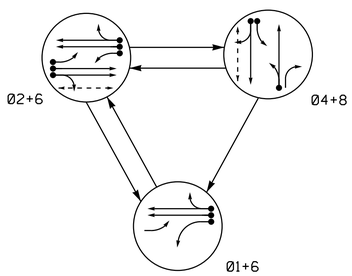
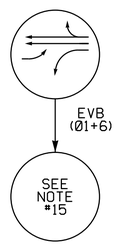
PROJECT REFERENCE NO.	SHEET NO.
SS-4905CK	Sig. 1.0

3 Phase
Fully Actuated
w/ EV Preemption
(Durham Signal System)

PHASING DIAGRAM



EV PREEMPT PHASES



PHASING DIAGRAM DETECTION LEGEND

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

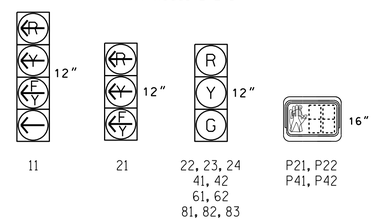
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	02+6	04+8	EVB	FLASH
11	←	F Y	R	←	Y
21	F Y	F Y	R	F Y	Y
22, 23, 24	R	G	R	R	Y
41, 42	R	R	G	R	R
61, 62	G	G	R	G	Y
81, 82, 83	R	R	G	R	R
P21, P22	DW	W	DW	DW	DRK
P41, P42	DW	DW	W	DW	DRK

W - Walk
DW - Don't Walk
DRK - Dark

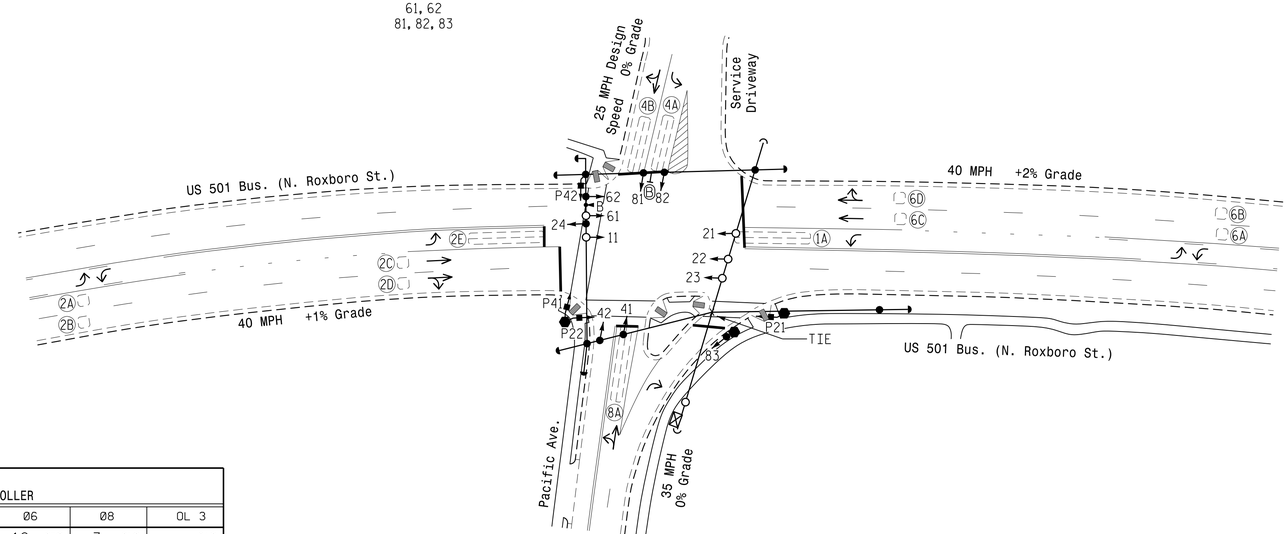
SIGNAL FACE I.D.

All Heads L.E.D.



