

metroplan orlando

2013

TRAVEL TIME  
STUDIES AND B/C ANALYSIS

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## INTRODUCTION

### OVERVIEW

MetroPlan Orlando has requested GMB Engineers & Planners, Inc. (GMB) to assess the benefits of the recently completed signal retiming projects on 18 selected roadways spread throughout the tri-county (Orange, Seminole, and Osceola) area in the Central Florida region. Out of the 18 study roadways, four (4) fall within Seminole County, seven (7) fall within Orange County, six (6) fall within the City of Orlando, and one (1) falls within Osceola County.

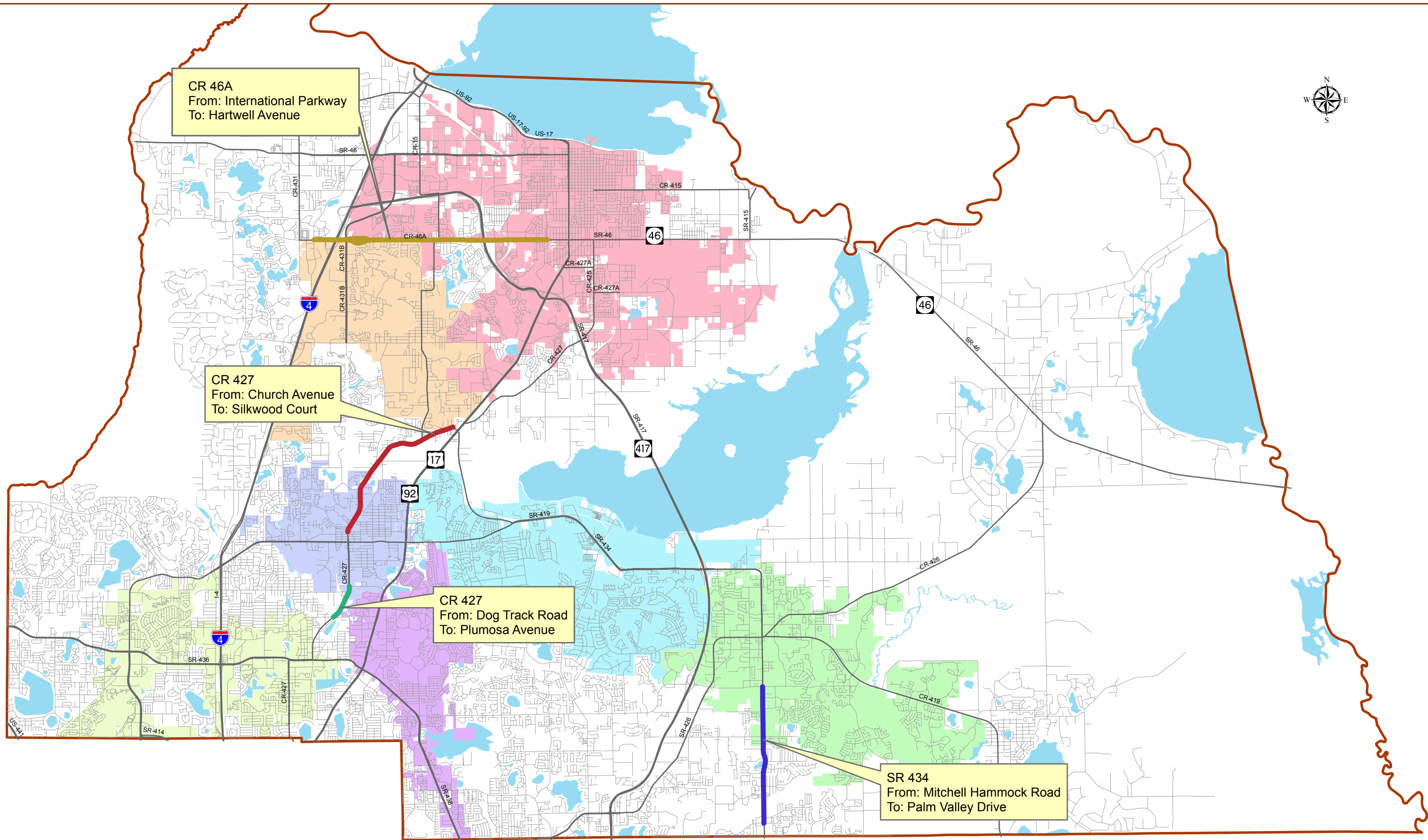
To determine whether the benefits from the completed signal retiming projects would outweigh the implementation costs, a Benefit-Cost (B-C) analysis was performed for each of the study roadways using the input parameters collected during the Travel Time (TT) study conducted before (before scenario) and after (after scenario) the implementation of retiming plans.

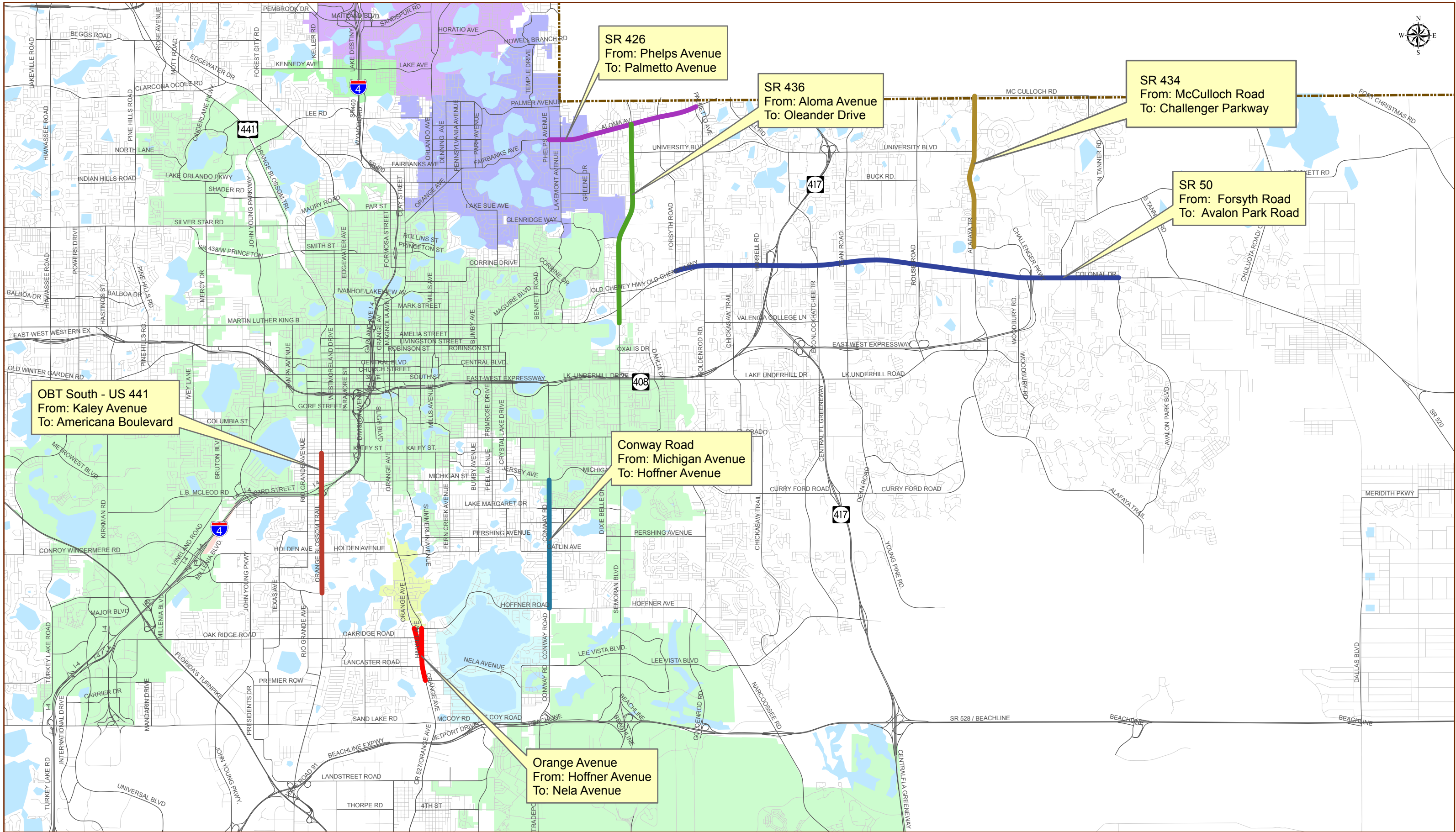
The study roadways for each of these four (4) jurisdictions are depicted in **Figures 1** through **4**. A list of the 18 study roadways with information on segment limits, length, and maintaining jurisdiction is provided in **Table 1**.

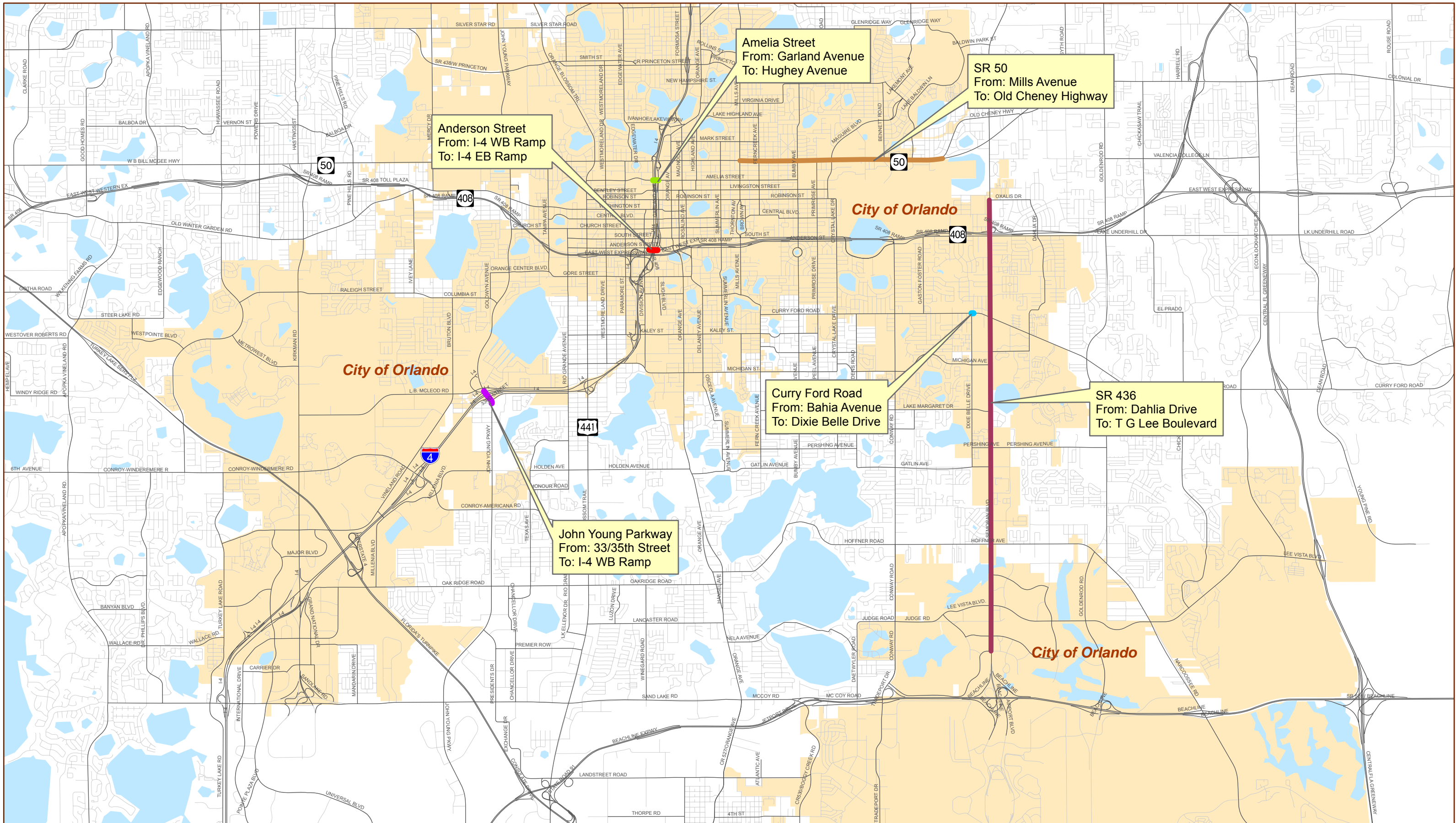
This report, in particular, presents the results of the TT studies and the B-C analysis for these recently completed signal-retiming projects.

### BACKGROUND

Signal re-timing projects generally demonstrate positive results with measurable benefits such as reduced delay, fuel savings, improved air quality, and others. Signal re-timing is one of the most cost-effective strategies to improve traffic flow, enhance safety, and lessen driver frustration. As part of the periodical signal retiming projects to improve the traffic flow on selected study roadways in Central Florida (Study Area), Florida Department of Transportation (FDOT) has recently completed signal re-timing on those roadways for the year 2013. GMB's role is to conduct TT studies for both the before scenario and after scenario and to assess the benefits achieved through these signal-retiming projects.









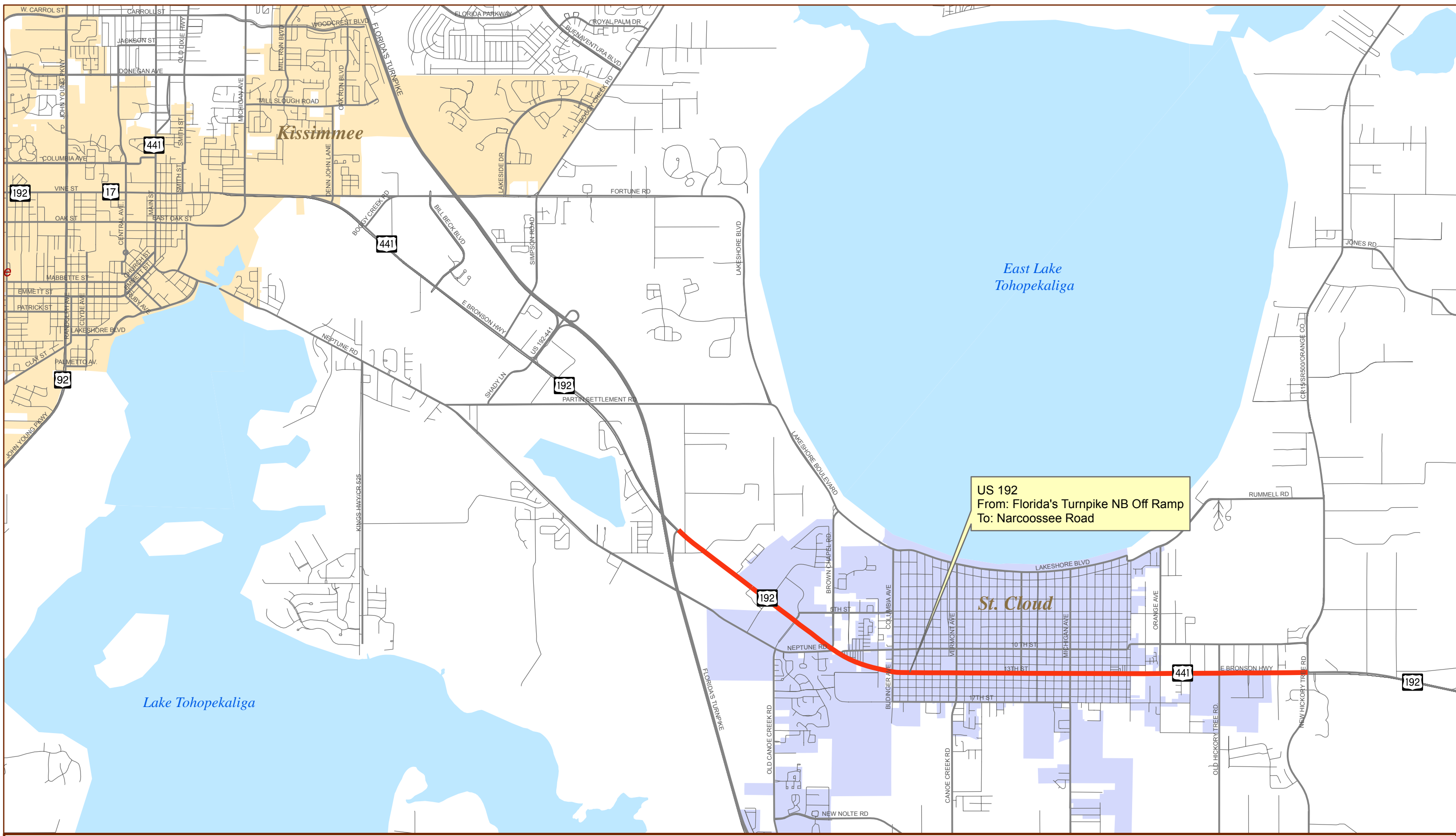


Table 1: List of Study Roadways

Roadway Name	Segment Limits	Length (Miles)	Jurisdiction
CR 427	Silkwood Ct. to Church Ave.	3.320	Seminole
CR 427	Dog Track Rd. to Plumosa Ave.	0.717	Seminole
SR 434	Mitchell Hammock Rd. to Palm Valley Dr.	2.760	Seminole
CR 46A	Hartwell Ave. to International Pkwy.	4.730	Seminole
SR 434	McCulloch Rd. to Challenger Pkwy.	2.670	Orange
SR 426	Phelps Ave. to Palmetto Ave.	2.660	Orange
SR 15	Michigan Ave. to Hoffner Ave.	2.300	Orange
SR 527	Hoffner Ave. to Nela Ave.	0.945	Orange
SR 436	Aloma Ave. to Oleander Dr.	3.560	Orange
OBT South – US 441	Kaley Ave. to Americana Blvd.	2.500	Orange
SR 50	Forsyth Rd. to Avalon Park Blvd.	7.860	Orange
SR 552	Bahia Ave./Dixie Belle Drive	0.026	City of Orlando
SR 436	Dahlia Dr. to TG Lee Blvd.	5.800	City of Orlando
John Young Pkwy.	33 <sup>rd</sup> /35 <sup>th</sup> St. to I-4 WB Ramp	0.421	City of Orlando
SR 50	Mills Ave. to Old Cheney Hwy.	2.650	City of Orlando
Anderson St.	I-4 WB Ramp to I-4 EB Ramp	0.116	City of Orlando
Amelia St.	Garland Ave. to Hughey Ave.	0.068	City of Orlando
US 192	FL Turnpike NB Off Ramp to Narcoossee Rd.	5.670	Osceola

Total - 48.773 Miles

## TRAVEL TIME & DELAY STUDIES

### OVERVIEW

For the purpose of TT studies, Bluetooth technology for data collection and computer algorithm for data reduction are used. The Bluetooth approach has proven to be cost-effective, safer, and more accurate than other methods. The before and after travel time data of the study roadways were collected using the MiniToad devices developed by TrafficCast. TrafficCast's web based data analysis tool was used to process the MiniToad log files. The travel time output from before and after TT studies along with the cost of signal retiming were used in calculating the B-C ratio for the study corridors.

### BACKGROUND

Bluetooth is an open, wireless communication platform used to connect myriad electronic devices. Many computers, car radios and dashboard systems, PDAs, cell phones, headsets, or other personal equipment are, or can be, Bluetooth-enabled to streamline the flow of information between devices. Each Bluetooth device uses a unique electronic identifier known as a Media Access Control (MAC) address. Conceptually, as a Bluetooth-equipped device travels along a roadway, it can be anonymously detected at multiple points where the MAC address, time of detection, and location are logged. By determining the difference in detection time of a particular MAC address, the travel time between locations can be derived. A significant advantage of the use of Bluetooth MAC addresses for travel time monitoring is that typically only one inconspicuous roadside installation is necessary (consisting of field processor with appropriate software and antenna) to capture the unique address of Bluetooth devices travelling in all directions of flow.

Travel time is a direct measure of the performance of the roadway network. High travel times are an indication of congestion, delay, loss of time by drivers, increased fuel use and increased pollution emissions. The travel time data collected can be an important component of the Congestion Management Process (CMP), which alerts the decision makers of progress toward meeting congestion and mobility goals, when collected on a regular basis.

## METHODOLOGY

### STUDY PROCEDURE

The Bluetooth receivers (MiniToad Devices) are placed at the end point of the study corridor for a period of 24-hours during the weekdays. Each Bluetooth device contains a unique MAC identifier. The standard format for a MAC address is six groups of hexadecimal digits separated by hyphens or colons. A representative example of a MAC address is “01:23:45:67:89:AB”. As the Bluetooth enabled device travels along the study corridor, the MiniToad logs the unique MAC address, along with its location and time of the day that the device was detected. When the same MAC address is detected by the MiniToad device at the other end of the study corridor, a travel time can be determined by calculating the difference in detection time at the end points. Using the known distance between the MiniToad devices along the study corridor, an average speed is determined.

The field data were collected from Tuesday through Thursday during the morning and afternoon peak periods.

In performing the data collection, the Bluetooth receivers (MiniToad devices) were placed at the end points of the study segments so as to minimize the logs of vehicles in turn lanes and other minor street traffic. The MiniToads were generally placed at an approximate distance of 200 feet further from the end point of the study segment.

The technicians took field notes describing any factors or conditions that may affect the traffic operations. As a rule, data collection runs were not performed when external factors such as inclement weather, or special events affected the typical traffic flow of the study roadway.

The data collected for each roadway segment for each period and direction included street name, beginning and ending cross street, jurisdiction, facility type, area type, number of through lanes, left turn and right turn lanes, length, average travel time, average travel speed, and speed limit. The procedures described above that were used in collecting the data for the “before” conditions prior to the signal timing plans are implemented were followed in the case of “after” conditions after the signal timing plans are implemented also.

## DATA ANALYSIS

The travel time data collected using the MiniToads were used to determine directly the following two crucial parameters for each of the study roadways during the identified peak hour before and after a retiming plan has been implemented. The two travel parameters are defined as follows:

**Average Travel Time:** The average time needed to travel between two control points.

**Average Travel Speed:** The average speed of travel between two control points, including all delays. It is calculated by dividing the total length of the section under consideration by the Average Travel Time.

These parameters were used as inputs for assessing the effectiveness of the completed signal retiming process.

## LEVEL OF SERVICE CALCULATION

Level of Service (LOS) is one of the vital measures used to evaluate intersection or roadway performance. LOS was calculated before and after a retiming plan is implemented. Using the Average Travel Speed and roadway class (predetermined using the posted speed limit) as inputs, the roadway LOS was determined using the HCM (2000) Exhibit 15-2 Urban Street LOS by Roadway Class and Average Travel Speed. The HCM (2000) Exhibit 15-2 is shown as Table 2.

Tables showing the TT study results for each study roadway are provided in Appendix A of this report. In addition, GIS maps graphically illustrating the LOS conditions and listing the travel time and delay summaries are also provided in Appendix A of this report.

Table 2: HCM Exhibit 15-2 - Urban Street LOS by Roadway Class

	Arterial Classification			
	I	II	III	IV
Range of Free-flow Speed	45 – 55 MPH	35 – 45 MPH	30 – 35 MPH	25 – 35 MPH
Typical Free Flow Speed	50 MPH	40 MPH	33 MPH	30 MPH
Level of Service	Speed (MPH)			
A	>42	>35	>30	>25
B	>34	>28	>24	>19
C	>27	>22	>18	>13
D	>21	>17	>14	>9
E	>16	>13	>10	>7
F	<=16	<=13	<=10	<=7

## BENEFIT COST ANALYSIS

To determine whether the completed signal retiming process benefits outweighed the implementation costs, a B-C analysis was performed using the input parameters collected during the travel time and delay studies conducted before and after the implementation of retiming plans. Some of the direct benefits of signal retiming include fuel savings, reduced delays & stops, improved traffic flow, reduced toxic emissions & improved air quality, reduced response time for emergency vehicles, etc. In addition, numerous indirect benefits could be attributed to signal retiming such as postponing long-term capacity improvements, reduced driver frustration, better air quality, etc.

The benefits of the improved signal plans are projected over three years using two peak hours of travel time, one during the morning peak hour and the other during the evening peak hour. The following paragraphs describe the overall procedure of B-C analysis utilized for the signal retiming evaluation process.

## BENEFITS

As the first step, the cost savings associated with various parameters that were improved because of the retiming process were identified. Benefits are defined in terms of annualized cost savings and were calculated based on reduction in travel times derived from the before and after travel time data. As the first step, the benefit input parameter (travel time [seconds/vehicle]) was multiplied with the corresponding peak hour directional traffic volume for each peak hour and direction to obtain the total travel time (vehicle-hours) for one hour. These calculations were performed for the before and after scenarios and the differences were obtained for the AM and PM peak hours. Then these differences (total travel time) were multiplied with the corresponding dollar value to obtain the time savings in dollars. The daily savings in dollars are obtained by adding the benefits for AM and PM peak hours. The yearly savings are obtained by applying the daily savings for 300 days per year. This accounts for reduced benefits anticipated from lower weekend traffic volumes.

The above-mentioned calculations are explained in the following paragraphs for an example roadway: SR 434 between McCulloch Road and Challenger Parkway.

## TRAVEL TIME COST SAVINGS

The cost associated with the lost travel time is valued at \$16.79 per hour for the year 2011 based on the latest Urban Mobility Report published by Texas Transportation Institute. The Urban Mobility Report page containing the delay value is provided in **Appendix B** of this memorandum.

Based on the calculations using the field travel time data and traffic volume data from the year 2013 Seminole County Traffic Counts, a total annual cost savings (two peak hours combined) of \$1,152,457.21 was obtained from reduction in travel time for the SR 434 (McCulloch Road to Challenger Parkway) study corridor.

## COSTS

The second step is to obtain the project implementation cost of the signal retiming process. These project costs were provided by the FDOT and are provided in **Appendix C** of this report for the study projects. The annualized implementation costs were calculated assuming three (3) years of service life for the improvement and a 7% rate of return on investment as currently recommended by the Federal Highway Administration (FHWA).

The annualized total signal-retiming cost was determined as \$14,700.59 from a one-time implementation cost of \$38,579 for the SR 434 (McCulloch Road to Challenger Parkway) study corridor.

**Tables 3 and 4** summarize the Measures of Effectiveness (MOEs) including travel time, delay, and average speed for the through movement for the before and after scenarios, respectively during the AM and PM peak periods. **Table 5** shows the benefits, costs, and B-C ratio for the example study corridor.

**Table 3: Summary of Before Study MOEs: SR 434 between McCulloch Road and Challenger Parkway**

Traffic Volume	MOE's per Vehicle		MOEs for all
	Travel Time (sec/vehicle)	Average Speed (mph)	Total Travel Time (Vehicle-hour)
Northbound/Eastbound – AM Peak Hour			
2,308	357	29.2	228.88
Northbound/Eastbound – PM Peak Hour			
1,969	491	21.3	268.55
Southbound/Eastbound – AM Peak Hour			
1,147	354	29.5	112.79
Southbound/Eastbound – PM Peak Hour			
2,551	637	16.4	451.39

**Table 4: Summary of After Study MOEs: SR 434 between McCulloch Road and Challenger Parkway**

Traffic Volume	MOE's per Vehicle		MOEs for all Vehicles
	Travel Time (sec/vehicle)	Average Speed (mph)	Total Travel Time (Vehicle-hour)
Northbound/Eastbound – AM Peak Hour			
2,308	316	33.0	202.59
Northbound/Eastbound – PM Peak Hour			
1,969	367	28.4	200.73
Southbound/Eastbound – AM Peak Hour			
1,147	296	35.3	94.31
Southbound/Eastbound – PM Peak Hour			
2,551	473	22.1	335.17



**Table 5: Summary of MOEs & Benefit Cost Analysis: SR 434 between McCulloch Road and Challenger Parkway**

MOE	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hours)	341.67	296.90	719.94	535.90
<b>BENEFITS</b>	<b>AM PEAK HOUR</b>		<b>PM PEAK HOUR</b>	
User Benefit Per Day	\$751.69		\$3,090.03	
Annual User Benefit	\$225,507.00		\$927,009.00	
Total Annual User Benefit			\$1,152,516.00	
Total Signal Retiming Annual Cost			\$14,700.59	
<b>User Benefit / Cost Ratio</b>			<b>78.40</b>	
Notes:				
1. Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)				
2. Benefits apply for 300 days per year. This accounts for reduced benefits anticipated from lower weekend traffic volumes.				
3. The service life of the improvement is assumed to be three (3) years.				
4. Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.				

### BENEFIT-COST RATIO

As shown in Table 5, a B-C ratio of **78.40 (greater than 1.0)** was derived from the analysis for SR 434 study corridor. The strong ratio indicates that the funds spent by FDOT/MetroPlan Orlando to increase the operational capacity of the study corridor on SR 434 between McCulloch Road and Challenger Parkway in Orange County receive approximately seventy eight times in benefits derived through reduced costs associated with reduced travel time. Therefore, the positive results of this B-C analysis justify the implementation of the recently completed signal timing improvements on this study corridor.

Similar to the MOE calculations and summaries shown in Tables 3 through 5, summary tables for each study roadway are provided in Appendix A of this report.

## CONCLUSIONS

This chapter presents the conclusions derived from the TT study results and a summary of B-C ratio analysis results. GMB has conducted before and after travel time studies on 18 study roadways in the tri-county area (Orange, Seminole, and Osceola) of the Central Florida region to evaluate the benefits of the recently completed signal retiming projects on these roadways.

## BENEFIT-COST RATIO ANALYSIS

As part of the current study, B-C ratios were calculated for the 18 study roadways falling within the Central Florida region. Tables 6 through 9 illustrate the B-C ratios by jurisdiction. Table 6 lists B-C ratios for Seminole County, Table 7 lists B-C ratios for Orange County, Table 8 lists B-C ratios for the City of Orlando, and Table 9 lists the B-C ratios for Osceola County.

Table 6: Benefit-Cost Ratio Summary for Seminole County Roadways

Roadway	Limits	Annual Benefit	Annual Cost	B/C Ratio
CR 427	Silkwood Ct. to Church Ave.	\$219,615.00	\$14,848.44	14.79
CR 427	Dog Track Rd. to Plumosa Ave.	\$78,024.00	\$7,424.41	10.51
SR 434	Mitchell Hammock Rd. to Palm Valley Dr.	\$241,371.00	\$13,024.35	18.53
CR 46A	Hartwell Ave. to International Pkwy.	\$459,477.00	\$37,232.18	12.34

Table 7: Benefit-Cost Ratio Summary for Orange County Roadways

Roadway	Limits	Annual Benefit	Annual Cost	B/C Ratio
SR 434	McCulloch Rd. to Challenge Pkwy.	\$1,152,465.00	\$14,700.59	78.40
SR 426	Phelps Ave. to Palmetto Ave.	\$373,746.00	\$17,008.24	21.97
SR 15	Michigan Ave. to Hoffner Ave.	\$176,145.00	\$10,261.34	17.17
SR 527	Hoffner Ave to Nela Ave.	\$200,775.00	\$11,761.92	17.07
SR 436	Aloma Ave. to Oleander Dr.	\$551,805.00	\$14,043.25	39.29
OBT South – US 441	Kaley Ave. to Americana Blvd.	\$196,143.00	\$11,354.96	17.27
SR 50	Forsyth Rd. to Avalon Park Blvd.	\$1,288,062.00	\$34,604.83	37.22

Table 8: Benefit-Cost Ratio Summary for City of Orlando Roadways

Roadway	Limits	Annual Benefit	Annual Cost	B/C Ratio
SR 552	Bahia Ave/Dixie Belle Drive	\$200,070.00	\$1,755.41	113.97
SR 436	Dahlia Dr. to TG Lee Blvd.	\$301,011.00	\$31,597.31	9.53
John Young Pkwy.	33/35 <sup>th</sup> St. to I-4 WB Ramp	\$426,330.00	\$11,410.21	37.36
SR 50	Mills Ave. to Old Cheney Hwy.	\$544,248.00	\$24,417.79	22.29
Anderson St.	I-4 WB Ramp to I-4 EB Ramp	\$50,118.00	\$3,219.89	15.57
Amelia St.	Garland Ave. to Hughey Ave.	\$26,949.00	\$4,498.31	5.99

**Table 9: Benefit-Cost Ratio Summary for Osceola County Roadways**

Roadway	Limits	Annual Benefit	Annual Cost	B/C Ratio
US 192	FL Turnpike NB Off Ramp to Narcoossee Rd.	\$681,708.00	\$21,344.61	31.94

As shown in Table 6, the B-C ratios range between 10 and 19 for the signal retiming projects on study roadways within Seminole County. From Table 7, the B-C ratios range between 17 and 78 for the signal retiming projects on study roadways within Orange County. As shown in Table 8, the B-C ratios range between 6 and 114 for the signal retiming projects on study roadways within the City of Orlando. As shown in Table 9, the B-C ratio is 31.94 for the one (1) signal retiming project on study roadways within Osceola County.

In conclusion, all the 18 study signal-retiming projects have B-C ratios of greater than one (1). This means that the cost benefits derived from reduced travel time exceeded the costs incurred from implementing improved signal timing plans on the study roadways. Therefore, these traffic operational improvements are well justified.

In addition, a summary of the annual travel time is shown in Table 10 for the study roadways. As shown in Table 10, 426,920.69 vehicle-hours of travel time is estimated to be saved with the improved signal timings on the study roadways.

Table 10: Annual Travel Time Savings Summary

Roadway Name	Limits	Annual Travel Time Savings (vehicle hours)
CR 427	Silkwood Ct. to Church Ave.	13,081.33
CR 427	Dog Track Rd. to Plumosa Ave.	4,648.67
SR 434	Mitchell Hammock Rd. to Palm Valley Dr.	14,375.42
CR 46A	Hartwell Ave. to International Pkwy.	27,365.58
SR 434	McCulloch Rd. to Challenger Pkwy.	68,639.50
SR 426	Phelps Ave. to Palmetto Ave.	22,258.67
SR 15	Michigan Ave. to Hoffner Ave.	10,492.17
SR 527	Hoffner Ave. to Nela Ave.	11,957.67
SR 436	Aloma Ave. to Oleander Dr.	32,862.42
OBT-South US 441	Kaley Ave. to Americana Blvd.	11,680.25
SR 50	Forsyth Rd. to Avalon Park Blvd.	76,716.50
SR 552	Bahia Ave./Dixie Belle Dr.	11,916.00
SR 436	Dahlia Dr. to TG Lee Blvd.	17,927.50
John Young Pkwy.	33/35 <sup>th</sup> St. to I-4 WB Ramp	25,393.25
SR 50	Mills Ave. to Old Cheney Hwy.	32,416.17
Anderson St.	I-4 WB Ramp to I-4 EB Ramp	2,983.67
Amelia St.	Garland Ave. to Hughey Ave.	1,603.67
US 192	FL Turnpike NB Off Ramp to Narcoossee Rd.	40,602.25
Total Savings		426,920.69

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**PRESENTATIONS MADE TO VARIOUS COMMITTEES**

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The results of this Year 2013 MetroPlan Orlando Travel Time Study and Benefit Cost Analysis were presented by GMB and MetroPlan Orlando to the following committees.

- ❖ Management & Operations Committee on June 28, 2013
- ❖ Citizens Advisory Committee on July 24, 2013.
- ❖ Transportation Technical Committee on July 26, 2013.
- ❖ Municipal Advisory Committee on August 08, 2013.
- ❖ MetroPlan Orlando Board on August 14, 2013.

The PowerPoint presentation is provided in Appendix D.

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**APPENDICES**

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*Appendix A: Before & After Travel Time & Delay Study Results, GIS Maps, MOE Summaries, and Benefit-Cost Ratio Calculation Sheets*

*Appendix B: Page from 2011 Urban Mobility Report*

*Appendix C: Signal Retiming Project Costs*

*Appendix D: Power Point Presentation*

## Appendix A:

**Before & After Travel Time Study Results, GIS Maps,  
MOE Summaries, and, Benefit-Cost Ratio Calculation  
Sheets**



**CR 427**  
**Silkwood Ct. to Church Ave.**

### Year 2013 METROPLAN Orlando Travel Time Study

CR 427 - From Church Ave to Silkwood Court - Northbound Direction Summary - Before Condition

Roadway Segment	Jurisdiction	Facility Type <sup>1</sup>	Area Type <sup>1</sup>	Left Turn Lanes <sup>2</sup>	Thru Lanes <sup>2</sup>	Right Turn Lanes <sup>2</sup>	Speed Limit (mph)	Distance (ft)	# Runs	Traffic Control Device	Travel Time (sec)	Stop Delay (sec)	Roadway Class	Roadway Segment		Roadway Summary	
														Average Speed		Avg Speed/	Avg. Fuel
														(mph)	LOS	Speed Limit	Consump.
<b>AM PEAK HOUR</b>																	
Church Ave to Longwood Hills Rd.	Seminole County	Arterial	URA	1	2	0	45	4,858	6	Signal	88.0	15.0	II	37.6	A	0.84	
Longwood Hills Rd to Longwood Lake Mary Rd	Seminole County	Arterial	URA	2	3	0	45	3,115	6	Signal	63.0	5.0	II	33.7	B	0.75	
Longwood Lake Mary Rd. to General Hutchinson Pkwy	Seminole County	Arterial	URA	1	3	0	45	528	6	Signal	14.0	4.0	II	25.7	C	0.57	
General Hutchiston Pkwy to S County Club Road	Seminole County	Arterial	URA	1	2	0	45	5,333	6	Signal	89.0	7.0	II	40.9	A	0.91	
S Country Club Rd. to Silkwood Ct.	Seminole County	Arterial	URA	1	3	1	45	3,590	6	Signal	65.0	21.0	II	37.7	A	0.84	
<b>TOTAL</b>							45	17,424			319.0	52.0	II	37.2	A	0.83	0.116 gal/veh
<b>PM PEAK HOUR</b>																	
Church Ave to Longwood Hills Rd.	Seminole County	Arterial	URA	1	2	0	45	4,858	5	Signal	85.0	7.0	II	39.0	A	0.87	
Longwood Hills Rd to Longwood Lake Mary Rd	Seminole County	Arterial	URA	2	3	0	45	3,115	5	Signal	50.0	6.0	II	42.5	A	0.94	
Longwood Lake Mary Rd. to General Hutchinson Pkwy	Seminole County	Arterial	URA	1	3	0	45	528	5	Signal	14.0	12.0	II	25.7	C	0.57	
General Hutchiston Pkwy to S County Club Road	Seminole County	Arterial	URA	1	2	0	45	5,333	5	Signal	146.0	36.0	II	24.9	C	0.55	
S Country Club Rd. to Silkwood Ct.	Seminole County	Arterial	URA	1	3	1	45	3,590	5	Signal	60.0	7.0	II	40.8	A	0.91	
<b>TOTAL</b>							45	17,424			355.0	68.0	II	33.5	B	0.74	0.115 gal/veh

Note:

1. The Facility type and Area type definitions were obtained from the latest Orlando Urban Area Transportation Study (OUATS) Model.
2. The Through lanes and Turn lanes are provided for the approach of the direction of travel.
3. URA - Urbarnized Residential Area

**Year 2013 METROPLAN Orlando Travel Time Study**  
**CR 427 - From Church Ave to Silkwood Court - Southbound Direction Summary - Before Condition**

Roadway Segment	Jurisdiction	Facility Type <sup>1</sup>	Area Type <sup>1</sup>	Left Turn Lanes <sup>2</sup>	Thru Lanes <sup>2</sup>	Right Turn Lanes <sup>2</sup>	Speed Limit (mph)	Distance (ft)	# Runs	Traffic Control Device	Travel Time (sec)	Stop Delay (sec)	Roadway Class	Roadway Segment		Roadway Summary	
														Average Speed		Avg Speed/Speed Limit	Avg. Fuel Consump.
														(mph)	LOS		
<b>AM PEAK HOUR</b>																	
Silkwood Ct. to S Country Club Rd.	Seminole County	Arterial	URA	1	2	0	45	3,590	6	Signal	74.0	10.0	II	33.1	B	0.74	
S Country Club Rd. to General Hutchinson Pkwy	Seminole County	Arterial	URA	1	2	0	45	5,333	6	Signal	89.0	0.0	II	40.9	A	0.91	
General Hutchinson Pkwy to Longwood Lake Mary Rd.	Seminole County	Arterial	URA	0	2	1	45	528	6	Signal	13.0	0.0	II	27.7	C	0.62	
Longwood Lake Mary Rd. to Longwood Hills Rd	Seminole County	Arterial	URA	1	2	1	45	3,115	6	Signal	76.0	38.0	II	27.9	C	0.62	
Longwood Hills Rd to Church Ave	Seminole County	Arterial	URA	1	2	0	45	4,858	6	Signal	163.0	22.0	II	20.3	D	0.45	
<b>TOTAL</b>							45	17,424			415.0	70.0	II	28.6	B	0.64	0.119 gal/veh
<b>PM PEAK HOUR</b>																	
Silkwood Ct. to S Country Club Rd.	Seminole County	Arterial	URA	1	2	0	45	3,590	5	Signal	74.0	21.0	II	33.1	B	0.74	
S Country Club Rd. to General Hutchinson Pkwy	Seminole County	Arterial	URA	1	2	0	45	5,333	5	Signal	89.0	6.0	II	40.9	A	0.91	
General Hutchinson Pkwy to Longwood Lake Mary Rd.	Seminole County	Arterial	URA	0	2	1	45	528	5	Signal	36.0	29.0	II	10.0	F	0.22	
Longwood Lake Mary Rd. to Longwood Hills Rd	Seminole County	Arterial	URA	1	2	1	45	3,115	5	Signal	71.0	42.0	II	29.9	B	0.66	
Longwood Hills Rd to Church Ave	Seminole County	Arterial	URA	1	2	0	45	4,858	5	Signal	165.0	53.0	II	20.1	D	0.45	
<b>TOTAL</b>							45	17,424			435.0	151.0	II	27.3	C	0.61	0.118 gal/veh

Note:

1. The Facility type and Area type definitions were obtained from the latest Orlando Urban Area Transportation Study (OUATS) Model.
2. The Through lanes and Turn lanes are provided for the approach of the direction of travel.
3. URA - Urbanized Residential Area

**Year 2013 MetroPlan Orlando Travel Time Study**  
*After Condition*

**Roadway:** CR 427  
**Segment:** Church Avenue to Silkwood Court  
**Jurisdiction:** Seminole County  
**Area Type:** Urbanized Residential Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 45 MPH  
**Length of Arterial:** 3.32 miles      **Arterial Class:** II  
**Distance between BlueToad Devices:** 3.45 miles

**Northbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Church Avenue	1	2	0	45	
Longwood Hills Road	1	2	0	45	
Longwood Lake Mary Road	2	3	0	45	
General Hutchinson Parkway	1	3	0	45	
S County Club Road	1	2	0	45	
Silkwood Court	1	3	1	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	8	300	41.4	A
Northbound	PM	19	324	38.3	A

**Southbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Silkwood Court	1	2	0	45	
S County Club Road	1	2	0	45	
General Hutchinson Parkway	1	2	0	45	
Longwood Lake Mary Road	0	2	1	45	
Longwood Hills Road	1	2	1	45	
Church Avenue	1	2	0	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	21	404	30.7	B
Southbound	PM	9	361	34.4	B

**CR 427 - Church Avenue to Silkwood Court**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
865	319.0	37.2	76.65	300.0	41.4	72.08
Northbound/Eastbound - PM Peak Hour						
1,349	355.0	33.5	133.03	324.0	38.3	121.41
Southbound/Westbound - AM Peak Hour						
1,272	415.0	28.6	146.63	404.0	30.7	142.75
Southbound/Westbound - PM Peak Hour						
1,145	435.0	27.3	138.35	361.0	34.4	114.82

\*Traffic Volumes are obtained from the latest 2013 Seminole County Traffic Counts.

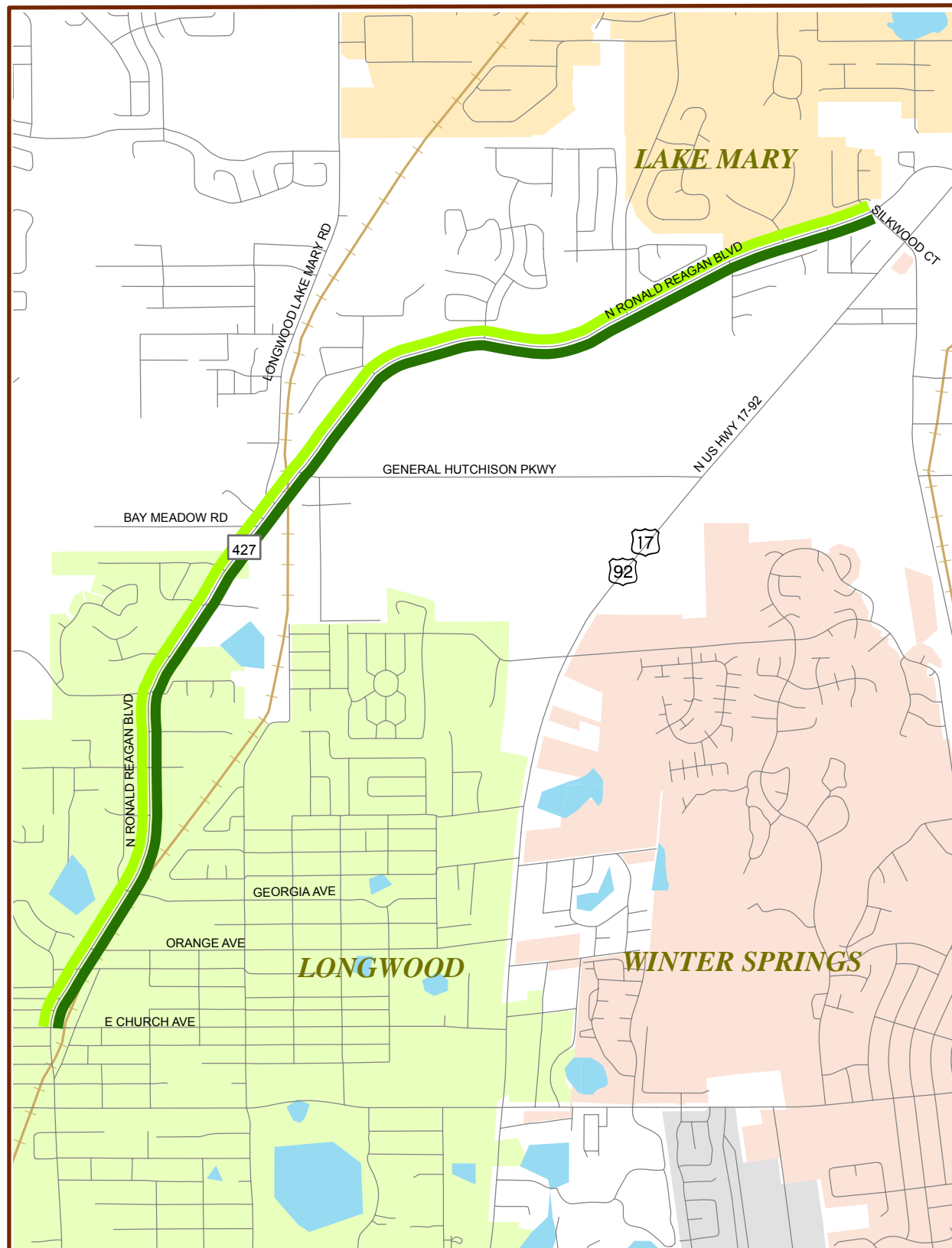
**CR 427 - Church Avenue to Silkwood Court**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	223.28	214.83	271.38	236.23

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$141.88	\$590.17
Annual User Benefit	\$42,564.00	\$177,051.00
<b>Total Annual User Benefit</b>	<b>\$219,615.00</b>	
Total Signal Retiming Annual Cost	\$14,848.44	
<b>User Benefit / Cost Ratio</b>	<b>14.79</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement is assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.



