Florida Department of Transportation

District 1 Traffic Operations

Guidelines for the Development of Traffic Signal Timings

1. GENERAL REQUIREMENTS

1.1. **Sign and Seal Requirement**: A Timing Report signed and sealed by a licensed Professional Traffic Engineer, registered in the State of Florida must be maintained for each signal/signal system. This is a requirement by the Department of Professional Regulation as well as FDOT.

1.2. **Timing Changes**: Signed and sealed timing revisions to the Timing Report must be prepared for timing changes made to the signal/system timing parameters/settings; and sent to FDOT for records.

1.3. **Temporary Timing Changes**: It is okay for the maintaining agency to make temporary timing adjustments at state signals (under the supervision of a licensed traffic engineer) to handle emergency/unusual traffic situations. All temporary timing changes must be documented with justification and the approved timings must be reinstated as soon as possible.

1.4. **Phasing Changes**: No phasing changes shall be made at state signals without prior approval from FDOT Traffic Operations.

2. TIMING PARAMETERS

2.1. Minimum Green (See section 2.11 for movements with dilemma zone detection having no detection available within 40 ft from stop bar)

These values are the minimums and can be increased at the discretion of the engineer for site specific conditions like higher heavy vehicle presence, driver behavior etc.

a. Through Movements

The below values are to be increased if advance detection is used and no presence detection available at stop bar, depending upon the location of the advance detection from stop line.

40 mph or less:	7 Seconds minimum (This can be lowered up to 5 seconds at the discretion of the engineer for low volume minor street approaches of speed limit 35 mph or less)
45 mph:	10 Seconds minimum
50 mph or greater:	15 Seconds minimum

b. Left Turn Movements

5 Seconds minimum

2.2. Extension (passage) (See section 2.11 for movements with dilemma zone detection)

a) 5 seconds minimum for major street through movements with no dilemma zone detection and 3 seconds minimum for all other movements, field adjusted (upwards) as necessary.

2.3. Locking Detector (Detector Memory)

a) Non-lock (memory off) is generally preferred, however, a movement that is not recalled and does not have presence detection at the stop bar, must have memory locked (on).

2.4. Maximum Green I

a) Typically used during FREE operation, based on volume data, field observations and analysis.

2.5. Maximum Green II

a) Typically used during coordination operation or for special traffic conditions at isolated traffic signals.
b) When used during coordinated operation, it must be set high enough to accommodate the split times.

2.6. Walk Time (Refer 2009 MUTCD Guidelines)

a) 7 seconds minimum.
b) This may be increased based on engineering judgment justified with measurements and observations. All justifications and judgments must be documented.
c) The 'Walk' interval of more than 10 seconds is not recommended in any case, unless justified with a valid reason.

2.7. Pedestrian Clearance

a) Must meet or exceed 2009 MUTCD.
b) Cross walk measurement shall be the entire length of the crosswalk.
c) A walking speed of less than 3.5 ft/sec may be used based on engineering judgment justified with measurements and observations. All justifications and judgments must be documented.
d) For non-exclusive pedestrian movements, pedestrian clearance intervals shall time with concurrent phase green ONLY; never with yellow or all red intervals.

2.8. Vehicle Clearance Intervals

2.8.1 GENERAL

1. Use the same YELLOW and ALL RED intervals for **concurrent through movements** when the opposing left turn movements are permissive or protected/permissive.

2. Use the same YELLOW and ALL RED intervals for **concurrent left turn movements** and **concurrent through movements** when the corresponding left turn phasing are 4 sections with Flashing Yellow Arrow (FYA).

3. For approaches with no posted speed limit and at least 150 ft of accelerating distance available, use a minimum of 30 mph for the calculation of YELLOW and ALL RED intervals.

4. For approaches with no posted speed limit and at least 150 ft of accelerating distance **not** available, use engineering judgment based on approach characteristics and driving patterns of the area (driving with the traffic is required) to come up with a speed for the calculation of YELLOW and ALL RED intervals.

5. A technical memorandum with justification must be submitted to the department for review and approval of the proposed speeds before used in the calculation of YELLOW and ALL RED intervals, when no posted speed limits are available.

6. The calculated YELLOW and ALL RED intervals must be **rounded up** to **one** decimal place.

2.8.2 YELLOW Interval

a. Use TEM, section 3.6.2

2.8.3 ALL RED Interval

Use the method described under section 3.6.2 of the TEM. Perform the following process to determine whether the ALL RED interval to be increased, above the interval calculated using the TEM method.

a. Through Movements when the associated left turn movements are protected only.

Find the highest of the values obtained with the following 2 formulae subject to a minimum of 2 seconds:

$$R = \frac{W + L}{1.47\ V} - CH$$

(Cap the conflict headway (CH) value to 1 second. Conflict headway may not be used for approach speed limits 50 mph or higher)

$$R = \frac{P + L}{1.47\ V} - 2$$

Where:

R = length of ALL RED interval in Seconds

W = total width traversed from the near side of approach stop bar to the far side of the worst case vehicle conflict (Signalized right turn lanes with exclusive receiving lanes or merge lanes and free flow/yield controlled right turn

lanes need not be included in the measurement. When right turn lanes are to be covered, measure up to an extension of the straight portion of the far side of the lane).

P = total width traversed from the near side of approach stop bar to the far side of the last pedestrian conflict point

2 seconds is considered as the startup delay for the pedestrians.

L = length of vehicle (use 20 ft)

V = approach speed limit

CH= conflict headway in seconds (As suggested in ITE journal, February 2011: CH = Square root [2D/(a_s-a_r)], where D is the conflict headway distance measured in feet from stop line to the first conflict point (the worst case of all possible conflicting movements that can follow the movement under consideration), a_s is the acceleration rate (7 ft/sec^2 recommended) and a_r is the deceleration rate (10 ft/sec^2 recommended). The deceleration rate shall be negative when used in this formula). **The Conflict headway interval (CH) need not be calculated for through movements, if the conflict headway distance (D) is 10 ft or more. For 'D', 10 ft or more, use 1 second of 'CH'.**

Engineering judgment should be used to consider higher ALL RED values for site specific conditions.

b. Left turn Phases

Find the value obtained with the following formula subject to a minimum of 2 seconds:

$$R = \frac{W + L}{1.47\ V} - CH$$

Where:

R = length of ALL RED interval in Seconds

W = length of turning path from near side of approach stop bar to the far side of the worst case vehicle conflict (Signalized right turn lanes with exclusive receiving lanes or merge lanes and free flow/yield controlled right turn lanes need not be included in the measurement. Engineering judgment should be used in including signalized right turn lanes, if multiple lanes are available on the receiving leg. When right turn lanes are to be covered, measure up to an extension of the straight portion of the far side of the lane). For single lane left turns, always measure to the inside lane of the receiving approach (unless otherwise indicated with pavement markings or signs).

