

# City Mobility Planning

## Phase I

Planning Commission Workshop

February 19, 2009



# Partners

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**Houston-Galveston Area Council**

## Consultant Team



**Kimley-Horn  
and Associates, Inc.**





# City Planning Commission – Guiding Principles

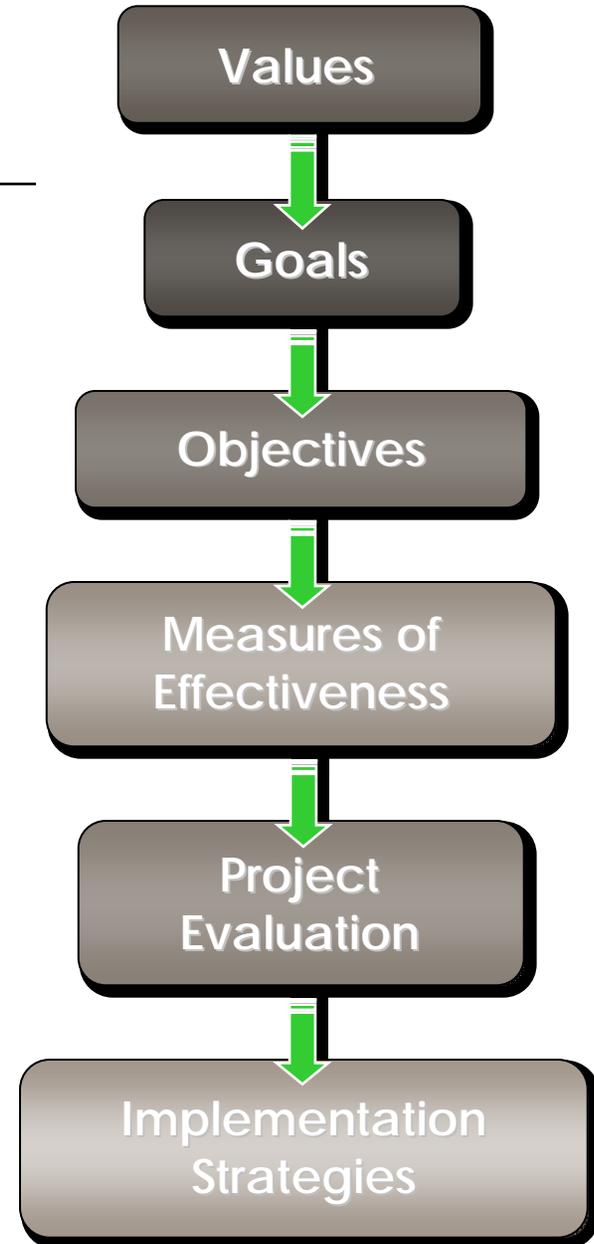
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- **Mobility**
- **Costs**
- **Access**
- **Right-of-Way Standards**
- **Neighborhood Concerns**
- **Major Thoroughfare & Freeway Plan**
- **Non-Structural Approaches**



# CMP Process

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# Measures of Effectiveness

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- Level of Service
- Vehicle Miles of Travel
- Vehicle Hours of Travel
- System Delay
- 45-Minute Travel Time Skim



# Mobility Toolbox

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- Technical Modeling Tools
- Technical Operations Tools
- Technical Planning Tools



# Multi-Modal Street Design

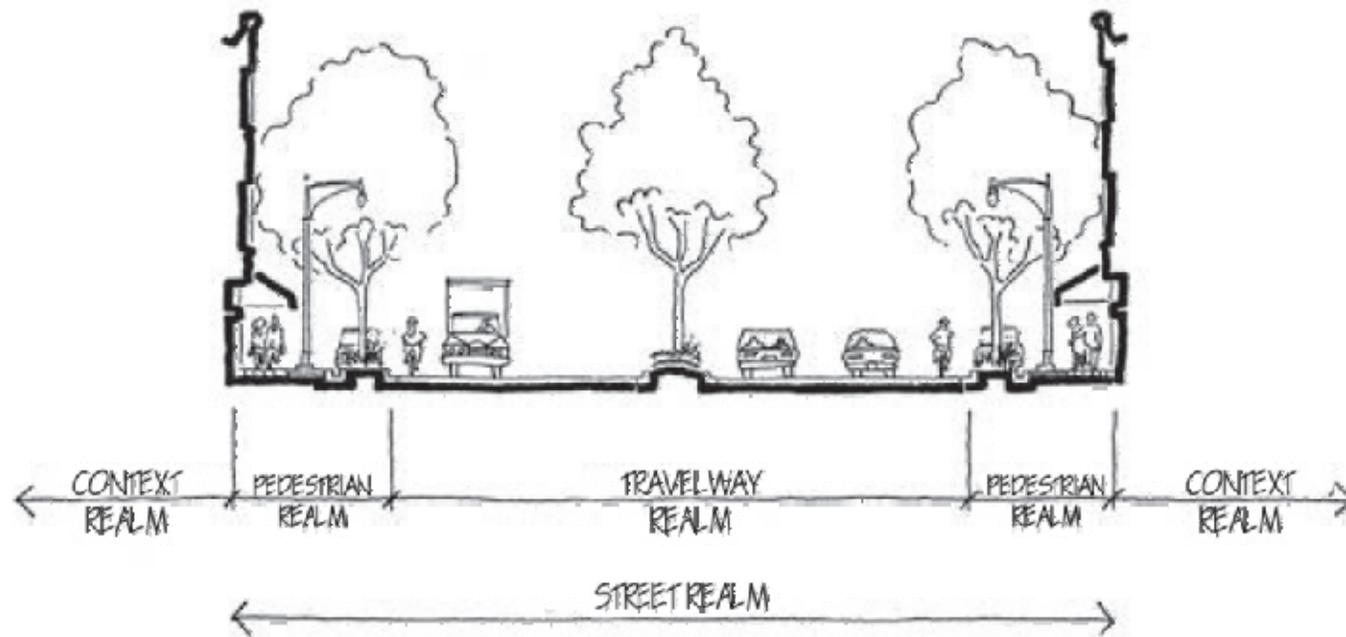
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The principles of multi-modal street design ensure that a street:

- Satisfies the purpose and needs of stakeholders;
- Is safe for users and the community;
- Involves the efficient and effective use of resources;
- Is designed and built with minimal disruption to the community;
- And has a lasting value to the community.