**CR 427  
- AM Peak**

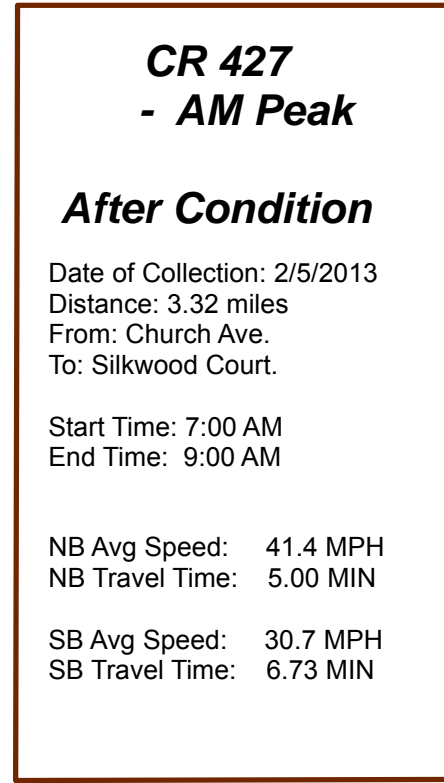
**Before Condition**

Date of Collection: 12/4/2012  
 Distance: 3.32 miles  
 From: Church Ave.  
 To: Silkwood Court.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 37.2 MPH  
 NB Travel Time: 5.32 MIN

SB Avg Speed: 28.6 MPH  
 SB Travel Time: 6.92 MIN



**CR 427  
- AM Peak**

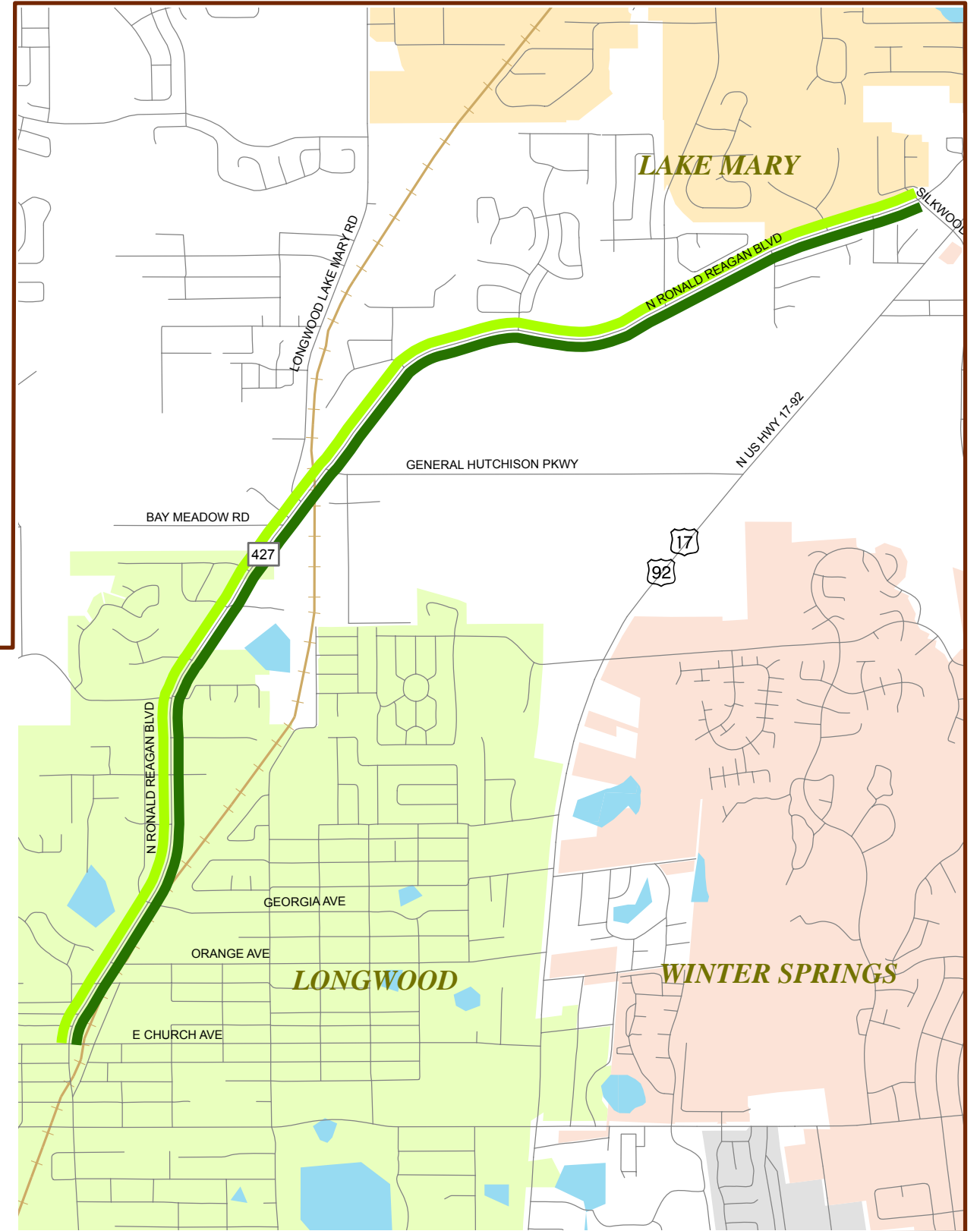
**After Condition**

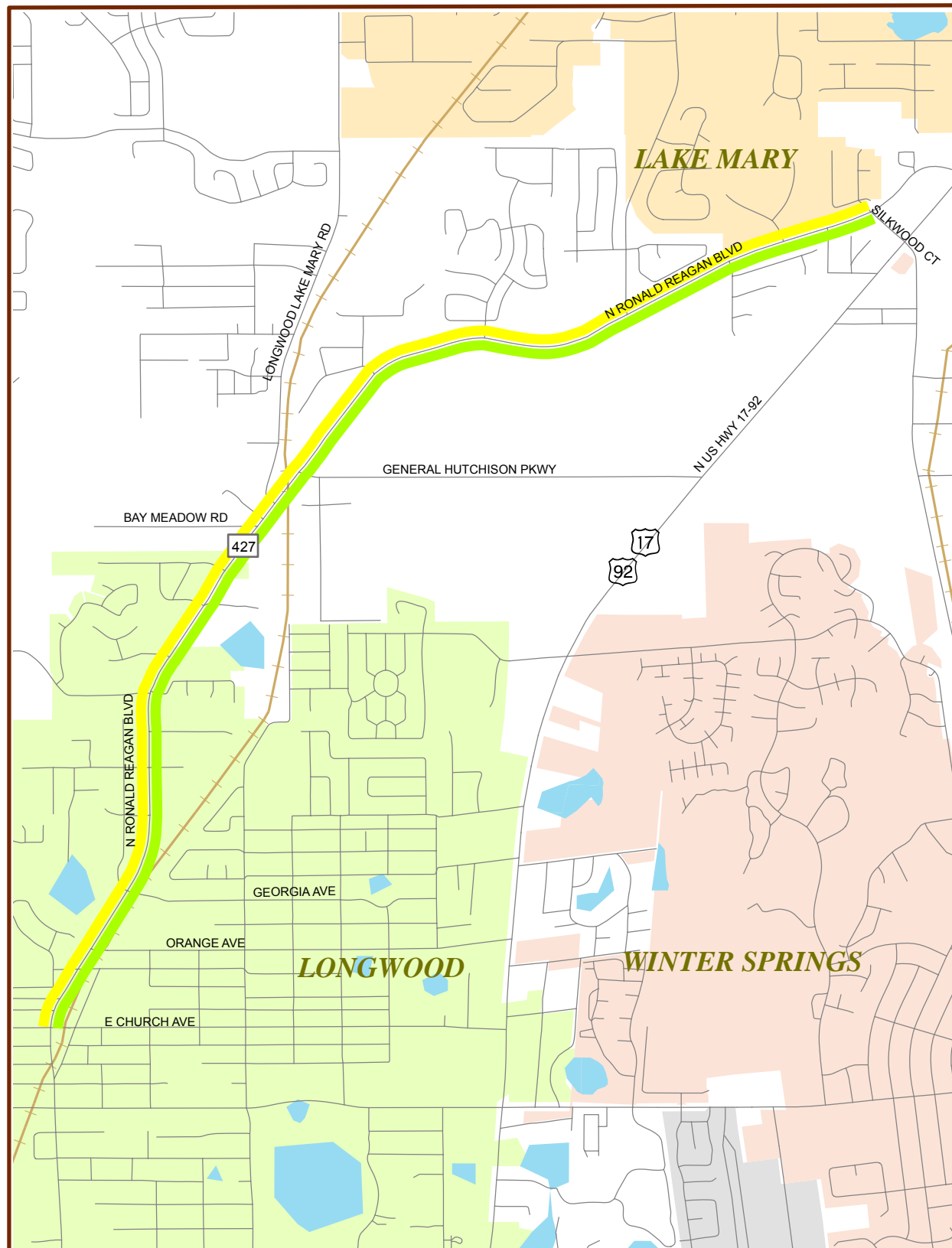
Date of Collection: 2/5/2013  
 Distance: 3.32 miles  
 From: Church Ave.  
 To: Silkwood Court.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 41.4 MPH  
 NB Travel Time: 5.00 MIN

SB Avg Speed: 30.7 MPH  
 SB Travel Time: 6.73 MIN





**CR 427  
- PM Peak**

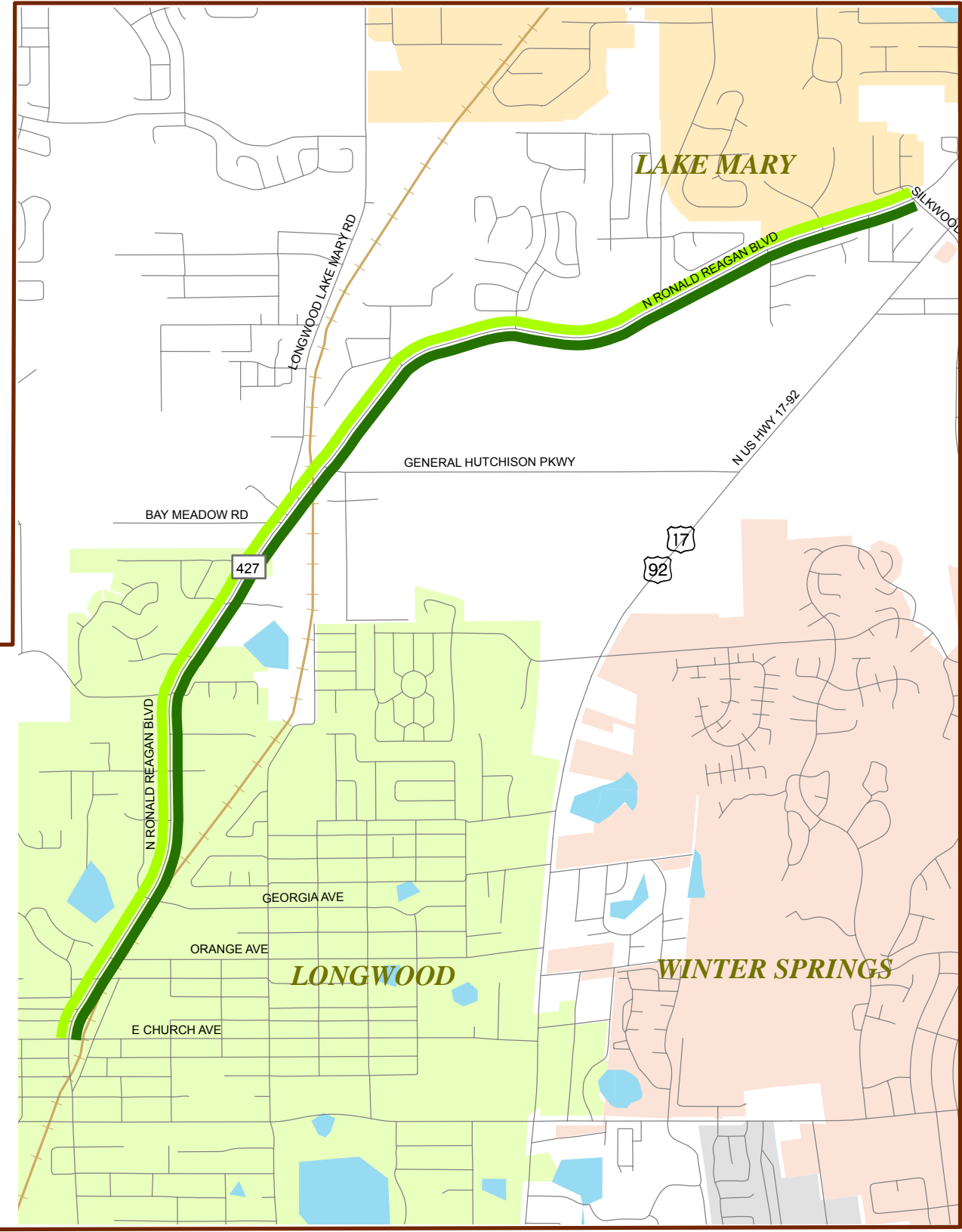
**Before Condition**

Date of Collection: 12/4/2012  
 Distance: 3.32 miles  
 From: Church Ave.  
 To: Silkwood Court.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 33.5 MPH  
 NB Travel Time: 5.92 MIN

SB Avg Speed: 27.3 MPH  
 SB Travel Time: 7.25 MIN



**CR 427  
- PM Peak**

**After Condition**

Date of Collection: 2/5/2013  
 Distance: 3.32 miles  
 From: Church Ave.  
 To: Silkwood Court.

Start Time: 4:00 PM  
 End Time: 6:00 PM

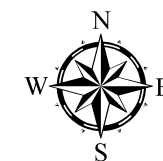
NB Avg Speed: 38.3 MPH  
 NB Travel Time: 5.40 MIN

SB Avg Speed: 34.4 MPH  
 SB Travel Time: 6.02 MIN

**Level of Services:**

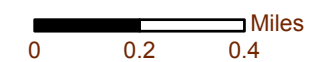


- |   |   |               |
|---|---|---------------|
| A | D | Roads         |
| B | E | City Boundary |
| C | F | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*





CR 427  
Dog Track Rd. to Plumosa Ave.

**Year 2013 MetroPlan Orlando Travel Time Study**  
*Before Condition*

**Roadway:** CR 427  
**Segment:** Pulmosa Avenue to Dog Track Road  
**Jurisdiction:** Seminole County  
**Area Type:** Urbanized Residential Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 40 MPH  
**Length of Arterial:** 0.717 miles      **Arterial Class:** II  
**Distance between BlueToad Devices:** 0.9 miles

**Northbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Pulmosa Avenue	1	2	0	40	
North Street/Warren Street	1	2	0	40	
Dog Track Road	0	2	1	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	22	133	24.4	C
Northbound	PM	37	138	23.5	C

**Southbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Dog Track Road	2	2	0	40	
North Street/Warren Street	1	2	1	40	
Pulmosa Avenue	1	2	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	36	114	28.5	B
Southbound	PM	29	112	28.9	B

**Year 2013 MetroPlan Orlando Travel Time Study**  
*After Condition*

**Roadway:** CR 427  
**Segment:** Pulmosa Avenue to Dog Track Road  
**Jurisdiction:** Seminole County  
**Area Type:** Urbanized Residential Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 40 MPH  
**Length of Arterial:** 0.717 miles      **Arterial Class:** II  
**Distance between BlueToad Devices:** 0.9 miles

**Northbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Pulmosa Avenue	1	2	0	40	
North Street/Warren Street	1	2	0	40	
Dog Track Road	0	2	1	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	27	109	29.7	B
Northbound	PM	55	118	27.5	C

**Southbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Dog Track Road	2	2	0	40	
North Street/Warren Street	1	2	1	40	
Pulmosa Avenue	1	2	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	45	86	37.7	A
Southbound	PM	28	96	33.8	B

**CR 427 - Dog Track Road to Plumosa Avenue**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
444	133.0	24.4	16.40	109.0	29.7	13.44
Northbound/Eastbound - PM Peak Hour						
744	138.0	23.5	28.52	118.0	27.5	24.39
Southbound/Westbound - AM Peak Hour						
754	114.0	28.5	23.88	86.0	37.7	18.01
Southbound/Westbound - PM Peak Hour						
571	112.0	28.9	17.76	96.0	33.8	15.23

\*Traffic Volumes are obtained from the latest 2011 Florida Traffic Information.

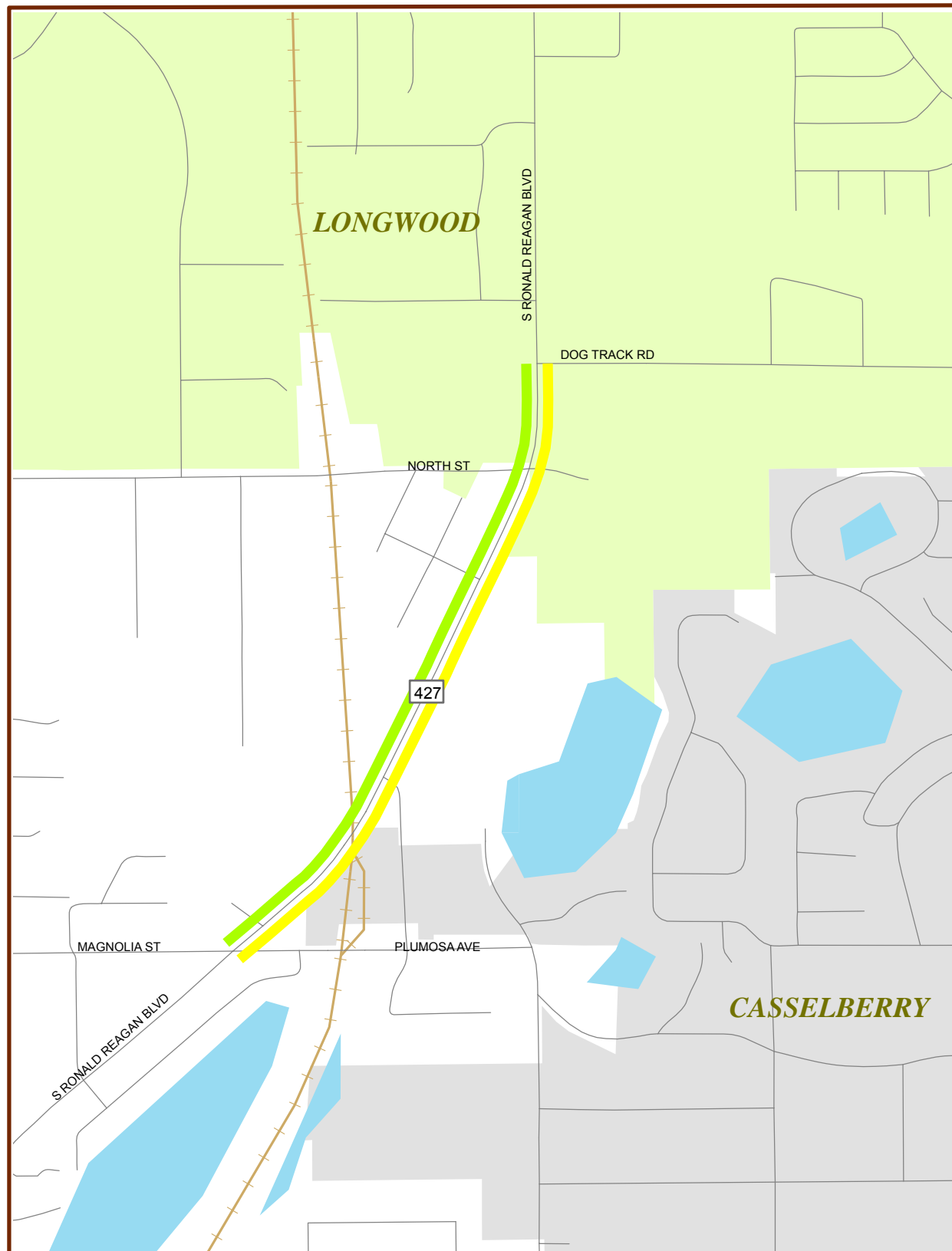
**CR 427 - Dog Track Road to Plumosa Avenue**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	40.28	31.46	46.28	39.61

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$148.09	\$111.99
<b>Annual User Benefit</b>	<b>\$44,427.00</b>	<b>\$33,597.00</b>
<b>Total Annual User Benefit =</b>	<b>\$78,024.00</b>	
Total Signal Retiming Annual Cost	\$7,424.41	
<b>User Benefit / Cost Ratio</b>	<b>10.51</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement is assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.



**CR 427  
- AM Peak**

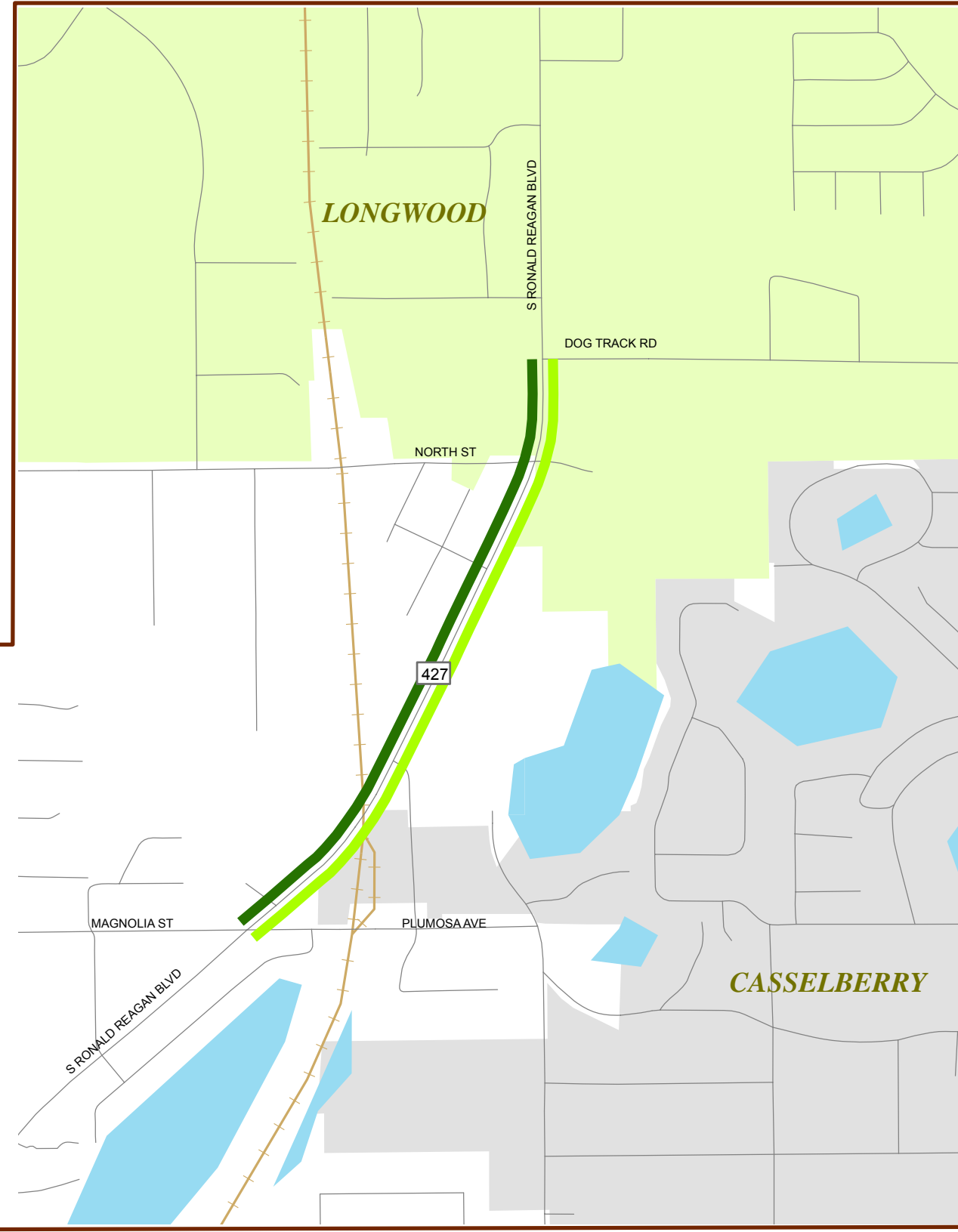
**Before Condition**

Date of Collection: 11/28/2012  
 Distance: 0.717 miles  
 From: Dog Track Rd.  
 To: Plumosa Ave.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 24.4 MPH  
 NB Travel Time: 2.22 MIN

SB Avg Speed: 28.5 MPH  
 SB Travel Time: 1.90 MIN



**CR 427  
- AM Peak**

**After Condition**

Date of Collection: 2/5/2013  
 Distance: 0.717 miles  
 From: Dog Track Rd.  
 To: Plumosa Ave.

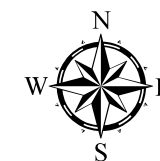
Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 29.7 MPH  
 NB Travel Time: 1.82 MIN

SB Avg Speed: 37.7 MPH  
 SB Travel Time: 1.43 MIN

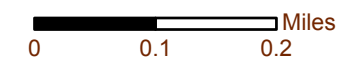
**Level of Services:**

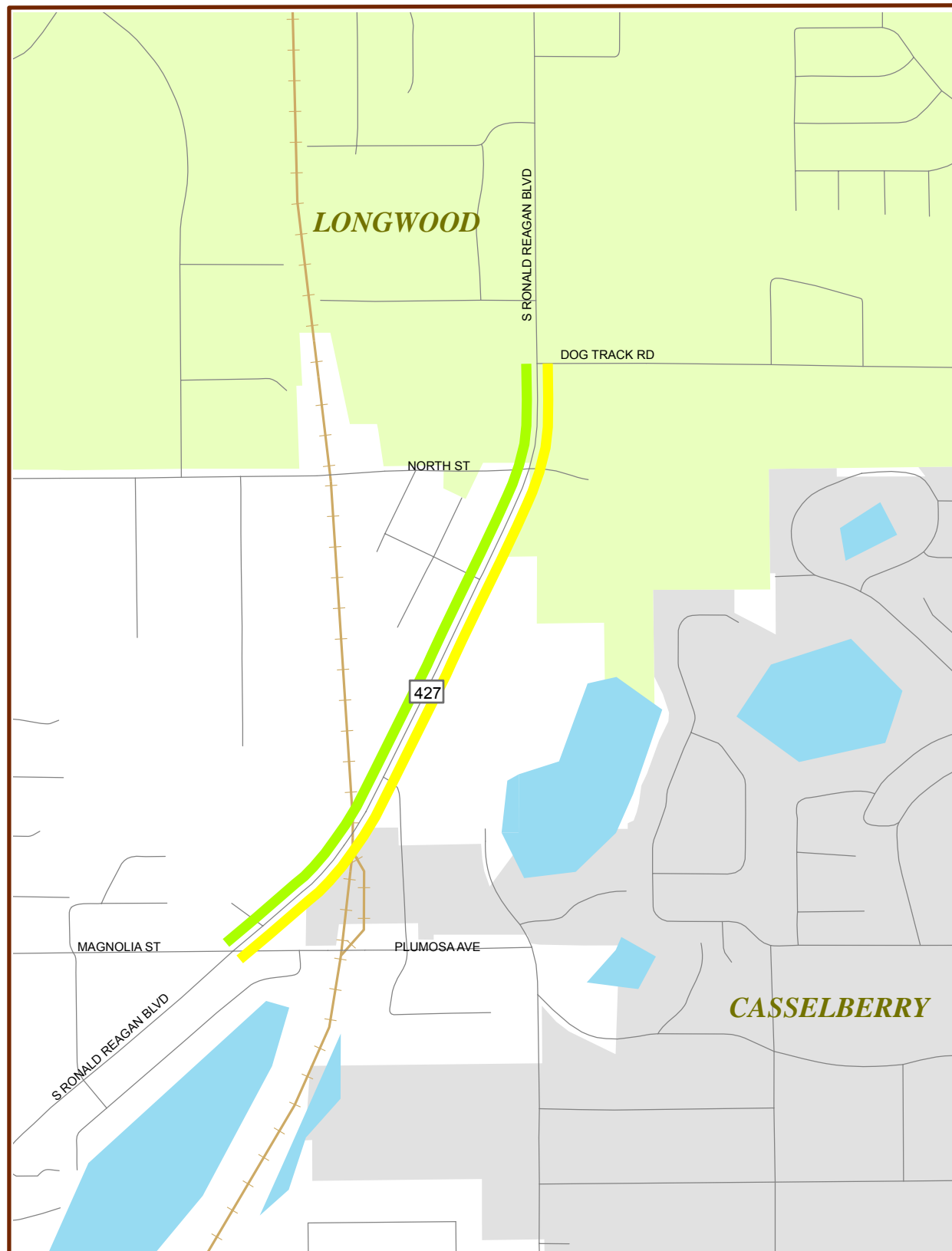
- |  |   |  |   |  |               |
|--|---|--|---|--|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*





**CR 427  
- PM Peak**

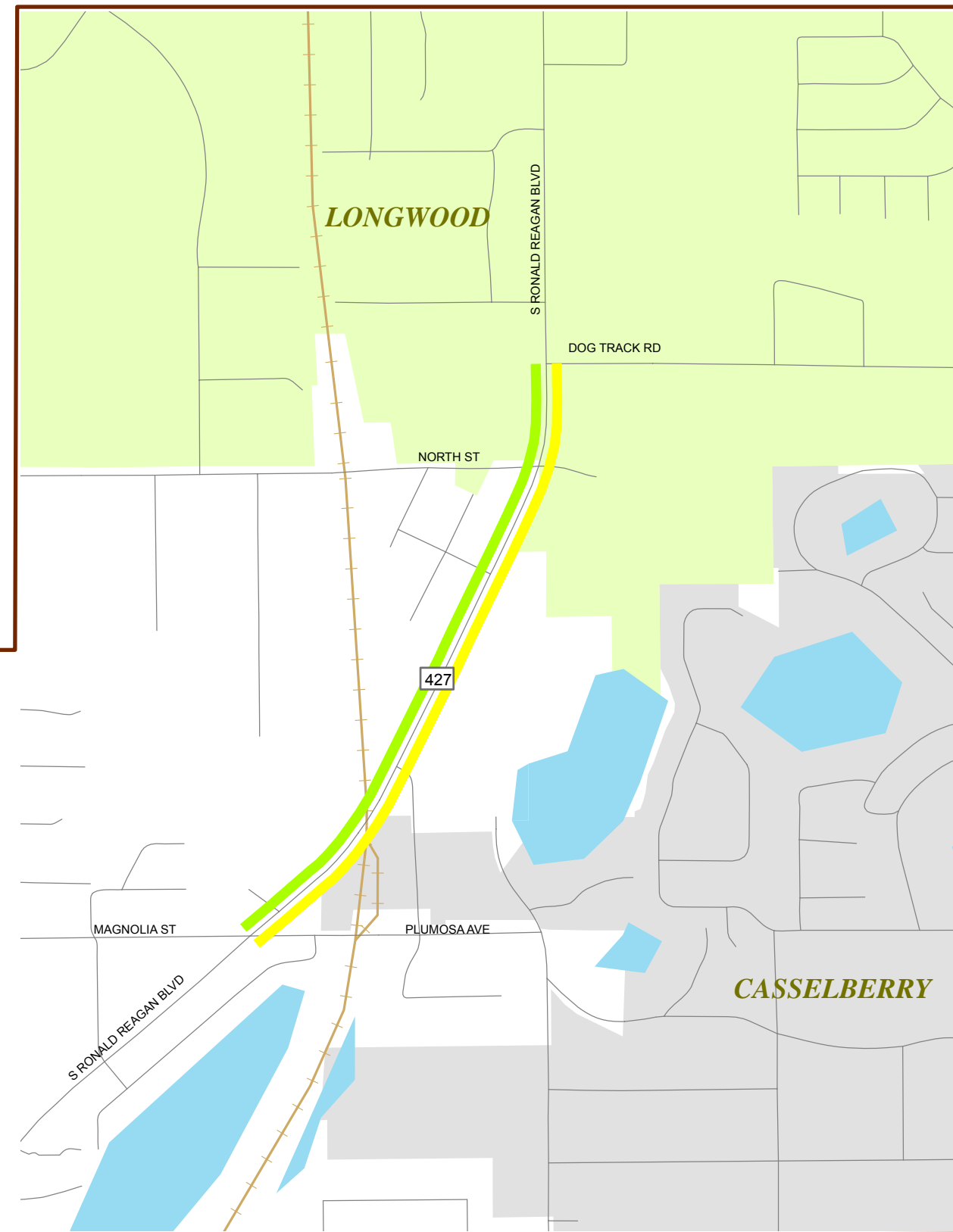
**Before Condition**

Date of Collection: 11/28/2012  
 Distance: 0.717 miles  
 From: Dog Track Rd.  
 To: Plumosa Ave.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 23.5 MPH  
 NB Travel Time: 2.30 MIN

SB Avg Speed: 28.9 MPH  
 SB Travel Time: 1.87 MIN



**CR 427  
- PM Peak**

**After Condition**

Date of Collection: 2/5/2013  
 Distance: 0.717 miles  
 From: Dog Track Rd.  
 To: Plumosa Ave.

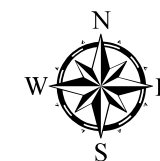
Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 27.5 MPH  
 NB Travel Time: 1.97 MIN

SB Avg Speed: 33.8 MPH  
 SB Travel Time: 1.60 MIN

**Level of Services:**

- |   |   |               |
|---|---|---------------|
| A | D | Roads         |
| B | E | City Boundary |
| C | F | Water         |



SR 434  
Mitchell Hammock Rd. to Palm Valley Dr.



**Year 2013 MetroPlan Orlando Travel Time Study**  
*Before Condition*

**Roadway:** SR 434  
**Segment:** Mitchell Hammock Road to Palm Valley Drive  
**Jurisdiction:** Seminole County  
**Area Type:** Urbanized Residential Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 45/50 MPH  
**Length of Arterial:** 2.76 miles    **Arterial Class:** II  
**Distance between BlueToad Devices:** 2.9 miles

**Northbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Palmvalley Drive	1	3	0	50	
Carrigan Avenue	1	3	0	50	
Chapman Road	2	3	0	50	
Alafaya Woods Boulevard	1	3	1	50	
Mitchell Hammock Road	2	2	1	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	8	296	35.3	A
Northbound	PM	22	341	30.6	B

**Southbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Mitchell Hammock Road	1	2	0	45	
Alafaya Woods Boulevard	1	3	0	50	
Chapman Road	1	3	1	50	
Carrigan Avenue	1	3	0	50	
Palmvalley Drive	1	3	0	50	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	23	277	37.7	A
Southbound	PM	6	370	28.2	B

**Year 2013 MetroPlan Orlando Travel Time Study**  
*After Condition*

**Roadway:** SR 434  
**Segment:** Mitchell Hammock Road to Palm Valley Drive  
**Jurisdiction:** Seminole County  
**Area Type:** Urbanized Residential Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 45/50 MPH  
**Length of Arterial:** 2.76 miles **Arterial Class:** II  
**Distance between BlueToad Devices:** 2.9 miles

**Northbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Palmvalley Drive	1	3	0	50	
Carrigan Avenue	1	3	0	50	
Chapman Road	2	3	0	50	
Alafaya Woods Boulevard	1	3	1	50	
Mitchell Hammock Road	2	2	1	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	7	250	41.8	A
Northbound	PM	13	325	32.1	B

**Southbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Mitchell Hammock Road	1	2	0	45	
Alafaya Woods Boulevard	1	3	0	50	
Chapman Road	1	3	1	50	
Carrigan Avenue	1	3	0	50	
Palmvalley Drive	1	3	0	50	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	17	258	40.5	A
Southbound	PM	10	352	29.7	B

## SR 434 - Mitchell Hammock Road to Palm Valley Drive

### Summary of Before & After Study Travel Time Results

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
1,376	296.0	35.3	113.14	250.0	41.8	95.56
Northbound/Eastbound - PM Peak Hour						
2,452	341.0	30.6	232.26	325.0	32.1	221.36
Southbound/Westbound - AM Peak Hour						
2,387	277.0	37.7	183.67	258.0	40.5	171.07
Southbound/Westbound - PM Peak Hour						
1,368	370.0	28.2	140.60	352.0	29.7	133.76

\*Traffic Volumes are obtained from the latest 2013 Seminole County Traffic Counts

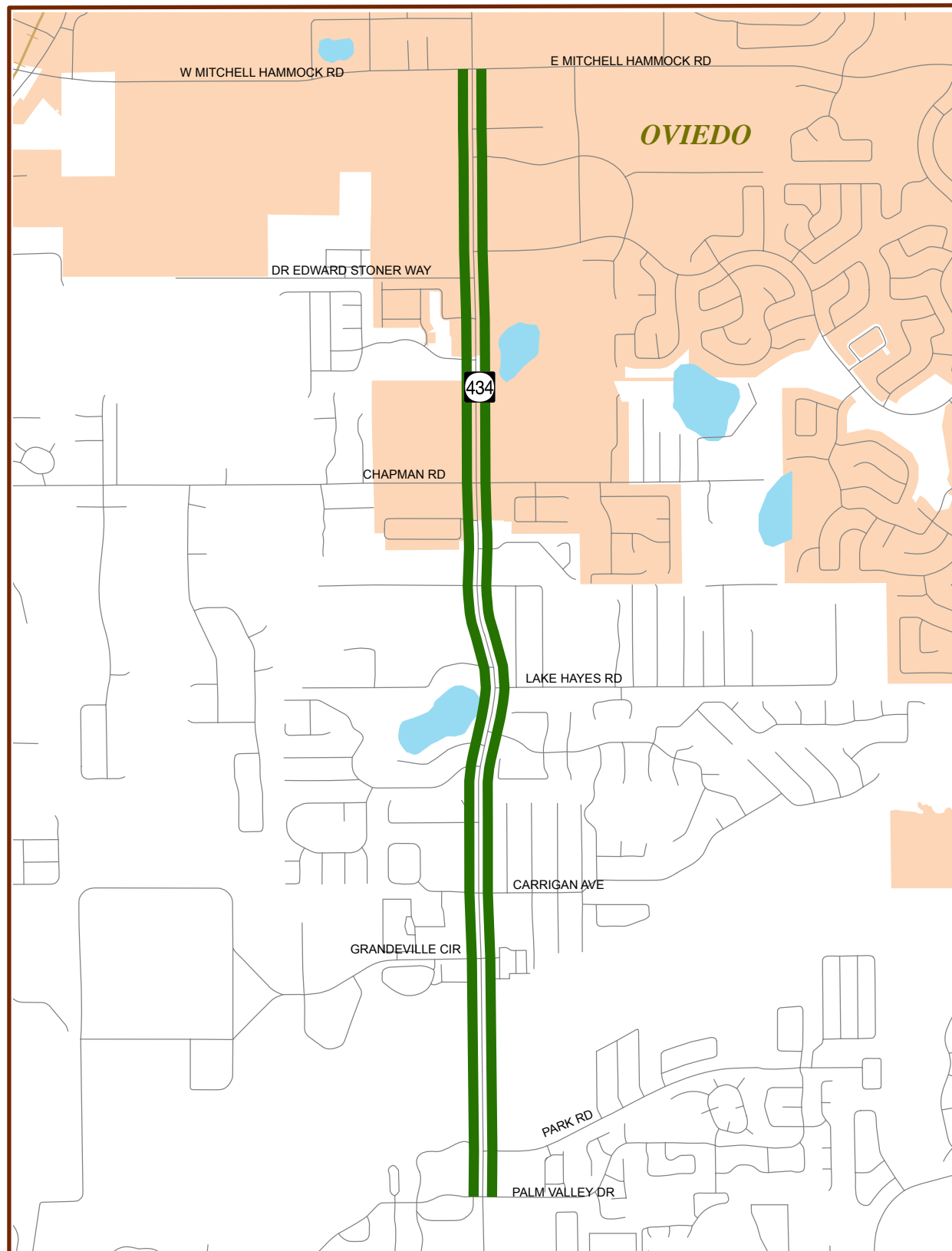
**SR 434 - Mitchell Hammock Road to Palm Valley Drive**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	296.80	266.62	372.86	355.12

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$506.72	\$297.85
<b>Annual User Benefit</b>	<b>\$152,016.00</b>	<b>\$89,355.00</b>
<b>Total Annual User Benefit =</b>	<b>\$241,371.00</b>	
Total Signal Retiming Annual Cost	\$13,024.35	
<b>User Benefit / Cost Ratio</b>	<b>18.53</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement was assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.



**SR 434  
- AM Peak**

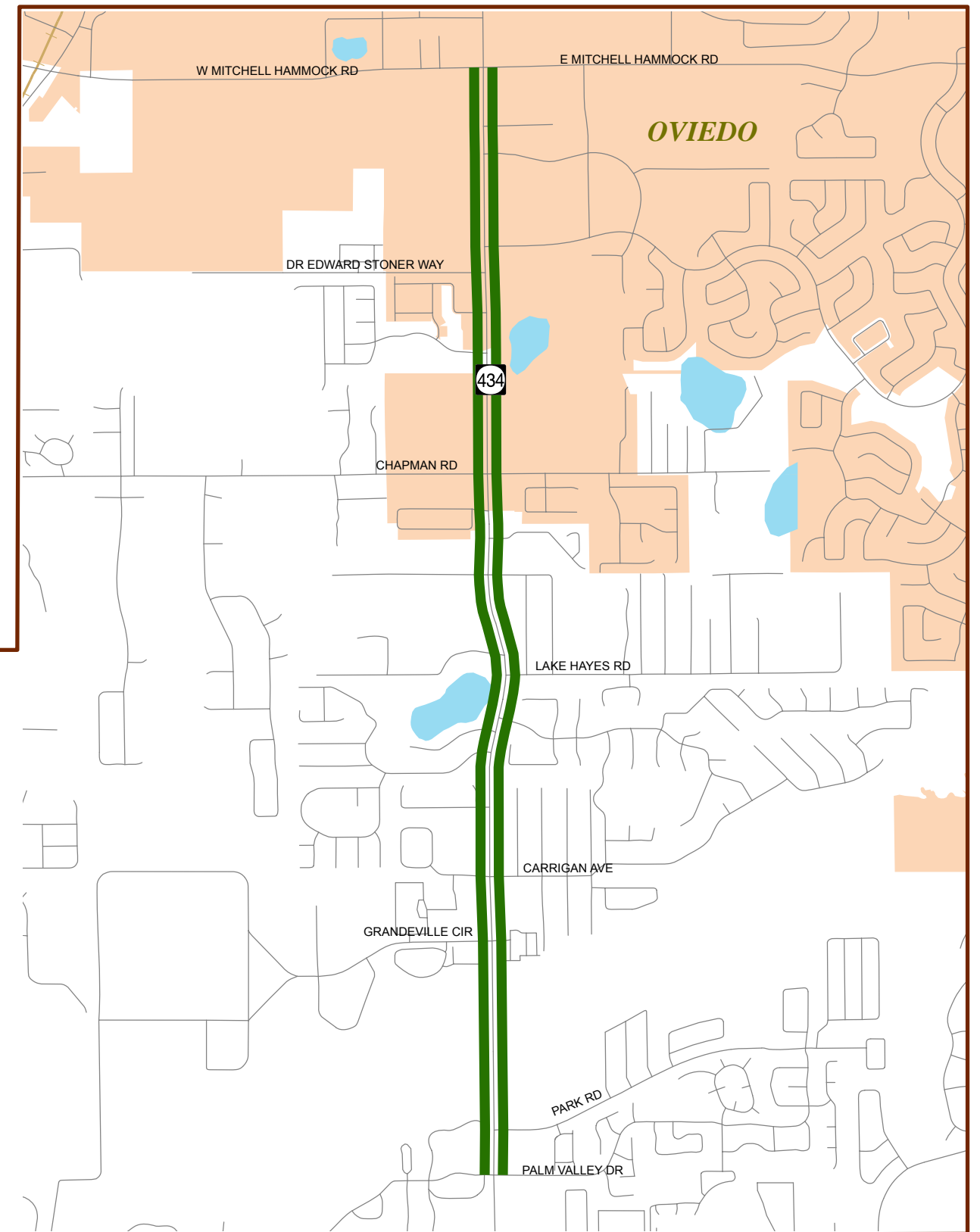
**Before Condition**

Date of Collection: 12/18/2012  
 Distance: 2.76 miles  
 From: Mitchell Hammock Rd.  
 To: Palm Valley Dr.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 35.3 MPH  
 NB Travel Time: 4.93 MIN

SB Avg Speed: 37.7 MPH  
 SB Travel Time: 4.62 MIN



**SR 434  
- AM Peak**

**After Condition**

Date of Collection: 2/19/2013  
 Distance: 2.76 miles  
 From: Mitchell Hammock Rd.  
 To: Palm Valley Dr.

