Multimodal Level of Service Monitoring Program

Gainesville Metropolitan Area Traffic Congestion Management System

September 30, 2017

Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area

Multimodal Level of Service Monitoring Program

Gainesville Metropolitan Area Congestion Management Process

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Prepared for the

Metropolitan Transportation Planning Organization
for the Gainesville Urbanized Area
Technical Advisory Committee

With Assistance from:
North Central Florida Regional Planning Council
2009 NW 67th Place
Gainesville, FL 32653
352.955.2200

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Executive Summary

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Executive Summary

As a component of the ongoing Congestion Management Process, The Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area annually monitors average annual daily traffic and performs multimodal level of service analyses. The Multimodal Level of Service Monitoring Program document includes information regarding the data, their collection and analyses for automotive/highway (hereinafter highway), bicycle, pedestrian and transit modes of travel. The Multimodal Level of Service Monitoring Program covers all federal aid-eligible functionally classified collector and arterial roadways within the Gainesville Metropolitan Area Boundary. Annual reporting of multimodal level of service is provided in the Multimodal Level of Service Report. In addition, the Multimodal Level of Service Report-Technical Appendix includes LOSPLAN analysis reports.

Level of service analysis is in accordance with the criteria set in this document and the Highway Capacity Manual 6th Edition. The Florida Department of Transportation 2013 Quality/Level of Service Handbook, including its LOSPLAN suite of analytic software, is the primary tool used for analysis.

The Multimodal Level of Service Monitoring Program employs a two-tiered multimodal level of service roadway facility analysis. Tier One analysis utilizes Florida Department of Transportation's Generalized Tables. Florida Department of Transportation Generalized Tables are contained in an Florida Department of Transportation document entitled 2013 Quality/Level of Service Handbook. Tier Two analysis is required for all "distressed" arterials. A "distressed" arterial is one where current highway traffic uses 85 percent or more of the maximum service volume for the adopted level of service for that roadway in Florida Department of Transportation Generalized Tables. Tier Two analysis, which utilizes Florida Department of Transportation LOSPLAN software, is performed for all "distressed" arterials. These analyses are done to develop a more accurate level of service estimate than can be obtained using Florida Department of Transportation Generalized Tables. The LOSPLAN software package includes three programs:

- ARTPLAN, which analyses interrupted flow (signalized) roadway facilities;
- HIGHPLAN, which analyses uninterrupted flow (unsignalized) roadway facilities; and
- FREEPLAN, which analyses uninterrupted flow and limited access (unsignalized) roadway facilities.

ARTPLAN, HIGHPLAN or FREEPLAN, as appropriate, are also used to calculate the amount of service volume that the road actually has at a given level of service. ARTPLAN provides a more accurate calculation of an arterial's service volume than can be obtained using the Florida Department of Transportation Generalized Tables.

Congestion Management Process

The Multimodal Level of Service Monitoring Program is a key component for prioritizing bicycle facility, pedestrian facility, roadway facility and transit projects that address congestion management, in the Long Range Transportation Plan and Transportation Improvement Program. This document is intended to address the Moving Ahead for Progress in the 21st Century Act (MAP-21) and Florida Statutes Chapter 339.177(2) congestion management process requirements.

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Chapter I
Introduction

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Chapter I: Introduction

The Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area maintains a Congestion Management Process that includes updating and monitoring of the Mobility Plan and Multimodal Level of Service Monitoring Program. The Multimodal Level of Service Monitoring Program annually monitors average annual daily traffic and performs multimodal level of service analyses. The Multimodal Level of Service Monitoring Program document includes information regarding the data, their collection and analyses for automotive/highway (hereinafter highway), bicycle, pedestrian and transit modes of travel.

The Multimodal Level of Service Monitoring Program covers all federal aid-eligible functionally classified collector and arterial roadways within the Gainesville Metropolitan Area Boundary. Annual reporting of multimodal level of service is provided in the Multimodal Level of Service Report. In addition, the Multimodal Level of Service Report- Technical Appendix includes LOSPLAN analysis reports. All references to level of service within Chapter II address only highway level of service as described in the Highway Capacity Manual 6th Edition. This program provides estimates of the level of service and maximum service volume for arterials, collectors functioning as arterials, transitioning arterials and collectors, major nonstate roads and other nonstate roads within the Gainesville Metropolitan Area Boundary. Illustration I shows the Gainesville Metropolitan Area as defined by Chapter 339.175(1)(c), Florida Statutes. Illustration II identifies National Highway System facilities within the Gainesville Metropolitan Area Boundary. National Highway System-designated roadway facilities include:

Facility	From	To
Interstate 75 (State Road 93) [S-41, S-42, S-43, S-51, S-52]	Gainesville Metropolitan Area South Boundary	Gainesville Metropolitan Area North Boundary
State Road 20 (East University Avenue - Hawthorne Road) [S-8, S-48, S-49]	State Road 24 (Waldo Road)	Gainesville Metropolitan Area East Boundary
State Road 24 (Archer Road) [S-10, S-11]	Interstate 75 (State Road 93)	US 441 (SW 13 Street)
State Road 24 (Waldo Road) [S-12, S-13, S-59]	State Road 26 (East University Avenue)	Gainesville Metropolitan Area North Boundary
State Road 26 (Newberry Road - University Avenue) [S-14, S-15, S-16, S-17, S-18, S-19, S-45]	Gainesville Metropolitan Area West Boundary	State Road 24 (Waldo Road)
State Road 222 (NW 39 Avenue) [S-29, S-30, S-31, S-53, S-56]	Interstate 75 (State Road 93)	Gainesville Regional Airport Entrance / End of 4-lane
State Roads 121/331 (Williston Road) [S-38, S-39]	Interstate 75 (State Road 93)	State Road 26 (East University Avenue)
US 441 (State Road 25) [S-1, S-2, S-3, S-4, S-5, S-50]	Gainesville Metropolitan Area South Boundary	Gainesville Metropolitan Area North Boundary

National Highway System facilities within the Gainesville Metropolitan Area Boundary are subject to performance measures monitoring as required by the federal Fixing America's Surface Transportation Act.

Within the Gainesville Metropolitan Area, the level of service and maximum service volume methodology utilizes a two-tiered approach utilizing the Florida Department of Transportation Quality/Level of Service Handbook Generalized Tables and its companion LOSPLAN software to determine roadway level of service and maximum service volume. The 2013 Quality/Level of Service Handbook, is currently the latest edition.

Tier One Level of Service/Maximum Service Volume Analysis uses the Florida Department of Transportation Generalized Tables. Tier One Level of Service/Maximum Service Volume Analysis is acceptable for use in the Gainesville Metropolitan Area for all roadways with less than 85 percent of the Florida Department of Transportation Generalized Tables maximum service volume for the adopted level of service. Tier One analysis results are reported in the Multimodal Level of Service Report.

Tier Two Level of Service/Maximum Service Volume Analysis uses the Florida Department of Transportation LOSPLAN analytical software to determine roadway level of service and maximum service volume. Tier Two Level of Service/Maximum Service Volume Analysis is required for use in the Gainesville Metropolitan Area for all "distressed" roadways (85 percent or more of the Florida Department of Transportation Generalized Tables maximum service volume for the adopted level of service). The LOSPLAN software suite includes:

- ARTPLAN, which analyses interrupted flow (signalized) roadway facilities;
- HIGHPLAN, which analyses uninterrupted flow (unsignalized) roadway facilities; and
- FREEPLAN, which analyses uninterrupted flow and limited access (unsignalized) roadway facilities.

This program also monitors estimates of bicycle, pedestrian and transit level of service for arterials, collectors functioning as arterials, transitioning arterials and collectors, major nonstate roads and other nonstate roads within the Gainesville Metropolitan Area Boundary. Bicycle, pedestrian and transit level of service methodology also utilizes a two-tiered approach. Those facilities for which the highway level of service is analyzed using the Florida Department of Transportation Generalized Tables, are LOSPLAN-analyzed for bicycle, pedestrian and transit level of service using the Florida Department of Transportation Generalized Tables roadway default values, except for signal density (distance between signals). Those facilities for which the highway level of service is analyzed using Florida Department of Transportation LOSPLAN software, are also analyzed for bicycle, pedestrian and transit level of service using Florida Department of Transportation LOSPLAN software. Local development codes are used for determining completeness of pedestrian facilities. For example, a minor arterial requiring a sidewalk on only one roadside gets full credit where sidewalks are present on one side but not the opposite side.

A. Purpose

The primary purpose of this program is to provide an estimate of roadway level of service possible for each state-maintained arterials, city and county collectors functioning as arterials, transitioning arterials or collectors, major nonstate roads and other nonstate roads within the Gainesville Metropolitan Area Boundary. All roadways are analyzed using Florida Department of Transportation Generalized Tables.

The purpose of providing bicycle, pedestrian and transit level of service, in addition to the automotive/ highway level of service, is to inform and educate the Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area, Alachua County and City of Gainesville elected officials and staffs, as well as, the public at-large regarding the Gainesville Metropolitan Area's multimodal transportation system and to provide a mechanism to monitor the implementation of the Livable Community Reinvestment Plan.

The Multimodal Level of Service Monitoring Program is a component of the Traffic Congestion Management System within the Gainesville Metropolitan Area that is required by Chapter 339.177(2), Florida Statutes.

Illustration I
Gainesville Metropolitan Area

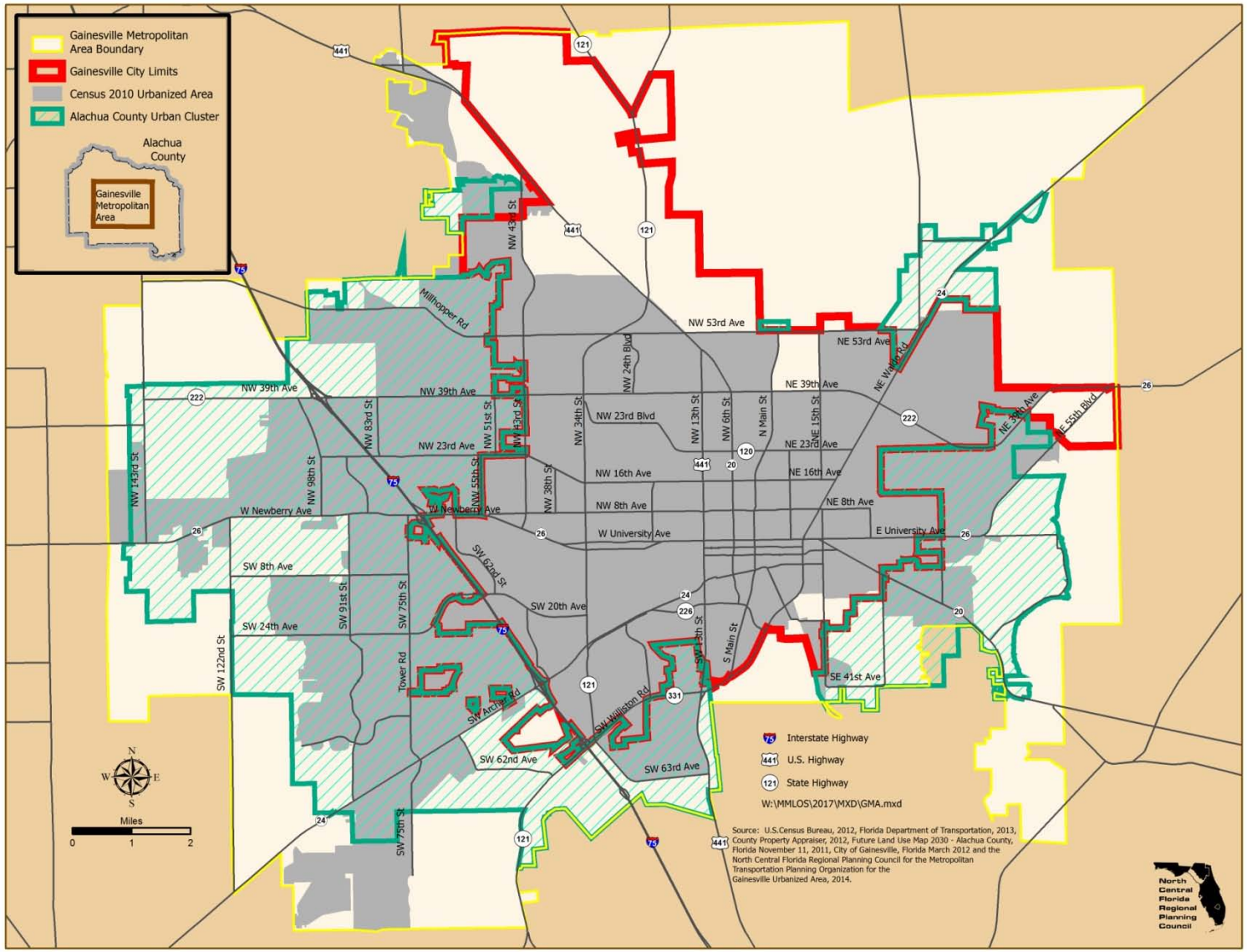

Illustration II
National Highway System Facilities

B. Scope of Study

The components and methodology for multimodal level of service analysis of all Florida Department of Transportation -functionally classified roadways within the Gainesville Metropolitan Area Boundary which are classified higher than local roads are included in this document.

1. Monitoring Program Components

Chapter II of this document includes automotive level of service analysis criteria, consisting of definitions, data collection requirements, data analysis requirements, highway level of service standards, traffic study procedures and methodology. Roadways which, when analyzed using the Florida Department of Transportation Generalized Tables, use 65 percent or more of the maximum service volume at the minimum acceptable level of service, are identified as "distressed."

Chapter III of this document includes the adopted level of service standards of the Florida Department of Transportation, Metropolitan Transportation Planning Organization for the Gainesville urbanized Area, Alachua County and the City of Gainesville.

Chapter IV of this document includes bicycle, pedestrian and transit level of service analysis criteria, consisting of definitions, data collection requirements, data analysis requirements, highway level of service standards, traffic study procedures and methodology.

2. Level of Service Annual Reporting Components

The Multimodal Level of Service Monitoring Program includes the publication of an annual Multimodal Level of Service Report.

Automotive/Highway level of service data for each roadway facility are provided for State-maintained, Alachua County-maintained and City of Gainesville-maintained roads within the Gainesville Metropolitan Area boundary. Tables 1-A and 1-B through Tables 3-A and 3-B provide median Annual Average Daily Traffic counts and Florida Department of Transportation Generalized Tables, ARTPLAN, HIGHPLAN or FREEPLAN level of service data for these roads, maximum service volumes, laneage, signal density, median and/or left turn adjustments and adopted level of service standards for these roads.

Tables 1-A and 1-B provide the automotive/ highway level of service and maximum service volume for the State-maintained arterials, Tables 2-A and 2-B provide the automotive/ highway level of service and maximum service volume for the Alachua County-maintained roads and Tables 3-A and 3-B provide the automotive/ highway level of service and maximum service volume for the City of Gainesville-maintained roads. The roads are labeled S (State), A (Alachua County) or G (City of Gainesville) and an assigned arterial number. For example, S-4 is the designation of U.S. 441 from State Road 26 (University Avenue) to NW 29 Road. Roadway facilities which are part of the Strategic Intermodal System, Florida Intrastate Highway System, Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area-designated multimodal corridors or are within a local government comprehensive plan-designated transportation mobility managed area are identified in the level of service tables.

In addition, Tables 4 through 12 provide multimodal levels of service by facility for, bicycle, pedestrian and transit modes. Tables 4, 7 and 10 provide the bicycle, pedestrian and transit levels of service, respectively, for the State-maintained arterials, Tables 5, 8 and 11 provide the bicycle, pedestrian and transit levels of service, respectively, for the Alachua County-maintained roads and Tables 6, 9 and 12

provide the bicycle, pedestrian and transit levels of service, respectively, for the City of Gainesville-maintained roads.

The Multimodal Level of Service Monitoring Program includes the publication of an annual Multimodal Level of Service Report- Technical Appendix. This Technical Appendix includes the LOSPLAN analysis reports for "distressed" facilities within the Gainesville Metropolitan Area.

3. Monitoring Program Updates

The Multimodal Level of Service Monitoring Program document will be updated, as needed, to coincide with updates and/or revisions to the:

- Highway Capacity Manual;
- Florida Department of Transportation Level of Service Handbook/LOSPLAN software; and
- Level of Service Standards.

Chapter II
Automotive/Highway Level of Service Analyses

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Chapter II: Automotive/Highway Level of Service Analyses

A. Definitions

ARTPLAN - ARTPLAN currently is an emulation of the 2010 Highway Capacity Manual software for the level of service measurement for an arterial roadway facility. The use of ARTPLAN entails the mathematical operations among average annual daily traffic (AADT) volume and traffic, roadway and signalization variables. ARTPLAN analyzes traffic in the peak and offpeak direction. The peak period peak direction is assumed in this study to be critical. Therefore, all analyses relate to the peak period and peak direction only. Offpeak direction is not considered for the Multimodal Level of Service Report. Local traffic characteristics are used which are specific to the particular road being analyzed. The ARTPLAN analysis methodology of the Multimodal Level of Service Report is based on the Florida Department of Transportation's Quality/Level of Service Handbook, appended with issues papers, and criteria specified by the Level of Service Subcommittee. The ARTPLAN software calculates facility-specific level of service and corresponding service volume tables.

FREEPLAN - FREEPLAN currently is an emulation of the 2010 Highway Capacity Manual software for freeways. The FREEPLAN software calculates facility-specific level of service and corresponding service volume tables.

HIGHPLAN - HIGHPLAN currently is an emulation of the 2010 Highway Capacity Manual software for two-lane and multilane highways. The HIGHPLAN software calculates facility-specific level of service and corresponding service volume tables.

