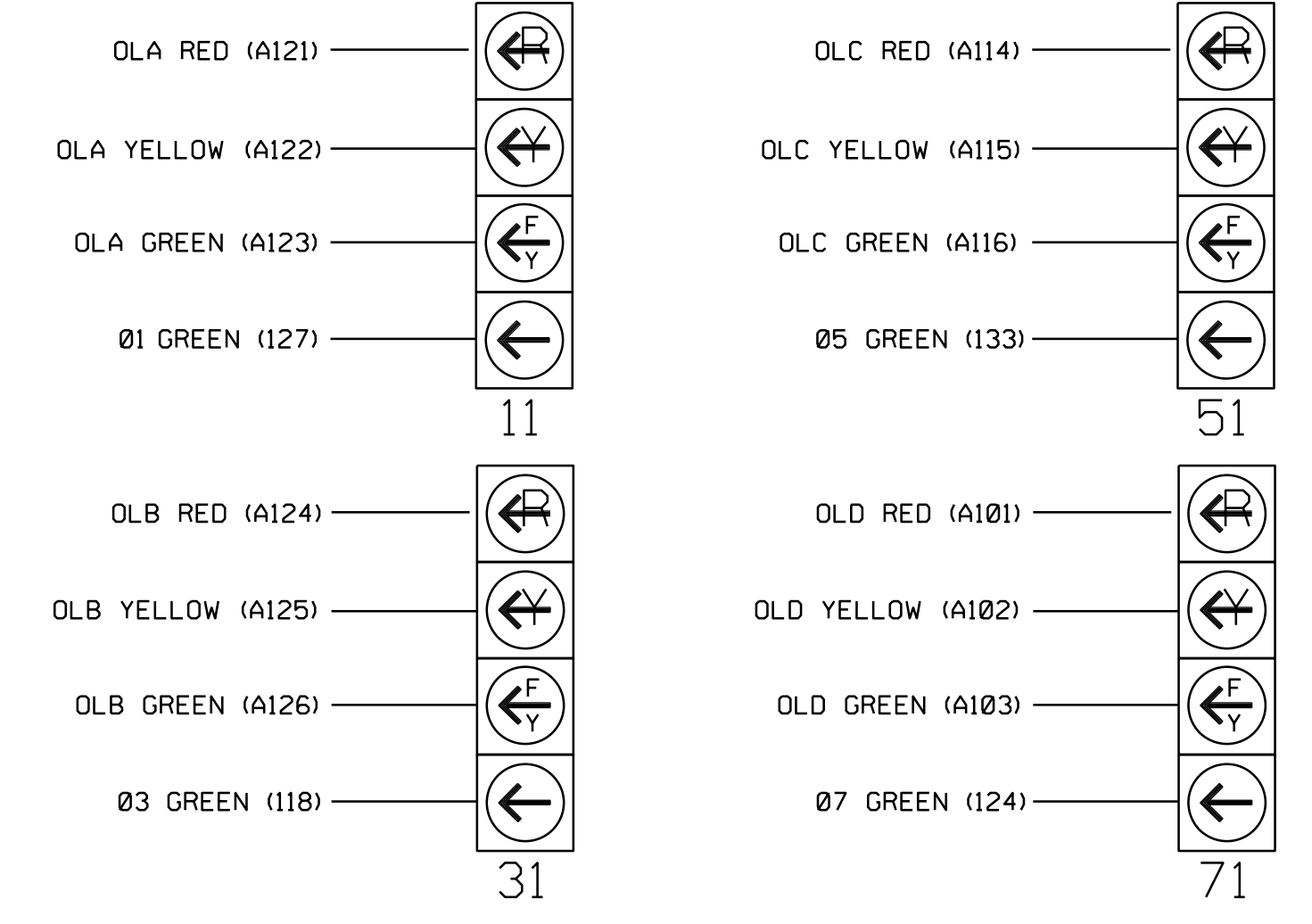
SIGNAL HEAD HOOK-UP CHART

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	DLC	OLD	SPARE				
SIGNAL HEAD NO.	11	21,22	NU	22	31	41,42	NU	42	51	61,62	NU	62	71	81,82	P81, P82	11	31	NU	51	71	NU	
RED		128		*	101		*	134		*	107											
YELLOW	*	129			102			135			108											
GREEN		130			103			136			109											
RED ARROW																A121	A124		A114	A101		
YELLOW ARROW					117			132			123					A122	A125		A115	A102		
FLASHING YELLOW ARROW																A123	A126		A116	A103		
GREEN ARROW	127			118	118		133	133		124	124											
Hand																						110
Person																						112

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

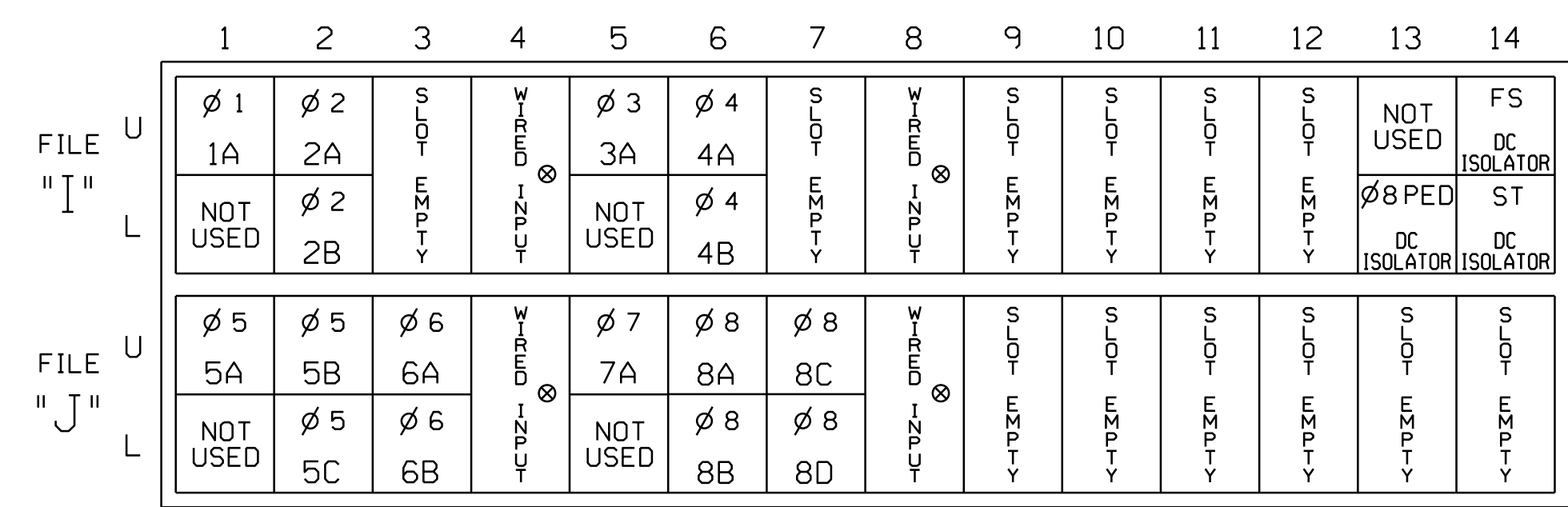


NOTE

- The sequence display for these signal heads requires special programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 ⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

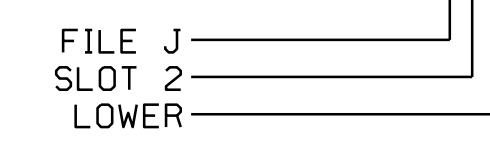
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A ²	TB4-5,6	I5U	58	20	3	3	Y	Y			15
	-	J8U	50	12	28	8	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4		Y			
	TB4-11,12	I6L	45	7	14	4	Y	Y	Y	2.0	5
5A ³	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y	Y		3
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			10
	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A ⁴	TB5-5,6	J5U	57	19	7	7	Y	Y			15
	-	I8U	49	11	24	4	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8		Y			
	TB5-11,12	J6L	46	8	18	8		Y			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y	Y	2.0	5
	TB7-3,4	J7L	79	41	48	8	Y	Y		2.0	10
PED PUSH BUTTONS											
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

NOTE:

INSTALL DC ISOLATORS IN INPUT FILE SLOT 113.