Start Time: 7:00 AM  
 End Time: 9:00 AM

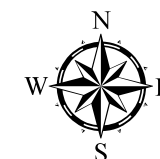
NB Avg Speed: 41.8 MPH  
 NB Travel Time: 4.17 MIN

SB Avg Speed: 40.5 MPH  
 SB Travel Time: 4.30 MIN

**Level of Services:**

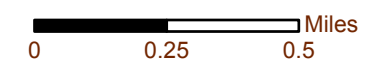


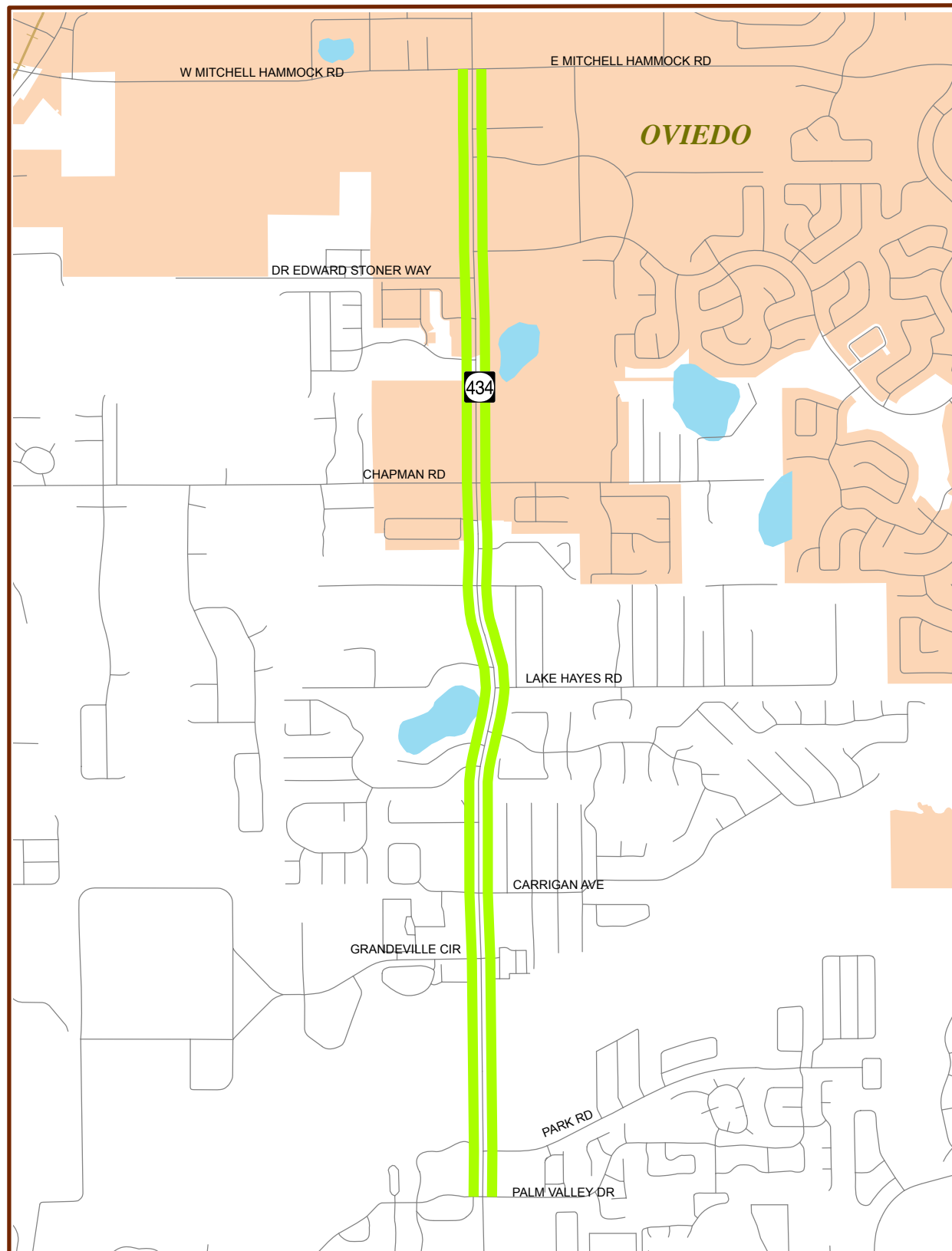
- |  |   |   |
|--|---|---|
|  A |  D |  Roads         |
|  B |  E |  City Boundary |
|  C |  F |  Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*





**SR 434  
- PM Peak**

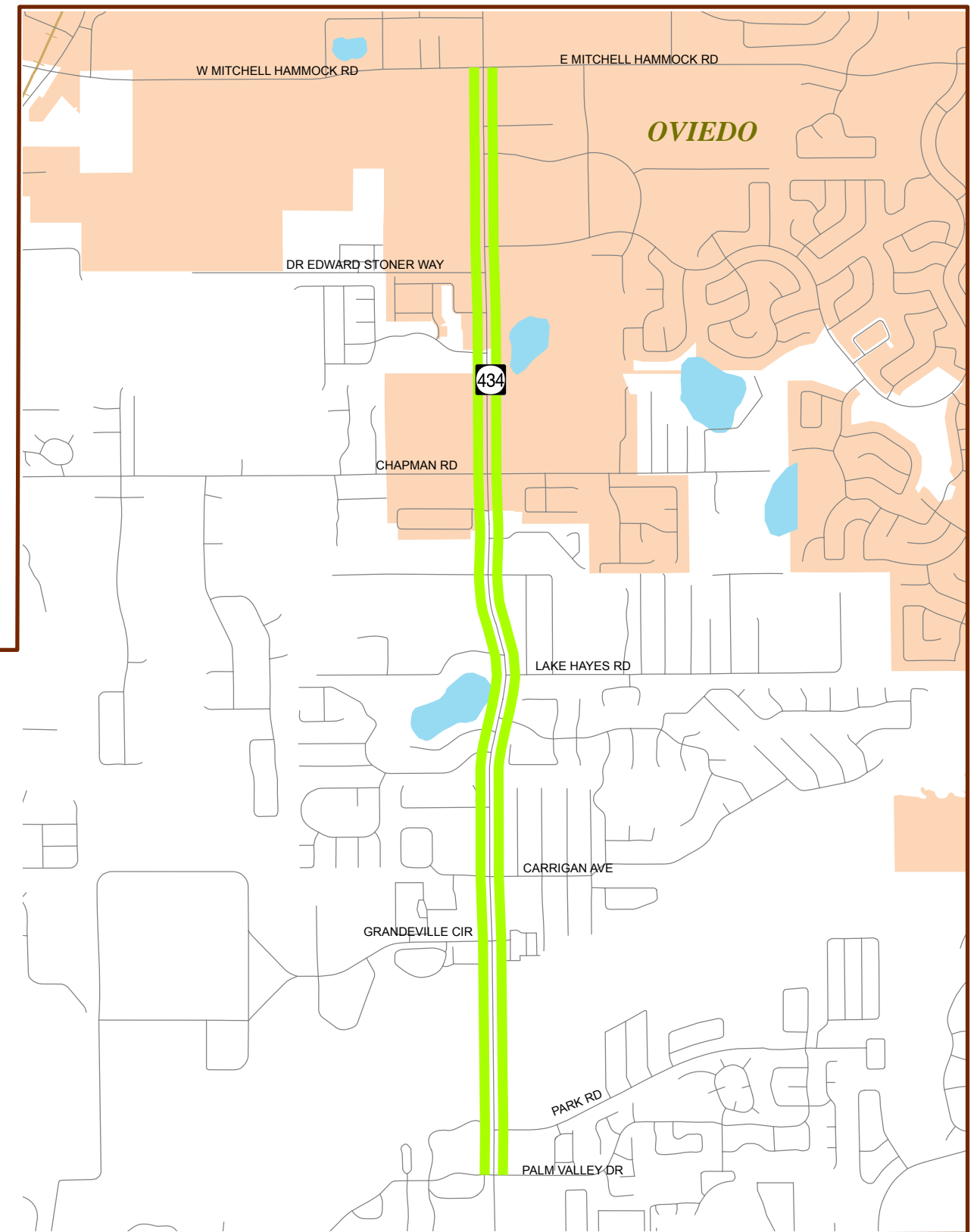
**Before Condition**

Date of Collection: 12/18/2013  
 Distance: 2.76 miles  
 From: Mitchell Hammock Rd.  
 To: Palm Valley Dr.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 30.6 MPH  
 NB Travel Time: 5.68 MIN

SB Avg Speed: 28.2 MPH  
 SB Travel Time: 6.17 MIN



**SR 434  
- PM Peak**

**After Condition**

Date of Collection: 2/19/2013  
 Distance: 2.76 miles  
 From: Mitchell Hammock Rd.  
 To: Palm Valley Dr.

Start Time: 4:00 PM  
 End Time: 6:00 PM

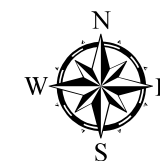
NB Avg Speed: 32.1 MPH  
 NB Travel Time: 5.42 MIN

SB Avg Speed: 29.7 MPH  
 SB Travel Time: 5.87 MIN



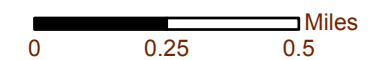
**Level of Services:**

- |  |   |   |   |   |               |
|--|---|---|---|---|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*



**CR 46A**  
**Hartwell Ave. to International Pkwy.**

**Year 2013 MetroPlan Orlando Travel Time Study**  
*Before Condition*

**Roadway:** CR 46A  
**Segment:** Hartwell Avenue to International Parkway  
**Jurisdiction:** Seminole County  
**Area Type:** Urbanized Residential Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 35/40/45 MPH  
**Length of Arterial:** 4.73 miles    **Arterial Class:** II  
**Distance between BlueToad Devices:** 4.9 miles

**Eastbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
International Parkway	1	2	0	35	
Colonial Center Parkway	1	2	1	40	
I-4 NB On Ramp	2	2	0	40	
Rinehart Road	2	2	1	40	
S Oregon Avenue	1	2	0	40	
Country Club Road	1	2	1	40	
Upsala Road	1	2	0	40	
Vihlen Road	1	2	0	40	
Casa Verde Boulevard	1	2	1	40	
SR 417 SB On Ramp	0	2	1	40	
SR 417 NB On Ramp	1	2	0	40	
W Airport Boulevard	2	2	1	40	
Old Lake Mary Road	1	2	0	40	
Ridgewood Avenue	0	2	0	45	
Hartwell Avenue	0	2	0	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	60	517	34.1	B
Eastbound	PM	91	598	29.5	B



**Westbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Hartwell Avenue	0	2	0	40	
Ridgewood Avenue	0	2	0	40	
Old Lake Mary Road	1	2	0	40	
W Airport Boulevard	1	2	0	40	
SR 417 NB On Ramp	0	2	0	40	
SR 417 SB On Ramp	1	2	0	40	
Cas Verde Boulevard	1	2	0	40	
Vihlen Road	1	2	0	40	
Upsala Road	0	2	0	40	
Country Club Road	1	2	0	40	
S Oregon Avenue	1	2	0	40	
Rinehart Road	1	2	1	40	
I-4 NB On Ramp	0	2	0	40	
Colonial Center Parkway	2	2	1	45	
International Parkway	2	2	1	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	65	632	27.9	C
Westbound	PM	54	650	27.1	C

## Year 2013 MetroPlan Orlando Travel Time Study

*After Condition*

**Roadway:** CR 46A  
**Segment:** Hartwell Avenue to International Parkway  
**Jurisdiction:** Seminole County  
**Area Type:** Urbanized Residential Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 35/40/45 MPH  
**Length of Arterial:** 4.73 miles    **Arterial Class:** II  
**Distance between BlueToad Devices:** 4.9 miles

*Eastbound Direction:*

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
International Parkway	1	2	0	35	
Colonial Center Parkway	1	2	1	40	
I-4 NB On Ramp	2	2	0	40	
Rinehart Road	2	2	1	40	
S Oregon Avenue	1	2	0	40	
Country Club Road	1	2	1	40	
Upsala Road	1	2	0	40	
Vihlen Road	1	2	0	40	
Casa Verde Boulevard	1	2	1	40	
SR 417 SB On Ramp	0	2	1	40	
SR 417 NB On Ramp	1	2	0	40	
W Airport Boulevard	2	2	1	40	
Old Lake Mary Road	1	2	0	40	
Ridgewood Avenue	0	2	0	45	
Hartwell Avenue	0	2	0	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	69	506	34.9	B
Eastbound	PM	82	533	33.1	B

*Westbound Direction:*

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Hartwell Avenue	0	2	0	40	
Ridgewood Avenue	0	2	0	40	
Old Lake Mary Road	1	2	0	40	
W Airport Boulevard	1	2	0	40	
SR 417 NB On Ramp	0	2	0	40	
SR 417 SB On Ramp	1	2	0	40	
Cas Verde Boulevard	1	2	0	40	
Vihlen Road	1	2	0	40	
Upsala Road	0	2	0	40	
Country Club Road	1	2	0	40	
S Oregon Avenue	1	2	0	40	
Rinehart Road	1	2	1	40	
I-4 NB On Ramp	0	2	0	40	
Colonial Center Parkway	2	2	1	45	
International Parkway	2	2	1	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	84	533	33.1	B
Westbound	PM	117	633	27.9	C

## CR 46A - International Drive to Hartwell Avenue

### Summary of Before & After Study Travel Time Results

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
1,541	517.0	34.1	221.30	506.0	34.9	216.60
Northbound/Eastbound - PM Peak Hour						
2,061	598.0	29.5	342.36	533.0	33.1	305.14
Southbound/Westbound - AM Peak Hour						
1,533	632.0	27.9	269.13	533.0	33.1	226.97
Southbound/Westbound - PM Peak Hour						
1,512	650.0	27.1	273.00	633.0	27.9	265.86

\*Traffic Volumes are obtained from the latest 2013 Seminole County Traffic Counts

**CR 46A - International Drive to Hartwell Avenue**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	490.43	443.57	615.36	571.00

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$786.78	\$744.80
Annual User Benefit	\$236,034.00	\$223,440.00
<b>Total Annual User Benefit =</b>	<b>\$459,474.00</b>	
Total Signal Retiming Annual Cost	\$37,232.18	
<b>User Benefit / Cost Ratio</b>	<b>12.34</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement is assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.

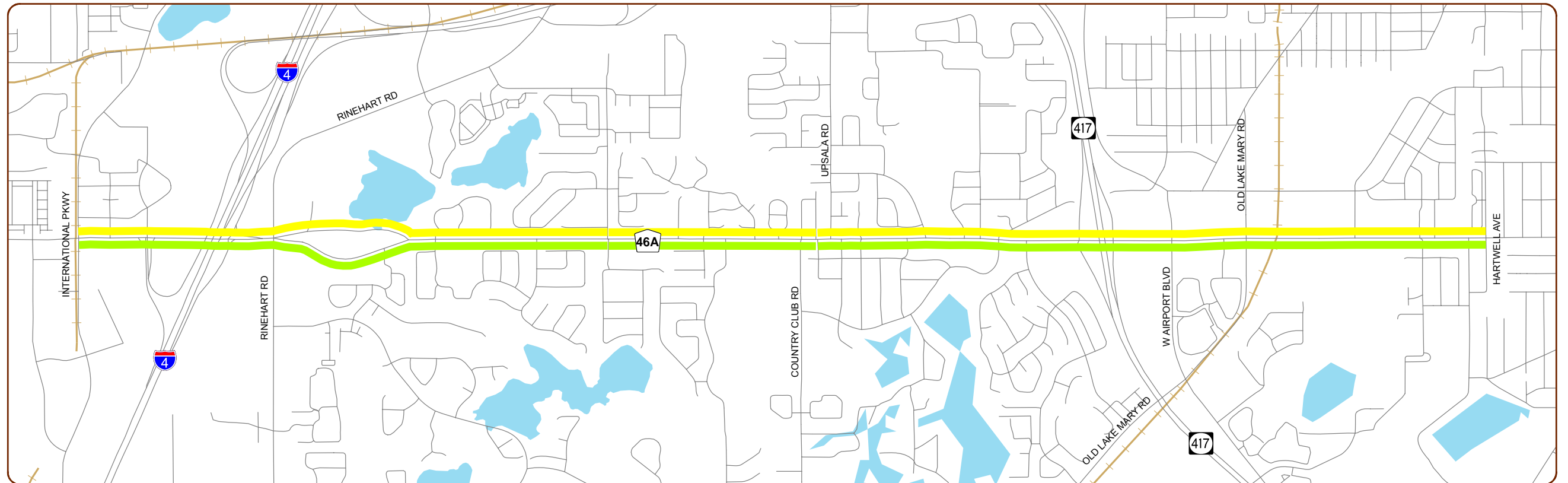
**CR 46A  
- AM Peak  
Before Condition**

Date of Collection: 1/29/2013  
Distance: 4.73 miles  
From: International Pkwy.  
To: Hartwell Ave.

Start Time: 7:00 AM  
End Time: 9:00 AM

EB Avg Speed: 34.1 MPH  
EB Travel Time: 8.62 MIN

WB Avg Speed: 27.9 MPH  
WB Travel Time: 10.53 MIN



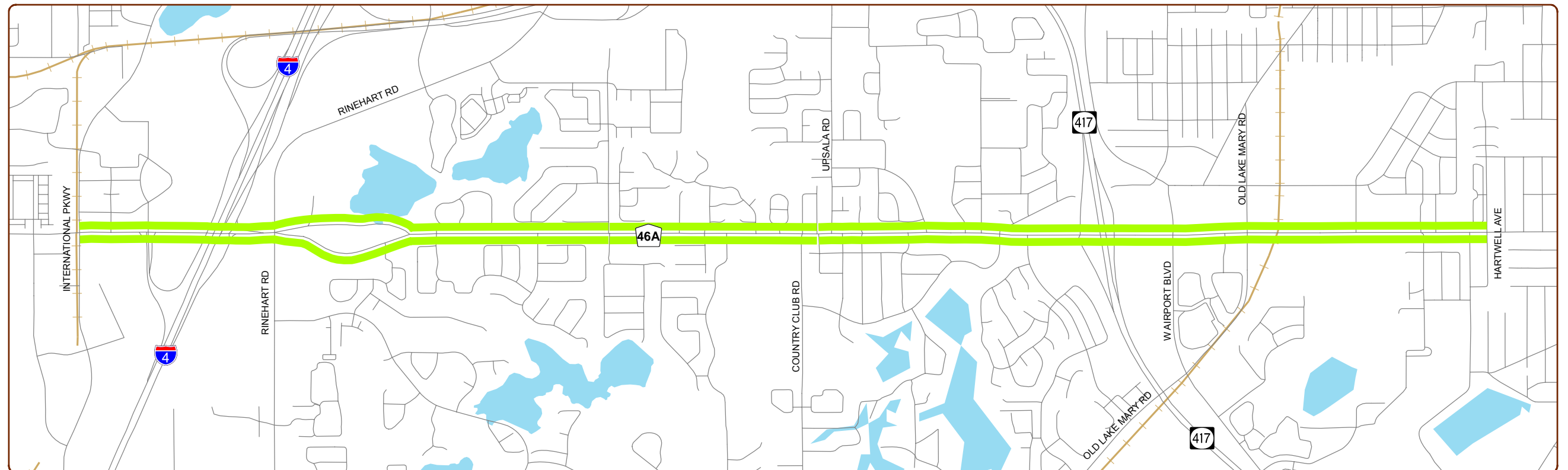
**CR 46A  
- AM Peak  
After Condition**

Date of Collection: 2/21/2013  
Distance: 4.73 miles  
From: International Pkwy.  
To: Hartwell Ave.

Start Time: 7:00 AM  
End Time: 9:00 AM

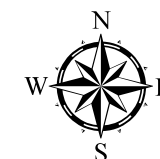
EB Avg Speed: 34.9 MPH  
EB Travel Time: 8.43 MIN

WB Avg Speed: 33.1 MPH  
WB Travel Time: 8.88 MIN



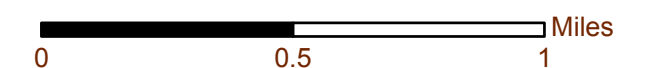
**Level of Services:**

- |  |   |  |   |  |               |
|--|---|--|---|--|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*



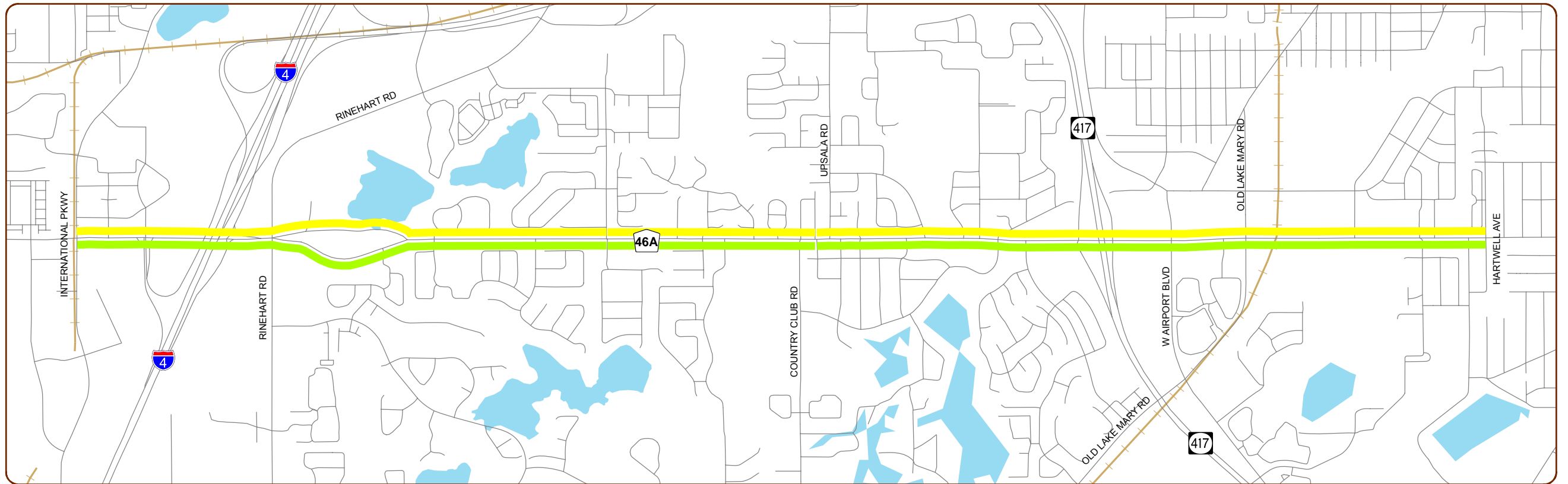
**CR 46A  
- PM Peak  
Before Condition**

Date of Collection: 1/29/2013  
Distance: 4.73 miles  
From: International Pkwy.  
To: Hartwell Ave.

Start Time: 4:00 PM  
End Time: 6:00 PM

EB Avg Speed: 29.5 MPH  
EB Travel Time: 9.97 MIN

WB Avg Speed: 27.1 MPH  
WB Travel Time: 10.83 MIN



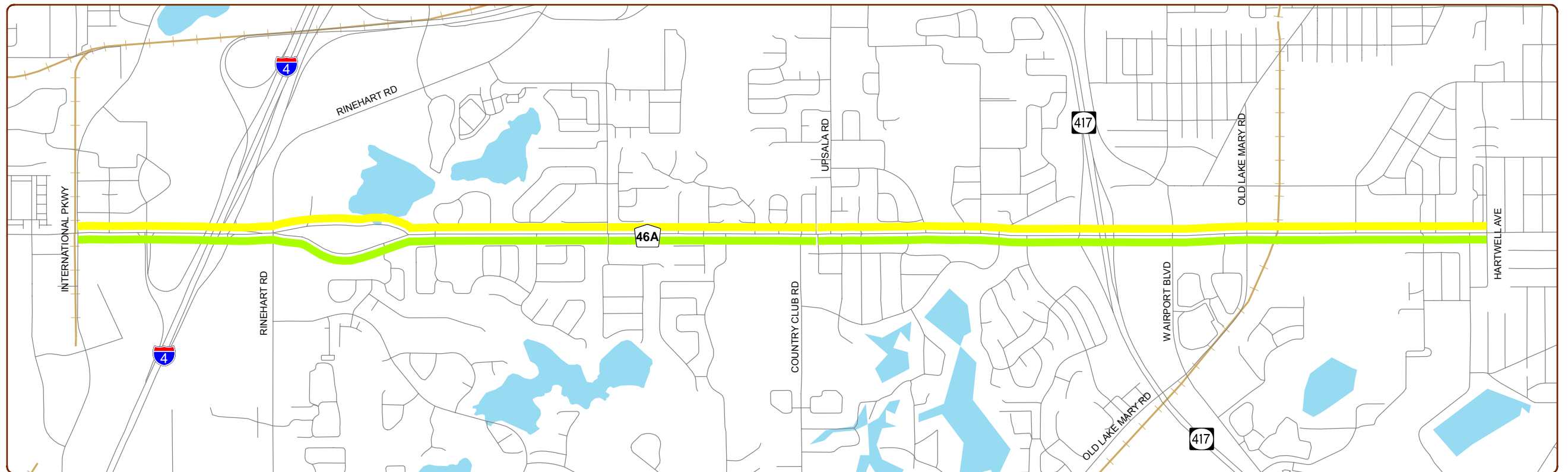
**CR 46A  
- PM Peak  
After Condition**

Date of Collection: 2/21/2013  
Distance: 4.73 miles  
From: International Pkwy.  
To: Hartwell Ave.

Start Time: 4:00 PM  
End Time: 6:00 PM

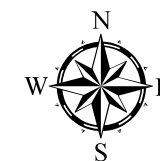
EB Avg Speed: 33.1 MPH  
EB Travel Time: 8.88 MIN

WB Avg Speed: 27.90 MPH  
WB Travel Time: 10.55 MIN



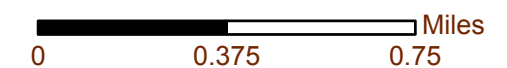
**Level of Services:**

- |  |   |  |   |  |               |
|--|---|--|---|--|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*



**SR 434**  
**McCulloch Rd. to Challenger Pkwy.**



## Year 2013 MetroPlan Orlando Travel Time Study

*Before Condition*

**Roadway:** SR 434 (Alafaya Trail)  
**Segment:** McCulloch Road to Challenger Parkway  
**Jurisdiction:** Orange County  
**Area Type:** Urbanized Residential Area/Other Outlying Business District  
**Facility Type:** Divided Arterial  
**Speed Limit:** 45 MPH  
**Length of Arterial:** 2.67 miles    **Arterial Class:** I  
**Distance between BlueToad Devices:** 2.9 miles

### Northbound Direction

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Challenger Parkway	1	3	0	45	
Lokanotosa Trail/Science Drive	1	3	0	45	
Research Parkway	1	3	0	45	
Central Florida Boulevard	1	3	1	45	
University Boulevard	2	3	1	45	
Centaurus Drive W	2	3	0	45	
Gemini Boulevard	1	3	1	45	
Mcculloch Road	1	3	1	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	23	357	29.2	C
Northbound	PM	22	491	21.3	D

### Southbound Direction

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Mcculloch Road	2	3	1	45	
Gemini Boulevard	1	3	1	45	
Centaurus Drive W	2	3	0	45	
University Boulevard	2	3	1	45	
Central Florida Boulevard	2	3	0	45	
Research Parkway	2	3	0	45	
Lokanotosa Trail/Science Drive	1	3	0	45	
Challenger Parkway	2	3	0	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	24	354	29.5	C
Southbound	PM	27	637	16.4	E

## Year 2013 MetroPlan Orlando Travel Time Study

*After Condition*

**Roadway:** SR 434 (Alafaya Trail)  
**Segment:** McCulloch Road to Challenger Parkway  
**Jurisdiction:** Orange County  
**Area Type:** Urbanized Residential Area/Other Outlying Business District  
**Facility Type:** Divided Arterial  
**Speed Limit:** 45 MPH  
**Length of Arterial:** 2.67 miles    **Arterial Class:** I  
**Distance between BlueToad Devices:** 2.9 miles

### Northbound Direction

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Challenger Parkway	1	3	0	45	
Lokanotosa Trail/Science Drive	1	3	0	45	
Research Parkway	1	3	0	45	
Central Florida Boulevard	1	3	1	45	
University Boulevard	2	3	1	45	
Centaurus Drive W	2	3	0	45	
Gemini Boulevard	1	3	1	45	
McCulloch Road	1	3	1	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	14	316	33.0	C
Northbound	PM	10	367	28.4	C

### Southbound Direction

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
McCulloch Road	2	3	1	45	
Gemini Boulevard	1	3	1	45	
Centaurus Drive W	2	3	0	45	
University Boulevard	2	3	1	45	
Central Florida Boulevard	2	3	0	45	
Research Parkway	2	3	0	45	
Lokanotosa Trail/Science Drive	1	3	0	45	
Challenger Parkway	2	3	0	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	24	296	35.3	B
Southbound	PM	27	473	22.1	D

**SR 434 - McCulloch Road to Challenger Parkway**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
2,308	357.0	29.2	228.88	316.0	33.0	202.59
Northbound/Eastbound - PM Peak Hour						
1,969	491.0	21.3	268.55	367.0	28.4	200.73
Southbound/Westbound - AM Peak Hour						
1,147	354.0	29.5	112.79	296.0	35.3	94.31
Southbound/Westbound - PM Peak Hour						
2,551	637.0	16.4	451.39	473.0	22.1	335.17

\*Traffic Volumes are obtained from the latest 2013 Seminole County Traffic Counts

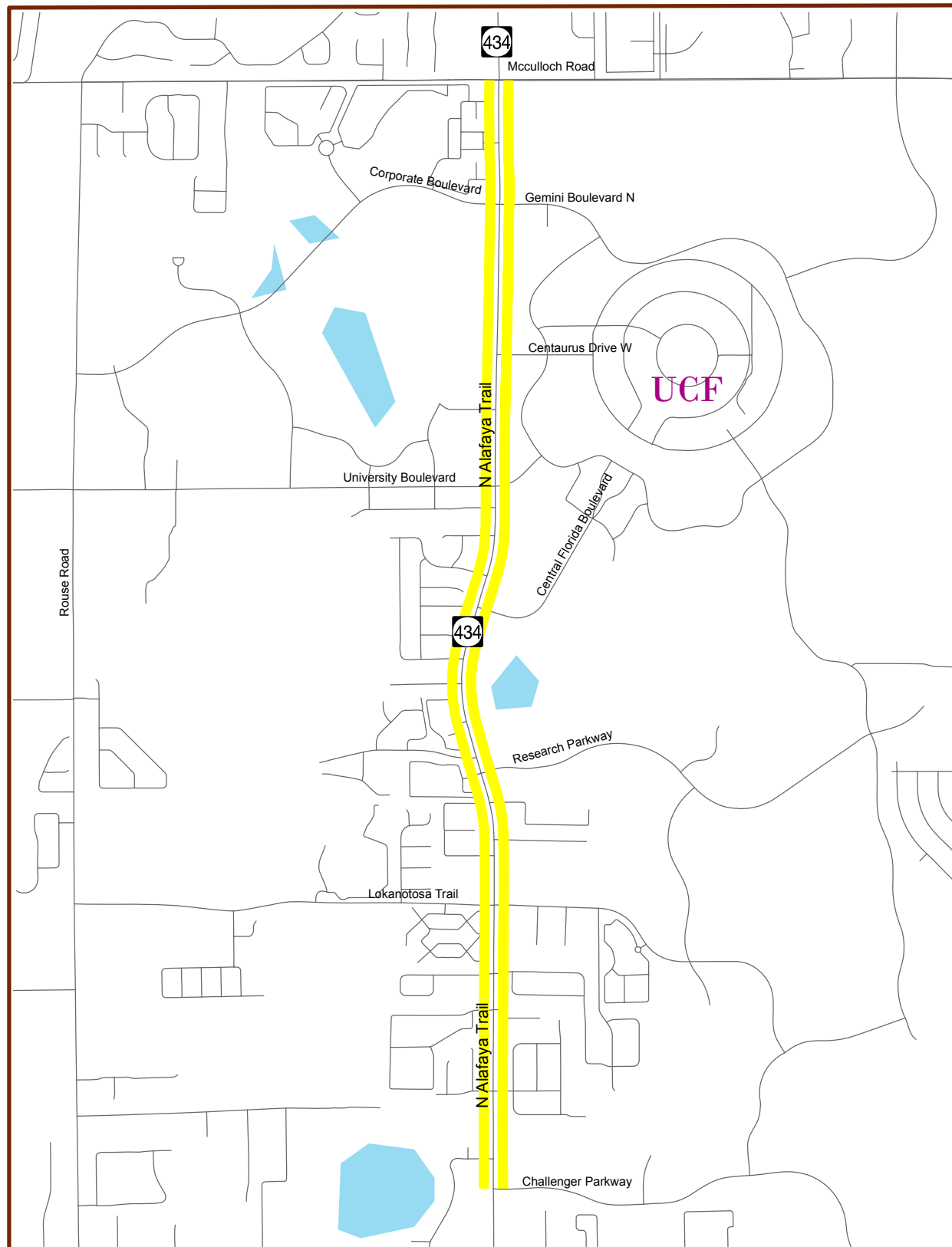
**SR 434 - McCulloch Road to Challenger Parkway**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	341.67	296.90	719.94	535.90

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$751.69	\$3,090.03
Annual User Benefit	\$225,507.00	\$927,009.00
<b>Total Annual User Benefit =</b>	<b>\$1,152,516.00</b>	
Total Signal Retiming Annual Cost	\$14,700.59	
<b>User Benefit / Cost Ratio</b>	<b>78.40</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement was assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.



**SR 434  
- AM Peak**

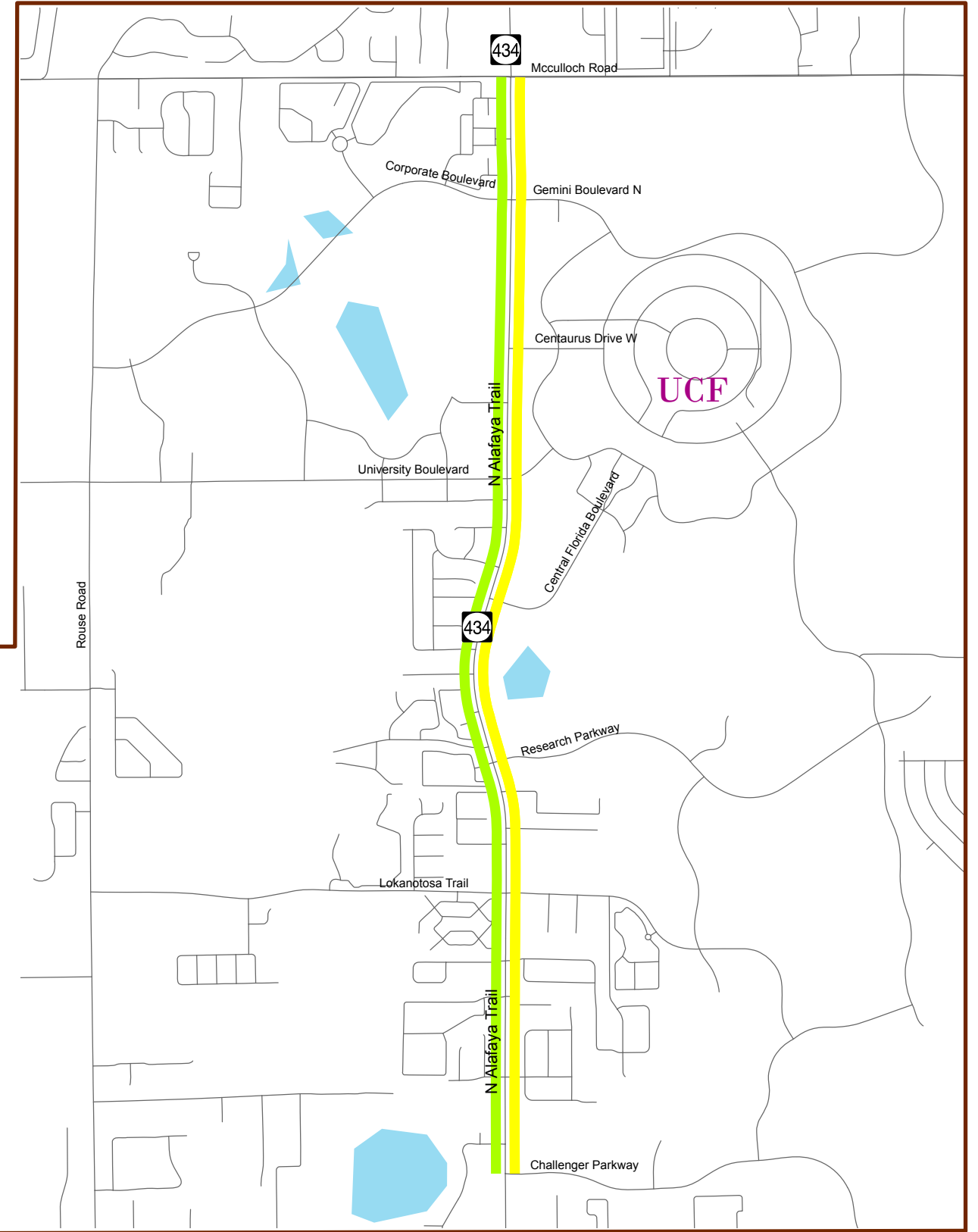
**Before Condition**

Date of Collection: 1/15/2013  
 Distance: 2.67 miles  
 From: McCulloch Rd.  
 To: Challenger Parkway.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 29.2 MPH  
 NB Travel Time: 5.95 MIN

SB Avg Speed: 29.5 MPH  
 SB Travel Time: 5.90 MIN



**SR 434  
- AM Peak**

**After Condition**

Date of Collection: 4/4/2013  
 Distance: 2.67 miles  
 From: McCulloch Rd.  
 To: Challenger Parkway.

Start Time: 7:00 AM  
 End Time: 9:00 AM

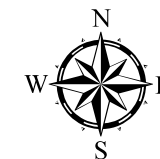
NB Avg Speed: 33.0 MPH  
 NB Travel Time: 5.27 MIN

SB Avg Speed: 35.3 MPH  
 SB Travel Time: 4.93 MIN



**Level of Services:**

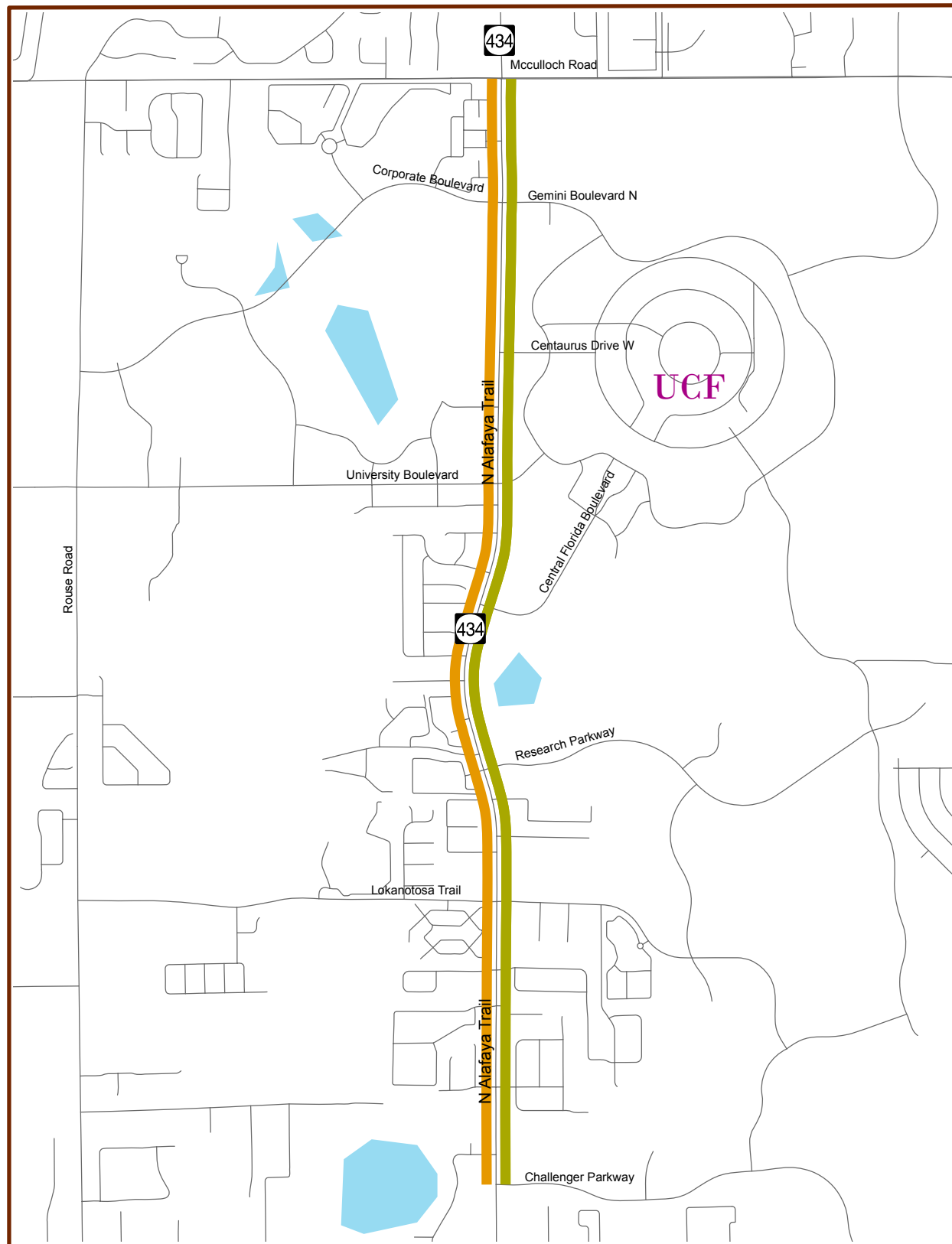
- |   |   |               |
|---|---|---------------|
| A | D | Roads         |
| B | E | City Boundary |
| C | F | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*





**SR 434  
- PM Peak**

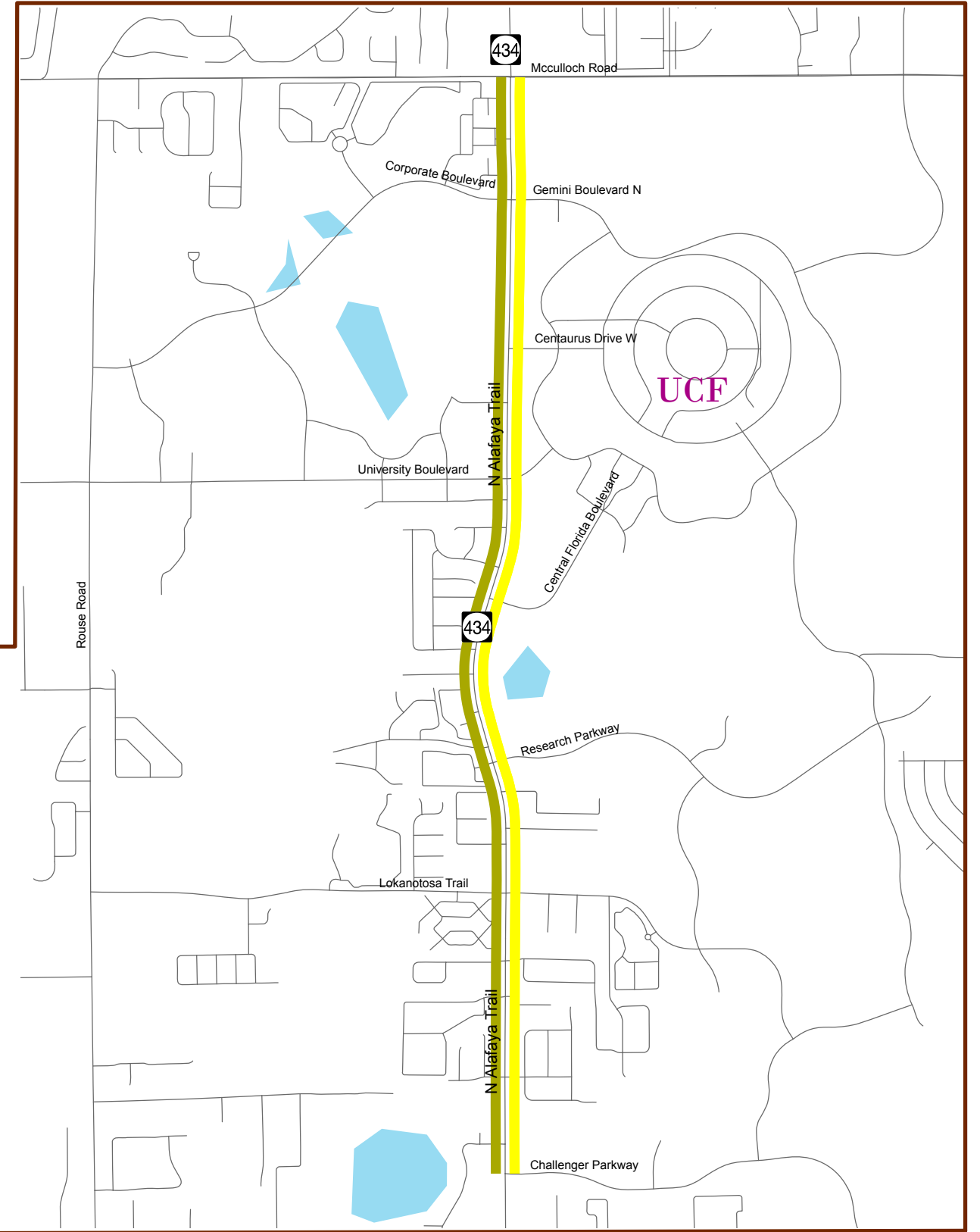
**Before Condition**

Date of Collection: 1/15/2013  
 Distance: 2.67 miles  
 From: McCulloch Rd.  
 To: Challenger Parkway.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 21.3 MPH  
 NB Travel Time: 8.18 MIN

SB Avg Speed: 16.40 MPH  
 SB Travel Time: 10.62 MIN



**SR 434  
- PM Peak**

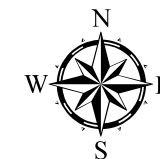
**After Condition**

Date of Collection: 4/4/2013  
 Distance: 2.67 miles  
 From: McCulloch Rd.  
 To: Challenger Parkway.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 28.4 MPH  
 NB Travel Time: 6.12 MIN

SB Avg Speed: 22.1 MPH  
 SB Travel Time: 7.88 MIN



**SR 426**  
**Phelps Ave. to Palmetto Ave.**

**Year 2013 MetroPlan Orlando Travel Time Study**  
*Before Condition*

**Roadway:** Aloma Avenue (SR 426)  
**Segment:** Phelps Avenue to Palmetto Avenue (SR 551)  
**Jurisdiction:** Orange County  
**Area Type:** Urbanized Residential Area/High Density Outlying Business District  
**Facility Type:** Undivided Arterial/Divided Arterial  
**Speed Limit:** 35/40 MPH  
**Length of Arterial:** 2.66 miles **Arterial Class:** II  
**Distance between BlueToad Devices:** 2.8 miles

**Eastbound Direction**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
N Phelps Avenue	0	2	0	35	
N Lakemont Avenue	1	2	1	35	
St Andrews Boulevard	1	2	0	35	
Balfour Drive	1	2	0	40	
N Ranger Boulevard	0	2	0	40	
N Semoran Boulevard	2	3	1	40	
Eastbrook Boulevard	1	2	1	40	
Forsyth Road	0	2	1	40	
N Palmetto Avenue	1	2	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	13	405	24.9	C
Eastbound	PM	37	658	15.3	E

**Westbound Direction**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
N Palmetto Avenue	2	2	0	40	
Forsyth Road	2	2	0	40	
Eastbrook Boulevard	0	2	0	40	
N Semoran Boulevard	2	3	1	40	
N Ranger Boulevard	1	2	0	40	
Balfour Drive	1	2	0	40	
St Andrews Boulevard	1	2	0	35	
N Lakemont Avenue	1	2	0	35	
N Phelps Avenue	0	2	0	35	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	30	539	18.7	D
Westbound	PM	21	413	24.4	C



**Year 2013 MetroPlan Orlando Travel Time Study**  
*After Condition*

**Roadway:** Aloma Avenue (SR 426)  
**Segment:** Phelps Avenue to Palmetto Avenue (SR 551)  
**Jurisdiction:** Orange County  
**Area Type:** Urbanized Residential Area/High Density Outlying Business District  
**Facility Type:** Undivided Arterial/Divided Arterial  
**Speed Limit:** 35/40 MPH  
**Length of Arterial:** 2.66 miles **Arterial Class:** II  
**Distance between BlueToad Devices:** 2.8 miles

*Eastbound Direction*

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
N Phelps Avenue	0	2	0	35	
N Lakemont Avenue	1	2	1	35	
St Andrews Boulevard	1	2	0	35	
Balfour Drive	1	2	0	40	
N Ranger Boulevard	0	2	0	40	
N Semoran Boulevard	2	3	1	40	
Eastbrook Boulevard	1	2	1	40	
Forsyth Road	0	2	1	40	
N Palmetto Avenue	1	2	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	11	387	26.0	C
Eastbound	PM	18	629	16.0	E

*Westbound Direction*

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
N Palmetto Avenue	2	2	0	40	
Forsyth Road	2	2	0	40	
Eastbrook Boulevard	0	2	0	40	
N Semoran Boulevard	2	3	1	40	
N Ranger Boulevard	1	2	0	40	
Balfour Drive	1	2	0	40	
St Andrews Boulevard	1	2	0	35	
N Lakemont Avenue	1	2	0	35	
N Phelps Avenue	0	2	0	35	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	21	446	22.6	C
Westbound	PM	11	401	25.1	C

**Aloma Avenue - Phelps Avenue to Palmetto Avenue**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
1,027	405.0	24.9	115.54	387.0	26.0	110.40
Northbound/Eastbound - PM Peak Hour						
1,798	658.0	15.3	328.63	629.0	16.0	314.15
Southbound/Westbound - AM Peak Hour						
1,936	539.0	18.7	289.86	446.0	22.6	239.85
Southbound/Westbound - PM Peak Hour						
1,369	413.0	24.4	157.05	401.0	25.1	152.49

\*Traffic Volumes are obtained from the latest 2012 Florida Traffic Information.

