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Final Report

Commercial Heavy Vehicle Impacts on Signalized Arterial Corridor Performance

December 2019

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Florida Department of Transportation

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Final Report

Commercial Heavy Vehicle Impacts on Signalized Arterial Corridor Performance

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DISCLAIMER

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the State of Florida Department of Transportation.

UNIT CONVERSION TABLE

APPROXIMATE CONVERSIONS TO SI UNITS

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
AREA				
in^2	squareinches	645.2	square millimeters	mm^2
ft^2	squarefeet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: volumes greater than 1000 L shall be shown in m^3				

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
TEMPERATURE (exact degrees)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
ILLUMINATION				
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m^2	cd/m^2

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
FORCE and PRESSURE or STRESS				
lbf	poundforce	4.45	newtons	N
lbf/in^2	poundforce per square inch	6.89	kilopascals	kPa

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16. **Abstract**
With changing population, economy, and business practices, there has been a significant increase in commercial truck traffic on urban roadways in Florida. Arterial corridors with heavy use by commercial vehicles often suffer from poor operational performance, either because they were not designed considering the current level of commercial truck traffic or the analysis tools used for such design did not properly account for the effect of commercial vehicles. The *Highway Capacity Manual* (HCM) provides one of the most commonly used analysis methods for arterial corridors, and it employs a methodology that does not properly account for the full vehicle dynamics of heavy vehicles. To improve on this shortcoming in the HCM calculations, this project makes use of a microsimulation tool, which takes into account advanced vehicle acceleration modeling of heavy vehicles.
The field data were obtained by setting up cameras, data from which were used as the basis of calibrating the microsimulation tool. To develop recommendations, synthetic data were generated using this tool, and experimental design scenarios were set up. These scenarios were tested against both the microsimulation tool and HCM, and comparisons were made of the obtained results from both tools. Regression models were developed to provide recommendations for Florida to adjust saturation flow rate and running time calculations. These models were developed with the intent that the usage of these models will result in more accurate signalized arterial design in Florida, compared to solely using the current HCM methodologies.
The major benefit for Florida through this study is the development of adjusted calculations of the HCM urban streets and signalized intersections methodologies so they do not overestimate running speeds and saturation flow rates. This will positively affect signalized arterial corridor planning in Florida and may positively impact the state's freight signal priority goals and interests.

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EXECUTIVE SUMMARY

Within the last decade, freight operations in Florida have reached new heights, contributing to increased truck traffic in urban areas and potentially poor operational performance on arterial corridors. This might have occurred because facilities were not designed in anticipation of the current influx of commercial truck traffic or because the analysis tools used for such design did not fully account for the full effect of commercial vehicles. Currently, the Urban Street Analysis Methodology of the *Highway Capacity Manual*, 6th Ed. (HCM), is used to perform arterial analysis in the United States, but this latest version is very limited with respect to incorporating factors, either implicitly or explicitly, that are sensitive to commercial vehicles and their impact on roadway operations. A major objective of this project was to suggest recommendations to overcome limitations of the Urban Street Analysis Methodology of HCM.

After the kickoff meeting and literature review tasks were performed for this project, the second task was to collect the data from four arterial corridors, each consisting of four consecutive intersections in the Tampa, Gainesville-Starke, Jacksonville, and Miami areas in Florida. Video data were collected from these sites, each with a significant percentage of commercial trucks (8-10%, or more in some cases). The video data were reduced to obtain traffic volumes, vehicle classifications, time stamps of vehicles crossing the stop bar of each intersection, and signal timings.

The third task was directed towards using a microsimulation tool, one capable of accurately modeling the acceleration performance of heavy trucks. This tool is a cost-free program and has been used successfully in numerous academic and research projects. The vehicle characteristics (e.g., weight), driver characteristics (e.g., aggressiveness distribution), and vehicle-movement model parameters (e.g., stop gap, desired acceleration) for the tool were adjusted to obtain an overall reasonable match between the simulation and field traffic stream performance measurements. Multiple performance measures were considered in this calibration effort, with the goal of getting reasonably good agreement across all measures.

In the fourth task, recommendations for representative sites on Florida arterial corridors with higher truck percentages received from FDOT along with the research team's research on additional sites around logistics activity centers (LACs) were considered to finalize the proposed experimental design geometries. Five experimental design geometries were chosen to represent Florida arterial corridor traffic conditions. Each of these geometries generated 36 scenarios with differing traffic volumes, truck percentages, and roadway grades.

From the results comparison of HCM and simulation, as expected, both sets of results indicated that with the increase in volumes and truck percentages, there was a significant decrease in the segment average speeds as running times and control delays increase. The saturation flow rates were impacted in a similar manner because there was a gradual decrease in saturation flow rates with the increase in truck percentage and grade as expected. In addition, it was observed that the simulation results for travel speed and saturation flow rate were generally lower than those obtained from the HCM methodology. It should be noted that saturation flow rate is a major factor in control delay determination. The main reason for this is that the HCM methodology does not take into account the gear-changing capabilities of trucks in its deterministic and analytic methodology, therefore not accounting for powertrain characteristics (engine and transmission characteristics) and resistance forces that provide more accurate vehicle acceleration modeling.

The HCM running times in general were found to be lower (translating to higher running speeds) than those from simulation. Again, this was expected because the HCM running time calculation does not explicitly consider roadway grade nor truck percentage in the traffic stream, only overall traffic volume.

Models were developed to provide adjustments to the saturation flow rate and running speed calculations from the HCM to provide for more accurate results for arterials with significant percentages of commercial trucks. It is recommended that these model adjustments be applied in Florida for signalized arterial analysis.

The major benefit of this study for Florida is the development of methodologies to adjust the calculations of the HCM urban streets and signalized intersection methodologies so that running speeds and saturation flow rates are more accurate when relatively high percentages of commercial trucks are present in the traffic stream. This will positively affect signalized arterial corridor planning in Florida, ultimately lead to improved signalized arterial operations, and improve future freight arterial signal priority efforts.

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1 Introduction

With changing population, economy, and business practices, there has been a significant increase in commercial truck traffic on urban roadways in Florida. Arterial corridors with heavy use by commercial vehicles suffer from poor operational performance, either because they were not designed considering the current abundant influx of commercial truck traffic or the analysis tools used for such design did not properly account for the effect of commercial vehicles. The two most common approaches for performing arterial analysis are (1) the *Highway Capacity Manual* (HCM) Urban Streets analysis methodology (TRB, 2016) and (2) simulation. The analytical procedure of the HCM is relatively straightforward and transparent, and generally provides consistent, even if not accurate, results across a wide range of inputs. The simulation approach often provides more accurate results; however, most simulation tools do not model vehicle dynamics with enough detail to capture the performance limitations of commercial trucks. Thus, for modeling scenarios with relatively high percentages of commercial trucks, the results can be significantly inaccurate. Furthermore, simulation results can be difficult to review for transportation agencies due to their general lack of transparency, which also makes simulation much more susceptible to misuse and abuse.

The shortcomings of the previous HCM approach to the Urban Street Analysis Methodology were incrementally addressed in a study titled "Incorporating Truck Analysis into the *Highway Capacity Manual"* (National Cooperative Freight Research Program [NCFRP] Report 31), which demonstrated that the HCM method underestimates the impacts of commercial vehicles on traffic operations performance, especially with respect to lost start-up time and passenger car equivalency (PCE) values. However, these shortcomings were not fully addressed and were not sufficient in nature. This study was more focused on freeways than arterials; thus, the suggested improvements with respect to the urban street analysis methodology in the latest release of the HCM (TRB, 2016) were very modest with respect to commercial vehicles.

A small validation study (Washburn and Bian, 2014) on the HCM saturation flow rate calculations illustrated significant differences between the measured saturation flow rate values and those calculated using the new HCM approach. These errors can be attributed to the fact that the HCM still takes a simplistic approach. Another FDOT study by Washburn and Cruz-Casas (2007) demonstrated that a two-second value for lost time can significantly underestimate the actual lost time when commercial trucks are present in the traffic stream; in fact, it showed that two seconds are not even sufficient for a traffic stream full of passenger cars.

Thus, there is a need for a comprehensive study focused on the impact of heavy vehicles on arterial corridors that overcomes the limitations of the Urban Street Analysis Methodology of the HCM.

1.1 Project Objective and Tasks

The objective of this research was to identify improvements that can be made to the HCM Urban Street Analysis Methodology that will better account for the impacts of commercial vehicles on Florida's arterial corridor operations. The specific project tasks to achieve the objective included the following:

1. Perform a literature review.
2. Perform field data collection, reduction, and analysis.

3. Calibrate the microsimulation tool.
4. Develop simulation experimental design.
5. Develop recommendations for enhancements to urban street analysis methodology of HCM (TRB, 2016) Edition.

1.2 Report Organization

Chapters 1 and 2 address the first task of the project and detail the literature review conducted by the research team. The HCM has been used as the primary guide to analyze the effects of motorized vehicles (automobile, truck, motorcycle, transit) on motorized vehicle methodologies. These chapters further detail the formulas used to calculate the traffic parameters, laying the foundational task of this project. Chapter 3 describes the field data collection effort and details how the data collection plan was conceptualized, starting with the selection of suitable data collection sites to the methods and processes executed to collect accurate video data for this study. Chapter 4 explains how the field data reduction plan and development of experimental design scenarios were conceptualized. Chapter 5 details the final steps of this project for generating data from the representative sites obtained via the experimental design scenarios. These were run using the microsimulation tool, and data were generated and analyzed against the values obtained via the coding of HCM. Further analysis and recommendations from the analysis of these data is explained in Chapter 6.

2 Literature Review

2.1 Overview of HCM Methodologies

This section evaluates the methodology and limitations of the HCM (TRB, 2016) on analyzing the effects of heavy vehicles with other modes in the traffic stream on interrupted flow facilities.

The HCM has been used as the primary guide to analyze the effects of motorized vehicles (automobile, truck, motorcycle, transit) on motorized vehicle methodologies; it focuses primarily on automobiles, as they represent the highest percentage in a traffic stream. To determine the level of service (LOS) on urban streets, the HCM uses two parameters—1) control delay and 2) volume-to-capacity ratio (v/c). It includes two 10-step motorized vehicle methodologies for calculating LOS—signalized intersections and urban street facilities.

2.1.1 Urban Street Intersection Analysis Methodology

To calculate the LOS for a lane group at a signalized intersection, the HCM adjusts the base saturation flow rate using various adjustment factors, including a combined adjustment factor (f_{HVg}), which accounts for the specific conditions experienced at the intersection approach. Following is Eq. 19-8 from the HCM (TRB, 2016) Ed:

$$s = s_0 f_w f_{HVg} f_p f_{bb} f_a f_{LU} f_{LT} f_{RT} f_{Lpb} f_{Rpb} f_{wz} f_{ms} f_{sp} \quad (1)$$

Where,

s = adjusted saturation flow rate (veh/h/ln)
s_0 = base saturation flow rate (pc/h/ln)
f_{HVg} = adjustment factor for heavy vehicle and grade
f_{LT} = adjustment factor for left-turning vehicle presence in a lane group
f_{RT} = adjustment factor for right-turning vehicle presence in a lane group
All other $f_{...}$ values = other adjustment factors

In earlier versions of the HCM, passenger car equivalent (PCE) was used to account for the impact of trucks when calculating saturation flow rate and free flow speed for signalized arterial corridors. The default PCE value was fixed at 2.0 for all heavy vehicles (irrespective of the different types of truck). The HCM (TRB, 2016) replaced the PCE value with a combined adjustment factor (f_{HVg}) that accounts for the impact of heavy vehicles and grades. This adjustment factor is calculated using two equations that are based on the type of grade, as shown in Eqs. 2 and 3 (as taken from Eq. 19-9 and Eq. 19-10 in HCM (TRB, 2016), respectively):

If the grade is negative (i.e., downhill), then the factor is computed with

$$f_{HVg} = \frac{100 - 0.79 P_{HV} - 2.07 P_g}{100} \quad (2)$$

If the grade is positive (i.e., level or uphill), then the factor is computed with,

$$f_{HVg} = \frac{100 - 0.78 P_{HV} - P_g^2}{100} \quad (3)$$

Where,

P_{HV} = percent heavy vehicles in corresponding movement group (%)

P_g = approach grade for corresponding movement group (%)

This factor applies to heavy vehicles percentages up to 50% in the traffic stream and grades ranging from -4.0% to +10.0%.

Although f_{HVg} accounts for different grades and percentages of heavy vehicles, it does not account for the different categories of trucks in the traffic stream or their gear-changing behavior on interrupted flow facilities.

The adjustment factors for left-turning vehicle presence in a lane group (f_{LT}) and right-turning vehicle presence in a lane group (f_{RT}) reflects the effects of turning vehicle movement on the saturation flow rate. These factors are computed using an equivalent factor that accounts for the number of through cars for a protected left-/right-turning vehicle. Eqs. 4 and 5 are taken from Eq. 19-13 and Eq. 19-14, respectively in the HCM:

$$f_{LT} = \frac{1}{E_L} \tag{4}$$

Where,

E_L = equivalent number of through cars for a protected left-turning vehicle (=1.05).

$$f_{RT} = \frac{1}{E_R} \tag{5}$$

Where,

E_R = equivalent number of through cars for a protected right-turning vehicle (=1.18).

These equivalent factors account for passenger cars only; they are fixed and do not consider the impact of trucks on turning movements. On the contrary, due to their limited turning radii, trucks would add more delay to the through vehicles compared to passenger cars.

2.1.2 Urban Street Facility Analysis Methodology

Chapters 16 and 17 in the HCM (TRB, 2016) describe the methodology to evaluate the quality of service provided to road users traveling along an urban street facility. Figure 1 (similar to Exhibit 16-8, HCM (TRB, 2016) illustrates the calculation framework of the motorized vehicle methodology for an urban street facility.

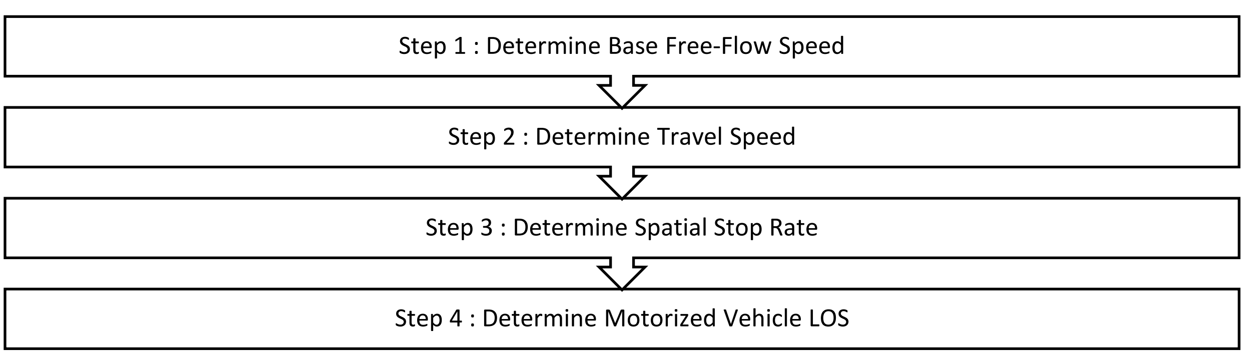


Figure 1. Motorized vehicle methodology for urban street facilities

The base free-flow speed for a facility is computed using Eq. 6 (Eq. 16-2 in HCM):

$$S_{f\,o,F} = \frac{\sum_{i=1}^{m} L_i}{\sum_{i=1}^{m} \frac{L_i}{S_{f\,o,i}}} \tag{6}$$

Where,

$S_{f\,o,F}$ = base free-flow speed for facility (mi/h)
L_i = length of segment i (ft)
m = number of segments on facility
$S_{f\,o,i}$ = base free-flow speed for segment i (mi/h)

For each segment, the base free-flow speed is computed using Eq. 7 (Eq. 18-3 in HCM):

Base free-flow speed, $S_{fo} = S_{calib} + S_o + f_{CS} + f_A + f_{pk}$ (7)

Where,

S_{calib} = base free-flow speed calibration factor (mi/h)
S_o = speed constant (mi/h)
f_{CS} = adjustment for cross section (mi/h)
f_A = adjustment for access points (mi/h)
f_{pk} = adjustment for on-street parking (mi/h)

The base free-flow speed includes the influence of speed limit, access point density, median type, curb presence, and on-street parking presence, but it does not account for truck mix and its characteristics.

The travel speed of through vehicle traffic for a facility is computed using Eq. 8 (Eq. 16-3 in HCM):

$$S_{T,F} = \frac{\sum_{i=1}^{m} L_i}{\sum_{i=1}^{m} \frac{L_i}{S_{T,seg,i}}} \tag{8}$$

Where,

$S_{T,F}$ = travel speed for the facility (mi/h)

$S_{T,seg,i}$ = travel speed of through vehicles for segment i (mi/h).

The travel speed of through vehicles is used as a performance measure, along with the v/c ratio at the downstream boundary intersection to estimate the LOS of urban street segments. The travel speed of the through vehicles is computed using Eq. 9 (Eq. 18-15 in HCM):

$$S_{T,seg} = \frac{3600L}{5{,}280\,(t_R + d_t)} \tag{9}$$

Where,

$S_{T,seg}$ = travel speed of through vehicles for segment (mi/h)
L = segment length (ft)
t_R = segment running time (s)
d_t = through delay (s/veh)

Segment running time (t_R) is computed using various factors (start-up lost time, segment length, free flow speed, etc.) that incur delay in traffic along an urban street. The delay associated with these factors is too small when compared to the control delays at signalized intersections. However, such factors are significant for specific situations as shown in Eq. 10 (Eq. 18-7 in HCM):

$$t_R = \frac{6.0 - l_1}{0.0025L} f_x + \frac{3600L}{5280S_f} f_v + \sum_{i=1}^{N_{ap}} d_{ap,i} + d_{other} \quad (10)$$

Where,

t_R = segment running time (sec)
l_1 = start-up lost time = 2.0 if signalized, 2.5 if STOP or YIELD controlled (s)
L = segment length
f_v = proximity adjustment factor
S_f = free-flow speed

$$f_x = \text{control-type adjustment factor} = \begin{Bmatrix} 1.00 \text{ (signalized or STOP-controlled through movement)} \\ 0.00 \text{ (uncontrolled through movement)} \\ \min\left[\frac{v_{th}}{c_{th}}, 1.00\right] \text{ (yield-controlled through movement)} \end{Bmatrix}$$

v_{th} = through-demand flow rate (veh/h)
c_{th} = through-movement capacity (veh/h)
$d_{ap,i}$ = delay due to left and right turns from street into access point intersection i (s/veh)
N_{ap} = number of influential access point approaches along segment
d_{other} = delay due to other sources along segment (s/veh)

The first component of this equation considers start-up lost time, length of segment, and control-type adjustment factor (recently added in HCM (TRB, 2016)), where the start-up lost time is fixed at 2.0 s for signalized intersections. In addition, the phase lost time of a cycle comprises start-up lost time and clearance lost time, as depicted in Eq. 11 (Eq. 19-1 in the HCM):

Phase Lost Time, $l_t = l_1 + l_2$ (11)

Where,

l_1 = start-up lost time = 2.0 sec
l_2 = clearance lost time $= Y + R_c - e$
e = extension of effective green = 2.0 s
Y = yellow change interval (s)
R_c = red clearance Interval (s)

As trucks have lower acceleration capacity when compared to passenger cars, the fixed 2-s lost time value seems to be an oversimplification of the actual values that may be experienced at intersections. Additionally, each truck has different capabilities (weight-to-horsepower ratio), which affects the acceleration rate at which the truck would pass the intersection. Thus, there may be a need to revise the equation for start-up lost time (l_1).

The second component of Eq.10 represents the product of travel speed and free-flow speed. This combined speed represents the speed favored by automobile users when traveling in low volume conditions with the presence of traffic control devices. The free flow speed (S_f) is computed using Eq. 12 (Eq. 18-5 in HCM):

Free Flow Speed, $S_f = S_{fo} f_L \geq S_{pl}$ (12)

Where,

S_f = free flow speed (mi/h)

S_{fo} = base-free flow speed (mi/h)
S_{calib} = base-free flow speed calibration factor (mi/h)
S_o = speed constant (mi/h)
f_{CS} = adjustment for cross-section (mi/h)
f_A = adjustment for access points (mi/h)
f_{pk} = adjustment for on-street parking (mi/h)
f_L = signal spacing adjustment factor

From the above equations, base free flow speed is adjusted using various factors such as cross section, access points, on-street parking, and signal spacing. However, there is no adjustment factor to account for the impact of trucks on the free flow speed of a signalized intersection.

The third and fourth components of Eq. 10 account for delays such as delay incurred by through traffic due to turning vehicles ($d_{ap,i}$) and other delays such as curb parking or pedestrians that affect the running time of through traffic (d_{other}). These factors are influenced by the number of access point approaches along the segment. Both components stand true for the traffic stream, which has only automobiles; it does not account for the presence of trucks or the impact they can have due to grades and gear-changing behavior in the traffic stream.

The spatial stop rate for a facility is calculated using Eq. 16-4 from the HCM:

$$H_F = \frac{\sum_{i=1}^{m} H_{seg,i}\, L_i}{\sum_{i=1}^{m} L_i} \quad (13)$$

Where

H_F = travel speed for the facility (mi/h)

$H_{seg,i}$ = travel speed of through vehicles for segment i (mi/h).

For a segment, the spatial stop rate computed using Eq. 14 (Eq. 18-16 in HCM) is:

$$H_{seg} = 5280\ \frac{h + h_{other}}{L} \quad (14)$$

Where,

H_{seg} = spatial stop rate for the segment (stops/mi)

h= full stop rate (stops/veh)
h_{other} = full stop rate due to other sources (stops/veh)
L = segment length (ft)

The through stop rate at a signalized boundary intersection is computed by using Eq. 15 (Eq. 18-11 in HCM):

$$h = 3600\left[\frac{N_f}{min\left(1, \frac{v_{th}C}{N_{th} s\, g}\right) g\, s} + \frac{N_{th} Q_{2+3}}{v_{th}\, C}\right] \quad (15)$$

Where,

h = full stop rate (stops/veh)

N_f = number of fully stopped vehicles (veh/ln)
g = effective green (s)
s = saturation flow rate (veh/h/ln)
N_{th} = number of through lanes (shared or exclusive) (ln)
Q_{2+3} = back-of-queue size (veh/ln)

The first term of Eq. 15 considers the proportion of vehicles stopped once by the signal, and the second term represents the additional stops that may occur during cycle failure conditions, which is significant when the v/c ratio exceeds approximately 0.8. The full stop rate typically varies from 0.4 stops/veh at a low v/c ratio to 2.0 stops/veh when the v/c ratio is about 1.0. The full stop rate considers the proportion of through vehicles and overflow of traffic on an urban street segment; however, there is no discussion about trucks, so the assumption is that the influence of heavy vehicles and their characteristics is not considered.

2.2 Related Studies

National Cooperative Highway Research Program (NCHRP) Project 3-79 (2008) evaluated additional factors that can affect the operational performance of urban street traffic flow. In this study, procedures for estimating running time and signal control delay were developed using CORSIM to develop and calibrate segment running time, stop rate, and control delay at signalized intersections. However, the study focused primarily on automobile traffic and did not consider the effect of grades and gear changing behavior of trucks in the traffic stream on urban streets.

Another study, NCHRP Report 31 (2014), focused primarily on the impact of trucks and mentioned that the previous HCM methodology (HCM 2010) takes a simplistic approach when measuring PCE values. This value was independent of the proportion of trucks in traffic, type of truck, grade, and weight-to-horsepower ratio. Thus, an equation for calculating truck PCE values for arterial segments including the following factors is given in Eq. 16:

$$\text{PCE} = 0.5006 + 0.09447 \times TT + 0.004475 \times WtHp + .01223 \times T\% + 0.07621 \times G\% \quad (16)$$

Where,

TT = truck type,

WtHp = lb/hp,

T% = truck percentage,

G% = grade percentage.

Note that whereas the PCE of a truck will vary depending on the total flow of all vehicles on the facility, the procedure described above is designed to estimate PCEs only for under-saturated conditions.

In this study, VISSIM simulation models were used to calculate truck PCE at signalized intersections for different truck proportions, approach grades, and truck mixes. These models demonstrated the effect of grade and truck proportion on PCE values and the highest PCE values for trucks were obtained for high grades and low proportions of trucks. They also suggested a combined heavy vehicle factor for saturation flow rate, which is part of the current HCM methodology for calculating saturation flow rate at signalized intersections. However, this study provided modest updates for arterial corridors compared to freeways and was limited to PCE and adjustment factors only; it did not consider the impact of trucks on control delays at signalized intersections.

Another study by Ramsay et al. (2004) noted that not only the presence of heavy vehicles but also their position in the queue affects control delay at signalized intersections. The results of this study demonstrated that of the three components of control delay—deceleration delay, stopped delay, and start-up lost time—only start-up lost time varies with the presence and location of trucks in the queue. They formulated Eq. 17 for expected control delay due to the presence of heavy vehicles in the queue:

$$E(d) = \sum_{i=0}^{n} p_i \, d_i \quad (17)$$

Where,

p_i = probability of heavy vehicles in queue position i
i = 0 indicates no heavy vehicle, $\sum p_i = 1$
d_i = control delay with heavy vehicles in queue position i

The resources (simulation program) used for this study assumed a constant acceleration rate and did not consider the effect of grade on vehicle acceleration. Including a car-following model that determines the effect on capacity and delay due to the presence of heavy vehicles at signalized intersections would return more accurate results.

A comprehensive study by Washburn and Cruz-Casas (2007), which used a car-following model, demonstrated that the HCM's recommended value for start-up lost time (2.0s) does not hold true, even for queues consisting of only passenger cars. The results of this study showcased that start-up lost time is directly proportional to the percentage of trucks in the traffic, starting with 2.5s of start-up lost time for passenger-car-only queues (0% trucks) and reaching 17.5s for a queue of large trucks only (100% trucks). They also challenged various other factors of the previous HCM urban street methodology of this study's time, such as PCE values and base saturation flow rates. For calculating more accurate PCE values, they categorized heavy vehicles into three general categories—small, medium, and large—and considered both headway and the time each vehicle type added for trailing vehicles during the clearance process. They recommended PCE values of 1.8 for small trucks, 2.2 for medium trucks, and 2.8 for large trucks. Also, they suggested a general PCE value of 2.3 when truck type distribution is relatively balanced. This PCE value was later validated by NCHRP Report 41 in Chapter 10. The final form of recommended adjustment factor for heavy vehicle is in Eq. 18 (Eq. 3-1 in the report):

$$f_{HV} = \frac{1}{\left(1+P_{ST}\text{x}(E_{ST}-1)+P_{MT}\text{x}(E_{MT}-1)+P_{LT}\text{x}(E_{LT}-1)\right)} \quad (18)$$

Where,

fHV = adjustment factor for heavy vehicles in traffic stream
Pi = proportion of truck type i in traffic stream
Ei = PCE factor for truck type i
i = LT for large truck, MT for medium truck, and ST for small truck

Furthermore, this study observed that the HCM-suggested base saturation flow rate value of 1,900 pc/h/ln was never observed in the field data obtained in the study. Even for ideal conditions, where the traffic stream consisted only of passenger cars with no hesitant drivers (inattentive/distracted drivers who hesitate during their start-up process), they observed a saturation flow rate of 1,773 pc/h/ln. In addition, they also observed that start-up lost time extended beyond the fourth vehicle in the queue, contradicting HCM's assumption that the saturation section would start after the fourth vehicle in the queue. However, these results were not confirmed because the field data were not large enough to validate the findings. Also, the custom simulation program used for modeling in the study had computational limits and did not take a full vehicle dynamic modeling approach, which limits accuracy. Thus, a realistic modeling of heavy vehicle performance is required for better assessment of the impact of trucks on arterial segments.

In a study by Ozkul (2014), a more detailed vehicle dynamics approach was developed to integrate into the custom traffic microsimulation program SwashSim. This program ensured that the gear-changing capabilities of heavy vehicles were incorporated into the traffic microsimulation. Using this approach, updated PCE values for three truck types—single-unit trucks (small), semitrailer + trailer trucks (medium), and semi-tractor + double trailer (large)—were proposed. The resulting PCE values were found to be lower than the values obtained from earlier studies (which did not include a full vehicle modeling approach), which can be due to the fact that the Ozkul 2014 model enables and accounts for truck gear changing, replicating this real world field condition in the simulation environment. This model and the simulation software will also be used for this current FDOT study to determine the impacts of commercial heavy vehicles on Florida’s signalized arterial corridors.

3 Field Data Collection, Reduction, and Analysis

3.1 Field Data Collection Methodology and Site Selection

This section explains how the data collection plan was conceptualized, starting with the selection of data collection sites suitable for the methods and processes executed to collect accurate video data for this study.

3.1.1 Field Data Collection Site Selection

Data were collected from four arterial corridors, each consisting of four consecutive intersections in the Tampa, Gainesville-Starke, Jacksonville, and Miami areas. To keep the focus of the study aligned to its objective, arterial intersections were expected to meet certain criteria to collect accurate data, as discussed below.

Intersection

- Four-leg intersections with turning radii close to 90 degrees were preferred; however, three-leg intersections were also considered.
- An exclusive right-turn lane at the intersection was preferable for collecting data for the turning movements of trucks at the intersections.
- External factors such as curbside parking or bus stops were avoided, as they may have affected the saturation flow rate significantly.

Link

- A link length of less than 0.6 mile was preferred to avoid platoon dispersion, as highlighted in HCM Chapter 16-5. However, for some sites, if the intersections were more separate, they were still considered after initial field observations to determine in-field platoon dispersion.
- A consistent number of lanes should be included between consecutive links in a corridor; lane drops were avoided as much as possible.
- “Stop” or “Yield” signs were not present on the link.
- Level terrain was preferred, with the acceptance of small grades to represent Florida conditions.
- Railway crossings were avoided as much as possible to alleviate their possible impacts on the operations of the corridors selected.

Traffic

- At least 10% of truck traffic was sought for in the traffic stream, but lower truck traffic levels were also considered if the overall data quality was found to be acceptable.
- Length of the queue was up to 8–10 vehicles for a given lane at the beginning of each green cycle.
- Vehicles departing from the subject approach were expected not to create a downstream impact on the operations of observed approach.

After receiving a list of sites that were confirmed to fall under the criteria highlighted above, four sites were proposed for data collection to the FDOT Project Manager (PM) for his review and approval. The original list of sites was obtained through recommendations requested from the FDOT freight coordinators for their respective Districts in Florida. Four out of the initial recommended sites were then selected for proposal to the FDOT PM. Table 1 outlines the location and average AADT (Source: Florida Traffic Online https://tdaappsprod.dot.state.fl.us/fto/) of these sites and is followed by maps and aerials presented in the analysis direction (i.e., south to north, west to east, etc.) for the respective site location visualization.

Table 1. Field Data Collection Sites

#	City	Roadway	From Intersection	To Intersection	Avg. AADT (veh.)
1	Gainesville-Starke	US-301	US-301 and Hwy 100	US-301 and W Brownlee St	25,500
2	Tampa	US-301	US-301 and Breckenridge Pkwy	US-301 and Harney Rd	37,250
3	Jacksonville	US-1	US-1 and N Canal St	US-1 and Moncrief Rd	29,500
4	Miami	Krome Ave (SR 997)	Krome Ave and Palm Dr	Krome Ave and S Flagler Ave	15,350

3.1.1.1 Field Data Reference Images

1. Gainesville/Stark: Refer to figures Figure A2 through Figure A-6 in Appendix A.
2. Tampa: Refer to figures Figure A-7 through Figure A-11 in Appendix A.
3. Jacksonville: Refer to figures Figure A-12 through Figure A-16 in Appendix A.
4. Miami: Refer to figures Figure A-17 through Figure A-21 in Appendix A.

3.1.2 Methodology and Field Data Collection

Eight cameras were used for video data collection at the four consecutive intersections of an arterial corridor. Of the eight cameras, two were used at each intersection and were wired together to enable concurrent clock/timing settings. One camera captured traffic signal head status, and the other captured the stop line and the queue/back-of-queue at the subject intersection. Both cameras were mounted on an 8-ft high tripod stand. A visualization of a sample study intersection is provided in Figure 2.

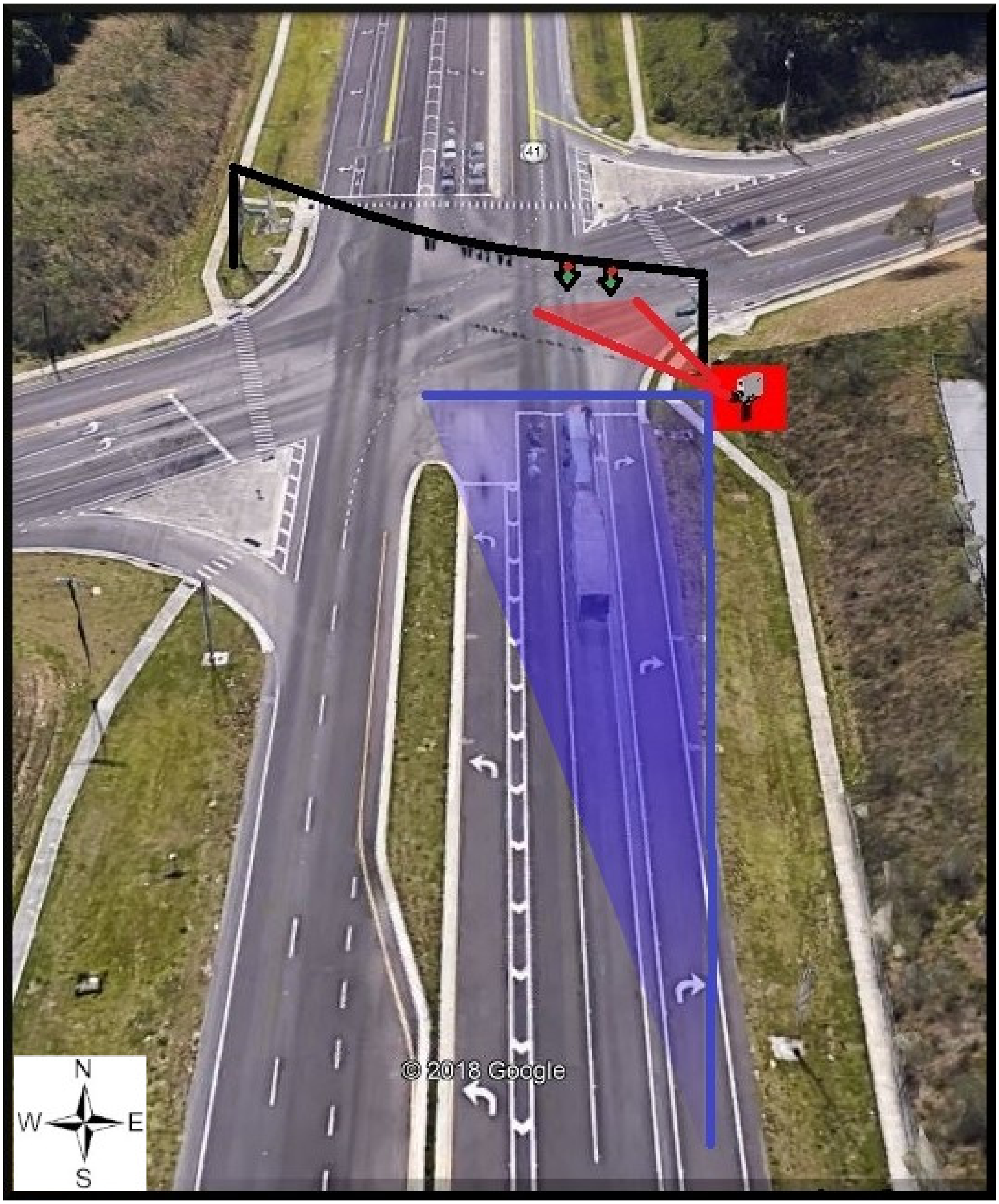


Figure 2. Sample camera placement depiction at each intersection

3.1.2.1 Setup

The setup used to record video data consisted of several main components, shown in Figure 3 and 4 and explained below.

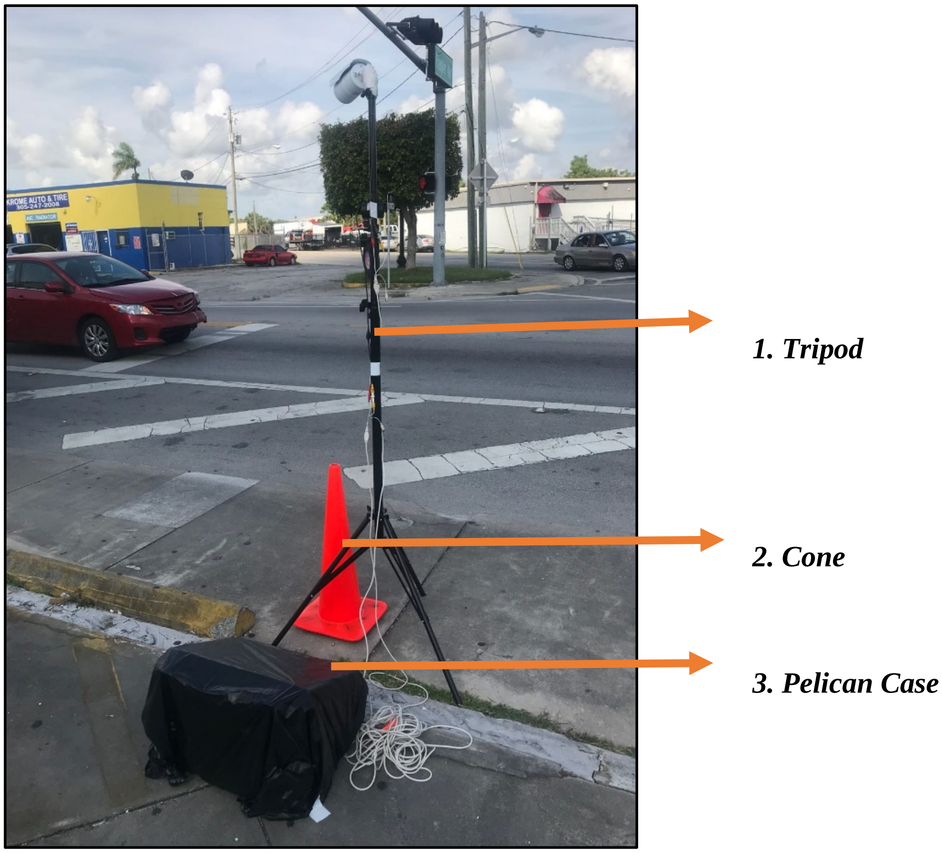


Figure 3. Photograph of data collection setup at an intersection

Figure 4. Close-up photograph of camera placement at each intersection

Equipment for each intersection:

- *Tripod*– 8-ft-high tripod to mount cameras
- *Cone* – placed to indicate caution for passers-by on the footpath
- *Pelican case* – used to store battery, DVR, and extra length of wiring;
    - *Camera 1*: A camera mounted at the very top of tripod to capture the queue waiting at the stop bar of the intersection. This camera had two connections, one with a DVR for sending recorded video data and one with an adapter to get power supply from the battery.

- *Camera 2*: A camera mounted in the midsection of the tripod stand to capture the signal head and left and right turn movements of vehicles passing at the intersection. This camera also had two connections, one with the DVR for sending recorded video data and another with an adapter to get power supply from the battery.
- *DVR*: A digital video recorder to record and store video, powered by a passenger car battery via an adapter. After data collection was finalized in the field, video data were extracted from the DVR using a USB flash drive.
- *Battery*: A passenger car battery to provide power supply to two cameras and the DVR via an adapter that converted the DC power of the battery to AC.
- *Adapter*: A battery power connection adapter to supply AC power to two cameras and DVR.
- *Video and power transmission wires*: A set of connecting wires to connect equipment to each other.

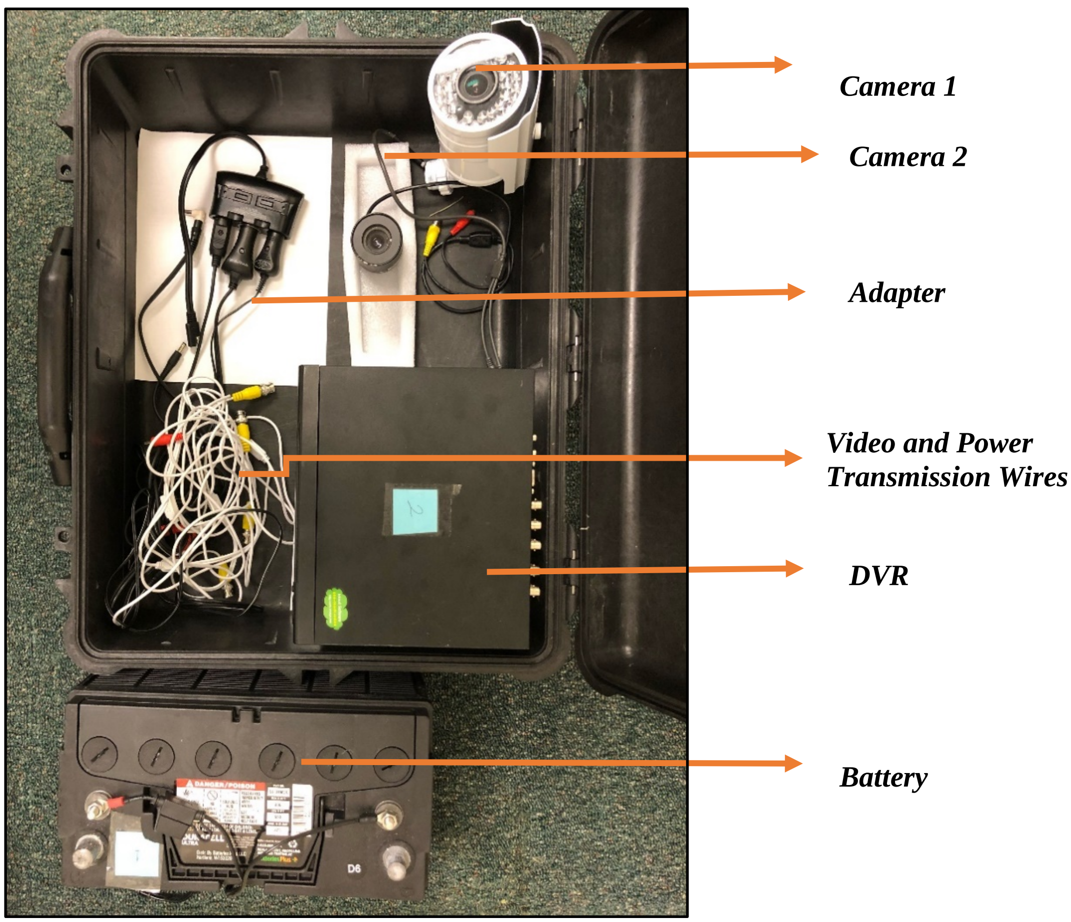


Figure 5. Black box containing equipment used at each intersection

3.2 Field Data Reduction

After the data collection effort was completed, approximately three hours of accurate and high-quality video data were obtained from each of the four intersections, totaling 720 minutes of data for each site (4 intersections per site). In total, 2,880 minutes of video data were reduced to obtain the necessary data for simulation calibration to be performed in the project task. While reducing video data, the following assumptions and steps were taken:

- *Assumptions*: As the reduced data would be used to set up the simulation inputs, it was important to reduce data that are compatible with the simulation tool; thus, the truck codes in Table 2 were adopted for this study.

Table 2. Vehicle Classification using Truck Codes

Truck Code	Vehicle Type
0	Other
1	Truck with no trailer
2	Truck with vehicle trailer
3	Truck with flatbed trailer
4	Truck with closed trailer
5	Truck with double closed trailer
6	Truck with tanker trailer
7	Single-unit truck
8	RV

- *Data reduction*: For each site, several lanes and their types (right or left turn) were observed, and tables were created to note data against each lane. From the recordings of Camera 2, timing for the green light interval (beginning of green light to end of green light for a direction) was noted in Excel. Recordings of Camera 1 were used to extract the total through traffic volume and truck volume that crossed the stop bar during the green interval or yellow/early red light. Vehicles that took a right or left turn on a green or red light (RTORs) were also recorded.

Figure A-1 in Appendix A shows part of a sample Excel data sheet produced for this study, including the data populated for a through lane against a green interval time of the first and second cycles. The "Start" and "End" columns indicate the time interval of the green light of a single cycle and "Total Thru" indicates the total number of vehicles that passed the stop bar during a green interval. The "Non-Trucks" and "Trucks" columns indicate how many "Total Thru" vehicles were trucks. The "Time" column notes the time each truck crossed the stop bar, and the "Type" column indicates the type of truck for the times these trucks were observed to pass the stop bar.

3.3 Field Data Analysis

After the data reduction process, the required information was acquired and analyzed using the following spreadsheets for each site/intersection. In total, three hours of data were reduced per intersection as described previously; however, considering the space constraints in this report, the following spreadsheets showcase only one hour of sample data for visualization purposes. In the next step of the study, a complete three hours of reduced data were calibrated in the simulation tool to replicate, field scenario and conduct simulation experiments.

It should be noted that to ensure high quality data, the data recording window (three hours) for different sites may be slightly different; however, all are between 10:00 am and 4:00 pm on a weekday to ensure that the bias (bumper-to-bumper traffic conditions) caused by the rush hour data is omitted. In addition, since the research team used these data for micro simulation calibration, the recording time difference between different sites did not affect the results and accuracy of the calibration effort.

3.3.1 Gainesville and Starke

Trucks traveling from the west coast of Florida to northeast Florida prefer to take US-301 through Gainesville-Starke to cut the overhead travel via I-75 then to I-4; thus, US-301 was expected to experience large truck traffic volume. Approximately three hours of video data from 11:40:00 to 14:30:00 were collected and reduced, and the spreadsheets shown below cover only one hour of sample data from 11:40:00 to 12:40:00 for each intersection from Hwy 100 to Brownlee St. To fit the spreadsheets in the frame of this document, for each intersection, two portions of spreadsheets are shown, with each portion showcasing approximately 30 minutes of reduced data, adding up to one hour of sample data.

3.3.1.1 Intersection Reference Images – Gainesville-Starke

1. Intersection US-301 and Hwy 100: Refer to Figure A-47 and Figure A-48 in Appendix A.
2. Intersection of US-301 and Pratt St: Refer to Figure A-22 and Figure A-23 in Appendix A.
3. Intersection of US-301 and Washington St: Refer to Figure A-24 and Figure A-25 in Appendix A.
4. Intersection of US-301 and Brownlee St: Refer to Figure A-26 and Figure A-27 in Appendix A.

3.3.2 Tampa

The Tampa site was located close to the I-4 and I-75 interchange and was expected to incur a large amount of truck traffic. Three hours of video data from 10:30:00 to 13:30:00 were collected and reduced, and the spreadsheets shown cover one hour of sample data from 10:30:00 to 11:30:00 for each intersection. Since, the spreadsheets containing one hour of reduced data were too large to fit into the frame of this document, it was divided in two portions for each site.

3.3.2.1 Intersection Reference Images - Tampa

1. Intersection of US-301 and Breckenridge Pkwy: Refer to Figure A-28 and Figure A-29 in Appendix A.
2. Intersection of US-301 and Sligh Ave: Refer to Figure A-30 and Figure A-31 in Appendix A.
3. Intersection US-301 and Maislin Rd: Refer to Figure A-32 and Figure A-33 in Appendix A.
4. Intersection of US-301 and Harney Rd: Refer to Figure A-34 and Figure A-35 in Appendix A.

3.3.3 Jacksonville

With the presence of JAXPORT, the Jacksonville urban area was expected to experience a large volume of truck traffic. Three hours of video data from 11:40:00 to 14:40:00 were collected and reduced, and the spreadsheets shown cover one hour of sample data from 12:30:00 to 13:30:00 for each intersection on US-1 from Canal St to Moncrief Rd. For few intersections, one hour of reduced data were too large to fit into frame of this document; thus, it has been divided in two 30-minute portions.

3.3.3.1 Intersection Reference Images – Jacksonville

1. Intersection US-1 and Canal St: Please refer to Figure A-36 in Appendix A.
2. Intersection of US-1 and Fairfax St: Please refer to Figure A-37 and Figure A-38 in Appendix A.
3. Intersection of US-1 and Myrtle Ave: Please refer to Figure A-39 and Figure A-40 in Appendix A.
4. Intersection US-1 and Moncrief Rd: Please refer to Figure A-41 in Appendix A.

3.3.4 Miami

In Miami, Krome Ave (SR 997) was referred to the research team by the FDOT district freight coordinator as a major truck route and was expected to experience above 10% of truck traffic. Three hours of video data from 11:00:00 to 14:00:00 were collected and reduced, and the spreadsheets shown cover one hour of sample data from 11:00:00 to 12:00:00 for each intersection, from Palm Dr to S Flagler Ave.

After the analysis was run, it was determined that the truck percentage on this route varied between 3% and 6%. It should be noted that these data from the Miami site, together with the data collected and reduced from the other three sites, were sufficient to calibrate the micro simulation tool; this Miami site can be used as the lower truck percentage site (compared to the other three sites) to test alternative scenarios.

3.3.4.1 Intersection Reference Images - Miami

1. Intersection of Krome Ave and Palm Dr: Please refer to Figure A-42 in Appendix A.
2. Intersection of Krome Ave and David Pkwy: Please refer to Figure A-43 in Appendix A.
3. Intersection of Krome Ave and SW 328 St: Please refer to Figure A-44 in Appendix A.
4. Intersection of Krome Ave and Flagler Ave: Please refer to Figure A-45 in Appendix A.

4 Calibration of the Simulation Tool

4.1 Field Data Observations

This section explains how the field data reduction plan was conceptualized. Traffic operations analysis of an arterial corridor employs basic traffic measurement parameters that reflect the conditions of traffic operations. These parameters can also be set up as the output options for the simulation tool, except for the signal timing offset. To perform the calibration of the microsimulation tool, six traffic parameters were extracted from field video data for comparison with the simulation outputs. Of these six parameters, only the signal timing offset was an input to the simulation and not an output, as these signal timing offsets are fixed. These six parameters and how they were extracted from the field video data are explained below. These are empirical observations from the field and representative of the "ground truth."

4.1.1 Average Speed

To calculate average speed, the following parameters were extracted from the video data:

- *Entry timestamp*: Time at which a vehicle (truck or non-truck) crossed the stop bar of the first intersection approach during green time (or sometimes yellow and even red).
- *Exit timestamp*: Time at which the vehicle (truck or non-truck) noted previously during entry crossed the stop bar of last/fourth intersection of the arterial corridor during green time (or sometimes yellow and even red).

Calculation of traffic parameters:

- *Segment running time (time in seconds)*: Difference between the exit and entry timestamps, calculated to obtain the time taken by vehicles to cross the four signalized arterial intersections.
- *Segment length (distance in ft)*: Total distance between the stop bar of the first and fourth intersections.
- *Average speed per vehicle (speed in mi/h)*: Segment length over segment running time of each vehicle.
- *Overall average speed*: Average speed across all individual vehicle average speeds.

Additionally, only peak-hour data were filtered from the total data set of three hours to calculate the average speed. If time taken by vehicles to cross the four intersections was observed to be abnormally high, it was assumed to indicate that the vehicle may have stopped in the middle of the corridor (e.g., getting gas, food, etc.); such vehicles were excluded from the calculation, as they can skew the total average speed.

4.1.2 Average Stopped Delay

To calculate average stopped delay, the following parameters were extracted per cycle per lane (excluding left-turn-only lane) per intersection from the videos recorded during the field data collection task:

- *Vehicle stop timestamp*: Time at which a vehicle, truck, or non-truck comes to a complete stop at any intersection of the arterial corridor due to a red signal indication or while waiting for the queue in front to dissipate during a green signal indication.

- *Vehicle start timestamp*: Time at which the vehicle noted in vehicle stop timestamp starts moving again.

Calculation of traffic parameters:

- *Stopped delay per vehicle*: Difference between vehicle start and stop timestamps by truck and non-truck categories.
- *Overall average stopped delay*: Average of all per vehicle stopped delays.

Note: In the calculation of average delay, the cycle numbers are shown in n1/n2 format (e.g., ½), which means "from the start of cycle n1 to the very beginning of cycle n2." It is representative of the calculation done for the cycle n1.)

4.1.3 Average Queue Length

To calculate average queue length, the following parameters were extracted from the video data:

- *Queue length per cycle per intersection (in units of vehicles)*: Number of vehicles waiting at the intersection due to a red signal indication per red phase per lane.

Calculation of traffic parameters:

- *Overall average queue length per cycle*: Average of queue lengths of all lanes per cycle for an intersection.

Additionally, the length of vehicles and inter-vehicle spacing can affect the length of a queue (in distance units) given the same number of vehicles in the queue; thus, such imbalances were also noted.

Note: In the calculation of average queue length, the cycle numbers are shown in n1/n2 format (e.g., 1/2), which means "from the start of cycle n1 to the very beginning of cycle n2." It is representative of the calculation done for the cycle n1.

4.1.4 Saturation Flow Rate

According to the study "Impact of Trucks on Signalized Intersection Capacity" (Washburn and Cruz-Casas, 2010), queues with a minimum length of six vehicles were filtered and used to extract headway from the first four vehicles as startup lost time, and the remaining vehicle headway was used as saturation headway. The following are the equations for saturation headway (h_{sat}), startup lost time (*SLT*), and saturation flow rate (s), where T_i is the time it takes for the front axle of vehicle i in the queue to cross the stop bar post green signal indication on the intersection, i ranges from 6–10 vehicles, depending upon the observed queue length:

$$h_{sat} = \frac{(T_i - T_4)}{i - 4} \tag{19}$$

$$SLT = T_4 - 4h_{sat} \tag{20}$$

$$s = \frac{3{,}600}{h_{sat}} \tag{21}$$

According to the above equations, the following parameters were extracted from the videos for queues greater than or equal to six vehicles:

- *Fourth vehicle cross time*: Time at which front axle of the 4th vehicle waiting in a queue at an intersection crosses the stop bar.
- *ith vehicle cross time*: Time at which front axle of the *i*th vehicle waiting in a queue at an intersection crosses the stop bar.
- *Green time*: Time duration of green signal indication per green cycle.

Calculation of traffic parameters:

- T_4: Difference between fourth vehicle cross time and the time at which green indication starts.
- T_i: Difference between *i*th vehicle cross time and green time.
- h_{sat}: Saturation headway, as calculated per Eq. 19
- *SLT*: Start up lost time, as calculated per Eq. 20
- *s*: Saturation flow rate, as calculated per Eq. 21

4.1.5 Stop Rate

According to the HCM (TRB, 2016), "through stop rate" is the stop rate of vehicles that enter and exit the segment as through vehicles. "Stop rate" is defined as the average number of full stops per vehicle, and a full stop occurs when a vehicle slows down to zero (or a crawl speed if in a queue) due to signal control. For an overflow queue, if the vehicle took more than one cycle to cross the intersection, then more than one stops would be counted towards stops for that vehicle.

The through stop rate at a signalized boundary intersection is computed by using Eq. 22 (Eq. 18-11 HCM):

$$h = 3600\left[\frac{N_f}{min\left(1, \frac{v_{th}C}{N_{th}s\ g}\right) g\ s} + \frac{N_{th}Q_{2+3}}{v_{th}\ C}\right] \tag{22}$$

Where,

h = full stop rate (stops/veh)

N_f = number of fully stopped vehicles (veh/ln)

g = effective green time (s)

s = saturation flow rate (vh/h/ln)

N_{th} = number of through lanes (shared or exclusive) (ln)

Q_{2+3} = back-of-queue size (veh/ln).

The first term of Eq. 22 considers the proportion of vehicles stopped once by the signal, and the second term represents the additional stops that may occur during cycle failure conditions (overflow of queue). Assuming, in field conditions, that overflow has not been observed and considering only the first component, the following parameters were extracted from the video data:

- *Number of fully-stopped vehicles per cycle*: Number of vehicles per cycle per lane that stopped at an intersection due to signal being red or while waiting for queue in front to dissipate at green.

Calculation of traffic parameters:

- *% of arrivals on red*: Total number of vehicles that stopped per red-to-red cycle over total vehicles that crossed the intersection during the same cycle.
- *% of arrivals on green*: Total number of vehicles that arrived per red-to-red cycle over total vehicles that crossed the intersection during the same cycle.
- *Stop rate*: Total number of vehicles that stopped per red-to-red cycle over total vehicles that crossed the intersection during the same cycle.

4.1.6 Signal Timing Offset

Signal timing offset is an input parameter and was set according to the values observed from the field and was coded in the simulation tool.

The research team had signal timing sheets, but also confirmed the data with video observations. Also, signal timing was observed to be relatively consistent during the observation period; thus, in cases of actuated control, an accurate approximation could also be reached with pre-timed operation for simplicity and simulation run time efficiency. The following parameters were extracted from the video data for all intersections:

- *Green start time per intersection*: Time at which the signal turns green at an intersection.

Calculation of traffic parameters (between int. 1 and 2, int. 2 and 3, and int. 3 and 4):

- *Relative offset of green start for intersection i+1 relative to intersection i*: Difference between green start time of i^{th} intersection and next green start time of $i+1^{th}$ intersection.
- *Average offset among intersection*: Average of relative offset per intersection-pair of all cycles.

4.1.7 Special Cases

Case 1: When a vehicle arrives at the signal during a red phase, it gets behind the queue waiting at the intersection stop bar, and the following parameters were noted from the video data for this vehicle along with its type:

- *Vehicle stop timestamp*: Time at which a vehicle, truck, or non-truck comes to a complete stop at any intersection of the arterial corridor during a red phase.
- *Vehicle start timestamp*: Time at which the vehicle noted in the above bullet starts moving again. This vehicle was counted as a stopped vehicle for the stop rate, which is the average number of full stops per vehicle at red phase but not counted in the queue for the queue length, which is the average number of vehicles waiting at the intersection due to a red signal indication per red phase per lane.

Case 2: When a vehicle arrives at a green phase, it may or may not slow down and get behind the queue waiting at the intersection stop bar.

Case 2.1: If a vehicle is halted behind a queue that is discharging at an intersection, the following parameters were noted from the video data for this vehicle along with its type:

- *Vehicle stop timestamp*: Time at which a vehicle, truck, or non-truck comes to a complete stop at any intersection of the arterial corridor during a green phase while waiting for the queue to dissipate.

- *Vehicle start timestamp*: Time at which the vehicle noted in the above bullet starts moving again. This vehicle was counted as a stopped vehicle for the stop rate, which is the average number of full stops per vehicle at red phase but not counted in the queue for the queue length, which is the average number of vehicles waiting on the intersection due to a red signal indication, per red phase per lane.

Case 2.2: If a vehicle does not come to a complete stop or if it only slows down to crawl speed behind a queue that is discharging at an intersection, the following parameters will be noted from the videos per cycle for this vehicle along with its type:

- *Delay*: Zero delay were noted against such vehicle.
- Vehicle not counted towards stop rate, which is the average number of full stops per vehicle at red phase.
- Vehicle not counted towards the queue length, which is the average number of vehicles waiting on the intersection due to a red signal indication, per red phase per lane.

4.2 Reduced Data per Site

Field video data collected from four arterial corridors of Florida, as listed in Table 3, were reduced using the methodology explained in Section 3 to obtain the six traffic parameters (average speed, average delay, average queue length, saturation flow rate, stop rate, and signal timing offset) to be used for the microsimulation tool calibration. In the following subsections, tables developed from the video data reduction are shown for each arterial corridor. Each subsection of arterial corridor further depicts six subsections for these six traffic parameters.

Table 3. Field Data Collection Locations and Sites

#	City	Roadway
1	Tampa	US-301
2	Miami	Krome Ave (SR 997)
3	Gainesville-Starke	US-301
4	Jacksonville	US-1

For further details on these four corridors and their geometry, refer to Section 3.

Video data were reduced to obtain six traffic parameters—average speed, average delay, queue length, saturation flow rate, stop rate, and signal offset. Table 4 lists the results obtained from manually reducing the traffic data for each of the parameters. It also notes the peak time when this data was obtained for each of the sites.

Table 4 Summary of Data Reduction

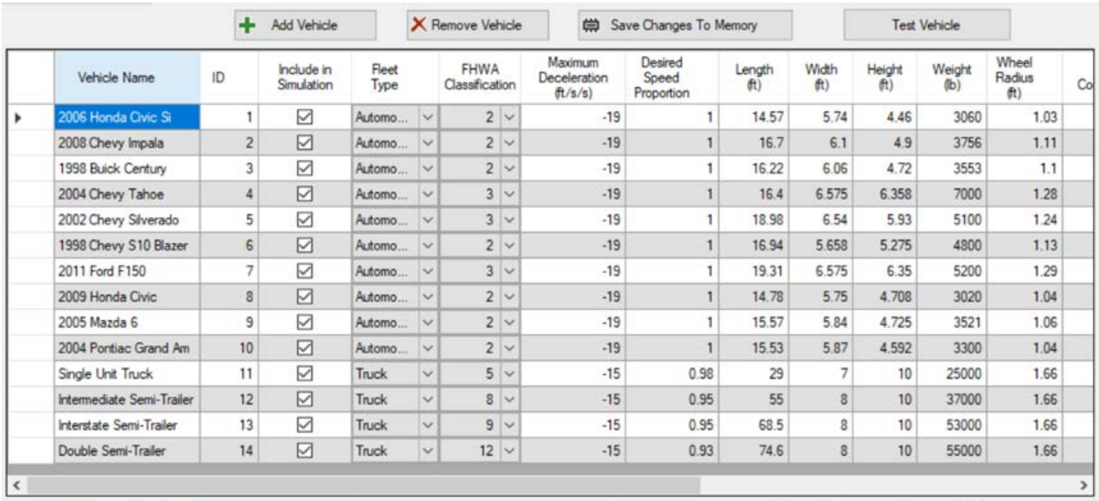
		Tampa	**Miami**	**Gainesville-Starke**	**Jacksonville**
Posted Speed (mi/h)		50	30	30	45
Average Speed (mi/h)		38.9	24.2	24.9	47
	Reference	Figures B-1 - B-2	Figure B-32	Figures B-63 - B-68	Figures B-85 - B-90
Average Delay (sec)	Int #1	6	65	15	17
	Int #2	8	24	2	10
	Int #3	8	29	2	4
	Int #4	19	19	6	3
	Reference	Figures B-3 - B-16	Figures B-33 - B-48	Figures B-69 - B-80	Figures B 91 - B-104
Queue Length (veh/h)	Int #1	3	2	7	6
	Int #2	1	4	3	6
	Int #3	2	6	3	3
	Int #4	3	4	4	1
	Reference	Figures B-17 – B-21	Figures B-49 – B-53	Figure B-81	Figures B-105 – B-106
Saturation Flow Rate (veh/h/ln)	Int #1	1,481	NA	1,207	1,341
	Int #2	NA	1,429	1,244	1,614
	Int #3	NA	1,625	NA	1,580
	Int #4	1,573	1,309	1,200	1,610
	Reference	Figure B-22	Figures B-54 – B-56	Figure B-82	Figures B-107 - B-108
Stop Rate (%)	Int #1	16	24	44	42
	Int #2	9	33	17	48
	Int #3	24	40	13	30
	Int #4	37	36	23	11
	Reference	Figures B-23 – B-29	Figures B-57 - B 61	Figure B-83	Figure B-109
Signal Offset (s)	Int #1 - Int #2	61	89	55	45
	Int #2 - Int #3	42	62	30	66
	Int #3 - Int #4	91	47	30	17
	Reference	Figures B-30 - B 31	Figure B-62	Figure B-84	Figure B-110
Time Period		10:30AM–11:30AM	1PM - 2PM	1PM - 2PM	1PM - 2PM

4.3 Simulation Tool

SwashSim is a microsimulation tool used for the analysis of traffic operations that enables users to create traffic networks and input traffic data to conduct simulation experiments. It has been successfully used in a previous FDOT research study regarding the impacts of commercial heavy vehicles in the traffic stream and also a recent NCHRP project related to two-lane highways. Initially, it was developed using CORSIM's underlying algorithms for vehicle movement logic; however, many enhancements have been made to those algorithms over the last several years of development. One of these enhancements includes an advanced vehicle dynamics model that is capable of modeling drivetrain characteristics and resistance forces in greater detail and consequently provide more accurate estimates of vehicle acceleration. Furthermore, SwashSim has the potential for many more modeling capabilities due to its state-of-the-art software architecture. Figure 6 shows the start screen of SwashSim.

Figure 6. Start screen of SwashSim traffic simulation program

Any number of vehicles can be added in SwashSim, as shown in Figure 7 and 8, with detailed vehicle characteristics, which enables a detailed vehicle dynamics and fuel consumption/emission model. Each vehicle needs detailed configuration settings for its engine, transmission, driver type, and desired speed. Acceleration value for each vehicle is calculated using the Modified-Pitt car-following model, which is based on the rule of desired following headway. This model inputs various parameters such as speed and acceleration of lead vehicle, speed of trailing vehicle, relative position of lead and trail vehicles, and desired headway. In addition, the model uses a sensitivity parameter, k, which adjusts acceleration changes for vehicles moving in a platoon.



Vehicle Name	ID	Include in Simulation	Fleet Type	FHWA Classification	Maximum Deceleration (ft/s/s)	Desired Speed Proportion	Length (ft)	Width (ft)	Height (ft)	Weight (lb)	Wheel Radius (ft)	Co
2006 Honda Civic Si	1	☑	Automo...	2	-19	1	14.57	5.74	4.46	3060	1.03	
2008 Chevy Impala	2	☑	Automo...	2	-19	1	16.7	6.1	4.9	3756	1.11	
1998 Buick Century	3	☑	Automo...	2	-19	1	16.22	6.06	4.72	3553	1.1	
2004 Chevy Tahoe	4	☑	Automo...	3	-19	1	16.4	6.575	6.358	7000	1.28	
2002 Chevy Silverado	5	☑	Automo...	3	-19	1	18.98	6.54	5.93	5100	1.24	
1998 Chevy S10 Blazer	6	☑	Automo...	2	-19	1	16.94	5.658	5.275	4800	1.13	
2011 Ford F150	7	☑	Automo...	3	-19	1	19.31	6.575	6.35	5200	1.29	
2009 Honda Civic	8	☑	Automo...	2	-19	1	14.78	5.75	4.708	3020	1.04	
2005 Mazda 6	9	☑	Automo...	2	-19	1	15.57	5.84	4.725	3521	1.06	
2004 Pontiac Grand Am	10	☑	Automo...	2	-19	1	15.53	5.87	4.592	3300	1.04	
Single Unit Truck	11	☑	Truck	5	-15	0.98	29	7	10	25000	1.66	
Intermediate Semi-Trailer	12	☑	Truck	8	-15	0.95	55	8	10	37000	1.66	
Interstate Semi-Trailer	13	☑	Truck	9	-15	0.95	68.5	8	10	53000	1.66	
Double Semi-Trailer	14	☑	Truck	12	-15	0.93	74.6	8	10	55000	1.66	

Figure 7. Basic info of vehicle types

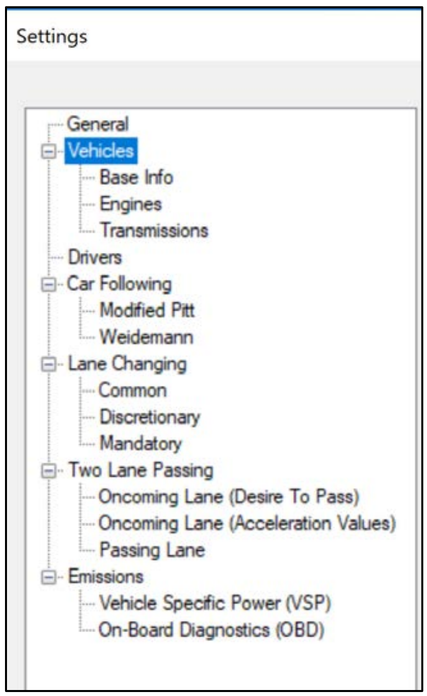


Figure 8. Detailed configuration settings allowed on SwashSim

Figure 9 depicts the engine power/torque as well as transmission characteristics windows in SwashSim.

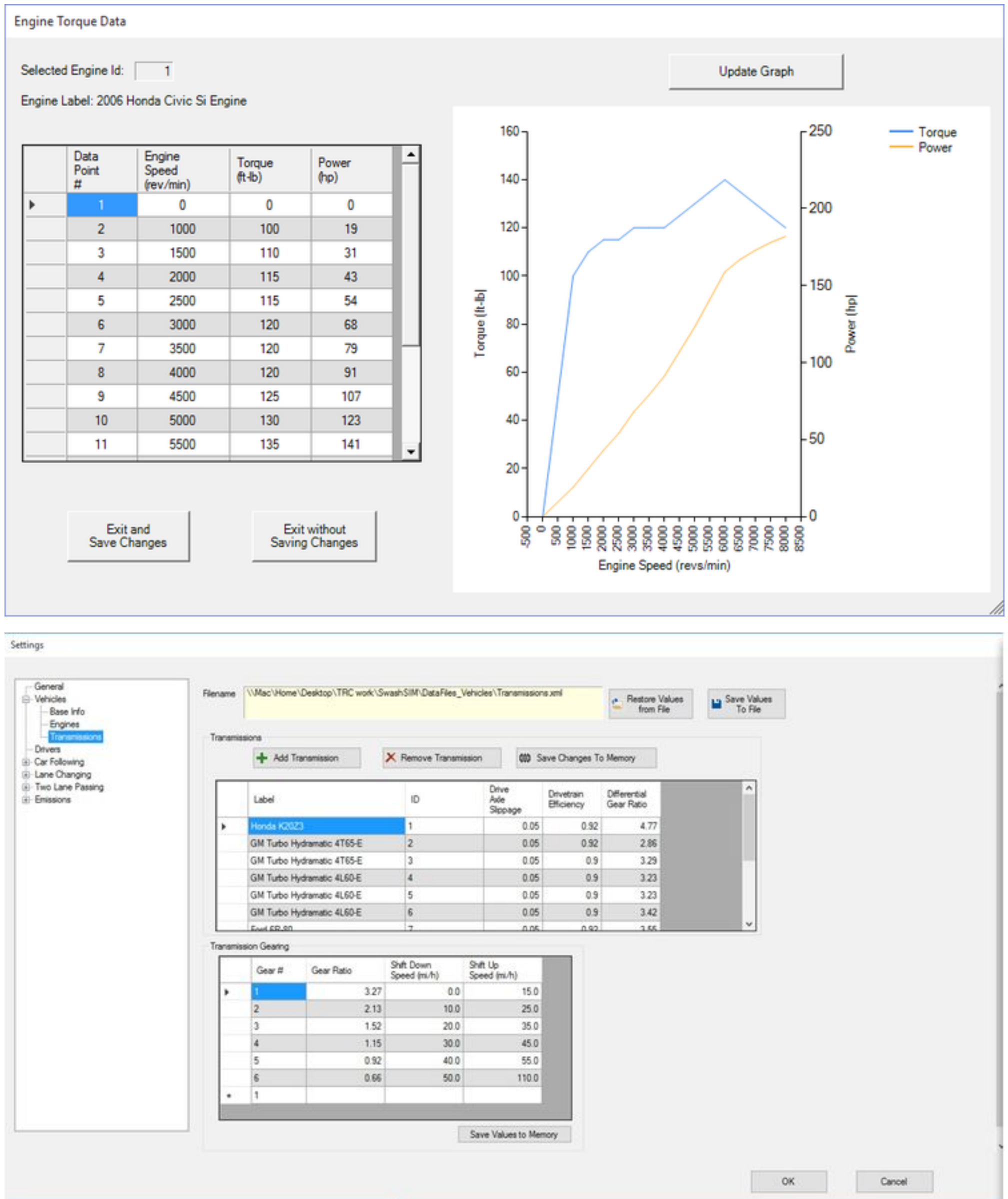


Figure 9. Engine power/torque and transmission characteristics

Please refer to https://swashsim.miraheze.org/ for further details about SwashSim.

4.4 Microsimulation Tool Calibration

In this section, stages of calibration are discussed, from the network creation of arterial corridors to the input parameters set for SwashSim simulation experiments.

4.4.1 Networks

Four networks representing the four arterial corridors of Florida chosen for analysis were developed in the simulation tool, as shown in following subsections. The arterial corridor for the four sites was coded in the simulator and details of the reference images are as below.

Tampa: Situated on US-301 from Breckenridge Pkwy to Harney Rd is shown in Figure B-111 through Figure B-115 in Appendix B.

Miami: Situated on Krome Ave from Palm Dr to S Flagler Ave is shown in Figure B-116 through Figure B-120 in Appendix B.

Starke: Situated on US-301 from Highway 100 to West Brownlee St is shown in Figure 121 through Figure B-125 in Appendix B.

Jacksonville: Situated on US-1 from N Canal St to Moncrief Rd is shown in Figure B-126 through Figure B-130 in Appendix B.

4.4.2 Calibration Process

After the arterial roadway geometry was coded into the simulator, the calibration process consisted of the following:

- Input the field traffic characteristics (flow rates, vehicle type distribution) in accordance with the field observations.
- Input the signal control characteristics (phasing, green times, cycle lengths, coordination parameters) in accordance with the field observations.
- Adjust vehicle characteristics (e.g., weight), driver characteristics (e.g., aggressiveness distribution), and vehicle-movement model parameters (e.g., stop gap, desired acceleration) were adjusted to obtain an overall reasonable match between the simulation and field traffic stream performance measurements. This parameter adjustment process was done manually, as automated calibration algorithms are still very susceptible to unrealistic settings for interacting effects (e.g., individual parameter settings might fall within the range of plausible values, but for parameters that have interacting effects, the "calibrated" individual settings might be feasible in isolation, but the settings in combination may be infeasible (e.g., driver type percentages biased toward more aggressive end of spectrum, but desired acceleration values biased toward lower end of spectrum). A manual calibration process is often more laborious than an automated one, but the probability of all parameter values getting set to realistic/feasible values is generally higher at this time. The other thing to note is that it is unrealistic to expect a "perfect" match between the simulation results and field data for any given performance measure, let alone across multiple performance measures. Multiple performance measures were considered in this calibration effort, with the goal of getting reasonably good agreement across all the measures. However, as expected, there are a handful of instances where the percentage error difference is larger than desired, but these cases are the exception rather than the norm.

Five major traffic parameters—average speed, average delay, queue length, saturation flow rate and stop rate —reduced from field video data, as discussed in Section 3, were used to finalize the simulation calibration. The following subsections show these comparisons in table format. Along with the tables, the simulation results are represented graphically, one for every corridor, representing the variance in saturation flow rate when the percentage of heavy vehicles in the queues change (represented as the percentage of the number of vehicles present in the queues at any instance). The histograms shown represent the frequency of vehicles and trucks at particular average speeds and queues.

4.4.2.1 Tampa

Table 5 summarizes the calibration results obtained for the arterial corridor in Tampa and shows a comparison to the field data. Considering there are five different variables that are calibrated for, the results obtained from the calibration is reasonable and satisfy the reasonable comparison between the field conditions and its representation by the microsimulation tool.

Table 5. Comparison of Calibration Results with Actual Field Data for Tampa

Traffic Measure	**Field Data Reduction Results**				**Calibration Results**			
	Inter-section 1	**Inter-section 2**	**Inter-section 3**	**Inter-section 4**	**Inter-section 1**	**Inter-section 2**	**Inter-section 3**	**Inter-section 4**
Average Speed (mi/h)	38.92				Refer to Figure 11			
Average Stopped Delay (s/veh)	6	8	8	19	5	7	7	16
Average Queue Length (veh)	3	1	2	3	3	2	2	3
Saturation Flow Rate (veh/h/ln)	1481	NA	NA	1,573	Refer to Figure 10			
Stop Rate (units)	16 %	9 %	24 %	37 %	26 %	18 %	24 %	50 %

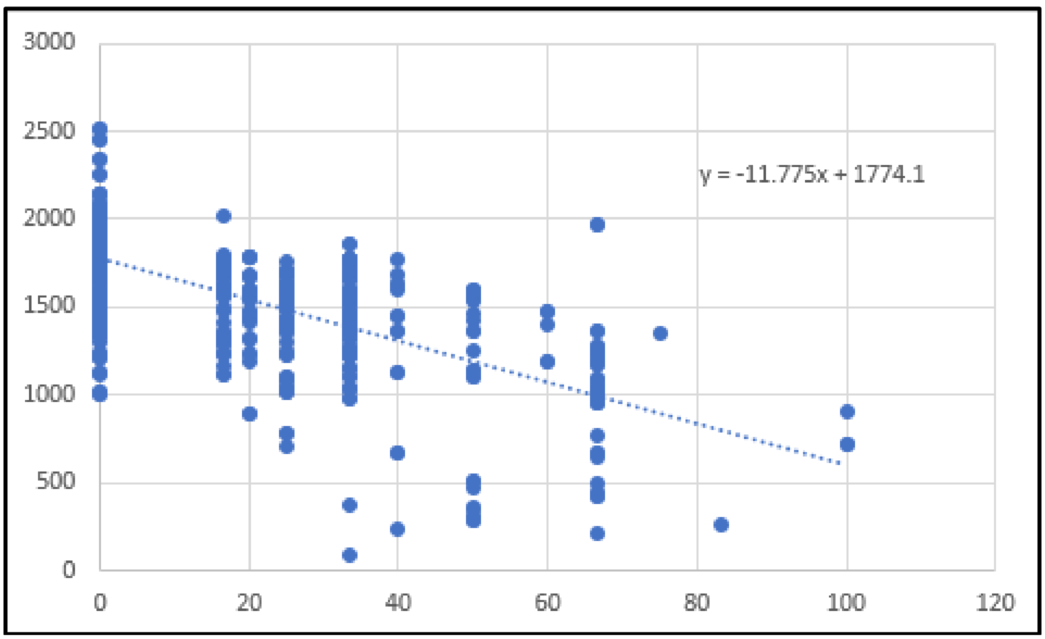


Figure 10. Saturation flow rate vs. percentage of heavy vehicles, Tampa

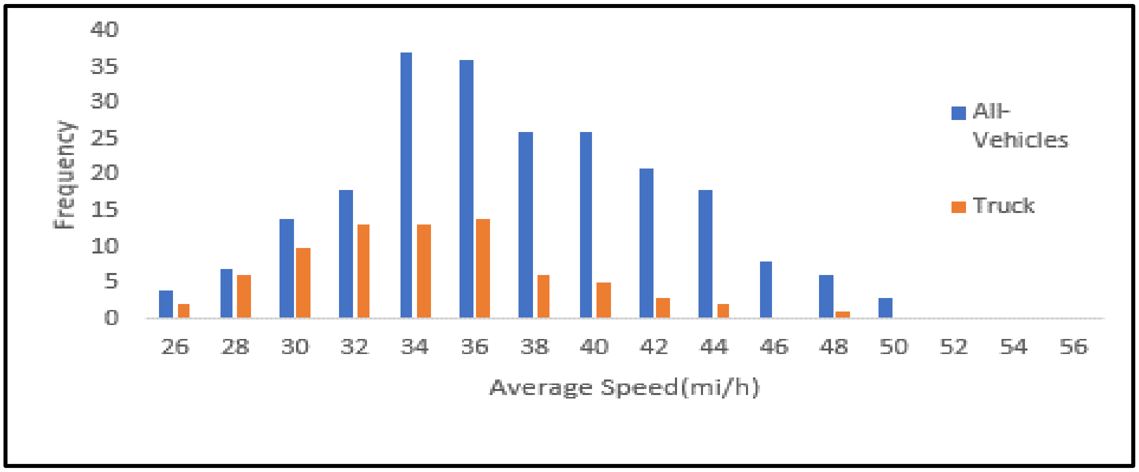


Figure 11. Average speed frequencies, Tampa

4.4.2.2 Miami

Table 6 summarizes the calibration results obtained for the arterial corridor in Miami and shows a comparison to the field data. Considering there are five different variables that are calibrated for, the results obtained from the calibration is reasonable and satisfy the reasonable comparison between the field conditions and its representation by the microsimulation tool.

Table 6. Comparison of Calibration Results with Actual Field Data for Miami

Traffic Measure	**Field Data Reduction Results**				**Calibration Results**			
	Inter-section 1	**Inter-section 2**	**Inter-section 3**	**Inter-section 4**	**Inter-section 1**	**Inter-section 2**	**Inter-section 3**	**Inter-section 4**
Average Speed (mi/h)	24.4				Refer to Figure 13			
Average Stopped Delay (s/veh)	65	24	29	19	59	26	25	17
Average Queue Length (veh)	2	4	6	4	4	3	5	3
Saturation Flow Rate (veh/h/ln)	N/A	1429	1625	1309	Refer to Figure 12			
Stop Rate (units)	24	33	40	36	25	38	46	42

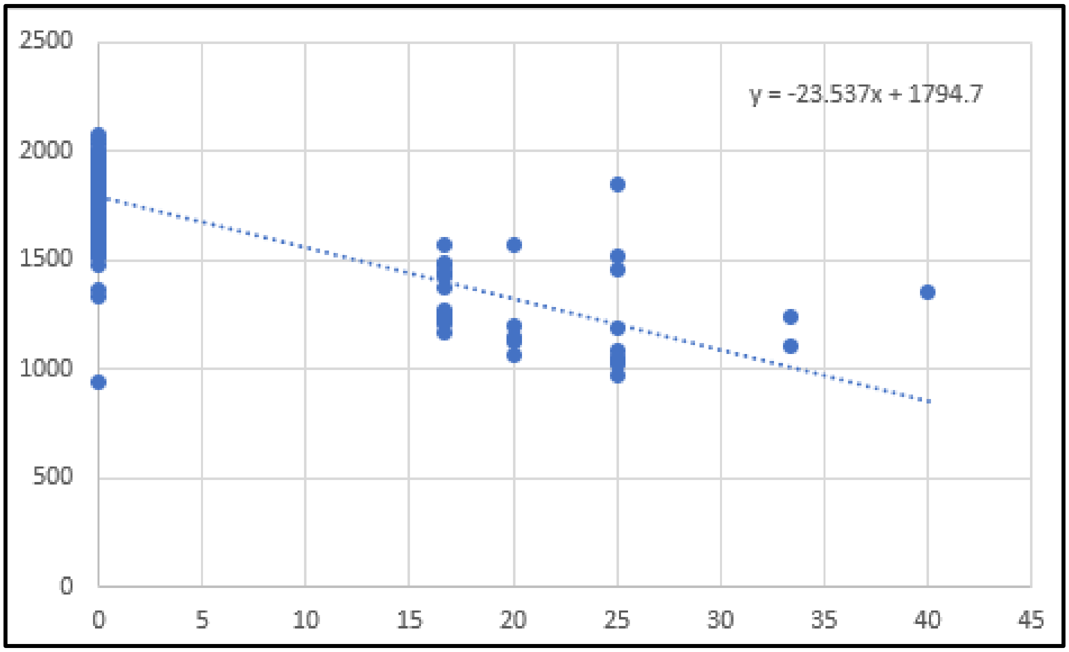


Figure 12. Saturation flow rate vs. percentage of heavy vehicles, Miami

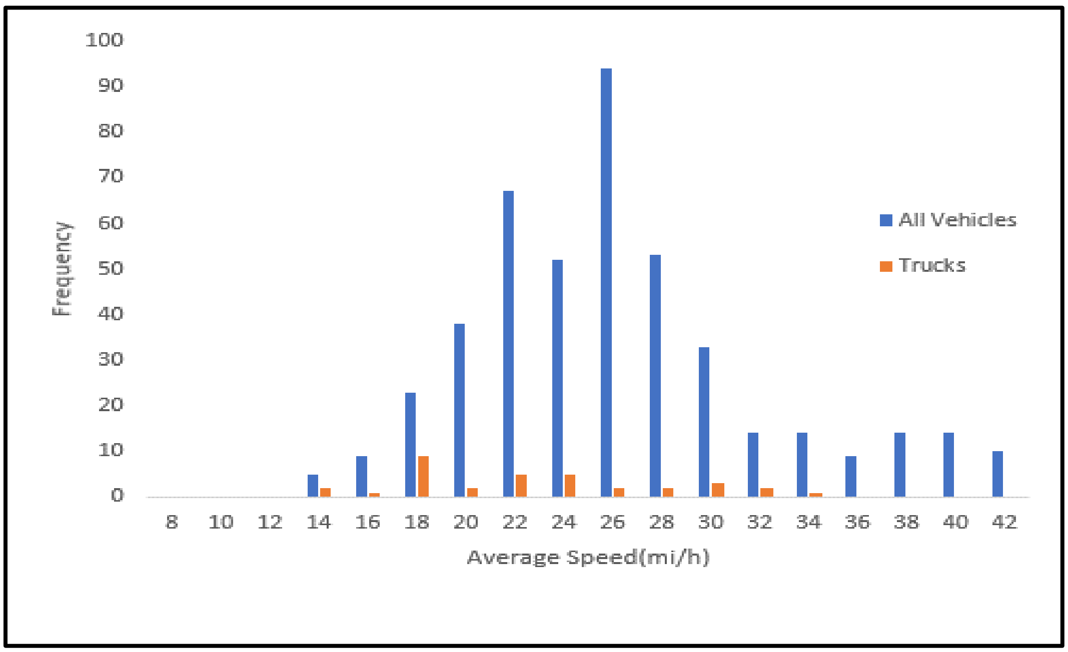


Figure 13. Average speed frequencies, Miami

4.4.2.3 Gainesville-Starke

Table 7 summarizes the calibration results obtained for the arterial corridor in Gainesville-Starke and shows a comparison to the field data. Considering there are five different variables that are calibrated for, the results obtained from the calibration is reasonable and satisfy the reasonable comparison between the field conditions and its representation by the microsimulation tool.

Table 7. Comparison of Calibration Results with Actual Field Data for Gainesville-Starke

Traffic Measure	Field Data Reduction Results				Calibration Results			
	Inter-section 1	**Inter-section 2**	**Inter-section 3**	**Inter-section 4**	**Inter-section 1**	**Inter-section 2**	**Inter-section 3**	**Inter-section 4**
Average Speed (mi/h)	24.9				Refer to Figure 16			
Average Stopped Delay (s/veh)	15	2	2	6	28	5	7	14
Average Queue Length (veh)	7	3	3	4	7	1	2	4
Saturation Flow Rate (veh/h/ln)	1207	1244	N/A	1200	Refer to Figures 14 and 15			
Stop Rate (units)	44 %	17 %	13 %	23 %	47%	15%	11%	24%

Note: Field delay at some intersections are underestimated because queue frequently extended beyond camera field of view.

