Intersection Analysis Study

SR 5 (US 1) at SR 421/SR A1A (Dunlawton Avenue)

VOLUSIA COUNTY
SECTION 79010
MP 27.573

Continuing Services for Traffic Operations
Contract Number C-8W24
Financial Project No. 237974-1-32-10
Work Order No. 44
Sequence No. 1
Study 7

FDA No. 390.44

Prepared For:

STATE OF FLORIDA • DEPARTMENT OF TRANSPORTATION

Prepared By:

Faller, Davis & Associates, Inc.
CONSULTING ENGINEERS

Maitland, Florida
December 2011

DOUGLAS JOHN PETTY ★ LICENSE No 58730 ★ STATE OF FLORIDA ★ PROFESSIONAL ENGINEER

12/16/11

Engineer of Record: Douglas J. Petty
P.E. No. 58730

TABLE OF CONTENTS

FIGURES and TABLES

FIGURES

TABLES

EXECUTIVE SUMMARY

Faller, Davis & Associates, Inc. (FDA) conducted an Intersection Analysis Study at the intersection of SR 5 (US 1) at SR 421/SR A1A (Dunlawton Avenue) in Port Orange, Volusia County, Florida. An arterial investment study (AIS) was performed for SR 5 in Volusia County in 2006. The study recommended various intersection-level improvements at several locations. This intersection was included in those recommendations and at the time of this study, the design was ongoing.

The purpose of this intersection analysis study is to evaluate the need and feasibility of the improvements identified in the AIS, as well as the need for other additional improvements to address observed operational or safety issues. The improvements developed in the AIS, which are being incorporated into the design include the addition of a second northbound left turn lane and bike lanes along US 1. This is referred to as Alternative 1 in this study.

Based on the results of the analysis, field observations, and engineering judgment, the following recommendations and conclusions were developed:

The improvements recommended in the AIS will result in minimal improvement to intersection operations over the no build condition in current and future years as the northbound left turn volume is moderate. Alternative 1 is not recommended as the addition of a second northbound left turn lane will require a reduction in lane widths and median reconstruction along the south approach of the intersection, which will result in the need to restrict the northbound U-turn movement. Alternative 4 is recommended, which includes the development of optimized coordinated timings between the intersection of Dunlawton Avenue and Herbert Street. Bike lanes could be added along US 1 as recommended in the AIS, without impacting the existing operations.

1. INTRODUCTION

The Florida Department of Transportation has retained Faller, Davis & Associates, Inc. (FDA) to perform an Intersection Analysis study at the intersection of SR 5 (US 1) at SR 421/SR A1A (Dunlawton Avenue) in Port Orange, Volusia County, Florida. The analysis methods used in conducting this study are consistent with those set forth in the Manual on Uniform Traffic Control Devices (MUTCD 2009), the Manual on Uniform Traffic Studies (MUTS), and FDOT District 5 guidelines and procedures.

Figure 1-Project Location Map

2. EXISTING CONDITIONS

The intersection of SR 5 (US 1) at SR 421/SR A1A (Dunlawton Avenue) is located in Port Orange, Florida. Significant features for the intersection are summarized below:

Table 1-Summary of Existing Conditions

Feature	Description
Main Street	• US 1
Side Street	• Dunlawton Avenue
Area Location	• The intersection is located 3.1 miles south of SR 400 (Beville Road) and 1.6 miles east of SR 5A (Nova Road).
Surrounding Development	• Development along US 1 is commercial.
Land Uses at Intersection	• Northeast-Vacant • Northwest-7-Eleven • Southwest-Port Orange Plaza • Southeast-Vacant
Pedestrian Generators	• Bus stops, schools, and convenience store in the vicinity of the intersection
Traffic Control	• Dunlawton Avenue is signalized with protected only left turn phasing for each approach.
Adjacent Signalized Intersections	• North Approach: Herbert Street approximately 0.15 miles north • South Approach: Emergency Signal 0.18 miles south • East Approach: Peninsula Drive 1.0 miles east • West Approach: Spruce Creek Road 0.7 miles west
US 1	• Function-Major arterial roadway in Volusia County. • Connectivity-SR 44 to the south and SR 400 to the north • Cross Section-Four lanes with a grassed median, an urban typical section and a closed drainage system • Posted Speed Limit-North Approach: 40 mph, South Approach: 40 mph • North Approach Lanes-Two through lanes, two left turn lanes, and one right turn lane • South Approach Lanes-Two through lanes, one left turn lane, and one channelized right turn lane • Alignment-Horizontal curve in the vicinity of the intersection • Sidewalks-Both sides of roadway • Utilities-Overhead power lines on both sides of the roadway • Street Lighting-Light poles on both sides of the roadway
Dunlawton Avenue	• Function-Urban collector/arterial roadway • Connectivity-Interstate 95 to the west and SR A1A to the east • Cross Section-Four lanes, divided with a raised median and a closed drainage system. Roadway elevates to a causeway to the east of the intersection. • Posted Speed Limit-East Approach: 35 mph, West Approach: 35 mph • East Approach Lanes-Two through lanes, two left turn lanes, and one right turn lane • West Approach Lanes-Two through lanes, two left turn lanes, and one right turn lane • Alignment-Horizontal curve just to the east and west of the intersection and intersects US 1 at a right angle • Sidewalks-Both sides of roadway • Utilities-Overhead utilities on the north side of the roadway and on the south side, west of the intersection • Street Lighting-Provided on both sides of the roadway
Other Distinct Features	• Railroad crossing west of the intersection, and on-street parking along both sides of US 1.

Traffic Volumes

Eight-hour turning movement counts were conducted from 7:00 to 9:00 AM, 11:00 AM to 1:00 PM, and 2:00 to 6:00 PM. The count reveals that the peak traffic volumes on US 1 occur from 4:30 to 5:30 PM with a total of 2,151 vehicles per hour (vph) approaching the intersection. The peak traffic volumes on Dunlawton Avenue occur from 4:30 to 5:30 PM with 1,868 vph approaching the intersection. The following table summarizes the minimum and maximum and distribution of turning movements during the eight highest hours:

Table 2-Turning Movement Count Summary

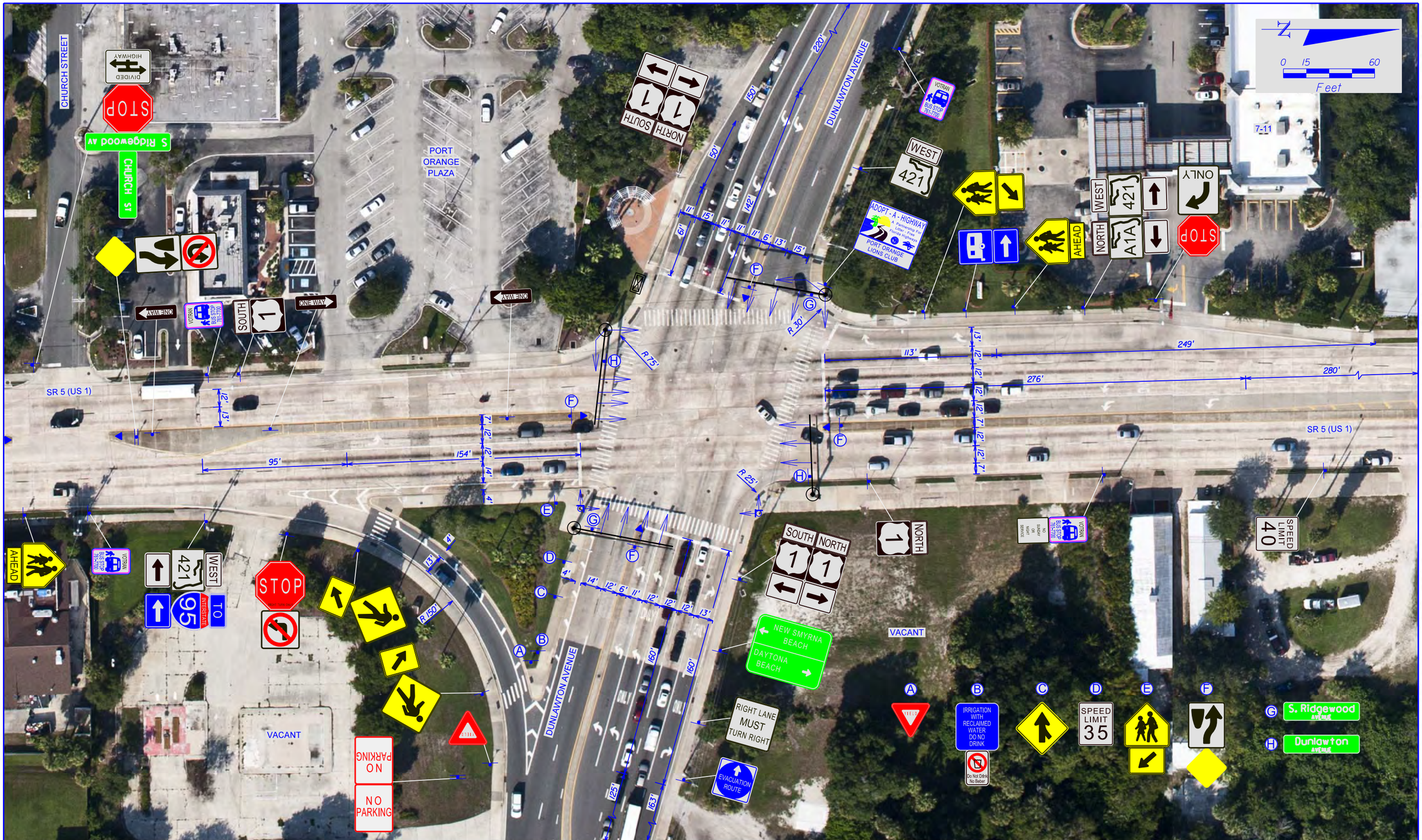
MOVEMENT		NB		SB		EB		WB	
		Min	Max	Min	Max	Min	Max	Min	Max
Left	Volume	63	185	159	263	202	350	126	260
	App % Avg	16%		24%		30%		21%	
Through	Min - Max	389	633	277	608	302	605	352	607
	App % Avg	62%		49%		60%		55%	
Right	Min - Max	150	205	140	348	43	103	177	242
	App % Avg	22%		26%		9%		24%	
U-Turn	Min - Max	1	5	4	26	0	9	0	6
	App % Avg	<1%		1%		<1%		<1%	

Seven pedestrians and forty-six bicyclists were observed crossing the north and south approaches of US 1 during the count period. Thirteen pedestrians and thirty-three bicyclists were observed crossing Dunlawton Avenue during the count period. Turning movement, pedestrian, and bicycle data is presented in further detail in the appendix.

Collision Data

Crash data was provided by the Florida Department of Transportation for the intersection of US 1 at Dunlawton Avenue for the 12-month period ending June 30, 2010. Eight rear end collisions, six angle collisions, two sideswipe collisions, one median crossover collision, and one hit utility pole collision occurred at the intersection. These collisions resulted in two incapacitating injuries, three non-incapacitating injuries, two possible injuries, and one fatality. Of the eighteen collisions, three occurred at night under street lighting, and one occurred on wet pavement. These collisions resulted in an estimated $116,550 in property damage.

Collision summary and collision plots of the intersection have been included on the following pages of this report.



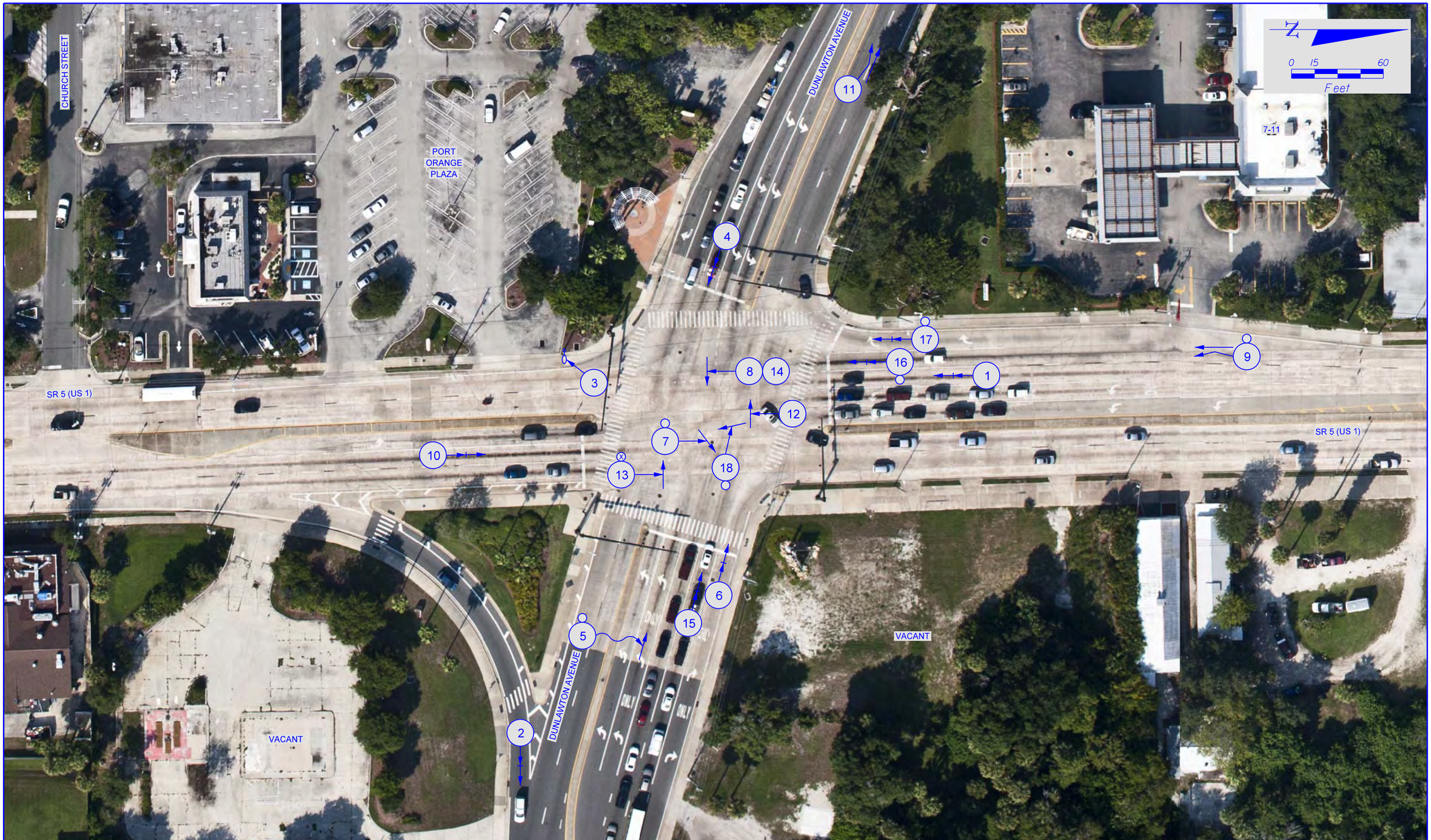
CONTROLLER CABINET	DELINEATOR	DITCH BOTTOM INLET	GUARDRAIL
TRAFFIC SIGNAL POLE	POWER POLE	MANHOLE	FENCE
SIGNAL HEAD	LIGHT POLE	MITERED END SECTION	TREE/SHRUB
SIGN	HYDRANT	DRAINAGE INLET	BUILDING

Faller, Davis & Associates, Inc.

FIGURE 2
CONDITION DIAGRAM
CONTINUING SERVICES FOR TRAFFIC OPERATIONS

PAGE NO.
5

nspatola 12/15/2011 3:04:01 PM Z:\390.00 D5 Continuing Services for Traffic Operations\390.44 US 1 Intersection Analysis Studies\3. US 1 at Dunlawton Ave & Herbert St\DGN\Condition - Dunlawton.dgn



⊗ FATAL	REAR END	RIGHT TURN	LEFT TURN	HIT BIKE
○ INJURY	SIDESWIPE	HIT PEDESTRIAN	OVERTURNED	HIT SIGN
(XX) COLLISION NUMBER	OUT OF CONTROL	ANGLE	HEAD ON	HIT UTILITY POLE
	BACKED INTO		HIT MOVEABLE OBJECT	HIT PARKED CAR

Fuller, Davis & Associates, Inc.

FIGURE 3
COLLISION DIAGRAM
CONTINUING SERVICES FOR TRAFFIC OPERATIONS

PAGE NO.
6

nspatola 9/9/2011 9:15:05 AM Z:\390.00 D5 Continuing Services for Traffic Operations\390.44 US 1 Intersection Analysis Studies\3. US 1 at Dunlawton Ave & Herbert St\DGN\Collision - Dunlawton.dgn

Table 3-Collision Summary

Section: 79010
Intersecting Street: Dunlawton Avenue
Source Data: Hard Copy Crash Reports
Study Period: From 7/1/2009 to 6/30/2010 12 Months

Route: SR 5 (US 1)
County: Volusia
City: Port Orange

No.	Long or Short Form	Date	Day	Time	DOB	Age	Alcohol / Drugs	Lighting Condition	Roadway Surface	Weather	Fatal	Injury	Most Severe Injury	Harmful Event	Property Damage	Vision Obstructed	Contributing Cause
1	L	7/3/2009	Friday	13:11	5/16/1960	49	None	Daylight	Dry	Clear	0	0	None	Rear End	$2,000	None	Careless Driving
2	S	7/10/2009	Friday	14:29	3/7/1931	78	None	Daylight	Dry	Cloudy	0	0	None	Rear End	$1,000	None	Careless Driving
3	L	7/24/2009	Friday	19:24	8/30/1986	23	None	Daylight	Wet	Rain	0	0	None	Hit Utility Pole	$2,000	None	No Improper Driving
4	L	8/26/2009	Wednesday	12:00	1/13/1949	61	None	Daylight	Dry	Clear	0	0	None	Rear End	$1,200	None	Careless Driving
5	L	10/10/2009	Saturday	11:54	12/27/1949	60	None	Daylight	Dry	Clear	0	1	Incapacitating	Median Crossover	$4,000	None	Careless Driving
6	S	10/13/2009	Tuesday	8:12	12/11/1952	57	None	Daylight	Dry	Clear	0	0	None	Rear End	$500	None	Careless Driving
7	L	10/17/2009	Saturday	11:27	9/17/1929	80	None	Daylight	Dry	Clear	0	1	Possible	Angle	$700	None	Disregarded Traffic Signal
8	S	11/4/2009	Wednesday	12:18	9/23/1949	60	None	Daylight	Dry	Clear	0	0	None	Angle	$3,500	None	Disregarded Traffic Signal
9	L	1/18/2010	Monday	12:40	2/27/1993	17	None	Daylight	Dry	Clear	0	1	Incapacitating	Sideswipe	$1,000	None	Improper Lane Change
10	L	2/11/2010	Thursday	21:21	5/24/1949	61	Alcohol	Dark (SL)	Dry	Clear	0	0	None	Rear End	$10,500	None	Alcohol-Under Influence
11	S	3/4/2010	Thursday	10:56	4/1/1950	60	None	Daylight	Dry	Clear	0	0	None	Sideswipe	$1,800	None	Improper Lane Change
12	L	3/7/2010	Sunday	1:51	4/18/1977	33	None	Dark (SL)	Dry	Clear	0	0	None	Angle	$11,500	None	FTYRW
13	L	3/28/2010	Sunday	0:37	5/3/1968	42	None	Dark (SL)	Dry	Clear	1	0	Fatal	Angle	$54,700	None	Disregarded Traffic Signal
14	L	4/9/2010	Friday	15:39	11/24/1928	81	None	Daylight	Dry	Clear	0	0	None	Angle	$6,500	None	Disregarded Traffic Signal
15	S	4/24/2010	Saturday	16:22	1/2/1975	35	None	Daylight	Dry	Clear	0	0	None	Rear End	$200	None	Careless Driving
16	L	5/21/2010	Friday	11:22	4/26/1972	38	None	Daylight	Dry	Clear	0	1	Non-Incapacitating	Rear End	$350	None	Careless Driving
17	L	6/2/2010	Wednesday	17:36	11/15/1967	43	None	Daylight	Dry	Clear	0	1	Possible	Rear End	$100	None	Careless Driving
18	L	6/16/2010	Wednesday	16:08	11/29/1926	84	None	Daylight	Dry	Clear	0	2	Non-Incapacitating	Angle	$15,000	None	Disregarded Traffic Signal