**Aloma Avenue - Phelps Avenue to Palmetto Avenue**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	405.40	350.25	485.69	466.64

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$925.97	\$319.85
Annual User Benefit	\$277,791.00	\$95,955.00
<b>Total Annual User Benefit</b>	<b>\$373,746.00</b>	
Total Signal Retiming Annual Cost	\$17,008.24	
<b>User Benefit / Cost Ratio</b>	<b>21.97</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement is assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.

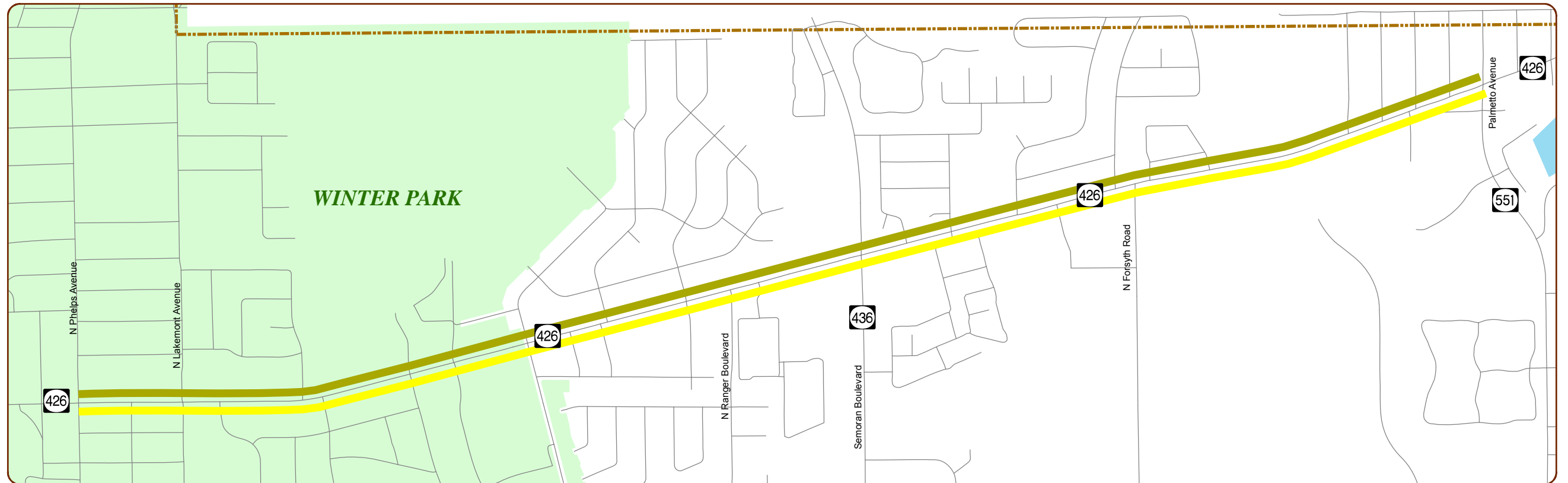
**SR 426  
- AM Peak  
Before Condition**

Date of Collection: 1/16/2013  
Distance: 2.66 miles  
From: Phelps Ave.  
To: Palmetto Ave.

Start Time: 7:00 AM  
End Time: 9:00 AM

EB Avg Speed: 24.9 MPH  
EB Travel Time: 6.75 MIN

WB Avg Speed: 18.7 MPH  
WB Travel Time: 8.98 MIN



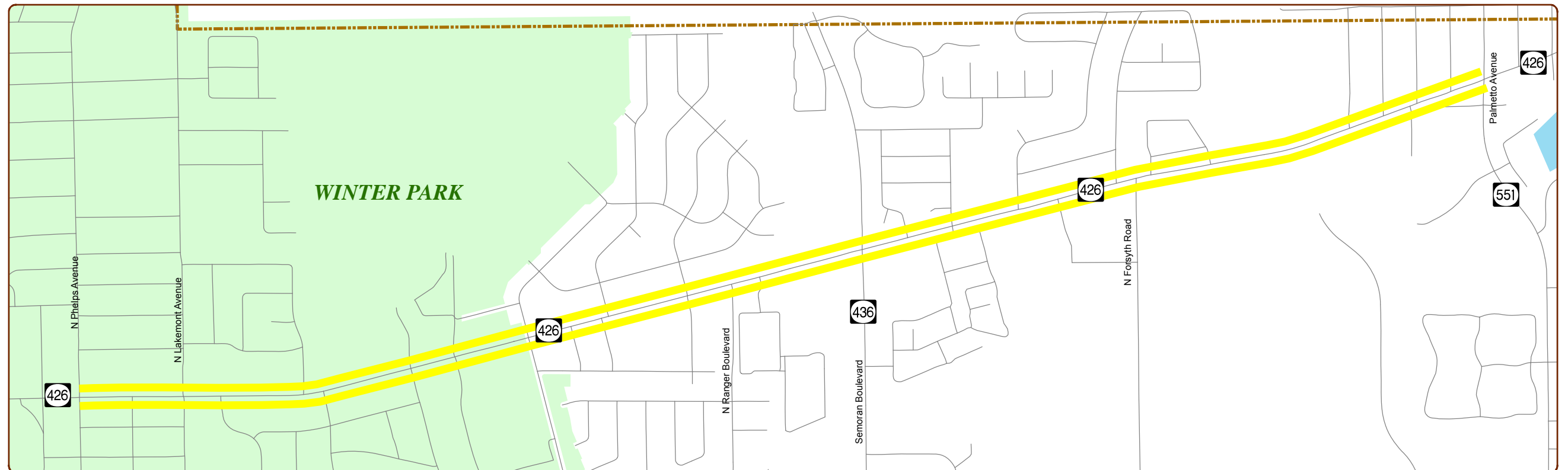
**SR 426  
- AM Peak  
After Condition**

Date of Collection: 5/9/2013  
Distance: 2.66 miles  
From: Phelps Ave.  
To: Palmetto Ave.

Start Time: 7:00 AM  
End Time: 9:00 AM

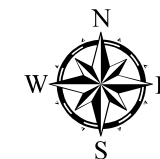
EB Avg Speed: 26.0 MPH  
EB Travel Time: 6.45 MIN

WB Avg Speed: 22.6 MPH  
WB Travel Time: 7.43 MIN



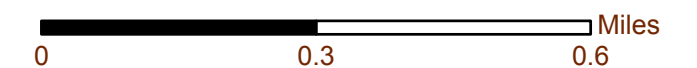
**Level of Services:**

- |  |   |  |   |  |               |
|--|---|--|---|--|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*



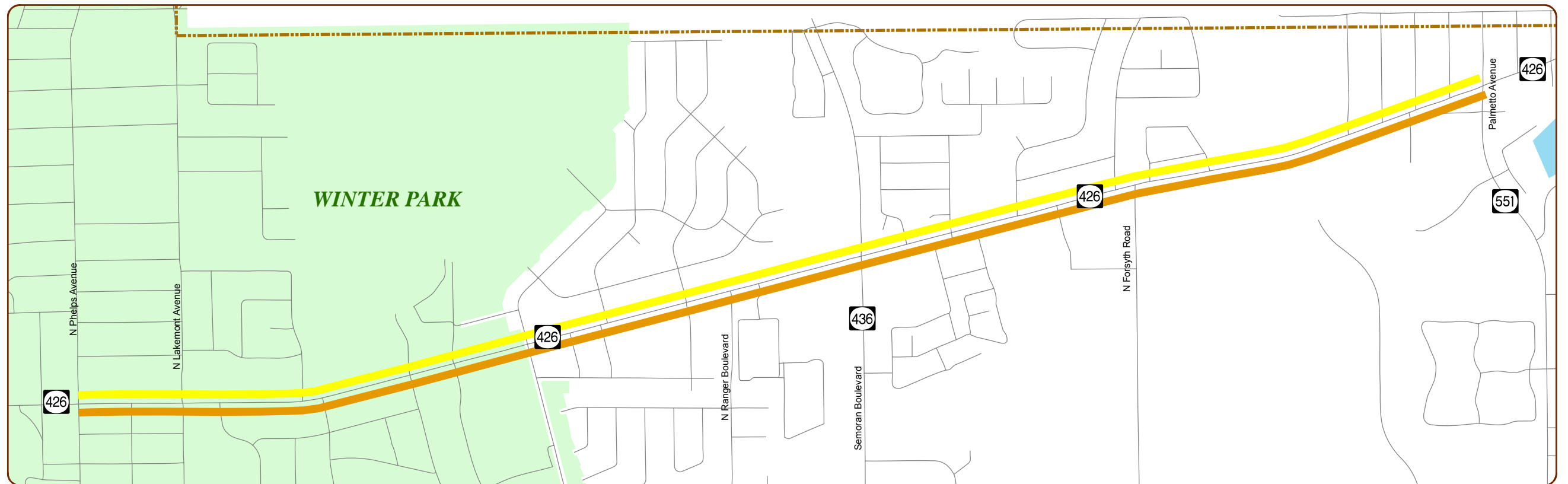
**SR 426  
- PM Peak  
Before Condition**

Date of Collection: 1/16/2013  
Distance: 2.66 miles  
From: Phelps Ave.  
To: Palmetto Ave.

Start Time: 4:00 PM  
End Time: 6:00 PM

EB Avg Speed: 15.30 MPH  
EB Travel Time: 10.97 MIN

WB Avg Speed: 24.4 MPH  
WB Travel Time: 6.88 MIN



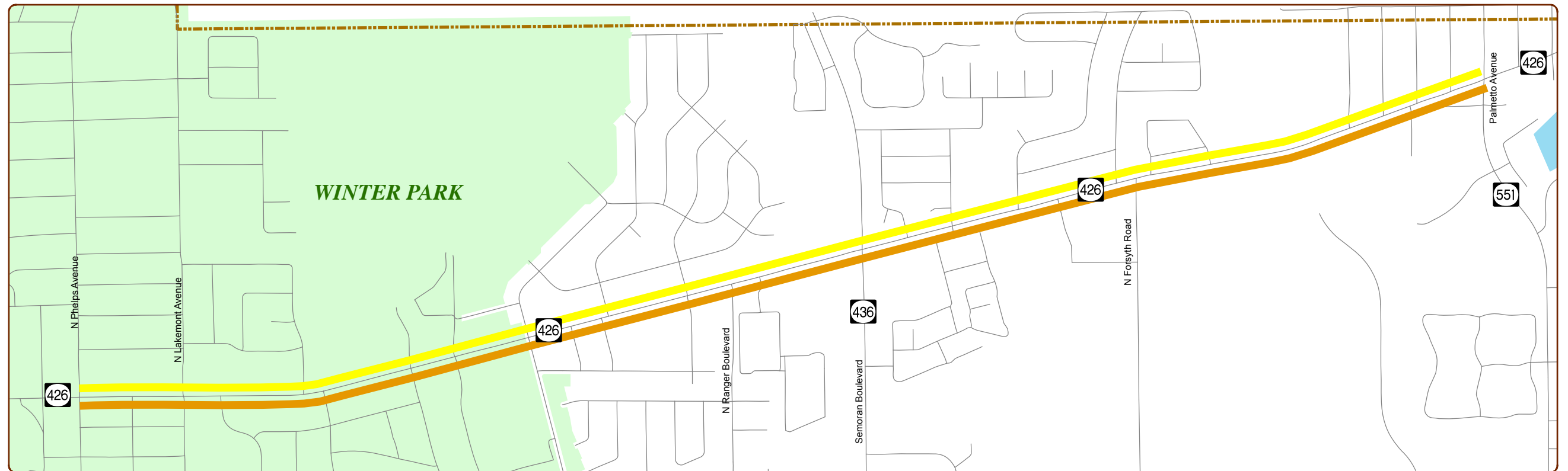
**SR 426  
- PM Peak  
After Condition**

Date of Collection: 5/9/2013  
Distance: 2.66 miles  
From: Phelps Ave.  
To: Palmetto Ave.

Start Time: 4:00 PM  
End Time: 6:00 PM

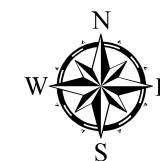
EB Avg Speed: 16.0 MPH  
EB Travel Time: 10.48 MIN

WB Avg Speed: 25.1 MPH  
WB Travel Time: 6.68 MIN



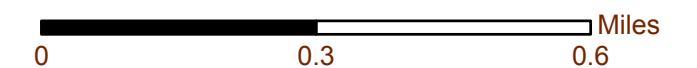
**Level of Services:**

- |  |   |  |   |  |               |
|--|---|--|---|--|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*



**SR 15**  
**Michigan Ave. to Hoffner Ave.**

## Year 2013 MetroPlan Orlando Travel Time Study

*Before Condition*

**Roadway:** Conway Road (SR 15)  
**Segment:** Hoffner Avenue to Michigan Avenue  
**Jurisdiction:** Orange County  
**Area Type:** Urbanized Residential Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 40 MPH  
**Length of Arterial:** 2.3 miles    **Arterial Class:** II  
**Distance between BlueToad Devices:** 2.5 miles

### Northbound Direction:

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Hoffner Avenue	1	2	1	40	
Shenadove Elem. School	1	2	0	40	
Gatlin Avenue	1	2	0	40	
Anderson Road	1	2	0	40	
Lake Margaret Drive	1	2	0	40	
E. Michigan Street	1	2	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	34	289	31.2	B
Northbound	PM	36	432	20.8	D

### Southbound Direction:

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
E. Michigan Street	1	2	0	40	
Lake Margaret Drive	1	2	0	40	
Anderson Road	1	2	0	40	
Gatlin Avenue	1	2	0	40	
Shenadove Elem. School	1	2	0	40	
Hoffner Avenue	1	2	1	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	17	266	33.9	B
Southbound	PM	29	286	31.5	B

## Year 2013 MetroPlan Orlando Travel Time Study

*After Condition*

**Roadway:** Conway Road (SR 15)  
**Segment:** Hoffner Avenue to Michigan Avenue  
**Jurisdiction:** Orange County  
**Area Type:** Urbanized Residential Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 40 MPH  
**Length of Arterial:** 2.3 miles **Arterial Class:** II  
**Distance between BlueToad Devices:** 2.5 miles

### *Northbound Direction:*

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Hoffner Avenue	1	2	1	40	
Shenadove Elem. School	1	2	0	40	
Gatlin Avenue	1	2	0	40	
Anderson Road	1	2	0	40	
Lake Margaret Drive	1	2	0	40	
E. Michigan Street	1	2	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	18	285	31.6	B
Northbound	PM	31	373	24.1	C

### *Southbound Direction:*

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
E. Michigan Street	1	2	0	40	
Lake Margaret Drive	1	2	0	40	
Anderson Road	1	2	0	40	
Gatlin Avenue	1	2	0	40	
Shenadove Elem. School	1	2	0	40	
Hoffner Avenue	1	2	1	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	13	263	34.2	B
Southbound	PM	18	272	33.1	B



**SR 15/Conway Road - Hoffner Avenue to Michigan Avenue**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
958	289.0	31.2	76.91	285.0	31.6	75.84
Northbound/Eastbound - PM Peak Hour						
1,708	432.0	20.8	204.96	373.0	24.1	176.97
Southbound/Westbound - AM Peak Hour						
978	266.0	33.9	72.26	263.0	34.2	71.45
Southbound/Westbound - PM Peak Hour						
1,312	286.0	31.5	104.23	272.0	33.1	99.13

\*Traffic Volumes are obtained from the latest 2012 Florida Traffic Information.

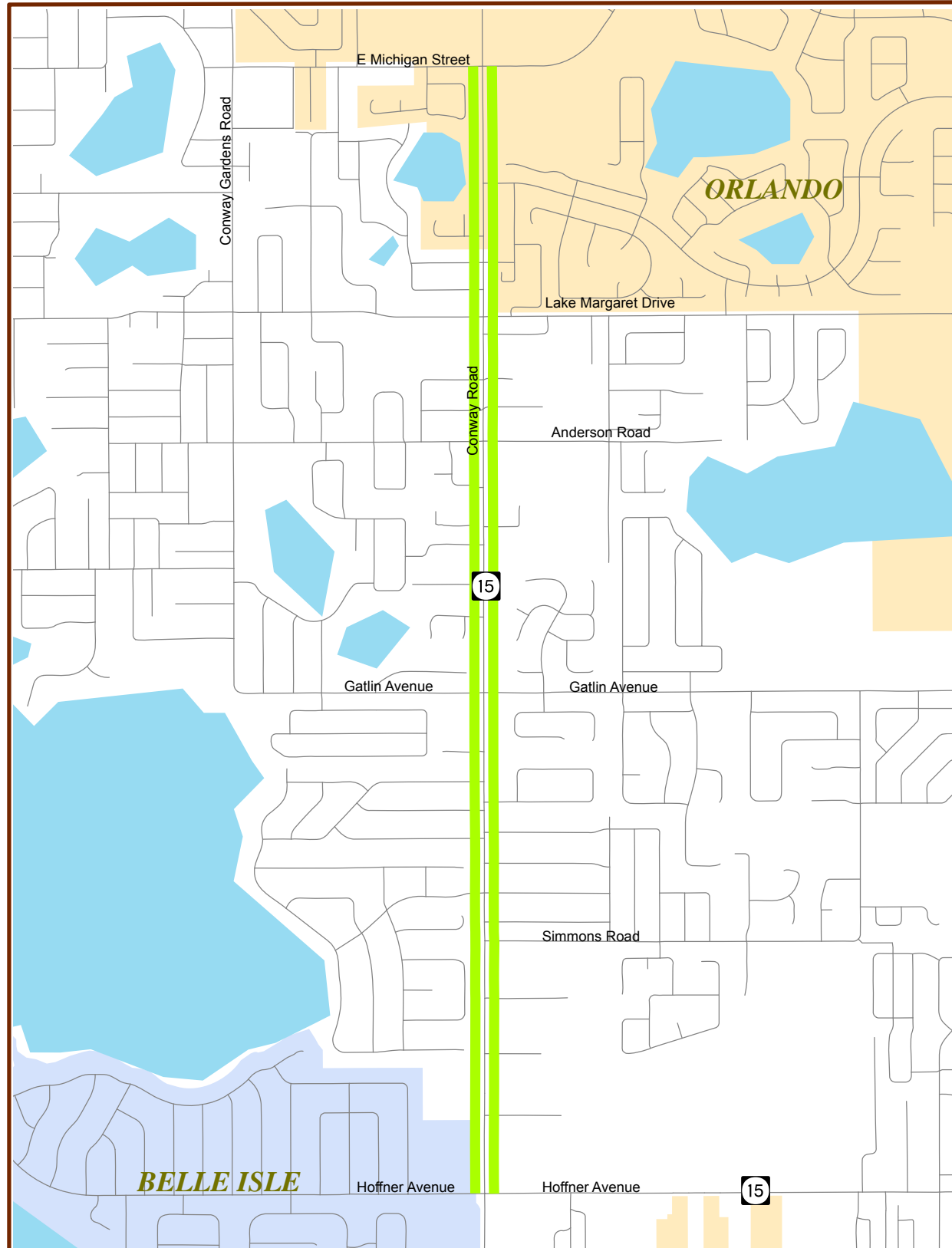
**SR 15/Conway Road - Hoffner Avenue to Michigan Avenue  
Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	149.17	147.29	309.19	276.10

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$31.57	\$555.58
Annual User Benefit	\$9,471.00	\$166,674.00
<b>Total Annual User Benefit</b>	<b>\$176,145.00</b>	
Total Signal Retiming Annual Cost	\$10,261.34	
<b>User Benefit / Cost Ratio</b>	<b>17.17</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement is assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.



**Conway Road  
- AM Peak**

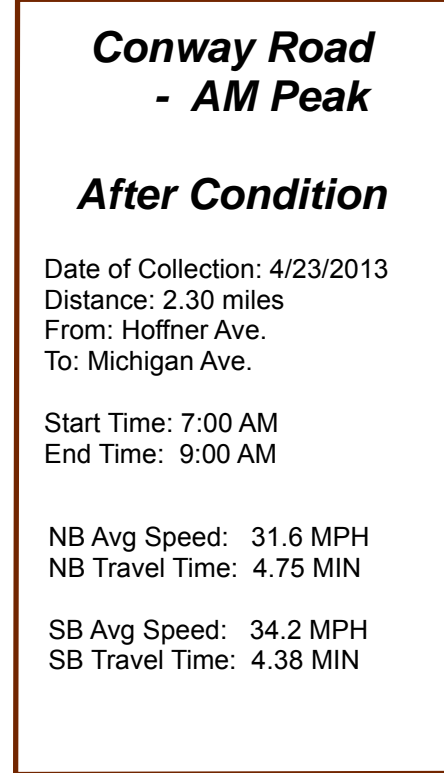
**Before Condition**

Date of Collection: 12/2/2012  
 Distance: 2.30 miles  
 From: Hoffner Ave.  
 To: Michigan Ave.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 31.2 MPH  
 NB Travel Time: 4.82 MIN

SB Avg Speed: 33.9 MPH  
 SB Travel Time: 4.43 MIN



**Conway Road  
- AM Peak**

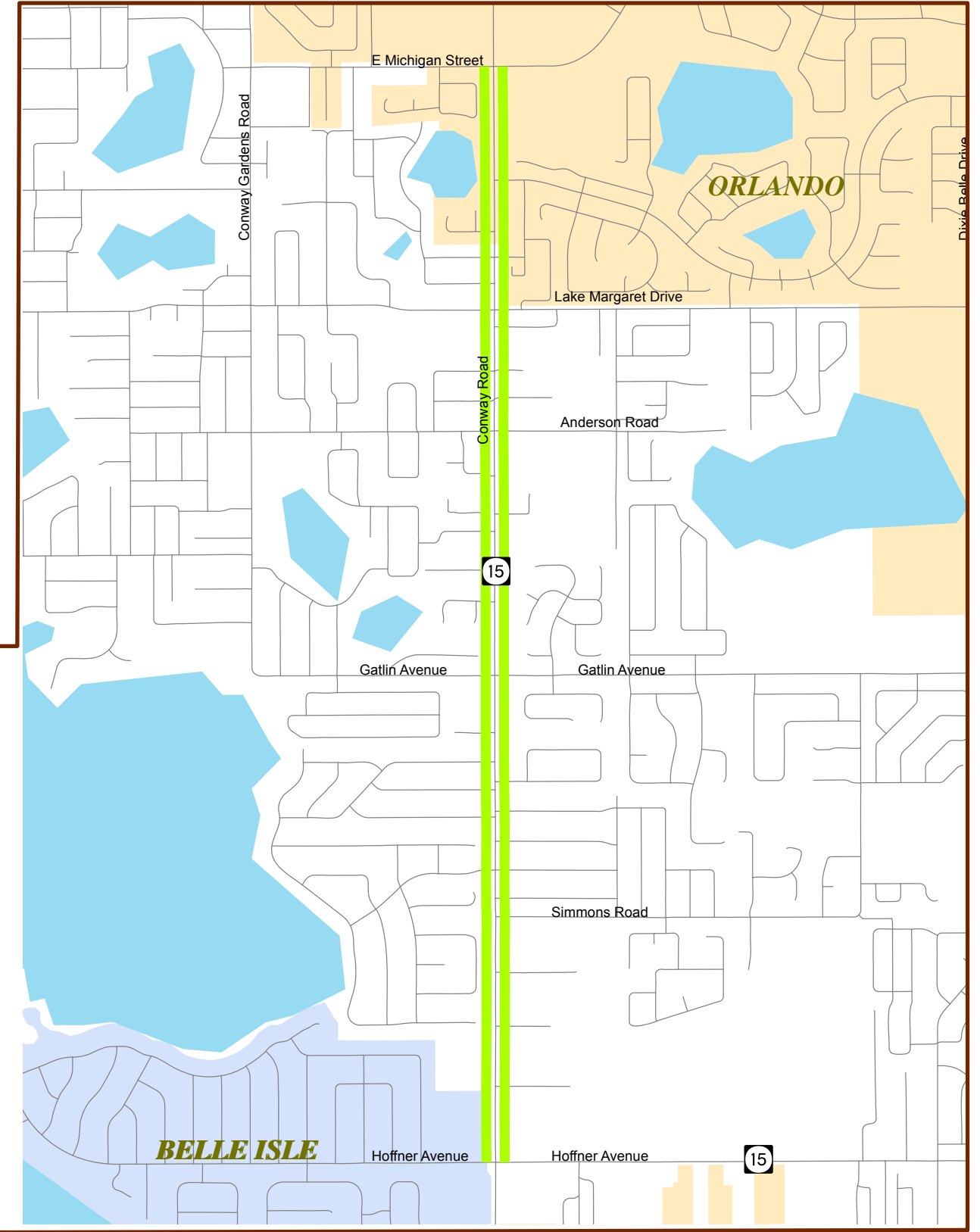
**After Condition**

Date of Collection: 4/23/2013  
 Distance: 2.30 miles  
 From: Hoffner Ave.  
 To: Michigan Ave.

Start Time: 7:00 AM  
 End Time: 9:00 AM

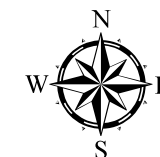
NB Avg Speed: 31.6 MPH  
 NB Travel Time: 4.75 MIN

SB Avg Speed: 34.2 MPH  
 SB Travel Time: 4.38 MIN



**Level of Services:**

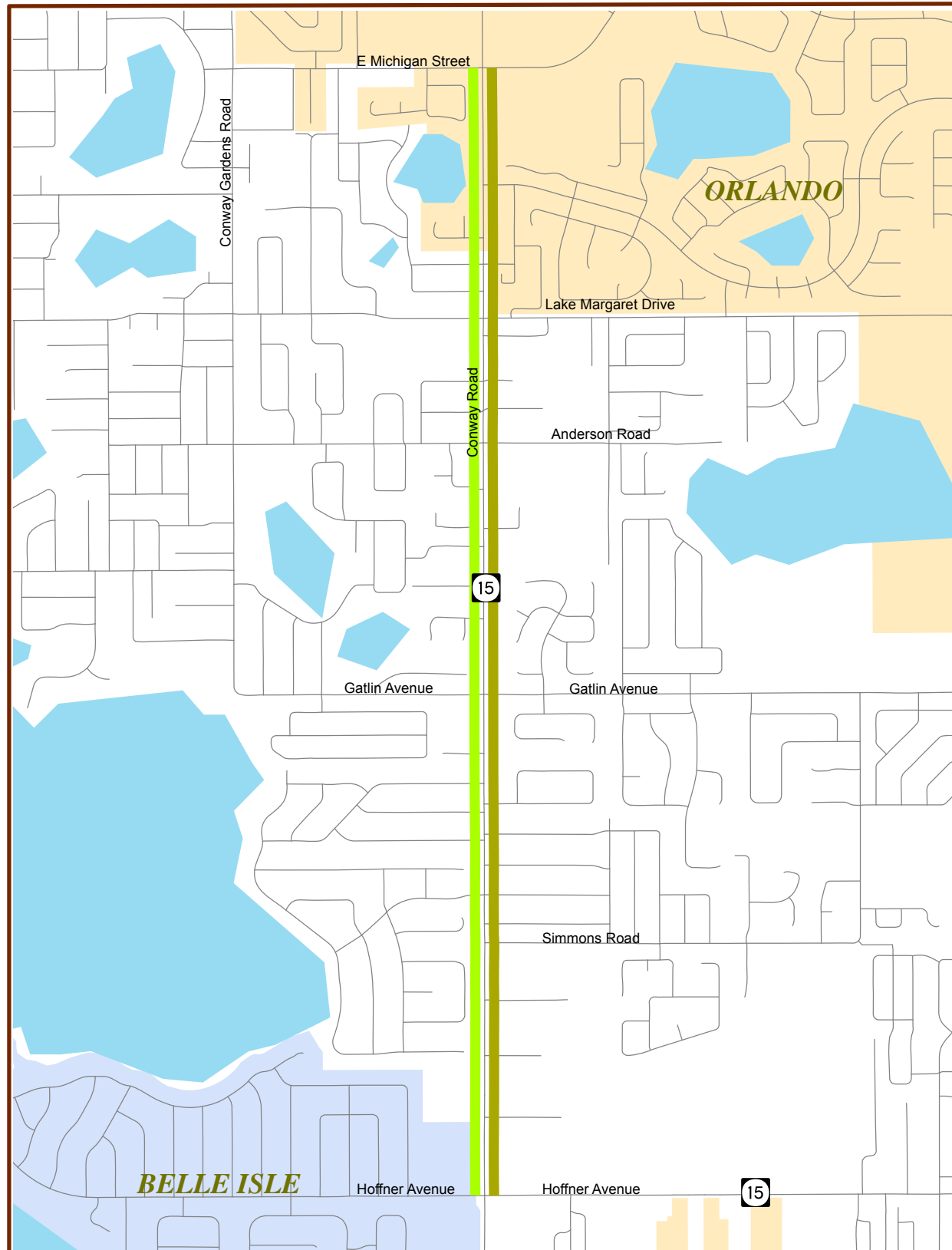
- |  |   |   |
|--|---|---|
|  A |  D |  Roads         |
|  B |  E |  City Boundary |
|  C |  F |  Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*





**Conway Road  
- PM Peak**

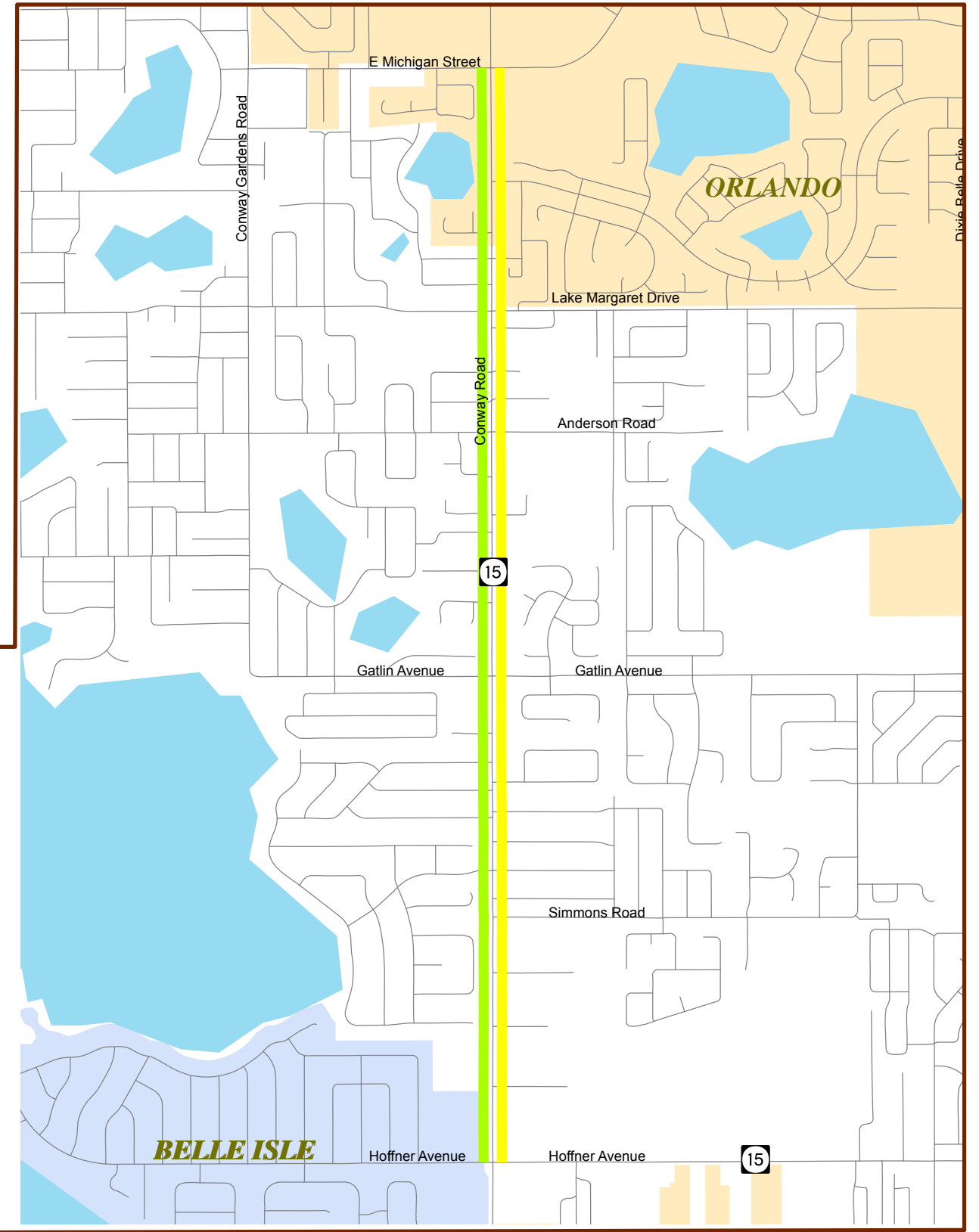
**Before Condition**

Date of Collection: 12/2/2012  
 Distance: 2.30 miles  
 From: Hoffner Ave.  
 To: Michigan Ave.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 20.8 MPH  
 NB Travel Time: 7.20 MIN

SB Avg Speed: 31.5 MPH  
 SB Travel Time: 4.77 MIN



**Conway Road  
- PM Peak**

**After Condition**

Date of Collection: 4/23/2013  
 Distance: 2.30 miles  
 From: Hoffner Ave.  
 To: Michigan Ave.

Start Time: 4:00 PM  
 End Time: 6:00 PM

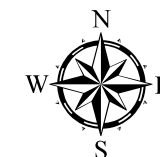
NB Avg Speed: 24.1 MPH  
 NB Travel Time: 6.22 MIN

SB Avg Speed: 33.1 MPH  
 SB Travel Time: 4.53 MIN



**Level of Services:**

- |  |   |   |
|--|---|---|
|  A |  D |  Roads         |
|  B |  E |  City Boundary |
|  C |  F |  Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*



SR 527  
Hoffner Ave. to Nela Ave.

**Year 2013 MetroPlan Orlando Travel Time Study**  
*Before Condition*

**Roadway:** Orange Avenue (SR 527)  
**Segment:** Hoffner Avenue to Nela Avenue  
**Jurisdiction:** Orange County  
**Area Type:** Urbanized Residential Area/Other Outlying Business District  
**Facility Type:** One-Way Facility/Divided Arterial  
**Speed Limit:** 35/40/45  
**Length of Arterial:** 0.945 miles **Arterial Class:** II  
**Distance between BlueToad Devices:** 1.0 miles

**Northbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Glenrose Road/Nela Avenue	1	2	0	45	
E Lancaster Road*	1	2	0	45	
Fairlane Avenue	1	2	0	40	
E Oak Ridge Road	1	2	0	40	
Hoffner Avenue	0	2	1	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	74	198	18.2	D
Northbound	PM	81	150	24.0	C

**Southbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Hoffner Avenue	1	2	0	35	
E Oak Ridge Road	0	2	1	35	
E Lancaster Road*	0	2	1	45	
Glenrose Road/Nela Avenue	1	2	0	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	31	122	29.5	B
Southbound	PM	26	135	26.7	C

\* E Lancaster Road was under construction during this study

**Year 2013 MetroPlan Orlando Travel Time Study**  
*After Condition*

**Roadway:** Orange Avenue (SR 527)  
**Segment:** Hoffner Avenue to Nela Avenue  
**Jurisdiction:** Orange County  
**Area Type:** Urbanized Residential Area/Other Outlying Business District  
**Facility Type:** One-Way Facility/Divided Arterial  
**Speed Limit:** 35/40/45  
**Length of Arterial:** 0.945 miles **Arterial Class:** II  
**Distance between BlueToad Devices:** 1.0 miles

**Northbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Glenrose Road/Nela Avenue	1	2	0	45	
E Lancaster Road*	1	2	0	45	
Fairlane Avenue	1	2	0	40	
E Oak Ridge Road	1	2	0	40	
Hoffner Avenue	0	2	1	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	74	172	20.9	D
Northbound	PM	81	115	31.3	B

**Southbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Hoffner Avenue	1	2	0	35	
E Oak Ridge Road	0	2	1	35	
E Lancaster Road*	0	2	1	45	
Glenrose Road/Nela Avenue	1	2	0	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	31	117	30.8	B
Southbound	PM	26	121	29.8	B

**Orange Avenue - Hoffner Avenue to Nela Avenue**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
1,928	198.0	18.2	106.04	172.0	20.9	92.12
Northbound/Eastbound - PM Peak Hour						
1,892	150.0	24.0	78.83	115.0	31.3	60.44
Southbound/Westbound - AM Peak Hour						
1,198	122.0	29.5	40.60	117.0	30.8	38.94
Southbound/Westbound - PM Peak Hour						
1,511	135.0	26.7	56.66	121.0	29.8	50.79

\*Traffic Volumes are obtained from the latest 2012 Florida Traffic Information.



**Orange Avenue - Hoffner Avenue to Nela Avenue**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	146.64	131.05	135.50	111.23

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$261.76	\$407.49
Annual User Benefit	\$78,528.00	\$122,247.00
<b>Total Annual User Benefit</b>	<b>\$200,775.00</b>	
Total Signal Retiming Annual Cost	\$11,761.92	
<b>User Benefit / Cost Ratio</b>	<b>17.07</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement is assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.