L = length of vehicle (use 20 ft)

V = Turning Speed **(**Calculated based on Turning Radius – typically not less than 20 mph**)**

CH= conflict headway in seconds (As suggested in ITE journal, February 2011: CH = Square root [2D/(a_s-a_r)], where D is the conflict headway distance measured in feet from stop line to the first conflict point (worst case of all possible conflicting movements that can follow the movement under consideration), a_s is the acceleration rate (7

ft/sec^2 recommended) and a_r is the deceleration rate (10 ft/sec^2 recommended). The deceleration rate shall be negative when used in this formula)

The AASHTO formula [$R = V^2 /15 (0.01e + f)$] with a friction factor (f) of 0.35 may be used to determine the turning speed based on an approximate average turning radius. Typically, in the absence of skip lines through the intersection, the turning path and turning radius can be determined by plotting the largest circle that can be inscribed between the tangents drawn along the straight portions of the sides (inner side or outer side depending upon the worst case scenario) of the departing and receiving lanes, without conflicting with the medians.

Cap the ALL RED value to be used at 3 seconds up to a calculated value of 5 seconds. Increase it proportionally for calculated values above 5 seconds.

Engineering judgment should be used to consider higher ALL RED values for site specific conditions.

c. Through movements with permissive or protected/permissive left turn phasing

Calculate All Red intervals for the Through and the Left turn movements separately using the procedures described above (a and b) for both of the opposing approaches and use the highest calculated value.

d. Split side street phasing

Calculate All Red intervals for the Through and the Left turn movements separately using the procedures described above (a and b) and use the highest calculated value, for each of the side street approach.

2.9. Offsets

a) Reference point must be defined (e.g., beginning/end main street green/walk/FDW; beginning /end 1st or 2nd main street green, etc.) and must be compatible with controller equipment.

2.10. Duration of Signal Coordination

a) A coupling index analysis as recommend by ITE, should be carried out to determine the duration of signal coordination.

2.11. Dilemma Zone Detection

a) Used at signals for the main street approaches in accordance with the D1 Multiple Point Detection Chart (attachment 1).

2.12. Emergency Vehicle Preemption (EVP)

a) Entry into EVP shall not violate minimum green or pedestrian clearance intervals.

b) The Minimum green intervals shall be updated to the guidelines 2.1.a. and 2.1.b. along with preemption programming.

2.13. Timing Package

a) Use District 1 timing sheet format (samples attached) or other format with prior approval.
b) Include time space diagrams prepared with Tru-Traffic computer program. Diagrams shall include offset values, band speeds, and plan identification. Orient diagrams with either a North or East arrow.
c) Include a line sketch of peak hour Turning Movement Counts (sample attached).
d) Include a line sketch of lane configuration (sample attached).
e) Include Preemption Operation Plan(s) if applicable (samples attached).
f) All data shall be in English units and seconds (unless percent is required for control equipment).
g) Provide separate timing report for each system and for each isolated signal.

2.14. All other traffic signal timing related standards that are not covered in this guideline shall be consistent with the guidelines, policies, and procedures of:

a) Federal Highway Administration, Manual on Uniform Traffic Control Devices (http://www.dot.state.fl.us/TrafficOperations/Operations/MUTCD.shtm)
b) Florida Department of Transportation, Plans Preparation Manual (http://www.dot.state.fl.us/rddesign/PPMManual/2009/PPM2009.shtm)
c) Florida Department of Transportation, Traffic Engineering Manual (http://www.dot.state.fl.us/trafficoperations/Operations/Studies/TEM/TEM.shtm)
d) Florida Department of Transportation, District 1, Traffic Signal Maintenance and Compensation agreement

Attachments:

1. District 1 Multipoint Detection Chart (2 pages)
2. Sample Coordinated System timing format (6 pages)
3. Sample Isolated traffic signal timing format (1 page)
4. Sample line sketch of peak hour Turning Movement Counts (1 page)
5. Sample line sketch of lane configuration (1 page)
6. Sample Railroad Preemption timing format (1 page)
7. Sample Emergency Vehicle Preemption timing format (1 page)
8. Sample Bridge and Emergency Vehicle Preemption timing format (1 page)
9. Emergency Signal Timing Format (1 page)

FDOT

District 1

Multiple Point Detection Chart

S* (Miles/Hour)	t (Seconds)	f	D (ft)	D_2 (ft)	D_1 (ft)	Minimum Green (Seconds) (If no detection is available within 40 ft from stop bar)**	T_1 (Extension) (Seconds)
40	1.4	0.33	244	138	106	16	1.9
45	1.4	0.33	298	166	132	18	2
50	1.4	0.33	356	196	160	21	2.2
55	1.4	0.33	419	230	189	24	2.4
60	1.4	0.33	488	265	223	27	2.6
65	1.4	0.33	561	303	258	31	2.8

Notes:

T_1 (Extension) = D_1 / (S x 1.47)

Minimum Green = [D_2 / 25 ft (vehicle length)] x 2.25 sec/veh (headway) + 3 sec (startup delay)

* The speed to be used is posted speed limit.

** Use regular Minimum Green if detection is available within 40 ft from stop bar.

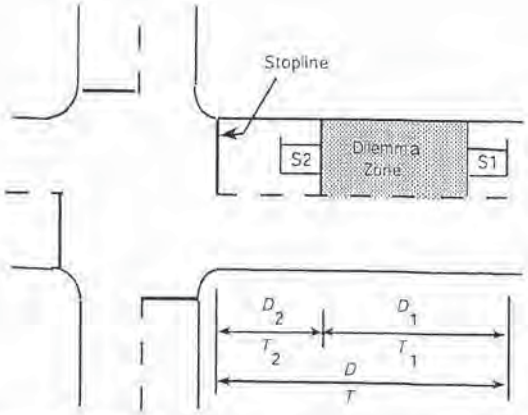


Figure 4-20. Green extension system using two inductive-loop detectors.