Crash Statistics							Injury Severity					Lighting			Roadway Condition		
Total Number of Crashes	Total Number of Long Form Crashes	Total Property Damage	Total Number of Fatalities	Total Number of Fatal Crashes	Total Number of Injuries	Total Number of Injury Crashes	None	Possible	Non-Incapacitating	Incapacitating	Fatal	Daylight	Dark (SL)	Dark (No SL)	Wet	Dry	Unknown
18	13	$116,550	1	1	7	6	11	2	2	2	1	15	3	0	1	17	0
100%	72%	N/A	N/A	6%	N/A	33%	61%	11%	11%	11%	6%	83%	17%	0%	6%	94%	0%

Rear End	Head On	Angle	Left Turn	Right Turn	Sideswipe	Backed Into	Parked Car	Collision with MV Other Road	Pedestrian	Bike	Bike (Bike Lane)	Moped	Train	Animal	Hit Sign/Sign Post	Hit Utility Pole	Median Crossover
8	0	6	0	0	2	0	0	0	0	0	0	0	0	0	0	1	1
44%	0%	33%	0%	0%	11%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%	6%

Hit Fence	Hit Concrete Barrier Wall	Hit Bridge/Pier/Abuttment	Hit Tree/Shrub	Hit Const Barricd/Sign/BrdgPier/Abutt	Traffic Gate	Crash Attenuator	Fixed Object Above Road	Other Fixed Object	Moveable Object	Ran Into Ditch/Culvert	Ran Off Road Into Water	Overturned	Occupant Fell From Vehicle	Trac/Trailer Jackknifed	Fire	Explosion	All Other
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

No Improper Driving	Careless Driving	FTYRW	Improper Backing	Improper Lane Change	Improper Turn	Followed Too Closely	Disregarded Traffic Signal	Exceed Safe Speed Limit	Disregarded Stop Sign	Failed to Maintain Equipment /	Improper Passing	Drove Left of Center	Exceeded Stated Safe Speed Limit	Obstructing Traffic	Improper Load	All Other	Alcohol/Drugs-Under Influence
1	8	1	0	2	0	0	5	0	0	0	0	0	0	0	0	0	1
6%	44%	6%	0%	11%	0%	0%	28%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%

3. QUALITATIVE ASSESSMENT

The intersection of US 1 and Herbert Street was observed by a registered professional engineer in the morning (7:00 to 9:00 AM) and afternoon (4:00 to 5:30 PM) peak periods to assess existing operating conditions and to determine if modifications are needed to improve the safety and efficiency of the intersection.

Request: The Department requested an evaluation of the improvements identified in the US 1 AIS, as well as the need for other additional improvements to address observed operational or safety issues.

Operations: Operations include the efficiency of operation and interaction of motor vehicles, pedestrians, and bicycles at the intersection. Following are the observations relating to these factors:

- The intersection is signalized and configured with mast arms located in each quadrant of the intersection. The signal operating plan includes protected-only left turn phases for each approach. Signalized pedestrian crossings with countdown pedestrian signals and ADA compliant pedestrian detectors are provided for each approach to the intersection.

- The traffic signal operates in coordinated mode with Herbert Street to the north during the weekday and weekend peak traffic periods utilizing a single coordination plan.

- North-south and east-west traffic is relatively balanced throughout the eight hour count period. Northbound traffic averaged approximately 830 vph, southbound traffic averaged approximately 940 vph, eastbound traffic averaged approximately 800 vph, and westbound traffic averaged approximately 910 vph.

- The southbound left turn/U-turn movement is the heaviest turning movement on US 1 averaging approximately 225 left turning vph and approximately 11 U-turning vph. The maximum queue observed for the southbound left turn/U-turn movement was 13 vehicles during the afternoon peak period.

- The eastbound left turn/U-turn movement is the heaviest turning movement on Dunlawton Avenue averaging approximately 240 left turning vph and approximately 3 U-turning vph. The maximum queue observed for the eastbound left turn/U-turn movement was 12 vehicles during the afternoon peak period.

- Dual left turn lanes are provided for three of the four approaches, with the exception being the northbound left turn lane. The northbound left turn/U-turn movement averaged approximately 130 left turning vph and approximately 3 U-turning vph during the count period. The maximum queue observed for the northbound left turn/U-turn movement was 7 vehicles during the afternoon peak period, which did not exceed the available storage.

- The southbound right turn movement is the heaviest right turning movement at the intersection, averaging approximately 250 vph during the eight hour count period. The southbound right turn movement was observed to extend back near the end of the right turn lane on several occasions during the afternoon peak period. No conflicts with through vehicles were observed.

- The signal timings were observed to accommodate the traffic demand during both peak periods, with one exception during the afternoon peak period. No phase failures occurred during the morning peak period, and one southbound left turn phase failure occurred during the afternoon peak period.

- Northbound and southbound U-turning drivers were observed to complete their movement within the available receiving pavement width without difficulty.

- No conflicts were observed at the intersection during the morning peak period. One conflict was observed during the afternoon peak period when a southbound right turn driver pulled out in front of a westbound through motorist, who had the right of way. The westbound driver honked their horn and slowed their vehicle to yield to the right turning vehicle.

- No conflicts were observed with the channelized northbound right turn lane during either peak periods.

- There is a full median opening on US 1 at Church Street, approximately 420 feet south of Dunlawton Avenue, which does not meet access management spacing standards. The northbound vehicle queues were observed to extend beyond Church Street in the morning peak period. No conflicts were observed with this median opening, and no crashes related to this median opening occurred in 12-month period ending June 30, 2010. The FDOT Crash Analysis Reporting (CAR) system was reviewed for Church Street using the previous five years of available data, and no crash trends were found at this opening.

Safety: Vehicle, pedestrian, and bicycle safety at the intersection are assessed through review of crash reports, identification of significant crash trends, then correlation to field conditions. Following are the observations relating to the safety of the intersection.

- Crash data was provided by the Florida Department of Transportation for the intersection of US 1 at Dunlawton Avenue for the 12-month period ending June 30, 2010. Eight rear end collisions, six angle collisions, two sideswipe collisions, one median crossover collision, and one hit utility pole collision occurred at the intersection. These collisions resulted in an estimated $116,550 in property damage.

- Three of the rear end collisions involved southbound drivers. Two rear end collisions involved westbound drivers, and one rear end crash involved eastbound drivers. The cause of all of these collisions was careless driving, which resulted in one possible and one non-incapacitating injury. All of these collisions occurred on dry pavement in daylight.

- One of the rear end collisions occurred when a northbound driver, under the influence of alcohol, struck another northbound vehicle. The collision resulted in no injuries and occurred at night under street lighting.

- An additional rear end crash occurred in the northbound channelized right turn lane onto Dunlawton Avenue. The collision resulted in no injuries and occurred on dry pavement in daylight.

- Two of the angle collisions occurred when southbound vehicles disregarded the traffic signal and struck eastbound vehicles. These collisions resulted in no injuries.

- One angle collision occurred when a southbound vehicle failed to yield the right of way to an emergency vehicle crossing the intersection with its emergency lights active. The collision occurred at night under street lighting and resulted in no injuries.

- Two of the angle collisions occurred when through vehicles disregarded the traffic signal and struck turning vehicles. One of these collisions involved a northbound vehicle striking an eastbound vehicle, and the second collision involved a westbound vehicle striking a southbound vehicle. These collisions resulted in two non-incapacitating injuries.

- The one fatal collision was the result of an angle collision between a northbound and westbound vehicle. The northbound vehicle disregarded the traffic signal and struck a westbound vehicle turning south onto US 1. The northbound vehicle proceeded through the intersection and struck several other non-moveable objects including a building northeast of the intersection before coming to rest. This collision occurred at night under street lighting and resulted in one fatality.

- The two sideswipe collisions were a result of improper lane changes. One collision involved southbound vehicles approaching the intersection, and one collision involved westbound vehicles departing the intersection. These collisions resulted in one incapacitating injury and occurred in daylight on dry pavement.

- The median crossover collision occurred when a driver in the northbound channelized right turn lane lost control of the vehicle and struck the curb of the channelized island. The vehicle then crossed the eastbound travel lanes and the traffic separator before striking a stopped vehicle in the westbound left turn lanes. The collision resulted in an incapacitating injury.

- The hit utility pole collision occurred when a driver making a westbound left onto US 1 lost control of the vehicle and struck a utility pole in the southwest quadrant of the intersection. The collision occurred on wet pavement in the rain.

- Approximately 30% of the crashes occurred as a result of disregarding the traffic signal. Red light running confirmation lights are provided for each approach of the intersection.

Maintenance: In addition to observing operational and safety conditions, correctible maintenance items are also identified during the field review. Following is a summary of maintenance items observed at the intersection.

- The existing signs and pavement markings are in good condition and properly applied.

- The intersection utilizes video vehicle detection on each approach. On a few occasions, it appeared as though the east-west non-coordinated phase was extending without vehicle demand present, which can lead to inefficient operation. The extension time for the east-west movement is three seconds, which is typical. The video detection equipment should be reviewed to ensure it is working as intended.

4. INTERSECTION ANALYSIS

The purpose of the intersection analysis is to evaluate alternatives that may improve intersection efficiency and safety. Synchro models for the base condition, scoped improvements, and two alternatives were developed for the morning and afternoon peak traffic periods for the current year (2011) and future year (2025) traffic volumes.

The raw turning movement count data for the morning and afternoon peak traffic periods was adjusted to the average week of the year then factored by the peak hour factor for the intersection. Then, the 2025 traffic volumes were developed utilizing a 1.5% growth rate. Table 4 summarizes the volumes developed for the analysis.

Table 4-Design Volumes

Morning Peak Period	Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Raw Count Data	7:45 AM	357	479	80	161	459	243	80	651	195	233	325	151
2011 Adjusted to Average Week (inc. PHF)		434	583	97	196	558	296	97	792	237	283	395	184
2025 Average Week		525	705	117	237	675	358	117	958	287	342	478	223
Afternoon Peak Period		**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Raw Count Data	4:30 PM	220	608	66	210	545	219	165	484	221	279	642	360
2011 Adjusted to Average Week (inc. PHF)		233	643	70	222	576	231	174	512	234	295	679	380
2025 Average Week		282	778	85	269	697	280	211	620	283	357	822	460
Peak Hour Factor for Entire Intersection										AM	0.855	PM	0.984
Date of Count							8/23/2011			Average Week Factor			1.04
Linear Growth Rate (per year)						1.5%	from	2011	to	2025	Growth Factor		1.21

The existing signal timings and phasing sequences were obtained from Volusia County Traffic Engineering. This intersection currently operates in coordinated mode throughout the day with the intersection of US 1 and Herbert Street to the north. The existing Yellow Change, Red Clearance, and Pedestrian Clearance intervals were checked against the requirements in the Traffic Engineering Manual (TEM) and District Five guidelines. Table 5 summarizes the recommended intervals.

Table 5-Recommended Intervals

Phase	1	2	3	4	5	6	7	8
Movement	SBL	NB	WBL	EB	NBL	SB	EBL	WB
Yellow Change Interval - Existing	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Yellow Change Interval - Calculated	4.0	4.0	3.6	3.6	4.0	4.0	3.6	3.6
Yellow Change Interval - Recommended	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval - Existing	1.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Red Clearance Interval - Calculated	2.7	2.2	2.1	3.1	2.6	2.4	2.3	3.0
Red Clearance Interval - Recommended	2.7	2.2	2.1	3.1	2.6	2.4	2.3	3.0
Pedestrian Clearance Interval - Existing		35.0		35.0		35.0		35.0
Pedestrian Clearance Interval - Calculated		28.0		33.0		35.0		35.0
Pedestrian Clearance Interval - Recommended		35.0		35.0		35.0		35.0

The local controller timing worksheet is included in the appendix.

Base Condition

The existing signal sequence, timings, and geometry were modeled to establish base operating conditions. The models were calibrated based on existing signal operations with the use of the existing cycle lengths, splits, and offsets. Due the proximity of Herbert Street to the north, the analysis of Dunlawton Avenue includes both intersections. Currently, there is a single coordinated plan that runs from 6:30 AM to 8:00 PM on weekdays and consists of a 160 second cycle length.

Alternative 1 (Scoped Improvements)

Alternative 1 includes the addition of a second northbound left turn lane. Northbound and southbound bike lanes will also be added along both sides of US 1. To implement these changes, the northbound traffic separator on US 1 will be shifted, and the northbound and southbound lanes will be narrowed. The existing signal timings were used in this alternative. A portion of the existing on-street parking will need to be removed to accommodate these improvements. Curb cut ramp modifications for the northeast and northwest quadrants are also included with the scoped improvements.

Alternative 2

Alternative 2 includes the improvements in Alternative 1 and the development of optimized coordinated timings for Dunlawton Avenue and Herbert Street. The timings developed include separate cycle lengths for the 2011 and 2025 volumes for both the morning peak period and the afternoon peak period.

Alternative 3

The receiving pavement and median width will be reduced for the northbound U-turn movement due to the scoped improvements described above, while the receiving pavement width for the southbound U-turn movement will be unchanged. With the reduction in receiving pavement (approximately 31 feet to 26 feet) and median width (approximately 19 feet to 15 feet) for the northbound U-turn movement, passenger vehicles will not be able to complete U-turn movements, based on the FDOT Median Handbook and the AASHTO minimum turning paths. In lieu of northbound U-turn movements using a portion of the west approach to complete their U-turn movements, which is not desirable, northbound U-turn movements would need to be restricted. This can be accomplished by providing an overhead mast arm mounted “No U-turn” sign. Northbound U-turn volumes at Dunlawton Avenue are light with a total of twenty-one U-turns during the eight hour count period.

Alternative 3 includes the improvements in Alternative 2, restricts northbound U-turn movements, and reassigns northbound U-turn movements from Dunlawton Avenue to the northbound left turn movement at Herbert Street, where the scoped improvements increase the receiving pavement width for U-turn movements.

Alternative 4

This alternative includes the development of optimized coordinated timings for Dunlawton Avenue and Herbert Street, while maintaining the existing geometry. This alternative also includes lane reductions to accommodate a southbound bike lane along the north approach of US 1. Bike lanes can be added on US 1 approaching Dunlawton Avenue northbound and departing Dunlawton Avenue without narrowing the existing lane widths.

The following table summarizes the results of the Synchro analysis. Synchro reports for each alternative are included in the appendix.

Table 6-Alternatives Comparison

Morning Peak Period	Intersection LOS	Intersection Delay (Sec/Veh)	NB Approach Delay (Sec/Veh)
Base Condition 2011	E	59.4	38.5
Alternative 1 (Scoped Improvements) - 2011	E	58.8	38.1
Alternative 2 - 2011	D	46.0	35.6
Alternative 3 - 2011	D	46.0	35.5
Alternative 4 - 2011	D	46.2	36.0
Base Condition (No Build) 2025	E	72.4	47.8
Alternative 1 (Scoped Improvements) - 2025	E	72.3	47.4
Alternative 2 - 2025	E	55.5	50.2
Alternative 3 - 2025	E	55.5	50.5
Alternative 4 - 2025	E	55.6	50.9
Afternoon Peak Period			
Base Condition 2011	D	49.9	44.5
Alternative 1 (Scoped Improvements) - 2011	D	48.0	38.0
Alternative 2 - 2011	D	42.9	30.7
Alternative 3 - 2011	D	42.9	30.7
Alternative 4 - 2011	D	44.0	32.9
Base Condition (No Build) 2025	E	55.0	58.8
Alternative 1 (Scoped Improvements) - 2025	D	52.3	44.9
Alternative 2 - 2025	D	48.2	40.0
Alternative 3 - 2025	D	48.2	40.0
Alternative 4 - 2025	D	50.1	44.6

Review of the results for the current and future year traffic volumes indicates that the addition of a second northbound left turn lane does not show significant improvement in terms of LOS, approach delay, or intersection delay. Alternatives 2 and 3 show the best measures of effectiveness in terms of delay and level of service (LOS) for all plans except for the northbound approach delay for the 2025 morning peak period. Alternative 4 shows improvement over the Base Conditions for all periods with the exception of the northbound approach delay for the 2025 morning peak period. For all periods analyzed, Alternative 4 shows similar results when compared to Alternatives 2 and 3 in terms of delay and LOS. Alternative 4 is recommended as it improves the intersection operation with the development of coordinated signal timings between the intersections of Dunlawton Avenue and Herbert Street without restricting northbound U-turn movements.

Other improvements, such as right turn overlap phases, were reviewed to determine if the LOS could be improved for the current and future years. It was determined that the addition of right turn overlap phases did not improve the operation of the intersection.