**Orange Ave.  
- AM Peak**

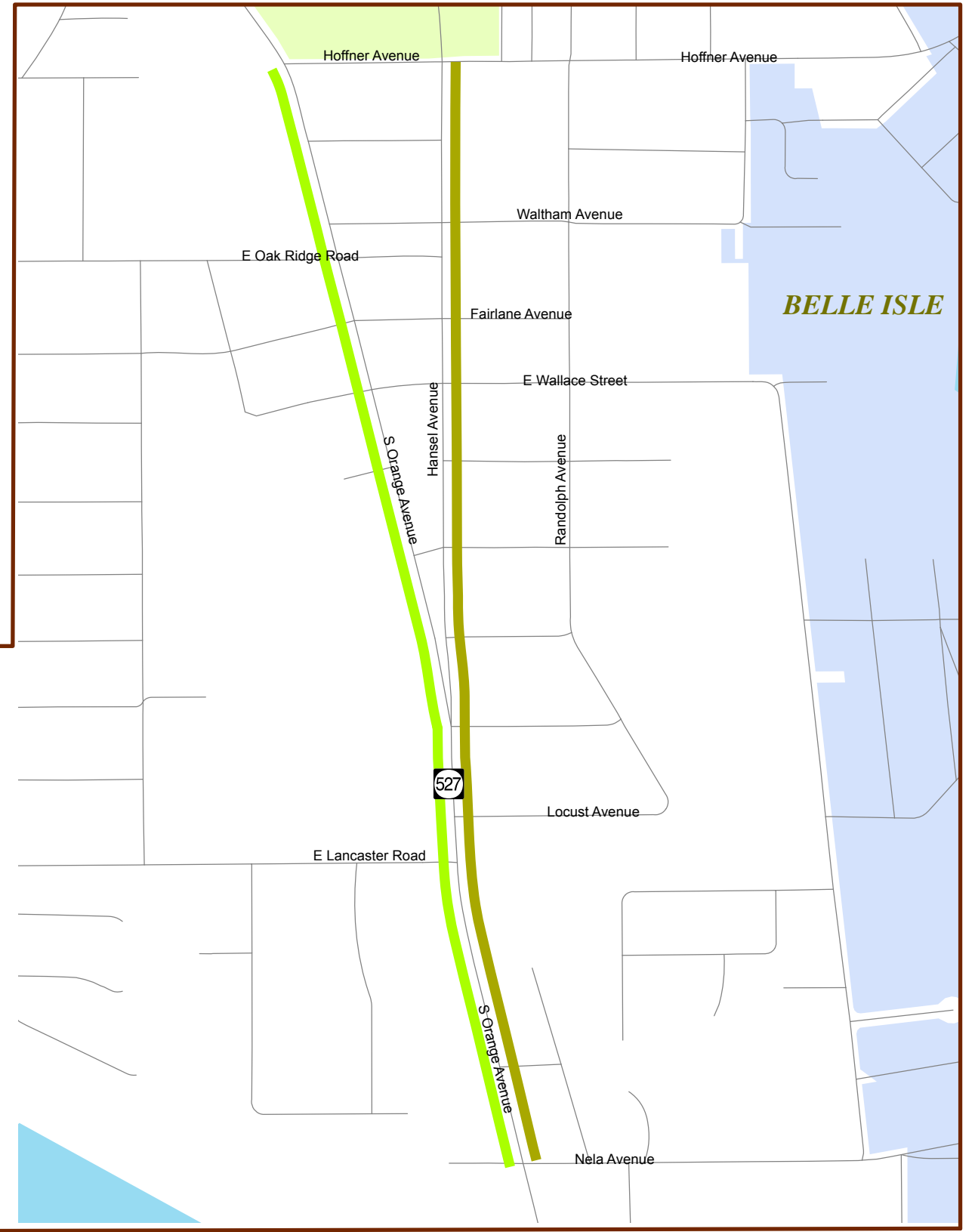
**Before Condition**

Date of Collection: 1/22/2013  
 Distance: 0.945 miles  
 From: Hoffner Ave.  
 To: Nela Ave.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 18.2 MPH  
 NB Travel Time: 3.30 MIN

SB Avg Speed: 29.5 MPH  
 SB Travel Time: 2.03 MIN



**Orange Ave.  
- AM Peak**

**After Condition**

Date of Collection: 4/16/2013  
 Distance: 0.945 miles  
 From: Hoffner Ave.  
 To: Nela Ave.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 20.9 MPH  
 NB Travel Time: 2.87 MIN

SB Avg Speed: 30.8 MPH  
 SB Travel Time: 1.95 MIN

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A REGIONAL TRANSPORTATION PARTNERSHIP

**Level of Services:**

<span style="display: inline-block; width: 15px; height: 10px; background-color: #008000; border: 1px solid black;"></span> A	<span style="display: inline-block; width: 15px; height: 10px; background-color: #FFD700; border: 1px solid black;"></span> D	<span style="display: inline-block; width: 15px; border-bottom: 1px solid black;"></span> Roads
<span style="display: inline-block; width: 15px; height: 10px; background-color: #00FF00; border: 1px solid black;"></span> B	<span style="display: inline-block; width: 15px; height: 10px; background-color: #FFA500; border: 1px solid black;"></span> E	<span style="display: inline-block; width: 15px; height: 10px; background-color: #FFDAB9; border: 1px solid black;"></span> City Boundary
<span style="display: inline-block; width: 15px; height: 10px; background-color: #FFFF00; border: 1px solid black;"></span> C	<span style="display: inline-block; width: 15px; height: 10px; background-color: #FF0000; border: 1px solid black;"></span> F	<span style="display: inline-block; width: 15px; height: 10px; background-color: #ADD8E6; border: 1px solid black;"></span> Water

**2013 METROPLAN ORLANDO**

*Travel Time Study*



**Orange Ave.  
- PM Peak**

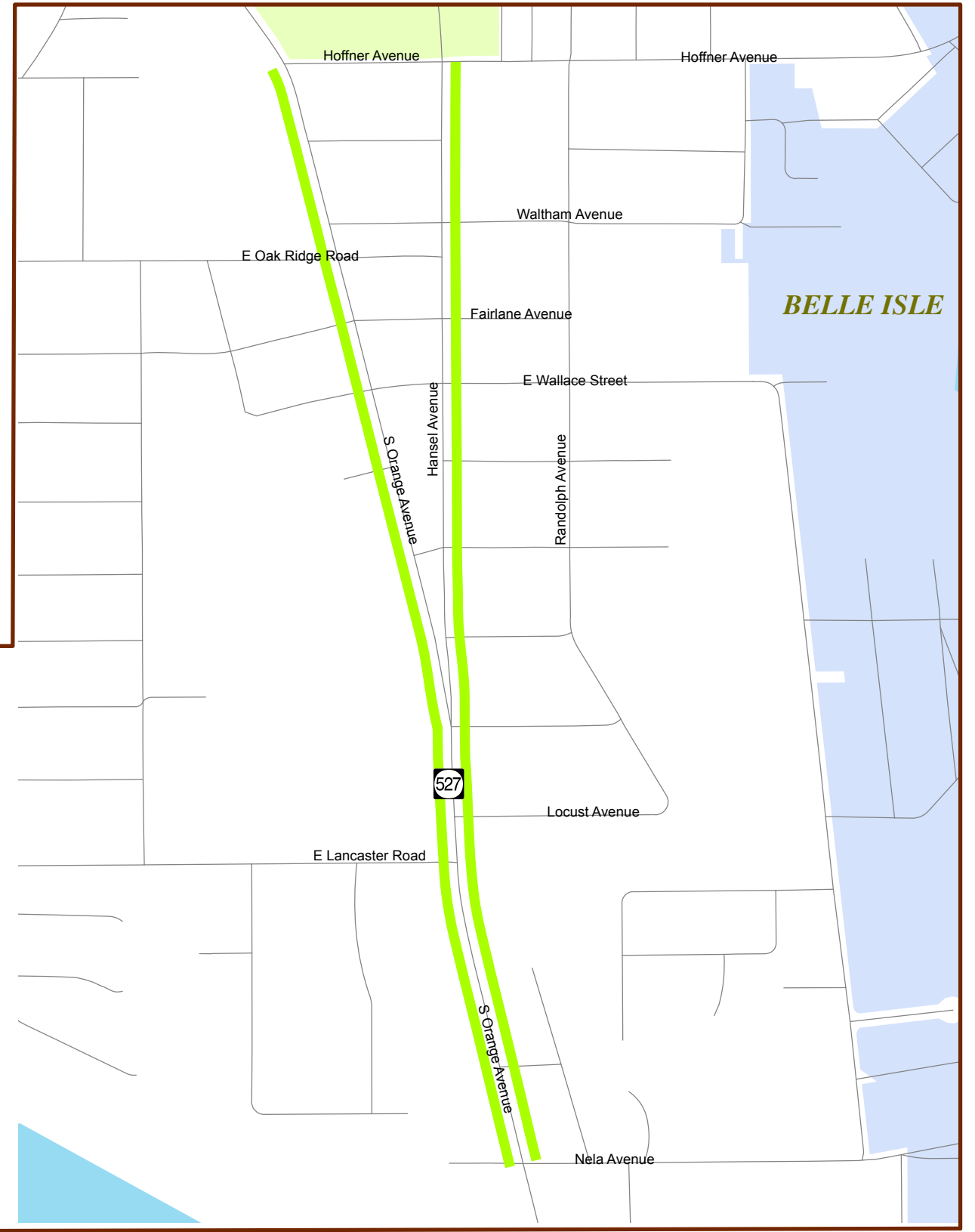
**Before Condition**

Date of Collection: 1/22/2013  
 Distance: 0.945 miles  
 From: Hoffner Ave.  
 To: Nela Ave.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 24.0 MPH  
 NB Travel Time: 2.50 MIN

SB Avg Speed: 26.7 MPH  
 SB Travel Time: 2.25 MIN



**Orange Ave.  
- PM Peak**

**After Condition**

Date of Collection: 4/16/2013  
 Distance: 0.945 miles  
 From: Hoffner Ave.  
 To: Nela Ave.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 31.3 MPH  
 NB Travel Time: 1.92 MIN

SB Avg Speed: 29.8 MPH  
 SB Travel Time: 2.02 MIN

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A REGIONAL TRANSPORTATION PARTNERSHIP

**Level of Services:**

<span style="display: inline-block; width: 15px; height: 10px; background-color: #008000; border: 1px solid black;"></span> A	<span style="display: inline-block; width: 15px; height: 10px; background-color: #90EE90; border: 1px solid black;"></span> D	<span style="display: inline-block; width: 15px; border-bottom: 1px solid black;"></span> Roads
<span style="display: inline-block; width: 15px; height: 10px; background-color: #00FF00; border: 1px solid black;"></span> B	<span style="display: inline-block; width: 15px; height: 10px; background-color: #FFA500; border: 1px solid black;"></span> E	<span style="display: inline-block; width: 15px; height: 10px; background-color: #FFDAB9; border: 1px solid black;"></span> City Boundary
<span style="display: inline-block; width: 15px; height: 10px; background-color: #FFFF00; border: 1px solid black;"></span> C	<span style="display: inline-block; width: 15px; height: 10px; background-color: #FF0000; border: 1px solid black;"></span> F	<span style="display: inline-block; width: 15px; height: 10px; background-color: #ADD8E6; border: 1px solid black;"></span> Water

**2013 METROPLAN ORLANDO**

*Travel Time Study*

**SR 436**  
**Aloma Ave. to Oleander Dr.**

**Year 2013 MetroPlan Orlando Travel Time Study**  
*Before Condition*

**Roadway:** SR 436 (Semoran Boulevard)  
**Segment:** Aloma Avenue to Oleander Drive  
**Jurisdiction:** Orange County  
**Area Type:** Urbanized Residential Area/Other Outlying Business District  
**Facility Type:** Divided Arterial  
**Speed Limit:** 45/50 MPH  
**Length of Arterial:** 3.56 miles **Arterial Class:** I  
**Distance between BlueToad Devices:** 3.8 miles

**Northbound Direction**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Oleander Drive	1	3	0	45	
E. Colonial Drive	2	3	1	45	
Old Cheney Highway	1	3	0	45	
Baldwin Park Street/Auvers Boulevard	1	3	1	50	
Hanging Moss Road	1	3	1	50	
Banchory Rd/University Park Drive	1	3	1	50	
University Boulevard	1	3	1	50	
Aloma Avenue	2	3	1	50	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	20	399	34.3	B
Northbound	PM	34	495	27.6	C

**Southbound Direction**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Aloma Avenue	2	3	1	50	
University Boulevard	2	3	1	50	
Banchory Rd/University Park Drive	1	3	1	50	
Hanging Moss Road	1	3	0	50	
Baldwin Park Street/Auvers Boulevard	1	3	1	50	
Old Cheney Highway	1	3	1	45	
E. Colonial Drive	2	3	1	45	
Oleander Drive	1	3	0	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	25	390	35.1	B
Southbound	PM	37	549	24.9	D

**Year 2013 MetroPlan Orlando Travel Time Study**  
*After Condition*

**Roadway:** SR 436 (Semoran Boulevard)  
**Segment:** Aloma Avenue to Oleander Drive  
**Jurisdiction:** Orange County  
**Area Type:** Urbanized Residential Area/Other Outlying Business District  
**Facility Type:** Divided Arterial  
**Speed Limit:** 45/50 MPH  
**Length of Arterial:** 3.56 miles **Arterial Class:** I  
**Distance between BlueToad Devices:** 3.8 miles

**Northbound Direction**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Oleander Drive	1	3	0	45	
E. Colonial Drive	2	3	1	45	
Old Cheney Highway	1	3	0	45	
Baldwin Park Street/Auvers Boulevard	1	3	1	50	
Hanging Moss Road	1	3	1	50	
Banchory Rd/University Park Drive	1	3	1	50	
University Boulevard	1	3	1	50	
Aloma Avenue	2	3	1	50	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	8	394	34.7	B
Northbound	PM	9	476	28.7	C

**Southbound Direction**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Aloma Avenue	2	3	1	50	
University Boulevard	2	3	1	50	
Banchory Rd/University Park Drive	1	3	1	50	
Hanging Moss Road	1	3	0	50	
Baldwin Park Street/Auvers Boulevard	1	3	1	50	
Old Cheney Highway	1	3	1	45	
E. Colonial Drive	2	3	1	45	
Oleander Drive	1	3	0	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	14	356	38.4	B
Southbound	PM	19	441	31.0	C

**SR 436 - Aloma Avenue to Oleander Drive**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
1,718	399.0	34.3	190.41	394.0	34.7	188.03
Northbound/Eastbound - PM Peak Hour						
1,881	495.0	27.6	258.64	476.0	28.7	248.71
Southbound/Westbound - AM Peak Hour						
1,912	390.0	35.1	207.13	356.0	38.4	189.08
Southbound/Westbound - PM Peak Hour						
2,639	549.0	24.9	402.45	441.0	31.0	323.28

\*Traffic Volumes are obtained from the latest 2012 Florida Traffic Information.

**SR 436 - Aloma Avenue to Oleander Drive**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	397.55	377.10	661.09	571.99

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$343.36	\$1,495.99
Annual User Benefit	\$103,008.00	\$448,797.00
<b>Total Annual User Benefit</b>	<b>\$551,805.00</b>	
Total Signal Retiming Annual Cost	\$14,043.25	
<b>User Benefit / Cost Ratio</b>	<b>39.29</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement was assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.





**SR 436  
- AM Peak**

**Before Condition**

Date of Collection: 12/20/2012  
 Distance: 3.56 miles  
 From: Aloma Ave.  
 To: Oleander Dr.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 34.3 MPH  
 NB Travel Time: 6.65 MIN

SB Avg Speed: 35.1 MPH  
 SB Travel Time: 6.50 MIN



**SR 436  
- AM Peak**

**After Condition**

Date of Collection: 5/7/2013  
 Distance: 3.56 miles  
 From: Aloma Ave.  
 To: Oleander Dr.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 34.7 MPH  
 NB Travel Time: 6.57 MIN

SB Avg Speed: 38.4 MPH  
 SB Travel Time: 5.93 MIN

**Level of Services:**

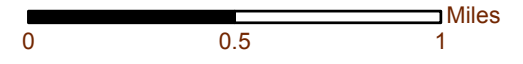


- |  |   |   |   |   |               |
|--|---|---|---|---|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*





**SR 436  
- PM Peak**

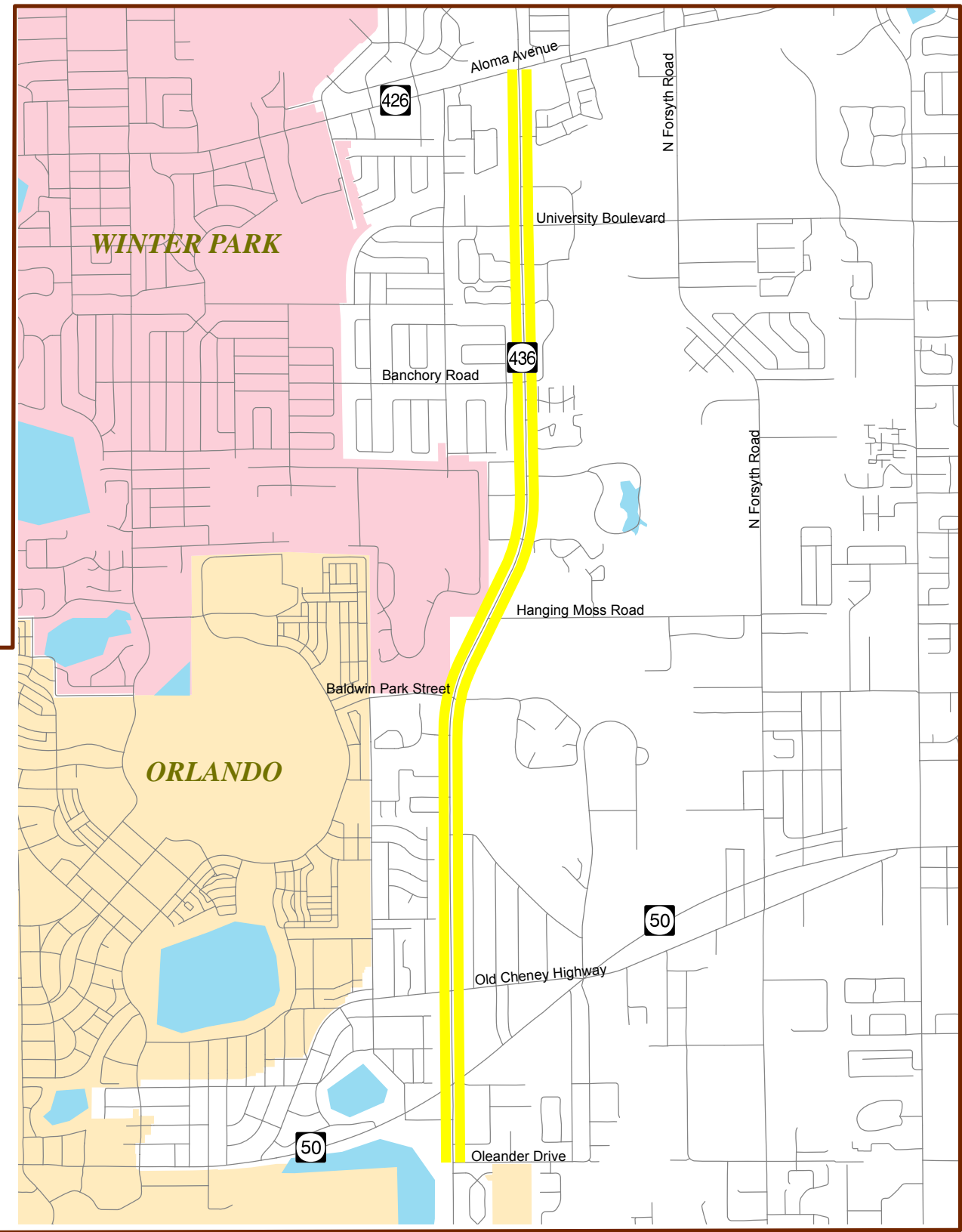
**Before Condition**

Date of Collection: 12/20/2012  
 Distance: 3.56 miles  
 From: Aloma Ave.  
 To: Oleander Dr.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 27.6 MPH  
 NB Travel Time: 8.25 MIN

SB Avg Speed: 24.9 MPH  
 SB Travel Time: 9.15 MIN



**SR 436  
- PM Peak**

**After Condition**

Date of Collection: 5/7/2013  
 Distance: 3.56 miles  
 From: Aloma Ave.  
 To: Oleander Dr.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 28.7 MPH  
 NB Travel Time: 7.93 MIN

SB Avg Speed: 31.0 MPH  
 SB Travel Time: 7.35 MIN

**Level of Services:**

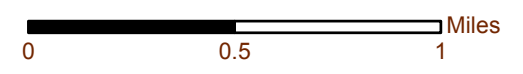


- |  |   |   |   |   |               |
|--|---|---|---|---|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*



**OBT South – US 441**  
**Kaley Ave. to Americana Blvd.**

## Year 2013 MetroPlan Orlando Travel Time Study

*Before Condition*

**Roadway:** US 441 (Orange Blossom Trail)  
**Segment:** Kaley Ave to Americana Blvd  
**Jurisdiction:** Orange County  
**Area Type:** Other Outlying Business District  
**Facility Type:** Divided Arterial  
**Speed Limit:** 45 MPH  
**Length of Arterial:** 2.5 miles    **Arterial Class:** I  
**Distance between BlueToad Devices:** 2.6 miles

**Northbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Americana Boulevard	1	3	0	45	
Holden Avenue	1	3	0	45	
39th Street	1	3	0	45	
29th Street	1	2	0	35	
Michigan Street	1	2	0	35	
Kaley Street	1	2	0	35	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	36	344	27.2	C
Northbound	PM	46	392	23.9	D

**Southbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Kaley Street	1	2	0	35	
Michigan Street	1	2	0	35	
29th Street	1	2	0	35	
39th Street	1	3	0	45	
Holden Avenue	1	3	0	45	
Americana Boulevard	1	3	1	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	36	304	30.7	C
Southbound	PM	41	349	26.9	D

## Year 2013 MetroPlan Orlando Travel Time Study

*After Condition*

**Roadway:** US 441 (Orange Blossom Trail)  
**Segment:** Kaley Ave to Americana Blvd  
**Jurisdiction:** Orange County  
**Area Type:** Other Outlying Business District  
**Facility Type:** Divided Arterial  
**Speed Limit:** 45 MPH  
**Length of Arterial:** 2.5 miles   **Arterial Class:** I  
**Distance between BlueToad Devices:** 2.6 miles

### Northbound Direction:

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Americana Boulevard	1	3	0	45	
Holden Avenue	1	3	0	45	
39th Street	1	3	0	45	
29th Street	1	2	0	35	
Michigan Street	1	2	0	35	
Kaley Street	1	2	0	35	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	36	333	28.1	C
Northbound	PM	46	358	26.1	D

### Southbound Direction:

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Kaley Street	1	2	0	35	
Michigan Street	1	2	0	35	
29th Street	1	2	0	35	
39th Street	1	3	0	45	
Holden Avenue	1	3	0	45	
Americana Boulevard	1	3	1	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	32	290	32.3	C
Southbound	PM	28	340	27.5	C

**US 441 - Kaley Avenue to Americana Boulevard**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
1,869	344.0	27.2	178.59	333.0	28.1	172.88
Northbound/Eastbound - PM Peak Hour						
2,110	392.0	23.9	229.76	358.0	26.1	209.83
Southbound/Westbound - AM Peak Hour						
2,110	304.0	30.7	178.18	290.0	32.3	169.97
Southbound/Westbound - PM Peak Hour						
2,036	349.0	26.9	197.38	340.0	27.5	192.29

\*Traffic Volumes are obtained from the latest 2012 Florida Traffic Information.

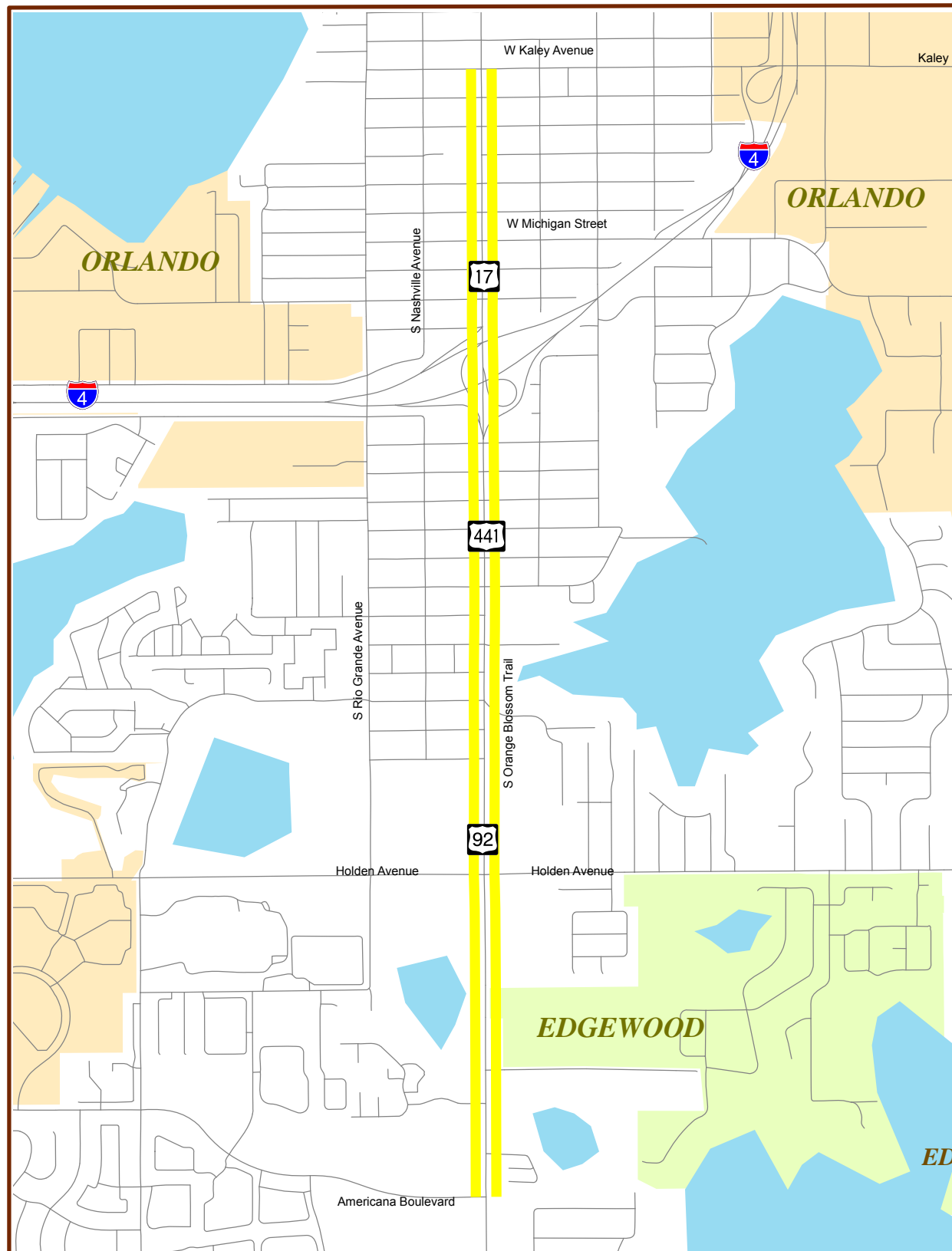
**US 441 - Kaley Avenue to Americana Boulevard**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	356.77	342.85	427.13	402.12

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$233.72	\$419.92
Annual User Benefit	\$70,116.00	\$125,976.00
<b>Total Annual User Benefit</b>	<b>\$196,092.00</b>	
Total Signal Retiming Annual Cost	\$11,354.96	
<b>User Benefit / Cost Ratio</b>	<b>17.27</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement was assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.



**US 441  
- AM Peak**

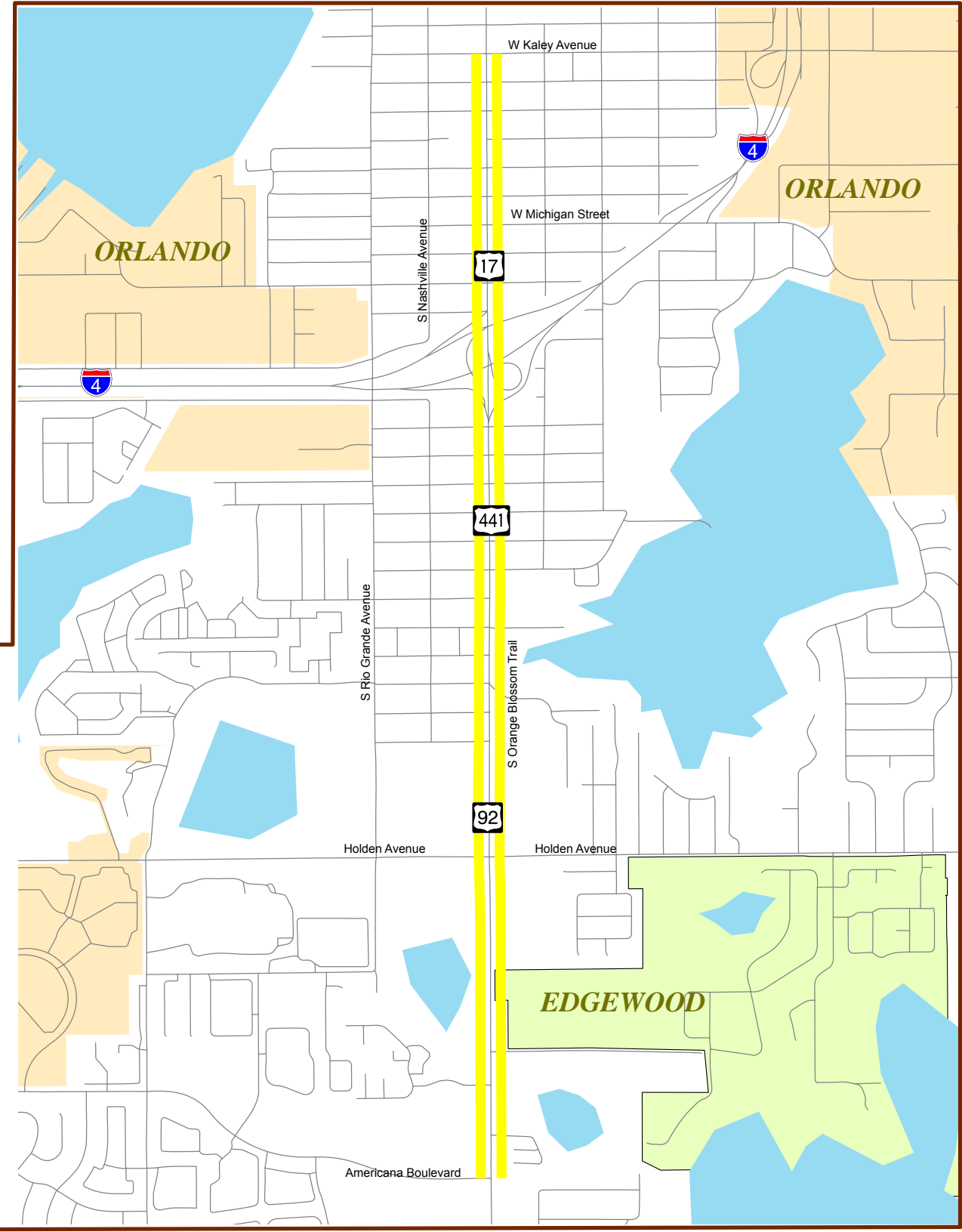
**Before Condition**

Date of Collection: 12/11/2012  
 Distance: 2.5 miles  
 From: Kaley Ave.  
 To: Americana Blvd.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 27.2 MPH  
 NB Travel Time: 5.73 MIN

SB Avg Speed: 30.7 MPH  
 SB Travel Time: 5.07 MIN



**US 441  
- AM Peak**

**After Condition**

Date of Collection: 2/26/2013  
 Distance: 2.5 miles  
 From: Kaley Ave.  
 To: Americana Blvd.

Start Time: 7:00 AM  
 End Time: 9:00 AM

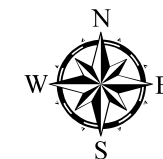
NB Avg Speed: 28.1 MPH  
 NB Travel Time: 5.55 MIN

SB Avg Speed: 32.3 MPH  
 SB Travel Time: 4.83 MIN



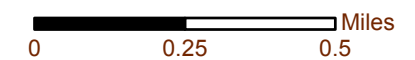
**Level of Services:**

- |   |   |               |
|---|---|---------------|
| A | D | Roads         |
| B | E | City Boundary |
| C | F | Water         |

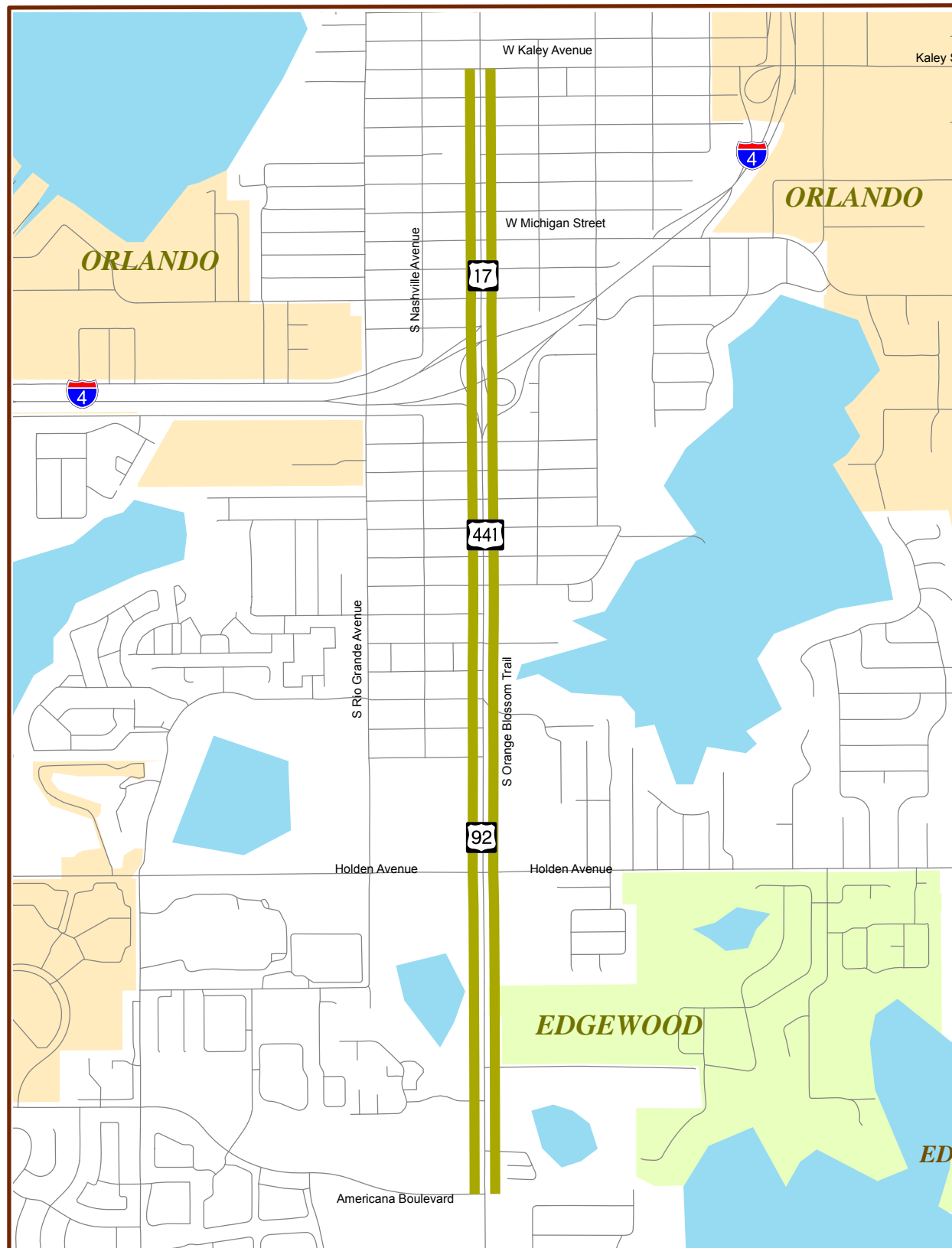


**2013 METROPLAN ORLANDO**

*Travel Time Study*







**US 441  
- PM Peak**

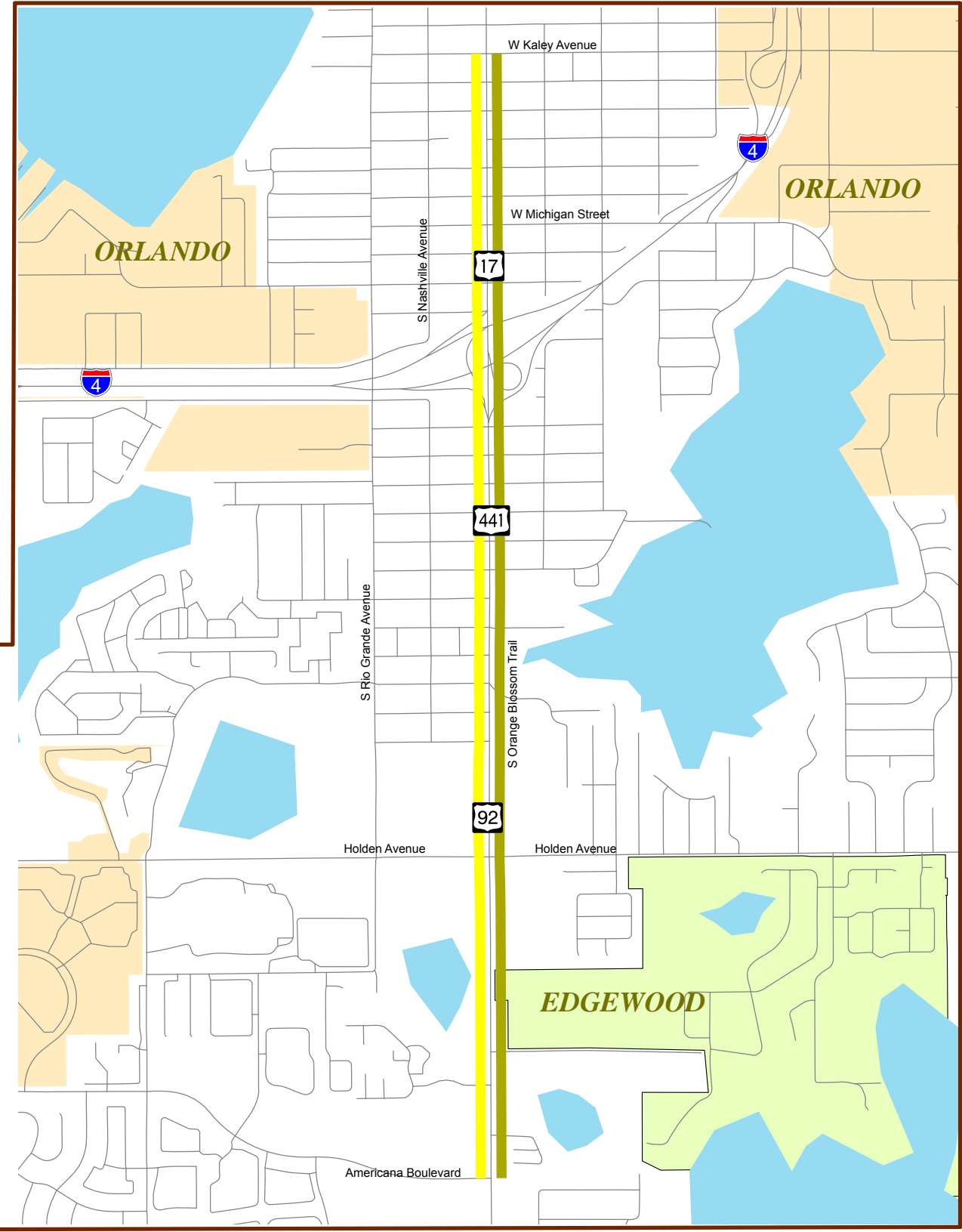
**Before Condition**

Date of Collection: 12/11/2012  
 Distance: 2.5 miles  
 From: Kaley Ave.  
 To: Americana Blvd.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 23.9 MPH  
 NB Travel Time: 6.53 MIN

SB Avg Speed: 26.9 MPH  
 SB Travel Time: 5.82 MIN



**US 441  
- PM Peak**

**After Condition**

Date of Collection: 2/26/2013  
 Distance: 2.5 miles  
 From: Kaley Ave.  
 To: Americana Blvd.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 26.1 MPH  
 NB Travel Time: 5.97 MIN

SB Avg Speed: 27.5 MPH  
 SB Travel Time: 5.67 MIN

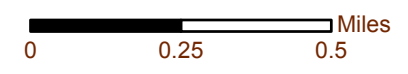
**Level of Services:**

- |   |   |               |
|---|---|---------------|
| A | D | Roads         |
| B | E | City Boundary |
| C | F | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*



**SR 50**  
**Forsyth Rd. to Avalon Park Blvd.**

**Year 2013 MetroPlan Orlando Travel Time Study**  
*Before Condition*

**Roadway:** SR 50 (E. Colonial Drive)  
**Segment:** Forsyth Road to Avalon Park Boulevard  
**Jurisdiction:** Orange County  
**Area Type:** Undeveloped portions of Urbanized Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 45/50/55 MPH  
**Length of Arterial:** 7.86 miles    **Arterial Class:** I  
**Distance between BlueToad Devices:** 8.6 miles

*Eastbound Direction*

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Forsyth Road	1	3	1	50	
Goldenrod Road	2	3	1	50	
Chickasaw Trail	1	3	1	50	
SR 417 SB Off Ramp	1	3	0	50	
SR 417 NB Off Ramp	1	3	0	50	
Constantine Street	1	3	1	50	
Econlockhatchee Trail	2	3	1	50	
Dean Road	2	3	1	45	
Murdock Boulevard	1	2	0	45	
Rouse Road	1	2	1	45	
Rouse Lake Road/Walmart	1	2	1	45	
Alafaya Trail	2	2	1	45	
Sophie Boulevard	1	2	1	45	
Woodbury Road	1	2	1	45	
SR 408 NB Off Ramp	0	2	0	45	
Bonneville Drive	1	3	0	45	
Lake Pickett Road	1	2	1	45	
Pebble Beach Boulevard	1	2	1	55	
Avalon Park Boulevard	1	2	1	55	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	14	1039	29.8	C
Eastbound	PM	14	1732	17.9	E

*Westbound Direction*

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Avalon Park Boulevard	1	2	1	55	
Pebble Beach Boulevard	1	2	1	55	
Lake Pickett Road	1	2	1	45	
Bonneville Drive	1	2	0	45	
SR 408 NB Off Ramp	0	2	0	45	
Woodbury Road	1	2	1	45	
Sophie Boulevard	1	2	1	45	
Alafaya Trail	2	2	1	45	
Rouse Lake Road/Walmart	1	2	0	45	
Rouse Road	1	2	1	45	
Murdock Boulevard	1	2	1	45	
Dean Road	1	3	1	45	
Econlockhatchee Trail	2	3	1	50	
Constantine Street	1	3	0	50	
SR 417 NB Off Ramp	0	3	1	50	
SR 417 SB Off Ramp	0	3	0	50	
Chickasaw Trail	1	3	0	50	
Goldenrod Road	2	3	1	50	
Forsyth Road	1	3	1	50	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	19	1502	20.6	E
Westbound	PM	10	1262	24.5	D

**Year 2013 MetroPlan Orlando Travel Time Study**  
*After Condition*

**Roadway:** SR 50 (E. Colonial Drive)  
**Segment:** Forsyth Road to Avalon Park Boulevard  
**Jurisdiction:** Orange County  
**Area Type:** Undeveloped portions of Urbanized Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 45/50/55 MPH  
**Length of Arterial:** 7.86 miles    **Arterial Class:** I  
**Distance between BlueToad Devices:** 8.6 miles

*Eastbound Direction*

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Forsyth Road	1	3	1	50	
Goldenrod Road	2	3	1	50	
Chickasaw Trail	1	3	1	50	
SR 417 SB Off Ramp	1	3	0	50	
SR 417 NB Off Ramp	1	3	0	50	
Constantine Street	1	3	1	50	
Econlockhatchee Trail	2	3	1	50	
Dean Road	2	3	1	45	
Murdock Boulevard	1	2	0	45	
Rouse Road	1	2	1	45	
Rouse Lake Road/Walmart	1	2	1	45	
Alafaya Trail	2	2	1	45	
Sophie Boulevard	1	2	1	45	
Woodbury Road	1	2	1	45	
SR 408 NB Off Ramp	0	2	0	45	
Bonneville Drive	1	3	0	45	
Lake Pickett Road	1	2	1	45	
Pebble Beach Boulevard	1	2	1	55	
Avalon Park Boulevard	1	2	1	55	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	95	943	32.8	C
Eastbound	PM	99	1467	21.1	D

**Westbound Direction**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Avalon Park Boulevard	1	2	1	55	
Pebble Beach Boulevard	1	2	1	55	
Lake Pickett Road	1	2	1	45	
Bonneville Drive	1	2	0	45	
SR 408 NB Off Ramp	0	2	0	45	
Woodbury Road	1	2	1	45	
Sophie Boulevard	1	2	1	45	
Alafaya Trail	2	2	1	45	
Rouse Lake Road/Walmart	1	2	0	45	
Rouse Road	1	2	1	45	
Murdock Boulevard	1	2	1	45	
Dean Road	1	3	1	45	
Econlockhatchee Trail	2	3	1	50	
Constantine Street	1	3	0	50	
SR 417 NB Off Ramp	0	3	1	50	
SR 417 SB Off Ramp	0	3	0	50	
Chickasaw Trail	1	3	0	50	
Goldenrod Road	2	3	1	50	
Forsyth Road	1	3	1	50	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	125	1478	20.9	E
Westbound	PM	109	1203	25.7	D

**SR 50 - Forsyth Road to Avalon Park Boulevard**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
1,517	1,039.0	29.8	437.82	943.0	37.2	397.37
Northbound/Eastbound - PM Peak Hour						
2,340	1,732.0	17.9	1,125.80	1,467.0	21.3	953.55
Southbound/Westbound - AM Peak Hour						
2,131	1,502.0	20.6	889.10	1,478.0	20.9	874.89
Southbound/Westbound - PM Peak Hour						
1,758	1,262.0	24.5	616.28	1,203.0	25.7	587.47

\*Traffic Volumes are obtained from the latest 2012 Florida Traffic Information.

**SR 50 - Forsyth Road to Avalon Park Boulevard**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	1,326.92	1,272.26	1,742.08	1,541.02

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$917.74	\$3,375.80
<b>Annual User Benefit</b>	<b>\$275,322.00</b>	<b>\$1,012,740.00</b>
<b>Total Annual User Benefit</b>	<b>\$1,288,062.00</b>	
Total Signal Retiming Annual Cost	\$34,604.83	
<b>User Benefit / Cost Ratio</b>	<b>37.22</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement was assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.



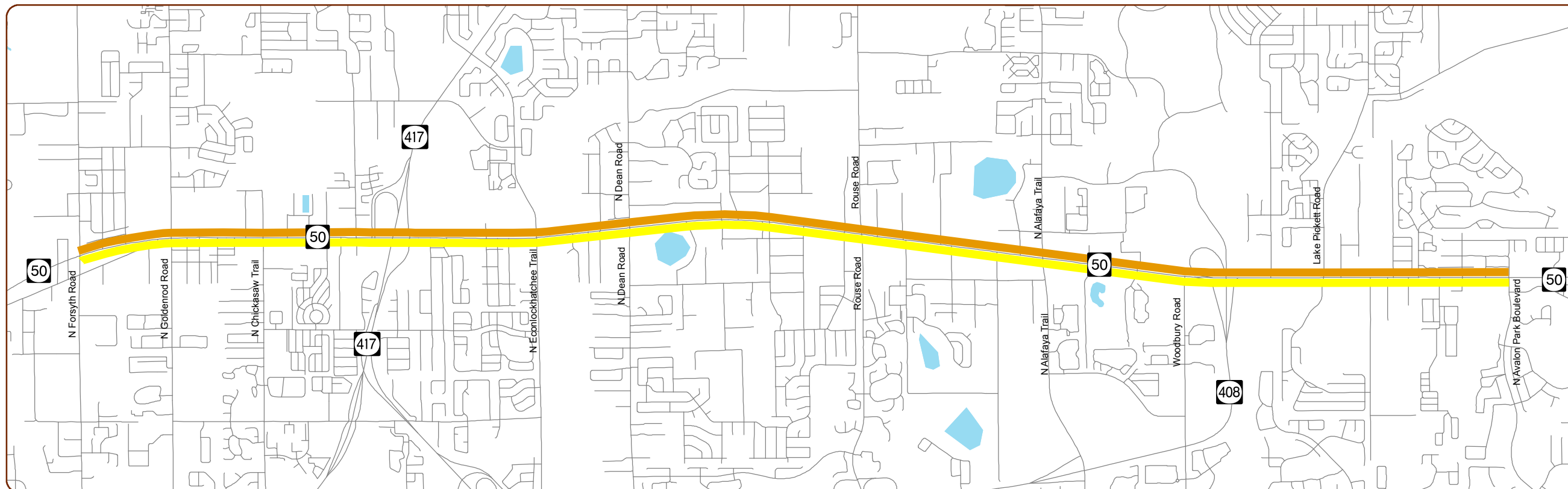
## SR 50 - AM Peak Before Condition

Date of Collection: 12/12/2012  
 Distance: 7.86 miles  
 From: Forsyth Rd.  
 To: Avalon Park Blvd.