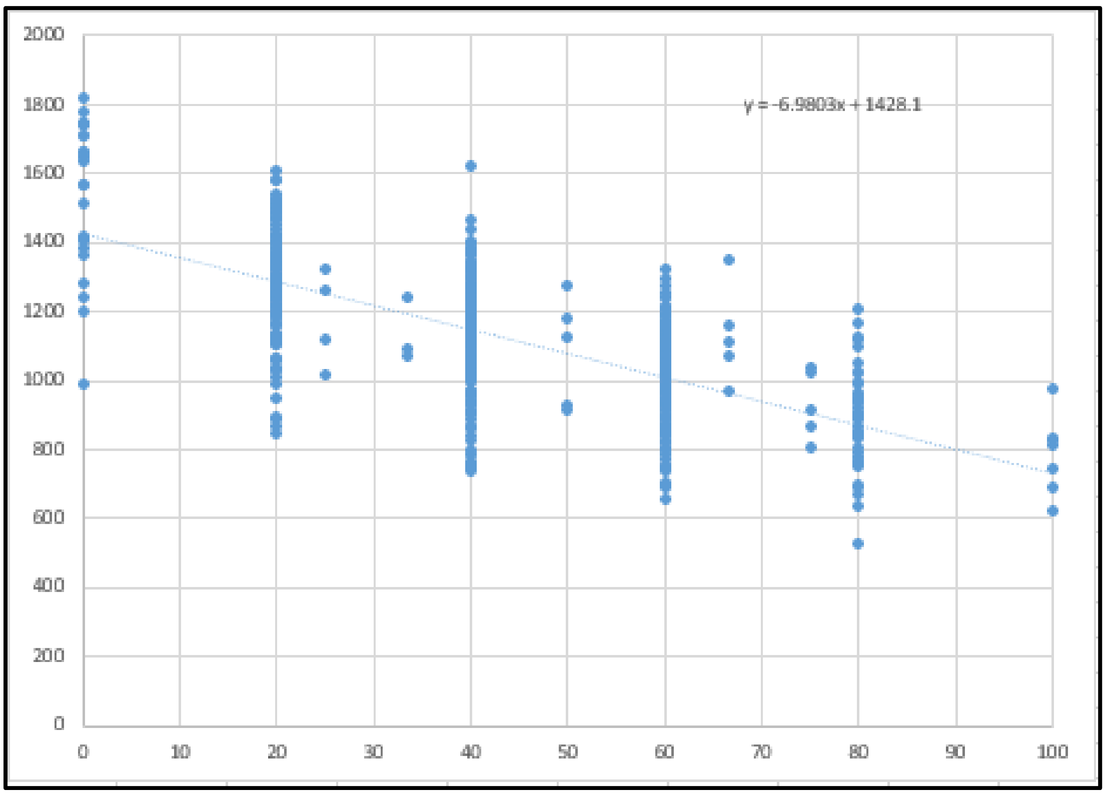


Figure 14. Saturation flow rate vs. percentage of heavy vehicles, Starke (upgrade direction)

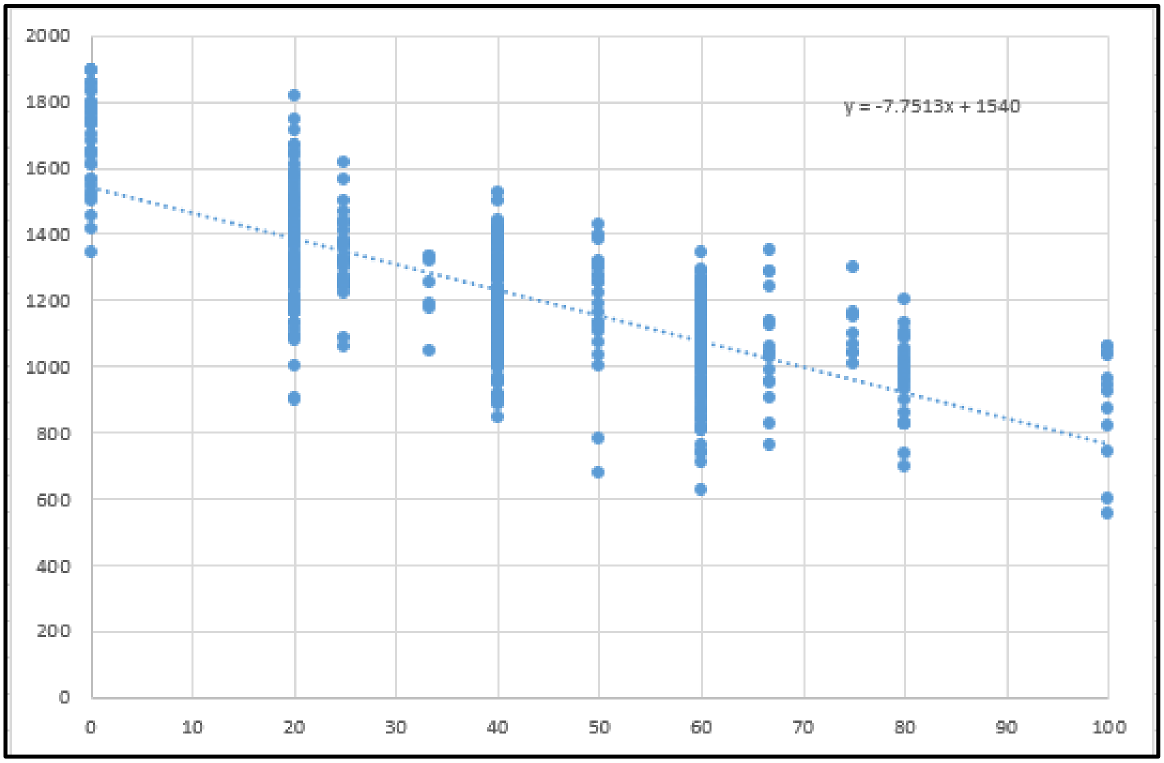


Figure 15. Saturation flow rate vs. percentage of heavy vehicles, Starke (level grade)

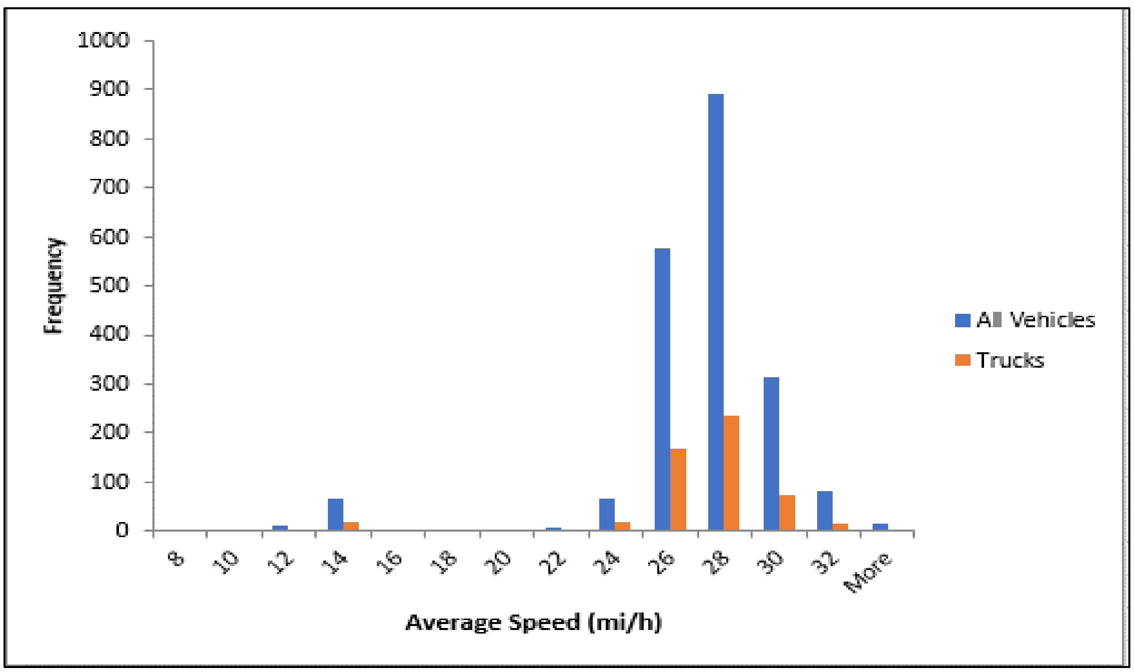


Figure 16. Average speed frequencies, Starke

4.4.2.4 Jacksonville

Table 8 summarizes the calibration results obtained for the arterial corridor in Jacksonville and shows a comparison to the field data. Considering there are five different variables that are calibrated for, the results obtained from the calibration is reasonable and satisfy the reasonable comparison between the field conditions and its representation by the microsimulation tool.

Table 8. Comparison of Calibration Results with Actual Field Data for Jacksonville

Traffic Measure	**Field Data Reduction Results**				**Calibration Results**			
	Inter-section 1	**Inter-section 2**	**Inter-section 3**	**Inter-section 4**	**Inter-section 1**	**Inter-section 2**	**Inter-section 3**	**Inter-section 4**
Average Speed (mi/h)	47				Please refer to Figure 17			
Average Stopped Delay (s/veh)	17	10	4	3	28	10	5	5
Average Queue Length (veh)	6	6	3	1	5	2	1	1
Saturation Flow Rate (veh/h/ln)	1341	1614	1580	1610	Please refer to Figure 18			
Stop Rate (units)	42%	48%	30%	11%	56%	25%	11%	14%

Note: Field delay at some intersections are underestimated because queue frequently extended beyond camera field of view.

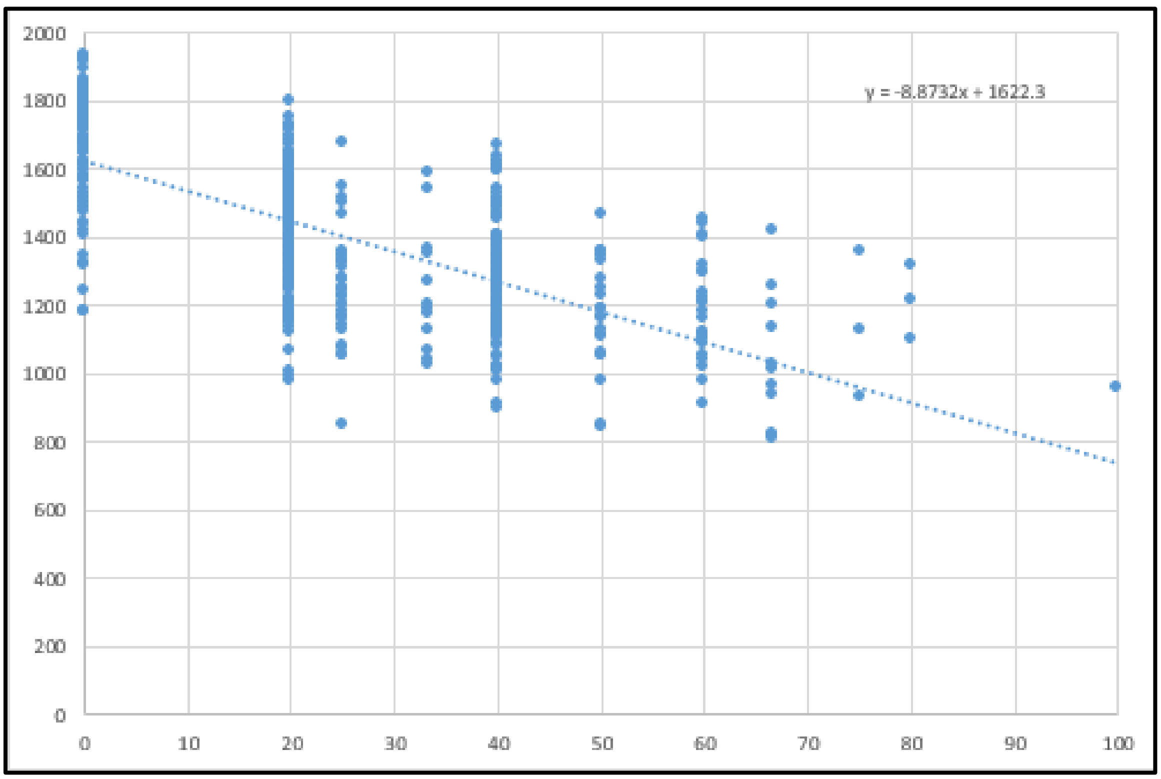


Figure 17. Saturation flow rate vs. percentage of heavy vehicles, Jacksonville

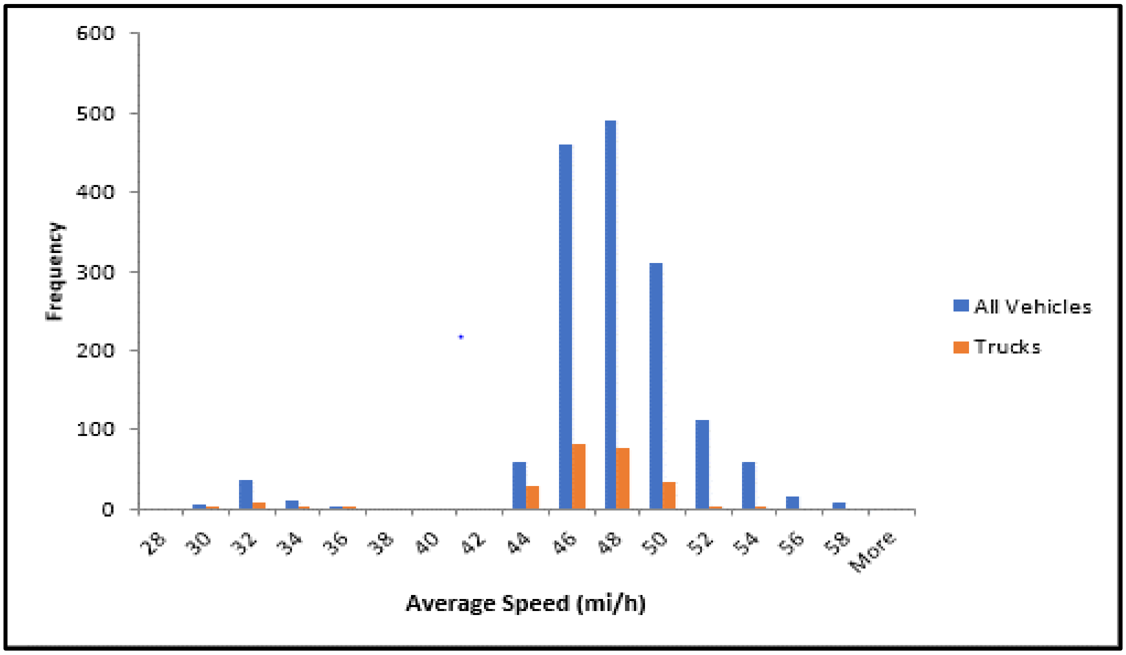


Figure 18. Average speed frequencies, Jacksonville

4.5 Calibration Results Summary

Tables 5 through 8 summarize the calibration results obtained for the four arterial corridors and show a comparison to the field data. The calibration effort performed in this study represents a five-dimensional calibration, where average speed, average stopped delay, average queue length, saturation flow rate, and stop rate were calibrated simultaneously to replicate the field conditions as best as possible. As noted, unlike one-dimensional calibration, this five-dimensional calibration effort is highly complex and time consuming, especially if a large percentage of trucks is being dealt with, which this study looked into.

Of these calibration results, for the purposes of this study, the most important aspects were the average travel speed and the saturation flow rate, which are replicated in simulation accurately, compared to the field data. The average speed results from simulation are provided in Figure 11, Figure 13, Figure 16, and Figure 18 in histogram format to depict the range and variability for passenger cars and commercial trucks. The saturation flow rate graphs obtained from simulation are indicative of the expected saturation flow rate decrease as the number of trucks in a queue at an arterial intersection increases, and therefore, the corresponding regression models as shown in Figures 10, 12, 14, 15, and 17 were found to replicate field-like conditions.

4.6 Development of Simulation Experiments

To lay the foundation for the next steps in this project, simulation experiments were conducted so that a wide range of traffic parameters could be considered to provide the necessary realism of commercial vehicle movement on arterial corridors to analyze the HCM (TRB, 2016) Urban Streets Methodology for improvements and benefits to Florida through better corridor planning using the results of this study.

4.6.1 New Sites Consideration and Methodology

This section explains how the experimental design scenarios were conceptualized, starting with the selection of Florida representative sites.

4.6.1.1 Florida Representative Site Selection

To select Florida representative conditions for experimental design, lists of sites were obtained through recommendations from FDOT freight coordinators for their respective Districts with signalized arterial corridors having four consecutive intersections and approximately 10% truck volume. Some examples of such sites provided by District 6 are as listed in Table 9.

Table 9. FDOT District 6 Representative Sites Used for Experimental Design Consideration

#	RDWYID	Local Name	BMP	From	EMP	To	Access Class	2016 AADT	T%
1	87150000	KROME AVE/ SW 177 AVE	0.793	SW 344 ST	1.810	SW 328 ST/ SE 8 ST	06	13400	10.90
	87150000	KROME AVE/ SW 177 AVE	1.810	SW 328 ST/ SE 8 ST	2.813	SW 312 ST/ NE 8 ST	06	19200	10.90
2	87150000	KROME AVE/ SW 177 AVE	3.827	SW 296 ST	7.879	SW 232 ST	02	16000	10.90
	87150000	KROME AVE/ SW 177 AVE	7.879	SW 232 ST	10.896	SW 184 ST	02	18300	10.80
3	87027000	NW 72 AVE	2.795	NW 31 ST	3.259	NW 58 ST	05	33500	11.00
	87027000	NW 72 AVE	4.423	NW 58 ST	5.406	NW 74 ST	05	16800	9.80
4	87053001	SW 1 ST	0.780	NW 17 AVE	1.726	NW 8 AVE	07	13000	10.00
5	87060001	HARDING AVE	0	72 ST	2.132	96 ST	07	27000	9.10
6	87090000	OKEECHOBEE RD	10.132	NW 79 AVE	11.55	W 12 AVE/ NW 74 ST	04	63000	10.60
7	87120001	SE/SW 7 ST	0	SW 4 AVE	0.625	BRICKELL AVE	07	9000	9.10

Where,

RDWYID: Roadway Identification Number

BMP: Roadway Beginning Milepost

EMP: Roadway Ending Milepost

AADT: Annual Average Daily Traffic Volume (two way)

T%: Percentage of Trucks

Other sites provided by other FDOT Districts for consideration did not come in the tabular format sent by FDOT District 6 as shown in Table 9; however, their site information was obtained through aerials, etc. These sites are as follows:

1. Heckscher Dr – Blount Blvd to August Dr (from JAXPORT's Blount Island Marine Terminal to cruise terminal at Dames Point Marine Terminal)
2. US-301 in Starke, FL
3. US-41 (50th St) south of I-4 to Madison St
4. US-301 south of Busch Blvd to I-4

   US-41B (Causeway Blvd) south of I-4 to 78th St

5. Jacksonville
    - US-1 from N Myrtle Ave to Division St
    - US-1 from Soutel Dr to W 45th St
    - US-90 from Myrtle Ave N to Robinson Ave
    - US-90 from Robinson Ave to McDuff Ave S

All earlier tasks targeted the use of these sites to infer the corridors for the purpose of microsimulation tool calibration. In this task, the intent is to create hypothetical scenarios where all these sites were considered as Florida representative sites along with additional sites, researched to be located near logistics activity centers (LACs) such as seaports, intermodal yards, distribution centers, etc. These sites were used to analyze the Florida corridors and derive the experimental design scenarios that would be representative of varied field conditions in Florida.

To keep the focus of the study aligned with its objective, arterial intersections were expected to meet certain criteria in accordance with the selection criteria used for calibrated sites, as discussed in Section 3.1.1 and highlighted below:

- Intersections
    - Four-legged intersections with turning radii as close to 90 degrees as possible preferred
    - External factors such as curbside parking or bus stops avoided, as they may have an effect on the saturation flow rate significantly
- Segments/Links
    - “Stop” or “Yield” signs not present on the link
    - Level terrain preferred, with the acceptance of minor grades
    - Railway crossings were avoided to alleviate their possible impact on the operations of the corridors selected

4.6.1.1.1 Florida Traffic Online

To explore more sites in Florida that complied with the above characteristics, a web-based mapping application (Florida Traffic Online, https://tdaappsprod.dot.state.fl.us/fto/) from FDOT that provides traffic count site locations and historical traffic count data was used. This map, as depicted in Figure 19, helped in identifying new sites that were considered for developing the experimental scenarios.

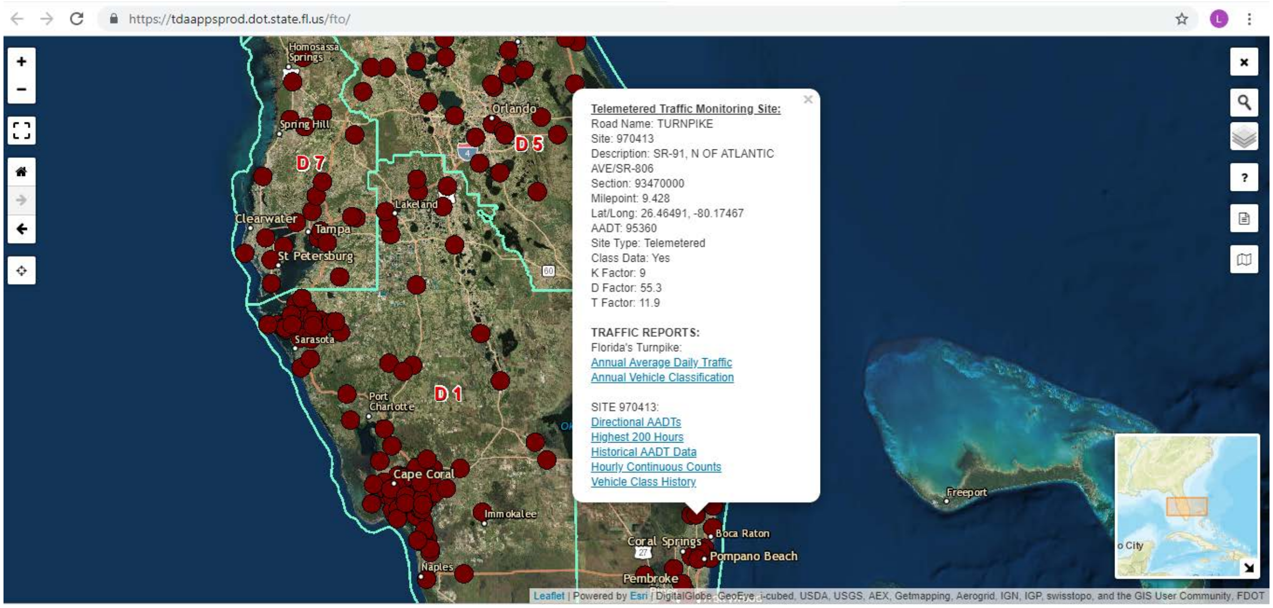


Figure 19. Florida Traffic Online sample screen shot

4.6.1.1.2 Sample Sites Considered Through Florida Traffic Online

Using the Florida traffic online tool to determine sites with truck percentage of 10% or higher as well as the lists of sites obtained through recommendations from FDOT freight coordinators, reviews on Google Earth were performed. This effort was undertaken to visually determine the geometries, posted speed limits, segment/corridor lengths as well as to ensure that intersections did not contain any stop/yield signs.

Some sample sites considered are depicted below for visualization purposes.

__Figure 20. Causeway Blvd & S 78th St__

Figure 21. NW 17 Ave and Miami Gardens Dr

Figure 22. Palm River Rd and MLK Jr Blvd

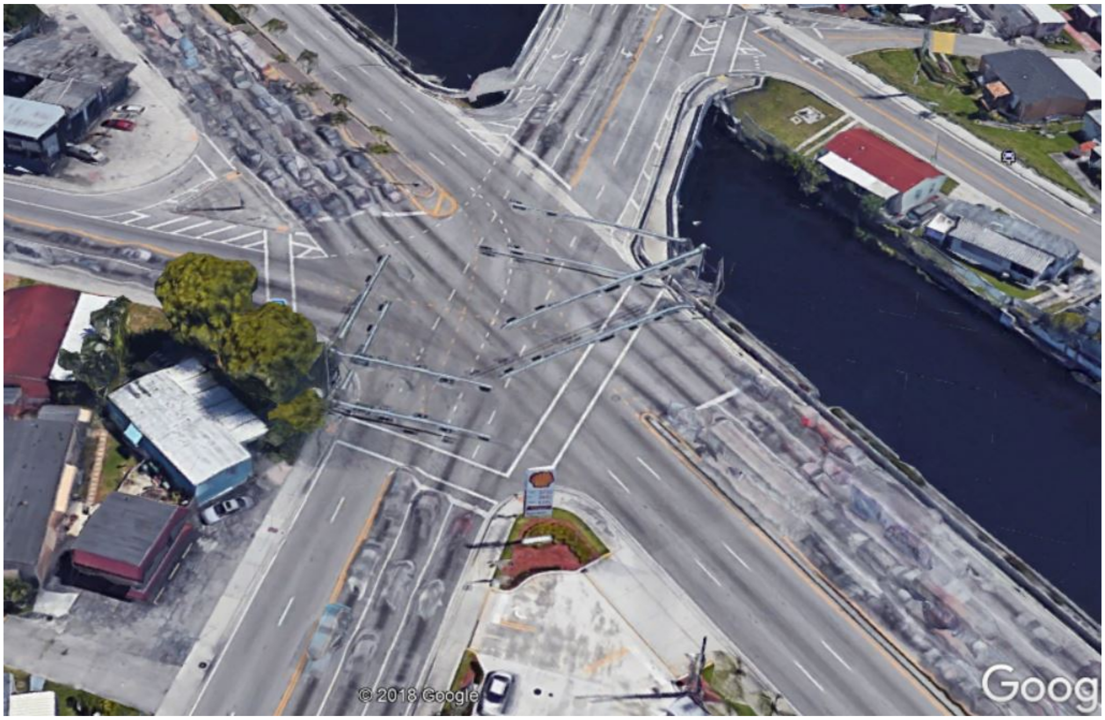


Figure 23. W Okeechobee Rd & NW 72nd Ave

Figure 24. E Adamo Dr and Palm River Rd

4.6.2 Experimental Design Scenarios

4.6.2.1 Proposed Scenarios

The primary goal of this task was to develop hypothetical Florida representative signalized arterial experimental design scenarios for microsimulation, which considers a wide variety of factors for traffic, roadway, and control characteristics.

To develop this comprehensive list of experimental scenarios comprising representative Florida characteristics, the suggestions of the FDOT freight coordinators along with the research team's findings on additional sites found in close proximity to LACs such as seaports, intermodal yards, etc., were taken into account. These were analyzed with respect to the required characteristics being considered, as summarized below:

1. ***Traffic Characteristics –*** To accommodate Florida representative traffic conditions, differing combinations of traffic volumes in vehicles per hour per lane (veh/h/ln) (600, 800, 1,000 veh/h/ln) comprising different levels of truck percentages (0%, 6%, 12%, 18%) in the traffic stream and several differing levels of grade (0%, 2%, 4%) were considered.

2. ***Roadway Characteristics –*** Different combinations of Florida representative geometries and posted speed limits were considered, including various combinations of left-only, through-only, and right-only lanes along with possible shared lanes such as through-left and through-right (see Figure 39).

3. ***Control Characteristics*** – TEAPAC software was used to check some of the calculation results from HCM-CALC software. The list of proposed experimental design scenarios was then sent for review to the FDOT freight coordinators, and after incorporating the review comments, a final consideration list was compiled, as depicted in Figure 25.

Experimental Design Scenarios

No of Left Lanes	No of Right Lanes	Shared Lane-Thru-Left	Shared Lane-Thru-Right	Shared Lane-Thru-LR	Total Number of Lanes	Posted Speed Limit (mi/h)	3-Segment Lengths (mi) to form a 4-signalized arterial corridor	Corridor Length (mi)	Traffic Volumes (veh/h/ln)	Truck Percentages (%)	Grade (%)
1	1	0	0	0	4	30	0.25-0.25-0.25	0.75	600, 800, 1000	0,6,12,18	0-2-4
1	1	0	0	0	5	40	0.50-0.75-0.50	1.75	600, 800, 1000	0,6,12,18	0-2-4
1	1	0	0	0	4	50	1.0-1.5-1.0	3.50	600, 800, 1000	0,6,12,18	0-2-4
1	0	0	1	0	4	30	0.50-0.75-0.50	1.75	600, 800, 1000	0,6,12,18	0-2-4
1	1	0	0	0	4	40	0.75-1.0-1.25	3.00	600, 800, 1000	0,6,12,18	0-2-4
2	0	0	0	0	5	30	0.25 -0.50-0.25	1.00	600, 800, 1000	0,6,12,18	0-2-4
1	1	0	0	0	4	30	0.25-0.50-0.75	1.50	600, 800, 1000	0,6,12,18	0-2-4
1	0	0	1	0	4	40	0.50-0.50-0.50	1.50	600, 800, 1000	0,6,12,18	0-2-4
2	1	0	0	0	5	40	1.0-1.0-1.0	3.00	600, 800, 1000	0,6,12,18	0-2-4
2	1	0	0	0	6	45	0.75-1.0-1.25	1.75	600, 800, 1000	0,6,12,18	0-2-4
2	1	0	0	0	5	50	1.5-2.0-2.5	6.00	600, 800, 1000	0,6,12,18	0-2-4

Green highlight depicts representative scenarios coded into simulation for analysis

Figure 25. Experimental design scenarios

Figure 25 depicted the 11 experimental design geometries, out of which five representative scenarios, as highlighted in green, will be used to compare against the HCM (TRB, 2016) results for similar field conditions. These geometries were further coded into simulation and the details of these geometries is summarized in the next section.

For each of the five Geometries, a range of roadway grades, traffic demands, and truck percentages were simulated. In all, 36 different combinations of these variables (3 × 3 × 4) were run for each geometry, as enumerated in Table 10.

Table 10. Enumeration of %Grade, %Trucks, and Traffic Demand Variables

Scenario #	% Grade	% Trucks	Volume (veh/lane)
1	0	0	600
2	0	6	600
3	0	12	600
4	0	18	600
5	0	0	800
6	0	6	800
7	0	12	800
8	0	18	800
9	0	0	1000
10	0	6	1000
11	0	12	1000
12	0	18	1000
13	2	0	600
14	2	6	600
15	2	12	600
16	2	18	600
17	2	0	800
18	2	6	800
19	2	12	800
20	2	18	800
21	2	0	1000
22	2	6	1000
23	2	12	1000
24	2	18	1000
25	4	0	600
26	4	6	600
27	4	12	600
28	4	18	600
29	4	0	800
30	4	6	800
31	4	12	800
32	4	18	800
33	4	0	1000
34	4	6	1000
35	4	12	1000
36	4	18	1000

In total, there were 180 simulation scenarios (36 × 5). Finally, 10 replications were performed for each of the 180 simulation scenarios. The Multi-Scenario Run capability of the simulator (Figure 26) was used to perform all of these simulation runs.

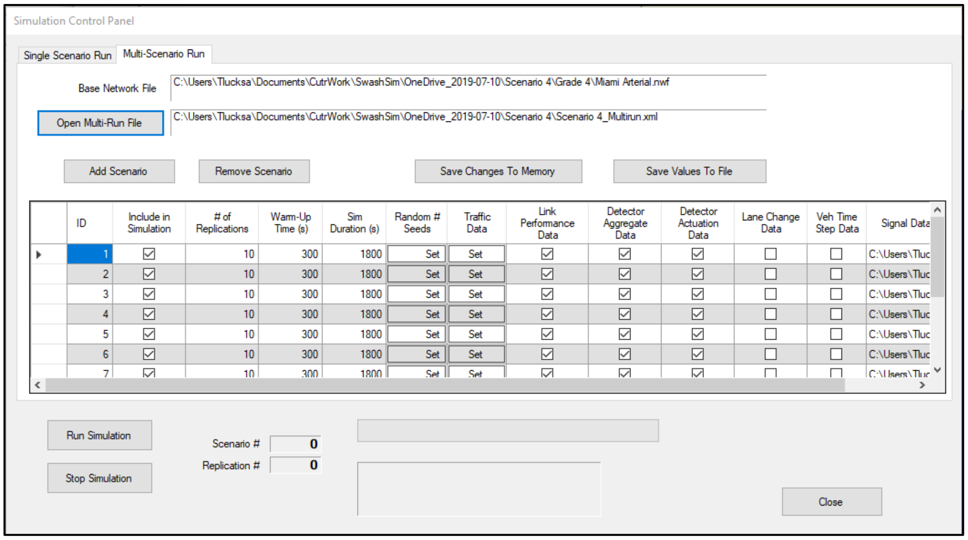


Figure 26. Simulation multi-scenario run configuration

4.6.3 Signal Timing Configuration

The next step after creating the multi-scenario run files was to appropriately optimize the signal timings per intersection per the roadway and traffic characteristics. SwashWare signal timing calculation software (user interface shown in Figure 27) was used for this purpose.

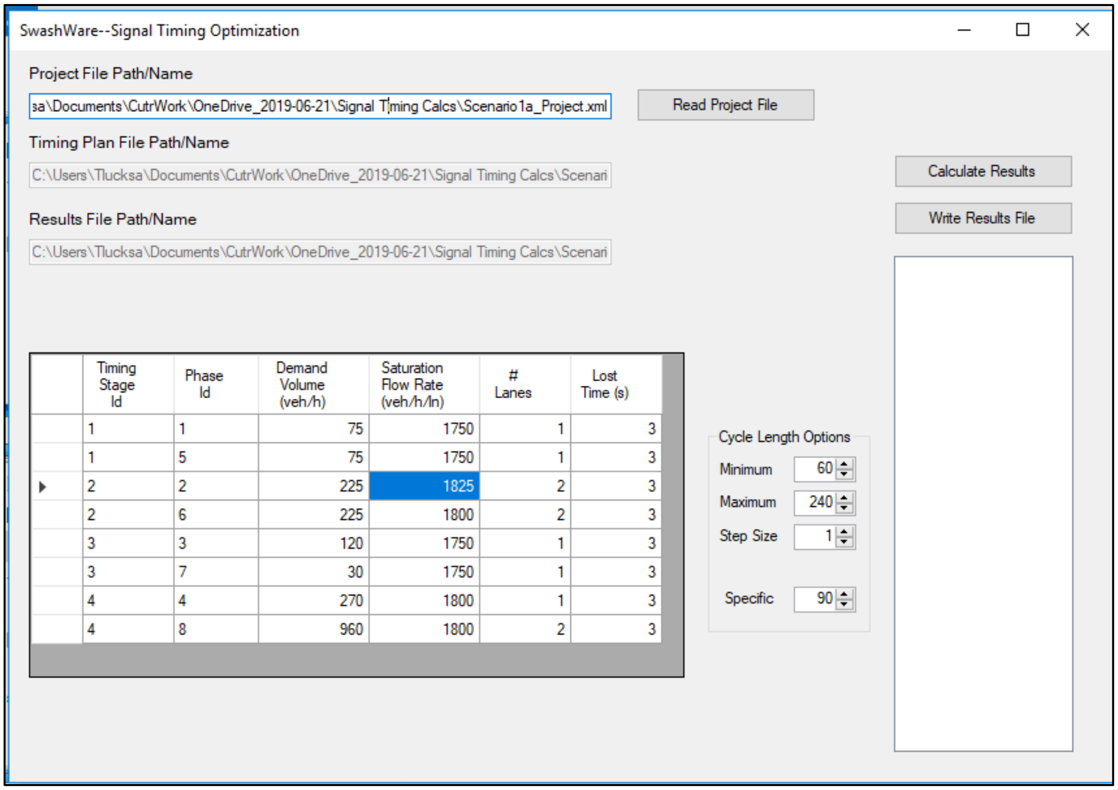


Figure 27.Signal timing calculation software

4.6.3.1 Representative Scenarios Coded into Simulation for Analysis

Of the 11 experimental design geometries highlighted in Figure 25 five were deemed representative for replicating Florida arterial corridor traffic conditions with approximately 10% of heavy vehicle traffic/volume. These geometries are highlighted in Figure 25 in green. Each will generate 36 scenarios with differing traffic volumes, truck percentages, and grades, as discussed in Section 4.6.2.1. The corresponding total scenarios will be 5 × 36 for a total of 180 scenarios for analysis purposes.

4.6.4 Simulation Tool Coding

The 5 representative geometries and 36 scenarios for each geometry were coded into SwashSim. The corresponding geometries and their respective specifications are further described in the next subsection.

Table 11 shows the roadway characteristics of each of the Geometries.

4.6.4.1 Geometry Characteristics

Geometry 1: The individual intersections are shown in Figure C-1 through Figure C-5 in Appendix C.

Geometry 2: The individual intersections are shown in Figure C-6 through Figure C-10 in Appendix C.

Geometry 3: The individual intersections are shown in Figure C-11 through Figure C-15 in Appendix C.

Geometry 4: The individual intersections are shown in Figure C-16 through Figure C-20 in Appendix C.

Geometry 5: The individual intersections are shown in Figure C-21 through Figure C-25 in Appendix C.

To summarize; each of the 5 geometries comprised 36 experimental scenarios for a total of 180 experimental scenarios.

5 Analysis of Simulation Data and Recommendations

5.1 Simulation Analysis Approach

5.1.1 Roadway and Traffic Characteristics

In the previous task, five geometric and posted speed scenarios (hereafter referred to as "Geometries) were coded into the simulator. These five Geometries provided good representation of the variety of Florida arterial corridor geometric configurations. The roadway characteristics used for the five Geometries are shown in Table 11. Roadway Characteristics.

Table 11. Roadway Characteristics

Geometry Configuration	1	2	3	4	5
Number of lanes	4	5	4	4	4
Lane combination	2 thru, 1 left, 1 right	3 thru, 1 left, 1 right	2 thru, 1 left, 1 right	2 thru, 1 left, 1 thru+right shared	2 thru, 1 left, 1 right
Posted speed (mi/h)	30	40	50	30	40
Distance between intersections (mi)					
1–2	0.25	0.50	1.00	0.50	0.75
2–3	0.25	0.75	1.50	0.75	1.00
3–4	0.25	0.50	1.00	0.50	1.25
Total distance (mi)	0.75	1.75	3.50	1.75	3.00

For each of the five Geometries, a range of roadway grades, traffic demands, and truck percentages were simulated. In all, 36 different combinations of these variables (3 × 3 × 4) were run for each geometry, as shown in Table 12.

Table 12. Grade and Traffic Characteristics

Variable	Levels
Roadway Grade (%)	0, 2, 4
Demand Volume (veh/h/ln)	600, 800, 1000
Trucks (%)	0, 6, 12, 18

5.2 Highway Capacity Manual Analysis Approach

This section summarizes the results obtained using the HCM (TRB, 2016) Urban Streets Methodology, which is located in Chapter 18.

5.2.1 Urban Street Facility Analysis Methodology

The three measures used for the comparisons were calculated using the following formulas from the HCM (TRB, 2016), as was also described in Section 2.1.2 of this report.

5.2.1.1 Segment Average Speed

The average speed of the through vehicles per segment was computed using Eq. 9 (as taken from Eq. 18-15 in the HCM) detailed in Section 2.1.2 of this report.

5.2.1.2 Running Time

Segment running time (t_R) is computed using various factors (start-up lost time, segment length, free-flow speed, etc.) that consider travel time at the free-flow speed and various sources of traffic friction along the segment that lead to increases in travel time. The other, and often more significant, source of delay for travel time on a segment is delay due to traffic control at an intersection (e.g., signal, stop sign, yield sign) is not included in this measure. The calculation for segment running time is given in Eq. 10 (Eq. 18-7 in HCM) as detailed in Section 2.1.2.

The first component of this equation considers start-up lost time, length of segment, and control-type adjustment factor (recently added in HCM (TRB, 2016), where the start-up lost time is fixed at 2.0 seconds for signalized intersections.

5.2.1.3 Saturation Flow Rates

The equations for saturation headway (h_{sat}), start-up lost time (SLT), and saturation flow rate (S), are as listed in Section 4.1.4, Eqs. 19-21.

5.2.2 HCM Coding

The 180 scenarios were coded into XML files for processing by HCM-CALC, a software tool developed by Dr. Scott Washburn. A sample input xml file is shown in Figure 28.

```
<?xml version="1.0"?>
<ArterialData xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/20
  <TotalInts>0</TotalInts>
  <TotalSegs>0</TotalSegs>
  <ArtName />
  <From />
  <To />
  <LengthMiles>0.75</LengthMiles>
  <AnalysisTravelDir>Northbound</AnalysisTravelDir>
  <Area>LargeUrbanized</Area>
  <Classification>1</Classification>
  <Kfactor>0</Kfactor>
  <Dfactor>0</Dfactor>
  <MaxSerVol>0</MaxSerVol>
  <Results>
  <Segments>
    <SegmentData ID="1">
      <Link ID="1">
      <Intersection ID="1">
      <Results>
    </SegmentData>
    <SegmentData ID="2">
      <Link ID="1">
      <Intersection ID="1">
      <Results>
    </SegmentData>
    <SegmentData ID="3">
      <Link ID="1">
        <LengthFt>1320</LengthFt>
        <AADT>6000</AADT>
```


Figure 28. HCM coding – sample input file

5.3 Results and Analysis

This section summarizes the measures considered for this research and the HCM vs. simulation results comparisons.

5.3.1 Measures Considered for this Project

As discussed previously, traffic operations analysis of an arterial corridor often considers one or more of the following traffic parameters:

1. Average Speed
2. Average Control/Stopped Delay
3. Average Queue Length
4. Stop Rate

Of these parameters, Average Speed is the one used for level of service (LOS) assessment with the urban streets analysis methodology. The latter three measures are typically used to assess the operating conditions of intersections, but control delay is used in the calculation of average segment speed. Saturation flow rate, while not a performance measure, *per se*, can significantly influence control delay, queue length, and stop rate.

Another significant factor affecting intersection performance measure values is the percentage of traffic arriving on the green signal indication (PVG).[1] In lieu of explicit calculation of the PVG value, an arrival

[1] The calculation for PVG in the HCM methodology uses a platoon dispersion model very similar to that employed in the TRANSYT-7F model and is currently not included in the HCM-CALC program. Implementing this capability is a major effort. Furthermore, the accuracy of this output from other software programs could not be verified. Thus, after discussion of this topic with the Project Manager, it was decided that explicit calculation of the PVG values was beyond the scope of this project.

type value of 5 was used in the HCM calculations. This value corresponds to “highly favorable” progression. The highest value of arrival type is 6, which corresponds to “exceptionally favorable.” The simulation runs used signal settings that generally produced “highly favorable” progression in the analysis direction. The final set of measures used to satisfy the scope of this project were:

1. Intersection Through Movement Saturation Flow Rate
2. Segment Running Time
3. Average Intersection Through Movement Control Delay
4. Segment Average Speed

The results obtained from the simulation multi-scenario runs as well as the HCM methodology are presented in this section.

5.3.2 Simulation and HCM Results Comparisons

This section discusses comparisons of the results obtained from simulation versus the HCM analysis methodology for each of the measurements calculated.

5.3.2.1 Saturation Flow Rate

The results obtained for saturation flow rates of each intersection are provided in Tables D-1 through D-5 in Appendix D for each Geometry, respectively. As expected, these results indicate that with both increasing grade and truck percentage, the saturation flow rate decreases, as would be expected.

For all saturation flow rate tables in this report, if there is a “NA” listed for an intersection, it means that queues greater than 7 were not observed at that intersection in the simulation results, so the saturation flow rate, per the HCM definition was not be calculated.

The saturation flow rates for the HCM are higher than those from simulation. This was expected, for reasons previously discussed (see references 2 and 3). Although the HCM has tried to address this issue to some extent with a new HCM (TRB, 2016) combined heavy vehicle-grade adjustment factor (f_{HVg}) for saturation flow rate, it still falls short of being sensitive enough to the impacts of higher percentages of commercial trucks in the traffic stream. A method to address this difference is discussed in Section 5.3.3.1.

5.3.2.2 Segment Running Time

Segment running time, in addition to control delay, is a major contributor to segment average speed. Tables D-6 through D-10 in Appendix D display the running times for each segment (Segment 2 running between Intersections 1 and 2, Segment 3, running between Intersections 2 and 3, and Segment 4 running between Intersections 3 and 4), for each geometry, respectively.

The running time values from Simulation indicate the total time for which the vehicles were in motion (i.e., excluding control delay) while traversing the three segments. The running times show an expected general trend of increasing as the truck percentage and percent grade increases.

The HCM running times in general were found to be lower (translating to higher running speeds) than those from simulation. Again, this was expected because the HCM running time calculation does not explicitly consider roadway grade nor truck percentage in the traffic stream, only overall traffic volume as shown in Equation 23 (Equation 18-6 in HCM). This equation accounts for the impact of segment traffic volume on running time. The need for further research on the impact of trucks on various models utilized in the HCM urban streets analysis methodology, such as running time, was specifically called out in the research that is the basis for the HCM methodology (Bonneson et al., 2008). A method to address this difference is discussed in Section 5.3.3.2.

$$f_v = \frac{2}{1 + \left(1 - \frac{v_m}{52.8 \times N_{th} \times S_f}\right)^{0.21}} \tag{23}$$

Where,

f_v= proximity adjustment factor

v_m = midsegment demand flow rate (veh/h)

N_{th} = number of through lanes on the segment in the subject direction of travel (ln)

S_f = free-flow speed (mi/h).

5.3.2.3 Control Delay

The results obtained for control delay of each intersection are provided in Tables D-11 through D-15 in Appendix D for each geometry, respectively. In the case of simulation, the obtained values of delay correspond to stopped delay, which does not consider deceleration and acceleration delay, as is the case for control delay. The stopped delay values were converted to control delay values by multiplying by the generally accepted adjustment of 1.3 (i.e., control delay is 30% larger than stopped delay). This was the approach used with the HCM when the stopped delay values in the 1985 HCM were revised to control delay values in the HCM 2000.

The control delay values, as expected, were generally found to increase as truck percentage and roadway grade increased. The control delay values obtained from the HCM methodology were observed to be lower than the values from simulation because the HCM overestimates segment speeds, as discussed in the following section. Therefore, the control delay values were found to be underestimated in the HCM methodology. It should be noted that the HCM (TRB, 2016) control delay calculations do not use the calculated percent vehicle arrivals on green (PVG), but rather an estimate based on “highly favorable” progression. Also, as discussed in Washburn and Cruz-Casas (2007 and 2010), start-up lost time and PCE values (replaced by f_{HV_g} factor in HCM (TRB, 2016) were found to be inadequate.

5.3.2.4 Segment Average Speed

Tables D-16 through D-20 in Appendix D display the average speed for each of the three analysis segments for each geometry, respectively. The average speeds obtained generally followed the expected trend of decreasing as truck percentage and roadway grade increases. It should be noted that the HCM (TRB, 2016) control delay calculations do not use the calculated percent vehicle arrivals on green (PVG), but rather an estimate based on “highly favorable” progression

The average speeds obtained via HCM follows a trend of being higher than those obtained from Simulation, which suggests that the HCM methodology overestimates average travel speed since it does not fully account for the full vehicle dynamics model to represent truck impacts on the traffic stream.

5.3.3 Regression Modeling and Recommended Adjustments to HCM Methodology

Based on the differences in results between Simulation and the HCM analysis methodology, as discussed in the previous subsection, two specific adjustment methods were developed which can be used to revise the HCM analysis methodology results to values that more accurately reflect traffic operations on Florida signalized arterials with high percentages of commercial trucks.

5.3.3.1 Saturation Flow Rate Adjustment

HCM Equation 19-8 gives the calculation for adjusted saturation flow rate (veh/h/ln), as shown in 2.1.1 in Eq. 1.

The other factors in Eq. 1 pertain to effects that were not considered in this project, such as parking activity, bicycle activity, lane utilization, lane blockage, etc.

Per this equation, S_o is the base saturation at 1,900 pc/h/ln flow rate for population >250,000, and 1,750 pc/h/ln otherwise, and it gets adjusted using the multitude of adjustment factors included in Equation 1. Since the results of this study showed that the HCM generally overestimates the saturation flow rate, a regression model was developed using the Simulation saturation flow rate results, to determine how this saturation flow rate is affected by percent grade, percentage of heavy vehicles and the presence of an exclusive right turn lane. This model is as follows.

$$s = 1{,}823 \times e^{(-0.011 \times \%HV)} - 16.13 \times \%Grade + 15.36 \times ExclusiveRightTurnLane? \qquad (24)$$

Where,

s = adjusted saturation flow rate (veh/h/ln)

%HV = percentage of heavy vehicles

%Grade = percentage of roadway grade

ExclusiveRightTurnLane? = presence of an exclusive right turn lane (equals to 1 if present, 0 otherwise)

The goodness-of-fit (R^2) for this model to the data is very good, at 0.928. The model parameters were statistically significant at the 95% confidence level. From this model, the base saturation flow rate is 1,823 pc/h/ln (no trucks at level grade with no exclusive right turn lane), as opposed to the HCM's suggested value of 1,900 pc/h/ln. The differences in the saturation flow rate results between HCM and Simulation is due to inappropriate values for start-up lost time and lack of sensitivity to lower truck acceleration capabilities, relative to passenger cars, which compounds the differences when high percentages of trucks are present in the traffic stream (Washburn and Cruz-Casas, 2007 and 2010). Example saturation flow rate values produced from this equation are illustrated in Figures 29 and 30.

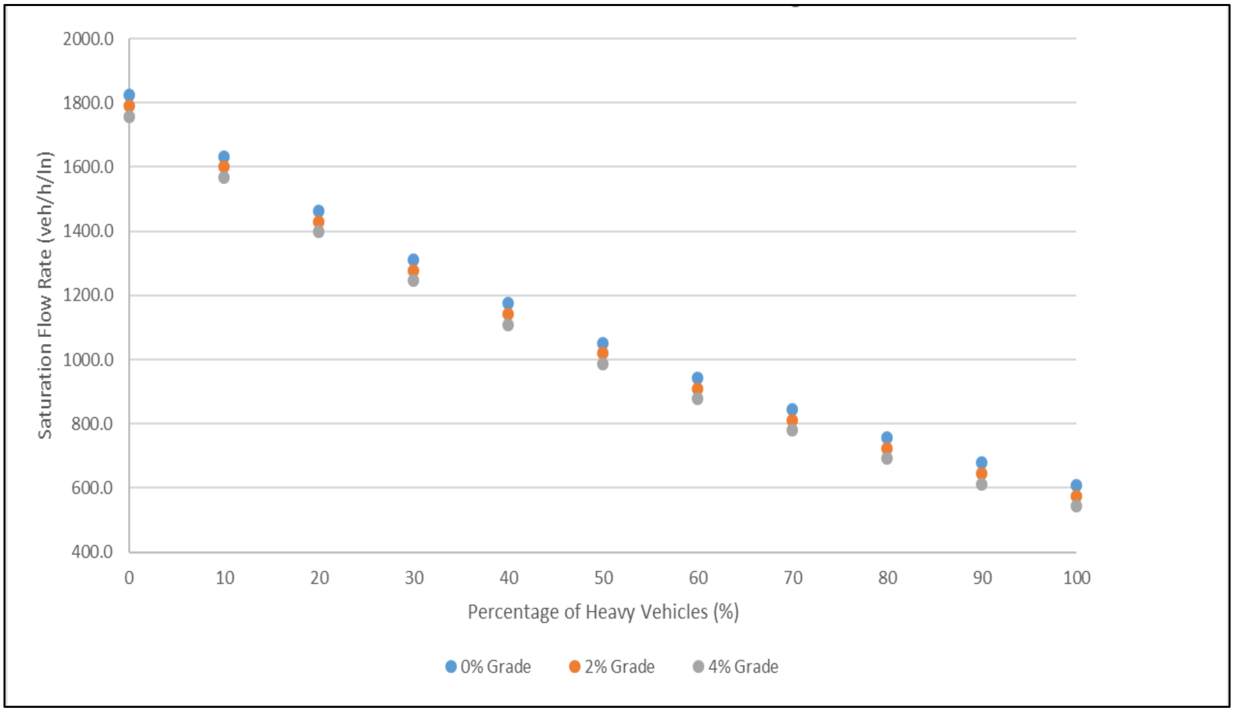


Figure 29. Saturation flow rate relationships per regression model – no exclusive right-turn lane

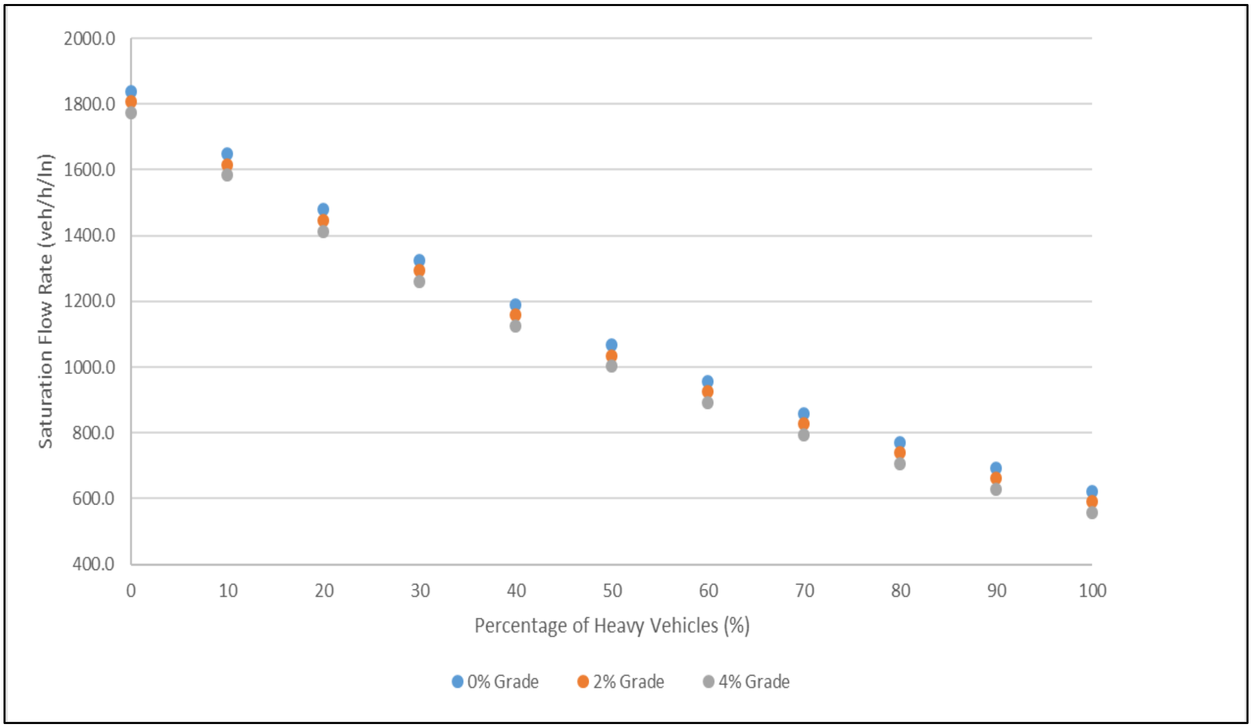


Figure 30. Saturation flow rate relationships per regression model –with an exclusive right-turn lane

Equation 24 can be used in two distinct ways to estimate adjusted saturation flow rate on Florida's signalized arterial corridors. One, it can directly replace the HCM Equation 19-8 (Equation 1 of this report) to calculate the adjusted saturation flow rate for Florida conditions.

Alternatively, using Equation 24, an adjusted base saturation flow rate for percent heavy vehicles and grade only could be generated to replace the "$s_o \times f_{HVg}$" component of the adjusted saturation flow rate. The variable, s_o^*, can then be used directly with the rest of the HCM Equation 19-8 (Equation 1 in this report) as shown in Equation 25.

$$s = s_0 * f_w f_p f_{bb} f_a f_{LU} f_{LT} f_{RT} f_{Lpb} f_{Rpb} f_{wz} f_{ms} f_{sp} \quad (25)$$

Where,

s_o^* = adjusted base saturation flow rate for percent heavy vehicles and grade only ($s_o \times f_{HVg}$).

5.3.3.2 Running Speed Adjustment

HCM Equation 18-3 gives the calculation for base free-flow speed, which together with Equation 18-4, are used in the calculation of free-flow speed. These are reproduced below as Equations 26 and 27, respectively.

$$S_{fo} = S_{calib} + S_o + f_{CS} + f_A + f_{pk} \quad (26)$$

Where,

S_{fo} = base free-flow speed (mi/h)

S_{calib} = base free-flow speed calibration factor, equal to 0 by default (mi/h)

S_O = speed constant (mi/h)

f_{CS} = adjustment for cross section (mi/h)

f_A = adjustment for access points (mi/h)

f_{pk} = adjustment of on-street parking (mi/h)

$$f_L = 1.02 - 4.7 \frac{S_{fo} - 19.5}{\max(Ls,\ 400)} \leq 1.0 \quad (27)$$

Where,

f_L = signal spacing adjustment factor

S_{fo} = base free-flow speed (mi/h)

L_s = distance between adjacent signalized intersections (ft).

This free flow speed, along with traffic volume per lane, is then used in the calculation of the proximity adjustment factor, f_v. Therefore, to take into account the running/free flow speed differences between HCM and Simulation results observed through this research, a model was developed to estimate the difference between the HCM and Simulation running speeds. This model was found to be a function of the percentage of heavy vehicles, the percent grade, and the signal spacing (stop-bar to stop-bar). This model is as follows:

$$\Delta RunningSpeed = 2.46 + 1.01 \times \%Grade + 0.17 \times \%HV - 2.55 \times SignalSpacing \quad (28)$$

Where,

$\Delta RunningSpeed$ = HCM running speed minus Simulation running speed (mi/h)

$\%Grade$ = percentage of roadway grade

$\%HV$ = percentage of heavy vehicles

$SignalSpacing$ = signal spacing (mi)

The goodness-of-fit (R^2) for this model to the data is good, at 0.754. The model parameters were statistically significant at a 95% confidence level. An example illustration of how $\Delta RunningSpeed$ is calculated is shown in Figure 31. In this graph, both the HCM and Simulation running speeds show decline as volume increases; however, their difference, $\Delta RunningSpeed$, increases as volume increases.

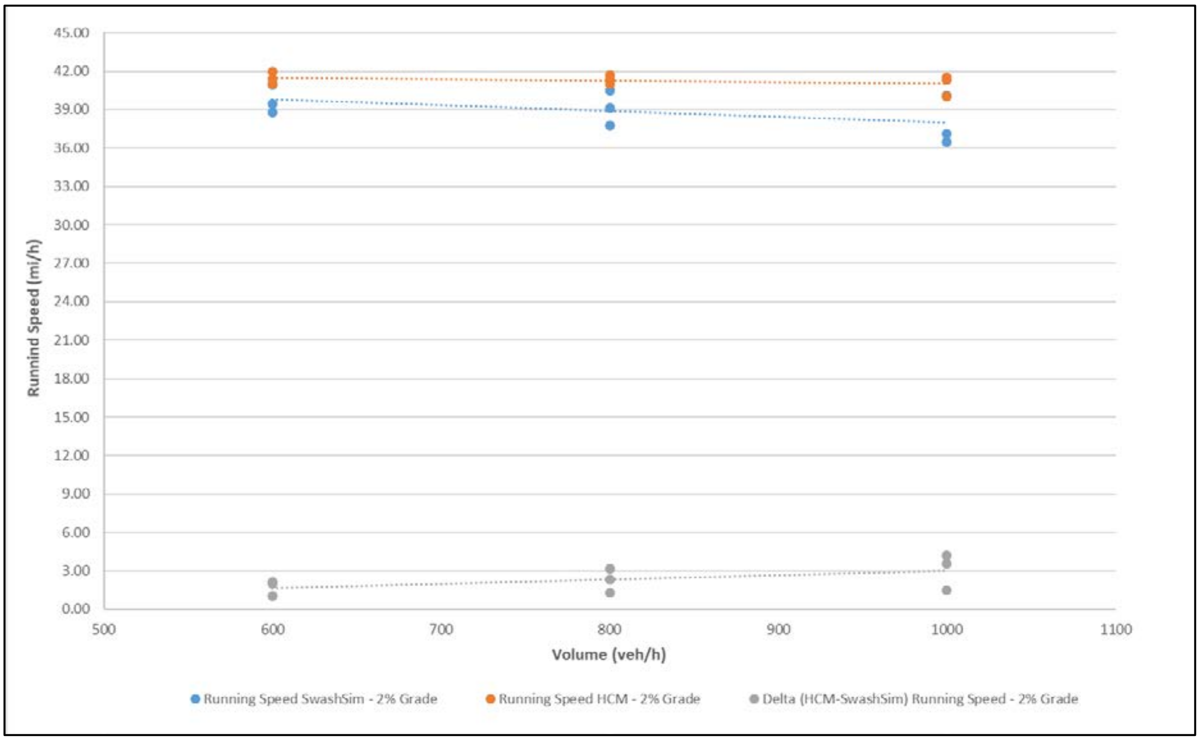


Figure 31. Sample running speed calculation using HCM and simulation running speed data

It should be noted that Equation 28 was developed using Florida signalized arterial corridor data, where very large grades (above 6%), very large percentage of trucks (over 50%), as well as very large signal spacing between signalized arterial intersections (over 3 mi/h) are not normally observed. That said, regardless of state, it is generally observed that places where truck percentages are high are not places with large grades combined with large signal spacing.

From the regression model above, it can be observed that with all variables being zero, HCM overestimates running time approximately 2.5 mi/h over Simulation. However, it should be noted that signal spacing will not have a value of zero. Therefore, to put this equation into perspective, at a level grade with no heavy vehicles, given a signal spacing of 0.25 miles, HCM overestimates running speed by

1.82 mi/h, an approximate 2 mi/h difference. As roadway grade and truck percentage increases, HCM increasingly overestimates the running/free flow speed compared to Simulation.

Therefore, to obtain more accurate average free flow speeds, it is recommended that Florida use Equation 28 to obtain the running speed differences between the HCM and Simulation, and using the S_{calib} adjustment factor as depicted in Equation 26, insert the "negative of *ΔRunningSpeed*" calculated in Equation 28 to determine the running speed.

Once this is addressed and the running speed is calculated using the above methodology adjustment, the rest of the procedure can follow the HCM methodology as described in the HCM (TRB, 2016), Chapter 18.

6 Conclusions

This chapter summarizes the conclusions obtained through this research. It also provides future research recommendations for fully revising the HCM (TRB, 2016) methodology in order to more accurately account for heavy vehicle impacts on signalized arterial corridors.

6.1 Summary and Recommendations

The 5 experimental design geometries, along with 36 scenarios with differing traffic volumes, truck percentages, and grades, resulted in a total of 180 simulation scenarios.

From the results comparison of HCM and Simulation, as expected, both sets of results indicate that with the increase in volumes and truck percentages, there is a significant decrease in the segment average speeds, as running times and control delays increase. The saturation flow rates were impacted in a similar manner since there was a gradual decrease in saturation flow rates with the increase in truck percentage and grade as expected. In addition, it was observed that the simulation results for travel speed and saturation flow rate were generally lower than those obtained from the HCM methodology. It should be noted that, saturation flow rate is a major factor in control delay determination. . The main reason for this is that the HCM methodology does not take into account the gear changing capabilities of trucks in its deterministic and analytic methodology, therefore not accounting for powertrain characteristics (engine and transmission characteristics) and resistance forces that provide more accurate vehicle acceleration modeling.

The HCM running times in general were found to be lower (translating to higher running speeds) than those from Simulation. Again, this was expected as the HCM running time calculation does not explicitly consider roadway grade nor truck percentage in the traffic stream, only overall traffic volume.

Models were developed to provide adjustments to the saturation flow rate and running speed calculations from the HCM to provide for more accurate results for arterials with significant percentages of commercial trucks. It is recommended that these model adjustments be applied in Florida for signalized arterial analysis.

These recommendations to revise the HCM methodology were made using data obtained through the usage of a microsimulation tool that more accurately accounts for the vehicle performance capabilities of commercial vehicles. In addition, the findings of this research impact the FDOT Quality/Level of Service (LOS) handbook as well as the Transportation Site Impact Handbook.

The major benefit for Florida through this study is the development of the adjustment methodologies depicted in Section 5 to adjust the calculations of the HCM urban streets and the signalized intersection methodologies, so that the running speeds and saturation flow rates are more accurate when relatively high percentages of commercial trucks are present in the traffic stream. This, in turn, will positively affect signalized arterial corridor planning in Florida, improve signalized arterial operations, improve freight signal priority efforts the state is interested in, and allow for cost savings through better planning in general.

6.2 Future Research Recommendations

Future research should be undertaken to include the platoon dispersion model from the HCM methodology so that a more accurate estimate of the percent arrivals on green (PVG) is considered, relative to the arrival type approach since the two major factors that have an impact on control delay calculations are saturation flow rate and PVG.

7 References

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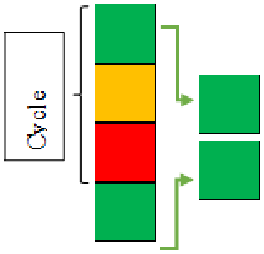
Appendix A – Data Collection Sites



Cycle No.	Start	End	Total Green Time	Through Lane				
				Total Thru	Non- Trucks	Trucks	Time	Type
1	10:34:18	10:35:10	0:00:52	7	5	2	10:34:42	6
							10:34:46	1
2	10:35:34	10:38:10	0:02:36	16	14	2	10:36:03	4
							10:37:55	7