5. RECOMMENDATIONS

Based on the results of the analysis, field observations, and engineering judgment, the following recommendations are made:

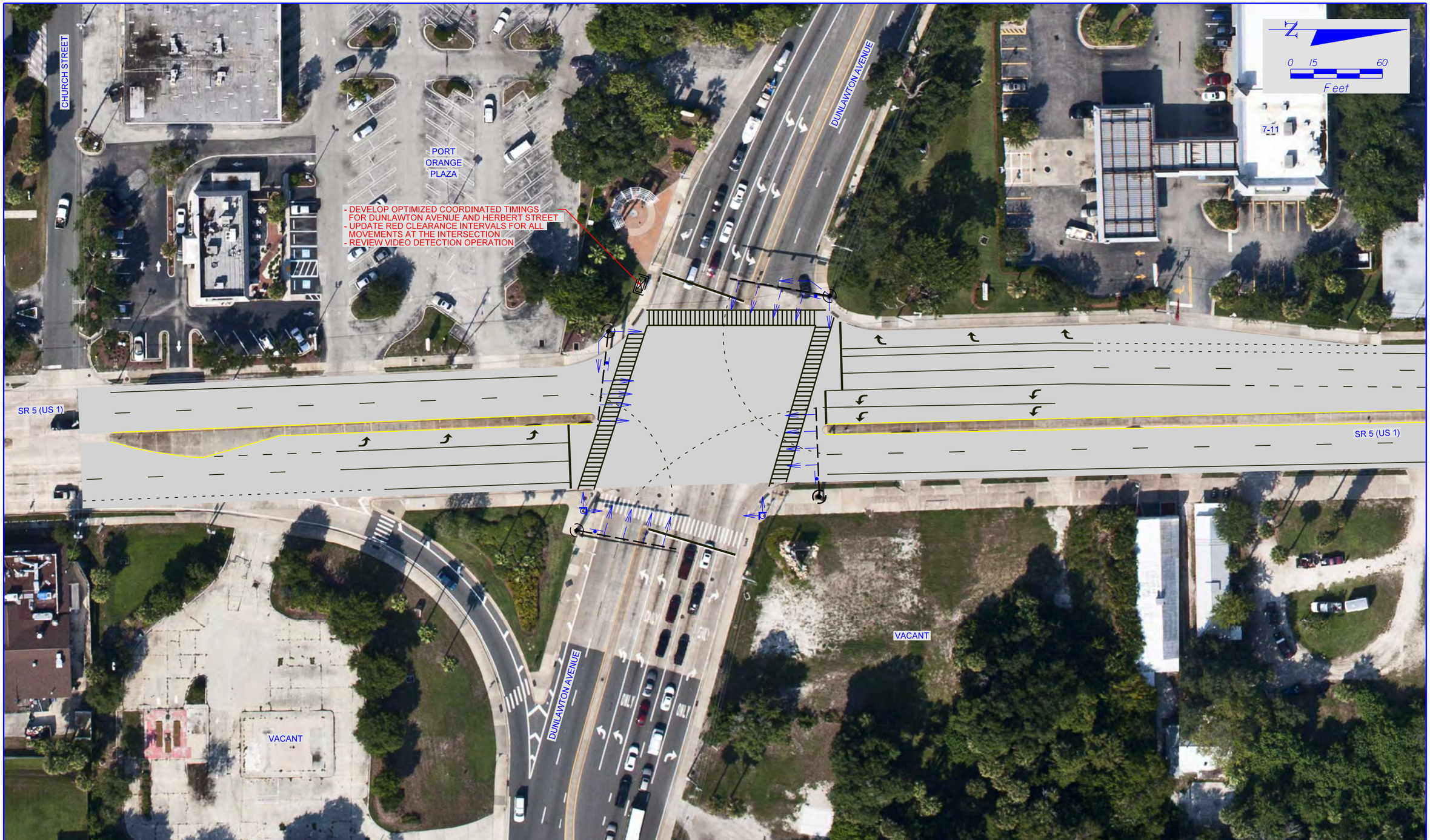
1. The improvements recommended in the AIS will result in minimal improvement to intersection operations over the no build condition in current and future years as the northbound left turn volume is moderate. Alternative 1 is not recommended as the addition of a second northbound left turn lane will require a reduction in lane widths and median reconstruction along the south approach of the intersection, which will result in the need to restrict the northbound U-turn movement. Alternative 4 is recommended, which includes the development of optimized coordinated timings between the intersection of Dunlawton Avenue and Herbert Street. Bike lanes could be added along US 1 as recommended in the AIS, without impacting the existing operations.

2. Optimized coordination timings should be developed for Dunlawton Avenue and Herbert Street.

3. The red clearance intervals should be increased for all of the movements at the intersection per Table 5.

4. The video detection equipment should be reviewed to ensure it is working as intended.

A conceptual improvement diagram has been developed to further depict the recommended improvements and is included on the following page.



CONTROLLER CABINET	DELINEATOR	DITCH BOTTOM INLET	GUARDRAIL
TRAFFIC SIGNAL POLE	POWER POLE	MANHOLE	FENCE
SIGNAL HEAD	LIGHT POLE	MITERED END SECTION	TREE/SHRUB
SIGN	HYDRANT	DRAINAGE INLET	BUILDING

Faller, Davis & Associates, Inc.

FIGURE 4
CONCEPTUAL IMPROVEMENT DIAGRAM
CONTINUING SERVICES FOR TRAFFIC OPERATIONS

nspatola 12/14/2011 7:24:42 AM Z:\390.00 D5 Continuing Services for Traffic Operations\390.44 US 1 Intersection Analysis Studies\3. US 1 at Dunlawton Ave & Herbert St\DGN\Conceptual - Dunlawton.dg.

APPENDIX

North Approach Photographs

Looking south into the intersection along US 1

Looking north from the intersection along US 1

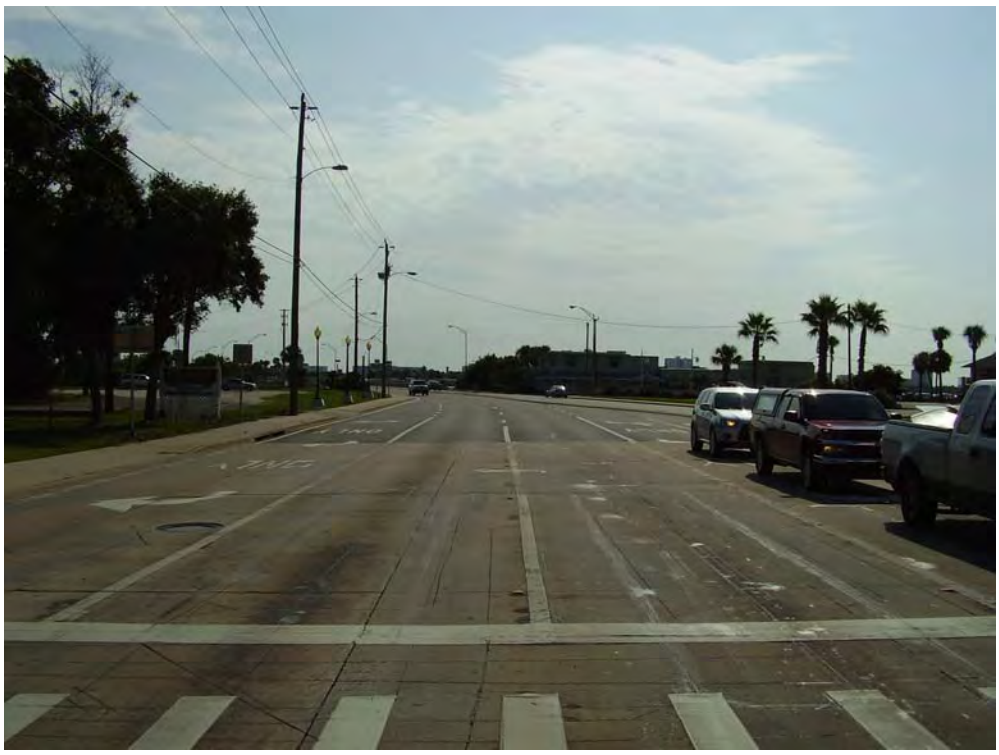
South Approach Photographs

Looking north into the intersection along US 1

Looking south from the intersection along US 1

East Approach Photographs

Looking west into the intersection along Dunlawton Avenue



Looking east from the intersection along Dunlawton Avenue

West Approach Photographs

Looking east into the intersection along Dunlawton Avenue

Looking west from the intersection along Dunlawton Avenue

TURNING MOVEMENT COUNT
NORTH STREET: SR 5 (US 1)
SOUTH STREET: SR 5 (US 1)
SR 5 (US 1) at SR 421 Dunlawton Avenue
ALL VEHICLES

DATE: 8/23/11
EAST STREET: SR 421 (Dunlawton Avenue)
WEST STREET: SR 421 (Dunlawton Avenue)
TIME: 7:00 AM - 9:00 AM, 11:00 AM to 1:00 PM and 2:00 PM - 6:00 PM
BY: FDA

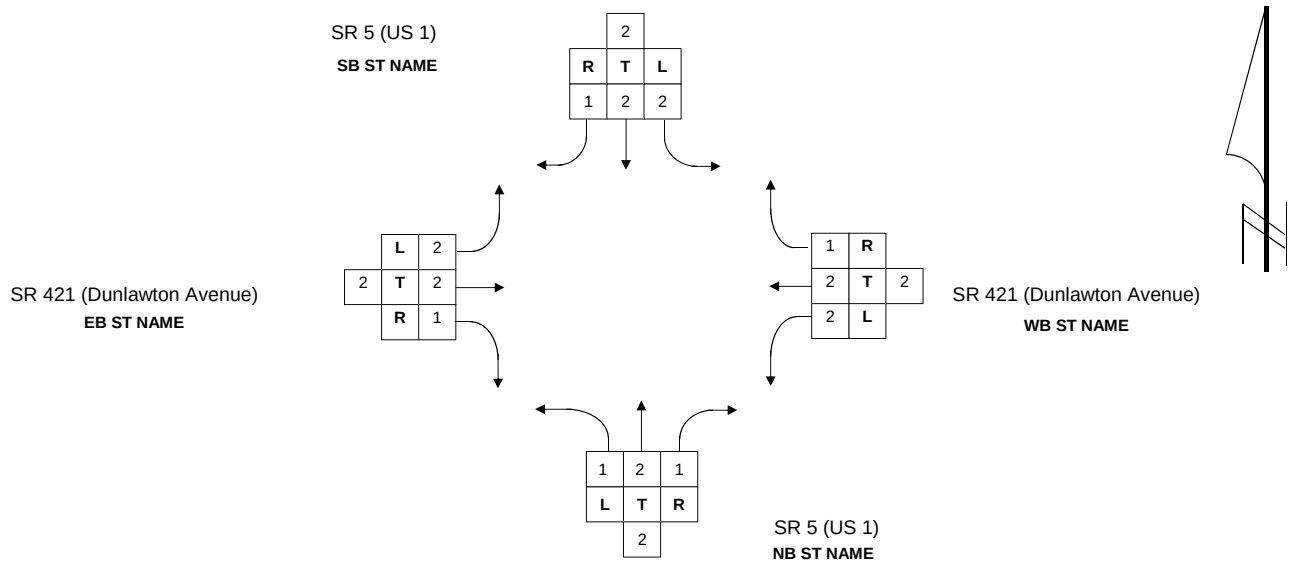
START	NORTHBOUND					SOUTHBOUND						EASTBOUND					WESTBOUND						GRAND
TIME	LEFT	THRU	RIGHT	U-TURN	TOTAL	LEFT	THRU	RIGHT	U-TURN	TOTAL	NS TOTAL	LEFT	THRU	RIGHT	U-TURN	TOTAL	LEFT	THRU	RIGHT	U-TURN	TOTAL	EW TOTAL	TOTAL
7:00	21	110	20	0	151	29	52	23	1	105	256	25	68	6	0	99	15	63	41	0	119	218	474
7:15	25	137	46	0	208	36	49	49	5	139	347	67	57	8	0	132	42	95	38	0	175	307	654
7:30	41	197	75	0	313	48	78	29	6	161	474	101	90	12	0	203	35	82	65	0	182	385	859
7:45	31	189	64	1	285	46	98	39	6	189	474	68	87	17	0	172	34	112	58	0	204	376	850
Total	**118**	**633**	**205**	**1**	**957**	**159**	**277**	**140**	**18**	**594**	**1,551**	**261**	**302**	**43**	**0**	**606**	**126**	**352**	**202**	**0**	**680**	**1,286**	**2,837**
8:00	14	162	41	0	217	43	58	29	7	137	354	83	81	14	0	178	42	123	80	0	245	423	777
8:15	18	166	65	2	251	44	83	43	5	175	426	73	90	15	1	179	46	76	62	0	184	363	789
8:30	13	134	25	1	173	73	86	40	9	208	381	132	221	34	0	387	39	148	43	0	230	617	998
8:45	18	111	59	0	188	48	84	43	5	180	368	62	113	15	0	190	40	125	53	0	218	408	776
Total	**63**	**573**	**190**	**3**	**829**	**208**	**311**	**155**	**26**	**700**	**1,529**	**350**	**505**	**78**	**1**	**934**	**167**	**472**	**238**	**0**	**877**	**1,811**	**3,340**
11:00	35	119	37	4	195	59	119	55	3	236	431	51	105	27	1	184	38	120	66	2	226	410	841
11:15	45	107	63	0	215	57	105	55	1	218	433	60	148	15	2	225	51	96	72	0	219	444	877
11:30	28	122	32	0	182	61	107	70	3	241	423	53	116	24	0	193	57	85	51	0	193	386	809
11:45	30	107	58	0	195	73	108	64	4	249	444	54	101	37	0	192	44	134	48	0	226	418	862
Total	**138**	**455**	**190**	**4**	**787**	**250**	**439**	**244**	**11**	**944**	**1,731**	**218**	**470**	**103**	**3**	**794**	**190**	**435**	**237**	**2**	**864**	**1,658**	**3,389**
12:00	43	143	34	1	221	56	96	74	1	227	448	45	128	28	0	201	58	151	53	0	262	463	911
12:15	60	114	26	1	201	52	136	62	5	255	456	68	128	25	0	221	43	127	60	5	235	456	912
12:30	62	113	43	0	218	82	103	53	4	242	460	54	110	21	0	185	56	154	58	0	268	453	913
12:45	20	170	47	2	239	43	95	60	0	198	437	57	137	22	0	216	70	122	40	0	232	448	885
Total	**185**	**540**	**150**	**4**	**879**	**233**	**430**	**249**	**10**	**922**	**1,801**	**224**	**503**	**96**	**0**	**823**	**227**	**554**	**211**	**5**	**997**	**1,820**	**3,621**
14:00	35	123	51	0	209	53	125	63	2	243	452	59	108	24	0	191	69	155	65	0	289	480	932
14:15	50	164	61	0	275	51	147	72	3	273	548	58	58	16	1	133	78	145	79	0	302	435	983
14:30	38	133	36	1	208	50	118	79	0	247	455	53	134	25	0	212	65	146	55	0	266	478	933
14:45	23	126	39	0	188	30	99	54	0	183	371	46	109	21	0	176	48	161	43	0	252	428	799
Total	**146**	**546**	**187**	**1**	**880**	**184**	**489**	**268**	**5**	**946**	**1,826**	**216**	**409**	**86**	**1**	**712**	**260**	**607**	**242**	**0**	**1,109**	**1,821**	**3,647**
15:00	48	98	41	1	188	51	126	75	3	255	443	52	94	16	1	163	32	118	59	1	210	373	816
15:15	26	84	44	1	155	59	119	72	1	251	406	64	118	19	0	201	44	140	71	2	257	458	864
15:30	48	137	49	1	235	66	143	80	0	289	524	70	119	15	2	206	42	119	41	1	203	409	933
15:45	25	136	39	2	202	69	108	63	2	242	444	52	137	19	0	208	51	167	56	1	275	483	927
Total	**147**	**455**	**173**	**5**	**780**	**245**	**496**	**290**	**6**	**1,037**	**1,817**	**238**	**468**	**69**	**3**	**778**	**169**	**544**	**227**	**5**	**945**	**1,723**	**3,540**
16:00	23	98	40	1	162	74	127	72	2	275	437	40	113	19	1	173	45	113	40	0	198	371	808
16:15	39	119	46	0	204	52	159	68	0	279	483	60	125	14	2	201	57	135	58	0	250	451	934
16:30	35	121	45	0	201	74	168	72	2	316	517	53	163	17	5	238	51	161	53	1	266	504	1,021
16:45	36	160	71	0	267	49	154	78	5	286	553	49	135	15	1	200	52	113	73	5	243	443	996
Total	**133**	**498**	**202**	**1**	**834**	**249**	**608**	**290**	**9**	**1,156**	**1,990**	**202**	**536**	**65**	**9**	**812**	**205**	**522**	**224**	**6**	**957**	**1,769**	**3,759**
17:00	51	116	63	0	230	67	179	107	1	354	584	55	132	20	1	208	41	118	39	0	198	406	990
17:15	42	87	42	1	172	80	141	103	1	325	497	55	178	14	1	248	60	153	54	0	267	515	1,012
17:30	13	104	37	1	155	56	144	68	1	269	424	51	150	13	2	216	42	132	47	1	222	438	862
17:45	17	82	33	0	132	60	140	70	1	271	403	50	145	12	1	208	40	97	37	0	174	382	785
Total	**123**	**389**	**175**	**2**	**689**	**263**	**604**	**348**	**4**	**1,219**	**1,908**	**211**	**605**	**59**	**5**	**880**	**183**	**500**	**177**	**1**	**861**	**1,741**	**3,649**

FLORIDA DEPARTMENT OF TRANSPORTATION

SUMMARY OF VEHICLE MOVEMENTS

SECTION	79010	**CITY** Port Orange		**COUNTY** Volusia	
MAIN STREET	SR 5 (US 1)	**INTERSECTING ROUTE** Dunlawton Aveune			
OBSERVER	FDA	**DATE** 8/23/11		**MILEPOST** 27.573	
WEATHER	Fair	**ROAD CONDITION** Good			
REMARKS					

FORM COMPLETED BY GEP **DATE** 08/31/11



TIME	NORTHBOUND					SOUTHBOUND					TOTAL	EASTBOUND					WESTBOUND					TOTAL
BEGIN/END	LEFT	THRU	RIGHT	U-TURN	**TOT**	LEFT	THRU	RIGHT	U-TURN	**TOT**	**N/S**	LEFT	THRU	RIGHT	U-TURN	**TOT**	LEFT	THRU	RIGHT	U-TURN	**TOT**	**E/W**
4 - 5																						
5 - 6																						
6 - 7																						
7 - 8	118	633	205	1	**957**	159	277	140	18	**594**	**1,551**	261	302	43	0	**606**	126	352	202	0	**680**	**1,286**
8 - 9	63	573	190	3	**829**	208	311	155	26	**700**	**1,529**	350	505	78	1	**934**	167	472	238	0	**877**	**1,811**
9 - 10																						
10 - 11																						
11 - 12	138	455	190	4	**787**	250	439	244	11	**944**	**1,731**	218	470	103	3	**794**	190	435	237	2	**864**	**1,658**
12 - 1	185	540	150	4	**879**	233	430	249	10	**922**	**1,801**	224	503	96	0	**823**	227	554	211	5	**997**	**1,820**
1 - 2																						
2 - 3	146	546	187	1	**880**	184	489	268	5	**946**	**1,826**	216	409	86	1	**712**	260	607	242	0	**1,109**	**1,821**
3 - 4	147	455	173	5	**780**	245	496	290	6	**1,037**	**1,817**	238	468	69	3	**778**	169	544	227	5	**945**	**1,723**
4 - 5	133	498	202	1	**834**	249	608	290	9	**1,156**	**1,990**	202	536	65	9	**812**	205	522	224	6	**957**	**1,769**
5 - 6	123	389	175	2	**689**	263	604	348	4	**1,219**	**1,908**	211	605	59	5	**880**	183	500	177	1	**861**	**1,741**
6 - 7																						
7 - 8																						
8 - 9																						
9 - 10																						
10 - 11																						
11 - 12																						
TOTAL	1,053	4,089	1,472	21	**6,635**	1,791	3,654	1,984	89	**7,518**	**14,153**	1,920	3,798	599	22	**6,339**	1,527	3,986	1,758	19	**7,290**	**13,629**

Percentage	16%	62%	22%	0%		24%	49%	26%	1%			30%	60%	9%	0%		21%	55%	24%	0%		
Maximum	185	633	205	5		263	608	348	26			350	605	103	9		260	607	242	6		
Minimum	63	389	150	1		159	277	140	4			202	302	43	0		126	352	177	0		

FLORIDA DEPARTMENT OF TRANSPORTATION

PEDESTRIAN MOVEMENT SUMMARY

SECTION 79010 **CITY** Port Orange **COUNTY** Volusia
STATE ROUTE SR 5 (US 1) **INTERSECTING ROUTE** Dunlawton Aveune
OBSERVER FDA **DATE** 8/23/11 **MILEPOST** 27.573

REMARKS

FORM COMPLETED BY GEP **DATE** 08/31/11

SR 5 (US 1)
SB ST NAME

7-8	8-9	11-12	12-1	2-3	3-4	4-5	5-6	Total
0	2	2	0	1	0	0	1	**6**
0	0	0	1	0	0	0	0	**1**
0	**2**	**2**	**1**	**1**	**0**	**0**	**1**	**7**

