

GROWTHMANAGEMENT

Level of Service Issues for Growth Management



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Some Level of Service (LOS) Fundamentals

Being Updated Now!



LOS resources can be found at:
<http://www.dot.state.fl.us/planning/systems/sm/los/default.htm>

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New Tools on Web

- Level of Service Issue Papers
- LOSPLAN 2007
- New Generalized Tables



Level of Service (LOS) Standard
Policy Fundamentals

- The higher Level of Service Standards for:
 - Highways on the Strategic Intermodal System
 - Other high speed highways
 - State Highways in rural area
- The lower standards for
 - Highways in generally developed areas
 - Highways in special exemption and management areas
 - Highways not on the Strategic Intermodal System

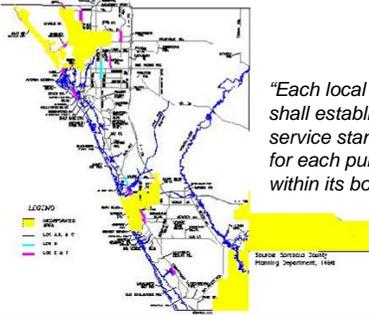


Level of Service (LOS) Standard
Policy Fundamentals

- Supports the integrity of the higher speed/ capacity potential of the State Highway System
- Supports compact development and helps discourage sprawl



The Requirements for LOS Standards



"Each local government shall establish a level of service standard for each public facility within its boundary..."

Source: Nevada State Planning Department, 1996

9J-5.005(3)
 Department of Community Affairs Concurrency Rule

Simplified LOS Standards

	SIS AND FIHS FACILITIES		OTHER STATE ROADS
	Limited Access (freeway)	Controlled Access (arterial)	Other Multilane (arterial)
Rural Areas	B	B	B
Transitioning Urbanized Areas, Urban Areas, or Communities	C	C	C
Urbanized Areas Over 500,000	D	D	D

Highly simplified to show the principal behind the Level of Service Standards

Relationship of LOS Standards to LOS Measurement Techniques

- Measurement techniques (Q/LOS Handbook, ARTPLAN, Generalized Tables)
 - These are not standards**
 - They offer guidance on how to calculate
- FDOT's "Statewide Minimum LOS Standard for the State Highway System"
 - are standards**
 - FIHS standards are to be adhered to
 - Other state roads are recommendations

Facility Type	FIHS Standard	Other State Roads
Freeway	B	B
Controlled Access Arterial	C	C
Multilane Arterial	C	C
Urban Freeway	C	D
Urban Controlled Access Arterial	D	D
Urban Multilane Arterial	E	E
Other	D or E	E

Statewide Minimum LOS Standards

	SIS AND FIHS FACILITIES		TRIP AND OTHER STATE ROADS ³	
	Limited Access ⁴	Controlled Access ⁴	Other Multilane ⁴	Two-Lane ⁴
Rural Areas	B	B¹	B	C
Transitioning Urbanized Areas, Urban Areas, or Communities	C	C	C	C
Urbanized Areas Under 500,000	C(D)	C	D	D
Urbanized Areas Over 500,000	D(E)	D	D	D
Roadways Parallel to Exclusive Transit Facilities	E	E	E	E
Inside TCMA ^s	D(E)²	E²	-2	-2
Inside TCEA ^s and MMTD ^s ²	-2	-2	-2	-2

FDOT Rule Chapter 14-94

Auto Level of Service – How is it measured?