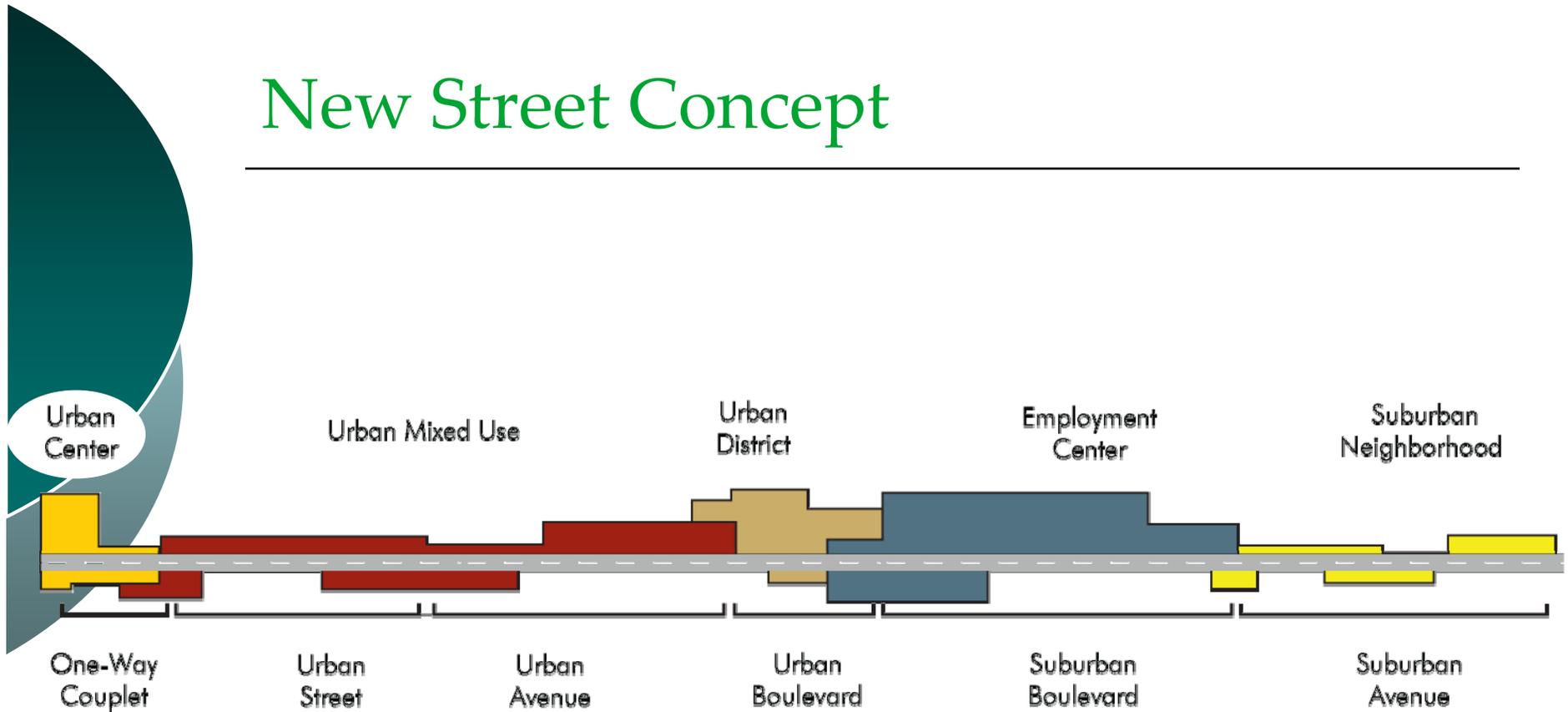
# Street Realm

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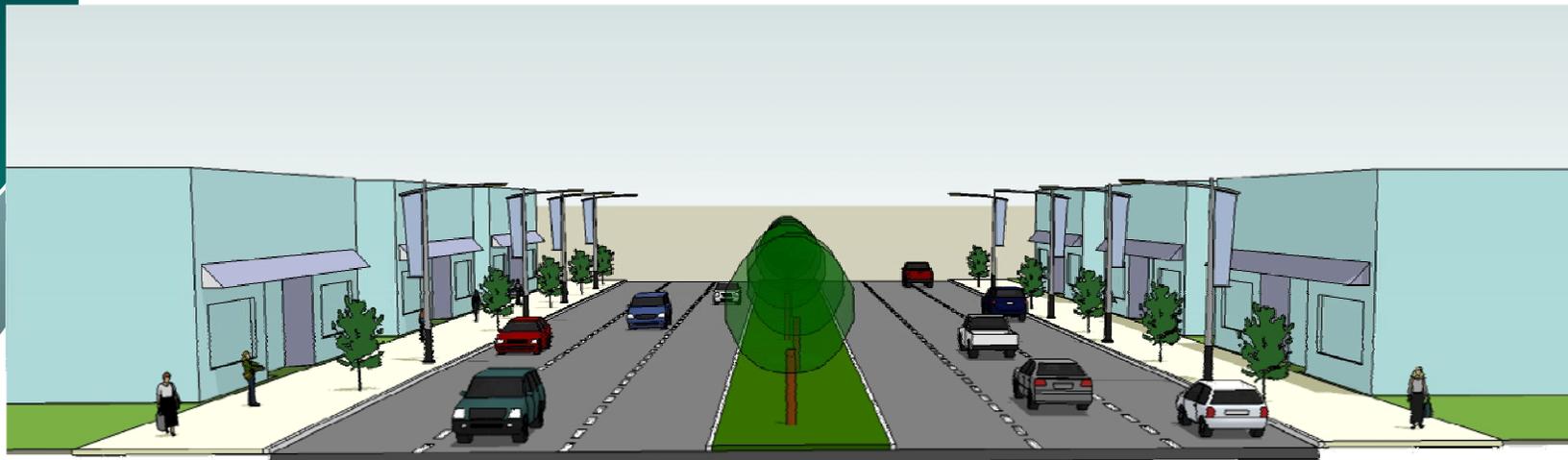


# New Street Concept

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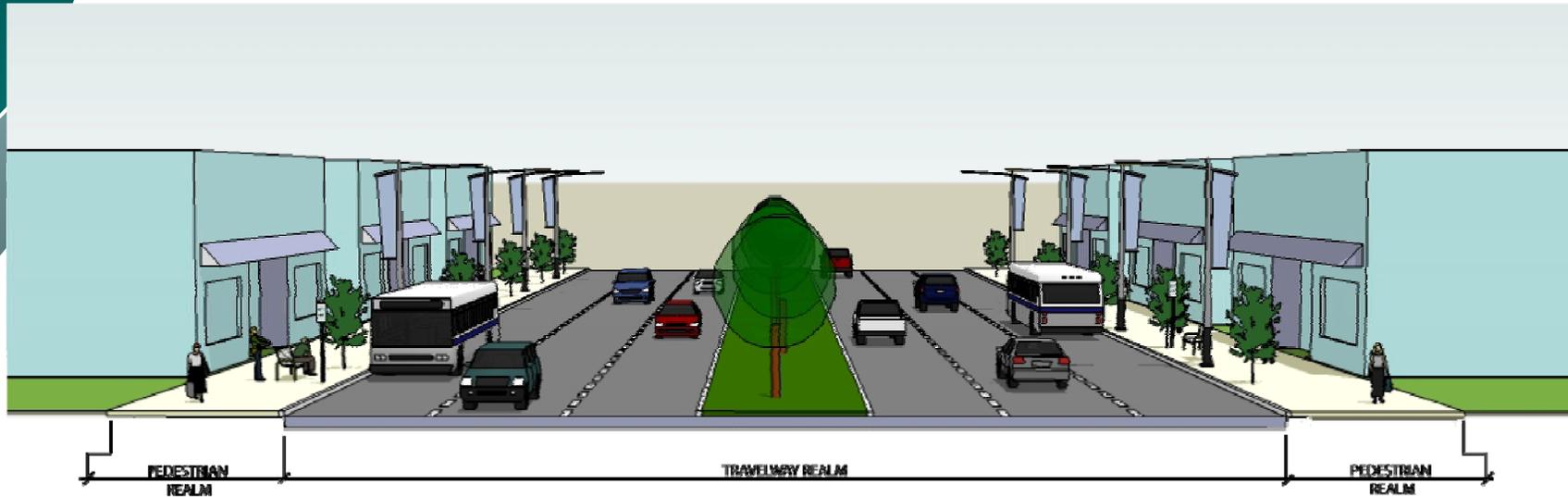
# Urban Boulevard



R.O.W.	Offset	Sidewalk*	Tree or Swale	Lane	Lane	Lane	Lane	Median*	Lane	Lane	Lane	Lane	Tree or Swale	Sidewalk*	Offset	ADT	
140'	0	10'	TW	12'	12'	12'	12'	24'	12'	12'	12'	12'	TW	10'	0	20,000-50,000	
120'	0	16'	TW	N/A	12'	12'	12'	16'	12'	12'	12'	Bike Lane	Tree or Swale	Sidewalk*	0	ADT	
	0	12'	TW	N/A				24'				N/A	TW	16'			15,000
	0	10'	TW	6'				16'				6'	TW	10'			40,000
100'	0	16'	TW	N/A	12'	12'	12'	20'	12'	12'	12'	Bike Lane	Tree or Swale	Sidewalk*	0	ADT	
	0	18'	TW	N/A				16'				N/A	TW	16'			15,000
	0	12'	TW	6'				16'				6'	TW	12'			30,000
	0	12'	TW	6'				16'				6'	TW	12'			0

\* Curb width of 0.5' is included

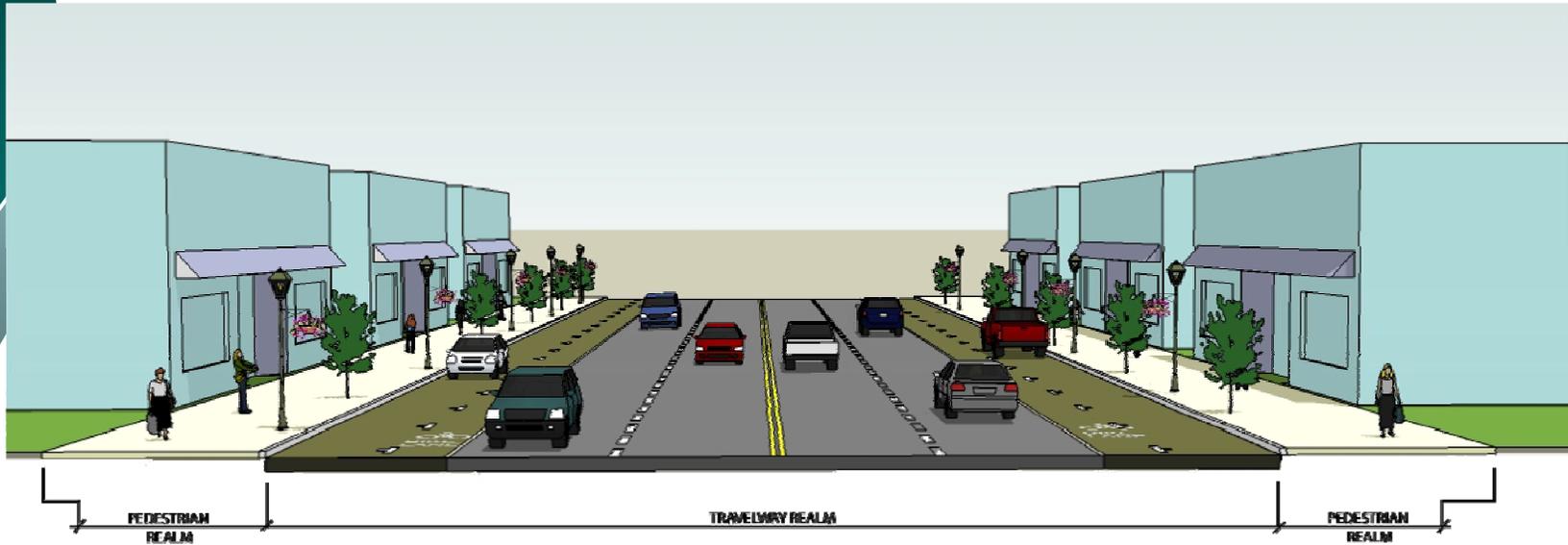
# Transit Street - Boulevard



R.O.W.	Offset	Sidewalk*	Tree or Swale	Bike Lane	Lane	Lane	Median*	Lane	Lane	Bike Lane	Tree or Swale	Sidewalk*	Offset	ADT
120'	0	22'	TW	N/A	12'	12'	28'	12'	12'	N/A	TW	22'	0	15,000-
	0	16'	TW	6'						6'	TW	16'	0	30,000
170'	0	15'	TW	13'	17'	17'	16'	17'	17'	13'	TW	15'	0	15,000-
	0	13'	TW				20'				TW	13'	0	30,000