Figure A-1. Sample reduced data sheet for two green cycles

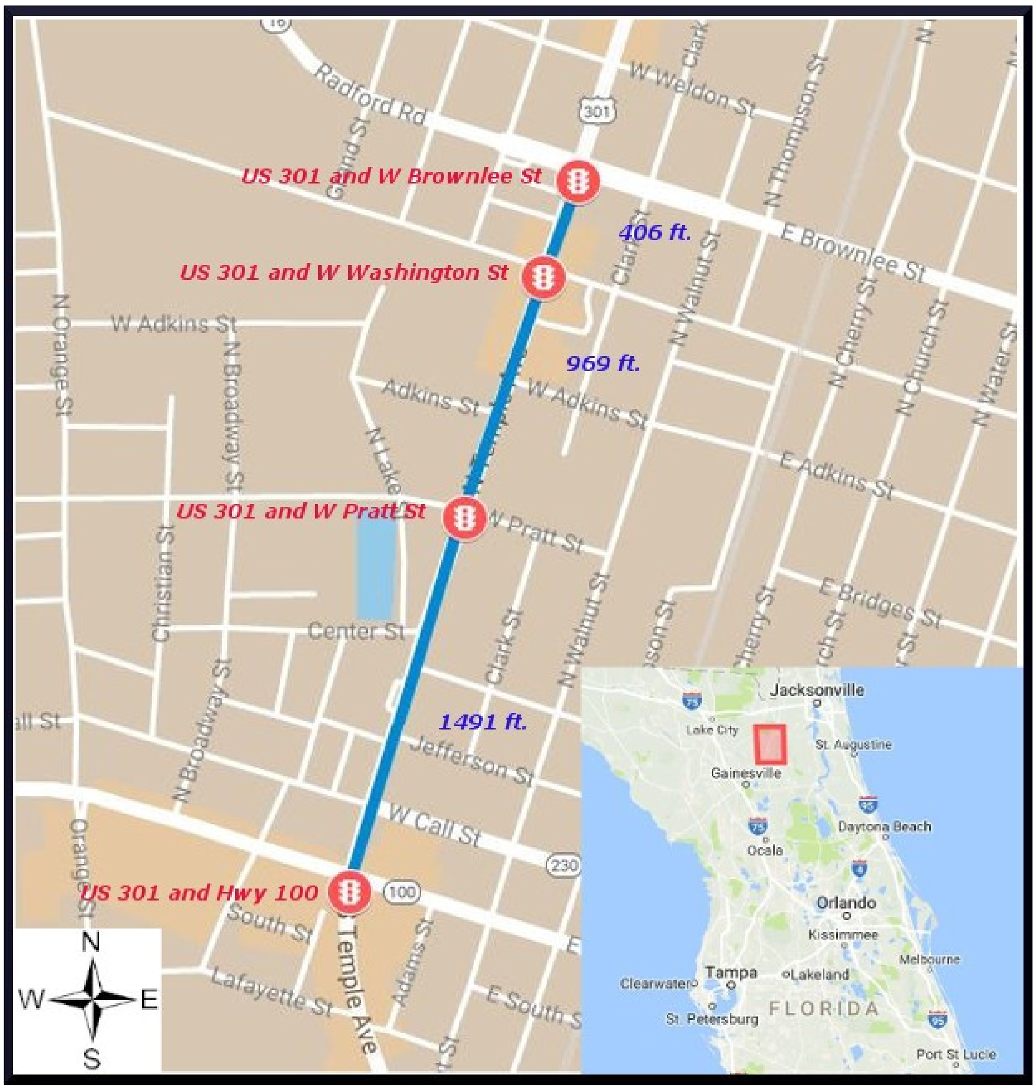


Figure A-2. Map of US-301 from Hwy 100 to W Brownlee St

Figure A-3. Aerial view of intersection of US-301 and Hwy 100

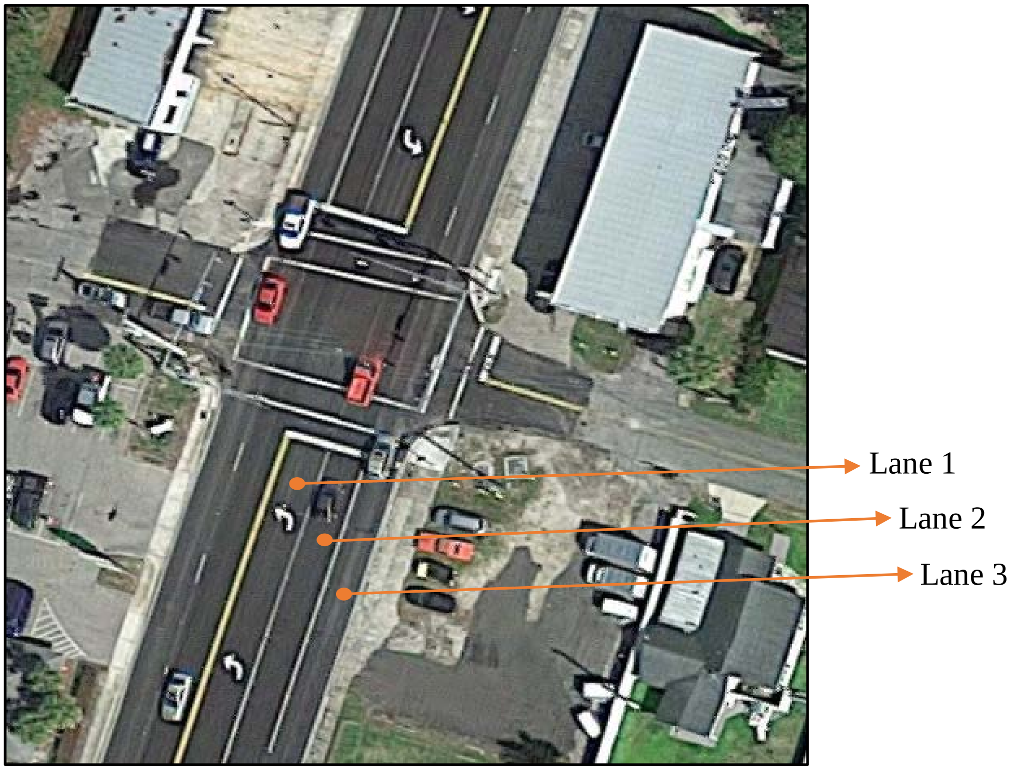


Figure A-4. Aerial view of intersection of US-301 and Pratt St

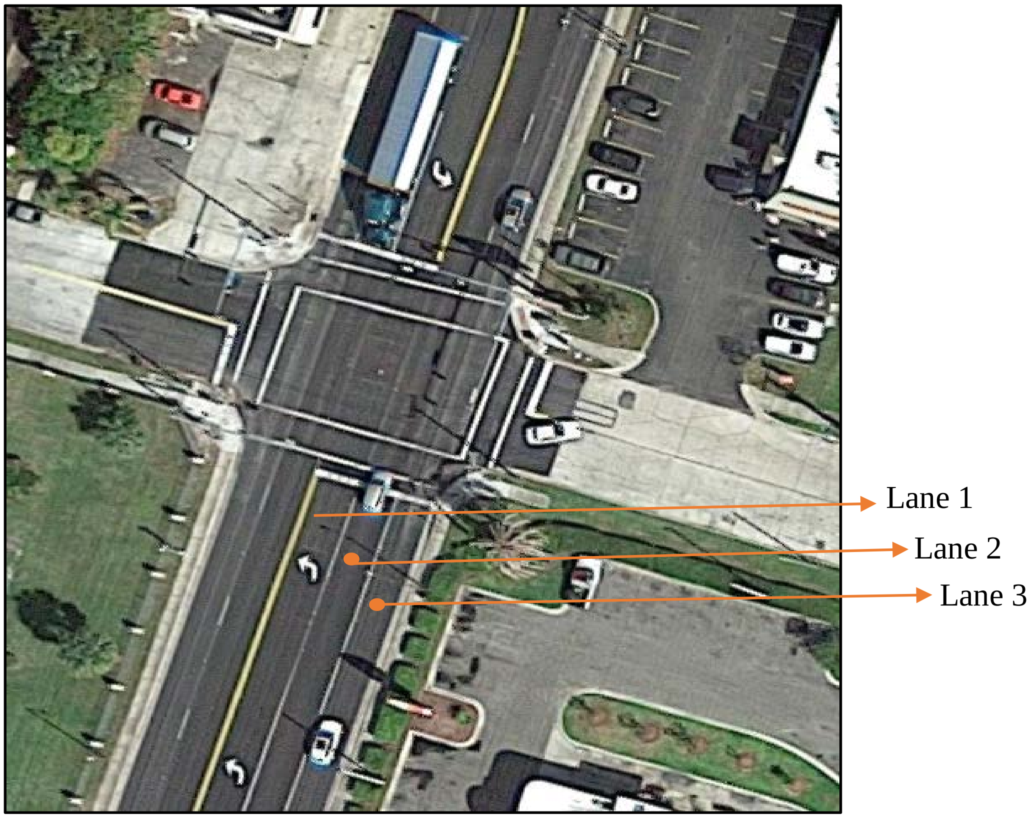


Figure A-5. Aerial view of intersection of US-301 and Washington St

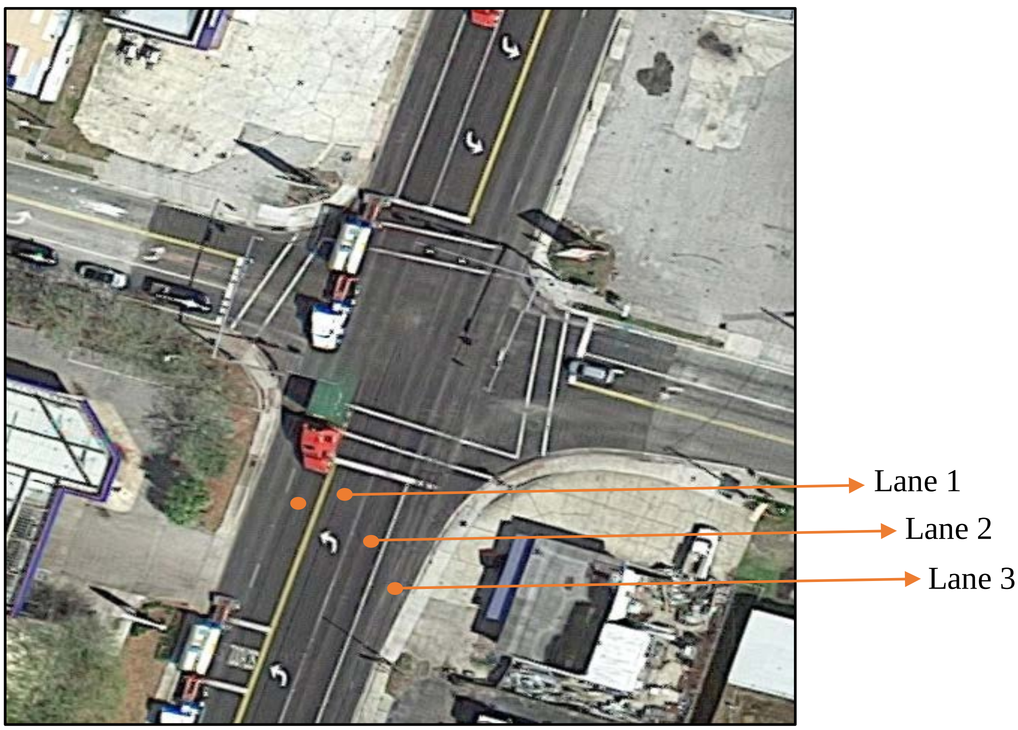


Figure A-6. Aerial view of intersection of US-301 and Brownlee St

Figure A-7. Map of US-301 from Breckenridge Pkwy to Harney Rd

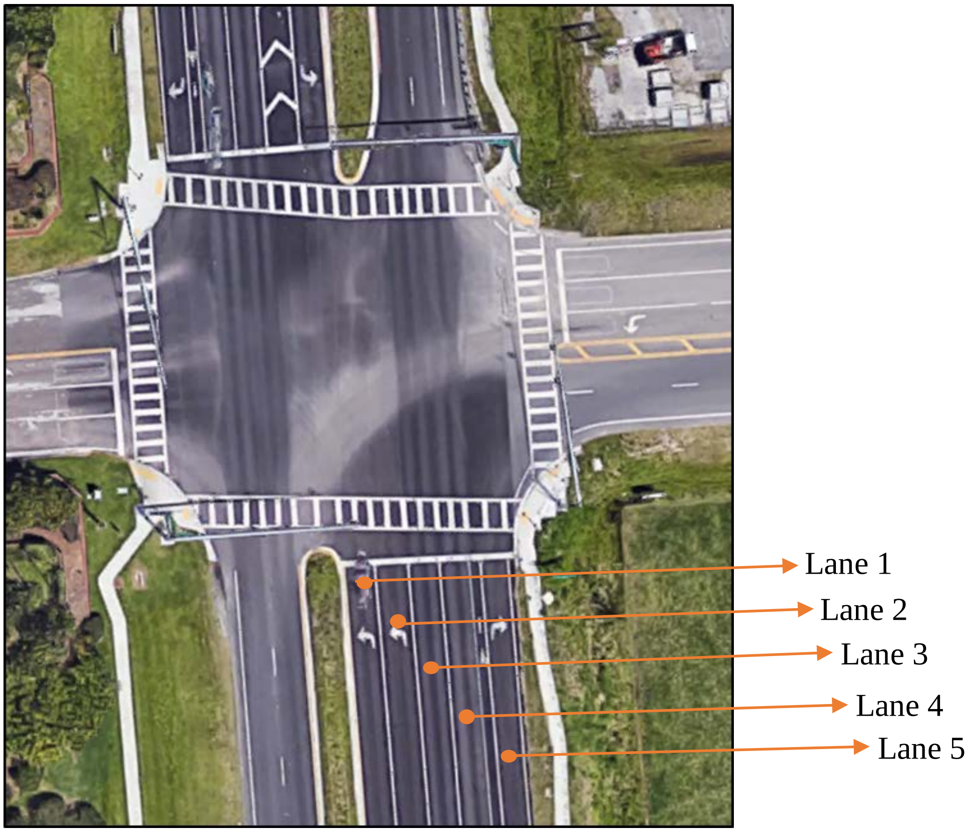


Figure A-8. Aerial view of intersection of US-301 and Breckenridge Pkwy

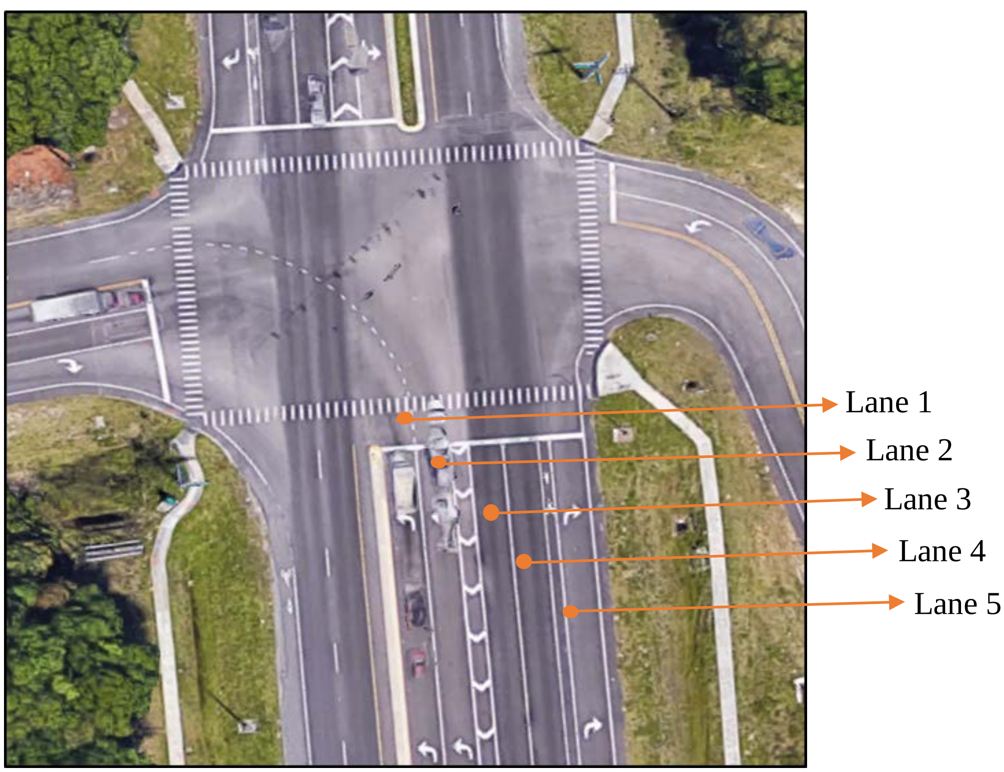


Figure A-9. Aerial view of intersection of US-301 and Sligh Ave

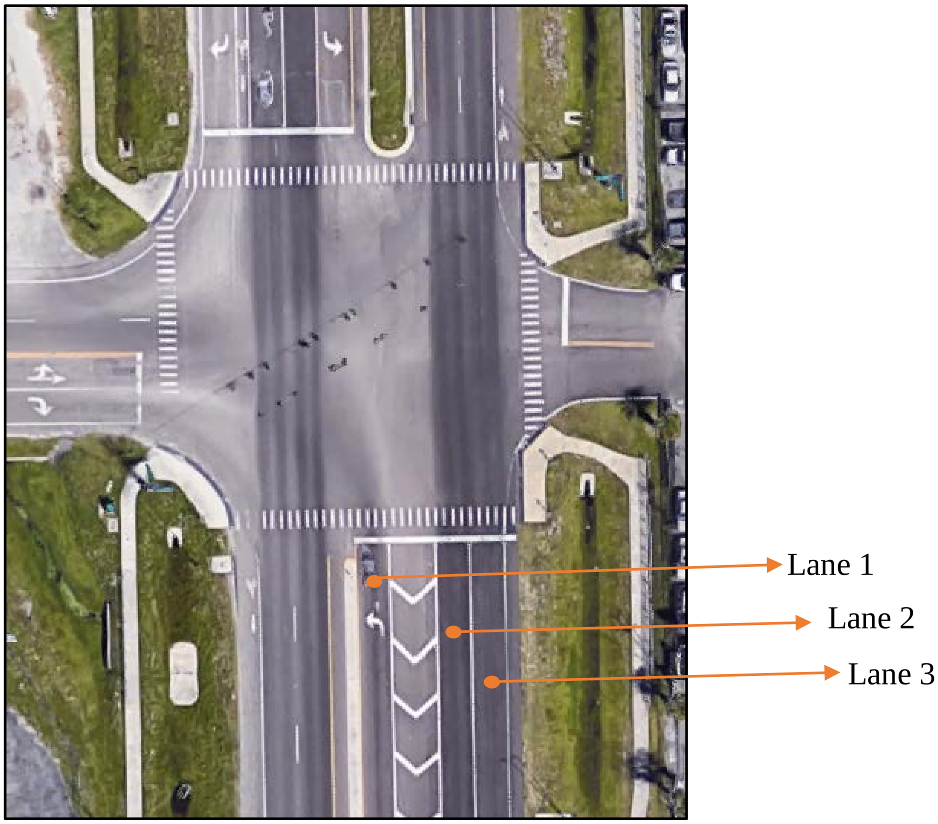


Figure A-10. Aerial view of intersection of US-301 and Maislin Rd

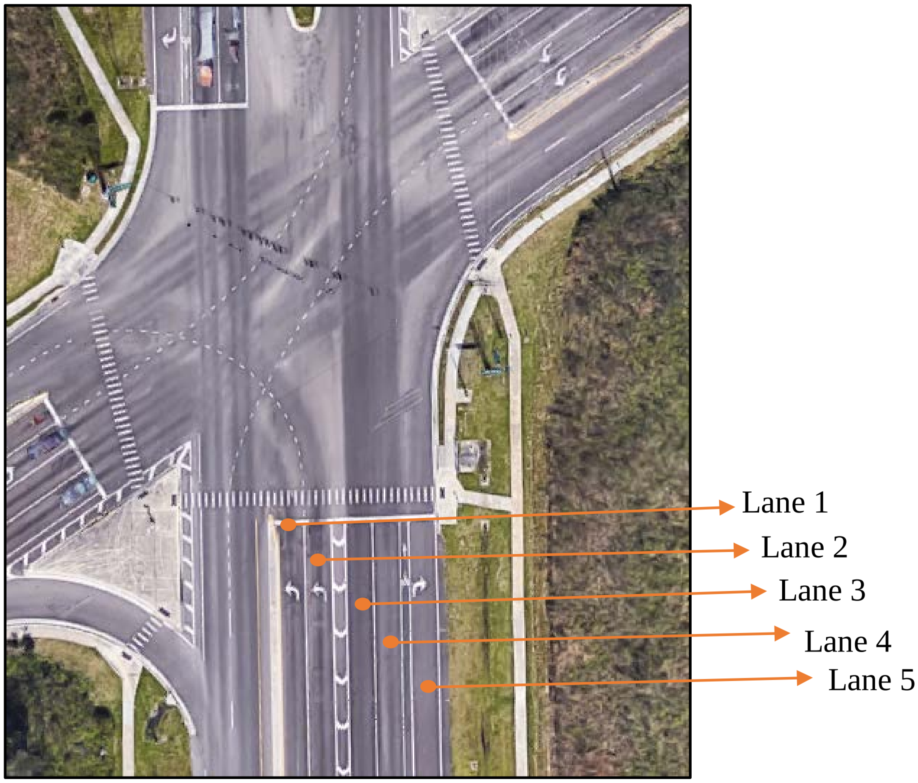


Figure A-11. Aerial view of intersection of US-301 and Harney Rd

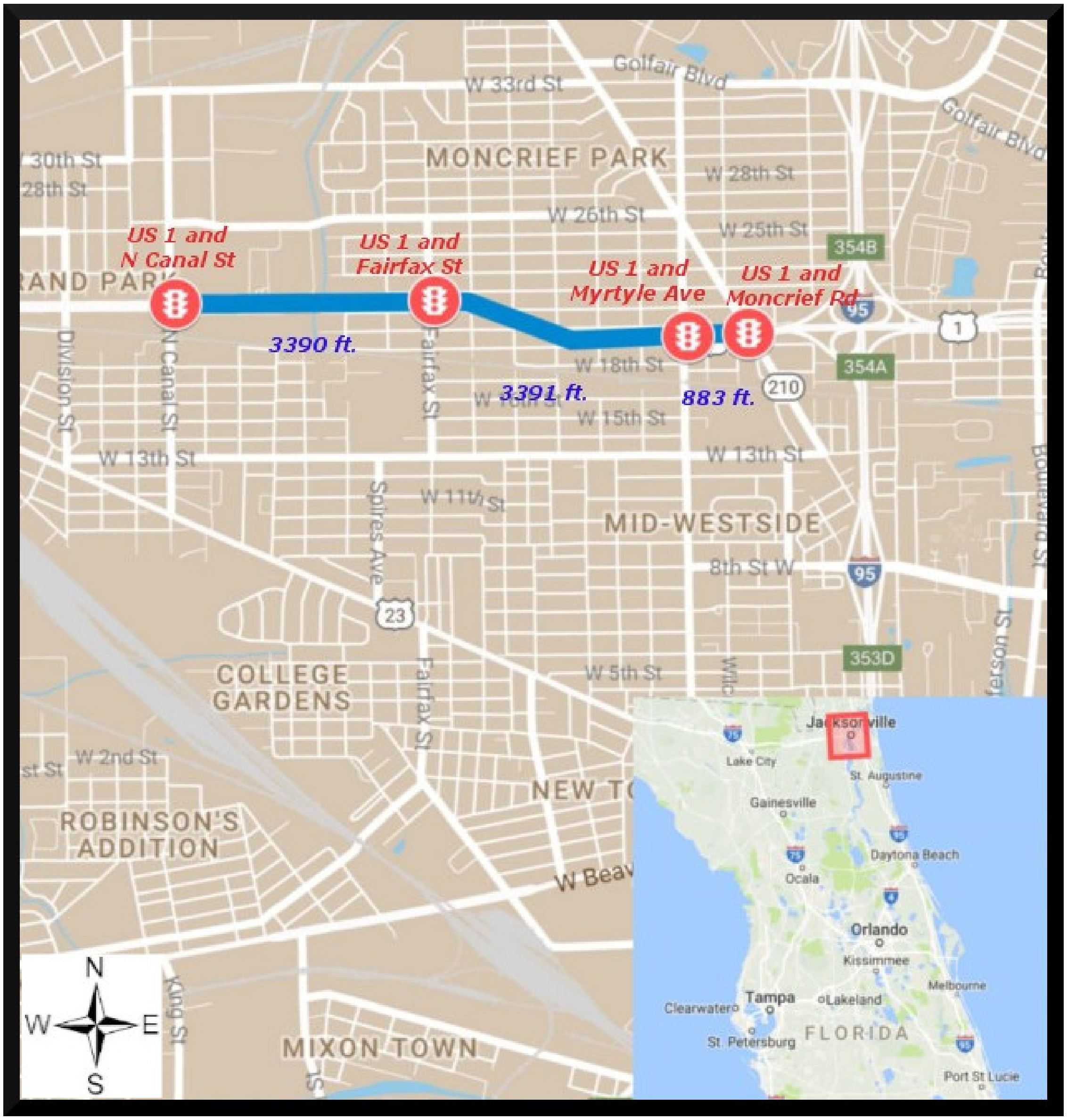


Figure A-12. Map of US-1 from N Canal St to Moncrief Rd

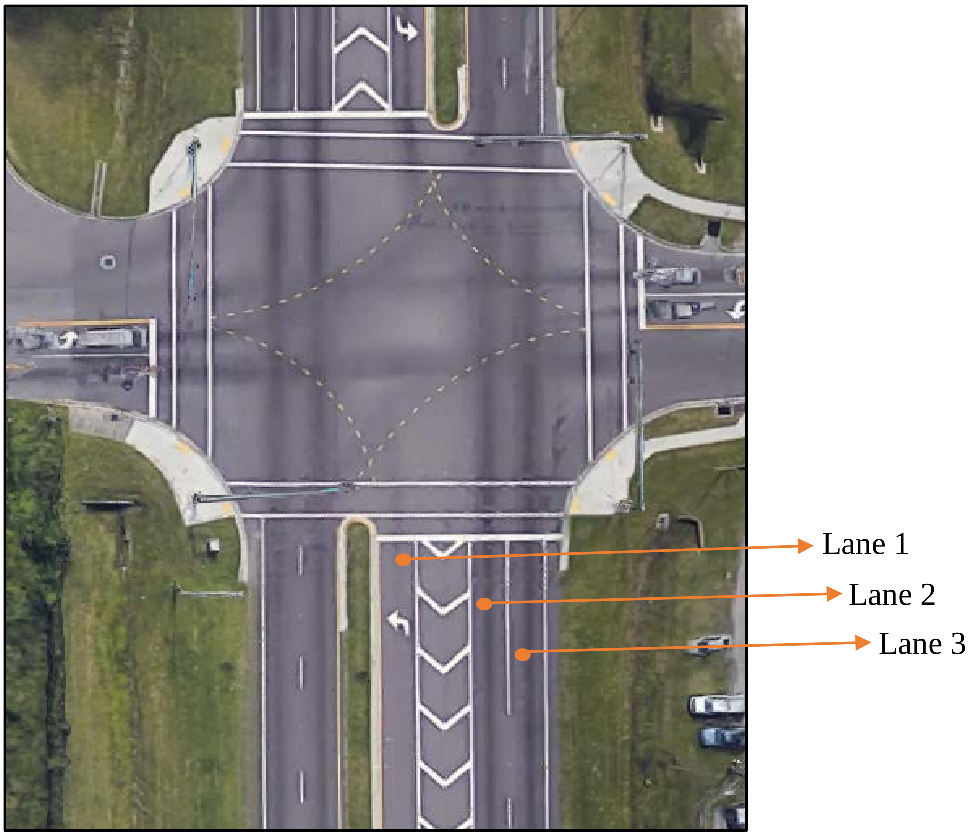


Figure A-13. Aerial view of intersection of US-1 and Canal St

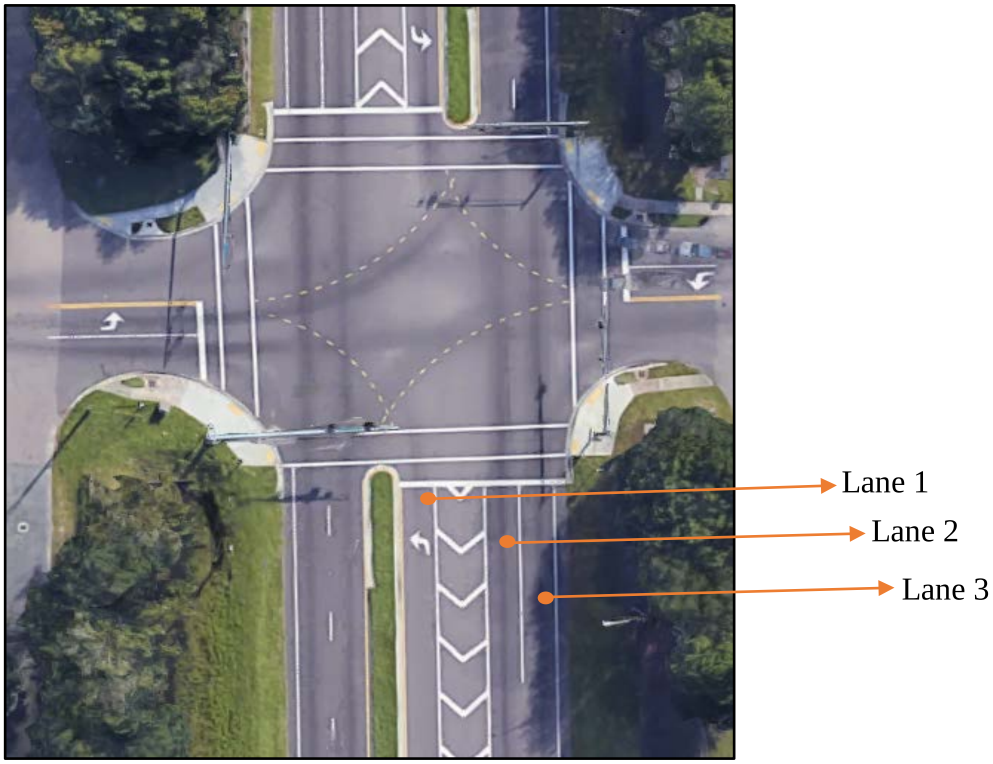


Figure A-14. Aerial view of intersection of US-1 and Fairfax St

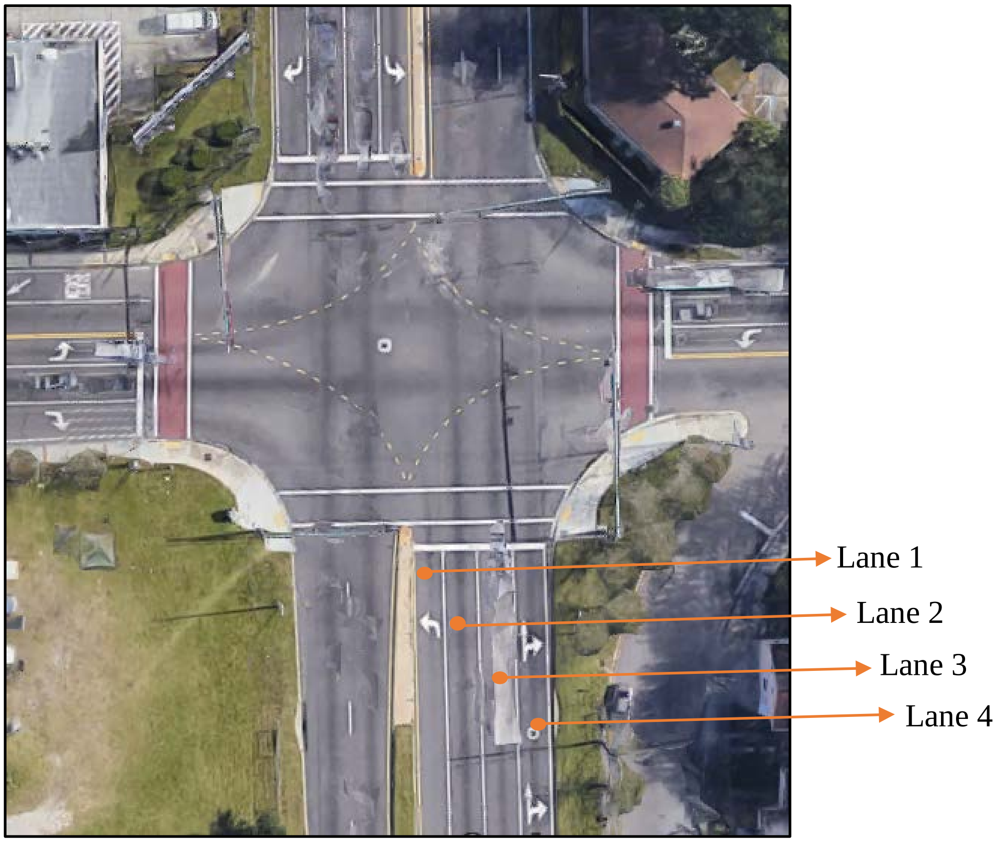


Figure A-15. Aerial view of intersection of US-1 and Myrtle Ave

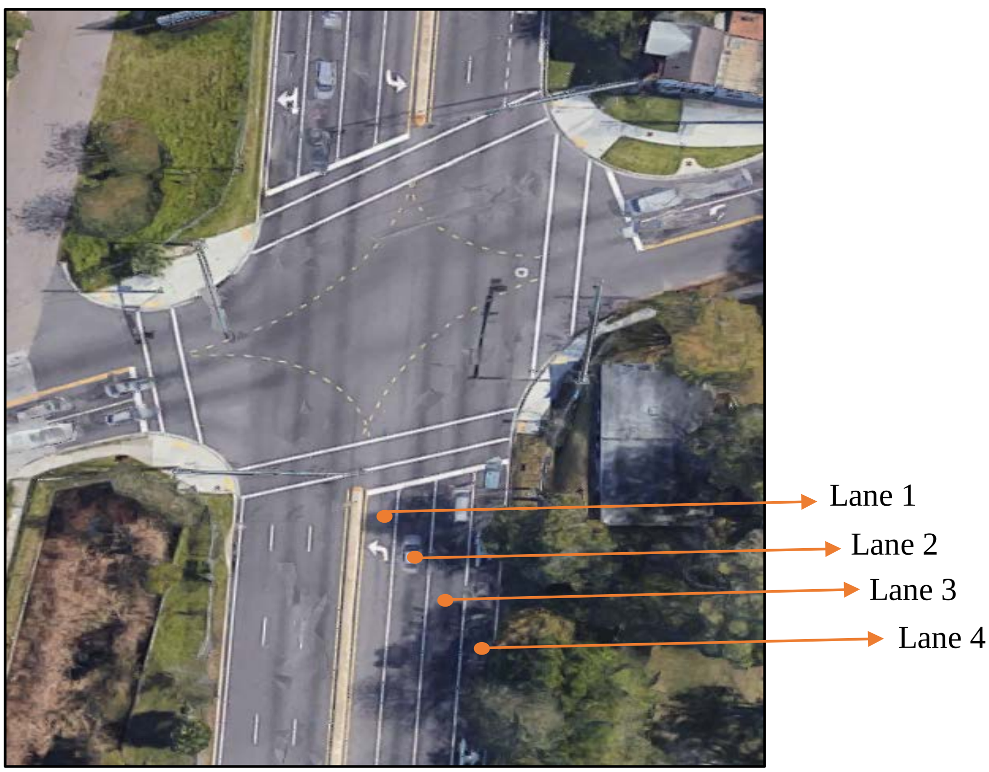


Figure A-16. Aerial view of intersection of US-1 and Moncrief Rd

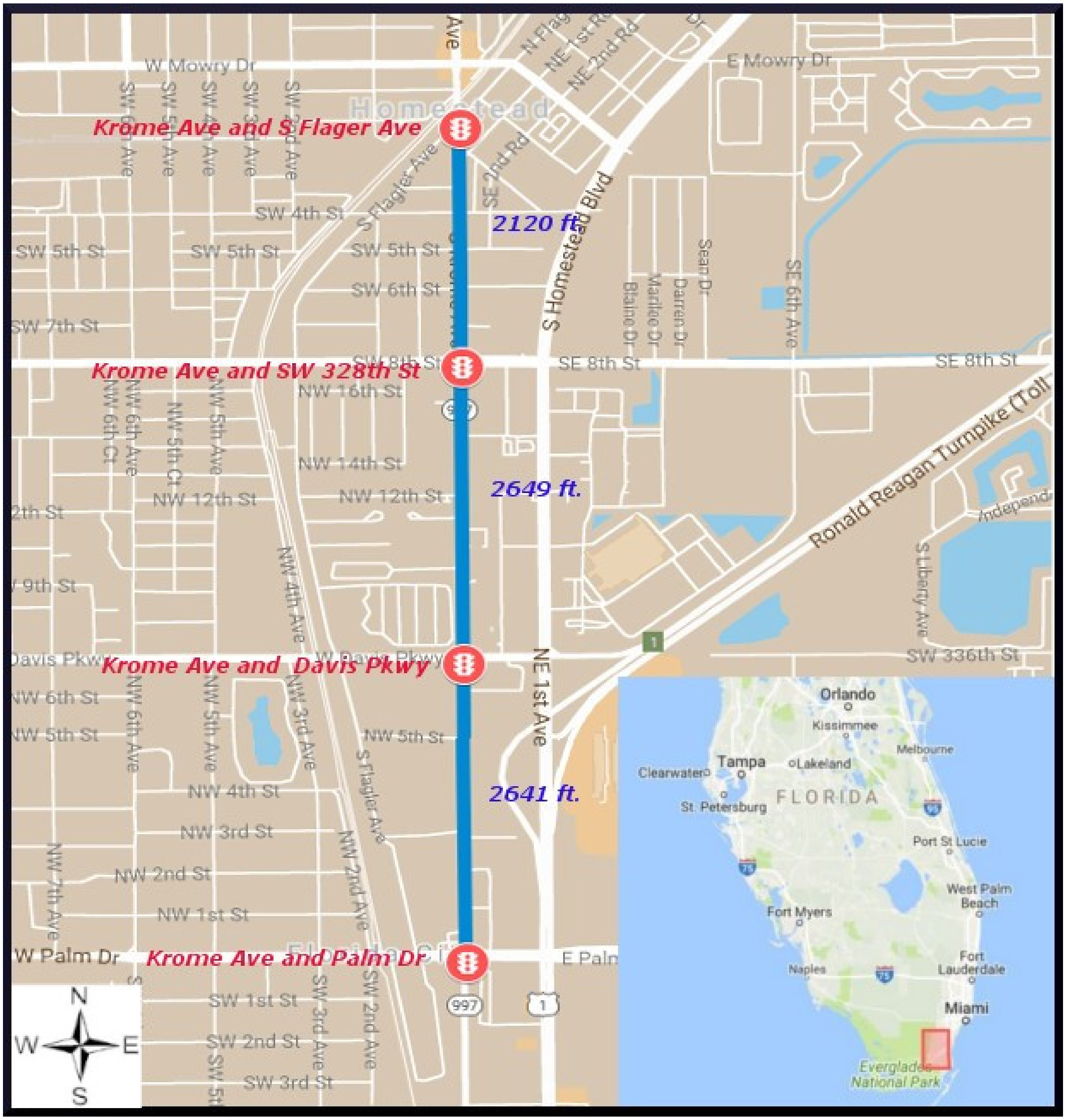


Figure A-17. Map of Krome Ave (SR-997) from Palm Dr to S Flagler Ave

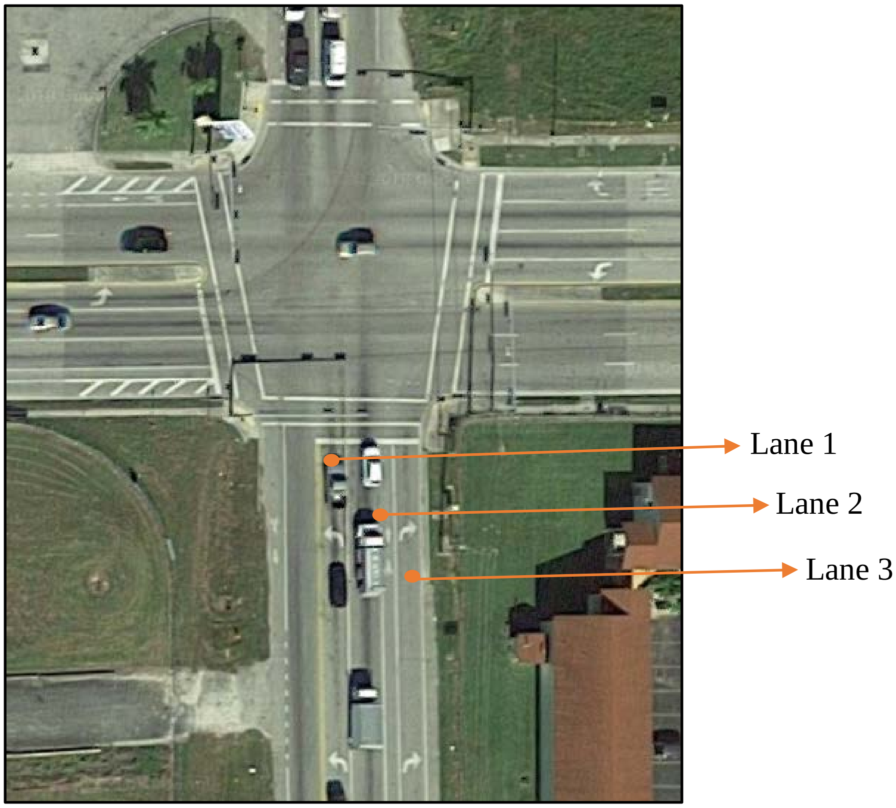


Figure A-18. Aerial view of intersection of Krome Ave and Palm Drive

Figure A-19. Aerial view of intersection of Krome Ave and David Pkwy

Figure A-20. Aerial view of intersection of Krome Ave and SW 328 St

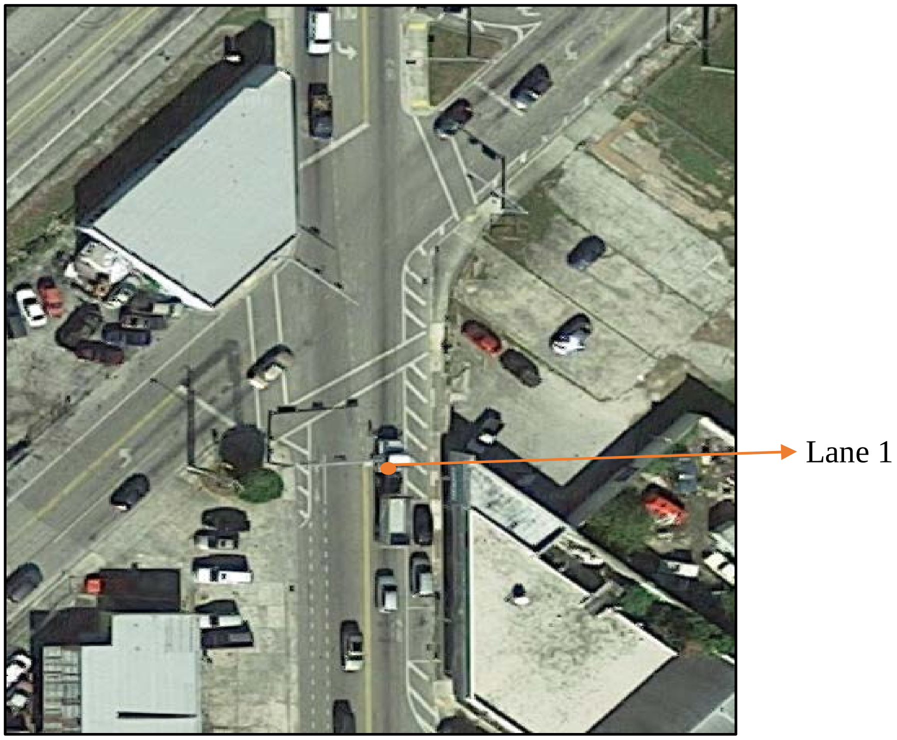


Figure A-21. Aerial view of intersection of Krome Ave and Flagler Ave

	11:40:00 AM		Lane 1					Lane 2					Lane 3									
			Left					Thru					Thru					Right				
Cycle	Start	End	LT	Non-Truck	Truck	Time	Type	Thru	Non-Truck	Truck	Time	Type	Thru	Non-Truck	Truck	Time	Type	RT	Non-Truck	Truck	Time	Type
1	11:39:43	11:41:45	1	1	0			22	18	4	11:39:58	7	15	12	3	11:40:18	4	0	0	0		
											11:40:05	7				11:40:22	4					
											11:40:09	4				11:40:31	4					
											11:41:16	4										
2	11:42:03	11:44:06	0	0	0			22	14	8	11:42:08	8	24	18	6	11:42:07	6	0	0	0		
											11:42:21	4				11:42:29	2					
											11:42:25	3				11:42:36	7					
											11:42:28	4				11:42:57	1					
											11:42:31	4				11:43:02	3					
											11:42:36	3				11:43:14	4					
											11:42:50	3										
											11:43:56	7										
3	11:44:24	11:46:25	0	0	0			21	20	1	11:44:33		14	11	3	11:44:32	4	0	0	0		
																11:44:54	4					
																11:45:16	2					
4	11:46:43	11:48:45	1	1	0			25	22	3	11:46:58	4	12	8	4	11:46:58	8	0	0	0		
											11:47:07	4				11:47:13	4					
											11:47:36	7				11:47:17	4					
																11:47:29	2					
5	11:49:14	11:51:09	0	0	0			20	16	4	11:49:23	4	13	8	5	11:49:26	6	0	0	0		
											11:49:43	4				11:49:32	6					
											11:49:52	7				11:49:45	7					
											11:50:00	4				11:49:50	4					
																11:50:04	3					
6	11:51:27	11:53:25	0	0	0			27	23	4	11:51:30	3	17	10	7	11:51:38	4	0	0	0		
											11:52:22	4				11:51:48	4					
											11:52:25	4				11:51:56	4					
											11:52:30	3				11:52:05	4					
																11:52:10	0					
																11:52:30	3					
																11:52:41	7					
7	11:53:47	11:55:45	1	1	0			21	18	3	11:54:12	4	26	22	4	11:53:48	7	0	0	0		
											11:54:38	4				11:54:04	4					
											11:54:47	4				11:54:23	4					
																11:54:39	4					
8	11:56:16	12:00:25	1	1	0			49	45	4	11:56:22	4	34	23	11	11:56:46	4	0	0	0		
											11:56:29	4				11:58:25	7					
											11:58:30	1				11:58:28	1					
											11:58:57	4				11:58:33	4					
																11:58:54	4					
																11:58:57	4					
																11:59:08	4					
																11:59:13	4					
																11:59:17	4					
																11:59:59	7					
																12:00:28	6					
9	12:00:48	12:02:45	2	2	0			26	21	5	12:01:23	4	17	8	9	12:00:55	4	0	0	0		
											12:01:29	4				12:01:05	4					
											12:01:39	3				12:01:10	3					
											12:01:54	4				12:01:17	3					
											12:02:37	7				12:01:21	4					
																12:01:25	4					
																12:01:34	4					
																12:01:43	4					
																12:01:58	3					
10	12:03:08	12:05:07	1	1	0			26	22	4	12:03:12	4	15	9	6	12:03:12	4	0	0	0		
											12:03:23	4				12:03:22	4					
											12:03:34	4				12:03:37	6					
											12:03:38	3				12:03:43	3					
																12:03:53	4					
																12:03:57	3					

Figure A-22. Sample data (approx 30 min) for intersection of US-301 and Pratt St, all lanes from 11:40:00 to 12:05:44

11	12:05:23	12:07:25	1	1	0	18	17	1	12:07:06	3	17	11	6	12:05:38	7	0	0	0
														12:05:37	4			
														12:05:42	2			
														12:06:02	3			
														12:06:05	4			
														12:06:46	4			
12	12:08:05	12:09:46	0	0	0	27	24	3	12:08:42	4	21	17	4	12:08:13	4	0	0	0
									12:08:47	4				12:08:21	4			
									12:09:38	0				12:08:57	4			
														12:09:14	4			
13	12:10:10	12:12:07	1	1	0	22	17	5	12:10:16	5	20	17	3	12:10:32	3	0	0	0
									12:10:21	4				12:10:41	4			
									12:10:27	4				12:10:46				
									12:10:52	4								
									12:10:59	3								
14	12:12:43	12:16:46	3	3	0	41	35	6	12:12:50	4	38	30	8	12:12:48	4	3	3	0
									12:13:02	4				12:12:59	4			
									12:14:59	4				12:13:24	3			
									12:15:17	4				12:13:32	4			
									12:15:23	4				12:14:53	4			
									12:15:29	3				12:15:10	3			
														12:15:33	4			
														12:15:40	4			
15	12:17:09	12:19:04	0	0	0	23	20	3	12:17:13	4	17	12	5	12:17:15	4	0	0	0
									12:17:42	4				12:17:47	2			
									12:17:57	3				12:17:50	4			
														12:17:59	1			
														12:18:05	4			
16	12:19:28	12:21:25	3	3	0	24	22	2	12:19:38	2	20	15	5	12:19:47	4	1	1	0
									12:20:01	7				12:20:07	6			
														12:20:11	4			
														12:20:16	6			
														12:20:27	4			
17	12:21:43	12:23:49	0	0	0	23	18	5	12:21:50	4	19	14	5	12:21:51	4	0	0	0
									12:22:19	7				12:22:02	4			
									12:22:20	4				12:22:11	4			
									12:22:34	4				12:22:34	7			
									12:22:38	4				12:22:41	4			
18	12:24:09	12:26:06	0	0	0	18	15	3	12:24:17	3	22	17	5	12:24:20	4	0	0	0
									12:24:20	4				12:24:32	4			
									12:24:40	3				12:24:52	4			
														12:25:18	4			
														12:25:26	4			
19	12:26:26	12:28:25	0	0	0	25	22	3	12:26:46	6	20	14	6	12:26:43	4	0	0	0
									12:27:11	3				12:26:52	6			
									12:27:18	3				12:27:14	0			
														12:27:20	7			
														12:27:25	4			
														12:27:29	4			
20	12:28:55	12:30:47	1	1	0	15	11	4	12:28:59	4	19	15	4	12:28:57	4	0	0	0
									12:29:17	4				12:29:19	4			
									12:29:22	4				12:29:23	4			
									12:29:35	4				12:30:25	4			
21	12:31:05	12:33:05	2	2	0	22	20	2	12:31:21	6	18	14	4	12:31:16	3	0	0	0
									12:31:39	4				12:31:48	7			
														12:31:53	6			
														12:31:57	4			
22	12:33:24	12:37:45	0	0	0	32	28	4	12:33:34	3	25	20	5	12:33:34	7	0	0	0
									12:33:40	4				12:33:40	4			
									12:36:04	4				12:35:07	7			
									12:36:09	4				12:36:07	3			
														12:36:12	8			
23	12:38:03	12:40:05	0	0	0	26	23	3	12:38:48	7	19	17	2	12:38:05	4	0	0	0
									12:39:02	7				12:38:25	1			
									12:39:40	7								

Figure A-23. Sample data (approx 30 min) for intersection of US-301 and Pratt St, all lanes from 12:05:44 to 12:40:00

			Lane 1					Lane 2					Lane 3									
			Left					Thru					Thru					Right				
Cycle	Start	End	LT	Non-Truck	Truck	Time	Type	Thru	Non-Truck	Truck	Time	Type	Thru	Non-Truc	Truck	Time	Type	RT	Non-Truc	Truck	Time	Type
1	11:39:36	11:41:21	0	0	0			22	18	4	11:40:22	7	15	13	2	11:40:37	4	0	0	0		
											11:40:26	4				11:40:53	4					
											11:40:36	4										
											11:40:43	4										
2	11:41:41	11:43:41	3	3	0			19	12	7	11:42:30	8	21	15	6	11:42:32	6	1	1	0		
											11:42:44	4				11:42:51	5					
											11:42:47	3				11:42:58	7					
											11:42:49	4				11:43:24	1					
											11:42:53	4				11:43:30	3					
											11:42:58	3				11:43:35	4					
											11:43:13	3										
3	11:44:08	11:46:01	0	0	0			18	16	2	11:44:17	7	17	14	3	11:44:50	4	0	0	0		
											11:44:54	3				11:45:17	4					
																11:45:37	2					
4	11:46:25	11:48:21	3	3	0			26	24	2	11:47:20	4	13	9	4	11:47:22	8	0	0	0		
											11:47:30	4				11:47:39	4					
																11:47:42	4					
																11:47:55	2					
5	11:48:48	11:53:01	0	0	0			50	44	6	11:49:45	4	26	14	12	11:49:49	6	1	1	0		
											11:50:06	4				11:49:54	6					
											11:51:56	3				11:50:09	7					
											11:52:47	4				11:50:15	4					
											11:52:51	4				11:50:19	7					
											11:52:55	3				11:50:28	9					
																11:50:33	3					
																11:52:05	4					
																11:52:17	4					
																11:52:27	4					
																11:52:34	4					
																11:52:59	3					
6	11:53:24	11:55:21	1	1	0			24	21	3	11:54:37	4	19	14	5	11:53:27	7	0	0	0		
											11:55:01	4				11:54:12	7					
											11:55:15	4				11:54:30	4					
																11:54:48	4					
																11:55:04	4					
7	11:56:05	11:57:41	1	1	0			18	16	2	11:56:46	4	18	17	1	11:57:28	4	1	1	0		
											11:56:53	4										
8	11:58:05	12:00:20	1	1	0			22	20	2	11:58:50	1	17	9	8	11:58:47	7	2	2	0		
											11:59:46	4				11:58:49	1					
																11:59:07	4					
																11:59:34	4					
																11:59:39	4					
																11:59:46	4					
																11:59:58	4					
																12:00:03	4					
9	12:00:41	12:02:30	0	0	0			30	26	4	12:01:46	4	15	4	11	12:00:54	6	0	0	0		
											12:01:54	4				12:01:18	7					
											12:02:03	3				12:01:27	4					
											12:02:17	4				12:01:37	4					
																12:01:41	3					
																12:01:45	3					
																12:01:50	4					
																12:01:53	4					
																12:02:01	4					
																12:02:08	4					
																12:02:21	3					
10	12:02:49	12:04:41	2	2	0			26	21	5	12:03:00	3	16	10	6	12:03:33	4	0	0	0		
											12:03:35	4				12:03:46	4					
											12:03:45	4				12:04:03	6					
											12:03:59	4				12:04:08	3					
											12:04:02	3				12:04:17	4					
																12:04:21	3					

Figure A-24. Sample data (approx 30 min) for intersection of US-301 and Washington St, all lanes from 11:40:00 to 12:04:41

11	12:05:15	12:07:01	1	1	0	15	15	0			15	10	5	12:05:53	7	0	0	0
														12:05:59	4			
														12:06:04	2			
														12:06:22	3			
														12:06:25	4			
12	12:07:25	12:09:21	0	0	0	29	27	2	12:09:03	4	17	13	4	12:07:30	4	0	0	0
									12:09:09	4				12:08:35	4			
														12:08:41	4			
														12:09:20	4			
13	12:09:45	12:11:41	1	1	0	21	15	6	12:09:59	0	18	14	4	12:10:03	4	0	0	0
									12:10:39	5				12:11:06	4			
									12:10:45	4				12:11:19	4			
									12:10:54	4				12:11:24	3			
									12:11:23	4								
									12:11:34	3								
14	12:12:12	12:14:01	1	1	0	23	21	2	12:13:18	4	13	9	4	12:13:15	4	0	0	0
									12:13:24	4				12:13:24	4			
														12:13:52	3			
														12:13:59	4			
15	12:14:26	12:16:21	2	2	0	22	17	5	12:15:19	4	24	21	3	12:15:15	4	0	0	0
									12:15:33	3				12:15:55	4			
									12:15:38	4				12:16:03	4			
									12:15:43	4								
									12:15:49	3								
16	12:16:50	12:18:51	3	3	0	28	25	3	12:17:35	4	18	13	5	12:17:36	4	0	0	0
									12:18:05	4				12:18:11	2			
									12:18:21	3				12:18:15	4			
														12:18:24	1			
														12:18:30	4			
17	12:19:14	12:21:01	1	1	0	25	23	2	12:20:00	2	18	13	5	12:20:18	4	0	0	0
									12:20:23	7				12:20:30	4			
														12:20:33	4			
														12:20:40	6			
														12:20:51	4			
18	12:21:30	12:23:22	0	0	0	23	18	5	12:22:10	4	17	12	5	12:22:17	7	0	0	0
									12:22:45	7				12:22:27	4			
									12:22:48	4				12:22:38	4			
									12:22:59	4				12:22:58	7			
									12:23:03	4				12:23:06	4			
19	12:23:43	12:25:41	0	0	0	21	18	3	12:24:41	3	18	15	3	12:24:44	4	1	1	0
									12:24:45	4				12:24:57	4			
									12:25:04	3				12:25:19	4			
20	12:26:01	12:28:01	0	0	0	26	22	4	12:26:02	4	19	12	7	12:26:15	4	0	0	0
									12:27:08	6				12:27:07	4			
									12:27:39	3				12:27:16	6			
									12:27:45	7				12:27:39	7			
														12:27:46	3			
														12:27:48	4			
														12:27:53	4			
21	12:28:27	12:30:21	4	4	0	15	10	5	12:29:31	4	17	14	3	12:29:25	4	0	0	0
									12:29:40	8				12:29:40	4			
									12:29:44	4				12:29:44	4			
									12:29:50	4								
									12:30:01	4								
22	12:30:49	12:32:41	2	2	0	19	17	2	12:31:43	6	15	10	5	12:30:56	4	0	0	0
									12:32:03	4				12:31:39	3			
														12:32:10	7			
														12:32:10	6			
														12:32:15	4			
23	12:33:05	12:35:01	2	2	0	14	12	2	12:33:57	3	19	17	2	12:33:57	7	1	1	0
									12:34:03	4				12:34:07	4			
24	12:35:34	12:37:34	1	1	0	12	11	1	12:36:31	4	9	5	4	12:35:37	7	1	1	0
														12:36:28	4			
														12:36:33	3			
														12:36:38	8			
25	12:37:56	12:39:42	3	3	0	26	24	2	12:39:14	7	19	17	2	12:38:36	4	2	2	0
									12:39:33	7				12:38:53	1			

Figure A-25. Sample data (approx 30 min) for intersection of US-301 and Washington St, all lanes from 12:05:00 to 12:40:00

Cycle	Start	End		Lane 1 Left LT	Non-Truck	Truck	Time	Type	Lane 2 Thru Thru	Non-Truck	Truck	Time	Type	Lane 3 Thru Thru	Non-Truck	Truck	Time	Type	Lane 3 Right RT	Non-Truck	Truck	Time	Type
1	Cycle beg	11:43:44		3	3	0			13	9	4	11:40:29	7	12	10	2	11:40:45	4	0	0	0		
												11:40:33	4				11:41:01	4					
												11:40:44	4										
												11:40:51	4										
			RTOR																	1			
2	11:42:08	11:43:44		5	5	0			16	8	8	11:42:37	8	16	11	5	11:42:38	6	6	2	1	11:43:47	4
												11:42:52	4				11:43:00	5					
												11:42:56	4				11:43:08	7					
												11:42:58	4				11:43:35	1					
												11:42:02	4				11:43:41	3					
												11:43:07	3										
												11:43:22	3										
												11:43:40	0										
			RTOR																	2	1	11:44:09	0
3	11:44:51	11:46:04		3	3	0			13	11	2	11:44:55	7	14	11	3	11:45:03	4	5	3	0		
												11:45:04	4				11:45:26	4					
																	11:45:46	2					
			RTOR																	2			
4	11:47:17	11:48:24		1	1	0			21	19	2	11:47:32	4	9	5	4	11:47:33	8	3	3	0		
												11:47:42	4				11:47:49	4					
																	11:47:52	4					
																	11:48:05	2					
5	11:49:20	11:50:44		5	5	0			9	7	2	11:49:54	4	8	3	5	11:49:58	6	7	5	2	11:50:19	7
												11:50:14	4				11:50:03	6				11:50:30	7
																	11:50:25	4					
																	11:50:39	4					
																	11:50:44	3					
6	11:51:42	11:53:04		3	3	0			21	17	4	11:52:03	3	8	4	4	11:52:13	4	0	0	0		
												11:52:57	4				11:52:27	4					
												11:53:00	4				11:52:37	4					
												11:53:04	3				11:52:44	4					
7	11:54:13	11:55:24		4	4	0			21	18	3	11:54:41	4	16	12	4	11:54:16	3	1	0	1	11:54:26	7
												11:54:48	4				11:54:28	7					
												11:55:13	4				11:54:59	4					
																	11:55:15	4					
8	11:55:51	11:57:44		4	3	1	11:55:58	4	15	13	2	11:56:54	4	15	14	1	11:57:38	4	2	2	0		
												11:57:00	4										
9	11:59:06	12:00:04		1	1	0			18	17	1	11:59:56	5	14	7	7	11:59:17	7	0	0	0		
																	11:59:30	7					
																	11:59:33	1					
																	11:59:36	4					
																	11:59:49	4					
																	11:59:52	4					
																	11:59:58	4					
10	12:01:02	12:02:24		2	2	0			25	22	3	12:01:56	4	15	4	11	12:01:04	4	2	1	1	12:02:12	4
												12:02:04	4				12:01:13	4					
												12:02:26	4				12:01:26	6					
																	12:01:32	7					
																	12:01:29	4					
																	12:01:48	4					
																	12:01:52	3					
																	12:01:57	3					
																	12:02:01	4					
																	12:02:04	4					
																	12:02:19	4					
11	12:03:29	12:04:43		5	3	2	12:03:39	7	16	13	3	12:03:54	4	13	6	7	12:03:34	3	4	3	0		
							12:03:45	4				12:04:06	4				12:03:47	3					
												12:04:09	3				12:03:57	4					
																	12:04:13	6					
																	12:04:17	3					
																	12:04:25	4					
																	12:04:30	3					
			RTOR																	1			
12	12:05:41	12:07:05		5	5	0			10	10	0			13	7	6	12:06:02	7	5	4	1		
																	12:06:09	4					
																	12:06:13	2					
																	12:06:20	8					
																	12:06:31	3					
																	12:06:34	4					
			RTOR																			12:07:55	4

Figure A-26. Sample data (approx 30 min) for intersection of US-301 and Brownlee St, all lanes from 11:40:00 to 12:07:05

13	12:08:02	12:09:24		2	1	1	12:08:07	3	25	23	2	12:09:10	4	11	8	3	12:08:42	4	5	5	0		
												12:09:17	4				12:08:48	4					
																	12:09:27	4					
14	12:10:42	12:11:44		4	3	1	12:10:33	0	20	15	5	12:10:56	5	15	12	3	12:11:22	4	3	2	1	12:11:00	4
												12:11:01	4				12:11:33	4					
												12:11:08	4				12:11:37	4					
												12:11:32	4										
												12:11:43	3										
15	12:13:01	12:14:04		5	4	1	12:13:39	4	17	16	1	12:13:26	4	13	10	3	12:13:23	4	1	1	0		
																	12:13:34	4					
																	12:14:02	3					
16	12:14:56	12:16:24		1	1	0			18	15	3	12:15:01	4	18	15	3	12:15:44	4	5	4	1	12:15:26	4
												12:15:46	4				12:16:05	4					
												12:15:51	4				12:16:03	4					
17	12:16:49	12:18:44		6	6	0			18	15	3	12:17:41	4	15	10	5	12:17:44	4	6	4	0		
												12:18:13	4				12:18:21	2					
												12:18:29	3				12:18:25	4					
																	12:18:33	1					
																	12:18:38	4					
			RTOR																	2			
18	12:19:28	12:21:04		5	5	0			19	17	2	12:20:08	2	11	6	5	12:20:16	4	4	4	0		
												12:20:31	7				12:20:38	4					
																	12:20:42	4					
																	12:20:49	6					
																	12:21:01	4					
19	12:22:19	12:23:23		5	5	0			14	9	5	12:22:27	4	14	9	5	12:22:34	7	3	3	0		
												12:22:56	7				12:22:42	4					
												12:22:59	4				12:22:51	4					
												12:23:09	4				12:23:08	7					
												12:23:13	4				12:23:15	4					
20	12:24:32	12:25:43		1	1	0			19	16	3	12:24:50	3	9	6	3	12:24:53	4	5	5	0		
												12:24:53	4				12:25:06	4					
												12:25:15	3				12:25:29	4					
21	12:26:28	12:28:04		4	4	0			23	20	3	12:27:18	6	17	10	7	12:26:50	4	9	8	1	12:26:57	4
												12:27:48	3				12:27:17	4					
												12:27:55	3				12:27:26	6					
																	12:27:48	7					
																	12:27:53	7					
																	12:27:57	4					
																	12:28:01	4					
22	12:29:03	12:30:24		3	3	0			13	9	4	12:29:39	4	13	10	3	12:29:33	4	3	3	0		
												12:29:51	4				12:29:48	4					
												12:29:58	4				12:29:53	4					
												12:30:09	4										
23	12:31:03	12:32:24		2	2	0			16	14	2	12:31:52	6	15	11	4	12:31:47	3	3	2	1	12:31:16	4
												12:32:10	4				12:32:19	7					
																	12:32:24	6					
																	12:32:29	4					
24	12:33:22	12:35:04		4	4	0			11	9	2	12:34:04	3	15	13	2	12:34:05	7	5	4	0		
												12:34:11	4				12:34:15	4					
			RTOR																	1			
25	12:36:04	12:37:24		6	6	0			9	8	1	12:36:39	4	8	4	4	12:36:07	7	2	1	0		
																	12:36:37	4					
																	12:36:34	3					
																	12:36:49	8					
			RTOR																	1			
26	12:38:45	12:39:44		1	1	0			16	16	0			14	12	2	12:38:52	4	5	5	0		
																	12:39:07	1					

Figure A-27. Sample data (approx 30 min) for intersection of US-301 and Brownlee St, all lanes from 12:08:44 to 12:40:00

Cycle				Lane 1					Lane 2					Lane 3				
				Left Turn Lane					Left Turn Lane					Through Lane				
Numb	Start	End		Total LT	Non- Trucks	Trucks	Time	Type	Total LT	Non- Trucks	Trucks	Time	Type	Total Thru	Non- Trucks	Trucks	Time	Type
1	10:30:25	10:33:02		2	2	0			0	0	0			14	12	2	10:30:47	7
																	10:31:17	4
			RTOR															
2	10:33:28	10:34:42		1	1	0			0	0	0			9	8	1	10:33:58	6
			RTOR															
3	10:35:02	10:36:02		0	0	0			1	1	0			5	4	1	10:35:20	6
			RTOR															
4	10:36:26	10:37:32		1	1	0			0	0	0			12	12	0		
5	10:38:16	10:39:02		1	1	0			0	0	0			12	11	1	10:38:53	1
6	10:39:39	10:40:32		2	2	0			0	0	0			13	9	4	10:39:41	7
																	10:40:01	6
																	10:40:05	4
																	10:40:25	7
7	10:41:11	10:42:02		0	0	0			0	0	0			17	16	1	10:41:37	7
8	10:42:27	10:43:32		2	2	0			0	0	0			19	19	0		
9	10:43:58	10:45:02		0	0	0			1	1	0			12	12	0		
10	10:45:38	10:48:01		3	3	0			0	0	0			18	17	1	10:46:30	7
11	10:48:44	10:49:31		1	1	0			1	1	0			6	6	0		
12	10:50:15	10:51:03		1	1	0			3	2	1	10:50:55	7	16	15	1	10:50:33	4
13	10:51:27	10:54:02		3	3	0			4	4	0			20	19	1	10:53:37	4
			RTOR															
14	10:54:39	10:55:32		0	0	0			0	0	0			10	9	1	10:54:41	7
15	10:55:56	10:57:02		0	0	0			0	0	0			4	4	0		
16	10:57:31	11:00:02		1	1	0			1	1	0			9	9	0		
17	11:00:38	11:01:32		1	1	0			0	0	0			7	6	1	11:01:20	7
18	11:02:00	11:03:02		3	3	0			0	0	0			6	6	0		
19	11:04:17	11:04:58		1	1	0			0	0	0			12	12	0		
20	11:05:23	11:06:15		0	0	0			1	1	0			8	7	1	11:06:16	4
21	11:06:41	11:07:34		0	0	0			3	2	1	11:07:28	4	12	12	0		
22	11:07:58	11:09:02		0	0	0			1	1	0			5	5	0		
23	11:09:26	11:10:32		0	0	0			0	0	0			9	6	3	11:09:37	7
																	11:10:13	3
																	11:10:19	6
24	11:11:00	11:12:02		1	1	0			2	2	0			12	11	1	11:11:47	7
25	11:12:25	11:13:32		2	2	0			0	0	0			12	9	3	11:12:49	3
																	11:13:01	1
																	11:13:10	3
26	11:13:55	11:15:02		1	1	0			1	1	0			8	7	1	11:14:21	3
			RTOR															
27	11:15:42	11:16:32		1	1	0			2	2	0			12	11	1	11:16:29	7
28	11:17:33	11:18:25		0	0	0			0	0	0			7	5	2	11:17:54	4
																	11:18:13	1
29	11:18:52	11:19:46		1	1	0			2	2	0			16	16	0		
30	11:21:00	11:21:54		2	2	0			0	0	0			11	11	0		
31	11:22:18	11:23:43		2	1	1	11:23:32	3	0	0	0			13	13	0		
32	11:24:07	11:25:32		1	1	0			2	2	0			12	10	2	11:25:14	7
																	11:25:20	7
33	11:25:56	11:27:02		0	0	0			1	1	0			14	10	4	11:26:16	7
																	11:26:39	4
																	11:26:45	7
																	11:26:49	4
			RTOR															
34	11:27:47	11:28:32		0	0	0			1	1	0			16	15	1	11:28:18	3
35	11:28:56	11:30:02		0	0	0			0	0	0			8	7	1	11:29:14	1

Figure A-28. Sample data (approx 1 hr) for intersection of US-301 and Breckenridge Pkwy, lanes 1, 2, and 3 from 10:30:00 to 11:30:00

				Lane 4					Lane 5				
Cycle				Through Lane					Right Turn Lane				
Numb	Start	End		Total Thru	Non- Trucks	Trucks	Time	Type	Total	Non- Trucks	Trucks	Time	Type
1	10:30:25	10:33:02		16	12	4	10:30:45	1	1	1	0		
							10:32:38	7					
							10:32:44	7					
							10:32:58	3					
			RTOR							1			
2	10:33:28	10:34:42		10	8	2	10:34:09	1	1	1	0		
							10:34:31	4					
			RTOR							1			
3	10:35:02	10:36:02		2	1	1	10:35:09	4	0	0	0		
			RTOR							1			
4	10:36:26	10:37:32		6	1	5	10:36:32	4	0	0	0		
							10:36:40	7					
							10:36:52	3					
							10:37:11	7					
							10:37:16	7					
5	10:38:16	10:39:02		8	6	2	10:38:36	6	2	2	0		
							10:38:59	4					
6	10:39:39	10:40:32		7	4	3	10:40:04	4	0	0	0		
							10:40:30	7					
							10:40:34	4					
7	10:41:11	10:42:02		12	9	3	10:41:12	4	0	0	0		
							10:41:56	3					
							10:42:00	3					
8	10:42:27	10:43:32		17	14	3	10:42:53	4	0	0	0		
							10:43:05	7					
							10:43:28	7					
9	10:43:58	10:45:02		8	6	2	10:44:39	7	0	0	0		
							10:45:01	7					
10	10:45:38	10:48:01		12	11	1	10:47:51	1	2	2	0		
11	10:48:44	10:49:31		4	4	0			0	0	0		
12	10:50:15	10:51:03		6	5	1	10:51:04	4	1	1	0		
13	10:51:27	10:54:02		9	8	1	10:53:37	3	0	0	0		
			RTOR							1			
14	10:54:39	10:55:32		8	8	0			0	0	0		
15	10:55:56	10:57:02		1	1	0			1	1	0		
16	10:57:31	11:00:02		9	9	0			0	0	0		
17	11:00:38	11:01:32		7	5	2	11:00:39	3	1	1	0		
							11:01:06	4					
18	11:02:00	11:03:02		6	6	0			1	1	0		
19	11:04:17	11:04:58		9	7	2	11:04:29	7	0	0	0		
							11:04:45	6					
20	11:05:23	11:06:15		5	4	1	11:05:25	3	0	0	0		
21	11:06:41	11:07:34		10	8	2	11:07:20	4	0	0	0		
							11:07:34	7					
22	11:07:58	11:09:02		7	4	3	11:08:00	4	0	0	0		
							11:08:37	7					
							11:09:03	4					
23	11:09:26	11:10:32		6	3	3	11:09:29	4	0	0	0		
							11:10:16	7					
							11:10:27	4					
24	11:11:00	11:12:02		15	14	1	11:11:43	7	0	0	0		
25	11:12:25	11:13:32		12	8	4	11:12:53	4	0	0	0		
							11:13:14	3					
							11:13:18	3					
							11:13:21	7					
26	11:13:55	11:15:02		4	3	1	11:14:53	4	1	0	0		
			RTOR							1			
27	11:15:42	11:16:32		8	7	1	11:16:02	7	2	2	0		
28	11:17:33	11:18:25		10	9	1	11:18:03	3	1	1	0		
29	11:18:52	11:19:46		8	5	3	11:19:15	7	0	0	0		
							11:19:18	7					
							11:19:44	7					
30	11:21:00	11:21:54		11	8	3	11:21:07	7	0	0	0		
							11:21:29	4					
							11:21:34	4					
31	11:22:18	11:23:43		9	8	1	11:22:31	7	1	1	0		
32	11:24:07	11:25:32		10	10	0			2	2	0		
33	11:25:56	11:27:02		4	4	0			1	0	0		
			RTOR							1			
34	11:27:47	11:28:32		10	7	3	11:28:06	3	1	1	0		
							11:28:19	7					
							11:28:28	4					
35	11:28:56	11:30:02		8	6	2	11:29:25	4	0	0	0		
							11:28:56	7					

Figure A-29. Sample data (approx 1 hr) for intersection of US-301 and Breckenridge Pkwy, lanes 4 and 5 from 10:30:00 to 11:30:00

				Lane 1					Lane 2					Lane 3				
Cycle				Left Turn Lane					Left Turn Lane					Through Lane				
Number	Start	End		Total LT	Non- Trucks	Trucks	Time	Type	Total LT	Non- Trucks	Trucks	Time	Type	Total Thru	Non- Trucks	Trucks	Time	Type
1	10:29:33	10:30:40		0	0	0			0	0	0			7	6	1	10:29:38	2
2	10:31:10	10:32:10		3	3	0			2	1	1	10:30:33	7	9	7	2	10:31:27	7
			RTOR														10:31:52	6
3	10:32:34	10:33:56		3	3	0			0	0	0			8	8	0		
4	10:34:18	10:35:10		0	0	0			0	0	0			7	5	2	10:34:42	6
																	10:34:46	1
5	10:35:34	10:38:10		7	6	1	10:35:35	7	2	2	0			16	14	2	10:36:03	4
																	10:37:55	7
6	10:38:49	10:39:40		2	2	0			2	2	0			11	9	2	10:39:03	4
																	10:39:35	4
7	10:40:07	10:41:10		2	2	0			0	0	0			8	5	3	10:40:37	7
																	10:40:45	4
																	10:40:52	4
8	10:41:52	10:44:10		2	2	0			2	1	1	10:41:42	4	19	15	4	10:42:15	4
																	10:42:30	7
																	10:42:45	3
																	10:44:05	7
9	10:45:07	10:47:10		4	4	0			0	0	0			21	18	3	10:45:42	7
																	10:46:36	0
																	10:47:09	7
10	10:47:58	10:48:40		1	1	0			2	2	0			9	9	0		
11	10:49:20	10:51:40		2	2	0			0	0	0			21	19	2	10:51:18	7
																	10:51:39	7
12	10:52:08	10:53:10		1	1	0			2	2	0			10	10	0		
13	10:53:40	10:54:40		2	2	0			1	1	0			9	9	0		
14	10:55:09	10:56:10		2	1	1	10:55:12	7	0	0	0			11	8	3	10:55:34	7
																	10:55:54	4
																	10:55:57	8
15	10:56:38	10:57:40		2	2	0			1	1	0			3	2	1	10:56:57	2
16	10:58:07	10:59:10		0	0	0			0	0	0			7	7	0		
17	10:59:34	11:02:10		3	3	0			3	3	0			11	11	0		
18	11:02:48	11:03:40		1	1	0			0	0	0			9	8	1	11:03:03	8
19	11:04:04	11:05:10		2	2	0			0	0	0			8	8	0		
20	11:05:34	11:06:40		2	2	0			2	2	0			25	23	2	11:07:07	4
																	11:07:20	7
21	11:07:04	11:08:10		1	1	0			2	2	0			16	12	4	11:09:15	7
																	11:10:52	7
																	11:10:57	0
																	11:11:01	4
22	11:08:43	11:11:08		5	5	0			4	3	1	11:12:56	7	26	22	4	11:13:24	3
																	11:13:36	7
																	11:13:55	3
																	11:14:01	3
23	11:11:35	11:14:10		3	3	0			2	2	0			7	6	1	11:15:00	3
24	11:14:34	11:15:40		0	0	0			0	0	0			11	10	1	11:17:10	7
25	11:16:35	11:17:10		2	2	0			1	1	0			10	9	1	11:18:48	4
26	11:17:37	11:18:40		1	1	0			0	0	0			12	9	3	11:19:11	1
																	11:19:58	4
																	11:20:02	4
27	11:19:06	11:20:10		3	3	0			1	1	0			14	12	2	11:22:13	4
																	11:22:15	4
28	11:20:34	11:23:10		3	3	0			0	0	0			4	4	0		
29	11:23:34	11:24:40		2	2	0			1	1	0			10	9	1	11:25:53	7
30	11:25:06	11:26:10		4	4	0			4	4	0			27	23	4	11:26:54	4
																	11:26:59	4
																	11:29:02	7
																	11:29:50	1
31	11:26:41	11:31:00		0	0	0			0	0	0			9	8	1	11:32:06	3

Figure A-30. Sample data (approx 1 hr) for intersection of US-301 and Sligh Ave, lanes 1, 2, and 3 from 10:30:00 to 11:30:00

				Lane 4					Lane 5				
Cycle				Through Lane					Right Turn Lane				
Number	Start	End		Total Thru	Non- Trucks	Trucks	Time	Type	Total	Non- Trucks	Trucks	Time	Type
1	10:29:33	10:30:40		5	4	1	10:29:26	2	0	0	0		
2	10:31:10	10:32:10		8	7	1	10:31:29	1	1	0			
			RTOR							1			
3	10:32:34	10:33:56		6	4	2	10:33:19	7	0	0	0		
							10:33:42	3					
4	10:34:18	10:35:10		4	4	0			0	0	0		
5	10:35:34	10:38:10		8	5	3	10:37:30	4	1	0	1	10:36:05	4
							10:37:37	4					
							10:38:03	7					
6	10:38:49	10:39:40		9	8	1	10:39:18	7	0	0	0		
7	10:40:07	10:41:10		8	7	1	10:40:44	4	0	0	0		
8	10:41:52	10:44:10		16	12	4	10:41:55	7	0	0	0		
							10:41:59	7					
							10:42:48	3					
							10:43:50	4					
9	10:45:07	10:47:10		9	8	1	10:45:23	7	0	0	0		
10	10:47:58	10:48:40		5	5	0			0	0	0		
11	10:49:20	10:51:40		8	7	1	10:50:30	7	0	0	0		
12	10:52:08	10:53:10		5	5	0			0	0	0		
13	10:53:40	10:54:40		4	3	1	10:54:26	3	0	0	0		
14	10:55:09	10:56:10		6	6	0			0	0	0		
15	10:56:38	10:57:40		2	2	0			0	0	0		
16	10:58:07	10:59:10		5	5	0			1	1	0		
17	10:59:34	11:02:10		10	8	2	11:01:50	4	0	0	0		
							11:02:01	7					
18	11:02:48	11:03:40		6	5	1	11:03:34	4	0	0	0		
19	11:04:04	11:05:10		9	8	1	11:04:52	4	0	0	0		
20	11:05:34	11:06:40		14	10	4	11:05:46	7	0	0	0		
							11:06:09	7					
							11:06:18	3					
							11:07:34	7					
21	11:07:04	11:08:10		10	5	5	11:08:45	0	1	0	1	11:10:37	7
							11:09:02	4					
							11:10:21	4					
							11:10:24	4					
							11:11:02	4					
22	11:08:43	11:11:08		20	16	4	11:12:26	7	0	0	0		
							11:13:36	4					
							11:13:59	3					
							11:14:01	7					
23	11:11:35	11:14:10		4	3	1	11:15:38	0	0	0	0		
24	11:14:34	11:15:40		5	4	1	11:16:51	7	0	0	0		
25	11:16:35	11:17:10		8	7	1	11:18:48	7	0	0	0		
26	11:17:37	11:18:40		9	9	0			0	0	0		
27	11:19:06	11:20:10		13	11	2	11:20:43	7	1	1	0		
							11:22:20	4					
28	11:20:34	11:23:10		6	5	1	11:23:41	7	0	0	0		
29	11:23:34	11:24:40		6	6	0			1	1	0		
30	11:25:06	11:26:10		18	14	4	11:27:16	7	3	3	0		
							11:27:38	7					
							11:29:05	7					
							11:30:37	0					
31	11:26:41	11:31:00		6	5	1	11:31:39	0	0	0	0		

Figure A-31. Sample data (approx 1 hr) for intersection of US-301 and Sligh Ave, lanes 4 and 5 from 10:30:00 to 11:30:00

			Lane 1					Lane 2					Lane 3				
Cycle			Left Turn					Through Lane					Through Lane				
Num	Start	End	Total	Non- Trucks	Trucks	Time	Type	Total	Non- Trucks	Trucks	Time	Type	Total	Non- Trucks	Trucks	Time	Type
1	10:29:59	10:30:15	3	1	2	10:31:25	4	5	5				9	8	1	10:31:37	3
						10:31:31	3										
2	10:30:40	10:31:06	6	6				5	5				4	3	1	10:32:43	1
3	10:31:30	10:32:06						2	2				8	7	1	10:34:16	7
4	10:32:32	10:33:06						3	3				1	1			
5	10:33:33	10:34:13															
6	10:34:38	10:35:00															
7	10:35:35	10:36:29						4	3	1	10:36:06						
8	10:37:03	10:37:24															
9	10:37:46	10:38:01	3	1	2	10:38:19	6	1	1				2	2			
						10:38:31	6										
10	10:38:40	10:40:52	2	2				7	6	1	10:39:48	4	24	20	4	10:38:50	4
																10:38:57	4
																10:39:03	4
																10:40:16	6
11	10:41:23	10:41:39	3	2	1	10:41:30	4	1	1				2	2			
12	10:42:04	10:42:23	2	1	1	10:42:01	7	4	4				5	5			
13	10:42:44	10:43:55						9	8	1	10:43:47	4	14	9	5	10:42:49	6
																10:43:20	4
																10:43:30	7
																10:43:34	7
																10:43:56	3
14	10:44:24	10:44:57	4	1	3	10:44:27	4	2	2				3	3			
						10:44:40	4										
						10:44:57	4										
15	10:45:24	10:45:52	5		5	10:45:27	4										
						10:45:31	4										
						10:45:41	4										
						10:45:42	4										
						10:45:50	7										
16	10:46:14	10:46:41	1	1				9	9				6	5	1	10:46:32	7
17	10:47:11	10:48:02						5	5				1	1			
18	10:49:29	10:49:55	2	2				2	1	1	10:48:59	4	3	3			
19	10:50:26	10:51:13	1	1				6	6				6	6			
20	10:50:26	10:51:13						5	4	1	10:50:35	6	6	6			
21	10:51:35	10:52:14						1		1	10:51:43	7	7	6	1	10:52:15	7
22	10:52:36	10:53:55	1		1	10:53:10	7	5	5				6	6			
23	10:53:40	10:53:55	1		1	10:53:51	7	5	5				4	3	1	10:53:48	1
24	10:54:25	10:55:31	4	4				7	7				5	4	1	10:55:36	3

Figure A-32. Sample data (approx 30 min) for intersection of US-301 and Maislin Rd, all lanes from 10:30:00 to 10:55:31

25	10:56:05	10:57:20						5	5				8	8			
26	10:57:42	10:57:58						1	1				4	4			
27	10:58:22	10:58:45	4	1	3	10:58:26	6						2	2			
						10:58:38	4										
						10:58:45	3										
28	10:59:16	10:59:45	2	1	1	10"59:19	4	1	1				3	3			
29	11:00:10	11:00:56	4	4				6	6				4	4			
30	11:01:18	11:01:36						1	1				2	2			
31	11:02:05	11:02:44	1	1				2	2				4	4			
32	11:03:07	11:03:44	5	5				5	4	1	11:03:23	3	5	4	1	11:03:11	4
33	11:03:54	11:04:10															
34	11:04:42	11:05:18						3	3				1	1			
35	11:05:45	11:05:59	3	3				6	6				7	6	1	10:04:50	4
36	11:06:10	11:06:53	2	1	1	11:06:14	4	7	7				2	2			
37	11:07:24	11:08:06	1		1	11:07:33	3	11	11				5	3	2	11:07:29	6
																11:07:35	3
38	11:08:37	11:09:22	2		2	11:08:39	3	9	8	1	11:09:26	7	8	8			
						11:08:48	4										
39	11:09:47	11:10:20						10	9	1	11:10:09	4	4	4			
40	11:10:42	11:11:20						2	1	1	11:10:48	4	2	1	1	11:11:16	4
41	11:11:54	11:12:14	1	1				4	2	2	11:12:04	4	4	2	2	11:11:58	4
											11:12:09	7				11:12:11	4
42	11:12:36	11:13:08	1	1				3	3				1	1			
43	11:13:30	11:14:01	1	1				8	8				4	3	1	11:13:39	7
44	11:14:23	11:14:48	1	1				1	1				4	1	3	11:14:25	4
																11:14:42	4
																11:14:52	3
45	11:14:58	11:15:31	1		1	11:15:00	3	5	4	1	11:15:08	3	7	6	1	11:15:01	7
46	11:15:56	11:16:36	2	1	1	11:16:04	3	4	4				3	3			
47	11:17:13	11:17:40	1		1	11:17:01	3	3	3				6	6			
48	11:18:05	11:18:30	1	1				8	7	1	11:18:27	7	4	3	1	11:18:11	4
49	11:18:40	11:19:30	2	2				7	7				4	4			
50	11:19:41	11:20:25	1	1				6	4	2	11:19:50	4	4	4			
											11:20:08	3					
51	11:20:46	11:21:24	3	2	1	11:20:50	3	11	111				4	4			
52	11:21:34	11:22:48	2		2	11:21:36	4	2	2				4	3	1	11:22:05	7
						11:20:08	3										
53	11:23:15	11:24:09	4	2	2	11:23:21	4	9	9				5	5			
						11:23:28	4										
54	11:24:32	11:25:08	3	2	1	11:24:35	4	4	3	1	11:24:45	7	6	5	1	11:24:54	3
55	11:25:31	11:26:12	3	2	1	11:25:43	6	3	3				3	3			
56	11:26:33	11:27:01						9	8	1	11:26:56	4	6	6			
57	11:27:25	11:27:55	1	1				1	1				1	1			
58	11:28:23	11:29:12	3	2	1	11:28:25	3	4	4				6	4	2	11:28:25	3
																11:28:36	7
59	11:29:47	11:30:26	1	1				11	11				8	7	1	11:30:17	7

Figure A-33. Sample data (approx 30 min) for intersection US-301 and Maislin Rd, all lanes from 10:55:31 to 11:30:00

Cycle				Left Turn Cycle		Lane 1					Lane 2				
						Left Turn Lane					Left Turn Lane				
Number	Start	End		Start	End	Total	Non- Trucks	Trucks	Time	Type	Total Thru	Non- Trucks	Trucks	Time	Type
1	10:30:36	10:31:15				1	1								
			RTOR												
2	10:32:07	10:32:48				1	1				3	3			
3	10:33:26	10:34:03				2	2				3	3			
4	10:34:49	10:35:33				3	3				2	2			
5	10:36:33	10:36:54									1				
6	10:37:17	10:27:32													
7	10:38:14	10:38:30													
			RTOR												
8	10:38:57	10:39:40				2	2				2	2			
			RTOR												
9	10:40:39	10:41:08				2	2				3	3			
			RTOR												
10	10:42:06	10:42:32				2	2				3	3			
11	10:43:12	10:44:00				2	2				6	5	1	10:43:21	7
			RTOR												
12	10:44:51	10:45:30				2	2				2	2			
13	10:46:23	10:46:57				1	1				2	2			
			RTOR												
			RTOR												
			RTOR												
14	10:47:42	10:48:18				2	2				3	3			
15	10:49:02	10:49:22													
16	10:50:01	10:50:18													
17	10:50:43	10:51:22				1	1				5	5			
			RTOR												
18	10:52:29	10:52:54		10:52:13	10:52:24	4	4				2		2	10:52:14	4
														10:52:23	6
19	10:53:42	10:54:32				5	4	1	10:53:51	7	7	7			
			RTOR												
20	10:55:18	10:56:04				2	2				2	2			
21	10:56:46	10:57:23				1	1				1	1			
22	10:57:51	10:58:48													
				10:58:45	10:58:55	2	2								
23	10:58:49	10:59:10													
24	10:59:50	11:00:05									1	1			
25	11:00:33	11:01:02									2	2			
26	11:01:29	11:02:05				2	2				2	2			
27	11:02:52	11:03:22				2	2				1	1			
28	11:03:45	11:04:30				1	1								
29	11:05:33	11:06:01				4	4				3	3			
30				11:06:34	11:06:44	1	1				2	2			
	11:06:46	11:07:05													
31	11:07:50	11:08:37				2	2				5	5			
			RTOR												
			RTOR												
32	11:09:27	11:10:23				4	4				6	6			
			RTOR												
33	11:11:05	11:12:01				6	6				4	4			
				11:12:50	11:13:00						2	2			
34	11:13:00	11:13:23													
35	11:14:13	11:14:52				2	2				1		1	11:14:15	7
36	11:15:22	11:16:03				2	2				5	5			
37	11:16:46	11:17:25				1	1				2	2			
38	11:18:09	11:18:58				2	2				2	2			
39	11:19:47	11:20:27				1	1				1	1			
40	11:21:06	11:21:43				1	1				3	3			
			RTOR												
41	11:22:26	11:23:15				2	2				6	6			
			RTOR												
42	11:23:41	11:23:56													
				11:24:36	11:24:50	2	2				4	4			
			RTOR												
43	11:24:50	11:25:16													
			RTOR												
44	11:26:03	11:26:46									4	4			
45	11:27:32	11:28:11				2	2				4	4			
46	11:28:48	11:29:27													

Figure A-34. Sample data (approx 1 hr) for intersection of US-301 and Harney Rd, lanes 1 and 2 from 10:30:00 to 11:30:00

				Lane 3					Lane 4					Lane 5				
Cycle				Through Lane					Through Lane					Right Turn Lane				
Number	Start	End		Total Thru	Non- Trucks	Trucks	Time	Type	Total LT	Non- Trucks	Trucks	Time	Type	Total LT	Non- Trucks	Trucks	Time	Type
1	10:30:36	10:31:15		7	7				3	2	1	10:31:11	7	1	1			
			RTOR											1	1		10:31:48	
2	10:32:07	10:32:48		4	4				3	3								
3	10:33:26	10:34:03		3	3				3	1	2	10:33:30	3	3	2	1	10:33:47	1
												10:33:41	6					
4	10:34:49	10:35:33		5	4	1	10:35:03	7	1		1	10:35:06	7	1	1			
5	10:36:33	10:36:54		5	4	1	10:36:55	4	5	4	1	10:36:34	7					
6	10:37:17	10:27:32							1		1	10:37:18	3					
7	10:38:14	10:38:30		2	2				1		1	10:38:21	5	1	1			
			RTOR											1	1		10:38:48	
8	10:38:57	10:39:40		3	3				2	1	1	10:39:12	7	1		1	10:39:30	4
			RTOR											1	1		10:40:01	
9	10:40:39	10:41:08		6	3	3	10:40:42	7	5	4	1	10:40:47	4					
							10:40:52	4										
							10:40:57	4										
			RTOR											1	1		10:41:41	
10	10:42:06	10:42:32		3	3				4	4								
11	10:43:12	10:44:00		6	6				1	1				3	2	1	10:43:55	6
			RTOR											1	1		10:44:48	
12	10:44:51	10:45:30		4	3	1	10:45:07	3	7	3	4	10:45:02	4	1	1			
												10:45:08	7					
												10:45:12	7					
												10:45:23	3					
13	10:46:23	10:46:57		2	1	1	10:46:29	4?	1		1	10:46:35	4					
			RTOR											3	2	1	10:47:11	
			RTOR														10:47:14	
			RTOR														10:47:28	7 (truck)
14	10:47:42	10:48:18		4	4				2	2								
15	10:49:02	10:49:22		1					1	1								
16	10:50:01	10:50:18		3	3				1	1								
17	10:50:43	10:51:22		6	6				5	5				1	1			
			RTOR											1	1		10:51:33	
18	10:52:29	10:52:54		4	4													
19	10:53:42	10:54:32							3	3				1	1			
			RTOR											1	1		10:54:48	
20	10:55:18	10:56:04		7	7				2	1	1	10:55:21	1					
21	10:56:46	10:57:23		4	4				5	4	1	10:56:55	3					
22	10:57:51	10:58:48		3	3													
23	10:58:49	10:59:10		2	2				4	4				1	1			
24	10:59:50	11:00:05		2	2									1	1			
25	11:00:33	11:01:02		4	4				1	1								
26	11:01:29	11:02:05		2	2				1	1								
27	11:02:52	11:03:22		3	3				2	2				1	1			
28	11:03:45	11:04:30		3	3				1		1	11:04:25	7	2	2			
29	11:05:33	11:06:01		4	4				3	2	1	11:05:54	4	2	2			
30																		
	11:06:46	11:07:05		3	2	1	11:06:52	7	2	2								
31	11:07:50	11:08:37		4	4				1	1				1	1			
			RTOR											1		1	11:09:02	6(truck)
			RTOR											1	1		11:09:02	
32	11:09:27	11:10:23		12	11	1	11:10:17	7	6	5	1	11:09:30	3					
			RTOR											1	1		11:10:48	
33	11:11:05	11:12:01		6	4	2	11:11:18	4	4	3	1	11:11:59	4?	1	1			
34	11:13:00	11:13:23		2	1	1	11:13:05	4	6	4	2	11:13:11	4					
												11:18:18	4					
35	11:14:13	11:14:52		6	6				4	4				1	1			
36	11:15:22	11:16:03		5	3	2	11:15:44	3	4	1	3	11:15:47	4	1	1			
							11:16:06	3				11:15:55	4					
												11:15:58	7					
37	11:16:46	11:17:25		5	5				2	2				1	1			
38	11:18:09	11:18:58		5	5				2	1	1	11:18:14	6					
39	11:19:47	11:20:27		10	9	1	11:20:05	7	7	5	2	11:19:48	7	1	1			
												11:19:54	7					
40	11:21:06	11:21:43		5	3	2	11:21:12	4	5	4	1	11:21:18	3	1	1			
							11:21:19	3										
			RTOR											1	1		11:22:20	
41	11:22:26	11:23:15		3	3				2	2				1		1	11:23:09	7
			RTOR											1	1		11:23:27	
42	11:23:41	11:23:56																
			RTOR											1	1		11:24:37	
43	11:24:50	11:25:16		3	3				3	3								
			RTOR											1	1		11:25:31	
44	11:26:03	11:26:46		3	1	2	11:26:06	3	5	3	2	11:26:13	3					
							11:26:09	3				11:26:47	6					
45	11:27:32	11:28:11		8	8				6	6								
46	11:28:48	11:29:27		1	1				2		2	11:28:29	3					
												11:29:30	7					

Figure A-35. Sample data (approx 1 hr) for intersection of US-301 and Harney Rd, lanes 3, 4, and 5 from 10:30:00 to 11:30:00

			Lane 1					Lane 2					Lane 3				
			Left					Thru					Thru				
Cycle	Start	End	LT	Non-Trucks	Trucks	Time	Type	Thru	Non-Trucks	Trucks	Time	Type	LT	Non-Trucks	Trucks	Time	Type
26	12:31:05	12:31:59						13	13				14	14			
27	12:33:05	12:33:59	1	1				9	9				10	9	1	12:33:55	4
28	12:35:24	12:35:59	1		1	12:36:01	4	12	12				15	14	1	12:35:50	4
29	12:37:04	12:37:59	1		1	12:37:33	3	13	13				11	10	1	12:37:42	3
30	12:39:21	12:39:59	1		1	12:39:11	3	10	7	3	12:39:48	6	11	9	2	12:39:23	4
											12:39:51	1				12:39:52	4
											12:39:56	4					
31	12:41:10	12:41:59	0					12	11	1	12:41:47	7	14	14			
32	12:43:10	12:44:00	0					13	13				11	10	1	12:43:50	7
33	12:45:17	12:44:00	0					7	7				10	9	1	12:46:02	2
34	12:47:11	12:44:00	1					17	17				12	9	3	12:47:12	6
																12:47:38	4
																12:47:43	1
35	12:49:08	12:50:00	1					9	9				9	9			
36	12:51:24	12:52:00	0					10	8	2	12:51:42	0	9	7	2	12:51:42	4
											12:51:56	2				12:51:49	4
37	12:52:50	12:54:00	0					9	9				5	4	1	12:52:56	4
38	12:55:22	12:56:00	0					17	17				12	7	5	12:55:25	1
																12:55:31	4
																12:55:36	7
																12:55:53	1
																12:56:01	4
39	12:56:50	12:58:00	1					17	16	1	12:52:53	4	9	9			
40	12:59:19	13:00:00	1		1	13:00:02	4	13	12	1	12:59:39	7	15	15			
41	13:01:03	13:02:00	0					15	15				8	7	1	13:01:24	7
42	13:03:25	13:04:00	0					9	7	2	13:03:44	1	7	4	3	13:03:27	1
											13:03:46	1				13:03:44	4
																13:03:48	4
43	13:05:10	13:06:00	0					16	14	2	13:05:40	4	12	8	4	13:05:14	3
											13:05:53	4				13:05:30	6
																13:05:48	1
																13:05:53	4
44	13:07:21	13:08:00	1					10	8	2	13:07:56	2	8	5	3	13:07:33	2
											13:08:03	4				13:07:39	4
																13:07:54	4
45	13:08:50	13:10:00	1					6	6				9	9			
46	13:11:04	13:12:00	0					10	10				12	11	1	13:11:27	4
47	13:13:12	13:14:00	1					13	11	2	13:13:36	7	7	5	2	13:13:23	7
											13:13:41	4				13:13:34	1
48	13:15:24	13:16:00	0					11	9	2	13:15:31	4	10	10			
											13:15:39	7					
49	13:17:12	13:18:00	0					14	12	2	13:17:23	7	14	13	1	13:17:57	0
											13:17:28	4					
50	13:19:05	13:20:00	2					6	6				7	7			
51	13:21:11	13:22:00	0					13	11	2	13:21:15	4	8	6	2	13:21:46	4
											13:22:02	4				13:21:49	4
52	13:23:22	13:24:00	1		1	13:23:58	7	12	9	3	13:23:28	1	12	10	2	13:23:28	7
											13:23:41	7				13:24:00	4
											13:23:53	8					
53	13:25:06	13:26:00	0					7	5	2	13:25:29	4	14	12	2	13:25:13	7
											13:25:35	1				13:25:52	7
54	13:27:18	13:28:00	0					8	8				8	5	3	13:27:34	4
																13:27:49	1
																13:27:59	0
55	13:29:11	13:30:00	1					12	11	1	13:29:32	4	10	7	3	13:29:19	7
																13:29:27	7
																13:29:35	4

Figure A-36. Sample data (approx 1 hr) for intersection of US-1 and Canal St, all lanes from 12:30:00 to 13:30:00

			Lane 1					Lane 2					Lane 3				
			Left					Thru					Thru				
Cycle	Start	End	LT	Non-Trucks	Trucks	Time	Type	Thru	Non-Trucks	Trucks	Time	Type	Thru	Non-Trucks	Trucks	Time	Type
26	12:30:04	12:31:06	2	2				14	13	1	12:30:17	1	14	11	3	12:30:00	3
																12:30:34	4
																12:30:47	4
27	12:31:54	12:32:59						14	14				14	14			
28	12:43:02	12:34:59						15	15				13	12	1	12:34:38	4
29	12:35:46	12:36:58	3	3				11	11				15	13	2	12:35:50	4
																12:36:41	4
30	12:37:46	12:38:59	1	1				8	8				13	12	1	12:38:23	7
31	12:40:00	12:40:49	0					17	13	4	12:40:37	6	10	6	4	12:40:02	1
											12:40:40	1				12:40:18	4
											12:40:44	4				12:40:46	4
											12:40:51	4				12:40:59	8
32	12:42:11	12:43:00	1					17	16	1	12:42:46	7	18	17	1	12:42:28	4
33	12:44:17	12:45:04	0					13	13				13	12	1	12:44:43	7
34	12:45:52	12:46:59	0					7	7				15	14	1	12:46:49	2
35	12:47:47	12:48:59	1					20	20				20	17	3	12:48:03	6
																12:48:24	4
																12:48:33	1
36	12:49:47	12:50:59	0					13	13				12	9	3	12:49:52	7
																12:50:18	7
																12:50:21	7
37	12:52:17	12:53:04	0					12	11	1	12:52:45		12	9	3	12:52:44	0
																12:52:48	4
																12:52:54	4
38	12:53:52	12:54:59	1					16	15	1	12:54:24	8	8	6	2	12:54:12	4
																12:52:00	4
39	12:55:47	12:56:59	1					18	18				14	8	6	12:56:17	1
																12:56:27	4
																12:56:30	7
																12:56:45	7
																12:56:54	1
																12:56:57	4
40	12:58:00	12:59:01	0					15	14	1	12:58:10	4	13	11	2	12:58:04	4
																12:58:16	4

Figure A-37. Sample data (approx 30 min) for intersection of US-1 and Fairfax St, all lanes from 12:30:00 to 12:59:01

41	13:00:04	13:01:04	1	14	13	1	13:00:27	7	15	15			
42	13:01:52	13:02:58	0	14	14				15	14	1	13:02:20	7
43	13:03:46	13:04:59	0	8	6	2	13:04:33	1	17	12	5	13:03:52	4
							13:04:35	1				13:04:05	4
												13:04:21	1
												13:04:38	4
												13:04:42	4
44	13:05:47	13:06:59	2	15	12	3	13:06:07	3	16	12	4	13:06:00	7
							13:06:25	4				13:06:23	6
							13:06:41	4				13:06:37	1
												13:06:43	4
45	13:07:47	13:08:59	1	10	6	4	13:07:54	1	15	11	4	13:08:25	2
							13:08:08	4				13:08:42	4
							13:08:42	2				13:08:46	4
							13:08:46	4				13:08:49	7
46	13:10:00	13:10:59	1	8	8				11	11			
47	13:10:47	13:12:59	1	11	10	1	13:12:22	4	16	15	1	13:12:18	2
48	13:14:03	13:14:59	1	12	11	1	13:14:21	7	13	11	2	13:14:27	7
												13:14:33	1
49	13:16:00	13:17:02	1	8	7	1	13:16:32	4	17	16	1	13:16:33	7
50	13:17:50	13:19:00	1	17	14	3	13:17:55	7	20	18	2	13:18:02	4
							13:18:18	7				13:18:29	4
							13:18:49	0					
51	13:20:00	13:21:01	0	8	8				8	8			
52	13:21:49	13:23:00	0	16	14	2	13:22:12	4	12	9	3	13:21:56	1
							13:22:32	4				13:22:08	7
												13:22:55	4
53	13:24:01	13:25:03	1	17	14	3	13:24:04	4	14	11	3	13:24:14	4
							13:24:24	1				13:24:34	7
							13:24:35	7				13:25:05	4
54	13:26:07	13:27:00	0	14	12	2	13:26:30	4	18	16	2	13:26:35	7
							13:26:37	1				13:26:47	7
55	13:27:48	13:29:00	0	11	11				12	9	3	13:28:25	4
												13:28:42	1
												13:28:47	0
56	13:29:48	13:31:00	0	12	11	1	13:30:13	4	12	9	3	13:30:05	7
												13:30:11	7
												13:30:29	4

Figure A-38. Sample data (approx 30 min) for intersection of US-1 and Fairfax St, all lanes from 12:59:02 to 13:31:00

			Lane 1					Lane 2					Lane 3					Lane 4				
			Left					Thru					Thru					Through and Right				
Cycle	Start	End	LT	Non-Truck	Trucks	Time	Type	Thru	Non-Truck	Trucks	Time	Type	Thru	Non-Trucks	Trucks	Time	Type	RT	Non-Trucks	Trucks	Time	Type
18	12:29:03	12:30:14						14	11	3	12:29:14	7	8	8				7	6	1	12:29:45	6
											12:29:29	7										
											12:29:50	5										
19	12:31:01	12:32:14						13	12	1	12:31:18	1	14	10	4	12:31:05	4	8	8			
																12:31:31	3					
																12:31:34	4					
																12:31:46	4					
20	12:33:02	12:34:15	1	1				14	14				11	11				9	9			
21	12:35:03	12:36:15						12	12				12	11	1	12:35:34	4	6	6			
22	12:37:03	12:38:15	1	1				12	11	1	12:37:11	6	12	11	1	12:23:27	4	13	13			
23	12:39:01	12:40:15	1					5	5				9	8	1	12:39:25	7	7	7			
24	12:41:03	12:42:18	1					12	8	4	12:41:28	6	17	13	4	12:41:12	1	2	2			
											12:41:32	1				12:41:32	4					
											12:41:36	4				12:41:42	4					
											12:41:41	4				12:42:20	4					
25	12:42:52	12:44:15	0					20	18		12:43:42	4	16	15	1	12:43:31	4	7	7			
											12:44:07	0										
26	12:45:17	12:46:15	1					8	8				9	8	1	12:45:44	7	7	7		13:45:19	4
																					13:45:49	3
27	12:47:17	12:50:15	1					26	26				25	22	3	12:48:49	4	15	15			
																12:49:16	4					
																12:49:24	1					
28	12:51:03	12:52:15	0					11	11				11	9	2	12:51:22	0	8	7	1	13:51:14	4
																12:52:11	1					
29	12:52:49	12:56:16	0					28	27	1	12:53:40	2	22	19	3	12:53:39	0	9	7	2	13:53:52	4
																12:55:13	4				13:54:00	4
																12:55:17	4					
30	12:57:31	12:58:21	2					8	7	1	12:58:06	4	9	7	2	12:57:40	4	13	12	1	13:57:35	1
																12:58:04	4					
31	12:59:10	13:00:15	2					12	11	1	12:59:17	4	12	10	2	12:59:17	4	1	1			
																12:59:33	4					
32	13:01:19	13:04:16	4					23	22	1	13:01:35	0	26	23	3	13:01:27	4	14	14			
																13:02:49	7					
																13:03:17	7					

Figure A-39. Sample data (approx 30 min) for intersection of US-1 and Myrtle Ave, all lanes from 12:30:00 to 13:04:16

33	13:05:04	13:06:19	1	8	7	1	13:05:31	1	12	7	5	13:05:08	4	7	7			
												13:05:17	4					
												13:05:30	1					
												13:05:39	4					
												13:05:44	4					
34	13:07:04	13:08:16	0	15	12	3	13:07:13	3	9	5	4	13:07:14	3	8	7	1	13:07:10	7
							13:07:26	4				13:07:23	6					
							13:07:29	4				13:07:33	1					
												13:07:37	4					
35	13:09:04	13:10:19	0	10	6	4	13:09:09	4	15	12	3	13:09:37	4	5	5			
							13:09:18	4				13:09:40	4					
							13:09:33	2				13:10:14	4					
							13:09:35	4										
36	13:11:18	13:12:16	1	7	7				7	7				5	5			
37	13:13:18	13:14:15	0	10	8	2	13:13:39	4	11	11				7	7			
							13:13:43	3										
38	13:14:48	13:16:16	1	10	8	2	13:15:09	7	11	9	2	13:15:28	1	16	15	1	13:15:23	3
							13:15:16	4				13:15:51	4					
39	13:17:04	13:18:16	0	7	5	2	13:17:21	7	7	7				8	8			
							13:17:25	4										
40	13:18:49	13:20:16	1	11	8	3	13:18:57	7	11	9	2	13:19:14	4	13	13			
							13:19:09	7				13:19:40	7					
							13:19:14	4										
41	13:21:04	13:22:16	2	6	6				5	4	1	13:22:15	1	8	8			
42	13:22:53	13:26:16	2	23	19	4	13:23:19	4	23	21	2	13:23:43	4	17	15	2	13:22:58	1
							13:23:26	4				13:25:18	7				13:23:07	3
							13:25:03	4										
							13:25:12	1										
43	13:27:04	13:28:19	0	11	10	1	13:27:38	1	13	11	2	13:27:09	4	7	6	1	13:27:30	4
												13:27:48	7					
44	13:29:20	13:30:16	0	16	16				10	7	3	13:29:41	4	4	4			
												13:29:47	1					
												13:29:50	0					

Figure A-40. Sample data (approx 30 min) for intersection of US-1 and Myrtle Ave, all lanes from 13:04:17 to 13:30:00

			Lane 1					Lane 2					Lane 3					Lane 4				
			Left					Thru					Thru					Thru and Right				
Cycle	Start	End	LT	Non-Trucks	Truck	Time	Typ	Thru	Non-Trucks	Truck	Time	Typ	Thru	Non-Trucks	Truck	Time	Type	RT	Non-Trucks	Truck	Time	Typ
1	12:31:13	12:32:19	2	1	1	12:31:06	7	12	11	1	12:31:49	1	15	11	4	12:31:49	7	15	15			
																12:32:02	3					
																12:32:05	4					
																12:32:15	4					
2	12:33:21	12:34:19						15	15				13	13				13	13			
3	12:35:18	12:36:19	2	2				10	10				14	14				11	10	1	12:36:06	4
4	12:37:28	12:38:05						12	11	1	12:37:56	6	13	13				13	11	2	12:37:50	3
																					12:38:07	4
5	12:39:08	12:40:05	1	1				5	5				9	8	1	12:39:45	7	7	7			
6	12:40:50	12:42:05	1	1				13	9	4	12:41:34	1	12	9	3	12:41:43	6	8	8			
											12:41:46	1				12:41:48	4					
											12:41:50	4				12:41:58	4					
											12:41:57	4										
7	12:42:50	12:44:05	1	1				15	14	1	12:43:57	0	13	12	1	12:42:55	4	13	12	1	12:43:46	4
8	12:44:54	12:46:05						16	15	1	12:44:56	0	12	11	1	12:46:00	7	9	7	2	12:45:53	4
																					12:46:04	2
9	12:46:52	12:48:05	1	1				10	10				8	8				8	8			
10	12:49:06	12:50:04						13	12	1	12:49:37	1	8	6	2	12:49:22	6	15	15			
																12:49:32	4					
11	12:50:57	12:52:05						16	16				15	13	2	12:51:32	7	8	8			
																12:51:44	7					
12	12:52:39	12:54:05	3	3				14	13	1	12:53:55	2	7	5	2	12:52:43	1	11	10	1	12:54:08	4
																12:53:54	0					
13	12:54:52	12:56:05	1	1				14	13	1	12:55:27	0	11	9	2	12:55:28	4	6	5	1	12:54:58	4
																12:55:33	4					
14	12:57:05	12:58:05						10	10				11	8	3	12:58:01	1	9	9			
																12:58:07	4					
																12:58:09	7					
15	12:59:23	13:00:05	1	1				12	10	2	12:59:38	4	18	16	2	12:59:33	1	15	14	1	12:59:58	4
											12:59:54	4				12:59:47	4					
16	13:01:15	13:02:05	1	1				10	10				12	10	2	13:01:54	7	15	15			
																13:01:57	4					