SR 421 (Dunlawton Avenue)
EB ST NAME

7-8	2	2	**4**
8-9	1	1	**2**
11-12	0	0	**0**
12-1	0	0	**0**
2-3	0	1	**1**
3-4	0	1	**1**
4-5	1	0	**1**
5-6	1	1	**2**
Total	**5**	**6**	**11**

SR 421 (Dunlawton Avenue)
WB ST NAME

7-8	0	0	**0**
8-9	0	0	**0**
11-12	0	0	**0**
12-1	0	1	**1**
2-3	0	0	**0**
3-4	0	0	**0**
4-5	0	0	**0**
5-6	0	1	**1**
Total	**0**	**2**	**2**

7-8	8-9	11-12	12-1	2-3	3-4	4-5	5-6	Total
0	0	0	0	0	0	0	0	**0**
0	0	0	0	0	0	0	0	**0**
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

SR 5 (US 1)
NB ST NAME

FLORIDA DEPARTMENT OF TRANSPORTATION

BICYCLE MOVEMENT SUMMARY

SECTION 79010 **CITY** Port Orange **COUNTY** Volusia
STATE ROUTE SR 5 (US 1) **INTERSECTING ROUTE** Dunlawton Aveune
OBSERVER FDA **DATE** 8/23/11 **MILEPOST** 27.573

REMARKS 26 Bicycle group observed with police protection at 4:36 PM

FORM COMPLETED BY GEP **DATE** 08/31/11

SR 5 (US 1)
SB ST NAME

7-8	8-9	11-12	12-1	2-3	3-4	4-5	5-6	Total
1	0	1	1	2	0	27	0	**32**
1	1	0	0	0	0	1	0	**3**
2	**1**	**1**	**1**	**2**	**0**	**28**	**0**	**35**

SR 421 (Dunlawton Avenue)
EB ST NAME

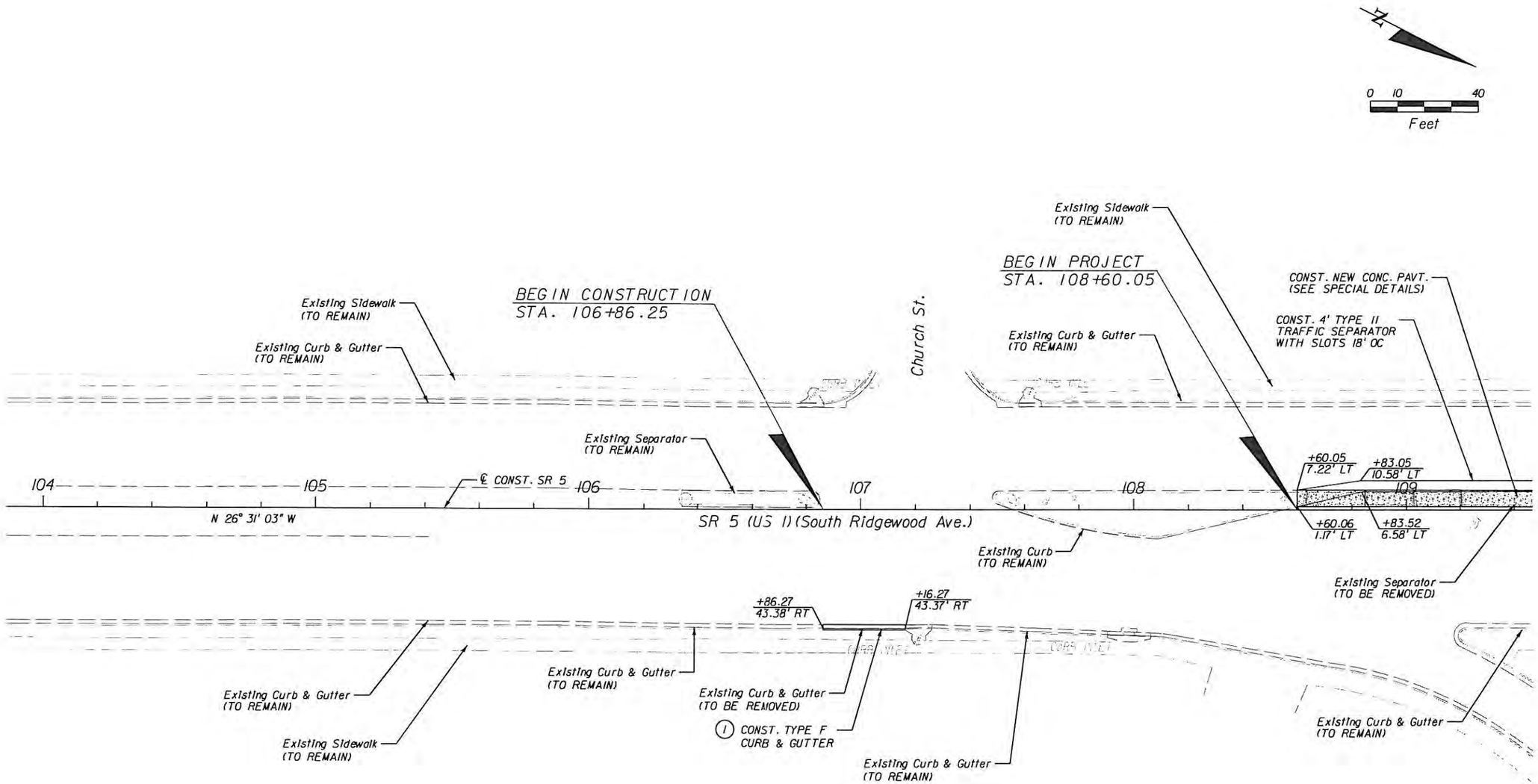
7-8	0	2	**2**
8-9	6	0	**6**
11-12	1	1	**2**
12-1	1	0	**1**
2-3	0	1	**1**
3-4	5	1	**6**
4-5	0	2	**2**
5-6	2	1	**3**
Total	**15**	**8**	**23**

SR 421 (Dunlawton Avenue)
WB ST NAME

7-8	1	0	**1**
8-9	2	1	**3**
11-12	0	3	**3**
12-1	0	0	**0**
2-3	0	0	**0**
3-4	1	0	**1**
4-5	0	1	**1**
5-6	1	0	**1**
Total	**5**	**5**	**10**

7-8	8-9	11-12	12-1	2-3	3-4	4-5	5-6	Total
0	1	0	1	0	3	0	0	**5**
2	1	0	1	0	1	0	1	**6**
2	**2**	**0**	**2**	**0**	**4**	**0**	**1**	**11**

SR 5 (US 1)
NB ST NAME



1 PRIOR TO CONSTRUCTING THE CURB AND GUTTER, THE CONTRACTOR SHALL FILL ANY VOID UNDER THE CONCRETE PAVEMENT WITH FLOWABLE FILL.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

moffatt & nichol

MOFFATT & NICHOL
1025 GREENWOOD BLVD, STE 371
LAKE MARY, FL 32746
(407) 562-2030
CERT. OF AUTH. NO. 4877

ENGINEER OF RECORD: JEFFREY A. MESSENGER, PE
FL REGISTRATION NO. 57539

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

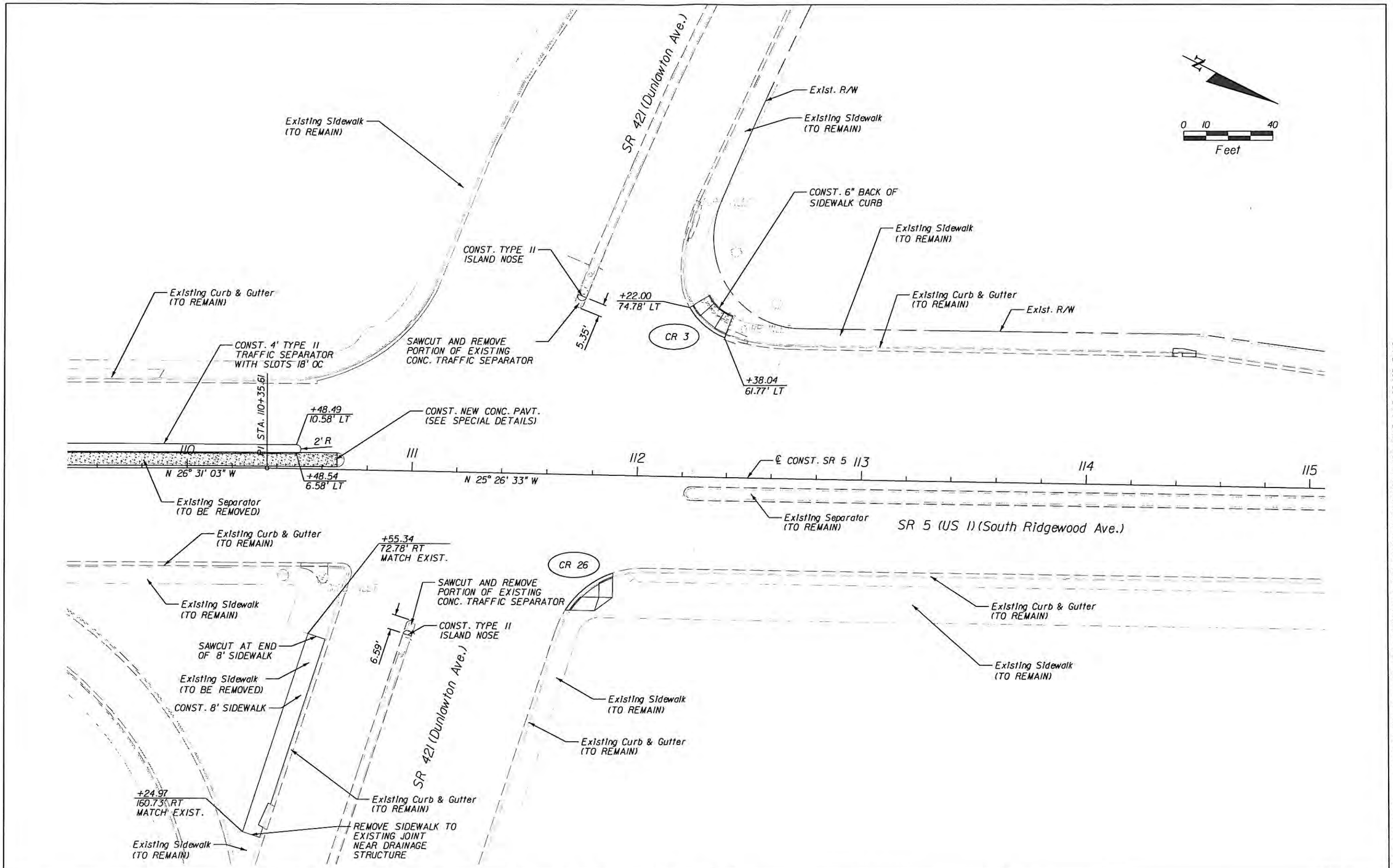
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
5	VOLUSIA	240992-2-52-01

PLAN SHEET

SHEET NO. 10

jlam 4/8/2011 1:52:07 PM P:\7287-US1-Dunlawton\240992252011\roadway\PLANRD01.DGN

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

moffatt & nichol

MOFFATT & NICHOL
1025 GREENWOOD BLVD, STE 371
LAKE MARY, FL 32746
(407) 562-2030
CERT. OF AUTH. NO. 4877

ENGINEER OF RECORD: JEFFREY A. MESSENGER, PE
FL REGISTRATION NO. 57539

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

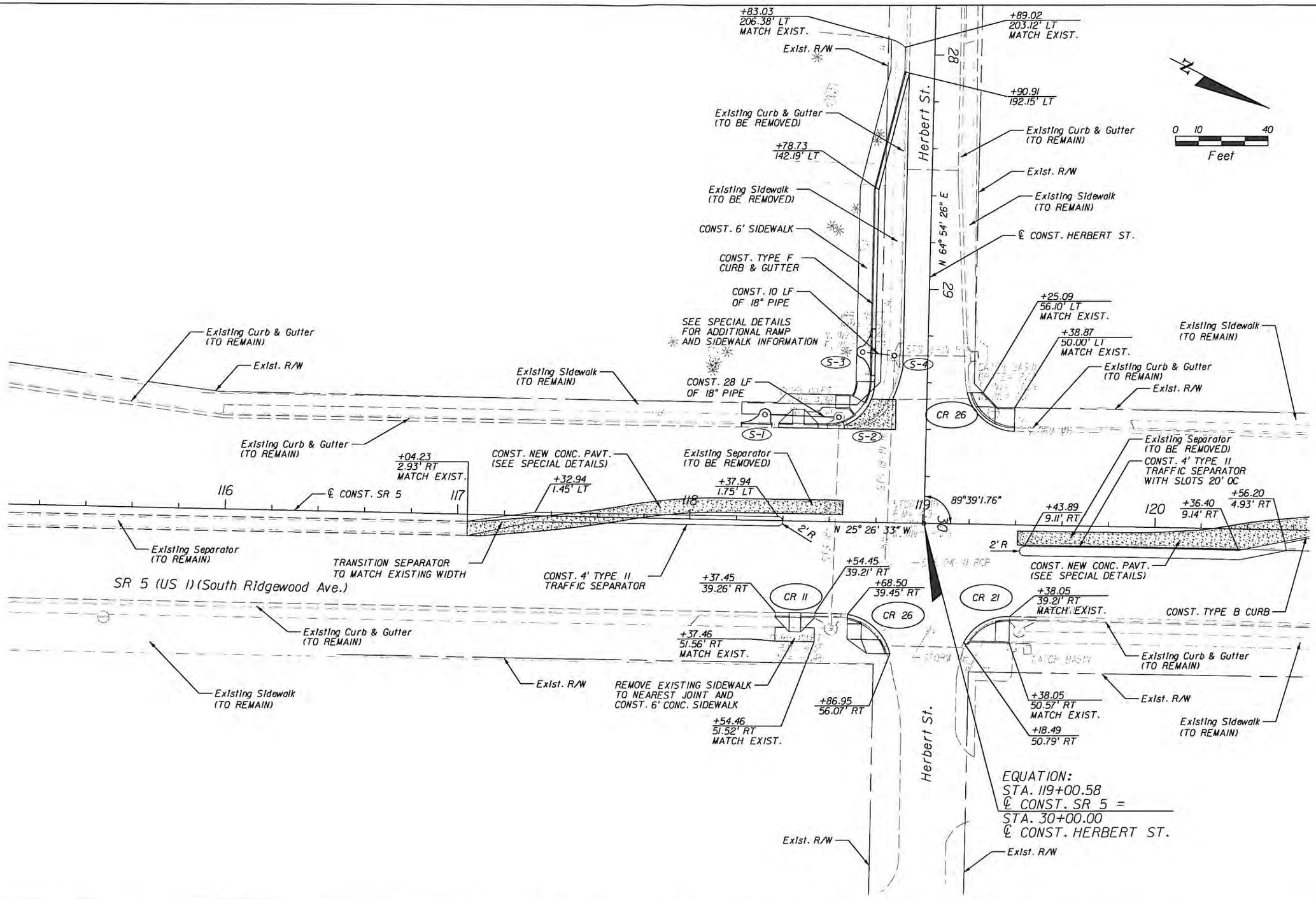
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
5	VOLUSIA	240992-2-52-01

PLAN SHEET

SHEET NO. 11

jtam 4/8/2011 1:52:08 PM P:\7287-US1-Dunlawton\240992520\roadway\PLANRD02.DGN

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

moffatt & nichol

MOFFATT & NICHOL
1025 GREENWOOD BLVD, STE 371
LAKE MARY, FL 32746
(407) 562-2030
CERT. OF AUTH. NO. 4877

ENGINEER OF RECORD: JEFFREY A. MESSENGER, PE
FL REGISTRATION NO. 57539

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

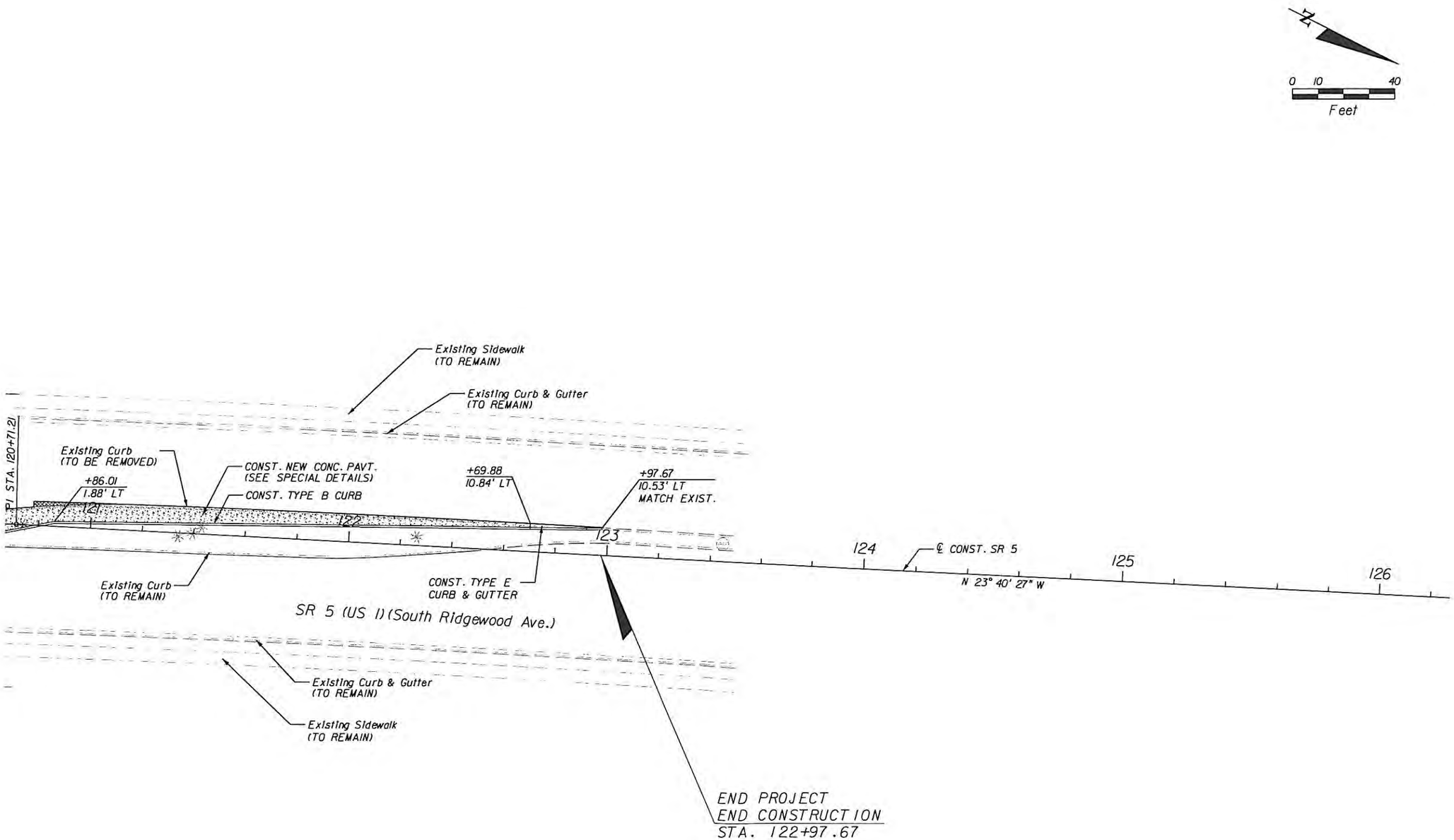
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
5	VOLUSIA	240992-2-52-01

PLAN SHEET

SHEET NO. 12

jtam 4/8/2011 1:52:09 PM P:\287-US1-Dunlawton\240992520\roadway\PLANRD03.DGN

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.



NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

moffatt & nichol

MOFFATT & NICHOL
1025 GREENWOOD BLVD, STE 371
LAKE MARY, FL 32746
(407) 562-2030
CERT. OF AUTH. NO. 4877

ENGINEER OF RECORD: JEFFREY A. WESSENGER, PE
FL REGISTRATION NO. 57539

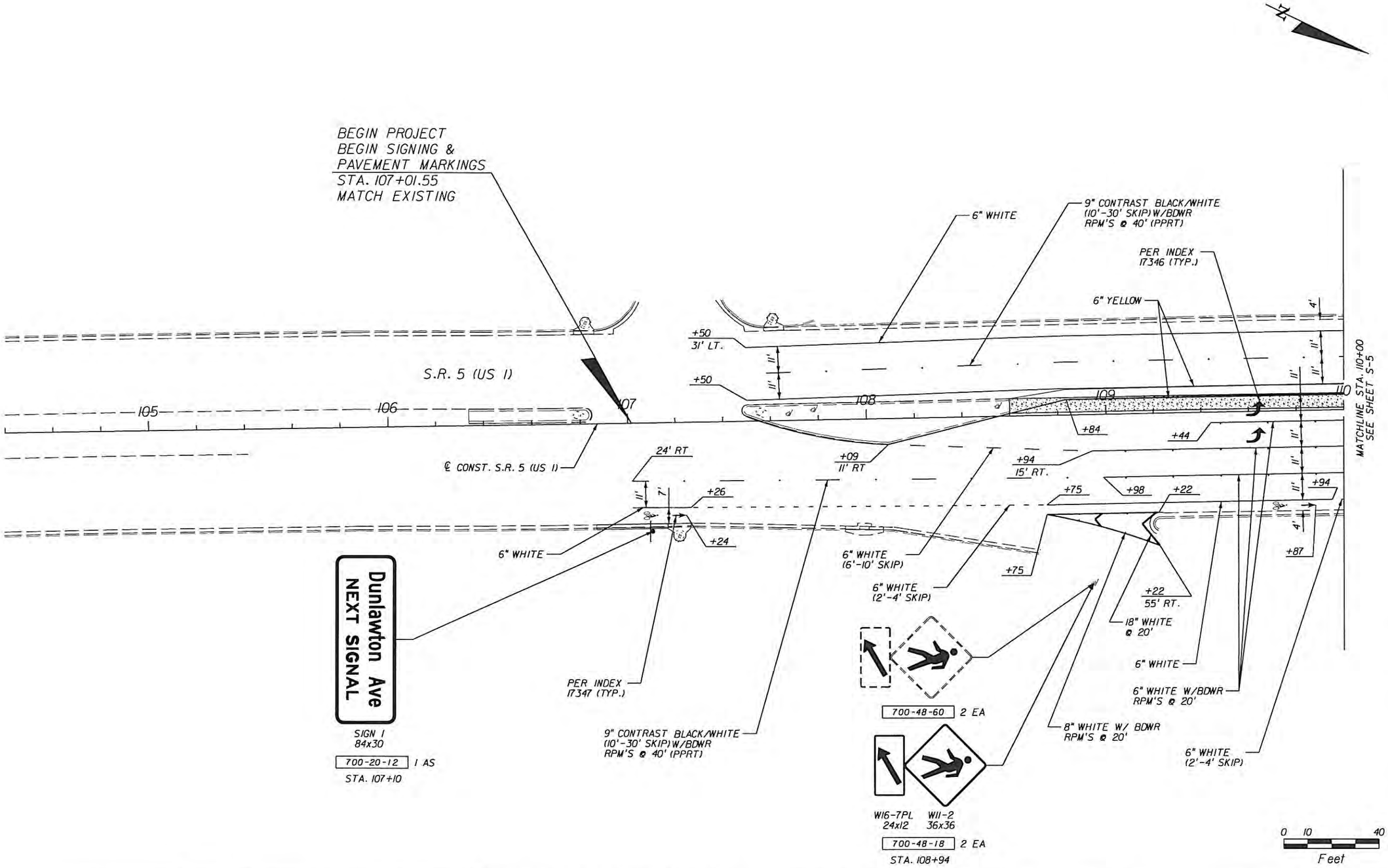
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
5	VOLUSIA	240992-2-52-01

PLAN SHEET

SHEET NO. 13

jtcm 4/8/2011 1:52:11 PM P:\7287 USI-Dunlawton\240992520\roadway\PLANRD04.DGN



NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

proltelan design group
CERTIFICATE OF AUTHORIZATION NUMBER 7865
100 EAST PINE STREET, SUITE 600
ORLANDO FLORIDA 32801
PHONE (407) 246-0044
SCOTT G. HORLANDER, P.E. No. 46624

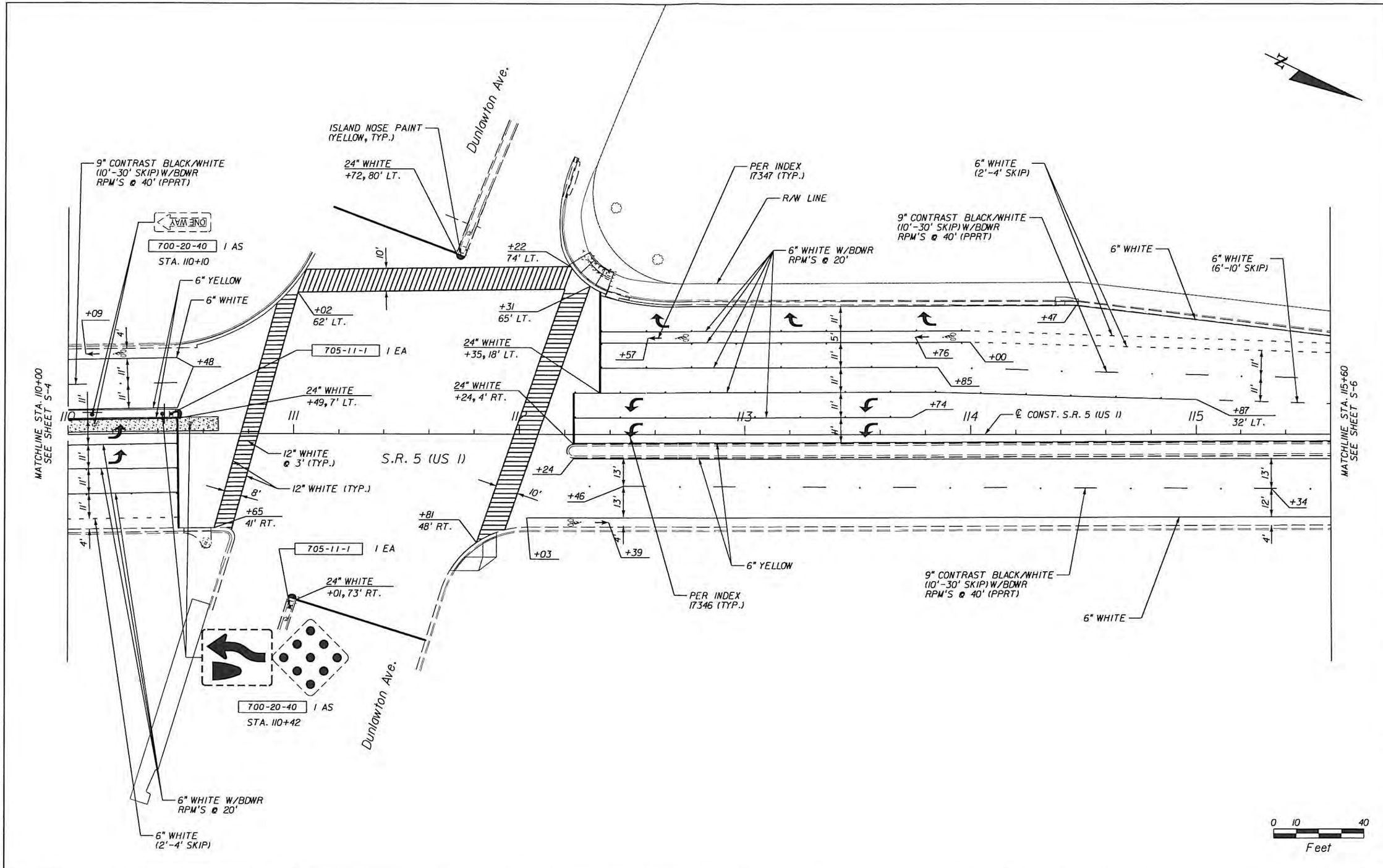
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
5	VOLUSIA	240992-2-52-01

SIGNING & MARKING PLAN

SHEET NO. S-4

jmessenger 4/12/2011 1:08:27 PM P:\7287-US1-Dunlawton\240992252G\signing\PLANSP01.DGN



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

proltelan design group
CERTIFICATE OF AUTHORIZATION NUMBER 7865
100 EAST PINE STREET, SUITE 600
ORLANDO FLORIDA 32801
PHONE (407) 246-0014
SCOTT G. HORLANDER, P.E. NO. 46624

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

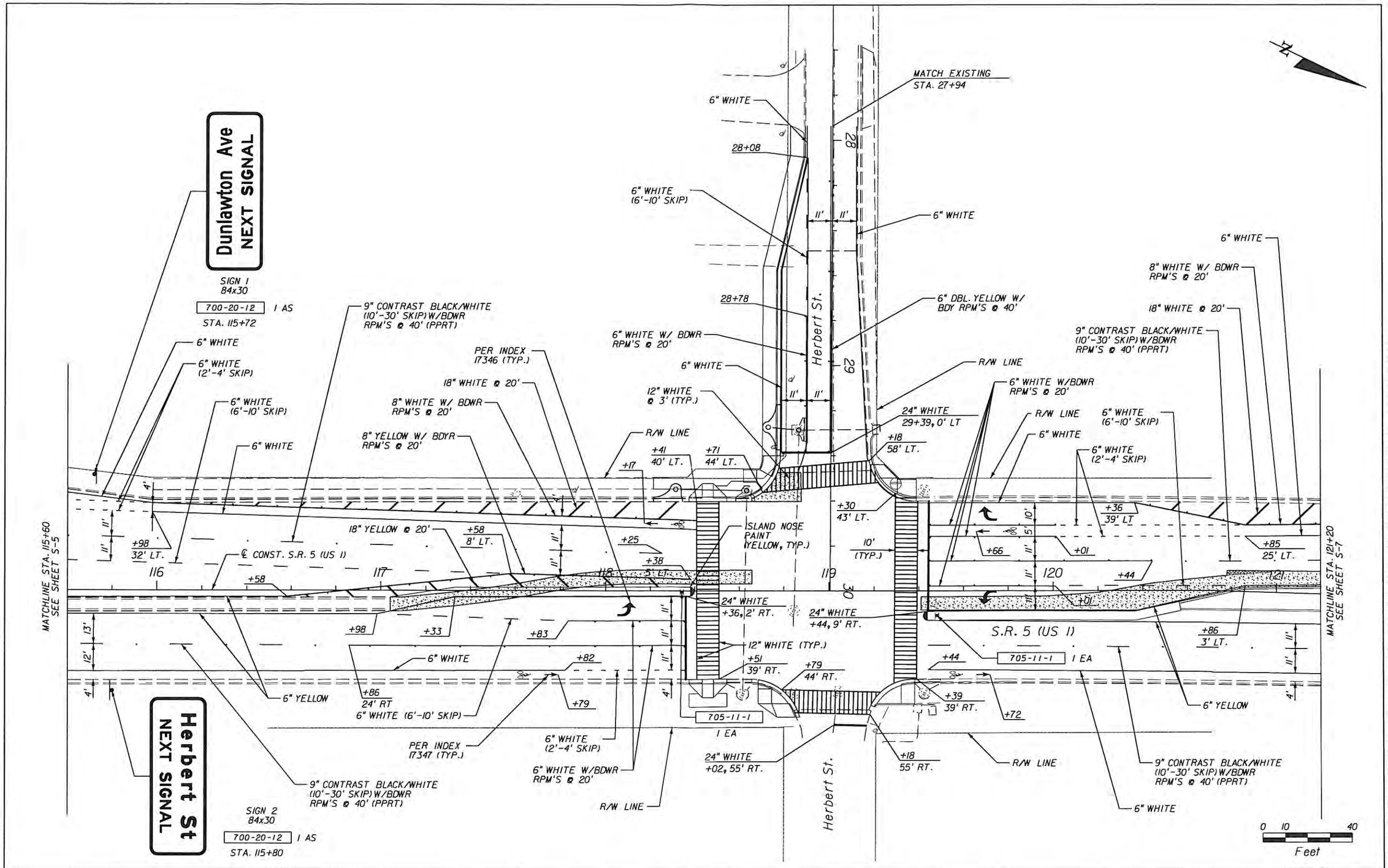
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
5	VOLUSIA	240992-2-52-01

SIGNING & MARKING PLAN

SHEET NO. S-5

jmessenger 4/12/2011 1:08:28 PM P:\7287-US1-Dunlawton\240992252011\signing\PLANSP02.DGN

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

proltelan design group
CERTIFICATE OF AUTHORIZATION NUMBER 7865
100 EAST PINE STREET, SUITE 600
ORLANDO FLORIDA 32801
PHONE (407) 246-0044
SCOTT G. HORLANDER, P.E. NO. 46624

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

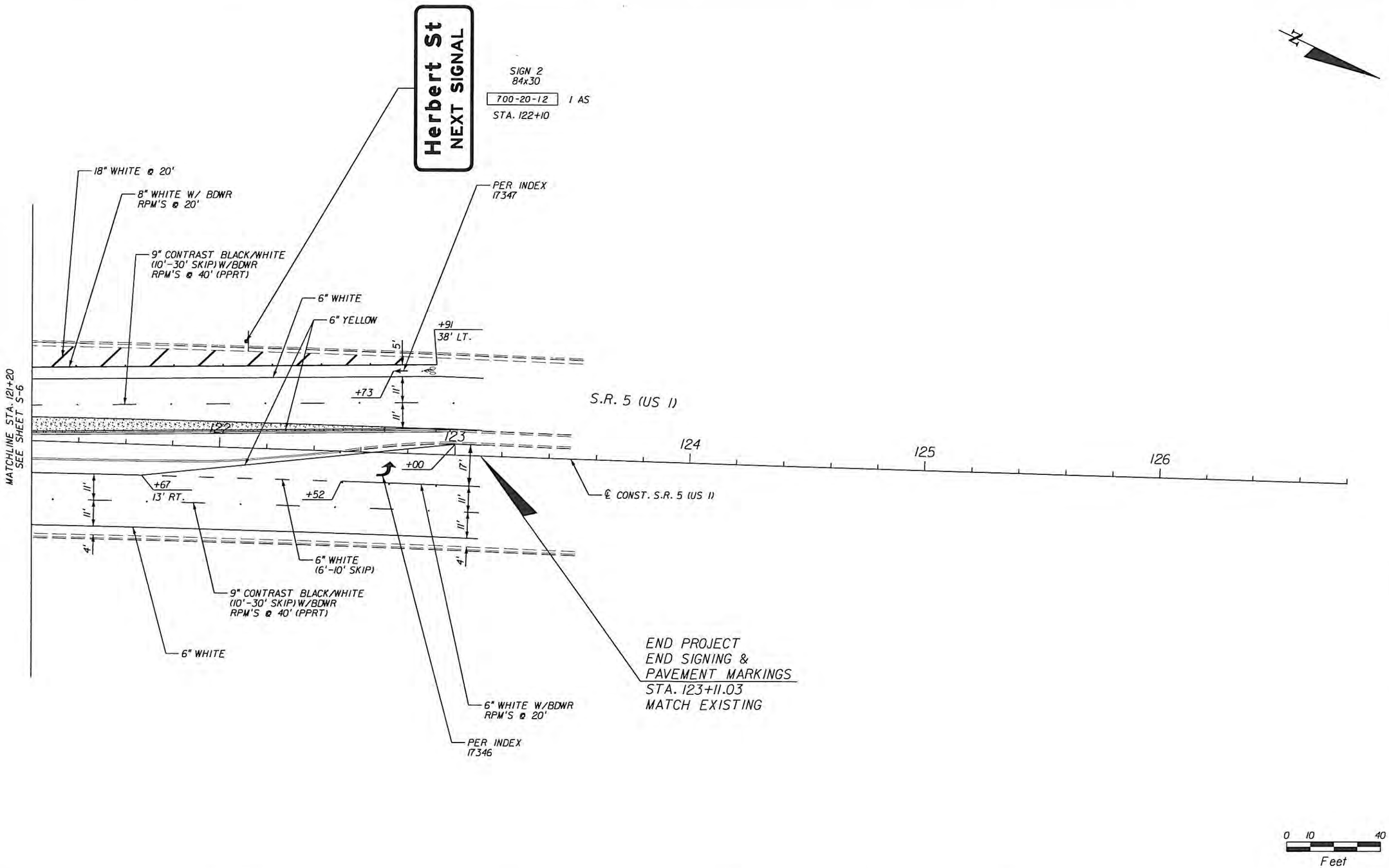
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
5	VOLUSIA	240992-2-52-01

SIGNING & MARKING PLAN

SHEET NO. S-6

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

Jmessenger 4/12/2011 1:08:30 PM P:\7287-US1-Dunlawton\240992252011\signing\PLANSP03.DGN



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

proltelan design group
CERTIFICATE OF AUTHORIZATION NUMBER 7865
100 EAST PINE STREET, SUITE 600
ORLANDO FLORIDA 32801
PHONE (407) 246-0044
SCOTT G. HORLANDER, P.E. NO. 46624

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
5	VOLUSIA	240992-2-52-01

SIGNING & MARKING PLAN

SHEET NO.
S-7

jmessenger 4/12/2011 1:08:31 PM P:\7287-US1-Dunlawton\240992252\01\signing\PLANSP04.DGN

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

CONTROLLER INTERVALS

Faller, Davis & Associates, Inc.