The appropriate distances for placing the loops are calculated using

$$D = 1.47St + \frac{S^2}{30f} \quad (4\text{-}7)$$

$$D_2 = 1.47S\left(\frac{S}{30} + 1\right) \quad (4\text{-}8)$$

$$D_1 = D - D_2 \quad (4\text{-}9)$$

where

S = 85th percentile speed, mi/h (km/h)

t = perception and reaction time, seconds

f = coefficient of friction

D = stopping distance, ft (m)

D_2 = clearing distance, ft (m)

D_1 = separation between loops, ft (m).

With the loops positioned as shown, a vehicle passing over loop S1 actuates an electronic timer, which extends the green for the vehicle to reach loop S2 in time T_1. Similarly, when the vehicle passes over loop S2, a second timer maintains the green while the vehicle proceeds toward the intersection. This design does not insure that vehicles traveling at speeds less than the 85th percentile speed would not be trapped in the dilemma zone.

Time of Day Plan

Designed By:	
Date:	
Checked By:	
Date:	

Arterial: ***SR 45 (US 41)***
System ID: ***01010 F***
Section: ***01010 / 17010***
From: ***Cornelius St***
To: ***Tuscola Blvd***

ALL SEASON PLAN

Day	Time	Pattern (C/S/O)	Cycle Length
Monday Thru Friday	0000	-	FREE
	0600	1-1-1	80
	0700	2-1-1	90
	0900	3-1-1	100
	1330	4-1-1	110
	1530	5-1-1	120
	1900	1-1-1	80
	2200	-	FREE
Saturday	0000	-	FREE
	0630	1-1-1	80
	0930	4-1-1	110
	1430	3-1-1	100
	1830	1-1-1	80
	2200	-	FREE
Sunday	0000	-	FREE
	0600	1-1-1	80
	0800	3-1-1	100
	1400	5-1-1	120
	1900	1-1-1	80
	2200	-	FREE

Time of Day Plan

Designed By:	
Date:	
Checked By:	
Date:	

Arterial: ***SR 45 (US 41)***
System ID: ***01010 F***
Section: ***01010 / 17010***
From: ***Cornelius St***
To: ***Tuscola Blvd***

PEAK SEASON PLAN - From Week **1** to Week **18** and from Week **44** to Week **53**

Day	Time	Pattern (C/S/O)	Cycle Length
Monday Thru Friday			
Saturday			
Sunday			

Time of Day Plan

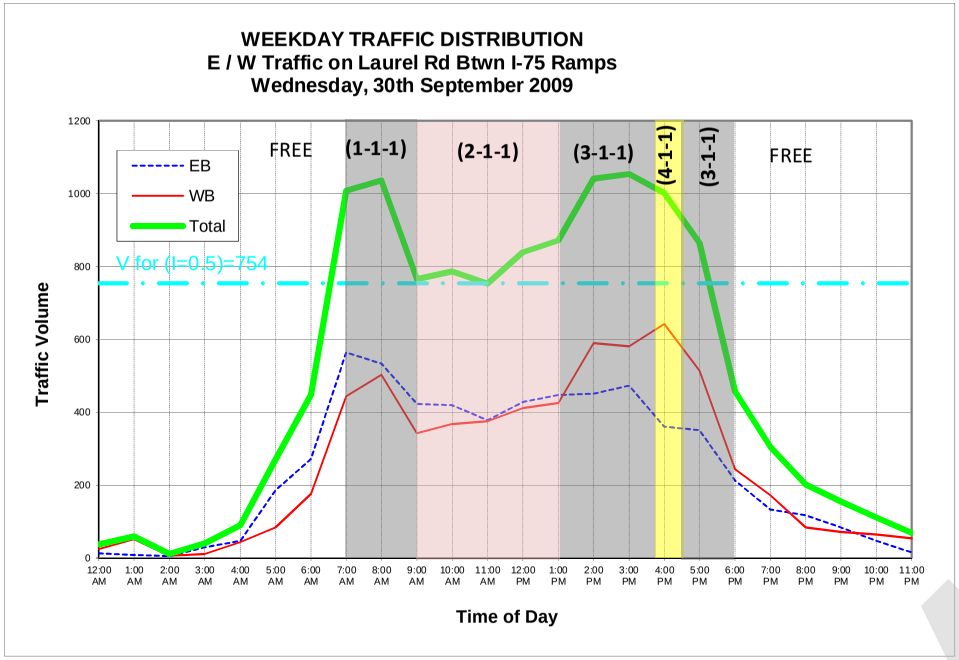
Designed By:	
Date:	
Checked By:	
Date:	

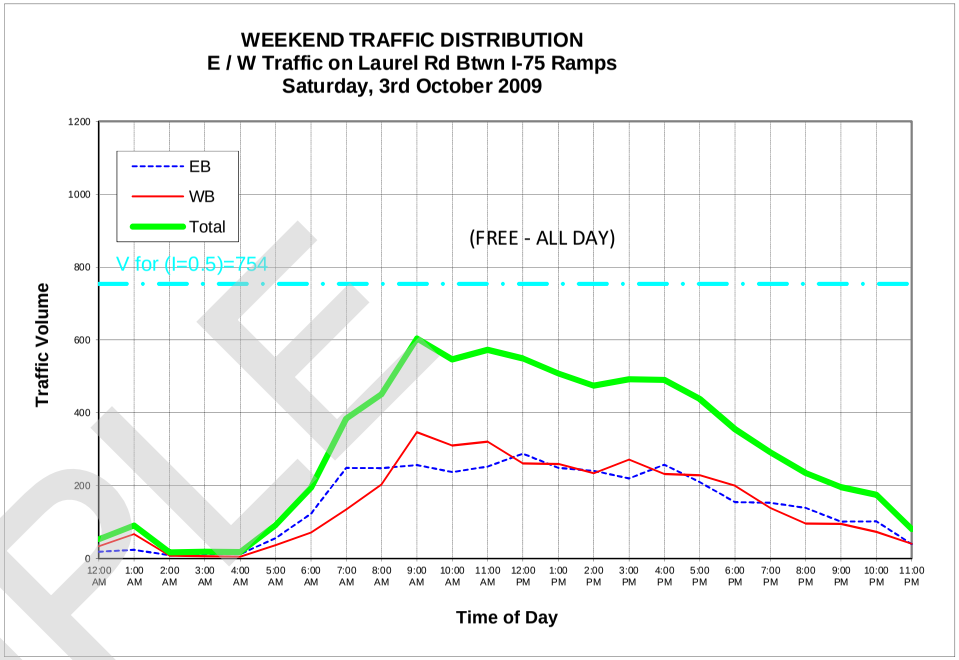
Arterial: ***SR 45 (US 41)***
System ID: ***01010 F***
Section: ***01010 / 17010***
From: ***Cornelius St***
To: ***Tuscola Blvd***