Figure A-41. Sample data (approx 30 min) for intersection of US-1 and Moncrief Rd, all lanes from 12:31:00 to 13:02:05

			Lane 1					Lane 2							Lane 3				
			Left					Thru					Right Turn Cycle		Right				
Cycle	Start	End	Total	Non-Truc	Truck	Time	Type	Total	Non-Tru	Truck	Time	Type	Start	End	Total	Non-Tru	Truck	Time	Type
1	11:01:02	11:01:32	0	0	0			8	6	2	11:01:04	7			0	0	0		
											11:01:17	7							
2	11:03:23	11:03:52	3	3	0			3	3	0					0	0	0		
														RTOR	1	1	0		
3	11:05:42	11:06:04	2	2	0			3	3	0					3	3	0		
4	11:08:02	11:08:27	1	1	0			5	5	0			11:08:35	11:08:47	0	0	0		
5	11:10:22	11:10:46	0	0	0			1	1	0					3	3	0		
6	11:12:42	11:13:15	2	2	0			2	2	0					3	3	0		
7	11:15:02	11:15:22	2	2	0			3	3	0					0	0	0		
8	11:17:22	11:17:43	4	4	0			2	2	0					4	4	0		
9	11:19:42	11:20:15	3	3	0			3	3	0					2	2	0		
10	11:22:02	11:22:17	0	0	0			1	1	0					2	2	0		
11	11:24:22	11:24:56	1	1	0			5	5	0					1	1	0		
12	11:26:42	11:27:08	1	1	0			4	4	0					2	2	0		
13	11:29:02	11:29:28	0	0	0			4	4	0					1	1	0		
14	11:31:22	11:31:43	0	0	0			4	4	0					0	0	0		
15	11:33:42	11:34:15	2	2	0			5	4	1	11:33:57	7			1	1	0		
16	11:36:02	11:36:15	0	0	0			2	2	0					1	1	0		
17	11:38:22	11:38:47	0	0	0			3	3	0					0	0	0		
18	11:40:42	11:41:08	0	0	0			6	6	0					1	1	0		
19	11:43:03	11:43:35	2	2	0			4	3	1	11:43:10	4			2	1	1	11:44:39	7
20	11:45:22	11:45:38	1	1	0			0	0	0					0	0	0		
21	11:47:42	11:48:13	3	3	0			5	5	0					0	0	0		
22	11:50:02	11:50:28	3	3	0			3	3	0					1	1	0		
23	11:52:22	11:52:22	1	1	0			5	5	0					1	1	0		
24	11:54:42	11:55:13	1	1	0			5	4	1	11:54:49	4			3	3	0		
25	11:57:02	11:57:21	2	2	0			3	3	0					2	2	0		
26	11:59:22	11:59:54	1	1	0			3	3	0					0	0	0		

Figure A-42. Sample data (approx 1 hr) for intersection of Krome Ave and Palm Dr, all lanes from 11:00:00 to 12:00:00

				Lane 1														
				All traffic uses single lane														
				Left					Thru					Right				
Cycle	Start	End		Total	Non-Truc	Truck	Time	Type	Total	Non-Trucks	Truck	Time	Type	Total	Non-Truc	Truck	Time	Type
1	11:00:01	11:01:15		0	0	0			6	5	1	11:00:06	7	3	3	0		
2	11:01:53	11:03:16		0	0	0			12	10	2	11:02:01	7	3	3	0		
												11:02:12	7			0		
3	11:04:04	11:05:16		0	0	0			7	7	0			1	1	0		
4	11:05:46	11:07:16		0	0	0			9	8	1	11:06:26	7	5	4	1	11:07:22	7
5	11:08:04	11:09:16		0	0	0			7	7	0			3	2	1	11:08:49	7
6	11:09:59	11:11:17		0	0	0			17	17	0			4	4	0		
7	11:11:55	11:13:16		0	0	0			8	8	0			2	2	0		
8	11:13:46	11:15:17		0	0	0			8	8	0			3	3	0		
9	11:16:00	11:17:16		0	0	0			9	8	1	11:16:12	8	1	1	0		
10	11:18:04	11:19:16		0	0	0			8	7	1	11:18:10	7	5	4	0		
			RTOR												1			
11	11:19:52	11:21:16		0	0	0			8	7	1	11:20:03	7	2	2	0		
12	11:22:04	11:23:16		1	1	0			4	4	0			5	3	0		
			RTOR												2			
13	11:24:04	11:25:15		1	1	0			5	5	0			2	2	0		
14	11:25:50	11:27:15		0	0	0			13	12	1	11:27:15	7	1	0	1	11:27:10	7
15	11:28:04	11:29:16		1	1	0			14	14	0			4	2	0		
			RTOR												2			
16	11:30:04	11:31:16		3	3	0			5	3	2	11:30:15	3	3	3	0		
												11:30:59	7					
17	11:31:47	11:33:16		0	0	0			13	12	1	11:32:01	7	4	3	0		
			RTOR												1			
18	11:34:04	11:35:15		0	0	0			11	10	1	11:34:53	7	3	1	2	11:34:11	7
																	11:35:15	7
19	11:36:02	11:37:17		2	2	0			13	12	1	11:36:10	0	7	7	0		
20	11:37:58	11:39:16		1	1	0			11	10	1	11:38:34	7	4	3	0		
			RTOR												1			
21	11:39:53	11:41:15		0	0	0			7	6	1	11:40:35	4	2	1	1	11:41:02	7
22	11:42:02	11:43:14		0	0	0			8	8	0			5	5	0		
23	11:43:54	11:45:15		0	0	0			12	11	1	11:44:11	4	3	3	0		
24	11:46:04	11:47:15		0	0	0			6	6	0			3	3	0		
25	11:48:04	11:49:15		0	0	0			10	10	0			2	2	0		
26	11:50:04	11:51:16		1	1	0			5	5	0			5	4	0		
			RTOR												1			
27	11:51:54	11:53:16		1	1	0			6	6	0			0	0	0		
28	11:53:54	11:55:15		1	1	0			10	10	0			3	3	0		
29	11:56:04	11:57:16		2	2	0			14	13	1	11:56:14	4	1	1	0		
30	11:58:04	11:59:15		0	0	0			10	10	0			1	1	0		

Figure A-43. Sample data (approx 1 hr) for intersection of Krome Ave and David Pkwy, all lanes from 11:00:00 to 12:00:00

				Lane 1					Lane 2									
				Left					Thru					Right				
Cycle	Start	End		Total	Non-Truc	Truck	Time	Type	Total	Non-Truc	Truck	Time	Type	Total RT	Non-Truc	Truck	Time	Type
1	11:00:32	11:01:40		1	1	0			13	12	1	11:01:18	7	0	0	0		
2	11:02:06	11:03:40		1	1	0			10	9	1	11:03:07	7	2	2	0		
3	11:04:28	11:03:40		4	4	0			15	15	0			4	4	0		
4	11:06:25	11:07:40		1	1	0			10	9	1	11:07:21	7	1	1	0		
5	11:08:31	11:09:39		2	2	0			11	11	0			0	0	0		
6	11:10:18	11:11:40		2	2	0			18	18	0			3	3	0		
7	11:12:21	11:13:40		1	1	0			13	13	0			3	3	0		
8	11:14:22	11:15:40		0	0	0			7	7	0			0	0	0		
9	11:16:18	11:17:41		3	3	0			12	11	1	11:17:10	8	2	2	0		
10	11:18:14	11:19:40		2	2	0			7	6	1	11:19:05	1	4	3	0		
			RTOR												1			
11	11:20:32	11:21:40		6	6	0			7	7	0			0		0		
12	11:22:22	11:23:40		2	2	0			7	7	0			3	3	0		
13	11:24:21	11:25:40		1	1	0			7	7	0			2	2	0		
14	11:26:32	11:27:40		4	4	0			13	13	0			2	2	0		
15	11:28:20	11:29:39		1	1	0			17	16	1	11:28:32	7	1	1	0		
16	11:30:13	11:31:39		0	0	0			15	15	0			3	3	0		
17	11:32:28	11:31:39		2	2	0			12	11	1	11:32:29	7	0	0	0		
18	11:34:13	11:35:40		0	0	0			10	10	0			0	0	0		
19	11:36:32	11:37:40		2	2	0			20	18	2	11:36:53	7	1	1	0		
												11:37:26	0					
20	11:38:18	11:39:40		1	1	0			15	14	1	11:38:56	4	5	3	1	11:38:39	1
			RTOR												1			
21	11:40:16	11:41:40		2	2	0			10	9	1	11:41:32	4	0	0	0		
22	11:42:22	11:43:40		0	0	0			12	12	0			4	3	0		
			RTOR												1			
23	11:44:11	11:45:40		3	3	0			14	14	0			3	3	0		
24	11:46:32	11:47:40		7	7	0			10	10	0			1	1	0		
25	11:48:14	11:49:40		3	3	0			8	8	0			2	2	0		
26	11:50:19	11:51:40		1	1	0			11	11	0			1	0	0		
			RTOR												1			
27	11:52:34	11:53:40		1	1	0			11	11	0			1	1	0		
28	11:54:34	11:55:40		1	1	0			8	8	0			1	1	0		
29	11:56:12	11:57:40		2	2	0			11	9	2	11:56:59	7	0	0	0		
												11:57:20	4					
30	11:58:32	11:59:40		1	1	0			15	15	0			2	2	0		

Figure A-44. Sample data (approx 1 hr) for intersection of Krome Ave and SW 328 St, all lanes from 11:00:00 to 12:00:00

				Lane 1															
				Left					Thru					Right					
Cycle	Start	End		Total	Non-Truc	Truck	Time	Type	Total	Non-Truc	Truck	Time	Type	Total	Non-Truc	Truck	Time	Type
1	11:00:00*	11:00:30		0	0	0			6	6	0			1	1	0		
2	11:01:01	11:01:56		0	0	0			10	9	1	11:02:12	7	2	2	0		
3	11:02:24	11:03:31		0	0	0			11	11	0			2	2	0		
4	11:03:58	11:05:01		0	0	0			13	13	0			0	0	0		
5	11:05:31	11:06:31		0	0	0			11	9	2	11:06:20	0	2	2	0		
												11:06:24	4			0		
6	11:07:03	11:08:01		0	0	0			7	7	0			0	0	0		
7	11:08:28	11:09:30		0	0	0			7	6	1	11:08:30	4	3	3	0		
8	11:10:05	11:11:01		0	0	0			8	8	0			1	0	1	11:10:38	3
9	11:11:36	11:12:31		0	0	0			14	14	0			1	1	0		
10	11:13:04	11:14:02		0	0	0			12	12	0			1	1	0		
11	11:14:30	11:15:30		0	0	0			6	5	1	11:15:19	1	1	1	0		
12	11:16:00	11:17:18		0	0	0			6	6	0			0	0	0		
13	11:17:46	11:18:31		0	0	0			9	8	1	11:18:02	8	0	0	0		
14	11:19:05	11:19:56		0	0	0			6	4	2	11:19:18	7	2	2	0		
												11:19:48	7					
15	11:20:28	11:21:32		0	0	0			13	10	3	11:20:41	3	1	1	0		
												11:20:58	0					
												11:21:08	7					
16	11:21:58	11:22:56		0	0	0			6	6	0			0	0	0		
17	11:23:26	11:24:31		0	0	0			10	8	2	11:23:55	7	0	0	0		
												11:24:08	7					
18	11:25:05	11:26:03		0	0	0			10	10	0			2	2	0		
19	11:26:32	11:27:32		0	0	0			9	9	0			1	1	0		
20	11:28:00	11:29:01		0	0	0			14	14	0			0	0	0		
21	11:29:34	11:30:33		0	0	0			13	12	1	11:30:05	7	2	2	0		
22	11:31:03	11:32:19		0	0	0			12	12	0			1	1	0		
23	11:32:45	11:33:31		0	0	0			13	12	1	11:33:28	7	0	0	0		
24	11:34:02	11:35:01		0	0	0			13	13	0			0	0	0		
			RTOR												1			
25	11:35:31	11:36:31		0	0	0			7	7	0			1	1	0		
26	11:37:04	11:38:04		0	0	0			12	10	2	11:37:20	7	1	1	0		
												11:37:56	7					
27	11:38:34	11:39:26		1	1	0			13	13	0			0	0	0		
28	11:39:56	11:41:02		0	0	0			12	12	0			2	2	0		
29	11:41:30	11:42:32		0	0	0			10	8	2	11:41:37	0	0	0	0		
												11:42:17	4					
30	11:43:00	11:44:01		0	0	0			10	10	0			0	0	0		
31	11:44:30	11:45:31		0	0	0			15	15	0			2	2	0		
32	11:46:04	11:47:02		0	0	0			17	17	0			1	1	0		
33	11:47:37	11:48:31		0	0	0			11	11	0			1	1	0		
34	11:49:11	11:50:01		0	0	0			8	7	1	11:49:22	7	0	0	0		
35	11:50:27	11:51:33		0	0	0			13	13	0			0	0	0		
36	11:51:59	11:53:01		0	0	0			12	12	0			2	2	0		
37	11:53:35	11:54:26		0	0	0			12	12	0			1	1	0		
38	11:54:56	11:56:01		0	0	0			9	9	0			0	0	0		
39	11:56:31	11:57:32		1	1	0			8	7	1	11:57:32	7	0	0	0		
40	11:57:58	11:58:56		0	0	0			7	6	1	11:58:18	4	0	0	0		
41	11:59:39	12:00:37		0	0	0			16	16	0			1	1	0		

Figure A-45. Sample data (approx 1 hr) for intersection of Krome Ave and Flagler Ave, all lanes from 11:00:00 to 12:00:00

17	13:03:23	13:04:05			13	12	1	13:03:36	0	11	10	1	13:03:39	7	11	11			
18	13:05:01	13:06:05			11	8	3	13:05:33	4	14	10	4	13:05:41	4	7	7			
								13:05:40	1				13:05:51	1					
								13:05:48	1				13:05:59	4					
													13:06:04	4					
19	13:06:54	13:08:05	1	1	14	12	2	13:07:32	4	10	6	4	13:07:42	6	12	11	1	13:07:35	3
								13:07:46	4				13:07:45	4					
													13:07:50	1					
													13:07:53	4					
20	13:08:50	13:10:05	1	1	10	7	3	13:09:33	1	17	14	3	13:09:47	4	5	5			
								13:09:41	4				13:09:53	4					
								13:09:51	2				13:09:56	4					
21	13:11:08	13:12:05			8	8				13	12	1	13:11:14	4	11	11			
22	13:12:42	13:14:05	2	2	8	6	2	13:14:01	4	15	15				10	10			
								13:14:03	3										
23	13:15:05	13:16:06			9	7	2	13:15:26	7	7	6	1	13:16:05	7	20	18	2	13:15:46	7
								13:15:31	4									13:15:52	1
24	13:16:50	13:18:06	1	1	11	10	1	13:17:36	7	10	10				11	11			
25	13:19:08	13:20:06			10	7	3	13:19:18	7	7	6	1	13:19:30	4	16	15	1	13:19:55	0
								13:19:25	7										
								13:19:29	4										
26	13:21:22	13:22:06			7	7				8	8				14	14			
27	13:22:45	13:24:06			12	10	2	13:23:42	4	9	7	2	13:22:47	1	14	11	3	13:22:54	0
								13:23:45	4				13:23:58	4				13:23:20	1
																		13:23:26	7
28	13:24:57	13:24:06	1	1	15	11	1	13:25:17	4	12	11	1	13:25:04	7	8	7	1	13:26:01	7
								13:25:25	1										
								13:25:29	7										
								13:25:59	7										
29	13:26:41	13:26:06	3	3	9	8	1	13:27:53	1	10	8	2	13:27:46	4	11	10	1	13:27:46	4
													13:28:04	7					
30	13:28:40	13:30:06			16	16				18	16	2	13:28:59	4	6	6			
													13:30:06	4					

Figure A-46. Sample data (approx 30 min) for intersection of US-1 and Moncrief Rd, all lanes from 13:03:23 to 13:30:06

			Lane 1					Lane 2					Lane 3									
			Left					Thru					Thru					Right				
Cycle	Start	End	LT	Non-Truck	Truck	Time	Type	Thru	Non-Truck	Truck	Time	Type	Thru	Non-Truck	Truck	Time	Type	RT	Non-Truck	Truck	Time	Type
1	11:39:04	11:40:04	0	0	0			18	13	5	11:39:18	7	17	15	2	11:39:41	4	2	2	0		
											11:39:25	7				11:39:52	4					
											11:39:35	7										
											11:39:43	4										
											11:39:50	4										
2	11:41:21	11:42:23	2	2	0			19	13	6	11:41:36	4	19	14	5	11:41:24	4	0	0	0		
											11:41:39	4				11:41:46	5					
											11:41:45	4				11:41:53	7					
											11:41:49	4				11:42:18	1					
											11:42:02	4				11:42:27	3					
											11:42:13	3										
3	11:43:45	11:44:43	3	3	0			11	10	1	11:43:50	3	14	11	3	11:43:50	4	0	0	0		
																11:44:14	4					
																11:44:44	2					
4	11:46:08	11:47:03	0	0	0			19	18	1	11:46:18	4	15	10	5	11:46:15	8	0	0	0		
																11:46:31	4					
																11:46:36	4					
																11:46:51	2					
																11:46:57	7					
5	11:48:22	11:49:23	0	0	0			13	10	3	11:48:35	4	11	5	6	11:48:38	6	0		0		
											11:49:01	4				11:48:47	6					
											11:49:11	7				11:49:00	7					
																11:49:05	4					
																11:49:14	4					
																11:49:21	3					
6	11:50:45	11:51:43	1	0	1	11:51:40	1	21	17	4	11:50:47	3	14	8	6	11:50:49	4	0	0	0		
											11:51:39	4				11:51:00	4					
											11:51:43	4				11:51:09	4					
											11:51:47	3				11:51:21	4					
																11:51:29	7					
																11:51:44	3					
7	11:53:04	11:54:03	2	2	0			21	16	5	11:53:09	7	17	15	2	11:53:18	4	0	0	0		
											11:53:53	4				11:53:57	4					
											11:53:39	4										
											11:53:54	4										
											11:54:03	4										
8	11:55:16	11:56:26	3	3	0			17	15	2	11:55:21	4	16	15	1	11:55:46	4	0	0	0		
											11:55:31	4										
9	11:57:44	11:58:43	4	4	0			19	18	1	11:58:29	5	14	5	9	11:57:44	7	0	0	0		
																11:57:51	1					
																11:57:57	1					
																11:58:01	4					
																11:58:15	4					
																11:58:22	4					
																11:58:34	4					
																11:58:39	4					
																11:58:44	4					
10	11:59:48	12:01:03	1	0	1	11:59:56	6	24	18	6	12:00:02	7	16	8	8	11:59:57	4	0	0	0		
											12:00:30	4				12:00:12	4					
											12:00:37	4				12:00:17	3					
											12:00:45	3				12:00:32	4					
											12:01:01	4				12:00:37	4					
											12:01:08	3				12:00:41	4					
																12:00:47	4					
																12:00:52	4					
11	12:02:21	12:03:24	2	2	0			20	16	4	12:02:24	4	11	5	6	12:02:25	4	0	0	0		
											12:02:41	4				12:02:37	4					
											12:02:54	4				12:02:56	6					
											12:03:02	4				12:03:01	3					
																12:03:16	4					
																12:03:21	3					
12	12:04:44	12:05:44	3	3	0			13	12	1	12:04:49	4	12	8	4	12:04:49	7	0	0	0		
																12:05:02	2					
																12:05:25	3					
																12:05:30	4					

Figure A-47. Sample data (approx 30 min) for intersection of US-301 and Hwy 100, all lanes from 11:40:00 to 12:05:44

13	12:07:07	12:08:04	1	1	0			19	18	1	12:07:54	4	17	13	4	12:07:13	4	0	0	0		
																12:07:23	7					
																12:07:53	4					
																12:08:02	4					
14	12:09:24	12:10:24	0	0	0			17	12	5	12:09:28	5	17	14	3	12:09:44	4	0	0	0		
											12:09:40	4				12:09:59	4					
											12:09:47	4				12:10:05	3					
											12:10:14	4										
											12:10:18	3										
15	12:11:43	12:12:44	3	3	0			18	15	3	12:11:54	4	12	8	4	12:11:45	4	0	0	0		
											12:12:03	4				12:11:54	4					
											12:12:25	7				12:12:21	3					
																12:12:41	4					
16	12:14:05	12:15:05	0	0	0			21	17	4	12:14:23	4	20	16	4	12:14:13	4	0		0		
											12:14:43	4				12:14:32	3					
											12:14:51	4				12:14:55	4					
											12:15:00	3				12:15:03	4					
17	12:16:24	12:17:23	1	1	0			19	16	3	12:16:29	4	16	11	5	12:16:29	4	0	0	0		
											12:17:01	4				12:17:05	2					
											12:17:17	3				12:17:12	4					
																12:17:18	1					
																12:17:25	4					
18	12:18:44	12:19:44	0	0	0			15	13	2	12:18:52	2	16	11	5	12:19:02	4	0	0	0		
											12:19:22	7				12:19:25	6					
																12:19:29	4					
																12:19:34	6					
																12:19:46	4					
19	12:21:06	12:22:04	2	2	0			18	13	5	12:21:09	4	16	11	5	12:21:10	7	0	0	0		
											12:21:41	7				12:21:21	4					
											12:21:45	4				12:21:34	4					
											12:21:55	4				12:21:54	7					
											12:21:59	4				12:21:59	4					
20	12:23:34	12:24:24	0	0	0			17	14	3	12:23:35	3	18	15	3	12:23:34	4	1		0		
											12:23:41	4				12:23:41	4					
											12:23:58	3				12:24:03	4					
21	12:25:45	12:26:45	1	1	0			21	17	4	12:26:08	6	16	12	4	12:26:01	4	1	1	0		
											12:26:12	6				12:26:40	7					
											12:26:37	3				12:26:44	4					
											12:26:44	4				12:26:48	4					
22	12:28:05	12:29:06	0	0	0			15	11	4	12:28:07	7	16	13	3	12:28:07	4	1	1	0		
											12:28:25	4				12:28:36	4					
											12:28:32	4				12:28:42	4					
											12:28:53	4										
23	12:30:25	12:31:24	2	2	0			16	14	2	12:30:42	6	12	8	4	12:30:27	3	0	0	0		
											12:31:06	4				12:31:20	7					
																12:31:23	6					
																12:31:27	4					
24	12:32:28	12:33:44	4	4	0			14	12	2	12:34:43	3	15	13	2	12:32:41	7	0	0	0		
											12:32:50	4				12:32:46	4					
25	12:35:06	12:36:04	0	0	0			10	9	1	12:35:25	4	6	4	2	12:32:41	7	0	0	0		
																12:35:25	8					
26	12:37:05	12:38:26	4	3	1	12:37:06	7	24	22	2	12:37:59	7	19	17	2	12:37:12	7	0	0	0		
											12:38:20	7				12:37:33	1					
27	12:39:28	12:40:44	3	2	1	12:42:03	3	11	7	4	12:39:35	4	15	11	4	12:39:47	4	1	1	0		
											12:39:46	4				12:39:54	4					
											12:40:06	2				12:40:36	7					
											12:40:14	3				12:40:39	5					
																			1			

Figure A-48. Sample data (approx 30 min) for intersection of US-301 and Hwy 100, all lanes from 12:05:44 to 12:40:00

Appendix B – Collected Data and SwashSim Coding

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles	time(min)	speed (miles/hr)
Vehicle no.	start(int 1)	end(int 4)	start	end			
1	10:30:32	10:33:35			2.21	3.05	43.48
3	10:31:56	10:34:55			2.21	2.98	44.45
4	10:32:31	10:34:57			2.21	2.43	54.49
5	10:32:32	10:34:59			2.21	2.45	54.12
7	10:34:46	10:38:20			2.21	3.57	37.18
9	10:38:30	10:41:00			2.21	2.50	53.04
10	10:38:32	10:41:04			2.21	2.53	52.34
11	10:38:40	10:42:09			2.21	3.48	38.07
12	10:38:41	10:42:11			2.21	3.50	37.89
14	10:41:19	10:44:54			2.21	3.58	37.00
19	10:44:41	10:47:47			2.21	3.10	42.77
20	10:44:42	10:47:48			2.21	3.10	42.77
21	10:44:43	10:47:51			2.21	3.13	42.32
22	10:44:43	10:47:50			2.21	3.12	42.55
23	10:44:45	10:47:55			2.21	3.17	41.87
24	10:45:41	10:50:48			2.21	5.12	25.92
25	10:45:41	10:50:46			2.21	5.08	26.09
26	10:45:49	10:50:51			2.21	5.03	26.34
27	10:45:53	10:50:55			2.21	5.03	26.34
28	10:46:21	10:50:58			2.21	4.62	28.72
29	10:50:57	10:54:00			2.21	3.05	43.48
30	10:52:00	10:55:20			2.21	3.33	39.78
32	10:57:33	11:00:35			2.21	3.03	43.71
33	11:01:49	11:05:35			2.21	3.77	35.20
34	11:04:32	11:07:52			2.21	3.33	39.78
35	11:04:32	11:07:58			2.21	3.43	38.62
36	11:04:36	11:07:57			2.21	3.35	39.58
37	11:04:40	11:08:02			2.21	3.37	39.39
39	11:05:44	11:09:32			2.21	3.80	34.89
40	11:07:15	11:11:10			2.21	3.92	33.86
41	11:07:07	11:11:07			2.21	4.00	33.15
43	11:09:31	11:13:11			2.21	3.67	36.16

Figure B-1. Average speed per vehicle on arterial corridor of Tampa Part 1

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles	time(min)	speed (miles/hr)
Vehicle no.	start(int 1)	end(int 4)	start	end			
45	11:10:19	11:14:16			2.21	3.95	33.57
46	11:11:51	11:15:31			2.21	3.67	36.16
47	11:11:54	11:15:34			2.21	3.67	36.16
48	11:15:46	11:19:52			2.21	4.10	32.34
49	11:15:52	11:19:55			2.21	4.05	32.74
50	11:15:56	11:19:57			2.21	4.02	33.01
52	11:17:39	11:20:13			2.21	2.57	51.66
53	11:17:45	11:20:17			2.21	2.53	52.34
54	11:17:47	11:20:21			2.21	2.57	51.66
55	11:17:54	11:20:22			2.21	2.47	53.76
57	11:18:05	11:21:18			2.21	3.22	41.22
58	11:19:09	11:22:32			2.21	3.38	39.19
59	11:22:26	11:26:04			2.21	3.63	36.50
60	11:22:30	11:26:13			2.21	3.72	35.68
62	11:29:18	11:33:12			2.21	3.90	34.00
63	11:30:30	11:34:38			2.21	4.13	32.08

Figure B-2. Average speed per vehicle on arterial corridor of Tampa Part 2

				Intersection 1								
				Through Lane 1				Through Lane 2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
1/2		10:30:25	1	10:30:11	10:30:26							0:00:15
			2					10:30:22	10:30:27			0:00:05
			3	10:30:23	10:30:27							0:00:04
2/3	10:33:02	10:33:28	0	0	0							0:00:00
3/4	10:34:42	10:35:02	1	10:34:49	10:35:05							0:00:16
			2					10:34:56	10:35:04			0:00:08
			3					10:34:57	10:35:06			0:00:09
			4			10:34:58	10:35:05					0:00:07
4/5	10:36:02	10:36:26	1					10:36:17	10:36:32			0:00:15
			2					10:36:21	10:36:33			0:00:12
			3					10:36:27	10:36:35			0:00:08
			4					10:36:28	10:36:35			0:00:07
			5					10:36:29	10:36:35			0:00:06
5/6	10:37:32	10:38:16	1	10:38:13	10:38:17							0:00:04
			2					10:38:17	10:39:42			0:01:25
6/7	10:39:02	10:39:39	1							10:39:16	10:39:41	0:00:25
			2	10:39:20	10:39:40							0:00:20
7/8	10:40:32	10:41:11	1							10:40:44	10:41:11	0:00:27
			2					10:40:46	10:41:15			0:00:29
			3					10:40:48	10:41:15			0:00:27
			4	10:40:50	10:41:11							0:00:21
			5					10:40:52	10:41:17			0:00:25
			6	10:40:52	10:41:12							0:00:20
			7	10:41:00	10:41:12							0:00:12
			8					10:40:52	10:41:21			0:00:29
			9					10:40:56	19:41:21			9:00:25
			10					10:41:05	10:41:21			0:00:16
			11					10:41:20	10:41:23			0:00:03
8/9	10:42:02	10:42:27	1	10:42:18	10:42:29							0:00:11
			2					10:42:22	10:42:29			0:00:07
9/10	10:43:32	10:43:58	1					10:43:50	10:44:00			0:00:10
			2	10:43:58	10:44:00							0:00:02
10/11	10:45:02	10:45:38	1					10:45:15	10:45:39			0:00:24
			2	10:45:23	10:45:39							0:00:16
			3					10:45:22	10:45:40			0:00:18

Figure B-3. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 1

				Intersection 1								
				Through Lane 1				Through Lane 2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
11/12	10:48:01	10:48:44	1	10:48:20	10:48:46							0:00:26
			2	10:48:27	10:48:46							0:00:19
			3					10:48:28	10:48:46			0:00:18
			4					10:48:35	10:48:48			0:00:13
			5					10:48:48	10:48:51			0:00:03
12/13	10:49:31	10:50:15	1	10:49:49	10:50:22							0:00:33
			2	10:49:59	10:50:22							0:00:23
			3	10:50:01	10:50:24							0:00:23
			4					10:49:51	10:50:22			0:00:31
			5					10:49:59	10:50:24			0:00:25
			6					10:50:01	10:50:24			0:00:23
			7					10:50:03	10:50:27			0:00:24
13/14	10:51:03	10:51:27	0	0	0							0:00:00
14/15	10:54:02	10:54:39	1	10:54:17	10:54:41							0:00:24
			2	10:54:25	10:54:42							0:00:17
			3							10:54:13	10:54:43	0:00:30
			4					10:54:17	10:54:44			0:00:27
			5					10:54:23	10:54:45			0:00:22
			6					10:54:27	10:54:47			0:00:20
15/16	10:55:32	10:55:56	0	0	0							0:00:00
16/17	10:57:02	10:57:31	1	10:57:14	10:57:31							0:00:17
17/18	11:00:02	11:00:38	1			11:00:28	11:00:40					0:00:12
			2	11:00:39	11:00:41							0:00:02
18/19	11:01:32	11:02:00	1	11:01:53	11:02:01							0:00:08
19/20	11:03:02	11:04:17	1	11:03:27	11:04:18							0:00:51
			2	11:03:42	11:04:19							0:00:37
			3	11:03:51	11:04:20							0:00:29
			4					11:03:26	11:04:18			0:00:52
			5					11:03:31	11:04:20			0:00:49
			6					11:03:36	11:04:21			0:00:45
			7					11:03:41	11:04:21			0:00:40
			8	11:04:16	11:04:23							0:00:07
			9	11:04:18	11:04:24							0:00:06
			10	11:04:20	11:04:27							0:00:07
			11	11:04:24	11:04:28							0:00:04

Figure B-4. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 2

				Intersection 1								
				Through Lane 1				Through Lane 2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			12	11:04:24	11:04:33							0:00:09
			13					11:03:43	11:04:22			0:00:39
			14					11:03:56	11:04:23			0:00:27
			15					11:04:09	11:04:24			0:00:15
			16					11:04:09	11:04:26			0:00:17
			17					11:04:10	11:04:28			0:00:18
20/21	11:04:58	11:05:23	0	0	0							0:00:00
21/22	11:06:15	11:06:41	1	11:06:34	11:06:47							0:00:13
22/23	11:07:34	11:07:58	1			11:07:43	11:08:01					0:00:18
			2					11:07:49	11:08:01			0:00:12
			3					11:07:57	11:08:02			0:00:05
23/24	11:09:02	11:09:26	1			11:09:24	11:09:29					0:00:05
24/25	11:10:32	11:11:00	0	0	0							0:00:00
25/26	11:12:02	11:12:25	0	0	0							0:00:00
26/27	11:13:32	11:13:55	1	11:13:55	11:13:56							0:00:01
27/28	11:15:02	11:15:42	1					11:15:19	11:15:43			0:00:24
			2					11:15:36	11:15:44			0:00:08
			3	11:15:23	11:15:43							0:00:20
			4	11:15:31	11:15:44							0:00:13
			5					11:15:34	11:15:46			0:00:12
			6					11:15:36	11:15:46			0:00:10
			7					11:15:37	11:15:48			0:00:11
			8					11:15:46	11:15:50			0:00:04
28/29	11:16:32	11:17:33	1	11:16:56	11:17:34							0:00:38
			2	11:16:58	11:17:36							0:00:38
			3					11:17:04	11:17:36			0:00:32
			4					11:17:13	11:17:37			0:00:24
			5					11:17:24	11:17:37			0:00:13
29/30	11:18:25	11:18:52	1	11:18:48	11:18:53							0:00:05
30/31	11:19:46	11:21:00	1	11:20:34	11:21:02							0:00:28
			2	11:20:39	11:21:03							0:00:24
			3	11:20:46	11:21:05							0:00:19
			4	11:21:00	11:21:06							0:00:06
			5	11:21:00	11:21:07							0:00:07
			6	11:21:03	11:21:08							0:00:05

Figure B-5. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 3

				Intersection 1								
				Through Lane 1				Through Lane 2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			7	11:21:04	11:21:09							0:00:05
			8					11:20:37	11:21:02			0:00:25
			9							11:20:57	11:21:03	0:00:06
			10					11:20:57	11:21:06			0:00:09
			11					11:20:57	11:21:08			0:00:11
			12					11:20:58	11:21:09			0:00:11
31/32	11:21:54	11:22:18	1	11:21:08	11:21:14							0:00:06
			2	11:22:07	11:22:19							0:00:12
			3	11:22:15	11:22:20							0:00:05
			4	11:22:15	11:22:21							0:00:06
			5			11:22:23	11:22:24					0:00:01
			6	11:22:23	11:22:26							0:00:03
			7					11:22:10	11:22:19			0:00:09
			8					11:22:15	11:22:20			0:00:05
			9					11:22:16	11:22:21			0:00:05
			10					11:22:16	11:22:24			0:00:08
			11					11:22:21	11:22:25			0:00:04
32/33	11:23:43	11:24:07	1	11:23:58	11:24:10							0:00:12
			2	11:24:09	11:24:12							0:00:03
			3					11:23:55	11:24:10			0:00:15
			4					11:23:58	11:24:12			0:00:14
			5					11:24:00	11:24:13			0:00:13
			6					11:24:07	11:24:16			0:00:09
33/34	11:25:32	11:25:56	0	0	0							0:00:00
34/35	11:27:02	11:27:47	1	11:27:28	11:27:49							0:00:21
			2					11:27:21	11:27:49			0:00:28
35/36	11:28:32	11:28:56	1	11:28:46	11:28:58							0:00:12
36/37	11:30:02	11:31:08	1	11:30:18	11:30:29							0:00:11
			2					11:30:13	11:30:29			0:00:16
			3					11:30:26	11:30:31			0:00:05
			4					11:30:29	11:30:33			0:00:04
37/38	11:31:32	11:32:33	1	11:31:56	11:32:35							0:00:39
			2	11:32:01	11:32:36							0:00:35
			3	11:32:07	11:32:38							0:00:31
			4	11:32:25	11:32:40							0:00:15

Figure B-6. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 4

				Intersection 2								
				Through Lane 1				Through Lane 2				
	Red		Vehicle	Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
1/2		10:29:33	0	0	0							0:00:00
2/3	10:30:40	10:31:10	1					10:31:10	10:31:11			0:00:01
3/4	10:32:10	10:32:34	0	0	0							0:00:00
4/5	10:33:56	10:34:18	1	10:34:07	10:34:22							0:00:15
5/6	10:35:10	10:35:34	0	0	0							0:00:00
6/7	10:38:10	10:38:49	1					10:38:41	10:38:50			0:00:09
7/8	10:39:40	10:40:07	0	0	0							0:00:00
8/9	10:41:10	10:41:52	1			10:41:29	10:41:53					0:00:24
			2			10:41:29	10:41:54					0:00:25
9/10	10:44:10	10:45:07	1	10:44:49	10:45:09							0:00:20
			2					10:44:54	10:45:09			0:00:15
			3					10:44:57	10:45:10			0:00:13
			4	10:44:57	10:45:09							0:00:12
			5					10:45:10	10:45:12			0:00:02
10/11	10:47:10	10:47:58	1					10:47:37	10:47:55			0:00:18
			2					10:47:43	10:47:56			0:00:13
			3	10:47:48	10:47:55							0:00:07
11/12	10:48:40	10:49:20	1					10:49:16	10:49:22			0:00:06
			2					10:49:17	10:49:22			0:00:05
12/13	10:51:40	10:52:08	1					10:51:55	10:52:08			0:00:13
13/14	10:53:10	10:53:40	0	0	0							0:00:00
14/15	10:54:40	10:55:09	1	10:54:55	10:55:11							0:00:16
			2					10:54:50	10:55:11			0:00:21
15/16	10:56:10	10:56:38	0	0	0							0:00:00
16/17	10:57:40	10:58:07	0	0	0							0:00:00
17/18	10:59:10	10:59:34	1					10:59:33	10:59:37			0:00:04
			2					10:59:35	10:59:37			0:00:02
18/19	11:02:10	11:02:48	1	11:02:41	11:02:49							0:00:08
			2					11:02:34	11:02:50			0:00:16
			3					11:02:39	11:02:51			0:00:12
			4					11:02:49	11:02:52			0:00:03
19/20	11:03:40	11:04:04	1					11:03:51	11:04:06			0:00:15
20/21	11:05:10	11:05:34	1	11:05:36	11:05:39							0:00:03
			2					11:05:21	11:05:39			0:00:18
			3					11:05:32	11:05:39			0:00:07

Figure B-7. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 5

				Intersection 2								
				Through Lane 1				Through Lane 2				
	Red		Vehicle	Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			4					11:05:36	11:05:39			0:00:03
21/22	11:06:40	11:07:04	0	0	0							0:00:00
22/23	11:08:10	11:08:43	1			11:08:33	11:08:43					0:00:10
			2					11:08:20	11:08:43			0:00:23
			3					11:08:27	11:08:45			0:00:18
23/24	11:11:08	11:11:35	0	0	0							0:00:00
24/25	11:14:10	11:14:34	0	0	0							0:00:00
25/26	11:15:40	11:16:35	0	0	0							0:00:00
26/27	11:17:10	11:17:37	0	0	0							0:00:00
27/28	11:18:40	11:19:06	1	11:19:00	11:19:08							0:00:08
			2							11:19:05	11:19:08	0:00:03
28/29	11:20:10	11:20:34	1	11:20:33	11:20:36							0:00:03
			2					11:20:35	11:20:36			0:00:01
29/30	11:23:10	11:23:34	1	11:23:23	11:23:37							0:00:14
			2					11:23:29	11:23:37			0:00:08
30/31	11:24:40	11:25:06	0	0	0							0:00:00
31/32	11:26:10	11:26:41	0	0	0							0:00:00
32/33	11:31:00	11:31:24	1	11:31:18	11:31:26							0:00:08
33/34	11:32:10	11:32:34	0	0	0							0:00:00
34/35	11:33:40	11:34:06	1			11:33:58	11:34:10					0:00:12
			2					11:33:53	11:34:10			0:00:17
			3					11:34:02	11:34:12			0:00:10
			4					11:34:02	11:34:12			0:00:10
			5					11:34:03	11:34:13			0:00:10
			6					11:34:03	11:34:16			0:00:13

Figure B-8. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 6

				Intersection 3								
				Through Lane 1				Through Lane 2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
19/20	10:51:13	10:50:26	0	0:00:00	0:00:00							0:00:00
20/21	10:51:13	10:51:35	0	0:00:00	0:00:00							0:00:00
21/22	10:52:14	10:52:36	0	0:00:00	0:00:00							0:00:00
22/23	10:53:55	10:53:40	1	10:53:21	10:53:41							0:00:20
			2	10:53:33	10:53:42							0:00:09
23/24	10:53:55	10:54:25	1	10:54:15	10:54:26							0:00:11
			2					10:54:18	10:54:26			0:00:08
			3					10:54:21	10:54:28			0:00:07
24/25	10:55:31	10:56:05	1					10:55:52	10:56:07			0:00:15
25/26	10:57:20	10:57:42	1	10:57:35	10:57:45							0:00:10
			2	10:57:40	10:57:47							0:00:07
			3					10:57:42	10:57:45			0:00:03
26/27	10:57:58	10:58:22	0	0:00:00	0:00:00							0:00:00
27/28	10:58:45	10:59:16	1	10:59:12	10:59:18							0:00:06
			2	10:59:18	10:59:22							0:00:04
28/29	10:59:45	11:00:10	1	10:59:55	11:00:11							0:00:16
			2					11:00:03	11:00:11			0:00:08
			3					11:00:09	11:00:12			0:00:03
			4	11:00:05	11:00:12							0:00:07
			5	11:00:09	11:00:13							0:00:04
			6	11:00:12	11:00:14							0:00:02
29/30	11:00:56	11:01:18	0	0:00:00	0:00:00							0:00:00
30/31	11:01:36	11:02:05	1	11:01:45	11:02:07							0:00:22
31/32	11:02:44	11:03:07	1	11:03:03	11:03:11							0:00:08
			2							11:03:02	11:03:10	0:00:08
			3	11:03:05	11:03:12							0:00:07
			4	11:03:08	11:03:15							0:00:07
			5			11:03:11	11:03:16					0:00:05
32/33	11:03:44	11:03:54	0	0	0							0:00:00
33/34	11:04:10	11:04:42	1					11:04:25	11:04:44			0:00:19
			2					11:04:31	11:04:45			0:00:14
			3	11:04:33	11:04:44							0:00:11
34/35	11:05:18	11:05:45	1	11:05:30	11:05:46							0:00:16
35/36	11:05:59	11:06:10	0	0:00:00	0:00:00							0:00:00
36/37	11:06:53	11:07:24	1					11:07:06	11:07:28			0:00:22

Figure B-9. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 7

				Intersection 3								
				Through Lane 1				Through Lane 2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			2			11:07:07	11:07:28					0:00:21
			3					11:07:07	11:07:30			0:00:23
			4					11:07:24	11:07:31			0:00:07
			5			11:07:26	11:07:30					0:00:04
			6	11:07:27	11:07:31							0:00:04
			7					11:07:24	11:07:32			0:00:08
			8					11:07:30	11:07:35			0:00:05
			9					11:07:30	11:07:35			0:00:05
			10					11:07:30	11:07:36			0:00:06
37/38	11:08:06	11:08:37	1					11:08:30	11:08:38			0:00:08
38/39	11:09:22	11:09:47	1	11:09:44	11:09:48							0:00:04
			2					11:09:40	11:09:48			0:00:08
			3					11:09:48	11:09:49			0:00:01
39/40	11:10:20	11:10:42	0	0:00:00	0:00:00							0:00:00
40/41	11:11:20	11:11:54	1			11:11:36	11:11:58					0:00:22
			2					11:11:49	11:11:58			0:00:09
			3					11:11:55	11:11:59			0:00:04
			4					11:11:55	11:11:59			0:00:04
			5					11:11:56	11:12:00			0:00:04
41/42	11:12:14	11:12:36	0	0:00:00	0:00:00							0:00:00
42/43	11:13:08	11:13:30	1	11:13:22	11:13:32							0:00:10
			2	11:13:24	11:13:33							0:00:09
			3					11:13:19	11:13:32			0:00:13
			4					11:13:20	11:13:34			0:00:14
			5					11:13:28	11:13:36			0:00:08
			6					11:13:31	11:13:36			0:00:05
			7					11:13:34	11:13:37			0:00:03
43/44	11:14:01	11:14:23	1					11:14:20	11:14:27			0:00:07
			2			11:14:25	11:14:27					0:00:02
44/45	11:14:48	11:14:58	1							11:15:03	11:15:06	0:00:03
45/46	11:15:31	11:15:56	1	11:15:50	11:15:57							0:00:07
46/47	11:16:36	11:17:13	1	11:17:01	11:17:14							0:00:13
			2	11:17:08	11:17:15							0:00:07
			3	11:17:11	11:17:17							0:00:06
			4					11:16:46	11:17:14			0:00:28

Figure B-10. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 8

				Intersection 3								
				Through Lane 1				Through Lane 2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
47/48	11:17:40	11:18:05	1	11:17:49	11:18:07							0:00:18
			2					11:17:50	11:18:07			0:00:17
			3					11:17:55	11:18:08			0:00:13
			4					11:17:56	11:18:10			0:00:14
			5					11:18:02	11:18:10			0:00:08
			6					11:18:02	11:18:14			0:00:12
			7					11:18:03	11:18:15			0:00:12
			8					11:18:10	11:18:16			0:00:06
			9					11:18:12	11:18:18			0:00:06
48/49	11:18:30	11:18:40	0	0:00:00	0:00:00							0:00:00
49/50	11:19:30	11:19:41	1	11:19:42	11:19:43							0:00:01
			2					11:19:42	11:19:46			0:00:04
			3							11:19:46	11:19:47	0:00:01
50/51	11:20:25	11:20:46	0	0:00:00	0:00:00							0:00:00
51/52	11:21:24	11:21:34	0	0:00:00	0:00:00							0:00:00
52/53	11:22:48	11:23:15	1	11:23:08	11:23:19							0:00:11
			2	11:23:15	11:23:19							0:00:04
			3					11:23:09	11:23:18			0:00:09
			4					11:23:14	11:23:18			0:00:04
			5	11:23:16	11:23:20							0:00:04
53/54	11:24:09	11:24:32	1	11:24:22	11:24:34							0:00:12
			2	11:24:24	11:24:35							0:00:11
54/55	11:25:08	11:25:31	0	0:00:00	0:00:00							0:00:00
55/56	11:26:12	11:26:33	1					11:26:20	11:26:35			0:00:15
			2	11:26:23	11:26:35							0:00:12
			3					11:26:25	11:26:37			0:00:12
			4					11:26:30	11:26:40			0:00:10
			5					11:26:30	11:26:42			0:00:12
			6					11:26:30	11:26:43			0:00:13
			7	11:26:35	11:26:38							0:00:03
			8					11:26:39	11:26:43			0:00:04
56/57	11:27:01	11:27:25	0	0:00:00	0:00:00							0:00:00
57/58	11:27:55	11:28:23	1					11:28:09	11:28:24			0:00:15
			2			11:28:18	11:28:24					0:00:06
			3					11:28:21	11:28:27			0:00:06

Figure B-11. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 9

				Intersection 3								
				Through Lane 1				Through Lane 2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			4					11:28:23	11:28:28			0:00:05
58/59	11:29:12	11:29:47	1	11:29:37	11:29:48							0:00:11
			2					11:29:31	11:29:48			0:00:17
59/60	11:30:26	11:30:55	1					11:30:45	11:30:57			0:00:12
			2					11:30:50	11:30:58			0:00:08
			3					11:30:56	11:31:00			0:00:04
60/61	11:31:32	11:32:00	1					11:31:56	11:32:01			0:00:05
61/62	11:32:42	11:33:04	0	0:00:00	0:00:00							0:00:00
62/63	11:33:50	11:34:12	0	0:00:00	0:00:00							0:00:00
63/64	11:34:51	11:35:01	0	0:00:00	0:00:00							0:00:00
64/65	11:35:34	11:36:03	1	11:35:51	11:36:06							0:00:15
			2	11:35:52	11:36:06							0:00:14
			3	11:36:00	11:36:08							0:00:08
			4	11:36:05	11:36:08							0:00:03
			5					11:35:54	11:36:06			0:00:12

Figure B-12. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 10

				Intersection 4								
				Through Lane 1				Through Lane 2				
	Red		Vehicle	Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
1/2		10:30:36	1	10:30:29	10:30:37							0:00:08
			2	10:30:29	10:30:39							0:00:10
			3					10:30:24	10:30:37			0:00:13
			4					10:30:33	10:30:39			0:00:06
2/3	10:31:15	10:32:07	1	10:31:57	10:32:08							0:00:11
			2					10:31:45	10:32:09			0:00:24
			3					10:31:55	10:32:09			0:00:14
3/4	10:32:48	10:33:26	0	0	0							0:00:00
4/5	10:34:03	10:34:49	1					10:34:51	10:34:52			0:00:01
5/6	10:35:33	10:36:33	1							10:35:42	10:36:35	0:00:53
6/7	10:36:54	10:37:17	1			10:36:02	10:36:34					0:00:32
7/8	10:37:32	10:38:14	1			10:37:07	10:37:19					0:00:12
			2					10:38:09	10:38:18			0:00:09
			3					10:38:15	10:38:18			0:00:03
8/9	10:38:30	10:38:57	1					10:38:41	10:39:00			0:00:19
			2					10:38:57	10:39:01			0:00:04
9/10	10:39:40	10:40:39	1	10:39:56	10:40:41							0:00:45
			2			10:40:14	10:40:42					0:00:28
			3			10:40:14	10:40:45					0:00:31
			4			10:40:40	10:40:46					0:00:06
			5							10:40:09	10:40:41	0:00:32
			6					10:40:11	10:40:43			0:00:32
10/11	10:41:08	10:42:06	1	10:41:25	10:42:07							0:00:42
			2	10:41:51	10:42:09							0:00:18
			3	10:42:05	10:42:10							0:00:05
			4					10:41:34	10:42:08			0:00:34
			5					10:41:41	10:42:09			0:00:28
			6					10:42:06	10:42:10			0:00:04
11/12	10:42:32	10:43:12	1	10:42:50	10:43:14							0:00:24
12/13	10:44:00	10:44:51	1					10:44:14	10:44:54			0:00:40
			2	10:44:19	10:44:53							0:00:34
			3			10:44:27	10:44:58					0:00:31
			4					10:44:29	10:44:55			0:00:26
			5					10:44:29	10:44:55			0:00:26
			6			10:44:44	10:44:59					0:00:15

Figure B-13. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 11

				Intersection 4								
				Through Lane 1				Through Lane 2				
	Red		Vehicle	Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			7					10:44:35	10:44:56			0:00:21
			8					10:44:42	10:44:55			0:00:13
			9					10:44:50	10:45:00			0:00:10
			10							10:44:50	10:45:00	0:00:10
13/14	10:45:30	10:46:23	0	0	0							0:00:00
14/15	10:46:57	10:47:42	1	10:47:42	10:47:46							0:00:04
			2					10:47:21	10:47:43			0:00:22
			3					10:47:28	10:47:45			0:00:17
			4					10:47:30	10:47:47			0:00:17
			5					10:47:34	10:47:50			0:00:16
15/16	10:48:18	10:49:02	1	10:48:54	10:49:04							0:00:10
16/17	10:49:22	10:50:01	1	10:49:57	10:50:03							0:00:06
			2					10:49:59	10:50:05			0:00:06
17/18	10:50:18	10:50:43	1					10:50:36	10:50:45			0:00:09
			2	10:50:40	10:50:45							0:00:05
18/19	10:51:22	10:52:29	1					10:51:47	10:52:30			0:00:43
			2					10:51:52	10:52:31			0:00:39
19/20	10:52:54	10:53:42	0	0	0							0:00:00
20/21	10:54:32	10:55:18	1					10:54:49	10:55:20			0:00:31
21/22	10:56:04	10:56:46	1			10:56:25	10:56:47					0:00:22
			2			10:56:48	10:56:52					0:00:04
22/23	10:57:23	10:57:51	1					10:57:41	10:57:54			0:00:13
			2	10:58:41	10:58:52							0:00:11
			3					10:58:38	10:59:53			0:01:15
23/24	10:58:48	10:58:49	0	0	0							0:00:00
24/25	10:59:10	10:59:50	0	0	0							0:00:00
25/26	11:00:05	11:00:33	1					11:00:29	11:00:34			0:00:05
26/27	11:01:02	11:01:29	1	11:01:22	11:01:30							0:00:08
			2					11:01:21	11:01:30			0:00:09
			3					11:01:24	11:01:32			0:00:08
27/28	11:02:05	11:02:52	1	11:02:24	11:02:53							0:00:29
28/29	11:03:22	11:03:45	1					11:03:33	11:03:54			0:00:21
29/30	11:04:30	11:05:33	1	11:05:01	11:05:35							0:00:34
			2					11:05:30	11:05:36			0:00:06
30/31	11:06:01	11:06:46	1					11:06:40	11:06:48			0:00:08

Figure B-14. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 12

				Intersection 4								
				Through Lane 1				Through Lane 2				
	Red		Vehicle	Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
31/32	11:07:05	11:07:50	1					11:07:27	11:07:54			0:00:27
			2					11:07:51	11:07:54			0:00:03
			3					11:07:52	11:07:54			0:00:02
32/33	11:08:37	11:09:27	1			11:08:55	11:09:30					0:00:35
			2					11:08:45	11:09:30			0:00:45
			3					11:08:46	11:09:30			0:00:44
			4					11:09:00	11:09:33			0:00:33
			5					11:09:03	11:09:33			0:00:30
			6					11:09:17	11:09:34			0:00:17
			7					11:09:24	11:09:34			0:00:10
33/34	11:10:23	11:11:05	1	11:10:52	11:11:06							0:00:14
			2					11:10:37	11:11:07			0:00:30
			3	11:10:53	11:11:08							0:00:15
			4	11:11:05	11:11:10							0:00:05
			5					11:10:53	11:11:08			0:00:15
			6					11:11:00	11:11:08			0:00:08
34/35	11:12:01	11:13:00	1	11:12:52	11:13:01							0:00:09
35/36	11:13:23	11:14:13	1	11:14:01	11:14:15							0:00:14
			2							11:13:48	11:14:16	0:00:28
			3					11:13:53	11:14:16			0:00:23
36/37	11:14:52	11:15:22	1					11:15:14	11:15:23			0:00:09
37/38	11:16:03	11:16:46	1	11:16:34	11:16:48							0:00:14
			2					11:16:13	11:16:50			0:00:37
			3					11:16:39	11:16:50			0:00:11
			4					11:16:43	11:16:51			0:00:08
38/39	11:17:25	11:18:09	1					11:18:00	11:18:11			0:00:11
39/40	11:18:58	11:19:47	1			11:19:12	11:19:49					0:00:37
			2			11:19:28	11:19:51					0:00:23
			3	11:19:29	11:19:53							0:00:24
			4					11:19:21	11:19:44			0:00:23
			5					11:19:23	11:19:51			0:00:28
			6					11:19:29	11:19:53			0:00:24
			7					11:19:29	11:19:54			0:00:25
			8					11:19:31	11:19:55			0:00:24
			9					11:19:34	11:19:55			0:00:21

Figure B-15. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 13

				Intersection 4								
				Through Lane 1				Through Lane 2				
	Red		Vehicle	Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			10							11:19:34	11:19:57	0:00:23
40/41	11:20:27	11:21:06	1	11:20:55	11:21:08							0:00:13
			2	11:20:57	11:21:09							0:00:12
			3	11:20:57	11:21:09							0:00:12
			4					11:20:59	11:21:08			0:00:09
			5							11:21:07	11:21:08	0:00:01
			6							11:21:08	11:21:11	0:00:03
41/42	11:21:43	11:22:26	1					11:21:52	11:22:27			0:00:35
			2	11:22:00	11:22:27							0:00:27
			3					11:22:12	11:22:29			0:00:17
42/43	11:23:15	11:23:41	0									0:00:00
												0:00:00
43/44	11:23:56	11:24:50	1,2	11:24:23	11:24:51			11:24:43	11:24:51			0:00:28
			3,4	11:24:43	11:24:52			11:24:45	11:24:53			0:00:09
			5							11:24:44	11:26:05	0:01:21
44/45	11:25:16	11:26:03	1							11:25:50	11:26:05	0:00:15
			2	11:25:48	11:26:04							0:00:16
			3	11:25:55	11:26:05							0:00:10
			4			11:26:04	11:26:07					0:00:03
45/46	11:26:46	11:27:32	1					11:27:01	11:27:33			0:00:32
			2	11:27:04	11:27:33							0:00:29
46/47	11:28:11	11:28:48	1					11:28:36	11:28:51			0:00:15
47/48	11:29:27	11:30:10	1	11:29:41	11:30:13							0:00:32
			2	11:29:59	11:30:13							0:00:14
			3					11:30:08	11:30:13			0:00:05
48/49	11:30:55	11:31:58	1					11:31:07	11:32:00			0:00:53
			2					11:31:11	11:32:01			0:00:50
			3					11:31:19	11:32:03			0:00:44
			4					11:31:20	11:32:05			0:00:45
			5					11:31:59	11:32:06			0:00:07
			6	11:31:11	11:32:00							0:00:49
			7	11:31:14	11:32:01							0:00:47
			8			11:31:35	11:32:03					0:00:28
49/50	11:32:25	11:33:05	1	11:32:54	11:33:10							0:00:16
			2			11:33:07	11:33:11					0:00:04

Figure B-16. Average delay per vehicle per red cycle on arterial corridor of Tampa Part 14

	Intersection 1									
Cycle Number	red		Lane 1			Lane 2			Average Queue Length	Total Queue Length
	start	end	Non-Trucks	Trucks	Queue-Length	Non-Trucks	Trucks	Queue-Length		
2/3	10:33:02	10:33:28	0	0	0	0	0	0	0	0
3/4	10:34:42	10:35:02	1	1	2	2	0	2	2	4
4/5	10:36:02	10:36:26	0	0	0	2	0	2	1	2
5/6	10:37:32	10:38:16	1	0	1	1	0	1	1	2
6/7	10:39:02	10:39:39	1	0	1	0	1	1	1	2
7/8	10:40:32	10:41:11	3	0	3	6	1	7	5	10
8/9	10:42:02	10:42:27	1	0	1	1	0	1	1	2
9/10	10:43:32	10:43:58	1	0	1	1	0	1	1	2
10/11	10:45:02	10:45:38	1	0	1	2	0	2	2	3
11/12	10:48:01	10:48:44	2	0	2	2	0	2	2	4
12/13	10:49:31	10:50:15	3	0	3	4	0	4	4	7
13/14	10:51:03	10:51:27	0	0	0	0	0	0	0	0
14/15	10:54:02	10:54:39	2	0	2	3	1	4	3	6
15/16	10:55:32	10:55:56	0	0	0	0	0	0	0	0
16/17	10:57:02	10:57:31	1	0	1	0	0	0	1	1
17/18	11:00:02	11:00:38	0	0	0	1	0	1	1	1
18/19	11:01:32	11:02:00	1	0	1	0	0	0	1	1
19/20	11:03:02	11:04:17	4	0	4	9	0	9	7	13
20/21	11:04:58	11:05:23	0	0	0	0	0	0	0	0
21/22	11:06:15	11:06:41	1	0	1	0	0	0	1	1
22/23	11:07:34	11:07:58	0	1	1	2	0	2	2	3
23/24	11:09:02	11:09:26	0	1	1	0	0	0	1	1
24/25	11:10:32	11:11:00	0	0	0	0	0	0	0	0
25/26	11:12:02	11:12:25	0	0	0	0	0	0	0	0
26/27	11:13:32	11:13:55	1	0	1	0	0	0	1	1
27/28	11:15:02	11:15:42	2	0	2	5	0	5	4	7
28/29	11:16:32	11:17:33	2	0	2	3	0	3	3	5
29/30	11:18:25	11:18:52	1	0	1	0	0	0	1	1
30/31	11:19:46	11:21:00	5	0	5	4	1	5	5	10
31/32	11:21:54	11:22:18	4	0	4	4	0	4	4	8
32/33	11:23:43	11:24:07	1	0	1	4	0	4	3	5
33/34	11:25:32	11:25:56	0	0	0	0	0	0	0	0
34/35	11:27:02	11:27:47	1	0	1	1	0	1	1	2
35/36	11:28:32	11:28:56	1	0	1	3	0	3	2	4
36/37	11:30:02	11:31:08	1	0	1	3	1	4	3	5
37/38	11:31:32	11:32:33	4	0	4	7	1	8	6	12

Figure B-17. Queue length per lane per intersection on arterial corridor of Tampa Part 1

	Intersection 2									
Cycle	red		Lane 1			Lane 2			Average Queue	Total
Number	start	end	Non-Truck	Trucks	Queue-Length	Non-Trucks	Trucks	Queue-Length	Length	Queue length
1/2		10:29:33	0	0	0	0	0	0	0	0
2/3	10:30:40	10:31:10	0	0	0	1	0	1	1	1
3/4	10:32:10	10:32:34	0	0	0	0	0	0	0	0
4/5	10:33:56	10:34:18	1	0	1	0	0	0	1	1
5/6	10:35:10	10:35:34	0	0	0	0	0	0	0	0
6/7	10:38:10	10:38:49	0	0	0	1	0	1	1	1
7/8	10:39:40	10:40:07	0	0	0	0	0	0	0	0
8/9	10:41:10	10:41:52	2	0	2	0	0	0	1	2
9/10	10:44:10	10:45:07	2	0	2	2	0	2	2	4
10/11	10:47:10	10:47:58	1	0	1	2	0	2	2	3
11/12	10:48:40	10:49:20	0	0	0	2	0	2	1	2
12/13	10:51:40	10:52:08	0	0	0	1	0	1	1	1
13/14	10:53:10	10:53:40	0	0	0	0	0	0	0	0
14/15	10:54:40	10:55:09	1	0	1	1	0	1	1	2
15/16	10:56:10	10:56:38	0	0	0	0	0	0	0	0
16/17	10:57:40	10:58:07	0	0	0	0	0	0	0	0
17/18	10:59:10	10:59:34	0	0	0	1	0	1	1	1
18/19	11:02:10	11:02:48	1	0	1	2	0	2	2	3
19/20	11:03:40	11:04:04	0	0	0	1	0	1	1	1
20/21	11:05:10	11:05:34	0	0	0	2	0	2	1	2
21/22	11:06:40	11:07:04	0	0	0	0	0	0	0	0
22/23	11:08:10	11:08:43	0	1	1	2	0	2	2	3
23/24	11:11:08	11:11:35	0	0	0	0	0	0	0	0
24/25	11:14:10	11:14:34	0	0	0	0	0	0	0	0
25/26	11:15:40	11:16:35	0	0	0	0	0	0	0	0
26/27	11:17:10	11:17:37	0	0	0	0	0	0	0	0
27/28	11:18:40	11:19:06	1	0	1	0	1	1	1	2
28/29	11:20:10	11:20:34	1	0	1	0	0	0	1	1
29/30	11:23:10	11:23:34	1	0	1	1	0	1	1	2
30/31	11:24:40	11:25:06	0	0	0	0	0	0	0	0
31/32	11:26:10	11:26:41	0	0	0	0	0	0	0	0
32/33	11:31:00	11:31:24	1	0	1	0	0	0	1	1
33/34	11:32:10	11:32:34	0	0	0	0	0	0	0	0
34/35	11:33:40	11:34:06	1	0	1	5	0	5	3	6
35/36	11:35:10	11:35:46	1	0	1	1	0	1	1	2

Figure B-18. Queue length per lane per intersection on arterial corridor of Tampa Part 2

	Intersection 3								
Cycle	red		Lane 1			Lane 2			Queue
Number	start	end	Non-Truc	Trucks	Queue-Leng	Non-Truc	Trucks	Queue-Length	Length
35/36	11:05:59	11:06:10	0	0	0	0	0	0	0
36/37	11:06:53	11:07:24	0	1	1	2	0	2	1.5
37/38	11:08:06	11:08:37	0	0	0	1	0	1	0.5
38/39	11:09:22	11:09:47	1	0	1	1	0	1	1
39/40	11:10:20	11:10:42	0	0	0	0	0	0	0
40/41	11:11:20	11:11:54	0	1	1	1	0	1	1
41/42	11:12:14	11:12:36	0	0	0	0	0	0	0
42/43	11:13:08	11:13:30	2	0	2	3	0	3	2.5
43/44	11:14:01	11:14:23	0	0	0	1	0	1	0.5
44/45	11:14:48	11:14:58	0	0	0	0	0	0	0
45/46	11:15:31	11:15:56	1	0	1	0	0	0	0.5
46/47	11:16:36	11:17:13	3	0	3	1	0	1	2
47/48	11:17:40	11:18:05	1	0	1	6	0	6	3.5
48/49	11:18:30	11:18:40	0	0	0	0	0	0	0
49/50	11:19:30	11:19:41	0	0	0	0	0	0	0
50/51	11:20:25	11:20:46	0	0	0	0	0	0	0
51/52	11:21:24	11:21:34	0	0	0	0	0	0	0
52/53	11:22:48	11:23:15	2	0	2	2	0	2	2
53/54	11:24:09	11:24:32	2	0	2	0	0	0	1
54/55	11:25:08	11:25:31	0	0	0	0	0	0	0
55/56	11:26:12	11:26:33	1	0	1	5	0	5	3
56/57	11:27:01	11:27:25	0	0	0	0	0	0	0
57/58	11:27:55	11:28:23	0	1	1	3	0	3	2
58/59	11:29:12	11:29:47	1	0	1	1	0	1	1
59/60	11:30:26	11:30:55	0	0	0	2	0	2	1

Figure B-19. Queue length per lane per intersection on arterial corridor of Tampa Part 3

	Intersection 3									
Cycle	red		Lane 1			Lane 2			Average	Total
Number	start	end	Non-Truck	Trucks	Queue-Length	Non-Truck	Trucks	Queue-Length	Queue Length	Queue length
0/1		10:29:59	0	0	0	0	0	0	0	0
1/2	10:30:15	10:30:40	0	0	0	0	0	0	0	0
2/3	10:31:06	10:31:30	0	0	0	0	0	0	0	0
3/4	10:32:06	10:32:32	2	0	2	0	0	0	1	2
4/5	10:33:06	10:33:33	0	0	0	0	0	0	0	0
5/6	10:34:13	10:34:36	0	1	1	1	0	1	1	2
6/7	10:35:00	10:35:35	1	0	1	0	0	0	1	1
7/8	10:36:29	10:37:03	1	0	1	0	0	0	1	1
8/9	10:37:24	10:37:46	1	0	1	0	0	0	1	1
9/10	10:38:01	10:38:40	2	0	2	0	0	0	1	2
10/11	10:40:52	10:41:23	0	0	0	0	0	0	0	0
11/12	10:41:39	10:42:04	1	0	1	1	0	1	1	2
12/13	10:42:23	10:42:44	0	0	0	0	0	0	0	0
13/14	10:43:55	10:44:24	1	0	1	0	0	0	1	1
14/15	10:44:57	10:45:24	0	0	0	0	0	0	0	0
15/16	10:45:52	10:46:14	0	0	0	0	0	0	0	0
16/17	10:46:41	10:47:11	0	0	0	0	0	0	0	0
17/18	10:48:02	10:49:29	0	0	0	1	0	1	1	1
18/19	10:49:55	10:50:26	5	0	5	4	0	4	5	9
19/20	10:51:13	10:50:26	0	0	0	0	0	0	0	0
20/21	10:51:13	10:51:35	0	0	0	0	0	0	0	0
21/22	10:52:14	10:52:36	0	0	0	0	0	0	0	0
22/23	10:53:55	10:53:40	2	0	2	0	0	0	1	2
23/24	10:53:55	10:54:25	1	0	1	2	0	2	2	3
24/25	10:55:31	10:56:05	0	0	0	1	0	1	1	1
25/26	10:57:20	10:57:42	2	0	2	1	0	1	2	3
26/27	10:57:58	10:58:22	0	0	0	0	0	0	0	0
27/28	10:58:45	10:59:16	1	0	1	0	0	0	1	1
28/29	10:59:45	11:00:10	3	0	3	2	0	2	3	5
29/30	11:00:56	11:01:18	0	0	0	0	0	0	0	0
30/31	11:01:36	11:02:05	1	0	1	0	0	0	1	1
31/32	11:02:44	11:03:07	2	0	2	0	1	1	2	3
32/33	11:03:44	11:03:54	0	0	0	0	0	0	0	0
33/34	11:04:10	11:04:42	1	0	1	2	0	2	2	3
34/35	11:05:18	11:05:45	1	0	1	0	0	0	1	1
35/36	11:05:59	11:06:10	0	0	0	0	0	0	0	0
36/37	11:06:53	11:07:24	0	1	1	2	0	2	2	3
37/38	11:08:06	11:08:37	0	0	0	1	0	1	1	1
38/39	11:09:22	11:09:47	1	0	1	1	0	1	1	2
39/40	11:10:20	11:10:42	0	0	0	0	0	0	0	0
40/41	11:11:20	11:11:54	0	1	1	1	0	1	1	2
41/42	11:12:14	11:12:36	0	0	0	0	0	0	0	0
42/43	11:13:08	11:13:30	2	0	2	3	0	3	3	5
43/44	11:14:01	11:14:23	0	0	0	1	0	1	1	1
44/45	11:14:48	11:14:58	0	0	0	0	0	0	0	0
45/46	11:15:31	11:15:56	1	0	1	0	0	0	1	1
46/47	11:16:36	11:17:13	3	0	3	1	0	1	2	4

Figure B-20. Queue length per lane per intersection on arterial corridor of Tampa Part 4

	Intersection 4									
Cycle	red		Lane 1			Lane 2			Queue	Total
Number	start	end	Non-Truck	Trucks	Queue-Length	Non-Trucks	Trucks	Queue-Length	Length	Queue length
1/2		10:30:36	2	0	2	2	0	2	2	4
2/3	10:31:15	10:32:07	1	0	1	2	0	2	2	3
3/4	10:32:48	10:33:26	0	0	0	0	0	0	0	0
4/5	10:34:03	10:34:49	0	0	0	0	0	0	0	0
5/6	10:35:33	10:36:33	0	1	1	0	1	1	1	2
6/7	10:36:54	10:37:17	0	0	0	0	0	0	0	0
7/8	10:27:32	10:38:14	1	0	1	1	0	1	1	2
8/9	10:38:30	10:38:57	0	0	0	2	0	2	1	2
9/10	10:39:40	10:40:39	3	0	3	1	1	2	3	5
10/11	10:41:08	10:42:06	3	0	3	3	0	3	3	6
11/12	10:42:32	10:43:12	1	2	3	0	0	0	2	3
12/13	10:44:00	10:44:51	1	0	1	6	1	7	4	8
13/14	10:45:30	10:46:23	0	0	0	0	0	0	0	0
14/15	10:46:57	10:47:42	1	0	1	4	0	4	3	5
15/16	10:48:18	10:49:02	1	0	1	0	0	0	1	1
16/17	10:49:22	10:50:01	1	0	1	1	0	1	1	2
17/18	10:50:18	10:50:43	1	0	1	1	0	1	1	2
18/19	10:51:22	10:52:29	0	0	0	1	0	1	1	1
19/20	10:52:54	10:53:42	0	0	0	0	0	0	0	0
20/21	10:54:32	10:55:18	0	1	1	1	0	1	1	2
21/22	10:56:04	10:56:46	1	0	1	0	0	0	1	1
22/23	10:57:23	10:57:51	0	0	0	2	0	2	1	2
23/24	10:58:48	10:58:49	0	0	0	0	0	0	0	0
24/25	10:59:10	10:59:50	0	0	0	0	0	0	0	0
25/26	11:00:05	11:00:33	0	0	0	1	0	1	1	1
26/27	11:01:02	11:01:29	1	0	1	2	0	2	2	3
27/28	11:02:05	11:02:52	1	0	1	0	0	0	1	1
28/29	11:03:22	11:03:45	0	0	0	1	0	1	1	1
29/30	11:04:30	11:05:33	1	0	1	1	0	1	1	2
30/31	11:06:01	11:06:46	0	0	0	1	0	1	1	1
31/32	11:07:05	11:07:50	0	0	0	1	0	1	1	1
32/33	11:08:37	11:09:27	1	0	1	6	0	6	4	7
33/34	11:10:23	11:11:05	3	0	3	3	0	3	3	6
34/35	11:12:01	11:13:00	1	0	1	0	0	0	1	1
35/36	11:13:23	11:14:13	1	0	1	1	1	2	2	3
36/37	11:14:52	11:15:22	0	0	0	1	0	1	1	1
37/38	11:16:03	11:16:46	1	0	1	3	0	3	2	4
38/39	11:17:25	11:18:09	0	0	0	1	0	1	1	1
39/40	11:18:58	11:19:47	1	2	3	6	1	7	5	10
40/41	11:20:27	11:21:06	3	0	3	1	0	1	2	4
41/42	11:21:43	11:22:26	1	0	1	2	0	2	2	3
42/43	11:23:15	11:23:41	0	0	0	0	0	0	0	0
43/44	11:23:56	11:24:50	2	0	2	2	1	3	3	5
44/45	11:25:16	11:26:03	2	0	2	1	0	1	2	3
45/46	11:26:46	11:27:32	1	0	1	1	0	1	1	2
46/47	11:28:11	11:28:48	0	0	0	1	0	1	1	1
47/48	11:29:27	11:30:10	2	0	2	1	0	1	2	3

Figure B-21. Queue length per lane per intersection on arterial corridor of Tampa Part 5

	Intersection 1						
	Lane 2						
Cycle No.	QueueLer	T4	Tn	Tn-T4	Seconds	Hsat(sec)	S
8	7	0:00:13	0:00:20	0:00:07	7	2.33	1545
20	9	0:00:09	0:00:20	0:00:11	11	2.20	1636
38	8	0:00:12	0:00:24	0:00:12	12	3	1200
61	7	0:00:08	0:00:15	0:00:07	7	2.33	1545

	Intersection 2						
	Lane 2						
Cycle No.	QueueLer	T4	Tn	Tn-T4	Seconds	Hsat(sec)	S
Queues less than 7							

	Intersection 3						
	Lane 2						
Cycle No.	QueueLer	T4	Tn	Tn-T4	Seconds	Hsat(sec)	S
Queues less than 7							

	Intersection 4						
	Lane 2						
Cycle No.	QueueLer	T4	Tn	Tn-T4	Seconds	Hsat(sec)	S
13	7	0:00:12	0:00:19	0:00:07	7	2.33	1545
40	8	0:00:11	0:00:20	0:00:09	9	2.25	1600

Figure B-22. Saturation flow rate per lane per intersection on arterial corridor of Tampa

Cycle	Tampa							
	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
1	0.90	1.00	1.00	0.60	0.10	0.00	0.00	0.40
2	1.00	0.94	1.00	0.57	0.00	0.06	0.00	0.43
3	0.43	1.00	1.00	1.00	0.57	0.00	0.00	0.00
4	0.89	0.91	0.50	1.00	0.11	0.09	0.50	0.00
5	0.90	1.00	-	0.80	0.10	0.00	1.00	0.20
6	0.90	0.95	-	1.00	0.10	0.05	1.00	0.00
7	0.66	1.00	0.75	0.33	0.34	0.00	0.25	0.67
8	0.94	0.94	-	0.60	0.06	0.06	1.00	0.40
9	0.90	0.87	0.67	0.55	0.10	0.13	0.33	0.45
10	0.90	0.79	0.94	0.14	0.10	0.21	0.06	0.86
11	0.60	0.93	1.00	0.57	0.40	0.07	0.00	0.43
12	0.68	0.93	0.78	0.27	0.32	0.07	0.22	0.73
13	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
14	0.67	0.88	0.80	0.17	0.33	0.12	0.20	0.83
15	1.00	1.00	-	0.50	0.00	0.00	1.00	0.50
16	0.94	1.00	1.00	0.50	0.06	0.00	0.00	0.50
17	0.93	0.95	1.00	0.82	0.07	0.05	0.00	0.18
18	0.92	0.80	0.80	0.75	0.08	0.20	0.20	0.25
19	0.38	0.94	0.25	1.00	0.62	0.06	0.75	0.00
20	1.00	0.95	1.00	0.78	0.00	0.05	0.00	0.22
21	0.95	1.00	1.00	0.89	0.05	0.00	0.00	0.11
22	0.75	0.93	1.00	0.50	0.25	0.07	0.00	0.50
23	0.93	1.00	0.78	1.00	0.07	0.00	0.22	0.00
24	1.00	1.00	0.75	1.00	0.00	0.00	0.25	0.00
25	1.00	1.00	0.92	0.80	0.00	0.00	0.08	0.20
26	0.92	1.00	0.40	-	0.08	0.00	0.60	1.00

Figure B-23. Stop rate per red-to-red cycle per intersection on arterial corridor of Tampa Part 1

Cycle	Tampa							
	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
27	0.65	0.93	1.00	0.80	0.35	0.07	0.00	0.20
28	0.71	0.90	0.75	0.75	0.29	0.10	0.25	0.25
29	0.96	0.88	0.50	0.71	0.04	0.13	0.50	0.29
30	0.55	1.00	1.00	0.80	0.45	0.00	0.00	0.20
31	0.64	1.00	0.83	0.80	0.36	0.00	0.17	0.20
32	0.77	0.92	0.70	0.61	0.23	0.08	0.30	0.39
33	1.00	1.00	-	0.40	0.00	0.00	1.00	0.60
34	0.92	0.80	0.25	0.88	0.08	0.20	0.75	0.13
35	0.75	0.92	0.92	0.70	0.25	0.08	0.08	0.30
36	-	1.00	1.00	0.89	1.00	0.00	0.00	0.11
37	0.91	1.00	0.81	0.43	0.09	0.00	0.19	0.57
38	0.91	1.00	0.94	0.86	0.09	0.00	0.06	0.14
39	0.92	1.00	0.33	0.41	0.08	0.00	0.67	0.59
40	0.89	1.00	1.00	0.60	0.11	0.00	0.00	0.40
41	0.94	0.92	0.60	0.40	0.06	0.08	0.40	0.60
42	0.97	1.00	1.00	-	0.03	0.00	0.00	1.00
43	0.86	0.86	0.29	0.17	0.14	0.14	0.71	0.83
44	0.83	0.98	0.92	0.63	0.17	0.03	0.08	0.38
45	0.89	0.97	1.00	0.86	0.11	0.03	0.00	0.14
46	0.86	1.00	0.92	0.67	0.14	0.00	0.08	0.33
47	0.77	0.78	0.43	0.50	0.23	0.22	0.57	0.50
48	0.91	0.63	0.22	0.36	0.09	0.38	0.78	0.64
49	0.71	0.95	1.00	0.88	0.29	0.05	0.00	0.13
50	0.96	1.00	1.00	0.83	0.04	0.00	0.00	0.17
51	0.87	0.95	1.00	0.50	0.13	0.05	0.00	0.50
52	0.93	1.00	1.00	0.62	0.07	0.00	0.00	0.38

Figure B-24. Stop rate per red-to-red cycle per intersection on arterial corridor of Tampa Part 2

	Tampa							
Cycle	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
53	1.00	0.95	0.33	0.43	0.00	0.05	0.67	0.57
54	0.89	0.63	0.86	0.36	0.11	0.38	0.14	0.64
55	0.90	0.69	1.00	0.50	0.10	0.31	0.00	0.50
56	0.75	1.00	0.25	0.75	0.25	0.00	0.75	0.25
57	1.00	0.91	1.00	0.50	0.00	0.09	0.00	0.50
58	0.58	0.96	0.20	0.50	0.42	0.04	0.80	0.50
59	0.93	1.00	0.80	1.00	0.07	0.00	0.20	0.00
60	0.33	0.86	0.89	0.78	0.67	0.14	0.11	0.22
61	0.90	0.86	0.90	0.83	0.10	0.14	0.10	0.17
62	0.92	1.00	1.00	1.00	0.08	0.00	0.00	0.00
63	0.83	1.00	1.00	0.14	0.17	0.00	0.00	0.86
64	0.72	0.93	1.00	0.70	0.28	0.07	0.00	0.30
65	0.93	0.94	0.33	0.83	0.07	0.06	0.67	0.17
66	0.75	1.00	1.00	0.57	0.25	0.00	0.00	0.43
67	0.68	0.83	0.90	0.25	0.32	0.17	0.10	0.75
68	0.94	0.86	0.50	0.20	0.06	0.14	0.50	0.80
69	1.00	1.00	0.75	0.50	0.00	0.00	0.25	0.50
70	0.82	0.70	1.00	0.62	0.18	0.30	0.00	0.38
71	0.86	0.92	0.67	1.00	0.14	0.08	0.33	0.00
72	0.95	1.00	0.67	0.25	0.05	0.00	0.33	0.75
73	0.79	0.87	1.00	0.75	0.21	0.13	0.00	0.25
74	0.67	1.00	0.93	0.40	0.33	0.00	0.07	0.60
75	0.91	0.93	0.25	0.50	0.09	0.07	0.75	0.50
76	1.00	0.95	0.86	0.92	0.00	0.05	0.14	0.08
77	0.82	1.00	0.43	0.40	0.18	0.00	0.57	0.60
78	0.53	0.96	1.00	0.33	0.47	0.04	0.00	0.67

Figure B-25. Stop rate per red-to-red cycle per intersection on arterial corridor of Tampa Part 3

	Tampa							
Cycle	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
79	0.92	0.94	1.00	0.22	0.08	0.06	0.00	0.78
80	0.57	1.00	1.00	0.17	0.43	0.00	0.00	0.83
81	0.77	0.82	1.00	0.22	0.23	0.18	0.00	0.78
82	0.88	1.00	0.29	0.47	0.12	0.00	0.71	0.53
83	0.92	1.00	0.77	1.00	0.08	0.00	0.23	0.00
84	0.89	0.70	0.29	0.36	0.11	0.30	0.71	0.64
85	1.00	0.71	0.94	0.36	0.00	0.29	0.06	0.64
86	0.82	0.95	1.00	0.67	0.18	0.05	0.00	0.33
87	0.70	1.00	0.71	1.00	0.30	0.00	0.29	0.00
88	0.94	0.87	0.38	0.60	0.06	0.13	0.63	0.40
89	0.98	0.80	0.43	1.00	0.02	0.20	0.57	0.00
90	1.00	0.88	0.56	0.25	0.00	0.12	0.44	0.75
91	0.94	0.78	0.88	0.80	0.06	0.22	0.12	0.20
92	0.95	0.92	1.00	0.71	0.05	0.08	0.00	0.29
93	0.93	1.00	0.89	0.63	0.07	0.00	0.11	0.38
94	0.78	1.00	0.93	-	0.22	0.00	0.07	1.00
95	0.76	0.47	0.50	0.29	0.24	0.53	0.50	0.71
96	1.00	0.86	1.00	0.80	0.00	0.14	0.00	0.20
97	1.00	0.95	0.22	0.67	0.00	0.05	0.78	0.33
98	0.92	0.30	0.88	0.70	0.08	0.70	0.12	0.30
99	1.00	1.00	0.33	1.00	0.00	0.00	0.67	0.00
100	0.73	0.33	0.95	0.67	0.27	0.67	0.05	0.33
101	0.91	0.50	1.00	0.83	0.09	0.50	0.00	0.17
102			1.00	1.00			0.00	0.00
103			0.20	0.75			0.80	0.25
104			0.75	0.60			0.25	0.40

Figure B-26. Stop rate per red-to-red cycle per intersection on arterial corridor of Tampa Part 4

	Tampa							
Cycle	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
105			0.90	0.67			0.10	0.33
106			0.40	0.50			0.60	0.50
107			0.71	0.50			0.29	0.50
108			0.83	0.50			0.17	0.50
109			0.92	0.88			0.08	0.13
110			0.63	1.00			0.38	0.00
111			0.89	0.50			0.11	0.50
112			0.63	0.87			0.38	0.13
113			0.73	1.00			0.27	0.00
114			-	0.46			1.00	0.54
115			0.93	0.60			0.07	0.40
116			1.00	0.93			0.00	0.07
117			1.00	0.94			0.00	0.06
118			0.92	0.67			0.08	0.33
119			-	0.38			1.00	0.62
120			0.67	-			0.33	1.00
121			1.00	0.57			0.00	0.43
122			0.50	1.00			0.50	0.00
123			0.90	-			0.10	1.00
124			0.89	-			0.11	1.00
125			1.00	1.00			0.00	0.00
126			1.00	0.91			0.00	0.09
127			0.25	0.75			0.75	0.25
128			0.50	0.60			0.50	0.40
129			1.00	0.91			0.00	0.09
130			0.94	0.88			0.06	0.13

Figure B-27. Stop rate per red-to-red cycle per intersection on arterial corridor of Tampa Part 5

	Tampa							
Cycle	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
131			1.00	0.57			0.00	0.43
132			1.00	1.00			0.00	0.00
133			1.00				0.00	
134			0.40				0.60	
135			0.78				0.22	
136			0.92				0.08	
137			0.83				0.17	
138			0.80				0.20	
139			1.00				0.00	
140			1.00				0.00	
141			0.75				0.25	
142			1.00				0.00	
143			0.83				0.17	
144			1.00				0.00	
145			0.87				0.13	
146			0.33				0.67	
147			1.00				0.00	
148			0.57				0.43	
149			1.00				0.00	
150			0.50				0.50	
151			0.60				0.40	
152			0.94				0.06	
153			0.88				0.13	
154			1.00				0.00	
155			0.83				0.17	
156			1.00				0.00	

Figure B-28. Stop rate per red-to-red cycle per intersection on arterial corridor of Tampa Part 6

	Tampa							
Cycle	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
158			1.00				0.00	
159			1.00				0.00	
160			1.00				0.00	
161			0.90				0.10	
162			0.50				0.50	
163			1.00				0.00	
164			1.00				0.00	
165			0.86				0.14	
166			-				1.00	
167			1.00				0.00	
168			1.00				0.00	
169			-				1.00	
170			-				1.00	
171			0.40				0.60	
172			0.57				0.43	
173			1.00				0.00	
174			1.00				0.00	
175			0.88				0.13	
176			0.94				0.06	
177			1.00				0.00	
178			0.89				0.11	
179			1.00				0.00	
180			1.00				0.00	
181			1.00				0.00	
Average	0.84	0.91	0.76	0.63	0.16	0.09	0.24	0.37
g/C	5.27	9.77	3.11	1.67				

Figure B-29. Stop rate per red-to-red cycle per intersection on arterial corridor of Tampa Part 7

Intersection 2-1	Intersection 3-2	Intersection 4-3
0:00:45	0:00:26	0:00:37
0:00:50	0:00:20	0:01:27
0:00:32	0:00:59	0:01:56
0:00:33	0:00:20	0:02:17
0:00:28	0:00:01	0:00:58
0:00:41	0:02:34	0:00:14
0:01:09	0:01:57	0:00:28
0:02:20	0:00:52	0:00:17
0:00:36	0:00:17	0:00:43
0:01:53	0:01:31	0:01:08
0:02:13	0:01:06	0:02:07
0:00:30	0:00:28	0:01:59
0:00:42	0:00:45	0:02:18
0:00:36	0:00:56	0:02:48
0:00:48	0:01:04	0:02:50
0:00:11	0:00:15	0:01:14
0:00:23	0:00:36	0:02:03
0:00:45	0:00:19	0:01:06
0:00:35	0:00:38	0:01:38
0:00:39	0:00:11	0:02:21
0:00:53	0:00:20	0:01:46
0:00:04	0:01:04	0:01:07
0:00:14	0:00:19	0:01:28
0:02:34	0:00:24	0:01:17
0:02:48	0:00:38	0:01:19
0:02:34	0:00:28	0:01:34
0:01:16	0:00:35	0:01:40
	0:00:12	0:01:39
	0:00:58	0:01:01

Figure B-30. Signal offset between intersections on arterial corridor of Tampa Part 1

Intersection 2-1	Intersection 3-2	Intersection 4-3
	0:00:25	0:01:40
	0:00:44	0:02:03
		0:01:18
		0:01:06
		0:01:37
		0:01:52
		0:00:50
		0:00:56
		0:01:42
		0:01:25
		0:01:40
		0:02:07
		0:01:35
		0:01:31
		0:02:01
		0:01:23
		0:01:47

Figure B-31. Signal offset between intersections on arterial corridor of Tampa Part 2

