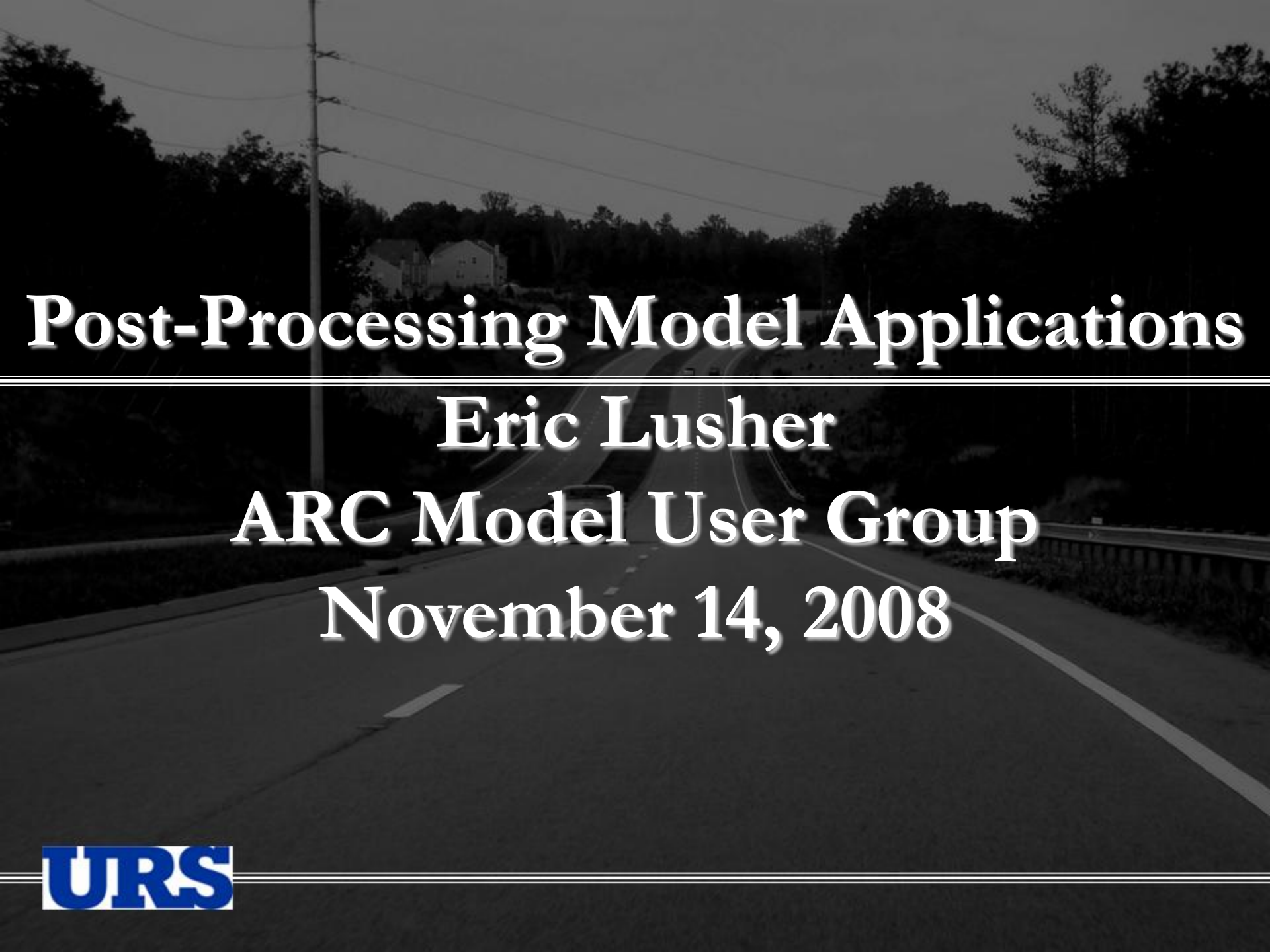


Post-Processing Model Applications

Eric Lusher

ARC Model User Group

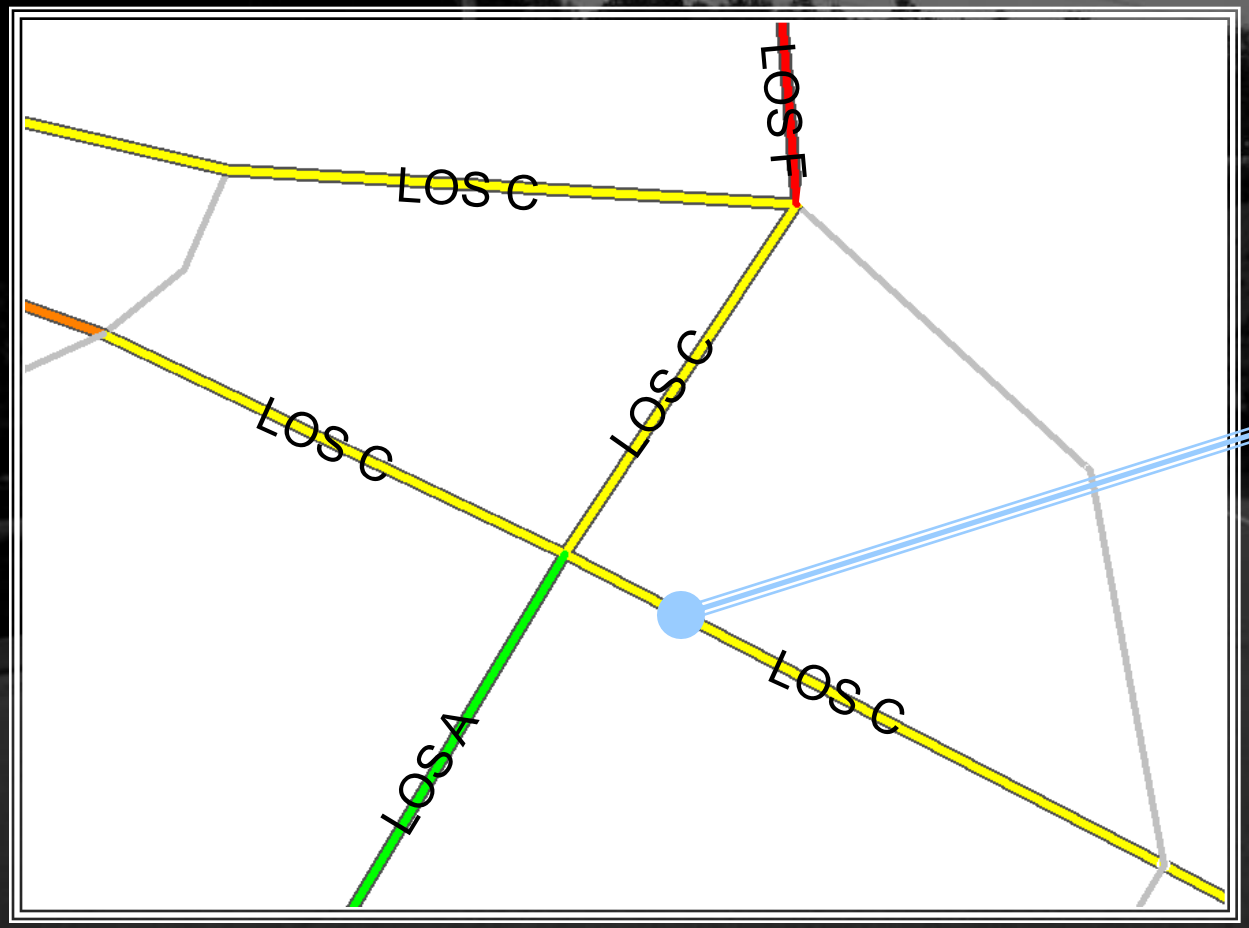
November 14, 2008

URS

Why is this important?

- Models have limitations
- "Black-box" approach can lead to substandard results/recommendations
- Citizens/Public Officials/Other Professionals have limited understanding of what models do
- 'Unreasonable' and 'unrealistic' results strain credibility of transportation demand modeling

Why is this important?



Why is this important?

- Explanations:
  - Model volume assignment low
  - Incorrect coding (Facility Type)
  - Poor socioeconomic data/survey data
  - Lack of study area validation
  - Large TAZs

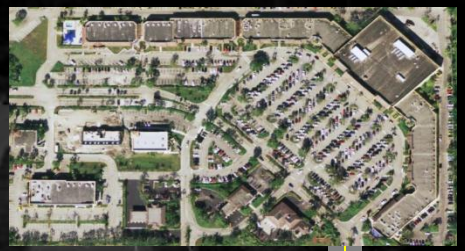
Why is this important?

Big Box

Two major competing movements (signal over capacity)

