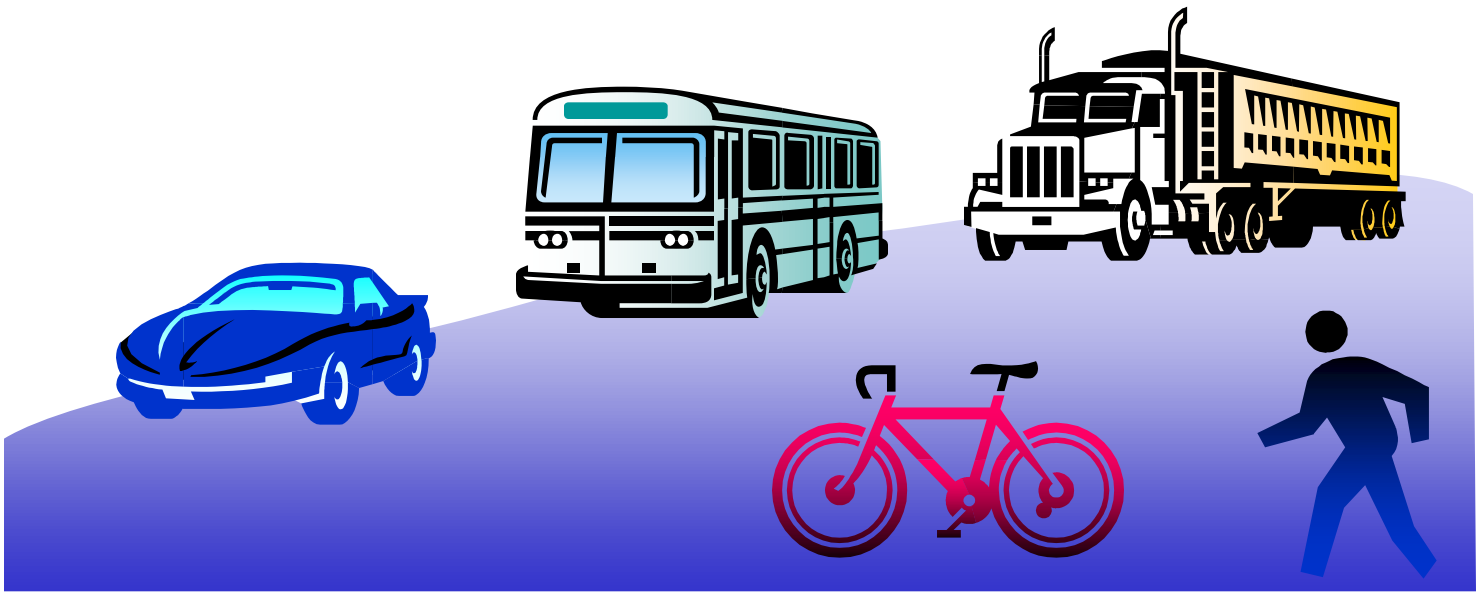


Overview of FDOT's Highway Capacity and LOS Preliminary Engineering Software (LOSPLAN)

Doug McLeod
FDOT Level of Service Manager
HCM Planning and Preliminary Engineering Subcommittee Chair





Presentation Purposes

- Introduction to capacity/LOS analyses
  - Introduction
  - Auto/truck
  - Multimodal (Bike/Ped/Transit)
- Introduction to preliminary engineering software
  - ARTPLAN (Arterial Planning)
  - FREEPLAN (Freeway Planning)
  - HIGHPLAN (Highway Planning)
- Discussion on applications within project development



Five Important Definitions

- **Capacity** – the maximum number of vehicles or persons that can pass a point on a roadway in an hour under prevailing roadway, traffic and control conditions
- **Quality of Service** - a user based assessment of how well a service or facility is operating
- **Level of Service** – a quantitative stratification of the "quality of service" of a service or facility into six letter grade levels with "A" describing the highest quality and "F" describing the lowest quality
- **Highway** - roadway with all transportation facilities (e.g., lanes, bus pull-outs, paved shoulders, sidewalks, signals) within the right of way
- **Multimodal** - more than one highway mode (auto, bicycle, bus, pedestrian, truck)



Levels of Analysis

- **Generalized Planning**
  - "In the ball park" LOS estimate
  - Extensive use of defaults
  - Generalized Tables
- ★ **Preliminary Engineering** (conceptual planning, preliminary design, project development)
  - Location and design concept
  - Alternatives analysis
  - Software (ARTPLAN, FREEPLAN, HIGHPLAN**)**
- **Simple Operational**
  - Final design
  - Signal timing
  - Software (e.g., HCS, HICAP, SOAP)
- **Complex Operational**
  - Simulation
  - Software (e.g., CORSIM)



Capacity/LOS Analyses and Evaluation Tools

Potential Accuracy

(Microsimulation) CORSIM

(Macroscopic Extensions) TRANSYT/Synchro

HCM/ TCQSM/ BLOS/ PLOS (Simple Operational Analysis)

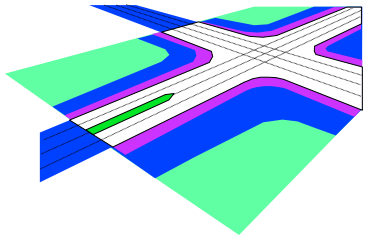
ARTPLAN/ FREEPLAN/ HIGHPLAN (Preliminary Engineering)

Generalized Tables (Generalized Planning)

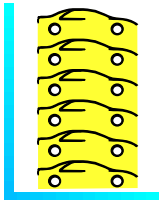
Effort/Complexity



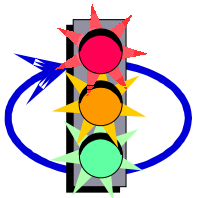
Input Variables Affecting Automobile LOS and Capacity



Roadway variables



Traffic variables



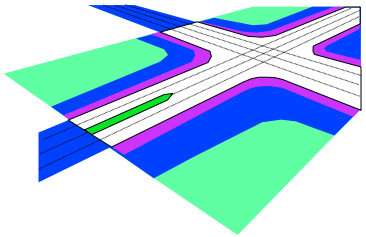
Control variables



Factors Affecting Level of Service and Capacity

Roadway characteristics

- Laneage
- Posted speed
- Turn lanes

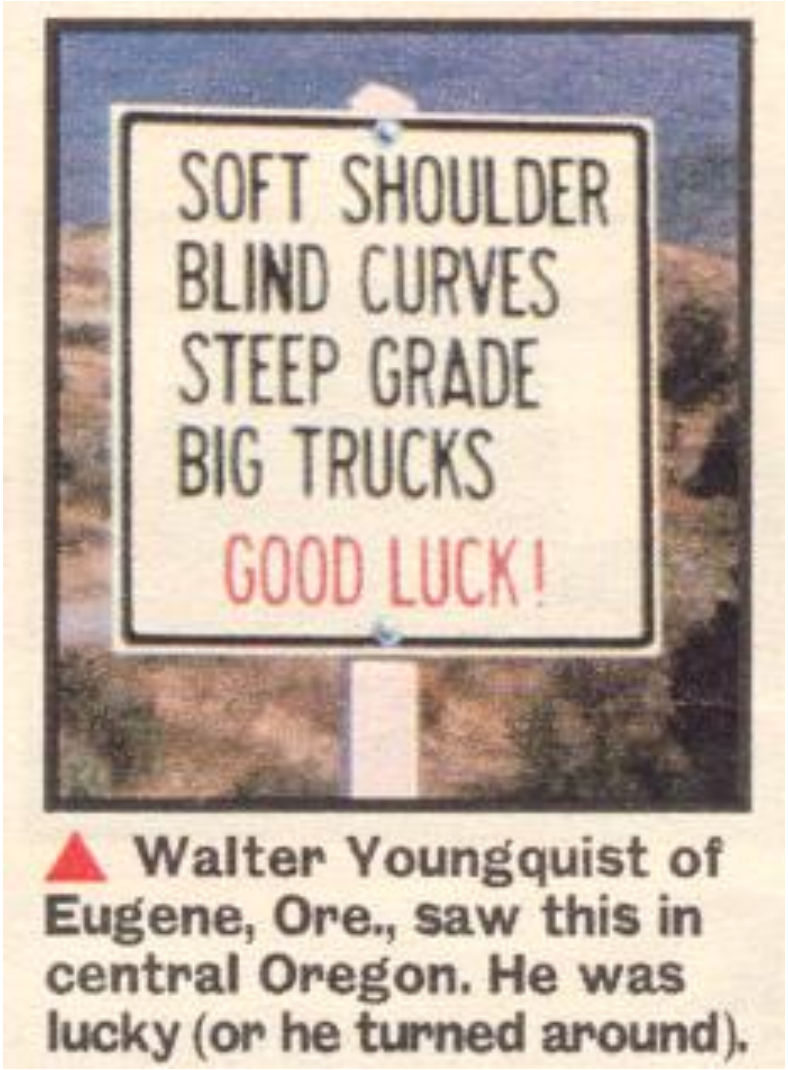


Traffic characteristics

Control characteristics

Quality/ Level of Service





▲ Walter Youngquist of Eugene, Ore., saw this in central Oregon. He was lucky (or he turned around).