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles	time(min)	speed (miles/hr)
Vehicle n	start(int 1)	end(int 4)	start	end			
81	13:02:15	13:06:03			1.44	3.80	22.74
82	13:04:35	13:08:00			1.44	3.42	25.29
83	13:04:38	13:08:40			1.44	4.03	21.42
84			13:04:41	13:08:43	1.44	4.03	21.42
85	13:04:52	13:08:53			1.44	4.02	21.51
86			13:11:40	13:15:26	1.44	3.77	22.94
87			13:11:45	13:15:28	1.44	3.72	23.25
88	13:11:47	13:15:31			1.44	3.73	23.14
89	13:13:59	13:17:42			1.44	3.72	23.25
90			13:14:03	13:17:49	1.44	3.77	22.94
91	13:14:11	13:17:55			1.44	3.73	23.14
92	13:14:14	13:17:57			1.44	3.72	23.25
93	13:18:38	13:23:53			1.44	5.25	16.46
94	13:21:16	13:25:00			1.44	3.73	23.14
95	13:23:19	13:25:37			1.44	2.30	37.57
96	13:23:24	13:26:40			1.44	3.27	26.45
97	13:23:26	13:26:43			1.44	3.28	26.31
98	13:23:49	13:26:46			1.44	2.95	29.29
99	13:25:36	13:29:50			1.44	4.23	20.41
100			13:25:47	13:29:53	1.44	4.10	21.07
101	13:25:48	13:30:02			1.44	4.23	20.41
102	13:32:35	13:36:02			1.44	3.45	25.04
103	13:32:38	13:36:08			1.44	3.50	24.69
104			13:34:59	13:38:45	1.44	3.77	22.94
105	13:35:04	13:38:49			1.44	3.75	23.04
106	13:39:37	13:42:35			1.44	2.97	29.12
107	13:39:44	13:42:47			1.44	3.05	28.33
108	13:40:02	13:42:49			1.44	2.78	31.04
109	13:46:39	13:50:48			1.44	4.15	20.82
110	13:46:41	13:51:18			1.44	4.62	18.71
111	13:46:44	13:51:20			1.44	4.60	18.78
112	13:48:57	13:52:14			1.44	3.28	26.31
113	13:49:04	13:52:32			1.44	3.47	24.92
114	13:51:18	13:54:29			1.44	3.18	27.14
115	13:53:40	13:56:51			1.44	3.18	27.14

Figure B-32. Average speed per vehicle on arterial corridor of Miami

				Intersection 1								
				Through Lane				Left Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	Delay
55/56			1					12:59:45	13:02:17			0:02:32
	13:00:29	13:02:13	2	13:00:45	13:02:14							0:01:29
			3					13:00:56	13:02:18			0:01:22
56/57			1					13:00:59	13:02:18			0:01:19
57/58	13:02:46	13:04:33	1					13:03:10	13:03:39			0:00:29
			2	13:03:55	13:04:34							0:00:39
			3	13:04:02	13:04:35							0:00:33
			4			13:04:11	13:04:37					0:00:26
59/60	13:05:02	13:06:53	1	13:05:30	13:06:56							0:01:26
			2	13:05:32	13:06:58							0:01:26
			3	13:05:55	13:06:59							0:01:04
			4	13:05:59	13:07:00							0:01:01
			5	13:06:16	13:07:02							0:00:46
60/61	13:07:26	13:09:13	1	13:08:08	13:09:14							0:01:06
			2	13:08:27	13:09:14							0:00:47
61/62	13:09:30	13:11:33	1	13:09:56	13:11:34							0:01:38
			2					13:10:01	13:11:34			0:01:33
			3			13:10:26	13:11:36					0:01:10
			4			13:10:34	13:11:39					0:01:05
			5	13:10:44	13:11:41							0:00:57
62/63	13:12:02	13:13:53	1	13:12:10	13:13:55							0:01:45
			2	13:12:24	13:13:56							0:01:32
			3			13:12:30	13:13:57					0:01:27
			4	13:12:36	13:13:56							0:01:20
			5	13:13:09	13:14:00							0:00:51
63/64			1	13:13:12	13:13:58							0:00:46
	13:14:26	13:16:13	2	13:14:59	13:16:17							0:01:18
			3					13:15:03	13:16:15			0:01:12
			4	13:15:06	13:16:17							0:01:11
			5	13:15:12	13:16:17							0:01:05
			6	13:15:19	13:16:19							0:01:00
64/65			1					13:15:47	13:16:15			0:00:28
	13:16:46	13:18:33	2	13:16:57	13:18:34							0:01:37
			3	13:17:08	13:18:36							0:01:28
			4	13:17:13	13:18:37							0:01:24
			5					13:17:23	13:18:36			0:01:13
65/66			1	13:17:44	13:18:38							0:00:54
	13:19:06	13:20:53	2	13:19:26	13:20:54							0:01:28
			3					13:19:29	13:20:55			0:01:26
			4					13:19:35	13:20:55			0:01:20

Figure B-33. Average delay per vehicle per red cycle on arterial corridor of Miami Part 1

				Intersection 1								
				Through Lane				Left Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	Delay
66/67			1	13:19:43	13:20:58							0:01:15
			2	13:19:43	13:21:00							0:01:17
			3	13:19:51	13:21:01							0:01:10
67/68	13:21:26	13:23:13	1	13:21:41	13:23:15							0:01:34
			2	13:21:51	13:23:16							0:01:25
			3	13:22:03	13:23:15							0:01:12
			4	13:22:16	13:23:16							0:01:00
			5	13:22:18	13:23:17							0:00:59
	13:23:46	13:25:33	6							13:23:13	13:23:20	0:00:07
68/69			1	13:23:55	13:25:34							0:01:39
			2					13:24:06	13:25:34			0:01:28
			3	13:24:13	13:25:36							0:01:23
			4	13:24:22	13:25:36							0:01:14
69/70	13:26:06	13:27:53	1					13:26:27	13:27:53			0:01:26
			2	13:26:36	13:27:55							0:01:19
			3					13:26:42	13:27:55			0:01:13
72/73			1	13:31:16	13:32:34							0:01:18
			2	13:31:58	13:32:35							0:00:37
			3	13:32:24	13:32:35							0:00:11
			4					13:33:43	13:34:55			0:01:12
			5							13:33:53	13:34:57	0:01:04
			6	13:33:58	13:34:57							0:00:59
73/74			1	13:34:13	13:34:57							0:00:44
			2	13:34:45	13:35:00							0:00:15
74/75			1	13:36:11	13:37:14							0:01:03
75/76			1	13:38:46	13:39:36							0:00:50
			2	13:39:16	13:39:36							0:00:20
			3	13:39:32	13:39:40							0:00:08
76/77			1	13:40:35	13:41:54							0:01:19
			2	13:40:45	13:41:58							0:01:13
			3					13:40:48	13:41:54			0:01:06
			4	13:40:52	13:41:58							0:01:06
			5	13:41:21	13:41:58							0:00:37
77/78			1					13:43:14	13:44:15			0:01:01
			2	13:43:48	13:44:15							0:00:27
78/79			1	13:45:20	13:46:35							0:01:15
			2	13:45:39	13:46:35							0:00:56
			3	13:46:04	13:46:36							0:00:32
			4	13:46:04	13:46:38							0:00:34
			5	13:46:04	13:46:38							0:00:34

Figure B-34. Average delay per vehicle per red cycle on arterial corridor of Miami Part 2

				Intersection 1								
				Through Lane				Left Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	Delay
79/80			1	13:47:27	13:48:55							0:01:28
			2					13:47:36	13:48:55			0:01:19
			3	13:47:59	13:48:56							0:00:57
			4	13:48:00	13:48:58							0:00:58
80/81			1	13:48:13	13:48:59							0:00:46
			2	13:49:37	13:51:15							0:01:38
			3					13:49:38	13:51:15			0:01:37
81/82			1	13:49:40	13:51:16							0:01:36
			2	13:51:02	13:51:16							0:00:14
82/83			1	13:52:29	13:53:35							0:01:06
			2	13:52:47	13:53:37							0:00:50
			3	13:52:48	13:53:38							0:00:50
			4	13:53:13	13:53:35							0:00:22
			5	13:54:12	13:55:55							0:01:43
83/84			1							13:54:22	13:55:55	0:01:33
			2	13:54:43	13:55:56							0:01:13
			3	13:55:22	13:55:56							0:00:34
			4	13:55:30	13:55:57							0:00:27
			5	13:55:41	13:55:57							0:00:16
			6	13:55:42	13:55:57							0:00:15
84/85			1	13:56:28	13:58:15							0:01:47
			2					13:56:37	13:58:15			0:01:38
			3					13:57:13	13:58:16			0:01:03
			4					13:58:02	13:58:17			0:00:15

Figure B-35. Average delay per vehicle per red cycle on arterial corridor of Miami Part 3

				Intersection 2				
				Through Lane				
	Red			Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	Delay
61/62	13:01:15	13:02:03	1	13:01:42	13:01:53			0:00:11
			2	13:01:50	13:02:05			0:00:15
			3	13:01:50	13:02:05			0:00:15
			4	13:01:53	13:02:06			0:00:13
			5	13:01:53	13:02:06			0:00:13
			6	13:01:53	13:02:07			0:00:14
63/64	13:05:15	13:06:03	1	13:05:27	13:06:05			0:00:38
			2	13:05:29	13:06:05			0:00:36
			3	13:05:31	13:06:06			0:00:35
			4			13:05:33	13:06:08	0:00:35
64/65	13:07:15	13:07:58	1	13:07:34	13:08:01			0:00:27
			2	13:07:48	13:08:01			0:00:13
			3	13:07:53	13:08:01			0:00:08
65/66	13:09:15	13:09:56	1	13:09:43	13:09:58			0:00:15
66/67	13:11:15	13:12:03	1	13:11:28	13:12:06			0:00:38
			2	13:11:35	13:12:07			0:00:32
			3	13:11:37	13:12:09			0:00:32
			4	13:11:41	13:12:12			0:00:31
			5	13:11:52	13:12:12			0:00:20
			6	13:11:58	13:12:15			0:00:17
			7	13:12:04	13:12:15			0:00:11
			8			13:12:09	13:12:18	0:00:09
			9	13:11:58	13:12:15			0:00:17
			10	13:12:09	13:12:18			0:00:09
67/68	13:13:15	13:14:03	1	13:13:31	13:14:05			0:00:34
			2	13:13:43	13:14:05			0:00:22
			3	13:13:45	13:14:07			0:00:22
			4			13:14:05	13:14:08	0:00:03
			5	13:14:06	13:14:09			0:00:03
			6	13:14:24	13:14:31			0:00:07
			7	13:14:27	13:14:31			0:00:04
			8	13:14:27	13:14:32			0:00:05
68/69	13:15:15	13:16:03	1	13:15:41	13:16:05			0:00:24
			2	13:15:45	13:16:06			0:00:21
			3	13:15:53	13:16:08			0:00:15
			4	13:16:05	13:16:11			0:00:06
69/70	13:17:15	13:18:03	1	13:17:20	13:18:05			0:00:45
			2	13:17:20	13:18:05			0:00:45
			3	13:17:27	13:18:07			0:00:40
			4	13:17:31	13:18:09			0:00:38

Figure B-36. Average delay per vehicle per red cycle on arterial corridor of Miami Part 4

				Intersection 2				
				Through Lane				
	Red			Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	Delay
			5	13:17:32	13:18:10			0:00:38
			6	13:17:35	13:18:11			0:00:36
			7	13:17:41	13:18:13			0:00:32
			8	13:17:45	13:18:15			0:00:30
			9	13:17:50	13:18:17			0:00:27
			10	13:18:05	13:18:20			0:00:15
70/71	13:19:15	13:20:03	1	13:19:26	13:19:50			0:00:24
			2	13:19:34	13:20:08			0:00:34
			3	13:19:40	13:20:08			0:00:28
			4	13:19:40	13:20:09			0:00:29
			5			13:19:46	13:20:09	0:00:23
			6	13:19:48	13:20:11			0:00:23
			7	13:19:50	13:20:16			0:00:26
			8	13:19:54	13:20:19			0:00:25
			9	13:20:01	13:20:20			0:00:19
71/72	13:21:15	13:22:02	1	13:21:34	13:22:04			0:00:30
			2	13:21:37	13:22:06			0:00:29
			3	13:21:46	13:22:06			0:00:20
			4	13:21:45	13:22:10			0:00:25
			5	13:21:51	13:22:11			0:00:20
			6	13:21:54	13:22:11			0:00:17
			7	13:22:00	13:22:17			0:00:17
			8	13:22:00	13:22:19			0:00:19
			9	13:22:04	13:22:19			0:00:15
			10	13:22:04	13:22:20			0:00:16
72/73	13:23:14	13:24:02	1	13:23:31	13:24:03			0:00:32
			2	13:23:44	13:24:04			0:00:20
			3	13:24:03	13:24:05			0:00:02
73/74	13:25:14	13:26:02	1	13:25:29	13:26:06			0:00:37
			2	13:25:54	13:26:39			0:00:45
			3	13:26:00	13:26:40			0:00:40
			4	13:26:02	13:26:42			0:00:40
			5	13:26:07	13:26:42			0:00:35
			6	13:26:27	13:26:43			0:00:16
			7	13:26:30	13:26:44			0:00:14
			8	13:26:30	13:26:45			0:00:15
			9	13:26:31	13:26:45			0:00:14
			10			13:26:38	13:26:48	0:00:10
74/75	13:27:15	13:27:59	1	13:27:22	13:28:01			0:00:39
			2	13:27:27	13:28:03			0:00:36

Figure B-37. Average delay per vehicle per red cycle on arterial corridor of Miami Part 5

				Intersection 2				
				Through Lane				
	Red			Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	Delay
			3	13:27:29	13:28:04			0:00:35
			4	13:27:30	13:28:06			0:00:36
			5	13:27:33	13:28:07			0:00:34
			6	13:27:36	13:28:07			0:00:31
			7	13:27:40	13:28:10			0:00:30
75/76	13:29:15	13:30:03	1	13:29:32	13:30:06			0:00:34
			2	13:29:34	13:30:07			0:00:33
			3	13:29:37	13:30:08			0:00:31
			4	13:29:43	13:30:10			0:00:27
			5	13:30:03	13:30:12			0:00:09
			6	13:30:03	13:30:12			0:00:09
76/77	13:31:03	13:31:28	1	13:31:22	13:31:44			0:00:22
77/78	13:32:42	13:33:28	1	13:33:14	13:33:16			0:00:02
78/79	13:34:37	13:35:07	1	13:34:59	13:35:17			0:00:18
79/80	13:36:37	13:37:28	1	13:36:49	13:37:15			0:00:26
			2	13:37:00	13:37:15			0:00:15
			3	13:37:00	13:37:21			0:00:21
80/81	13:38:37	13:39:16	1	13:38:56	13:39:18			0:00:22
			2	13:39:09	13:39:18			0:00:09
			3	13:39:10	13:39:19			0:00:09
			4	13:39:16	13:39:19			0:00:03
81/82	13:40:37	13:41:28	1	13:41:13	13:41:30			0:00:17
			2	13:41:20	13:41:30			0:00:10
			3	13:41:23	13:41:31			0:00:08
			4	13:41:29	13:41:33			0:00:04
			5	13:41:32	13:41:36			0:00:04
82/83	13:42:37	13:43:28	1	13:42:56	13:43:30			0:00:34
			2	13:43:02	13:43:31			0:00:29
			3	13:43:19	13:43:33			0:00:14
			4	13:43:22	13:43:34			0:00:12
			5	13:43:24	13:43:35			0:00:11
			6	13:43:30	13:43:37			0:00:07
83/84	13:44:37	13:45:09	1			13:45:06	13:45:14	0:00:08
			2	13:45:11	13:45:15			0:00:04
84/85	13:46:37	13:47:28	1	13:46:44	13:47:30			0:00:46
			2	13:46:47	13:47:31			0:00:44
			3	13:46:52	13:47:32			0:00:40
			4	13:46:57	13:47:34			0:00:37
			5	13:47:04	13:47:36			0:00:32
			6	13:47:07	13:47:40			0:00:33

Figure B-38. Average delay per vehicle per red cycle on arterial corridor of Miami Part 6

				Intersection 2				
				Through Lane				
	Red			Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	Delay
			7	13:47:18	13:47:41			0:00:23
			8	13:47:22	13:47:42			0:00:20
85/86	13:48:37	13:49:23	1	13:48:50	13:49:26			0:00:36
86/87	13:50:37	13:51:23	1	13:50:54	13:51:05			0:00:11
			2	13:50:57	13:51:25			0:00:28
			3	13:51:01	13:51:29			0:00:28
			4	13:51:06	13:51:29			0:00:23
			5	13:51:12	13:51:29			0:00:17
87/88	13:52:37	13:53:27	1	13:52:53	13:53:28			0:00:35
			2	13:52:12	13:53:29			0:01:17
			3	13:53:28	13:53:30			0:00:02
			4	13:53:30	13:53:32			0:00:02
88/89	13:54:37	13:55:28	1	13:54:22	13:54:24			0:00:02
			2	13:54:42	13:55:30			0:00:48
			3	13:54:48	13:55:31			0:00:43
			4	13:55:01	13:55:32			0:00:31
			5	13:55:15	13:55:36			0:00:21
			6	13:55:15	13:55:38			0:00:23
			7	13:55:19	13:55:39			0:00:20
			8	13:55:19	13:55:41			0:00:22
89/90	13:56:37	13:57:28	1	13:56:50	13:57:32			0:00:42
			2	13:56:54	13:57:33			0:00:39
			3	13:56:58	13:57:34			0:00:36
			4	13:57:00	13:57:35			0:00:35
			5	13:56:58	13:57:37			0:00:39
			6	13:56:58	13:57:38			0:00:40
			7	13:56:58	13:57:41			0:00:43
			8	13:57:00	13:57:42			0:00:42
			9	13:57:00	13:57:44			0:00:44
90/91	13:58:37	13:59:08	1	13:58:45	13:59:10			0:00:25

Figure B-39. Average delay per vehicle per red cycle on arterial corridor of Miami Part 7

				Intersection 3								
				Through Lane				Left Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
60/61	12:59:40	13:00:32	1	13:00:02	13:00:34							0:00:32
			2	13:00:07	13:00:36							0:00:29
			3					13:00:07	13:00:34			0:00:27
			4	13:00:16	13:00:36							0:00:20
			5	13:00:16	13:00:39							0:00:23
			6	13:00:23	13:00:39							0:00:16
			7	13:00:23	13:00:44							0:00:21
			8	13:00:32	13:00:44							0:00:12
61/62	13:01:40	13:02:32	1	13:01:52	13:02:34							0:00:42
			2					13:01:56	13:02:34			0:00:38
			3	13:02:01	13:02:38							0:00:37
			4	13:02:17	13:02:38							0:00:21
			5	13:02:20	13:02:42							0:00:22
			6	13:02:25	13:02:42							0:00:17
62/63	13:03:40	13:04:23	1	13:03:50	13:04:21							0:00:31
			2	13:03:54	13:04:22							0:00:28
			3	13:03:57	13:04:22							0:00:25
			4	13:03:58	13:04:24							0:00:26
			5	13:04:05	13:04:25							0:00:20
			6	13:04:14	13:04:26							0:00:12
63/64	13:05:40	13:06:24	1	13:05:45	13:06:26							0:00:41
			2					13:05:49	13:06:26			0:00:37
			3	13:05:55	13:06:27							0:00:32
			4	13:05:55	13:06:27							0:00:32
			5	13:05:56	13:06:31							0:00:35
			6	13:06:00	13:06:32							0:00:32
			7	13:06:03	13:06:35							0:00:32
			8	13:06:06	13:06:36							0:00:30
			9	13:06:11	13:06:37							0:00:26
			10	13:06:11	13:06:37							0:00:26
64/65	13:07:40	13:08:32	1			13:07:53	13:08:34					0:00:41
			2	13:07:55	13:08:36							0:00:41
			3	13:08:03	13:08:36							0:00:33
			4			13:08:00	13:08:38					0:00:38
			5	13:08:03	13:08:39							0:00:36
			6					13:08:13	13:08:34			0:00:21
			7	13:08:30	13:08:41							0:00:11
65/66	13:09:40	13:10:28	1	13:09:49	13:10:14							0:00:25
66/67	13:11:40	13:12:32	1			13:11:58	13:12:37					0:00:39
			2	13:12:07	13:12:39							0:00:32

Figure B-40. Average delay per vehicle per red cycle on arterial corridor of Miami Part 8

				Intersection 3								
				Through Lane				Left Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			3	13:12:14	13:12:40							0:00:26
			4	13:12:14	13:12:40							0:00:26
			5	13:12:28	13:12:40							0:00:12
			6	13:12:29	13:12:40							0:00:11
67/68	13:13:40	13:14:18	1	13:13:52	13:14:20							0:00:28
			2	13:13:56	13:14:21							0:00:25
			3			13:14:16	13:14:22					0:00:06
			4			13:14:17	13:14:27					0:00:10
			5	13:14:19	13:14:31							0:00:12
			6	13:14:19	13:14:33							0:00:14
			7	13:14:19	13:14:36							0:00:17
			8	13:14:19	13:14:39							0:00:20
68/69	13:15:40	13:16:23	1					13:15:50	13:16:24			0:00:34
			2					13:15:52	13:16:30			0:00:38
			3					13:15:56	13:16:38			0:00:42
			4	13:16:04	13:16:24							0:00:20
			5	13:16:17	13:16:25							0:00:08
			6			13:16:21	13:16:27					0:00:06
69/70	13:17:40	13:18:31	1	13:18:06	13:18:32							0:00:26
			2	13:18:03	13:18:32							0:00:29
			3	13:18:12	13:18:34							0:00:22
			4	13:18:33	13:18:35							0:00:02
70/71	13:19:00	13:20:25	1	13:19:57	13:29:27							0:09:30
			2	13:20:01	13:20:28							0:00:27
71/72	13:21:40	13:22:26	1	13:21:45	13:22:27							0:00:42
			2	13:21:50	13:22:27							0:00:37
			3	13:21:51	13:22:30							0:00:39
			4	13:21:53	13:22:30							0:00:37
			5	13:21:56	13:22:33							0:00:37
			6	13:21:58	13:22:33							0:00:35
			7	13:22:04	13:22:36							0:00:32
			8					13:22:10	13:22:27			0:00:17
			9					13:22:14	13:22:29			0:00:15
72/73	13:23:40	13:24:31	1	13:23:49	13:24:34							0:00:45
			2	13:23:52	13:24:35							0:00:43
			3	13:23:55	13:24:35							0:00:40
			4	13:24:01	13:24:35							0:00:34
			5	13:24:10	13:24:39							0:00:29
			6	13:24:17	13:24:41							0:00:24
			7	13:24:18	13:24:44							0:00:26

Figure B-41. Average delay per vehicle per red cycle on arterial corridor of Miami Part 9

				Intersection 3								
				Through Lane				Left Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			8	13:24:25	13:24:45							0:00:20
			9					13:24:26	13:24:34			0:00:08
73/74	13:25:39	13:26:21	1	13:26:08	13:26:24							0:00:16
			2	13:26:10	13:26:25							0:00:15
			3					13:26:12	13:26:24			0:00:12
			4	13:26:21	13:26:25							0:00:04
			5	13:26:21	13:26:27							0:00:06
74/75	13:27:40	13:28:29	1	13:27:50	13:28:31							0:00:41
			2	13:27:56	13:28:32							0:00:36
			3	13:28:02	13:28:35							0:00:33
			4	13:28:02	13:28:35							0:00:33
			5			13:28:12	13:28:36					0:00:24
			6	13:28:12	13:28:37							0:00:25
			7			13:28:21	13:28:41					0:00:20
75/76	13:29:40	13:30:24	1	13:29:47	13:30:15							0:00:28
			2	13:29:50	13:30:16							0:00:26
			3	13:29:53	13:30:17							0:00:24
			4	13:29:56	13:30:19							0:00:23
			5	13:29:57	13:30:21							0:00:24
			6	13:30:00	13:30:22							0:00:22
			7	13:30:05	13:30:25							0:00:20
			8	13:30:12	13:30:27							0:00:15
			9	13:30:12	13:30:27							0:00:15
76/77	13:31:56	13:32:48	1	13:32:11	13:32:50							0:00:39
			2	13:32:12	13:32:51							0:00:39
			3	13:32:29	13:32:52							0:00:23
			4	13:32:33	13:32:54							0:00:21
			5	13:32:33	13:32:56							0:00:23
			6	13:32:43	13:32:58							0:00:15
77/78	13:34:17	13:35:17	1					13:34:32	13:35:20			0:00:48
			2	13:34:39	13:35:19							0:00:40
			3	13:34:39	13:35:20							0:00:41
			4	13:34:43	13:35:21							0:00:38
			5	13:34:44	13:35:22							0:00:38
			6	13:34:48	13:35:23							0:00:35
			7	13:34:54	13:35:24							0:00:30
			8	13:34:55	13:35:25							0:00:30
			9	13:35:06	13:35:27							0:00:21
78/79	13:36:26	13:37:19	1	13:36:47	13:37:21							0:00:34
			2	13:36:53	13:37:22							0:00:29

Figure B-42. Average delay per vehicle per red cycle on arterial corridor of Miami Part 10

				Intersection 3								
				Through Lane				Left Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			2	13:36:53	13:37:22							0:00:29
			3	13:37:11	13:37:24							0:00:13
			4	13:37:16	13:37:24							0:00:08
79/80	13:38:25	13:39:19	1	13:38:52	13:39:22							0:00:30
			2	13:38:50	13:39:22							0:00:32
			3	13:38:57	13:39:23							0:00:26
			4	13:39:02	13:39:25							0:00:23
80/81	13:40:28	13:41:01	1	13:40:48	13:41:04							0:00:16
			2	13:40:49	13:41:04							0:00:15
81/82	13:42:27	13:43:19	1	13:42:39	13:43:21							0:00:42
			2	13:42:39	13:43:21							0:00:42
			3	13:42:40	13:43:22							0:00:42
			4	13:42:49	13:43:24							0:00:35
			5					13:42:49	13:43:22			0:00:33
			6					13:42:53	13:43:24			0:00:31
			7	13:42:56	13:43:24							0:00:28
			8	13:42:58	13:43:27							0:00:29
			9	13:43:03	13:43:29							0:00:26
			10	13:43:07	13:43:31							0:00:24
			11	13:43:08	13:43:33							0:00:25
			12	13:43:10	13:43:36							0:00:26
			13	13:43:11	13:43:38							0:00:27
82/83	13:44:26	13:45:19	1	13:44:41	13:45:23							0:00:42
			2	13:44:43	13:45:24							0:00:41
			3	13:44:48	13:45:24							0:00:36
			4	13:44:57	13:45:25							0:00:28
			5	13:44:59	13:45:28							0:00:29
			6	13:45:01	13:45:29							0:00:28
			7	13:45:07	13:45:31							0:00:24
			8	13:45:15	13:45:31							0:00:16
83/84	13:46:26	13:46:54	1	13:46:39	13:46:57							0:00:18
			2	13:46:39	13:46:57							0:00:18
			3	13:46:41	13:46:58							0:00:17
			4	13:46:42	13:47:01							0:00:19
			5			13:46:44	13:47:03					0:00:19
			6	13:46:51	13:47:05							0:00:14
			7	13:47:02	13:47:07							0:00:05
			8	13:47:02	13:47:08							0:00:06
84/85	13:48:25	13:49:18	1	13:48:38	13:49:22							0:00:44
			2	13:48:49	13:49:22							0:00:33

Figure B-43. Average delay per vehicle per red cycle on arterial corridor of Miami Part 11

				Intersection 3								
				Through Lane				Left Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			2	13:48:49	13:49:22							0:00:33
			3	13:48:51	13:49:23							0:00:32
			4	13:48:55	13:49:25							0:00:30
			5	13:48:58	13:49:28							0:00:30
			6	13:49:00	13:49:30							0:00:30
			7	13:49:02	13:49:31							0:00:29
			8					13:49:08	13:49:22			0:00:14
			9	13:49:10	13:49:33							0:00:23
85/86	13:50:26	13:51:09	1	13:50:35	13:51:11							0:00:36
			2	13:50:42	13:51:11							0:00:29
			3					13:50:47	13:51:11			0:00:24
			4	13:50:53	13:51:13							0:00:20
			5	13:50:57	13:51:13							0:00:16
			6	13:51:03	13:51:14							0:00:11
86/87	13:52:27	13:53:03	1	13:52:39	13:53:06							0:00:27
			2	13:52:50	13:53:06							0:00:16
			3	13:52:57	13:53:07							0:00:10
			4	13:52:57	13:53:09							0:00:12
			5	13:53:01	13:53:09							0:00:08
87/88	13:54:27	13:55:19	1	13:54:44	13:55:23							0:00:39
			2	13:54:45	13:55:23							0:00:38
			3					13:54:48	13:55:23			0:00:35
			4	13:54:56	13:55:23							0:00:27
			5	13:54:59	13:55:24							0:00:25
			6	13:55:03	13:55:25							0:00:22
			7	13:55:05	13:55:27							0:00:22
			8	13:55:09	13:55:27							0:00:18
			9			13:55:13	13:55:29					0:00:16
88/89	13:56:27	13:57:13	1	13:56:35	13:57:16							0:00:41
			2	13:56:54	13:57:17							0:00:23
			3	13:56:58	13:57:18							0:00:20
			4	13:57:00	13:57:18							0:00:18
			5	13:57:06	13:57:19							0:00:13
89/90	13:58:26	13:59:21	1	13:58:37	13:59:22							0:00:45
			2	13:58:44	13:59:22							0:00:38
			3	13:58:50	13:59:22							0:00:32
			4	13:58:49	13:59:23							0:00:34
			5	13:59:00	13:59:23							0:00:23
			6	13:59:01	13:59:23							0:00:22
			7	13:59:03	13:59:22							0:00:19

Figure B-44. Average delay per vehicle per red cycle on arterial corridor of Miami Part 12

				Intersection 4				
				Through Lane				
	Red			Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	Delay
81/82	13:00:32	13:00:58	1	13:00:44	13:01:02			0:00:18
			2	13:00:58	13:01:03			0:00:05
82/83	13:02:02	13:02:37	1	13:02:17	13:02:39			0:00:22
			2	13:02:19	13:02:41			0:00:22
			3	13:02:19	13:02:42			0:00:23
			4	13:02:22	13:02:44			0:00:22
			5	13:02:28	13:02:45			0:00:17
			6	13:02:41	13:02:49			0:00:08
83/84	13:03:33	13:04:05	1	13:03:43	13:04:08			0:00:25
			2	13:03:51	13:04:09			0:00:18
			3	13:03:53	13:04:09			0:00:16
			4	13:03:54	13:04:10			0:00:16
			5	13:04:08	13:04:11			0:00:03
84/85	13:05:03	13:05:34	1	13:05:17	13:05:36			0:00:19
			2	13:05:17	13:05:40			0:00:23
			3	13:05:22	13:05:40			0:00:18
			4	13:05:26	13:05:41			0:00:15
			5	13:05:29	13:05:42			0:00:13
			6	13:05:32	13:05:44			0:00:12
			7	13:05:32	13:05:47			0:00:15
			8	13:05:36	13:05:47			0:00:11
85/86	13:06:27	13:07:03	1	13:07:03	13:07:06			0:00:03
86/87	13:08:02	13:08:37	1	13:08:23	13:08:39			0:00:16
			2			13:08:23	13:08:39	0:00:16
			3	13:08:27	13:08:42			0:00:15
87/88	13:09:32	13:10:08	1	13:09:45	13:10:10			0:00:25
			2	13:09:48	13:10:10			0:00:22
			3	13:09:50	13:10:11			0:00:21
			4	13:09:55	13:10:12			0:00:17
			5	13:09:59	13:10:13			0:00:14
			6	13:10:05	13:10:16			0:00:11
			7	13:10:05	13:10:16			0:00:11
88/89	13:11:10	13:11:37	1	13:11:20	13:11:40			0:00:20
			2	13:11:31	13:11:41			0:00:10
			3	13:11:34	13:11:41			0:00:07
			4	13:11:41	13:11:43			0:00:02
90/91	13:14:02	13:14:29	1	13:14:09	13:14:30			0:00:21
			2	13:14:10	13:14:31			0:00:21
			3	13:14:12	13:14:32			0:00:20
			4	13:14:16	13:14:35			0:00:19

Figure B-45. Average delay per vehicle per red cycle on arterial corridor of Miami Part 13

				Intersection 4				
				Through Lane				
	Red			Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	Delay
			5	13:14:20	13:14:36			0:00:16
			6	13:14:23	13:14:38			0:00:15
			7	13:14:28	13:14:41			0:00:13
			8	13:14:32	13:14:45			0:00:13
			9	13:14:32	13:14:46			0:00:14
			10	13:14:34	13:14:46			0:00:12
			11	13:14:36	13:14:47			0:00:11
91/92	13:15:35	13:16:02	1	13:15:50	13:16:03			0:00:13
			2	13:16:01	13:16:06			0:00:05
			3	13:16:03	13:16:08			0:00:05
			4	13:16:06	13:16:09			0:00:03
92/93	13:17:02	13:17:29	1	13:17:09	13:17:31			0:00:22
			2	13:17:11	13:17:34			0:00:23
			3	13:17:14	13:17:34			0:00:20
			4	13:17:19	13:17:35			0:00:16
			5	13:17:35	13:17:38			0:00:03
93/94	13:18:36	13:19:03	1	13:18:42	13:19:05			0:00:23
			2	13:18:49	13:19:05			0:00:16
94/95	13:20:02	13:20:33	1	13:20:26	13:20:37			0:00:11
			2	13:20:28	13:20:38			0:00:10
			3	13:20:34	13:20:40			0:00:06
			4	13:20:37	13:20:42			0:00:05
			5	13:20:37	13:20:44			0:00:07
			6	13:20:39	13:20:45			0:00:06
95/96	13:21:33	13:21:59	1	13:21:44	13:22:01			0:00:17
96/97	13:22:57	13:23:39	1	13:23:19	13:23:41			0:00:22
			2	13:23:26	13:23:42			0:00:16
			3	13:23:30	13:23:43			0:00:13
			4	13:23:31	13:23:48			0:00:17
			5	13:23:33	13:23:50			0:00:17
			6	13:23:35	13:23:51			0:00:16
			7	13:23:37	13:23:54			0:00:17
			8	13:23:39	13:23:54			0:00:15
			9	13:23:40	13:23:54			0:00:14
97/98	13:24:32	13:24:58	1	13:24:41	13:25:00			0:00:19
			2	13:24:52	13:25:02			0:00:10
98/99	13:25:57	13:26:26	1	13:25:00	13:25:03			0:00:03
			2	13:26:04	13:26:28			0:00:24
			3	13:26:07	13:26:29			0:00:22
			4	13:26:08	13:26:31			0:00:23

Figure B-46. Average delay per vehicle per red cycle on arterial corridor of Miami Part 14

				Intersection 4				
				Through Lane				
	Red			Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	Delay
			5	13:26:10	13:26:32			0:00:22
			6	13:26:16	13:26:34			0:00:18
			7	13:26:19	13:26:36			0:00:17
			8	13:26:20	13:26:38			0:00:18
99/100	13:27:32	13:28:14	1	13:27:40	13:28:20			0:00:40
			2			13:27:53	13:28:20	0:00:27
			3	13:27:55	13:28:24			0:00:29
			4	13:28:01	13:28:25			0:00:24
			5	13:28:04	13:28:27			0:00:23
			6	13:28:04	13:28:28			0:00:24
101/102	13:30:22	13:30:49	1	13:30:43	13:30:51			0:00:08
102/103	13:31:18	13:31:52	1	13:31:36	13:31:53			0:00:17
			2	13:31:36	13:31:53			0:00:17
			3	13:31:38	13:31:56			0:00:18
			4	13:31:45	13:31:57			0:00:12
			5	13:31:48	13:31:58			0:00:10
			6	13:31:51	13:31:59			0:00:08
			7	13:31:52	13:32:01			0:00:09
104/105	13:34:18	13:34:45	1	13:34:37	13:34:46			0:00:09
105/106	13:37:18	13:37:45	1	13:37:37	13:37:46			0:00:09
			2	13:37:40	13:37:49			0:00:09
106/107	13:38:48	13:39:20	1	13:38:59	13:39:21			0:00:22
			2	13:39:08	13:39:22			0:00:14
			3	13:39:08	13:39:24			0:00:16
			4	13:39:10	13:39:26			0:00:16
			5	13:39:16	13:39:30			0:00:14
107/108	13:40:14	13:40:56	1	13:40:26	13:41:03			0:00:37
			2	13:40:30	13:41:04			0:00:34
			3	13:40:49	13:41:04			0:00:15
108/109	13:41:49	13:42:24	1	13:42:08	13:42:26			0:00:18
			2	13:42:15	13:42:27			0:00:12
			3	13:42:22	13:42:30			0:00:08
			4	13:42:22	13:42:39			0:00:17
			5	13:42:24	13:42:40			0:00:16
			6	13:42:26	13:42:42			0:00:16
109/110	13:43:19	13:43:45	1	13:43:37	13:43:48			0:00:11
110/111	13:44:48	13:45:16	1	13:45:14	13:45:22			0:00:08
111/112	13:46:18	13:46:45	1	13:46:25	13:46:47			0:00:22
			2	13:46:33	13:46:47			0:00:14
			3	13:46:39	13:46:49			0:00:10

Figure B-47. Average delay per vehicle per red cycle on arterial corridor of Miami Part 15

				Intersection 4				
				Through Lane				
	Red			Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	Delay
112/113	13:47:49	13:48:16	1	13:47:59	13:48:19			0:00:20
			2	13:48:05	13:48:20			0:00:15
			3			13:48:10	13:48:22	0:00:12
			4	13:48:14	13:48:23			0:00:09
			5	13:48:18	13:48:25			0:00:07
			6	13:48:19	13:48:27			0:00:08
			7	13:48:19	13:48:31			0:00:12
			8	13:48:19	13:48:31			0:00:12
113/114	13:49:18	13:49:53	1	13:49:52	13:49:59			0:00:07
			2	13:49:56	13:50:00			0:00:04
			3	13:49:58	13:50:01			0:00:03
			4	13:49:58	13:50:03			0:00:05
114/115	13:50:48	13:51:15	1	13:50:53	13:51:17			0:00:24
			2	13:50:57	13:51:17			0:00:20
			3	13:50:58	13:51:20			0:00:22
			4	13:51:00	13:51:23			0:00:23
			5	13:51:02	13:51:27			0:00:25
			6	13:51:04	13:51:27			0:00:23
115/116	13:52:20	13:52:47	1	13:52:27	13:52:49			0:00:22
			2	13:52:30	13:52:52			0:00:22
116/117	13:53:44	13:54:13	1	13:53:50	13:54:13			0:00:23
			2	13:53:52	13:54:15			0:00:23
			3	13:54:12	13:54:18			0:00:06
			4	13:54:13	13:54:21			0:00:08
			5	13:54:13	13:54:22			0:00:09
			6	13:54:15	13:54:24			0:00:09
117/118	13:55:20	13:55:45	1	13:55:31	13:55:48			0:00:17
			2	13:55:33	13:55:48			0:00:15
			3	13:55:36	13:55:51			0:00:15
			4	13:55:38	13:55:51			0:00:13
118/119	13:56:58	13:57:25	1	13:57:12	13:57:26			0:00:14
			2	13:57:16	13:57:28			0:00:12
			3	13:57:24	13:57:29			0:00:05
119/120	13:58:14	13:58:43	1	13:58:23	13:58:46			0:00:23
			2	13:58:29	13:58:49			0:00:20
			3	13:58:40	13:58:51			0:00:11
			4	13:58:40	13:58:54			0:00:14
			5	13:58:42	13:58:55			0:00:13
			6	13:58:42	13:59:00			0:00:18
			7	13:58:45	13:59:02			0:00:17

Figure B-48. Average delay per vehicle per red cycle on arterial corridor of Miami Part 16

Cycle	Intersection 1									
	red		Lane 1			Lane 2			Average	Total
Number	start	end	Non-Truck	Trucks	Queue-Length	Non-Trucks	Trucks	Queue-Length	Queue Length	Queue length
57/58	13:01:40	13:02:32	2	1	3	1	0	1	2	4
58/59	13:03:40	13:04:21	0	0	0	0	0	0	0	0
59/60	13:05:40	13:06:25	4	0	4	1	0	1	3	5
60/61	13:07:40	13:08:32	2	0	2	0	0	0	1	2
61/62	13:09:40	13:10:25	1	0	1	1	0	1	1	2
62/63	13:11:40	13:12:32	2	1	3	0	0	0	2	3
63/64	13:13:40	13:14:18	1	0	1	0	0	0	1	1
64/65	13:15:40	13:16:23	0	0	0	1	0	1	1	1
65/66	13:17:39	13:18:31	1	0	1	0	0	0	1	1
66/67	13:19:40	13:20:25	3	0	3	0	0	0	2	3
67/68	13:21:40	13:22:24	5	0	5	0	0	0	3	5
68/69	13:23:39	13:24:32	3	0	3	1	0	1	2	4
69/70	13:25:39	13:26:21	0	0	0	0	0	0	0	0
70/71	13:27:39	13:28:29	0	0	0	0	0	0	0	0
71/72	13:29:39	13:30:23	0	0	0	0	0	0	0	0
72/73	13:31:56	13:32:48	3	0	3	0	0	0	2	3
73/74	13:34:17	13:35:17	2	0	2	0	0	0	1	2
74/75	13:36:26	13:37:19	1	0	1	0	0	0	1	1
75/76	13:38:26	13:39:19	2	0	2	0	0	0	1	2
76/77	13:40:26	13:41:01	3	0	3	1	0	1	2	4
77/78	13:42:26	13:43:19	0	0	0	1	0	1	1	1
78/79	13:44:26	13:45:20	0	0	0	0	0	0	0	0
79/80	13:46:26	13:47:54	1	0	1	1	0	1	1	2
80/81	13:48:25	13:49:19	1	0	1	0	0	0	1	1
81/82	13:50:26	13:51:09	2	0	2	0	0	0	1	2
82/83	13:52:26	13:53:03	3	0	3	0	0	0	2	3
83/84	13:54:27	13:55:20	1	0	1	0	1	1	1	2
84/85	13:56:26	13:57:11	1	0	1	1	0	1	1	2
85/86	13:58:26	13:59:20	0	0	0	2	0	2	1	2

Figure B-49. Queue length per lane per intersection on arterial corridor of Miami Part 1

Cycle	Intersection 2				
	red		Lane 1		
Number	start	end	Non-Trucl	Trucks	Queue-Length
61/62	13:01:15	13:02:03	6	0	6
62/63	13:03:15	13:04:03	0	0	0
63/64	13:05:15	13:06:03	3	1	4
64/65	13:07:15	13:07:58	3	0	3
65/66	13:09:15	13:09:56	1	0	1
66/67	13:11:15	13:12:03	6	1	7
67/68	13:13:15	13:14:03	2	1	3
68/69	13:15:15	13:16:03	3	0	3
69/70	13:17:15	13:18:03	9	0	9
70/71	13:19:15	13:20:03	8	1	9
71/72	13:21:15	13:22:02	8	0	8
72/73	13:23:14	13:24:02	2	0	2
73/74	13:25:14	13:26:02	3	1	4
74/75	13:27:15	13:27:59	7	0	7
75/76	13:29:15	13:30:03	6	0	6
76/77	13:31:03	13:33:28	1	0	1
77/78	13:32:42	13:33:28	1	0	1
78/79	13:34:37	13:35:07	1	0	1
79/80	13:36:37	13:37:28	3	0	3
80/81	13:38:37	13:39:16	4	0	4
81/82	13:40:37	13:41:28	3	0	3
82/83	13:42:37	13:43:28	5	0	5
83/84	13:44:37	13:45:09	0	1	1
84/85	13:46:37	13:47:28	8	0	8
85/86	13:48:37	13:49:23	1	0	1
86/87	13:50:37	13:51:23	5	0	5
87/88	13:52:37	13:53:27	2	0	2
88/89	13:54:37	13:55:28	8	0	8
89/90	13:56:37	13:57:28	9	0	9
90/91	13:58:37	13:59:08	1	0	1

Figure B-50. Queue length per lane per intersection on arterial corridor of Miami Part 2

	Intersection 3									
Cycle	red		Lane 1			Lane 2			Average	Total
Number	start	end	Non-Truck	Trucks	Queue-Lengt	Non-Truck	Trucks	Queue-Length	Queue	length
61/62	13:01:40	13:02:32	5	0	5	1	0	1	3	6
62/63	13:03:40	13:04:23	6	0	6	0	0	0	3	6
63/64	13:05:40	13:06:24	9	0	9	1	0	1	5	10
64/65	13:07:40	13:08:32	4	2	6	1	0	1	4	7
65/66	13:09:40	13:10:28	1	0	1	0	0	0	1	1
66/67	13:11:40	13:12:32	5	1	6	0	0	0	3	6
67/68	13:13:40	13:14:18	2	2	4	0	0	0	2	4
68/69	13:15:40	13:16:23	2	1	3	3	0	3	3	6
69/70	13:17:40	13:18:31	3	0	3	0	0	0	2	3
70/71	13:19:00	13:20:25	2	0	2	0	0	0	1	2
71/72	13:21:40	13:22:26	7	0	7	2	0	2	5	9
72/73	13:23:40	13:24:31	8	0	8	1	0	1	5	9
73/74	13:25:39	13:26:21	4	0	4	1	0	1	3	5
74/75	13:27:40	13:28:29	5	2	7	0	0	0	4	7
75/76	13:29:40	13:30:24	9	0	9	0	0	0	5	9
76/77	13:31:56	13:32:48	6	0	6	0	0	0	3	6
77/78	13:34:17	13:35:17	8	0	8	1	0	1	5	9
78/79	13:36:26	13:37:19	4	0	4	0	0	0	2	4
79/80	13:38:25	13:39:19	4	0	4	0	0	0	2	4
80/81	13:40:28	13:41:01	2	0	2	0	0	0	1	2
81/82	13:42:27	13:43:19	10	0	10	3	0	3	7	13
82/83	13:44:26	13:45:19	8	0	8	0	0	0	4	8
83/84	13:46:26	13:46:54	5	1	6	0	0	0	3	6
84/85	13:48:25	13:49:18	8	0	8	1	0	1	5	9
85/86	13:50:26	13:51:09	5	0	5	1	0	1	3	6
86/87	13:52:27	13:53:03	5	0	5	0	0	0	3	5
87/88	13:54:27	13:55:19	8	1	9	1	0	1	5	10
88/89	13:56:27	13:57:13	5	0	5	0	0	0	3	5
89/90	13:58:26	13:59:21	8	1	9	0	0	0	5	9

Figure B-51. Queue length per lane per intersection on arterial corridor of Miami Part 3

	Intersection 4				
Cycle	red		Lane 1		
Number	start	end	Non-Trucl	Trucks	Queue-Length
81/82	13:00:32	13:00:58	2	0	2
82/83	13:02:02	13:02:37	5	0	5
83/84	13:03:33	13:04:05	4	0	4
84/85	13:05:03	13:05:34	7	0	7
85/86	13:06:27	13:07:03	1	0	1
86/87	13:08:02	13:08:37	2	1	3
87/88	13:09:32	13:10:08	7	0	7
88/89	13:11:10	13:11:37	3	0	3
89/90	13:12:27	13:12:55	0	0	0
90/91	13:14:02	13:14:29	7	0	7
91/92	13:15:35	13:16:02	2	0	2
92/93	13:17:02	13:17:29	5	0	5
93/94	13:18:36	13:19:03	2	0	2
94/95	13:20:02	13:20:33	4	0	4
95/96	13:21:33	13:21:59	1	0	1
96/97	13:22:57	13:23:39	8	0	8
97/98	13:24:32	13:24:58	2	0	2
98/99	13:25:57	13:26:26	8	0	8
99/100	13:27:32	13:28:14	5	1	6
100/101	13:29:02	13:29:32	0	0	0
101/102	13:30:22	13:30:49	1	0	1
102/103	13:31:18	13:31:52	7	0	7
103/104	13:32:48	13:33:22	0	0	0
104/105	13:34:18	13:34:45	1	0	1
105/106	13:37:18	13:37:45	2	0	2
106/107	13:38:48	13:39:20	5	0	5
107/108	13:40:14	13:40:56	3	0	3
108/109	13:41:49	13:42:24	5	0	5
109/110	13:43:19	13:43:45	1	0	1
110/111	13:44:48	13:45:16	1	0	1
111/112	13:46:18	13:46:45	5	0	5
112/113	13:47:49	13:48:16	3	1	4
113/114	13:49:18	13:49:53	1	0	1
114/115	13:50:48	13:51:15	6	0	6
115/116	13:52:20	13:52:47	2	0	2

Figure B-52. Queue length per lane per intersection on arterial corridor of Miami Part 4

	Intersection 4				
Cycle Number	red		Lane 1		
	start	end	Non-Trucl	Trucks	Queue-Length
116/117	13:53:44	13:54:13	5	0	5
117/118	13:55:20	13:55:45	4	0	4
118/119	13:56:58	13:57:25	3	0	3
119/120	13:58:14	13:58:43	6	0	6

Figure B-53. Queue length per lane per intersection on arterial corridor of Miami Part 5

	Intersection 1						
	Lane 2						
Cycle No.	QueueLer	T4	Tn	Tn-T4	Seconds	Hsat(sec)	S
Queues less than 7							

	Intersection 2						
	Lane 1						
Cycle No.	QueueLer	T4	Tn	Tn-T4	Seconds	Hsat(sec)	S
6	7	0:00:14	0:00:20	0:00:06	6	2.00	1800
15	8	0:00:14	0:00:23	0:00:09	9	2.25	1600
24	6	0:00:11	0:00:19	0:00:08	8	4.00	900
30	6	0:00:12	0:00:16	0:00:04	4	2.00	1800
47	6	0:00:14	0:00:22	0:00:08	8	4.00	900
49	10	0:00:15	0:00:28	0:00:13	13	2.17	1662
57	6	0:00:12	0:00:24	0:00:12	12	6.00	600
59	6	0:00:08	0:00:15	0:00:07	7	3.50	1029
62	6	0:00:11	0:00:18	0:00:07	7	3.50	1029
67	7	0:00:14	0:00:24	0:00:10	10	3.33	1080
70	9	0:00:12	0:00:23	0:00:11	11	2.20	1636
71	9	0:00:14	0:00:29	0:00:15	15	3.00	1200
72	8	0:00:13	0:00:25	0:00:12	12	3.00	1200
75	7	0:00:12	0:00:19	0:00:07	7	2.33	1543
76	6	0:00:14	0:00:19	0:00:05	5	2.50	1440
85	8	0:00:11	0:00:22	0:00:11	11	2.75	1309
89	8	0:00:24	0:00:35	0:00:11	11	2.75	1309
90	9	0:00:32	0:00:41	0:00:09	9	1.80	1800

Figure B-54. Saturation flow rate per lane per intersection on arterial corridor of Miami Part 1

Intersection 3						
Lane 1						
QueueLer	T4	Tn	Tn-T4	Seconds	Hsat(sec)	S
7	0:00:13	0:00:23	0:00:10	10	3.33	1080
6	0:00:08	0:00:12	0:00:04	4	2.00	1800
9	0:00:12	0:00:28	0:00:16	16	3.20	1125
6	0:00:14	0:00:18	0:00:04	4	2.00	1800
6	0:00:16	0:00:20	0:00:04	4	2.00	1800
7	0:00:10	0:00:18	0:00:08	8	2.67	1350
8	0:00:11	0:00:22	0:00:11	11	2.75	1309
7	0:00:12	0:00:21	0:00:09	9	3.00	1200
9	0:00:08	0:00:18	0:00:10	10	2.00	1800
6	0:00:11	0:00:16	0:00:05	5	2.50	1440
8	0:00:11	0:00:21	0:00:10	10	2.50	1440
10	0:00:10	0:00:25	0:00:15	15	2.50	1440
8	0:00:14	0:00:22	0:00:08	8	2.00	1800
6	0:00:12	0:00:18	0:00:06	6	3.00	1200
8	0:00:13	0:00:26	0:00:13	13	3.25	1108
9	0:00:15	0:00:26	0:00:11	11	2.20	1636
9	0:00:08	0:00:20	0:00:12	12	2.40	1500

Figure B-55. Saturation flow rate per lane per intersection on arterial corridor of Miami Part 2

	Intersection 4						
	Lane 1						
Cycle No.	QueueLer	T4	Tn	Tn-T4	Seconds	Hsat(sec)	S
9	6	0:00:13	0:00:18	0:00:05	5	2.50	1440.00
24	6	0:00:11	0:00:16	0:00:05	5	2.50	1440.00
27	6	0:00:13	0:00:17	0:00:04	4	2.00	1800.00
43	6	0:00:11	0:00:18	0:00:07	7	3.50	1028.57
56	6	0:00:16	0:00:22	0:00:06	6	3.00	1200.00
69	9	0:00:17	0:00:31	0:00:14	14	2.80	1285.71
70	9	0:00:12	0:00:21	0:00:09	9	1.80	2000.00
76	8	0:00:11	0:00:24	0:00:13	13	3.25	1107.69
77	8	0:00:11	0:00:21	0:00:10	10	2.50	1440.00
80	7	0:00:14	0:00:22	0:00:08	8	2.67	1350.00
85	7	0:00:13	0:00:21	0:00:08	8	2.67	1350.00
88	7	0:00:10	0:00:20	0:00:10	10	3.33	1080.00
91	7	0:00:12	0:00:19	0:00:07	7	2.33	1542.86
97	8	0:00:11	0:00:25	0:00:14	14	3.50	1028.57
99	8	0:00:12	0:00:23	0:00:11	11	2.75	1309.09
100	6	0:00:17	0:00:23	0:00:06	6	3.00	1200.00
103	7	0:00:12	0:00:20	0:00:08	8	2.67	1350.00
115	6	0:00:13	0:00:20	0:00:07	7	3.50	1028.57
120	6	0:00:17	0:00:24	0:00:07	7	3.50	1028.57

Figure B-56. Saturation flow rate per lane per intersection on arterial corridor of Miami Part 3

	Miami							
Cycle	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
1	0.14	0.87	0.92	0.92	0.86	0.13	0.08	0.08
2	0.63	1.00	0.78	0.69	0.38	-	0.22	0.31
3	0.17	0.86	1.00	0.92	0.83	0.14	-	0.08
4	0.75	0.70	0.77	0.92	0.25	0.30	0.23	0.08
5	0.63	0.67	0.87	0.86	0.38	0.33	0.13	0.14
6	0.80	0.90	0.71	0.90	0.20	0.10	0.29	0.10
7	0.50	0.82	0.71	0.56	0.50	0.18	0.29	0.44
8	0.63	0.50	0.76	0.60	0.38	0.50	0.24	0.40
9	0.83	0.85	0.85	0.77	0.17	0.15	0.15	0.23
10	0.29	0.90	0.62	0.71	0.71	0.10	0.38	0.29
11	0.14	0.60	0.83	1.00	0.86	0.40	0.17	-
12	0.40	0.75	0.70	0.89	0.60	0.25	0.30	0.11
13	0.25	0.71	0.63	0.75	0.75	0.29	0.37	0.25
14	0.50	0.58	0.79	0.79	0.50	0.42	0.21	0.21
15	0.50	0.73	0.78	0.67	0.50	0.27	0.22	0.33
16	0.75	0.88	0.71	0.80	0.25	0.12	0.29	0.20
17	0.43	0.64	0.90	0.92	0.57	0.36	0.10	0.08
18	0.38	0.77	0.57	0.80	0.63	0.23	0.43	0.20
19	0.80	0.75	0.76	0.64	0.20	0.25	0.24	0.36
20	0.38	0.89	0.75	0.67	0.63	0.11	0.25	0.33
21	0.29	0.69	0.75	0.62	0.71	0.31	0.25	0.38
22	0.57	0.80	0.90	0.69	0.43	0.20	0.10	0.31
23	0.44	0.33	0.89	0.54	0.56	0.67	0.11	0.46
24	0.29	0.75	0.85	0.88	0.71	0.25	0.15	0.13
25	0.75	0.64	0.54	0.85	0.25	0.36	0.46	0.15
26	1.00	0.57	0.46	0.57	-	0.43	0.54	0.43

Figure B-57. Stop rate per red-to-red cycle per intersection on arterial corridor of Miami Part 1

	Miami							
Cycle	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
27	0.67	0.64	0.80	0.64	0.33	0.36	0.20	0.36
28	1.00	0.94	0.85	0.80	-	0.06	0.15	0.20
29	0.75	0.36	0.50	0.80	0.25	0.64	0.50	0.20
30	0.79	0.80	0.70	0.71	0.21	0.20	0.30	0.29
31	0.75	0.86	0.75	0.72	0.25	0.14	0.25	0.28
32	0.78	0.89	0.67	1.00	0.22	0.11	0.33	-
33	0.76	0.82	0.75	0.38	0.24	0.18	0.25	0.63
34	1.00	0.58	0.79	0.92	-	0.42	0.21	0.08
35	0.89	0.67	0.55	0.71	0.11	0.33	0.45	0.29
36	0.95	0.73	0.82	0.92	0.05	0.27	0.18	0.08
37	0.60	0.92	0.71	0.89	0.40	0.08	0.29	0.11
38	0.94	0.83	0.79	0.89	0.06	0.17	0.21	0.11
39	0.86	0.76	0.71	0.86	0.14	0.24	0.29	0.14
40	1.00	0.79	0.74	0.88	-	0.21	0.26	0.12
41	0.84	0.79	0.90	0.67	0.16	0.21	0.10	0.33
42	0.90	0.88	0.69	0.33	0.10	0.12	0.31	0.67
43	0.62	0.56	0.69	0.70	0.38	0.44	0.31	0.30
44	0.89	0.88	0.73	0.82	0.11	0.13	0.27	0.18
45	0.87	0.79	0.53	0.75	0.13	0.21	0.47	0.25
46	0.88	0.60	0.68	0.80	0.12	0.40	0.32	0.20
47	0.44	0.75	0.83	1.00	0.56	0.25	0.17	-
48	0.89	0.38	0.65	0.78	0.11	0.63	0.35	0.22
49	0.76	0.64	0.63	0.90	0.24	0.36	0.38	0.10
50	0.75	0.57	0.71	0.58	0.25	0.43	0.29	0.42
51	0.71	0.83	0.33	0.87	0.29	0.17	0.67	0.13

Figure B-58. Stop rate per red-to-red cycle per intersection on arterial corridor of Miami Part 2

	Miami							
Cycle	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
52	0.95	0.75	0.94	0.43	0.05	0.25	0.06	0.57
53	0.83	0.80	0.67	0.89	0.17	0.20	0.33	0.11
54	0.36	0.40	0.46	0.50	0.64	0.60	0.54	0.50
55	0.94	0.69	0.79	0.63	0.06	0.31	0.21	0.38
56	0.96	0.60	0.82	0.77	0.04	0.40	0.18	0.23
57	0.79	0.29	0.50	0.88	0.21	0.71	0.50	0.13
58	0.74	0.54	0.67	0.55	0.26	0.46	0.33	0.45
59	0.89	0.78	0.90	0.73	0.11	0.22	0.10	0.27
60	0.71	1.00	0.53	0.70	0.29	-	0.47	0.30
61	0.83	0.63	0.71	0.80	0.17	0.38	0.29	0.20
62	0.93	1.00	0.68	0.78	0.07	-	0.32	0.22
63	0.95	0.64	0.47	0.92	0.05	0.36	0.53	0.08
64	0.93	0.73	0.63	0.88	0.07	0.27	0.37	0.13
65	0.80	0.92	0.83	1.00	0.20	0.08	0.17	-
66	0.74	0.68	0.63	0.73	0.26	0.32	0.38	0.27
67	0.80	0.83	0.75	0.50	0.20	0.17	0.25	0.50
68	1.00	0.75	0.67	0.40	-	0.25	0.33	0.60
69	1.00	0.50	0.84	0.47	-	0.50	0.16	0.53
70	1.00	0.40	0.87	0.67	-	0.60	0.13	0.33
71	0.83	0.68	0.55	0.71	0.17	0.32	0.45	0.29
72	0.83	0.83	0.53	0.67	0.17	0.17	0.47	0.33
73	0.94	0.71	0.55	1.00	0.06	0.29	0.45	-
74	0.88	0.65	0.68	0.86	0.12	0.35	0.32	0.14
75	0.69	0.63	0.59	0.38	0.31	0.38	0.41	0.62
76	0.96	0.80	0.60	0.56	0.04	0.20	0.40	0.44

Figure B-59. Stop rate per red-to-red cycle per intersection on arterial corridor of Miami Part 3

	Miami							
Cycle	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
77	1.00	0.88	0.25	0.75	-	0.13	0.75	0.25
78	0.88	0.92	0.75	0.67	0.12	0.08	0.25	0.33
79	0.95	0.70	0.78	0.53	0.05	0.30	0.22	0.47
80	0.88	0.67	0.85	1.00	0.12	0.33	0.15	-
81	0.70	0.83	0.41	0.67	0.30	0.17	0.59	0.33
82	0.90	0.64	0.50	0.50	0.10	0.36	0.50	0.50
83	0.87	0.93	0.65	0.75	0.13	0.07	0.35	0.25
84		0.60	0.55	0.36		0.40	0.45	0.64
85		0.92	0.67	0.93		0.08	0.33	0.07
86		0.44	0.50	0.73		0.56	0.50	0.27
87		0.85	0.53	0.63		0.15	0.47	0.37
88		0.47	0.67	0.63		0.53	0.33	0.38
89		0.53	0.64	1.00		0.47	0.36	-
90		0.90		0.71		0.10		0.29
91				0.60				0.40
92				0.78				0.22
93				0.78				0.22
94				0.64				0.36
95				0.75				0.25
96				0.50				0.50
97				0.85				0.15
98				0.33				0.67
99				0.45				0.55
100				1.00				-
101				0.75				0.25

Figure B-60. Stop rate per red-to-red cycle per intersection on arterial corridor of Miami Part 4

	Miami							
Cycle	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
102				0.53				0.47
103				1.00				-
104				0.92				0.08
105				0.86				0.14
106				0.58				0.42
107				0.63				0.38
108				0.38				0.63
109				0.92				0.08
110				0.90				0.10
111				0.55				0.45
112				0.69				0.31
113				0.93				0.07
114				0.65				0.35
115				0.78				0.22
116				0.58				0.42
117				0.81				0.19
118				0.57				0.43
119				0.54				0.46
Average	0.74	0.72	0.70	0.73	0.26	0.28	0.30	0.27
g/C	2.77	2.58	2.28	2.68				

Figure B-61. Stop rate per red-to-red cycle per intersection on arterial corridor of Miami Part 5

Intersection 2-1	Intersection 3-2	Intersection 4-3
0:01:31	0:00:31	0:00:26
0:01:31	0:00:29	0:00:05
0:01:42	0:00:20	0:01:11
0:01:33	0:00:21	0:00:39
0:01:24	0:00:34	0:00:05
0:01:38	0:00:32	0:01:09
0:01:31	0:00:29	0:00:23
0:01:45	0:00:15	0:00:11
0:01:40	0:00:20	0:01:06
0:01:32	0:00:28	0:00:32
0:01:37	0:00:22	0:00:08
0:01:38	0:00:24	0:01:13
0:01:30	0:00:29	0:00:27
0:01:38	0:00:19	0:00:05
0:01:34	0:00:30	0:01:03
0:02:05	0:00:21	0:00:25
0:00:40	0:00:20	0:00:34
0:02:11	0:01:49	0:02:28
0:01:57	0:02:12	0:02:01
0:02:09	0:01:51	0:01:37
0:02:27	0:01:45	0:01:23
0:01:50	0:01:51	0:00:26
0:02:08	0:01:51	0:01:26
0:02:29	0:01:45	0:01:22
0:02:04	0:01:50	0:00:35
0:02:18	0:01:46	0:00:06
0:02:25	0:01:40	0:01:10
0:02:08	0:01:52	0:00:26
0:01:57	0:01:45	0:00:12

Figure B-62. Signal offset between intersections on arterial corridor of Miami

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles	time(min)	speed (miles/hr)
Vehicle no	start(int 1)	end(int 4)	start	end			
1	12:46:47	12:48:02			0.55	1.25	26.40
2	12:46:50	12:48:08			0.55	1.30	25.38
3	12:46:54	12:48:09			0.55	1.25	26.40
4	12:46:55	12:48:00			0.55	1.08	30.46
5			12:46:59 PM	12:48:20 PM	0.55	1.35	24.44
6	12:47:05	12:48:24			0.55	1.32	25.06
7	12:47:08	12:48:28			0.55	1.33	24.75
8	12:47:10	12:48:29			0.55	1.32	25.06
9			12:47:16 PM	12:48:35 PM	0.55	1.32	25.06
10	12:47:27	12:48:39			0.55	1.20	27.50
11	12:47:29	12:48:40			0.55	1.18	27.89
12			12:47:31 PM	12:48:43 PM	0.55	1.20	27.50
13	12:47:43	12:48:49			0.55	1.10	30.00
14			12:46:49 PM	12:48:13 PM	0.55	1.40	23.57
15	12:46:56	12:48:17			0.55	1.35	24.44
16	12:46:59	12:48:17			0.55	1.30	25.38
17	12:47:04	12:48:23			0.55	1.32	25.06
18	12:47:06	12:48:27			0.55	1.35	24.44
19	12:47:08	12:48:35			0.55	1.45	22.76
20	12:47:13	12:48:35			0.55	1.37	24.15
21	12:47:19	12:48:40			0.55	1.35	24.44
22	12:47:20	12:48:42			0.55	1.37	24.15
23	12:47:24	12:48:45			0.55	1.35	24.44
24			12:47:26 PM	12:48:47 PM	0.55	1.35	24.44
25			12:47:34 PM	12:48:52 PM	0.55	1.30	25.38
26			12:51:18 PM	12:52:51 PM	0.55	1.55	21.29
27	12:51:25	12:52:55			0.55	1.50	22.00
28	12:51:28	12:52:56			0.55	1.47	22.50
29	12:51:30	12:53:01			0.55	1.52	21.76
30	12:51:32	12:53:01			0.55	1.48	22.25
31			12:51:37 PM	12:53:14 PM	0.55	1.62	20.41
32	12:51:42	12:53:18			0.55	1.60	20.62
33			12:51:45 PM	12:53:23 PM	0.55	1.63	20.20
34			12:51:54 PM	12:53:36 PM	0.55	1.70	19.41
35	12:51:59	12:53:41			0.55	1.70	19.41
36	12:52:02	12:53:43			0.55	1.68	19.60
37	12:52:04	12:53:47			0.55	1.72	19.22
38	12:51:27	12:52:55			0.55	1.47	22.50
39			12:51:33 PM	12:53:06 PM	0.55	1.55	21.29
40	12:51:41	12:53:09			0.55	1.47	22.50
41	12:51:44	12:53:17			0.55	1.55	21.29
42	12:51:48	12:53:19			0.55	1.52	21.76
43	12:52:00	12:53:22			0.55	1.37	24.15

Figure B-63. Average speed per vehicle on arterial corridor of Gainesville-Starke Part 1

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles	time(min)	speed (miles/hr)
Vehicle no	start(int 1)	end(int 4)	start	end			
44	12:52:07	12:53:26			0.55	1.32	25.06
45	12:56:04	12:57:19			0.55	1.25	26.40
46	12:56:07	12:57:20			0.55	1.22	27.12
47	12:56:10	12:57:22			0.55	1.20	27.50
48	12:56:20	12:57:33			0.55	1.22	27.12
49	12:56:25	12:57:37			0.55	1.20	27.50
50	12:56:28	12:57:43			0.55	1.25	26.40
51	12:56:30	12:57:46			0.55	1.27	26.05
52	12:56:36	12:57:54			0.55	1.30	25.38
53	12:56:39	12:57:57			0.55	1.30	25.38
54			12:56:42 PM	12:57:59 PM	0.55	1.28	25.71
55	12:56:47	12:58:03			0.55	1.27	26.05
56	12:56:17	12:57:33			0.55	1.27	26.05
57	12:56:25	12:57:39			0.55	1.23	26.76
58	12:56:26	12:57:41			0.55	1.25	26.40
59	12:56:28	12:57:41			0.55	1.22	27.12
60	12:56:30	12:57:43			0.55	1.22	27.12
61			12:56:37 PM	12:57:48 PM	0.55	1.18	27.89
62			1:00:36 PM	1:02:13 PM	0.55	1.62	20.41
63	13:00:43	13:02:19			0.55	1.60	20.63
64			1:00:47 PM	1:02:22 PM	0.55	1.58	20.84
65			1:00:57 PM	1:02:30 PM	0.55	1.55	21.29
66	13:01:08	13:02:37			0.55	1.48	22.25
67	13:01:13	13:02:40			0.55	1.45	22.76
68	13:01:15	13:02:43			0.55	1.47	22.50
69	13:01:16	13:02:44			0.55	1.47	22.50
70	13:00:41	13:02:11			0.55	1.50	22.00
71	13:00:48	13:02:13			0.55	1.42	23.29
72	13:00:50	13:02:17			0.55	1.45	22.76
73	13:00:52	13:02:19			0.55	1.45	22.76
74			1:00:54 PM	1:02:21 PM	0.55	1.45	22.76
75			1:01:01 PM	1:02:29 PM	0.55	1.47	22.50
76	13:01:05	13:02:33			0.55	1.47	22.50
77	13:01:11	13:02:35			0.55	1.40	23.57
78	13:01:14	13:02:37			0.55	1.38	23.86
79			1:01:16 PM	1:02:39 PM	0.55	1.38	23.86
80	13:05:28	13:06:47			0.55	1.32	25.06
81	13:05:31	13:06:48			0.55	1.28	25.71
82	13:05:33	13:06:49			0.55	1.27	26.05
83	13:05:36	13:06:52			0.55	1.27	26.05
84	13:05:38	13:07:00			0.55	1.37	24.15
85	13:05:43	13:07:04			0.55	1.35	24.44
86	13:05:47	13:07:06			0.55	1.32	25.06

Figure B-64. Average speed per vehicle on arterial corridor of Gainesville-Starke Part 2

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles	time(min)	speed (miles/hr
Vehicle no	start(int 1)	end(int 4)	start	end			
87	13:05:49	13:07:06			0.55	1.28	25.71
88	13:05:52	13:07:03			0.55	1.18	27.89
89			1:05:56 PM	1:07:08 PM	0.55	1.20	27.50
90	13:05:29	13:06:45			0.55	1.27	26.05
91	13:05:38	13:06:54			0.55	1.27	26.05
92	13:05:40	13:06:57			0.55	1.28	25.71
93	13:05:42	13:07:00			0.55	1.30	25.38
94			1:05:47 PM	1:07:12 PM	0.55	1.42	23.29
95	13:05:51	13:07:16			0.55	1.42	23.29
96			1:06:07 PM	1:07:19 PM	0.55	1.20	27.50
97	13:06:11	13:07:22			0.55	1.18	27.89
98			1:10:08 PM	1:11:28 PM	0.55	1.33	24.75
99	13:10:17	13:11:35			0.55	1.30	25.38
100	13:10:22	13:11:40			0.55	1.30	25.38
101	13:10:27	13:11:43			0.55	1.27	26.05
102	13:10:39	13:11:54			0.55	1.25	26.40
103	13:10:41	13:11:55			0.55	1.23	26.76
104	13:10:46	13:11:58			0.55	1.20	27.50
105	13:10:48	13:12:01			0.55	1.22	27.12
106	13:10:51	13:12:08			0.55	1.28	25.71
107			1:10:54 PM	1:12:12 PM	0.55	1.30	25.38
108			1:10:16 PM	1:11:28 PM	0.55	1.20	27.50
109	13:10:21	13:11:33			0.55	1.20	27.50
110			1:10:26 PM	1:11:37 PM	0.55	1.18	27.89
111	13:10:35	13:11:48			0.55	1.22	27.12
112	13:10:42	13:11:50			0.55	1.13	29.12
113	13:14:52	13:16:09			0.55	1.28	25.71
114	13:14:54	13:16:20			0.55	1.43	23.02
115			1:14:59 PM	1:16:23 PM	0.55	1.40	23.57
116			1:15:05 PM	1:16:32 PM	0.55	1.45	22.76
117			1:15:10 PM	1:16:37 PM	0.55	1.45	22.76
118			1:15:17 PM	1:16:47 PM	0.55	1.50	22.00
119	13:15:27	13:16:50			0.55	1.38	23.86
120	13:15:29	13:16:53			0.55	1.40	23.57
121			1:15:40 PM	1:17:05 PM	0.55	1.42	23.29
122	13:14:50	13:16:07			0.55	1.28	25.71
123	13:14:53	13:16:17			0.55	1.40	23.57
124	13:14:55	13:16:18			0.55	1.38	23.86
125	13:14:58	13:16:21			0.55	1.38	23.86
126	13:15:06	13:16:30			0.55	1.40	23.57
127			1:15:08 PM	1:16:32 PM	0.55	1.40	23.57
128			1:15:12 PM	1:16:35 PM	0.55	1.38	23.86
129	13:15:19	13:16:45			0.55	1.43	23.02

Figure B-65. Average speed per vehicle on arterial corridor of Gainesville-Starke Part 3

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles	time(min)	speed (miles/hr
Vehicle no	start(int 1)	end(int 4)	start	end			
130	13:15:24	13:16:48			0.55	1.40	23.57
131	13:15:28	13:16:51			0.55	1.38	23.86
132	13:15:29	13:16:53			0.55	1.40	23.57
133			1:15:37 PM	1:16:59 PM	0.55	1.37	24.15
134			1:15:48 PM	1:17:05 PM	0.55	1.28	25.71
135	13:19:25	13:20:39			0.55	1.23	26.76
136	13:19:29	13:20:41			0.55	1.20	27.50
137	13:19:32	13:20:46			0.55	1.23	26.76
138			1:19:38 PM	1:20:55 PM	0.55	1.28	25.71
139	13:19:42	13:21:02			0.55	1.33	24.75
140	13:19:45	13:21:05			0.55	1.33	24.75
141	13:19:48	13:21:08			0.55	1.33	24.75
142	13:19:51	13:21:12			0.55	1.35	24.44
143	13:19:53	13:21:14			0.55	1.35	24.44
144	13:19:55	13:21:19			0.55	1.40	23.57
145	13:20:04	13:21:22			0.55	1.30	25.38
146	13:19:27	13:20:38			0.55	1.18	27.89
147	13:19:30	13:20:59			0.55	1.48	22.25
148			1:19:32 PM	1:20:42 PM	0.55	1.17	28.29
149	13:19:44	13:20:57			0.55	1.22	27.12
150			1:19:49 PM	1:20:59 PM	0.55	1.17	28.29
151	13:19:53	13:21:03			0.55	1.17	28.29
152	13:19:55	13:21:06			0.55	1.18	27.89
153	13:20:07	13:21:18			0.55	1.18	27.89
154	13:24:09	13:25:28			0.55	1.32	25.06
155	13:24:12	13:25:30			0.55	1.30	25.38
156	13:24:14	13:25:33			0.55	1.32	25.06
157	13:24:17	13:25:35			0.55	1.30	25.38
158	13:24:20	13:25:39			0.55	1.32	25.06
159	13:24:24	13:25:43			0.55	1.32	25.06
160	13:24:26	13:25:45			0.55	1.32	25.06
161			1:24:27 PM	1:25:48 PM	0.55	1.35	24.44
162	13:24:36	13:25:56			0.55	1.33	24.75
163			1:24:42 PM	1:26:01 PM	0.55	1.32	25.06
164	13:24:12	13:25:29			0.55	1.28	25.71
165	13:24:16	13:25:33			0.55	1.28	25.71
166	13:24:19	13:25:35			0.55	1.27	26.05
167	13:24:21	13:25:37			0.55	1.27	26.05
168	13:24:23	13:25:40			0.55	1.28	25.71
169			1:24:27 PM	1:25:42 PM	0.55	1.25	26.40
170	13:24:31	13:25:45			0.55	1.23	26.76
171	13:24:32	13:25:46			0.55	1.23	26.76
172	13:24:34	13:25:48			0.55	1.23	26.76

Figure B-66. Average speed per vehicle on arterial corridor of Gainesville-Starke Part 4

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles	time(min)	speed (miles/hr
Vehicle no	start(int 1)	end(int 4)	start	end			
173	13:24:37	13:25:51			0.55	1.23	26.76
174	13:24:41	13:25:54			0.55	1.22	27.12
175	13:24:42	13:25:56			0.55	1.23	26.76
176	13:28:48	13:29:58			0.55	1.17	28.29
177			1:28:58 PM	1:30:08 PM	0.55	1.17	28.29
178			1:29:02 PM	1:30:11 PM	0.55	1.15	28.70
179	13:29:06	13:30:18			0.55	1.20	27.50
180	13:29:09	13:30:25			0.55	1.27	26.05
181	13:29:11	13:30:27			0.55	1.27	26.05
182			1:29:14 PM	1:30:33 PM	0.55	1.32	25.06
183	13:29:25	13:30:46			0.55	1.35	24.44
184			1:29:33 PM	1:30:47 PM	0.55	1.23	26.76
185			1:28:48 PM	1:29:55 PM	0.55	1.12	29.55
186	13:28:55	13:30:04			0.55	1.15	28.70
187	13:28:56	13:30:02			0.55	1.10	30.00
188	13:29:03	13:30:10			0.55	1.12	29.55
189	13:29:10	13:30:14			0.55	1.07	30.94
190	13:29:12	13:30:16			0.55	1.07	30.94
191	13:29:14	13:30:19			0.55	1.08	30.46
192	13:29:16	13:30:21			0.55	1.08	30.46
193	13:29:20	13:30:25			0.55	1.08	30.46
194	13:33:27	13:34:39			0.55	1.20	27.50
195	13:33:36	13:34:47			0.55	1.18	27.89
196	13:33:38	13:34:49			0.55	1.18	27.89
197	13:33:42	13:34:54			0.55	1.20	27.50
198	13:33:44	13:34:58			0.55	1.23	26.76
199	13:33:47	13:35:00			0.55	1.22	27.12
200	13:33:49	13:35:03			0.55	1.23	26.76
201	13:33:51	13:35:05			0.55	1.23	26.76
202	13:33:55	13:35:08			0.55	1.22	27.12
203	13:34:05	13:35:15			0.55	1.17	28.29
204	13:34:08	13:35:18			0.55	1.17	28.29
205			1:34:11 PM	1:35:20 PM	0.55	1.15	28.70
206	13:33:27	13:34:38			0.55	1.18	27.89
207	13:33:31	13:34:41			0.55	1.17	28.29
208	13:33:34	13:34:43			0.55	1.15	28.70
209	13:33:39	13:34:52			0.55	1.22	27.12
210	13:33:42	13:34:50			0.55	1.13	29.12
211	13:33:44	13:34:51			0.55	1.12	29.55
212	13:33:48	13:34:53			0.55	1.08	30.46
213			1:33:51 PM	1:34:58 PM	0.55	1.12	29.55
214			1:33:54 PM	1:35:01 PM	0.55	1.12	29.55
215			1:34:05 PM	1:35:14 PM	0.55	1.15	28.70

Figure B-67. Average speed per vehicle on arterial corridor of Gainesville-Starke Part 5

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles	time(min)	speed (miles/hr)
Vehicle no	start(int 1)	end(int 4)	start	end			
216			1:34:11 PM	1:35:18 PM	0.55	1.12	29.55
217			1:34:15 PM	1:35:21 PM	0.55	1.10	30.00
218	13:38:12	13:39:35			0.55	1.38	23.86
219	13:38:15	13:39:27			0.55	1.20	27.50
220	13:38:17	13:39:29			0.55	1.20	27.50
221			1:38:23 PM	1:39:39 PM	0.55	1.27	26.05
222			1:38:28 PM	1:39:44 PM	0.55	1.27	26.05
223	13:38:33	13:40:03			0.55	1.50	22.00
224			1:38:36 PM	1:40:06 PM	0.55	1.50	22.00
225	13:38:39	13:40:10			0.55	1.52	21.76
226			1:38:40 PM	1:40:11 PM	0.55	1.52	21.76
227	13:38:46	13:40:16			0.55	1.50	22.00
228			1:38:52 PM	1:40:18 PM	0.55	1.43	23.02
229			1:38:58 PM	1:40:21 PM	0.55	1.38	23.86
230	13:38:09	13:39:17			0.55	1.13	29.12
231	13:38:11	13:39:19			0.55	1.13	29.12
232	13:38:14	13:39:44			0.55	1.50	22.00
233			1:38:21 PM	1:39:32 PM	0.55	1.18	27.89
234	13:38:26	13:39:41			0.55	1.25	26.40
235	13:38:38	13:39:56			0.55	1.30	25.38
236	13:38:39	13:39:58			0.55	1.32	25.06
237	13:38:44	13:40:02			0.55	1.30	25.38
238	13:38:52	13:40:12			0.55	1.33	24.75
239	13:38:57	13:40:19			0.55	1.37	24.15
240			1:39:01 PM	1:40:21 PM	0.55	1.33	24.75
241	13:42:44	13:43:56			0.55	1.20	27.50
242	13:42:50	13:44:02			0.55	1.20	27.50
243	13:42:53	13:44:04			0.55	1.18	27.89
244	13:42:56	13:44:07			0.55	1.18	27.89
245	13:42:58	13:44:09			0.55	1.18	27.89
246	13:43:00	13:44:11			0.55	1.18	27.89
247	13:43:02	13:44:13			0.55	1.18	27.89
248			1:43:05 PM	1:44:27 PM	0.55	1.37	24.15
249			1:43:10 PM	1:44:31 PM	0.55	1.35	24.44
250	13:42:45	13:43:56			0.55	1.18	27.89
251	13:42:48	13:44:02			0.55	1.23	26.76
252	13:42:50	13:44:04			0.55	1.23	26.76
253	13:42:53	13:44:09			0.55	1.27	26.05
254			1:42:56 PM	1:44:11 PM	0.55	1.25	26.40
255	13:42:59	13:44:15			0.55	1.27	26.05
256	13:43:01	13:44:17			0.55	1.27	26.05
257			1:43:03 PM	1:44:18 PM	0.55	1.25	26.40
258	13:43:09	13:44:24			0.55	1.25	26.40

Figure B-68. Average speed per vehicle on arterial corridor of Gainesville-Starke Part 6

				Intersection 1								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
1/2	12:52:28	12:54:48	1					12:53:11	12:53:27			0:00:16
			2	12:53:14	12:53:29							0:00:15
			3	12:53:18	12:53:30							0:00:12
			4					12:53:20	12:53:28			0:00:08
			5	12:53:22	12:53:33							0:00:11
			6					12:53:23	12:53:30			0:00:07
			7	12:53:25	12:53:33							0:00:08
			8	12:53:29	12:53:36							0:00:07
			9					12:53:29	12:53:34			0:00:05
2/3	12:56:08	12:58:28	1	12:57:14	12:58:28							0:01:14
			2	12:57:18	12:58:28							0:01:10
			3					12:57:18	12:58:27			0:01:09
			4	12:57:30	12:58:30							0:01:00
			5					12:57:37	12:58:29			0:00:52
			6	12:57:44	12:58:32							0:00:48
			7	12:57:47	12:58:34							0:00:47
			8	12:57:47	12:58:36							0:00:49
			9	12:57:55	12:58:39							0:00:44
			10	12:58:00	12:58:41							0:00:41
			11					12:58:05	12:58:31			0:00:26
			12	12:58:08	12:58:42							0:00:34
			13					12:58:08	12:58:33			0:00:25
			14					12:58:14	12:58:35			0:00:21
			15					12:58:28	12:58:37			0:00:09
3/4	13:01:48	13:04:08	1	13:01:50	13:03:06							0:01:16

Figure B-69. Average delay per vehicle per red cycle on arterial corridor of Gainesville-Starke Part 1

				Intersection 1								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			2	13:02:02	13:03:08							0:01:06
			3	13:02:32	13:03:10							0:00:38
			4	13:02:44	13:03:12							0:00:28
			5	13:02:46	13:03:15							0:00:29
			6	13:02:48	13:03:16							0:00:28
			7	13:03:02	13:03:17							0:00:15
4/5	13:11:08	13:13:28	1	13:11:13	13:12:17							0:01:04
			2					13:11:48	13:12:17			0:00:29
			3					13:11:55	13:12:20			0:00:25
			4					13:11:55	13:12:21			0:00:26
			5					13:11:56	13:12:23			0:00:27
			6					13:11:58	13:12:25			0:00:27
			7	13:11:59	13:12:22							0:00:23
			8					13:12:01	13:12:27			0:00:26
			9	13:12:06	13:12:23							0:00:17
			10					13:12:07	13:12:28			0:00:21
			11	13:12:13	13:12:26							0:00:13
			12	13:12:15	13:12:28							0:00:13
5/6	13:22:48	13:25:08	1	13:22:59	13:24:05							0:01:06
			2	13:23:05	13:24:06							0:01:01
			3					13:23:05	13:24:05			0:01:00
			4					13:23:06	13:24:07			0:01:01
			5	13:23:13	13:24:08							0:00:55
			6					13:23:18	13:24:09			0:00:51
			7	13:23:40	13:24:10							0:00:30

Figure B-70. Average delay per vehicle per red cycle on arterial corridor of Gainesville-Starke Part 2

				Intersection 1								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			8					13:23:43	13:24:10			0:00:27
			9	13:23:44	13:24:11							0:00:27
			10	13:23:50	13:24:13							0:00:23
			11	13:23:52	13:24:15							0:00:23
			12					13:23:54	13:24:12			0:00:18
			13					13:23:55	13:24:13			0:00:18
			14	13:24:03	13:24:16							0:00:13
			15					13:24:03	13:24:14			0:00:11
6/7	13:27:28	13:29:48	1	13:27:45	13:28:47							0:01:02
			2					13:28:15	13:28:47			0:00:32
			3					13:28:16	13:28:51			0:00:35
			4					13:28:17	13:28:52			0:00:35
			5					13:28:20	13:28:54			0:00:34
			6					13:28:20	13:28:57			0:00:37
			7					13:28:22	13:28:58			0:00:36
			8	13:28:23	13:28:48							0:00:25
			9					13:28:26	13:28:59			0:00:33
			10	13:28:33	13:28:54							0:00:21
			11					13:28:35	13:29:01			0:00:26
			12	13:28:35	13:28:56							0:00:21
			13	13:28:39	13:28:58							0:00:19
			14	13:28:43	13:28:59							0:00:16
			15	13:28:47	13:29:00							0:00:13
7/8	13:32:08	13:34:28	1					13:32:18	13:33:27			0:01:09
			2	13:32:22	13:33:26							0:01:04

Figure B-71. Average delay per vehicle per red cycle on arterial corridor of Gainesville-Starke Part 3

				Intersection 1								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			3					13:32:25	13:33:28			0:01:03
			4					13:32:27	13:33:29			0:01:02
			5	13:32:37	13:33:28							0:00:51
			6					13:33:00	13:33:31			0:00:31
			7					13:33:04	13:33:33			0:00:29
			8	13:33:07	13:33:30							0:00:23
			9	13:33:08	13:33:32							0:00:24
			10	13:33:10	13:33:35							0:00:25
			11					13:33:25	13:33:35			0:00:10
			12	13:33:26	13:33:36							0:00:10
			13					13:33:27	13:33:37			0:00:10
8/9	13:34:28	13:36:48	1	13:34:38	13:35:46							0:01:08
			2	13:34:51	13:35:48							0:00:57
			3	13:35:28	13:35:51							0:00:23
			4	13:35:31	13:35:53							0:00:22
			5	13:35:35	13:35:55							0:00:20
			6	13:35:38	13:35:56							0:00:18
			7	13:35:42	13:35:58							0:00:16
			8	13:35:43	13:35:59							0:00:16
9/10	13:39:08	13:41:29	1					13:39:12	13:40:27			0:01:15
			2	13:39:20	13:40:27							0:01:07
			3	13:39:32	13:40:29							0:00:57
			4	13:39:48	13:40:33							0:00:45
			5	13:39:55	13:40:35							0:00:40
			6					13:39:55	13:40:28			0:00:33

Figure B-72. Average delay per vehicle per red cycle on arterial corridor of Gainesville-Starke Part 4