\* Curb width of 0.5' is included

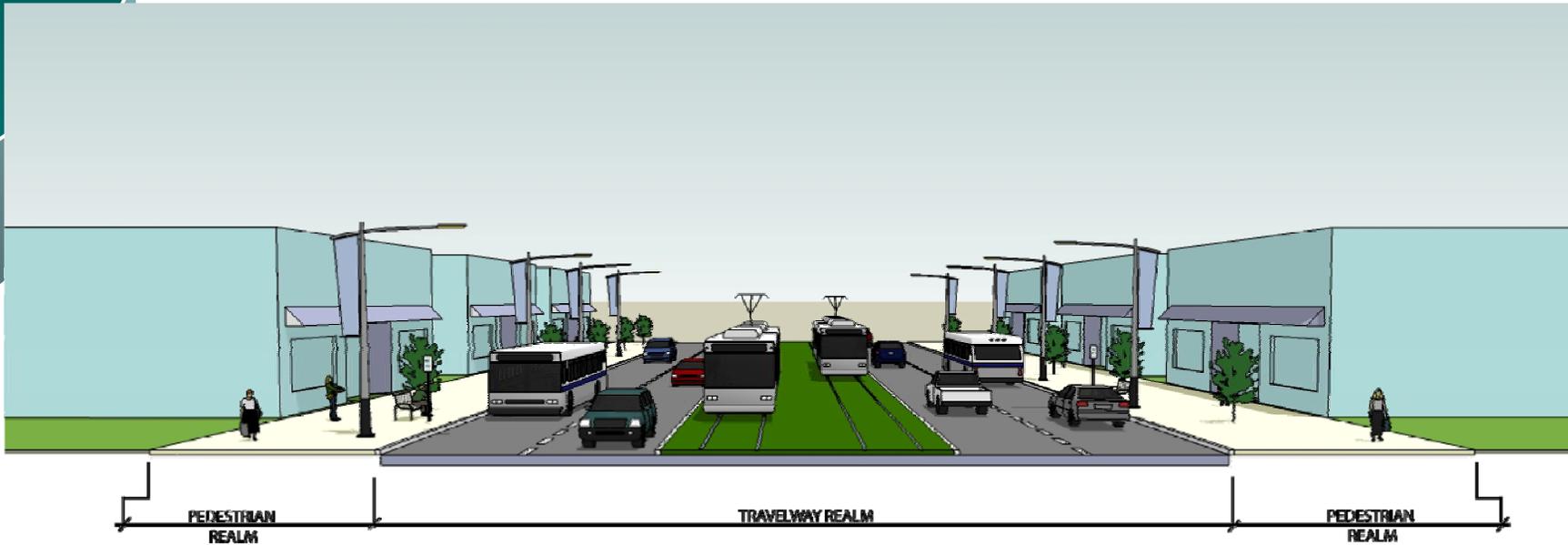
# Urban Avenue



R.O.W.	Offset	Sidewalk*	Tree or Swale	Parking	Bike Lane	Lane	Lane	Lane	Lane	Bike Lane	Parking	Tree or Swale	Sidewalk*	Offset	ADT
100'	0	16'	TW	8'	5'	12'	12'	12'	12'	5'	8'	TW	16'	0	10,000-30,000
	0	20'	TW	N/A	6'					6'	N/A	TW	20'	0	
	0	16'	TW	N/A	N/A					N/A	N/A	TW	16'	0	
	0	8'	TW	8'	N/A					N/A	8'	TW	8'	0	
80'	0	10'	IW	N/A	6'	12'	14'	12'	6'	N/A	IW	10'	0	1,500-15,000	
	0	21'	TW	N/A	N/A				N/A	N/A	TW	21'	0		
	0	13'	TW	8'	N/A				N/A	13'	TW	13'	0		
	0	8'	TW	8'	5'				5'	8'	TW	8'	0		
80'	0	15'	TW	N/A	6'	12'	12'	12'	6'	N/A	TW	15'	0	1,500-15,000	
	0	20'	TW	8'	N/A				N/A	N/A	TW	20'	0		
	0	10'	TW	18'	N/A				N/A	18'	TW	10'	0		
	0	15'	TW	8'	5'				5'	8'	TW	15'	0		
	0	6'	TW	18'	5'				5'	18'	TW	6'	0		
	0	22'	TW	N/A	6'				6'	N/A	TW	22'	0		

\* Curb width of 0.5' is included

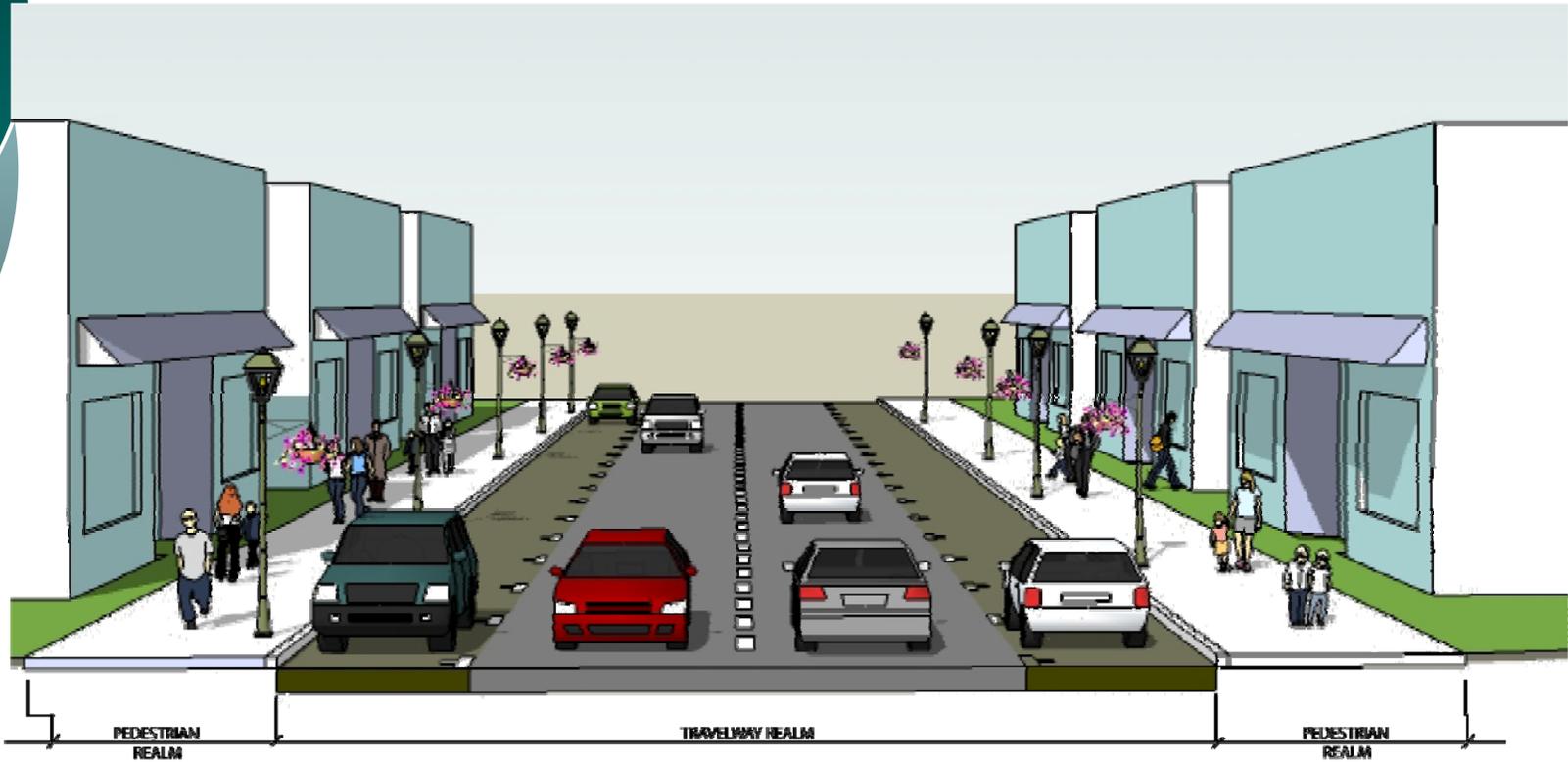
# Transit Street - Avenue



R.O.W.	Offset	Sidewalk*	Tree or Swale	Parking	Bike Lane	Lane	Lane	Median*	Lane	Lane	Bike Lane	Parking	Tree or Swale	Sidewalk*	Offset	ADT
100	0	12'	TW	N/A	N/A	12'	12'	28'	12'	12'	N/A	N/A	TW	12'	0	15,000
90	0	13'	TW	N/A	6'	12'	12'		6'	N/A	TW	13'	0	30,000		
	0	11'	TW	8'	N/A					N/A	8'	TW	11'	0		