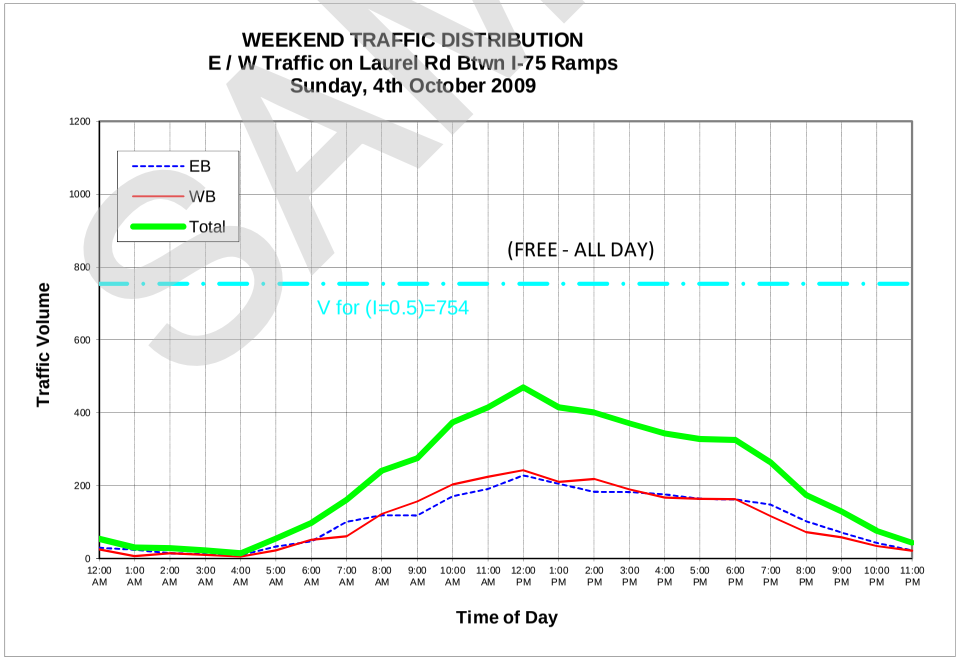
OFF PEAK SEASON PLAN - From Week **19** to Week **43**

Day	Time	Pattern (C/S/O)	Cycle Length
Monday Thru Friday			
Saturday			
Sunday			

COUPLING ANALYSIS







Designed By:	
Date:	
Checked By:	
Date:	

Location Details	
Section: ***17010***	Mile Post: ***0.583***
Major Stree ***SR 45 (US 41)***	Orientation: ***N-S***
Minor Stree ***Cocoplum Blvd / Wal-mart Ent.***	Orientation: ***E-W***
Sig ID: ***852***	System ID: ***01010 F***

Controller Timings (seconds)

Movement # (Controller Phase Ø)	1	2	3	4	5	6	7	8	Notes
Direction	***SBL***	***NB***	***WBL***	***EB***	***NBL***	***SB***	***EBL***	***WB***	
Turn Type	***Protected***		***Protected***		***Protected***		***Protected***		
Min Green	***7***	***20***	***7***	***7***	***7***	***20***	***7***	***7***	
Ext	***3.0***	***5.0***	***3.0***	***3.0***	***3.0***	***5.0***	***3.0***	***3.0***	
Yellow	***4.5***	***5.0***	***3.0***	***3.0***	***4.5***	***5.0***	***3.0***	***3.0***	
All Red	***3.5***	***2.5***	***6.0***	***6.0***	***3.5***	***2.5***	***6.0***	***6.0***	
Max I	***20***	***40***	***20***	***25***	***20***	***40***	***20***	***25***	
Max II	***18***	***30***	***18***	***20***	***18***	***30***	***18***	***20***	
Walk		***7***		***13***		***12***			
Flashing Don't Walk		***26***		***34***		***33***			
Detector Memory									
Det. Cross Switch.									
Dual Entry		***ON***		***ON***		***ON***		***ON***	
Vehicle Recall		***MIN***				***MIN***			
CNA									
Rest in Walk									

Coordination Timings (seconds)

Pattern	C-O-S	Cycle Length	Splits								Offset	Coord Phase	Sequence
1	***1-1-1***	***80***	***16***	***30***	***17***	***17***	***16***	***30***	***17***	***17***	***36***	***2***	***1***
2	***2-1-1***	***90***	***16***	***40***	***17***	***17***	***16***	***40***	***17***	***17***	***17***	***2***	***1***
3	***3-1-1***	***100***	***16***	***50***	***17***	***17***	***16***	***50***	***17***	***17***	***47***	***2***	***1***
4	***4-1-1***	***110***	***16***	***60***	***17***	***17***	***16***	***60***	***17***	***17***	***47***	***2***	***1***
5	***5-1-1***	***120***	***16***	***70***	***17***	***17***	***16***	***70***	***17***	***17***	***58***	***2***	***1***

Offset Reference Point
End of Main Street Green

SOP 10 (Sequence 1)

Ring - 1	1	2	3	4
Ring - 2	5	6	7	8

Notes:

1) Use 'Max 1' during FREE operation and 'Max II' during coordination
2) Use Fixed Force Offs
3) Sequence 1 used during FREE operation
4) Max recall phases 2 & 6 during coordination
5) Program 8 Seconds detection delay for minor street right turn movements.
6) Controller Brand: Naztec Controller Model: 980
6.a) Program 'MinPerm' for pedestrian phases during coordination
6.b) Enable 'Stop In Walk' during coordination.
6.c) Program 'Return Hold' during coordination
6.d) Short/Long percentage is 10/22 for all patterns
6.e) Program Walk Recycle, "3478_INH" during coordination

Designed By:		Checked By:		Major Street:	***SR 45 (US 41)***
Date:		Date:		Minor Street:	***Cocoplum Blvd / Wal-mart Ent.***

Coordination Timings (seconds) - Continued...