Outparcels

Strip Shopping

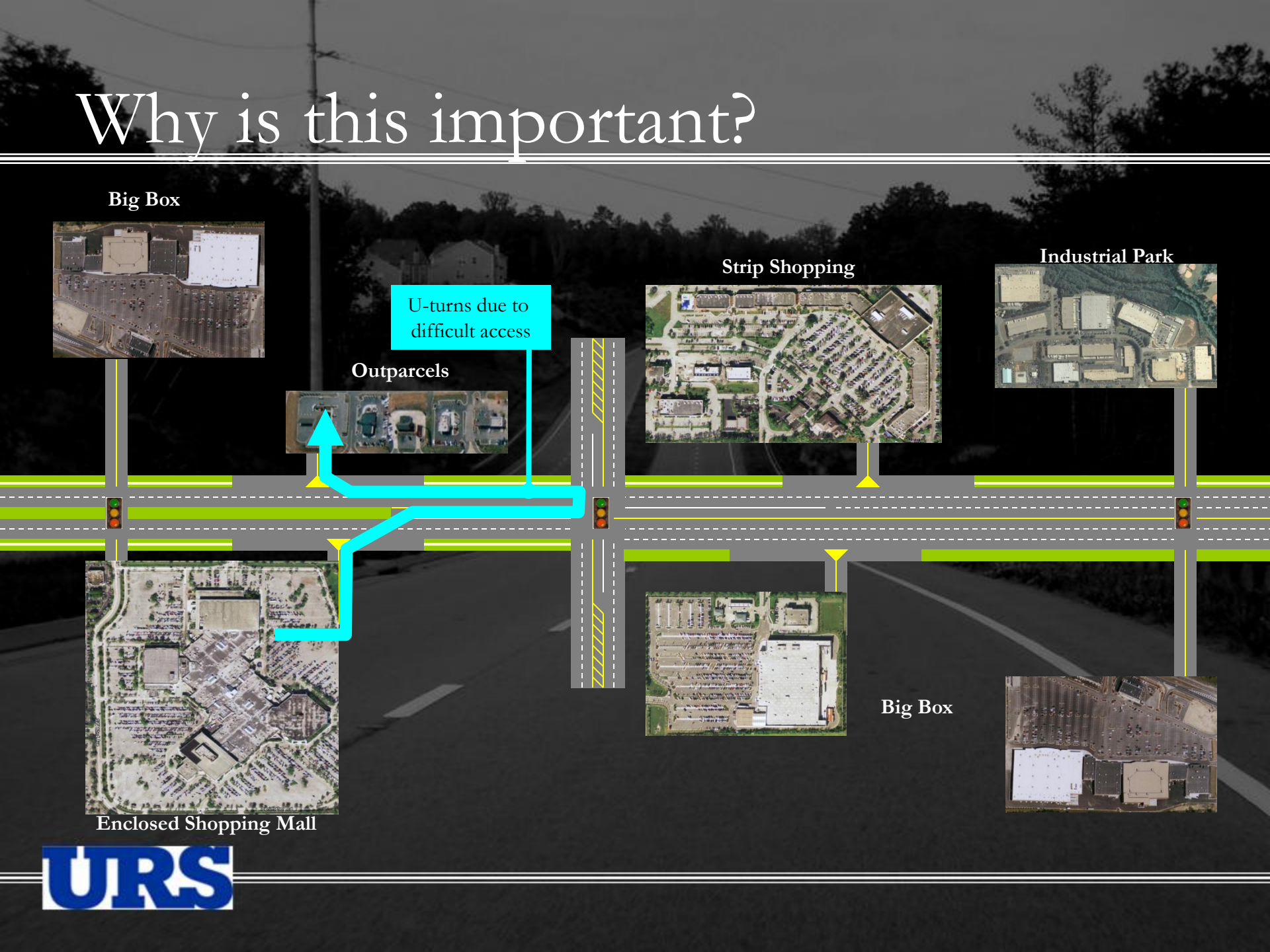


Industrial Park

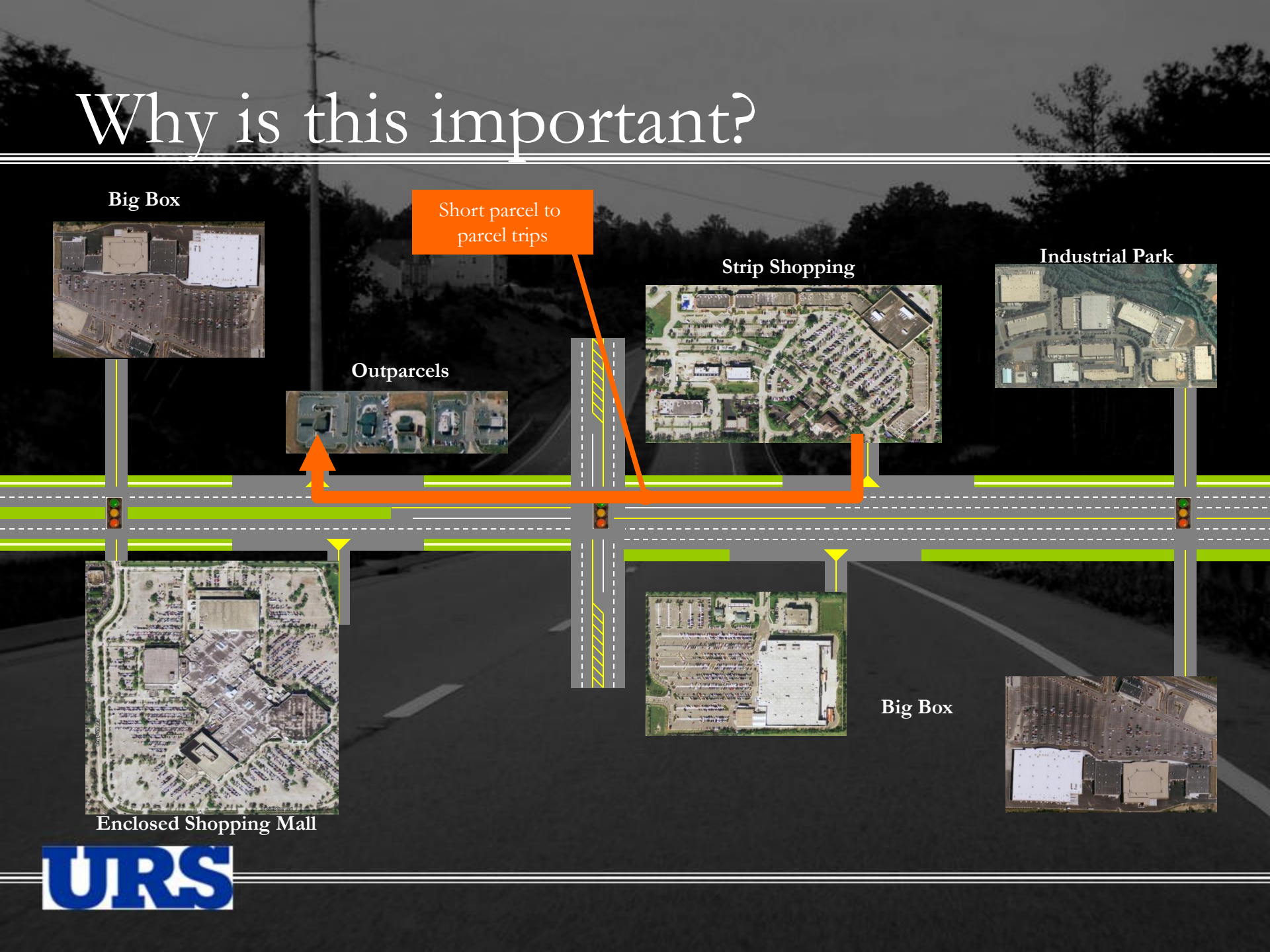
Enclosed Shopping Mall

Big Box

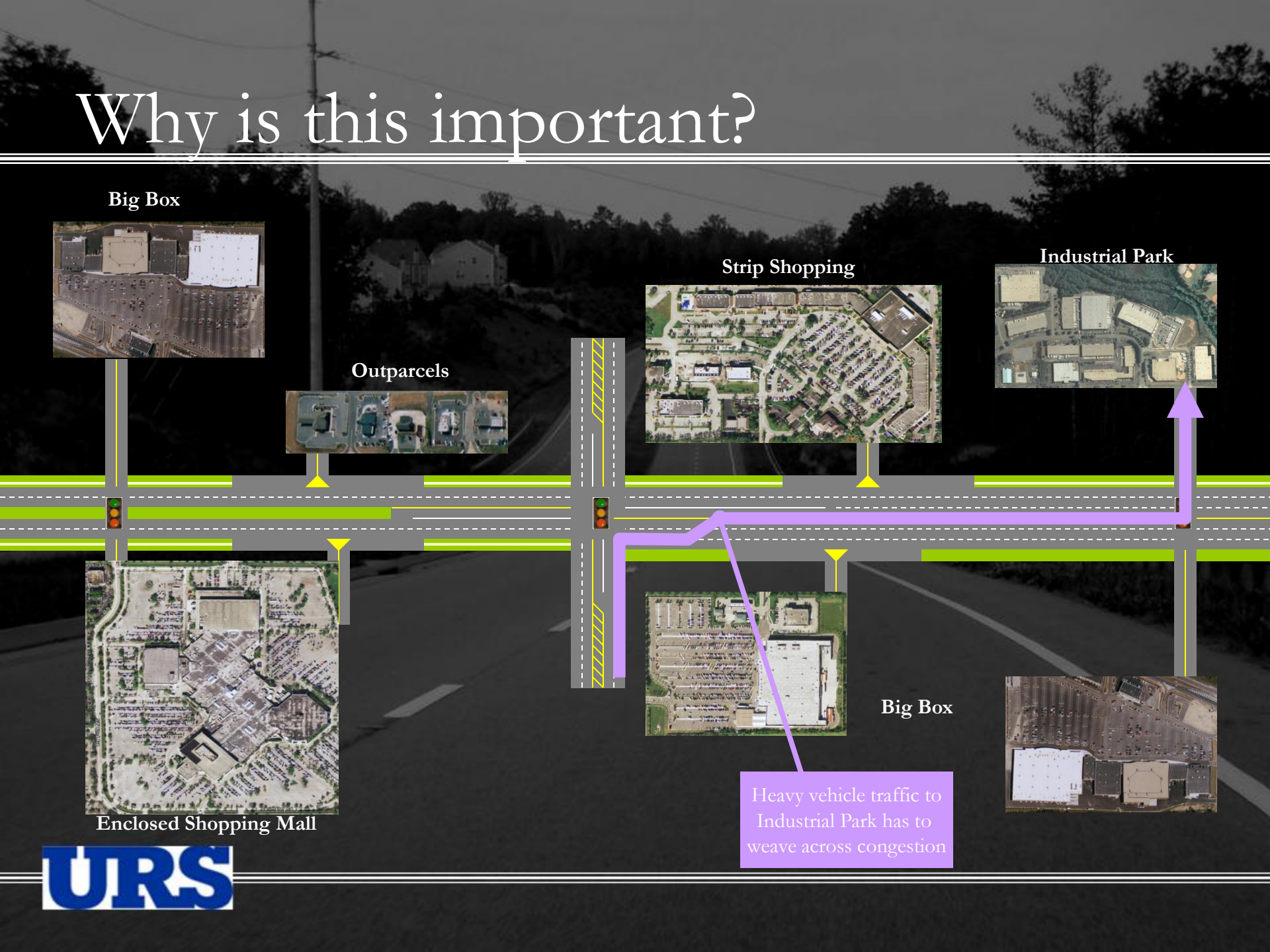
Why is this important?



Why is this important?



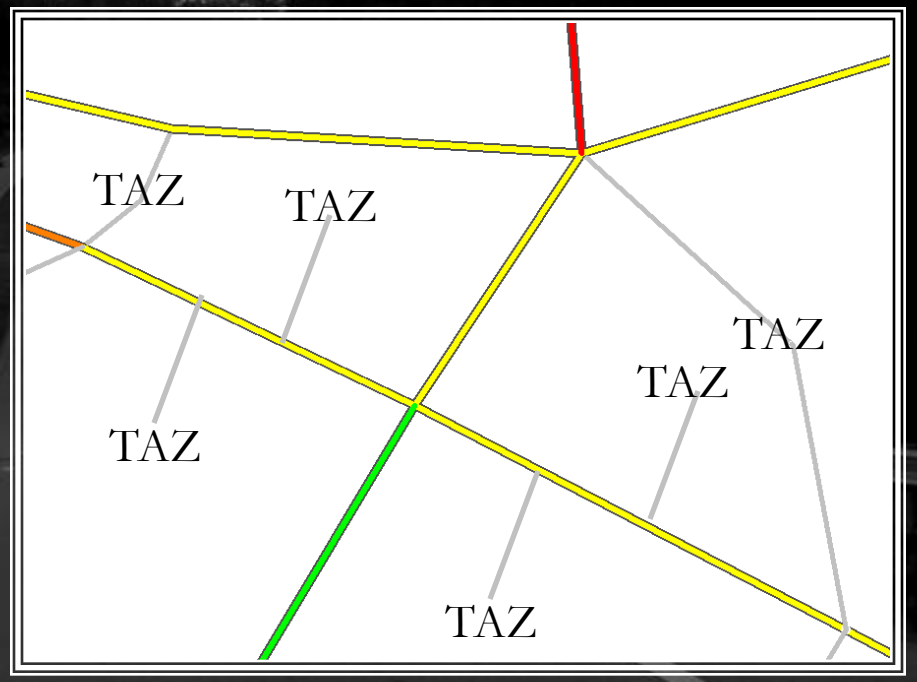
Why is this important?



Why is this important?

Why is this important?

- Various model improvements can potentially be made (smaller TAZs, coding verification, new speed and capacity changes) but there are limitations
- However, the raw model data can be applied to other tools to get a more accurate result