Start Time: 7:00 AM  
 End Time: 9:00 AM

EB Avg Speed: 29.80 MPH  
 EB Travel Time: 17.32 MIN

WB Avg Speed: 20.60 MPH  
 WB Travel Time: 25.03 MIN



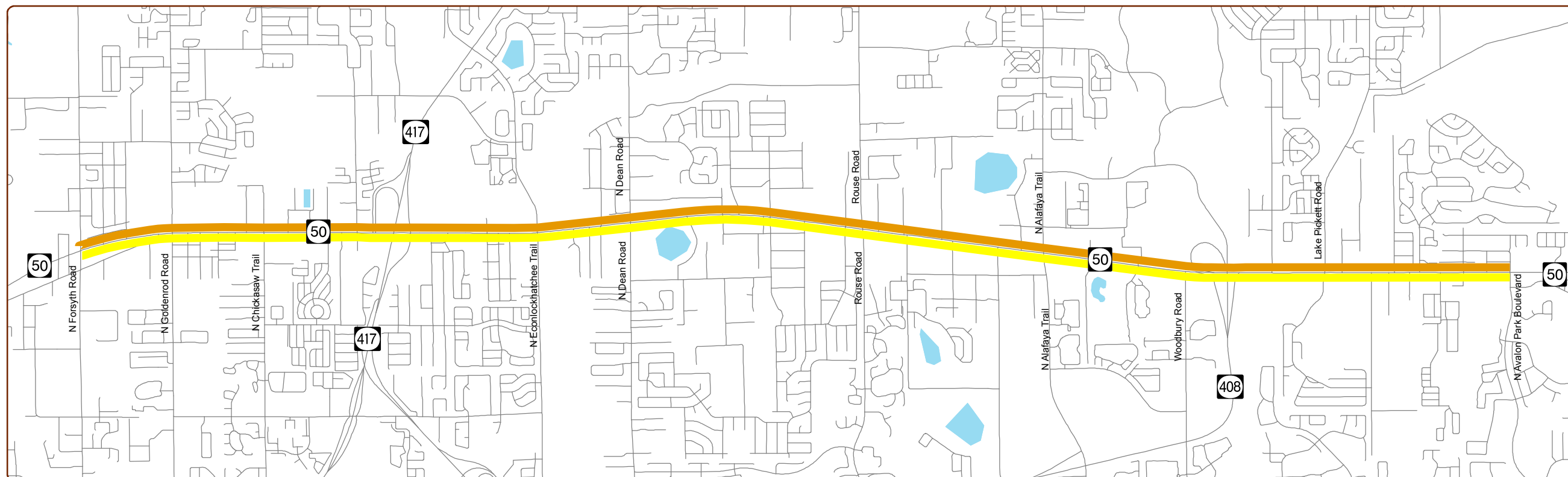
## SR 50 - AM Peak After Condition

Date of Collection: 4/18/2013  
 Distance: 7.86 miles  
 From: Forsyth Rd.  
 To: Avalon Park Blvd.

Start Time: 7:00 AM  
 End Time: 9:00 AM

EB Avg Speed: 32.80 MPH  
 EB Travel Time: 15.72 MIN

WB Avg Speed: 20.90 MPH  
 WB Travel Time: 24.63 MIN

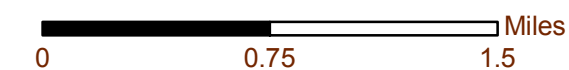


### Level of Services:



## 2013 METROPLAN ORLANDO

### Travel Time Study



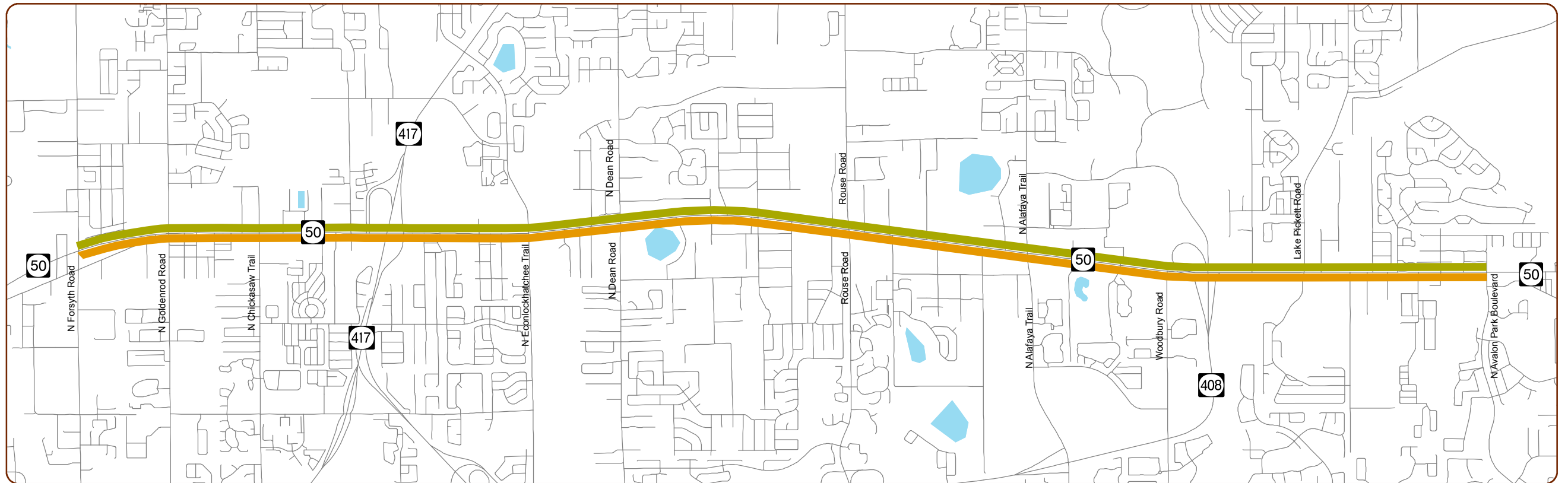
## SR 50 - PM Peak Before Condition

Date of Collection: 12/12/2012  
 Distance: 7.86 miles  
 From: Forsyth Rd.  
 To: Avalon Park Blvd.

Start Time: 4:00 PM  
 End Time: 6:00 PM

EB Avg Speed: 17.90 MPH  
 EB Travel Time: 28.87 MIN

WB Avg Speed: 24.50 MPH  
 WB Travel Time: 21.03 MIN



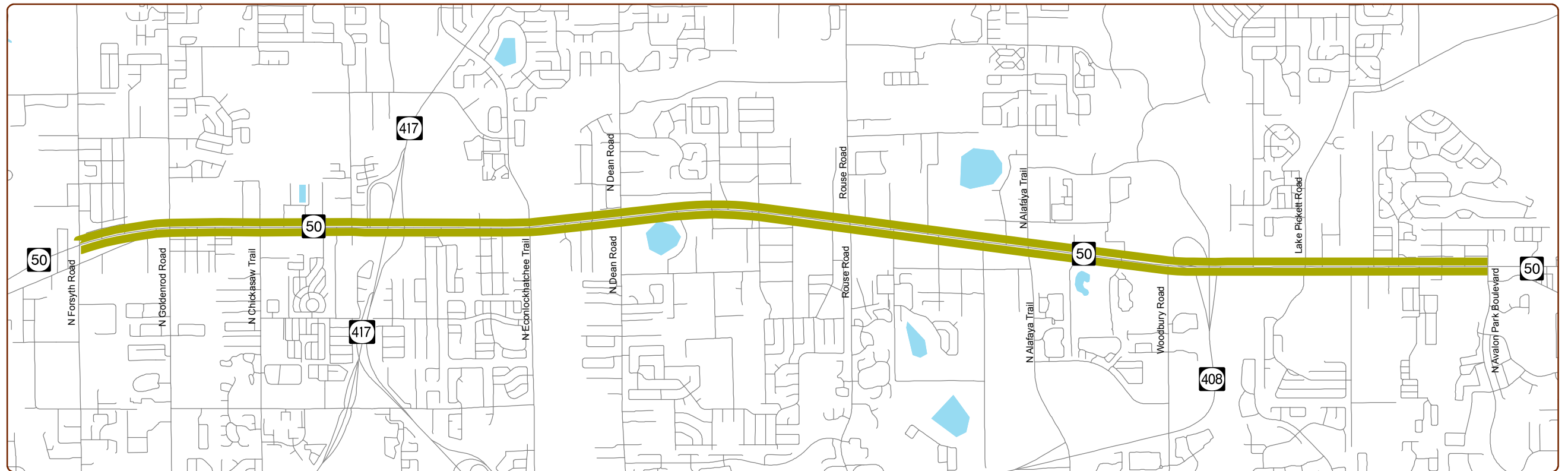
## SR 50 - PM Peak After Condition

Date of Collection: 4/18/2013  
 Distance: 7.86 miles  
 From: Forsyth Rd.  
 To: Avalon Park Blvd.

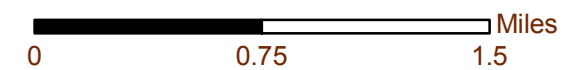
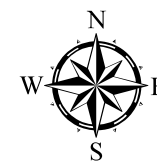
Start Time: 4:00 PM  
 End Time: 6:00 PM

EB Avg Speed: 21.10 MPH  
 EB Travel Time: 24.45 MIN

WB Avg Speed: 25.70 MPH  
 WB Travel Time: 20.05 MIN



### Level of Services:



SR 552  
Bahia Ave. to Dixie Belle Drive

**Year 2013 MetroPlan Orlando Travel Time Study**  
*Before Condition*

**Roadway:** Curry Ford Road  
**Segment:** Bahia Ave to Dixie Belle Drive  
**Jurisdiction:** City of Orlando  
**Area Type:** Urbanized Residential Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 40 MPH  
**Length of Arterial:** 0.026 miles    **Arterial Class:** II  
**Distance between BlueToad Devices:** 0.3 miles

**Eastbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Dixie Belle Drive	0	2	0	40	
Bahia Avenue	0	2	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	55	57	18.9	D
Eastbound	PM	89	157	6.9	F

**Westbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Bahia Avenue	0	2	0	40	
Dixie Belle Drive	0	2	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	66	30	36.0	A
Westbound	PM	79	34	31.8	B

**Year 2013 MetroPlan Orlando Travel Time Study**  
*After Condition*

**Roadway:** Curry Ford Road  
**Segment:** Bahia Ave to Dixie Belle Drive  
**Jurisdiction:** City of Orlando  
**Area Type:** Urbanized Residential Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 40 MPH  
**Length of Arterial:** 0.026 miles    **Arterial Class:** II  
**Distance between BlueToad Devices:** 0.3 miles

**Eastbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Dixie Belle Drive	0	2	0	40	
Bahia Avenue	0	2	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	11	43	25.1	C
Eastbound	PM	18	76	14.2	E

**Westbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Bahia Avenue	0	2	0	40	
Dixie Belle Drive	0	2	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	19	29	37.2	A
Westbound	PM	10	28	38.6	A

**SR 552/Curry Ford Road - Bahia Avenue to Dixie Belle Drive**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
784	57.0	18.9	12.41	43.0	25.1	9.36
Northbound/Eastbound - PM Peak Hour						
1,536	157.0	6.9	66.99	76.0	14.2	32.43
Southbound/Westbound - AM Peak Hour						
1,252	30.0	36.0	10.43	29.0	37.2	10.09
Southbound/Westbound - PM Peak Hour						
1,058	34.0	31.8	9.99	28.0	38.6	8.23

\*Traffic Volumes are obtained from the latest 2012 Turning Movement Count.

**SR 552/Curry Ford Road - Bahia Avenue to Dixie Belle Drive**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	22.85	19.45	76.98	40.66

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$57.09	\$609.81
Annual User Benefit	\$17,127.00	\$182,943.00
<b>Total Annual User Benefit</b>	<b>\$200,070.00</b>	
Total Signal Retiming Annual Cost	\$1,755.41	
<b>User Benefit / Cost Ratio</b>	<b>113.97</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement is assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.

**Curry Ford Road  
- AM Peak  
Before Condition**

Date of Collection: 12/20/2012  
Distance: 0.026 miles  
From: Bahia Ave.  
To: Dixie Belle Dr.

Start Time: 7:00 AM  
End Time: 9:00 AM

EB Avg Speed: 18.9 MPH  
EB Travel Time: 0.95 MIN

WB Avg Speed: 36.0 MPH  
WB Travel Time: 0.50 MIN



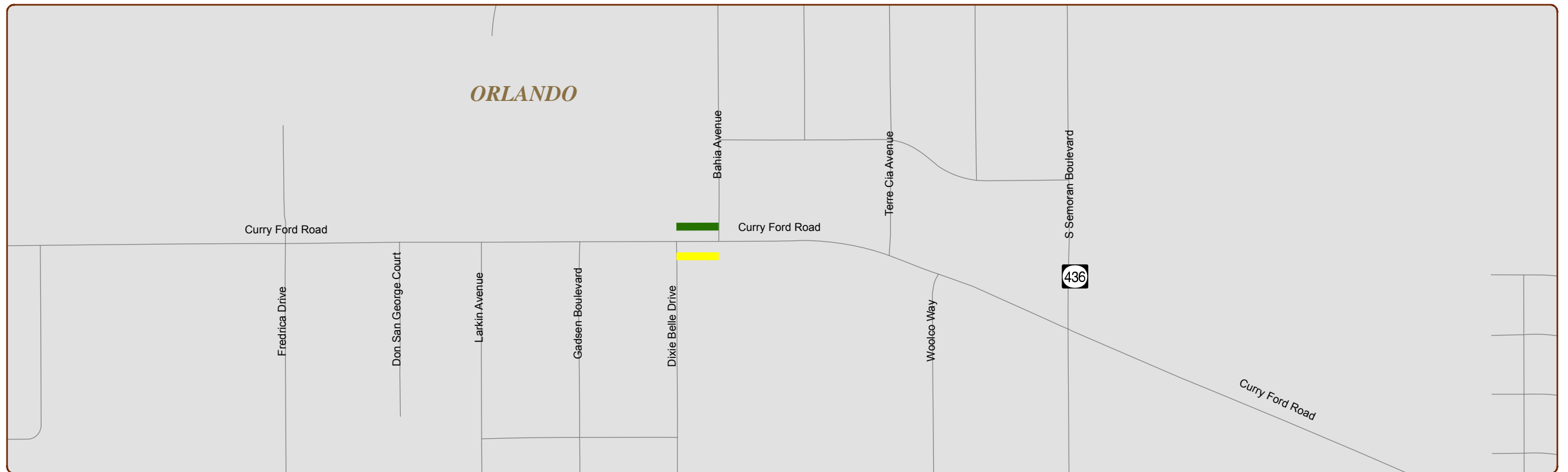
**Curry Ford Road  
- AM Peak  
After Condition**

Date of Collection: 4/23/2013  
Distance: 0.026 miles  
From: Bahia Ave.  
To: Dixie Belle Dr.

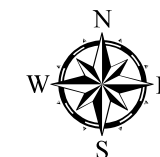
Start Time: 7:00 AM  
End Time: 9:00 AM

EB Avg Speed: 25.1 MPH  
EB Travel Time: 0.72 MIN

WB Avg Speed: 37.2 MPH  
WB Travel Time: 0.48 MIN

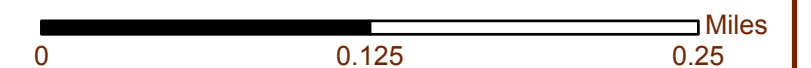


**Level of Services:**



**2013 METROPLAN ORLANDO**

*Travel Time Study*





**Curry Ford Road  
- PM Peak  
Before Condition**

Date of Collection: 12/20/2012  
Distance: 0.026 miles  
From: Bahia Ave.  
To: Dixie Belle Dr.

Start Time: 4:00 PM  
End Time: 6:00 PM

EB Avg Speed: 6.90 MPH  
EB Travel Time: 2.62 MIN

WB Avg Speed: 31.8 MPH  
WB Travel Time: 0.57 MIN



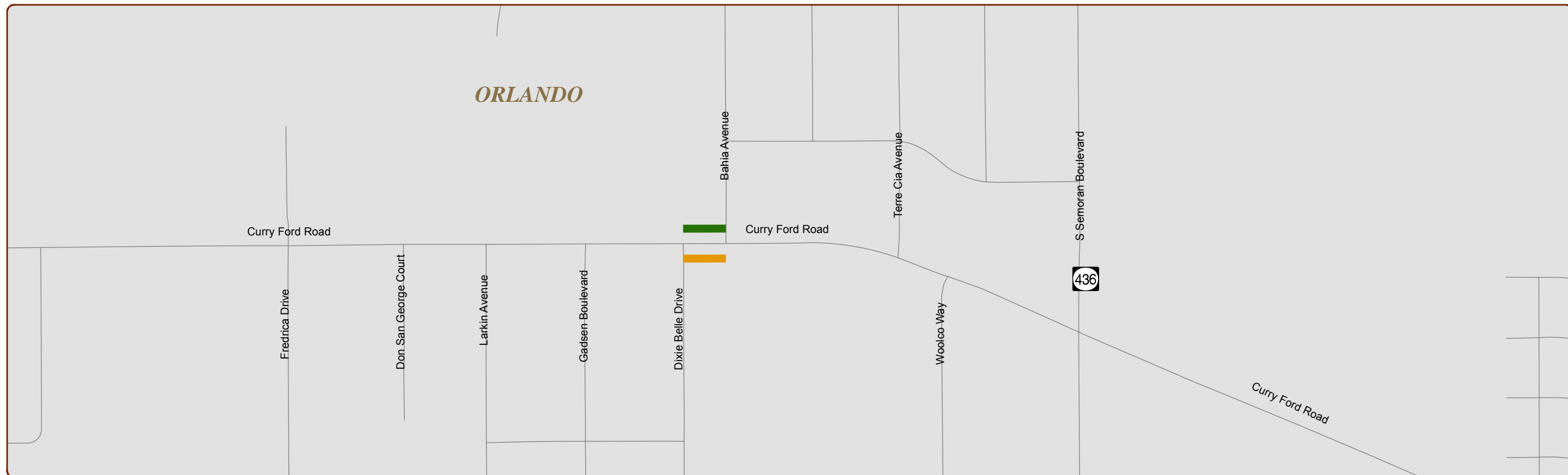
**Curry Ford Road  
- PM Peak  
After Condition**

Date of Collection: 4/23/2013  
Distance: 0.026 miles  
From: Bahia Ave.  
To: Dixie Belle Dr.

Start Time: 4:00 PM  
End Time: 6:00 PM

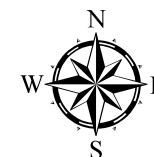
EB Avg Speed: 14.2 MPH  
EB Travel Time: 1.27 MIN

WB Avg Speed: 38.6 MPH  
WB Travel Time: 0.47 MIN



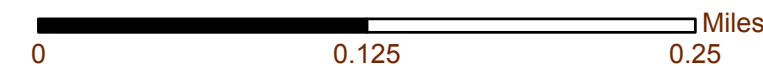
**Level of Services:**

- |  |   |   |   |   |               |
|--|---|---|---|---|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*



SR 436  
Dahlia Dr. to TG Lee Blvd.

**Year 2013 MetroPlan Orlando Travel Time Study**  
*Before Condition*

**Roadway:** SR 436 (Semoran Boulevard)  
**Segment:** Dahila Drive to TG Lee Boulevard  
**Jurisdiction:** City of Orlando  
**Area Type:** Other Outlying Business District  
**Facility Type:** Divided Arterial  
**Speed Limit:** 45/50 MPH  
**Length of Arterial:** 5.8 miles    **Arterial Class:** I  
**Distance between BlueToad Devices:** 6.2 miles

*Northbound Direction*

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
TG Lee Boulevard	2	3	1	45	
Hazeltine National Drive	1	3	1	45	
Lee Vista Boulevard	1	3	1	50	
Bent Pine Drive	1	3	1	50	
Hoffner Avenue	2	3	1	50	
Turnbull Drive	1	3	0	50	
Gatlin Avenue	1	3	1	50	
Pershing Avenue	1	3	1	50	
Lake Margaret Drive	2	3	1	50	
E Michigan Street	2	3	1	50	
E Grant Street	1	3	1	45	
Curry Ford Road	2	3	1	45	
La Costa Drive	1	3	0	45	
Stonewall Jackson Road	0	3	0	45	
Lake Underhill Road	1	3	0	50	
Yew Drive	1	3	0	50	
Kalima Drive	1	3	0	45	
Dahlia Drive	1	3	0	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	16	891	25.1	D
Northbound	PM	21	870	25.7	D

*Southbound Direction*

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Dahlia Drive	1	3	0	45	
Kalima Drive	1	3	0	45	
Yew Drive	0	3	0	45	
Lake Underhill Road	2	3	0	45	
Stonewall Jackson Road	1	3	0	45	
La Costa Drive	1	3	0	45	
Curry Ford Road	2	3	0	45	
E Grant Street	1	3	1	45	
E Michigan Street	1	3	1	50	
Lake Margaret Drive	1	3	1	50	
Pershing Avenue	2	3	1	50	
Gatlin Avenue	1	3	1	50	
Turnbull Drive	1	3	0	50	
Hoffner Avenue	2	3	1	50	
Bent Pine Drive	1	3	0	50	
Lee Vista Boulevard	2	3	1	50	
Hazeltine National Drive	2	3	1	45	
TG Lee Boulevard	1	3	1	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	13	774	28.8	C
Southbound	PM	13	878	25.4	D

## Year 2013 MetroPlan Orlando Travel Time Study

*After Condition*

**Roadway:** SR 436 (Semoran Boulevard)  
**Segment:** Dahila Drive to TG Lee Boulevard  
**Jurisdiction:** City of Orlando  
**Area Type:** Other Outlying Business District  
**Facility Type:** Divided Arterial  
**Speed Limit:** 45/50 MPH  
**Length of Arterial:** 5.8 miles    **Arterial Class:** I  
**Distance between BlueToad Devices:** 6.2 miles

### Northbound Direction

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
TG Lee Boulevard	2	3	1	45	
Hazeltine National Drive	1	3	1	45	
Lee Vista Boulevard	1	3	1	50	
Bent Pine Drive	1	3	1	50	
Hoffner Avenue	2	3	1	50	
Turnbull Drive	1	3	0	50	
Gatlin Avenue	1	3	1	50	
Pershing Avenue	1	3	1	50	
Lake Margaret Drive	2	3	1	50	
E Michigan Street	2	3	1	50	
E Grant Street	1	3	1	45	
Curry Ford Road	2	3	1	45	
La Costa Drive	1	3	0	45	
Stonewall Jackson Road	0	3	0	45	
Lake Underhill Road	1	3	0	50	
Yew Drive	1	3	0	50	
Kalima Drive	1	3	0	45	
Dahlia Drive	1	3	0	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	26	863	25.9	D
Northbound	PM	18	852	26.2	D

*Southbound Direction*

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Dahlia Drive	1	3	0	45	
Kalima Drive	1	3	0	45	
Yew Drive	0	3	0	45	
Lake Underhill Road	2	3	0	45	
Stonewall Jackson Road	1	3	0	45	
La Costa Drive	1	3	0	45	
Curry Ford Road	2	3	0	45	
E Grant Street	1	3	1	45	
E Michigan Street	1	3	1	50	
Lake Margaret Drive	1	3	1	50	
Pershing Avenue	2	3	1	50	
Gatlin Avenue	1	3	1	50	
Turnbull Drive	1	3	0	50	
Hoffner Avenue	2	3	1	50	
Bent Pine Drive	1	3	0	50	
Lee Vista Boulevard	2	3	1	50	
Hazeltine National Drive	2	3	1	45	
TG Lee Boulevard	1	3	1	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	23	742	30.1	C
Southbound	PM	24	848	26.3	D

**SR 436 - Dahlia Drive to TG Lee Boulevard**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
2,182	891.0	25.1	540.05	863.0	25.9	523.07
Northbound/Eastbound - PM Peak Hour						
2,039	870.0	25.7	492.76	852.0	26.2	482.56
Southbound/Westbound - AM Peak Hour						
1,741	774.0	28.8	374.32	742.0	30.1	358.84
Southbound/Westbound - PM Peak Hour						
2,054	878.0	25.4	500.95	848.0	26.3	483.83

\*Traffic Volumes are obtained from the latest 2012 Florida Traffic Information.

**SR 436 - Dahlia Drive to TG Lee Boulevard**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

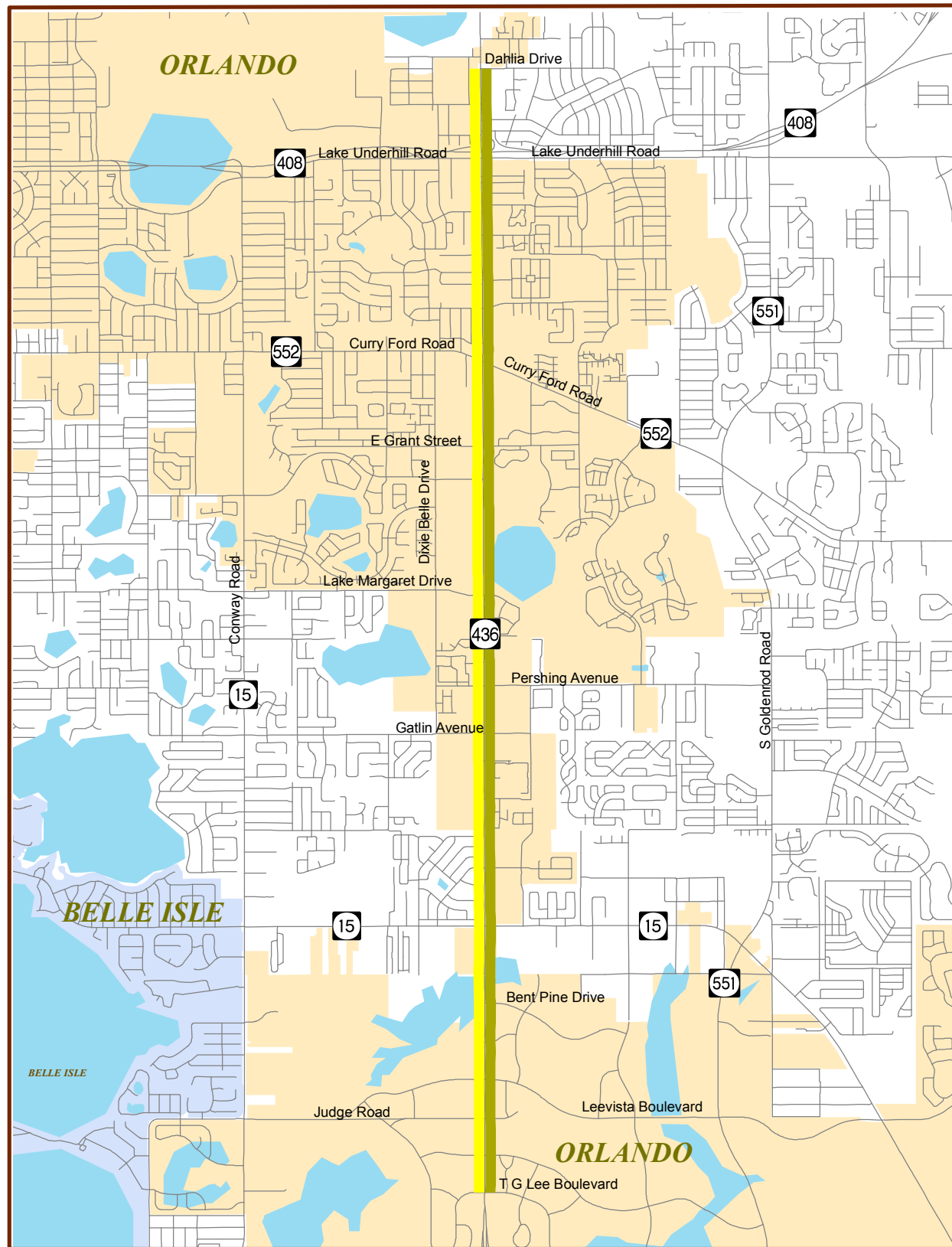
MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	914.36	881.91	993.71	966.39

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$544.84	\$458.70
Annual User Benefit	\$163,452.00	\$137,610.00
<b>Total Annual User Benefit</b>	<b>\$301,062.00</b>	
Total Signal Retiming Annual Cost	\$31,597.31	
<b>User Benefit / Cost Ratio</b>	<b>9.53</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement was assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.





**SR 436  
- AM Peak**

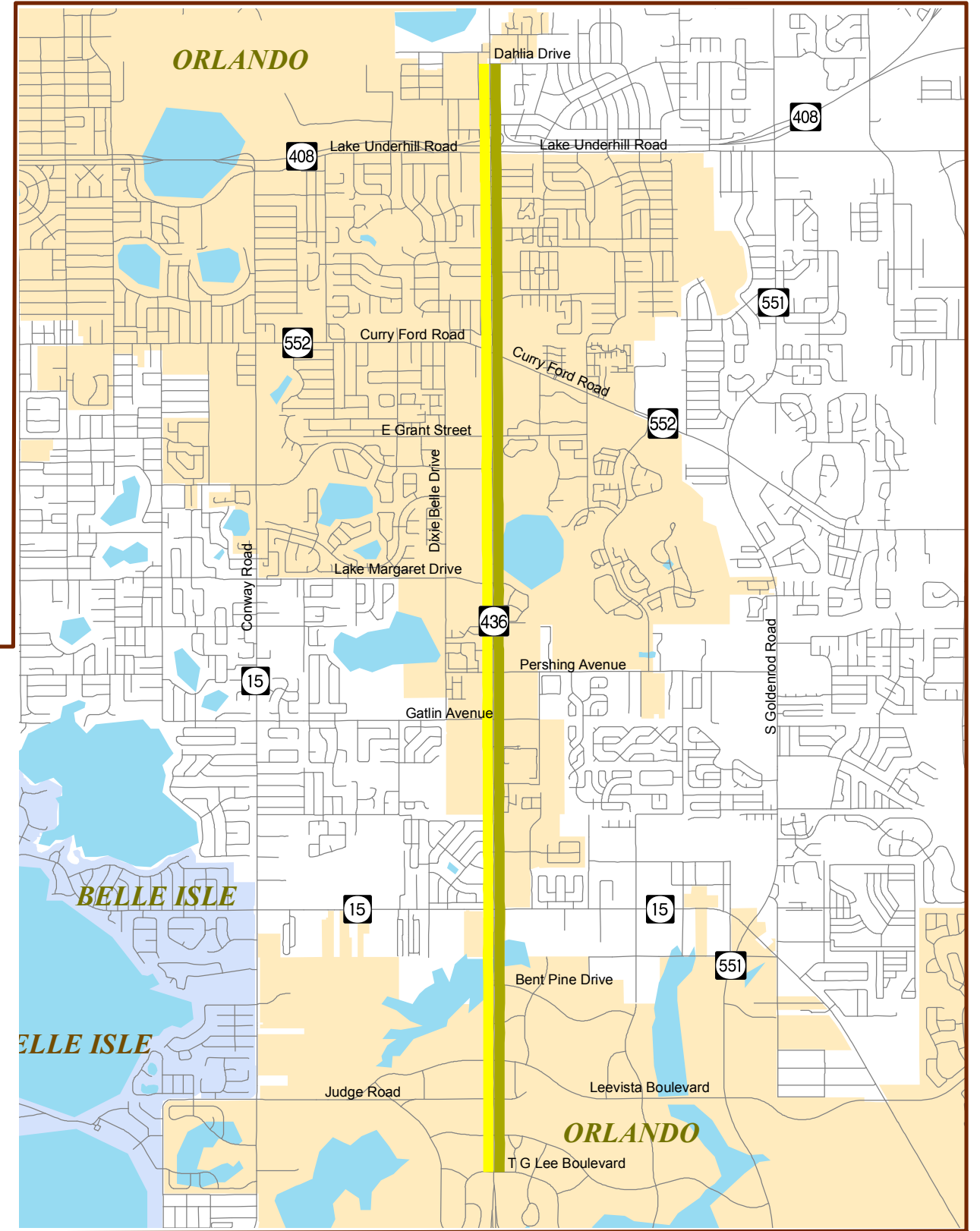
**Before Condition**

Date of Collection: 12/19/2012  
 Distance: 5.8 miles  
 From: Dahlia Drive  
 To: TG Lee Blvd.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 25.10 MPH  
 NB Travel Time: 14.85 MIN

SB Avg Speed: 28.80 MPH  
 SB Travel Time: 12.90 MIN



**SR 436  
- AM Peak**

**After Condition**

Date of Collection: 4/11/2013  
 Distance: 5.80 miles  
 From: Dahlia Drive  
 To: TG Lee Blvd.

Start Time: 7:00 AM  
 End Time: 9:00 AM

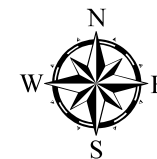
NB Avg Speed: 25.90 MPH  
 NB Travel Time: 14.38 MIN

SB Avg Speed: 30.10 MPH  
 SB Travel Time: 12.37 MIN



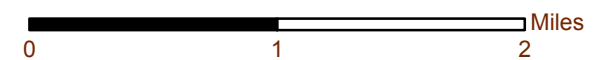
**Level of Services:**

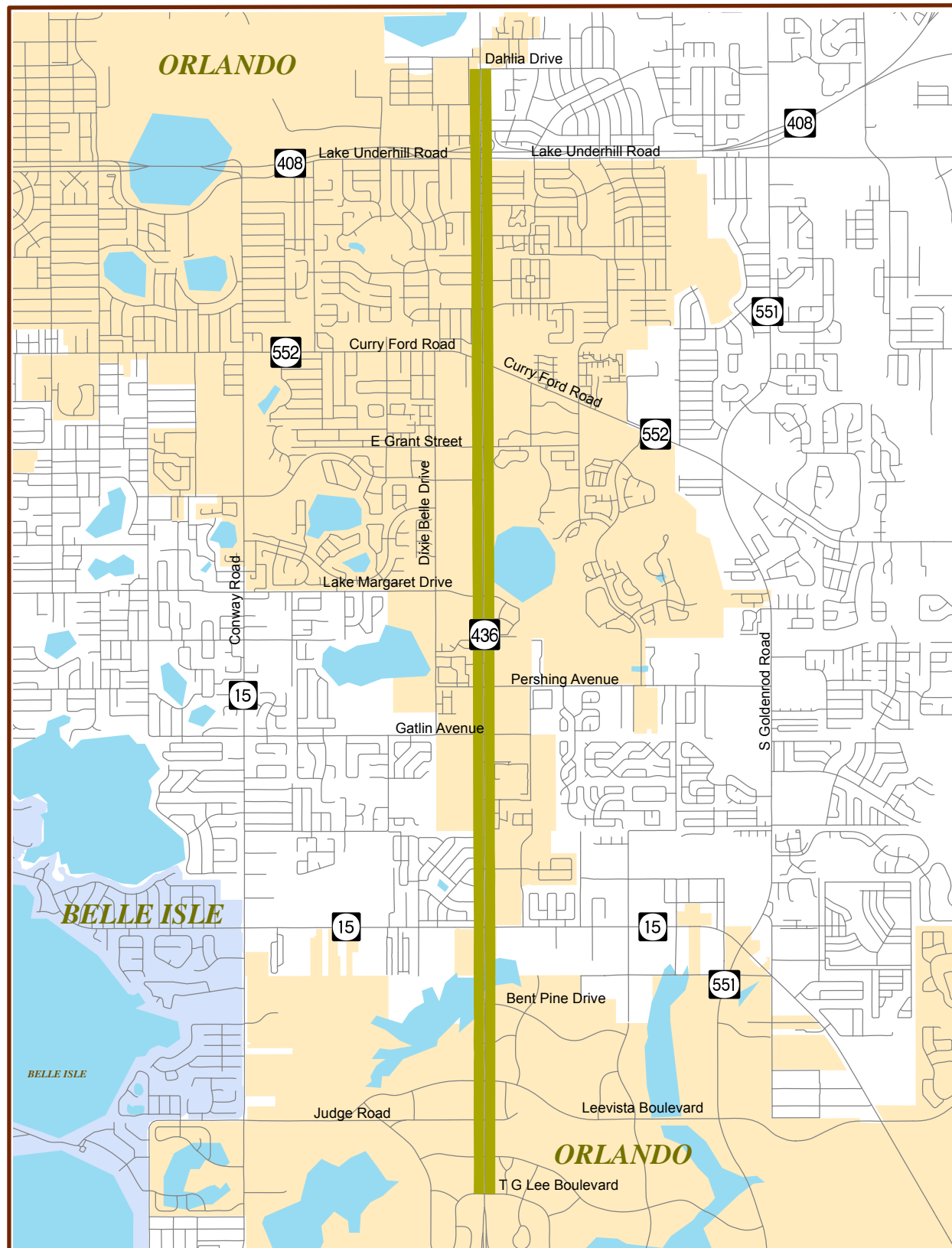
- |   |   |               |
|---|---|---------------|
| A | D | Roads         |
| B | E | City Boundary |
| C | F | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*





**SR 436  
- PM Peak**

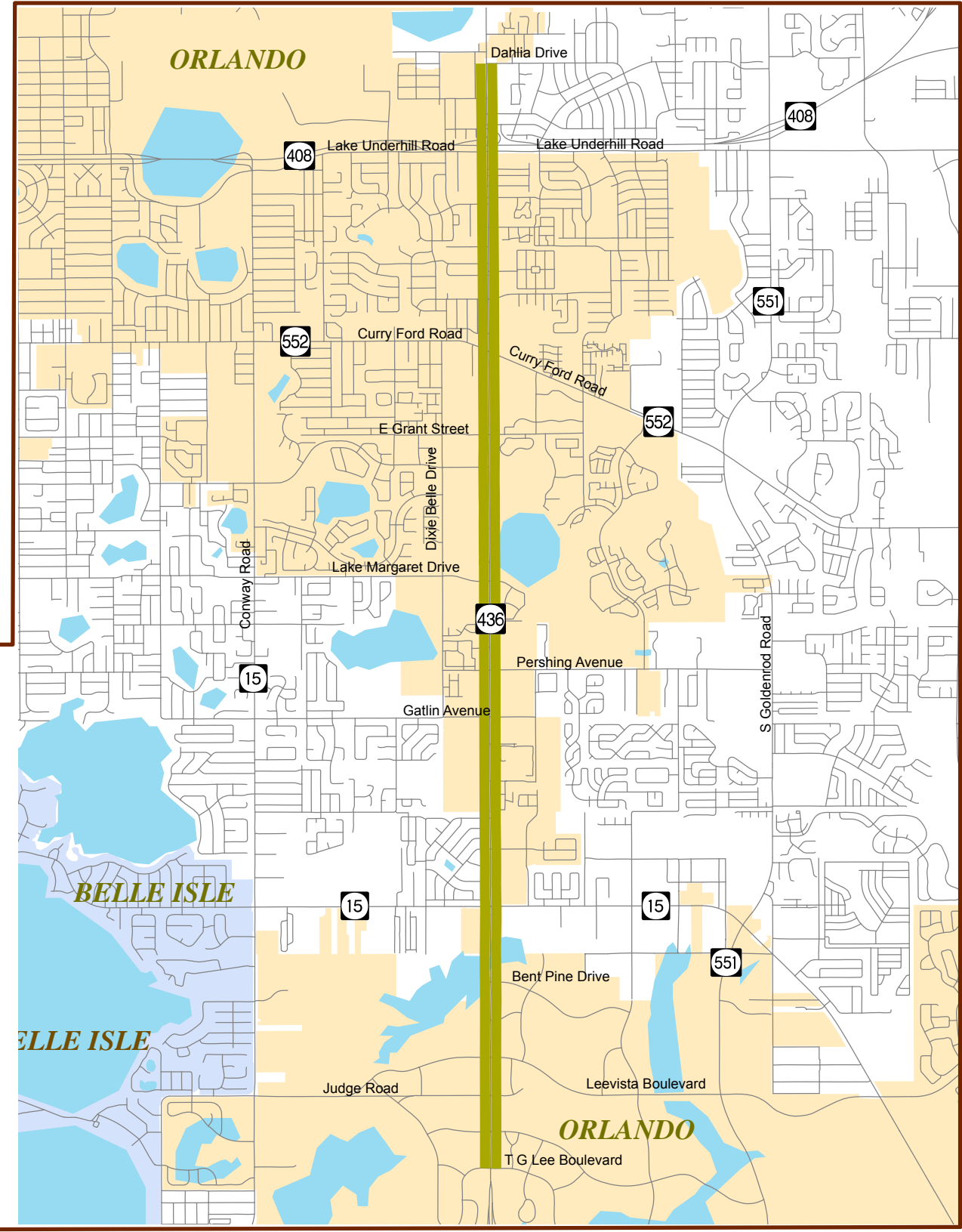
**Before Condition**

Date of Collection: 12/19/2013  
 Distance: 5.8 miles  
 From: Dahlia Drive  
 To: TG Lee Blvd.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 25.70 MPH  
 NB Travel Time: 14.50 MIN

SB Avg Speed: 25.40 MPH  
 SB Travel Time: 14.63 MIN



**SR 436  
- PM Peak**

**After Condition**

Date of Collection: 4/11/2013  
 Distance: 5.80 miles  
 From: Dahlia Drive  
 To: TG Lee Blvd.

Start Time: 4:00 PM  
 End Time: 6:00 PM

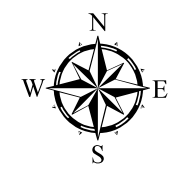
NB Avg Speed: 26.20 MPH  
 NB Travel Time: 14.20 MIN

SB Avg Speed: 26.30 MPH  
 SB Travel Time: 14.13 MIN

**Level of Services:**



- |  |   |   |   |   |               |
|--|---|---|---|---|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*



**John Young Pkwy.  
33<sup>rd</sup>/35<sup>th</sup> St. to I-4 WB Ramp**

## Year 2013 MetroPlan Orlando Travel Time Study

*Before Condition*

**Roadway:** John Young Parkway  
**Segment:** 33/35 Street to I-4 WB off Ramp  
**Jurisdiction:** City of Orlando  
**Area Type:** Urbanized Residential Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 40 MPH  
**Length of Arterial:** 0.421 miles **Arterial Class:** II  
**Distance between BlueToad Devices:** 0.6 miles

### Northbound Direction:

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
33rd/35th Street	1	5	0	40	
I-4 EB On Ramp	2	4	1	40	
L B McLeod Road	2	3	0	40	
Clear Way	0	3	0	40	
I-4 WB Off Ramp	0	3	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	39	126	17.2	D
Northbound	PM	90	117	18.5	D

### Southbound Direction:

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
I-4 WB Off Ramp	0	3	0	40	
Clear Way	1	5	0	40	
L B McLeod Road	1	3	2	40	
I-4 WB On Ramp	0	3	1	40	
I-4 EB On Ramp	2	3	0	40	
33rd/35th Street	2	3	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	61	106	20.5	D
Southbound	PM	78	149	14.5	E

**Year 2013 MetroPlan Orlando Travel Time Study**  
*After Condition*

**Roadway:** John Young Parkway  
**Segment:** 33/35 Street to I-4 WB off Ramp  
**Jurisdiction:** City of Orlando  
**Area Type:** Urbanized Residential Area  
**Facility Type:** Divided Arterial  
**Speed Limit:** 40 MPH  
**Length of Arterial:** 0.421 miles **Arterial Class:** II  
**Distance between BlueToad Devices:** 0.6 miles

**Northbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
33rd/35th Street	1	5	0	40	
I-4 EB On Ramp	2	4	1	40	
L B McLeod Road	2	3	0	40	
Clear Way	0	3	0	40	
I-4 WB Off Ramp	0	3	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Northbound	AM	49	82	26.3	C
Northbound	PM	100	86	25.1	C

**Southbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
I-4 WB Off Ramp	0	3	0	40	
Clear Way	1	5	0	40	
L B McLeod Road	1	3	2	40	
I-4 WB On Ramp	0	3	1	40	
I-4 EB On Ramp	2	3	0	40	
33rd/35th Street	2	3	0	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Southbound	AM	62	73	29.6	B
Southbound	PM	52	114	18.9	D

## John Young Parkway - 33/35 Street to I-4 WB Off Ramp

### Summary of Before & After Study Travel Time Results

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
1,363	126.0	17.2	47.71	82.0	26.3	31.05
Northbound/Eastbound - PM Peak Hour						
2,261	117.0	18.5	73.48	86.0	25.1	54.01
Southbound/Westbound - AM Peak Hour						
2,482	106.0	20.5	73.08	73.0	29.6	50.33
Southbound/Westbound - PM Peak Hour						
2,650	149.0	14.5	109.68	114.0	18.9	83.92

\*Traffic Volumes are obtained from the latest Turning Movement Count information.

**John Young Parkway - 33/35 Street to I-4 WB Off Ramp**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	120.79	81.38	183.16	137.93

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$661.69	\$759.41
Annual User Benefit	\$198,507.00	\$227,823.00
<b>Total Annual User Benefit</b>	<b>\$426,330.00</b>	
Total Signal Retiming Annual Cost	\$11,410.21	
<b>User Benefit / Cost Ratio</b>	<b>37.36</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement is assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.