Pattern	C-O-S	Cycle Length	Force Offs - CNA Inactive							
			1	2	3	4	5	6	7	8
			SBL	NB	WBL	EB	NBL	SB	EBL	WB
1	1-1-1	80	50.0	0	16.0	33.0	50.0	0	16.0	33.0
2	2-1-1	90	50.0	0	16.0	33.0	50.0	0	16.0	33.0
3	3-1-1	100	50.0	0	16.0	33.0	50.0	0	16.0	33.0
4	4-1-1	110	50.0	0	16.0	33.0	50.0	0	16.0	33.0
5	5-1-1	120	50.0	0	16.0	33.0	50.0	0	16.0	33.0

Coordination Timings (seconds) - Continued...

Pattern	C-O-S	Cycle Length	Force Offs- CNA Active							
			1	2	3	4	5	6	7	8
			SBL	NB	WBL	EB	NBL	SB	EBL	WB
1	1-1-1	80	-	-	-	-	-	-	-	-
2	2-1-1	90	-	-	-	-	-	-	-	-
3	3-1-1	100	-	-	-	-	-	-	-	-
4	4-1-1	110	-	-	-	-	-	-	-	-
5	5-1-1	120	-	-	-	-	-	-	-	-

Coordination Timings (seconds) - Continued...

Pattern	C-O-S	Cycle Length	End of Permissives							
			1	2	3	4	5	6	7	8
			SBL	NB	WBL	EB	NBL	SB	EBL	WB
1	1-1-1	80	10.0	0	1.0	5.0	10.0	0	1.0	5.0
2	2-1-1	90	10.0	0	1.0	5.0	10.0	0	1.0	5.0
3	3-1-1	100	10.0	0	1.0	5.0	10.0	0	1.0	5.0
4	4-1-1	110	10.0	0	1.0	5.0	10.0	0	1.0	5.0
5	5-1-1	120	10.0	0	1.0	5.0	10.0	0	1.0	5.0

FDOT - DISTRICT 1

Signal Timing Report

(For isolated traffic signal)

Drawn By:	
Date:	
Checked By:	
Date:	

Approved By:

Date:

Revisions	Location Details	
	Section: ***13030***	Mile Post: ***4.789***
	Major Street: ***US 41***	Orientation: ***N-S***
	Minor Street: ***73rd ST E/69th ST E***	Orientation: ***E-W***
	Sig ID: ***433***	

Disclaimer Statement

The revisions noted above are the only timing parameters being approved. The remaining timing data was previously approved as part of previous revisions or as part of previous retiming efforts or other projects.

Controller Timings

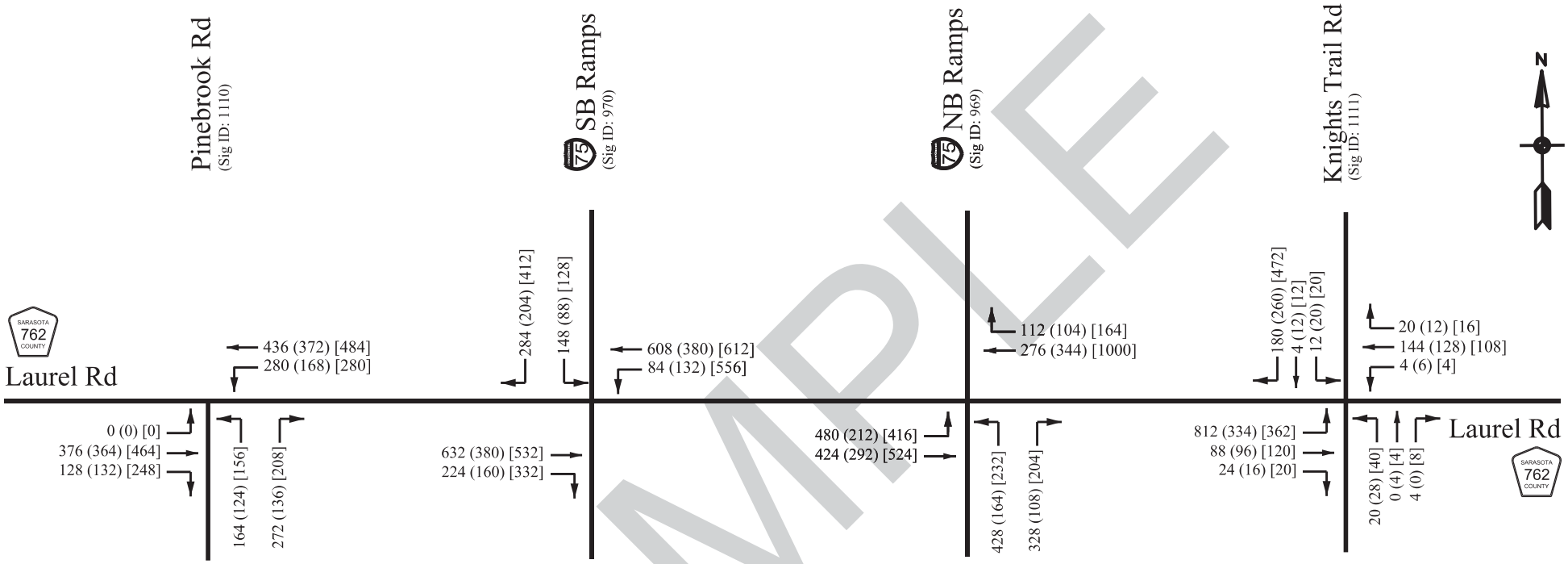
Movement # (Controller Phase Ø)	1	2	3	4	5	6	7	8	Notes
Direction	***SBL***	***NB***		***EB***	***NBL***	***SB***		***WB***	
Turn Type	***Prot/Perm***				***Prot/Perm***				
Min Green	***7***	***20***		***10***	***7***	***20***		***10***	
Ext	***3.0***	***5.0***		***4.0***	***3.0***	***5.0***		***4.0***	
Yellow	***6.0***	***6.0***		***4.0***	***6.0***	***6.0***		***4.0***	
All Red	***2.0***	***2.0***		***1.0***	***2.0***	***2.0***		***1.0***	
Max I	***15***	***50***		***25***	***15***	***50***		***25***	
Max II									
Max Limit	***30***			***50***	***30***			***50***	
Adjust By	***10***			***10***	***10***			***10***	
Walk		***7***		***7***		***7***		***7***	
Flashing Don't Walk		***22***		***39***		***17***		***43***	
Detector Memory									
Det. Cross Switch.	***YES***				***YES***				
Dual Entry		***ON***		***ON***		***ON***		***ON***	
Recall		***MIN***				***MIN***			