Annual Average Daily Traffic (AADT) - Annual average daily traffic consists of the Florida Department of Transportation annual and local government semiannual traffic counts as measured at approved count station locations. Florida Department of Transportation counts are yearly counts, as adjusted for axle and seasonal collection factors. Local counts are the actual counts, taken only in the spring and fall when the University of Florida and public schools are is conducting classes. To accommodate for possible inaccurate measurement due to road construction, special events, faulty equipment, etc., the methodology noted in the facility on Determining Roadway Facility Level of Service is used. In addition, the Level of Service Subcommittee has determined that the median traffic counts within the last three-year time span shall be used for the Florida Intrastate Highway System / Strategic Intermodal System for analysis consistency with Alachua County and City of Gainesville-maintained roadways for Tier One Level of Service/Maximum Service Volume analysis. The Florida Department of Transportation will continue to use the latest available single-year counts. Annual average daily traffic counts for distressed roadway facility analyses shall be the three-year median traffic count for the median traffic count station within the roadway facility.

"Backlogged" Roadway - an unconstrained facility which is operating at a level of service below the adopted minimum operating level of service standard and not programmed for construction in the first three years of the Florida Department of Transportation adopted work program or the first three years of the five year schedule of improvements in a local government's capital improvements element.

"Constrained" Roadway - means that it is not feasible to add through lanes to meet current or future traffic needs due to physical, environmental or policy constraints.

"Distressed" Roadway - Where a Tier One Level of Service/Maximum Service Volume analysis of a roadway facility using the Florida Department of Transportation Generalized Tables is measured at 65 percent or more of the maximum service volume for the adopted level of service, the roadway facility is identified as "distressed." These "distressed" arterials are to be analyzed with more accurate analytical tools.

Florida Department of Transportation Generalized Tables - For broad planning applications, the Florida Department of Transportation developed Generalized Tables, which are contained in the 2013 Quality/Level of Service Handbook. The Generalized Tables, which provide generalized daily and peak hour level of service volumes for Florida's urbanized, transitioning and rural areas, are derived from the methodology in the 2010 Highway Capacity Manual. These tables, which reflect the emphasis on signalization characteristics, are based on actual Florida traffic, roadway and signalization data. In developing the Florida Department of Transportation Generalized Tables, a number of assumptions were made pertaining to roadway characteristics, signal design and traffic conditions. These assumptions are based on average conditions for the State of Florida. The Generalized Tables are accurate to the extent that the local conditions of the arterial which is being analyzed are consistent with the statewide assumptions made. The assumptions are provided as a part of the table.

Level of Service - The Highway Capacity Manual 6th Edition defines level of service as "qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists and passengers. The descriptions of individual levels of service characterize these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience." The level of service of an arterial facility is determined by the average travel speed (miles per hour) a motorist can reasonably attain through the facility. For freeways and multilane uninterrupted flow highways, the volume to capacity ratio determines capacity. For signalized intersections, seconds of stopped delay is the determining factor. Six level of service are defined for each type of facility ranging from A to F. A description of the traffic characteristics and driver expectations from Chapter 16 of the 2010 Highway Capacity Manual for Urban Streets level of service is as follows:

LOS A - "describes primarily free-flow operation. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at the boundary intersections is minimal. The travel speed exceeds 85% of the base free-flow speed."

LOS B - "describes a reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted and control delay at the boundary intersections is not significant. The travel speed is between 67% and 85% of the base free-flow speed."

LOS C - "describes stable operations. The ability to maneuver and change lanes in midsegment locations may be more restricted than at level of service B. Longer queues at the boundary intersections may contribute to lower than average travel speeds. The travel speed is between 50% and 67% of the base free-flow speed."

LOS D - "indicates a less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volume, and inappropriate signal timing at the boundary intersections. The travel speed is between 40% and 50% of the base free-flow speed."

LOS E - "is characterized by unstable operation and significant delay. Such operations may be due to some combination of adverse progression, high volume, extensive delays at critical intersections and inappropriate signal timing, and inappropriate signal timing at the boundary intersections. The travel speed is between 30% and 40% of the base free-flow speed."

LOS F - "is characterized by flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay and extensive queuing. The travel speed is 30% or less of the base free-flow speed. Also, level of service F is assigned to the subject direction of travel if the trough movement at one or more boundary intersections has a volume-to-capacity ratio greater than 1.0.

Maximum Service Volume - Maximum service volume for a roadway facility is the average annual daily traffic volume or peak hour volume as indicated in the Florida Department of Transportation Quality/Level of Service Handbook's Generalized Tables for Tier One Maximum Service Volume Analysis, as calculated by ARTPLAN analysis software Tier Two Maximum Service Volume Analysis, or as is negotiated between the local government and Florida Department of Economic Opportunity for the corresponding adopted level of service standard in a local government comprehensive plan. Maximum service volume, which is the roadway facility's adopted capacity, utilizes volume to capacity (v/c) ratio to measure capacity sufficiency.

Peak Direction - The direction during the planning analysis hour with the most vehicles. It is best to determine which peak period is critical for the arterial and then use the direction which experiences the highest volumes. Determining the peak direction of a roadway facility is usually simple - it is the direction with the most traffic.

Peak Hour - The 100th highest demand volume hour of the year for a roadway facility. The peak hour is that hour of the day in which the most traffic volume is measured in the peak direction.

Roadway Facility - A corridor within the Gainesville Metropolitan Area, as represented in the Multimodal Level of Service Report, consisting of termini determined by the Level of Service Subcommittee using the Quality/Level of Service Handbook criteria.

Roadway Segment - A component of a roadway facility, where segment breaks are in accordance with criteria specified in the Quality/Level of Service Handbook. Segment breaks are typically signalize intersections, number of lanes changes and termini.

B. Data Collection Requirements

All data shall be collected in accordance with the procedures in the latest available edition of the Quality/Level Handbook. Traffic study termini shall be consistent with the roadway facility termini established in the Multimodal Level of Service Report. The roadway facility(s) analyzed shall be identified in the traffic study. Data collection requirements include:

1. Traffic Counts - A three-day (72 hour) midweek traffic count at 15-minute intervals when the University of Florida and Alachua County schools are in session shall be collected. In order to account for through movement traffic, traffic count devices shall be placed at appropriate midblock locations away from entrances to activity centers such as shopping centers and schools, to the maximum extent possible. These traffic counts shall be adjusted for axle and seasonal traffic conditions for roadway facilities on the State Highway System and other roadway facilities, as specified by the Level of Service Subcommittee.

2. Turning Movements - At least two days of turning movements for all signalized intersections (and the roadway section's peak direction terminus) for the peak period/ direction shall be collected. For studies in which the peak period/direction is to be determined, turning movements shall be collected in both directions for a.m. and p.m. periods. Turning movements from exclusive lanes shall be indicated. At the outside throughlane, right turns on a redlight may be counted as a turning movement from exclusive lanes.

3. Adjusted Saturation Flow Rate - Use the default adjusted saturation flow rate that corresponds to the appropriate Florida Department of Transportation Generalized Table in the Quality/Level Handbook for the type of facility being analyzed.

4. Number of Lanes - Identify the number of peak direction through-movement lanes at signalized intersections and other roadway segment breaks within the roadway facility being analyzed. Also identify the number of off-peak direction through-movement lanes at signalized intersections and other roadway segment breaks within the roadway facility being analyzed. Use of partial lanes shall be consistent with the Quality/Level Handbook criteria.

5. Arterial Class - Use the arterial classification for signal density that corresponds to the appropriate Florida Department of Transportation Generalized Table in the Quality/Level Handbook.

6. Free Flow Speed - Use the roadway facility's predominant posted speed limit, i.e. the speed limit with the longest duration over the length of the roadway facility.

7. Arrival Type - Use the observed prevailing arrival types for both peak and off-peak direction for the peak hour for each roadway segment, based on professional judgment, using criteria specified in the Highway Capacity Manual 6th Edition for the roadway facility.

8. Type Signal System - Use the signal type from information collected from the City of Gainesville Public Works Department.

9. Distance Between Signals - Use the distances between traffic signals for all the roadway segments from the initial terminus to the peak direction terminus.

C. Data Analysis Requirements

Roadway facility analysis shall be undertaken utilizing Florida Department of Transportation -approved analysis tools. These tools include, but are not limited to, the latest version of ARTPLAN, Highway Capacity Manual 6th Edition and Highway Capacity Software. In some cases, the use of Florida Department of Transportation FREEPLAN or HIGHPLAN software may be appropriate. Data analysis requirements include:

1. Roadway Facility AADT for ARTPLAN 2012 is defined as the AADT of the segment with the highest volume to capacity ratio (v/c) as calculated by ARTPLAN 2012;

2. K-Factor (Florida Department of Transportation Standard K Factor, K_{100} Factor or Planning Analysis Hour Factor); D-Factor (Directional Factor); Peak Hour Factor (PHF), which is to be estimated based on three-day bidirectional, 24-hour, 15-minute interval traffic counts for each roadway segment in accordance with criteria specified in the Quality/Level Handbook.

3. Segment Average Annual Daily Traffic (AADT) - Use the average traffic count from the three-day, 24-hour, 15-minute traffic counts that have been collected (latest traffic count available) which is nearest in the approach of a signalized intersection, terminus or other roadway segment break.

4. Segment Peak Hour Volume (PHV) - Use the median traffic count from the three-day, peak hour, 15-minute traffic counts that have been collected which is nearest in the approach of a signalized intersection, terminus or other roadway segment break.

5. Cycle Length at Signalized Intersections - Use the average cycle length for the peak hour, as calculated from the median of at least two days (Tuesday - Thursday) of field-collected data. Signal timing data from local traffic studies, which are maintained by the City of Gainesville Public Works Department, may be used with the permission of the appropriate government agencies. Those intersections, which are identified as running free, shall be analyzed using field-collected data.

6. Effective ^{g}/C at Signalized Intersections - Use the average effective green time (green + yellow + all red - lost time) for the peak hour, as calculated from the median of at least two days (Tuesday - Thursday) of field-collected data. Signal timing data from local traffic studies, which are maintained by the City of Gainesville Public Works Department, may be used with the permission of the appropriate government agencies. Those intersections, which are identified as running free, shall be analyzed using field-collected data.

D. Highway Level Of Service Standards

1. State of Florida

In March, 1992, the Florida Department of Transportation adopted by rule *Statewide Minimum Level of Service Standards for the State Highway System*. In 2007, these standards were modified to account for the Florida Strategic Intermodal System (SIS), and appended to the 2002 Quality/Level Handbook and included in Section 8 of the 2013 Quality/Level Handbook. In 2012, Florida's Planning Level of Service Standards were revised to account for changes in growth management legislation. The standards incorporate the growth management concepts of:

- urban infill;
- infrastructure concurrent with the impact of development option;
- alternative modes of transportation;
- local flexibility in setting standards;
- different roles the state's facilities provide; and
- the direct correlation between urban size and acceptance of some highway congestion as a tradeoff for other urban amenities.

Chapter III includes the State Highway System level of service standards. The maximum service volume (i.e., service flow rate) for roadways will relate to the adopted level of service standards identified in the appropriate local government comprehensive plan.

In 2011, the Community Planning Act, modifications of Chapter 163 as described in HB 7207, was passed. This Act makes transportation concurrency optional. Alachua County maintains a transportation concurrency. The City of Gainesville has replaced concurrency exception areas with a Transportation Mobility Program Areas. Chapter 380.06(29) exempts Dense Urban Land Areas (DULAs) from the Development of Regional Impact (DRI) review program. The City of Gainesville is a Dense Urban Land Area. Alachua County's Urban Services Area is a Dense Urban Land Area.

2. Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area

The minimum acceptable level of service standards within the Gainesville Metropolitan Area Boundary are provided in Chapter III. These standards are consistent with the standards for state-maintained Florida Intrastate Highway System and Strategic Intermodal System and state-maintained, county-maintained and city-maintained roads, as stated in the Alachua County Comprehensive Plan, as amended and the City of Gainesville Comprehensive Plan, as amended. The minimum acceptable level of service for each roadway is shown in Tables 1, 2 and 3.

3. Alachua County and City Of Gainesville

The minimum acceptable level of service standards for Alachua County are provided in Chapter III. The County standards are consistent with Florida Department of Transportation roadway level of service standards. Roads within the City must meet the City of Gainesville requirements which are also included in Chapter III. The City standards are inconsistent with Florida Department of Transportation roadway level of service standards.

E. Traffic Study Procedures

1. Tier One Analyzed Roadway Facilities

For development or other projects in which the planning review process requires a traffic study on roadway facilities identified in the Multimodal Level of Service Report as being Tier One analyzed, the following procedure shall be implemented:

1. Determine project traffic demand for all appropriate adjacent facilities.

2. For each project-affected roadway facility, add project traffic demand (P_T) to the latest available existing traffic count data (E_T), as identified in the Multimodal Level of Service Report or from field-collected data, plus any additional reserve trips allocated (R_T) by any local government to any project-affected facilities to determine the total allocated traffic (T_T).

$$(P_T) + (E_T) + (R_T) = (T_T)$$

3_A. Determine whether the total allocated traffic is equal to or exceeds 65 percent of the each roadway facility's Generalized Tables maximum service volume (MSV_{GT}). Any roadway facilities that meet this "distressed" threshold shall be Tier Two analyzed. Any roadway facilities that do not meet this "distressed" threshold can be Tier One analyzed or may be Tier Two analyzed.

3_B. For those roadway facilities in the Multimodal Level of Service Report which are Tier One analyzed and the total allocated traffic is less than 65 percent of the each roadway facility's Generalized Tables maximum service volume (MSV_{GT}), then implement the Tier One analysis procedures.

If $(T_T) < .65\ MSV_{GT}$, then Tier One analyze
If $(T_T) >$ or $= .65\ MSV_{GT}$, then Tier Two analyze

2. Tier Two Analyzed Roadway Facilities

Perform Tier Two analysis to determine whether the project meets criteria for development or other projects in which the planning review process requires a traffic study on:

1. Roadway facilities identified in the Multimodal Level of Service Report as being Tier Two analyzed; or

2. Any Tier One analyzed roadway facility where the total allocated traffic is equal to or exceeds 65 percent of the roadway facility's Generalized Tables maximum service volume.

F. Methodology

1. Determining Roadway Level Of Service

I. Determination of Average Annual Daily Traffic (AADT)

A. Step 1 - Traffic Count Station Average Annual Daily Traffic

1. At established traffic count stations which are counted yearly, the average annual daily traffic for the station will be, for all analysis purposes, the median volume of the current year's count and the two previous years' counts.

2. At established traffic count stations which are counted semiannually, the average annual daily traffic for the station will be, for all analysis purposes, the median volume of the semiannual count average for the current year's and the two previous years' counts.

3. At established traffic count stations which traffic counts are collected in alternate years, the average annual daily traffic for the station will be, for all analysis purposes, the average of the two most recent counts.

4. At established traffic count stations, where traffic counts are collected once every three years, the average annual daily traffic for the station will be, for all analysis purposes, that count.

5. At traffic count stations, which have only been counted one year (such as a new or special study count station), the average annual daily traffic for the station will be, for all analysis purposes, that count.

6. Traffic counts for functionally classified arterials, collectors functioning as arterials and collectors which were collected four years preceding the current year shall be considered stale data and may only be used with the consent of the Level of Service Subcommittee.

7. Traffic counts collected for roadway facilities on the State Highway System shall be factored for latest available seasonal and axle adjustments. These factor tables are available from the Florida Department of Transportation District 2 office. Local roads are not required to be factored for seasonal and axle adjustments. But the level of Service Subcommittee may request that these factors be applied to certain roadways.

B. Step 2 - Roadway Facility Average Annual Daily Traffic

1. For Tier One Generalized Tables analysis purposes at established roadway facilities designated in the Multimodal Level of Service Report, the average annual daily traffic for the facility will be the median value of the count station median values as determined in Step 1, above. **In 2008, the Technical Advisory Committee Level of Service Subcommittee modified the Tier One analysis to be the median of count station values within a Roadway Facility for the latest available traffic count.**

2. For Tier Two ARTPLAN analysis purposes at established roadway facilities designated in the Multimodal Level of Service Report, the average annual daily traffic for the facility will be the "sensitive intersection" three-year median value as indicated by the ARTPLAN analysis of the facility using the SEGMENT Average Annual Daily Traffic counts as determined below:

    a. At established roadway facilities, the SEGMENT Average Annual Daily Traffic will be for ARTPLAN analysis purposes, the latest three-year median annual value for the nearest count station of the signalized intersection being analyzed for those segments with more than one average annual daily traffic.

    b. At established roadway facilities, the SEGMENT Average Annual Daily Traffic, for those facilities for which there are segments without traffic counts (not field studied), will be for ARTPLAN analysis purposes:

        i. for field-studied facilities, the calculated value that correspond to the level of service field study traffic count profile associated with the latest three-year median annual value for the nearest count stations; and

        ii. For nonfield-studied facilities:

            (a). the latest three-year median annual value for the nearest count station extrapolated to the adjacent segment without data; or

            (b). the latest three-year median annual value for the nearest count stations interpolated to the adjacent segment(s) without data.

II. Tier One Evaluation of All Functionally Classified Roadways

A. Tier One Level of Service evaluations and determination of roadway maximum service volumes, at the minimum acceptable level of service, for all functionally classified roads within the Gainesville Metropolitan Area Boundary, are to be performed using the Generalized Tables contained in the Florida Department of Transportation publication, 2013 Quality/Level of Service Handbook, as revised, or any subsequent updates.

B. Average Annual Daily Traffic counts (obtained using the method described in Section I) are to be compared with the service volumes at the minimum acceptable level of service to determine if the roadway facility is "distressed". The level of service and maximum service volume at the adopted level of service as determined by the Generalized Tables is to be used for all roadway facilities which are **not** considered "distressed". However, once a roadway facility meets the "distressed" threshold, the roadway facility will be analyzed using ARTPLAN analysis until modification, such as additional lanes, to the roadway facility increases capacity. The continuation of ARTPLAN analysis is to sufficiently assess the roadway facility's performance since local government transportation demand management (TDM) and transportation system management (TSM) policies may have been activated to address congested traffic conditions.

C. The number of signalized intersections per roadway facility is a factor used in Florida Department of Transportation Generalized Tables analyses. For the Multimodal Level of Service Report, the number of signalized intersections is determined by averaging the number of intersections (both signalized and ones requiring the through movement to stop) in the peak directions, not counting the starting one, with the number of intersections, not counting the starting one, in the offpeak direction.