				Intersection 1								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			7					13:39:56	13:40:30			0:00:34
			8	13:39:58	13:40:36							0:00:38
			9					13:40:00	13:40:31			0:00:31
			10	13:40:02	13:40:37							0:00:35
			11					13:40:02	13:40:33			0:00:31
			12	13:40:03	13:40:38							0:00:35
			13					13:40:03	13:40:35			0:00:32
			14					13:40:03	13:40:36			0:00:33
			15					13:40:04	13:40:37			0:00:33
			16					13:40:05	13:40:38			0:00:33
			17					13:40:06	13:40:39			0:00:33
			18	13:40:12	13:40:39							0:00:27
10/11	13:13:28	13:15:49	1	13:13:35	13:14:47	0:01:12						0:01:12
			2	13:13:37	13:14:48	0:01:11						0:01:11
			3	13:14:28	13:14:49	0:00:21						0:00:21
			4	13:14:37	13:14:52	0:00:15						0:00:15
			5	13:14:43	13:14:54	0:00:11						0:00:11

Figure B-73. Average delay per vehicle per red cycle on arterial corridor of Gainesville-Starke Part 5

				Intersection 2								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	Delay
1/2	12:47:09	12:49:29	1	12:47:18	12:47:29							0:00:11
			2					12:47:23	12:47:31			0:00:08
			3	12:47:27	12:47:31							0:00:04
			4					12:47:28	12:47:32			0:00:04
			5	12:47:29	12:47:33							0:00:04
			6	12:47:29	12:47:34							0:00:05
2/3	12:49:29	12:51:49	1					12:49:53	12:49:55			0:00:02
			2					12:49:54	12:49:55			0:00:01
3/4	12:51:49	12:54:10	1	12:52:04	12:52:16							0:00:12
			2	12:52:05	12:52:18							0:00:13
			3	12:52:08	12:52:20							0:00:12
			4	12:52:12	12:52:22							0:00:10
			5	12:52:14	12:52:24							0:00:10
			6	12:52:15	12:52:27							0:00:12
4/5	12:56:29	12:58:49	1	12:56:39	12:56:45							0:00:06
			2					12:56:39	12:56:47			0:00:08
			3	12:56:42	12:56:46							0:00:04
			4	12:56:44	12:56:49							0:00:05
			5					12:56:45	12:56:48			0:00:03
5/6	13:05:49	13:08:09	1					13:06:03	13:06:14			0:00:11
			2	13:06:06	13:06:13							0:00:07
			3					13:06:09	13:06:16			0:00:07
			4	13:06:10	13:06:14							0:00:04
			5					13:06:11	13:06:17			0:00:06
			6	13:06:12	13:06:17							0:00:05

Figure B-74. Average delay per vehicle per red cycle on arterial corridor of Gainesville-Starke Part 6

				Intersection 2								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			7					13:06:13	13:06:19			0:00:06
			8	13:06:14	13:06:18							0:00:04
6/7	13:12:49	13:15:09	1					13:12:57	13:13:14			0:00:17
			2	13:13:01	13:13:13							0:00:12
			3					13:13:01	13:13:15			0:00:14
			4					13:13:02	13:13:17			0:00:15
			5					13:13:05	13:13:19			0:00:14
			6	13:13:07	13:13:16							0:00:09
			7	13:13:09	13:13:18							0:00:09
			8	13:13:09	13:13:22							0:00:13
			9					13:13:09	13:13:20			0:00:11
			10					13:13:12	13:13:22			0:00:10
			11	13:13:13	13:13:24							0:00:11
			12					13:13:13	13:13:23			0:00:10
7/8	13:15:09	13:17:29	1					13:15:10	13:15:30			0:00:20
			2	13:15:11	13:15:29							0:00:18
			3					13:15:11	13:15:31			0:00:20
			4					13:15:20	13:15:33			0:00:13
			5					13:15:23	13:15:34			0:00:11
			6	13:15:25	13:15:31							0:00:06
			7	13:15:27	13:15:33							0:00:06
8/9	13:24:29	13:26:49	1	13:24:41	13:24:48							0:00:07
			2	13:24:44	13:24:50							0:00:06
9/10	13:40:55	13:43:09	1	13:41:07	13:41:17							0:00:10
			2					13:41:07	13:41:17			0:00:10

Figure B-75. Average delay per vehicle per red cycle on arterial corridor of Gainesville-Starke Part 7

				Intersection 2								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			3	13:41:09	13:41:19							0:00:10
			4	13:41:12	13:41:20							0:00:08
10/11	13:47:49	13:50:09	1					13:48:01	13:48:08			0:00:07
			2					13:48:04	13:48:11			0:00:07
			3					13:48:07	13:48:12			0:00:05

Figure B-76. Average delay per vehicle per red cycle on arterial corridor of Gainesville-Starke Part 8

				Intersection 3								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
1/2	12:46:45	12:47:06		12:47:00	12:47:09							0:00:09
				12:47:04	12:47:11							0:00:07
2/3	12:56:05	12:58:25	1	12:56:16	12:56:29							0:00:13
			2	12:56:18	12:56:30							0:00:12
3/4	12:58:25	13:00:45	1					12:58:27	12:58:55			0:00:28
			2					12:58:38	12:58:56			0:00:18
			3					12:58:49	12:58:57			0:00:08
			4					12:58:50	12:58:59			0:00:09
4/5	13:03:05	13:05:25	1	13:03:13	13:03:37			13:03:28	13:03:37			0:00:24
			2	13:03:15	13:03:39			13:03:31	13:03:39			0:00:24
			3	13:03:22	13:03:40			13:03:34	13:03:41			0:00:18
			4	13:03:27	13:03:42							0:00:15
			5									0:00:00
			6									0:00:00
			7									0:00:00
5/6	13:10:05	13:12:25	1	13:10:10	13:10:26			13:10:09	13:10:26			0:00:16
			2	13:10:18	13:10:30			13:10:24	13:10:28			0:00:12
			3									0:00:00
			4									0:00:00
6/7	13:14:45	13:17:20	1	13:14:46	13:15:02							0:00:16
			2	13:14:55	13:15:05							0:00:10
			3	13:15:02	13:15:06							0:00:04
7/8	13:33:47	13:35:45	1					13:24:13	13:24:34			0:00:21
			2					13:24:26	13:24:36			0:00:10
			3					13:24:35	13:24:37			0:00:02

Figure B-77. Average delay per vehicle per red cycle on arterial corridor of Gainesville-Starke Part 9

				Intersection 3								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
8/9	13:26:30	13:29:05	1					13:26:37	13:26:47			0:00:10
			2					13:26:42	13:26:49			0:00:07
9/10	13:29:05	13:33:47										0:00:00
												0:00:00
10/11	13:33:47	13:35:45	1	13:33:53	13:34:03							0:00:10
			2	13:33:55	13:34:05							0:00:10
			3	13:33:59	13:34:07							0:00:08
			4	13:34:03	13:34:09							0:00:06

Figure B-78. Average delay per vehicle per red cycle on arterial corridor of Gainesville-Starke Part 10

				Intersection 4								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	Delay
1/2	12:53:48	12:56:08	1	12:53:52	12:54:38							0:00:46
			2	12:53:55	12:54:41							0:00:46
			3	12:54:00	12:54:42							0:00:42
			4	12:54:02	12:54:43							0:00:41
			5	12:54:13	12:54:45							0:00:32
			6	12:54:37	12:54:47							0:00:10
			7	12:54:38	12:54:48							0:00:10
2/3	12:56:08	12:58:28	1	12:56:15	12:56:55							0:00:40
			2	12:56:48	12:56:57							0:00:09
			3	12:56:48	12:56:58							0:00:10
			4	12:56:55	12:57:01							0:00:06
3/4	13:05:28	13:07:48	1					13:05:35	13:06:34			0:00:59
			2					13:06:05	13:06:37			0:00:32
4/5	13:07:48	13:10:08	1	13:08:07	13:08:42							0:00:35
			2					13:08:22	13:08:41			0:00:21
			3	13:08:23	13:08:44							0:00:21
			4	13:08:24	13:08:45							
			5	13:08:25	13:08:43							
5/6	13:14:47	13:17:06	1	13:14:47	13:15:55							0:01:08
			2	13:14:51	13:15:57							0:01:06
			3	13:14:53	13:15:59							0:01:06
			4	13:15:14	13:16:00							0:00:46
			5	13:15:16	13:16:01							0:00:45
			6	13:15:19	13:16:02							0:00:43
6/7	13:31:08	13:33:28	1					13:31:15	13:32:11			0:00:56

Figure B-79. Average delay per vehicle per red cycle on arterial corridor of Gainesville-Starke Part 11

				Intersection 4								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			2					13:31:32	13:32:13			0:00:41
			3					13:31:47	13:32:16			0:00:29
7/8	13:40:28	13:42:47	1	13:40:38	13:41:14							0:00:36
			2	13:40:40	13:41:16							0:00:36
			3					13:40:45	13:41:14			0:00:29
			4	13:40:49	13:41:19							0:00:30
			5					13:40:57	13:41:17			0:00:20
			6					13:40:59	13:41:19			0:00:20
8/9	13:49:48	13:52:08	1					13:50:13	13:50:59			0:00:46
			2	13:50:20	13:50:59							0:00:39
			3					13:50:45	13:51:00			0:00:15
			4					13:50:46	13:51:02			0:00:16
			5	13:50:48	13:51:00							0:00:12
			6					13:50:49	13:51:04			0:00:15
			7	13:50:56	13:51:02							0:00:06
9/10	13:03:08	13:05:28	1	13:03:18	13:04:11							0:00:53
			2	13:03:21	13:04:14							0:00:53
			3	13:03:53	13:04:15							0:00:22
			4	13:03:56	13:04:16							0:00:20
			5	13:03:56	13:04:17							0:00:21
			6	13:03:57	13:04:18							0:00:21
10/11	12:58:28	13:00:48	1	12:58:49	12:59:14							0:00:25
			2					12:58:52	12:59:15			0:00:23
			3	12:59:11	12:59:15							0:00:04
			4					12:59:12	12:59:17			0:00:05

Figure B-80. Average delay per vehicle per red cycle on arterial corridor of Gainesville-Starke Part 12

	Intersection 1									
	red		Lane 1			Lane 2			Average Queue	Total Queue length
Cycle Number	start	end	Non-Tru	Trucks	Queue-L	Non-Tru	Trucks	Queue-L		
1/2	12:52:28	12:54:48	5	0	5	4	0	4	5	9
2/3	12:56:08	12:58:28	9	0	9	6	0	6	8	15
3/4	13:01:48	13:04:08	7	0	7	0	0	0	4	7
4/5	13:11:08	13:13:28	5	0	5	7	0	7	6	12
5/6	13:22:48	13:25:08	8	0	8	7	0	7	8	15
6/7	13:27:28	13:29:48	7	0	7	8	0	8	8	15
7/8	13:32:08	13:34:28	6	0	6	7	0	7	7	13
8/9	13:34:28	13:36:48	8	0	8	0	0	0	4	8
9/10	13:39:08	13:41:29	8	0	8	10	0	10	9	18
10/11	13:13:28	13:15:49	5	0	5	0	0	0	3	5

	Intersection 2									
	red		Lane 1			Lane 2			Average Queue	Total Queue length
Cycle Number	start	end	Non-Tru	Trucks	Queue-L	Non-Tru	Trucks	Queue-L		
1/2	12:47:09	12:49:29	3	0	3	2	0	2	3	5
2/3	12:49:29	12:51:49	4	0	4	4	0	4	4	8
3/4	12:51:49	12:54:10	5	0	5	7	0	7	6	12
4/5	12:56:29	12:58:49	3	0	3	4	0	4	4	7
5/6	13:05:49	13:08:09	2	0	2	0	0	0	1	2
6/7	13:12:49	13:15:09	3	0	3	1	0	1	2	4
7/8	13:15:09	13:17:29	0	0	0	3	0	3	2	3
8/9	13:24:29	13:26:49	6	0	6	0	0	0	3	6
9/10	13:40:55	13:43:09	4	0	4	2	0	2	3	6
10/11	13:47:49	13:50:09	0	0	0	2	0	2	1	2

	Intersection 3									
	red		Lane 1			Lane 2			Average Queue	Total Queue length
Cycle Number	start	end	Non-Tru	Trucks	Queue-L	Non-Tru	Trucks	Queue-L		
1/2	12:46:45	12:49:05	2	0	2	0	0	0	1	2
2/3	12:56:05	12:58:25	0	0	0	4	0	4	2	4
3/4	12:58:25	13:00:45	4	0	4	3	0	3	4	7
4/5	13:03:05	13:05:25	2	0	2	2	0	2	2	4
5/6	13:10:05	13:12:25	3	0	3	0	0	0	2	3
6/7	13:14:45	13:17:20	0	0	0	3	0	3	2	3
7/8	13:33:47	13:35:45	4	0	4	0	0	0	2	4
8/9	13:26:30	13:29:05	2	0	2	0	0	0	1	2
9/10	13:29:05	13:33:47	0	0	0	2	0	2	1	2
10/11	13:33:47	13:35:45	1	0	1	0	0	0	1	1

	Intersection 4									
	red		Lane 1			Lane 2			Average Queue	Total Queue length
Cycle Number	start	end	Non-Tru	Trucks	Queue-L	Non-Tru	Trucks	Queue-L		
1/2	12:53:48	12:56:08	7	0	7	0	0	0	4	7
2/3	12:56:08	12:58:28	4	0	4	0	0	0	2	4
3/4	13:05:28	13:07:48	0	0	0	2	0	2	1	2
4/5	13:07:48	13:10:08	3	0	3	2	0	2	3	5
5/6	13:14:47	13:17:06	6	0	6	0	0	0	3	6
6/7	13:31:08	13:33:28	0	0	0	3	0	3	2	3
7/8	13:40:28	13:42:47	3	0	3	3	0	3	3	6
8/9	13:49:48	13:52:08	3	0	3	4	0	4	4	7
9/10	13:03:08	13:05:28	6	0	6	0	0	0	3	6
10/11	12:58:28	13:00:48	2	0	2	3	0	3	3	5

Figure B-81. Queue length per lane per intersection on arterial corridor of Gainesville-Starke

Cycle No.	QueueLeng	T4	Tn	Tn-T4	Seconds	Hsat(sec	S
	Intersection 1						
	Lane 1						
1	10	12:46:54	12:47:15	0:00:21	21	4.20	857.14
2	10	12:49:26	12:49:41	0:00:15	15	2.50	1440.00
3	8	12:51:30	12:51:44	0:00:14	14	3.50	1028.57
4	10	12:53:38	12:53:59	0:00:21	21	3.50	1028.57
5	10	12:56:13	12:56:30	0:00:17	17	2.83	1270.59
6	10	12:58:37	12:58:52	0:00:15	15	2.50	1440.00
7	10	13:00:51	13:01:08	0:00:17	17	2.83	1270.59
10	9	13:12:31	13:12:44	0:00:13	13	2.60	1384.62
11	10	13:19:37	13:19:54	0:00:17	17	2.83	1270.59
14	10	13:31:20	13:31:40	0:00:20	20	3.33	1080.00
15	10	13:33:37	13:33:54	0:00:17	17	2.83	1270.59
18	9	13:40:41	13:40:59	0:00:18	18	3.60	1000.00
19	10	13:42:53	13:43:11	0:00:18	18	3.00	1200.00
20	9	13:45:18	13:45:34	0:00:16	16	3.20	1125.00
	Lane 2						
4	10	12:53:39	12:53:54	0:00:15	15	2.50	1440.00
6	10	12:58:37	12:58:54	0:00:17	17	2.83	1270.59
10	10	13:12:26	13:12:44	0:00:18	18	3.00	1200.00
11	10	13:19:36	13:19:54	0:00:18	18	3.00	1200.00
12	10	13:24:14	13:24:31	0:00:17	17	2.83	1270.59
15	10	13:33:36	13:33:54	0:00:18	18	3.00	1200.00
16	10	13:36:04	13:36:26	0:00:22	22	3.67	981.82
17	10	13:38:20	13:38:38	0:00:18	18	3.00	1200.00
	Intersection 2						
Cycle No.	Lane 1						
	QueueLeng	T4	Tn	Tn-T4	Seconds	Hsat(sec	S
1	10	12:52:29	12:52:52	0:00:23	23	3.83	939.13
4	8	13:13:26	13:13:38	0:00:12	12	3.00	1200.00
	Lane 2						
2	8	12:54:34	12:54:44	0:00:10	10	2.50	1440.00
3	8	13:06:23	13:06:33	0:00:10	10	2.50	1440.00
4	8	13:13:23	13:13:35	0:00:12	12	3.00	1200.00
	Intersection 4						
Cycle No.	Lane 1						
	QueueLeng	T4	Tn	Tn-T4	Seconds	Hsat(sec	S
1	10	13:02:18	13:02:36	0:00:18	18	3.00	1200.00
2	8	13:18:33	13:18:51	0:00:18	18	4.50	800.00
	Lane 2						
3	8	13:51:08	13:51:17	0:00:09	9	2.25	1600.00

Figure B-82. Saturation flow rate per lane per intersection on arterial corridor of Gainesville-Starke

Cycle	Starke							
	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
1	0.80	0.88	0.89	0.59	0.20	0.12	0.11	0.41
2	0.58	0.78	0.82	0.80	0.42	0.22	0.18	0.20
3	0.50	0.73	0.84	0.89	0.50	0.27	0.16	0.11
4	0.67	0.83	0.86	0.85	0.33	0.17	0.14	0.15
5	0.52	0.87	0.84	0.67	0.48	0.13	0.16	0.33
6	0.50	0.88	0.87	0.79	0.50	0.13	0.13	0.21
7	0.64	0.87	0.82	0.83	0.36	0.13	0.18	0.17
8	0.43	0.73	0.90	0.81	0.57	0.27	0.10	0.19
9	0.33	0.86	0.89	0.67	0.67	0.14	0.11	0.33
10	0.62	0.90	0.97	0.86	0.38	0.10	0.03	0.14
Average	0.56	0.83	0.87	0.77	0.44	0.17	0.13	0.23
g/C	0.46	0.61	0.54	0.39				

Figure B-83. Stop rate per intersection on arterial corridor of Gainesville-Starke

Intersection 2-1	Intersection 3-2	Intersection 4-3
0:00:43	0:00:22	0:00:34
0:00:56	0:00:00	0:00:14
0:01:19	0:00:08	0:00:55
0:00:39	0:00:21	0:00:38
0:00:42	0:00:14	0:00:51
0:01:00	0:00:15	0:00:38
0:01:37	0:00:01	0:00:11
0:00:38	0:02:46	0:00:09
0:00:43	0:00:23	0:00:17

Figure B-84. Signal offset between intersections on arterial corridor of Gainesville-Starke

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles)	time(min)	speed (miles/hr)
Vehicle no	start(int 1)	end(int 4)	start	end			
1			12:39:24	12:41:50	1.1	2.43	27.12
2	12:39:32	12:41:50			1.1	2.30	28.70
3	12:39:33	12:43:31			1.1	3.97	16.64
4	12:39:35	12:41:41			1.1	2.10	31.43
5	12:39:38	12:41:42			1.1	2.07	31.94
6	12:39:45	12:41:33			1.1	1.80	36.67
7	12:39:46	12:41:39			1.1	1.88	35.04
8	12:39:46	12:41:53			1.1	2.12	31.18
9			12:39:48	12:41:43	1.1	1.92	34.43
10	12:39:51	12:41:46			1.1	1.92	34.43
11	12:39:51	12:42:05			1.1	2.23	29.55
12			12:39:52	12:41:57	1.1	2.08	31.68
13			12:39:56	12:41:58	1.1	2.03	32.46
14	12:39:57	12:43:37			1.1	3.67	18.00
15	12:39:59	12:43:43			1.1	3.73	17.68
16	12:43:41	12:45:42			1.1	2.02	32.73
17	12:43:16	12:45:52			1.1	2.60	25.38
18	12:43:17	12:45:37			1.1	2.33	28.29
19	12:43:18	12:45:37			1.1	2.32	28.49
20	12:43:19	12:45:42			1.1	2.38	27.69
21	12:43:22	12:45:42			1.1	2.33	28.29
22	12:43:24	12:45:49			1.1	2.42	27.31
23	12:43:25	12:45:58			1.1	2.55	25.88
24	12:43:26	12:45:47			1.1	2.35	28.09
25	12:43:31	12:45:49			1.1	2.30	28.70
26	12:43:34	12:45:51			1.1	2.28	28.91
27	12:43:36	12:45:55			1.1	2.32	28.49
28	12:43:49	12:45:50			1.1	2.02	32.73
29			12:43:50	12:46:00	1.1	2.17	30.46
30	12:44:00	12:45:56			1.1	1.93	34.14
31			12:47:14	12:49:21	1.1	2.12	31.18
32	12:47:17	12:49:20			1.1	2.05	32.20
33	12:47:20	12:49:19			1.1	1.98	33.28
34	12:47:21	12:49:22			1.1	2.02	32.73
35	12:47:23	12:49:54			1.1	2.52	26.23
36	12:47:23	12:49:14			1.1	1.85	35.68

Figure B-85. Average speed per vehicle on arterial corridor of Jacksonville Part 1

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles)	time(min)	speed (miles/hr)
Vehicle no.	start(int 1)	end(int 4)	start	end			
37	12:47:25	12:49:20			1.1	1.92	34.43
38	12:47:28	12:49:17			1.1	1.82	36.33
39	12:47:33	12:49:27			1.1	1.90	34.74
40	12:47:34	12:49:25			1.1	1.85	35.68
41	12:47:36	12:49:25			1.1	1.82	36.33
42			12:47:37	12:49:32	1.1	1.92	34.43
43	12:47:40	12:49:30			1.1	1.83	36.00
44	12:47:43	12:49:36			1.1	1.88	35.04
45	12:47:51	12:49:26			1.1	1.58	41.68
46	12:47:51	12:49:36			1.1	1.75	37.71
47	12:47:53	12:49:33			1.1	1.67	39.60
48	12:48:02	12:49:49			1.1	1.78	37.01
49	12:48:04	12:49:50			1.1	1.77	37.36
50	12:48:04	12:49:52			1.1	1.80	36.67
51	12:51:26	12:53:30			1.1	2.07	31.94
52	12:51:26	12:53:44			1.1	2.30	28.70
53	12:51:32	12:53:46			1.1	2.23	29.55
54	12:51:36	12:53:45			1.1	2.15	30.70
55	12:51:38	12:53:34			1.1	1.93	34.14
56	12:51:40	12:53:43			1.1	2.05	32.20
57			12:51:42	12:53:53	1.1	2.18	30.23
58			12:51:43	12:54:08	1.1	2.42	27.31
59			12:51:49	12:54:27	1.1	2.63	25.06
60	12:51:54	12:53:51			1.1	1.95	33.85
61	12:51:56	12:53:55			1.1	1.98	33.28
62	12:52:04	12:53:54			1.1	1.83	36.00
63			12:55:24	12:58:01	1.1	2.62	25.22
64	12:55:25	12:57:56			1.1	2.52	26.23
65	12:55:29	12:57:56			1.1	2.45	26.94
66			12:55:31	12:58:06	1.1	2.58	25.55
67			12:55:35	12:58:09	1.1	2.57	25.71
68	12:55:37	12:57:59			1.1	2.37	27.89
69	12:55:42	12:57:54			1.1	2.20	30.00
70	12:55:42	12:58:05			1.1	2.38	27.69
71	12:55:44	12:58:21			1.1	2.62	25.22
72	12:55:46	12:58:09			1.1	2.38	27.69

Figure B-86. Average speed per vehicle on arterial corridor of Jacksonville Part 2

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles)	time(min)	speed (miles/hr)
Vehicle no.	start(int 1)	end(int 4)	start	end			
73	12:55:47	12:58:04			1.1	2.28	28.91
74	12:55:49	12:58:02			1.1	2.22	29.77
75			12:55:52	12:58:30	1.1	2.63	25.06
76	12:55:57	12:58:15			1.1	2.30	28.70
77			12:56:00	12:58:30	1.1	2.50	26.40
78	12:56:03	12:58:13			1.1	2.17	30.46
79	12:59:23	13:02:04			1.1	2.68	24.60
80	12:59:21	13:02:00			1.1	2.65	24.91
81	12:59:25	13:01:49			1.1	2.40	27.50
82	12:59:27	13:01:46			1.1	2.32	28.49
83	12:59:30	13:01:50			1.1	2.33	28.29
84	12:59:31	13:01:47			1.1	2.27	29.12
85	12:59:32	13:01:50			1.1	2.30	28.70
86	12:59:32	13:01:52			1.1	2.33	28.29
87	12:59:37	13:01:54			1.1	2.28	28.91
88			12:59:39	13:01:54	1.1	2.25	29.33
89	12:59:45	13:01:55			1.1	2.17	30.46
90	12:59:45	13:02:03			1.1	2.30	28.70
91	13:03:31	13:05:43			1.1	2.20	30.00
92	13:03:35	13:05:45			1.1	2.17	30.46
93	13:03:38	13:05:43			1.1	2.08	31.68
94	13:03:39	13:05:47			1.1	2.13	30.94
95			13:03:44	13:05:50	1.1	2.10	31.43
96			13:03:44	13:05:58	1.1	2.23	29.55
97			13:03:46	13:05:48	1.1	2.03	32.46
98			13:03:48	13:06:03	1.1	2.25	29.33
99	13:03:51	13:06:06			1.1	2.25	29.33
100	13:07:27	13:10:05			1.1	2.63	25.06
101	13:07:30	13:09:36			1.1	2.10	31.43
102	13:07:35	13:09:37			1.1	2.03	32.46
103			13:07:39	13:09:53	1.1	2.23	29.55
104	13:07:49	13:09:40			1.1	1.85	35.68
105			13:07:53	13:09:56	1.1	2.05	32.20
106	13:07:56	13:09:51			1.1	1.92	34.43
107	13:07:57	13:09:59			1.1	2.03	32.46
108	13:07:59	13:10:02			1.1	2.05	32.20

Figure B-87. Average speed per vehicle on arterial corridor of Jacksonville Part 3

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles)	time(min)	speed (miles/hr)
Vehicle no.	start(int 1)	end(int 4)	start	end			
109			13:08:02	13:09:47	1.1	1.75	37.71
110	13:11:07	13:14:03			1.1	2.93	22.50
111	13:11:10	13:13:54			1.1	2.73	24.15
112	13:11:11	13:13:57			1.1	2.77	23.86
113	13:11:13	13:13:43			1.1	2.50	26.40
114	13:11:14	13:13:45			1.1	2.52	26.23
115	13:11:18	13:13:55			1.1	2.62	25.22
116	13:11:21	13:13:52			1.1	2.52	26.23
117	13:11:27	13:13:52			1.1	2.42	27.31
118	13:11:23	13:13:59			1.1	2.60	25.38
119	13:11:26	13:13:50			1.1	2.40	27.50
120			13:11:27	13:14:01	1.1	2.57	25.71
121	13:11:34	13:13:46			1.1	2.20	30.00
122	13:11:37	13:13:58			1.1	2.35	28.09
123	13:11:55	13:14:01			1.1	2.10	31.43
124	13:12:01	13:14:08			1.1	2.12	31.18
125	13:12:03	13:14:09			1.1	2.10	31.43
126	13:11:27	13:14:03			1.1	2.60	25.38
127	13:15:25	13:17:29			1.1	2.07	31.94
128	13:15:28	13:17:26			1.1	1.97	33.56
129	13:15:30	13:17:33			1.1	2.05	32.20
130			13:15:31	13:17:41	1.1	2.17	30.46
131	13:15:33	13:17:37			1.1	2.07	31.94
132			13:15:39	13:17:36	1.1	1.95	33.85
133	13:15:41	13:17:34			1.1	1.88	35.04
134	13:15:42	13:17:36			1.1	1.90	34.74
135	13:15:43	13:17:44			1.1	2.02	32.73
136	13:15:44	13:17:37			1.1	1.88	35.04
137	13:15:44	13:17:44			1.1	2.00	33.00
138	13:15:51	13:17:56			1.1	2.08	31.68
139	13:15:51	13:17:46			1.1	1.92	34.43
140	13:15:56	13:17:56			1.1	2.00	33.00
141	13:19:07	13:21:38			1.1	2.52	26.23
142	13:19:07	13:21:39			1.1	2.53	26.05
143	13:19:10	13:21:29			1.1	2.32	28.49
144	13:19:11	13:21:37			1.1	2.43	27.12

Figure B-88. Average speed per vehicle on arterial corridor of Jacksonville Part 4

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles)	time(min)	speed (miles/hr)
Vehicle no.	start(int 1)	end(int 4)	start	end			
145	13:19:14	13:21:41			1.1	2.45	26.94
146	13:19:15	13:21:43			1.1	2.47	26.76
147	13:19:20	13:21:45			1.1	2.42	27.31
148	13:19:22	13:21:34			1.1	2.20	30.00
149	13:19:27	13:21:36			1.1	2.15	30.70
150	13:19:55	13:21:47			1.1	1.87	35.36
151			13:23:27	13:26:01	1.1	2.57	25.71
152			13:23:27	13:25:25	1.1	1.97	33.56
153	13:23:30	13:26:31			1.1	3.02	21.88
154	13:23:32	13:25:29			1.1	1.95	33.85
155	13:23:36	13:26:23			1.1	2.78	23.71
156	13:23:37	13:25:26			1.1	1.82	36.33
157			13:23:41	13:25:29	1.1	1.80	36.67
158	13:23:44	13:25:33			1.1	1.82	36.33
159	13:23:45	13:25:47			1.1	2.03	32.46
160	13:23:48	13:25:41			1.1	1.88	35.04
161	13:23:50	13:25:50			1.1	2.00	33.00
162	13:23:52	13:26:09			1.1	2.28	28.91
163	13:23:53	13:25:59			1.1	2.10	31.43
164	13:23:54	13:26:14			1.1	2.33	28.29
165	13:23:54	13:26:14			1.1	2.33	28.29
166	13:23:58	13:27:53			1.1	3.92	16.85
167			13:23:59	13:27:46	1.1	3.78	17.44
168	13:27:20	13:29:45			1.1	2.42	27.31
169	13:27:21	13:29:20			1.1	1.98	33.28
170	13:27:23	13:29:53			1.1	2.50	26.40
171	13:27:23	13:29:55			1.1	2.53	26.05
172	13:27:24	13:29:54			1.1	2.50	26.40
173	13:27:25	13:29:46			1.1	2.35	28.09
174	13:27:27	13:29:51			1.1	2.40	27.50
175	13:27:28	13:29:58			1.1	2.50	26.40
176	13:27:30	13:30:00			1.1	2.50	26.40
177	13:27:31	13:29:50			1.1	2.32	28.49
178	13:27:34	13:29:52			1.1	2.30	28.70
179			13:27:34	13:30:06	1.1	2.53	26.05
180			13:27:49	13:30:12	1.1	2.38	27.69

Figure B-89. Average speed per vehicle on arterial corridor of Jacksonville Part 5

	Arterial Corridor						
	Non-trucks		Trucks		distance(miles)	time(min)	speed (miles/hr)
Vehicle no.	start(int 1)	end(int 4)	start	end			
181			13:27:59	13:30:10	1.1	2.18	30.23
182			13:31:07	13:33:20	1.1	2.22	29.77
183	13:31:07	13:33:20			1.1	2.22	29.77
184	13:31:13	13:33:19			1.1	2.10	31.43
185	13:31:13	13:33:17			1.1	2.07	31.94
186	13:31:17	13:33:27			1.1	2.17	30.46
187	13:31:46	13:33:21			1.1	1.58	41.68
188	13:31:48	13:33:28			1.1	1.67	39.60
189	13:31:48	13:33:33			1.1	1.75	37.71
190	13:31:51	13:33:34			1.1	1.72	38.45
191	13:31:52	13:33:32			1.1	1.67	39.60
192			13:31:52	13:33:33	1.1	1.68	39.21
193	13:31:55	13:33:36			1.1	1.68	39.21
194	13:31:57	13:33:39			1.1	1.70	38.82
195	13:32:00	13:33:46			1.1	1.77	37.36
196	13:35:10	13:37:46			1.1	2.60	25.38
197	13:35:10	13:37:43			1.1	2.55	25.88
198	13:35:13	13:37:49			1.1	2.60	25.38
199	13:35:15	13:37:44			1.1	2.48	26.58
200	13:35:16	13:37:45			1.1	2.48	26.58
201	13:35:16	13:37:48			1.1	2.53	26.05
202	13:35:27	13:37:52			1.1	2.42	27.31
203	13:35:37	13:37:42			1.1	2.08	31.68
204	13:35:54	13:37:49			1.1	1.92	34.43

Figure B-90. Average speed per vehicle on arterial corridor of Jacksonville Part 6

				Intersection 1								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	Delay
1/2	12:39:59	12:42:00	1	12:40:21	12:41:12							0:00:51
			2					12:40:28	12:41:21			0:00:53
			3	12:40:29	12:41:15							0:00:46
			4	12:40:31	12:41:15							0:00:44
			5	12:40:33	12:41:16							0:00:43
			6					12:40:33	12:41:15			0:00:42
			7	12:40:44	12:41:16							0:00:32
			8	12:41:05	12:41:19							0:00:14
			9					12:41:01	12:41:16			0:00:15
			10					12:41:09	12:41:18			0:00:09
2/3	12:46:00	12:48:00	1	12:46:10	12:47:14							0:01:04
			2	12:46:33	12:47:18							0:00:45
			3	12:46:09	12:47:19							0:01:10
3/4	12:52:00	12:54:00	1	12:52:12	12:52:52							0:00:40
			2	12:52:31	12:52:55							0:00:24
			3	12:52:44	12:52:58							0:00:14
4/5	12:58:00	12:13:00	1	12:58:12	12:59:22							0:01:10
			2					12:58:12	12:59:21			0:01:09
			3	12:58:13	12:59:23							0:01:10
			4					12:58:15	12:59:22			0:01:07
			5	12:58:16	12:59:24							0:01:08
			6	12:58:17	12:59:27							0:01:10
			7					12:58:19	12:59:24			0:01:05
			8					12:58:21	12:59:27			0:01:06
			9	12:58:25	12:59:28							0:01:03

Figure B-91. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 1

				Intersection 1								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			10	12:58:25	12:59:29							0:01:04
			11	12:58:32	12:59:32							0:01:00
			12					12:58:34	12:59:29			0:00:55
			13					12:58:36	12:59:31			0:00:55
			14	12:58:41	12:59:33							0:00:52
			15	12:58:41	12:59:33							0:00:52
			16	12:58:52	12:59:34							0:00:42
			17	12:59:04	12:59:35							0:00:31
			18					12:59:09	12:59:33			0:00:24
5/6	13:04:00	13:06:00	1	13:04:15	13:05:12							0:00:57
			2					13:04:15	13:05:12			0:00:57
			3	13:04:18	13:05:15							0:00:57
			4	13:04:36	13:05:16							0:00:40
			5	13:04:37	13:05:17							0:00:40
			6	13:04:37	13:05:18							0:00:41
			7	13:04:37	13:05:19							0:00:42
			8					13:04:42	13:05:16			0:00:34
			9	13:04:47	13:05:20							0:00:33
			10	13:04:54	13:05:21							0:00:27
			11					13:04:59	13:05:17			0:00:18
			12					13:05:08	13:05:18			0:00:10
			13					13:05:08	13:05:19			0:00:11
6/7	13:10:00	13:12:00	1	13:10:28	13:11:06							0:00:38
			2					13:10:28	13:11:06			0:00:38
			3	13:10:32	13:11:09							0:00:37

Figure B-92. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 2

				Intersection 1								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			4	13:10:36	13:11:11							0:00:35
			5					13:10:37	13:11:09			0:00:32
			6	13:10:38	13:11:12							0:00:34
			7	13:10:47	13:11:14							0:00:27
			8					13:10:49	13:11:09			0:00:20
			9	13:10:58	13:11:15							0:00:17
7/8	13:16:00	13:18:00	1	13:16:19	13:17:13							0:00:54
			2					13:16:17	13:17:13			0:00:56
			3	13:16:21	13:17:15							0:00:54
			4					13:16:22	13:17:15			0:00:53
			5	13:16:26	13:17:17							0:00:51
			6					13:16:27	13:17:16			0:00:49
			7	13:16:29	13:17:18							0:00:49
			8	13:16:43	13:17:18							0:00:35
			9	13:16:51	13:17:20							0:00:29
			10					13:16:53	13:17:18			0:00:25
			11	13:16:59	13:17:22							0:00:23
			12					13:17:01	13:17:19			0:00:18
8/9	13:22:00	13:24:00	1	13:22:13	13:23:27							0:01:14
			2	13:22:15	13:23:29							0:01:14
			3	13:22:17	13:23:32							0:01:15
			4	13:22:24	13:23:33							0:01:09
			5	13:22:26	13:23:34							0:01:08
			6	13:22:29	13:23:34							0:01:05
			7	13:22:31	13:23:37							0:01:06

Figure B-93. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 3

				Intersection 1								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			8	13:22:32	13:23:37							0:01:05
			9	13:22:33	13:23:39							0:01:06
			10	13:23:05	13:23:40							0:00:35
			11	13:23:26	13:23:40							0:00:14
9/10	13:28:00	13:30:00	1	13:28:15	13:29:13							0:00:58
			2	13:28:18	13:29:15							0:00:57
			3	13:28:33	13:29:15							0:00:42
			4	13:28:34	13:29:17							0:00:43
			5	13:28:35	13:29:21							0:00:46
			6					13:28:37	13:29:14			0:00:37
			7	13:28:40	13:29:22							0:00:42
			8	13:28:41	13:29:24							0:00:43
			9					13:28:44	13:29:15			0:00:31
			10					13:29:07	13:29:15			0:00:08
			11					13:29:12	13:29:16			0:00:04
10/11	13:34:01	13:36:01	1					13:34:28	13:35:10			0:00:42
			2	13:34:25	13:35:10							0:00:45
			3	13:34:35	13:35:11							0:00:36
			4					13:34:44	13:35:11			0:00:27
			5	13:35:05	13:35:11							0:00:06
			6	13:35:07	13:35:12							0:00:05

Figure B-94. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 4

				Intersection 2								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
1/2	12:41:03	12:43:05	1	12:41:05	12:42:14							0:01:09
			2	12:41:06	12:42:16							0:01:10
			3	12:41:08	12:42:17							0:01:09
			4	12:41:08	12:42:18							0:01:10
			5	12:41:12	12:42:20							0:01:08
			6	12:41:27	12:42:23							0:00:56
			7	12:41:42	12:42:25							0:00:43
			8	12:42:12	12:42:26							0:00:14
			9	12:42:15	12:42:29							0:00:14
			10	12:42:23	12:42:29							0:00:06
2/3	12:51:04	12:53:09	1	12:51:13	12:52:19							0:01:06
			2	12:51:21	12:52:20							0:00:59
			3					12:51:36	12:52:20			0:00:44
			4	12:51:39	12:52:22							0:00:43
			5	12:51:42	12:52:24							0:00:42
			6					12:51:43	12:52:20			0:00:37
3/4	13:03:03	13:05:04	1	13:03:07	13:03:49							0:00:42
			2	13:03:16	13:03:52							0:00:36
			3	13:03:36	13:03:53							0:00:17
			4	13:03:36	13:03:55							0:00:19
			5	13:03:46	13:03:56							0:00:10
			6	13:03:51	13:03:56							0:00:05
4/5	13:09:04	13:11:04	1					13:09:10	13:10:04			0:00:54
			2	13:09:43	13:10:03							0:00:20
			3					13:09:46	13:10:05			0:00:19

Figure B-95. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 5

				Intersection 2								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			4	13:09:49	13:10:05							0:00:16
			5					13:09:50	13:10:07			0:00:17
			6	13:09:53	13:10:08							0:00:15
			7					13:09:55	13:10:08			0:00:13
			8	13:10:01	13:10:11							0:00:10
5/6	13:25:08	13:27:05	1	13:25:33	13:26:10							0:00:37
			2					13:25:38	13:26:08			0:00:30
			3					13:25:41	13:26:10			0:00:29
			4					13:25:44	13:26:11			0:00:27
			5	13:25:52	13:26:12							0:00:20
			6	13:25:52	13:26:14							0:00:22
			7	13:25:56	13:26:15							0:00:19
			8	13:26:02	13:26:16							0:00:14
			9					13:26:03	13:26:13			0:00:10
			10	13:26:05	13:26:18							0:00:13
			11					13:26:05	13:26:15			0:00:10
			12	13:26:08	13:26:19							0:00:11
			13					13:26:08	13:26:17			0:00:09
			14	13:26:14	13:26:21							0:00:07
6/7	13:33:05	13:35:05	1	13:33:18	13:34:03							0:00:45
			2					13:33:26	13:34:03			0:00:37
			3	13:33:31	13:34:04							0:00:33
			4	13:33:32	13:34:05							0:00:33
			5					13:33:39	13:34:04			0:00:25
			6	13:33:52	13:34:07							0:00:15

Figure B-96. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 6

				Intersection 2								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			7					13:33:56	13:34:05			0:00:09
			8	13:33:57	13:34:09							0:00:12
			9					13:34:03	13:34:06			0:00:03
			10					13:34:04	13:34:07			0:00:03
7/8	13:39:09	13:41:13	1	13:39:27	13:40:23							0:00:56
			2	13:39:35	13:40:24							0:00:49
			3	13:39:40	13:40:26							0:00:46
			4	13:39:51	13:40:30							0:00:39
			5	13:40:04	13:40:31							0:00:27
			6	13:40:06	13:40:32							0:00:26
			7	13:40:10	13:40:33							0:00:23
			8	13:40:18	13:40:34							0:00:16
			9	13:40:20	13:40:35							0:00:15
8/9	12:43:05	12:45:09	1	12:43:12	12:44:19							0:01:07
			2					12:44:06	12:44:19			0:00:13
			3	12:44:09	12:44:20							0:00:11
			4	12:44:11	12:44:21							0:00:10
			5					12:44:11	12:44:20			0:00:09
			6	12:44:12	12:44:23							0:00:11
			7					12:44:13	12:44:22			0:00:09
			8					12:44:14	12:44:23			0:00:09
			9	12:44:15	12:44:25							0:00:10
			10	12:44:16	12:44:26							0:00:10
			11					12:44:17	12:44:24			0:00:07
			12	12:44:18	12:44:27							0:00:09

Figure B-97. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 7

				Intersection 2								
				Outer Lane				Inner Lane				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			13					12:44:19	12:44:26			0:00:07
			14	12:44:20	12:44:28							0:00:08
			15					12:44:20	12:44:27			0:00:07
9/10	13:19:04	13:21:06	1	13:19:30	13:20:02							0:00:32
			2	13:19:34	13:20:03							0:00:29
			3					13:19:45	13:20:01			0:00:16
			4					13:19:51	13:20:03			0:00:12
			5					13:19:56	13:20:04			0:00:08
			6	13:19:59	13:20:05							0:00:06
			7	13:20:01	13:20:06							0:00:05
			8					13:20:03	13:20:05			0:00:02
			9	13:20:04	13:20:08							0:00:04
			10	13:20:06	13:20:09							0:00:03
												0:00:00
10/11	12:53:09	12:55:04	1	12:53:18	12:53:54							0:00:36
			2					12:53:28	12:53:54			0:00:26
			3					12:53:30	12:53:55			0:00:25
			4	12:53:33	12:53:55							0:00:22
			5	12:53:45	12:53:56							0:00:11
			6					12:53:45	12:53:56			0:00:11
			7					12:53:47	12:53:57			0:00:10
			8					12:53:48	12:53:59			0:00:11
			9					12:53:52	12:54:01			0:00:09
			10	12:53:54	12:54:04							0:00:10

Figure B-98. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 8

				Intersection 3												
				Outer Lane				Inner Lane1				Inner Lane2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	stops	starts	stops	starts	Delay
1/2	12:40:15	12:42:18	1									12:41:02	12:41:05			0:00:03
			2									12:41:03	12:41:07			0:00:04
			3									12:41:05	12:41:08			0:00:03
2/3	12:46:15	12:50:15	1					12:46:38	12:47:19							0:00:41
			2									12:46:38	12:47:20			0:00:42
			3					12:46:47	12:47:21							0:00:34
			4					12:46:52	12:47:22							0:00:30
			5									12:47:00	12:47:21			0:00:21
			6									12:47:03	12:47:22			0:00:19
			7									12:47:04	12:47:26			0:00:22
			8	12:47:07	12:47:19											0:00:12
			9									12:47:07	12:47:27			0:00:20
			10	12:47:12	12:47:21											0:00:09
			11					12:47:12	12:47:26							0:00:14
			12					12:47:12	12:47:27							0:00:15
			13					12:47:17	12:47:28							0:00:11
			14					12:47:17	12:47:28							0:00:11
			15					12:47:17	12:47:28							0:00:11
3/4	12:56:16	12:58:21	1	12:57:04	12:57:34											0:00:30
			2	12:57:15	12:57:36											0:00:21
			3	12:57:16	12:57:37											0:00:21
			4									12:57:16	12:57:34			0:00:18
			5									12:57:18	12:57:35			0:00:17
			6									12:57:20	12:57:37			0:00:17
			7					12:57:22	12:57:35							0:00:13

Figure B-99. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 9

				Intersection 3												
				Outer Lane				Inner Lane1				Inner Lane2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			8									12:57:24	12:57:36			0:00:12
			9	12:57:32	12:57:39											0:00:07
			10	12:57:32	12:57:39											0:00:07
			11	12:57:34	12:57:40											0:00:06
			12					12:57:34	12:57:37							0:00:03
4/5	13:04:16	13:06:19	1					13:04:38	13:05:07							0:00:29
			2					13:04:52	13:05:07							0:00:15
			3	13:04:55	13:05:06											0:00:11
			4	13:04:58	13:05:10											0:00:12
			5	13:05:00	13:05:12											0:00:12
			6	13:05:01	13:05:13											0:00:12
			7									13:05:04	13:05:06			0:00:02
5/6	13:10:19	13:12:16	1					13:10:28	13:11:20							0:00:52
			2					13:10:31	13:11:21							0:00:50
			3	13:11:02	13:11:19											0:00:17
			4									13:11:02	13:11:20			0:00:18
			5									13:11:08	13:11:22			0:00:14
			6					13:11:13	13:11:23							0:00:10
			7									13:11:14	13:11:24			0:00:10
			8	13:11:14	13:11:23											0:00:09
			9	13:11:15	13:11:24											0:00:09
			10	13:11:15	13:11:27											0:00:12
			11	13:11:16	13:11:21											0:00:05
			12									13:11:16	13:11:25			0:00:09
			13									13:11:16	13:11:25			0:00:09

Figure B-100. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 10

				Intersection 3												
				Outer Lane				Inner Lane1				Inner Lane2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	stops	starts	stops	starts	Delay
6/7	13:16:16	13:18:16	1									13:16:42	13:17:06			0:00:24
			2									13:16:40	13:17:08			0:00:28
			3	13:17:00	13:17:06											0:00:06
			4					13:17:00	13:17:07							0:00:07
			5									13:17:01	13:17:09			0:00:08
			6	13:17:05	13:17:08											0:00:03
			7									13:17:05	13:17:12			0:00:07
7/8	13:22:16	13:26:16	1									13:22:47	13:22:55			0:00:08
			2									13:22:49	13:22:56			0:00:07
			3									13:22:53	13:22:57			0:00:04
			4									13:22:56	13:23:02			0:00:06
			5									13:22:56	13:23:05			0:00:09
8/9	13:30:16	13:.32:16	1					13:30:36	13:31:04							0:00:28
			2					13:30:51	13:31:06							0:00:15
			3									13:30:51	13:31:04			0:00:13
			4	13:30:55	13:31:05											0:00:10
			5	13:30:57	13:31:07											0:00:10
			6									13:30:58	13:31:06			0:00:08
			7	13:31:00	13:31:09											0:00:09
			8					13:31:00	13:31:07							0:00:07
			9									13:31:00	13:31:07			0:00:07
			10									13:31:02	13:31:08			0:00:06
			11	13:31:04	13:31:09											0:00:05
9/10	13:36:16	13:38:16	1					13:36:46	13:37:19							0:00:33
			2	13:36:58	13:37:19											0:00:21

Figure B-101. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 11

				Intersection 3												
				Outer Lane				Inner Lane1				Inner Lane2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No.	stops	starts	stops	starts	stops	starts	stops	starts	stops	starts	stops	starts	Delay
			3									13:37:02	13:37:20			0:00:18
			4	13:37:07	13:37:21											0:00:14
			5									13:37:07	13:37:22			0:00:15
			6	13:37:08	13:37:23											0:00:15
			7	13:37:08	13:37:24											0:00:16
			8					13:37:09	13:37:22							0:00:13
			9									13:37:09	13:37:23			0:00:14
			10	13:37:17	13:37:25											0:00:08
			11									13:37:17	13:37:24			0:00:07
			12									13:37:17	13:37:26			0:00:09
10/11	13:42:22	13:44:17	1	13:42:34	13:42:57											0:00:23
			2	13:42:45	13:43:00											0:00:15
			3					13:42:52	13:42:58							0:00:06

Figure B-102. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 12

				Intersection 4												
				Outer Lane				Inner Lane1				Inner Lane2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	stops	starts	stops	starts	Delay
1	12:40:05	12:42:05	1									12:40:30	12:40:52			0:00:22
2	12:46:05	12:48:05	1									12:46:18	12:46:55			0:00:37
3	12:52:05	12:54:05	1									12:52:31	12:52:42			0:00:11
			2					12:52:34	12:52:42							0:00:08
			3	12:52:35	12:52:43											0:00:08
			4	12:52:38	12:52:44											0:00:06
4	12:58:05	13:00:05	1	12:58:15	12:59:24											0:01:09
			2									12:58:15	12:59:24			0:01:09
			3	12:58:17	12:59:27											0:01:10
			4					12:58:18	12:59:26							0:01:08
			5	12:58:20	12:59:28											0:01:08
			6									12:58:20	12:59:24			0:01:04
			7	12:58:22	12:59:30											0:01:08
			8									12:58:22	12:59:24			0:01:02
			9	12:58:26	12:59:30											0:01:04
			10					12:58:31	12:59:27							0:00:56
			11									12:58:34	12:59:27			0:00:53
			12									12:58:37	12:59:32			0:00:55
			13					12:58:39	12:59:31							0:00:52
			14					12:58:41	12:59:31							0:00:50
			15					12:58:49	12:59:33							0:00:44
5	13:04:05	13:06:05	1					13:04:57	13:05:02							0:00:05
			2									13:04:58	13:05:03			0:00:05
			3					13:05:01	13:05:04							0:00:03
			4									13:05:01	13:05:04			0:00:03

Figure B-103. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 13

				Intersection 4												
				Outer Lane				Inner Lane1				Inner Lane2				
	Red			Non-trucks		Trucks		Non-trucks		Trucks		Non-trucks		Trucks		
Cycle	Start	Stop	Vehicle No	stops	starts	stops	starts	stops	starts	stops	starts	stops	starts	stops	starts	Delay
6	13:10:05	13:12:05	1	13:10:15	13:11:10											0:00:55
			2					13:10:31	13:11:09							0:00:38
			3					13:10:39	13:11:11							0:00:32
			4	13:11:01	13:11:14											0:00:13
7	13:16:06	13:18:06	0													0:00:00
8	13:22:06	13:24:06	1					13:22:40	13:22:46							0:00:06
9	13:28:06	13:30:06	1					13:28:17	13:28:42							0:00:25
			2					13:28:19	13:28:44							0:00:25
			3									13:28:21	13:28:42			0:00:21
			4					13:28:23	13:28:45							0:00:22
			5	13:28:32	13:28:42											0:00:10
			6					13:28:32	13:28:48							0:00:16
			7					13:28:32	13:28:49							0:00:17
			8									13:28:33	13:28:44			0:00:11
			9	13:28:38	13:28:44											0:00:06
10	13:34:06	13:36:06	1	13:34:24	13:34:43											0:00:19
			2									13:34:40	13:34:43			0:00:03

Figure B-104. Average delay per vehicle per red cycle on arterial corridor of Jacksonville Part 14

	Intersection 1									
	red		Lane 1			Lane 2			Average Queue Length	Total Queue length
Cycle Number	start	end	Non-Truc	Trucks	Queue-L	Non-Truc	Trucks	Queue-L		
1/2	12:39:59	12:42:00	6	0	6	4	0	4	5	10
2/3	12:46:00	12:48:00	3	0	3	0	0	0	2	3
3/4	12:52:00	12:54:00	3	0	3	0	0	0	2	3
4/5	12:58:00	12:13:00	11	0	11	7	0	7	9	18
5/6	13:04:00	13:06:00	8	0	8	5	0	5	7	13
6/7	13:10:00	13:12:00	6	0	6	3	0	3	5	9
7/8	13:16:00	13:18:00	7	0	7	5	0	5	6	12
8/9	13:22:00	13:24:00	11	0	11	0	0	0	6	11
9/10	13:28:00	13:30:00	7	0	7	4	0	4	6	11
10/11	13:34:01	13:36:01	4	0	4	2	0	2	3	6

	Intersection 2									
	red		Lane 1			Lane 2			Average Queue Length	Total Queue length
Cycle Number	start	end	Non-Truc	Trucks	Queue-L	Non-Truc	Trucks	Queue-L		
1/2	12:41:03	12:43:05	10	0	10	0	0	0	5	10
2/3	12:51:04	12:53:09	4	0	4	2	0	2	3	6
3/4	13:03:03	13:05:04	6	0	6	0	0	0	3	6
4/5	13:09:04	13:11:04	4	0	4	4	0	4	4	8
5/6	13:25:08	13:27:05	8	0	8	6	0	6	7	14
6/7	13:33:05	13:35:05	5	0	5	5	0	5	5	10
7/8	13:39:09	13:41:13	9	0	9	0	0	0	5	9
8/9	12:43:05	12:45:09	8	0	8	7	0	7	8	15
9/10	13:19:04	13:21:06	6	0	6	4	0	4	5	10
10/11	12:53:09	12:55:04	4	0	4	6	0	6	5	10

Figure B-105. Queue length per lane per intersection on arterial corridor of Jacksonville Part 1

	Intersection 3													
Cycle Num ber	red		Lane 1			Lane 2			Lane 3			Average Queue Length	Total Queue length
	start	end	Non-Trucks	Trucks	Queue-Length	Non-Trucks	Trucks	Queue-Length	Non-Trucks	Trucks	Queue-Length		
1/2	12:40:15	12:42:18	0	0	0	0	0	0	3	0	3	1	3
2/3	12:46:15	12:50:15	2	0	2	8	0	8	5	0	5	5	15
3/4	12:56:16	12:58:21	6	0	6	2	0	2	4	0	4	4	12
4/5	13:04:16	13:06:19	4	0	4	2	0	2	1	0	1	2	7
5/6	13:10:19	13:12:16	5	0	5	3	0	3	5	0	5	4	13
6/7	13:16:16	13:18:16	2	0	2	1	0	1	4	0	4	2	7
7/8	13:22:16	13:26:16	0	0	0	0	0	0	5	0	5	2	5
8/9	13:30:16	13:.32:16	4	0	4	3	0	3	4	0	4	4	11
9/10	13:36:16	13:38:16	5	0	5	2	0	2	5	0	5	4	12
10/11	13:42:22	13:44:17	2	0	2	1	0	1	0	0	0	1	3

	Intersection 4												
Cycle Num ber	red		Lane 1			Lane 2			Lane 3			Average Queue Length	Total
	start	end	Non-Trucks	Trucks	Queue-Length	Non-Trucks	Trucks	Queue-Length	Non-Trucks	Trucks	Queue-Length		
1/2	12:40:05	12:42:05	0	0	0	0	0	0	1	0	1	0	1
2/3	12:46:05	12:48:05	0	0	0	0	0	0	1	0	1	0	1
3/4	12:52:05	12:54:05	2	0	2	1	0	1	1		1	1	4
4/5	12:58:05	13:00:05	5	0	5	5	0	5	5	0	5	5	15
5/6	13:04:05	13:06:05	0	0	0	2	0	2	2	0	2	1	4
6/7	13:10:05	13:12:05	2	0	2	2	0	2	0	0	0	1	4
7/8	13:16:06	13:18:06	0	0	0	0	0	0	0	0	0	0	0
8/9	13:22:06	13:24:06	0	0	0	1	0	1	0	0	0	0	1
9/10	13:28:06	13:30:06	2	0	2	5	0	5	2	0	2	3	9
10/11	13:34:06	13:36:06	1	0	1	0	0	0	1	0	1	1	2

Figure B-106. Queue length per lane per intersection on arterial corridor of Jacksonville Part 2

Cycle No.	QueueL	T4	Tn	Tn-T4	Seconds	Hsat(sec	S
	Intersection 1						
	Lane 1						
1	8	12:55:36	12:55:46	0:00:10	10	2.50	1440
2	10	12:59:30	12:59:44	0:00:14	14	2.33	1543
3	8	13:01:19	13:01:33	0:00:14	14	3.50	1029
4	8	13:05:22	13:05:33	0:00:11	11	2.75	1309
5	9	13:07:39	13:07:53	0:00:14	14	2.80	1286
7	8	13:17:22	13:17:35	0:00:13	13	3.25	1108
	Lane 2						
3	10	13:01:13	13:01:26	0:00:13	13	2.17	1662
8	10	13:23:37	13:23:53	0:00:16	16	2.67	1350

Cycle No.	QueueL	T4	Tn	Tn-T4	Seconds	Hsat(sec	S
	Intersection 2						
	Lane 1						
1	10	12:42:24	12:42:40	0:00:16	16	2.67	1350
2	10	12:44:27	12:44:37	0:00:10	10	1.67	2160
3	8	12:58:23	12:58:30	0:00:07	7	1.75	2057
4	10	13:14:16	13:14:30	0:00:14	14	2.33	1543
5	10	13:26:21	13:26:35	0:00:14	14	2.33	1543
	Lane 2						
2	10	12:44:26	12:44:37	0:00:11	11	1.83	1964
5	10	13:26:17	13:26:38	0:00:21	21	3.50	1029
6	10	13:40:30	13:40:47	0:00:17	17	2.83	1271

Figure B-107. Saturation flow rate per lane per intersection on arterial corridor of Jacksonville Part 1

Cycle No.	QueueL	T4	Tn	Tn-T4	Seconds	Hsat(sec	S
	Intersection 3						
	Lane 1						
3	10	13:01:32	13:01:43	0:00:11	11	1.83	1964
5	8	13:13:31	13:13:39	0:00:08	8	2.00	1800
	Lane 2						
2	9	13:13:29	13:13:40	0:00:11	11	2.20	1636
5	9	13:29:32	13:29:49	0:00:17	17	3.40	1059
	Lane 3						
4	8	13:11:30	13:11:40	0:00:10	10	2.50	1440

Cycle No.	QueueL	T4	Tn	Tn-T4	Seconds	Hsat(sec	S
	Intersection 4						
	Lane 1						
4	10	13:21:32	13:21:43	0:00:11	11	1.83	1964
	Lane 2						
5	9	13:31:42	13:31:56	0:00:14	14	2.80	1286
	Lane 3						
1	9	12:49:16	12:49:26	0:00:10	10	2.00	1800
2	9	12:59:42	12:59:54	0:00:12	12	2.40	1500
3	9	13:03:33	13:03:45	0:00:12	12	2.40	1500

Figure B-108. Saturation flow rate per lane per intersection on arterial corridor of Jacksonville Part 2

	Jacksonville							
Cycle	Prop. of arriving on green				Stop rate			
	Int.1	Int.2	Int.3	Int.4	Int.1	Int.2	Int.3	Int.4
1	0.58	0.44	0.90	0.97	0.42	0.56	0.10	0.03
2	0.77	0.74	0.75	0.96	0.23	0.26	0.25	0.04
3	0.67	0.63	0.60	0.87	0.33	0.38	0.40	0.13
4	0.42	0.58	0.74	0.68	0.58	0.42	0.26	0.32
5	0.62	0.55	0.41	0.88	0.38	0.45	0.59	0.13
6	0.59	0.68	0.70	0.82	0.41	0.32	0.30	0.18
7	0.61	0.25	0.92	1.00	0.39	0.75	0.08	0.00
8	0.39	0.42	0.63	0.97	0.61	0.58	0.37	0.03
9	0.52	0.38	0.45	0.79	0.48	0.63	0.55	0.21
10	0.67	0.58	0.92	0.95	0.33	0.42	0.08	0.05
Average	0.58	0.52	0.70	0.89	0.42	0.48	0.30	0.11
g/C	0.42	0.50	0.60	0.60				

Figure B-109. Stop rate per red-to-red cycle per intersection on arterial corridor of Jacksonville

Intersection 2-1	Intersection 3-2	Intersection 4-3
0:00:38	0:00:59	0:00:07
0:00:35	0:00:35	0:00:23
0:00:53	0:00:32	0:00:10
0:01:03	0:01:44	0:00:26
0:00:21	0:02:27	0:00:04
0:01:03	0:00:43	0:00:10
0:00:36	0:01:12	0:00:18
0:00:38	0:00:45	0:00:18
0:00:30	0:00:44	0:00:23
0:00:50	0:01:11	0:00:08
0:01:10	0:01:11	0:00:42

Figure B-110. Signal offset between intersections on arterial corridor of Jacksonville