Updated 8/9/11

Intersection: US 1 at SR 421 (Dunlawton Avenue) **EOR:** DJP **Date:** 8/30/2011

Movement # (Controller Phase Ø)	1	2	3	4	5	6	7	8
Direction of Travel	SBL	NB	WBL	EB	NBL	SB	EBL	WB
Existing Timings								
Min Green	*5*	*12*	*5*	*5*	*5*	*12*	*5*	*5*
Extension	*3.0*	*4.0*	*3.0*	*3.0*	*3.0*	*4.0*	*3.0*	*3.0*
Yellow	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*	*4.0*
Red Clearance	*1.0*	*2.0*	*1.0*	*2.0*	*1.0*	*2.0*	*1.0*	*2.0*
Max I	*20.0*	*40.0*	*20.0*	*35.0*	*20.0*	*40.0*	*20.0*	*35.0*
Max II	*20.0*	*40.0*	*20.0*	*90.0*	*20.0*	*40.0*	*20.0*	*90.0*
Walk		*7*		*7*		*7*		*7*
Pedestrian Clearance		*35*		*35*		*35*		*35*
Calculated Timings								
Approach Speed (mph)[2]	40	40	35	35	40	40	35	35
% Grade of Approach (+ Uphill, - Downhill)	0%	0%	0%	0%	0%	0%	0%	0%
Exposure Dist. (ft)[3]	140	107	89	141	130	122	96	134
Crossing Dist. For Concurrent Ped Mvmnt (ft)[4]		95		115		121		122
Pedestrian Crossing Speed (ft/sec)[5]		3.5		3.5		3.5		3.5
Yellow[7]	4.0	4.0	3.6	3.6	4.0	4.0	3.6	3.6
Red Clearance[7]	2.7	2.2	2.1	3.1	2.6	2.4	2.3	3.0
Pedestrian Clearance[11]		28		33		35		35
Recommended Timings								
Min Green[6]	5	12	5	5	5	12	5	5
Extension[6]	3	4	3	3	3	4	3	3
Yellow	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance	2.7	2.2	2.1	3.1	2.6	2.4	2.3	3.0
Max I[8]	20	40	20	35	20	40	20	35
Max II[9]	20	40	20	90	20	40	20	90
Walk[10]		7		7		7		7
Pedestrian Clearance		35.0		35.0		35.0		35.0
Minimum Split without Peds	12	19	12	13	12	19	12	12
Maximum Split without Peds	27	47	27	43	27	47	27	42

Notes

1 *Data to be entered in cells with black font and no fill color.*

2 *The 85th percentile or posted speed limit of the approach. If no speed limit is posted and the 85th percentile speed is not available, then 25 mph should be used. Used for calculation of the Yellow Change Interval and the Red Clearance Interval.*

3 *Through path or turning movement path from stop bar to last point of conflict including bicycle lanes and pedestrian crosswalks. The last point of conflict may be defined by District preference (i.e. D5 is last conflicting through lane & D1 is beyond furthest conflicting crosswalk). Exposure distances shall be measured for all left turn phases.*

4 *Curb to curb.*

5 *Use 3.5 fps. Use 3.0 fps for school crossings, locations where there is a significant elderly population, or where there are disabled pedestrians.*

6 *Use existing values and field adjust as necessary. Update values as needed for local preferences, dilemma zone protection, if newly signalized, or if loop placement changed.*

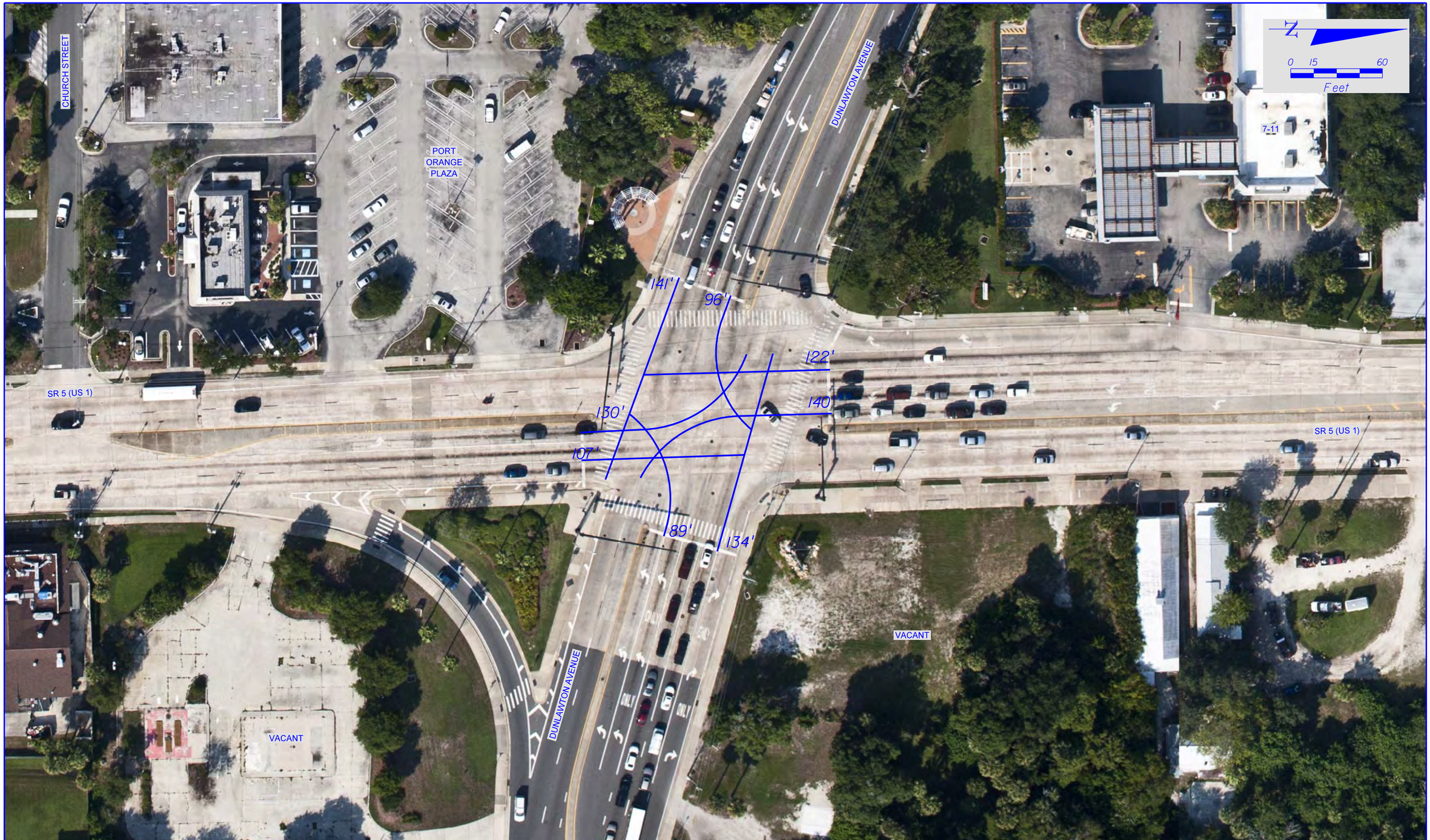
7 *Calculation based on 2009 MUTCD and 2011 TEM requirements. If calculated value lower than existing value, do not reduce without compelling reason. Yellow minimum 3.0 seconds. Yellow maximum 6.0 seconds. Red Clearance interval minimum 1.0 second and maximum 6.0 seconds. Maximums may be increased based on engineering judgment. When through and turning movements always terminate together (i.e. permissive left turn movement), the Red Clearance interval for the through movement shall be used. In the case of a split phased intersection or T-intersection, the longer of the left turn or through exposure distance should be used for the Red Clearance interval calculation.*

8 *Use existing values and field adjust as necessary. Update values as needed for local preferences.*

9 *Use existing values and field adjust as necessary. Update values as needed for local preferences. Calculate if Inhibit Max Termination is not used.*

10 *Use existing values and update values as needed for local preferences or to meet minimum requirements. 2009 MUTCD typical value 7.0 seconds, but may be reduced to 4.0 seconds. May be increased for school crossings, locations where there is a significant elderly population, or where there are disabled pedestrians.*

11 *Pedestrian Clearance must end at the start of the Yellow interval for the concurrent vehicle movement.*



CONTROLLER CABINET	DELINEATOR	DITCH BOTTOM INLET	GUARDRAIL
TRAFFIC SIGNAL POLE	POWER POLE	MANHOLE	FENCE
SIGNAL HEAD	LIGHT POLE	MITERED END SECTION	TREE/SHRUB
SIGN	HYDRANT	DRAINAGE INLET	BUILDING

Faller, Davis & Associates, Inc.

EXPOSURE DISTANCE DIAGRAM

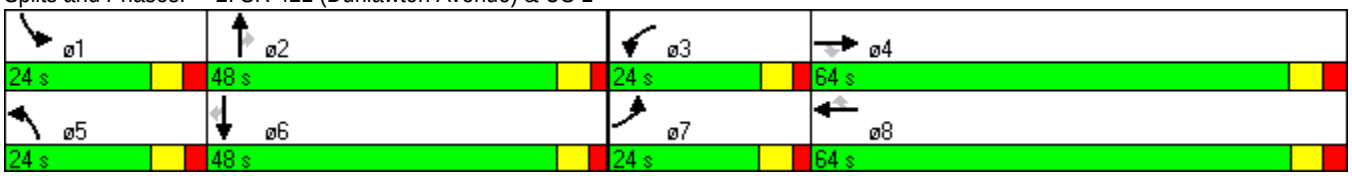
kcarey 12/19/2011 3:34:24 PM Z:\390.00 D5 Continuing Services for Traffic Operations\390.44 US 1 Intersection Analysis Studies\3. US 1 at Dunlawton Ave & Herbert St\DGN\Exposure Dist - Dunlawto

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	434	583	97	196	558	296	97	792	237	283	395	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	12	12	13	12	12	13
Storage Length (ft)	165		65	175		225	200		145	225		215
Storage Lanes	2		1	2		1	1		1	2		1
Taper Length (ft)	265		100	100		100	50		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3433	3539	1636
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3433	3539	1636
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			40			257			118			184
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	434	583	97	196	558	296	97	792	237	283	395	184
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	24.0	64.0	64.0	24.0	64.0	64.0	24.0	48.0	48.0	24.0	48.0	48.0
Total Split (%)	15.0%	40.0%	40.0%	15.0%	40.0%	40.0%	15.0%	30.0%	30.0%	15.0%	30.0%	30.0%
Maximum Green (s)	17.7	56.9	56.9	17.9	57.0	57.0	17.4	41.8	41.8	17.3	41.6	41.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	17.7	36.8	36.8	14.6	33.6	33.6	13.7	66.0	66.0	16.5	68.8	68.8
Actuated g/C Ratio	0.11	0.23	0.23	0.09	0.21	0.21	0.09	0.41	0.41	0.10	0.43	0.43
v/c Ratio	1.18	0.74	0.25	0.65	0.75	0.54	0.64	0.54	0.32	0.80	0.26	0.23
Control Delay	164.9	63.2	30.4	80.2	65.6	12.7	89.4	38.4	17.9	87.1	27.0	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	164.9	63.2	30.4	80.2	65.6	12.7	89.4	38.4	17.9	87.1	27.0	3.9
LOS	F	E	C	F	E	B	F	D	B	F	C	A
Approach Delay		99.9			53.4			38.5			41.8	
Approach LOS		F			D			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.18	
Intersection Signal Delay: 59.4	Intersection LOS: E
Intersection Capacity Utilization 79.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

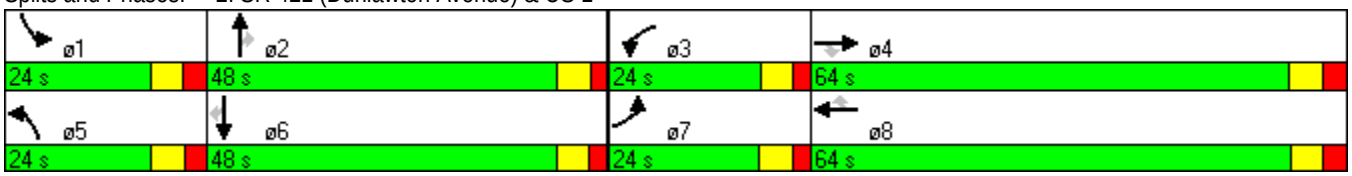


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	434	583	97	196	558	296	97	792	237	283	395	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	11	11	13	11	11	11
Storage Length (ft)	165		65	175		225	165		145	225		215
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	265		100	100		100	75		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	3319	3421	1636	3319	3421	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	3319	3421	1636	3319	3421	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			40			257			118			184
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	434	583	97	196	558	296	97	792	237	283	395	184
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	24.0	64.0	64.0	24.0	64.0	64.0	24.0	48.0	48.0	24.0	48.0	48.0
Total Split (%)	15.0%	40.0%	40.0%	15.0%	40.0%	40.0%	15.0%	30.0%	30.0%	15.0%	30.0%	30.0%
Maximum Green (s)	17.7	56.9	56.9	17.9	57.0	57.0	17.4	41.8	41.8	17.3	41.6	41.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	17.7	36.8	36.8	14.6	33.6	33.6	10.0	65.8	65.8	16.7	72.4	72.4
Actuated g/C Ratio	0.11	0.23	0.23	0.09	0.21	0.21	0.06	0.41	0.41	0.10	0.45	0.45
v/c Ratio	1.18	0.74	0.25	0.65	0.75	0.54	0.47	0.56	0.32	0.82	0.26	0.23
Control Delay	164.9	63.2	30.4	80.2	65.6	12.7	79.3	39.1	18.0	82.5	24.4	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	164.9	63.2	30.4	80.2	65.6	12.7	79.3	39.1	18.0	82.5	24.4	4.0
LOS	F	E	C	F	E	B	E	D	B	F	C	A
Approach Delay		99.9			53.4			38.1			39.1	
Approach LOS		F			D			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.18	
Intersection Signal Delay: 58.8	Intersection LOS: E
Intersection Capacity Utilization 79.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

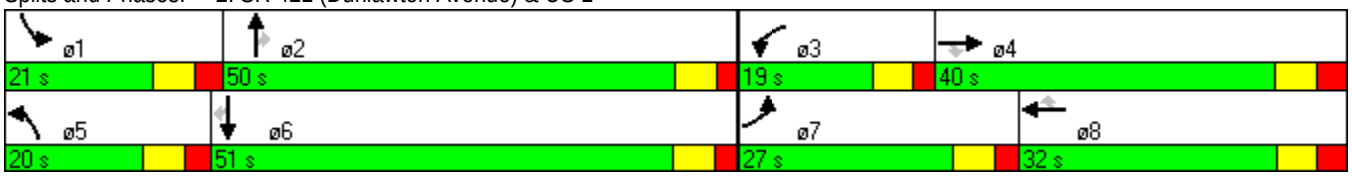


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	434	583	97	196	558	296	97	792	237	283	395	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	11	11	13	11	11	11
Storage Length (ft)	165		65	175		225	165		145	225		215
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	265		100	100		100	75		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	3319	3421	1636	3319	3421	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	3319	3421	1636	3319	3421	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			42			238			161			184
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	434	583	97	196	558	296	97	792	237	283	395	184
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	27.0	40.0	40.0	19.0	32.0	32.0	20.0	50.0	50.0	21.0	51.0	51.0
Total Split (%)	20.8%	30.8%	30.8%	14.6%	24.6%	24.6%	15.4%	38.5%	38.5%	16.2%	39.2%	39.2%
Maximum Green (s)	20.7	32.9	32.9	12.9	25.0	25.0	13.4	43.8	43.8	14.3	44.6	44.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	19.9	32.3	32.3	11.9	24.2	24.2	9.2	45.8	45.8	13.9	50.4	50.4
Actuated g/C Ratio	0.15	0.25	0.25	0.09	0.19	0.19	0.07	0.35	0.35	0.11	0.39	0.39
v/c Ratio	0.85	0.69	0.24	0.64	0.85	0.59	0.41	0.66	0.35	0.80	0.30	0.26
Control Delay	70.2	48.9	24.0	67.1	63.9	16.1	62.8	39.2	12.2	93.0	23.2	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.2	48.9	24.0	67.1	63.9	16.1	62.8	39.2	12.2	93.0	23.2	2.3
LOS	E	D	C	E	E	B	E	D	B	F	C	A
Approach Delay		55.0			51.0			35.6			41.7	
Approach LOS		E			D			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 46.0	Intersection LOS: D
Intersection Capacity Utilization 79.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

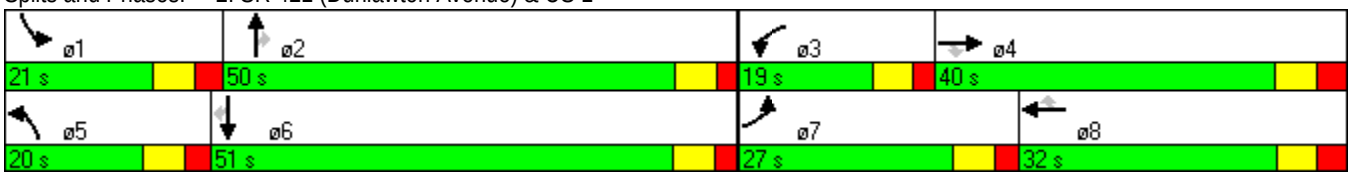


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	434	583	97	196	558	296	92	797	237	283	395	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	11	11	13	11	11	11
Storage Length (ft)	165		65	175		225	165		145	225		215
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	265		100	100		100	75		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	3319	3421	1636	3319	3421	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	3319	3421	1636	3319	3421	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			42			237			161			184
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	434	583	97	196	558	296	92	797	237	283	395	184
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	27.0	40.0	40.0	19.0	32.0	32.0	20.0	50.0	50.0	21.0	51.0	51.0
Total Split (%)	20.8%	30.8%	30.8%	14.6%	24.6%	24.6%	15.4%	38.5%	38.5%	16.2%	39.2%	39.2%
Maximum Green (s)	20.7	32.9	32.9	12.9	25.0	25.0	13.4	43.8	43.8	14.3	44.6	44.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	19.9	32.3	32.3	11.9	24.2	24.2	9.0	45.8	45.8	13.9	50.6	50.6
Actuated g/C Ratio	0.15	0.25	0.25	0.09	0.19	0.19	0.07	0.35	0.35	0.11	0.39	0.39
v/c Ratio	0.85	0.69	0.24	0.64	0.85	0.59	0.40	0.66	0.35	0.80	0.30	0.26
Control Delay	70.2	48.9	24.0	67.1	63.9	16.3	62.6	39.4	12.2	93.0	23.1	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.2	48.9	24.0	67.1	63.9	16.3	62.6	39.4	12.2	93.0	23.1	2.3
LOS	E	D	C	E	E	B	E	D	B	F	C	A
Approach Delay		55.0			51.1			35.5			41.6	
Approach LOS		E			D			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 46.0	Intersection LOS: D
Intersection Capacity Utilization 79.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

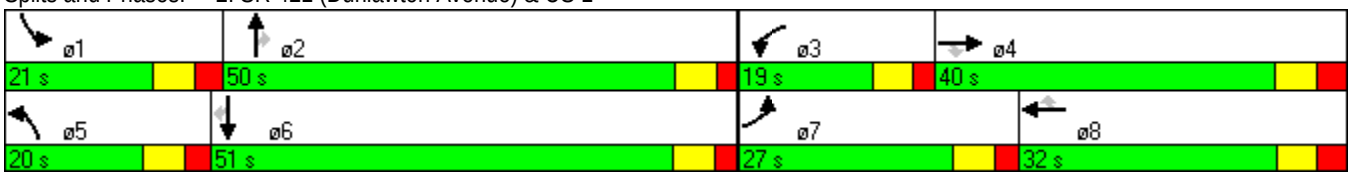


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	434	583	97	196	558	296	97	792	237	283	395	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	12	12	13	11	11	12
Storage Length (ft)	165		65	175		225	200		145	225		215
Storage Lanes	2		1	2		1	1		1	2		1
Taper Length (ft)	265		100	100		100	50		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3319	3421	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3319	3421	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			42			238			161			184
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	434	583	97	196	558	296	97	792	237	283	395	184
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	27.0	40.0	40.0	19.0	32.0	32.0	20.0	50.0	50.0	21.0	51.0	51.0
Total Split (%)	20.8%	30.8%	30.8%	14.6%	24.6%	24.6%	15.4%	38.5%	38.5%	16.2%	39.2%	39.2%
Maximum Green (s)	20.7	32.9	32.9	12.9	25.0	25.0	13.4	43.8	43.8	14.3	44.6	44.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	19.9	32.3	32.3	11.9	24.2	24.2	11.5	45.8	45.8	13.9	48.1	48.1
Actuated g/C Ratio	0.15	0.25	0.25	0.09	0.19	0.19	0.09	0.35	0.35	0.11	0.37	0.37
v/c Ratio	0.85	0.69	0.24	0.64	0.85	0.59	0.62	0.64	0.35	0.80	0.31	0.26
Control Delay	70.2	48.9	24.0	67.1	63.9	16.1	74.1	38.5	12.2	92.5	25.1	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.2	48.9	24.0	67.1	63.9	16.1	74.1	38.5	12.2	92.5	25.1	2.6
LOS	E	D	C	E	E	B	E	D	B	F	C	A
Approach Delay		55.0			51.0			36.0			42.4	
Approach LOS		E			D			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 46.2	Intersection LOS: D
Intersection Capacity Utilization 79.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