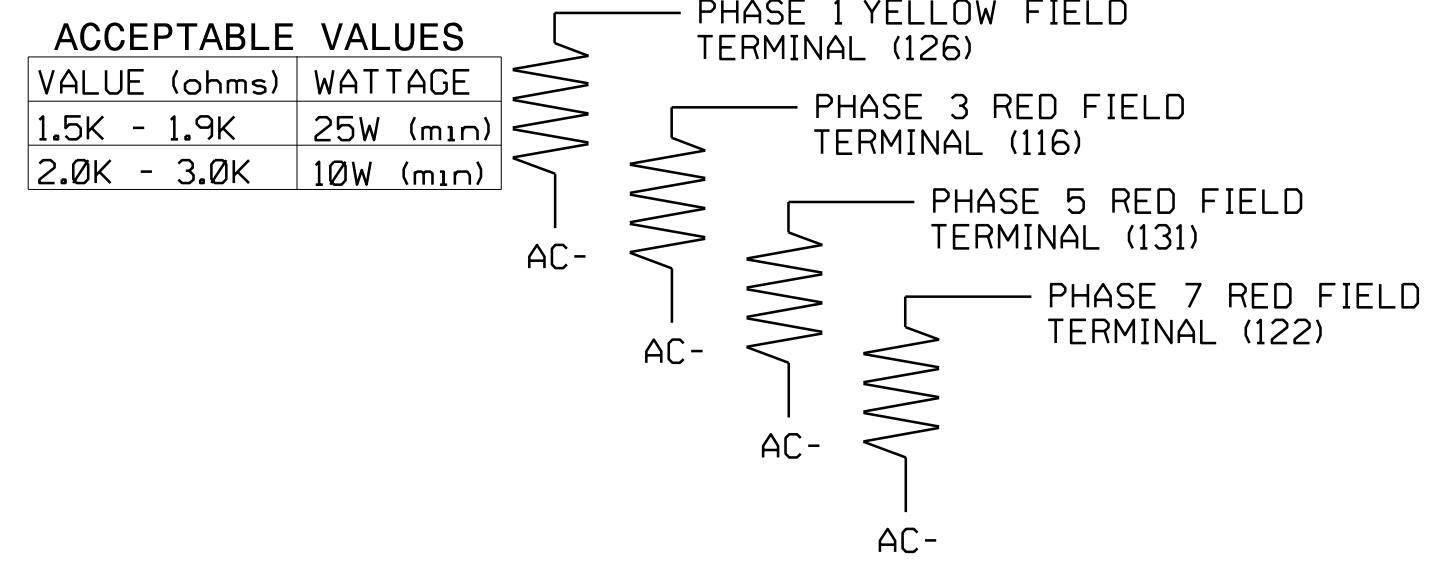
- Add jumper from I1-W to J4-W, on rear of input file.
- Add jumper from I5-W to J8-W, on rear of input file.
- Add jumper from J1-W to I4-W, on rear of input file.
- Add jumper from J5-W to I8-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



Electrical Detail Sheet 1 of 2

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2383
 DESIGNED: Jun 2019
 SEALED: 6-4-19
 REVISED: N/A

SR 1628 (O'Kelly Chapel Road) and SR 2153 (Little Drive) at SR 1632/2153 (Louis Stephens Road) Division 5 Wake County RTP

Prepared in the offices of: **RAMEY KEMP ASSOCIATES, INC.**

Transportation Engineers
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 919-872-9115 Tel. 919-872-9116 Fax. www.rameykemp.com

Plan Date: June 2019
 Prepared by: TS Popelka
 RKA PROJ. NO: 15268 (040)

Reviewed by: WJ Hamilton

Signature: William J. Hamilton
 Date: 6-4-19

DocuSign Envelope ID: 77E246F7-9B97-4C9D-AF22-84CB765AA9C

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

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS), SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 AND 12.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON
AND RED CLEAR ON PHASE #1 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #1 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #7 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON
AND RED CLEAR ON PHASE #3 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #47 ON
SET OUTPUT ASSIGNMENT #48 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

LOGICAL I/O COMMAND #8 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #49 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #9 (+/-COMMAND#)
IF YELLOW ON PHASE #3 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #48 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #10 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON
AND RED CLEAR ON PHASE #7 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #39 ON
SET OUTPUT ASSIGNMENT #40 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

LOGICAL I/O COMMAND #11 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #41 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

LOGICAL I/O COMMAND #12 (+/-COMMAND#)
IF YELLOW ON PHASE #7 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #40 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

- OUTPUT 39 = Overlap D Red
- OUTPUT 40 = Overlap D Yellow
- OUTPUT 41 = Overlap D Green
- OUTPUT 42 = Overlap C Red
- OUTPUT 43 = Overlap C Yellow
- OUTPUT 44 = Overlap C Green
- OUTPUT 47 = Overlap B Red
- OUTPUT 48 = Overlap B Yellow
- OUTPUT 49 = Overlap B Green
- OUTPUT 50 = Overlap A Red
- OUTPUT 51 = Overlap A Yellow
- OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: :XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0.0

PRESS '+'

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: :XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0.0

PRESS '+'

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: :XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0.0

PRESS '+'

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: :XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0.0

PRESS '+'

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

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: 05-2383
DESIGNED: Jun 2019
SEALED: 6-4-19
REVISED: N/A

Electrical Detail
Sheet 2 of 2



Electrical and Programming Details For: SR 1628 (O'Kelly Chapel Road) and SR 2153 (Little Drive) at SR 1632/2153 (Louis Stephens Road) Division 5 Wake County RTP

Prepared in the offices of: RAMEY KEMP ASSOCIATES, INC. Transportation Engineers

Plan Date: June 2019 Reviewed By: WJ Hamilton
Prepared By: TS Popelka RKA Proj. No: 15268 (040)

750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER WILLIAM J. HAMILTON

Signature: William J. Hamilton Date: 6-4-19

SIG. INVENTORY NO. 05-2383

PHASING DIAGRAM

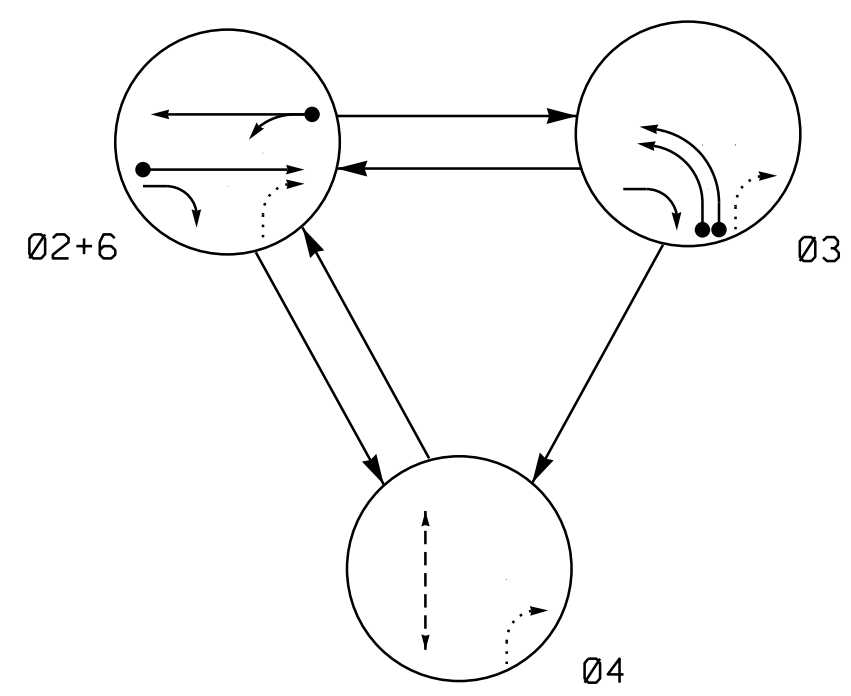
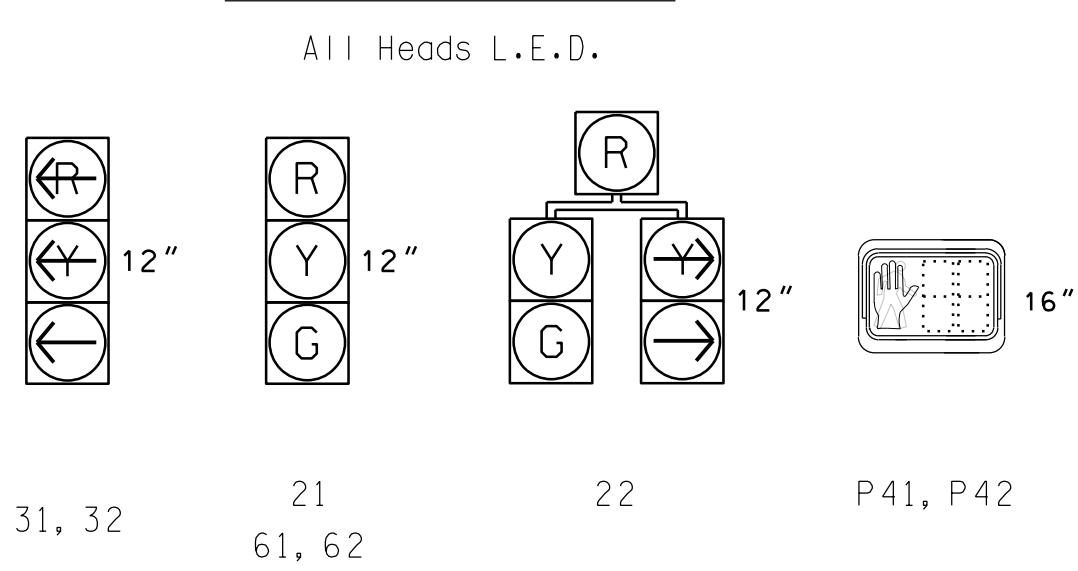


TABLE OF OPERATION

SIGNAL FACE	PHASE				FLASH
	Ø 2 + 6	Ø 3	Ø 4	Ø 6	
21	G	R	R	Y	
22	G	R	R	Y	
31, 32	R	R	R	R	
61, 62	G	R	R	Y	
P41, P42	DW	DW	W	DRK	

SIGNAL FACE I.D.