\* Curb width of 0.5' is included

# Urban Street

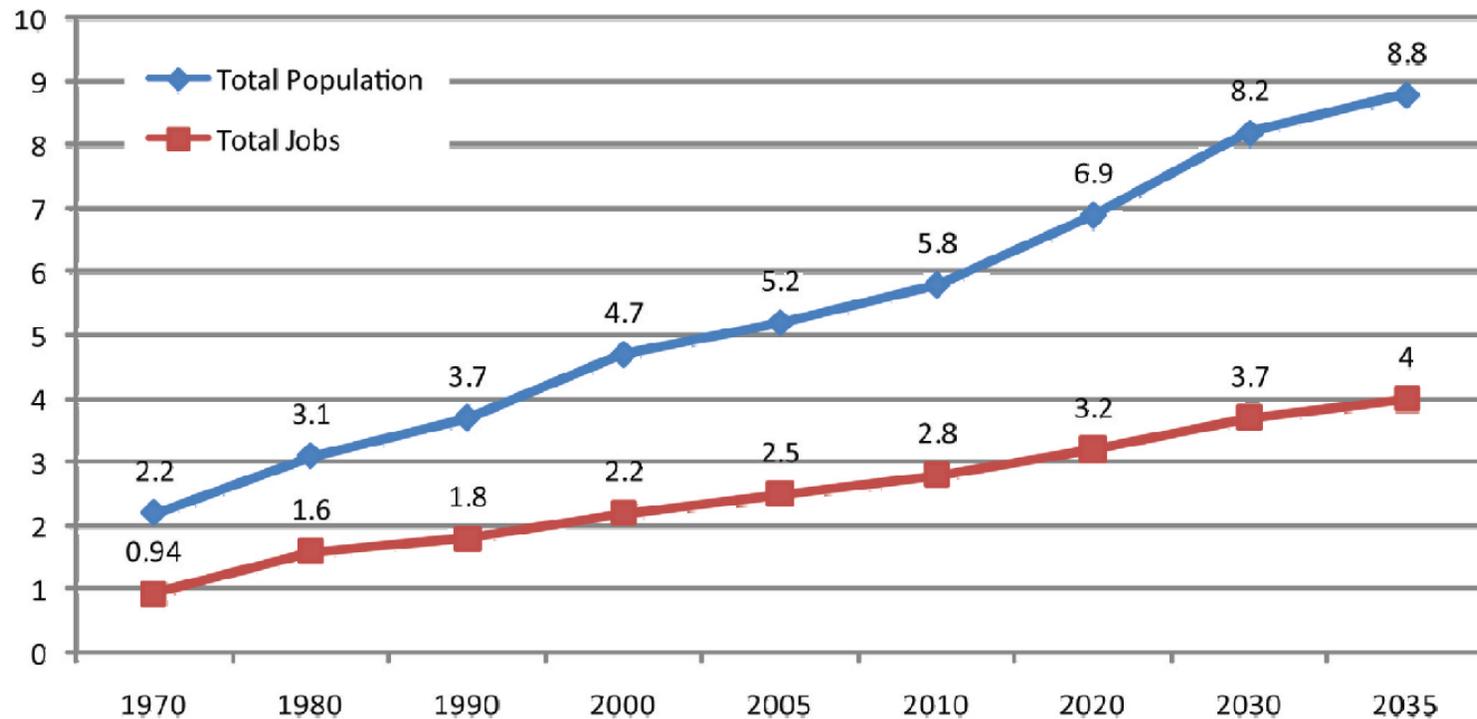


R.O.W.	Offset	Sidewalk*	Tree or Swale	Parking	Bike Lane	Lane	Lane	Bike Lane	Parking	Tree or Swale	Sidewalk*	Offset	ADT
60'	0	18'	TW	N/A	N/A	12'	12'	N/A	N/A	TW	18'	0	1,000-10,000
	0	10'	TW	8'	N/A			N/A	8'	TW	10'	0	
	0	12'	TW	N/A	6'			6'	N/A	TW	12'	0	
	0	5'	TW	8'	5'			5'	8'	TW	5'	0	

\* Curb width of 0.5' is included

# Houston Galveston Area Population & Employment Growth

Houston Galveston Region Historical and Projected  
Future Growth (in Millions)





# Travel Demand Model

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- **Travel Demand Modeling**
  - Trip Generation
  - Trip Distribution
  - Modal Split
  - Network Assignment

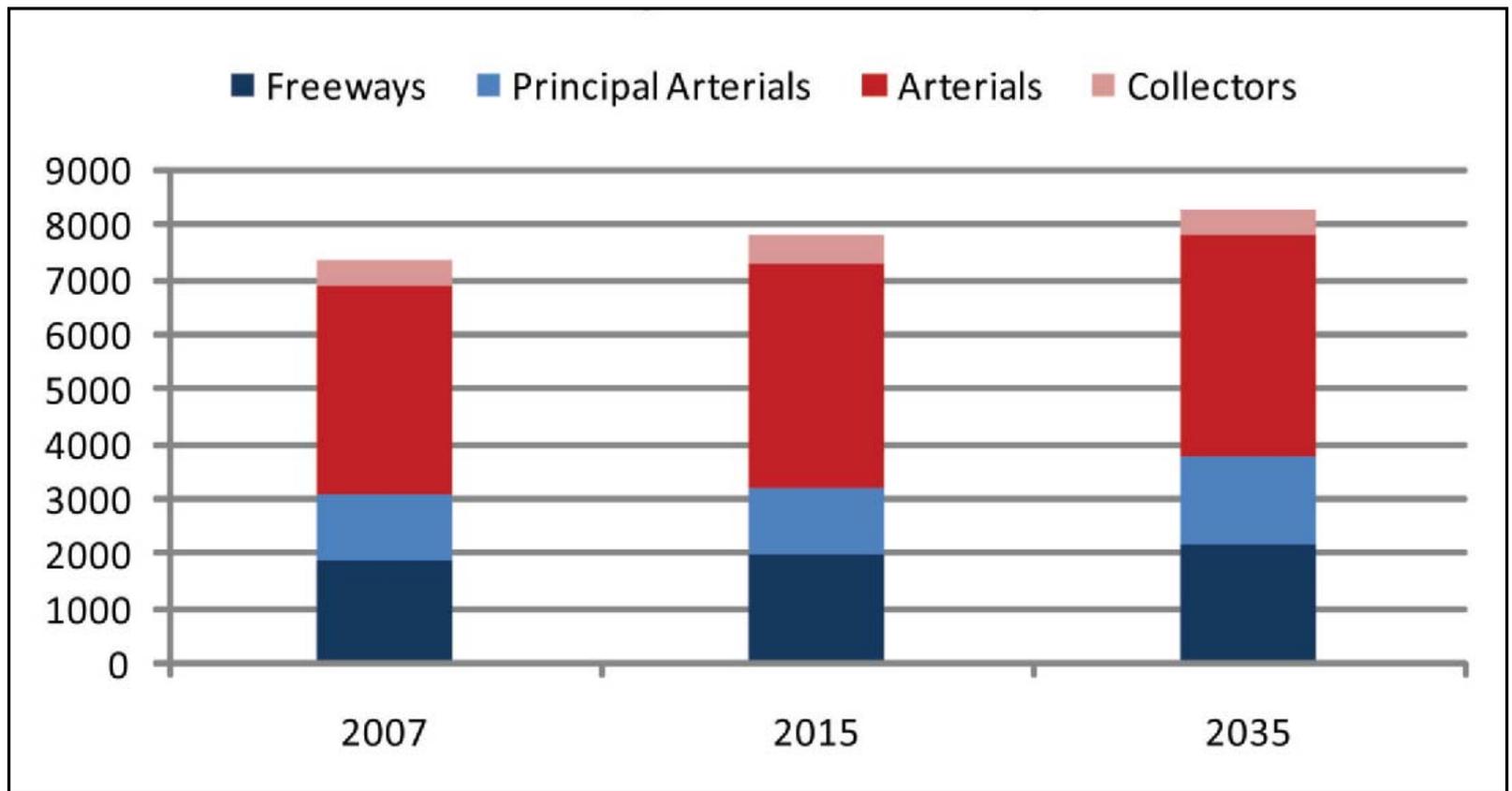


# Travel Demand Model Horizons

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- **2007**
  - Base Year
  - Existing Street Network & Demographics
- **2015**
  - 2009-2013 City Capital Improvement Plan (CIP)
  - 2008-2011 H-GAC Transportation Improvement Program (TIP)
  - Metro Solutions
- **2035**
  - H-GAC 2035 Regional Transportation Plan (RTP)