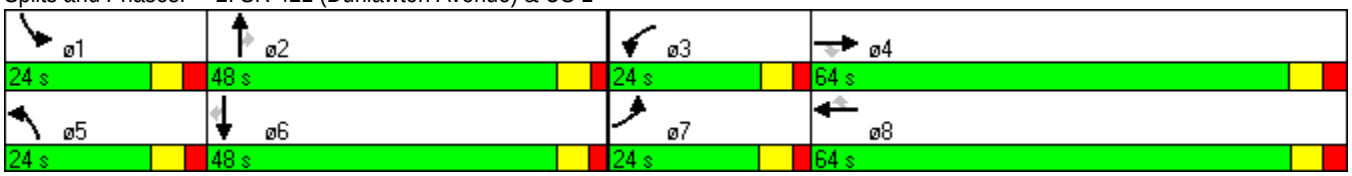


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	525	705	117	237	675	358	117	958	287	342	478	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	12	12	13	12	12	13
Storage Length (ft)	165		65	175		225	200		145	225		215
Storage Lanes	2		1	2		1	1		1	2		1
Taper Length (ft)	265		100	100		100	50		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3433	3539	1636
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3433	3539	1636
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			40			250			118			223
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	525	705	117	237	675	358	117	958	287	342	478	223
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	24.0	64.0	64.0	24.0	64.0	64.0	24.0	48.0	48.0	24.0	48.0	48.0
Total Split (%)	15.0%	40.0%	40.0%	15.0%	40.0%	40.0%	15.0%	30.0%	30.0%	15.0%	30.0%	30.0%
Maximum Green (s)	17.7	56.9	56.9	17.9	57.0	57.0	17.4	41.8	41.8	17.3	41.6	41.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	17.7	41.9	41.9	15.9	40.1	40.1	14.8	58.7	58.7	17.3	61.1	61.1
Actuated g/C Ratio	0.11	0.26	0.26	0.10	0.25	0.25	0.09	0.37	0.37	0.11	0.38	0.38
v/c Ratio	1.43	0.79	0.27	0.72	0.76	0.60	0.71	0.74	0.43	0.92	0.35	0.29
Control Delay	256.2	61.5	31.0	82.4	61.1	18.8	93.7	49.1	25.1	96.5	32.6	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	256.2	61.5	31.0	82.4	61.1	18.8	93.7	49.1	25.1	96.5	32.6	5.0
LOS	F	E	C	F	E	B	F	D	C	F	C	A
Approach Delay		134.7			53.1			47.8			47.6	
Approach LOS		F			D			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.43	
Intersection Signal Delay: 72.4	Intersection LOS: E
Intersection Capacity Utilization 91.7%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

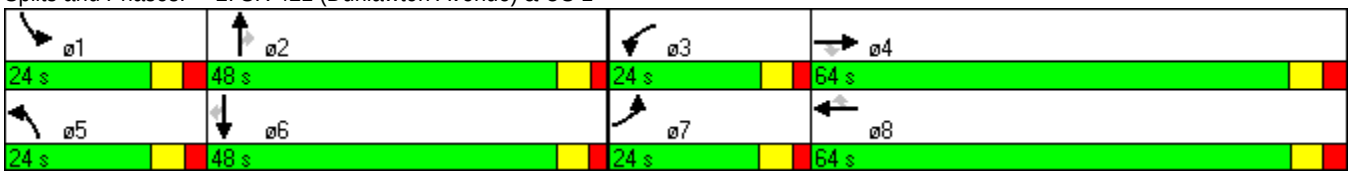


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	525	705	117	237	675	358	117	958	287	342	478	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	11	11	13	11	11	11
Storage Length (ft)	165		65	175		225	165		145	225		215
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	265		100	100		100	75		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	3319	3421	1636	3319	3421	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	3319	3421	1636	3319	3421	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			40			250			118			223
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Lane Group Flow (vph)	525	705	117	237	675	358	117	958	287	342	478	223
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	24.0	64.0	64.0	24.0	64.0	64.0	24.0	48.0	48.0	24.0	48.0	48.0
Total Split (%)	15.0%	40.0%	40.0%	15.0%	40.0%	40.0%	15.0%	30.0%	30.0%	15.0%	30.0%	30.0%
Maximum Green (s)	17.7	56.9	56.9	17.9	57.0	57.0	17.4	41.8	41.8	17.3	41.6	41.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	17.7	41.9	41.9	15.9	40.1	40.1	11.0	58.7	58.7	17.3	64.9	64.9
Actuated g/C Ratio	0.11	0.26	0.26	0.10	0.25	0.25	0.07	0.37	0.37	0.11	0.41	0.41
v/c Ratio	1.43	0.79	0.27	0.72	0.76	0.60	0.51	0.76	0.43	0.95	0.34	0.30
Control Delay	256.2	61.5	31.0	82.4	61.1	18.8	79.5	50.2	25.1	100.1	29.6	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	256.2	61.5	31.0	82.4	61.1	18.8	79.5	50.2	25.1	100.1	29.6	5.2
LOS	F	E	C	F	E	B	E	D	C	F	C	A
Approach Delay		134.7			53.1			47.4			47.5	
Approach LOS		F			D			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.43	
Intersection Signal Delay: 72.3	Intersection LOS: E
Intersection Capacity Utilization 91.7%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

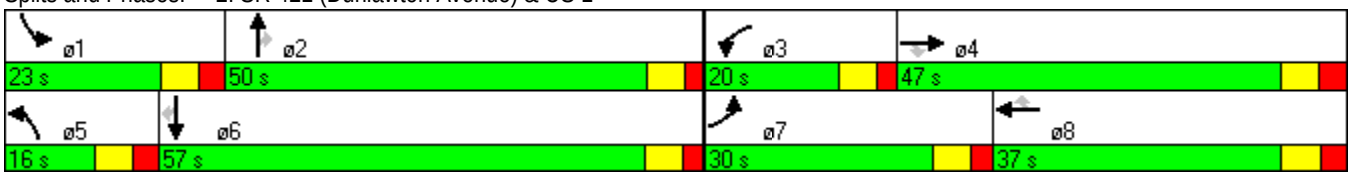


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	525	705	117	237	675	358	117	958	287	342	478	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	11	11	13	11	11	11
Storage Length (ft)	165		65	175		225	165		145	225		215
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	265		100	100		100	75		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	3319	3421	1636	3319	3421	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	3319	3421	1636	3319	3421	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			41			163			145			223
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	525	705	117	237	675	358	117	958	287	342	478	223
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	30.0	47.0	47.0	20.0	37.0	37.0	16.0	50.0	50.0	23.0	57.0	57.0
Total Split (%)	21.4%	33.6%	33.6%	14.3%	26.4%	26.4%	11.4%	35.7%	35.7%	16.4%	40.7%	40.7%
Maximum Green (s)	23.7	39.9	39.9	13.9	30.0	30.0	9.4	43.8	43.8	16.3	50.6	50.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	23.6	39.9	39.9	13.3	29.6	29.6	8.9	44.5	44.5	16.2	51.6	51.6
Actuated g/C Ratio	0.17	0.28	0.28	0.10	0.21	0.21	0.06	0.32	0.32	0.12	0.37	0.37
v/c Ratio	0.94	0.72	0.25	0.75	0.90	0.76	0.55	0.88	0.46	0.89	0.38	0.32
Control Delay	82.9	50.1	26.3	77.0	70.2	38.7	73.7	56.1	21.1	102.5	27.4	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.9	50.1	26.3	77.0	70.2	38.7	73.7	56.1	21.1	102.5	27.4	2.6
LOS	F	D	C	E	E	D	E	E	C	F	C	A
Approach Delay		60.8			62.6			50.2			46.7	
Approach LOS		E			E			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 55.5	Intersection LOS: E
Intersection Capacity Utilization 91.7%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

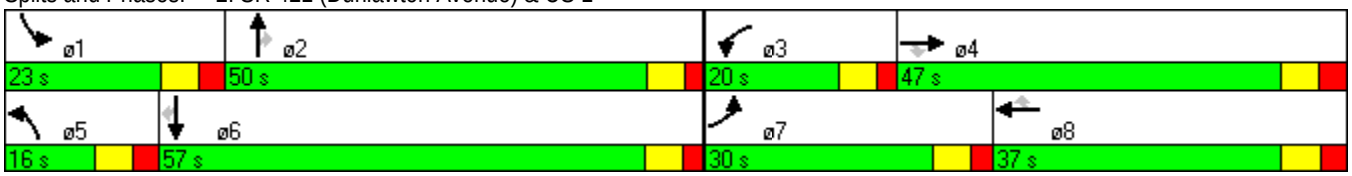


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	525	705	117	237	675	358	111	964	287	342	478	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	11	11	13	11	11	11
Storage Length (ft)	165		65	175		225	165		145	225		215
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	265		100	100		100	75		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	3319	3421	1636	3319	3421	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	3319	3421	1636	3319	3421	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			41			163			144			223
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	525	705	117	237	675	358	111	964	287	342	478	223
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	30.0	47.0	47.0	20.0	37.0	37.0	16.0	50.0	50.0	23.0	57.0	57.0
Total Split (%)	21.4%	33.6%	33.6%	14.3%	26.4%	26.4%	11.4%	35.7%	35.7%	16.4%	40.7%	40.7%
Maximum Green (s)	23.7	39.9	39.9	13.9	30.0	30.0	9.4	43.8	43.8	16.3	50.6	50.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	23.6	39.9	39.9	13.3	29.6	29.6	8.9	44.5	44.5	16.2	51.7	51.7
Actuated g/C Ratio	0.17	0.28	0.28	0.10	0.21	0.21	0.06	0.32	0.32	0.12	0.37	0.37
v/c Ratio	0.94	0.72	0.25	0.75	0.90	0.76	0.53	0.89	0.46	0.89	0.38	0.32
Control Delay	82.9	50.1	26.3	77.0	70.2	38.7	72.8	56.6	21.2	102.7	27.3	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.9	50.1	26.3	77.0	70.2	38.7	72.8	56.6	21.2	102.7	27.3	2.6
LOS	F	D	C	E	E	D	E	E	C	F	C	A
Approach Delay		60.8			62.6			50.5			46.7	
Approach LOS		E			E			D			D	

Intersection Summary

Area Type:	Other	
Cycle Length: 140		
Actuated Cycle Length: 140		
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow		
Natural Cycle: 90		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.94		
Intersection Signal Delay: 55.5		Intersection LOS: E
Intersection Capacity Utilization 91.9%		ICU Level of Service F
Analysis Period (min) 15		

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

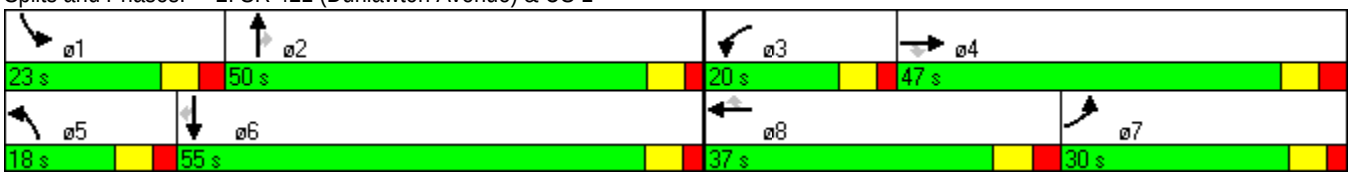


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	525	705	117	237	675	358	117	958	287	342	478	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	12	12	13	11	11	12
Storage Length (ft)	165		65	175		225	200		145	225		215
Storage Lanes	2		1	2		1	1		1	2		1
Taper Length (ft)	265		100	100		100	50		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3319	3421	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3319	3421	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			41			174			145			223
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	525	705	117	237	675	358	117	958	287	342	478	223
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	30.0	47.0	47.0	20.0	37.0	37.0	18.0	50.0	50.0	23.0	55.0	55.0
Total Split (%)	21.4%	33.6%	33.6%	14.3%	26.4%	26.4%	12.9%	35.7%	35.7%	16.4%	39.3%	39.3%
Maximum Green (s)	23.7	39.9	39.9	13.9	30.0	30.0	11.4	43.8	43.8	16.3	48.6	48.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	23.6	39.9	39.9	13.3	29.6	29.6	11.2	44.5	44.5	16.2	49.4	49.4
Actuated g/C Ratio	0.17	0.28	0.28	0.10	0.21	0.21	0.08	0.32	0.32	0.12	0.35	0.35
v/c Ratio	0.94	0.72	0.25	0.75	0.90	0.74	0.83	0.85	0.46	0.89	0.40	0.32
Control Delay	82.9	50.1	26.3	77.0	70.2	36.2	103.6	53.4	21.1	102.4	29.1	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.9	50.1	26.3	77.0	70.2	36.2	103.6	53.4	21.1	102.4	29.1	2.7
LOS	F	D	C	E	E	D	F	D	C	F	C	A
Approach Delay		60.8			61.9			50.9			47.5	
Approach LOS		E			E			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 55.6	Intersection LOS: E
Intersection Capacity Utilization 91.7%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

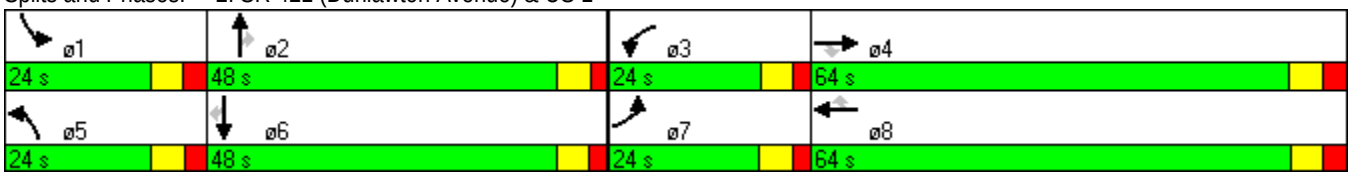


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	233	643	70	222	576	231	174	512	234	295	679	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	12	12	13	12	12	13
Storage Length (ft)	165		65	175		225	200		145	225		215
Storage Lanes	2		1	2		1	1		1	2		1
Taper Length (ft)	265		100	100		100	50		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3433	3539	1636
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3433	3539	1636
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			26			231			180			311
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	233	643	70	222	576	231	174	512	234	295	679	380
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	24.0	64.0	64.0	24.0	64.0	64.0	24.0	48.0	48.0	24.0	48.0	48.0
Total Split (%)	15.0%	40.0%	40.0%	15.0%	40.0%	40.0%	15.0%	30.0%	30.0%	15.0%	30.0%	30.0%
Maximum Green (s)	17.7	56.9	56.9	17.9	57.0	57.0	17.4	41.8	41.8	17.3	41.6	41.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	15.7	37.4	37.4	15.5	37.1	37.1	17.2	64.2	64.2	16.7	63.6	63.6
Actuated g/C Ratio	0.10	0.23	0.23	0.10	0.23	0.23	0.11	0.40	0.40	0.10	0.40	0.40
v/c Ratio	0.71	0.80	0.19	0.69	0.70	0.41	0.92	0.36	0.31	0.82	0.48	0.45
Control Delay	82.3	65.7	30.9	81.2	60.8	7.3	115.5	36.0	10.5	101.1	30.7	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.3	65.7	30.9	81.2	60.8	7.3	115.5	36.0	10.5	101.1	30.7	5.7
LOS	F	E	C	F	E	A	F	D	B	F	C	A
Approach Delay		67.2			53.2			44.5			39.0	
Approach LOS		E			D			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 49.9	Intersection LOS: D
Intersection Capacity Utilization 74.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

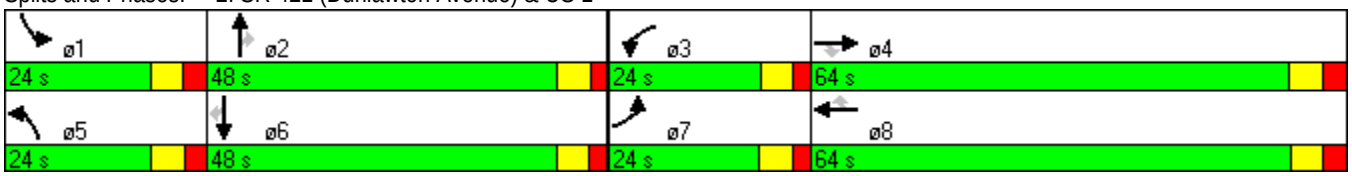


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	233	643	70	222	576	231	174	512	234	295	679	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	11	11	11	11	11	11
Storage Length (ft)	165		65	175		225	165		145	225		215
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	265		100	100		100	75		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	3319	3421	1531	3319	3421	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	3319	3421	1531	3319	3421	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			26			231			180			311
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	233	643	70	222	576	231	174	512	234	295	679	380
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	24.0	64.0	64.0	24.0	64.0	64.0	24.0	48.0	48.0	24.0	48.0	48.0
Total Split (%)	15.0%	40.0%	40.0%	15.0%	40.0%	40.0%	15.0%	30.0%	30.0%	15.0%	30.0%	30.0%
Maximum Green (s)	17.7	56.9	56.9	17.9	57.0	57.0	17.4	41.8	41.8	17.3	41.6	41.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	15.7	37.4	37.4	15.5	37.1	37.1	13.7	64.1	64.1	16.8	67.2	67.2
Actuated g/C Ratio	0.10	0.23	0.23	0.10	0.23	0.23	0.09	0.40	0.40	0.10	0.42	0.42
v/c Ratio	0.71	0.80	0.19	0.69	0.70	0.41	0.61	0.37	0.32	0.85	0.47	0.46
Control Delay	82.3	65.7	30.9	81.2	60.8	7.3	79.7	36.3	10.7	96.3	29.3	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.3	65.7	30.9	81.2	60.8	7.3	79.7	36.3	10.7	96.3	29.3	6.8
LOS	F	E	C	F	E	A	E	D	B	F	C	A
Approach Delay		67.2			53.2			38.0			37.6	
Approach LOS		E			D			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 48.0	Intersection LOS: D
Intersection Capacity Utilization 69.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