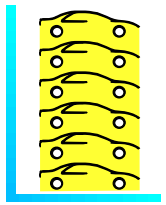


Factors Affecting Level of Service and Capacity

Roadway characteristics

Traffic characteristics

- **Daily/Hourly/Sub-hourly aspects**
- **Directional aspects**
- **Vehicle types**



Control characteristics

Quality/ Level of Service







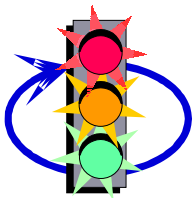
Factors Affecting Level of Service and Capacity

Roadway characteristics

Traffic characteristics

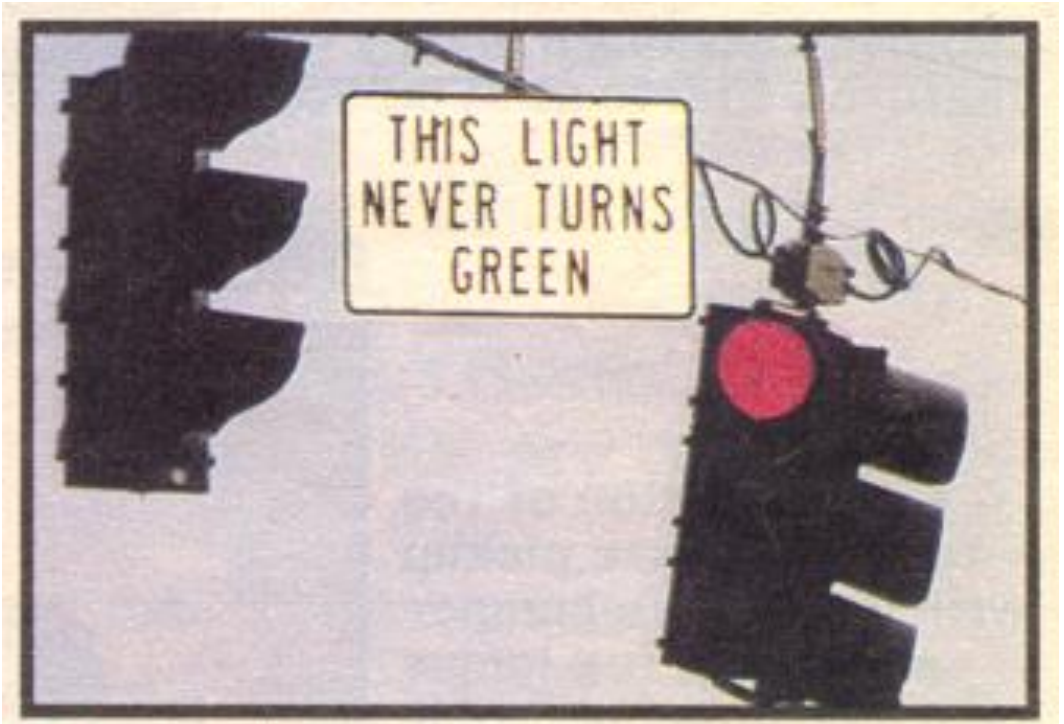
Control characteristics

- **Signalized intersections**
- **Cycle length**
- **Progression**





Control Characteristics



▲ Jim Plantholt of Fort Walton Beach, Fla., no doubt saw red when he first spotted this sign in his town.

Simplified Arterial LOS Flow Chart

Automobile

Major Inputs

Volume & Lanes

Control Characteristics

Other Traffic & Roadway Characteristics

Arterial Running Speed

Control Delay

Arterial Running Time

Service Measure

Average Travel Speed



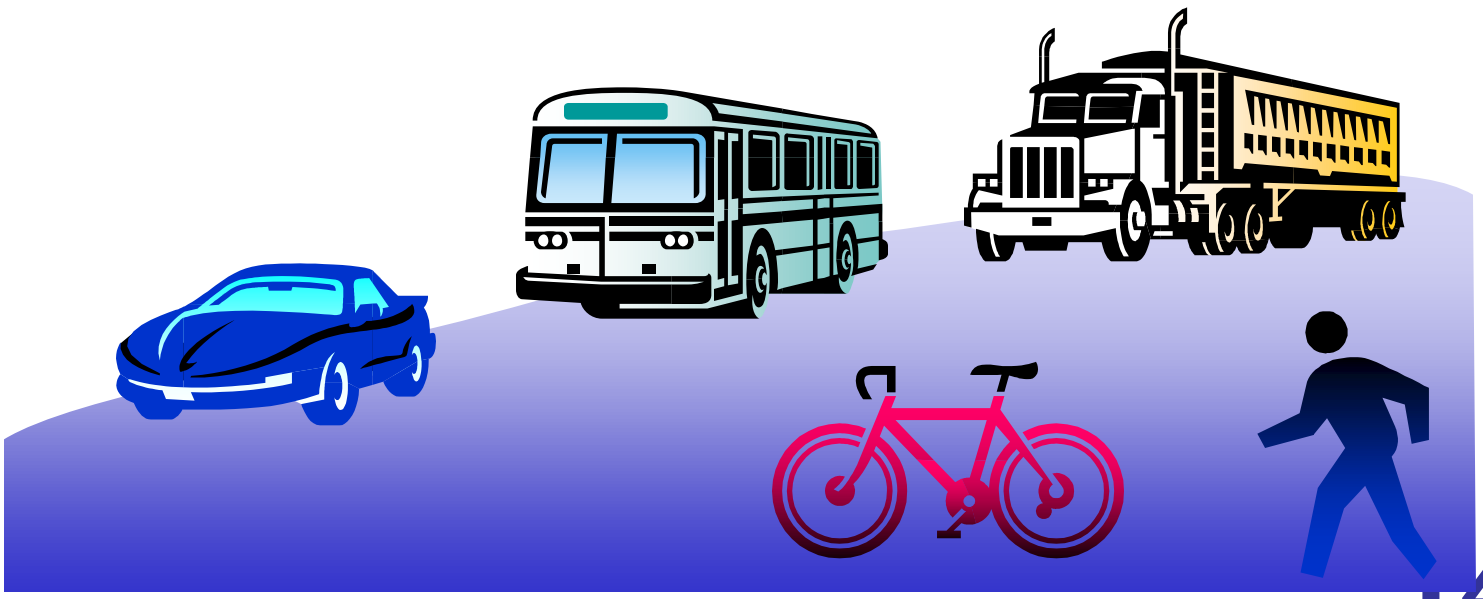
LOS Determination

HCM LOS Criteria



Primary Highway Modes
(to be included in a multimodal analysis)

- Automobile
- Bicycle
- Bus
- Pedestrian
- Truck





Best Source for LOS Analysis?



Auto ✓

Bicycle ??

Pedestrian ??

Bus ??