# Street Mileage within City Limits









## Boom in City & ETJ

Houston Population	2007	2035	Change
City	<b>2,158,000</b>	<b>2,708,000</b>	<b>+26%</b>
ETJ	<b>690,000</b>	<b>1,560,000</b>	<b>+127%</b>

Houston Employment	2007	2035	Change
City	<b>1,531,000</b>	<b>2,115,000</b>	<b>+39%</b>
ETJ	<b>160,000</b>	<b>320,000</b>	<b>+100%</b>



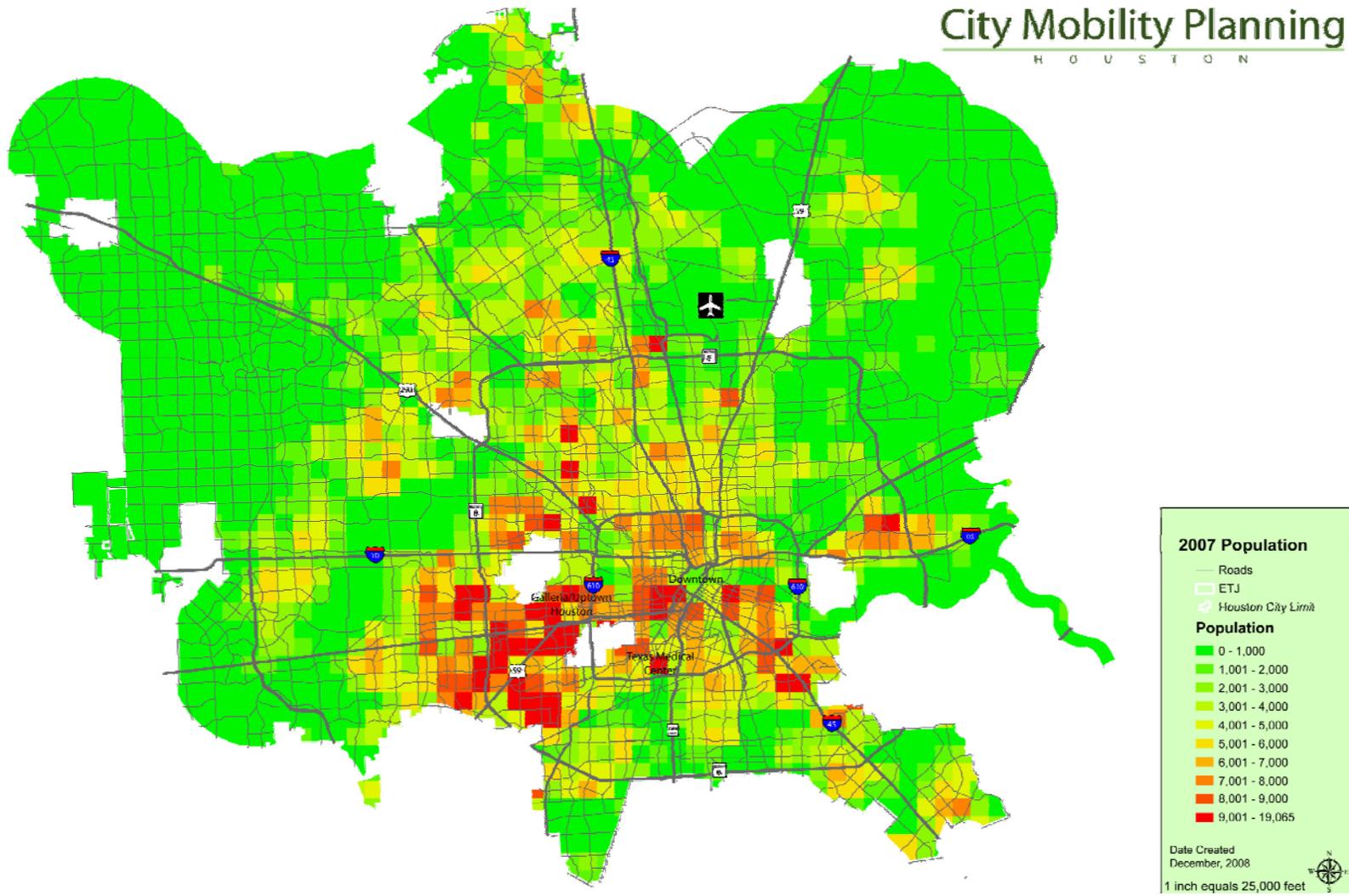
## Jobs – Housing Balance

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Jobs Per Resident	2007	2035	Change
City	.71	.78	+10%
ETJ	.24	.21	-13%