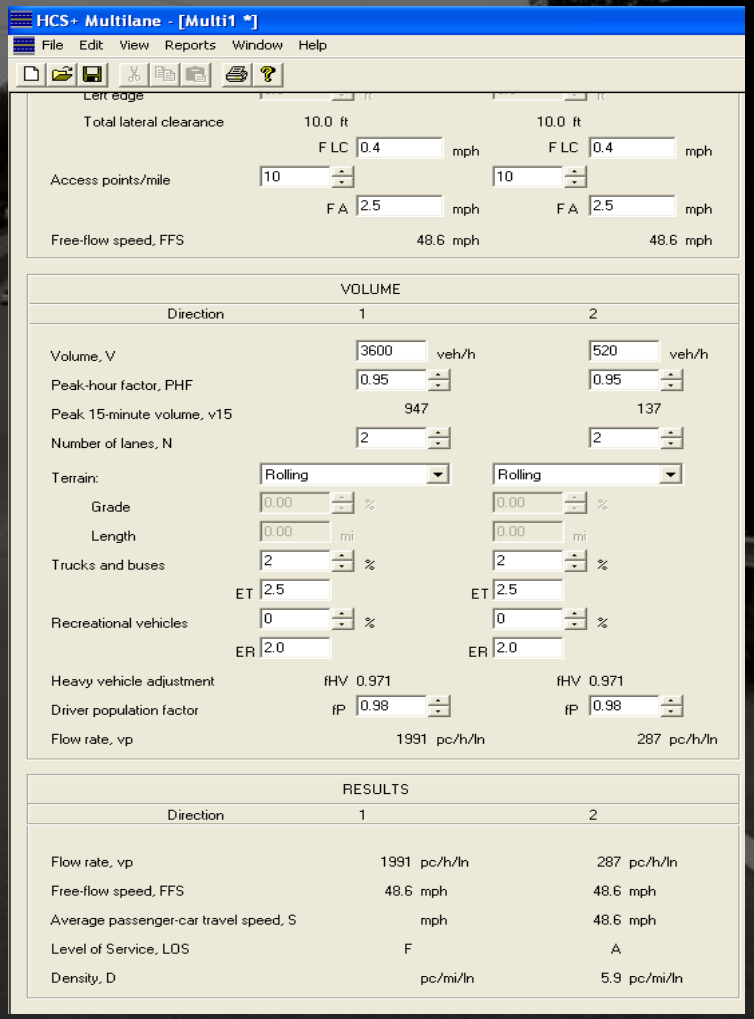
Planning Applications

- For existing conditions, a generalized analysis of a recent AADT count can be conducted
  - HCM/HCS
  - LOSPLAN
  - Generalized Level of Service Tables

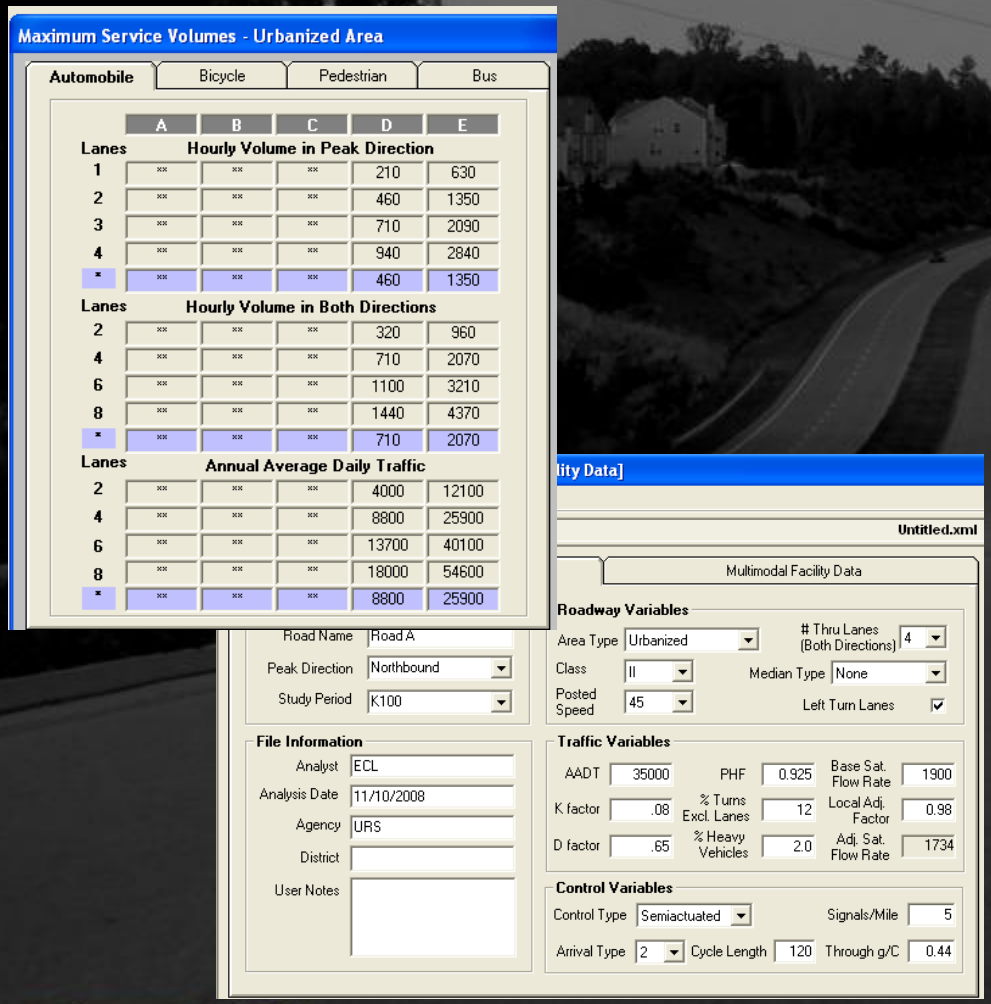
Planning Applications

HCS Arterial and Highway

- Incorporates localized traffic characteristics
  - Free-flow speeds
  - Access points per mile
  - Signal data (arterials)
  - Terrain
  - Vehicle types
  - Driver behavior factors
  - Peak Hour Factors



Planning Applications



LOSPLAN (ARTPLAN, HIGHPLAN, FREEPLAN)

- Not much different from HCS
- Interface designed for planning purposes

Planning Applications

- Generalized Level of Service Tables
  - GRTA
  - FDOT 2002 Quality / Level of Service Manual
  - Generalized assumptions for traffic characteristics