**John Young Parkway  
- AM Peak**

**Before Condition**

Date of Collection: 12/18/2012  
 Distance: 0.42 miles  
 From: 33/35 Street  
 To: I4 WB Off Ramp

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 17.2 MPH  
 NB Travel Time: 2.10 MIN

SB Avg Speed: 20.5 MPH  
 SB Travel Time: 1.77 MIN



**John Young Parkway  
- AM Peak**

**After Condition**

Date of Collection: 4/2/2013  
 Distance: 0.42 miles  
 From: 33/35 Street  
 To: I4 WB Off Ramp

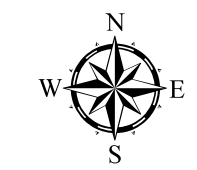
Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 26.3 MPH  
 NB Travel Time: 1.37 MIN

SB Avg Speed: 29.6 MPH  
 SB Travel Time: 1.22 MIN

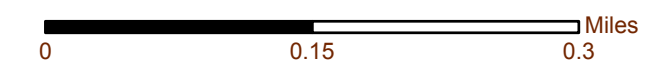
**Level of Services:**

- |  |   |   |   |   |               |
|--|---|---|---|---|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*







**John Young Parkway  
- PM Peak**

**Before Condition**

Date of Collection: 12/18/2012  
 Distance: 0.42 miles  
 From: 33/35 Street  
 To: I4 WB Off Ramp

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 18.5 MPH  
 NB Travel Time: 1.95 MIN

SB Avg Speed: 14.5 MPH  
 SB Travel Time: 2.48 MIN



**John Young Parkway  
- PM Peak**

**After Condition**

Date of Collection: 4/2/2013  
 Distance: 0.42 miles  
 From: 33/35 Street  
 To: I4 WB Off Ramp

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 25.1 MPH  
 NB Travel Time: 1.43 MIN

SB Avg Speed: 18.9 MPH  
 SB Travel Time: 1.90 MIN

**Level of Services:**

- |  |   |   |   |   |               |
|--|---|---|---|---|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*



**SR 50**  
**Mills Ave. to Old Cheney Hwy.**

**Year 2013 MetroPlan Orlando Travel Time Study**  
*Before Condition*

**Roadway:** Colonial Drive (SR 50)  
**Segment:** Mills Avenue to Old Cheney Highway  
**Jurisdiction:** City of Orlando  
**Area Type:** Other Outlying Business District  
**Facility Type:** Divided Arterial  
**Speed Limit:** 40 MPH  
**Length of Arterial:** 2.65 miles **Arterial Class:** II  
**Distance between BlueToad Devices:** 2.8 miles

**Eastbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Mills Avenue	1	2	0	40	
Shine Avenue	1	2	0	40	
N. Frenchcreek Avenue	1	2	0	40	
Hampton Avenue	1	2	0	40	
N. Bumby Avenue	1	3	0	40	
Coy Drive	1	3	1	40	
N. Primrose Drive	1	3	0	40	
Maguire Boulevard	2	3	0	40	
Fashion Square Mall	1	3	0	40	
Herndon Avenue	1	3	0	40	
Bennett Road	1	3	0	40	
Lake Baldwin Lane	1	3	0	45	
Old Cheney Highway	1	3	0	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	47	414	24.4	C
Eastbound	PM	33	531	19.0	D

**Westbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Old Cheney Highway	1	3	1	45	
Lake Baldwin Lane	1	3	0	45	
Bennett Road	1	3	0	40	
Herndon Avenue	1	3	0	40	
Fashion Square Mall	1	3	1	40	
Maguire Boulevard	2	3	0	40	
N. Primrose Drive	1	3	0	40	
Coy Drive	1	3	0	40	
N. Bumby Avenue	2	3	0	40	
Hampton Avenue	1	2	0	40	
N. Frenchcreek Avenue	1	2	0	40	
Shine Avenue	1	2	0	40	
Mills Avenue	1	2	1	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	65	407	24.8	C
Westbound	PM	49	687	14.7	E

**Year 2013 MetroPlan Orlando Travel Time Study**  
*After Condition*

**Roadway:** Colonial Drive (SR 50)  
**Segment:** Mills Avenue to Old Cheney Highway  
**Jurisdiction:** City of Orlando  
**Area Type:** Other Outlying Business District  
**Facility Type:** Divided Arterial  
**Speed Limit:** 40 MPH  
**Length of Arterial:** 2.65 miles **Arterial Class:** II  
**Distance between BlueToad Devices:** 2.8 miles

**Eastbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Mills Avenue	1	2	0	40	
Shine Avenue	1	2	0	40	
N. Frenchcreek Avenue	1	2	0	40	
Hampton Avenue	1	2	0	40	
N. Bumby Avenue	1	3	0	40	
Coy Drive	1	3	1	40	
N. Primrose Drive	1	3	0	40	
Maguire Boulevard	2	3	0	40	
Fashion Square Mall	1	3	0	40	
Herndon Avenue	1	3	0	40	
Bennett Road	1	3	0	40	
Lake Baldwin Lane	1	3	0	45	
Old Cheney Highway	1	3	0	45	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	30	324	31.1	B
Eastbound	PM	31	522	19.3	D

**Westbound Direction:**

Signalized Intersections	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Old Cheney Highway	1	3	1	45	
Lake Baldwin Lane	1	3	0	45	
Bennett Road	1	3	0	40	
Herndon Avenue	1	3	0	40	
Fashion Square Mall	1	3	1	40	
Maguire Boulevard	2	3	0	40	
N. Primrose Drive	1	3	0	40	
Coy Drive	1	3	0	40	
N. Bumby Avenue	2	3	0	40	
Hampton Avenue	1	2	0	40	
N. Frenchcreek Avenue	1	2	0	40	
Shine Avenue	1	2	0	40	
Mills Avenue	1	2	1	40	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	15	403	25.0	C
Westbound	PM	21	519	19.4	D

**SR 50 - Mills Avenue to Old Cheney Highway**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
1,073	414.0	24.4	123.40	324.0	31.1	96.57
Northbound/Eastbound - PM Peak Hour						
1,740	531.0	19.0	256.65	522.0	19.3	252.30
Southbound/Westbound - AM Peak Hour						
1,991	407.0	24.8	225.09	403.0	25.0	222.88
Southbound/Westbound - PM Peak Hour						
1,600	687.0	14.7	305.33	519.0	19.4	230.67

\*Traffic Volumes are obtained from the latest 2012 Florida Traffic Information.

**SR 50 - Mills Avenue to Old Cheney Highway**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	348.49	319.45	561.98	482.97

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$487.58	\$1,326.58
Annual User Benefit	\$146,274.00	\$397,974.00
<b>Total Annual User Benefit</b>	<b>\$544,248.00</b>	
Total Signal Retiming Annual Cost	\$24,417.79	
<b>User Benefit / Cost Ratio</b>	<b>22.29</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement was assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.



### SR 50 - AM Peak Before Condition

Date of Collection: 11/28/2012  
Distance: 2.65 miles  
From: Mills Ave.  
To: Old Cheney Highway.

Start Time: 7:00 AM  
End Time: 9:00 AM

EB Avg Speed: 24.4 MPH  
EB Travel Time: 6.90 MIN

WB Avg Speed: 24.8 MPH  
WB Travel Time: 6.78 MIN



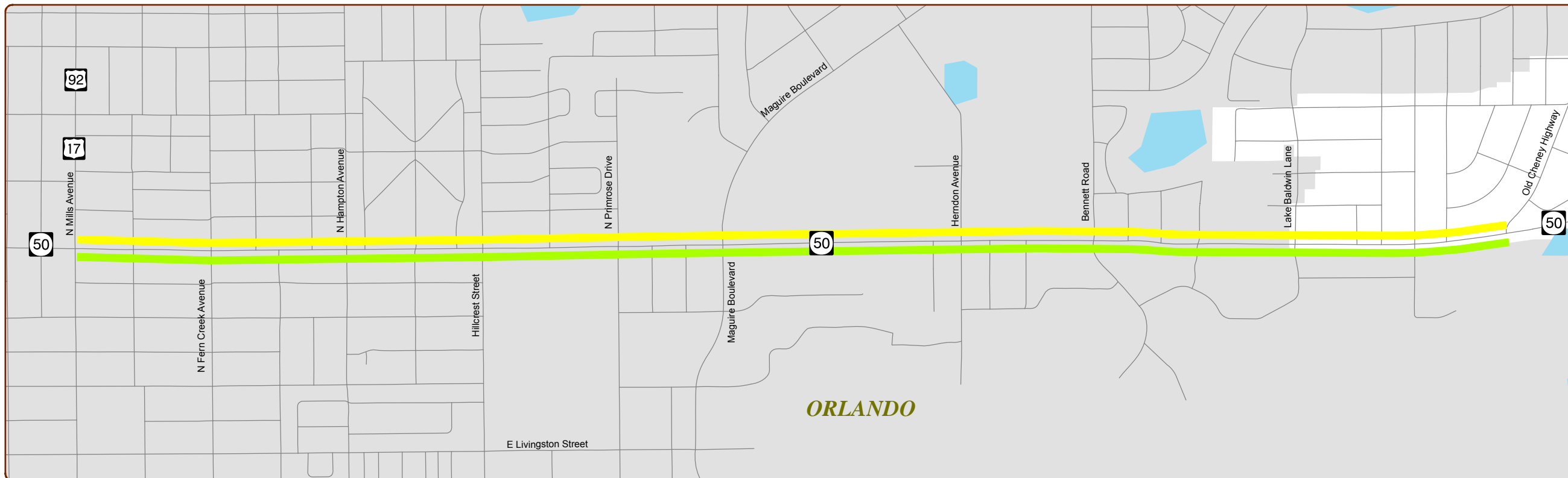
### SR 50 - AM Peak After Condition

Date of Collection: 5/15/2013  
Distance: 2.65 miles  
From: Mills Ave.  
To: Old Cheney Highway.

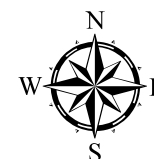
Start Time: 7:00 AM  
End Time: 9:00 AM

EB Avg Speed: 31.1 MPH  
EB Travel Time: 5.40 MIN

WB Avg Speed: 25.0 MPH  
WB Travel Time: 6.72 MIN

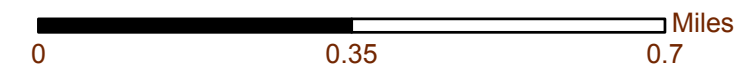


#### Level of Services:



## 2013 METROPLAN ORLANDO

### Travel Time Study



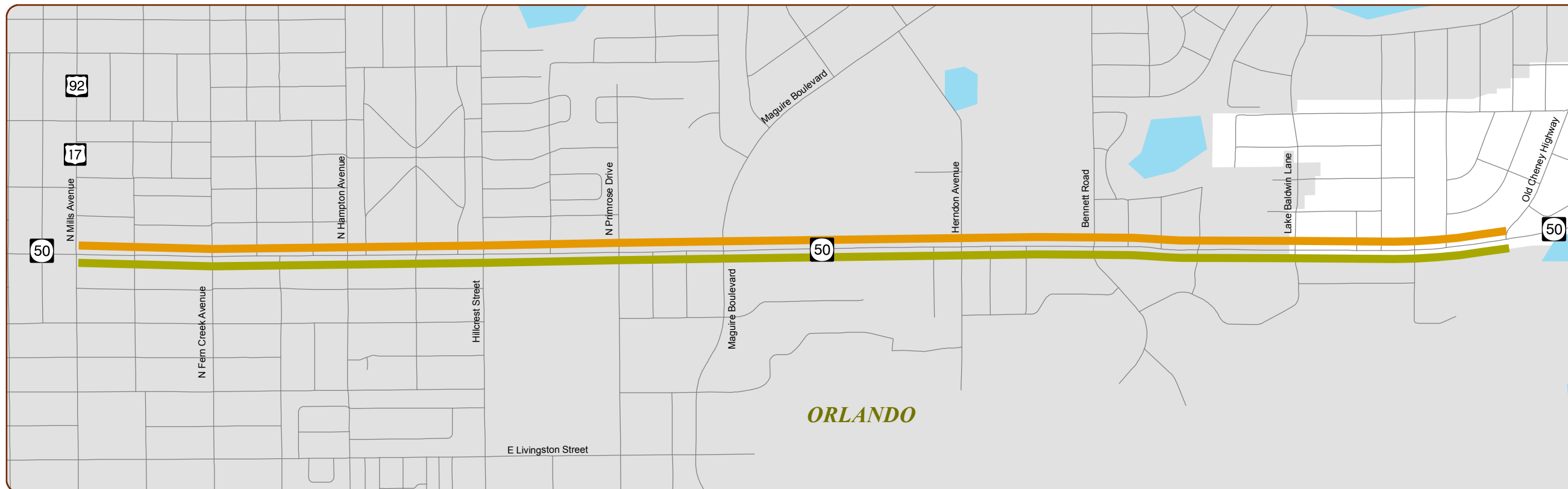
### SR 50 - PM Peak Before Condition

Date of Collection: 11/28/2012  
 Distance: 2.65 miles  
 From: Mills Ave.  
 To: Old Cheney Highway.

Start Time: 4:00 PM  
 End Time: 6:00 PM

EB Avg Speed: 19.0 MPH  
 EB Travel Time: 8.85 MIN

WB Avg Speed: 14.70 MPH  
 WB Travel Time: 11.45 MIN



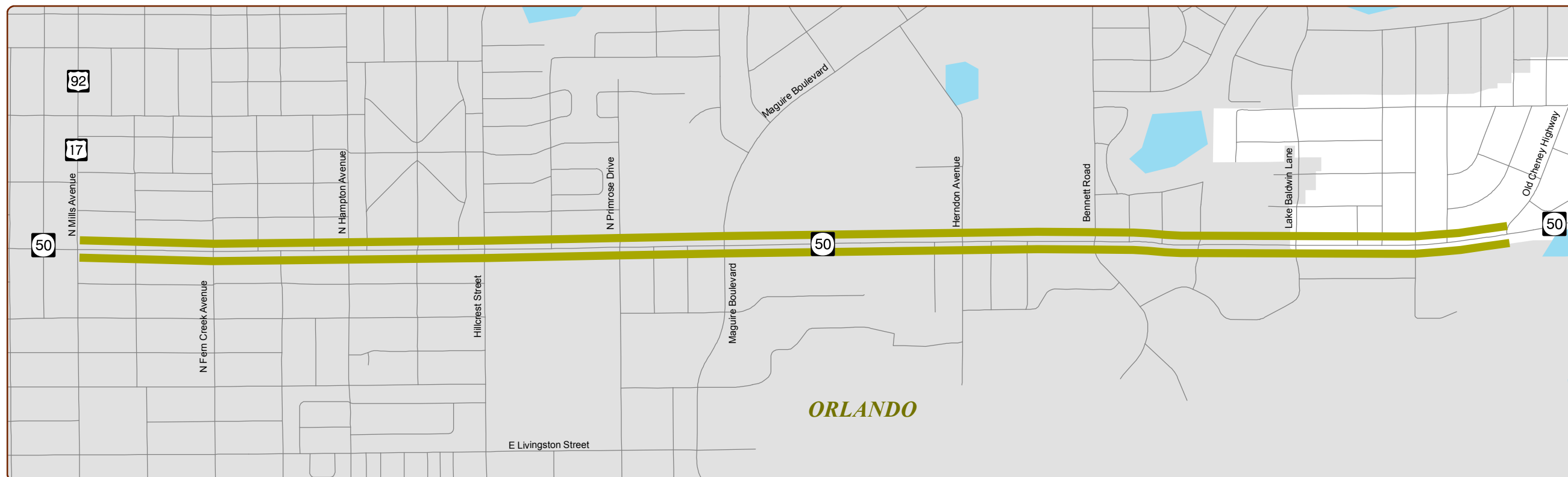
### SR 50 - PM Peak After Condition

Date of Collection: 5/15/2013  
 Distance: 2.65 miles  
 From: Mills Ave.  
 To: Old Cheney Highway.

Start Time: 4:00 PM  
 End Time: 6:00 PM

EB Avg Speed: 19.3 MPH  
 EB Travel Time: 8.70 MIN

WB Avg Speed: 19.4 MPH  
 WB Travel Time: 8.65 MIN



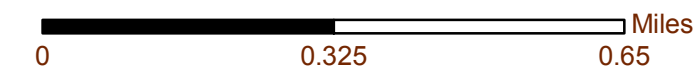
#### Level of Services:

- |  |   |   |   |   |               |
|--|---|---|---|---|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



## 2013 METROPLAN ORLANDO

### Travel Time Study



**Anderson St.  
I-4 WB Ramp to I-4 EB Ramp**

**Year 2013 MetroPlan Orlando Travel Time Study**  
*Before Condition*

**Roadway:** Anderson Street  
**Segment:** I-WB Ramp to I-4 EB Ramp  
**Jurisdiction:** City of Orlando  
**Area Type:** Central Business District  
**Facility Type:** Collector  
**Speed Limit:** 30 MPH  
**Length of Arterial:** 0.116 miles    **Arterial Class:** III  
**Distance between BlueToad Devices:** 0.25 miles

**Eastbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
I-4 WB Ramp	0	3	0	30	
I-4 EB Ramp	1	2	0	30	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	39	38	23.5	C
Eastbound	PM	77	77	11.7	E

**Westbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
I-4 EB Ramp	0	1	1	30	
I-4 WB Ramp	0	1	0	30	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	21	32	27.8	B
Westbound	PM	15	35	25.6	B

**Year 2013 MetroPlan Orlando Travel Time Study**  
*After Condition*

**Roadway:** Anderson Street  
**Segment:** I-WB Ramp to I-4 EB Ramp  
**Jurisdiction:** City of Orlando  
**Area Type:** Central Business District  
**Facility Type:** Collector  
**Speed Limit:** 30 MPH  
**Length of Arterial:** 0.116 miles    **Arterial Class:** III  
**Distance between BlueToad Devices:** 0.25 miles

**Eastbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
I-4 WB Ramp	0	3	0	30	
I-4 EB Ramp	1	2	0	30	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	70	35	25.7	B
Eastbound	PM	69	59	15.3	D

**Westbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
I-4 EB Ramp	0	1	1	30	
I-4 WB Ramp	0	1	0	30	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	30	27	33.3	A
Westbound	PM	26	22	40.9	A

**Anderson Street - I-4 WB Ramp to I-4 EB Ramp**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
1,215	38.0	23.5	12.83	35.0	25.7	11.81
Northbound/Eastbound - PM Peak Hour						
1,410	77.0	11.7	30.16	59.0	15.3	23.11
Southbound/Westbound - AM Peak Hour						
516	32.0	27.8	4.59	27.0	33.3	3.87
Southbound/Westbound - PM Peak Hour						
323	35.0	25.6	3.14	22.0	40.9	1.97

\*Traffic Volumes are obtained from the latest Turning Movement Count information.

**Anderson Street - I-4 WB Ramp to I-4 EB Ramp**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	17.41	15.68	33.30	25.08

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$29.05	\$138.01
Annual User Benefit	\$8,715.00	\$41,403.00
<b>Total Annual User Benefit</b>	<b>\$50,118.00</b>	
Total Signal Retiming Annual Cost	\$3,219.89	
<b>User Benefit / Cost Ratio</b>	<b>15.57</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement is assumed to three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.

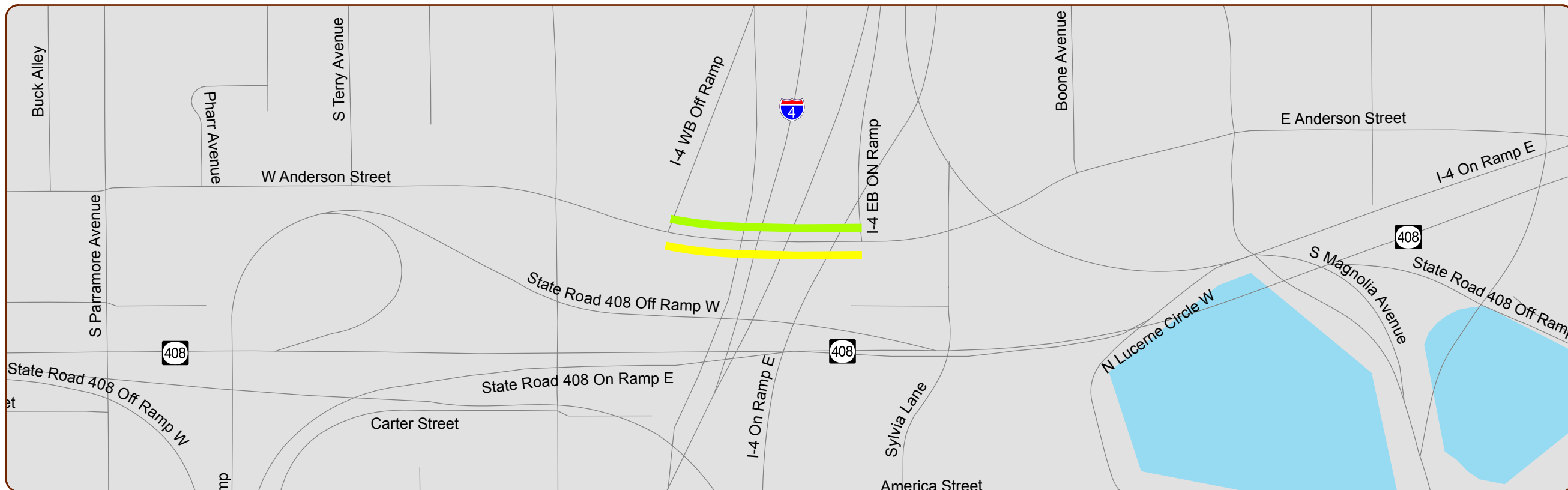
### Anderson Street - AM Peak Before Condition

Date of Collection: 11/14/2012  
 Distance: 0.116 miles  
 From: I-4 WB Ramp.  
 To: I-4 EB Ramp.

Start Time: 7:00 AM  
 End Time: 9:00 AM

EB Avg Speed: 23.5 MPH  
 EB Travel Time: 0.63 MIN

WB Avg Speed: 27.8 MPH  
 WB Travel Time: 0.53 MIN



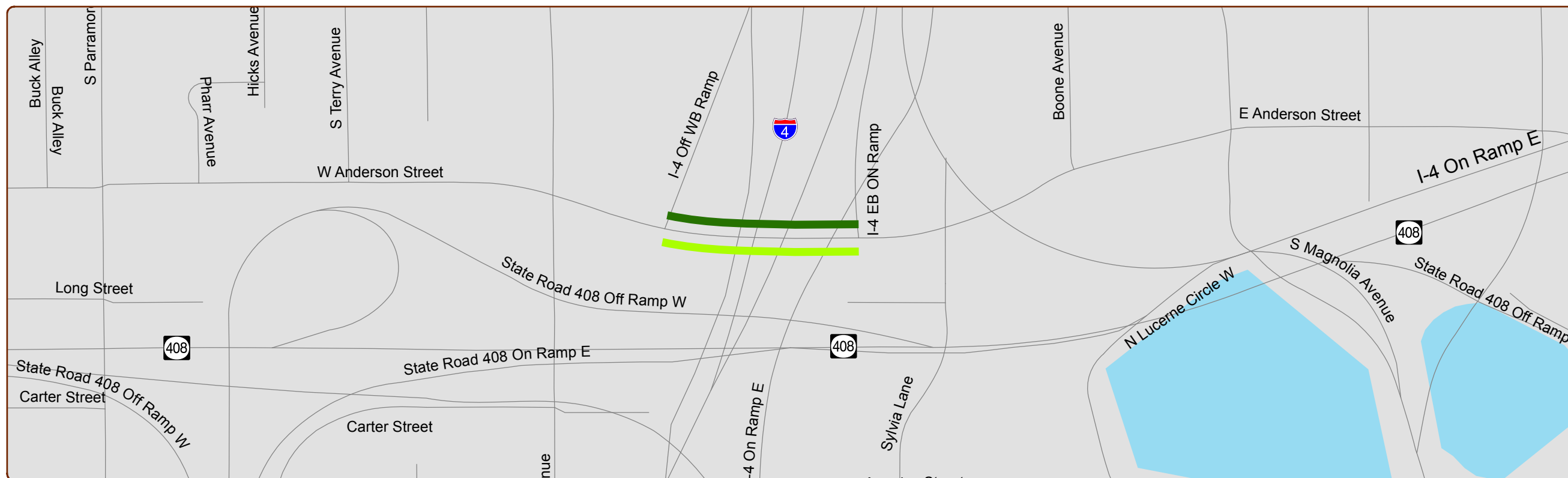
### Anderson Street - AM Peak After Condition

Date of Collection: 4/2/2013  
 Distance: 0.116 miles  
 From: I-4 WB Ramp.  
 To: I-4 EB Ramp.

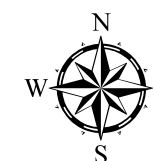
Start Time: 7:00 AM  
 End Time: 9:00 AM

EB Avg Speed: 25.7 MPH  
 EB Travel Time: 0.58 MIN

WB Avg Speed: 33.3 MPH  
 WB Travel Time: 0.45 MIN

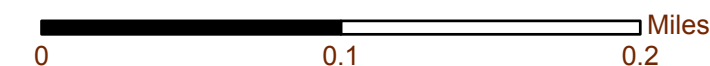


#### Level of Services:



### 2013 METROPLAN ORLANDO

#### Travel Time Study





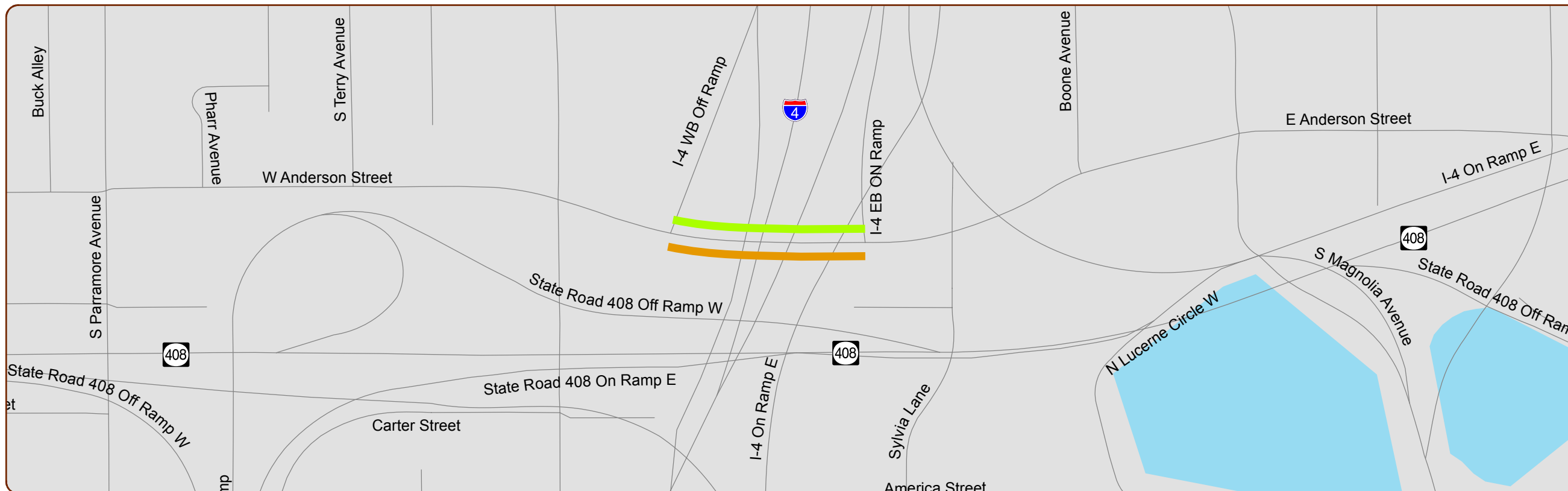
### Anderson Street - PM Peak Before Condition

Date of Collection: 11/14/2012  
 Distance: 0.116 miles  
 From: I-4 WB Ramp.  
 To: I-4 EB Ramp.

Start Time: 4:00 PM  
 End Time: 6:00 PM

EB Avg Speed: 11.7 MPH  
 EB Travel Time: 1.28 MIN

WB Avg Speed: 25.6 MPH  
 WB Travel Time: 0.58 MIN



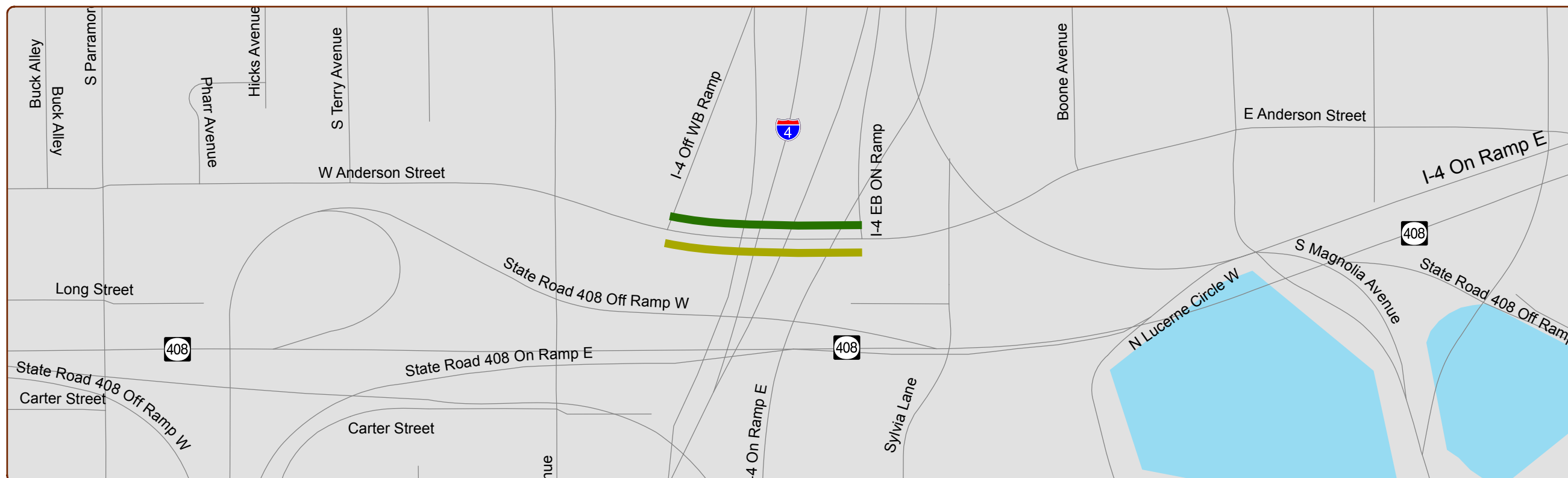
### Anderson Street - PM Peak After Condition

Date of Collection: 4/2/2013  
 Distance: 0.116 miles  
 From: I-4 WB Ramp.  
 To: I-4 EB Ramp.

Start Time: 4:00 PM  
 End Time: 6:00 PM

EB Avg Speed: 15.3 MPH  
 EB Travel Time: 0.98 MIN

WB Avg Speed: 40.9 MPH  
 WB Travel Time: 0.37 MIN



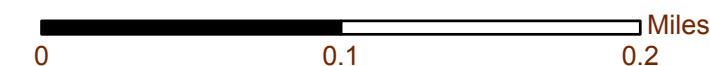
#### Level of Services:

- |   |   |               |
|---|---|---------------|
| A | D | Roads         |
| B | E | City Boundary |
| C | F | Water         |



### 2013 METROPLAN ORLANDO

#### Travel Time Study



*Amelia St.  
Garland Ave. to Hughey Ave.*

## Year 2013 METROPLAN Orlando Travel Time Study

### Amelia Street - From Hughey Avenue to Garland Avenue - Eastbound Direction Summary - Before Condition

Roadway Segment	Jurisdiction	Facility Type <sup>1</sup>	Area Type <sup>1</sup>	Left Turn Lanes <sup>2</sup>	Thru Lanes <sup>2</sup>	Right Turn Lanes <sup>2</sup>	Speed Limit (mph)	Distance (ft)	# Runs	Traffic Control Device	Travel Time (sec)	Stop Delay (sec)	Roadway Class	Roadway Segment		Roadway Summary	
														Average Speed		Avg Speed/Speed Limit	Avg. Fuel Consump.
														(mph)	LOS		
<b>AM PEAK HOUR</b>																	
Median Opening to Hughey Ave	City of Orlando	Collector	CBD	0	2	0	30	1,056	16	Signal	51.0	32.0	III	14.1	D	0.47	
Hughey Ave to Garland Ave	City of Orlando	Collector	CBD	1	2	0	30	354	16	Signal	50.0	53.0	III	4.8	F	0.16	
<b>TOTAL</b>							30	1,410			101.0	85.0	III	9.5	F	0.32	0.009 gal/veh
<b>PM PEAK HOUR</b>																	
Median Opening to Hughey Ave	City of Orlando	Collector	CBD	0	2	0	30	1,056	16	Signal	53.0	32.0	III	13.6	E	0.45	
Hughey Ave to Garland Ave	City of Orlando	Collector	CBD	1	2	0	30	354	16	Signal	33.0	32.0	III	7.3	F	0.24	
<b>TOTAL</b>							30	1,410			86.0	64.0	III	11.2	E	0.37	0.009 gal/veh

Note:

1. The Facility type and Area type definitions were obtained from the latest Orlando Urban Area Transportation Study (OUATS) Model.
2. The Through lanes and Turn lanes are provided for the approach of the direction of travel.
3. CBD - Central Business District

## Year 2013 METROPLAN Orlando Travel Time Study

### Amelia Street - From Hughey Avenue to Garland Avenue - Westbound Direction Summary - Before Condition

Roadway Segment	Jurisdiction	Facility Type <sup>1</sup>	Area Type <sup>1</sup>	Left Turn Lanes <sup>2</sup>	Thru Lanes <sup>2</sup>	Right Turn Lanes <sup>2</sup>	Speed Limit (mph)	Distance (ft)	# Runs	Traffic Control Device	Travel Time (sec)	Stop Delay (sec)	Roadway Class	Roadway Segment		Roadway Summary	
														Average Speed		Avg Speed/Speed Limit	Avg. Fuel Consump.
														(mph)	LOS		
<b>AM PEAK HOUR</b>																	
Median Opening to Garland Ave	City of Orlando	Collector	CBD	0	2	0	30	700	16	Signal	108.0	92.0	III	4.4	F	0.15	
Garland Ave to Hughey Ave	City of Orlando	Collector	CBD	1	2	0	30	354	16	Signal	21.0	11.0	III	11.5	E	0.38	
<b>TOTAL</b>							30	1,054			129.0	103.0	III	5.6	F	0.19	0.008 gal/veh
<b>PM PEAK HOUR</b>																	
Median Opening to Garland Ave	City of Orlando	Collector	CBD	0	2	0	30	700	16	Signal	88.0	72.0	III	5.4	F	0.18	
Garland Ave to Hughey Ave	City of Orlando	Collector	CBD	1	2	0	30	354	16	Signal	38.0	28.0	III	6.4	F	0.21	
<b>TOTAL</b>							30	1,054			126.0	100.0	III	5.7	F	0.19	0.009 gal/veh

Note:

1. The Facility type and Area type definitions were obtained from the latest Orlando Urban Area Transportation Study (OUATS) Model.
2. The Through lanes and Turn lanes are provided for the approach of the direction of travel.
3. CBD - Central Business District

## Year 2013 METROPLAN Orlando Travel Time Study

### Amelia Street - From Hughey Avenue to Garland Avenue - Eastbound Direction Summary - After Condition

Roadway Segment	Jurisdiction	Facility Type <sup>1</sup>	Area Type <sup>1</sup>	Left Turn Lanes <sup>2</sup>	Thru Lanes <sup>2</sup>	Right Turn Lanes <sup>2</sup>	Speed Limit (mph)	Distance (ft)	# Runs	Traffic Control Device	Travel Time (sec)	Stop Delay (sec)	Roadway Class	Roadway Segment		Roadway Summary	
														Average Speed		Avg Speed/Speed Limit	Avg. Fuel Consump.
														(mph)	LOS		
<b>AM PEAK HOUR</b>																	
Median Opening to Hughey Ave	City of Orlando	Collector	CBD	0	2	0	30	1,056	15	Signal	72.6	47.4	III	9.9	F	0.33	
Hughey Ave to Garland Ave	City of Orlando	Collector	CBD	1	2	0	30	354	15	Signal	9.0	0.0	III	26.8	B	0.89	
<b>TOTAL</b>							30	1,410			81.6	47.4	III	11.8	E	0.39	0.009 gal/veh
<b>PM PEAK HOUR</b>																	
Median Opening to Hughey Ave	City of Orlando	Collector	CBD	0	2	0	30	1,056	15	Signal	66.0	42.0	III	10.9	E	0.36	
Hughey Ave to Garland Ave	City of Orlando	Collector	CBD	1	2	0	30	354	15	Signal	9.6	0.0	III	25.1	B	0.84	
<b>TOTAL</b>							30	1,410			75.6	42.0	III	12.7	E	0.42	0.009 gal/veh

Note:

1. The Facility type and Area type definitions were obtained from the latest Orlando Urban Area Transportation Study (OUATS) Model.
2. The Through lanes and Turn lanes are provided for the approach of the direction of travel.
3. CBD - Central Business District

**Year 2013 METROPLAN Orlando Travel Time Study**  
**Amelia Street - From Hughey Avenue to Garland Avenue - Westbound Direction Summary - After Condition**

Roadway Segment	Jurisdiction	Facility Type <sup>1</sup>	Area Type <sup>1</sup>	Left Turn Lanes <sup>2</sup>	Thru Lanes <sup>2</sup>	Right Turn Lanes <sup>2</sup>	Speed Limit (mph)	Distance (ft)	# Runs	Traffic Control Device	Travel Time (sec)	Stop Delay (sec)	Roadway Class	Roadway Segment		Roadway Summary	
														Average Speed		Avg Speed/Speed Limit	Avg. Fuel Consump.
														(mph)	LOS		
<b>AM PEAK HOUR</b>																	
Median Opening to Garland Ave	City of Orlando	Collector	CBD	0	2	0	30	700	16	Signal	96.0	81.0	III	5.0	F	0.17	
Garland Ave to Hughey Ave	City of Orlando	Collector	CBD	1	2	0	30	354	16	Signal	9.6	0.0	III	25.1	B	0.84	
<b>TOTAL</b>							30	1,054			105.6	81.0	III	6.8	F	0.23	0.008 gal/veh
<b>PM PEAK HOUR</b>																	
Median Opening to Garland Ave	City of Orlando	Collector	CBD	0	2	0	30	700	16	Signal	87.6	73.8	III	5.4	F	0.18	
Garland Ave to Hughey Ave	City of Orlando	Collector	CBD	1	2	0	30	354	16	Signal	9.6	0.0	III	25.1	B	0.84	
<b>TOTAL</b>							30	1,054			97.2	73.8	III	7.4	F	0.25	0.009 gal/veh

Note:

1. The Facility type and Area type definitions were obtained from the latest Orlando Urban Area Transportation Study (OUATS) Model.
2. The Through lanes and Turn lanes are provided for the approach of the direction of travel.
3. CBD - Central Business District

**Amelia Street -Garland Ave to Hughey Ave**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
188	101.0	9.5	5.27	82.0	11.8	4.28
Northbound/Eastbound - PM Peak Hour						
234	86.0	11.2	5.59	76.0	12.7	4.94
Southbound/Westbound - AM Peak Hour						
301	129.0	5.6	10.79	106.0	6.8	8.86
Southbound/Westbound - PM Peak Hour						
221	126.0	5.6	7.7	97.0	7.4	5.95

\*Traffic Volumes are obtained from the latest Turning Movement Count information.

**Amelia Street -Garland Ave to Hughey Ave**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	16.06	13.15	13.33	10.89

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$48.86	\$40.97
Annual User Benefit	\$14,658.00	\$12,291.00
<b>Total Annual User Benefit</b>	<b>\$26,949.00</b>	
Total Signal Retiming Annual Cost	\$4,498.31	
<b>User Benefit / Cost Ratio</b>	<b>5.99</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement is assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.



### Amelia Street - AM Peak Before Condition

Date of Collection: 12/11/2012  
 Distance: 0.068 miles  
 From: Garland Ave.  
 To: Hughey Ave.

Start Time: 7:00 AM  
 End Time: 9:00 AM

EB Avg Speed: 9.50 MPH  
 EB Travel Time: 1.68 MIN

WB Avg Speed: 5.60 MPH  
 WB Travel Time: 2.15 MIN



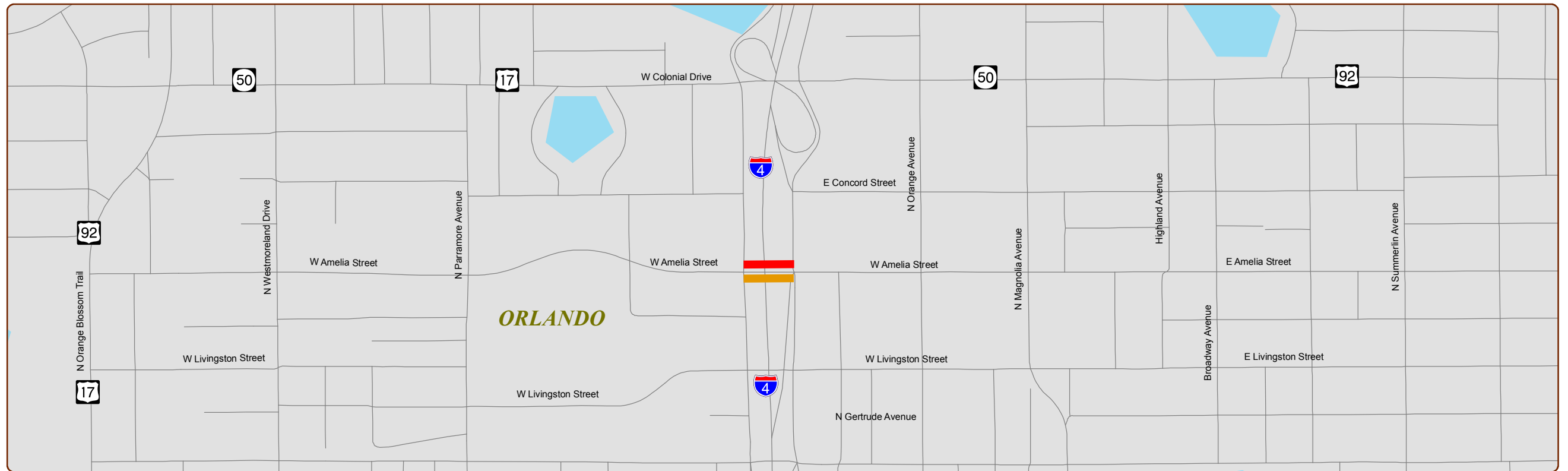
### Amelia Street - AM Peak After Condition

Date of Collection: 4/18/2013  
 Distance: 0.068 miles  
 From: Garland Ave.  
 To: Hughey Ave.

Start Time: 7:00 AM  
 End Time: 9:00 AM

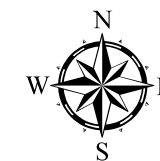
EB Avg Speed: 11.8 MPH  
 EB Travel Time: 1.36 MIN

WB Avg Speed: 6.80 MPH  
 WB Travel Time: 1.76 MIN



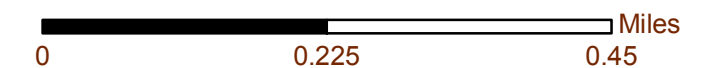
#### Level of Services:

- |   |   |               |
|---|---|---------------|
| A | D | Roads         |
| B | E | City Boundary |
| C | F | Water         |



## 2013 METROPLAN ORLANDO

### Travel Time Study



### Amelia Street - PM Peak Before Condition

Date of Collection: 12/11/2013  
 Distance: 0.068 miles  
 From: Garland Ave.  
 To: Hughey Ave.

Start Time: 4:00 PM  
 End Time: 6:00 PM

EB Avg Speed: 11.2 MPH  
 EB Travel Time: 1.43 MIN

WB Avg Speed: 5.70 MPH  
 WB Travel Time: 2.10 MIN



### Amelia Street - PM Peak After Condition

Date of Collection: 4/18/2013  
 Distance: 0.068 miles  
 From: Garland Ave.  
 To: Hughey Ave.

Start Time: 4:00 PM  
 End Time: 6:00 PM

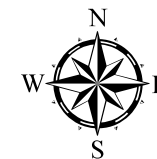
EB Avg Speed: 12.7 MPH  
 EB Travel Time: 1.26 MIN

WB Avg Speed: 7.40 MPH  
 WB Travel Time: 1.62 MIN



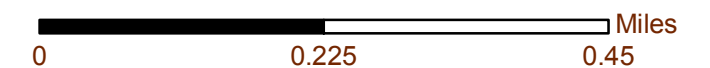
#### Level of Services:

- |   |   |               |
|---|---|---------------|
| A | D | Roads         |
| B | E | City Boundary |
| C | F | Water         |



## 2013 METROPLAN ORLANDO

### Travel Time Study



US 192  
FL Turnpike NB off Ramp to Narcoossee Rd.

**Year 2013 MetroPlan Orlando Travel Time Study**  
*Before Condition*

**Roadway:** US 192  
**Segment:** FL Turnpike NB Off Ramp (Exit 242) to Narcoossee Road  
**Jurisdiction:** Osceola County  
**Area Type:** Other Outlying Business District  
**Facility Type:** Divided Arterial  
**Speed Limit:** 40/45/55 MPH  
**Length of Arterial:** 5.67 miles      **Arterial Class:** I  
**Distance between BlueToad Devices:** 6.0 miles

**Eastbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
FL Turnpike NB Off Ramp	1	2	0	55	
Commerce Center Drive	1	2	1	50	
Old Canoe Creek Road	1	2	1	45	
Neptune Road	1	2	1	45	
Westgate	0	2	1	45	
Columbia Avenue	1	3	0	40	
Tennessee Avenue	1	3	0	40	
Vermont Avenue	1	3	0	40	
New York Avenue	1	3	0	40	
Michigan Avenue	1	3	0	40	
Delware Avenue	1	3	0	40	
Old Hickory Tree Road	1	2	1	45	
Narcoossee Road	1	2	1	55	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	13	613	35.2	B
Eastbound	PM	16	756	28.6	C

**Westbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Narcoossee Road	1	2	1	55	
Old Hickory Tree Road	1	2	0	55	
Delware Avenue	1	3	0	40	
Michigan Avenue	1	3	0	40	
New York Avenue	1	3	0	40	
Vermont Avenue	1	3	0	40	
Tennessee Avenue	1	3	0	40	
Columbia Avenue	1	2	1	40	
Westgate	1	2	0	45	
Neptune Road	1	2	1	45	
Old Canoe Creek Road	1	2	1	45	
Commerce Center Drive	1	2	1	50	
FL Turnpike NB Off Ramp	0	2	1	55	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	29	710	30.4	C
Westbound	PM	20	736	29.4	C

**Year 2013 MetroPlan Orlando Travel Time Study**  
*After Condition*

**Roadway:** US 192  
**Segment:** FL Turnpike NB Off Ramp (Exit 242) to Narcoossee Road  
**Jurisdiction:** Osceola County  
**Area Type:** Other Outlying Business District  
**Facility Type:** Divided Arterial  
**Speed Limit:** 40/45/55 MPH  
**Length of Arterial:** 5.67 miles      **Arterial Class:** I  
**Distance between BlueToad Devices:** 6.0 miles

*Eastbound Direction:*

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
FL Turnpike NB Off Ramp	1	2	0	55	
Commerce Center Drive	1	2	1	50	
Old Canoe Creek Road	1	2	1	45	
Neptune Road	1	2	1	45	
Westgate	0	2	1	45	
Columbia Avenue	1	3	0	40	
Tennessee Avenue	1	3	0	40	
Vermont Avenue	1	3	0	40	
New York Avenue	1	3	0	40	
Michigan Avenue	1	3	0	40	
Delware Avenue	1	3	0	40	
Old Hickory Tree Road	1	2	1	45	
Narcoossee Road	1	2	1	55	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Eastbound	AM	27	585	36.9	B
Eastbound	PM	28	671	32.2	C

**Westbound Direction:**

Signalized Intersection	# of Lanes			Speed Limit (MPH)	Observations
	Left	Through	Right		
Narcoossee Road	1	2	1	55	
Old Hickory Tree Road	1	2	0	55	
Delware Avenue	1	3	0	40	
Michigan Avenue	1	3	0	40	
New York Avenue	1	3	0	40	
Vermont Avenue	1	3	0	40	
Tennessee Avenue	1	3	0	40	
Columbia Avenue	1	2	1	40	
Westgate	1	2	0	45	
Neptune Road	1	2	1	45	
Old Canoe Creek Road	1	2	1	45	
Commerce Center Drive	1	2	1	50	
FL Turnpike NB Off Ramp	0	2	1	55	

Direction of Travel	Analysis Time Period	# of Samples	Travel Time (Sec)	Average Speed (MPH)	LOS
Westbound	AM	23	578	37.4	B
Westbound	PM	34	716	30.2	C

**US 192 - Florida's Turnpike to Narcoossee Road**  
**Summary of Before & After Study Travel Time Results**

	Before Scenario			After Scenario		
Traffic Volume	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)	Travel Time (sec/veh)	Average Speed (mph)	Total Travel Time (Veh-hour)
Northbound/Eastbound - AM Peak Hour						
948	613.0	35.2	161.42	585.0	36.9	154.05
Northbound/Eastbound - PM Peak Hour						
1,839	756.0	28.6	386.19	671.0	32.2	342.77
Southbound/Westbound - AM Peak Hour						
2,109	710.0	30.4	415.94	578.0	37.4	338.61
Southbound/Westbound - PM Peak Hour						
1,299	736.0	29.4	265.57	716.0	30.2	258.36

\*Traffic Volumes are obtained from the latest 2011 Florida Traffic Information.