SOP 7

Ring - 1	1	2	4
Ring - 2	5	6	8

Notes:

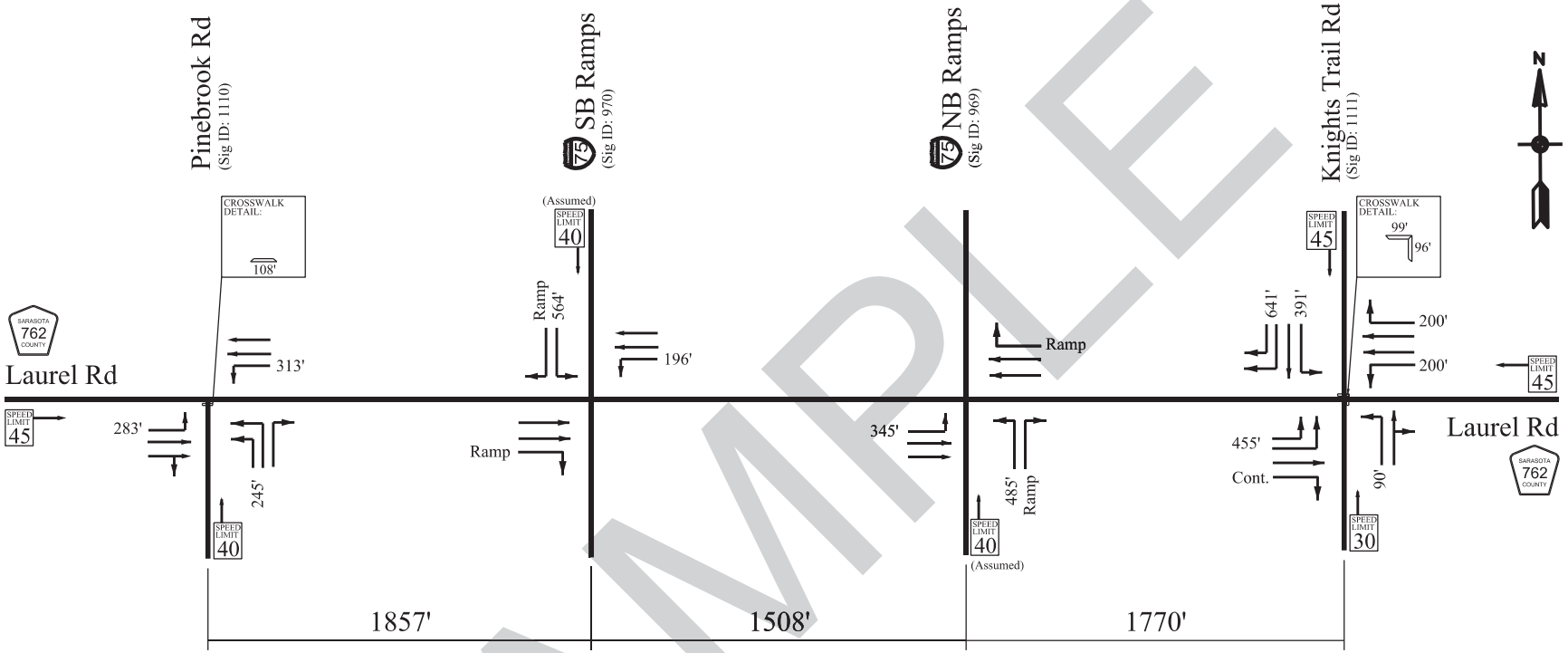
1) Program phase restrictions to omit movement 1 when movement 2 is green, and omit movement 5 when movement 6 is green, in addition to detector cross switching
2) Program 8 Seconds detection delay for minor street right turn movements.
3) Controller Brand: Naztec Controller Model: 980



NOTES:

* XXXX (XXXX) [XXXX] - AM VOLUME (NOON VOLUME) [PM VOLUME]
* ALL VOLUMES ARE ADJUSTED FOR PHF, HEAVY VEHICLES AND U-TURNS
* ALL VOLUME VALUES SHOWN IN THIS SHEET ARE FOR TRAFFIC ANALYSIS FOR SIGNAL TIMING DESIGN PURPOSES ONLY

DISTRICT ONE TRAFFIC OPERATIONS SIGNAL SECTION	Laurel Rd FROM Pinebrook Rd TO Knights Trail Rd LINE SKETCH OF ADJUSTED TRAFFIC VOLUME	PREPARED BY: *ELH* DATE: *2/9/2010* Page 3



NOTES:

*ALL DIMENSIONS ARE IN LINEAR FEET AND SPEED LIMITS ARE IN MILES PER HOUR

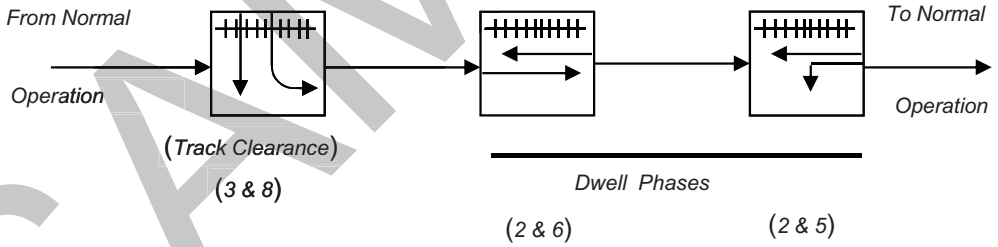
*DRAWING IS NOT TO SCALE

DISTRICT ONE TRAFFIC OPERATIONS SIGNAL SECTION	Laurel Rd FROM Pinebrook Rd TO Knights Trail Rd LINE SKETCH OF LANE CONFIGURATIONS	PREPARED BY: *ELH* DATE: *2/9/2010* Page 2