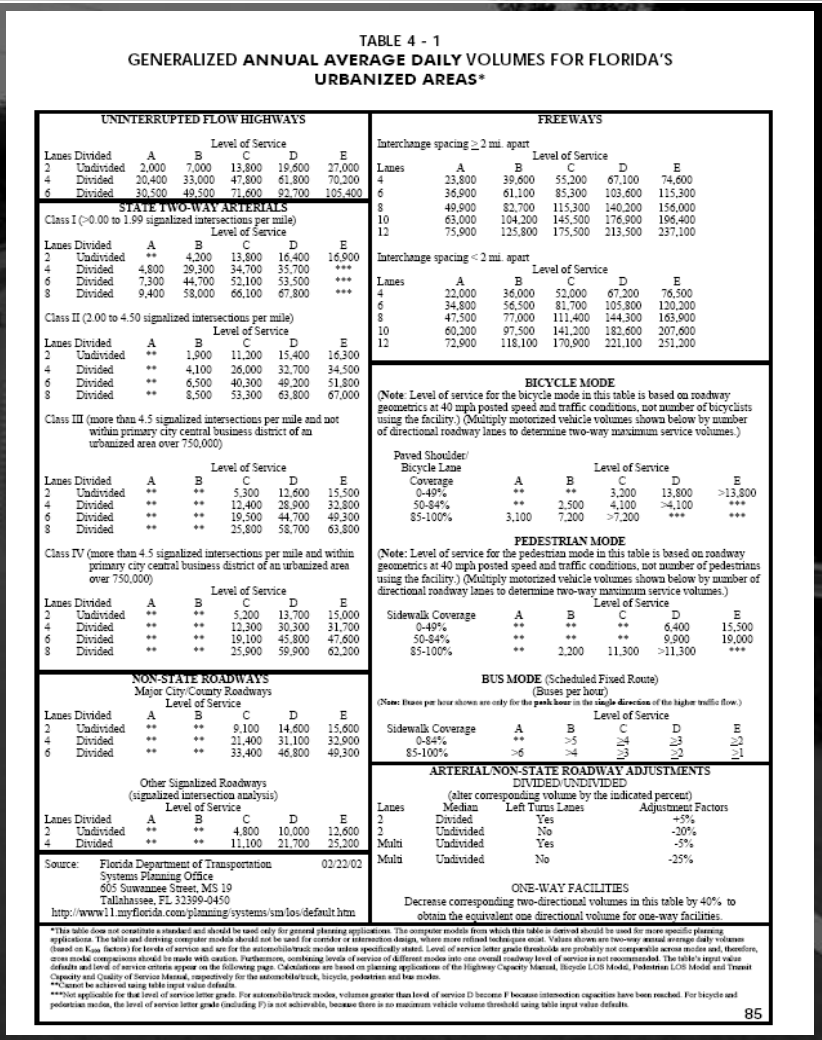


TABLE 4 - 1
GENERALIZED **ANNUAL AVERAGE DAILY** VOLUMES FOR FLORIDA'S **URBANIZED AREAS***

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Divided	A	B	C	D	E
2	Undivided	2,000	7,000	13,800	19,600	27,000
4	Divided	20,400	33,000	47,800	61,800	70,200
6	Divided	30,500	49,500	71,600	92,700	105,400

STATE TWO-WAY ARTERIALS

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

Lanes	Divided	A	B	C	D	E
2	Undivided	**	4,200	13,800	16,400	16,900
4	Divided	4,800	29,300	34,700	35,700	***
6	Divided	7,300	44,700	52,100	53,500	***
8	Divided	9,400	58,000	66,100	67,800	***

Class II (2.00 to 4.50 signalized intersections per mile)

Lanes	Divided	A	B	C	D	E
2	Undivided	**	1,900	11,200	15,400	16,300
4	Divided	**	4,100	26,000	32,700	34,500
6	Divided	**	6,500	40,300	49,200	51,800
8	Divided	**	8,500	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	A	B	C	D	E
2	Undivided	**	**	5,300	12,600	15,500
4	Divided	**	**	12,400	28,900	32,800
6	Divided	**	**	19,500	44,700	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	A	B	C	D	E
2	Undivided	**	**	5,200	13,700	15,000
4	Divided	**	**	12,300	30,300	31,700
6	Divided	**	**	19,100	45,800	47,600
8	Divided	**	**	25,900	59,900	62,200

NON-STATE ROADWAYS

Major City/County Roadways

Lanes	Divided	A	B	C	D	E
2	Undivided	**	**	9,100	14,600	15,600
4	Divided	**	**	21,400	31,100	32,900
6	Divided	**	**	33,400	46,800	49,300

Other Signalized Roadways
(signalized intersection analysis)

Lanes	Divided	A	B	C	D	E
2	Undivided	**	**	4,800	10,000	12,600
4	Divided	**	**	11,100	21,700	25,200

Source: Florida Department of Transportation 02/22/02
Systems Planning Office
605 Suwannee Street, MS 19
Tallahassee, FL 32399-0450
http://www11.myflorida.com/planning/systems/sm/los/default.htm

FREEWAYS

Interchange spacing ≥ 2 mi. apart

Lanes	A	B	C	D	E
4	23,800	39,600	55,200	67,100	74,600
6	36,900	61,100	85,300	103,600	115,300
8	49,900	82,700	115,300	140,200	156,000
10	63,000	104,200	145,500	176,900	196,400
12	75,900	125,800	175,500	213,500	237,100

Interchange spacing < 2 mi. apart

Lanes	A	B	C	D	E
4	22,000	36,000	52,000	67,200	76,500
6	34,800	56,500	81,700	105,800	120,200
8	47,500	77,000	111,400	144,300	163,900
10	60,200	97,500	141,200	182,600	207,600
12	72,900	118,100	170,900	221,100	251,200

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 two-way maximum service volumes.)

Paved Shoulder/ Bicycle Lane Coverage	A	B	C	D	E
0-49%	**	**	3,200	13,800	>13,800
50-84%	**	2,500	4,100	>4,100	***
85-100%	3,100	7,200	>7,200	***	***

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 two-way maximum service volumes.)

Sidewalk Coverage	A	B	C	D	E
0-49%	**	**	**	6,400	15,500
50-84%	**	**	**	9,900	19,000
85-100%	**	2,200	11,300	>11,300	***

BUS MODE (Scheduled Fixed Route)
(Buses per hour)
(**Note**: Buses per hour shown are only for the **peak hour** in the **single direction** of the higher traffic flow.)

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

ARTERIAL/NON-STATE ROADWAY ADJUSTMENTS

DIVIDED/UNDIVIDED
(alter corresponding volume by the 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
Decrease corresponding two-directional volumes in this table by 40% to obtain the equivalent one directional volume for one-way facilities.

*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. Values shown are two-way annual average daily volumes (based on K_{100} factors) for levels of service and are for the automobile/truck modes unless specifically stated. Level of service letter grade thresholds are probably not comparable across modes and, therefore, cross mode comparisons should be made with caution. Furthermore, combining levels of service of different modes into one overall roadway level of service is not recommended. The table's input value defaults and level of service criteria appear on the following page. Calculations are based on planning applications of the Highway Capacity Manual, Bicycle LOS Model, Pedestrian LOS Model and Transit Capacity and Quality of Service Manual, respectively for the automobile/truck, bicycle, pedestrian and bus modes.
**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 threshold using table input value defaults.