Truck ✓

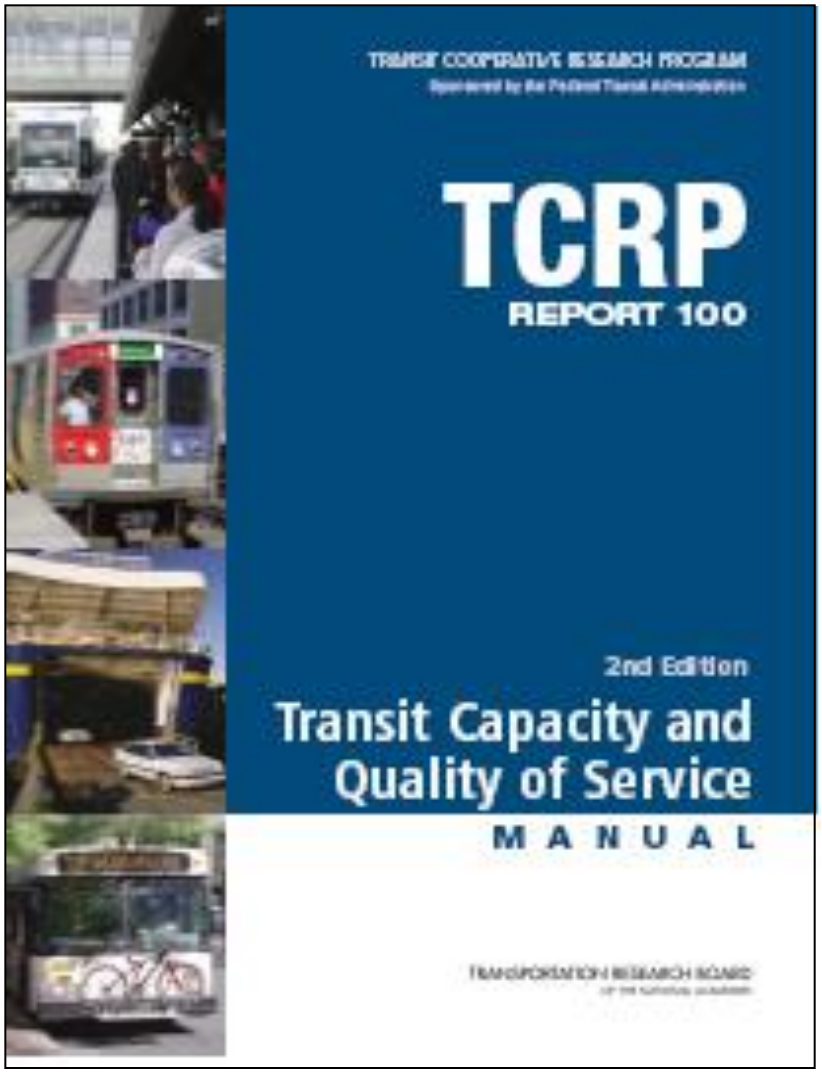


Transit Quality of Service



Quality/ Level of Service





Availability Measures: Transit Stops Headway LOS

LOS	Headway (min)	Frequency (bus/h)	
A	<10	>6	Schedules not needed
B	10-14	5-6	Riders consult schedule
C	15-20	3-4	Maximum desirable wait time
D	21-30	2	Unattractive to choice riders
E	31-60	1	Service provided during hour
F	>60	<1	Unattractive to all riders





Key Factors Affecting Transit Quality of Service along an Arterial (Route Segment)

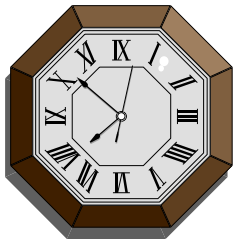
- **Availability!** (bus frequency)



- Pedestrian LOS (accessibility)



- Hours of service



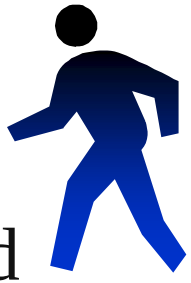


View of HCM



Bus –

Pedestrian –



How crowded the sidewalk is (hindrance)

Bicycle –



HCM Concept of Pedestrian Level of Service





What's the pedestrian level of service along this arterial?





Level of Service

Pedestrian

A/B



C/D



E/F





Pedestrian Level of Service Model

- Initial concept developed in 1997 based on Bicycle LOS Model
- Early applications in Tampa and Phoenix
- Model developed in 2000 from FDOT sponsored research in Pensacola



Factors Affecting Pedestrian Quality of Service







- Presence of a sidewalk
- Lateral separation of pedestrians and motorized vehicles
  - Includes presence of barriers and buffers, i.e. parked cars, trees
- Motorized vehicle
  - Volume
  - Speed

Roadside Design & Performance Standards

All values below produce Pedestrian (safety) Level of Service "B" in unscreened conditions

Posted Speed	Truck %	Average Daily Traffic (ADT) and Laneage																	
		60,000	50,000	40,000		30,000		25,000		20,000		17,500		15,000	12,500	10,000	7,500	5,000	2,500	1,000
		6L	6L	6L	4L	6L	4L	6L	4L	4L	2L	4L	2L	2L	2L	2L	2L	2L	2L	2L
Speed > 55 mph	> 4%	67	63	58	67	52	60	48	56	52	67	49	64	60	56	52	46	39	29	19
	2 - 4%	45	42	38	45	34	40	31	37	34	45	32								
	0 - 2%	31	29	26	31	23	27	21	25	23	31	21								
Speed 41 - 50 mph	> 4%	51	47	43	51	38	45	35	42	38	51	36								
	2 - 4%	36	33	30	36	27	32	24	29	27	36	25								
	0 - 2%	26	24	22	26	19	23	17	21	19	26	17								
Speed 30 - 40 mph	> 4%	38	35	32	38	28	33	26	31	28	38	26								
	2 - 4%	28	26	23	28	20	25	19	23	20	28	19								
	0 - 2%	22	20	18	22	15	19	14	17	15	22	14								
Speed < 30 mph	> 4%	27	25	23	27	20	24	18	22	20	27	18								
	2 - 4%	22	20	18	22	15	19	14	17	15	22	14								
	0 - 2%	18	16	14	18	12	15	11	14	12	18	11								

Un-adjusted Separation in feet (from Table 1)	Planted Buffer[2] - Tree Spacing (feet on center)					
	200 o.c.	100 o.c.	60 o.c.	40 o.c.	20 o.c.	10 o.c.
	Buffer Width	Buffer Width	Buffer Width	Buffer Width	Buffer Width	Buffer Width
125	109	67	47	36	23	15
120	105	64	45	35	22	14
115	100	62	43	33	21	14
110	96	59	41	32	20	13
105	91	56	39	30	19	13
100	86	53	37	29	18	12
95	82	50	35	27	17	11
90	77	48	33	26	17	11
85	73	45	31	24	16	10
80	68	42	29	23	15	10
75	64	39	28	21	14	9
70	59	37	26	20	13	8
65	55	34	24	18	12	8
60	50	31	22	17	11	7
55	46	28	20	15	10	7
50	41	25	18	14	9	6
45	36	23	16	12	8	6
40	32	20	14	11	7	5
35	27	17	12	10	6	4
30	23	14	10	8	5	4
25	18	12	8	7	5	4*
20	14	9	6	5	4	4*
15	9	6	4	4	4*	4*
10	5	4*	4*	4*	4*	4*

1. Includes all space between outside edge of travel lane to inside edge of sidewalk
2. Parking has a tremendous effect on providing a greater sense of safety to the pedestrians alongside the roadway, but it has limited application (on-street parking is not a viable option on roadways with higher operating speeds

* Buffer limited by practical planting width



Bicycle Quality of Service





View of HCM



Bus –

Pedestrian -

Bicycle –



How crowded the bicycle facility is (hindrance)





The Bicycle LOS Model

- Developed in 1996
- Published in Transportation Research Record 1578
- Applied in over 200,000 miles of U.S. highway networks
- Adopted by numerous metro areas
- Statewide applications



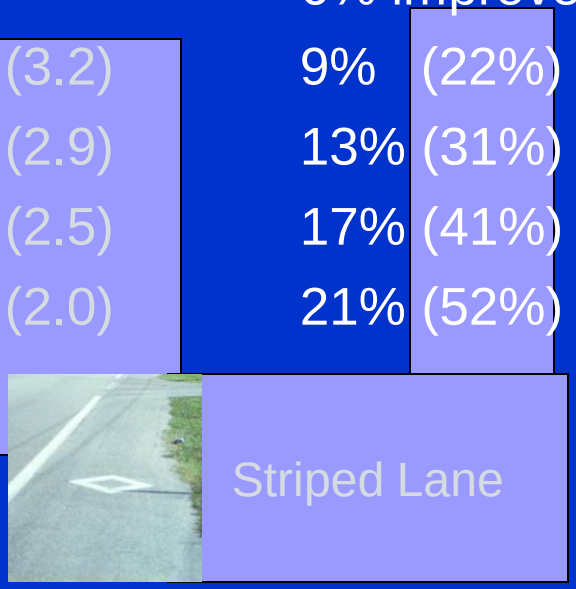
Factors Affecting Bicycling Quality of Service

- Proximity of bicyclists to motorized vehicles
- Motorized vehicle
  - Volume
  - Speed
  - Type
- Pavement condition
- On-street parking