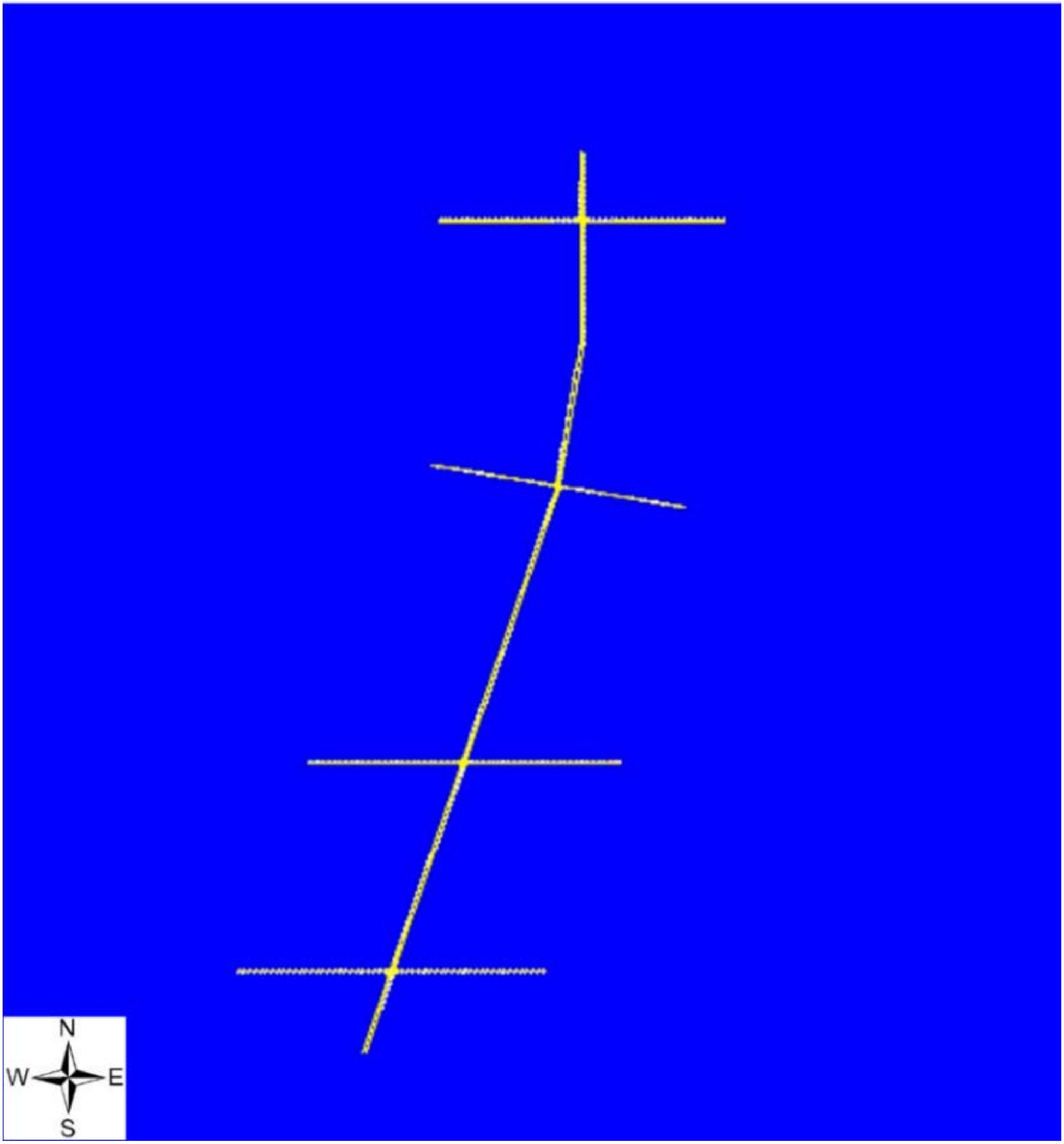


Figure B-111.Tampa arterial corridor network coded in SwashSim

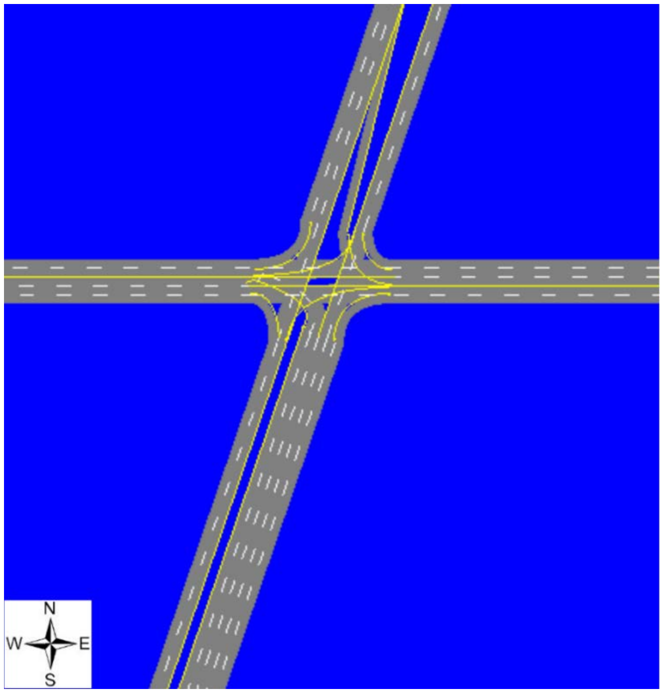


Figure B-112. Intersection of US-301 and Breckenridge Pkwy on network

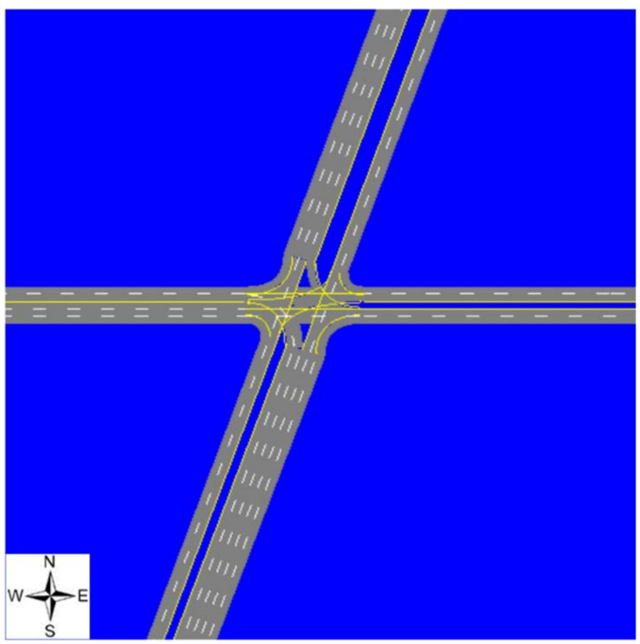


Figure B-113. Intersection of US-301 and Sligh Ave on network

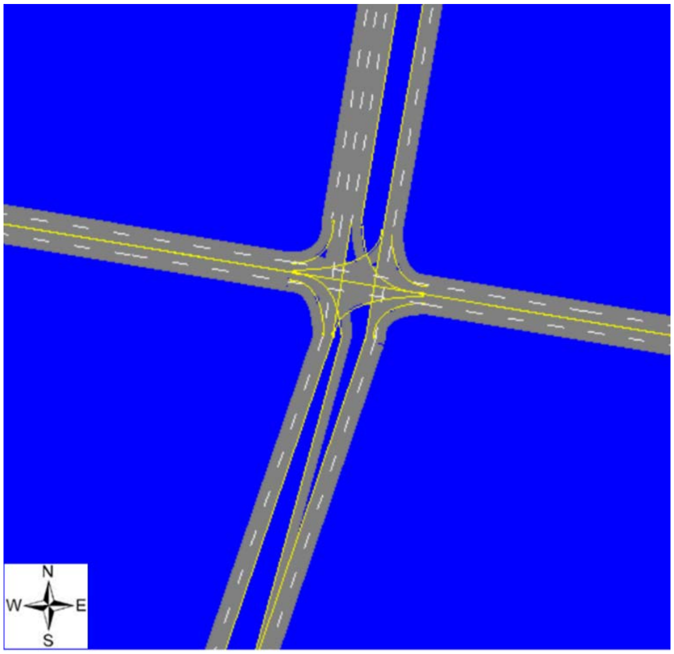


Figure B-114. Intersection of US-301 and Maislin Rd on network

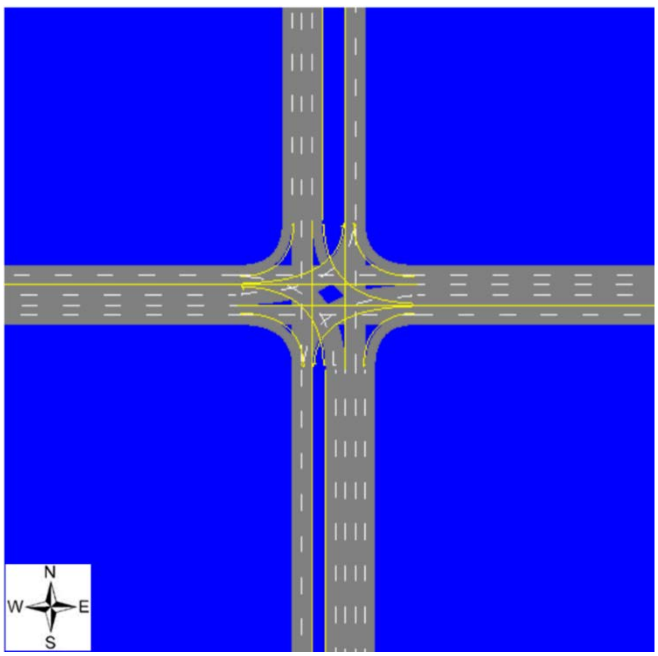


Figure B-115. Intersection of US-301 and Harney Rd on network

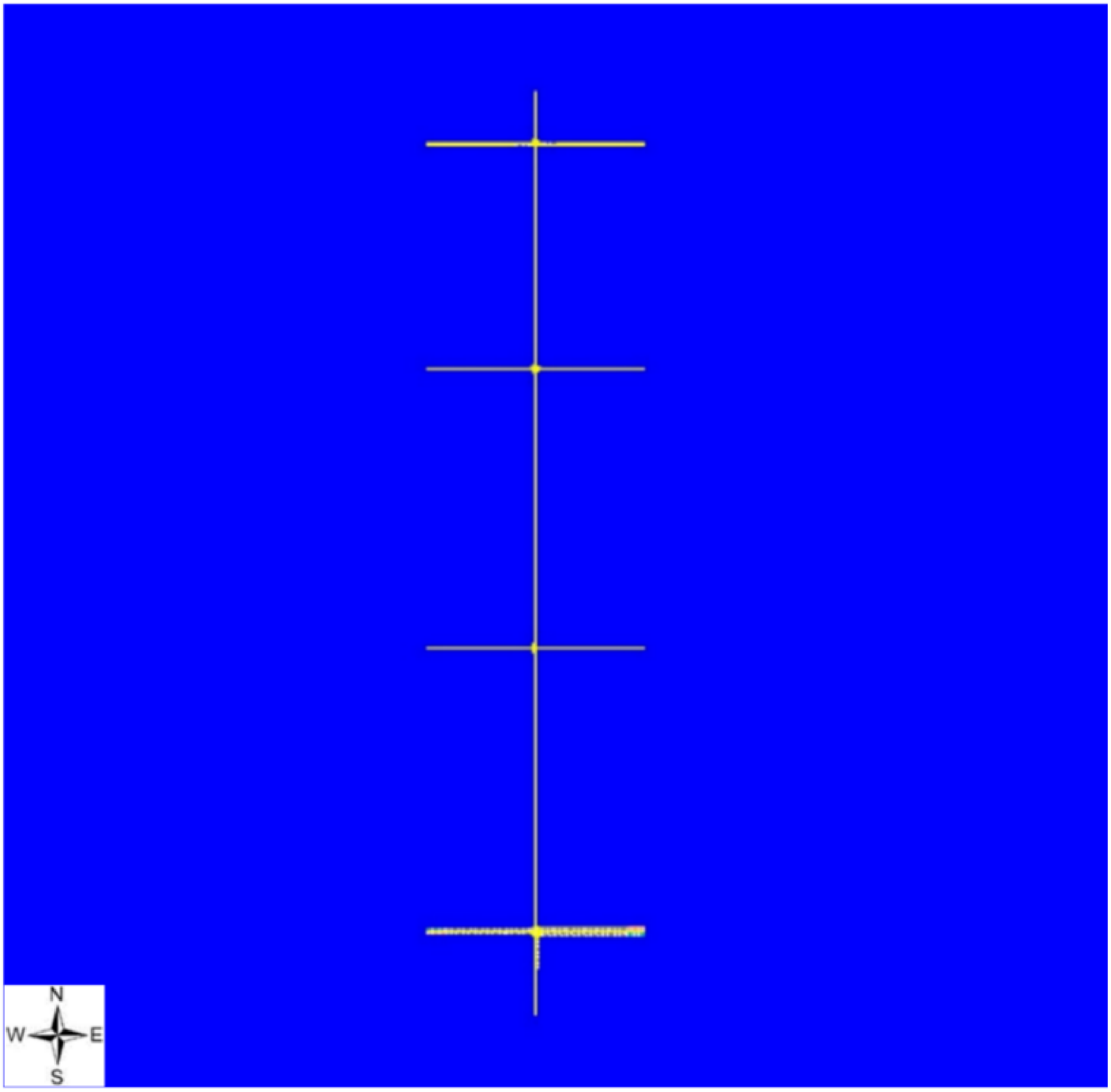


Figure B-116. Miami arterial corridor network coded in SwashSim

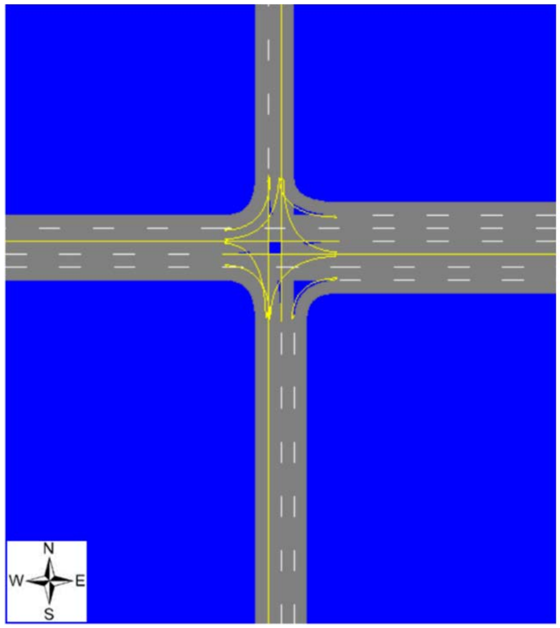


Figure B-117. Intersection of Krome Ave and Palm Dr on network

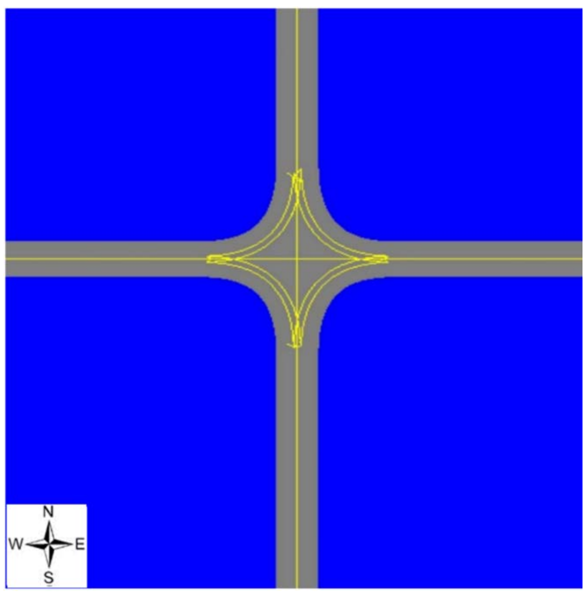


Figure B-118. Intersection of Krome Ave and David Pkwy on network

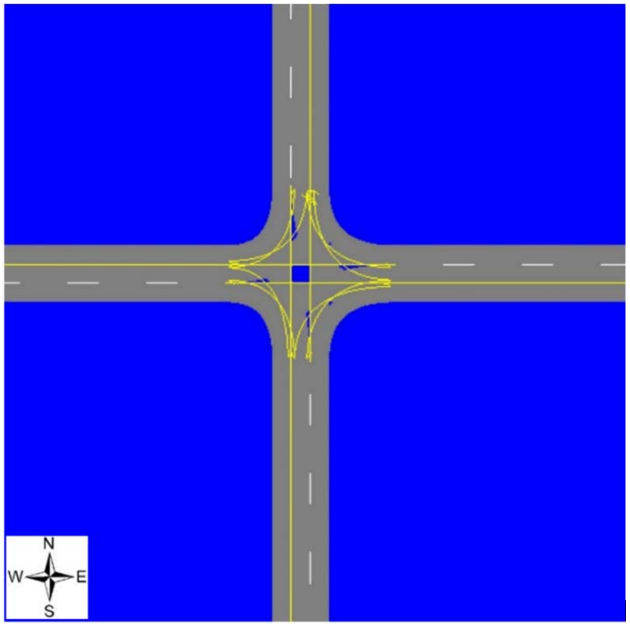


Figure B-119. Intersection of Krome Ave and Palm Dr on network

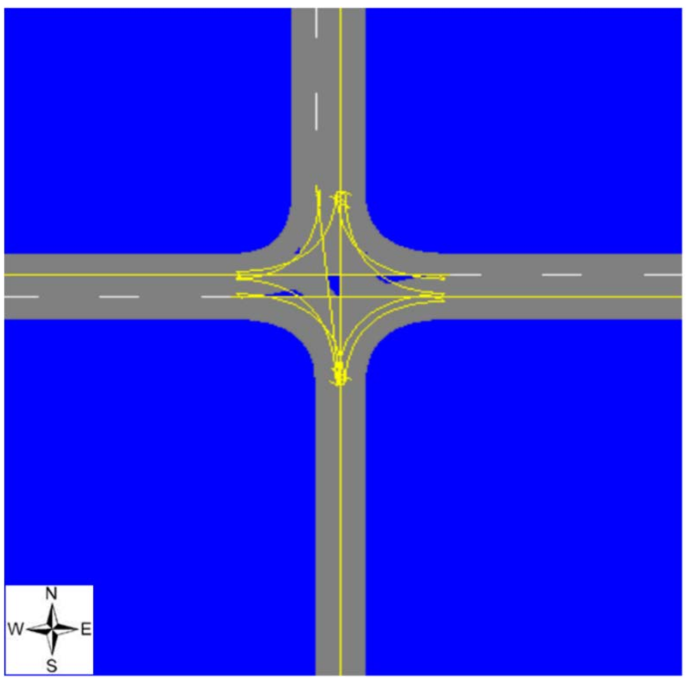


Figure B-120. Intersection of Krome Ave and Palm Dr on network

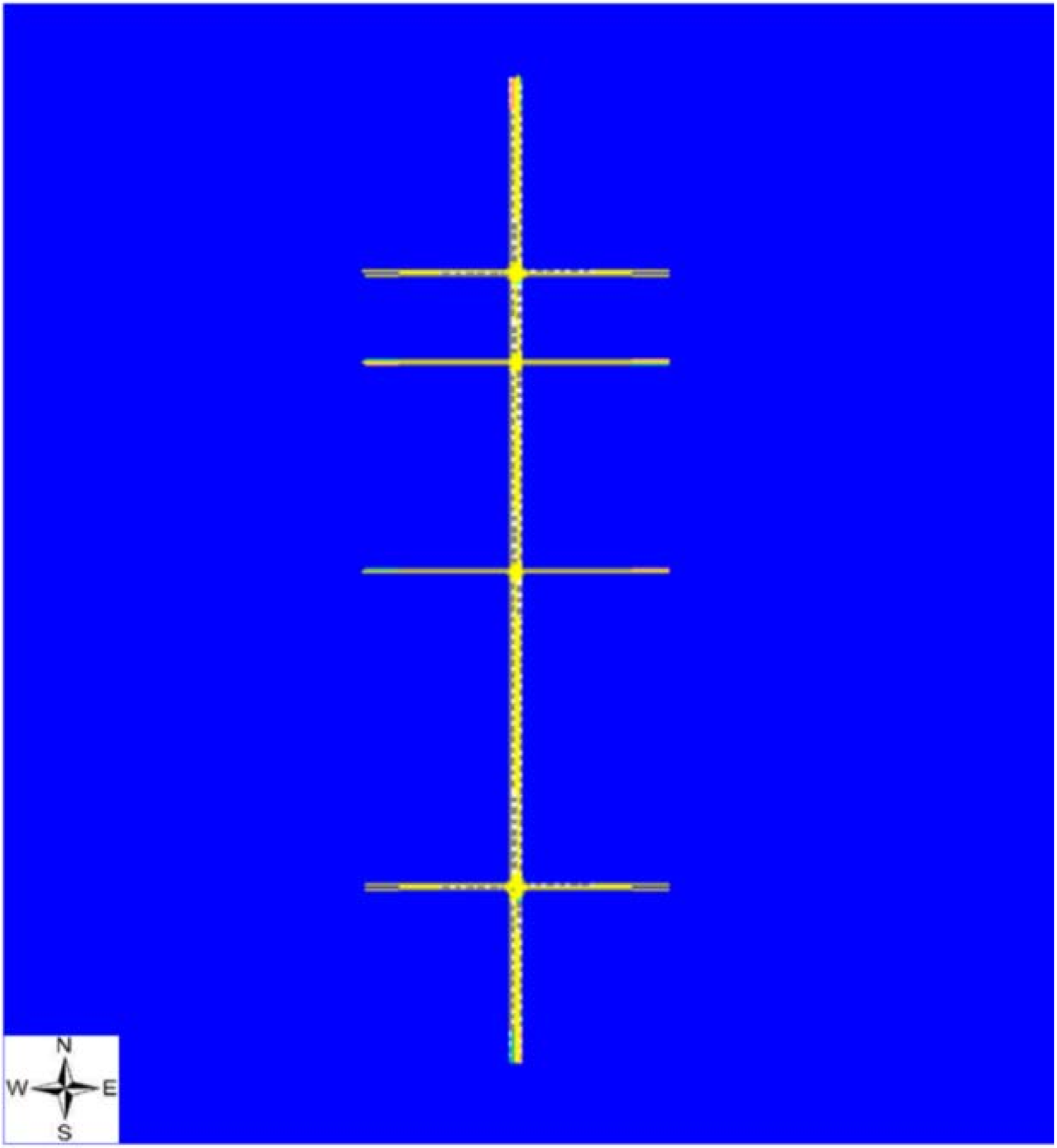


Figure B-121. Gainesville-Starke arterial corridor network coded in SwashSim

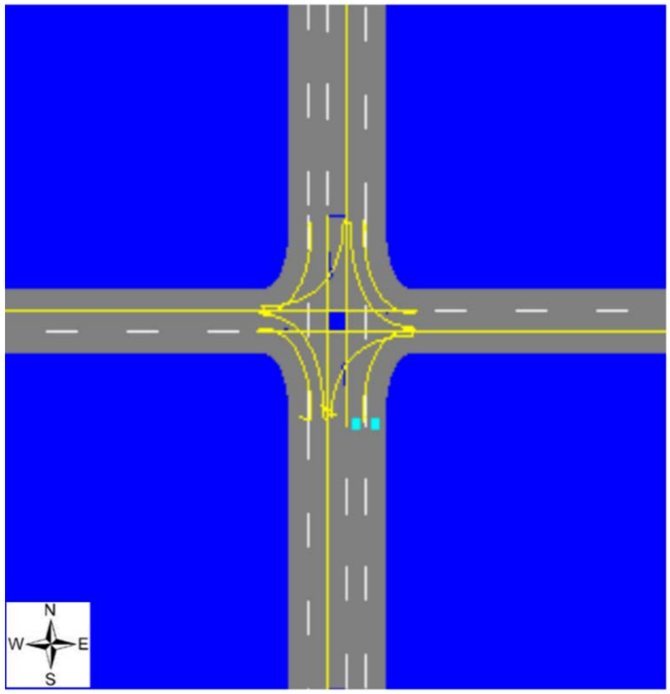


Figure B-122. Intersection of US-301 and Hwy 100 on network

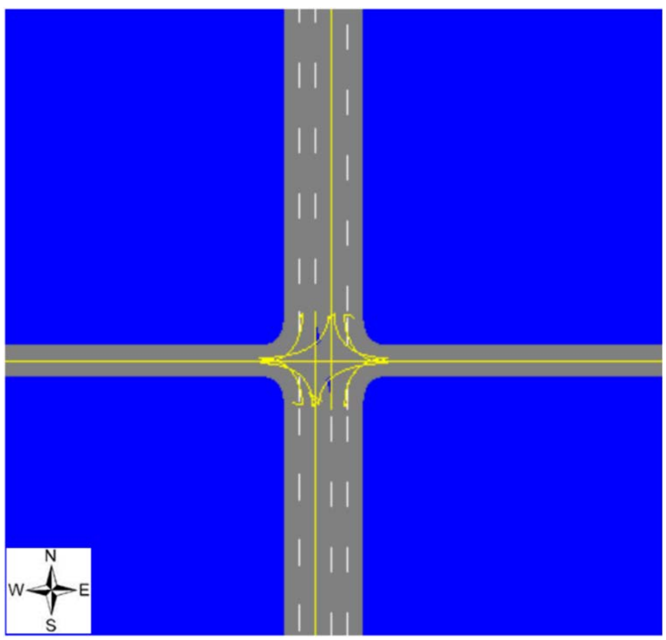


Figure B-123. Intersection of US-301 and Pratt St on network

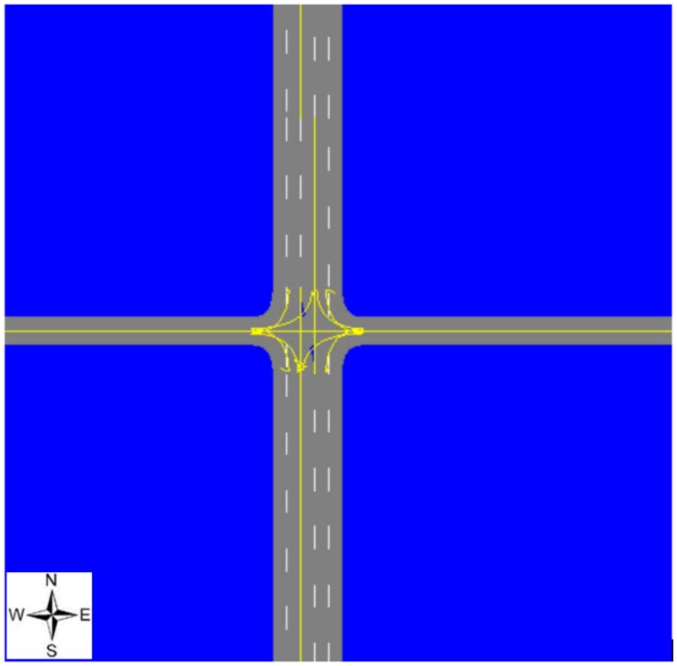


Figure B-124. Intersection of US-301 and Washington St on network

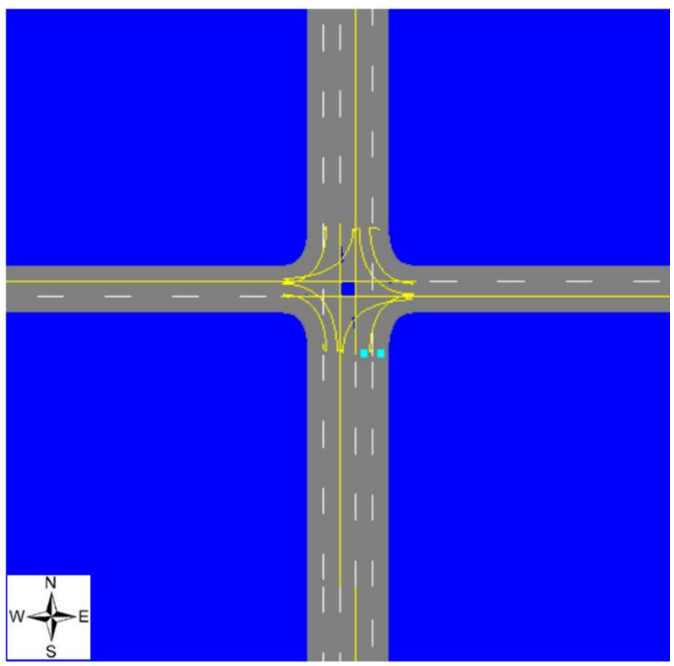


Figure B-125. Intersection of US-301 and Brownlee St on network

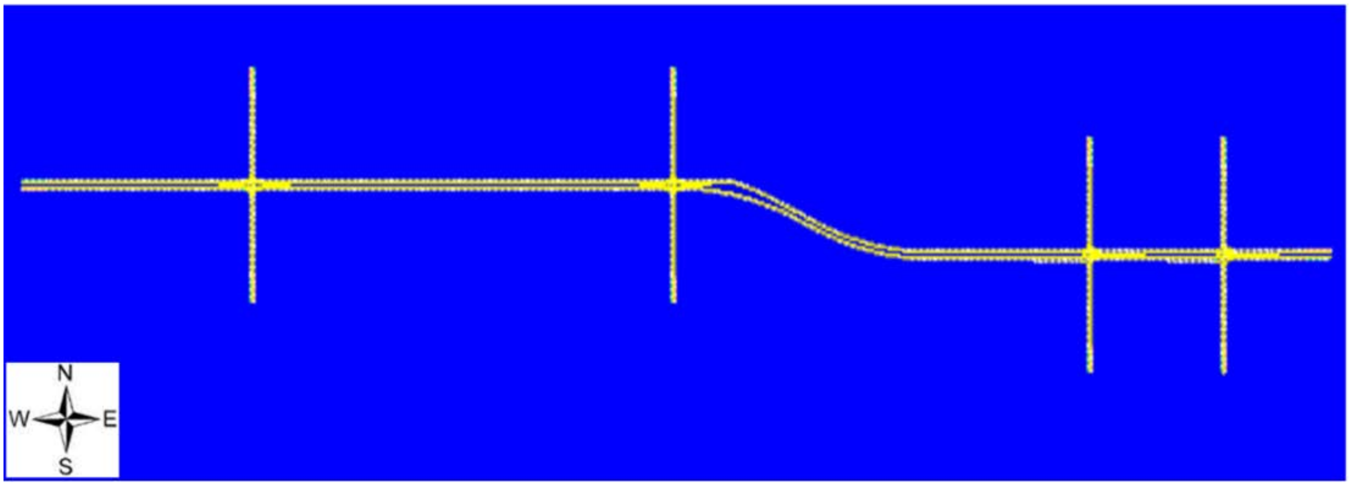


Figure B-126. Jacksonville arterial corridor network coded in SwashSim

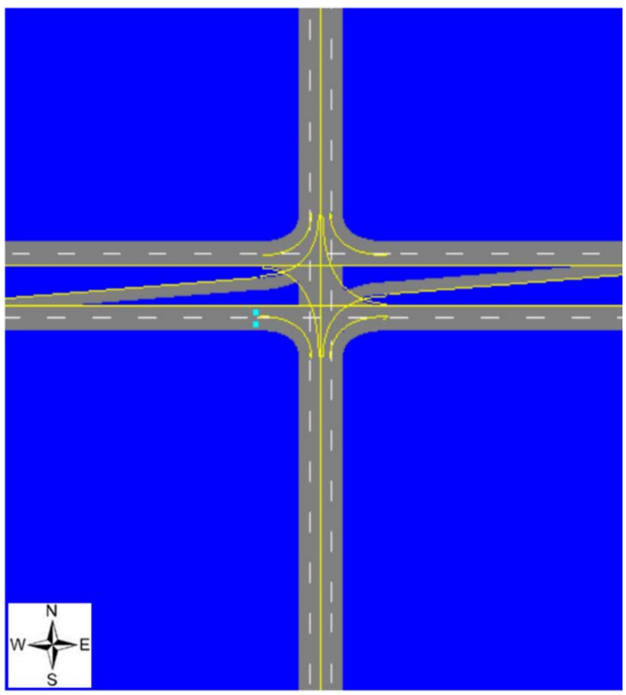


Figure B-127. Intersection of US-1 and Canal St on network

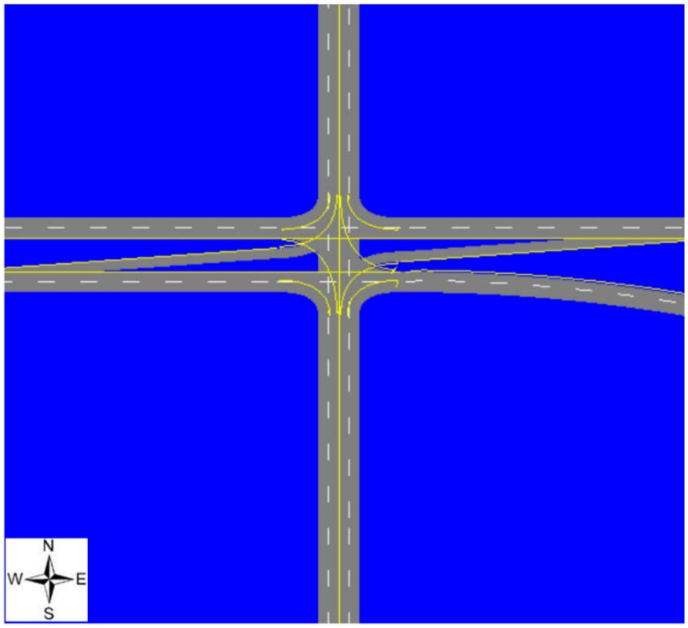


Figure B-128. Intersection of US-1 and Fairfax St on network

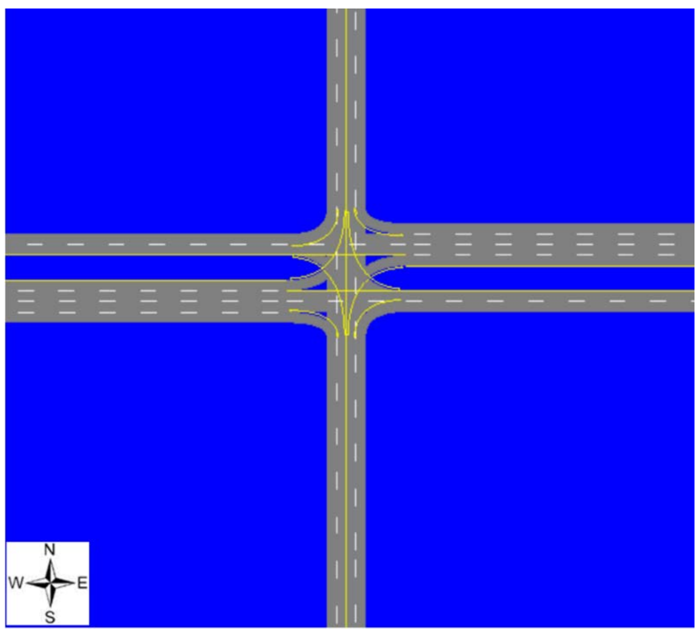


Figure B-129. Intersection of US-1 and Myrtle Ave on network

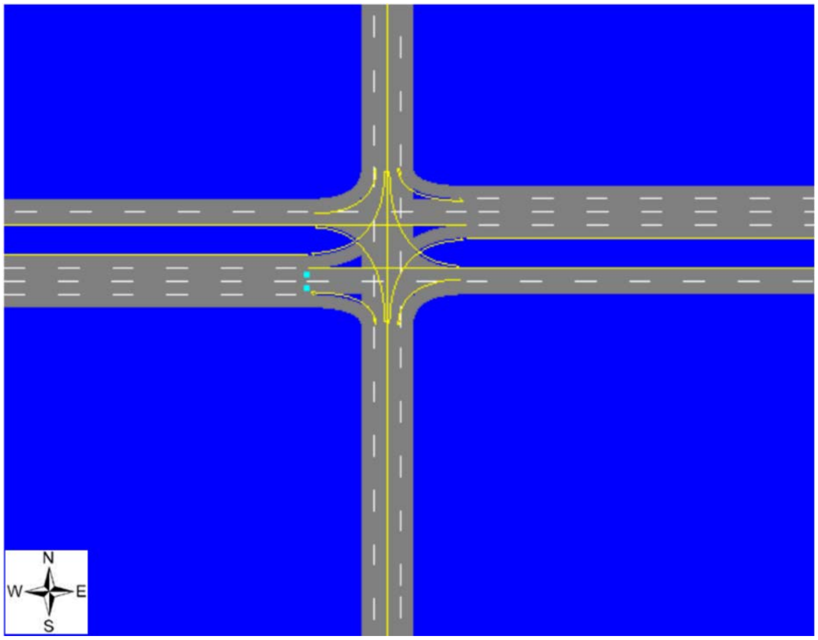


Figure B-130. Intersection of US-1 and Moncrief Rd on network

Appendix C – SwashSim Experimental Scenarios

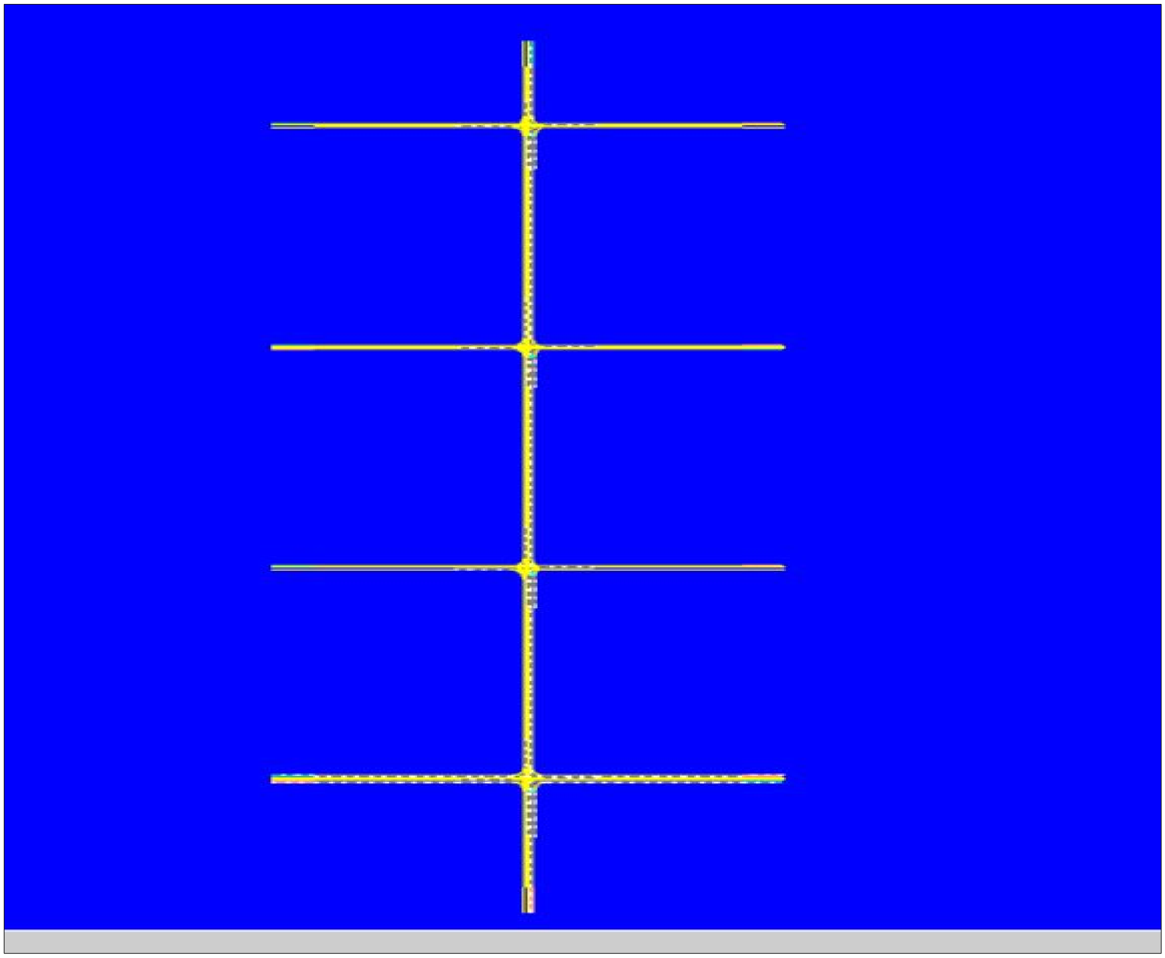


Figure C-1. Geometry 1 coded in SwashSim

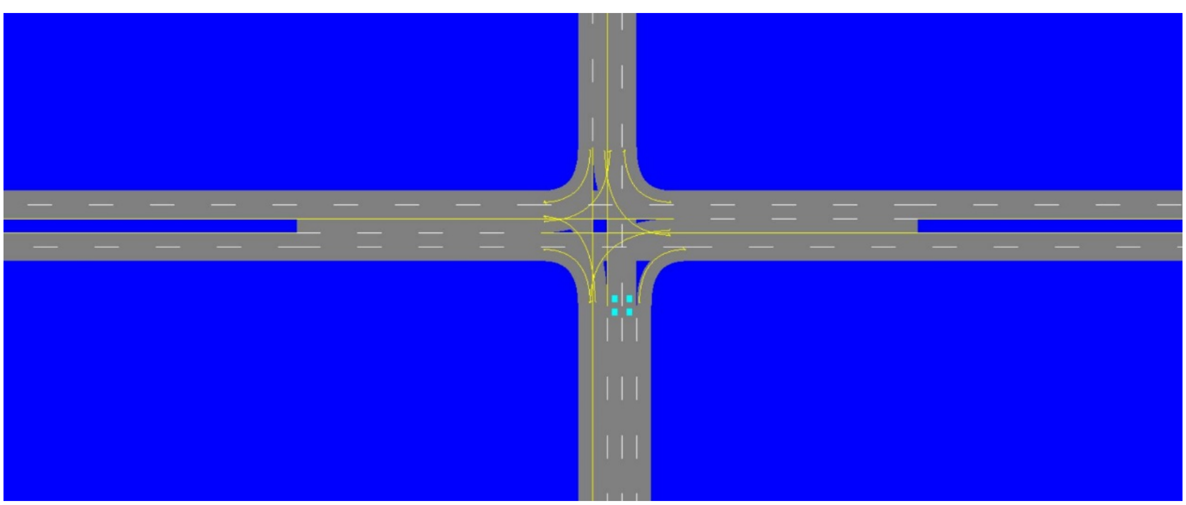


Figure C-2. Geometry 1 – Intersection 1 coded in SwashSim

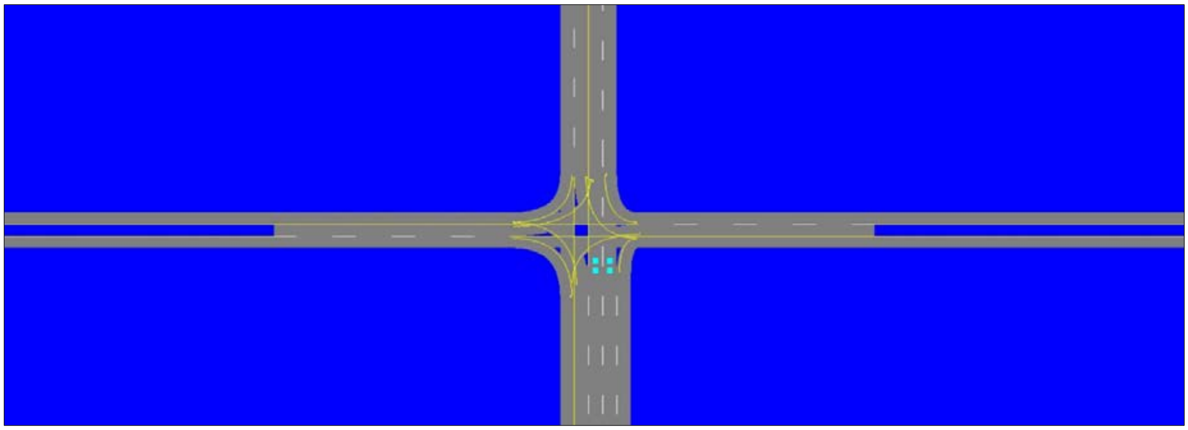


Figure C-3. Geometry 1 – Intersection 2 coded in SwashSim

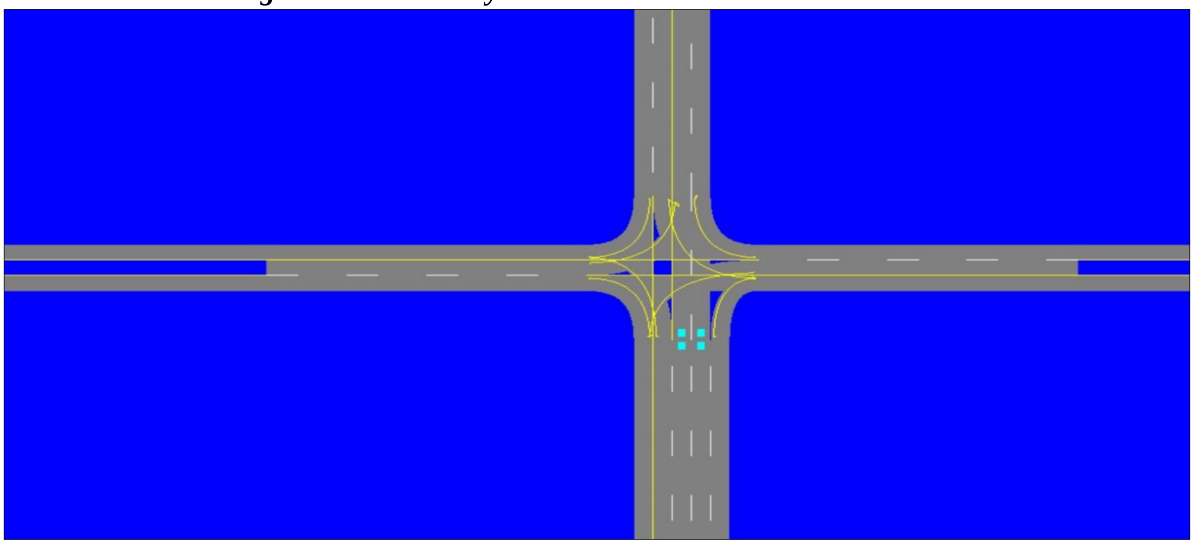


Figure C-4. Geometry 1 – Intersection 3 coded in SwashSim

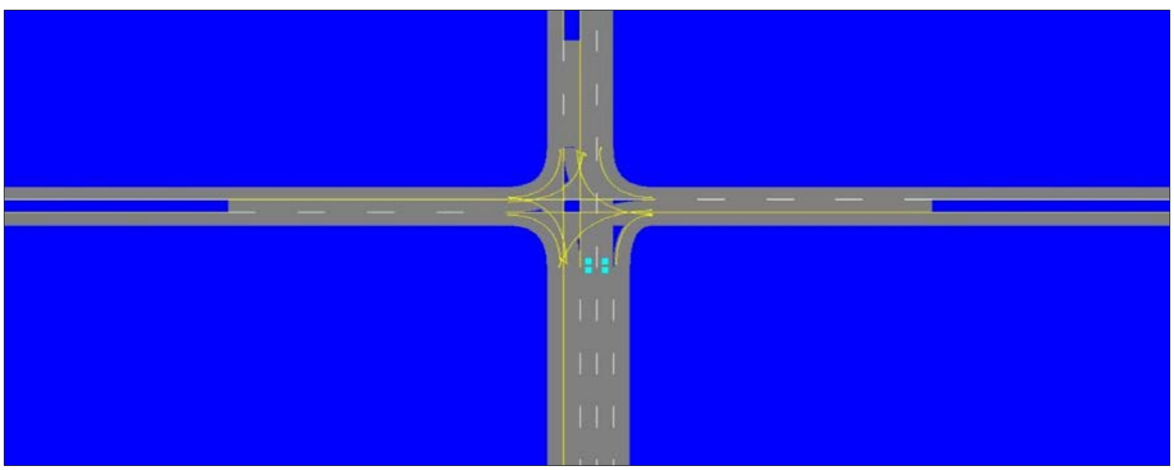


Figure C-5. Geometry 1 – Intersection 4 coded in SwashSim

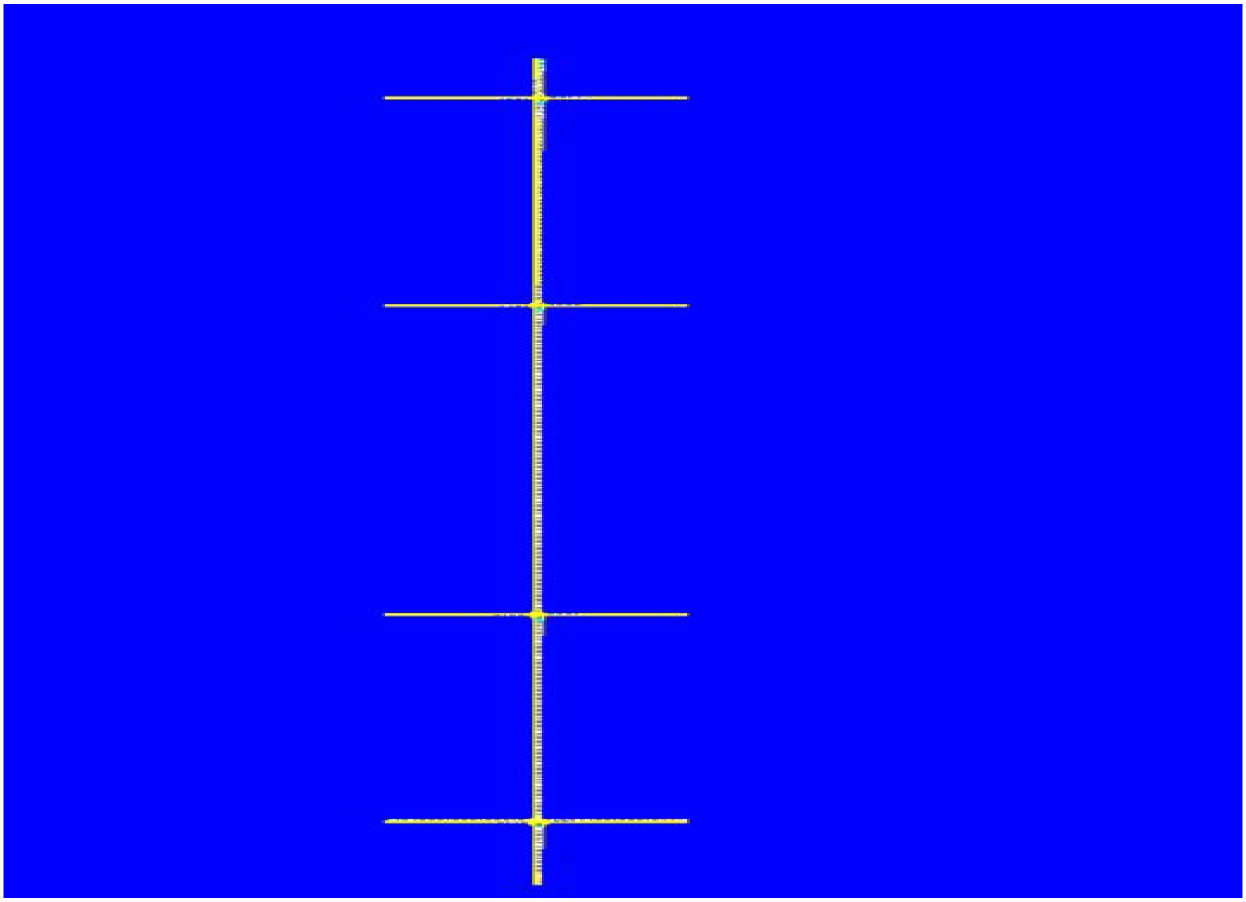


Figure C-6. Geometry 2 coded in SwashSim

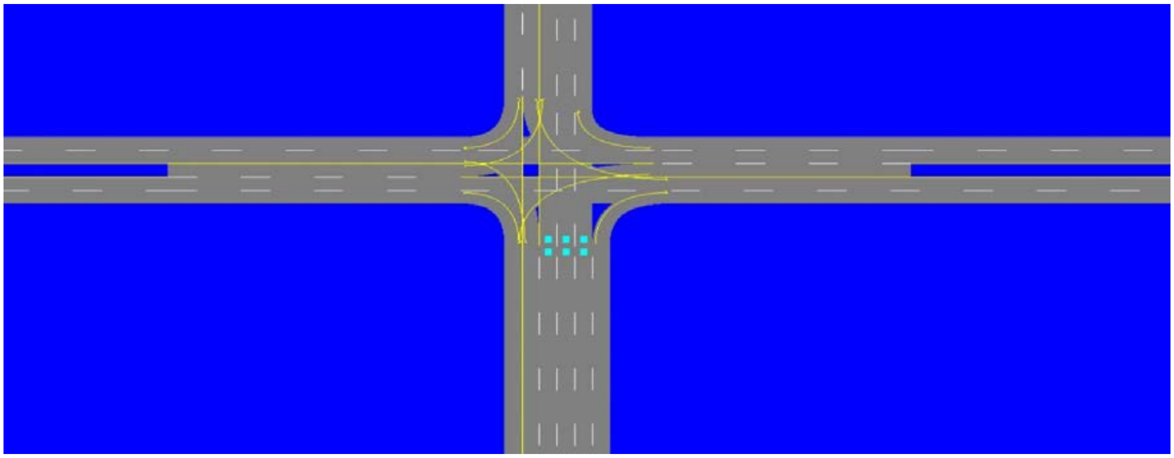


Figure C-7. Geometry 2 – Intersection 1 coded in SwashSim

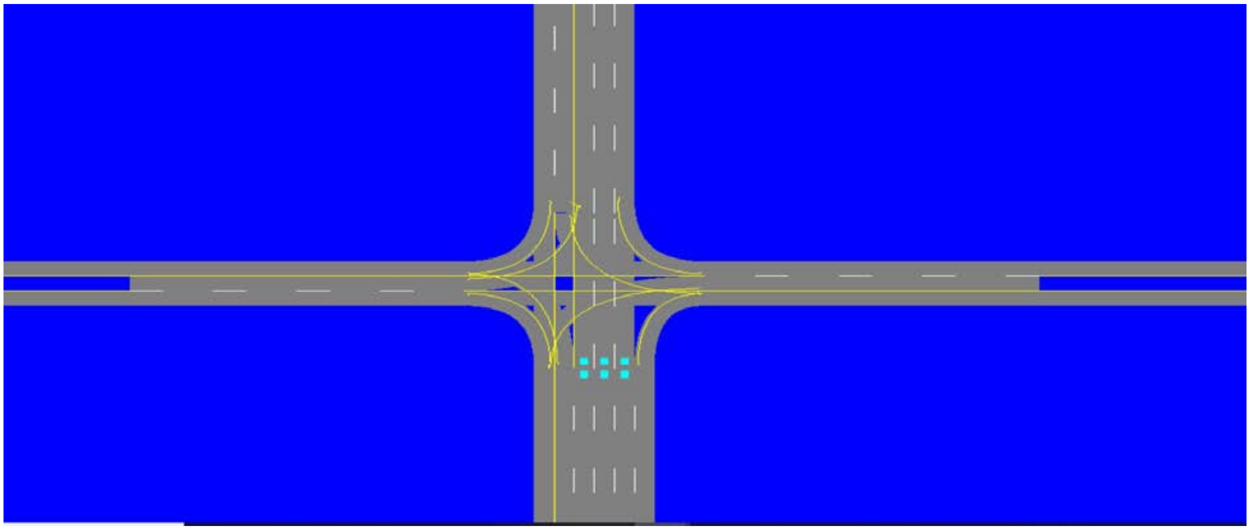


Figure C-8. Geometry 2 – Intersection 2 coded in SwashSim

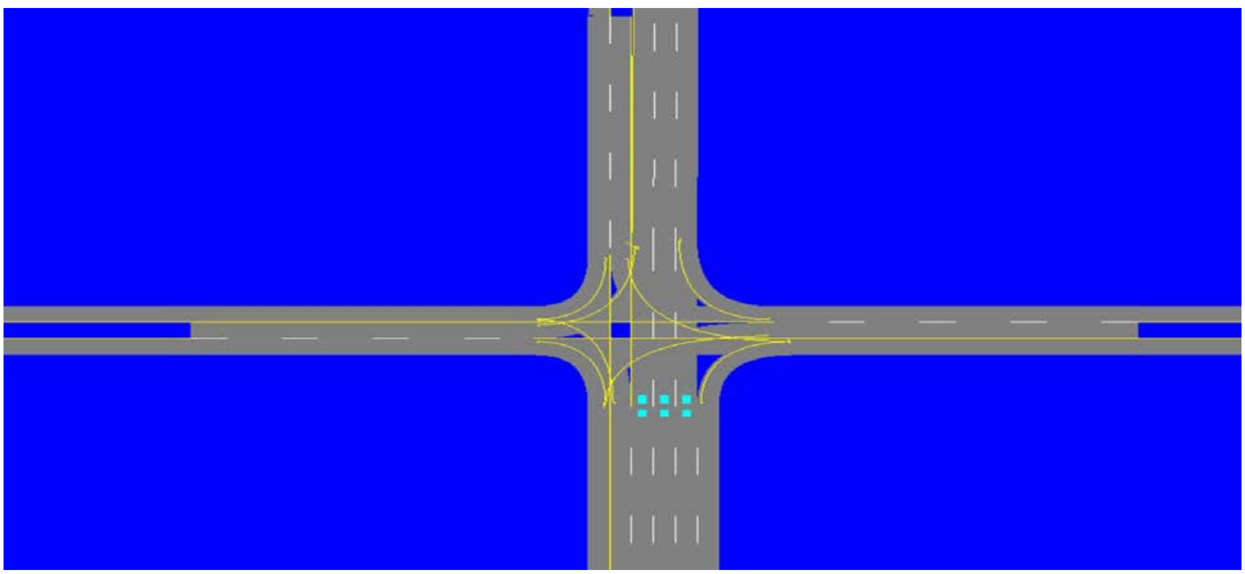


Figure C-9. Geometry 2 – Intersection 3 coded in SwashSim

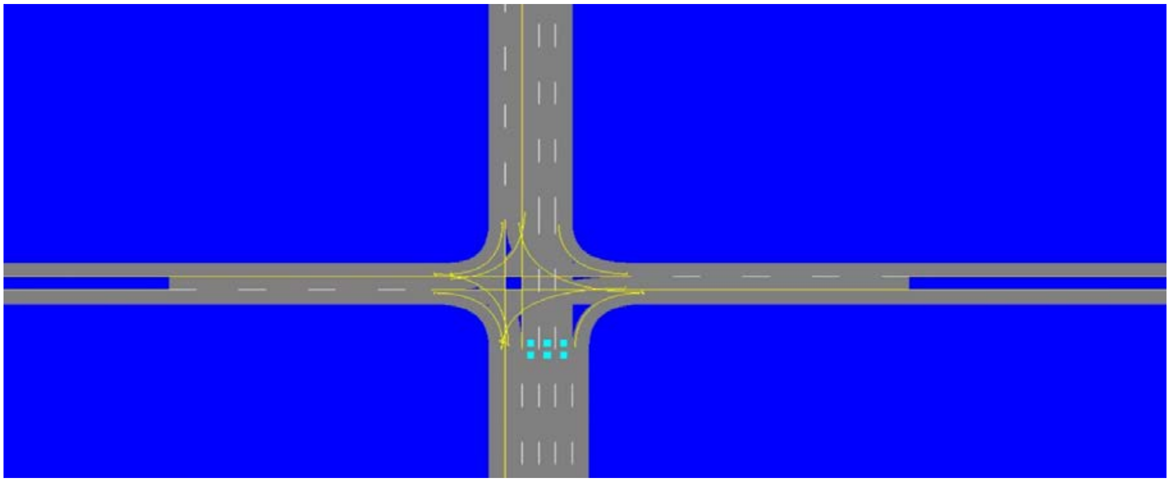


Figure C-10. Geometry 2 – Intersection 4 coded in SwashSim

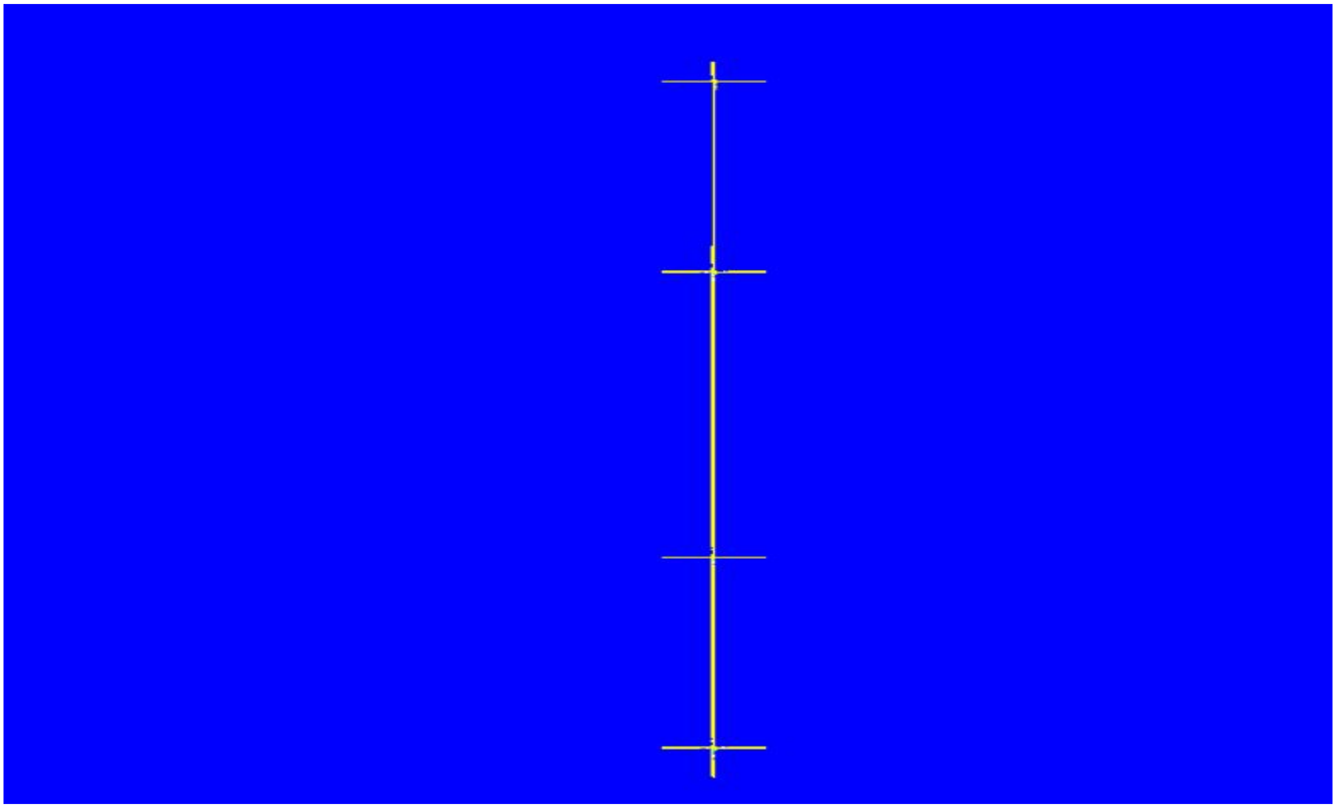


Figure C-11. Geometry 3 coded in SwashSim

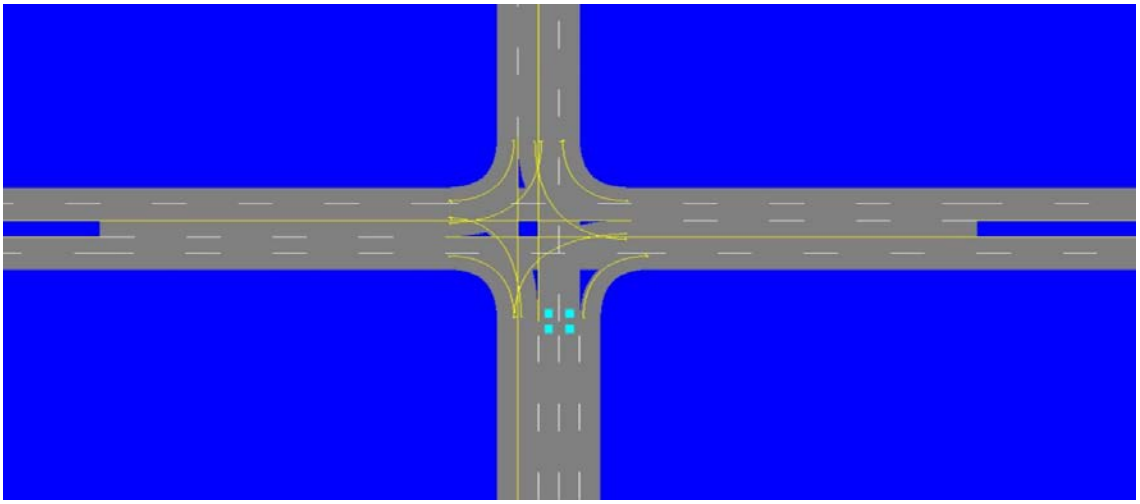


Figure C-12. Geometry 3 – Intersection 1 coded in SwashSim

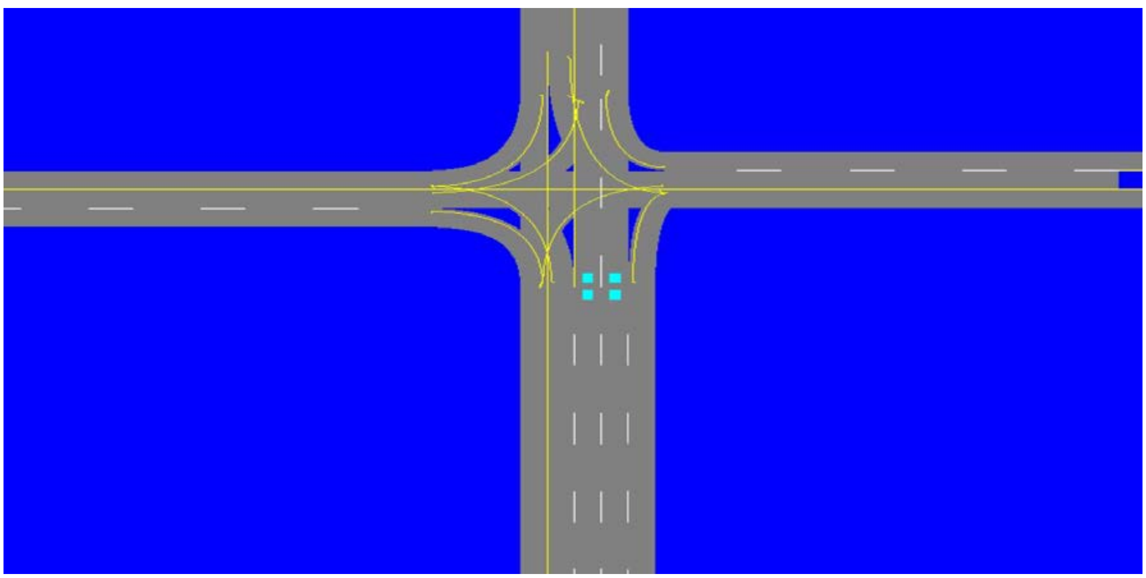


Figure C-13. Geometry 3 – Intersection 2 coded in SwashSim

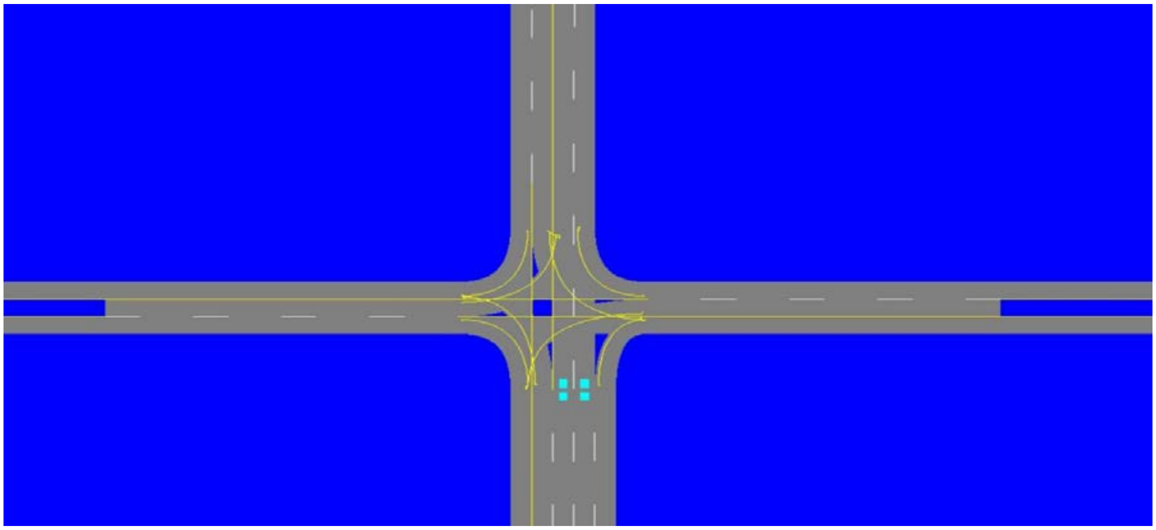


Figure C-14. Geometry 3 – Intersection 3 coded in SwashSim

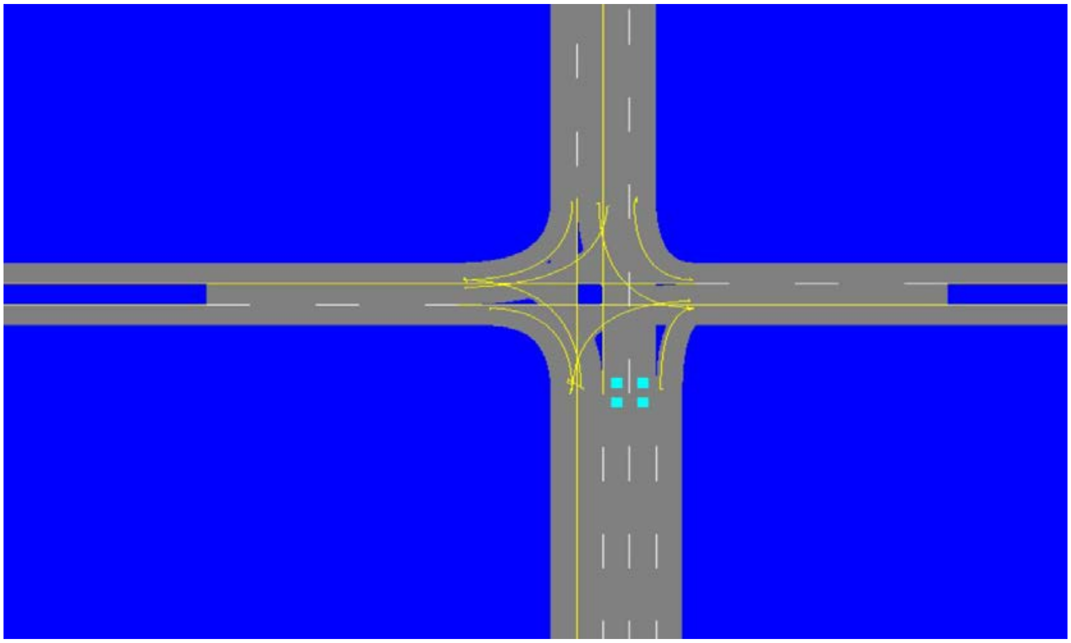


Figure C-15. Geometry 3 – Intersection 4 coded in SwashSim

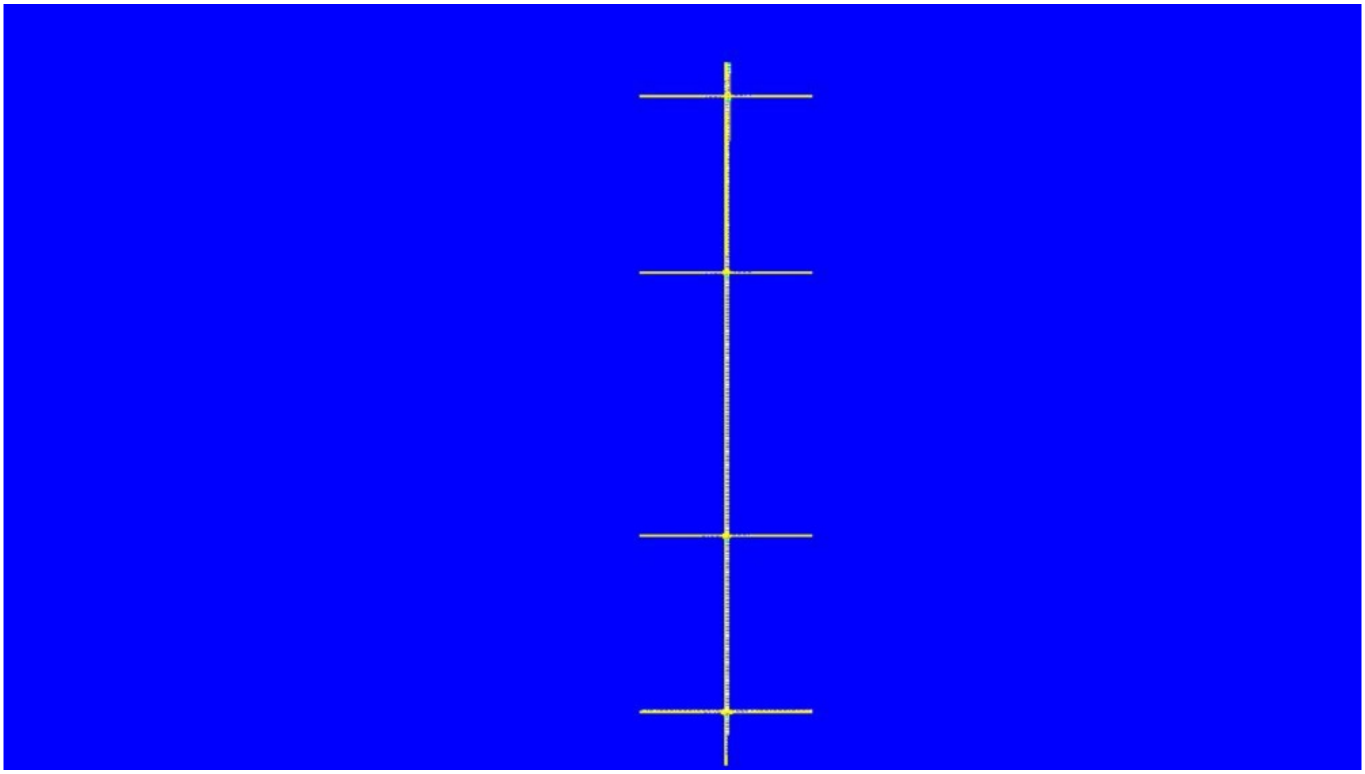


Figure C-16. Geometry 4 coded in SwashSim

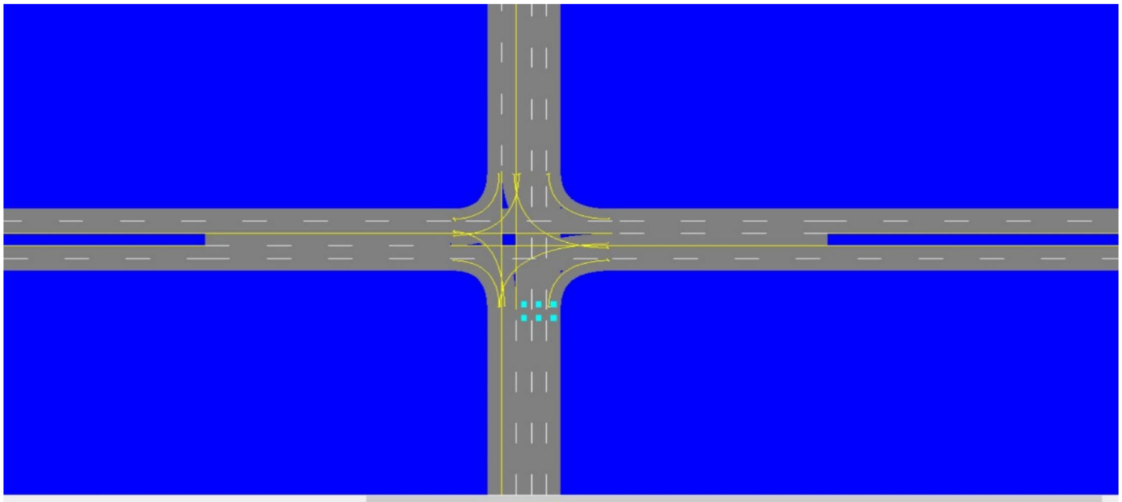


Figure C-17. Geometry 4 – Intersection 1 coded in SwashSim

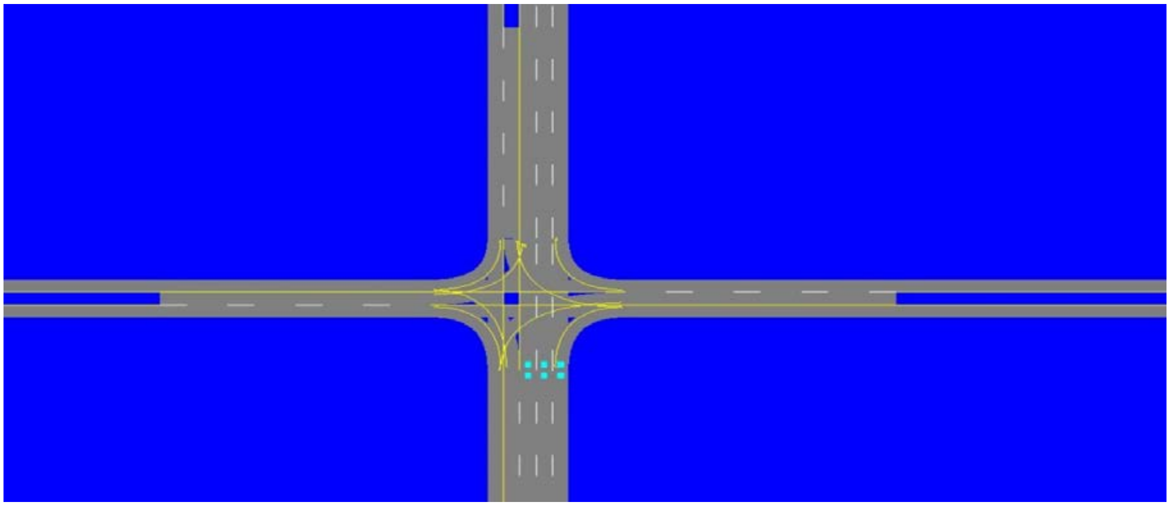


Figure C-18. Geometry 4 – Intersection 2 coded in SwashSim

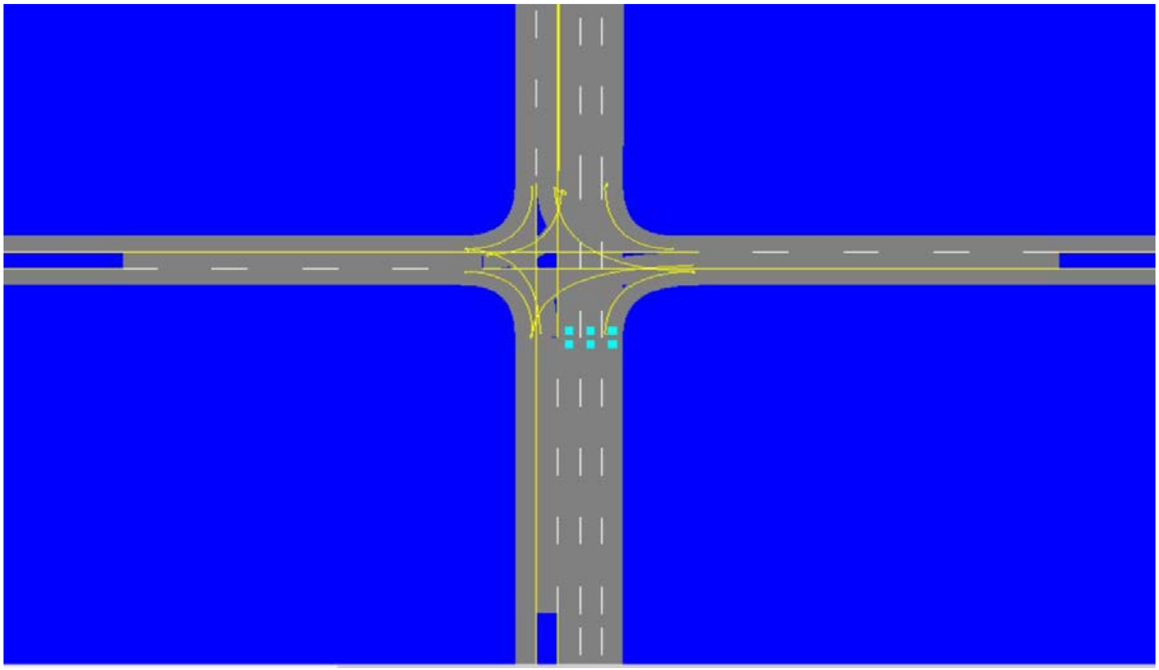


Figure C-19. Geometry 4 – Intersection 3 coded in SwashSim

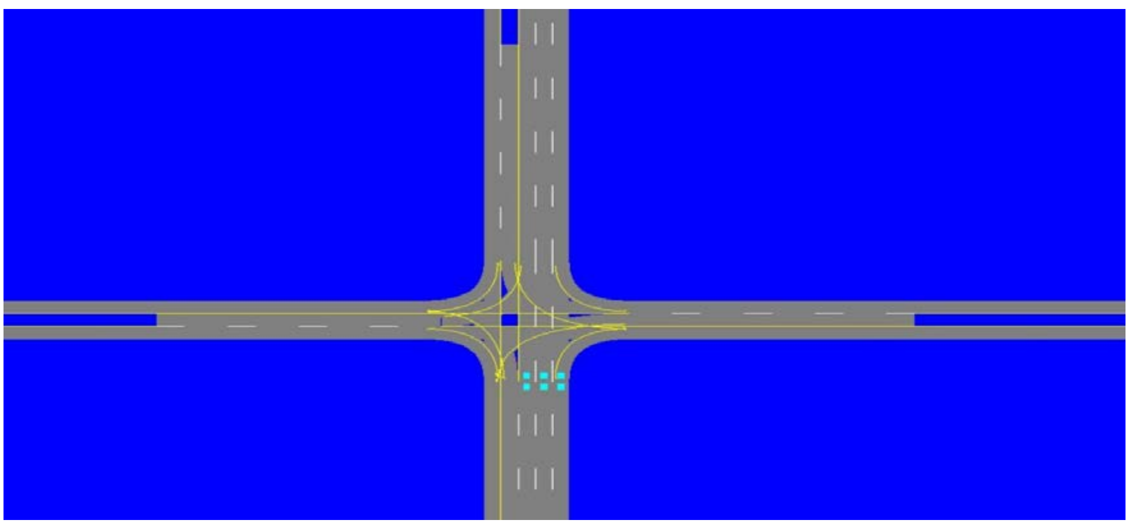


Figure C-20. Geometry 4 – Intersection 4 coded in SwashSim

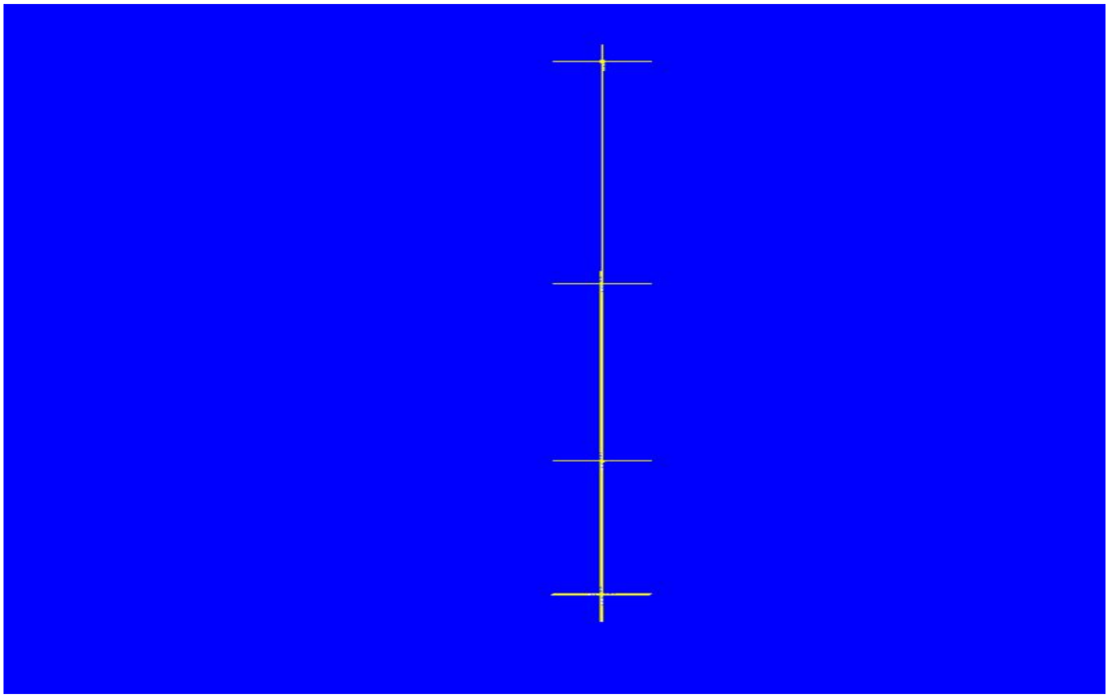


Figure C-21. Geometry 5 coded in SwashSim

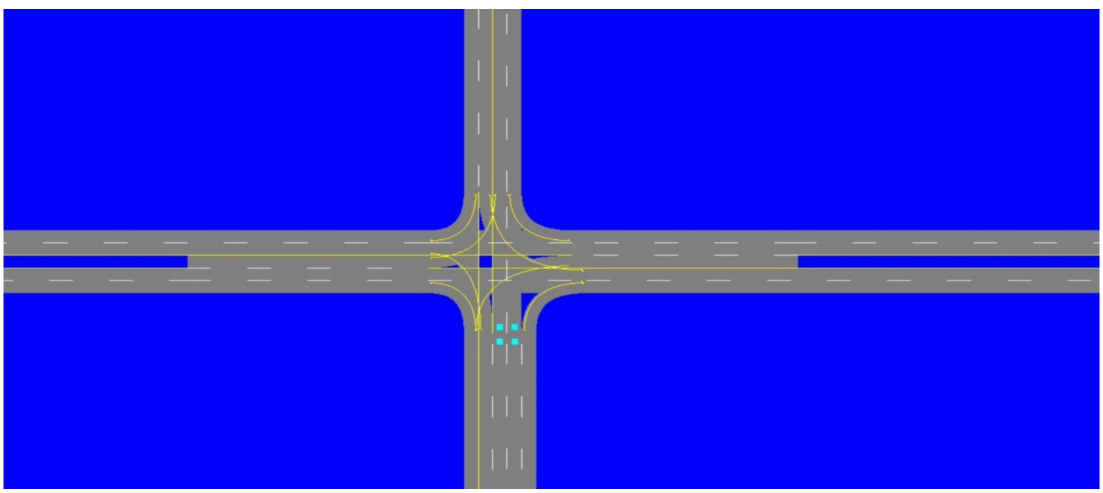


Figure C-22. Geometry 5 – Intersection 1 coded in SwashSim

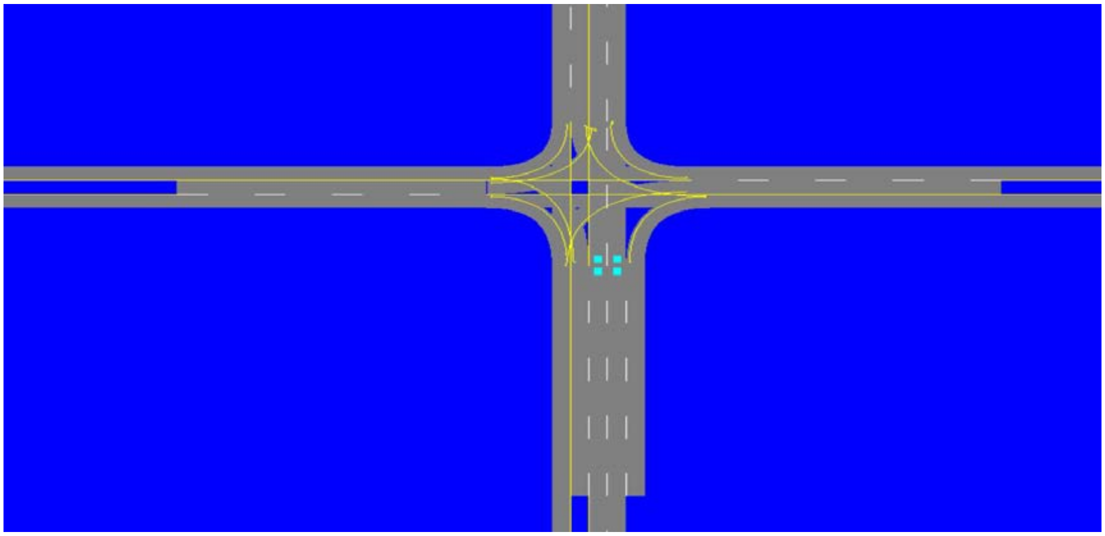


Figure C-23. Geometry 5 – Intersection 2 coded in SwashSim

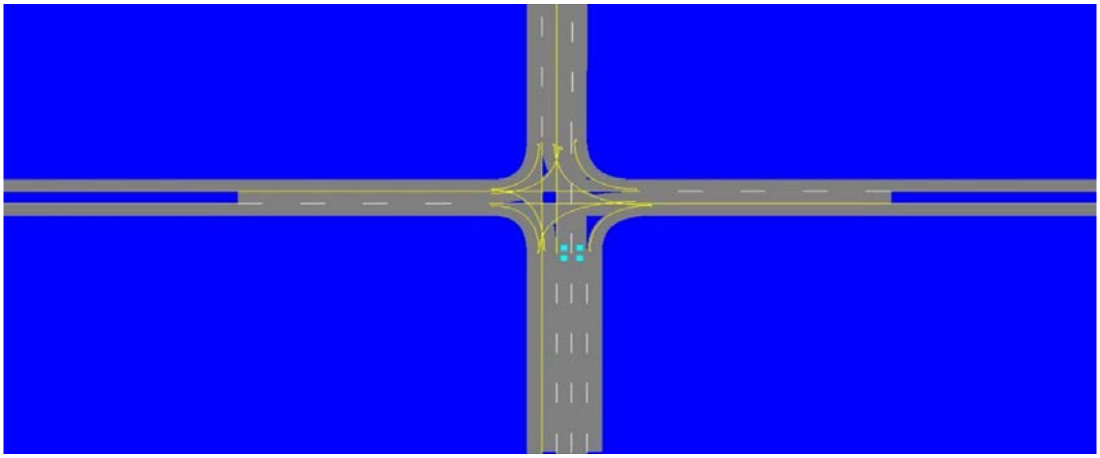


Figure C-24. Geometry 5 – Intersection 3 coded in SwashSim

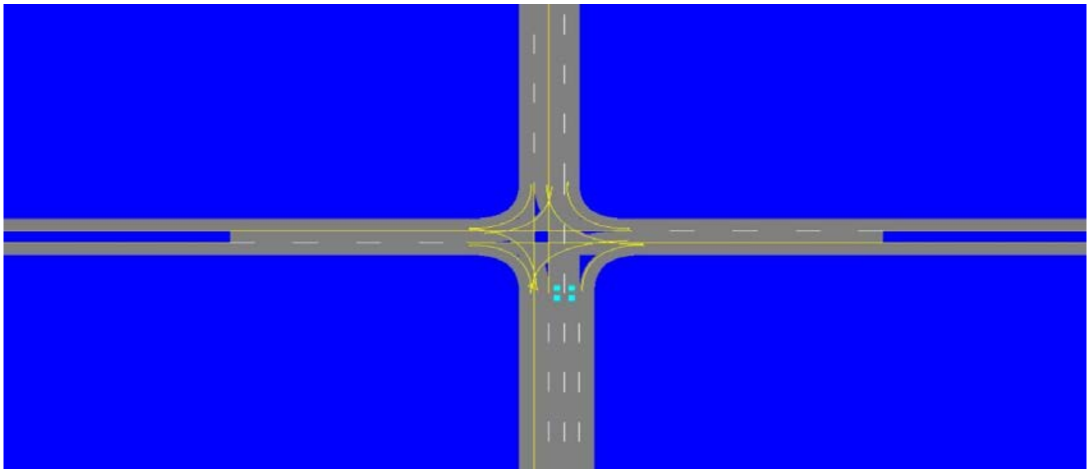


Figure C-25. Geometry 5 – Intersection 4 coded in SwashSim

Appendix D – SwashSim and HCM Results

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Saturation Flow Rate Results (veh/hr/lane)					HCM 6th Edition Saturation Flow Rate Results (veh/hr/lane)			
					Intersection 1	Intersection 2	Intersection 3	Intersection 4	Overall	Intersection 1	Intersection 2	Intersection 3	Intersection 4
1	30	0	0	600	1799.0	1788.6	NA	NA	1798.4	1808.8	1808.8	1808.8	1808.8
2	30	0	6	600	1639.0	1636.1	NA	NA	1638.4	1724.2	1724.2	1724.2	1724.2
3	30	0	12	600	1585.3	1657.2	NA	NA	1594.9	1639.5	1639.5	1639.5	1639.5
4	30	0	18	600	1498.2	1511.8	NA	NA	1499.8	1554.9	1554.9	1554.9	1554.9
5	30	0	0	800	1831.8	1852.5	NA	1860.4	1837.8	1808.8	1808.8	1808.8	1808.8
6	30	0	6	800	1695.0	1704.0	NA	NA	1697.5	1724.2	1724.2	1724.2	1724.2
7	30	0	12	800	1553.5	1598.2	NA	NA	1568.2	1639.5	1639.5	1639.5	1639.5
8	30	0	18	800	1512.3	1530.0	NA	NA	1517.8	1554.9	1554.9	1554.9	1554.9
9	30	0	0	1000	1865.7	1816.8	NA	1838.6	1859.5	1808.8	1808.8	1808.8	1808.8
10	30	0	6	1000	1696.6	1711.5	NA	1800.1	1701.7	1724.2	1724.2	1724.2	1724.2
11	30	0	12	1000	1564.7	1576.4	NA	1757.2	1568.6	1639.5	1639.5	1639.5	1639.5
12	30	0	18	1000	1510.9	1494.0	NA	1721.2	1506.8	1554.9	1554.9	1554.9	1554.9
13	30	2	0	600	1815.5	1785.2	NA	NA	1811.0	1786.4	1786.4	1786.4	1786.4
14	30	2	6	600	1639.9	1639.3	NA	NA	1639.8	1701.7	1701.7	1701.7	1701.7
15	30	2	12	600	1504.7	1662.7	NA	NA	1529.8	1617.1	1617.1	1617.1	1617.1
16	30	2	18	600	1445.6	1393.6	NA	NA	1436.7	1532.4	1532.4	1532.4	1532.4
17	30	2	0	800	1828.4	1852.5	NA	NA	1836.0	1786.4	1786.4	1786.4	1786.4
18	30	2	6	800	1663.7	1669.7	NA	NA	1665.7	1701.7	1701.7	1701.7	1701.7
19	30	2	12	800	1599.5	1615.1	NA	NA	1598.3	1617.1	1617.1	1617.1	1617.1
20	30	2	18	800	1515.8	1514.0	824.4	NA	1513.7	1532.4	1532.4	1532.4	1532.4
21	30	2	0	1000	1866.7	1802.5	NA	1816.0	1858.9	1786.4	1786.4	1786.4	1786.4
22	30	2	6	1000	1661.1	1672.2	1459.5	1778.4	1666.9	1701.7	1701.7	1701.7	1701.7
23	30	2	12	1000	1527.3	1558.0	NA	1753.6	1543.2	1617.1	1617.1	1617.1	1617.1
24	30	2	18	1000	1479.6	1367.3	NA	1741.9	1447.7	1532.4	1532.4	1532.4	1532.4
25	30	4	0	600	1802.3	1819.1	NA	NA	1803.9	1719.1	1719.1	1719.1	1719.1
26	30	4	6	600	1626.0	1598.2	1770.5	NA	1623.7	1634.4	1634.4	1634.4	1634.4
27	30	4	12	600	1536.5	1592.1	1028.6	NA	1539.7	1549.8	1549.8	1549.8	1549.8
28	30	4	18	600	1313.7	1430.4	1588.2	2000.0	1350.3	1465.1	1465.1	1465.1	1465.1
29	30	4	0	800	1802.3	1819.1	NA	NA	1803.9	1719.1	1719.1	1719.1	1719.1
30	30	4	6	800	1618.0	1626.0	1996.3	1405.6	1621.0	1634.4	1634.4	1634.4	1634.4
31	30	4	12	800	1495.5	1557.1	1800.5	1401.3	1515.1	1549.8	1549.8	1549.8	1549.8
32	30	4	18	800	1418.4	1466.3	1860.1	1385.3	1440.6	1465.1	1465.1	1465.1	1465.1
33	30	4	0	1000	1863.5	1816.6	NA	1805.1	1857.4	1719.1	1719.1	1719.1	1719.1
34	30	4	6	1000	1600.8	1658.1	1754.0	1780.4	1623.6	1634.4	1634.4	1634.4	1634.4
35	30	4	12	1000	1490.8	1430.7	1688.0	1816.2	1483.8	1549.8	1549.8	1549.8	1549.8
36	30	4	18	1000	1417.4	1343.0	NA	1661.5	1397.6	1465.1	1465.1	1465.1	1465.1

Table D-1. Geometry 1 – Saturation Flow Rate

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Saturation Flow Rate Results (veh/hr/lane)					HCM 6th Edition Saturation Flow Rate Results (veh/hr/lane)			
					Intersection 1	Intersection 2	Intersection 3	Intersection 4	Overall	Intersection 1	Intersection 2	Intersection 3	Intersection 4
1	40	0	0	600	1854.6	1687.8	1803.5	1777.6	1806.8	1725.2	1725.2	1725.2	1725.2
2	40	0	6	600	1843.3	1068.1	1800.0	1612.4	1688.8	1644.5	1644.5	1644.5	1644.5
3	40	0	12	600	1576.6	1592.4	1640.9	1532.1	1562.8	1563.7	1563.7	1563.7	1563.7
4	40	0	18	600	1521.9	1465.6	1753.9	1511.2	1514.8	1483.0	1483.0	1483.0	1483.0
5	40	0	0	800	1830.3	1840.0	1843.4	1875.1	1843.1	1725.2	1725.2	1725.2	1725.2
6	40	0	6	800	1674.0	1677.8	1738.4	1663.3	1682.1	1644.5	1644.5	1644.5	1644.5
7	40	0	12	800	1588.2	1615.0	1698.2	1565.7	1601.6	1563.7	1563.7	1563.7	1563.7
8	40	0	18	800	1557.0	1534.0	1630.6	1506.5	1547.9	1483.0	1483.0	1483.0	1483.0
9	40	0	0	1000	1864.5	1843.2	1854.1	1840.4	1855.6	1725.2	1725.2	1725.2	1725.2
10	40	0	6	1000	1677.5	1692.6	1689.9	1747.9	1689.3	1644.5	1644.5	1644.5	1644.5
11	40	0	12	1000	1621.7	1640.0	1617.6	1681.5	1628.2	1563.7	1563.7	1563.7	1563.7
12	40	0	18	1000	1564.1	1539.8	1533.0	1608.3	1550.9	1483.0	1483.0	1483.0	1483.0
13	40	2	0	600	1794.5	1808.8	1805.8	1822.3	1808.0	1703.8	1703.8	1703.8	1703.8
14	40	2	6	600	1666.0	1680.2	1681.0	1681.6	1674.3	1623.1	1623.1	1623.1	1623.1
15	40	2	12	600	1591.0	1555.5	1708.3	1586.2	1587.3	1542.3	1542.3	1542.3	1542.3
16	40	2	18	600	1558.6	1578.3	1786.2	1520.4	1548.8	1461.6	1461.6	1461.6	1461.6
17	40	2	0	800	1828.3	1850.7	1849.3	1875.0	1844.2	1703.8	1703.8	1703.8	1703.8
18	40	2	6	800	1677.3	1697.1	1743.8	1672.1	1689.0	1623.1	1623.1	1623.1	1623.1
19	40	2	12	800	1584.6	1610.1	1702.4	1573.3	1602.4	1542.3	1542.3	1542.3	1542.3
20	40	2	18	800	1501.2	1531.9	1603.0	1493.5	1515.8	1461.6	1461.6	1461.6	1461.6
21	40	2	0	1000	1864.3	1845.5	1859.0	1833.5	1859.1	1703.8	1703.8	1703.8	1703.8
22	40	2	6	1000	1687.0	1689.2	1690.9	1730.8	1690.7	1623.1	1623.1	1623.1	1623.1
23	40	2	12	1000	1610.2	1592.0	1600.0	1584.1	1601.4	1542.3	1542.3	1542.3	1542.3
24	40	2	18	1000	1553.8	1558.6	1558.2	1649.2	1562.0	1461.6	1461.6	1461.6	1461.6
25	40	4	0	600	1779.2	1829.9	1779.0	1817.9	1800.6	1639.6	1639.6	1639.6	1639.6
26	40	4	6	600	1667.8	1530.8	1631.8	1668.9	1647.3	1558.9	1558.9	1558.9	1558.9
27	40	4	12	600	1497.9	1481.5	1565.5	1502.2	1503.7	1478.2	1478.2	1478.2	1478.2
28	40	4	18	600	1431.3	1379.8	1520.8	1553.4	1451.4	1397.4	1397.4	1397.4	1397.4
29	40	4	0	800	1828.0	1834.5	1833.6	1874.6	1839.2	1639.6	1639.6	1639.6	1639.6
30	40	4	6	800	1666.2	1608.6	1720.6	1708.1	1672.7	1558.9	1558.9	1558.9	1558.9
31	40	4	12	800	1552.1	1510.5	1580.8	1583.6	1554.7	1478.2	1478.2	1478.2	1478.2
32	40	4	18	800	1478.7	1423.8	1567.5	1565.9	1502.4	1397.4	1397.4	1397.4	1397.4
33	40	4	0	1000	1864.7	1855.9	1855.5	1851.3	1859.6	1639.6	1639.6	1639.6	1639.6
34	40	4	6	1000	1610.0	1636.9	1477.3	1684.5	1613.0	1558.9	1558.9	1558.9	1558.9
35	40	4	12	1000	1580.0	1521.2	1433.4	1553.8	1506.8	1478.2	1478.2	1478.2	1478.2
36	40	4	18	1000	1510.4	1446.1	1428.3	1546.7	1468.2	1397.4	1397.4	1397.4	1397.4

Table D-2. Geometry 2 – Saturation Flow Rate

Scenario #	Posted Speed (mi/hr)	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Saturation Flow Rate Results (veh/hr/lane)					HCM 6th Edition Saturation Flow Rate Results (veh/hr/lane)			
						Intersection 1	Intersection 2	Intersection 3	Intersection 4	Overall	Intersection 1	Intersection 2	Intersection 3	Intersection 4
1	50	50	0	0	600	1807.7	1811.1	1835.9	1839.2	1810.6	1808.8	1808.8	1808.8	1808.80
2	50	50	0	6	600	1704.0	1707.6	1666.8	1873.0	1703.8	1724.1	1724.1	1724.1	1724.15
3	50	50	0	12	600	1621.2	1598.1	1633.1	1766.1	1621.7	1639.5	1639.5	1639.5	1639.50
4	50	50	0	18	600	1531.9	1418.9	1613.1	1700.4	1546.8	1554.8	1554.8	1554.8	1554.84
5	50	50	0	0	800	1817.3	1830.3	1818.5	NA	1820.5	1808.8	1808.8	1808.8	1808.80
6	50	50	0	6	800	1683.2	1735.4	1683.2	NA	1694.3	1724.1	1724.1	1724.1	1724.15
7	50	50	0	12	800	1595.8	1596.5	1618.2	1622.1	1600.9	1639.5	1639.5	1639.5	1639.50
8	50	50	0	18	800	1487.2	1557.3	1536.7	1894.7	1514.4	1554.8	1554.8	1554.8	1554.84
9	50	50	0	0	1000	1844.4	1824.0	1796.8	1830.0	1837.4	1808.8	1808.8	1808.8	1808.80
10	50	50	0	6	1000	1684.4	1730.4	1780.1	1686.8	1697.1	1724.1	1724.1	1724.1	1724.15
11	50	50	0	12	1000	1587.9	1631.3	1921.1	1619.7	1606.5	1639.5	1639.5	1639.5	1639.50
12	50	50	0	18	1000	1525.8	1555.0	1757.6	1536.1	1535.7	1554.8	1554.8	1554.8	1554.84
13	50	50	2	0	600	1805.6	1811.7	1800.0	1846.3	1808.6	1786.4	1786.4	1786.4	1786.37
14	50	50	2	6	600	1639.3	1746.7	1586.1	1841.7	1668.3	1701.7	1701.7	1701.7	1701.72
15	50	50	2	12	600	1528.5	1646.2	1370.3	1674.0	1543.1	1617.1	1617.1	1617.1	1617.07
16	50	50	2	18	600	1503.8	1568.1	1515.0	1649.3	1521.7	1532.4	1532.4	1532.4	1532.42
17	50	50	2	0	800	1826.0	1825.5	1822.2	NA	1825.6	1786.4	1786.4	1786.4	1786.37
18	50	50	2	6	800	1690.0	1723.9	1600.5	NA	1680.6	1701.7	1701.7	1701.7	1701.72
19	50	50	2	12	800	1486.1	1609.7	1518.1	1866.9	1527.0	1617.1	1617.1	1617.1	1617.07
20	50	50	2	18	800	1492.9	1543.3	1376.8	1628.3	1479.0	1532.4	1532.4	1532.4	1532.42
21	50	50	2	0	1000	1837.7	1825.7	1799.7	1828.0	1832.9	1786.4	1786.4	1786.4	1786.37
22	50	50	2	6	1000	1633.6	1635.0	1803.4	1616.2	1632.9	1701.7	1701.7	1701.7	1701.72
23	50	50	2	12	1000	1550.4	1674.4	1993.9	1531.0	1575.7	1617.1	1617.1	1617.1	1617.07
24	50	50	2	18	1000	1509.7	1571.2	1585.6	1565.6	1537.6	1532.4	1532.4	1532.4	1532.42
25	50	50	4	0	600	1797.4	1802.8	1775.1	NA	1798.1	1719.1	1719.1	1719.1	1719.08
26	50	50	4	6	600	1585.5	1661.6	1552.5	1543.8	1583.2	1634.4	1634.4	1634.4	1634.43
27	50	50	4	12	600	1487.8	1608.1	1518.9	1531.9	1527.5	1549.8	1549.8	1549.8	1549.78
28	50	50	4	18	600	1374.7	1499.0	1369.5	1455.5	1410.9	1465.1	1465.1	1465.1	1465.13
29	50	50	4	0	800	1812.5	1827.8	1818.5	NA	1815.4	1719.1	1719.1	1719.1	1719.08
30	50	50	4	6	800	1643.3	1670.0	1665.7	1598.9	1646.8	1634.4	1634.4	1634.4	1634.43
31	50	50	4	12	800	1455.7	1620.6	1538.6	1500.9	1512.1	1549.8	1549.8	1549.8	1549.78
32	50	50	4	18	800	1427.2	1539.4	1422.3	1422.4	1450.6	1465.1	1465.1	1465.1	1465.13
33	50	50	4	0	1000	1841.7	1835.8	1870.3	1828.9	1839.6	1719.1	1719.1	1719.1	1719.08
34	50	50	4	6	1000	1627.1	1715.9	1587.3	1610.1	1636.8	1634.4	1634.4	1634.4	1634.43
35	50	50	4	12	1000	1531.1	1556.0	1480.2	1618.6	1554.5	1549.8	1549.8	1549.8	1549.78
36	50	50	4	18	1000	1473.3	1521.2	1231.3	1547.6	1493.3	1465.1	1465.1	1465.1	1465.13

Table D-3. Geometry 3 – Saturation Flow Rate

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Saturation Flow Rate Results (veh/hr/lane)					HCM 6th Edition Saturation Flow Rate Results (veh/hr/lane)			
					Intersection 1	Intersection 2	Intersection 3	Intersection 4	Overall	Intersection 1	Intersection 2	Intersection 3	Intersection 4
1	30	0	0	600	1781.9	1791.7	NA	NA	1784.9	1866.4	1866.4	1866.4	1866.4
2	30	0	6	600	1664.7	1657.1	NA	NA	1662.3	1779.1	1779.1	1779.1	1779.1
3	30	0	12	600	1549.0	1564.0	NA	NA	1553.4	1691.7	1691.7	1691.7	1691.7
4	30	0	18	600	1515.0	1531.7	NA	NA	1527.3	1604.4	1604.4	1604.4	1604.4
5	30	0	0	800	1807.1	1825.7	1826.1	1826.1	1818.6	1866.4	1866.4	1866.4	1866.4
6	30	0	6	800	1664.2	1684.9	1674.1	1744.5	1679.7	1779.1	1779.1	1779.1	1779.1
7	30	0	12	800	1576.0	1610.2	1590.6	1659.0	1595.6	1691.7	1691.7	1691.7	1691.7
8	30	0	18	800	1508.0	1527.4	NA	1671.9	1540.9	1604.4	1604.4	1604.4	1604.4
9	30	0	0	1000	1843.3	1843.0	1828.9	1867.6	1846.8	1866.4	1866.4	1866.4	1866.4
10	30	0	6	1000	1690.8	1694.0	1708.2	1696.4	1696.3	1779.1	1779.1	1779.1	1779.1
11	30	0	12	1000	1614.4	1591.1	1548.7	1604.2	1592.9	1691.7	1691.7	1691.7	1691.7
12	30	0	18	1000	1543.6	1509.2	1550.2	1577.6	1547.7	1604.4	1604.4	1604.4	1604.4
13	30	2	0	600	1782.0	1809.5	NA	NA	1790.8	1843.3	1843.3	1843.3	1843.3
14	30	2	6	600	1640.9	1642.2	NA	NA	1641.3	1755.9	1755.9	1755.9	1755.9
15	30	2	12	600	1497.8	1541.9	NA	NA	1511.0	1668.6	1668.6	1668.6	1668.6
16	30	2	18	600	1456.4	1453.1	NA	NA	1455.3	1581.2	1581.2	1581.2	1581.2
17	30	2	0	800	1816.0	1828.2	1841.5	1838.2	1821.5	1843.3	1843.3	1843.3	1843.3
18	30	2	6	800	1637.0	1651.5	1650.8	1781.3	1660.1	1755.9	1755.9	1755.9	1755.9
19	30	2	12	800	1529.4	1523.2	1512.9	1736.6	1534.8	1668.6	1668.6	1668.6	1668.6
20	30	2	18	800	1474.0	1526.7	1481.0	1716.4	1499.3	1581.2	1581.2	1581.2	1581.2
21	30	2	0	1000	1846.3	1843.1	1832.5	1867.5	1848.3	1843.3	1843.3	1843.3	1843.3
22	30	2	6	1000	1661.8	1665.9	1666.1	1645.7	1658.5	1755.9	1755.9	1755.9	1755.9
23	30	2	12	1000	1534.8	1497.5	1549.8	1500.3	1518.1	1668.6	1668.6	1668.6	1668.6
24	30	2	18	1000	1492.8	1497.1	1461.1	1473.1	1479.7	1581.2	1581.2	1581.2	1581.2
25	30	4	0	600	1772.0	1809.8	NA	NA	1784.8	1773.8	1773.8	1773.8	1773.8
26	30	4	6	600	1631.0	1614.0	1934.1	1402.6	1626.6	1686.5	1686.5	1686.5	1686.5
27	30	4	12	600	1516.5	1451.2	1936.7	1741.9	1500.7	1599.1	1599.1	1599.1	1599.1
28	30	4	18	600	1466.2	1367.3	1916.0	1440.0	1425.3	1511.8	1511.8	1511.8	1511.8
29	30	4	0	800	1802.4	1820.5	1820.0	1824.9	1813.8	1773.8	1773.8	1773.8	1773.8
30	30	4	6	800	1629.8	1593.7	1585.3	1763.6	1622.7	1686.5	1686.5	1686.5	1686.5
31	30	4	12	800	1500.8	1495.2	1443.1	1745.5	1498.8	1599.1	1599.1	1599.1	1599.1
32	30	4	18	800	1389.0	1434.5	1433.7	1716.7	1447.1	1511.8	1511.8	1511.8	1511.8
33	30	4	0	1000	1839.7	1844.7	1832.2	1870.8	1847.1	1773.8	1773.8	1773.8	1773.8
34	30	4	6	1000	1654.2	1553.7	1641.9	1563.6	1596.7	1686.5	1686.5	1686.5	1686.5
35	30	4	12	1000	1477.8	1499.9	1532.0	1465.5	1490.3	1599.1	1599.1	1599.1	1599.1
36	30	4	18	1000	1394.7	1407.4	1397.2	1325.2	1375.8	1511.8	1511.8	1511.8	1511.8