85

Planning Applications

- For future scenarios, manually applying changes in traffic volume can negate some model errors
  - Percent change
  - Absolute change
  - Adjustment factors

2005 AADT = 45,300

2005 Model Volume = 32,500

2010 Model Volume = 37,600

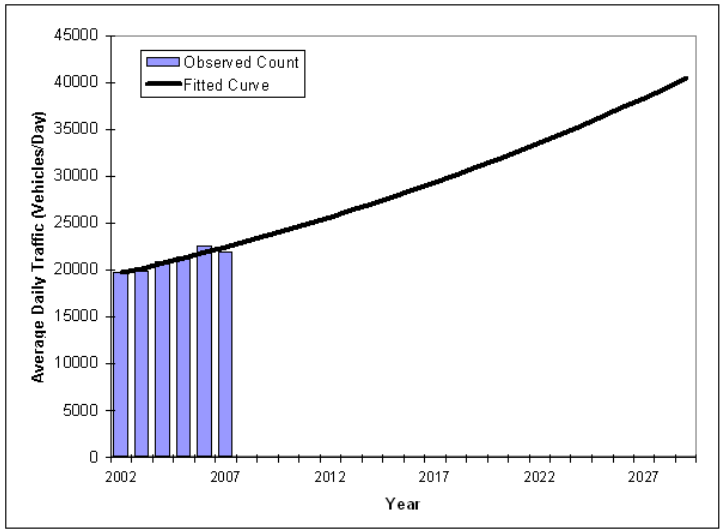
2010 AADT =(37,600-32,500)+45,300 = 50,400?

Planning Applications

- Can also compare against trend analysis
- Look at several years of historical traffic counts to determine if a statistically valid (R^2 >75%) trend is available
- Compare growth trend to model results
- Limitations (does the past represent the future?)

TRAFFIC TRENDS
SR 34 -- West of I-85

County:	Newnan
Station #:	638
Highway:	SR 34



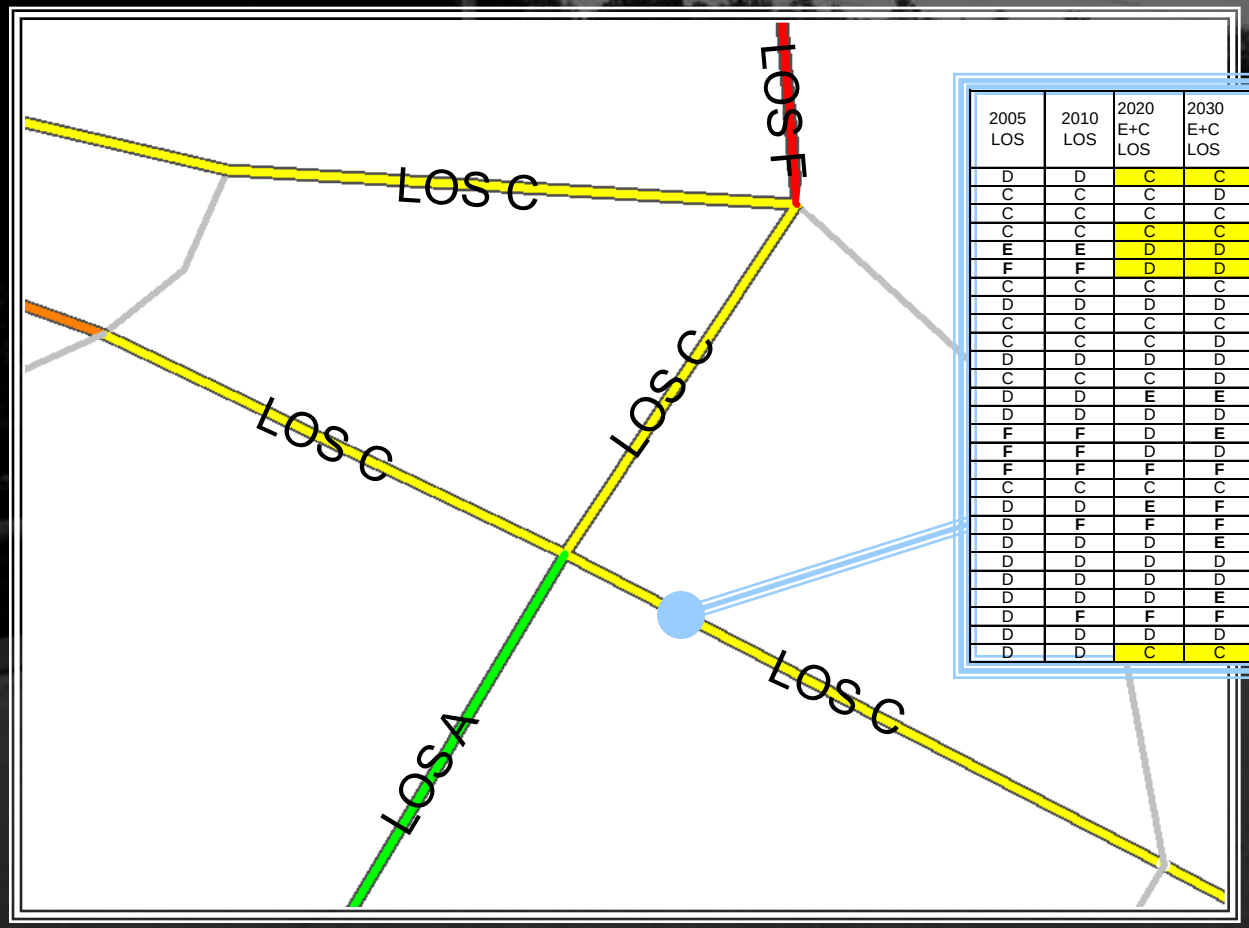
Year	Traffic (ADT/AADT) Count*	Trend**
2002	19700	19700
2003	19900	20200
2004	20900	20800
2005	21400	21300
2006	22600	21900
2007	21900	22500
2009 Opening Year Trend		
2009	N/A	23700
2019 Mid-Year Trend		
2019	N/A	31000
2029 Design Year Trend		
2029	N/A	40500
TRANPLAN Forecasts/Trends		