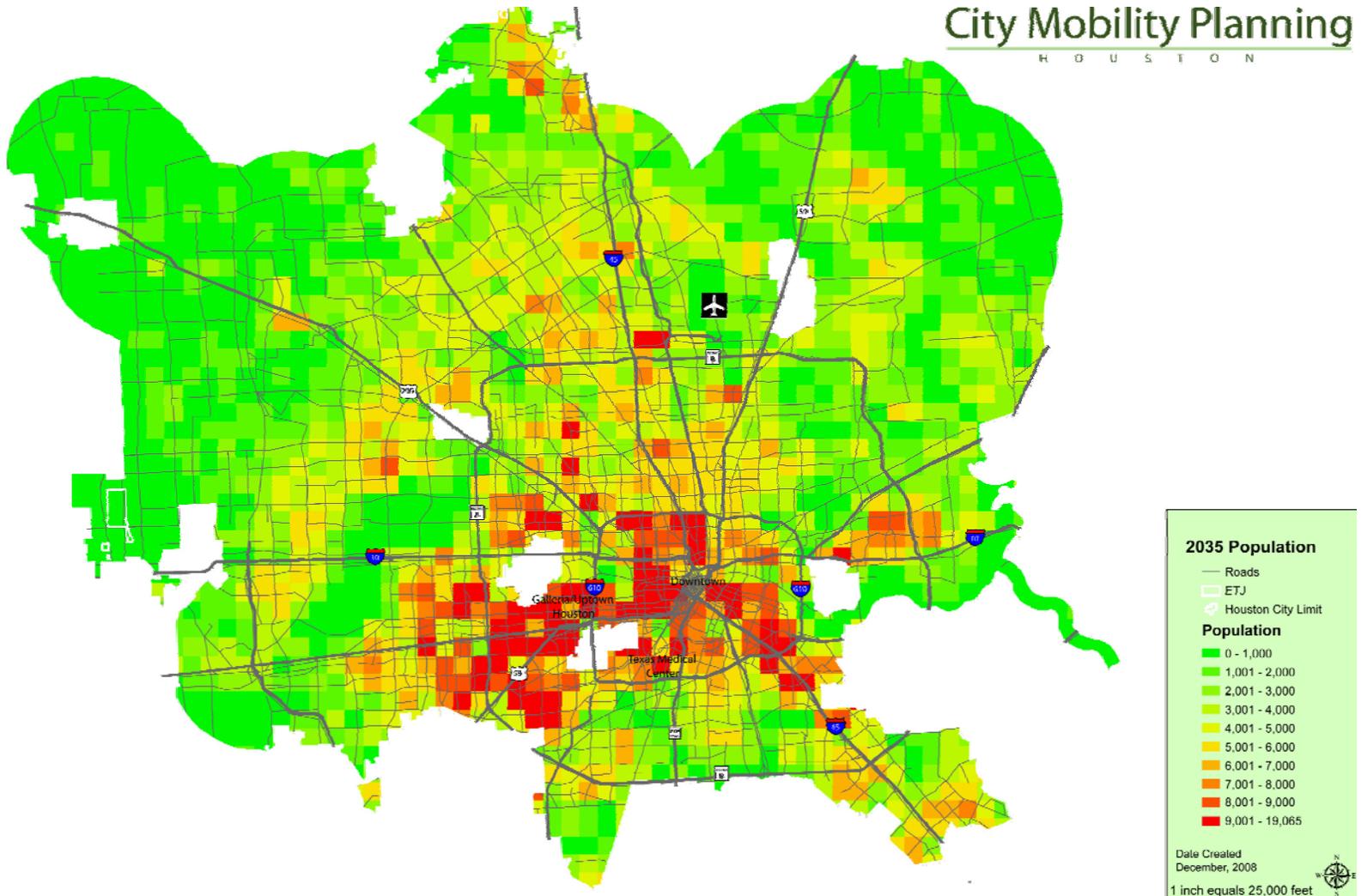
# 2007 Population Density

City Mobility Planning  
HOUSTON



# 2035 Population Density

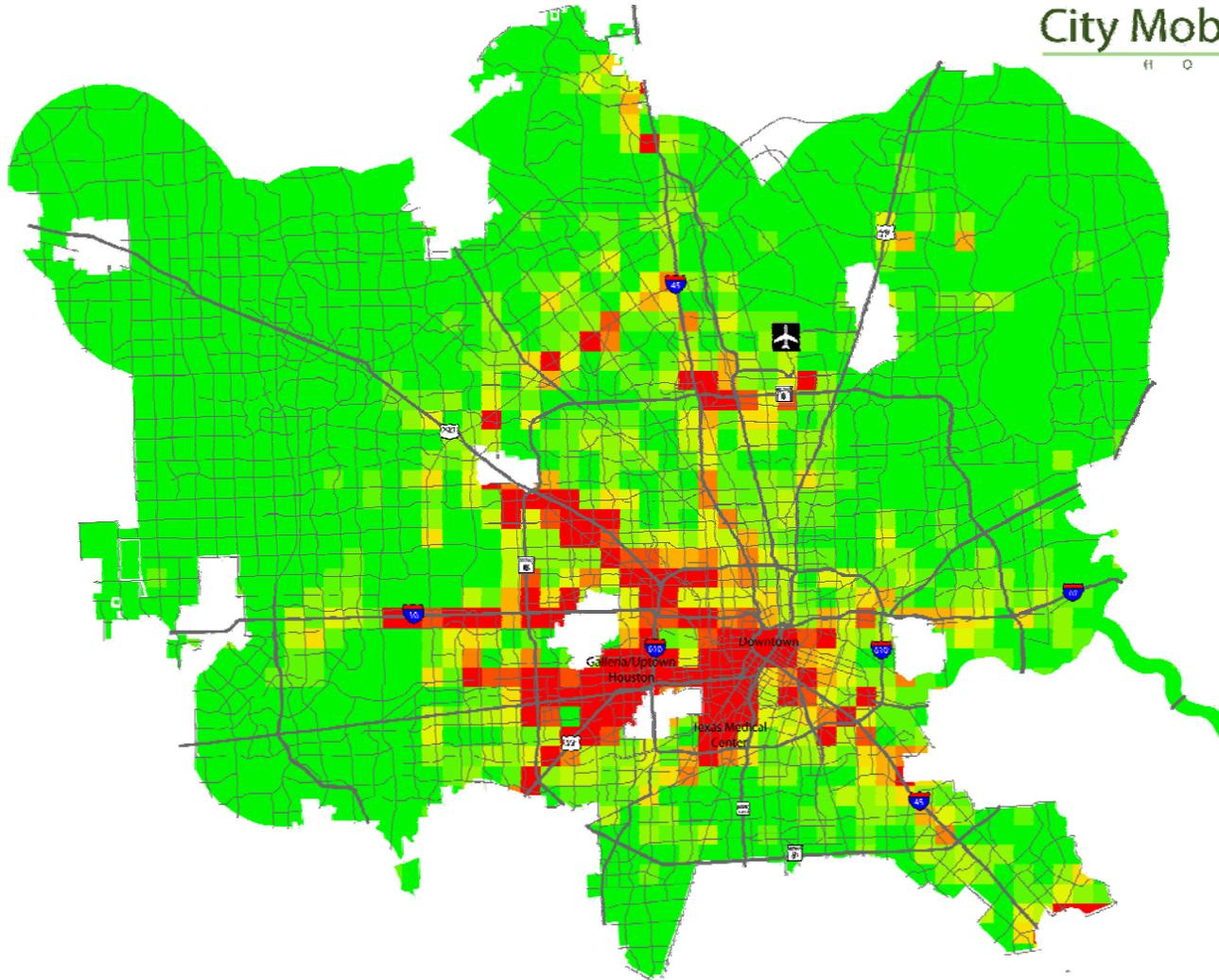
City Mobility Planning  
HOUSTON



# 2007 Employment Density

City Mobility Planning

H O U S T O N



## 2007 Employment

- Roads
- ETJ
- Houston City Limit

### Employment

- 0 - 500
- 501 - 1000
- 1001 - 1500
- 1501 - 2000
- 2001 - 2500
- 2501 - 3000
- 3001 - 3500
- 3501 - 4000
- 4001 - 4500
- 4501 - 111126