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-  • **Freeways** = ability to maneuver (density of traffic)
-  • **Arterials** = average travel speed
-  • **Signals** = seconds of delay
-  • **Two lane rural** = % of time spent behind vehicle

Levels of Analysis

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- **Generalized Planning**
 - “In the ball park” LOS estimate
 - Extensive use of defaults
 - Generalized Tables
- **Preliminary Engineering** (Conceptual planning, preliminary design, project development)
 - Design concept and scope
 - Alternatives analysis
 - Software (ARTPLAN, FREEPLAN, HIGHPLAN)
- **Operational** (Final Design & Traffic Engineering)

Capacity/Level of Service Analyses and Evaluation Tools

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The graph shows the relationship between the accuracy of different analysis tools and the effort/complexity required to use them. The y-axis represents Potential Accuracy, and the x-axis represents Effort/Complexity. The tools are plotted as follows:

- Generalized Tables** (Generalized Planning): Lowest accuracy and lowest effort/complexity.
- ARTPLAN/FREEPLAN/HIGHPLAN** (Preliminary Engineering): Higher accuracy than generalized tables, but still low effort/complexity.
- HCM/TCQSM/BLOS/PLOS** (Simple Operational Analysis): Moderate accuracy and moderate effort/complexity.
- CORSIM** (Complex Operational Analysis): High accuracy and moderate effort/complexity.
- Field Measurement** (Direct Measurement): Highest accuracy and highest effort/complexity.

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**HCM and Q/LOS -
Down to 3 pages!**

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The Tables...

...provide estimates of maximum service volumes for various types of Florida road facilities

...represent average roadway conditions for the state, not representative of any single roadway

...allow analysts to quickly and easily compare measured volumes to estimate LOS.

...are **NOT** capacities or standards.

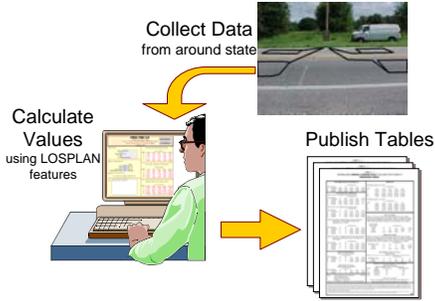
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Relationship of LOS Measurement Techniques to LOS Standards

- Measurement techniques (Generalized Tables)
 - Are measurement techniques
- FDOT's "Statewide Minimum LOS Standard for the State Highway System"
 - Not measurement techniques

Service Type	LOS A	LOS B	LOS C	LOS D	LOS E
Freeway	A	B	C	D	E
Expressway	A	B	C	D	E
Arterial	A	B	C	D	E
Collector	A	B	C	D	E
Local	A	B	C	D	E
Other	A	B	C	D	E

Table Development



Input Value Assumptions

ROADWAY CHARACTERISTICS	Class I			Class II			State A
	2	4 - 6	8	2	4 - 6	8	
Number of through lanes	2	4 - 6	8	2	4 - 6	8	
Posted speed (mph)	45	50	50	45	45	45	
Free flow speed (mph)	50	55	55	50	50	50	
Median type (n,m,r)	N	r	r	n	r	r	
Left turn lanes (n,s)	Y	y	y	Y	Y	Y	
Paved shoulder/bicycle lane (n,s)							
Outside lane width (n,s)							
Pavement condition (n,L,d)							
Sidewalk (n,s)							
Sidewalk/roadway separation (n,l,w)							
Sidewalk/roadway protective barrier (n,s)							
Obstacle to bus stop (n,s)							
TRAFFIC CHARACTERISTICS							
Planning analysis hour factor (K)	0.095	0.095	0.095	0.095	0.095	0.095	
Directional distribution factor (DD)	0.55	0.55	0.55	0.55	0.55	0.55	
Peak hour factor (PHF)	0.925	0.925	0.925	0.925	0.925	0.925	
Base saturation flow rate (pcuphpl)	1900	1900	1900	1900	1900	1900	
Heavy vehicle percent	2.0	2.0	2.0	2.0	2.0	2.0	
Local adjustment factor	1.0	1.0	0.95	0.95	0.95	0.95	
% turns from exclusive turn lanes	12	12	12	12	12	12	
Bus span of service							
CONTROL CHARACTERISTICS							
Signalized intersections per mile	1.5	1.0	1.0	3.0	3.0	3.0	
Arrival type (1-6)	3	3	3	4	4	4	
Signal type (a,s,f)	a	a	a	s	s	s	
Cycle length (C)	120	120	120	120	120	120	
Effective green ratio (g/C)	0.44	0.44	0.44	0.44	0.44	0.44	