III. Tier Two Evaluation of "Distressed" Roadways

A detailed analysis of all "distressed" roadways will be performed using ARTPLAN (or the latest technique and/or program approved and recommended by the Florida Department of Transportation and Level of Service Subcommittee for obtaining a more accurate analysis). The results of the detailed analysis and the maximum service volumes, at the adopted level of service derived from that analysis, will be used for the "distressed" roadways.

IV. Options Involving Roadways Determined to be Operating at an Unacceptable Level of Service

A. Roadways previously designated as "constrained" and/or "backlogged"-

1. Roadways previously designated as "backlogged" and/or "constrained", based on a generalized tables analysis, will be analyzed using the detailed technique. The results of the detailed analysis will be used for these roadways.

a. If, because of the detailed analysis, it is determined that the roadway is operating at an **acceptable** level of service, the level of service and maximum service volume at the adopted level of service derived from that analysis will be used.

b. If it is confirmed, through the detailed analysis, that the roadway is operating at an **unacceptable** level of service, the "backlogged" and/or "constrained" designation will remain on the facility and any negotiated maximum service volumes designated in the City or County's Comprehensive Plan will be used.

B. When a roadway, which has not previously been designated as "constrained", is found to be operating at an unacceptable level of service (by the detailed analysis), the determination as to whether the road should be considered "constrained" will be made. When the Florida Department of Transportation or local government identifies a roadway facility as "constrained", the local government should appropriately update its planning documents.

C. Roadways operating at an unacceptable level of service may gain some additional capacity through negotiation between the local government and Florida Department of Economic Opportunity. Among the options for increasing capacity for development purposes include: a negotiated capacity degradation of up to ten percent of the maximum service volume for the adopted level of service; designation of a transportation mobility program area (TMPA); and designation of a transportation concurrency management area (TCMA).

2. Determining Roadway Maximum Service Volumes

Tier One Maximum Service Volume is determined by identifying the corresponding service volume in the Florida Department of Transportation Generalized Tables for the adopted level of service of the roadway facility.

Tier Two Maximum Service Volume is determined by identifying the corresponding service volume as calculated using the Florida Department of Transportation LOSPLAN software programs- ARTPLAN, FREEPLAN or HIGHPLAN, or as calculated by an Florida Department of Transportation and Level of Service Subcommittee-approved analytical tool.

In addition, for capacity evaluation purposes, the maximum service volume of a roadway facility is the adopted value as negotiated by the local government and the Florida Department of Economic Opportunity.

3. Level Of Service Analysis Techniques

There are a number of methods for determining level of service. The simplest (and the least accurate) method is the use of the Florida Department of Transportation Generalized Tables. An intermediate level analysis can be performed using the LOSPLAN family software developed by the Florida Department of Transportation. One of the more complex (and more accurate) methods for determining level of service employs calculations derived using the 2010 Highway Capacity Manual or Highway Capacity Software (HCS). The 2010 Highway Capacity Manual and Highway Capacity Software are acceptable analytical tools for determining level of service. All of these techniques are based on the Highway Capacity Manual 6th Edition. Data collection shall be consistent with the criteria specified in the Quality/Level of Service Handbook or criteria designated by Florida Department of Transportation District 2.

a. Tier One Level of Service Analysis

Florida Department Of Transportation Generalized Tables

To determine the level of service of a roadway facility, use the appropriate urban, transitioning, or rural area Florida Department of Transportation Generalized Table. Within the table, select the appropriate signal density classification and applicable assumption factors to the average annual daily traffic or peak hour volume being analyzed.

b. Tier Two Level of Service Analysis

ARTPLAN for Estimating Level Of Service

For ARTPLAN analysis, localized data is entered for each segment and intersection to achieve a more accurate level of service estimate. Data specific to the road being analyzed should be used wherever possible. However, default values may be used for adjusted saturation flow rate.

FREEPLAN/HIGHPLAN For Estimating Level Of Service

The FREEPLAN and HIGHPLAN programs are used for level of service analysis of arterial roadways that are not adequately represented in the Generalized Tables. These programs create a localized table showing service volumes for each level of service for freeways, limited-access arterials and 2-lane and multilane highways.

4. Maximum Service Volume Analysis Techniques

a. Tier One Maximum Service Volume Analysis

Florida Department of Transportation Generalized Tables

For Tier One Maximum Service Volume analysis, the maximum service volume is the volume for the appropriate Florida Department of Transportation Generalized Table, signal density classification, and roadway facility characteristic assumptions that correspond to the adopted level of service of the roadway facility being analyzed.

b. Tier Two Maximum Service Volume Analysis

ARTPLAN for Estimating Maximum Service Volume

ARTPLAN calculates the service volume for all measurable levels of service of the roadway facility. The roadway facility's maximum service volume is determined by identifying the corresponding service volume for the adopted level of service Standard. The Alachua County Urban Services Area and the City of Gainesville include transportation mobility program areas which provide development permitting criteria for additional vehicle trip demand above the adopted level of service Standard.

FREEPLAN/HIGHPLAN for Estimating Maximum Service Volume

The FREEPLAN and HIGHPLAN programs can also be used to estimate the service volume at any level of service. The level of service volume in the calculated tables corresponding to the adopted level of service would be the maximum service volume.

5. Variables Used to Perform Level of Service / Maximum Service Volume Analyses

a. Tier One Level of Service Analysis

Tier One analysis inputs shall be in conformance with criteria specified in the Quality/Level of Service Handbook. Non-State Highway System roadways carry a five percent service volume penalty from the Florida Department of Transportation Generalized Tables service volumes.

Roadway Facility Median Average Annual Daily Traffic (AADT) - Determine the median average annual daily traffic by calculating the median traffic count of all of the count station locations within the roadway facility, in which each count station location's median traffic count consists of the median of the latest traffic counts. See sample below, where roadway facility S-24's median average annual daily traffic is 43,250.

S-24	SR 121 (W 34 Street From SR 24 (SW Archer Road) To SR 26 (W University Avenue)			**43,250**
	Count Station Location	Station Number	1999	Median Count
	South of SW 20 Avenue	6135	42,000	42,000
	North of SW 20 Avenue	6076	50,500	50,500
	North of Radio Road	6136	44,500	44,500
	South of SR 26A	4009		Inactive
	South of SR 26	6075	28,500	28,500

Class (Signal Density) - Florida Department of Transportation Generalized Tables identify arterial classification factors based on signal density (number of signals per mile). The number of signalized intersections is determined by averaging the number of intersections (signalized and ones requiring the through movement to stop) in the peak directions, not counting the starting one, with the number of intersections, not counting the starting one, in the off-peak direction.

Area Type - Use the Gainesville Metropolitan Area transportation planning boundaries map (see Illustration I) or refer to the Multimodal Level of Service Report's Level of Service Tables to determine whether the roadway facility being analyzed is urban, transitioning or rural, so that the appropriate Generalized Table-based service volumes are used for analysis.

Number of Lanes - Determine the number of through lanes being analyzed to select the appropriate Generalized Table-based service volumes.

Arterial/Non-State Roadway Adjustments-

Divided/Undivided Facilities-

Left Turn Lanes - Apply the left turn bay adjustment factor in the Generalized Table-based service volumes if left turn lanes are (not) present.

Medians - Apply the median adjustment factor in the Generalized Table-based service volumes if medians are (not) present.

One-Way Facilities - Apply the one-way facility adjustment factor in the Generalized Table-based service volumes if the roadway being analyzed is a one-way facility.

Input Value Assumptions - When using the Florida Department of Transportation Generalized Tables, deviation from the input value assumptions for: traffic characteristics, including the planning analysis hour Standard K factor, directional (D) factor, peak hour factor (PHF), and adjusted saturation flow rate; roadway characteristics; and signal characteristics is not permitted. If it is preferred to use local data variables rather than statewide default variables to produce Generalized Tables, then FREEPLAN/HIGHPLAN software shall be used.

b. Tier Two Level of Service Analysis

Tier Two ARTPLAN analysis inputs shall be in conformance with criteria specified in the Quality/Level of Service Handbook. Tier Two FREEPLAN/HIGHPLAN software analyses shall use roadway facility specific inputs, as determined by Florida Department of Transportation District 2. Note that ARTPLAN is a more accurate Tier Two analysis tool. The appropriate development review agency shall indicate the acceptable analysis tool of those tools approved by Florida Department of Transportation and the Level of Service Subcommittee. ARTPLAN features three screens, two input (the first screen is facility-level data and the second screen is segment-level data) and one output (the third screen is service volume tables). In addition, ARTPLAN produces a printout of input data, calculated level of service and service volume tables.

i. ARTPLAN - GENERAL FACILITY DATA (SCREEN ONE) CHARACTERISTICS

DESCRIPTION OF ROADWAY FACILITY

Road Name - Input the roadway facility name.

Peak Direction - Select the peak hour service volume direction (eastbound or westbound; northbound or southbound) on the roadway facility which has the higher traffic count.

Study Time Period - Select the Standard K traffic analysis period. The Level of Service Subcommittee would need to approve non-Standard K traffic analysis periods for inclusion in the Multimodal Level of Service Report.

FILE INFORMATION

Analyst - Input name of person's name performing the analysis.

Analysis Date - Input the traffic study date.

Agency - Input the entity employing the traffic study analyst.

District - Leave blank. This is a cell for identifying the Florida Department of Transportation district.

User Notes - Input the roadway facility ARTPLAN filename and path (its Multimodal Level of Service Report designation); the initial peak period/peak direction and the end peak period/peak direction termini. Also, input any relevant comments to the particular analysis.

ROADWAY VARIABLES

Area Type - Use the Gainesville Metropolitan Area transportation planning boundaries map (see Illustration I) or refer to the Multimodal Level of Service Report's Level of Service Tables to determine whether the roadway facility being analyzed is urban, transitioning or rural, so that the appropriate Generalized Table-based service volumes are used for analysis.

Class (Signal Density) - Florida Department of Transportation Generalized Tables identify arterial classification factors based on signal density (number of signals per mile). The number of signalized intersections is determined by averaging the number of intersections (signalized and unsignalized traffic-controlled for the through movement) in the peak directions, not counting the starting one, with the number of intersections, not counting the starting one, in the off-peak direction. Use the arterial classification for signal density that corresponds to the appropriate Florida Department of Transportation Generalized Table in the Quality/Level of Service Handbook.

Left Turnlanes - Check if the roadway facility has exclusive left and/or right turnlane facilities at signalized intersections.

Number (#) of Throughlanes (Both Directions) - Input the number of peak direction and offpeak direction through-movement lanes at signalized intersections and other roadway segment breaks within the roadway facility being analyzed on page one and two of the ARTPLAN spreadsheet. Use of partial lanes shall be consistent with the Quality/Level of Service Handbook criteria.

Posted Speed - Input the roadway facility's predominant posted speed limit, i.e. the speed limit with the longest duration over the length of the roadway facility. ARTPLAN calculates the free flow speed.

TRAFFIC VARIABLES

To determine the roadway facility AADT, collect three days of 24-hour bidirectional counts (Tuesday through Thursday) by 15 minute increments.

Roadway Facility AADT- Input the traffic count for the sensitive intersection, where the sensitive intersection is defined as that intersection which is the first to reach a volume:capacity (v/c) ratio of 1.0.

Adjusted Saturation Flow Rate - Use the ARTPLAN-calculated adjusted saturation flow rate. This flow rate is the base saturation flow rate times the effects of many roadway and traffic variables in the Quality/Level of Service Handbook.

Base Saturation Flow Rate - The maximum steady flow rate, expressed in passenger cars per hour per lane, at which passenger cars can cross a point on interrupted flow roadways. ARTPLAN calculates a base saturation flow rate that corresponds to the appropriate Florida Department of Transportation Generalized Table in the Quality/Level of Service Handbook for the type of facility being analyzed. A calculated saturation flow rate, if approved by Florida Department of Transportation District 2, may be used for the specific roadway facility.

"D" Factor (Directional Factor) - The real "D" factor is inputted on the ARTPLAN software, if available. Otherwise, it is estimated based on three-day bidirectional, peak hour, 15-minute incremental traffic counts for each roadway segment in accordance with criteria specified in the Quality/Level of Service Handbook.

"K" Factor ("K" Factor or Planning Analysis Hour Factor) - The appropriate Florida Department of Transportation-specified Standard K factor is inputted on the ARTPLAN software in accordance with criteria specified in the Quality/Level of Service Handbook.

Peak Hour Factor (PHF) - Use Quality/Level of Service Handbook methodology to calculate the peak hour factor. The peak hour factor shall be based on three-day, 24-hour, bidirectional traffic counts at 15-minute intervals for each roadway segment.

Percent (%) Heavy Vehicles - percentage of vehicles with more than four wheels touching the pavement during normal operation. For ARTPLAN analyses, use the default value for State Highway System arterials and nonstate facilities.

Percent (%) of Turns From Exclusive Lanes - The median percent turn data is inputted for each roadway segment based on turning movement data collected for the roadway segments. Two days of peak hour, peak direction turning movement counts for each signalized intersection, including the last peak direction terminus (if not signalized) shall be collected to determine an estimated average percent of turns from exclusive lanes.

TRAFFIC CONTROL VARIABLES

Arrival Type - Input the median of the observed prevailing arrival types for both peak and off-peak direction for the peak hour for each roadway segment, based on professional judgement, using criteria specified in the Highway Capacity Manual 6th Edition for the roadway facility.

Control Type - Input the traffic signal control type (actuated, semiactuated or pretimed) from information collected from the City of Gainesville Public Works Department.

Cycle Length (C) - Input the observed traffic signal cycle length for the peak direction for the peak hour for sensitive intersection.

Signals/Mile - Input the signal density (number of traffic signals per mile) for the roadway.

Through $^{g}/C$ - Input the through movement $^{g}/C$ for the sensitive intersection, as calculated from the roadway segment data, using Quality/Level of Service Handbook criteria.

ii. ARTPLAN Segment Data Screen Peak Direction Inputs

Arrival Type - Input observed prevailing roadway segment arrival types for peak direction for the peak hour, based on professional judgment, using criteria specified in the Highway Capacity Manual 6th edition.

Average Annual Daily Traffic - Input the median traffic count from the three-day, 24-hour, 15- minute traffic counts that have been collected (latest traffic count available) which is nearest in the approach of a signalized intersection, terminus or other segment break. This median traffic count shall be adjusted for axle and seasonal traffic conditions for roadway facilities on the State Highway System and other roadway facilities, as specified by the Level of Service Subcommittee. For nonfield-studied ARTPLAN analyses, the average of the three-year median traffic counts of adjacent segments is used for segments without traffic counts. For ARTPLAN analyses subsequent to the field study year, a value that maintains the proportion defined by the field-collected data is used for the traffic count, i.e. the roadway facility traffic profile will be maintained.

Cross Street Names - Input the names of the roadway facility's cross streets beginning with the initial terminus (intersection, political boundary, etc) for the peak direction as intersection $^{\#}1$ until all traffic-controlled intersections up to-and-including the end terminus (intersection, political boundary, etc) for the peak direction in the roadway facility are entered.

Cycle Length at Traffic-Controlled Intersections - Input the average cycle length for the peak hour, as calculated from the median of at least two days (Tuesday - Thursday) of field-collected data. Signal timing data from local traffic studies, which are maintained by the City of Gainesville Public Works Department, may be used with the permission of the appropriate government agencies. Use the mode cycle length for the peak direction end terminus which is not signalized.

Free-Flow Speed - The average speed of vehicles not under the influence of speed reduction conditions, generally assumed to be 5 mph over the posted speed limit. Use the default free-flow speed as automatically calculated by ARTPLAN. Use of Field-collected free flow speeds shall be coordinated with the Level of Service Subcommittee and Florida Department of Transportation District 2 staff.

^{g}/C at Traffic-Controlled Intersections - Input the average effective green time (green + yellow + all red - lost time) for the peak hour, as calculated from the median of at least two days (Tuesday - Thursday) of field-collected data. Signal timing data from local traffic studies, which are maintained by the City of Gainesville Public Works Department, may be used with the permission of the appropriate government agencies. Use 0.99 as the ^{g}/C for the peak direction end terminus which is not signalized.

Length (Distance Between Signals) - Input the distances between traffic signals for all the roadway segments from the initial terminus to the peak direction terminus. Note that this data may be inputted as feet or miles data.

Number (#) of Directional Lanes - Input the number of peak direction through-movement lanes at signalized intersections and other roadway segment breaks within the roadway segment being analyzed. Use of partial lanes shall be consistent with the Quality/Level of Service Handbook criteria.

Peak Hour Volume (PHV) - Input the median traffic count from the three-day, peak hour, 15- minute traffic counts that have been collected (latest traffic count available) which is nearest in the approach of a signalized intersection, terminus or other segment break. This median traffic count shall be adjusted for axle and seasonal traffic conditions for roadway facilities on the State Highway System and other roadway facilities, as specified by the Level of Service Subcommittee.

Percent (%) of Turns From Exclusive Lanes - Input percent turn data for each roadway segment. Percent turns is determined from at least two days of peak hour, peak direction turning movement counts for each signalized intersection, including the last peak direction terminus (if not signalized) shall be collected to determine an estimated average percent of turns from exclusive lanes.

iii. ARTPLAN Facility and Segment Level Of Service Output Screen

Facility Outputs

Arterial Length - The length of the roadway facility is displayed.

Auto LOS - The calculated roadway facility level of service for automobiles is displayed.

Auto Speed - The calculated roadway facility average vehicle speed is displayed.

Segments - The segment termini names are displayed.

Segment Outputs

Control Delay - The calculated roadway segment control delay is displayed.
Intersection Approach LOS - The calculated roadway segment intersection approach level of service is displayed.

Segment LOS - The calculated roadway segment level of service is displayed.

Speed (mph) - The calculated roadway segment speed is displayed.

Through Movement Flow Rate - The calculated roadway segment through movement flow rate is displayed.

v/c (Volume:Capacity Ratio) - The calculated roadway segment v/c ratio is displayed.

iv. ARTPLAN Facility Service Volume Screen

Maximum Service Volumes - Maximum service volume tables for hourly volume in the peak direction, hourly volume for both directions and annual average daily traffic are displayed.