LOOP & DETECTOR INSTALLATION CHART
ASC/3-2070EN2 CONTROLLER w/ TS-2 CABINET

LOOP NO.	SIZE (ft)	DIST. FROM STOPBAR (ft)	TURNS	NEW EXISTING	NEMA PHASE	NEW EXISTING	DETECTOR UNITS					
							FEATURE	TIME	USE ADDED INITIAL	DET. TYPE		
2A	6X6	70	5	X	-	2	X	-	-	-	-	S
3A	6X40	0	2-4-2	X	-	3	X	-	DELAY	3	-	S
3B	6X40	0	2-4-2	X	-	3	X	-	-	-	-	S
6A	6X6	70	5	X	-	6	X	-	-	-	-	S

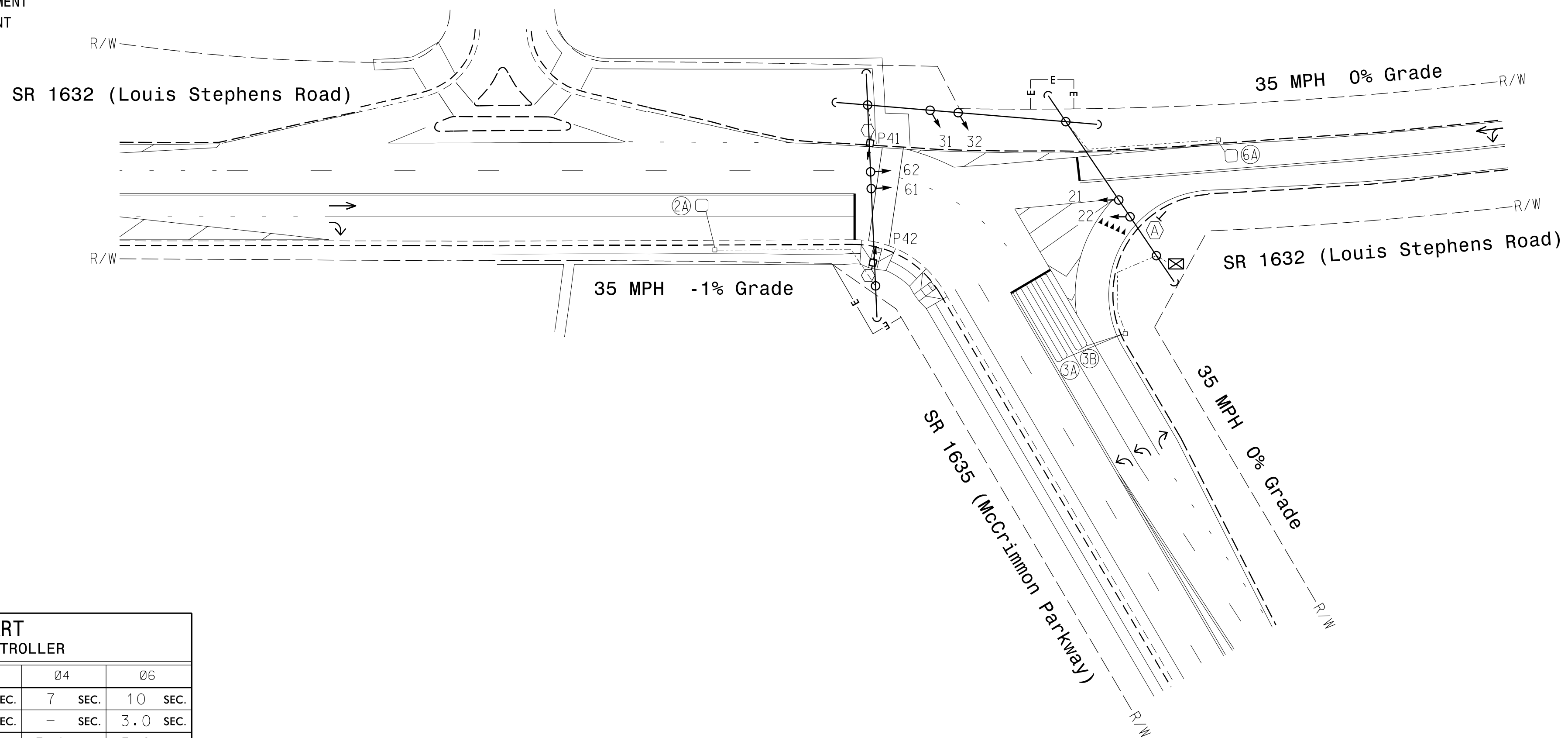
3 Phase Fully Actuated (Cary Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. The order of phase 3 and phase 4 may be reversed.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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



TIMING CHART
ASC/3-2070EN2 CONTROLLER

PHASE	Ø 2	Ø 3	Ø 4	Ø 6
MINIMUM GREEN *	10 SEC.	7 SEC.	7 SEC.	10 SEC.
VEHICLE EXT. *	3.0 SEC.	2.0 SEC.	- SEC.	3.0 SEC.
YELLOW CHANGE INT.	3.9 SEC.	3.0 SEC.	3.0 SEC.	3.8 SEC.
RED CLEARANCE	1.5 SEC.	3.1 SEC.	1.0 SEC.	1.8 SEC.
MAX. I *	90 SEC.	30 SEC.	19 SEC.	90 SEC.
RECALL POSITION	MIN. RECALL	NONE	NONE	MIN. RECALL
LOCK DET.	ON	OFF	OFF	ON
WALK *	- SEC.	- SEC.	7 SEC.	- SEC.
PED. CLEAR	- SEC.	- SEC.	12 SEC.	- SEC.
VOLUME DENSITY	OFF	OFF	OFF	OFF
ACTUATION B4 ADD *	- VEH.	- VEH.	- VEH.	- VEH.
SEC. PER ACTUATION *	- SEC.	- SEC.	- SEC.	- SEC.
MAX. INITIAL *	- SEC.	- SEC.	- SEC.	- SEC.
TIME B4 REDUCTION *	- SEC.	- SEC.	- SEC.	- SEC.
TIME TO REDUCE *	- SEC.	- SEC.	- SEC.	- SEC.
MINIMUM GAP	- SEC.	- SEC.	- SEC.	- SEC.
DUAL ENTRY	OFF	OFF	OFF	OFF
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.

LEGEND

PROPOSED	EXISTING
○	●
○	N/A
+	+
□	□
○	○
□	□
○	○
□	□
○	○
□	□
○	○
□	□
N/A	N/A
→	→
—	—
○	○
⊙	⊙

New Installation

Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
SIGNAL DESIGN SECTION

Prepared in the offices of:
RAMEY KEMP ASSOCIATES, INC.
750 N. Greenfield Pkwy, Garner, NC 27529
910-275-9111 FAX 910-275-0416 FAX
www.rameykemp.com

SR 1632 (Louis Stephens Drive) at SR 1635 (McCrimmon Parkway)

Division 5 Wake County Cary

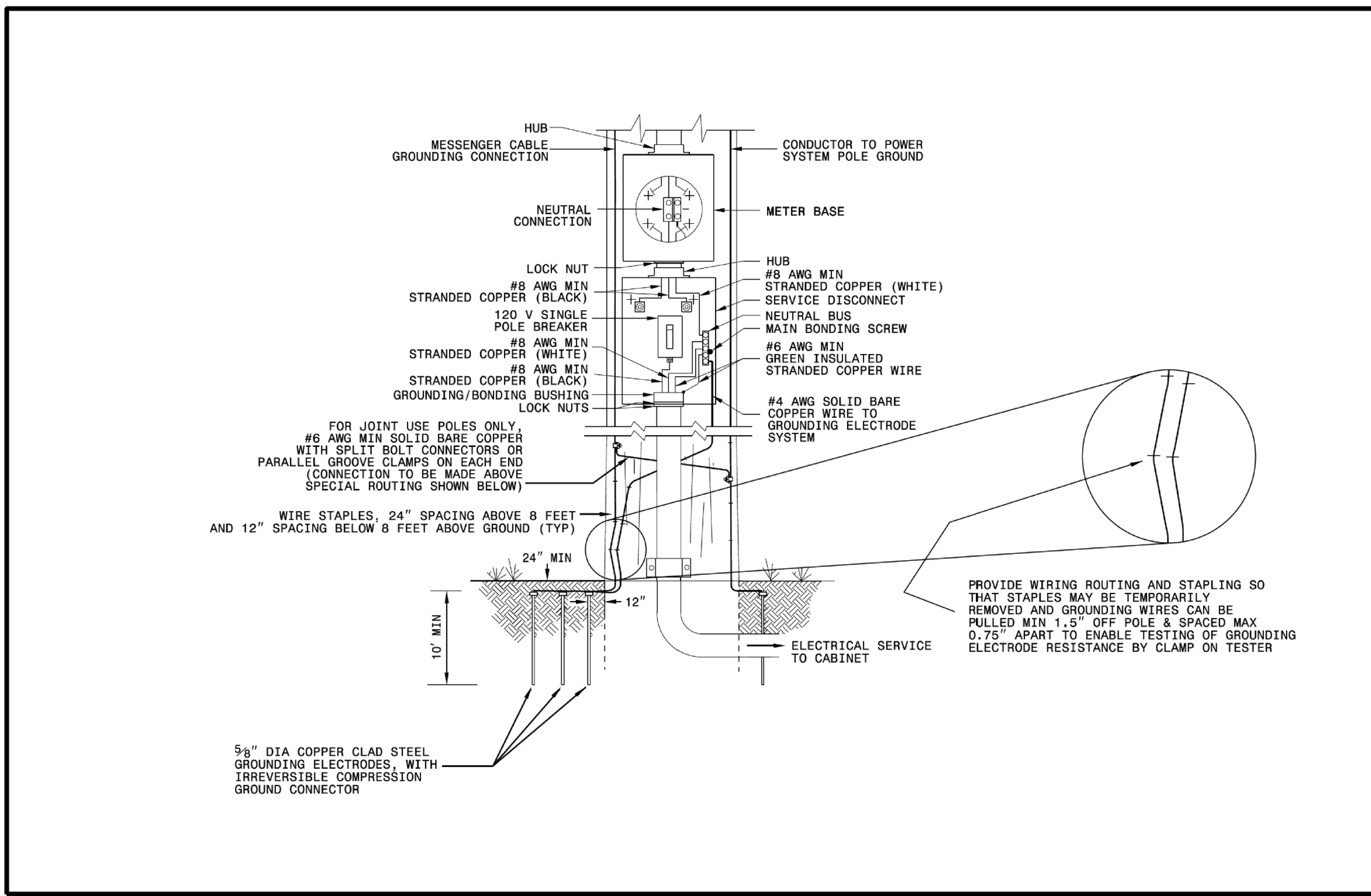
PLAN DATE: June 2019 REVIEWED BY: WJ Hamilton
PREPARED BY: TS Popelka RKA PROJ. NO.: 15268 (040)