Types of Tables



- **Time**
 - AADT
 - Peak Hour Two-Way
 - Peak Hour Peak Direction
- **Area**
 - Urbanized
 - Transitioning/Urban
 - Rural

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LOS Tables to LOS_PLAN Software

- The generalized LOS tables represent a “first cut” at estimating LOS
- Tables are based on averages across Florida
 - If volumes being analyzed exceed 85% of the Maximum Service Volume (**MaxSV**), a more detailed analysis may then be required

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Conceptual Planning Software

- Opening screen
- General facility data
- Segment data
- LOS results
- Service volume tables



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★ Most Important Variables ★

- Number of through lanes
- Left turn lanes
- Paved shoulder/bicycle lane/outside lane width
- Sidewalk
- Annual average daily traffic (AADT)
- Planning analysis hour factor (K)
- Directional distribution factor (D)
- Bus frequency
- Signalized intersection spacing
- Effective green ratio (g/C)

*More Detailed Analysis Requires
More Detailed Data*

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LOSPLAN Usage Issues

- Choose correct application
 - FREEPLAN for freeway analysis
 - HIGHPLAN for uninterrupted flow analysis
 - ARTPLAN for arterial analysis
- Apply appropriate level of data
 - Apply caution when mixing field data with default values
 - Request justification and data to support analysis (i.e. not just output results)
- Analyst/reviewer should be experienced with fundamental analysis concepts

Detailed LOSPLAN training to be provided as part of Site Impact training September 18 and 19

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FDOT QLOS Resources



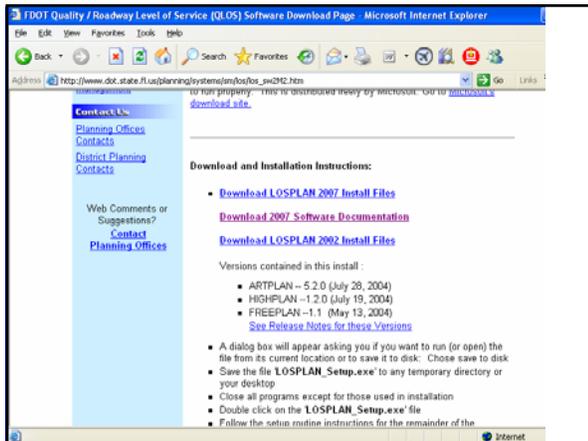
- LOS Issue Papers
- Updated LOSPLAN 2007 software
- Q/LOS Training
- 2002 Q/LOS handbook
- MMTD Handbook & Training
- Research
- Website

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LOS Issue Paper Topics (1)

- 1) Purpose of Issue Papers
- 2) Impact of Growth Management Act of 2005
- 3) Overview of Capacity and LOS Tools
- 4) Guidance on Applying Capacity and LOS Tools in Planning Stages
- 5) Highway System Structure Terminology Related to Highway Capacity and LOS Analyses
- 6) Partitioning of Roadways for LOS Analysis (Segmentation)
- 7) Area Types
- 8) Applicability of FDOT's Statewide Minimum LOS Standards for Roadway LOS Analyses





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Technical Assistance

- Specific project information
 - District LOS Coordinator
 - DCA reviewer
- Technical analysis tool assistance
 - FDOT central office Systems Planning Office
- Transportation policy assistance
 - FDOT Office of Policy Planning
- FDOT planning website
- DCA website

LOS Resources

-  Multimodal Transportation Districts and Areawide Quality of Service Handbook
-  Model Regulations and Plan Amendments for Multimodal Transportation Districts

martin.guttenplan@dot.state.fl.us

(850) 414-4906

- FDOT LOS Website:

www.dot.state.fl.us/planning/systems/sm/los/default.htm



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