**US 192 - Florida's Turnpike to Narcoossee Road**  
**Summary of Measures of Effectiveness & Benefit Cost Analysis**

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	577.37	492.66	651.76	601.13

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$1,422.28	\$850.08
Annual User Benefit	\$426,684.00	\$255,024.00
<b>Total Annual User Benefit</b>	<b>\$681,708.00</b>	
Total Signal Retiming Annual Cost	\$21,344.61	
<b>User Benefit / Cost Ratio</b>	<b>31.94</b>	

Notes:

- \* Value of Delay Time is \$16.79 per hour (Mobility Data for Orlando for the year 2011)
- \* Benefits apply for 300 days per year. This accounts for the reduced benefits anticipated from lower weekend traffic.
- \* The service life of the improvement was assumed to be three (3) years.
- \* Interest rate of 7% (Source: FDOT) was used in estimating the annual cost of improvements.

**US 192  
- AM Peak  
Before Condition**

Date of Collection: 12/6/2012  
Distance: 5.67 miles  
From: NB Off Ramp of FL Turnpike  
To: Narcoossee Rd.

Start Time: 7:00 AM  
End Time: 9:00 AM

EB Avg Speed: 35.20 MPH  
EB Travel Time: 10.22 MIN

WB Avg Speed: 30.40 MPH  
WB Travel Time: 11.83 MIN



**US 192  
- AM Peak  
After Condition**

Date of Collection: 2/12/2013  
Distance: 5.67 miles  
From: NB Off Ramp of FL Turnpike  
To: Narcoossee Rd.

Start Time: 7:00 AM  
End Time: 9:00 AM

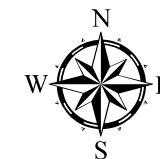
EB Avg Speed: 36.9 MPH  
EB Travel Time: 9.75 MIN

WB Avg Speed: 37.4 MPH  
WB Travel Time: 9.63 MIN



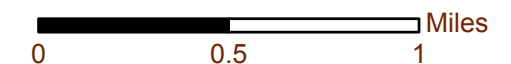
**Level of Services:**

- |  |   |  |   |  |               |
|--|---|--|---|--|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



**2013 METROPLAN ORLANDO**

*Travel Time Study*



### US 192 - PM Peak Before Condition

Date of Collection: 12/6/2012  
 Distance: 5.67 miles  
 From: NB Off Ramp of FL Turnpike  
 To: Narcoossee Rd.

Start Time: 4:00 PM  
 End Time: 6:00 PM

EB Avg Speed: 28.6 MPH  
 EB Travel Time: 12.6 MIN

WB Avg Speed: 29.40 MPH  
 WB Travel Time: 12.27 MIN



### US 192 - PM Peak After Condition

Date of Collection: 2/12/2013  
 Distance: 5.67 miles  
 From: NB Off Ramp of FL Turnpike  
 To: Narcoossee Rd.

Start Time: 4:00 PM  
 End Time: 6:00 PM

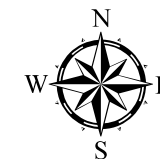
EB Avg Speed: 32.20 MPH  
 EB Travel Time: 11.18 MIN

WB Avg Speed: 30.20 MPH  
 WB Travel Time: 11.93 MIN



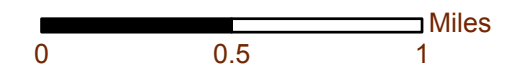
#### Level of Services:

- |  |   |   |   |   |               |
|--|---|---|---|---|---------------|
|  | A |  | D |  | Roads         |
|  | B |  | E |  | City Boundary |
|  | C |  | F |  | Water         |



## 2013 METROPLAN ORLANDO

### Travel Time Study



**Appendix B:**

**Page from 2010 Urban Mobility Report**

## **National Constants**

The congestion calculations utilize the values in Exhibit A-7 as national constants—values used in all urban areas to estimate the effect of congestion.

**Exhibit A-7. National Congestion Constants for 2012 Urban Mobility Report**

Constant	Value
Vehicle Occupancy	1.25 persons per vehicle
Average Cost of Time (\$2011) (2)	\$16.79 per person hour <sup>1</sup>
Commercial Vehicle Operating Cost (\$2011) (3)	\$86.81 per vehicle hour <sup>1</sup>
Total Travel Days (7x52)	364 days

<sup>1</sup> Adjusted annually using the Consumer Price Index.

### *Vehicle Occupancy*

The average number of persons in each vehicle during peak period travel is 1.25.

### *Working Days and Weeks*

With the addition of the INRIX speed data in the 2011 UMR, the calculations are based on a full year of data that includes all days of the week rather than just the working days. The delay from each day of the week is multiplied by 52 work weeks to annualize the delay. Total delay for the year is based on 364 total travel days in the year.

### *Average Cost of Time*

The 2011 value of person time used in the report is \$16.79 per hour based on the value of time, rather than the average or prevailing wage rate (2).

### *Commercial Vehicle Operating Cost*

Truck travel time and operating costs (excluding diesel costs) are valued at \$86.81 per hour (3).

## Appendix C:

### Signal Retiming Project Costs

<u>County</u>	<u>Section</u>	<u>MP from</u>	<u>MP to</u>	<u>State Road</u>	<u>Limits</u>	<u>Last time</u>	<u>Consultant</u>	<u>This time</u>	<u># of signals</u>	<u>Estimated cost</u>
Seminole	N/A	-	-	CR 427	Silkwood to Plumosa	-	-	A/G	9	\$58,451
Seminole	77170	0.264	3.028	SR 434	Mitchell Hammock to Palm Valley	2010	A/G	A/G	5	\$34,180
Seminole	N/A	-	-	CR 46A	Hartwell to International Drive	-	-	A/G	15	\$97,709
Orange	-	-	-	I-4	Additional Ramps	-	-	HDR	2	\$8,450
Orange	75037	1.128	3.126	SR 434	Science/Lokantosa to McCulloch	-	-	FDA	7	\$38,579
Orange	75090	1.463	4.125	SR 426*	Phelps to SR 551	2010	FDA	FDA	9	\$44,635
Orange	75003	0.652	10.638	SR 436***	TG Lee to SR 426	2010 & 11	Various	FDA	27	\$124,382
Orange	75060	1.898	4.560	SR 50	Mills Ave to Old Cheney	2010 & 11	Various	HDR	13	\$64,080
Orange	75060	1.898	14.293	SR 50**	Forsyth to Avalon Park	2010 & 11	Various	HDR	20	\$90,814
Orange	75080	12.829	15.096	SR 15 (Conway)	Hoffner to Michigan	2010	HDR	HDR	6	\$26,929
Orange	75040	9.344	8.424	SR 527	Nela to Hoffner	-	-	FDA	7	\$30,867
Orange	75010	9.44	11.911	US 441	Americana to Kaley	2009	Metric	HDR	6	\$29,799
Orange	-	-	-	JYP	33rd to I-4 WB Ramp	-	-	HDR	6	\$29,944
Osceola	92030	5.575	11.277	US 192	FL Trnpke Ramp to Narcoossee/Old Hickory	2009	FDA	A/G	13	\$56,015

\*SR 436 included in Section 75003 - also Include SR 551 at University

\*\*Includes SR 434 at Challenger

\*\*\*Include SR 552 at Bahia/Dixie Belle

	<u># of int.</u>	<u>Estimated cost</u>	<u>Remaining</u>
A/G	42	\$ 246,355	\$3,645
FDA	50	\$ 238,463	\$11,537
HDR	53	\$ 250,016	-\$16
	145	\$ 734,834	\$15,166

**Appendix D:**

**Power Point Presentation**



# Year 2013 Travel Time Study and Benefit - Cost Analysis



GMB Engineers and  
Planners, Inc.



metroplan orlando  
A REGIONAL TRANSPORTATION PARTNERSHIP

# Study Purpose



- Benefit/Cost Analysis of Signal Retiming was performed by FDOT
- GMB Engineers and Planners, Inc.
- Bluetooth Technology
- Graphs depicting the Benefit – Cost Analysis and Travel Time Comparison

# Why Signal Retiming?



- Improves traffic flow
- Account for changes in traffic patterns
- Reduce driver frustration, emissions and fuel consumption
- Regular signal timing updates has a benefit/cost ratio between 20:1 and 55:1\*

\* ITS Benefits, Costs and Lessons Learned Database. U.S. Department of Transportation (U.S. DOT) Intelligent Transportation Systems Joint Program Office. Accessible via [www.benefitcost.its.dot.gov](http://www.benefitcost.its.dot.gov).

## Year 2013 MetroPlan Orlando Travel Time Study – Roadway Limits

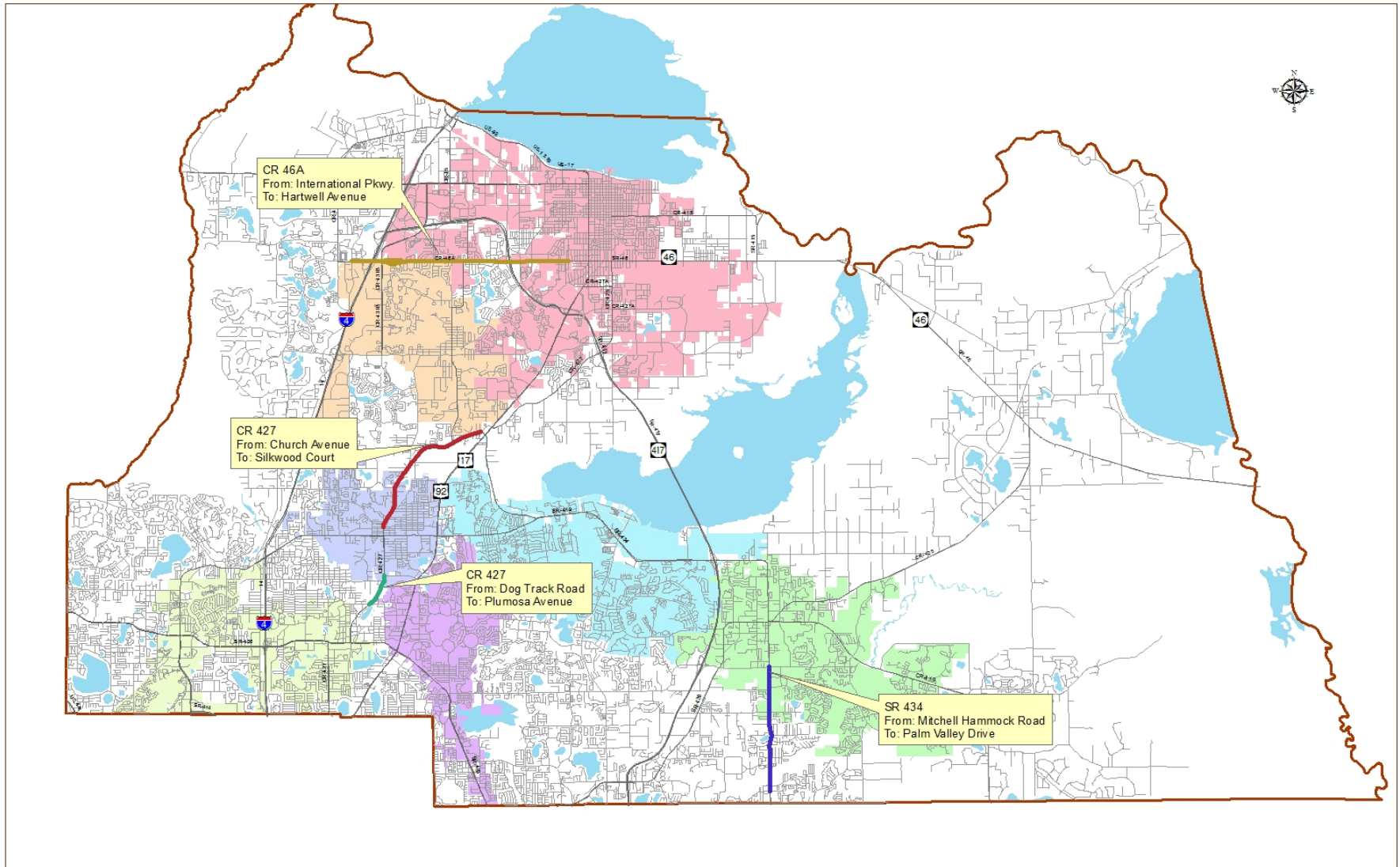
Street	From	To	Distance	Jurisdiction
CR 427	SILKWOOD CT.	CHURCH AVE.	3.320	SEMINOLE
CR 427	DOG TRACK RD.	PLUMOSA AVE.	0.717	SEMINOLE
SR 434	MITCHELL HAMMOCK RD.	PALM VALLEY DR.	2.760	SEMINOLE
CR 46A	HARTWELL AVE.	INTERNATIONAL PKWY.	4.730	SEMINOLE
SR 434	McCULLOCH RD.	CHALLENGER PKWY.	2.670	ORANGE
SR 426	PHELPS AVE.	PALMETTO AVE.	2.660	ORANGE
SR 15	MICHIGAN AVE.	HOFFNER AVE.	2.300	ORANGE
SR 527	HOFFNER AVE.	NELA AVE.	0.945	ORANGE
SR 436	ALOMA AVE.	OLEANDER DR.	3.560	ORANGE
OBT SOUTH - US 441	KALEY AVE.	AMERICANA BLVD.	2.500	ORANGE
SR 50	FORSYTH RD.	AVALON PARK BLVD.	7.860	ORANGE
SR 552	BAHIA AVE./ DIXIE BELLE DR.		0.026	CITY OF ORLANDO
SR 436	DAHLIA DR.	T G LEE BLVD.	5.800	CITY OF ORLANDO
JOHN YOUNG PKWY.	33/35TH ST.	I-4 WB OFF RAMP	0.421	CITY OF ORLANDO
SR 50	MILLS AVE.	OLD CHENEY HWY.	2.650	CITY OF ORLANDO
ANDERSON ST.	I-4 WB RAMP	I-4 EB RAMP	0.116	CITY OF ORLANDO
AMELIA ST.	GARLAND AVE.	HUGHEY AVE.	0.068	CITY OF ORLANDO
US 192	FL TURNPIKE NB OFF RAMP	NARCOOSSEE RD.	5.670	OSCEOLA

TOTAL – **48.773** MILES

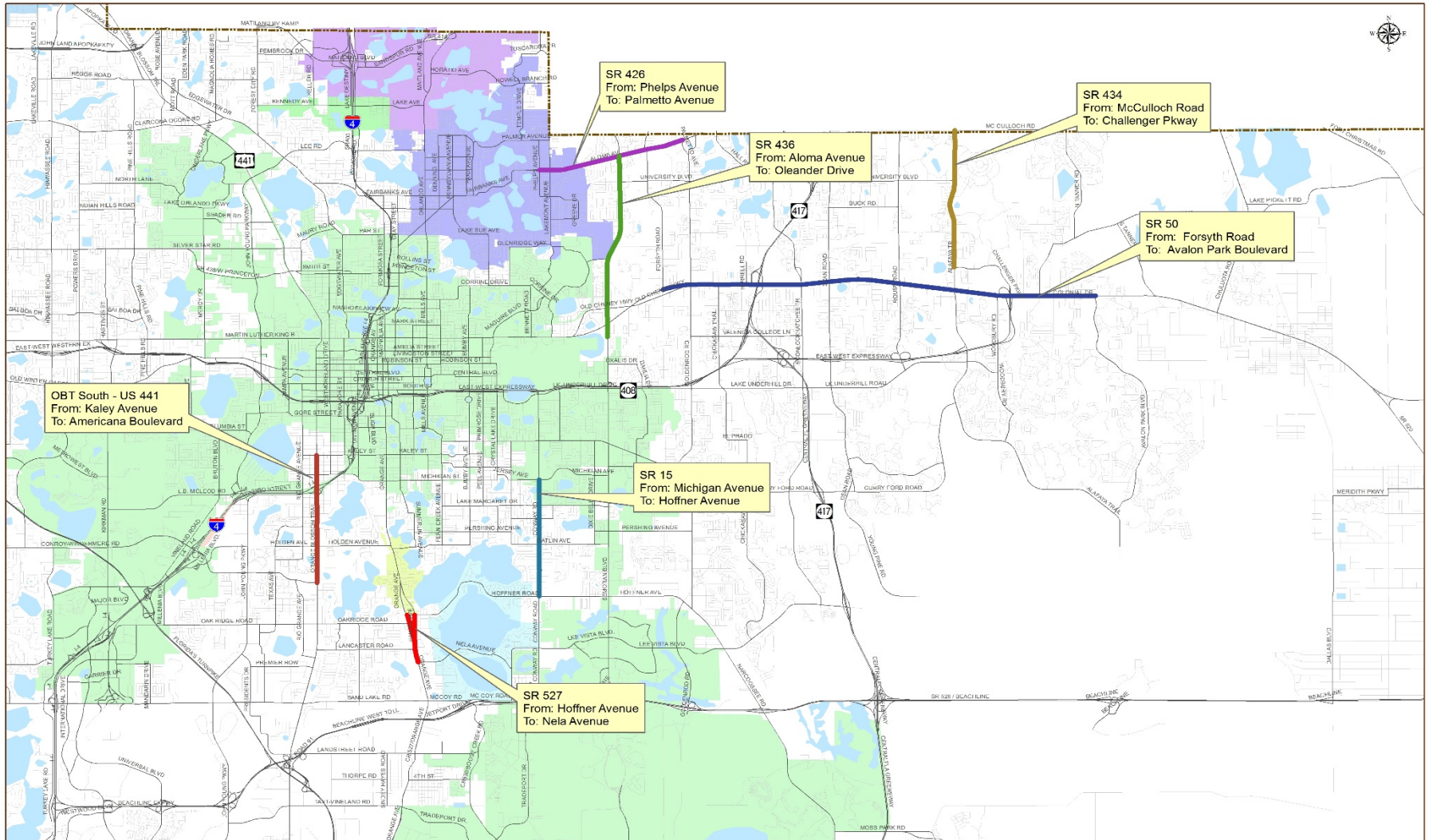


# Year 2013 MetroPlan Orlando Travel Time Study

## Seminole County

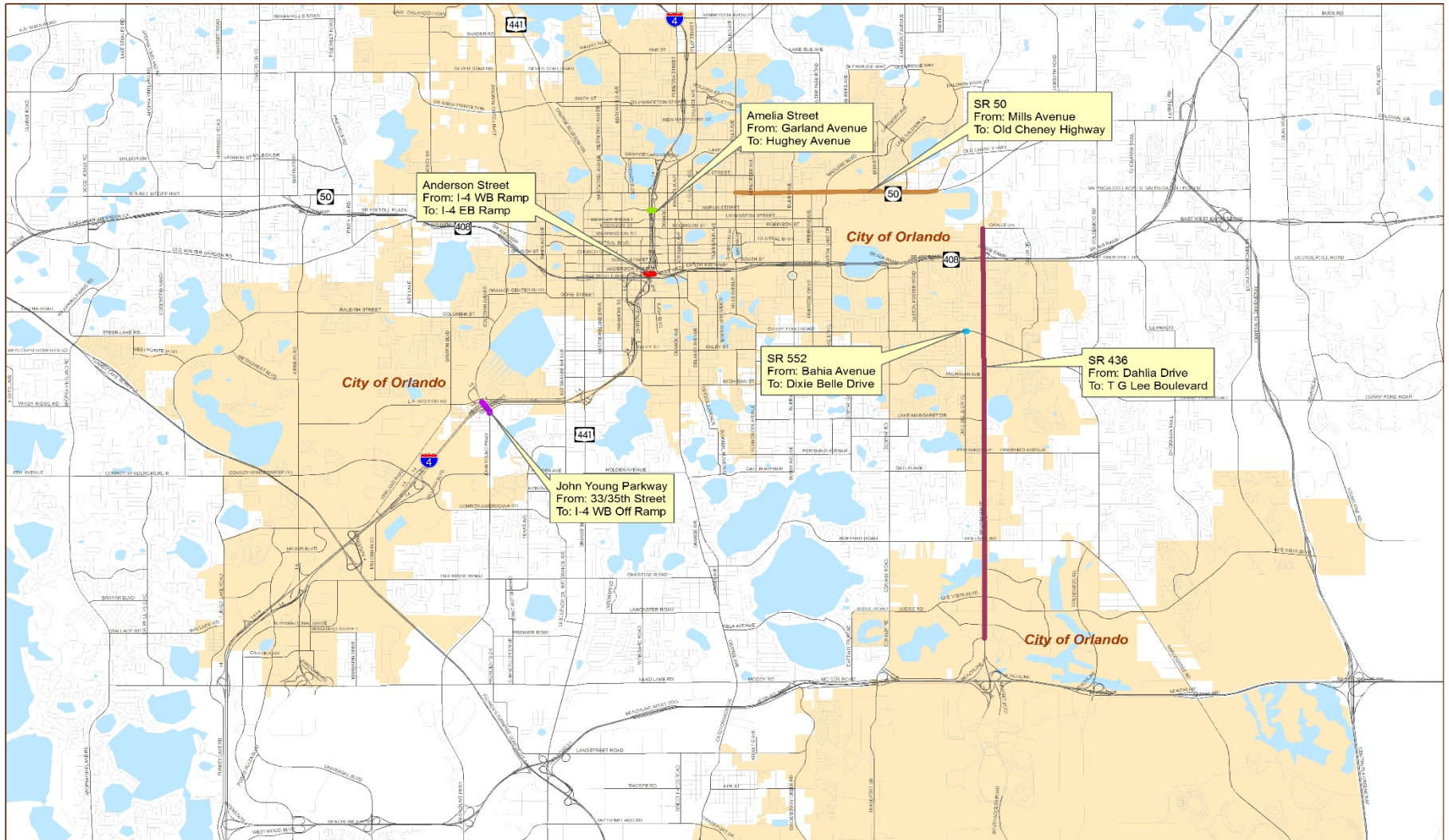


# Year 2013 MetroPlan Orlando Travel Time Study Orange County



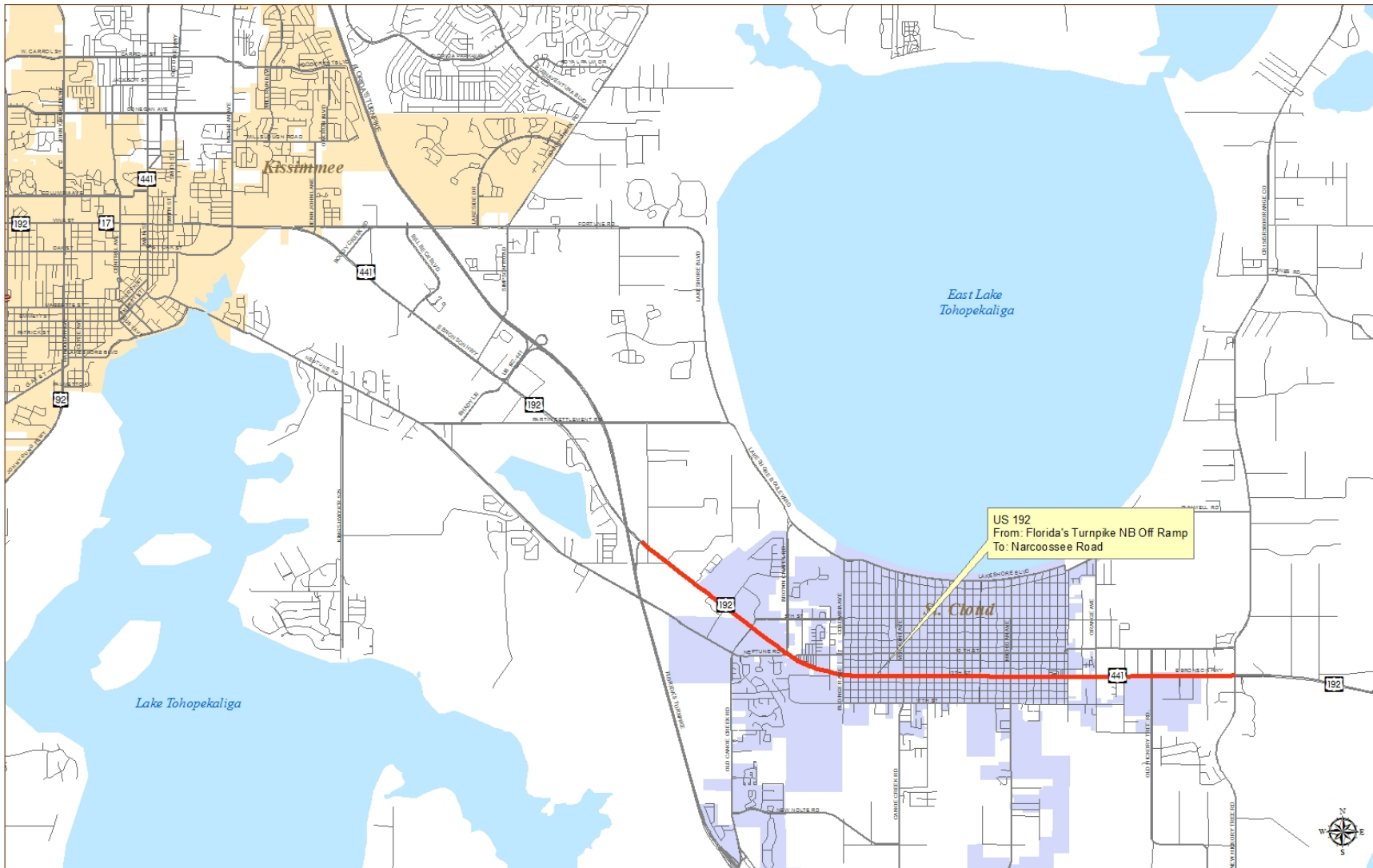
# Year 2013 MetroPlan Orlando Travel Time Study

## City of Orlando



# Year 2013 MetroPlan Orlando Travel Time Study

## Osceola County





# Benefit – Cost Analysis



- Input Benefit Items
  - \*Travel Time Cost Savings: \$16.79/hr for Orlando
- Signal Retiming Costs obtained from FDOT

\*Source: Year 2011 Mobility Data for Orlando

## Sample Benefit / Cost Calculation

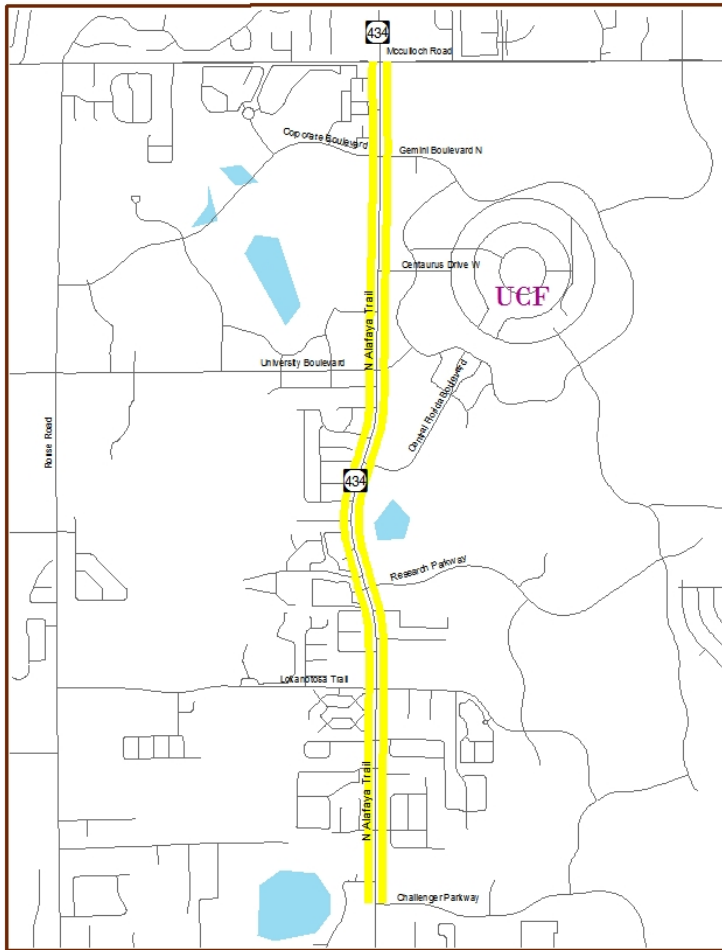
### SR 434 – McCulloch Road to Challenger Parkway

### Summary of Measures of Effectiveness & Benefit Cost Analysis

MOE's	AM PEAK HOUR		PM PEAK HOUR	
	Before	After	Before	After
Total Travel Time (vehicle - hrs)	341.67	296.90	719.94	535.90

BENEFITS	AM PEAK HOUR	PM PEAK HOUR
User Benefit Per Day	\$751.69	\$3,090.03
<b>Annual User Benefit</b>	<b>\$225,507.00</b>	<b>\$927,009.00</b>
<b>Total Annual User Benefit</b>	<b>\$1,152,516.00</b>	
Total Signal Retiming Annual Cost	\$14,700.59	
<b>User Benefit / Cost Ratio</b>	<b>78.40</b>	

# Year 2013 MetroPlan Orlando Travel Time Study



## SR 434 - AM Peak

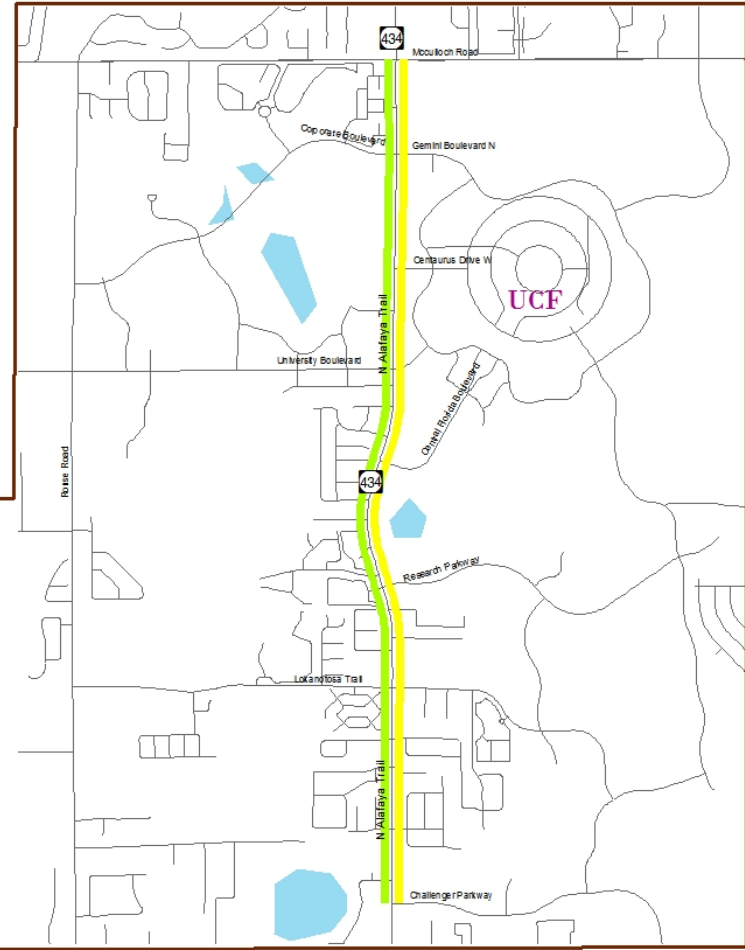
### Before Condition

Date of Collection: 1/15/2013  
 Distance: 2.67 miles  
 From: McCulloch Rd.  
 To: Challenger Parkway.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 29.20 MPH  
 NB Travel Time: 5.95 MIN

SB Avg Speed: 29.50 MPH  
 SB Travel Time: 5.90 MIN



## SR 434 - AM Peak

### After Condition

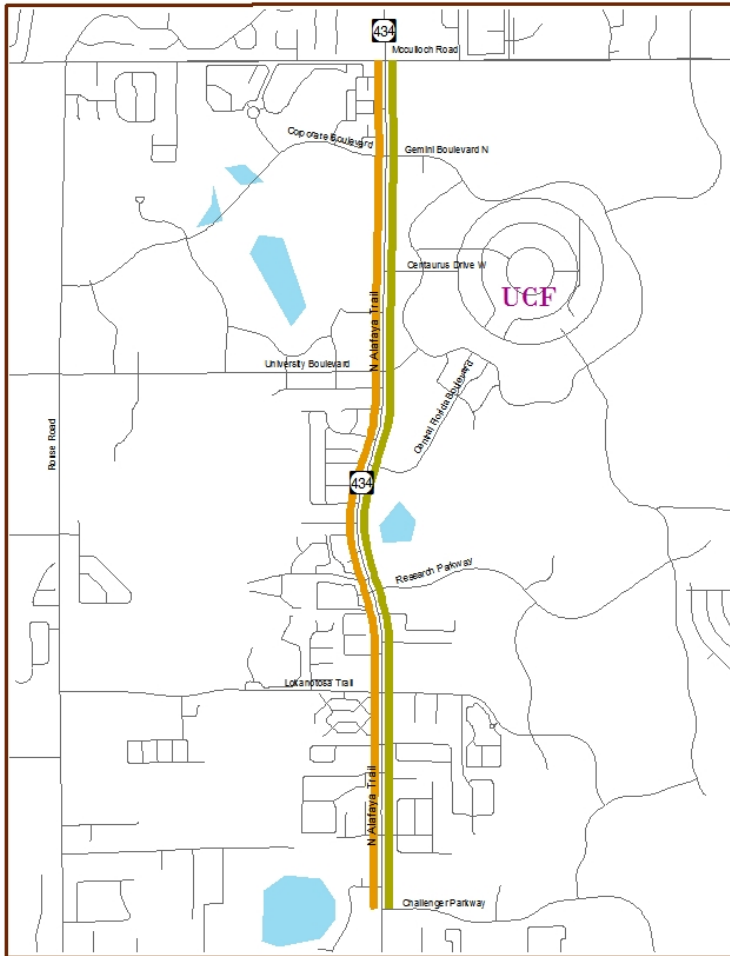
Date of Collection: 4/4/2013  
 Distance: 2.67 miles  
 From: McCulloch Rd.  
 To: Challenger Parkway.

Start Time: 7:00 AM  
 End Time: 9:00 AM

NB Avg Speed: 33.00 MPH  
 NB Travel Time: 5.27 MIN

SB Avg Speed: 35.30 MPH  
 SB Travel Time: 4.93 MIN

# Year 2013 MetroPlan Orlando Travel Time Study



**SR 434  
- PM Peak**

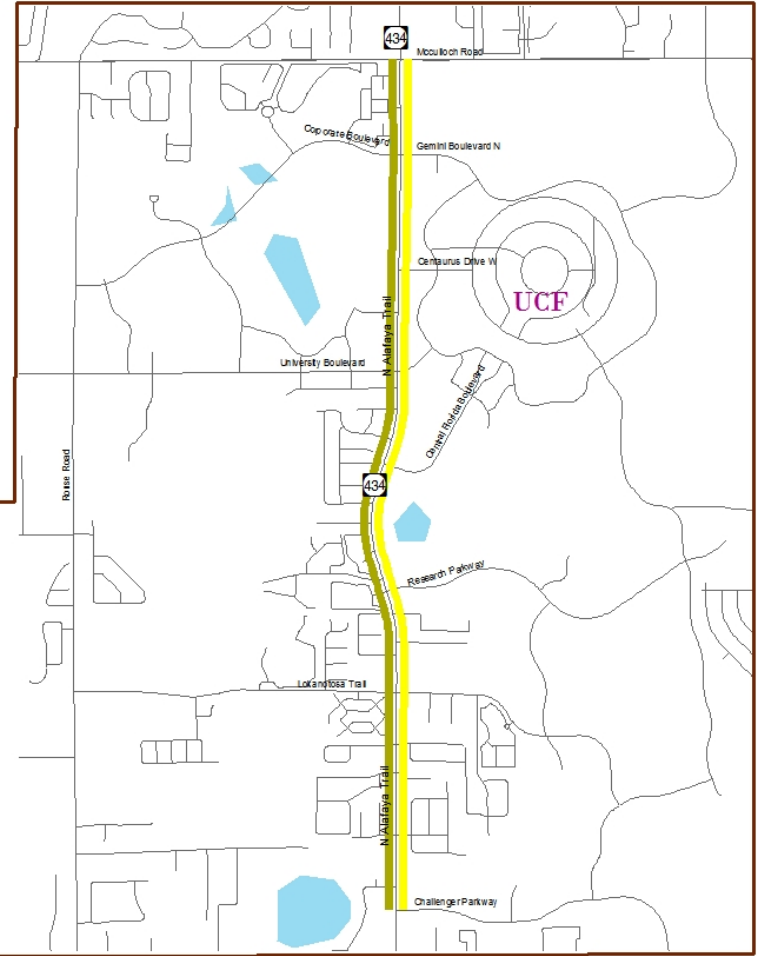
**Before Condition**

Date of Collection: 1/15/2013  
 Distance: 2.67 miles  
 From: McCulloch Rd.  
 To: Challenger Parkway.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 21.30 MPH  
 NB Travel Time: 8.18 MIN

SB Avg Speed: 16.40 MPH  
 SB Travel Time: 10.62 MIN



**SR 434  
- PM Peak**

**After Condition**

Date of Collection: 4/4/2013  
 Distance: 2.67 miles  
 From: McCulloch Rd.  
 To: Challenger Parkway.

Start Time: 4:00 PM  
 End Time: 6:00 PM

NB Avg Speed: 28.40 MPH  
 NB Travel Time: 6.12 MIN

SB Avg Speed: 22.10 MPH  
 SB Travel Time: 7.88 MIN

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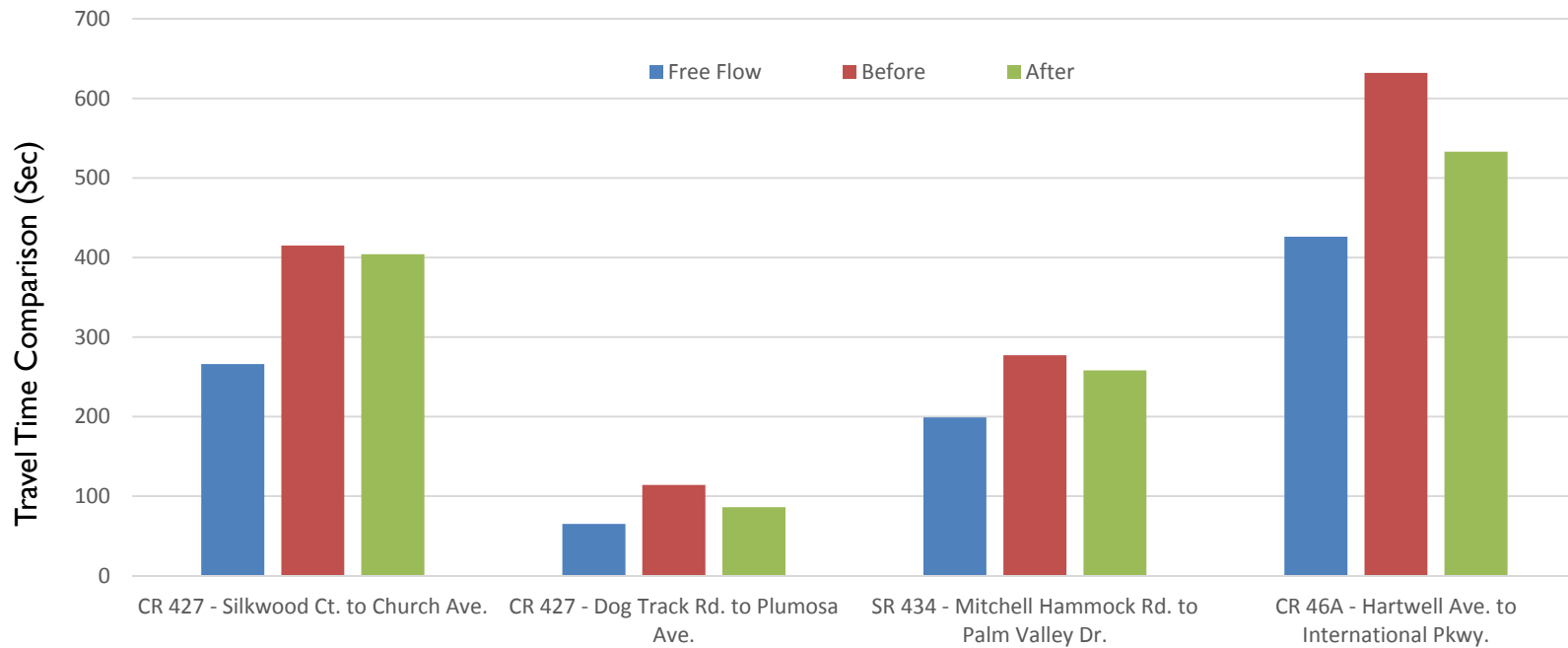
**Level of Services:**

<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #006400; border: 1px solid black; margin-right: 5px;"></span> A</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #00FF00; border: 1px solid black; margin-right: 5px;"></span> B</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #FFFF00; border: 1px solid black; margin-right: 5px;"></span> C</li> </ul>	<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #FFD700; border: 1px solid black; margin-right: 5px;"></span> D</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #FFA500; border: 1px solid black; margin-right: 5px;"></span> E</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #FF0000; border: 1px solid black; margin-right: 5px;"></span> F</li> </ul>	<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; border-bottom: 1px solid black; margin-right: 5px;"></span> Roads</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #FFDAB9; border: 1px solid black; margin-right: 5px;"></span> City Boundary</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #ADD8E6; border: 1px solid black; margin-right: 5px;"></span> Water</li> </ul>
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**2013 METROPLAN ORLANDO**

*Travel Time Study*

# Year 2013 Seminole County Corridors WB Travel Time Comparison



# Annual Travel Time and Fuel Savings



- Annual Time Savings (vehicle hours): **426,920.70**
- Overall Annual User Benefit: **\$7,168,062.00**
- Overall Annual Cost: **\$284,508.03**
- Overall B/C: **25.19**



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# B/C Ratio Summary – Seminole County

S No.	Street	From	To	Annual User Benefit	Annual Cost	B/C Ratio
1	CR 427	SILKWOOD CT.	CHURCH AVE.	\$219,615.00	\$14,848.44	<b>14.79</b>
2	CR 427	DOG TRACK RD.	PLUMOSA AVE.	\$78,024.00	\$7,424.41	<b>10.51</b>
3	SR 434	MITCHELL HAMMOCK RD.	PALM VALLEY DR.	\$241,371.00	\$13,024.35	<b>18.53</b>
4	CR 46A	HARTWELL AVE.	INTERNATIONAL PKWY.	\$459,474.00	\$37,232.18	<b>12.34</b>



# B/C Ratio Summary – Orange County

S No.	Street	From	To	Annual User Benefit	Annual Cost	B/C Ratio
1	SR 434	McCULLOCH RD.	CHALLENGER PKWY.	\$1,152,516.00	\$14,700.59	<b>78.40</b>
2	SR 426	PHELPS AVE.	PALMETTO AVE.	\$373,746.00	\$17,008.24	<b>21.97</b>
3	SR 15	MICHIGAN AVE.	HOFFNER AVE.	\$176,145.00	\$10,261.34	<b>17.17</b>
4	SR 527	HOFFNER AVE.	NELA AVE.	\$200,775.00	\$11,761.92	<b>17.07</b>
5	SR 436	ALOMA AVE.	OLEANDER DR.	\$551,805.00	\$14,043.25	<b>39.29</b>
6	OBT SOUTH - US 441	KALEY AVE.	AMERICANA BLVD.	\$196,092.00	\$11,354.96	<b>17.27</b>
7	SR 50	FORSYTH RD.	AVALON PARK RD.	\$1,288,062.00	\$34,604.83	<b>37.22</b>

# B/C Ratio Summary – City of Orlando

S No.	Street	From	To	Annual User Benefit	Annual Cost	B/C Ratio
1	SR 552	BAHIA AVE./ DIXIE BELLE DR.		\$200,070.00	\$1,755.41	<b>113.97</b>
2	SR 436	DAHLIA DR.	T G LEE BLVD.	\$301,062.00	\$31,597.31	<b>9.53</b>
3	JOHNYOUNG PKWY.	33/35TH ST.	I-4 WB Off RAMP	\$426,330.00	\$11,410.21	<b>37.36</b>
4	SR 50	MILLS AVE.	OLD CHENEY HWY.	\$544,248.00	\$24,417.79	<b>22.29</b>
5	ANDERSON ST.	I-4 WB RAMP	I-4 EB RAMP	\$50,118.00	\$3,219.89	<b>15.57</b>
6	AMELIA ST.	GARLAND AVE.	HUGHEY AVE.	\$26,949.00	\$4,498.31	<b>5.99</b>

## B/C Ratio Summary - Osceola

S No.	Street	From	To	Annual User Benefit	Annual Cost	B/C Ratio
1	US 192	FL TURNPIKE NB OFF RAMP	NARCOOSSEE RD.	\$681,708.00	\$21,344.61	<b>31.94</b>