Lane Width and Lane Striping

	BLOS	% Change
W_t = 10 ft	4.4	5% worse
W_t = 11 ft	4.3	3% worse
W_t = 12 ft - - (example street)- -	4.1	- - - - - - - - - no change
W_t = 13 ft	4.0	3% improvement
W_t = 14 ft	3.9	6% improvement
W_t = 15 ft (W_l = 3 ft)	3.7 (3.2)	9% (22%) improvement
W_t = 16 ft (W_l = 4 ft)	3.6 (2.9)	13% (31%) improvement
W_t = 17 ft (W_l = 5 ft)	3.4 (2.5)	17% (41%) improvement
W_t = 18 ft (W_l = 6 ft)	3.2 (2.0)	21% (52%) improvement



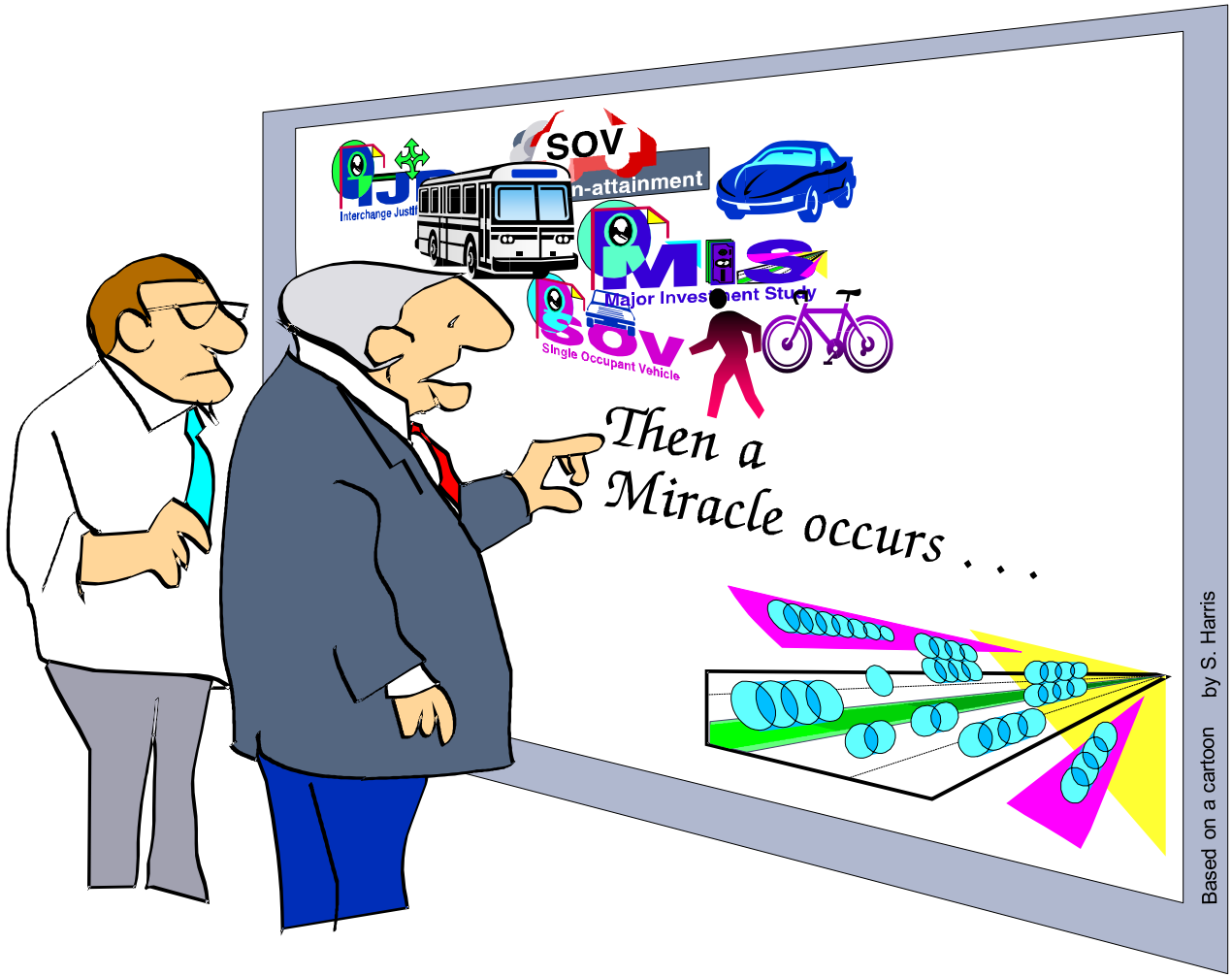


So, how do we proceed?

- Auto 
- Bicycle 
- Pedestrian 
- Transit 
- Truck 

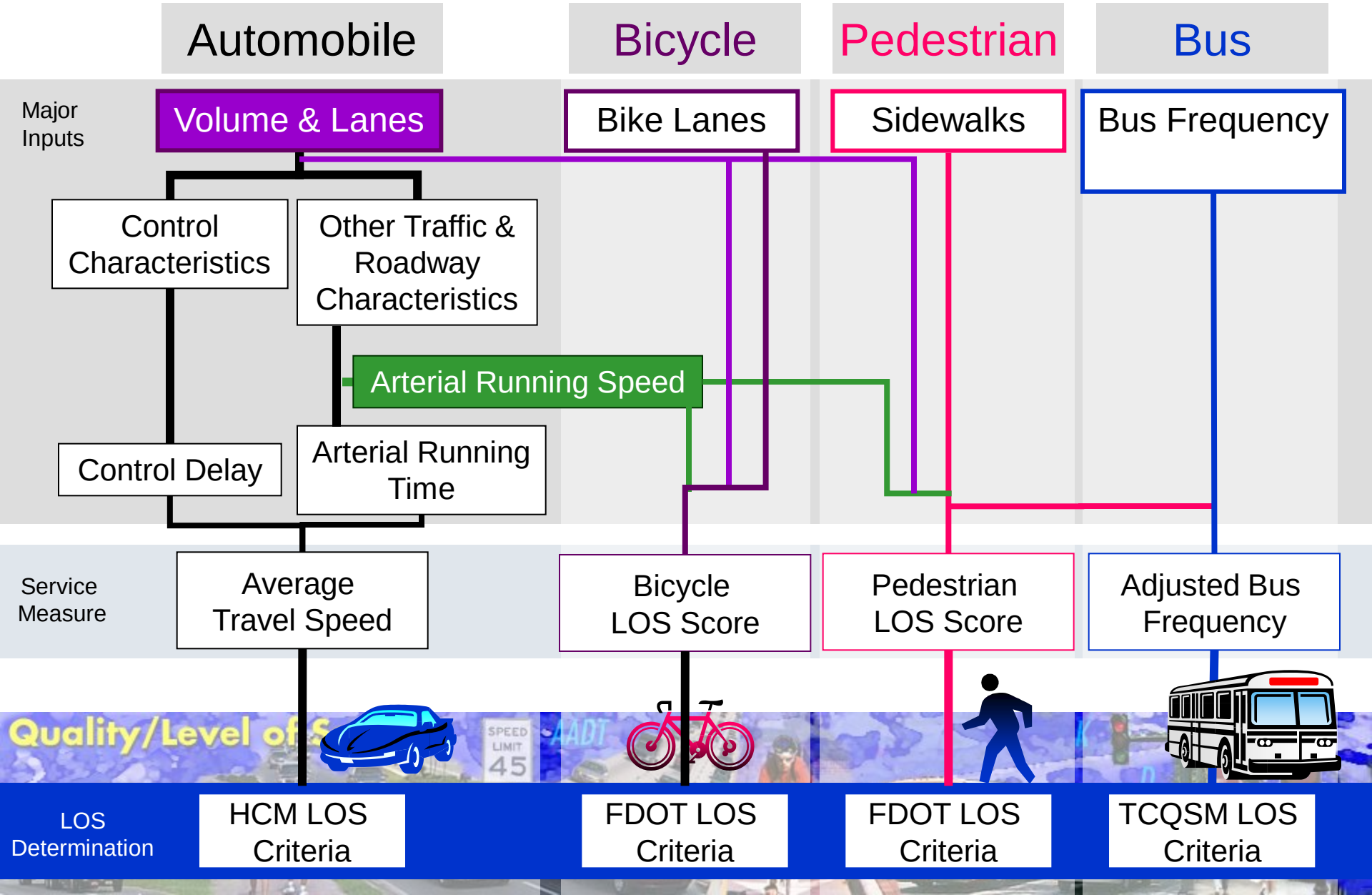
- All together? 





"I think you should be more explicit here in Step Two."

Simplified Multimodal Arterial Flow Chart





NCHRP 3-70
Multimodal LOS for Urban Streets

- To develop and test enhanced methods for determining levels of service for automobile, transit, bicycle, and pedestrian modes on urban streets,
  - in particular with respect to the interaction among the modes.