REVISIONS	INIT.	DATE

SCALE: 0 40
1" = 40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
WILLIAM J. HAMILTON
32396
DATE: 6-4-19
SIG. INVENTORY NO. 05-2064



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

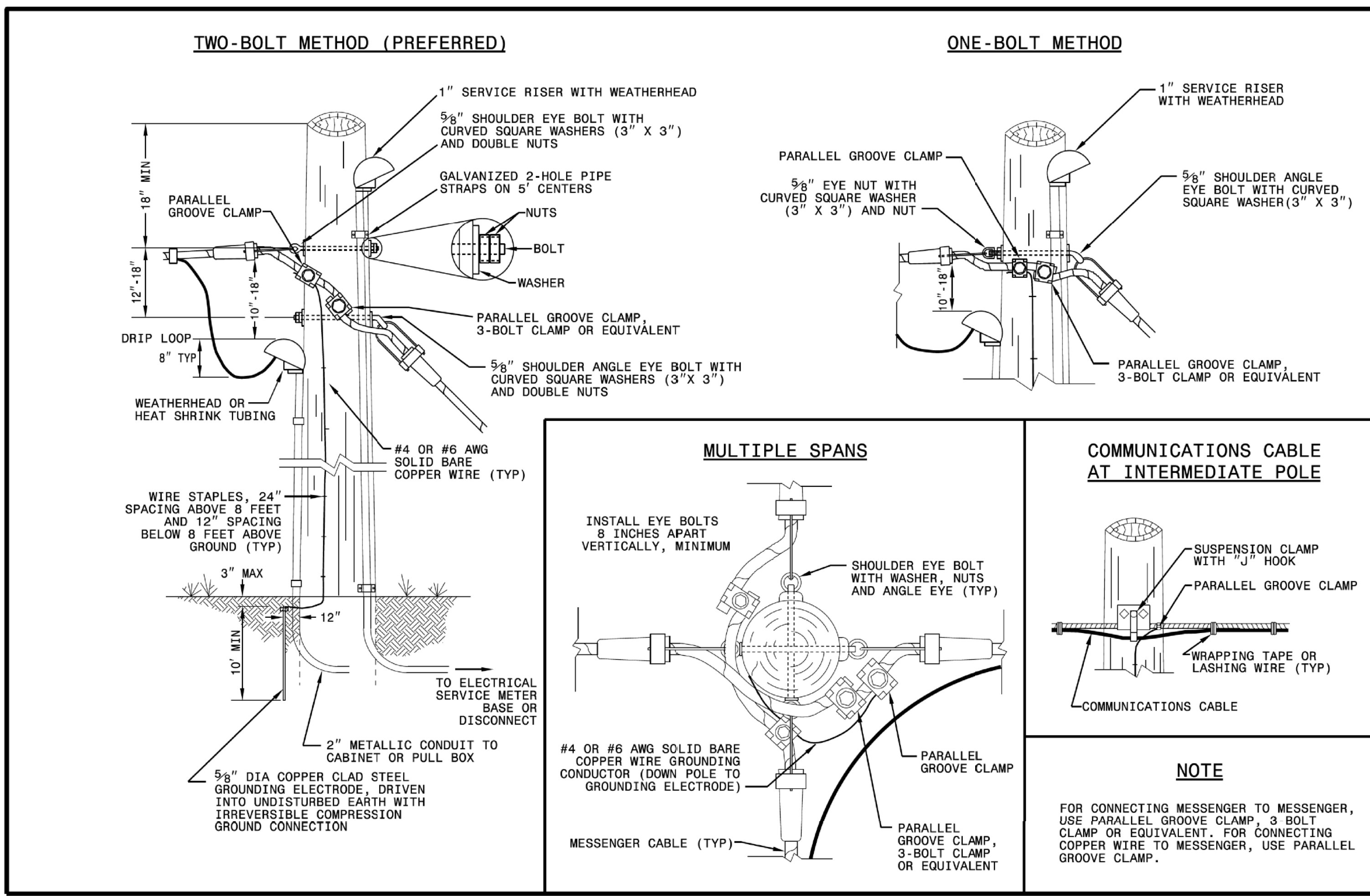
ENGLISH STANDARD DRAWING FOR

ELECTRICAL SERVICE GROUNDING

GROUNDING AND BONDING

SHEET 1 OF 1

1700D01



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR

WOOD POLES

METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1

1720D01

11-2017-2017_09-55
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See Plate for Title

Prepared in the Offices of:

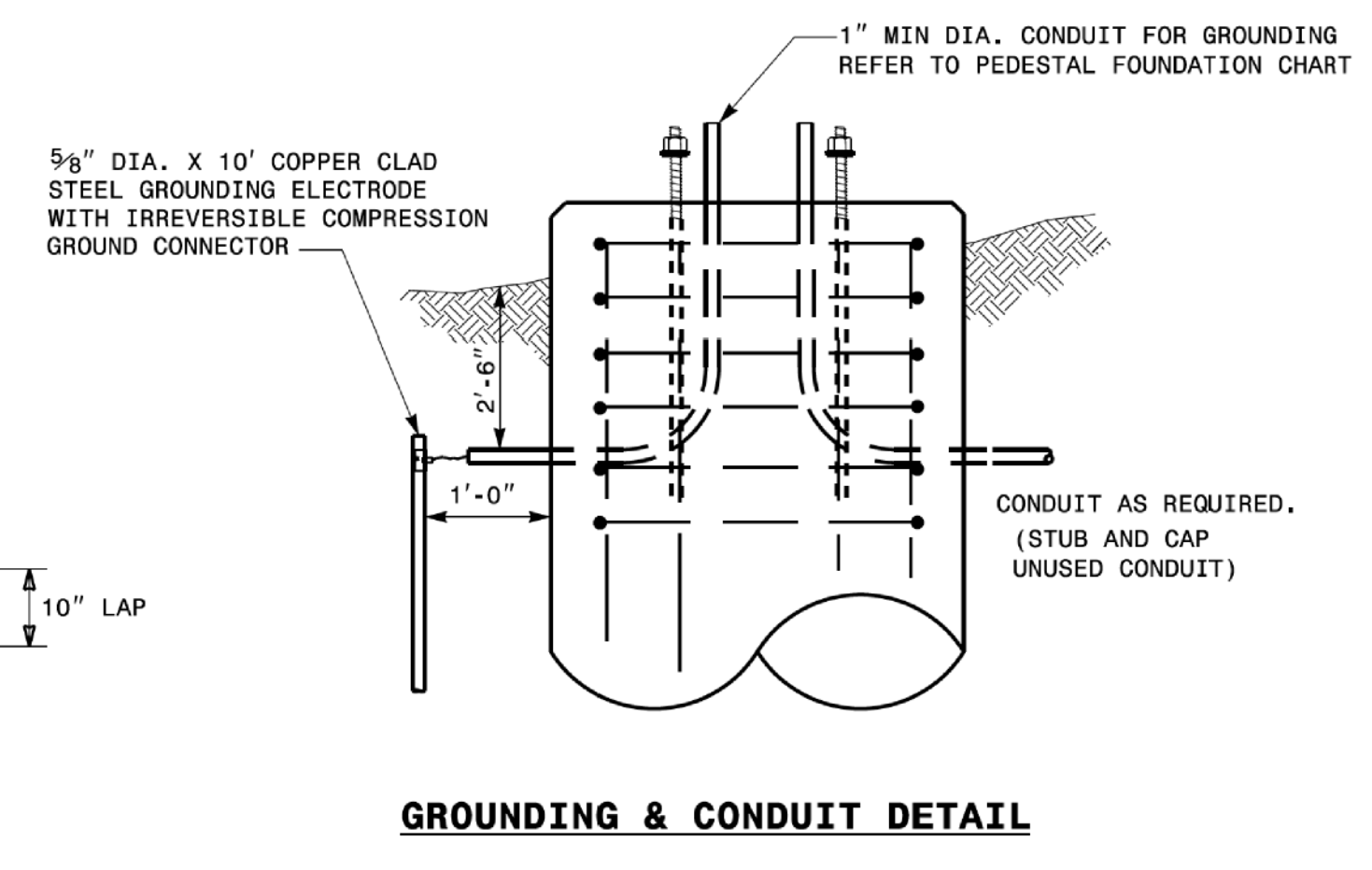
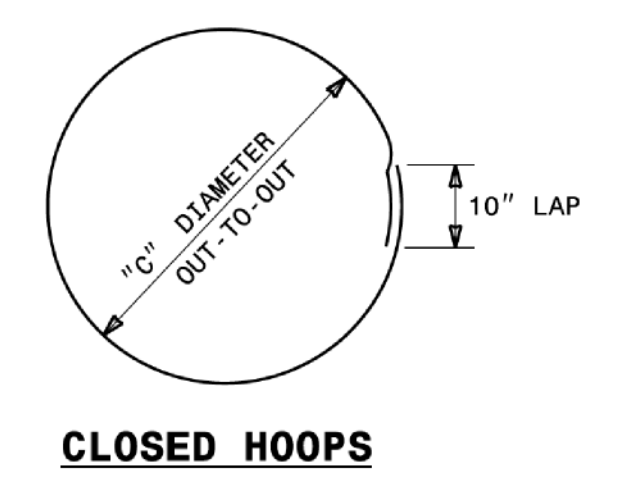
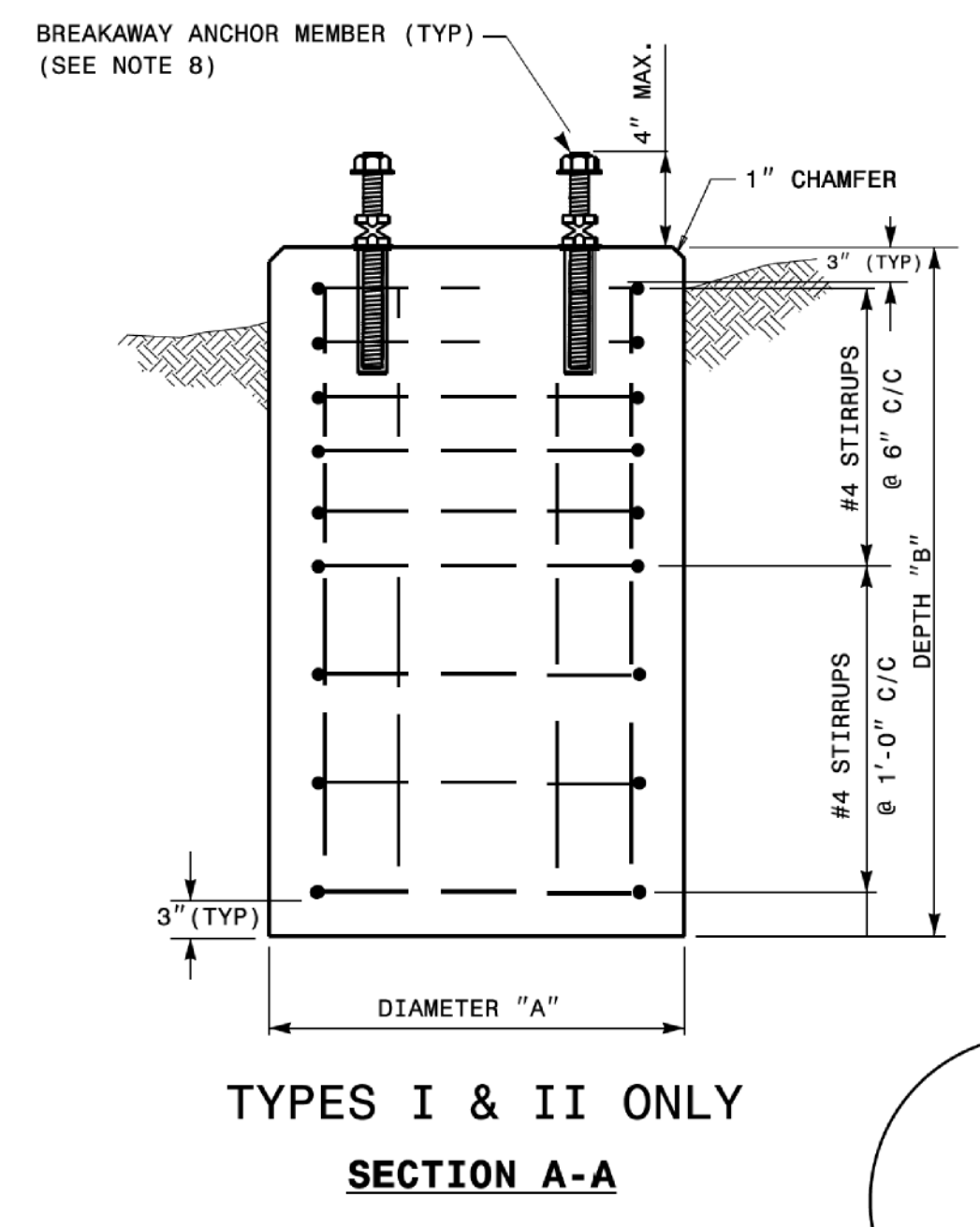
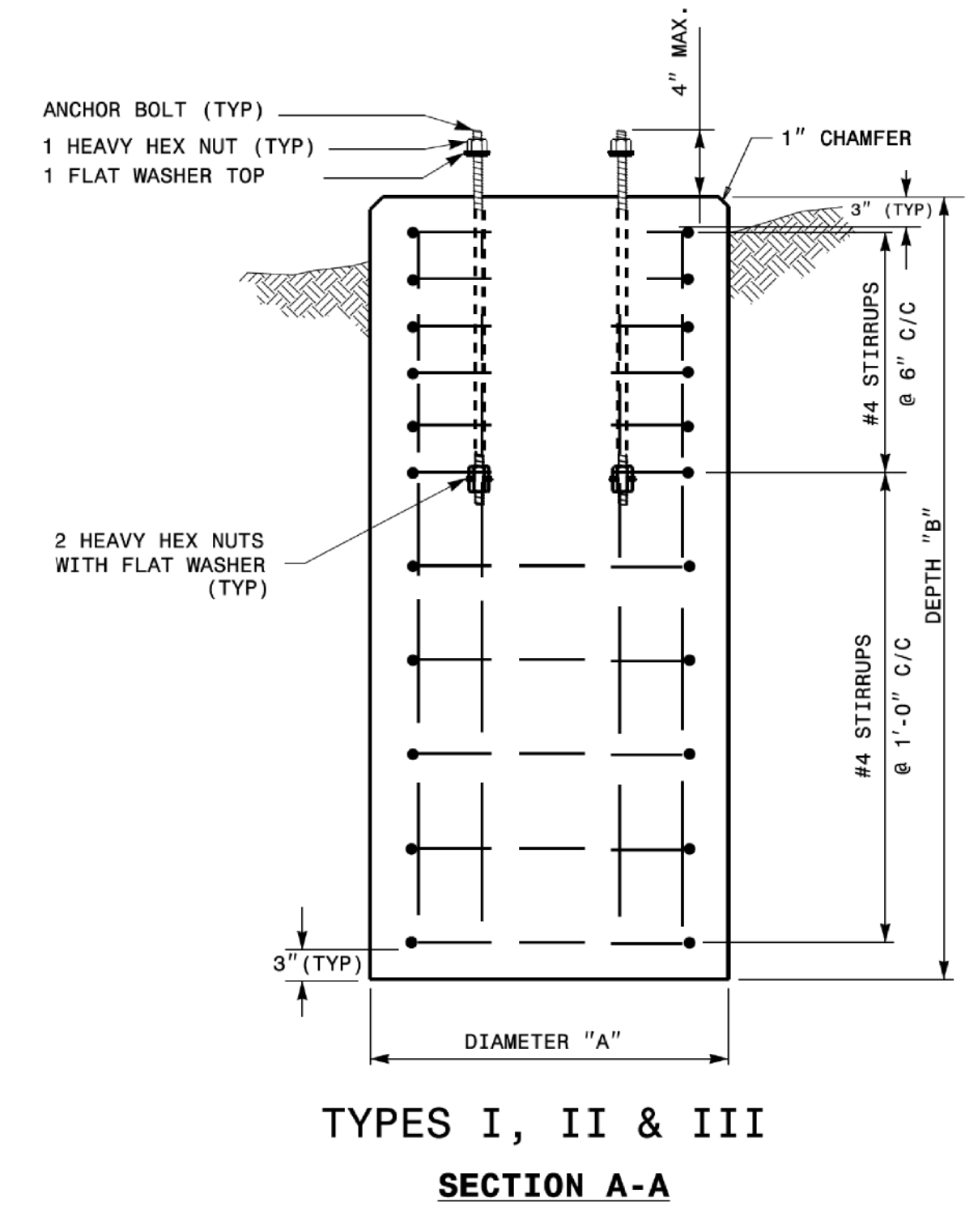
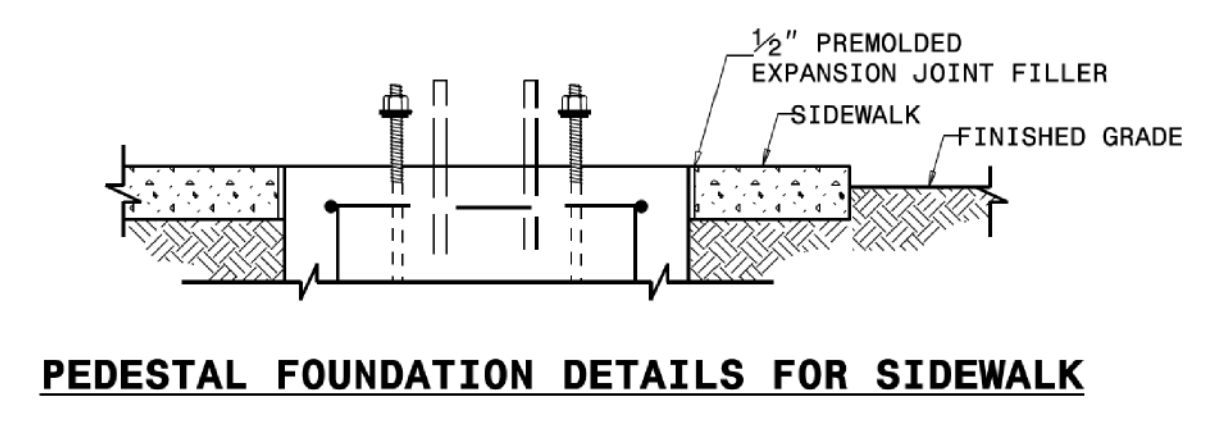
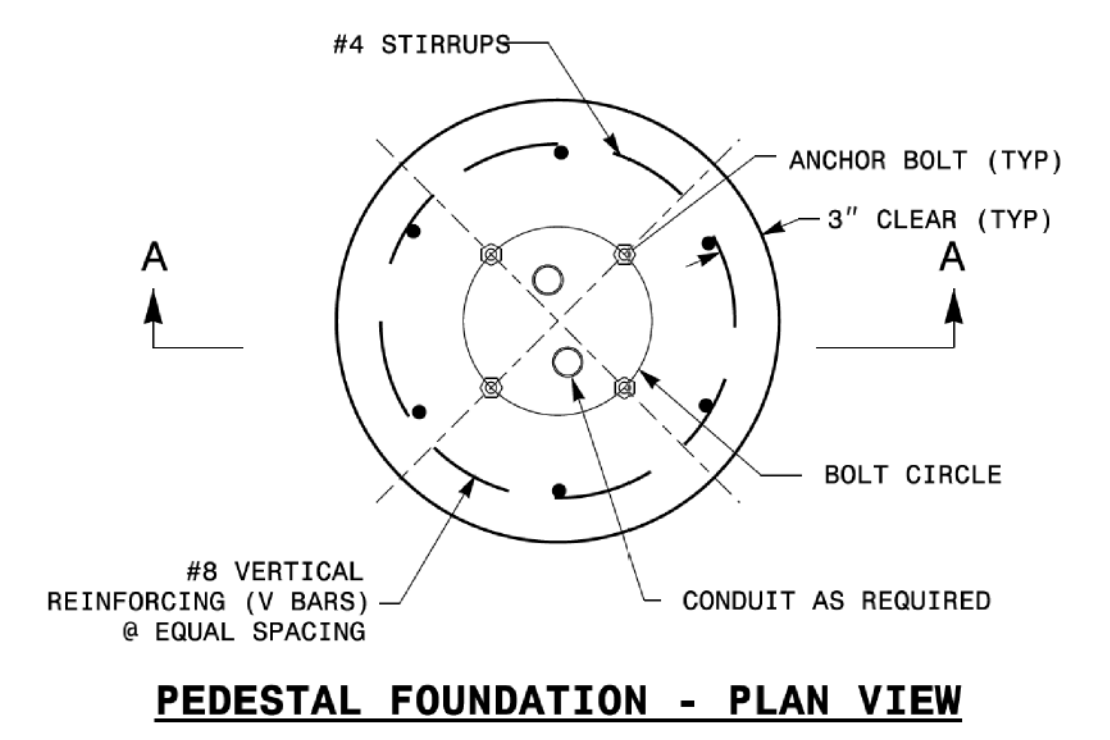
SEAL