Designed By:		Checked By:		Major Street:	***SR 45 (US 41)***
Date:		Date:		Minor Street:	***Cocoplum Blvd / Wal-mart Ent.***

RAIL ROAD PRE-EMPTION

Preemption Timing Plan	
Minimum Green Before Pre-emption	0
Yellow Clearance	*
All Red Clearance	*
Track Clearance Green	7
Yellow Clearance	*
All Red Clearance	*
Minimum Dwell	20
Yellow Clearance	*
All Red Clearance	*



Notes:

1) During dwell phase, phases 2, 5 and 6 can be serviced upon demand.

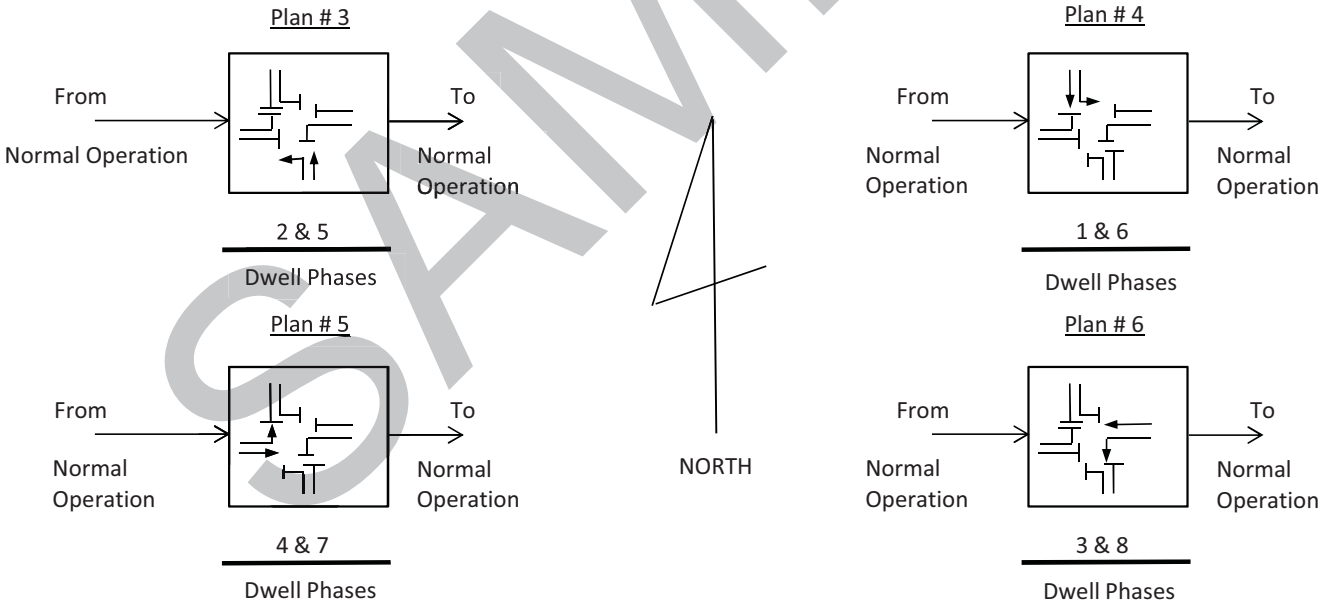
2) * YELLOW and ALL RED intervals during preemption shall be the same values used during normal controller operations.

3) Controller Brand: Naztec Controller Model: 980

Designed By:		Checked By:		Major Street:	***SR 45 (US 41)***
Date:		Date:		Minor Street:	***Cocoplum Blvd / Wal-mart Ent.***

Emergency Vehicle Preemption

Preemption Timing Plan	1	2	3 (NB)	4 (SB)	5 (EB)	6 (WB)
Priority			6	6	6	6
Delay Before Preemption (Sec)			0	0	0	0
Minimum Green Before Preemption (Sec)			*	*	*	*
Lock Call			OFF	OFF	OFF	OFF
Maximum Presence (sec)			120	120	120	120
Yellow Clearance (Sec)			**	**	**	**
Red Clearance (Sec)			**	**	**	**
Dwell Phase(s)			2 & 5	1 & 6	4 & 7	3 & 8
Minimum Dwell (Sec)			10	10	7	7
Yellow Clearance (Sec)**			**	**	**	**
Red Clearance (Sec)**			**	**	**	**
Exit Phases			2 & 6	2 & 6	2 & 6	2 & 6



Notes:

1) * Entry into preemption shall not violate minimum green or pedestrian clearance intervals.