2010 Highway Capacity Manual















PD & E Manual

- Part 1, Chapter 4 – Project Development
  - 4-2.2.7.4 Highway Capacity and LOS Analyses
    - Capacity and LOS must be based on LOSPLAN
    - Computation techniques found in FDOT's Q/LOS Handbook
    - Supplemental techniques
      - Generalized Maximum Service Volume Tables
      - Highway Capacity Software (HCS+)
- Other
  - Part 2, 6-2.4 – Multimodal Alternatives
  - Part 2, 14 – Bicycle and Pedestrian Facilities
  - Other



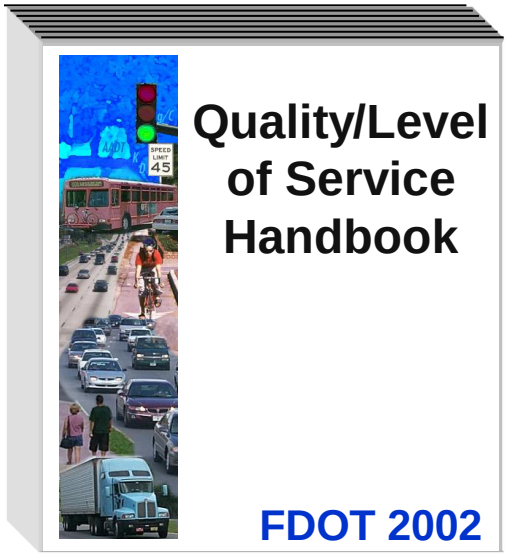
HCM/QLOS Handbook Compatibility

Primarily
Operational

Planning/
Preliminary
Engineering



≈





Capacity/Level of Service Analyses and Evaluation Tools

Potential Accuracy

(Microsimulation) CORSIM

(Macrosimulation) TRANSYT/Synchro

HCM/ TCQSM/ BLOS/ PLOS (Simple Operational Analysis)

ARTPLAN/ FREEPLAN/ HIGHPLAN (Preliminary Engineering)

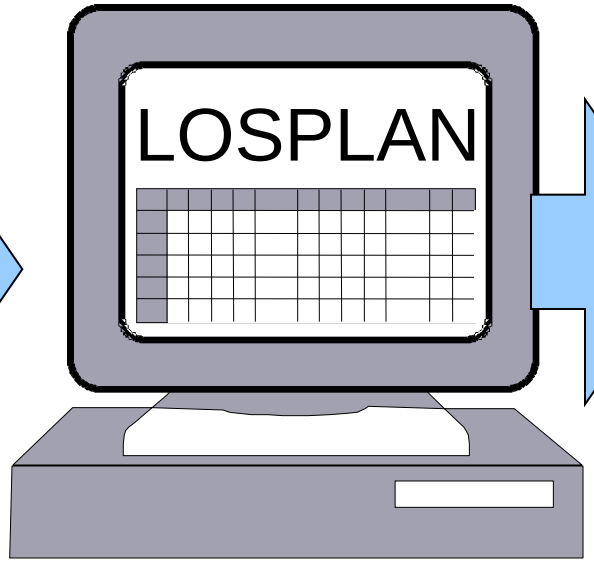
Generalized Tables (Generalized Planning)

Effort/Complexity

Level of Service Planning/Preliminary Engineering Tools

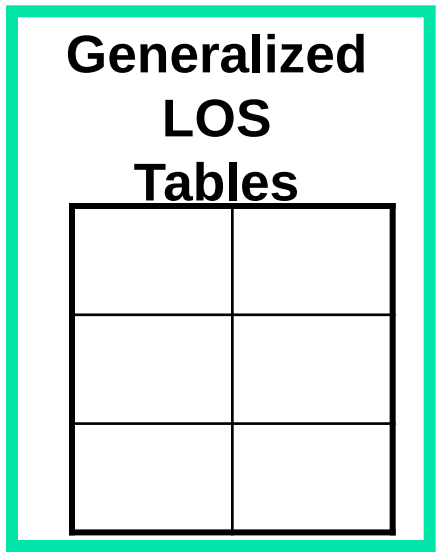


Preliminary Engineering Models



Generalized Planning Tools

Generalized LOS Tables







Florida's Generalized Service Volume Tables

3 - 4

GENERALIZED ANNUAL AVERAGE DAILY VOLUMES FOR FLORIDA'S URBANIZED AREAS*

STATE TWO-WAY ARTERIALS
UNINTERRUPTED FLOW

Unsignalized Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	8,900	13,900	18,900	24,800	33,100
4	Divided	21,500	35,800	50,100	60,100	71,600
6	Divided	32,200	53,700	75,200	90,200	107,400

INTERRUPTED FLOW

Class I (>0.00 to 1.99 signalized intersections per mile)

Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	2,200	13,400	16,400	16,900	****
4	Divided	***	29,300	34,700	35,700	****
6	Divided	***	44,800	52,100	53,500	****
8	Divided	***	58,000	66,100	67,800	****

Class II (2.00 to 4.50 signalized intersections per mile)

Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	***	1,900	11,300	15,400	16,300
4	Divided	***	2,800	26,000	32,700	34,500
6	Divided	***	3,700	40,300	49,200	51,800
8	Divided	***	4,700	53,300	63,800	67,000

Class III (more than 4.5 signalized intersections per mile and not within primary city central business district of an urbanized area over 750,000)

Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	***	***	5,300	12,600	15,500
4	Divided	***	***	12,500	29,000	32,800
6	Divided	***	***	19,500	44,800	49,300
8	Divided	***	***	25,800	58,700	63,800

Class IV (more than 4.5 signalized intersections per mile and within primary city central business district of an urbanized area over 750,000)

Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	***	***	5,200	13,700	15,000
4	Divided	***	***	12,300	30,300	31,700
6	Divided	***	***	19,400	45,800	47,600
8	Divided	***	***	25,900	59,900	62,200

NON-STATE ROADWAYS
Major City/County Roadways

Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	***	***	8,600	14,600	16,000
4	Divided	***	***	19,800	31,700	33,900
6	Divided	***	***	30,800	47,800	51,000

OTHER SIGNALIZED ROADWAYS
(signalized intersection analysis)

Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	***	***	4,800	10,900	11,900
4	Divided	***	***	11,600	23,800	25,400

Source: Florida Department of Transportation
Systems Planning Office
605 Suwannee Street, MS 19
Tallahassee, FL 32399-0450
http://www.dot.state.fl.us/planning

06/13/01

FREEWAYS

Classes I, II, III (interchange spacing ≥ 2 mi. apart)

Lanes	Level of Service A	B	C	D	E
4	25,300	41,800	56,600	67,100	74,600
6	39,200	64,400	87,500	103,600	115,300
8	53,100	87,300	118,500	140,200	156,000
10	66,700	110,000	149,400	176,900	196,400
12	80,600	132,900	180,300	213,500	237,100

Class IV (interchange spacing < 2 mi. apart)

Lanes	Level of Service A	B	C	D	E
4	22,220	35,800	51,800	66,900	76,100
6	34,100	55,300	79,900	103,500	117,500
8	46,100	74,700	108,100	140,000	159,200
10	58,100	94,300	136,500	176,400	200,500
12	70,100	113,800	164,500	212,900	242,000

BICYCLE MODE

(**Note**: Level of service for the bicycle mode in this table is based on roadway geometrics at 40 mph posted speed and traffic conditions, not number of bicyclists using the facility.) (Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine maximum service volumes).

Paved Shoulder Bicycle Lane % Coverage	Level of Service A	B	C	D	E
0-49%	***	***	3,200	14,400	>14,400
50-84%	***	2,400	3,700	>3,700	****
85-100%	2,800	3,700	>3,700	****	****

PEDESTRIAN MODE

(**Note**: Level of service for the pedestrian mode in this table is based on roadway geometrics at 40 mph posted speed and traffic conditions, not number of pedestrians using the facility.) (Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine maximum service volumes.)

% Sidewalk Coverage	Level of Service A	B	C	D	E
0-49%	***	***	***	6,600	15,400
50-84%	***	***	3,900	13,100	>13,100
85-100%	***	1,500	10,700	>10,700	****

BUS MODE (Scheduled Fixed Route)

(Buses per hour)

(Note: Buses per hour shown are only for the peak hour in the single direction of higher traffic flow)

% Sidewalk Coverage	Level of Service A	B	C	D	E
0-84%	***	***	>4	≥3	≥2
85-100%	>6	≥5	≥3	≥2	≥1

ARTERIAL/NON-STATE ROADWAY ADJUSTMENTS
DIVIDED/UNDIVIDED
(alter corresponding volume indicated percent)

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

ONE-WAY FACILITIES

Alter equivalent two-way lane volume –40%

* This table does not constitute a standard and should be used only for general planning applications. The computer models for 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 microscopic design, where more refined techniques exist. Values shown are hourly volumes for levels of service and are for the automobile/truck modes unless specifically stated. Level of service lower grade thresholds are probably not comparable across modes and, therefore, cross modal comparisons should be made with caution. The table's input value defaults and level of service criteria appear on the following page.