DocuSigned by:
 Mohd Aslami

10/11/2017

DATE

750 N. Greenfield Parkway
 Garner, NC 27529



- NOTES:**
- CAST FOUNDATION AGAINST UNDISTURBED SOIL WHEREVER CONDITIONS PERMIT. IN UNSTABLE SOIL, CAST-IN-PLACE TUBE FORMS ARE ALLOWED WITH APPROVAL.
 - COMPLY WITH APPLICABLE PROVISIONS OF SECTION 825 FOR CONCRETE CONSTRUCTION.
 - USE CLASS "A" CONCRETE THAT MEETS THE REQUIREMENTS OF SECTION 1000 WITH A COMPRESSION STRENGTH AT 28 DAYS OF $F'_c = 3000$ PSI (MIN.).
 - USE ASTM GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL.
 - GRADE IS ASSUMED TO BE (8H:1V) OR FLATTER. FOUNDATION SIZE AND DEPTHS ARE BASED ON THE FOLLOWING SOIL DESIGN PARAMETERS:
 - SANDY TYPE SOIL
 - NO GROUND WATER WITHIN 5'-0" OF SURFACE ELEVATION
 - WIND SPEED NOT TO EXCEED 140 MPH
 IF ACTUAL CONDITIONS VARY SUBSTANTIALLY FROM THOSE ASSUMED, THE FOUNDATION DEPTH MAY BE ADJUSTED. IN THIS CASE, CONTACT THE ENGINEER.
 - MAINTAIN AT LEAST 3" COVER ON ALL REINFORCEMENT.
 - ORIENT CONDUIT AS REQUIRED BY THE DESIGN OR AS DICTATED BY FIELD CONDITIONS.
 - USE ADHESIVE ANCHOR FOR THREADED COUPLING INSERT. FOR TYPE I MINIMUM DEPTH NECESSARY IS 0'-4 1/2" AND FOR TYPE II MINIMUM DEPTH NECESSARY IS 0'-6 5/8". FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS.

PEDESTAL FOUNDATION TYPE AND SIZE							
TYPE	PEDESTAL DESCRIPTION	SIZE			ANCHOR BOLT		INSTALL GROUNDING SYSTEM (YES/NO)
		DIAMETER "A" FT	DEPTH "B" FT	CONCRETE VOLUME CY	DIAMETER (MIN.) IN	LENGTH FT-IN	
I	PEDESTRIAN PUSHBUTTON	2'-0"	3'-6"	.41	1/2	1'-6"	NO
II	NORMAL-DUTY	2'-0"	5'-0"	.58	3/4	2'-0"	YES
III	HEAVY-DUTY	2'-6"	7'-0"	1.27	1	4'-0"	YES

REINFORCING STEEL SCHEDULE													
TYPE	V-BAR				STIRRUP								
	SIZE #	QTY	LENGTH	WEIGHT LBS	QUANTITY			LENGTH	DIAMETER "C" FT	OVERLAP MIN.	WEIGHT LBS	TOTAL STEEL WEIGHT LBS	
					ON 6" CENTERS	ON 12" CENTERS	TOTAL						
I	8	6	3'-0"	56	4	0	4	4	5'-7"	1'-6"	0'-10"	15	71
II	8	6	4'-6"	86	4	5	3	8	5'-7"	1'-6"	0'-10"	30	116
III	8	6	6'-6"	122	4	7	4	11	7'-2"	2'-0"	0'-10"	53	175

STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

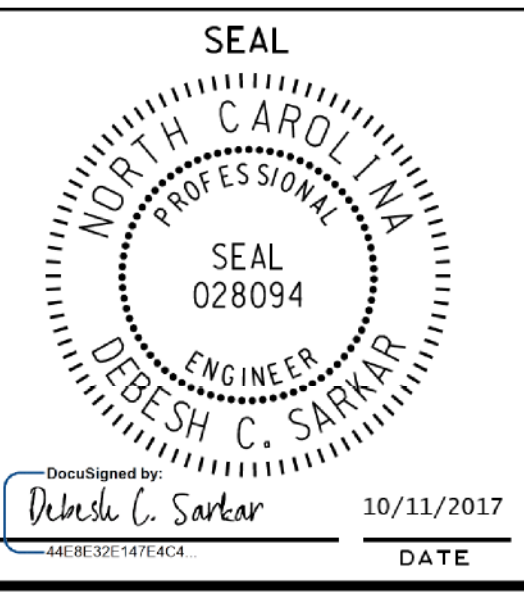
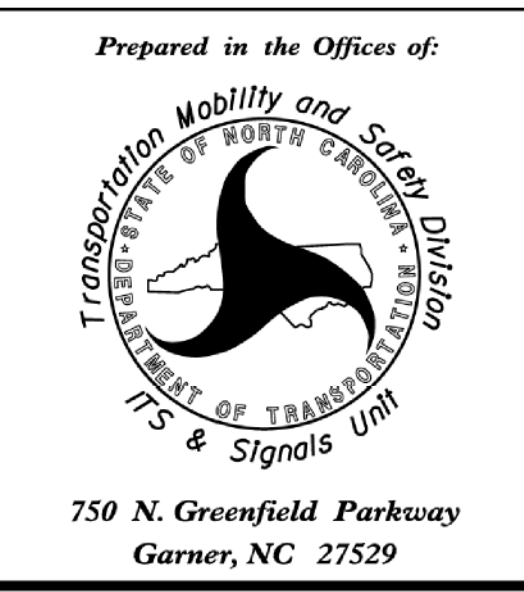
ENGLISH STANDARD DRAWING FOR
PEDESTALS
 FOUNDATIONS