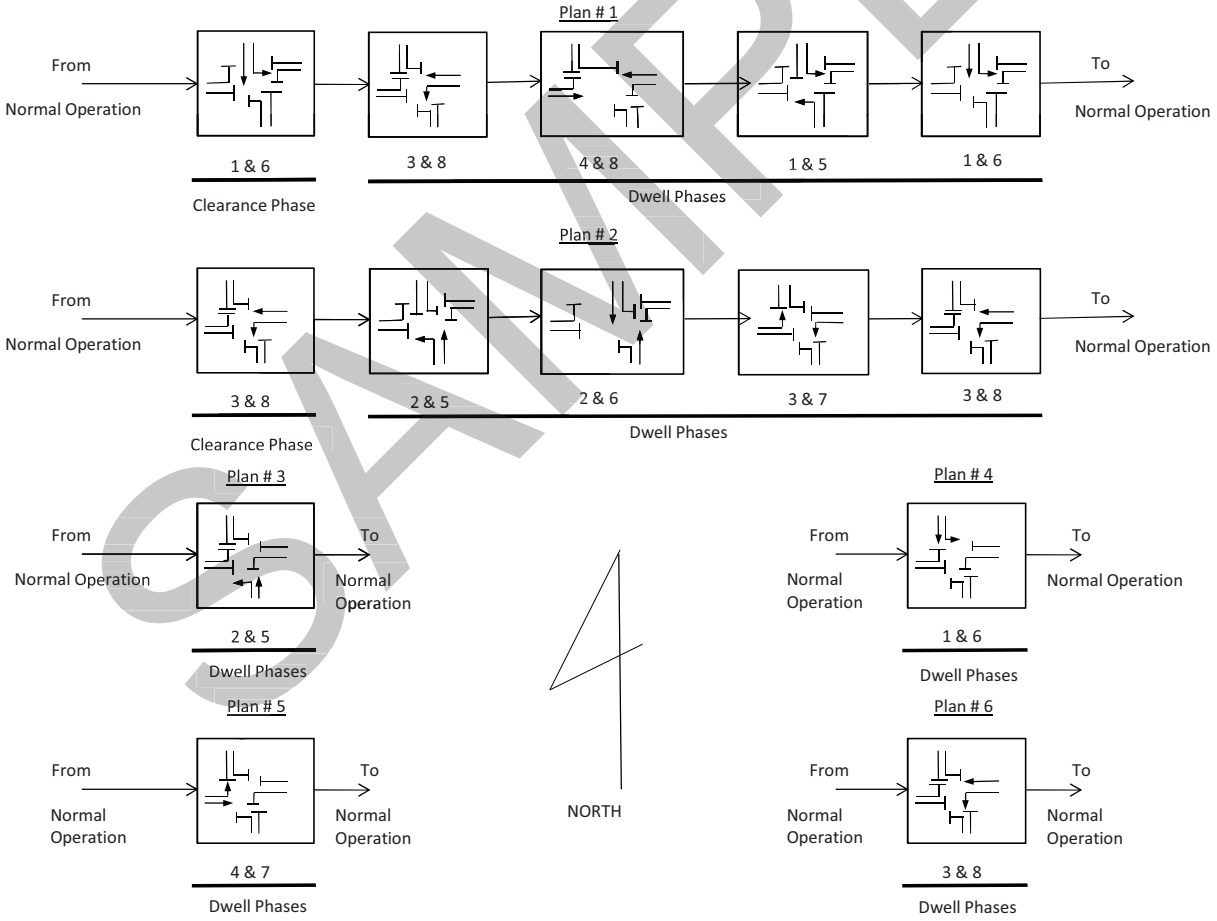
2) ** YELLOW and ALL RED intervals during preemption shall be the same values used during normal controller operations.

3) Controller Brand: Naztec Controller Model: 980

Designed By:		Checked By:		Major Street:	***SR 45 (US 41)***
Date:		Date:		Minor Street:	***Cocoplum Blvd / Wal-mart Ent.***

Bridge & Emergency Vehicle Preemption

Preemption Timing Plan	1***	2***	3 (NB)	4 (SB)	5 (EB)	6 (WB)
Priority	1	1	6	6	6	6
Delay Before Preemption (Sec)	0	0	0	0	0	0
Minimum Green Before Preemption (Sec)	*	*	*	*	*	*
Lock Call	OFF	OFF	OFF	OFF	OFF	OFF
Maximum Presence (sec)	-	-	120	120	120	120
Yellow Clearance (Sec)	**	**	**	**	**	**
Red Clearance (Sec)	**	**	**	**	**	**
Clearance Phase(s)	1, 6	3, 8	-	-	-	-
Clearance Green (Sec)	33	20	-	-	-	-
Yellow Clearance (Sec)	4	4	-	-	-	-
Red Clearance (Sec)	1	1	-	-	-	-
Dwell Phase(s)	1, 3, 4, 5, 6, 8, P2, P4, P6 & P8	2, 3, 5, 6, 7, 8, P2, P4, P6 & P8	2 & 5	1 & 6	4 & 7	3 & 8
Minimum Dwell (Sec)	10	10	10	10	7	7
Yellow Clearance (Sec)**	**	**	**	**	**	**
Red Clearance (Sec)**	**	**	**	**	**	**
Exit Phases	2 & 6	2 & 6	2 & 6	2 & 6	2 & 6	2 & 6



Notes:

1) During dwell phase, the noted dwell phases can be serviced upon demand.

2) * Entry into preemption shall not violate minimum green or pedestrian clearance intervals.

3) ** YELLOW and ALL RED intervals during preemption shall be the same values used during normal controller operations.

4) *** Plan 1 is Bridge preemption for the north side Bridge and Plan 2 is Bridge preemption for the west side Bridge.

5) The blank out sign "No Left Turn" for EB shall be activated during the clearance and dwell phases of preemption plan 1.

6) Controller Brand: Naztec Controller Model: 980

FDOT - DISTRICT 1

Signal Timing Report

(For Emergency traffic signal)

Drawn By:	
Date:	
Checked By:	
Date:	

Approved By:
Date:

Revisions	Location Details	
	Section: ***162010***	Mile Post: ***8.483***
	Major Street: ***US 98***	Orientation: ***N-S***
	Minor Street: ***Fire Station***	Orientation: ***E-W***
	Sig ID: ***774***	

Controller Timings

Movement # (Controller Phase Ø)	1	2	3	4	5	6	7	8
Direction		*SB*		*WB*		*NB*		*EB*
Turn Type								
Min Green								*7*
Ext								*4.0*
Yellow		*5.6*				*5.6*		*3.0*
All Red		*2.0*		*4.1*		*2.0*		*4.1*
Signal Display - Normal Operation								
Signal Display		FY		FR		FY		FR
Signal Display - Preemption Operation								Duration (Sec)
Delay Before Preemption		FY		FR		FY		FR	0
Clearance (Sec)		Y		R		Y		R	5.6
All Red (Sec)		R		R		R		R	2
Minimum Preemption Dwell (Sec)		R		R		R		G	50
Clearance (Sec)		R		R		R		Y	3
All Red (Sec)		R		R		R		R	4.1

Note:

Program 15 seconds minimum normal operation before entry into preemption.

Legend:

FY - Flashing Yellow

FR - Flashing Red

Y - Steady Yellow

R - Steady Red

G - Steady Green