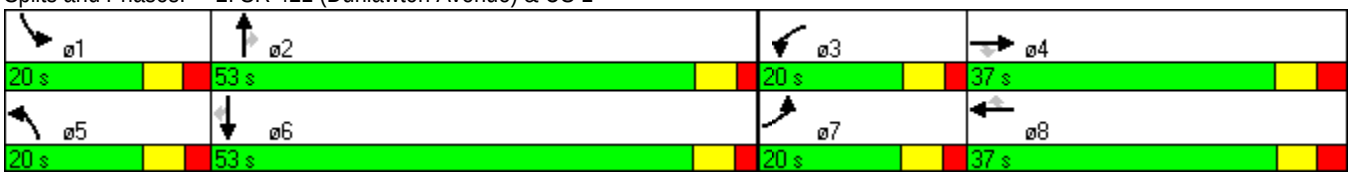


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	233	643	70	222	576	231	174	512	234	295	679	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	11	11	11	11	11	11
Storage Length (ft)	165		65	175		225	165		145	225		215
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	265		100	100		100	75		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	3319	3421	1531	3319	3421	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	3319	3421	1531	3319	3421	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			27			231			234			310
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	233	643	70	222	576	231	174	512	234	295	679	380
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	20.0	37.0	37.0	20.0	37.0	37.0	20.0	53.0	53.0	20.0	53.0	53.0
Total Split (%)	15.4%	28.5%	28.5%	15.4%	28.5%	28.5%	15.4%	40.8%	40.8%	15.4%	40.8%	40.8%
Maximum Green (s)	13.7	29.9	29.9	13.9	30.0	30.0	13.4	46.8	46.8	13.3	46.6	46.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	12.9	28.2	28.2	12.8	28.1	28.1	11.7	49.6	49.6	13.3	51.1	51.1
Actuated g/C Ratio	0.10	0.22	0.22	0.10	0.22	0.22	0.09	0.38	0.38	0.10	0.39	0.39
v/c Ratio	0.71	0.87	0.20	0.68	0.75	0.43	0.58	0.39	0.32	0.87	0.50	0.48
Control Delay	69.0	62.0	27.7	67.3	54.4	7.7	64.8	31.0	4.7	102.1	24.1	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.0	62.0	27.7	67.3	54.4	7.7	64.8	31.0	4.7	102.1	24.1	4.0
LOS	E	E	C	E	D	A	E	C	A	F	C	A
Approach Delay		61.2			46.7			30.7			35.4	
Approach LOS		E			D			C			D	

Intersection Summary

Area Type: Other	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 42.9	Intersection LOS: D
Intersection Capacity Utilization 69.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

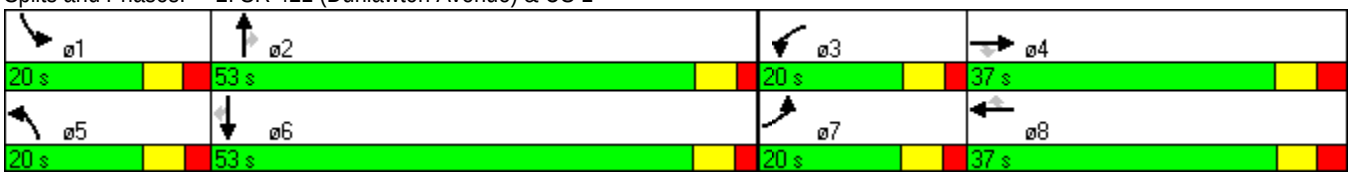


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	233	643	70	222	576	231	173	513	234	296	679	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	11	11	11	11	11	11
Storage Length (ft)	165		65	175		225	165		145	225		215
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	265		100	100		100	75		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	3319	3421	1531	3319	3421	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	3319	3421	1531	3319	3421	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			27			231			234			310
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	233	643	70	222	576	231	173	513	234	296	679	380
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	20.0	37.0	37.0	20.0	37.0	37.0	20.0	53.0	53.0	20.0	53.0	53.0
Total Split (%)	15.4%	28.5%	28.5%	15.4%	28.5%	28.5%	15.4%	40.8%	40.8%	15.4%	40.8%	40.8%
Maximum Green (s)	13.7	29.9	29.9	13.9	30.0	30.0	13.4	46.8	46.8	13.3	46.6	46.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	12.9	28.2	28.2	12.8	28.1	28.1	11.7	49.6	49.6	13.3	51.1	51.1
Actuated g/C Ratio	0.10	0.22	0.22	0.10	0.22	0.22	0.09	0.38	0.38	0.10	0.39	0.39
v/c Ratio	0.71	0.87	0.20	0.68	0.75	0.43	0.58	0.39	0.32	0.87	0.50	0.48
Control Delay	69.0	62.0	27.7	67.3	54.4	7.7	64.7	31.1	4.7	102.5	24.1	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.0	62.0	27.7	67.3	54.4	7.7	64.7	31.1	4.7	102.5	24.1	4.0
LOS	E	E	C	E	D	A	E	C	A	F	C	A
Approach Delay		61.2			46.7			30.7			35.6	
Approach LOS		E			D			C			D	

Intersection Summary

Area Type: Other	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 42.9	Intersection LOS: D
Intersection Capacity Utilization 69.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

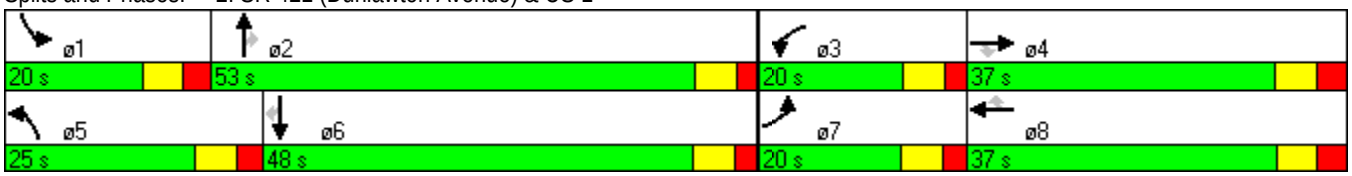


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	233	643	70	222	576	231	174	512	234	295	679	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	12	12	13	11	11	12
Storage Length (ft)	165		65	175		225	200		145	225		215
Storage Lanes	2		1	2		1	1		1	2		1
Taper Length (ft)	265		100	100		100	50		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3319	3421	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3319	3421	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			27			231			234			334
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	233	643	70	222	576	231	174	512	234	295	679	380
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	20.0	37.0	37.0	20.0	37.0	37.0	25.0	53.0	53.0	20.0	48.0	48.0
Total Split (%)	15.4%	28.5%	28.5%	15.4%	28.5%	28.5%	19.2%	40.8%	40.8%	15.4%	36.9%	36.9%
Maximum Green (s)	13.7	29.9	29.9	13.9	30.0	30.0	18.4	46.8	46.8	13.3	41.6	41.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	12.9	28.2	28.2	12.8	28.1	28.1	16.5	49.6	49.6	13.3	46.3	46.3
Actuated g/C Ratio	0.10	0.22	0.22	0.10	0.22	0.22	0.13	0.38	0.38	0.10	0.36	0.36
v/c Ratio	0.71	0.87	0.20	0.68	0.75	0.43	0.77	0.38	0.30	0.87	0.56	0.49
Control Delay	69.0	62.0	27.7	67.3	54.4	7.7	77.4	30.8	4.5	101.4	28.3	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.0	62.0	27.7	67.3	54.4	7.7	77.4	30.8	4.5	101.4	28.3	4.1
LOS	E	E	C	E	D	A	E	C	A	F	C	A
Approach Delay		61.2			46.7			32.9			37.4	
Approach LOS		E			D			C			D	

Intersection Summary

Area Type: Other	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 44.0	Intersection LOS: D
Intersection Capacity Utilization 74.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

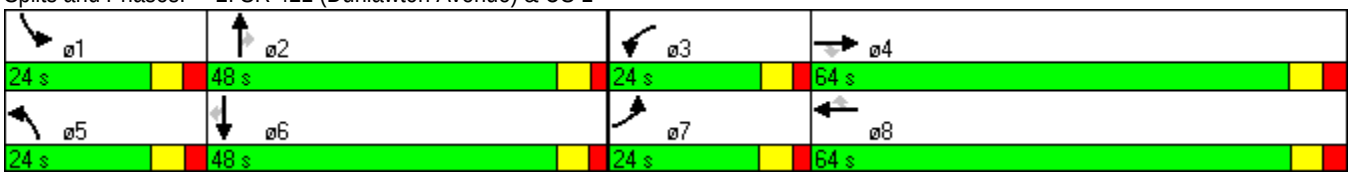


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	282	778	85	269	697	280	211	620	283	357	822	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	12	12	13	12	12	13
Storage Length (ft)	165		65	175		225	200		145	225		215
Storage Lanes	2		1	2		1	1		1	2		1
Taper Length (ft)	265		100	100		100	50		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3433	3539	1636
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3433	3539	1636
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			26			267			180			276
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	282	778	85	269	697	280	211	620	283	357	822	460
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	24.0	64.0	64.0	24.0	64.0	64.0	24.0	48.0	48.0	24.0	48.0	48.0
Total Split (%)	15.0%	40.0%	40.0%	15.0%	40.0%	40.0%	15.0%	30.0%	30.0%	15.0%	30.0%	30.0%
Maximum Green (s)	17.7	56.9	56.9	17.9	57.0	57.0	17.4	41.8	41.8	17.3	41.6	41.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	16.9	44.3	44.3	16.7	44.0	44.0	17.4	55.6	55.6	17.3	55.4	55.4
Actuated g/C Ratio	0.11	0.28	0.28	0.10	0.28	0.28	0.11	0.35	0.35	0.11	0.35	0.35
v/c Ratio	0.81	0.82	0.19	0.78	0.72	0.43	1.10	0.50	0.41	0.96	0.67	0.62
Control Delay	87.6	61.6	29.6	85.6	56.2	7.3	156.6	44.5	17.1	114.2	38.7	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Total Delay	87.6	61.6	29.6	85.6	56.2	7.3	156.6	44.5	17.1	114.2	38.7	12.4
LOS	F	E	C	F	E	A	F	D	B	F	D	B
Approach Delay		65.6			51.6			58.8			47.7	
Approach LOS		E			D			E			D	

Intersection Summary

Area Type: Other	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.10	
Intersection Signal Delay: 55.0	Intersection LOS: E
Intersection Capacity Utilization 85.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

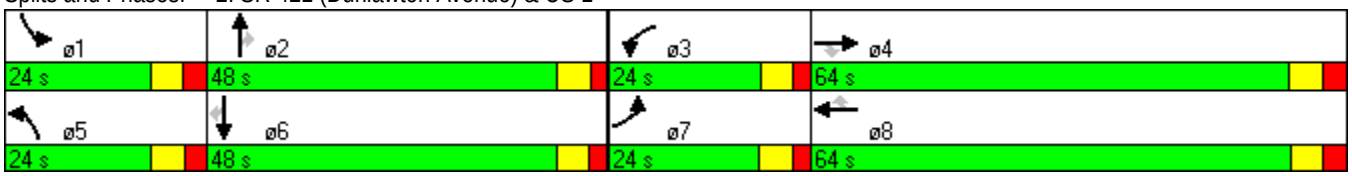


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	282	778	85	269	697	280	211	620	283	357	822	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	11	11	11	11	11	11
Storage Length (ft)	165		65	175		225	165		145	225		215
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	265		100	100		100	75		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	3319	3421	1531	3319	3421	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	3319	3421	1531	3319	3421	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			26			267			180			276
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	282	778	85	269	697	280	211	620	283	357	822	460
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	24.0	64.0	64.0	24.0	64.0	64.0	24.0	48.0	48.0	24.0	48.0	48.0
Total Split (%)	15.0%	40.0%	40.0%	15.0%	40.0%	40.0%	15.0%	30.0%	30.0%	15.0%	30.0%	30.0%
Maximum Green (s)	17.7	56.9	56.9	17.9	57.0	57.0	17.4	41.8	41.8	17.3	41.6	41.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	16.9	44.3	44.3	16.7	44.0	44.0	15.0	55.6	55.6	17.3	57.8	57.8
Actuated g/C Ratio	0.11	0.28	0.28	0.10	0.28	0.28	0.09	0.35	0.35	0.11	0.36	0.36
v/c Ratio	0.81	0.82	0.19	0.78	0.72	0.43	0.68	0.52	0.44	0.99	0.67	0.63
Control Delay	87.6	61.6	29.6	85.6	56.2	7.3	81.3	45.0	17.6	116.9	38.4	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Total Delay	87.6	61.6	29.6	85.6	56.2	7.3	81.3	45.0	17.6	116.9	38.4	14.1
LOS	F	E	C	F	E	A	F	D	B	F	D	B
Approach Delay		65.6			51.6			44.9			48.7	
Approach LOS		E			D			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 52.3	Intersection LOS: D
Intersection Capacity Utilization 79.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

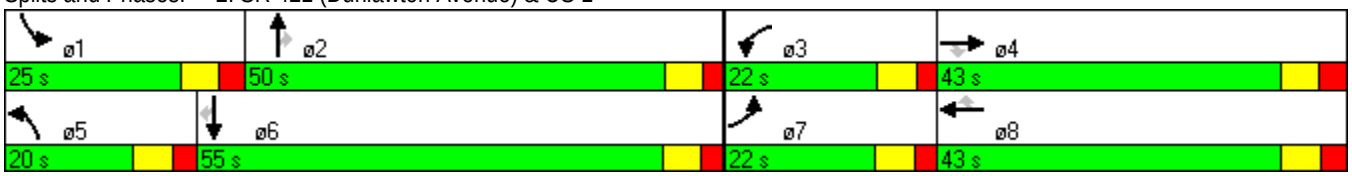


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	282	778	85	269	697	280	211	620	283	357	822	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	11	11	11	11	11	11
Storage Length (ft)	165		65	175		225	165		145	225		215
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	265		100	100		100	75		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	3319	3421	1531	3319	3421	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	3319	3421	1531	3319	3421	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			26			256			221			291
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	282	778	85	269	697	280	211	620	283	357	822	460
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	22.0	43.0	43.0	22.0	43.0	43.0	20.0	50.0	50.0	25.0	55.0	55.0
Total Split (%)	15.7%	30.7%	30.7%	15.7%	30.7%	30.7%	14.3%	35.7%	35.7%	17.9%	39.3%	39.3%
Maximum Green (s)	15.7	35.9	35.9	15.9	36.0	36.0	13.4	43.8	43.8	18.3	48.6	48.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	15.1	35.0	35.0	14.9	34.7	34.7	12.6	46.3	46.3	17.8	51.3	51.3
Actuated g/C Ratio	0.11	0.25	0.25	0.11	0.25	0.25	0.09	0.33	0.33	0.13	0.37	0.37
v/c Ratio	0.79	0.91	0.21	0.76	0.79	0.47	0.71	0.55	0.43	0.85	0.66	0.62
Control Delay	77.2	66.5	29.8	75.2	56.7	9.3	75.0	41.2	11.3	99.5	30.8	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.2	66.5	29.8	75.2	56.7	9.3	75.0	41.2	11.3	99.5	30.8	9.3
LOS	E	E	C	E	E	A	E	D	B	F	C	A
Approach Delay		66.4			50.1			40.0			39.7	
Approach LOS		E			D			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 48.2	Intersection LOS: D
Intersection Capacity Utilization 79.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1

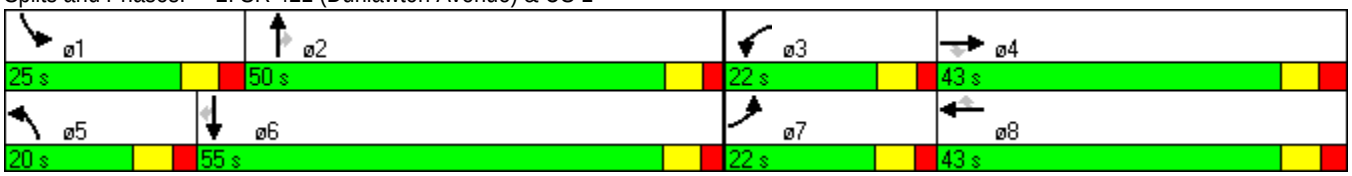


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	282	778	85	269	697	280	209	621	283	358	822	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	11	11	11	11	11	11
Storage Length (ft)	165		65	175		225	165		145	225		215
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	265		100	100		100	75		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	3319	3421	1531	3319	3421	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	3319	3421	1531	3319	3421	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			26			256			220			291
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	282	778	85	269	697	280	209	621	283	358	822	460
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	22.0	43.0	43.0	22.0	43.0	43.0	20.0	50.0	50.0	25.0	55.0	55.0
Total Split (%)	15.7%	30.7%	30.7%	15.7%	30.7%	30.7%	14.3%	35.7%	35.7%	17.9%	39.3%	39.3%
Maximum Green (s)	15.7	35.9	35.9	15.9	36.0	36.0	13.4	43.8	43.8	18.3	48.6	48.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	15.1	35.0	35.0	14.9	34.7	34.7	12.6	46.2	46.2	17.8	51.3	51.3
Actuated g/C Ratio	0.11	0.25	0.25	0.11	0.25	0.25	0.09	0.33	0.33	0.13	0.37	0.37
v/c Ratio	0.79	0.91	0.21	0.76	0.79	0.47	0.70	0.55	0.43	0.85	0.65	0.62
Control Delay	77.2	66.5	29.8	75.2	56.7	9.3	74.8	41.2	11.4	99.6	30.8	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.2	66.5	29.8	75.2	56.7	9.3	74.8	41.2	11.4	99.6	30.8	9.3
LOS	E	E	C	E	E	A	E	D	B	F	C	A
Approach Delay		66.4			50.1			40.0			39.8	
Approach LOS		E			D			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 48.2	Intersection LOS: D
Intersection Capacity Utilization 79.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	282	778	85	269	697	280	211	620	283	357	822	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	13	12	12	13	11	11	12
Storage Length (ft)	165		65	175		225	200		145	225		215
Storage Lanes	2		1	2		1	1		1	2		1
Taper Length (ft)	265		100	100		100	50		25	280		135
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3319	3421	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3319	3421	1531	3319	3539	1636	1770	3539	1636	3319	3421	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			26			264			221			294
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		1000			1000			1000			750	
Travel Time (s)		19.5			19.5			17.0			12.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	282	778	85	269	697	280	211	620	283	357	822	460
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	12.0	13.0	13.0	12.0	12.0	12.0	12.0	19.0	19.0	12.0	19.0	19.0
Total Split (s)	22.0	43.0	43.0	22.0	43.0	43.0	25.0	50.0	50.0	25.0	50.0	50.0
Total Split (%)	15.7%	30.7%	30.7%	15.7%	30.7%	30.7%	17.9%	35.7%	35.7%	17.9%	35.7%	35.7%
Maximum Green (s)	15.7	35.9	35.9	15.9	36.0	36.0	18.4	43.8	43.8	18.3	43.6	43.6
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	3.1	3.1	2.1	3.0	3.0	2.6	2.2	2.2	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	7.1	7.1	6.1	7.0	7.0	6.6	6.2	6.2	6.7	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	15.1	35.0	35.0	14.9	34.7	34.7	18.2	46.3	46.3	17.8	45.8	45.8
Actuated g/C Ratio	0.11	0.25	0.25	0.11	0.25	0.25	0.13	0.33	0.33	0.13	0.33	0.33
v/c Ratio	0.79	0.91	0.21	0.76	0.79	0.46	0.92	0.53	0.41	0.85	0.74	0.64
Control Delay	77.2	66.5	29.8	75.2	56.7	8.5	101.2	40.7	11.0	98.5	36.7	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.2	66.5	29.8	75.2	56.7	8.5	101.2	40.7	11.0	98.5	36.7	10.3
LOS	E	E	C	E	E	A	F	D	B	F	D	B
Approach Delay		66.4			49.9			44.6			42.7	
Approach LOS		E			D			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 50.1	Intersection LOS: D
Intersection Capacity Utilization 85.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: SR 421 (Dunlawton Avenue) & US 1