2033 SOFTWARE w/ 2070 CONTROLLER LOOP & DETECTOR UNIT INSTALLATION CHART

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		ATTRIBUTES									STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	NEMA PHASE	DELAY	CARRY (STRETCH)	1 FULL TIME PEDESTRIAN CALL	2 PEDESTRIAN CALL	3 RESERVED	4 COUNT	5 EXTENSION	6 TYPE 3	7 CALLING	8 ALTERNATE	SYSTEM LOOPS	NEW	EXISTING
1A	6X40	2-4-2	+5	-	X	1	15 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
						6	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
2A	6X6	EXIST	250	-	X	2	- SEC.	1.3 SEC.	-	-	-	-	X	-	X	-	-	X	-
2B	6X6	EXIST	250	-	X	2	- SEC.	1.3 SEC.	-	-	-	-	X	-	X	-	-	X	-
2C	6X6	EXIST	80	-	X	2	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
2D	6X6	EXIST	80	-	X	2	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
2E	6X40	2-4-2	0	-	X	2	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
4A	6X30	2-4-2	0	-	X	4	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
4B	6X30	2-4-2	0	-	X	4	10 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
6A	6X6	EXIST	250	-	X	6	- SEC.	1.3 SEC.	-	-	-	-	X	-	X	-	-	X	-
6B	6X6	EXIST	250	-	X	6	- SEC.	1.3 SEC.	-	-	-	-	X	-	X	-	-	X	-
6C	6X6	EXIST	80	-	X	6	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
6D	6X6	EXIST	80	-	X	6	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
8A	6X40	2-4-2	0	-	X	8	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
PEDESTRIAN DETECTION																			
P21, P22	N/A	N/A	N/A	-	X	2	- SEC.	- SEC.	-	X	-	-	-	-	-	-	-	X	-
P41, P42	N/A	N/A	N/A	-	X	4	- SEC.	- SEC.	-	X	-	-	-	-	-	-	-	X	-



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Reposition existing signal head number 62.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Program all timing information into phase banks 1, 2, and 3 unless otherwise noted.
9. Set phase bank 3 maximum limit to 250 seconds for phases used.
10. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
11. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
12. Remove existing Left Arrow "ONLY" Signs (R3-5L).
13. Pavement markings are existing.
14. This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
15. Upon completion of Emergency Vehicle Preemption, controller returns to normal operation based on vehicle demand.
16. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Optical Detector	
	Type II Signal Pedestal	
N/A	Wheelchair Ramp	
	Combined Through and Left Arrow Sign (R3-6L)	

TIMING CHART
2033 SOFTWARE w/ 2070 CONTROLLER

PHASE	Ø1	Ø2	Ø4	Ø6	Ø8	OL 3
MINIMUM INITIAL *	7 SEC.	12 SEC.	7 SEC.	12 SEC.	7 SEC.	– SEC.
VEHICLE EXTENSION *	2.0 SEC.	2.0 SEC.	2.0 SEC.	2.0 SEC.	2.0 SEC.	– SEC.
YELLOW CHANGE INT.	3.0 SEC.	4.1 SEC.	3.2 SEC.	4.1 SEC.	3.8 SEC.	4.1 SEC.
RED CLEARANCE	2.8 SEC.	1.8 SEC.	2.0 SEC.	1.8 SEC.	1.7 SEC.	1.8 SEC.
MAXIMUM LIMIT *	20 SEC.	60 SEC.	30 SEC.	60 SEC.	30 SEC.	
RECALL POSITION	NONE	VEH. RECALL	NONE	VEH. RECALL	NONE	
VEHICLE CALL MEMORY	NONLOCK	YELLOW LOCK	NONLOCK	YELLOW LOCK	NONLOCK	
DOUBLE ENTRY	OFF	OFF	ON	OFF	ON	
WALK *	– SEC.	7 SEC.	7 SEC.	– SEC.	– SEC.	
FLASHING DON'T WALK	– SEC.	21 SEC.	14 SEC.	– SEC.	– SEC.	
PED CLEAR BEFORE PREEMPT	– SEC.	11 SEC.	7 SEC.	– SEC.	– SEC.	
TYPE 3 LIMIT	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	
ALTERNATE EXTENSION	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	
ADD PER VEHICLE *	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	
MAXIMUM INITIAL *	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	
MAXIMUM GAP*	2.0 SEC.	2.0 SEC.	2.0 SEC.	2.0 SEC.	2.0 SEC.	
REDUCE 0.1 SEC EVERY *	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	
MINIMUM GAP	2.0 SEC.	2.0 SEC.	2.0 SEC.	2.0 SEC.	2.0 SEC.	

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

2033 EV PREEMPTION TIMING CHART

FUNCTION	EVB (SECONDS)
DELAY BEFORE PREEMPT	0
PED. CLEAR BEFORE PREEMPT	#
MIN. GREEN BEFORE PREEMPT	1.0
CLEARANCE TIME	2.0
PREEMPT EXTEND***	2.0

\# See Timing Chart this sheet
*** Program Timing on Optical Detector Unit

This plan supersedes the plan signed and sealed on 3/2/2015

Signal Upgrade

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

US 501 Bus. (N. Roxboro St.) at Pacific Ave./ Service Driveway

Division 5 Durham County Durham

PLAN DATE: September 2015 REVIEWED BY:
PREPARED BY: R. W. Hough REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by: Ryan W. Hough 12/14/2015
43020FAA2664C3 DATE

SIG. INVENTORY NO. 05-0889

01-FEB-2016 11:15
S:\STD\CAD\Lib\Library\01\05\050889.sig_dsn_20151214.dgn
rwhough