Table D-4. Geometry 4 – Saturation Flow Rate

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Saturation Flow Rate Results (veh/hr/lane)					HCM 6th Edition Saturation Flow Rate Results (veh/hr/lane)			
					Intersection 1	Intersection 2	Intersection 3	Intersection 4	Overall	Intersection 1	Intersection 2	Intersection 3	Intersection 4
1	40	0	0	600	1793.6	1827.6	NA	1845.1	1808.1	1808.8	1808.8	1808.8	1808.8
2	40	0	6	600	1681.7	1682.6	1846.2	1803.3	1692.1	1724.1	1724.1	1724.1	1724.1
3	40	0	12	600	1594.9	1614.7	NA	1626.2	1602.9	1639.5	1639.5	1639.5	1639.5
4	40	0	18	600	1490.6	1518.2	NA	1635.5	1502.7	1554.8	1554.8	1554.8	1554.8
5	40	0	0	800	1812.2	1841.5	1807.3	1826.7	1819.8	1808.8	1808.8	1808.8	1808.8
6	40	0	6	800	1669.2	1656.7	1579.3	1753.5	1668.4	1724.1	1724.1	1724.1	1724.1
7	40	0	12	800	1599.5	1652.3	1701.6	1672.2	1620.7	1639.5	1639.5	1639.5	1639.5
8	40	0	18	800	1476.5	1570.8	1811.4	1605.1	1535.2	1554.8	1554.8	1554.8	1554.8
9	40	0	0	1000	1823.7	1851.3	1832.4	1847.4	1829.7	1808.8	1808.8	1808.8	1808.8
10	40	0	6	1000	1702.2	1702.8	1820.7	1782.0	1712.2	1724.1	1724.1	1724.1	1724.1
11	40	0	12	1000	1638.5	1621.3	NA	1824.1	1633.1	1639.5	1639.5	1639.5	1639.5
12	40	0	18	1000	1580.1	1560.7	NA	1684.2	1571.4	1554.8	1554.8	1554.8	1554.8
13	40	2	0	600	1790.1	1827.0	NA	1811.6	1804.0	1786.4	1786.4	1786.4	1786.4
14	40	2	6	600	1605.0	1717.6	1894.7	1684.0	1650.9	1701.7	1701.7	1701.7	1701.7
15	40	2	12	600	1529.3	1565.2	1794.7	1690.7	1555.3	1617.1	1617.1	1617.1	1617.1
16	40	2	18	600	1410.5	1525.9	NA	1856.4	1447.2	1532.4	1532.4	1532.4	1532.4
17	40	2	0	800	1816.7	1851.5	1852.7	1819.0	1825.5	1786.4	1786.4	1786.4	1786.4
18	40	2	6	800	1647.6	1695.9	NA	1818.6	1669.9	1701.7	1701.7	1701.7	1701.7
19	40	2	12	800	1574.2	1639.4	NA	1750.1	1611.0	1617.1	1617.1	1617.1	1617.1
20	40	2	18	800	1484.0	1472.1	1661.5	1674.2	1482.2	1532.4	1532.4	1532.4	1532.4
21	40	2	0	1000	1831.2	1842.0	1844.0	1833.1	1833.3	1786.4	1786.4	1786.4	1786.4
22	40	2	6	1000	1657.6	1696.9	1823.7	1693.8	1685.2	1701.7	1701.7	1701.7	1701.7
23	40	2	12	1000	1547.6	1610.3	NA	1831.0	1597.4	1617.1	1617.1	1617.1	1617.1
24	40	2	18	1000	1387.4	1518.0	NA	1855.7	1476.9	1532.4	1532.4	1532.4	1532.4
25	40	4	0	600	1796.5	1829.1	NA	1804.7	1808.3	1719.1	1719.1	1719.1	1719.1
26	40	4	6	600	1645.3	1642.8	1484.3	1603.0	1620.3	1634.4	1634.4	1634.4	1634.4
27	40	4	12	600	1445.9	1509.9	1437.4	1474.0	1466.0	1549.8	1549.8	1549.8	1549.8
28	40	4	18	600	1348.5	1558.2	1396.8	1399.8	1425.9	1465.1	1465.1	1465.1	1465.1
29	40	4	0	800	1814.1	1844.7	NA	1812.2	1821.4	1719.1	1719.1	1719.1	1719.1
30	40	4	6	800	1633.3	1664.3	1526.2	1593.2	1621.0	1634.4	1634.4	1634.4	1634.4
31	40	4	12	800	1510.5	1545.1	1444.9	1453.8	1495.9	1549.8	1549.8	1549.8	1549.8
32	40	4	18	800	1364.9	1538.3	1394.6	1429.8	1454.1	1465.1	1465.1	1465.1	1465.1
33	40	4	0	1000	1825.4	1850.4	1852.6	1830.0	1831.1	1719.1	1719.1	1719.1	1719.1
34	40	4	6	1000	1588.4	1630.3	1538.9	1566.4	1586.4	1634.4	1634.4	1634.4	1634.4
35	40	4	12	1000	1533.3	1535.5	1409.0	1464.7	1487.2	1549.8	1549.8	1549.8	1549.8
36	40	4	18	1000	1360.6	1562.9	1330.1	1402.1	1440.1	1465.1	1465.1	1465.1	1465.1

Table D-5. Geometry 5 – Saturation Flow Rate

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Running Time Results (Sec)			HCM 6th Edition Running Time Results		
					Segment 2	Segment 3	Segment 4	Segment 2	Segment 3	Segment 4
1	30	0	0	600	29.6	30.0	30.3	26.9	26.9	26.9
2	30	0	6	600	29.4	30.6	30.6	26.9	26.8	26.9
3	30	0	12	600	30.5	30.9	30.5	26.9	26.7	26.9
4	30	0	18	600	30.7	31.1	30.7	26.9	26.5	26.9
5	30	0	0	800	30.3	30.8	29.7	22.0	21.6	22.0
6	30	0	6	800	31.2	31.2	29.8	21.6	21.0	21.6
7	30	0	12	800	31.6	31.8	29.7	21.0	20.1	21.0
8	30	0	18	800	32.8	31.8	29.9	19.9	18.8	19.9
9	30	0	0	1000	30.6	31.3	31.5	26.9	26.1	26.9
10	30	0	6	1000	30.6	31.6	31.6	26.9	25.8	26.9
11	30	0	12	1000	31.7	31.7	31.6	26.9	25.5	26.9
12	30	0	18	1000	32.3	31.5	31.5	26.9	24.9	26.9
13	30	2	0	600	29.6	30.2	29.9	26.9	26.9	26.9
14	30	2	6	600	30.1	30.5	30.5	26.9	26.8	26.9
15	30	2	12	600	30.3	31.3	30.2	26.9	26.6	26.9
16	30	2	18	600	31.3	31.3	31.0	26.9	26.5	26.9
17	30	2	0	800	30.3	30.6	29.7	21.9	21.5	21.9
18	30	2	6	800	30.9	31.3	29.8	21.5	20.8	21.5
19	30	2	12	800	32.3	32.6	29.7	20.7	19.8	20.7
20	30	2	18	800	33.7	32.4	29.8	19.4	18.3	19.4
21	30	2	0	1000	29.9	30.9	31.5	26.9	26.1	26.9
22	30	2	6	1000	31.2	31.4	31.5	26.9	25.8	26.9
23	30	2	12	1000	31.1	31.3	31.6	26.9	25.3	26.9
24	30	2	18	1000	31.6	31.6	31.6	26.9	24.7	26.9
25	30	4	0	600	29.7	30.2	30.4	26.9	26.8	26.9
26	30	4	6	600	30.3	31.2	30.8	26.9	26.7	26.9
27	30	4	12	600	31.0	31.6	31.1	26.9	26.5	26.9
28	30	4	18	600	31.9	32.7	31.2	26.9	26.4	26.9
29	30	4	0	800	30.5	30.6	29.9	21.5	21.0	21.5
30	30	4	6	800	31.5	31.8	29.7	20.8	20.1	20.8
31	30	4	12	800	32.9	32.6	29.7	19.7	18.7	19.7
32	30	4	18	800	35.2	33.2	30.1	17.6	16.4	17.6
33	30	4	0	1000	30.7	31.4	31.5	26.9	25.8	26.9
34	30	4	6	1000	31.9	32.0	31.5	26.9	25.4	26.9
35	30	4	12	1000	32.6	32.8	31.9	26.9	24.8	26.9
36	30	4	18	1000	34.0	32.5	31.7	26.9	23.9	26.9

Table D-6. Geometry 1 – Running Time

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Running Time Results (Sec)			HCM 6th Edition Running Time Results (Sec)		
					Segment 2	Segment 3	Segment 4	Segment 2	Segment 3	Segment 4
1	40	0	0	600	46.2	67.2	45.6	45.0	65.9	45.0
2	40	0	6	600	46.6	67.0	45.6	45.0	65.9	45.0
3	40	0	12	600	47.0	67.6	46.5	45.0	65.9	45.0
4	40	0	18	600	48.1	67.6	46.5	44.9	65.9	44.9
5	40	0	0	800	48.1	70.5	51.3	43.0	64.5	43.0
6	40	0	6	800	49.2	70.8	51.9	42.9	64.4	42.9
7	40	0	12	800	50.2	71.4	53.1	42.8	64.3	42.8
8	40	0	18	800	51.8	72.1	54.0	42.7	64.1	42.7
9	40	0	0	1000	53.3	69.2	45.1	42.7	64.2	42.7
10	40	0	6	1000	52.5	72.3	46.0	42.5	64.0	42.5
11	40	0	12	1000	54.4	74.2	46.5	42.2	63.6	42.2
12	40	0	18	1000	53.9	74.5	46.6	41.6	63.1	41.6
13	40	2	0	600	46.0	67.7	46.4	45.0	65.9	45.0
14	40	2	6	600	46.6	68.2	46.8	45.0	65.9	45.0
15	40	2	12	600	47.2	68.2	46.9	45.0	65.9	45.0
16	40	2	18	600	48.2	68.2	46.9	45.0	65.9	45.0
17	40	2	0	800	48.1	70.8	51.1	43.0	64.5	43.0
18	40	2	6	800	49.3	71.3	52.2	42.9	64.4	42.9
19	40	2	12	800	50.2	71.4	52.9	42.8	64.3	42.8
20	40	2	18	800	51.4	72.3	54.1	42.6	64.1	42.6
21	40	2	0	1000	47.5	71.6	45.4	42.7	64.1	42.7
22	40	2	6	1000	51.8	73.1	46.3	42.4	63.9	42.4
23	40	2	12	1000	53.5	74.5	46.8	42.0	63.5	42.0
24	40	2	18	1000	54.2	74.8	47.0	41.4	62.8	41.4
25	40	4	0	600	46.1	67.2	45.4	45.0	65.9	45.0
26	40	4	6	600	47.8	71.5	47.7	45.0	65.9	45.0
27	40	4	12	600	51.2	77.8	51.6	45.0	65.9	45.0
28	40	4	18	600	54.1	82.6	55.2	45.0	65.9	45.0
29	40	4	0	800	48.2	70.4	51.2	42.9	64.4	42.9
30	40	4	6	800	51.1	75.5	52.8	42.8	64.3	42.8
31	40	4	12	800	56.8	80.7	55.7	42.6	64.1	42.6
32	40	4	18	800	58.2	82.6	56.5	42.4	63.9	42.4
33	40	4	0	1000	52.8	69.5	45.6	42.5	63.9	42.5
34	40	4	6	1000	56.1	81.6	54.0	42.1	63.6	42.1
35	40	4	12	1000	59.6	88.8	58.8	41.5	63.0	41.5
36	40	4	18	1000	64.7	93.7	60.9	40.3	61.8	40.3

Table D-7. Geometry 2 – Running Time

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Running Time Results (Sec)			HCM 6th Edition Running Time Results (Sec)		
					Segment 2	Segment 3	Segment 4	Segment 2	Segment 3	Segment 4
1	50	0	0	600	77.2	110.8	73.3	78.8	117.2	78.8
2	50	0	6	600	78.4	111.2	74.8	78.8	117.2	78.8
3	50	0	12	600	79.4	112.4	76.5	78.8	117.2	78.8
4	50	0	18	600	80.8	111.7	77.5	92.5	130.9	92.5
5	50	0	0	800	77.2	110.9	75.2	78.8	117.2	78.8
6	50	0	6	800	79.4	111.8	76.6	78.8	117.2	78.8
7	50	0	12	800	80.8	113.7	78.2	78.8	117.2	78.8
8	50	0	18	800	82.7	115.6	79.8	78.8	117.2	78.8
9	50	0	0	1000	78.5	114.1	75.5	78.8	117.2	78.8
10	50	0	6	1000	82.3	116.4	77.0	78.8	117.2	78.8
11	50	0	12	1000	84.9	117.7	78.5	78.8	117.2	78.8
12	50	0	18	1000	85.2	119.2	80.2	78.8	117.2	78.8
13	50	2	0	600	77.3	110.3	73.1	78.8	117.2	78.8
14	50	2	6	600	79.3	112.9	77.8	78.8	117.2	78.8
15	50	2	12	600	83.5	117.2	83.7	78.8	117.2	78.8
16	50	2	18	600	84.8	118.6	85.9	92.8	131.2	92.8
17	50	2	0	800	77.9	111.1	75.3	78.8	117.2	78.8
18	50	2	6	800	82.1	116.8	81.6	78.8	117.2	78.8
19	50	2	12	800	86.0	123.1	86.6	78.8	117.2	78.8
20	50	2	18	800	88.6	126.6	88.9	78.8	117.2	78.8
21	50	2	0	1000	79.4	114.5	75.5	78.8	117.2	78.8
22	50	2	6	1000	85.6	120.0	81.2	78.8	117.2	78.8
23	50	2	12	1000	89.2	123.4	85.2	78.8	117.2	78.8
24	50	2	18	1000	85.1	113.4	93.3	78.8	117.2	78.8
25	50	4	0	600	77.2	110.3	73.4	78.8	117.2	78.8
26	50	4	6	600	84.0	129.0	89.5	78.8	117.2	78.8
27	50	4	12	600	93.8	152.1	108.9	78.8	117.2	78.8
28	50	4	18	600	101.1	163.2	115.0	94.1	132.5	94.1
29	50	4	0	800	77.5	110.9	75.2	78.8	117.2	78.8
30	50	4	6	800	87.4	139.4	95.2	78.8	117.2	78.8
31	50	4	12	800	102.3	167.2	112.4	78.8	117.2	78.8
32	50	4	18	800	110.1	176.9	121.0	78.8	117.2	78.8
33	50	4	0	1000	80.3	115.8	75.6	78.8	117.2	78.8
34	50	4	6	1000	92.7	145.2	98.2	78.8	117.2	78.8
35	50	4	12	1000	107.1	181.3	125.0	78.8	117.2	78.8
36	50	4	18	1000	116.7	195.6	137.1	78.8	117.2	78.8

Table D-8. Geometry 3 – Running Time

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Running Time Results (Sec)			HCM 6th Edition Running Time Results (Sec)		
					Segment 2	Segment 3	Segment 4	Segment 2	Segment 3	Segment 4
1	30	0	0	600	57.4	86.8	58.1	48.6	71.5	48.6
2	30	0	6	600	57.8	87.2	58.2	48.6	71.5	48.6
3	30	0	12	600	58.5	87.8	58.6	48.6	71.5	48.6
4	30	0	18	600	59.7	88.4	58.9	48.6	71.5	48.6
5	30	0	0	800	59.3	87.6	60.6	48.6	71.5	48.6
6	30	0	6	800	60.3	89.5	61.4	48.6	71.5	48.6
7	30	0	12	800	61.6	90.9	61.4	48.6	71.5	48.6
8	30	0	18	800	61.5	92.3	62.1	48.6	71.5	48.6
9	30	0	0	1000	62.8	93.1	68.2	48.6	71.5	48.6
10	30	0	6	1000	64.6	95.0	70.2	48.6	71.5	48.6
11	30	0	12	1000	63.7	93.8	68.4	48.6	71.5	48.6
12	30	0	18	1000	66.2	93.7	68.0	48.6	71.5	48.6
13	30	2	0	600	57.5	86.9	58.2	48.6	71.5	48.6
14	30	2	6	600	57.6	87.1	58.3	48.6	71.5	48.6
15	30	2	12	600	58.5	87.8	58.7	48.6	71.5	48.6
16	30	2	18	600	59.5	88.7	58.6	48.6	71.5	48.6
17	30	2	0	800	59.1	88.0	60.8	48.6	71.5	48.6
18	30	2	6	800	60.3	90.0	61.2	48.6	71.5	48.6
19	30	2	12	800	62.0	92.4	61.6	48.6	71.5	48.6
20	30	2	18	800	61.5	90.0	61.3	48.6	71.5	48.6
21	30	2	0	1000	63.4	93.4	68.3	48.6	71.5	48.6
22	30	2	6	1000	65.2	95.4	69.0	48.6	71.5	48.6
23	30	2	12	1000	65.6	94.3	68.9	48.6	71.5	48.6
24	30	2	18	1000	69.1	91.5	65.3	48.6	71.5	48.6
25	30	4	0	600	57.2	87.0	58.0	48.6	71.5	48.6
26	30	4	6	600	58.4	88.1	58.5	48.6	71.5	48.6
27	30	4	12	600	60.0	89.9	59.3	48.6	71.5	48.6
28	30	4	18	600	61.5	91.3	59.8	48.6	71.5	48.6
29	30	4	0	800	58.9	87.1	60.6	48.6	71.5	48.6
30	30	4	6	800	61.4	91.3	61.2	48.6	71.5	48.6
31	30	4	12	800	62.9	93.6	62.2	48.6	71.5	48.6
32	30	4	18	800	62.8	93.6	62.6	48.6	71.5	48.6
33	30	4	0	1000	63.5	93.2	68.5	48.6	71.5	48.6
34	30	4	6	1000	65.7	94.0	67.2	48.6	71.5	48.6
35	30	4	12	1000	63.7	93.4	65.3	48.6	71.5	48.6
36	30	4	18	1000	65.2	93.0	65.6	48.6	71.5	48.6

Table D-9. Geometry 4 – Running Time

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Running Time Results (Sec)			HCM 6th Edition Running Time Results (Sec)		
					Segment 2	Segment 3	Segment 4	Segment 2	Segment 3	Segment 4
1	40	0	0	600	68.6	90.3	110.2	65.9	87.0	108.3
2	40	0	6	600	69.2	91.0	110.1	65.9	87.0	108.3
3	40	0	12	600	69.8	91.5	110.3	65.9	87.0	108.3
4	40	0	18	600	70.7	92.3	111.0	65.9	87.0	108.3
5	40	0	0	800	70.3	90.8	111.1	65.9	87.0	109.9
6	40	0	6	800	70.9	91.5	111.4	65.9	87.0	110.1
7	40	0	12	800	71.9	92.1	111.8	65.9	87.0	110.5
8	40	0	18	800	72.4	92.5	111.9	65.9	87.0	111.2
9	40	0	0	1000	71.6	91.1	112.1	65.9	87.0	108.3
10	40	0	6	1000	72.1	91.7	112.2	65.9	87.0	108.3
11	40	0	12	1000	72.0	92.3	111.8	65.9	87.0	108.3
12	40	0	18	1000	72.3	92.8	111.4	65.9	87.0	108.3
13	40	2	0	600	68.6	90.6	110.2	65.9	87.0	108.3
14	40	2	6	600	69.6	91.3	110.0	65.9	87.0	108.3
15	40	2	12	600	71.3	92.9	110.1	65.9	87.0	108.3
16	40	2	18	600	72.9	94.0	111.2	65.9	87.0	108.3
17	40	2	0	800	69.8	90.7	110.9	65.9	87.0	109.9
18	40	2	6	800	71.5	92.1	111.2	65.9	87.0	110.2
19	40	2	12	800	73.1	93.4	111.5	65.9	87.0	110.6
20	40	2	18	800	74.0	93.7	112.0	65.9	87.0	111.5
21	40	2	0	1000	71.7	91.2	112.4	65.9	87.0	108.3
22	40	2	6	1000	72.7	92.4	112.3	65.9	87.0	108.3
23	40	2	12	1000	73.4	93.5	111.9	65.9	87.0	108.3
24	40	2	18	1000	73.9	94.1	111.5	65.9	87.0	108.3
25	40	4	0	600	68.7	90.5	110.0	65.9	87.0	108.3
26	40	4	6	600	72.3	97.8	122.6	65.9	87.0	108.3
27	40	4	12	600	77.3	104.2	136.7	65.9	87.0	108.3
28	40	4	18	600	81.2	108.4	142.6	65.9	87.0	108.3
29	40	4	0	800	70.0	90.7	111.2	65.9	87.0	110.1
30	40	4	6	800	75.2	100.0	126.9	65.9	87.0	110.5
31	40	4	12	800	79.9	109.0	140.8	65.9	87.0	111.3
32	40	4	18	800	83.0	112.6	148.4	65.9	87.0	112.7
33	40	4	0	1000	71.3	91.0	112.4	65.9	87.0	108.3
34	40	4	6	1000	77.3	103.1	133.2	65.9	87.0	108.3
35	40	4	12	1000	80.4	108.4	141.0	65.9	87.0	108.3
36	40	4	18	1000	83.4	109.8	145.3	65.9	87.0	108.3

Table D-10. Geometry 5 – Running Time

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Control Delay Results (Sec)				HCM 6th Edition Control Delay Results (Sec)			
					Intersection 1	Intersection 2	Intersection 3	Intersection 4	Intersection 1	Intersection 2	Intersection 3	Intersection 4
1	30	0	0	600	17.3	4.8	1.8	2.2	4.6	0.6	0.6	0.6
2	30	0	6	600	19.4	7.4	2.2	2.3	4.8	0.7	0.7	0.7
3	30	0	12	600	20.6	5.6	2.2	2.3	5.0	0.8	0.8	0.8
4	30	0	18	600	21.5	6.4	1.9	2.2	5.3	0.9	0.9	0.9
5	30	0	0	800	18.4	8.6	2.1	3.2	3.0	5.9	5.9	5.9
6	30	0	6	800	19.7	9.6	2.0	3.6	3.2	6.5	6.5	6.5
7	30	0	12	800	21.1	10.8	1.9	4.0	3.4	7.4	7.4	7.4
8	30	0	18	800	23.2	11.2	2.5	4.9	3.7	8.7	8.7	8.7
9	30	0	0	1000	19.8	7.1	2.2	3.8	2.3	1.4	1.4	1.4
10	30	0	6	1000	20.6	7.8	2.3	3.6	2.6	1.6	1.6	1.6
11	30	0	12	1000	22.4	8.0	2.3	3.7	3.0	2.0	2.0	2.0
12	30	0	18	1000	23.6	10.1	3.2	4.2	3.5	2.6	2.6	2.6
13	30	2	0	600	18.1	4.9	1.9	2.4	4.6	0.6	0.6	0.6
14	30	2	6	600	20.0	5.7	2.0	2.2	4.8	0.7	0.7	0.7
15	30	2	12	600	20.8	7.3	2.0	2.4	5.0	0.8	0.8	0.8
16	30	2	18	600	26.5	7.5	2.0	2.2	5.3	1.0	1.0	1.0
17	30	2	0	800	18.1	8.9	2.1	3.1	3.0	6.0	6.0	6.0
18	30	2	6	800	20.5	10.6	2.0	3.6	3.2	6.7	6.7	6.7
19	30	2	12	800	23.9	11.2	2.1	4.9	3.5	7.6	7.6	7.6
20	30	2	18	800	26.3	11.9	2.3	5.5	3.8	9.1	9.1	9.1
21	30	2	0	1000	19.7	7.2	2.4	3.8	2.4	1.4	1.4	1.4
22	30	2	6	1000	22.1	8.2	2.2	3.6	2.7	1.7	1.7	1.7
23	30	2	12	1000	26.6	8.9	3.0	3.9	3.1	2.2	2.2	2.2
24	30	2	18	1000	25.7	9.8	3.9	4.9	3.7	2.8	2.8	2.8
25	30	4	0	600	17.6	4.8	1.8	2.1	4.8	0.7	0.7	0.7
26	30	4	6	600	21.1	6.6	2.1	2.3	5.0	0.8	0.8	0.8
27	30	4	12	600	24.3	8.4	2.5	2.8	5.3	0.9	0.9	0.9
28	30	4	18	600	34.2	9.6	3.4	3.1	5.6	1.1	1.1	1.1
29	30	4	0	800	18.7	9.0	2.3	3.1	3.2	6.5	6.5	6.5
30	30	4	6	800	21.7	10.6	2.5	5.1	3.4	7.4	7.4	7.4
31	30	4	12	800	29.2	12.0	3.1	7.4	3.7	8.8	8.8	8.8
32	30	4	18	800	32.1	14.5	4.3	9.1	4.2	11.0	11.0	11.0
33	30	4	0	1000	19.3	6.4	2.3	3.9	2.6	1.7	1.7	1.7
34	30	4	6	1000	24.8	9.3	2.4	3.4	3.0	2.1	2.1	2.1
35	30	4	12	1000	30.7	9.9	3.9	4.1	3.5	2.6	2.6	2.6
36	30	4	18	1000	29.8	10.9	5.3	4.6	4.6	3.5	3.5	3.5

Table D-11. Geometry 1 – Control Delay

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Control Delay Results (Sec)				HCM 6th Edition Control Delay Results (Sec)			
					Intersection 1	Intersection 2	Intersection 3	Intersection 4	Intersection 1	Intersection 2	Intersection 3	Intersection 4
1	40	0	0	600	19.2	4.9	6.2	19.0	6.0	1.4	1.4	1.4
2	40	0	6	600	20.4	5.6	6.0	19.4	6.2	1.4	1.4	1.4
3	40	0	12	600	23.0	7.5	5.5	19.3	6.5	1.6	1.6	1.6
4	40	0	18	600	26.3	7.0	5.2	19.4	7.1	20.3	20.3	20.3
5	40	0	0	800	22.1	6.9	9.1	18.6	4.9	0.9	0.9	0.9
6	40	0	6	800	23.8	8.9	9.5	18.6	5.2	1.1	1.1	1.1
7	40	0	12	800	27.2	8.9	9.4	17.7	5.6	1.3	1.3	1.3
8	40	0	18	800	32.3	9.9	9.3	17.0	6.1	1.6	1.6	1.6
9	40	0	0	1000	22.8	9.1	12.0	9.6	5.0	1.6	1.6	1.6
10	40	0	6	1000	23.9	9.8	14.3	8.6	5.7	2.0	2.0	2.0
11	40	0	12	1000	26.3	10.4	14.6	9.5	7.0	2.6	2.6	2.6
12	40	0	18	1000	26.1	11.0	15.6	9.5	14.0	3.8	3.8	3.8
13	40	2	0	600	19.5	5.8	6.0	18.6	6.1	1.4	1.4	1.4
14	40	2	6	600	20.9	7.8	6.2	18.9	6.3	1.5	1.5	1.5
15	40	2	12	600	22.6	8.1	6.4	19.2	6.6	1.6	1.6	1.6
16	40	2	18	600	26.2	7.2	5.3	19.3	7.8	21.0	21.0	21.0
17	40	2	0	800	22.3	8.9	9.5	18.5	5.0	1.0	1.0	1.0
18	40	2	6	800	24.5	8.9	9.7	18.2	5.3	1.1	1.1	1.1
19	40	2	12	800	26.9	9.7	9.9	17.9	5.7	1.4	1.4	1.4
20	40	2	18	800	29.9	10.5	9.4	17.1	6.3	1.8	1.8	1.8
21	40	2	0	1000	22.0	9.3	12.4	4.5	5.2	1.7	1.7	1.7
22	40	2	6	1000	23.5	12.2	14.3	7.3	6.0	2.1	2.1	2.1
23	40	2	12	1000	26.3	13.1	14.9	7.3	7.6	2.9	2.9	2.9
24	40	2	18	1000	26.7	14.2	14.8	8.8	19.9	4.2	4.2	4.2
25	40	4	0	600	18.7	5.5	6.2	18.9	6.3	1.5	1.5	1.5
26	40	4	6	600	21.5	9.3	8.5	16.5	6.5	1.6	1.6	1.6
27	40	4	12	600	32.0	13.2	12.8	12.4	6.9	1.7	1.7	1.7
28	40	4	18	600	48.1	15.7	17.1	9.5	9.1	24.1	24.1	24.1
29	40	4	0	800	22.5	7.9	9.6	18.8	5.2	1.1	1.1	1.1
30	40	4	6	800	27.8	10.6	10.2	17.1	5.6	1.3	1.3	1.3
31	40	4	12	800	41.7	13.2	12.0	14.4	6.1	1.7	1.7	1.7
32	40	4	18	800	42.7	13.6	12.2	12.9	6.9	2.2	2.2	2.2
33	40	4	0	1000	22.8	9.6	11.6	9.6	5.8	2.0	2.0	2.0
34	40	4	6	1000	32.9	11.4	14.4	11.6	7.1	2.7	2.7	2.7
35	40	4	12	1000	34.5	12.7	15.5	14.6	15.2	3.9	3.9	3.9
36	40	4	18	1000	35.8	17.2	14.5	15.9	43.3	6.3	6.3	6.3

Table D-12. Geometry 2 – Control Delay

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Control Delay Results (Sec)				HCM 6th Edition Control Delay Results (Sec)			
					Intersection 1	Intersection 2	Intersection 3	Intersection 4	Intersection 1	Intersection 2	Intersection 3	Intersection 4
1	50	0	0	600	15.6	7.0	3.7	6.2	4.6	0.6	0.6	0.6
2	50	0	6	600	17.2	6.2	5.7	6.3	4.8	0.7	0.7	0.7
3	50	0	12	600	20.0	7.9	8.1	6.3	5.0	0.8	0.8	0.8
4	50	0	18	600	19.1	5.8	9.0	6.0	5.2	1.5	1.5	1.5
5	50	0	0	800	16.4	7.0	6.1	3.1	3.0	5.9	5.9	5.9
6	50	0	6	800	18.0	7.8	8.9	3.3	3.2	6.5	6.5	6.5
7	50	0	12	800	19.6	8.4	10.6	3.2	3.4	7.4	7.4	7.4
8	50	0	18	800	20.6	9.3	12.5	3.0	3.7	8.7	8.7	8.7
9	50	0	0	1000	17.4	8.2	4.5	9.8	2.3	1.4	1.4	1.4
10	50	0	6	1000	19.1	9.3	4.1	10.5	2.6	1.6	1.6	1.6
11	50	0	12	1000	19.5	9.4	3.9	11.9	3.0	2.0	2.0	2.0
12	50	0	18	1000	20.9	7.6	3.9	13.1	3.5	2.6	2.6	2.6
13	50	2	0	600	15.8	6.1	3.4	6.2	4.6	0.6	0.6	0.6
14	50	2	6	600	16.6	6.1	4.7	5.1	4.8	0.7	0.7	0.7
15	50	2	12	600	21.0	7.6	8.8	5.2	5.0	0.8	0.8	0.8
16	50	2	18	600	21.8	7.3	9.3	4.6	2.7	1.6	1.6	1.6
17	50	2	0	800	16.8	6.6	6.3	3.2	3.0	6.0	6.0	6.0
18	50	2	6	800	18.6	7.9	9.1	3.0	3.2	6.7	6.7	6.7
19	50	2	12	800	21.0	9.2	11.3	3.1	3.5	7.6	7.6	7.6
20	50	2	18	800	23.0	9.4	13.0	3.0	3.8	9.1	9.1	9.1
21	50	2	0	1000	17.8	7.7	4.9	9.1	2.4	1.4	1.4	1.4
22	50	2	6	1000	19.9	8.2	3.9	11.1	2.7	1.7	1.7	1.7
23	50	2	12	1000	21.4	7.0	3.5	12.8	3.1	2.2	2.2	2.2
24	50	2	18	1000	25.5	15.2	16.8	9.8	3.7	2.8	2.8	2.8
25	50	4	0	600	16.1	6.7	3.5	6.0	4.8	0.7	0.7	0.7
26	50	4	6	600	18.2	8.9	8.5	13.3	5.0	0.8	0.8	0.8
27	50	4	12	600	22.4	10.8	14.7	16.7	5.3	0.9	0.9	0.9
28	50	4	18	600	25.8	13.5	16.4	18.9	3.4	1.7	1.7	1.7
29	50	4	0	800	16.5	6.3	6.0	3.1	3.2	6.5	6.5	6.5
30	50	4	6	800	19.4	10.8	12.2	10.8	3.4	7.4	7.4	7.4
31	50	4	12	800	24.3	14.6	16.6	15.1	3.7	8.8	8.8	8.8
32	50	4	18	800	28.1	15.7	18.8	16.6	4.2	11.0	11.0	11.0
33	50	4	0	1000	17.7	8.4	4.8	8.4	2.6	1.7	1.7	1.7
34	50	4	6	1000	20.3	10.1	9.2	7.1	3.0	2.1	2.1	2.1
35	50	4	12	1000	28.7	11.9	6.5	5.1	3.5	2.6	2.6	2.6
36	50	4	18	1000	30.8	10.5	5.3	4.6	4.6	3.5	3.5	3.5

Table D-13. Geometry 3 – Control Delay

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Control Delay Results (Sec)				HCM 6th Edition Control Delay Results (Sec)			
					Intersection 1	Intersection 2	Intersection 3	Intersection 4	Intersection 1	Intersection 2	Intersection 3	Intersection 4
1	30	0	0	600	19.8	11.0	2.7	2.5	5.2	0.8	0.4	0.4
2	30	0	6	600	23.2	11.7	2.6	2.3	5.4	0.9	0.4	0.4
3	30	0	12	600	26.8	12.5	2.4	2.4	5.7	1.0	0.4	0.4
4	30	0	18	600	36.2	12.8	2.4	2.1	6.0	1.1	0.4	0.4
5	30	0	0	800	21.9	11.7	20.9	10.2	4.2	0.7	0.1	0.1
6	30	0	6	800	24.1	12.3	20.9	9.8	4.4	0.8	0.1	0.1
7	30	0	12	800	27.1	13.5	20.6	9.9	4.8	0.9	0.1	0.1
8	30	0	18	800	31.4	12.8	19.5	9.3	5.3	1.0	0.1	0.1
9	30	0	0	1000	22.0	12.7	14.0	20.3	3.5	0.9	0.1	0.1
10	30	0	6	1000	24.9	14.3	14.2	19.2	4.0	1.0	0.2	0.2
11	30	0	12	1000	26.1	13.7	14.4	19.1	5.1	1.2	0.2	0.2
12	30	0	18	1000	30.1	14.4	13.6	18.3	11.5	1.4	0.3	0.3
13	30	2	0	600	20.2	11.3	2.5	2.4	5.3	0.8	0.4	0.4
14	30	2	6	600	23.3	12.2	2.7	2.5	5.5	0.9	0.4	0.4
15	30	2	12	600	30.5	12.6	2.8	2.2	5.7	1.0	0.4	0.4
16	30	2	18	600	40.0	13.5	2.4	2.5	6.1	1.1	0.4	0.4
17	30	2	0	800	22.1	12.9	20.7	10.1	4.2	0.7	0.1	0.1
18	30	2	6	800	27.0	13.5	20.5	9.6	4.5	0.8	0.1	0.1
19	30	2	12	800	33.6	14.1	20.1	8.7	4.9	0.9	0.1	0.1
20	30	2	18	800	32.8	14.5	19.3	7.9	5.5	1.1	0.2	0.2
21	30	2	0	1000	22.1	13.8	14.1	20.1	3.6	0.9	0.1	0.1
22	30	2	6	1000	27.8	14.8	14.6	19.3	4.2	1.0	0.2	0.2
23	30	2	12	1000	27.6	15.1	14.5	18.7	5.6	1.2	0.3	0.3
24	30	2	18	1000	31.2	16.3	15.0	18.7	17.4	1.5	0.4	0.4
25	30	4	0	600	20.1	11.3	2.7	2.4	5.4	0.9	0.4	0.4
26	30	4	6	600	25.0	12.1	3.1	2.8	5.7	1.0	0.4	0.4
27	30	4	12	600	38.2	13.2	3.3	3.6	6.0	1.1	0.4	0.4
28	30	4	18	600	51.3	14.5	4.6	3.9	6.4	1.2	0.5	0.5
29	30	4	0	800	21.3	11.6	21.2	10.3	4.4	0.8	0.1	0.1
30	30	4	6	800	30.4	14.6	20.4	8.8	4.8	0.9	0.1	0.1
31	30	4	12	800	37.6	14.7	19.2	7.2	5.3	1.0	0.2	0.2
32	30	4	18	800	50.1	14.0	18.0	6.3	6.1	1.2	0.2	0.2
33	30	4	0	1000	22.1	13.6	14.3	20.1	4.0	1.0	0.2	0.2
34	30	4	6	1000	30.6	16.1	15.1	19.7	5.2	1.2	0.2	0.2
35	30	4	12	1000	38.6	15.6	13.7	19.1	12.7	1.5	0.4	0.4
36	30	4	18	1000	52.1	15.7	14.2	18.6	53.9	1.9	0.7	0.7

Table D-14. Geometry 4 – Control Delay

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Control Delay Results (Sec)				HCM 6th Edition Control Delay Results (Sec)			
					Intersection 1	Intersection 2	Intersection 3	Intersection 4	Intersection 1	Intersection 2	Intersection 3	Intersection 4
1	40	0	0	600	19.0	9.5	2.5	8.4	21.9	12.6	12.6	12.6
2	40	0	6	600	19.2	10.3	2.6	8.7	22.9	13.2	13.2	13.2
3	40	0	12	600	21.6	10.2	2.4	7.9	24.1	14.1	14.1	14.1
4	40	0	18	600	25.9	10.6	2.3	7.3	26.1	15.2	15.2	15.2
5	40	0	0	800	19.9	8.7	2.3	7.8	10.1	16.7	16.7	16.7
6	40	0	6	800	27.2	9.9	2.1	7.4	10.8	19.3	19.3	19.3
7	40	0	12	800	40.2	10.3	2.6	6.7	11.6	23.7	23.7	23.7
8	40	0	18	800	47.0	10.6	2.6	6.3	12.7	32.1	32.1	32.1
9	40	0	0	1000	21.0	8.2	2.9	7.2	2.3	1.4	1.4	1.4
10	40	0	6	1000	36.5	10.2	2.9	6.7	2.6	1.6	1.6	1.6
11	40	0	12	1000	44.7	10.3	2.4	6.9	3.0	2.0	2.0	2.0
12	40	0	18	1000	47.4	10.7	2.2	6.6	3.5	2.6	2.6	2.6
13	40	2	0	600	18.9	9.3	2.4	8.6	22.1	12.8	12.8	12.8
14	40	2	6	600	20.0	9.9	2.7	8.3	23.2	13.4	13.4	13.4
15	40	2	12	600	25.0	10.7	2.3	7.7	24.6	14.3	14.3	14.3
16	40	2	18	600	31.6	11.1	2.1	6.4	27.0	15.6	15.6	15.6
17	40	2	0	800	20.3	9.0	2.4	7.7	10.3	17.2	17.2	17.2
18	40	2	6	800	31.8	10.1	2.3	7.2	10.9	20.2	20.2	20.2
19	40	2	12	800	47.1	10.8	2.5	6.5	11.8	25.4	25.4	25.4
20	40	2	18	800	50.4	10.5	2.4	6.1	13.1	35.3	35.3	35.3
21	40	2	0	1000	21.0	8.5	2.3	6.9	2.4	1.4	1.4	1.4
22	40	2	6	1000	39.4	10.2	2.7	6.3	2.7	1.7	1.7	1.7
23	40	2	12	1000	48.7	10.6	2.6	6.1	3.1	2.2	2.2	2.2
24	40	2	18	1000	52.0	10.4	2.0	5.8	3.7	2.8	2.8	2.8
25	40	4	0	600	18.4	9.5	2.1	8.4	22.9	13.3	13.3	13.3
26	40	4	6	600	21.6	11.4	9.6	11.0	24.2	14.1	14.1	14.1
27	40	4	12	600	29.0	11.3	15.5	14.9	26.3	15.3	15.3	15.3
28	40	4	18	600	39.7	12.7	17.5	16.6	34.5	17.0	17.0	17.0
29	40	4	0	800	19.9	9.0	2.5	8.0	10.8	19.5	19.5	19.5
30	40	4	6	800	34.5	11.7	10.8	12.1	11.6	24.1	24.1	24.1
31	40	4	12	800	50.8	13.3	17.0	16.2	12.8	32.7	32.7	32.7
32	40	4	18	800	56.1	13.1	18.9	18.4	14.8	48.6	48.6	48.6
33	40	4	0	1000	21.9	8.8	2.8	6.8	2.6	1.7	1.7	1.7
34	40	4	6	1000	41.0	13.3	13.9	14.4	3.0	2.1	2.1	2.1
35	40	4	12	1000	52.5	12.8	16.9	16.4	3.5	2.6	2.6	2.6
36	40	4	18	1000	57.9	12.4	17.3	17.2	4.6	3.5	3.5	3.5

Table D-15. Geometry 5 – Control Delay

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Average Speed Results (mi/hr)				HCM 6th Edition Average Speed Results (mi/hr)			
					Segment 2	Segment 3	Segment 4	Overall	Segment 2	Segment 3	Segment 4	Overall
1	30	0	0	600	26.2	28.3	27.7	26.6	32.8	32.8	32.8	32.8
2	30	0	6	600	24.5	27.5	27.4	25.6	32.6	32.6	32.6	32.6
3	30	0	12	600	24.9	27.2	27.4	25.7	32.5	32.5	32.5	32.5
4	30	0	18	600	24.3	27.3	27.4	25.5	32.4	32.4	32.4	32.4
5	30	0	0	800	23.2	27.3	27.3	25.2	32.2	32.2	32.2	32.2
6	30	0	6	800	22.1	27.1	26.9	24.5	32.1	32.1	32.1	32.1
7	30	0	12	800	21.2	26.8	26.7	24.0	31.8	31.8	31.8	31.8
8	30	0	18	800	20.4	26.3	25.9	23.3	31.6	31.6	31.6	31.6
9	30	0	0	1000	23.9	26.9	25.5	24.7	31.9	31.9	31.9	31.9
10	30	0	6	1000	23.4	26.6	25.6	24.5	31.6	31.6	31.6	31.6
11	30	0	12	1000	22.7	26.5	25.5	24.1	31.1	31.1	31.1	31.1
12	30	0	18	1000	21.2	25.9	25.2	23.2	30.5	30.5	30.5	30.5
13	30	2	0	600	26.1	28.0	27.9	26.6	32.7	32.7	32.7	32.7
14	30	2	6	600	25.2	27.7	27.5	26.0	32.6	32.6	32.6	32.6
15	30	2	12	600	24.0	27.0	27.6	25.4	32.5	32.5	32.5	32.5
16	30	2	18	600	23.2	27.0	27.1	25.0	32.3	32.3	32.3	32.3
17	30	2	0	800	23.0	27.6	27.5	25.2	32.2	32.2	32.2	32.2
18	30	2	6	800	21.7	27.0	27.0	24.4	32.0	32.0	32.0	32.0
19	30	2	12	800	20.7	26.0	26.0	23.3	31.7	31.7	31.7	31.7
20	30	2	18	800	19.8	26.0	25.6	22.8	31.5	31.5	31.5	31.5
21	30	2	0	1000	24.3	27.0	25.5	24.9	31.8	31.8	31.8	31.8
22	30	2	6	1000	22.9	26.8	25.6	24.3	31.5	31.5	31.5	31.5
23	30	2	12	1000	22.5	26.3	25.4	23.9	31.0	31.0	31.0	31.0
24	30	2	18	1000	21.8	25.3	24.7	23.1	30.3	30.3	30.3	30.3
25	30	4	0	600	26.1	28.1	27.7	26.5	32.6	32.6	32.6	32.6
26	30	4	6	600	24.4	27.0	27.2	25.5	32.5	32.5	32.5	32.5
27	30	4	12	600	22.8	26.3	26.5	24.5	32.4	32.4	32.4	32.4
28	30	4	18	600	21.7	25.0	26.3	23.5	32.2	32.2	32.2	32.2
29	30	4	0	800	22.8	27.3	27.2	25.0	32.1	32.1	32.1	32.1
30	30	4	6	800	21.4	26.3	25.8	23.7	31.9	31.9	31.9	31.9
31	30	4	12	800	20.0	25.2	24.2	22.3	31.6	31.6	31.6	31.6
32	30	4	18	800	18.1	24.0	23.0	20.8	31.4	31.4	31.4	31.4
33	30	4	0	1000	24.3	26.7	25.5	24.8	31.5	31.5	31.5	31.5
34	30	4	6	1000	21.9	26.2	25.8	23.8	31.1	31.1	31.1	31.1
35	30	4	12	1000	21.2	24.6	25.0	22.7	30.5	30.5	30.5	30.5
36	30	4	18	1000	20.0	23.8	24.8	22.1	29.6	29.6	29.6	29.6

Table D-16. Geometry 1 – Average Speed

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Average Speed Results (mi/hr)				HCM 6th Edition Average Speed Results (mi/hr)			
					Segment 2	Segment 3	Segment 4	Overall	Segment 2	Segment 3	Segment 4	Overall
1	40	0	0	600	35.3	36.8	27.8	32.6	38.9	40.1	38.9	39.3
2	40	0	6	600	34.5	37.0	27.7	32.4	38.8	40.1	38.8	39.2
3	40	0	12	600	33.0	36.9	27.4	31.9	38.7	40.0	38.7	39.1
4	40	0	18	600	32.7	37.1	27.3	31.8	27.6	31.3	27.6	28.8
5	40	0	0	800	32.7	33.9	25.8	30.3	41.0	41.3	41.0	41.1
6	40	0	6	800	31.0	33.6	25.5	29.7	40.9	41.2	40.9	41.0
7	40	0	12	800	30.5	33.4	25.4	29.4	40.8	41.2	40.8	40.9
8	40	0	18	800	29.2	33.2	25.4	28.9	40.6	41.0	40.6	40.8
9	40	0	0	1000	28.9	33.3	32.9	31.3	40.7	41.1	40.7	40.8
10	40	0	6	1000	28.9	31.2	33.0	30.6	40.5	40.9	40.5	40.6
11	40	0	12	1000	27.8	30.4	32.2	29.7	40.2	40.7	40.2	40.4
12	40	0	18	1000	27.7	30.0	32.1	29.4	39.7	40.4	39.7	39.9
13	40	2	0	600	34.7	36.7	27.7	32.4	38.9	40.1	38.9	39.3
14	40	2	6	600	33.0	36.3	27.4	31.7	38.8	40.1	38.8	39.2
15	40	2	12	600	32.6	36.2	27.2	31.5	38.7	40.0	38.7	39.1
16	40	2	18	600	32.5	36.7	27.2	31.6	27.3	31.1	27.3	28.5
17	40	2	0	800	31.6	33.6	25.9	30.0	40.9	41.3	40.9	41.1
18	40	2	6	800	31.0	33.3	25.6	29.6	40.9	41.2	40.9	41.0
19	40	2	12	800	30.1	33.2	25.4	29.2	40.7	41.1	40.7	40.9
20	40	2	18	800	29.1	33.0	25.3	28.8	40.6	41.0	40.6	40.7
21	40	2	0	1000	31.7	32.2	36.1	32.6	40.6	41.0	40.6	40.8
22	40	2	6	1000	28.1	30.9	33.6	30.3	40.4	40.9	40.4	40.6
23	40	2	12	1000	27.0	30.2	33.3	29.6	40.1	40.7	40.1	40.3
24	40	2	18	1000	26.3	30.1	32.3	29.1	39.5	40.3	39.5	39.7
25	40	4	0	600	34.9	36.8	28.0	32.6	38.8	40.1	38.8	39.2
26	40	4	6	600	31.6	33.7	28.0	30.7	38.7	40.0	38.7	39.1
27	40	4	12	600	28.0	29.8	28.1	28.3	38.6	39.9	38.6	39.0
28	40	4	18	600	25.8	27.1	27.8	26.5	26.1	30.0	26.1	27.4
29	40	4	0	800	32.1	33.7	25.7	30.1	40.9	41.2	40.9	41.0
30	40	4	6	800	29.2	31.5	25.7	28.5	40.8	41.1	40.8	40.9
31	40	4	12	800	25.7	29.1	25.7	26.6	40.6	41.0	40.6	40.8
32	40	4	18	800	25.1	28.5	26.0	26.3	40.4	40.9	40.4	40.6
33	40	4	0	1000	28.8	33.3	32.6	31.2	40.5	40.9	40.5	40.6
34	40	4	6	1000	26.7	28.1	27.4	27.1	40.2	40.7	40.2	40.3
35	40	4	12	1000	24.9	25.9	24.5	24.8	39.6	40.4	39.6	39.9
36	40	4	18	1000	22.0	25.0	23.5	23.3	38.6	39.6	38.6	38.9

Table D-17. Geometry 2 – Average Speed

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Average Speed Results (mi/hr)				HCM 6th Edition Average Speed Results (mi/hr)			
					Segment 2	Segment 3	Segment 4	Overall	Segment 2	Segment 3	Segment 4	Overall
1	50	0	0	600	42.8	47.1	45.3	44.7	45.3	45.8	45.3	45.5
2	50	0	6	600	42.5	46.2	44.4	43.9	45.3	45.8	45.3	45.5
3	50	0	12	600	41.2	44.8	43.5	42.7	45.2	45.8	45.2	45.4
4	50	0	18	600	41.6	44.7	43.1	42.7	38.3	40.8	38.3	39.1
5	50	0	0	800	42.8	46.2	46.0	44.6	42.5	43.9	42.5	43.0
6	50	0	6	800	41.3	44.7	45.1	43.3	42.2	43.7	42.2	42.7
7	50	0	12	800	40.4	43.5	44.2	42.3	41.8	43.4	41.8	42.3
8	50	0	18	800	39.1	42.2	43.5	41.2	41.2	42.9	41.2	41.7
9	50	0	0	1000	41.5	45.5	42.2	42.9	44.9	45.6	44.9	45.1
10	50	0	6	1000	39.3	44.8	41.1	41.6	44.8	45.4	44.8	45.0
11	50	0	12	1000	38.2	44.4	39.8	40.6	44.5	45.3	44.5	44.8
12	50	0	18	1000	38.8	43.9	38.6	40.2	44.2	45.1	44.2	44.5
13	50	2	0	600	43.1	47.5	45.4	44.9	45.3	45.8	45.3	45.5
14	50	2	6	600	42.2	45.9	43.4	43.5	45.3	45.8	45.3	45.4
15	50	2	12	600	39.5	42.9	40.5	40.7	45.2	45.8	45.2	45.4
16	50	2	18	600	39.1	42.2	39.8	40.1	38.1	40.7	38.1	39.0
17	50	2	0	800	42.6	46.0	45.9	44.4	42.4	43.8	42.4	42.9
18	50	2	6	800	40.0	42.9	42.6	41.5	42.1	43.6	42.1	42.6
19	50	2	12	800	37.8	40.2	40.2	39.1	41.6	43.3	41.6	42.2
20	50	2	18	800	36.7	38.7	39.2	37.9	40.9	42.7	40.9	41.5
21	50	2	0	1000	41.3	45.2	42.5	42.8	44.9	45.5	44.9	45.1
22	50	2	6	1000	38.4	43.6	39.0	40.1	44.7	45.4	44.7	44.9
23	50	2	12	1000	37.4	42.6	36.7	38.7	44.5	45.2	44.5	44.7
24	50	2	18	1000	35.9	41.5	34.9	36.5	44.1	45.0	44.1	44.4
25	50	4	0	600	42.9	47.4	45.4	44.8	45.3	45.8	45.3	45.5
26	50	4	6	600	38.7	39.3	35.0	37.2	45.2	45.8	45.2	45.4
27	50	4	12	600	34.4	32.4	28.7	31.3	45.1	45.7	45.1	45.3
28	50	4	18	600	31.4	30.1	26.9	29.0	37.6	40.2	37.6	38.5
29	50	4	0	800	43.0	46.2	46.0	44.6	42.2	43.6	42.2	42.7
30	50	4	6	800	36.7	35.6	34.0	34.9	41.8	43.3	41.8	42.3
31	50	4	12	800	30.8	29.4	28.2	29.1	41.1	42.9	41.1	41.7
32	50	4	18	800	28.6	27.6	26.2	27.1	40.1	42.1	40.1	40.8
33	50	4	0	1000	40.6	44.8	42.9	42.5	44.7	45.4	44.7	45.0
34	50	4	6	1000	35.0	35.0	34.2	34.4	44.5	45.3	44.5	44.8
35	50	4	12	1000	30.2	28.8	27.7	28.4	44.2	45.1	44.2	44.5
36	50	4	18	1000	28.3	26.9	25.4	25.9	43.7	44.7	43.7	44.1

Table D-18. Geometry 3 – Average Speed

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Average Speed Results (mi/hr)				HCM 6th Edition Average Speed Results (mi/hr)			
					Segment 2	Segment 3	Segment 4	Overall	Segment 2	Segment 3	Segment 4	Overall
1	30	0	0	600	26.3	30.2	29.7	28.4	36.4	37.5	36.7	36.9
2	30	0	6	600	25.9	30.1	29.8	28.3	36.4	37.5	36.7	36.9
3	30	0	12	600	25.4	29.9	29.5	28.0	36.3	37.5	36.7	36.9
4	30	0	18	600	24.8	29.8	29.5	27.7	36.3	37.5	36.7	36.8
5	30	0	0	800	25.4	24.9	25.4	24.8	36.5	37.7	37.0	37.1
6	30	0	6	800	24.8	24.5	25.3	24.4	36.5	37.7	37.0	37.1
7	30	0	12	800	24.0	24.2	25.2	24.0	36.4	37.7	37.0	37.0
8	30	0	18	800	24.2	24.1	25.2	24.1	36.3	37.7	36.9	37.0
9	30	0	0	1000	23.8	25.2	20.3	22.9	36.4	37.7	36.9	37.0
10	30	0	6	1000	22.8	24.7	20.1	22.4	36.3	37.7	36.9	37.0
11	30	0	12	1000	23.3	25.0	20.6	22.7	36.2	37.6	36.9	36.9
12	30	0	18	1000	22.3	25.2	20.9	22.6	36.0	37.6	36.8	36.8
13	30	2	0	600	26.2	30.2	29.7	28.4	36.4	37.5	36.7	36.9
14	30	2	6	600	25.8	30.1	29.6	28.2	36.4	37.5	36.7	36.9
15	30	2	12	600	25.3	29.8	29.5	27.9	36.3	37.5	36.7	36.9
16	30	2	18	600	24.7	29.7	29.5	27.6	36.2	37.5	36.7	36.8
17	30	2	0	800	25.0	24.9	25.4	24.7	36.5	37.7	37.0	37.1
18	30	2	6	800	24.4	24.4	25.4	24.3	36.5	37.7	37.0	37.0
19	30	2	12	800	23.7	24.0	25.6	24.0	36.4	37.7	36.9	37.0
20	30	2	18	800	23.7	24.7	26.0	24.4	36.2	37.7	36.9	36.9
21	30	2	0	1000	23.3	25.1	20.4	22.7	36.4	37.7	36.9	37.0
22	30	2	6	1000	22.5	24.6	20.4	22.3	36.3	37.7	36.9	36.9
23	30	2	12	1000	22.3	24.8	20.6	22.4	36.1	37.6	36.8	36.9
24	30	2	18	1000	21.1	25.4	21.4	22.3	35.9	37.6	36.7	36.7
25	30	4	0	600	26.3	30.1	29.8	28.4	36.4	37.5	36.7	36.9
26	30	4	6	600	25.6	29.6	29.3	27.9	36.3	37.5	36.7	36.9
27	30	4	12	600	24.6	29.0	28.6	27.1	36.3	37.5	36.7	36.8
28	30	4	18	600	23.7	28.2	28.3	26.4	36.2	37.5	36.7	36.8
29	30	4	0	800	25.5	24.9	25.4	24.8	36.5	37.7	37.0	37.1
30	30	4	6	800	23.7	24.2	25.7	24.1	36.4	37.7	37.0	37.0
31	30	4	12	800	23.2	24.0	26.0	23.9	36.3	37.7	36.9	37.0
32	30	4	18	800	23.5	24.2	26.1	23.3	36.1	37.7	36.9	36.9
33	30	4	0	1000	23.4	25.1	20.3	22.7	36.3	37.7	36.9	37.0
34	30	4	6	1000	22.0	24.8	20.7	22.4	36.2	37.6	36.9	36.9
35	30	4	12	1000	22.7	25.2	21.3	22.9	36.0	37.6	36.8	36.8
36	30	4	18	1000	22.3	25.2	21.4	22.5	35.6	37.4	36.5	36.5

Table D-19. Geometry 4 – Average Speed

Scenario #	Posted Speed (mi/hr)	% Grade	% Trucks	Volume (veh/lane)	SwashSim Average Speed Results (mi/hr)				HCM 6th Edition Average Speed Results (mi/hr)			
					Segment 2	Segment 3	Segment 4	Overall	Segment 2	Segment 3	Segment 4	Overall
1	40	0	0	600	34.6	38.8	37.9	36.8	34.4	36.2	37.2	35.9
2	40	0	6	600	34.0	38.5	37.9	36.6	34.1	35.9	37.0	35.7
3	40	0	12	600	33.8	38.4	38.1	36.5	33.8	35.6	36.8	35.4
4	40	0	18	600	33.2	38.1	38.1	36.3	33.3	35.2	36.4	35.0
5	40	0	0	800	34.2	38.7	37.8	36.7	32.7	34.7	35.6	34.3
6	40	0	6	800	33.4	38.5	37.9	36.4	31.7	33.9	34.8	33.5
7	40	0	12	800	32.9	38.0	38.0	36.1	30.1	32.5	33.5	32.1
8	40	0	18	800	32.6	37.8	38.1	36.0	27.6	30.2	31.4	29.7
9	40	0	0	1000	33.8	38.3	37.7	36.4	40.1	40.8	41.0	40.6
10	40	0	6	1000	32.8	38.1	37.9	36.1	40.0	40.6	40.9	40.5
11	40	0	12	1000	32.8	38.0	37.9	36.1	39.8	40.5	40.8	40.3
12	40	0	18	1000	32.6	37.9	38.1	36.1	39.4	40.2	40.6	40.1
13	40	2	0	600	34.6	38.8	37.9	36.8	34.3	36.1	37.2	35.9
14	40	2	6	600	34.0	38.3	38.1	36.6	34.0	35.9	37.0	35.6
15	40	2	12	600	32.9	37.8	38.2	36.2	33.7	35.5	36.7	35.3
16	40	2	18	600	32.1	37.5	38.3	35.9	33.1	35.1	36.3	34.9
17	40	2	0	800	34.3	38.7	37.9	36.7	32.5	34.6	35.4	34.1
18	40	2	6	800	33.1	38.2	38.0	36.3	31.4	33.6	34.5	33.2
19	40	2	12	800	32.2	37.5	38.2	35.9	29.6	32.0	33.1	31.6
20	40	2	18	800	32.0	37.5	38.1	35.8	26.7	29.4	30.6	28.9
21	40	2	0	1000	33.7	38.5	37.7	36.4	40.1	40.7	41.0	40.6
22	40	2	6	1000	32.6	37.9	38.0	36.0	39.9	40.6	40.9	40.5
23	40	2	12	1000	32.1	37.5	38.1	35.8	39.7	40.4	40.7	40.3
24	40	2	18	1000	32.0	37.4	38.3	35.9	39.3	40.1	40.5	40.0
25	40	4	0	600	34.5	38.9	38.0	36.9	34.1	35.9	37.0	35.7
26	40	4	6	600	32.3	33.5	33.7	32.9	33.7	35.6	36.7	35.4
27	40	4	12	600	30.5	30.1	29.7	29.6	33.3	35.2	36.4	35.0
28	40	4	18	600	28.7	28.6	28.3	28.2	32.6	34.6	35.9	34.4
29	40	4	0	800	34.2	38.6	37.8	36.6	31.6	33.8	34.7	33.4
30	40	4	6	800	31.1	32.5	32.4	31.7	30.0	32.4	33.4	32.0
31	40	4	12	800	29.0	28.6	28.7	28.4	27.4	30.1	31.2	29.6
32	40	4	18	800	28.1	27.4	27.0	27.1	23.6	26.6	27.9	26.0
33	40	4	0	1000	33.7	38.4	37.8	36.5	40.0	40.6	40.9	40.5
34	40	4	6	1000	29.8	30.8	30.5	30.1	39.7	40.4	40.8	40.3
35	40	4	12	1000	29.0	28.7	28.6	28.4	39.4	40.2	40.6	40.0
36	40	4	18	1000	28.19	28.33	27.7	27.69	38.88	39.77	40.22	39.63

Table D-20. Geometry 5 – Average Speed

Appendix E – Review of Existing Signal Priority

This section presents a brief review of truck signal priority (TkSP), an explanation of various field implementations, and a summary of performance impacts. This section also describes different TkSP strategies and their implementation benefits.

TkSP uses a strategy similar to transit signal priority (TSP). For transit, priority is given to a transit vehicle to reduce travel time and delay. For commercial trucks, priority is given to reduce hard stops and red-light running as well as to reduce delay. The two widely-used TkSP strategies are green time extension and early green time (red truncation).

A study by Kari et al. (2014) discusses implementation of connected vehicles for TkSP with a higher goal of reducing energy consumption and emissions. The authors considered traffic as a multi-agent system (MAS) and introduced a MAS-based eco-freight signal priority algorithm comprising two agents: 1) Vehicle Agent (VA), which is responsible for predicting time of arrival and requesting signal priority, and 2) Intersection Management Agent, which receives priority requests from several VAs and generates optimized signal timing to reduce delays/emissions. Simulations were conducted using Simulation of Urban Mobility (SUMO) along with Python Traffic Control Interface (TraCI). The results depict a reduction in travel time of freight vehicles by 26%. However, this study used up to a maximum of 20% trucks in the traffic stream, which does not fully represent the current Florida urban street segment traffic composition. In addition, a better prediction model might be used for predicting travel delays/emissions.

Zhao and Ioannou (2016) assessed a TkSP control framework for a signalized urban intersection. A particular focus was on the issue of whether extending a green interval to reduce the percentage of heavy trucks stopping at the intersection would have benefits for all vehicles. The suggested signal control framework uses a co-simulation advancement control to produce the traffic light sequence in a system of a signalized intersection. This study used a baseline signal generation stage and an active priority stage. In the first stage, the system attempts to determine the best signal sequence for a controlled intersection based on current traffic flow and predicted future traffic demand. The second stage is an active stage; the communication between approaching vehicles and the signal controller is necessary for this stage because it receives a request from approaching trucks.

To approximate the nonlinear function that estimates the number of vehicles and their class entering and leaving the intersection in the baseline signal generation problem formulation, this study used a simulation model that captures the majority of dynamic features and complexity of the network instead of using a mathematical model, which ignores much of the complicated dynamic phenomena and interactions. The network simulation model was formulated in VISSIM, a microscopic and behavior-based simulation software tool. The determined approach can be suitable for any quantifiable criteria that could be attained or calculated using simulations including vehicle travel delay, number of stops, and environmental impact. The active priority problem formulation is then divided into subsections such as priority request, action classification, priority action evaluation, and decision.

The results of the baseline signal generation stage and active priority stage were more favorable than traditional signal timing plans that do not explicitly consider truck priority and best signal sequence. For example, both system controllers reduced the network delay by 28–45% (Figure E-1) and the number of all vehicle stops by about 30% (Figure E-2). Furthermore, decreases in environmental impacts, such as reduced fuel consumption and reductions in the emissions of greenhouse gases were realized, compared to the traditional signal timing plan (Figure E-3). These developments are assumed to be more significant if the percentage of truck penetration is increased.

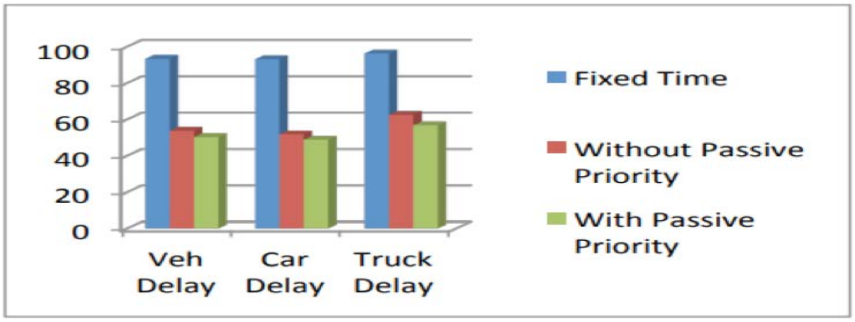


Figure E-1. Average delay for 20% truck penetration (unit: sec)
Source: Zhao and Ioannou (2016)

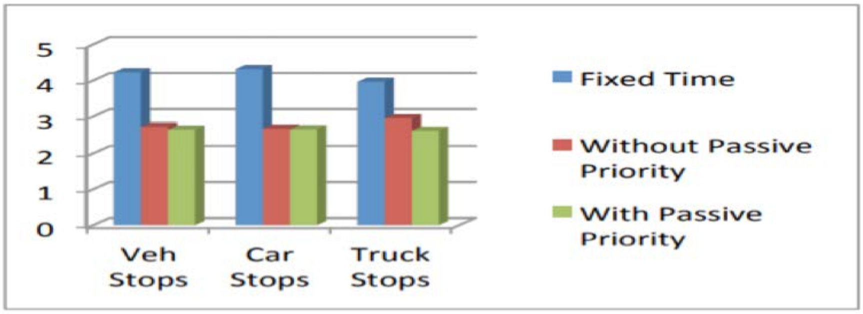


Figure E-2. Average number of vehicle stops for 20% truck penetration
Source: Zhao and Ioannou (2016)

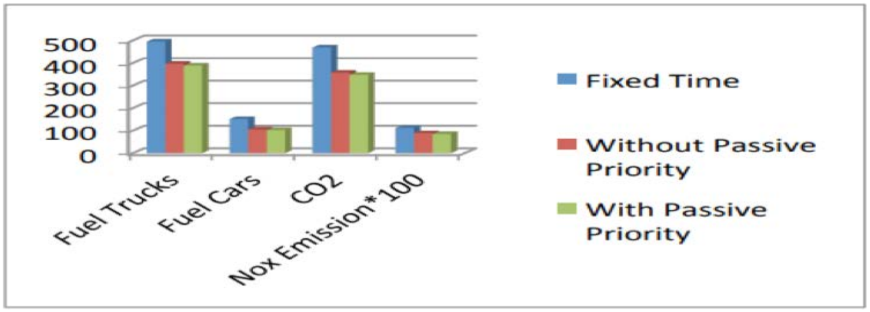


Figure E-3. Average emissions for 20% truck penetration (unit: g/km)
Source: Zhao and Ioannou (2016)

Ioannou (2015) gave a brief explanation of the background and functioning of existing TkSPs. In a typical TSP scheme, the priority is to reduce bus delay irrespective of the traffic demand in the opposite direction, whereas the TkSP is motivated by the objective of decreasing delays for all vehicles involved and minimizing pollution. Most TkSP studies focus on traffic delay and environmental effects and compare the commonly-used controller and controller with priority per those two benefits. Ioannou's (2015) study applied two different methods for traffic signal control with truck priority. The first method is predicting delays by using a neural network system and implementing a program to reduce these delays by creating suitable traffic light signal sequences. The second method is a combination of passive and active approaches and uses actual time simulations together with an optimization mechanism to generate the signal sequence.

The neural network-established model predicts short-term delays of all vehicles located in the network depending on the information of the passenger cars and trucks and also information attained from other signals. An algorithm to optimize the traffic delay was also developed. This algorithm optimizes the transition time of traffic signals and decreases the delay for every intersection by considering all other intersections. Thus, the algorithm reduces the overall delay of the traffic network.

The second method is a combination of passive priority and active priority. Passive priority refers to a situation in which the signal controller does not receive detection information specific to trucks—i.e., timing plan optimization is done with respect to all vehicles. Active priority, on the other hand, uses detection and communication technologies such that specific information about the arrivals of trucks can be considered in the timing plan configuration. A microscopic traffic simulator of a chosen street was developed in VISSIM, and the priority control calculations were executed in MATLAB/C++ and joined with the simulation environment by means of a Component Object Model (COM) interface.

The results from these two different controller schemes are different and depicted in Tables E-1 to E-4.

Table E-1. Acceleration Rates of Typical Car and Truck

Speed Range (mph)	**Acceleration Rates (ft/sec^2)**	
	Passenger Car	***Typical Truck***
0 – 20	7.5	1.6
20 – 30	6.5	1.3
30 – 40	5.9	0.7
40 – 50	5.2	0.7
50 – 60	4.6	0.3

Source: Ioannou (2015)

Table E-2. Road Network Results (3% Truck)

	Fixed Time	Proposed Controller 1		Proposed Controller 2	
		W/out Priority	***W/ Priority***	***W/out Priority***	***W/ Priority***
Avg. Delay/Veh (sec)	85.4	67.2	59.2	51.5	49.3
Avg. Delay/Car (sec)	85.1	67.3	59.5	52.2	49.1
Avg. Delay/Truck (sec)	88.1	65.2	52.1	63.3	55.5
Avg. Stops/Veh	3.84	2.91	2.73	2.76	2.73
Avg. Stops/Car	3.93	2.98	2.77	2.77	2.74
Avg. Stops/Truck	3.8	2.61	1.88	2.50	2.49
Fuel Trucks (g/km)	452.0	336.0	316.8	362.2	354.7
Fuel cars (g/km)	137.8	110.1	106.2	95.6	93.2
Fuel all veh. (g/km)	163.6	132.7	127.2	117.3	115.0
CO2 Emis. All (g/km)	427.9	347.1	333.0	325.5	316.8
NOx Emis. All (g/km)	1.01	0.82	0.78	0.80	0.76

Source: Ioannou (2015)

Table E-3. Road Network Results (10% Truck)

	Fixed Time	Proposed Controller 1		Proposed Controller 2	
		W/out Priority	***W/ Priority***	***W/out Priority***	***W/ Priority***
Avg. Delay/Veh (sec)	89.0	70.0	67.3	52.7	49.3
Avg. Delay/Car (sec)	88.7	70.2	67.6	51.6	48.2
Avg. Delay/Truck (sec)	91.8	68.0	64.1	62.7	59.3
Avg. Stops/Veh	4	2.95	2.71	2.72	2.67
Avg. Stops/Car	4.09	3	2.76	2.70	2.65
Avg. Stops/Truck	3.9	2.65	2.04	2.85	2.82
Fuel Trucks (g/km)	470.9	350.1	330.0	377.3	369.5
Fuel cars (g/km)	143.6	114.7	110.7	99.6	97.1
Fuel all veh. (g/km)	170.5	138.3	132.6	122.2	119.8
CO2 Emis. All (g/km)	445.8	361.6	346.9	339.1	330.1
NOx Emis. All (g/km)	1.06	0.86	0.82	0.84	0.80

Source: Ioannou (2015)

Table E-4. Road Network Results (20% Truck)

	Fixed Time	Proposed Controller 1		Proposed Controller 2	
		W/out Priority	W/ Priority	W/out Priority	W/ Priority
Avg. Delay/Veh (sec)	93.4	73.5	59.9	53.8	50.3
Avg. Delay/Car (sec)	93.1	73.7	60.3	51.8	48.8
Avg. Delay/Truck (sec)	96.3	71.4	56.6	62.5	56.8
Avg. Stops/Veh	4.22	3.10	2.82	2.73	2.65
Avg. Stops/Car	4.31	3.15	2.87	2.68	2.66
Avg. Stops/Truck	3.96	2.55	2.13	2.95	2.62
Fuel Trucks (g/km)	494.4	367.6	346.5	396.1	387.9
Fuel cars (g/km)	150.7	120.4	116.2	104.5	101.9
Fuel all veh. (g/km)	179.0	145.2	139.2	128.3	125.7
CO2 Emis. All (g/km)	468.0	379.6	364.2	356.0	346.6
NOx Emis. All (g/km)	1.11	0.90	0.86	0.88	0.84

Source: Ioannou (2015)

Mahmud (2014) performed a study similar to the previous study, focusing on evaluating the effects of TkSP at a high truck density intersection such as N Columbia Blvd and Martin Luther King Jr. Blvd in Portland, Oregon. VISSIM was used in this project as well. Mahmud's intersection setup consisted of a stopbar detector and another detector 650 ft upstream of the stopbar in the eastbound direction. The upstream detector classified the vehicles and communicated this information with the signal controller in VISSIM (Figure 4 and 5). Depending on the signal state and vehicle actuation/classification, the signal controller may increase the green time to decrease the likelihood of a hard braking stop of a truck at the stop bar. The signal controller places an extension of green time, as predefined depending on current clearance time on that approach. The classifier in VISSIM attains the actuation and averages from the two pairs of loops in the eastbound approach and determines the vehicle class and speed. Based on the signal state and the velocity of the truck, the program extends the green time for the approach.

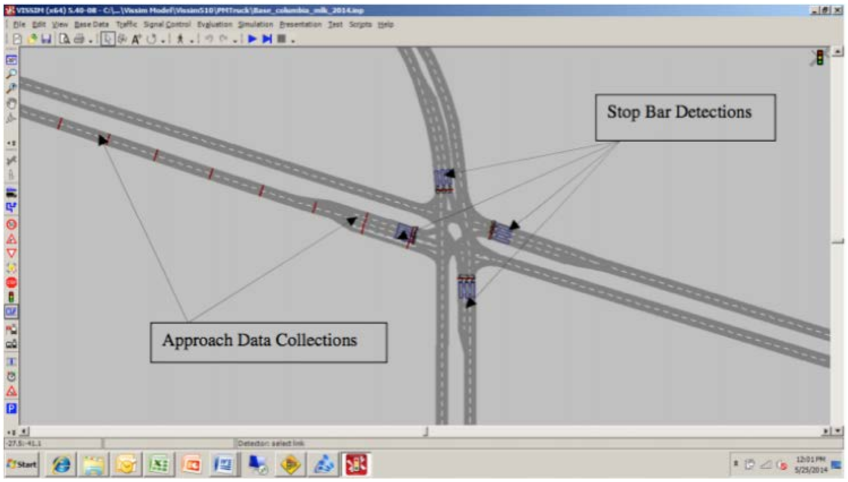


Figure E-4. Example of base model setup in VISSIM for study intersection
Source: Mahmud (2014)

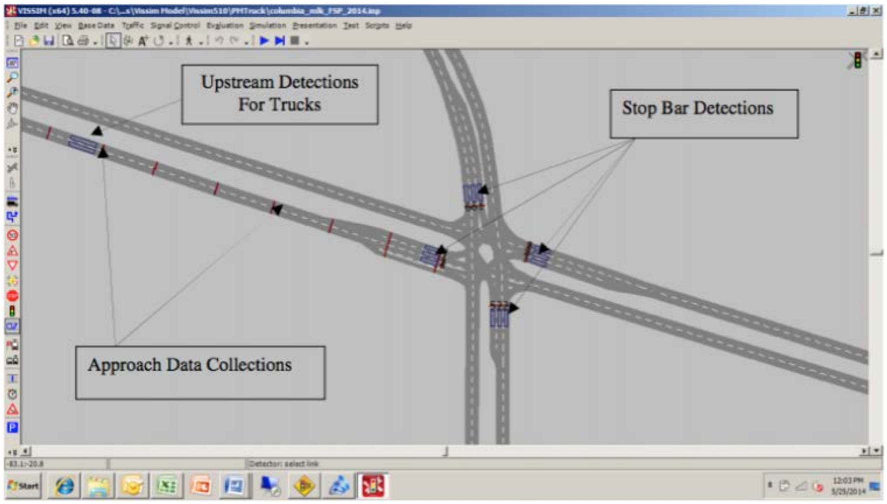


Figure E-5. Example of truck priority model setup in VISSIM for study intersection
Source: Mahmud (2014)

The results of this study demonstrate benefits in regards to the impact on truck operations and reliability, impact on total traffic stream, reduced carbon emission, as well as decreased pavement damage, travel delay, and number of truck stops (Tables E-5 and E-6).

Table E-5. Average Vehicular Delay Comparison

Direction of Travel	PM Peak Hour		PM Peak with More Truck		Mid Day Hour	
	Without Truck Priority	With Priority	Without Truck Priority	With Priority	Without Truck Priority	With Priority
	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)
EB All Vehicles	27	27	28	26	22	20
EB Truck Only	32	28	33	26	26	20
Intersection All Vehicles	30	30	29	29	25	25
Intersection Truck Only	37	36	35	31	29	28

Source: Mahmud (2014)

Table E-6. Average Stopped Delay Comparison

Direction of Travel	PM Peak Hour		PM Peak with More Truck		Mid Day Hour	
	Without Truck Priority	With Priority	Without Truck Priority	With Priority	Without Truck Priority	With Priority
	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)
EB All Vehicles	18	17	17	16	13	12
EB Truck Only	15	12	15	11	11	8
Intersection All Vehicles	20	20	19	19	17	17
Intersection Truck Only	20	19	18	16	14	14

Source: Mahmud (2014)

Another study, by Saunier and Kang (2008), evaluated and applied TkSP using a system for the detection and tracking of trucks with video sensors and evaluating different signal priority strategies using micro-simulation with VISSIM and VISVap. The TkSP strategies tested were green extension and red truncation. The project illustrated that the conventional system fell short, which means that it did not count in travel time from a check-in detector 156–312 ft upstream to the intersection, so a queue may extend beyond check-in detector. Issues raised included that roughly 10% of trucks are assumed to not be classified as trucks (detection errors). Moreover, 0.5% of non-truck road users are assumed to be classified as trucks. The study applied two strategies of signal priority—green extension and red truncation. The average of travel time and delay for all vehicles was improved, but was not found to be very significant (Tables E-8 and E-7).

Table E-7. Travel Times

Direction	Section	Distance (m)	Average Time (S)			Average Travel Time Change (%)	
			No TkSP	Conventional TkSP	Advanced TkSP	Conventional TkSP	Advanced TkSP
NB	57 to 47	1,060	92.5	94.1	89.0	1.67%	-3.81%
	47 to 37	1,023	100.0	103.4	103.1	3.43%	3.15%
	37 to 29	858	92.6	94.7	82.2	2.32%	-11.20%
	Total	2,941	285.1	292.2	274.4	2.50%	-3.77%
SB	29 to 37	858	71.9	68.3	67.8	-5.00%	-5.66%
	37 to 47	1,023	78.7	83.2	85.2	5.66%	8.26%
	47 to 57	1,060	108.3	108.3	110.2	-.04%	1.69%
	Total	2,941	258.9	259.8	263.2	0.32%	1.65%

Source: Saunier and Kang (2008)

Table E-8. Delay

Intersection		Approach	Average Delays and Volumes						Delay Changes (%)	
#	Streets		No TkSP		Conventional TkSP		Advanced TkSP		Conven-tional TkSP	Ad-vanced TkSP
			Delay*	Vol.	Delay*	Vol.	Delay*	Vol.		
3	Knight and E 33rd	NB	28.6	1,472	37.7	1,481	25.8	1,465	31.7%	-9.6%
		SB	10.5	709	9.0	710	9.4	710	-14.4%	-11.2%
		Knight	11.4	2,181	14.2	2,190	10.2	2,175	24.9%	-10.0%
		EB	17.5	663	15.6	663	18.6	666	-10.4%	6.6%
		WB	20.2	991	17.7	991	21.2	992	-12.1%	5.0%
		Cross	9.5	1,655	8.4	1,653	10.1	1,658	-11.5%	5.6%
		Total	21.2	3,836	23.5	3,843	20.3	3,833	10.8%	-3.9%
5	Knight and E 41st	NB	27.9	1,595	32.3	1,597	30.3	1,584	15.7%	8.4%
		SB	9.0	899	13.3	901	13.0	901	47.6%	44.0%
		Knight	10.6	2,494	12.7	2,498	12.0	2,485	20.6%	13.7%
		EB	23.1	1,029	21.8	1,028	23.5	1,030	-5.4%	2.1%
		WB	28.9	1,380	27.4	1,377	29.7	1,379	-5.3%	2.6%
		Cross	13.2	2,409	12.5	2,405	13.5	2,409	-5.3%	2.4%
		Total	23.7	4,903	25.2	4,904	25.5	4,894	6.3%	7.4%
7	Knight and E 49th	NB	19.5	1,586	22.0	1,584	17.1	1,590	12.7%	-12.5%
		SB	11.5	1,090	11.4	1,087	10.6	1,102	-1.1%	-7.4%
		Knight	8.1	2,676	8.8	2,671	7.2	2,692	8.8%	-11.1%
		EB	16.7	462	13.9	462	16.7	460	-16.8%	0.4%
		WB	17.8	1,033	15.8	1,034	18.2	1,031	-11.7%	2.0%
		Cross	8.7	1,494	7.6	1,495	8.9	1,491	-13.2%	1.5%
		Total	16.7	4,171	16.8	4,166	15.6	4,183	0.7%	-6.4%
Network Total			20.7	12,910	22.0	12,913	20.8	12,910	6.3%	0.6%

**Delay in sec.*

Liu et al. (2006) simulated TSP using the National Transportation Communications for ITS Protocol (NTCIP) architecture. Their paper demonstrates the advancement and utilization of a simulation model particularly intended for the design and assessment of TSP frameworks. The proposed simulation tool models in detail all the TSP parts as per the NTCIP standard for TSP frameworks. The study focused on how the assortment of TSP elements can be applied in microscopic simulation in a structured and systematic method. Sample applications of the model on a real roadway in California show its abilities and features.

The sample simulation model was generated in support of a study for developing advanced TSP strategies. One of the principal distinctions between the selective vehicle detection (SVD-based), zone detection, and area detection systems and the Automatic Vehicle Location (AVL-based) TSP system is that the latter grants further priority treatment options (e.g., queue jump, transit phase, recall, green hold, etc.). The sample application investigates the effect of detector locations (for SVD-based system) and actuation time (AVL-based) on the overall performance of TSP.

The test site comprised 12 signalized intersections. Bus dwell time was determined based on real data from SamTrans' GPS-equipped buses (Liu et al., 2004). Pedestrian demand was simulated by the "Walk" and flashing "Don't Walk" signal intervals, which were assumed to be activated once on every approach every five signal cycles. The bus frequency was set at six buses/hour during the analysis period. For SVD-based simulation, the check-in bus detectors were placed in different locations, and each scenario had a specific distance upstream of the intersection—150 m, 200 m, and 250 m. If the spacing between two intersections was shorter than 150 m, the check-out detector of the upstream intersection was used as the check-in detector of the downstream intersection. For the AVL-based approach, priority calls were placed when buses were 15, 20, 25, and 30 seconds away from the intersection.

The result, illustrated in Figure E-6, shows that placing the bus detectors 200 meters upstream of the intersections and triggering the signals when the buses are 25 s away from the intersections gave the minimum bus intersection delay. Figure E- 7 illustrates the effectiveness of various signal priority strategies regarding the reduced bus headway deviations. Table E-9 summarizes the average bus speeds, bus travel times, bus dwell time and signal delay in total bus travel times, and the time savings due to signal priority (in s and % of total travel time). This study illustrated how TSP was effective for reducing bus travel time; however, from Figure E-8 it can be observed that other vehicles' travel time was not affected.

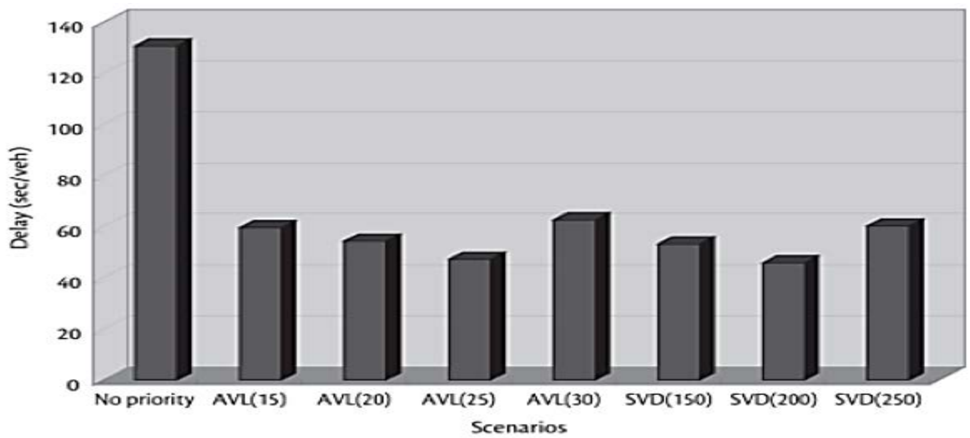


Figure E-6. Average bus intersection delay
Source: Liu et al. (2006)

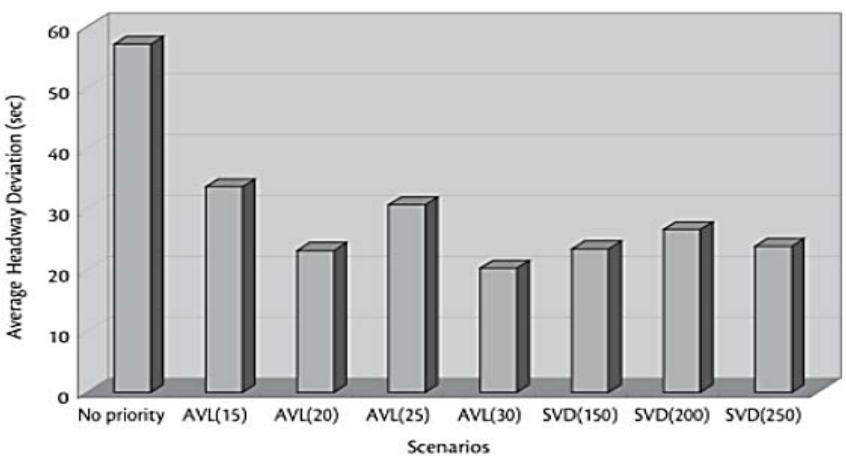


Figure E-7. Bus headway deviation
Source: Liu et al. (2006)

Table E-9 Sample MOE Analysis

Scenarios	Average travel time (sec)	Average Speed (mph)	Dwell time (% of travel time)	Signal delay		Time savings*	
				(sec)	(%)	(sec)	(%)
No priority	576	21	21.7%	131	22.7%	0	0.0%
AVL(15)	505	25	24.8%	60	11.8%	71	12.3%
AVL(20)	509	25	24.5%	54	10.6%	77	13.4%
AVL(25)	492	26	25.4%	47	9.6%	84	14.5%
AVL(30)	508	25	24.6%	63	12.3%	68	11.8%
SVD(150)	498	26	25.1%	53	10.7%	78	13.5%
SVD(200)	491	26	25.5%	46	9.3%	85	14.7%
SVD(250)	505	25	24.7%	60	11.9%	70	12.2%

Source: Liu et al. (2006)

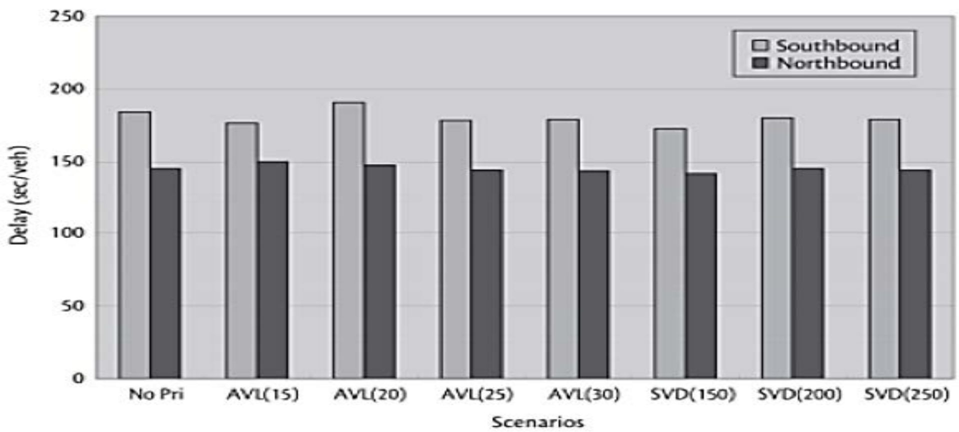


Figure E-8. Vehicle intersection delay
Source: Liu et al. (2006)

Appendix F – Python Automation Code

To most effectively calculate the results of the 180 scenarios, another automation code was generated and ran using Python software language to calculate the parameters, including Control Delay, Saturation Flow Rate, Average Speed, and Running Time. A sample results file from automation is shown in Figure E-1.

```
---------------------------------------------------------------------
--------2. Speed ----
Scenario :1 :: AvgSpeed: 26.53
Scenario :2 :: AvgSpeed: 25.46
Scenario :3 :: AvgSpeed: 24.46
Scenario :4 :: AvgSpeed: inf
Scenario :5 :: AvgSpeed: 24.96
Scenario :6 :: AvgSpeed: 23.66
Scenario :7 :: AvgSpeed: 22.31
Scenario :8 :: AvgSpeed: 20.8
Scenario :9 :: AvgSpeed: 24.76
Scenario :10 :: AvgSpeed: 23.75
Scenario :11 :: AvgSpeed: 22.74
Scenario :12 :: AvgSpeed: 22.05
---------------------------------------------------------------------
--------3. Stop Delay ----
Scenario : 1
         Link Id : 45   Delay: 13.57
         Link Id : 1213 Delay: 3.66
         Link Id : 2021 Delay: 1.38
         Link Id : 199200       Delay: 1.62
Scenario : 2
         Link Id : 45   Delay: 16.21
         Link Id : 1213 Delay: 5.05
         Link Id : 2021 Delay: 1.63
         Link Id : 199200       Delay: 1.76
Scenario : 3
         Link Id : 45   Delay: 18.67
         Link Id : 1213 Delay: 6.47
         Link Id : 2021 Delay: 1.95
         Link Id : 199200       Delay: 2.15
```

Figure F-1. Sample automation Python output

Using the above automation tool generated by the research team, the Simulation outputs were analyzed, and the four measures of interest were calculated for the 180 analysis scenarios.