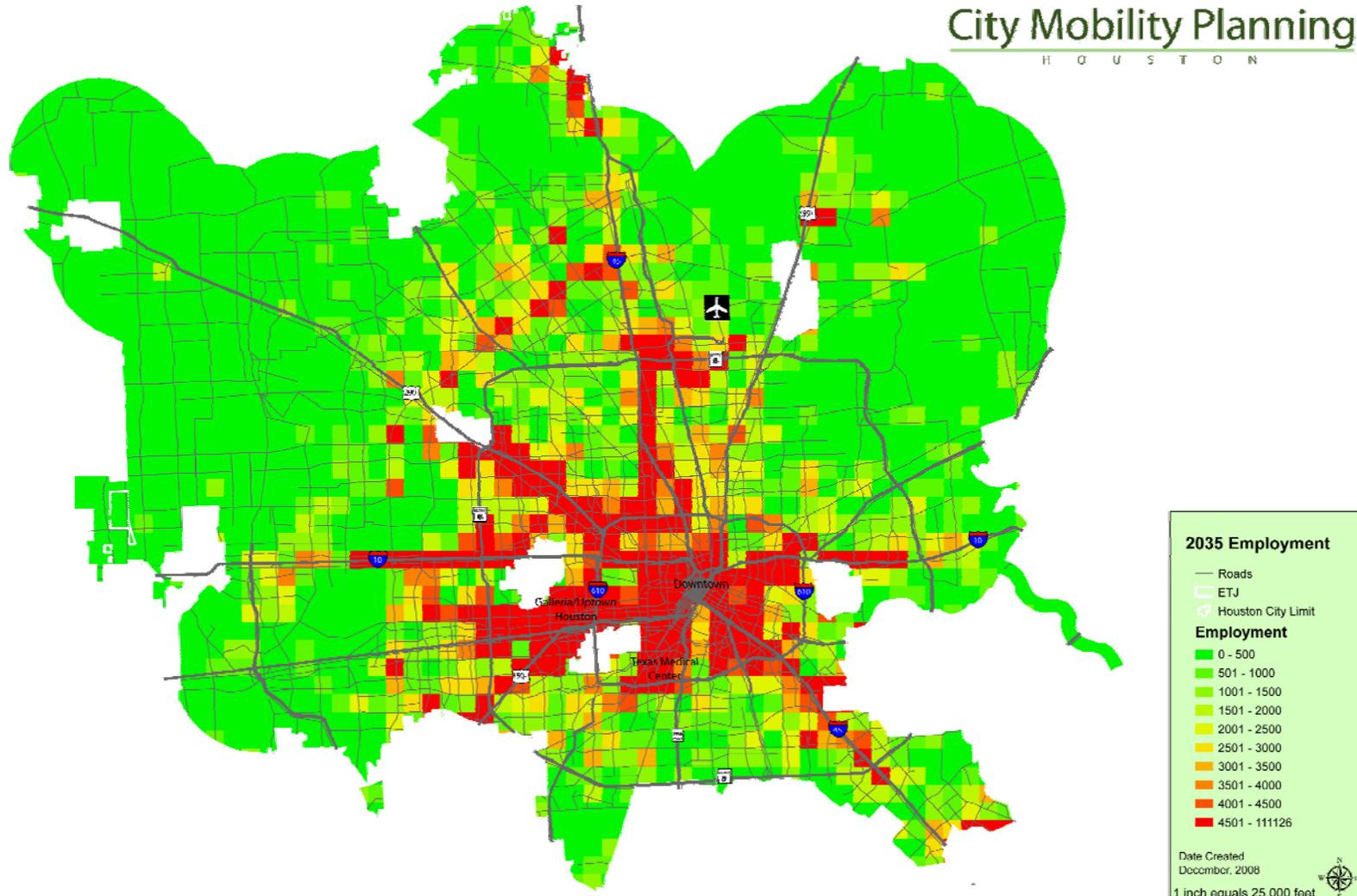
Date Created  
December, 2008

1 inch equals 25,000 feet



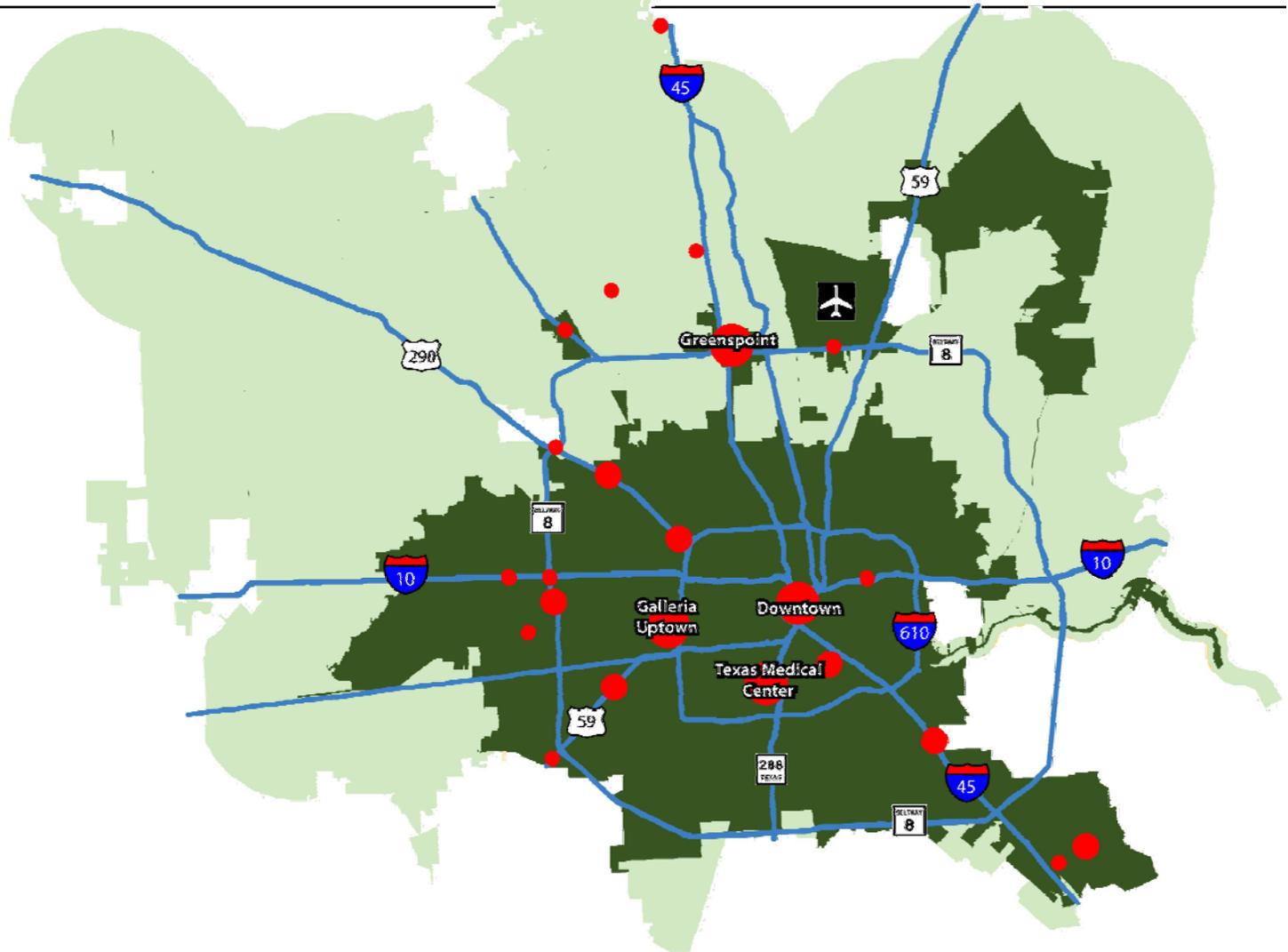
# 2035 Employment Density

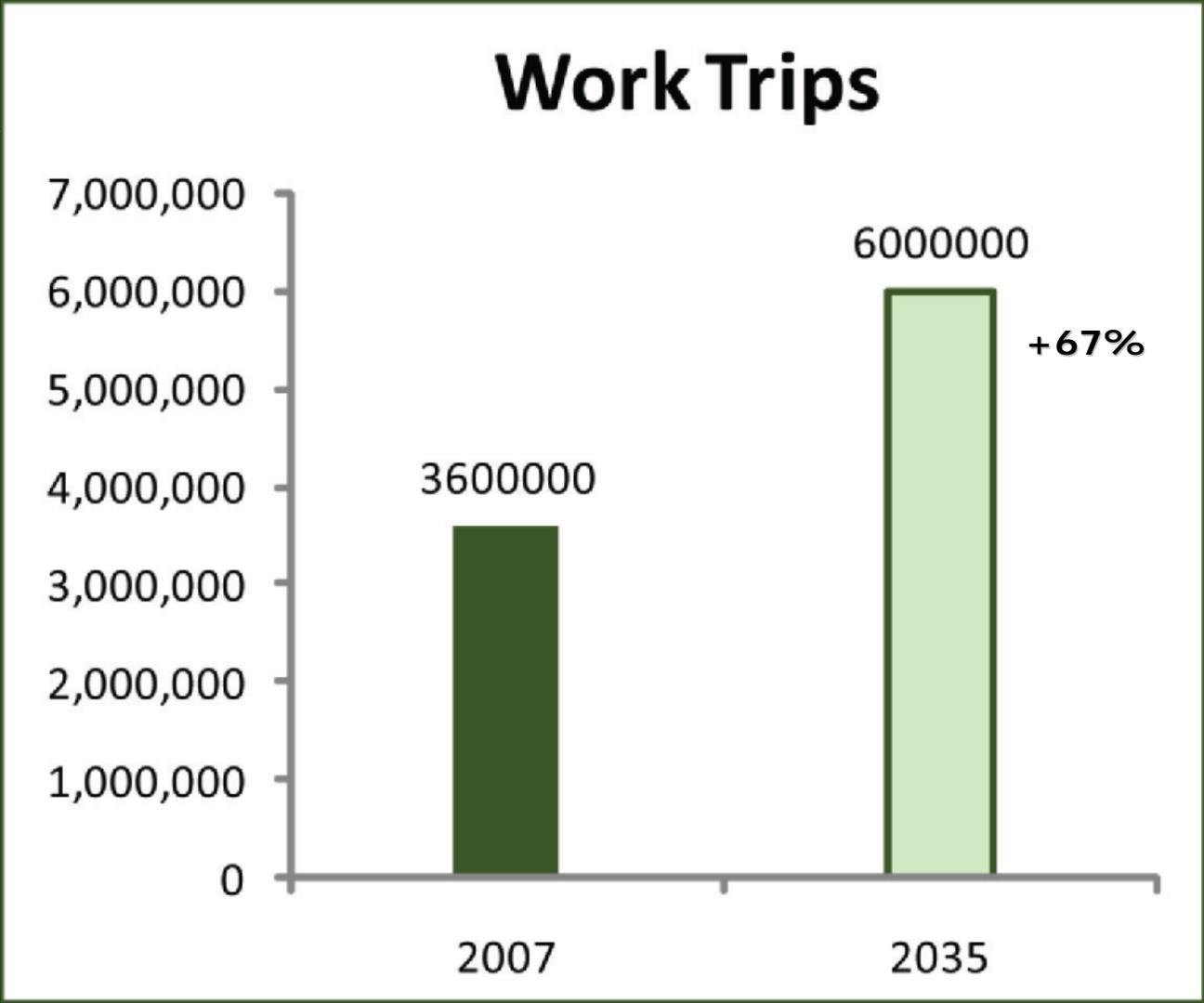
City Mobility Planning  
HOUSTON

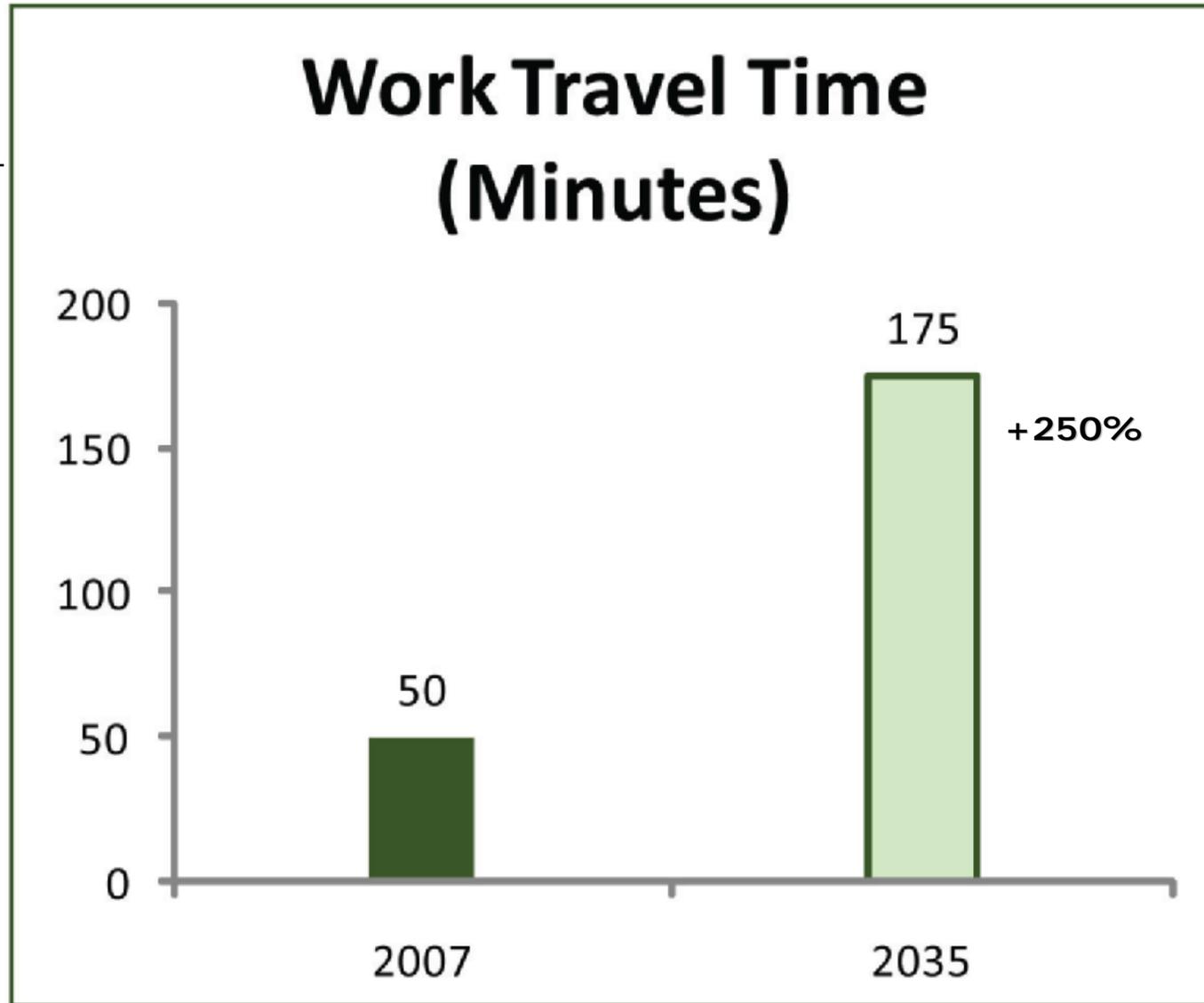


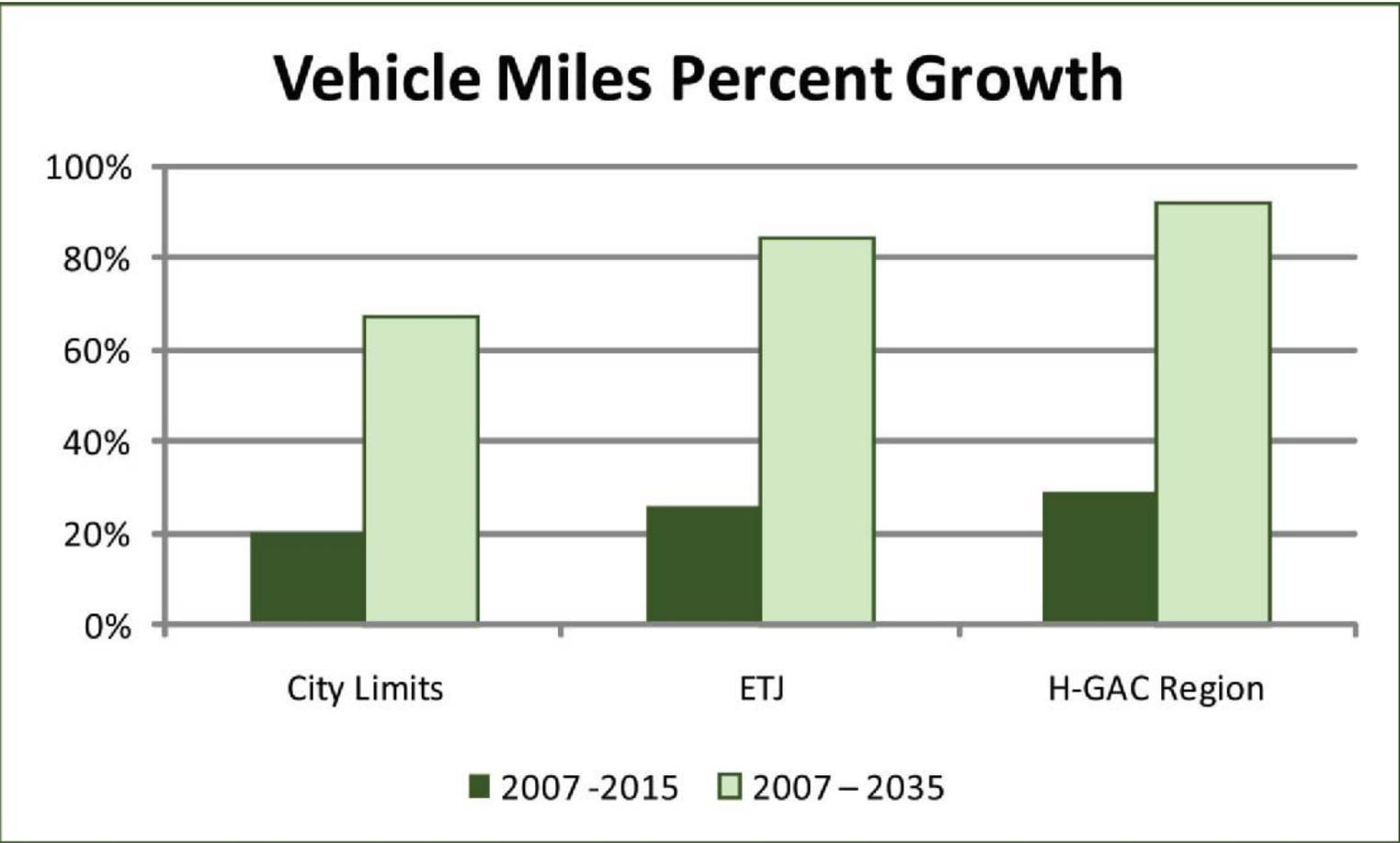