Exhibit II-1

Sensitive Intersection for ARTPLAN-Analyzed Facilities

Roadway Facility	From	To	Sensitive Intersection
(S-3) SW 13 Street [US 441]	Archer Road	University Avenue	University Avenue
(S-4) NW 13 Street [US 441]	University Avenue [SR 26]	NW 29 Road	NW 16 Avenue
(S-11) Archer Road [SR 24]	SW 16 Avenue [SR 226]	SW 13 Street [US 441]	SW 13 Street [US 441]
(S-14) Newberry Road [SR 26]	Parker Road / SW 122 Street	Interstate-75 [east ramp]	Tower Road / NW 75 Street
(S-17) University Avenue [SR 26]	W 34 Street [SR 121]	Gale Lemerand Drive	W 34 Street [SR 121]
(S-18) University Avenue [SR 26]	Gale Lemerand Drive	W 13 Street [US 441]	Gale Lemerand Drive
(S-21) SW 2 Avenue [SR 26A]	Newberry Road [SR 26]	SW 34 Street [SR 121]	Newberry Road [SR 26]
(S-22) SW 2 Avenue [SR 26A]	SW 34 Street [SR 121]	University Avenue [SR 26]	SW 34 Street [SR 121]
(S-25) NW 34 Street [SR 121]	University Avenue [SR 26]	NW 16 Avenue	NW 8 Avenue
(S-27) NW 34 Street [SR 121]	NW 39 Avenue [SR 222]	NW 53 Avenue	NW 53 Avenue
(S-47) Archer Road [SR 24]	SW 91 Street	SW 75 Street	SW 91 Street
(S-57) Archer Road [SR 24]	Parker Road / SW 122 Street	SW 91 Street	Parker Road / SW 122 Street
(A-9) NW 23 Avenue	NW 98 Street	NW 55 Street	NW 83 Street
(A-13) Tower Road SW 75 Street	Archer Road	SW 8 Avenue	SW 46 Boulevard
(A-15) SW 24 Avenue	Tower Road	SW 62 Boulevard	Tower Road / SW 75 Street
(A-16) SW 20 Avenue	SW 62 Boulevard	SW 34 Street	SW 43 Street
(A-17) N Main Street	N 8 Avenue	N 16 Avenue	NW 10 Avenue
(A-19) NW 39 Avenue	NW 110 Terrace	NW 98 Street	NW 110 Terrace
(A-20) SW 24 Avenue	SW 91 Street	Tower Road / SW 75 Street	SW 91 Street
(A-23) NW 83 Street	NW 23 Avenue	NW 39 Avenue [SR 222]	NW 39 Avenue [SR 222]
(A-45) Fort Clarke Boulevard	Newberry Road [SR 26]	NW 23 Avenue	NW 23 Avenue
(G-42) SW 62 Boulevard	SW 20 Avenue	NW 1 Place	NW 1 Place

N - North; NW - Northwest; S - South; SR - State Road; SW - Southwest; US - United States federal highway

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Chapter III
Minimum Acceptable Highway Level Of Service Standards within the Gainesville Metropolitan Area Boundary

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Chapter III: Minimum Acceptable Highway Level of Service Standards within the Gainesville Metropolitan Area Boundary

In accordance with the guidance of the 1985 Growth Management Act, as amended, all roadway facilities within the Gainesville Metropolitan Area have a designated level of service standard.

In 2011, the Community Planning Act, modifications of Chapter 163 as described in HB 7207, was passed. This Act makes transportation concurrency optional. Alachua County and the City of Gainesville maintain transportation concurrency. Chapter 380.06(29) exempts Dense Urban Land Areas from the Development of Regional Impact review program. As designated by the Florida Legislature's Office of Economic and Demographic Research, the City of Gainesville and the Alachua County Urban Services Area meet the Dense Urban Land Areas criteria of 1,000 persons per square mile. The City of Gainesville also has a citywide Transportation Mobility Program Area. The Alachua County Urban Services Area includes three districts.

A. Florida State Highway System

Exhibit III-1 is a level of service excerpt from the Quality/Level of Service Handbook. Exhibit III-2 is the Florida Department of Transportation Level of Service Standard and Procedure documentation. Illustration II shows the Strategic Intermodal System within the Gainesville Metropolitan Area. Illustration III shows the Florida Department of Transportation District 2 Dense Urban Land Areas.

B. Metropolitan Planning Organization for the Gainesville Urbanized Area

Exhibit III-3 shows the level of service standards adopted by the Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area. These standards apply to the roadway facilities within the Gainesville Metropolitan Area.

C. Alachua County

Level of service standards that were adopted by Alachua County are contained in the County's comprehensive plan. These standards apply to the roadway facilities within the Gainesville Metropolitan Area which are not contained within municipal corporate limits. Alachua County uses an areawide level of service. The Alachua County Comprehensive Plan is maintained by the Alachua County Department of Growth Management. Requests for the latest information on level of service standards should be directed to the Alachua County Department of Growth Management. Roadway facility-specific level of service standards are included in the Level of Service Tables in Chapter 2 of the Multimodal Level of Service Report. Illustration IV shows the current boundaries for the County's Transportation Concurrency Exception Area districts.

D. City Of Gainesville

Level of service standards, as adopted by the City of Gainesville, are contained in the City's comprehensive plan. These standards apply to the roadway facilities within the Gainesville Metropolitan Area which are contained within municipal corporate limits of the City. The City of Gainesville Comprehensive Plan is maintained by the City of Gainesville Department of Planning and Development Services. Requests for the latest information on level of service standards should be directed to the Department of Planning and Development Services. Roadway facility-specific level of service standards are included in the Level of Service Tables facility of this report. Illustration V shows the current boundaries for the City's Transportation Mobility Program Area zones.

E. Florida State Highway System

FLORIDA STATE HIGHWAY SYSTEM

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Exhibit III-1
Florida Planning Level of Service Standards

10 FLORIDA'S LOS STANDARDS FOR THE STATE

It is the Department's intent to plan, design, and operate the State Highway System at an acceptable level of service for the traveling public. Level of service standards for the State Highway System during peak travel hours are D in urbanized areas and C outside urbanized areas. For additional information, refer to FDOT's Procedure on **Level of Service Standards and Highway Capacity Analysis for the State Highway System (Topic No. 525-000-006).**

10.1. Application of Standards

Urban State Highway System LOS Standard = LOS D

Outside Urban Areas = LOS C

The use of standard LOS is intended to promote public safety and general welfare, ensure the mobility of people and goods, and preserve the facilities on the State Highway System. The standards are to be applied to FDOT's planning activities. Unless otherwise provided by law, the minimum LOS standards for the State Highway System will be used by FDOT in review of local government comprehensive plans, assessing impacts related to developments of regional impact (DRI), and assessing other developments affecting the State Highway System.

The standards require all LOS determinations be based on the latest edition of the HCM, this FDOT Q/LOS Handbook or a methodology determined by FDOT as having comparable reliability. There are only two FDOT supported highway capacity and LOS analysis tools for generalized and conceptual planning: FDOT's Generalized Service Volume Tables and FDOT's LOSPLAN software. These two tools form the core for all FDOT's highway capacity and LOS analyses and reviews in planning stages.

10.1.1. Area Type

The area and roadway types in the LOS standards match well with FDOT's Generalized Service Volume Tables appearing at the end of this Q/LOS Handbook; however, subtleties exist on delineation of areas, as discussed in **Chapter 4**.

While the standards are applicable at the facility and section levels, there may be small lengths of roadways (e.g., 2 miles) between area types that from a logical and analytical perspective should be combined into one area type or another. This situation typically happens in transitioning areas, but may also occur elsewhere. FDOT District LOS Coordinators should be consulted for applicable boundaries within their districts.

Exhibit III-1 (Continued)
Florida Planning Level of Service Standards

10.1.2. Future Years

For development reviews, FDOT's LOS standards and area types remain effective throughout the project's planning horizon. For example, in FDOT's review of a proposed multi-phase development the same standards and area types would be used regardless of the amount of development anticipated over time. The only time the applicable standards may change is when the development order conditions provide for a reevaluation of transportation impacts for subsequent phases of development. The change in LOS standards may result from an official change in designation (e.g., Census update, rule change, variance).

10.1.3. Signalized Intersection Analysis

The logical extension of applying the LOS standards to point analyses is to apply the applicable standards to the through movement of the roadway. For example, for a site impact analysis, if the LOS standard for an arterial is D, then the through movement at the intersection should also be D. However, while sound in concept, it is usually possible to achieve a desired LOS for an intersection approach if the other approaches are ignored. Therefore, if an operational analysis of a signalized intersection is part of a planning study, the operational analysis should be conducted with HCS for the entire intersection with appropriate traffic volumes and other inputs for each approach. No intersection approach should fall below its established LOS standard. If there is no LOS standard, the approach should not have a volume to capacity ratio in excess of 1.0 for the full hour. The segment and the relevant intersection approaches must operate at acceptable levels of service. Other techniques exist for analyzing signalized intersections in planning studies, so District LOS Coordinators should be consulted for specific techniques and acceptable values in their districts.

If a detailed point analysis is performed, the applicant must demonstrate ample left turn storage. Any actual turning movement counts can only be used to determine the percentage of the approach turning left, not the actual number of turning vehicles as this number can be constrained and not representative of a demand volume.

Exhibit III-1 (Continued)
Florida Planning Level of Service Standards

10.1.4. Standard K

Standard K is the primary planning analysis hour factor used in Florida. Unless otherwise noted, all references in this Q/LOS Handbook and accompanying LOSPLAN software to a planning analysis hour or K factor refer to Standard K. The use of Standard K represents a design approach in which the K factor for a roadway is established from planning through design. The updated LOSPLAN software automatically enters the correct Standard K value based on the selected area and facility type, using the following values:

- Urbanized and transitioning areas (all facility types) – 0.090
- Large urbanized – 0.080-0.090
- Urban
  - Freeways – 0.105
  - Highways – 0.090
  - Arterials – 0.090
- Rural developed and rural undeveloped
  - Freeways – 0.105
  - Highways – 0.095
  - Arterials – 0.095

Refer to **Section 5.3** for additional information related to the use of Standard K.

All references in this Q/LOS Handbook and accompanying LOSPLAN software to a planning analysis hour or K factor refer to Standard K.

10 FLORIDA'S LOS STANDARDS FOR THE STATE PAGE 125

Exhibit III-2
FDOT Level of Service Policy and Procedure

Florida Department of Transportation

RICK SCOTT
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

ANANTH PRASAD, P.E.
SECRETARY

POLICY

Effective: April 18, 2012
Office: Systems Planning
Topic No.: 000-525-006-a

LEVEL OF SERVICE STANDARDS FOR THE STATE HIGHWAY SYSTEM

It is the Department's intent to plan, design and operate the State Highway System at an acceptable level of service for the traveling public. The automobile mode level of service standards for the State Highway System during peak travel hours are "D" in urbanized areas and "C" outside urbanized areas. See ***Procedure No. 525-000-006, Level of Service Standards and Highway Capacity Analysis for the State Highway System*** for more information. No specific level of service standards are established for other highway modes (e.g., bus, pedestrian, bicycle). Quality/level of service for these modes is determined on a case by case basis.

Ananth Prasad, P.E.
Secretary

www.dot.state.fl.us

Exhibit III-2 (Continued)
FDOT Level of Service Policy and Procedure

Approved:

Effective: May 20, 2014
Office: Systems Planning
Topic No.: 525-000-006-b

Department of Transportation

LEVEL OF SERVICE STANDARDS AND HIGHWAY CAPACITY ANALYSIS FOR THE STATE HIGHWAY SYSTEM

PURPOSE:

To provide implementation procedures and criteria for the Florida Department of Transportation's Level of Service Standards for the State Highway System.

AUTHORITY:

Sections 20.23(4)(a) and 334.048(3), Florida Statutes (F.S.)

SCOPE:

This procedure will be used by all offices of the Florida Department of Transportation (Department) for the planning, design and operation of the automobile mode on the State Highway System. No specific level of service requirements are established for other highway modes (e.g., bus, pedestrian, bicycle). Rather, these modes are determined on a case by case basis in accordance with guidance in the Department's ***Quality/Level of Service Handbook***. This procedure may also serve as a reference document for other entities involved with highway capacity and quality/level of service analyses of the State Highway System.

REFERENCES:

- Sections 334.03, 334.044(10)(a), (12), (19), and 339.155(2), F.S.
- Level of Service Standards for the State Highway System, Policy No. 000-525-006
- Plans Preparation Manual, Topic No. 625-000-007
- Project Development and Environment Manual, Topic No. 650-000-001
- New or Modified Interchanges, Topic No. 525-030-160
- Project Traffic Forecasting Procedure, Topic No. 525-030-120
- System Planning Office's Quality/Level of Service Handbook
- System Planning Office's Interchange Access Request User's Guide
- Transportation Research Board's Highway Capacity Manual

Exhibit III-2 (Continued)
FDOT Level of Service Policy and Procedure

525-000-006-b
Page 2 of 6

DEFINITIONS:

Automobile Mode: A travel mode that includes all motor vehicle traffic using a roadway such as trucks, recreational vehicles, motorcycles, and tour buses, with the exception of transit buses.

Facility: A length of roadway consisting of a combination of points and segments.

Capacity: The maximum number of vehicles or persons that can reasonably be expected to pass a point on a roadway during a specified time period under prevailing roadway, environmental, traffic, and control conditions.

Standard K Factor: The ratio of the peak hour traffic volume to the annual average daily traffic, based on a roadway's characteristics and location.

Level of Analysis: Analytic methods relating to transportation phases of planning, project development, design and operations; or to the transportation system structure of points, segments or facilities.

Level of Service (LOS): A quantitative stratification of the quality of service to a typical traveler of a service or facility into six letter grade levels, with "A" describing the highest quality and "F" describing the lowest quality. LOS "C" and "D" represent generally acceptable moderate to heavy traffic flows or operating conditions. For further clarification as it relates to specific LOS grades see ***Quality/Level of Service Handbook***.

Managed Lane: Exclusive lane(s) on a freeway accessible to those who pay a toll, carpool, or ride in public transit vehicles.

Peak Hour(s): Hour(s) of the day in which the maximum volume occurs.

Performance Measure: A quantitative or qualitative characterization used to evaluate a particular aspect of travel quality.

Point: A place along a facility where conflicting traffic streams cross, merge, or diverge.

Quality of Service: A traveler based perception of how well a service or facility is operating.

Segment: A portion of a facility from one point to the next consecutive point.

Standard: A specification to be employed for the majority of conditions and applications for which it is defined.

State Highway System (SHS): The interstate system and all other roads within the state which were under the jurisdiction of the state on June 10, 1995, and roads

Exhibit III-2 (Continued)
FDOT Level of Service Policy and Procedure

constructed by an agency of the state for the State Highway System, plus roads transferred to the state's jurisdiction after that date by mutual consent with another governmental entity, but not including roads so transferred from the state's jurisdiction. These facilities shall be facilities to which access is regulated.

Transportation Impact Assessment: An analysis conducted to determine the impacts to the transportation system of a proposed development.

Urbanized Area: A geographic region comprising as a minimum the area inside an urban place of 50,000 or more persons, as designated by the United States Bureau of the Census, expanded to include adjacent developed areas as provided for by the Federal Highway Administration regulations.

1. BACKGROUND FOR LEVEL OF SERVICE STANDARDS AND HIGHWAY CAPACITY CONCEPTS

Since publication of the ***Highway Capacity Manual (HCM)***, LOS has been the primary technical tool used for planning and designing the nation's highways. Early common practice was for highways to be planned and designed towards LOS "C". By the mid-1970's, common practice in urbanized areas has been to design highways to achieve LOS "D".

1.1 HIGHWAY CAPACITY MANUAL

The ***HCM*** is widely recognized as the leading reference document on highway capacity and LOS in the United States. It contains analytical methodologies, but does not address what levels of service are desirable.

The first ***HCM*** was published by the Bureau of Public Roads in 1950. Subsequent major updates were published by the Transportation Research Board (TRB) in 1965, 1985, 2000 and 2010. The 2010 ***HCM*** is multimodal in approach, simultaneously addressing automobile, transit, pedestrian and bicycle modes. Collectively, these travel modes represent the major highway modes of travel. The Department has been actively involved with the ***HCM*** since the early 1990's. In fact, many traffic engineering/planning advances developed in the Department's operating procedures and handbooks were incorporated in the 2010 ***HCM***.

The concept of highway (i.e., automobile mode) LOS first appeared in the 1965 ***HCM***. While the primary users of the ***HCM*** are practicing traffic engineers, LOS became the primary method to explain technical traffic planning and engineering analyses to elected officials, as well as the general public.

1.1.1 HIGHWAY CAPACITY SOFTWARE

To facilitate the use of the HCM analytical methodologies, the ***Highway Capacity Software (HCS)*** was created to replicate the ***HCM*** analytical methodologies. Nationally,

Exhibit III-2 (Continued)
FDOT Level of Service Policy and Procedure

it is widely regarded as the leading software package implementing the ***HCM***. ***HCS*** is owned and maintained by the University of Florida McTrans Center.

1.2 QUALITY/LEVEL OF SERVICE HANDBOOK

The Department began publishing its ***Quality/Level of Service (Q/LOS) Handbook*** in 1989, with the purpose of serving Florida as a planning guide to the ***HCM***. It is maintained by the Systems Planning Office and updated as needed or approximately every four years.

The ***Q/LOS Handbook*** contains simplifying assumptions to the more detailed ***HCM*** procedures, extensions and modifications to the ***HCM*** procedures, maximum acceptable capacity volumes to be used in Florida and descriptions of the ***LOSPLAN*** software. It also contains generalized service volume tables which are frequently used around the United States. Analytical methods are provided for the automobile, bus, pedestrian and bicycle modes.

1.2.1 LOSPLAN SOFTWARE

The Department's ***LOSPLAN*** (LOS planning) software contains the core tools for site and project specific planning-level analyses. The software is based on the ***Q/LOS Handbook*** and tied directly to the ***HCM*** analytical methodologies. ***LOSPLAN*** is distributed as part of the ***HCS***.