** Cannot be achieved using table input value defaults.

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



LOSPLAN
FDOT's Updated Software for Preliminary Engineering



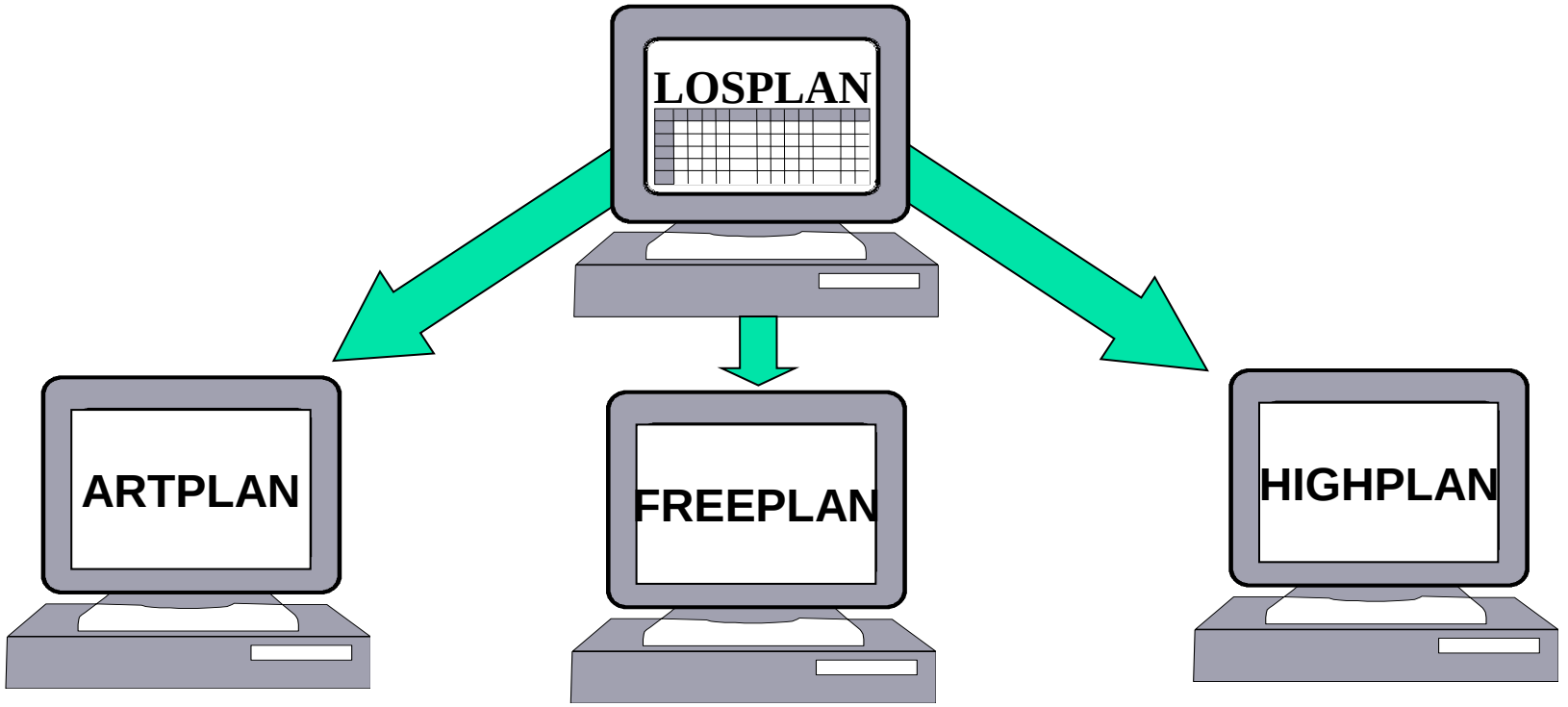
Primary Developers
Elena Prassas (Polytechnic University) – HCM Signalized Intersection Subcommittee Chair
Scott Washburn (University of Florida) – HCM Freeway Subcommittee Chair



FHWA Approval of LOSPLAN
(FHWA, Division Office, 3/11/02)

- "LOSPLAN and its elements ARTPLAN and FREEPLAN is based on the procedures of the HCM2000 for motorized vehicles and includes the best level of service methodology for bicycle, pedestrian and transit modes."
- "Based on this information **the use of FREEPLAN and ARTPLAN are acceptable for planning and preliminary engineering applications.**"

Preliminary Engineering Software Analysis Tools



Arterial facilities
Arterial segments
Intersections

Freeway facilities
Basic segments
Interchanges

Two-Lane facilities
Multilane facilities
Segments





Freeway Level of Service Analysis



Freeway Level of Service Analysis

Florida Department of Transportation

FREEPLAN 2007

Freeway Level of Service
for Conceptual Planning and Preliminary Engineering

Version Date: 5/14/07

Startup Options

Would you like to...

Start a new project or Open an existing project





FREEPLAN Major Features

- HCM based
- Developed for planning and preliminary engineering applications
  - Calculates LOS for design concept and scope
  - Determines maximum service volumes
  - Identifies “hot spots”
- Directly applicable to Florida
  - Matches well with Florida freeway capacities
    - Warnings if values are out of line
  - Freeway operational features (new)
    - Auxiliary lanes
    - Extensions of ramp acceleration and deceleration lanes
    - Ramp metering
    - Ramp terminal capacity check



FREEPLAN General Input Data Screen

FREEPLAN - Large Urbanized - [Define Facility]

File Inputs Results Defaults Help

Freeway Name	Sample Freeway	Analysis Direction	Eastbound
From		Peak or Off Peak	Peak Direction
To		Study Period	K100
Analysis Date	1/9/2007	User Notes	
Analyst			

General Freeway Characteristics

Area Type	Large Urbanized
Freeway Length (miles)	4
Number of Segments	4
Posted Speed (mph)	60
Base Saturation Flow Rate per Lane (pcphpl)	2350
Number of Thru Lanes (Both Directions)	
Auxiliary Lanes (Y/N)?	(No)
Ramp Metering (Y/N)?	(No)
Extend Accel/Decel Lanes to 1500 feet?	(No)

Traffic Characteristics

AADT	
K Factor	
D Factor	
Directional Hourly Volume	
Peak Hour Factor	0.95
Percent Heavy Vehicles Entering First Segment	4.0
Local Adjustment Factor	1

For the variables highlighted in blue, local values must be used.

FREEPLAN Special Features



FREEPLAN - Large Urbanized - [Define Facility]

File Inputs Results Defaults Help

Freeway Name: Sample Freeway
From:
To:
Analysis Date: 1/9/2007
Analyst:

Analysis Direction: Eastbound
Peak or Off Peak: Peak Direction
Study Period: K100
User Notes:

General Freeway Characteristics

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Freeway Length (miles): 4
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Traffic Characteristics

AADT:
K Factor:
D Factor:
Directional Hourly Volume:
Peak Hour Factor: 0.95
Percent Heavy Vehicles Entering First Segment: 4.0
Local Adjustment Factor: 1

For the variables highlighted in blue, local values must be used.