SHEET 1 OF 1
1743D01

11-2017-2017 09/03
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 FINAL UNLESS ALL
 SIGNATURES COMPLETED

See Plate for Title



Date Signed by: Debesh C. Sarkar 10/11/2017
 DATE

- 1 INSTALL REA, PE - 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 2 INSTALL COAX CABLE
- 3 INSTALL ETHERNET CABLE
- 4 INSTALL SMFO CABLE
- 5 INSTALL MMFO 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 MODIFY EXISTING INTERCONNECT CENTER /SPLICE ENCLOSURE
- 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 INSTALL POLE MOUNTED SPLICE CABINET
- 32 INSTALL BASE MOUNTED SPLICE CABINET
- 33 REMOVE EXISTING SPLICE CABINET

- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 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
- 48 REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
- 49 REMOVE EXISTING MESSENGER CABLE
- 50 INSTALL TELEPHONE SERVICE
- 51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
- 52A INSTALL DELINEATOR MARKER
- 52B INSTALL JUNCTION BOX MARKER
- 53 STORE 20 FEET OF COMMUNICATIONS CABLE
- 54 LASH CABLE(S) TO EXISTING SIGNAL/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 FIELD ETHERNET SWITCH
- 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 INSTALL HEATSHRINK TUBING RETROFIT KIT

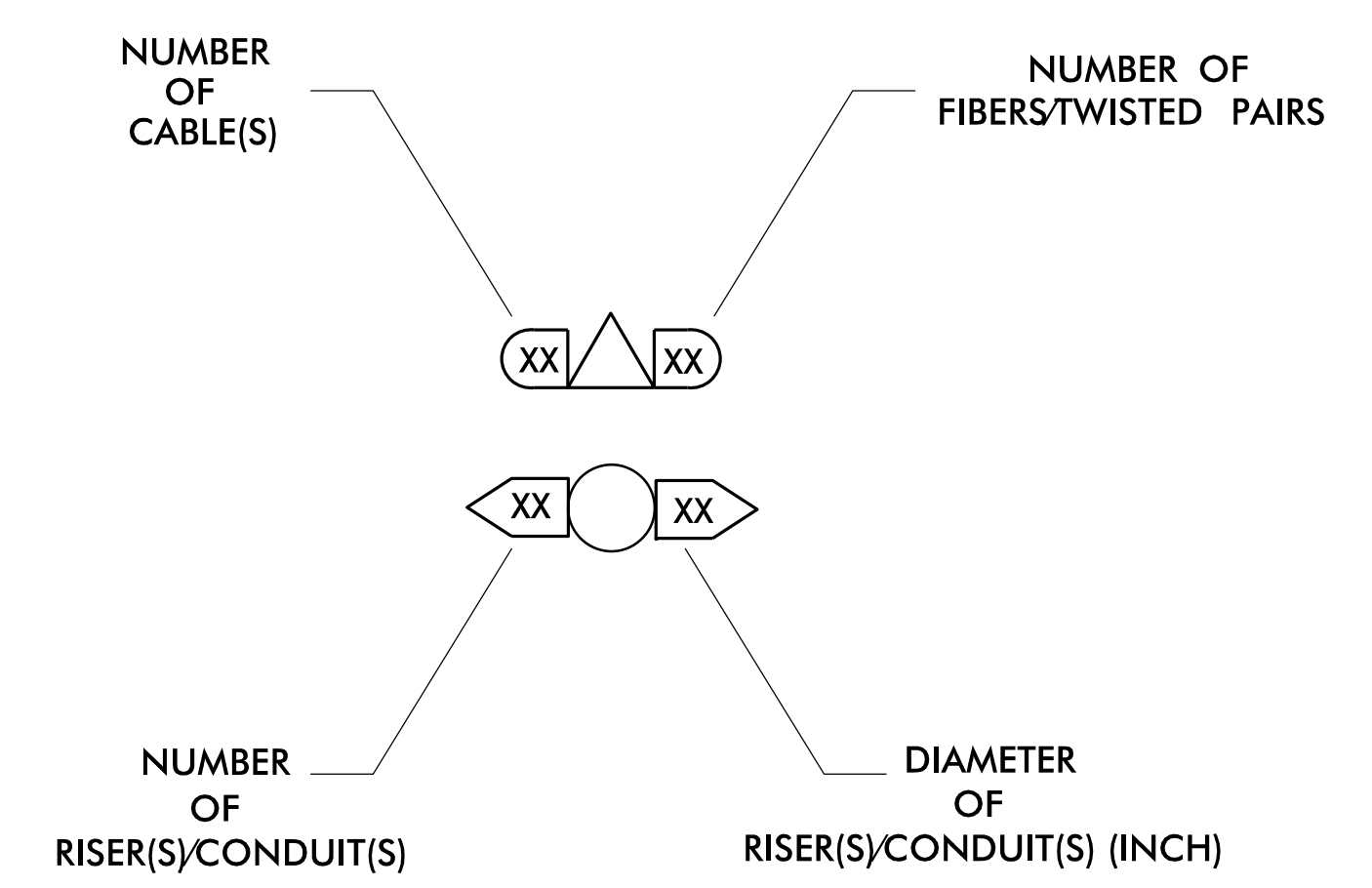
"SS" REFERENCE LOCATION
 FS = FRONT SIDE OF POLE
 BS = BACK SIDE OF POLE

LEGEND

- NEW FIBER OPTIC COMMUNICATIONS CABLE
- NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXISTING COMMUNICATIONS CABLE
- EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- NEW DIRECTIONAL DRILLED CONDUIT
- NEW BORED AND JACKED CONDUIT
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- AERIAL SPLICE ENCLOSURE
- NEW METAL POLE
- EXISTING METAL POLE
- 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
- EXISTING SPLICE CABINET
- NEW SPLICE CABINET
- SIGNAL POLE
- SIGNAL INVENTORY NUMBER