2. ACCEPTABLE OPERATING LOS STANDARDS

It is the Department's intent to plan, design, and operate the SHS at a generally acceptable LOS for the traveling public. LOS standards for the automobile mode on the SHS during a peak hour(s) are "D" in urbanized areas and "C" outside of urbanized areas. LOS standards represent goals for Department and other entities to achieve and maintain. No specific LOS standards are established for other highway modes (e.g., bus, pedestrian, bicycle).

2.1 APPLICATION OF LOS STANDARDS

Except for toll and managed lane facilities, including express lanes, the standards are applied by the Department from planning through design phases for all facility level analyses. In the planning phase, the LOS standards are considered in prioritizing the funding of projects and are used in the reporting of LOS as part of the Department's performance measurement activities. In identifying future transportation needs, the LOS standards are the primary measure of existing and future mobility needs of the traveling public. In project development and design, the LOS standards serve as the principal mobility goal.

Exhibit III-2 (Continued)
FDOT Level of Service Policy and Procedure

Department documents tied directly to the application of the LOS standards include:

- Systems Planning's ***Q/LOS Handbook***
- Systems Planning's ***New or Modified Interchanges***, Topic No. 525-030-160
- Transportation Statistics' ***Project Traffic Forecasting Procedure***, Topic No. 525-030-120
- Environmental Management's ***Project Development and Environment Manual***, Topic No. 650-000-001
- Design's ***Plans Preparation Manual***, Topic No. 625-000-007

Use of Department's LOS standards and guidance on acceptable highway capacity and LOS methods (including software) apply to all Department reviews and assessments of proposed developments directly impacting the SHS. In the review of plans and designs of other entities directly impacting the SHS, the Department recommends the adoption and use of the Department's LOS standards. Regardless of adoption or use by non-Department entities, the Department will use the LOS standards for the review of actions directly affecting the SHS for its planning and permitting processes.

The LOS standards apply to peak hour(s) using Standard K factors at a facility level with guidance provided on application to other levels of analysis (e.g., signalized intersections). Having the LOS standards directly applied at the facility level provides both reasonable consistency and flexibility at a project level for appropriate planning and design of highway facilities.

3. APPLICABILITY OF HIGHWAY CAPACITY AND LOS METHODS AND SOFTWARE

3.1 HIGHWAY CAPACITY MANUAL

Since the 1970's, more sophisticated tools like signal optimization and complex microsimulation programs have been developed to offer the potential for more accuracy in addressing traffic engineering issues. Conversely in recent years, less sophisticated traffic engineering/planning tools have been developed which require less analytical effort. In the broad spectrum of LOS analysis tools, the ***HCM*** falls approximately in the middle in terms of complexity and potential accuracy. Although the ***HCM*** is nationally viewed as the leading resource document on highway capacity and LOS and has national consensus behind it, its methodologies do not necessarily provide the greatest accuracy at either the national or state levels.

Given its generally acceptable principles, the Department's primary source for highway capacity and LOS analysis methodologies is the ***HCM***. However, some evaluation methodologies may be overridden or supplemented by those documented in the ***Q/LOS Handbook*** or in other Department procedures. In general, ***HCM*** capacity methodologies and ***HCS*** analyses take precedence over other techniques for

Exhibit III-2 (Continued)
FDOT Level of Service Policy and Procedure

operational analyses at the point and segment levels of analysis. Frequently, other analytical methodologies take precedence at the facility level.

3.2 QUALITY/LEVEL OF SERVICE (Q/LOS) HANDBOOK

On the SHS the following planning-level analysis techniques described in the ***Q/LOS Handbook*** may be used in lieu of the techniques in the ***HCM/HCS*** or other related methodologies:

- Generalized service volume tables
- Freeway facility capacities
- Rural freeway LOS criteria
- Arterial facility LOS criteria
- Arterial free flow speed determinations
- Passing lanes on two-lane highways

4. TRAINING

No mandatory training is associated with this procedure; however, technical training is the optimal practice.

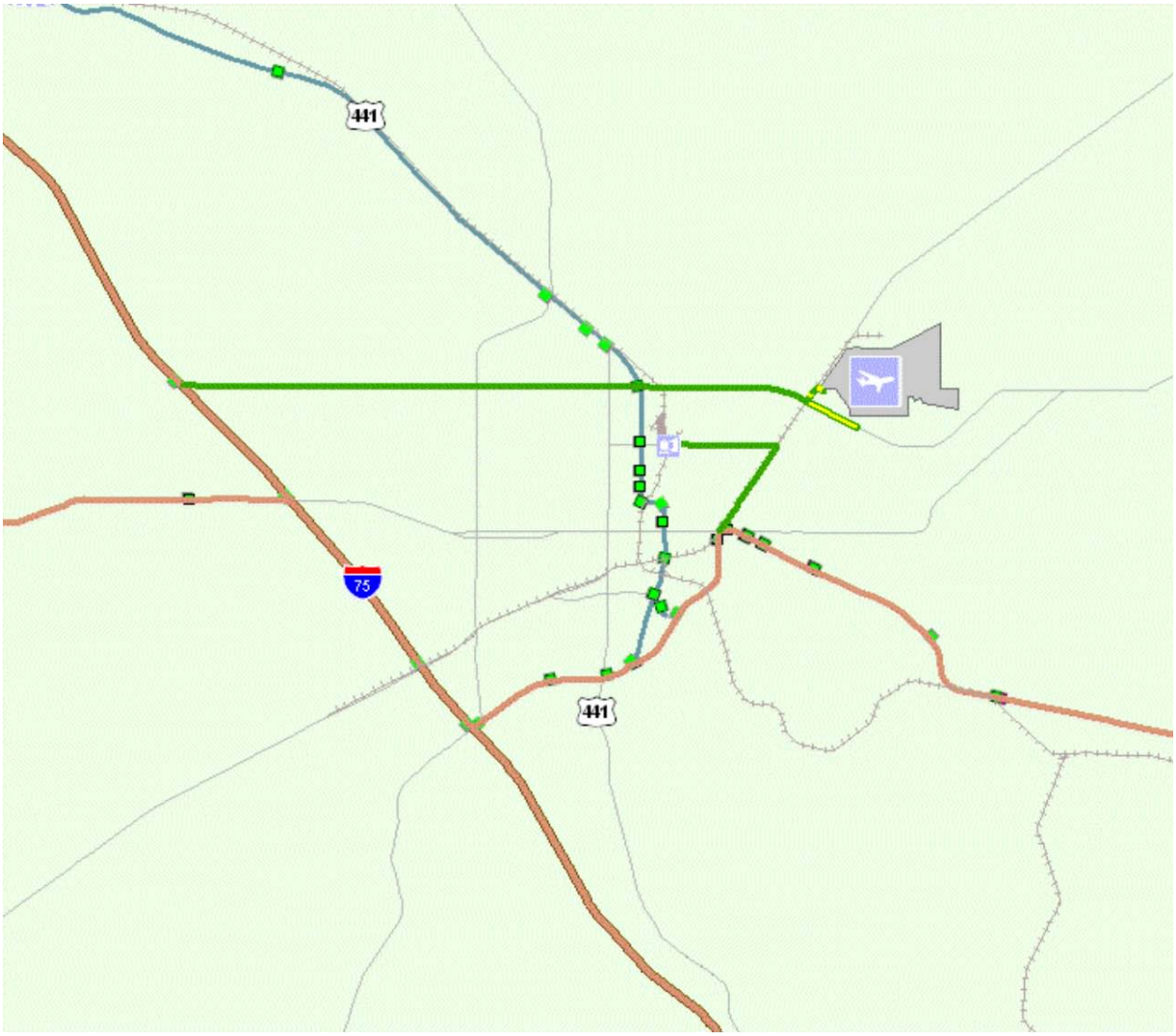
At the planning level, the Central Office Systems Planning Office provides training in the Districts upon each update of the ***Q/LOS Handbook***, as well as regional trainings approximately every 2 years between updates.

At the design and operational levels, as funding allows, the Systems Planning Office provides regional training on the ***HCM*** and ***HCS*** approximately every 4 years. In addition to the Department, other entities may provide additional ***HCM*** and ***HCS*** training on an as-needed basis.

5. FORMS

No forms are required as part of this procedure.

Illustration II
Florida Strategic Intermodal System
Gainesville Metropolitan Area

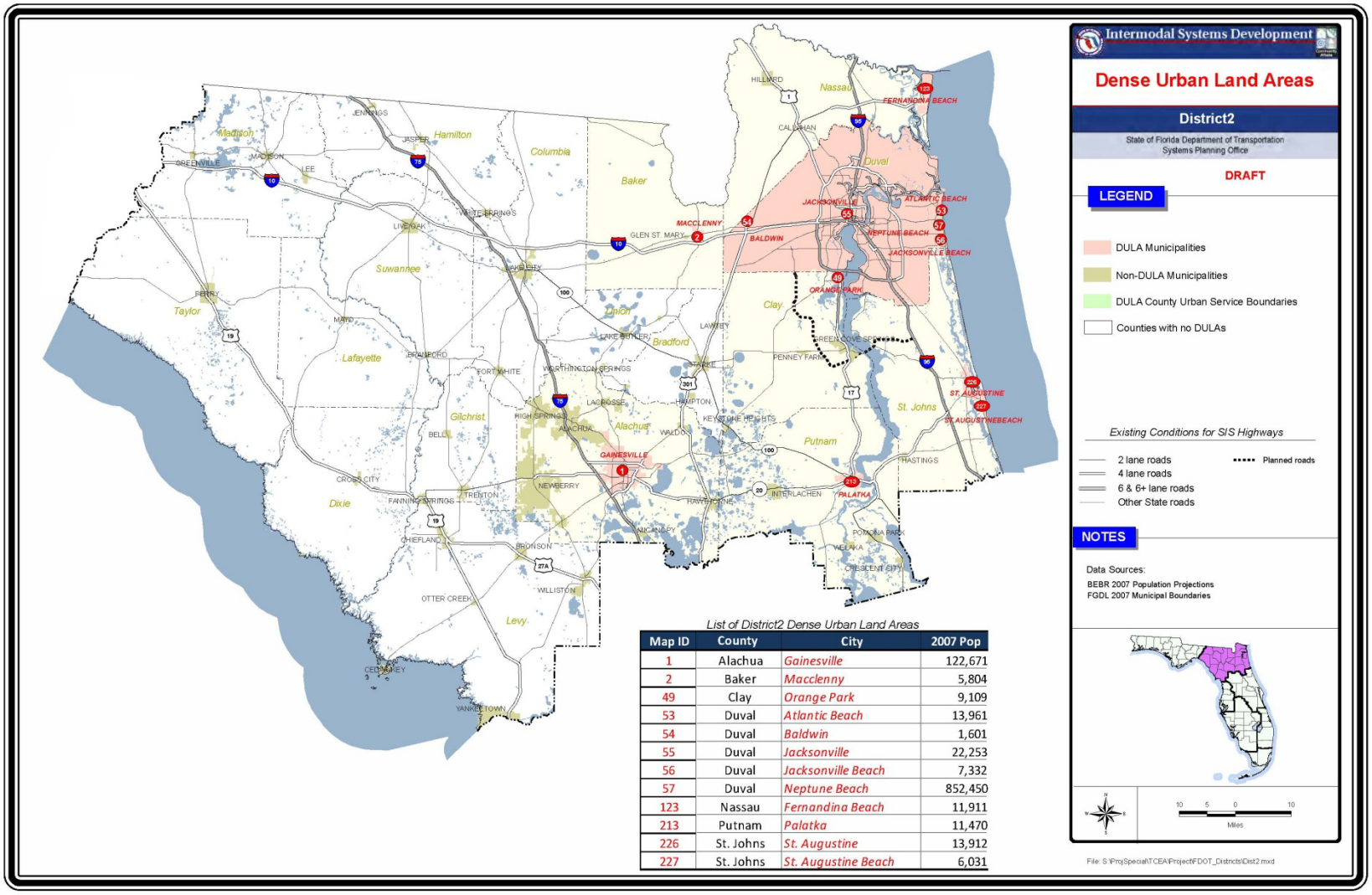


Source: Florida Department of Transportation Strategic Intermodal System website- http://camims01.camsys.com/siswebsite/

Strategic Intermodal System (SIS) facilities- Interstate 75, Hawthorne Road (State Road 20), Williston Road (State Road 331) and Newberry Road (State Road 26)

Strategic Intermodal System Connectors- N 39 Avenue (State Road 222), Waldo Road (State Road 24) and NE 23 Avenue (State Road 120)

Illustration III
Dense Urban Land Areas



List of District2 Dense Urban Land Areas

Map ID	County	City	2007 Pop
1	Alachua	*Gainesville*	122,671
2	Baker	*Macclenny*	5,804
49	Clay	*Orange Park*	9,109
53	Duval	*Atlantic Beach*	13,961
54	Duval	*Baldwin*	1,601
55	Duval	*Jacksonville*	22,253
56	Duval	*Jacksonville Beach*	7,332
57	Duval	*Neptune Beach*	852,450
123	Nassau	*Fernandina Beach*	11,911
213	Putnam	*Palatka*	11,470
226	St. Johns	*St. Augustine*	13,912
227	St. Johns	*St. Augustine Beach*	6,031

F. Metropolitan Planning Organization

METROPOLITAN PLANNING ORGANIZATION

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Exhibit III-3
Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area
Minimal Acceptable Highway Level of Service Standards

Type Of Facility	Location	Standard [1, 2,]	
		Urbanized	Transitioning[3]
Interstate 75	Countywide	D	C
Other State Highway System and Nonstate Roads	Within City of Gainesville	E	E
	Within Unincorporated Alachua County	D	D

[1] Metropolitan Transportation Planning Organization Minimum Level of Service Standards for Highways were approved May 18, 1995.

[2] Incorporates mitigation provided by any Dense Urban Land Area (DULA), Transportation Concurrency Exception Area (TCEA) and/or Transportation Mobility Program Area (TMPA) designation.

[3] There are no City-maintained transitioning roadway facilities identified in this Multimodal Level of Service Report. As the City annexes areas containing transitioning roadway facilities, highway level of service standards specified in the City's Comprehensive Plan Transportation Mobility Element shall apply.

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G. Alachua County Roadways

ALACHUA COUNTY ROADWAYS

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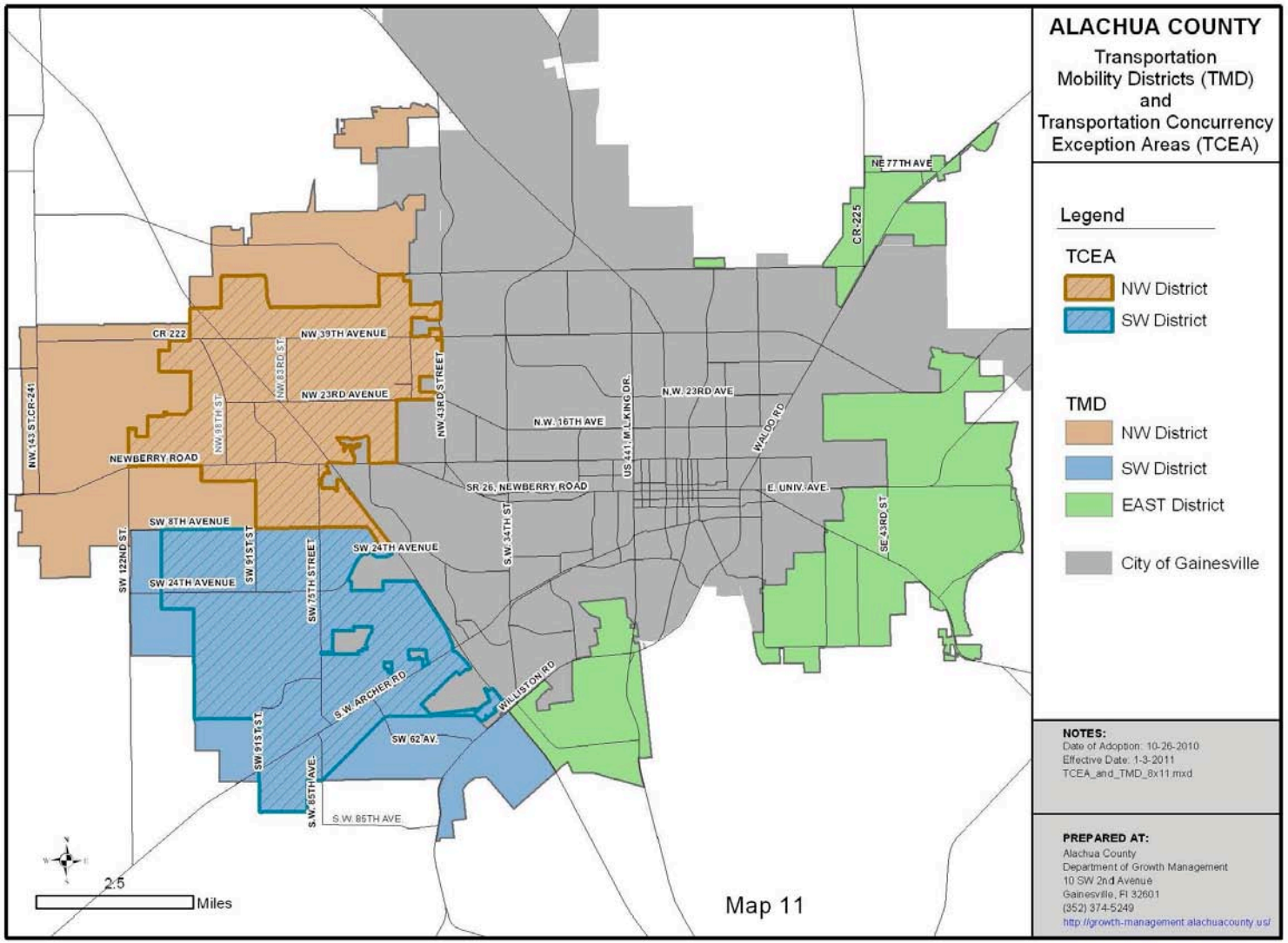
Illustration IV
Alachua County Transportation Mobility Districts and Transportation Concurrency Areas