*Axle-Adjusted

Trend R-squared:	86.1%
Compounded Annual Historic Growth Rate:	2.69%
Compounded Growth Rate (2007 to Design Year):	2.71%
Printed:	13-Nov-08

Exponential Growth Option

Planning Applications



2005 LOS	2010 LOS	2020 E+C LOS	2030 E+C LOS	2030 LOS
D	D	C	C	C
C	C	C	D	D
C	C	C	C	C
C	C	C	C	C
E	**E**	D	D	D
F	**F**	D	D	D
C	C	C	C	C
D	D	D	D	D
C	C	C	C	C
C	C	C	D	C
D	D	D	D	**F**
C	C	C	D	D
D	D	**E**	**E**	D
D	D	D	D	D
F	**F**	D	**E**	D
F	**F**	D	D	C
F	**F**	**F**	**F**	D
C	C	C	C	C
D	D	**E**	**F**	D
D	**F**	**F**	**F**	**F**
D	D	D	**E**	D
D	D	D	D	D
D	D	D	D	D
D	D	D	**E**	**E**
D	**F**	**F**	**F**	**F**
D	D	D	D	D
D	D	C	C	C

10 Model LOS	2020 E+C Model LOS	2030 E+C Model LOS	10 Model same as offline?	20 Model same as offline?	30 Model Same as Offline?
C	A/B	A/B	FALSE	FALSE	FALSE
A/B	A/B	A/B	FALSE	FALSE	FALSE
A/B	A/B	A/B	FALSE	FALSE	FALSE
A/B	A/B	A/B	FALSE	FALSE	FALSE
C	A/B	A/B	FALSE	FALSE	FALSE
A/B	A/B	A/B	FALSE	FALSE	FALSE
A/B	A/B	A/B	FALSE	FALSE	FALSE
A/B	C	C	FALSE	FALSE	FALSE
C	C	C	TRUE	TRUE	TRUE
C	C	D	TRUE	TRUE	TRUE
E	F	F	FALSE	FALSE	FALSE
A/B	A/B	A/B	FALSE	FALSE	FALSE
A/B	A/B	A/B	FALSE	FALSE	FALSE
A/B	A/B	A/B	FALSE	FALSE	FALSE
F	E	E	TRUE	FALSE	TRUE
F	C	D	TRUE	FALSE	TRUE
F	E	E	TRUE	FALSE	FALSE
A/B	A/B	A/B	FALSE	FALSE	FALSE
F	F	F	FALSE	FALSE	TRUE
F	F	F	TRUE	TRUE	TRUE
C	D	D	FALSE	TRUE	FALSE
A/B	A/B	A/B	FALSE	FALSE	FALSE
A/B	A/B	A/B	FALSE	FALSE	FALSE
D	D	D	TRUE	TRUE	FALSE
E	E	E	FALSE	FALSE	FALSE
C	C	C	FALSE	FALSE	FALSE
D	C	C	TRUE	TRUE	TRUE

Traffic Forecasting Applications

- Sources:
  - GDOT Design Manual (Chapter 13)
  - National Cooperative Highway Research Program Report 255
  - Other states (Minnesota, Florida)
- Application of model volume changes and reasonability checks with trend analyses
- Without comprehensive Origin/Destination survey, almost necessary for new facilities

URS

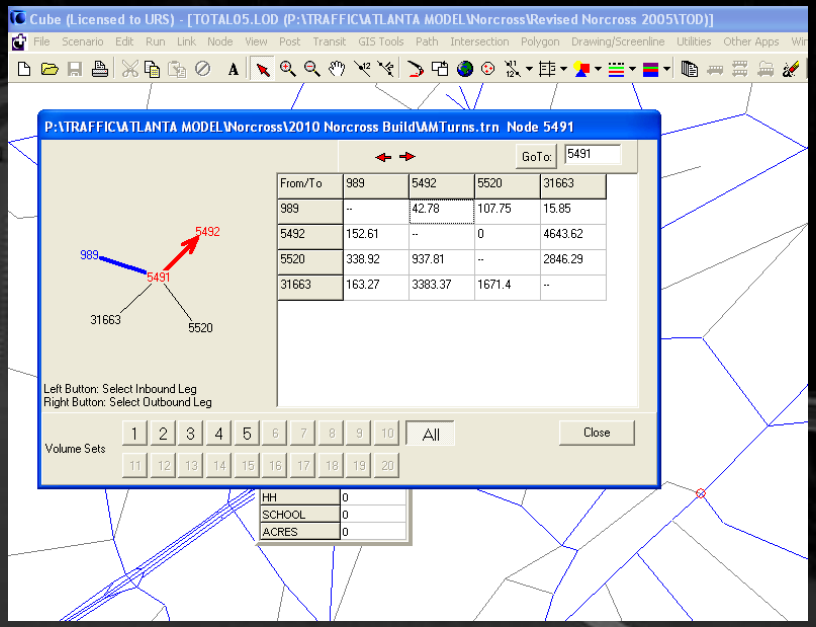
Traffic Forecasting Applications

- Design traffic incorporates model data as well as traffic factors
  - Truck factors
  - K factors (peak to daily ratio during design hour)
  - D factors (directional factor during design hour)
- Traffic factors applied to AADT volumes to determine DHV
  - Segments = simple
  - Intersections = challenging
  - Grid systems = rocket science

URS

Traffic Forecasting Applications

- Intersections and systems need variety of detail regarding traffic distributions
  - Turns
  - Select Links/Zones
- Measure magnitude of change in distribution for application to existing/no-build scenarios to quantify potential build changes (ratio method)



Other Applications

- Changes in travel time application to speed/delay runs
- Transit ridership
- Travel patterns
- O/D changes – validate model to O/D and apply model changes across scenarios/years

Questions?

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