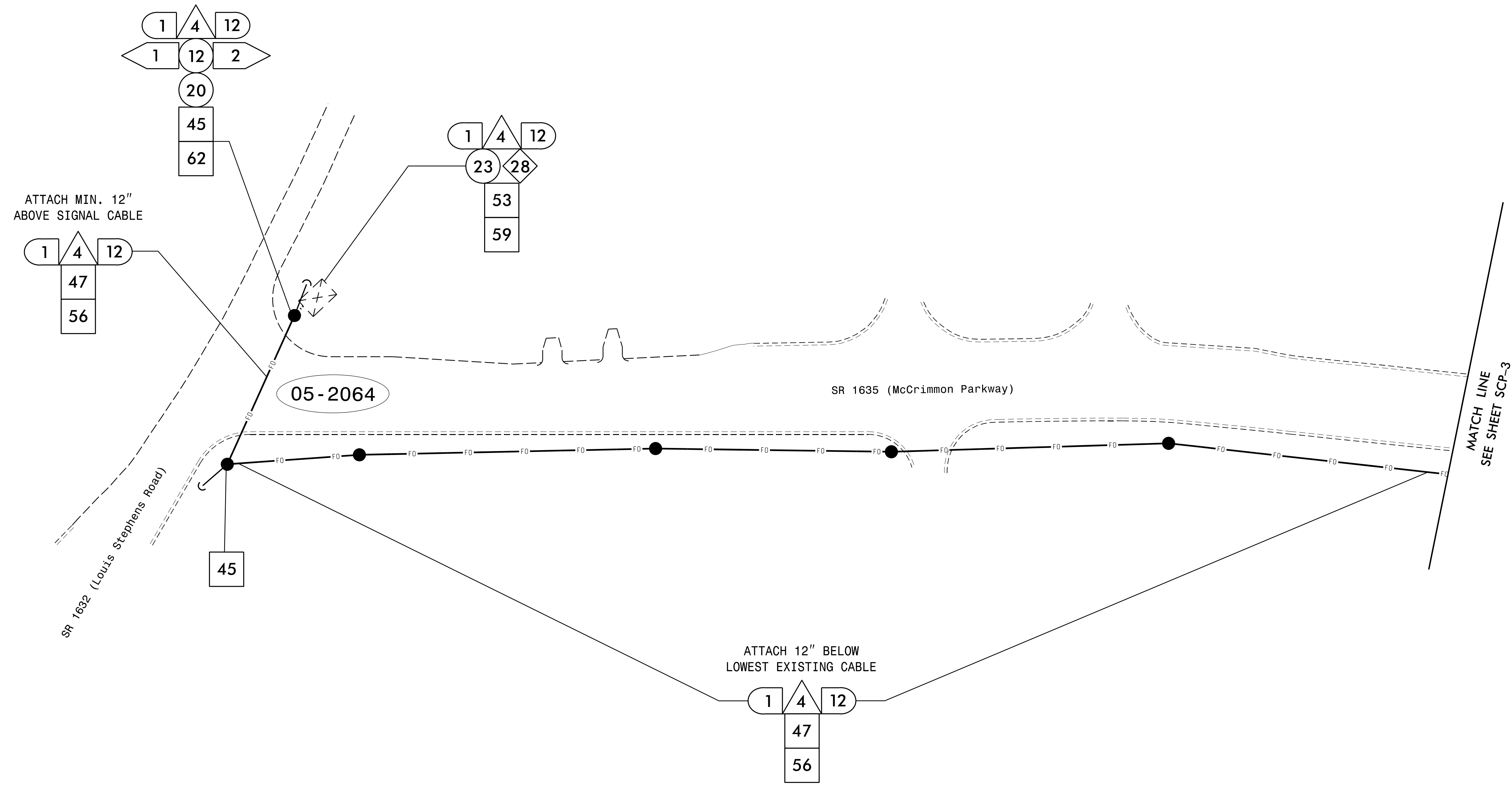
CONSTRUCTION NOTE SYMBOLOGY KEY

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



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 Prepared in the offices of: RAMEY KEMP ASSOCIATES, INC. <small>TRANSPORTATION ENGINEERS 8307 University Executive Park Drive, Suite 200 Cary, NC 27513 704-548-4200 FAX 704-548-5116 www.rameykemp.com</small>	 Prepared For: 750 N. Greenfield Pkwy., Garner, NC 27529	Construction Notes		SEAL NICHOLAS E. BURNS ENGINEER 046300 5/14/2019
		Division 5 Wake County Cary	PLAN DATE: May 2019 REVIEWED BY: NE Burns	



1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE TOWN OF CARY TRAFFIC SIGNAL SYSTEM SPECIALIST, THOMAS REILLY, AT 919-469-4203. NOTIFY THE TOWN OF CARY TRAFFIC SIGNAL SYSTEM SPECIALIST 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) 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.

3) CONTRACTOR TO PERFORM COMPATIBILITY ACCEPTANCE TESTING TO ENSURE THAT THE PROPOSED DEVICE IS 100% COMPATIBLE AND INTEROPERABLE WITH THE EXISTING CITY SIGNAL SYSTEM NETWORK, MONITORING SOFTWARE, AND TRAFFIC OPERATIONS CENTER NETWORK HARDWARE.

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Prepared in the offices of:

RAMEY KEMP ASSOCIATES, INC.
 Transportation Engineers
 8307 University Executive Park Drive, Suite 200
 Charlotte, North Carolina 28226
 704-545-4280 Tel. 919-378-5416 Fax
 www.rameykemp.com

Prepared for:

750 N. Greenfield Pkwy., Garner, NC 27529

Cable Routing Plan	
Division 5	Wake County Cary
PLAN DATE: May 2019	REVIEWED BY: NE Burns
PREPARED BY: ZM Esposito	RKA PROJ NO: 15268 (040)
REVISIONS	INIT. DATE

SEAL

Nicholas E. Burns
 SIGNATURE DATE 5/14/2019

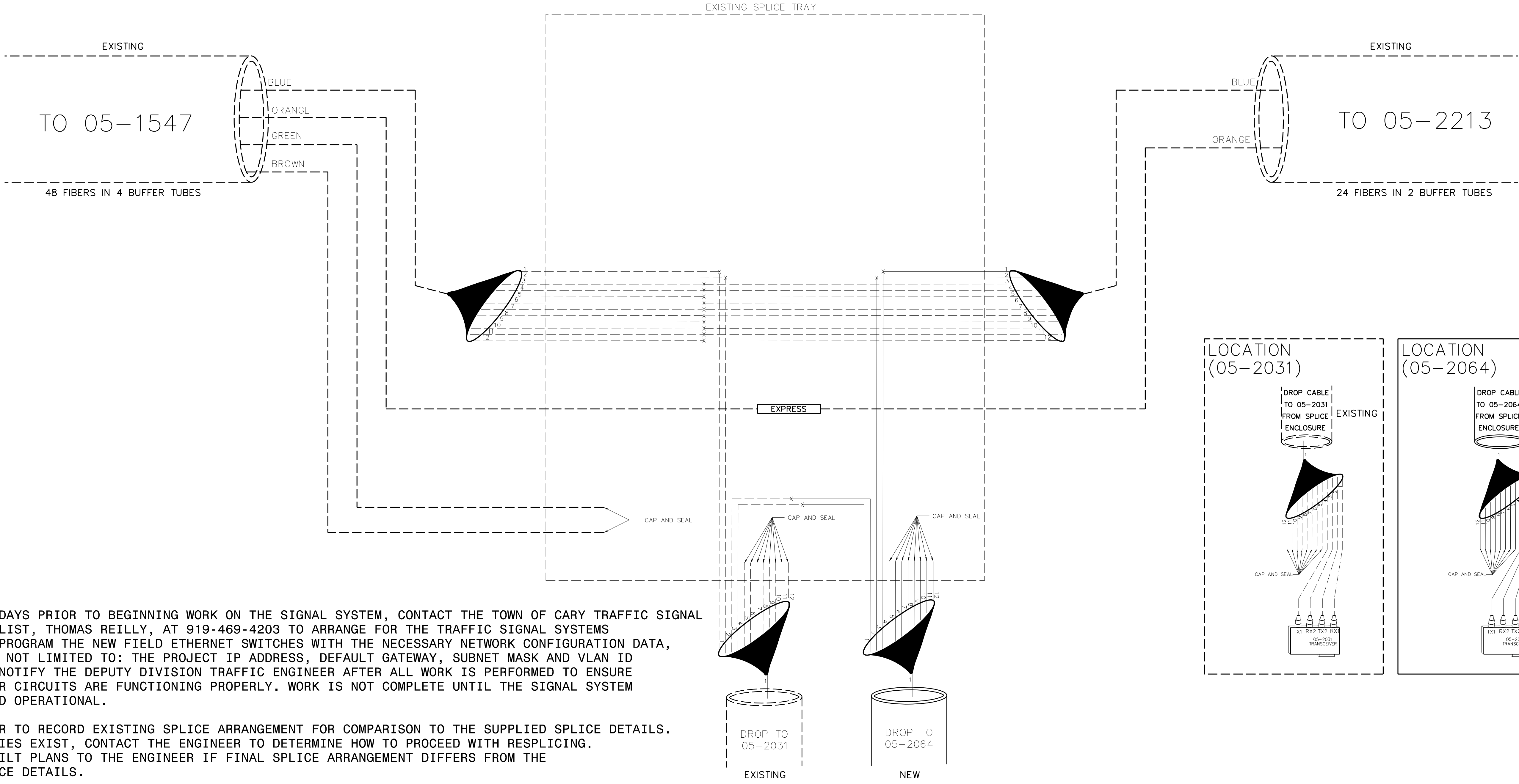
SCALE 0 50
 1"=50'

**IN SPLICE BOX ALONG
SR 1613 (DAVIS DRIVE)
NEAR SIG. INV. # 05-2031**

Unused fibers left coiled and stored in splice tray.
Unused Buffer Tubes left coiled and stored in splice tray.

LEGEND

COLOR CODE TIA/EIA 598-A		X - FUSION SPLICE INDIVIDUAL FIBER
(1) BLUE	(7) RED	
(2) ORANGE	(8) BLACK	[BUFFER TUBE] SPLICE OR EXPRESS ENTIRE BUFFER TUBE AS NOTED
(3) GREEN	(9) YELLOW	
(4) BROWN	(10) VIOLET	
(5) SLATE	(11) ROSE	
(6) WHITE	(12) AQUA	



NOTES:

- 1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE TOWN OF CARY TRAFFIC SIGNAL SYSTEMS SPECIALIST, THOMAS REILLY, AT 919-469-4203 TO ARRANGE FOR THE TRAFFIC SIGNAL SYSTEMS SPECIALIST 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 DEPUTY DIVISION TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.
- 2) 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.
- 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 SHALL ENSURE THAT SYSTEM DOWN TIME IS MINIMIZED DURING SPLICING OF NEW FIBER.

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UNLESS ALL SIGNATURES COMPLETED**

Prepared in the offices of:

**RAMEY KEMP
ASSOCIATES, INC.**
Transportation Engineers
8307 University Executive Park Drive, Suite 260
Charlotte, North Carolina 28222
704-548-4260 TdL 919-878-6416 Fax
www.rameykemp.com

<p>Prepared for:</p> <p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>Splice Details</p>		<p>SEAL</p> <p>NICHOLAS E. BURNS ENGINEER 5/14/2019</p>			
	<p>Division 5 Wake County Cary</p> <p>PLAN DATE: May 2019 REVIEWED BY: NE Burns</p> <p>PREPARED BY: ZM Esposito RKA PROJ. No.: 15268 (040)</p>	<p>SCALE</p>		<p>REVISIONS</p> <table border="1"> <tr> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> </tr> </table>	INIT.	DATE
INIT.	DATE					