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H. City of Gainesville Roadways

CITY OF GAINESVILLE ROADWAYS

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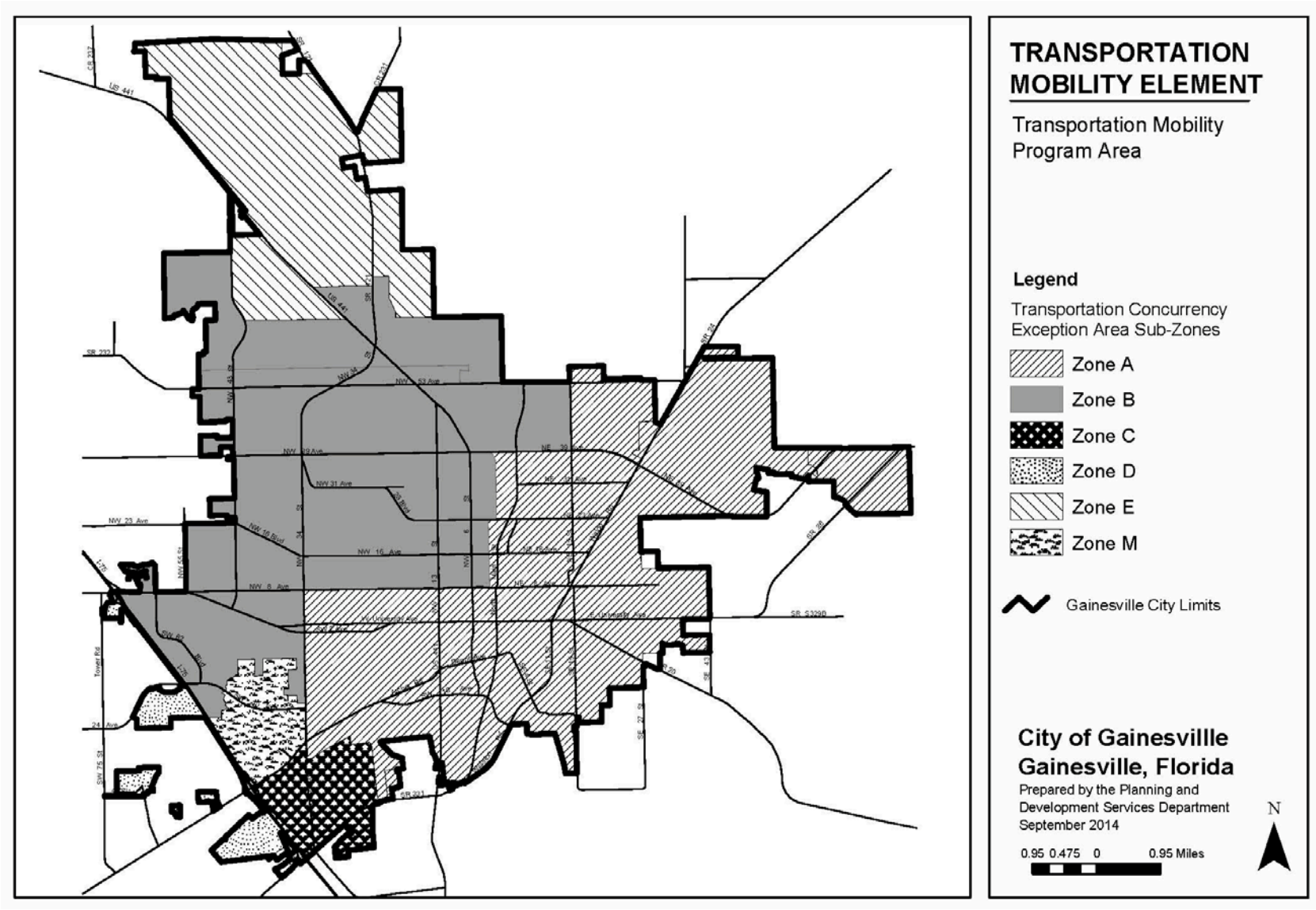
Illustration V
City of Gainesville Transportation Mobility Program Area



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Chapter IV
Bicycle, Pedestrian and Transit Level of Service Analyses

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Chapter IV: Bicycle, Pedestrian and Transit Level of Service Analyses

A. Definitions

Bicycle Level of Service - Bicycle level of service is defined in terms of the bicycle rider's perception of comfort and safety relative to automotive traffic in the roadway corridor.

$$\text{Bicycle LOS} = a_1 \ln(Vol_{15}/L_n) + a_2 SP_t(1+10.38HV)^2 + a_3(1/PR_5)2 + a_4(W_e)^2 + C$$

where:

Vol_{15} = (ADT x D x Kd) / (4 x PHF) *Volume of directional traffic in 15 minute time period*
where:
- ADT = Average Daily Traffic on the segment or link
- D = Directional Factor
- K_d = Peak to Daily Factor
- LOS = Level of Service
- PHF = Peak Hour Factor

L_n = Total number of directional lanes

SP_t = $1.1199 \ln(SP_p - 20) + 0.8103$
where:
- SP_p = Posted Speed limit (a surrogate for average running speed)

HV = percentage of heavy vehicles (as defined in the 2010 Highway Capacity Manual)

PR_5 = FHWA's five point pavement surface condition rating

W_e = Average effective width of outside throughlane:
where:
- $W_e = W_v - (10 \text{ ft} \times \%\text{ OSPA})$ and $W_l = 0$
- $W_e = W_v + W_l (1 - 2 \times \%\text{ OSPA})$ and $W_l > 0$ & $W_{ps} = 0$
- $W_e = W_v + W_l - 2(10 \times \%\text{ OSPA})$ and $W_l > 0$ & $W_{ps} = 0$ & a bikelanes exists

where:
- W_t = total width of outside lane and shoulder pavement
- OSPA = percentage of segment with occupied onstreet parking
- W_l = width of paving between the outside lane stripe & the edge of the pavement
- W_{ps} = width of pavement striped for onstreet parking
- W_v = effective width as a function of traffic volume

and
- $W_v = W_t$ if ADT > 4,000 vehicles/day
- $W_v = W_t(2 - 0.00025ADT)$ if ADT > 4,000 vehicles/day and if the street/road is undivided and unstriped

A_1 = 0.507
A_2 = 0.199
A_3 = 7.066
A_4 = -0.005
C = 0.760
(A_1 - A_4 are coefficients established by multivariate regression analysis)

Bicycle Level of Service Categories	
Level of Service	**Level of Service Score**
A	</= 2.0
B	> 2.0 and </= 2.75
C	> 2.75 and </= 3.5
D	> 3.5 and </= 4.25
E	> 4.25 and </= 5.0
F	> 5.0

Source: 2010 Highway Capacity Manual, Volume 3, Page 16-9

Pedestrian Level of Service - Pedestrian level of service is defined in terms of the bicycle rider's perception of comfort and safety relative to automotive traffic in the roadway corridor.

$$\text{Pedestrian LOS} = -1.2021 \ln(W_{ol} + W_l + f_p \times \%OSP + f_b \times W_b + f_{sw} \times W_s) + 0.253 \ln(Vol_{15}/L) + 0.0005\ SPD^2 + 5.3876$$

where:

- W_{ol} = Width of outside lane
- W_l = Width of shoulder or bikelane (feet)
- f_p = Onstreet parking effect coefficient (=0.20)
- %OSP = percent of segment with onstreet parking
- f_b = Buffer area baffier coefficient (=5.37 for trees spaced 20 feet on center)
- W_b = Buffer width (distance between edge of pavement and sidewalk, feet)
- f_{sw} = Sidewalk presence coefficient = $6 - 0.3W_s$
- W_s = Width of sidewalk (feet)
- Vol_{15} = Average traffic during a fifteen (15) minute period
- L = Total number of (through)lanes (for road or street)
- SPD = Average running speed of motor vehicle traffic (mi/hr)

Pedestrian Level of Service Categories	
Level of Service	**Level of Service Score**
A	</= 2.0
B	> 2.0 and </= 2.75
C	> 2.75 and </= 3.5
D	> 3.5 and </= 4.25
E	> 4.25 and </= 5.0
F	> 5.0

Source: 2010 Highway Capacity Manual, Volume 3, Page 16-9

The Florida Department of Transportation Generalized Tables and LOSPLAN software incorporate these level of service calculations into their respective level of service determinations.

B. Data Collection and Analysis Requirements

All data shall be collected in accordance with the procedures in the latest available edition of the Quality/Level of Service Handbook. Multimodal traffic study termini shall be consistent with the roadway facility termini established in the Multimodal Level of Service Report. The roadway facility(s) analyzed shall be identified in the traffic study. Roadway facility analysis shall be undertaken utilizing Florida Department of Transportation -approved analysis tools. These tools include, but are not limited to, Florida Department of Transportation's latest version of ARTPLAN, Highway Capacity Manual 6th Edition and Highway Capacity Software. Data collection and analysis requirements are identified below.

1. Bicycle Level Of Service Analyses

Generalized Tables data collection requirements for determining the bicycle level of service of the roadway facilities within the Gainesville Metropolitan Area consist of field collection of designated instreet bicycle lanes, paved shoulders and adjacent offstreet bicycle/pedestrian trails. Roadway facilities with wide curblanes are not considered to have bicycle facilities.

2. Pedestrian Level Of Service Analyses

Generalized Tables data collection requirements for determining the pedestrian level of service of the roadway facilities within the Gainesville Metropolitan Area consist of field collection of sidewalks and adjacent offstreet bicycle/pedestrian trails.

3. Transit Level Of Service Analyses

Generalized Tables data collection requirements for determining the transit level of service of the roadway facilities within the Gainesville Metropolitan Area consist of field collection of sidewalks, adjacent offstreet bicycle/ pedestrian trails and bus frequency within the corridor. In addition, barriers to transit access are to be identified.

C. Traffic Study Procedures

Typically, if the determination of automotive/highway level of service for roadway facilities within the Gainesville Metropolitan Area is measured using the Florida Department of Transportation Generalized Tables, then bicycle, pedestrian and transit levels of service are also measured using the Florida Department of Transportation Generalized Tables; and if the determination of automotive/highway level of service for roadway facilities within the Gainesville Metropolitan Area is measured using the Florida Department of Transportation LOSPLAN software (ARTPLAN, HIGHPLAN or FREEPLAN), then bicycle, pedestrian and transit levels of service are also measured using Florida Department of Transportation LOSPLAN software (ARTPLAN, HIGHPLAN or FREEPLAN). For special circumstances, the Level of Service Technical Advisory will determine whether a roadway facility that is analyzed for automotive/highway level of service using the Florida Department of Transportation Generalized Tables is to be analyzed using Florida Department of Transportation LOSPLAN software (ARTPLAN, HIGHPLAN or FREEPLAN) to determine the corresponding bicycle, pedestrian and transit level of service.

1. Level of Service Report Tier One Analyzed Bicycle, Pedestrian and Transit Facilities

Bicycle, pedestrian and transit level of service is determined by using the appropriate urban, transitioning, or rural area Florida Department of Transportation Generalized Table that is used for determining the automotive/highway level of service. Data requirements include the necessary field measurements and collection of information to utilize the Florida Department of Transportation Generalized Tables.

2. Level of Service Report Tier Two Analyzed Bicycle, Pedestrian and Transit Facilities

Bicycle, pedestrian and transit facility data collection shall be consistent with the criteria specified in the Quality/Level of Service Handbook or criteria designated by Florida Department of Transportation District 2. Data requirements include the necessary field measurements and collection of information to utilize the Florida Department of Transportation LOSPLAN software.

D. Methodology

1. Determining Facility Level Of Service

The roadway facility's bicycle and pedestrian level of service is determined by the availability of bicycle facilities (bicycle lanes, paved shoulders and offstreet bicycle/pedestrian trails) and pedestrian facilities (sidewalks and offstreet bicycle/pedestrian trails) within the corridor. The roadway facility's transit level of service is determined by the availability of bus service and frequency within the corridor.

2. Level of Service Analysis Techniques

Tools for measuring bicycle, pedestrian and transit levels of service have been developed. These include those developed by Sprinkle Consulting, Inc. and Florida Department of Transportation. The Florida Department of Transportation has applied these analysis techniques into its Quality/Level of Service Handbook. The simplest (and the least accurate) method is the use of the Florida Department of Transportation Generalized Tables. An intermediate level analysis can be performed using the LOSPLAN family software developed by the Florida Department of Transportation. All of these techniques are based on the Highway Capacity Manual 6th Edition. Data collection shall be consistent with the criteria specified in the Quality/Level of Service Handbook or criteria designated by Florida Department of Transportation District 2.

a. Tier One Level of Service Analysis

Bicycle Level of Service Analyses

The Bicycle Mode Generalized Table evaluates level of service by measuring the percent coverage of bicycle lanes or paved shoulder in reference to automotive traffic volume per lane.

Pedestrian Level of Service Analyses

The Pedestrian Mode Generalized Table evaluates level of service by measuring the percent coverage of sidewalk coverage in reference to automotive traffic volume per lane.

Transit Level of Service Analyses

The Transit Mode Generalized Table evaluates level of service by measuring peak hour, peak direction bus frequency for the roadway facility dependent of the amount of sidewalk coverage along the facility.

b. Tier Two Level of Service Analysis

For ARTPLAN analysis, localized data is entered for each segment to achieve a more accurate level of service estimate. Field data specific to the corridor being analyzed should be used.

i. Bicycle Level of Service Analyses

The Bicycle Mode ARTPLAN evaluates level of service at the facility and segment levels by pavement condition and the presence of wide outside curblane, paved shoulders and/or bicycle lanes in reference to automotive traffic volume per lane.

ii. Pedestrian Level of Service Analyses

The Pedestrian Mode ARTPLAN evaluates level of service at the facility and segment levels by the presence, including percent coverage, of sidewalk facilities, amount of sidewalk/roadway separation and presence of sidewalk/roadway protective barrier in reference to automotive traffic volume per lane. Up to three subsegments per segment of this input data may be applied to this program.

iii. Transit Level of Service Analyses

The Transit Mode ARTPLAN evaluates level of service at the facility and segment levels by the presence of obstacles to bus, span of service and peak hour, peak direction bus frequency for the roadway facility in reference to the amount of sidewalk coverage along the facility.

E. Variables Used To Perform Bicycle, Pedestrian And Transit Los Analyses

1. Tier One Level of Service Analysis

a. Bicycle Level of Service Analyses

Percentage of paved shoulder/bicycle lane coverage per peak direction roadway lane traffic volume.

b. Pedestrian Level of Service Analyses

Percentage of sidewalk coverage per peak direction roadway lane traffic volume.

c. Transit Level of Service Analyses

Percentage of sidewalk coverage by amount of bus frequency at peak hour, peak direction.

2. Tier Two Level of Service Analysis

a. ARTPLAN - Multimodal Facility Data (Screen One) Characteristics

i. Bicycle Level of Service Analyses

Pave Shoulder/Bicycle Lane Present- Check box if there is a bicycle lane, pave shoulder within the roadway corridor

Outside Lane Width- indicate whether the outside lane width is narrow, typical or wide; or enter the specific width

Pavement Condition- indicate whether the pavement condition is desirable, typical or undesirable.

ii. Pedestrian Level of Service Analyses

Sidewalk- indicate whether a sidewalk is present

Sidewalk/Roadway Separation- indicate whether the sidewalk/roadway separation is adjacent, typical or wide.

Sidewalk/Roadway Protective Barrier- indicate whether there is sidewalk/roadway protective barrier present.

iii. Transit Level of Service Analyses

Bus Frequency (Buses per Hour)- indicate how may times buses pass through the corridor in the peak direction during the peak hour.

Bus Span of Service (Hour per Day)- indicate how many hours of bus service per day for the corridor.

Obstacle to Bus Stop- indicate that there is an obstacle to accessing the bus stop.

b. ARTPLAN - Multimodal Segment Data (Screen Two) Characteristics

i. Bicycle Level of Service Analyses

Pave Shoulder/Bicycle Lane Present- Check box if there is a bicycle lane, pave shoulder within the roadway corridor

Outside Lane Width- indicates whether the outside lane width is narrow, typical or wide; or enter the specific width

Pavement Condition- indicates whether the pavement condition is desirable, typical or undesirable.

Pedestrian Level of Service Analyses

Sidewalk- indicates whether a sidewalk is present

Sidewalk/Roadway Separation- indicates whether the sidewalk/roadway separation is adjacent, typical or wide.

Sidewalk/Roadway Protective Barrier- indicates whether there is sidewalk/roadway protective barrier present.

Transit Level of Service Analyses

Bus Frequency (Buses per Hour)- indicates how may times buses pass through the corridor in the peak direction during the peak hour.

Bus Span of Service (Hour per Day)- indicates how many hours of bus service per day for the corridor.

Obstacle to Bus Stop- indicates that there is an obstacle to accessing the bus stop.

c. ARTPLAN - Pedestrian Subsegment Data (Screen Three) Characteristics

i. Pedestrian Level of Service Analyses

For evaluation of up to three subsegments of pedestrian facilities within the roadway corridor, Percentage (%) of Segment- indicates what percentage of the segment that the subsegment characteristics apply.

Sidewalk- indicates whether a sidewalk is present

Sidewalk/Roadway Separation- indicates whether the sidewalk/roadway separation is adjacent, typical or wide.

Sidewalk/Roadway Protective Barrier- indicates whether there is sidewalk/roadway protective barrier present.

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Chapter V
Multimodal Level of Service Analysis Tools

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Chapter V: Multimodal Level of Service Analysis Tools

A. Tier One Analysis- Generalized Tables

Tier one level of service is evaluated using the Florida Department of Transportation Generalized Tables. Exhibit V-1 includes Table 1 Urbanized Areas Average Annual Daily Volumes and input volume assumptions. Exhibit V-2 includes Table 7 Urbanized Areas Peak Hour Directional Volumes and input volume assumptions. Exhibit V-3 includes Table 2 Transitioning Areas Average Annual Daily Volumes and input volume assumptions. Exhibit V-4 includes Table 8 Transitioning Areas Peak Hour Directional Volumes and input volume assumptions.