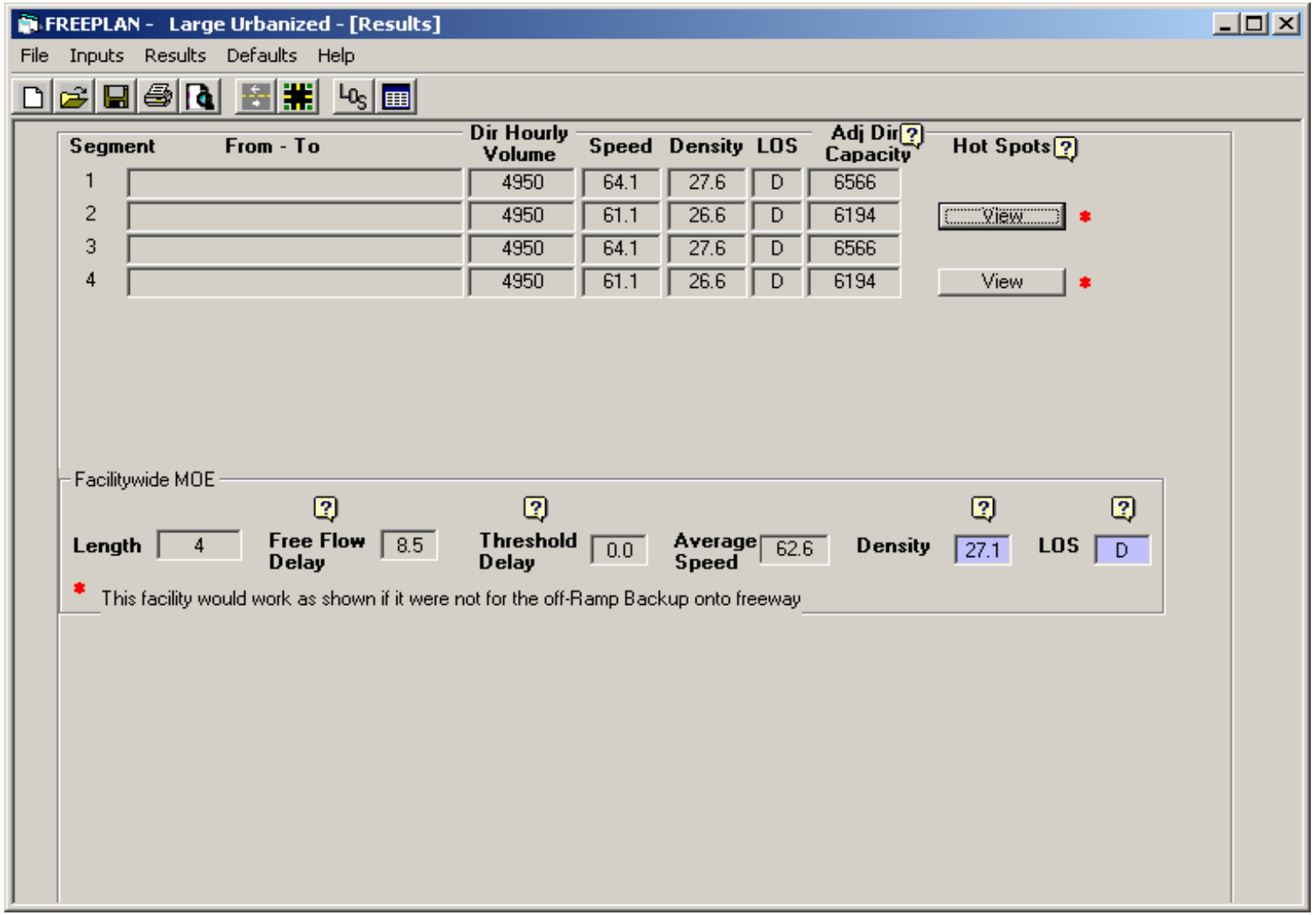
FREEPLAN Segment Input Data Screen

FREEPLAN - Large Urbanized - [Segment Information]

File Inputs Results Defaults Help

Seg No	From	To	Segment Type	Length	Influence Area	Thru Dir Lanes	Aux Lanes	FFS	Terrain	
1			Basic Segment	1	1	3	0	65	L	
2			Diamond	2280	1	3	0	65	L	Edit
3			Basic Segment	1	1	3	0	65	L	
4			Diamond	2280	1	3	0	65	L	Edit

FREEPLAN LOS Calculation Screen





FREEPLAN Service Volume Screen

Service Volumes

FACILITY SERVICE VOLUMES

Area Type: Large Urbanized

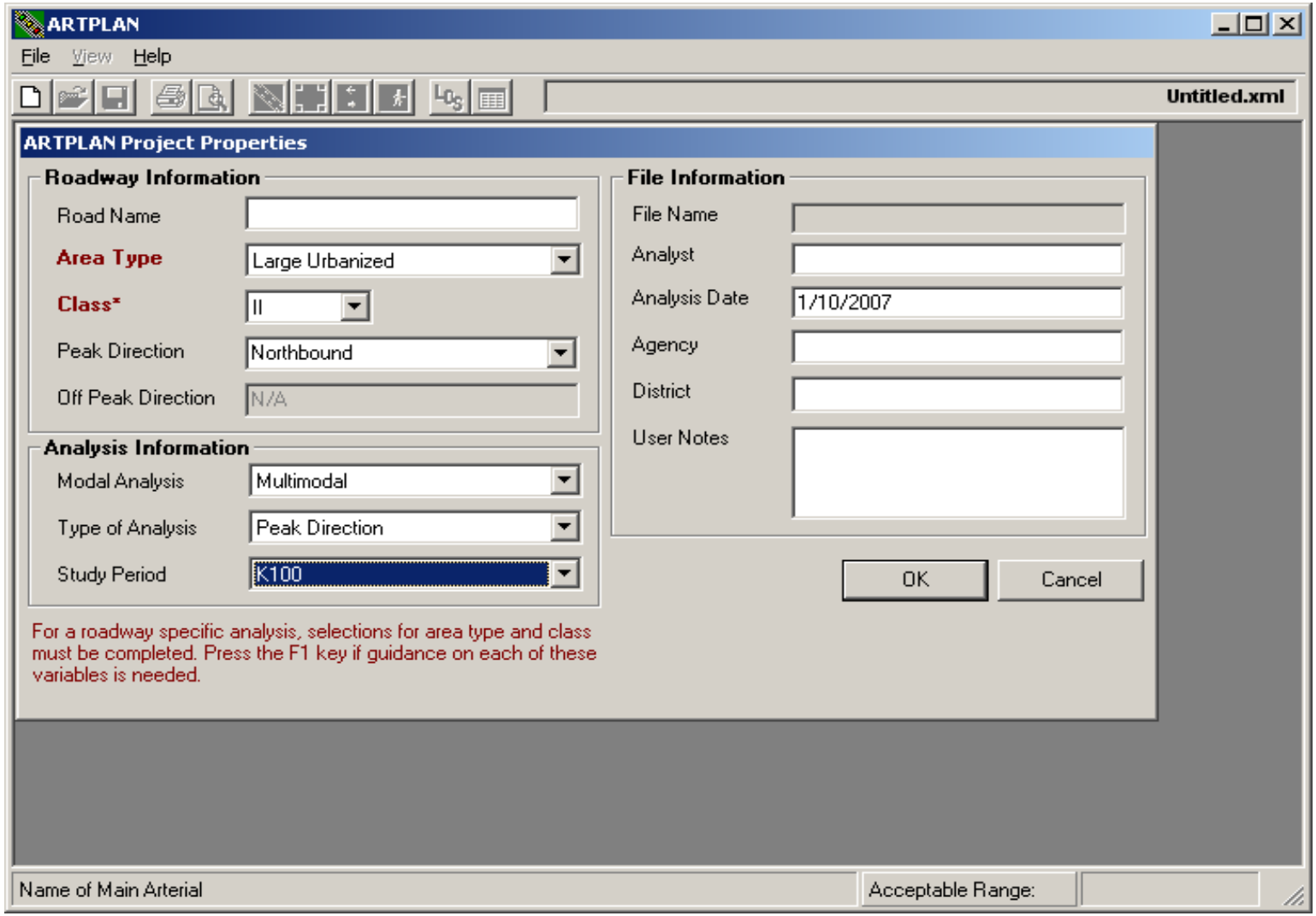
Lanes	A	B	C	D	E
	Peak Hour Volume Peak Direction (vph)				
2	1200	2000	2850	3570	4010
3	1860	3100	4400	5510	6190
4	2510	4190	5950	7460	8380
5	3170	5280	7500	9400	10560
6	3820	6370	9050	11350	12750
Lanes	Peak Hour Volume Both Directions				
4	2180	3640	5180	6490	7290
6	3380	5640	8000	10020	11250
8	4560	7620	10820	13560	15240
10	5760	9600	13640	17090	19200
12	6950	11580	16450	20640	23180
Lanes	AADT				
4	24200	40400	57600	72100	81000
6	37600	62700	88900	111300	125000
8	50700	84700	120200	150700	169300
10	64000	106700	151600	189900	213300
12	77200	128700	182800	229300	257600

Close

ARTPLAN Opening Screen



ARTPLAN Project Properties Screen





ARTPLAN Facility Data Screen

ARTPLAN: Large Urbanized Area - [Facility Data]

File View Help

Untitled.xml

Roadway Variables

# Thru Lanes (Both Directions)	4	Posted Speed	45	Exclusive Left Turn Lane(s)	☑
Median Type	Restrictive	Arterial Length	2	Storage Length	235
				Exclusive Right Turn Lane(s)	☐

Traffic Variables

		Dir. Hourly Volume		% Left Turns			
AADT	30000	Peak	1568	Peak	12	Base Sat. Flow Rate	1950
K factor	.095	Off Peak		Off Peak			
D factor	.55	% Heavy Vehicles		% Right Turns		Adj. Sat. Flow Rate	
Peak Hour Factor	0.925	Peak	2.0	Peak	12	Peak	1891
		Off Peak		Off Peak		Off Peak	

Control Variables

						Arrival Type	
# of Signals	6	Control Type	Semiactuated			Peak	4
Cycle Length	150	Through g/C	0.44	Left g/C	0.10	Off Peak	

For the variables highlighted in blue, local values must be used.