1. Urbanized Areas

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Exhibit V-1
Urbanized Areas Average Annual Daily Volumes and Input Volume Assumptions

TABLE 1

Generalized **Annual Average Daily** Volumes for Florida's **Urbanized Areas**

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	16,800	17,700	**
4	Divided	*	37,900	39,800	**
6	Divided	*	58,400	59,900	**
8	Divided	*	78,800	80,100	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	7,300	14,800	15,600
4	Divided	*	14,500	32,400	33,800
6	Divided	*	23,300	50,000	50,900
8	Divided	*	32,000	67,300	68,100

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	2,900	7,600	19,700
50-84%	2,100	6,700	19,700	>19,700
85-100%	9,300	19,700	>19,700	**

PEDESTRIAN MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	2,800	9,500
50-84%	*	1,600	8,700	15,800
85-100%	3,800	10,700	17,400	>19,700

BUS MODE (Scheduled Fixed Route)[3]
(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Core Urbanized

Lanes	B	C	D	E
4	47,400	64,000	77,900	84,600
6	69,900	95,200	116,600	130,600
8	92,500	126,400	154,300	176,600
10	115,100	159,700	194,500	222,700
12	162,400	216,700	256,600	268,900

Urbanized

Lanes	B	C	D	E
4	45,800	61,500	74,400	79,900
6	68,100	93,000	111,800	123,300
8	91,500	123,500	148,700	166,800
10	114,800	156,000	187,100	210,300

Freeway Adjustments

Auxiliary Lanes Present in Both Directions	Ramp Metering
+ 20,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	8,600	17,000	24,200	33,300
4	Divided	36,700	51,800	65,600	72,600
6	Divided	55,000	77,700	98,300	108,800

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1] Values shown are presented as two-way annual average daily volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Exhibit V-1 (Continued)
Urbanized Areas Average Annual Daily Volumes and Input Volume Assumptions

TABLE 1
(continued)

Generalized **Annual Average Daily** Volumes for Florida's
Urbanized Areas

12/18/12

INPUT VALUE ASSUMPTIONS	Uninterrupted Flow Facilities				Interrupted Flow Facilities					
					State Arterials				Class I	
	Freeways	Core Freeways	Highways		Class I		Class II		Bicycle	Pedestrian
ROADWAY CHARACTERISTICS										
Area type (u,lu)	lu	lu	u	u	u	u	u	u	u	u
Number of through lanes (both dir.)	4-10	4-12	2	4-6	2	4-8	2	4-8	4	4
Posted speed (mph)	70	65	50	50	45	50	30	30	45	45
Free flow speed (mph)	75	70	55	55	50	55	35	35	50	50
Auxiliary Lanes (n,y)	n	n								
Median (n, nr, r)			n	r	n	r	n	r	r	r
Terrain (l,r)	l	l	l	l	l	l	l	l	l	l
% no passing zone			80							
Exclusive left turn lane impact (n, y)			[n]	y	y	y	y	y	y	y
Exclusive right turn lanes (n, y)					n	n	n	n	n	n
Facility length (mi)	4	4	5	5	2	2	1.9	1.8	2	2
Number of basic segments	4	4								
TRAFFIC CHARACTERISTICS										
Planning analysis hour factor (K)	0.090	0.085	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Directional distribution factor (D)	0.547	0.547	0.550	0.550	0.550	0.560	0.565	0.560	0.565	0.565
Peak hour factor (PHF)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Base saturation flow rate (pcphpl)			1,700	2,100	1,950	1,950	1,950	1,950	1,950	1,950
Heavy vehicle percent	4.0	4.0	2.0	2.0	1.0	1.0	1.0	1.0	2.5	2.0
Local adjustment factor	0.91	0.91	0.97	0.98						
% left turns					12	12	12	12	12	12
% right turns					12	12	12	12	12	12
CONTROL CHARACTERISTICS										
Number of signals					4	4	10	10	4	6
Arrival type (1-6)					3	3	4	4	4	4
Signal type (a, c, p)					c	c	c	c	c	c
Cycle length (C)					120	150	120	120	120	120
Effective green ratio (g/C)					0.44	0.45	0.44	0.44	0.44	0.44
MULTIMODAL CHARACTERISTICS										
Paved shoulder/bicycle lane (n, y)									n, 50%, y	n
Outside lane width (n, t, w)									t	t
Pavement condition (d, t, u)									t	
On-street parking (n, y)										
Sidewalk (n, y)										n, 50%, y
Sidewalk/roadway separation(a, t, w)										t
Sidewalk protective barrier (n, y)										n

LEVEL OF SERVICE THRESHOLDS

Level of Service	Freeways	Highways		Arterials		Bicycle	Ped	Bus
	Density	Two-Lane %ffs	Multilane Density	Class I ats	Class II ats	Score	Score	Buses/hr.
B	≤ 17	> 83.3	≤ 17	> 31 mph	> 22 mph	≤ 2.75	≤ 2.75	≤ 6
C	≤ 24	> 75.0	≤ 24	> 23 mph	> 17 mph	≤ 3.50	≤ 3.50	≤ 4
D	≤ 31	> 66.7	≤ 31	> 18 mph	> 13 mph	≤ 4.25	≤ 4.25	< 3
E	≤ 39	> 58.3	≤ 35	> 15 mph	> 10 mph	≤ 5.00	≤ 5.00	< 2

% ffs = Percent free flow speed ats = Average travel speed

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Exhibit V-2
Urbanized Areas Peak Hour Directional Volumes and Input Volume Assumptions

TABLE 7

Generalized **Peak Hour Directional** Volumes for Florida's **Urbanized Areas**[1]

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	830	880	**
2	Divided	*	1,910	2,000	**
3	Divided	*	2,940	3,020	**
4	Divided	*	3,970	4,040	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	370	750	800
2	Divided	*	730	1,630	1,700
3	Divided	*	1,170	2,520	2,560
4	Divided	*	1,610	3,390	3,420

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
1	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding directional volumes in this table by 1.2

BICYCLE MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	150	390	1,000
50-84%	110	340	1,000	>1,000
85-100%	470	1,000	>1,000	**

PEDESTRIAN MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	140	480
50-84%	*	80	440	800
85-100%	200	540	880	>1,000

BUS MODE (Scheduled Fixed Route)[3]
(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
2	2,260	3,020	3,660	3,940
3	3,360	4,580	5,500	6,080
4	4,500	6,080	7,320	8,220
5	5,660	7,680	9,220	10,360
6	7,900	10,320	12,060	12,500

Freeway Adjustments

Auxiliary Lane	Ramp Metering
+ 1,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
1	Undivided	420	840	1,190	1,640
2	Divided	1,810	2,560	3,240	3,590
3	Divided	2,720	3,840	4,860	5,380

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
1	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1] Values shown are presented as peak hour directional volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* **Cannot be achieved using table input value defaults.**

** **Not applicable for that level of service letter grade.** For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Exhibit V-2 (Continued)
Urbanized Areas Peak Hour Directional Volumes and Input Volume Assumptions

TABLE 7
(continued)

Generalized **Peak Hour Directional** Volumes for Florida's
Urbanized Areas

12/18/12

INPUT VALUE ASSUMPTIONS	Uninterrupted Flow Facilities			Interrupted Flow Facilities					
				State Arterials				Class I	
	Freeways	Highways		Class I		Class II		Bicycle	Pedestrian
ROADWAY CHARACTERISTICS									
Area type (lu, u)	lu	u	u	u	u	u	u	u	u
Number of through lanes (both dir.)	4-12	2	4-6	2	4-8	2	4-8	4	4
Posted speed (mph)	70	50	50	45	50	30	30	45	45
Free flow speed (mph)	75	55	55	50	55	35	35	50	50
Auxiliary lanes (n,y)	n								
Median (n, nr, r)		n	r	n	r	n	r	r	r
Terrain (l,r)	l	l	l	l	l	l	l	l	l
% no passing zone		80							
Exclusive left turn lane impact (n, y)		[n]	y	y	y	y	y	y	y
Exclusive right turn lanes (n, y)				n	n	n	n	n	n
Facility length (mi)	4	5	5	2	2	1.9	1.8	2	2
Number of basic segments	4								
TRAFFIC CHARACTERISTICS									
Planning analysis hour factor (K)	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Directional distribution factor (D)	0.547	0.550	0.550	0.550	0.560	0.565	0.560	0.565	0.565
Peak hour factor (PHF)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Base saturation flow rate (pcphpl)		1,700	2,100	1,950	1,950	1,950	1,950	1,950	1,950
Heavy vehicle percent	4.0	2.0	2.0	1.0	1.0	1.0	1.0	2.5	2.0
Local adjustment factor	0.91	0.97	0.98						
% left turns				12	12	12	12	12	12
% right turns				12	12	12	12	12	12
CONTROL CHARACTERISTICS									
Number of signals				4	4	10	10	4	6
Arrival type (1-6)				3	3	4	4	4	4
Signal type (a, c, p)				c	c	c	c	c	c
Cycle length (C)				120	150	120	120	120	120
Effective green ratio (g/C)				0.44	0.45	0.44	0.44	0.44	0.44
MULTIMODAL CHARACTERISTICS									
Paved shoulder/bicycle lane (n, y)								n, 50%, y	n
Outside lane width (n, t, w)								t	t
Pavement condition (d, t, w)								t	
On-street parking (n, y)								n	n
Sidewalk (n, y)									n, 50%, y
Sidewalk/roadway separation (a, t, w)									t
Sidewalk protective barrier (n, y)									n

LEVEL OF SERVICE THRESHOLDS

Level of Service	Freeways	Highways		Arterials		Bicycle	Ped	Bus
	Density	Two-Lane %ffs	Multilane Density	Class I ats	Class II ats	Score	Score	Buses/hr.
B	≤ 17	> 83.3	≤ 17	> 31 mph	> 22 mph	≤ 2.75	≤ 2.75	≤ 6
C	≤ 24	> 75.0	≤ 24	> 23 mph	> 17 mph	≤ 3.50	≤ 3.50	≤ 4
D	≤ 31	> 66.7	≤ 31	> 18 mph	> 13 mph	≤ 4.25	≤ 4.25	< 3
E	≤ 39	> 58.3	≤ 35	> 15 mph	> 10 mph	≤ 5.00	≤ 5.00	< 2

% ffs = Percent free flow speed ats = Average travel speed

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

2. Areas Transitioning Into Urbanized Areas or Areas Over 5,000 Not in Urbanized Areas

Exhibit V-3
Transitioning Areas Average Annual Daily Volumes and Input Volume Assumptions

TABLE 2

Generalized **Annual Average Daily** Volumes for Florida's
Transitioning Areas and
Areas Over 5,000 Not In Urbanized Areas[1]

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	14,400	16,200	**
4	Divided	*	34,000	35,500	**
6	Divided	*	52,100	53,500	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	6,500	13,300	14,200
4	Divided	*	9,900	28,800	31,600
6	Divided	*	16,000	44,900	47,600

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	2,600	6,100	19,500
50-84%	1,900	5,500	18,400	>19,500
85-100%	7,500	19,500	>19,500	**

PEDESTRIAN MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	2,800	9,400
50-84%	*	1,600	8,600	15,600
85-100%	3,800	10,500	17,100	>19,500

BUS MODE (Scheduled Fixed Route)[3]
(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
4	44,100	57,600	68,900	71,700
6	65,100	85,600	102,200	111,000
8	85,100	113,700	135,200	150,000
10	106,200	141,700	168,800	189,000

Freeway Adjustments

Auxiliary Lanes Present in Both Directions	Ramp Metering
+ 20,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	9,200	17,300	24,400	33,300
4	Divided	35,300	49,600	62,900	69,600
6	Divided	52,800	74,500	94,300	104,500

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1] Values shown are presented as two-way annual average daily volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Exhibit V-3 (Continued)
Transitioning Areas Average Annual Daily Volumes and Input Volume Assumptions

TABLE 2
(continued)

Generalized **Annual Average Daily** Volumes for Florida's
Transitioning and
Areas Over 5,000 Not In Urbanized Areas

12/18/12

INPUT VALUE ASSUMPTIONS	Uninterrupted Flow Facilities			Interrupted Flow Facilities					
				State Arterials				Class I	
	Freeways	Highways		Class I		Class II		Bicycle	Pedestrian
ROADWAY CHARACTERISTICS									
Area type (t,uo)	t	t	t	t	t	t	t	t	t
Number of through lanes (both dir.)	4-10	2	4-6	2	4-6	2	4-6	4	4
Posted speed (mph)	70	50	50	45	50	30	30	45	45
Free flow speed (mph)	75	55	55	50	55	35	35	50	50
Auxiliary lanes (n,y)	n	n	n						
Median (n, nr, r)		n	r	n	y	n	y	r	r
Terrain (l,r)	l	l	l	l	l	l	l	l	l
% no passing zone		60							
Exclusive left turn lane impact (n, y)		[n]	y	y	y	y	y	y	y
Exclusive right turn lanes (n, y)				n	n	n	n	n	n
Facility length (mi)	8	5	5	1.8	2	2	2	2	2
Number of basic segments	4								
TRAFFIC CHARACTERISTICS									
Planning analysis hour factor (K)	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Directional distribution factor (D)	0.555	0.550	0.550	0.550	0.570	0.570	0.565	0.570	0.570
Peak hour factor (PHF)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Base saturation flow rate (pcphpl)		1,700	2,100	1,950	1,950	1,950	1,950	1,950	1,950
Heavy vehicle percent	9.0	4.0	4.0	2.0	3.0	2.0	3.0	3.0	3.0
Local adjustment factor	0.85	0.97	0.95						
% left turns				12	12	12	12	12	12
% right turns				12	12	12	12	12	12
CONTROL CHARACTERISTICS									
Number of signals				5	4	10	10	4	6
Arrival type (1-6)				4	3	4	4	4	4
Signal type (a, c, p)				c	c	c	c	c	c
Cycle length (C)				120	150	120	150	120	120
Effective green ratio (g/C)				0.44	0.45	0.44	0.45	0.44	0.44
MULTIMODAL CHARACTERISTICS									
Paved shoulder/bicycle lane (n, y)								n, 50%, y	n
Outside lane width (n, t, w)								t	t
Pavement condition (d, t, u)								t	
On-street parking (n, y)								n	n
Sidewalk (n, y)									n, 50%, y
Sidewalk/roadway separation (a, t, w)									t
Sidewalk protective barrier (n, y)									n

LEVEL OF SERVICE THRESHOLDS

Level of Service	Freeways	Highways		Arterials		Bicycle	Ped	Bus
	Density	Two-Lane	Multilane	Class I	Class II	Score	Score	Buses/hr.
		%ffs	Density	ats	ats			
B	≤ 17	> 83.3	≤ 17	> 31 mph	> 22 mph	≤ 2.75	≤ 2.75	≤ 6
C	≤ 24	> 75.0	≤ 24	> 23 mph	> 17 mph	≤ 3.50	≤ 3.50	≤ 4
D	≤ 31	> 66.7	≤ 31	> 18 mph	> 13 mph	≤ 4.25	≤ 4.25	< 3
E	≤ 39	> 58.3	≤ 35	> 15 mph	> 10 mph	≤ 5.00	≤ 5.00	< 2

% ffs = Percent free flow speed ats = Average travel speed

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Exhibit V-4
Transitioning Areas Peak Hour Directional Volumes and Input Volume Assumptions

TABLE 8

Generalized **Peak Hour Directional** Volumes for Florida's **Transitioning** and **Areas Over 5,000 Not In Urbanized Areas**[1]

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	710	800	**
2	Divided	*	1,740	1,820	**
3	Divided	*	2,670	2,740	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	330	680	720
2	Divided	*	500	1,460	1,600
3	Divided	*	810	2,280	2,420

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding directional volumes in this table by 1.2

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	140	320	1,000
50-84%	100	280	940	>1,000
85-100%	380	1,000	>1,000	**

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	140	480
50-84%	*	80	440	800
85-100%	200	540	880	>1,000

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
2	2,200	2,880	3,440	3,580
3	3,260	4,280	5,100	5,540
4	4,260	5,680	6,760	7,500
5	5,300	7,080	8,440	9,440

Freeway Adjustments

Auxiliary Lane	Ramp Metering
+ 1,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
1	Undivided	450	850	1,200	1,640
2	Divided	1,740	2,450	3,110	3,440
3	Divided	2,610	3,680	4,660	5,170

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
1	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1] Values shown are presented as peak hour directional volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Exhibit V-4 (Continued)
Transitioning Areas Peak Hour Directional Volumes and Input Volume Assumptions

TABLE 8
(continued)

Generalized **Peak Hour Directional** Volumes for Florida's
Transitioning and
Areas Over 5,000 Not In Urbanized Areas

12/18/12

INPUT VALUE ASSUMPTIONS	Uninterrupted Flow Facilities			Interrupted Flow Facilities					
				State Arterials				Class I	
	Freeways	Highways		Class I		Class II		Bicycle	Pedestrian
ROADWAY CHARACTERISTICS									
Area type (t,uo)	t	t	t	t	t	t	t	t	t
Number of through lanes (both dir.)	4-10	2	4-6	2	4-6	2	4-6	4	4
Posted speed (mph)	70	50	50	45	50	30	30	45	45
Free flow speed (mph)	75	55	55	50	55	35	35	50	50
Auxiliary lanes (n,y)	n	n	n						
Median (n, nr, r)		n	r	n	y	n	y	r	r
Terrain (l,r)	l	l	l	l	l	l	l	l	l
% no passing zone		60							
Exclusive left turn lane impact (n, y)		[n]	y	y	y	y	y	y	y
Exclusive right turn lanes (n, y)				n	n	n	n	n	n
Facility length (mi)	8	5	5	1.8	2	2	2	2	2
Number of basic segments	4								
TRAFFIC CHARACTERISTICS									
Planning analysis hour factor (K)	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Directional distribution factor (D)	0.555	0.550	0.550	0.550	0.570	0.570	0.565	0.570	0.570
Peak hour factor (PHF)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Base saturation flow rate (pcphpl)		1,700	2,100	1,950	1,950	1,950	1,950	1,950	1,950
Heavy vehicle percent	9.0	4.0	4.0	2.0	3.0	2.0	3.0	3.0	3.0
Local adjustment factor	0.85	0.97	0.95						
% left turns				12	12	12	12	12	12
% right turns				12	12	12	12	12	12
CONTROL CHARACTERISTICS									
Number of signals				5	4	10	10	4	6
Arrival type (1-6)				4	3	4	4	4	4
Signal type (a, c, p)				c	c	c	c	c	c
Cycle length (C)				120	150	120	150	120	120
Effective green ratio (g/C)				0.44	0.45	0.44	0.45	0.44	0.44
CONTROL CHARACTERISTICS									
Paved shoulder/bicycle lane (n, y)								n, 50%, y	n
Outside lane width (n, t, w)								t	t
Pavement condition (d, t, u)								t	
On-street parking (n, y)								n	n
Sidewalk (n, y)									n, 50%, y
Sidewalk/roadway separation (a, t, w)									t
Sidewalk protective barrier (n, y)									n

LEVEL OF SERVICE THRESHOLDS

Level of Service	Freeways	Highways		Arterials		Bicycle	Ped	Bus
	Density	Two-Lane %ffs	Multilane Density	Class I ats	Class II ats	Score	Score	Buses/hr.
B	≤ 17	> 83.3	≤ 17	> 31 mph	> 22 mph	≤ 2.75	≤ 2.75	≤ 6
C	≤ 24	> 75.0	≤ 24	> 23 mph	> 17 mph	≤ 3.50	≤ 3.50	≤ 4
D	≤ 31	> 66.7	≤ 31	> 18 mph	> 13 mph	≤ 4.25	≤ 4.25	< 3
E	≤ 39	> 58.3	≤ 35	> 15 mph	> 10 mph	≤ 5.00	≤ 5.00	< 2

% ffs = Percent free flow speed ats = Average travel speed

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

B. Tier Two Analysis - LOSPLAN Software Suite

Tier Two level of service is evaluated using the Florida Department of Transportation LOSPLAN roadway analysis software suite. This suite consists of

- ARTPLAN - signalized intersection facility analysis software;
- FREEPLAN - controlled access facility analysis software; and
- HIGHPLAN - uninterrupted flow limited access facility analysis software.

Exhibit V-5 includes a sample of an ARTPLAN analysis. Exhibit V-6 includes T a sample of an FREEPLAN analysis. Exhibit V-7 includes a sample of an HIGHPLAN analysis.

Exhibit V-5
ARTPLAN Analysis Sample

ARTPLAN 2012 Conceptual Planning Analysis

Project Information

Analyst	s-18	**Arterial Name**	W University Avenue	**Study Period**	**Standard K**
Date Prepared	6/19/2015 11:42:44 AM	**From**	North-South Drive	**Modal Analysis**	Multimodal
Agency		**To**	W 13th Street	**Program**	ARTPLAN 2012
Area Type	Other Urbanized	**Peak Direction**	Eastbound	**Version Date**	12/12/2012
Arterial Class	2				
File Name	T:\Mike\los\los15\ARTPLAN_2015\artplan_smpl_s18.xap				
User Notes	ARTPLAN sample for Multimodal Level of Service Program				

Arterial Data

K	0.097	**PHF**	0.925	**Control Type**	FullyActuated
D	0.55	**% Heavy Vehicles**	2	**Base Sat. Flow Rate**	1950

Automobile Intersection Data

Cross Street	Cycle Length	Thru g/C	Arr. Type	INT # Dir.Lanes	% Left Turns	% Right Turns	Left Turn Lanes	Left Turn Phasing	# Left Turn Lanes	LT Storage Length	Left g/C	Right Turn Lanes
NW 19th Street	150	0.71	4	2	5	1	Yes	Protected	1	235	0.15	No
NW 17th Street	150	0.79	4	2	7	6	Yes	Protected	1	235	0.15	No
NW 15th Street	150	0.84	4	2	3	3	Yes	Protected	1	235	0.15	No
W 13th Street	150	0.32	4	2	15	30	Yes	Protected	1	235	0.15	Yes

Automobile Segment Data

Segment #	Length	AADT	Hourly Vol.	SEG # Dir.Lanes	Posted Speed	Free Flow Speed	Median Type	On-Street Parking	Parking Activity
1 (to NW 19th Street)	1080	29000	1547	2	30	35	Restrictive	No	N/A
2 (to NW 17th Street)	486	29000	1547	2	30	35	Restrictive	No	N/A
3 (to NW 15th Street)	939	29000	1547	2	30	35	Restrictive	Yes	Low
4 (to W 13th Street)	780	29000	1547	2	30	35	Restrictive	No	N/A

Automobile LOS

Segment #	Thru Mvmt Flow Rate	Adj. Sat. Flow Rate	v/c	Control Delay	Int. Approach LOS	Queue Ratio	Speed (mph)	Segment LOS
1 (to NW 19th Street)	1589	3359	0.666	1.84	A	0.35	28.64	A

Exhibit V-5 (Continued)
ARTPLAN Analysis Sample

2 (to NW 17th Street)	1555	3348	0.588	0.16	A	0.50	25.85	B
3 (to NW 15th Street)	1622	3355	0.576	0.15	A	0.20	28.76	A
4 (to W 13th Street)	920	2101	0.942	59.80	E	#	7.22	F

Arterial Length	0.6676	Weighted g/C	##	FFS Delay	80.53	Threshold Delay	0.00	Auto Speed	16.63	Auto LOS	D

Exhibit V-5 (Continued)
ARTPLAN Analysis Sample

Automobile Service Volumes

Note: The maximum normally acceptable directional service volume for LOS E in Florida for this facility type and area type is 1000 veh/h/ln.

	A	B	C	D	E
Lanes	**Hourly Volume In Peak Direction**				
1	**	**	490	600	***
2	**	120	1040	1240	***
3	**	230	1630	1860	***
4	**	340	2220	2480	***
*	**	120	1040	1240	***
Lanes	**Hourly Volume In Both Directions**				
2	**	**	900	1100	***
4	**	220	1900	2240	***
6	**	420	2970	3380	***
8	**	620	4040	4520	***
*	**	220	1900	2240	***
Lanes	**Annual Average Daily Traffic**				
2	**	**	9200	11300	***
4	**	2300	19500	23100	***
6	**	4400	30600	34800	***
8	**	6400	41700	46600	***
*	**	2300	19500	23100	***

Exhibit V-5 (Continued)
ARTPLAN Analysis Sample

Multimodal Segment Data

Segment #	Outside Lane Width	Pave Cond	Pave Shldr /Bike Lane	Side Path	Side Path Separation	Side walk	Sidewalk Roadway Separation	Sidewalk Roadway Protective Barrier	Bus Freq	Passenger Load Factor	Amenities	Bus Stop Type
1 (to NW 19th Street)	Typical	Typical	No	Yes	20.00	Yes	Typical	No	10	0.6	Good	Typical
2 (to NW 17th Street)	Typical	Typical	No	Yes	20.00	Yes	Typical	No	10	0.6	Good	Typical
3 (to NW 15th Street)	Typical	Typical	No	Yes	20.00	Yes	Typical	No	4	0.6	Good	Typical
4 (to W 13th Street)	Typical	Typical	No	Yes	20.00	Yes	Typical	No	4	0.6	Good	Typical

Pedestrian SubSegment Data

	% of Segment			Sidewalk			Separation			Barrier		
Segment #	1	2	3	1	2	3	1	2	3	1	2	3
1 (to NW 19th Street)	100			Yes			Typical			No		
2 (to NW 17th Street)	100			Yes			Typical			No		
3 (to NW 15th Street)	100			Yes			Typical			No		
4 (to W 13th Street)	100			Yes			Typical			No		

Multimodal LOS

	Bicycle Street		Bicycle Sidepath		Pedestrian					Bus	
Link #	Score	LOS	Score	LOS	1	2	3	Score	LOS	Adj. Buses	LOS
1 (to NW 19th Street)	4.33	E	1.44	A				3.68	D	7.35	A
2 (to NW 17th Street)	4.15	D	1.23	A				3.58	D	7.35	A
3 (to NW 15th Street)	3.71	D	1.36	A				3.30	C	3.09	C
4 (to W 13th Street)	4.29	E	1.38	A				3.65	D	4.20	B
	Bicycle LOS	1.38	A		Pedestrian LOS			3.56	D	Bus LOS	5.39	B

Exhibit V-5 (Continued)
ARTPLAN Analysis Sample

MultiModal Service Volume Tables

Bicycle

	A	B	C	D	E
Lanes	**Hourly Volume In Peak Direction**				
1	**	80	280	1000	> 1000
2	**	160	560	2000	> 2000
3	**	230	840	3000	> 3000
4	**	310	1110	4000	> 4000
*	**	160	560	2000	> 2000
Lanes	**Hourly Volume In Both Directions**				
2	**	140	510	1820	> 1820
4	**	280	1020	3640	> 3640
6	**	420	1520	5460	> 5460
8	**	560	2010	7280	> 7280
*	**	280	1020	3640	> 3640
Lanes	**Annual Average Daily Traffic**				
2	**	1500	5300	18800	> 18800
4	**	2900	10500	37500	> 37500
6	**	4300	15600	56300	> 56300
8	**	5700	20700	75000	> 75000
*	**	2900	10500	37500	> 37500

Pedestrian

	A	B	C	D	E
Lanes	**Hourly Volume In Peak Direction**				
1	130	440	760	1000	> 1000
2	240	870	1500	2000	> 2000
3	360	1300	2250	3000	> 3000
4	480	1740	2990	4000	> 4000
*	240	870	1500	2000	> 2000
Lanes	**Hourly Volume In Both Directions**				
2	230	800	1370	1820	> 1820
4	440	1580	2720	3640	> 3640
6	660	2370	4080	5460	> 5460
8	880	3150	5440	7280	> 7280
*	440	1580	2720	3640	> 3640
Lanes	**Annual Average Daily Traffic**				
2	2400	8200	14100	18800	> 18800
4	4500	16300	28100	37500	> 37500
6	6800	24400	42100	56300	> 56300
8	9000	32500	56100	75000	> 75000
*	4500	16300	28100	37500	> 37500

Bus

A	B	C	D	E
Buses Per Hour In Peak Direction				
>= 7	>= 5	>= 4	>= 3	>= 2
Buses in Study Hour in Peak Direction (Daily)				

Exhibit V-5 (Continued)
ARTPLAN Analysis Sample

>= 6.82	>= 4.55	>= 3.41	>= 2.28	>= 1.14

*** Service Volumes for the specific facility being analyzed, based on # of lanes from the intersection and segment data screens.**
**** Cannot be achieved based on input data provided.**
***** Not applicable for that level of service letter grade. See generalized tables notes for more details.**
 # Under the given conditions, left turn lane storage is highly likely to overflow. The number of directional thru lanes should be reduced accordingly.
Facility weighted g/C exceeds normally acceptable upper range (0.5); verify that g/C inputs are correct.
Intersection capacity (ies) are exceeded for the full hour; an operational level analysis tool is more appropriate for this situation.

Exhibit V-6
FREEPLAN Analysis Sample

FREEPLAN 2012 Conceptual Planning Analysis

Project Information

Analyst	me	**Freeway Name**	Sample Freeway [S-42]	**Study Period**	**Standard K**
Date Prepared	6/19/2015 12:18:51 PM	**From**	Archer Road	**Program**	FREEPLAN 2012
Agency		**To**	Newberry Road	**Version Date**	12/12/2012
Area Type	Other Urbanized	**Peak Direction**	Northbound		
File Name	T:\Mike\los\los15\ARTPLAN_2015\free_smpl_s42.xfp				
User Notes	FREEPLAN sample for Multimodal Level of Service Monitoring Program				

Freeway Data

AADT	70000	**Freeway Input Volume**	3465	**Local Adjustment Factor**	0.96
K	0.09	**PHF**	1	**Ramp Metering Exists**	No
D	0.55	**Pecent Trucks Entering First Segment**	6		

Segment Data

Seg #	From	To	Input Type	Length (ft)	Hourly Volume (veh/h)	# Lanes	Posted Speed (mi/h)	Free-Flow Speed (mi/h)	Terrain
1	Archer Road	Newberry Road	Basic Segment	18075	3465	3	70	75	Level

Time Period Independent Weaving Segment Data

Seg #	Configuration	Short Length (ft)	# Weaving Lanes	Min. Lane Changes Freeway-Ramp	Min. Lane Changes Ramp-Freeway	Min. Lane Changes Ramp-Ramp

Ramp Descriptions

Segment	Type	On-Ramp					Off-Ramp				
		Hourly Volume (veh/h)	%HV	Lanes	Accel / Decel Length	FFS	Hourly Volume (veh/h)	%HV	Lanes	Accel / Decel Length	FFS

Toll Plaza Input Data

Segment	Configuration	Number of Manual Lanes	Number of Coin Machine Lanes	Number of ETC-Only Lanes		
Pct. Manual	Pct. Coin Machine	Pct. ETC-Only	Manual Avg. Service	Coin Avg. Service	ETC Free-Flow	Prop. Trad.

Exhibit V-6 (Continued)
FREEPLAN Analysis Sample

Payment	Payment	Payment	Time	Time	Speed	Demand

Segment Results and LOS

Seg #	From	To	Analysis Type	Analysis Volume (pc/h)	Capacity (pc/h)	v/c Ratio	Avg. Speed (mi/h)	Density (pc/h/ln)	LOS	Sig Impact
1	Archer Road	Newberry Road	Basic Segment	3717	7200	0.52	74.4	16.7	B	N/A

Freeway Length	3.4233	FFS Delay	1.4	Threshold Delay	0.0	Avg. Speed	74.4	Density	16.7	LOS	B

Service Volumes

Note: The maximum normally acceptable directional service volume for LOS E in Florida for this facility type and area type is 2000 veh/h/ln.

	A	B	C	D	E
Lanes	**Hourly Volume In Peak Direction**				
4	1380	2360	3120	3720	4200
6	2080	3560	4680	5560	6300
8	2780	4700	6280	7420	8380
10	3480	5900	7820	9280	10480
12	4180	7060	9380	11120	12580
Lanes	**Peak Hour Volume Both Directions**				
4	2500	4280	5690	6750	7630
6	3780	6460	8500	10110	11450
8	5050	8550	11410	13500	15250
10	6320	10730	14230	16860	19070
12	7600	12820	17050	20220	22890
Lanes	**Annual Average Daily Traffic**				
4	27800	47500	63200	75000	84800
6	42000	71800	94500	112400	127200
8	56100	95000	126800	149900	169400
10	70300	119200	158100	187300	211900
12	84400	142500	189400	224700	254300

 # Off-ramp storage is highly likely to overflow. The segment operations will likely be worse than indicated.
One or more segments have a demand-to-capacity ratio greater than 1.0; therefore, the performance measure values are highly unreliable.
Freeway LOS is defaulted to F. An operational level analysis tool is more appropriate for this situation.
*** For oversaturated conditions during the peak hour, subtract 10% from LOS E (capacity) volumes. This number becomes the new maximum service volume for LOS D, and LOS E cannot be achieved.**
**** Cannot be achieved based on input data provided.**
***** Not applicable for that level of service letter grade. See generalized tables notes for more details.**

Exhibit V-7
HIGHPLAN Analysis Sample

HIGHPLAN 2012 Conceptual Planning Analysis

Project Information

Analyst	me	**Highway Name**	Waldo Road	**Study Period**	**Standard K**
Date Prepared	6/19/2015 11:53:47 AM	**From**	Milligan Still Road	**Analysis Type**	Multilane Segment
Agency		**To**	NE 134 Street	**Program**	HIGHPLAN 2012
Area Type	Rural Undeveloped	**Peak Direction**	Northbound	**Version Date**	12/12/2012
File Name	T:\Mike\los\los15\ARTPLAN_2015\hi_smpl_sr24.xhp				
User Notes	HIGHPLAN sample for Multimodal Level of Service Monitoring Program				

Highway Data

Roadway Variables				Traffic Variables			
Segment Length	3.400	**Median**	Yes	**AADT**	13900	**PHF**	1.000
# Thru Lanes	4	**Left Turn Impact**	No	**K**	0.095	**% Heavy Vehicles**	5.0
Terrain	Level	**Pass Lane Length**	N/A	**D**	0.580	**Base Capacity**	2250
Posted Speed	60	**% NPZ**	N/A	**Peak Dir. Hrly. Vol.**	386	**Local Adj. Factor**	0.76
Free Flow Speed	65	**Class**	1	**Off Peak Dir. Hrly. Vol.**	279	**Adjusted Capacity**	1668

LOS Results

v/c Ratio	0.23	**Density**	7.9	**PTSF**	N/A	**ATS**	65.0	**% FFS**	100.0
FFS Delay	0.0	**LOS Thresh. Delay**	0.0	**Service Measure**	Density	**LOS**	B		

Service Volumes

Note: The maximum normally acceptable directional service volume for LOS E in Florida for this facility type and area type is 1600 veh/h/ln.

	A	B	C	D	E
Lanes	**Hourly Volume In Peak Direction**				
1					
2	570	1340	2110	2690	3060
3	860	2020	3170	4040	4600
4	1150	2690	4230	5390	6130
Lanes	**Hourly Volume In Both Directions**				
2					
4	990	2320	3640	4640	5280
6	1490	3490	5470	6970	7940
8	1990	4640	7300	9300	10570
Lanes	**Annual Average Daily Traffic**				
2					
4	10500	24500	38400	48900	55600
6	15700	36800	57600	73400	83600
8	21000	48900	76900	97900	111300

*** Cannot be achieved based on input data provided.**
 # Performance measure results are no longer applicable with the presence of passing lanes. Refer to the service volume tables to obtain the LOS.

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Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area

Multimodal Level of Service Report Team

Scott R. Koons, AICP, Executive Director

* Michael Escalante, AICP, Senior Planner

** Lauren Yeatter, AICP, Senior Planner

* Primary Responsibility
** Secondary Responsibility

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Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area

2009 NW 67th Place
Gainesville, FL 32653-1603
352.955.2200

www.ncfrpc.org/mtpo