Next ->>

Facility Data		Intersection	Segment Data		Results		
General/Auto	Bike, Ped, Bus	Auto	Auto	Bike, Ped, Bus	Auto	Bike, Ped, Bus	Service Volumes

Number of Lanes in Both Directions | Acceptable Range:

ARTPLAN Intersection Data Screen



ARTPLAN: Large Urbanized Area - [Intersection Data]

File View Help

Untitled.xml

Peak | Off Peak

Int. #	Cross Street Name	Cycle Length	g/C Thru	g/C Left	Arrival Type	Excl. Lanes Left	Excl. Lanes Right	% Turns Left	% Turns Right	# Dir. Thru Lanes
1		150				☐	☐			
2		150	0.44	0.10	4	☑	☐	12	12	2
3		150	0.44	0.10	4	☑	☐	12	12	2
4		150	0.44	0.10	4	☑	☐	12	12	2
5		150	0.44	0.10	4	☑	☐	12	12	2
6		150	0.44	0.10	4	☑	☐	12	12	2
7		150	0.44	0.10	4	☑	☐	12	12	2
8						☐	☐			
9						☐	☐			
10						☐	☐			

<< Back | +/- Intersections + - | Revert to Facility Data... | Display Intersections: 1-10 / 11-19 | Next >>

Facility Data: General/Auto | Bike, Ped, Bus
Intersection: Auto
Segment Data: Auto | Bike, Ped, Bus
Results: Auto | Bike, Ped, Bus | Service Volumes

Cross Street Name | Acceptable Range:

ARTPLAN Segment Data Screen



ARTPLAN: Large Urbanized Area - [Segment Data]

File View Help

Untitled.xml

Peak | Off Peak

Segment	Length	AADT	Adj. Dir. Hourly Vol.	# Dir. Thru Lanes	Free Flow Speed	Median Type
-	1760	30000	1568	2	50	Restrictive
-	1760	30000	1568	2	50	Restrictive
-	1760	30000	1568	2	50	Restrictive
-	1760	30000	1568	2	50	Restrictive
-	1760	30000	1568	2	50	Restrictive
-	1760	30000	1568	2	50	Restrictive

<< Back | Revert to Facility Data... | Display Segments: 1-9 / 10-18 | Next >>

Facility Data: General/Auto | Bike, Ped, Bus | Intersection: Auto | Segment Data: Auto | Bike, Ped, Bus | Results: Auto | Bike, Ped, Bus | Service Volumes

Segment Length (feet, entered values <= 3 assumed to be in miles) | Acceptable Range: 100 - 15840

ARTPLAN LOS Results Screen



ARTPLAN: Large Urbanized Area - [Results]

File View Help

Untitled.xml

Peak | Off Peak

Segment	Thru Mvmt Flow Rate	Adj. Sat. Flow Rate	v/c	Control Delay	Intersection Approach LOS	Left Turn Spill	Avg. Speed (mi/h)	Segment LOS
-	1492	1891	.90	35.82	D	Y	18.1	D
-	1492	1891	.90	35.82	D	Y	18.1	D
-	1492	1891	.90	35.82	D	Y	18.1	D
-	1492	1891	.90	35.82	D	Y	18.1	D
-	1492	1891	.90	35.82	D	Y	18.1	D
-	1492	1891	.90	35.82	D	Y	18.1	D

Length (mi) 2.0 | Wtd. g/C 0.44 | Free Flow Delay (sec/veh) 254.1 | LOS Threshold Delay (sec/veh) 0.0 | Avg. Speed (mi/h) 18.1 | LOS D

<<- Back | Warning Messages | Display Segments: 1-9 / 10-18 | Next ->>

Facility Data: General/Auto | Bike, Ped, Bus | Intersection: Auto | Segment Data: Auto | Bike, Ped, Bus | Results: Auto | Bike, Ped, Bus | Service Volumes

Acceptable Range:



Multimodal Perspective

- Besides auto LOS the ARTPLAN software includes LOS analyses for
  - Bicycle
  - Pedestrian
  - Scheduled fixed route bus transit



ARTPLAN Multimodal LOS Results Screen



ARTPLAN: Large Urbanized Area - [Results]

File View Help

Untitled.xml

Peak | Off Peak

Segment	Bike LOS Score	Bike LOS Seg	Pedestrian SubSegment 1	2	3	Pedestrian LOS Score	Pedestrian LOS Seg	Bus LOS Adj. Buses	Bus LOS Seg
-	4.53	E	D			4.01	D	2.00	D
-	4.53	E	D			4.01	D	2.00	D
-	4.53	E	D			4.01	D	2.00	D
-	4.53	E	D			4.01	D	2.00	D
-	4.53	E	D			4.01	D	2.00	D
-	4.53	E	D			4.01	D	2.00	D

Length 2.0 | Score 4.53 | Bike LOS E | Score 4.01 | Pedestrian LOS D | Adj. Buses 2.00 | Bus LOS D

<<- Back

Display Segments: 1-9 | 10-18

Next ->>

Facility Data: General/Auto | Bike, Ped, Bus | Intersection: Auto | Segment Data: Auto | Bike, Ped, Bus | Results: Auto | Bike, Ped, Bus | Service Volumes

Acceptable Range:



ARTPLAN Service Volume Screen

ARTPLAN: Large Urbanized Area - [Results]

File View Help

Untitled.xml

Automobile | Bike | Pedestrian | Bus

Lanes	A	B	C	D	E
Hourly Volume in Peak Direction					
1	**	**	430	790	900
2	**	**	960	1690	1830
3	**	**	1510	2590	2770
4	**	**	2050	3490	3700
*	**	**	960	1690	1830
Hourly Volume in Both Directions					
2	**	**	780	1440	1640
4	**	**	1750	3070	3330
6	**	**	2750	4710	5040
8	**	**	3730	6350	6730
*	**	**	1750	3070	3330
Annual Average Daily Traffic					
2	**	**	8200	15100	17200
4	**	**	18400	32300	35000
6	**	**	28900	49600	53000
8	**	**	39200	66800	70800
*	**	**	18400	32300	35000

Notes

* Service volumes for the specific facility being analyzed, based on the number of thru lanes appearing in the intersection and segment data screens.

** Cannot be achieved based on input data provided.

Facility Data: General/Auto | Bike, Ped, Bus
Intersection: Auto
Segment Data: Auto | Bike, Ped, Bus
Results: Auto | Bike, Ped, Bus | Service Volumes

Acceptable Range:

HIGHPLAN Opening Screen





HCM/LOSPLAN Compatibility

Primarily
Operational

Preliminary
Engineering



≈





Applications in Project Development

- Use of LOSPLAN in project development
  - Location and design concept
    - Lane calls
    - Other
  - Alternatives analysis
  - Capacity/LOS analyses
  - Bicycle & Pedestrian LOS analyses
  - Average travel speeds for environmental studies
  - Other



Where do we go from here?



▲ Corinne Carey of Temecula, Calif., saw this in the hills near her town. A twisted sense of humor.



Future activities

- LOS training
  - Basic LOS District training (8/07-9/07)
    - Through District LOS Coordinators
  - Additional future courses
  - Desire for project development LOS training?
- Future coordination



FDOT LOS Resources

- FDOT LOS Website:

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

- LOSPLAN software
  - ARTPLAN
  - FREEPLAN
  - HIGHPLAN
- Quality/Level of Service Handbook
  - LOS issue papers (addendum)
- Training
- Other



Presentation Purposes

- Introduction to capacity/LOS analyses
  - Introduction
  - Auto/truck
  - Multimodal (Bike/Ped/Transit)
- Introduction to preliminary engineering software
  - ARTPLAN (Arterial Planning)
  - FREEPLAN (Freeway Planning)
  - HIGHPLAN (Highway Planning)
- Discussion on applications within project development