# City Centers

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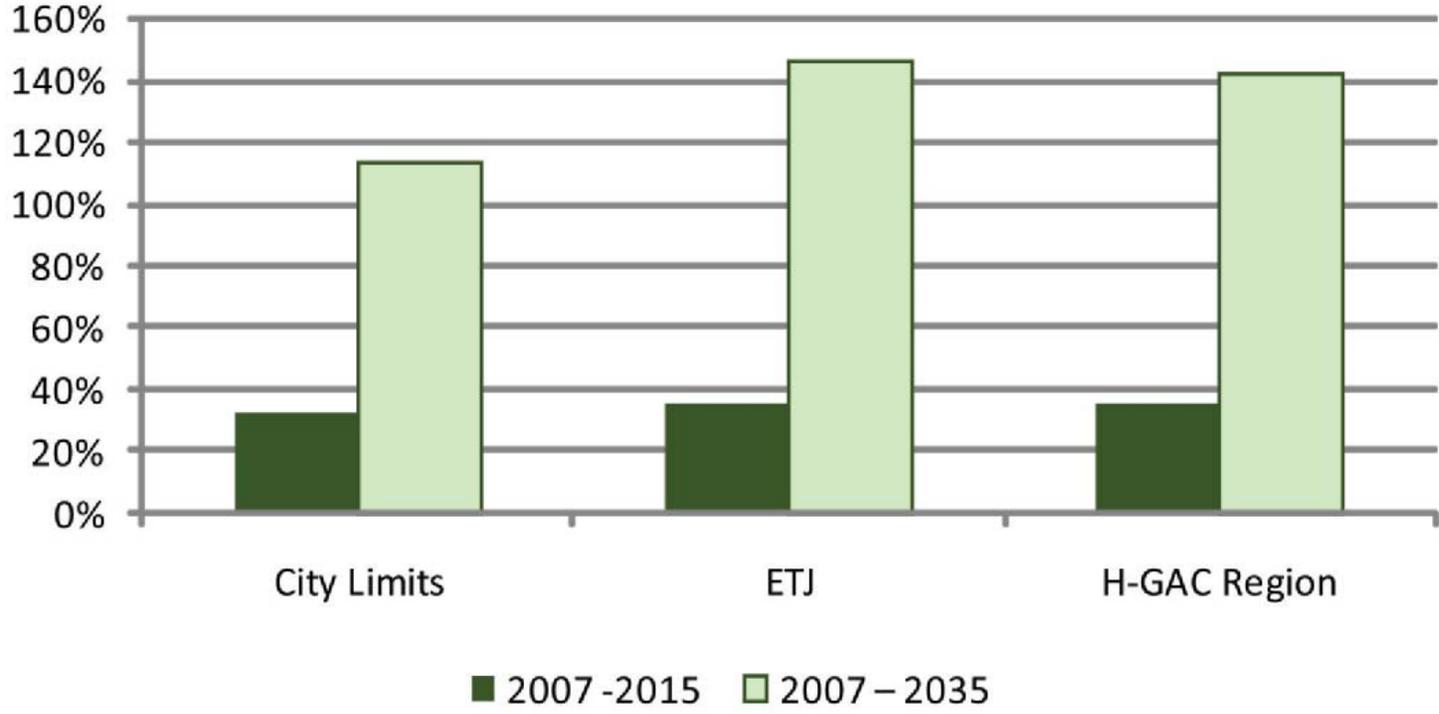








# Vehicle Hours Percent Growth



# Modal Split

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2007			2035		
Total Daily Trips	Transit Trips	Transit Share (%)	Total Daily Trips	Transit Trips	Transit Share (%)
<b>3,566,651</b>	<b>135,338</b>	<b>3.8%</b>	<b>5,970,666</b>	<b>195,689</b>	<b>3.3%</b>

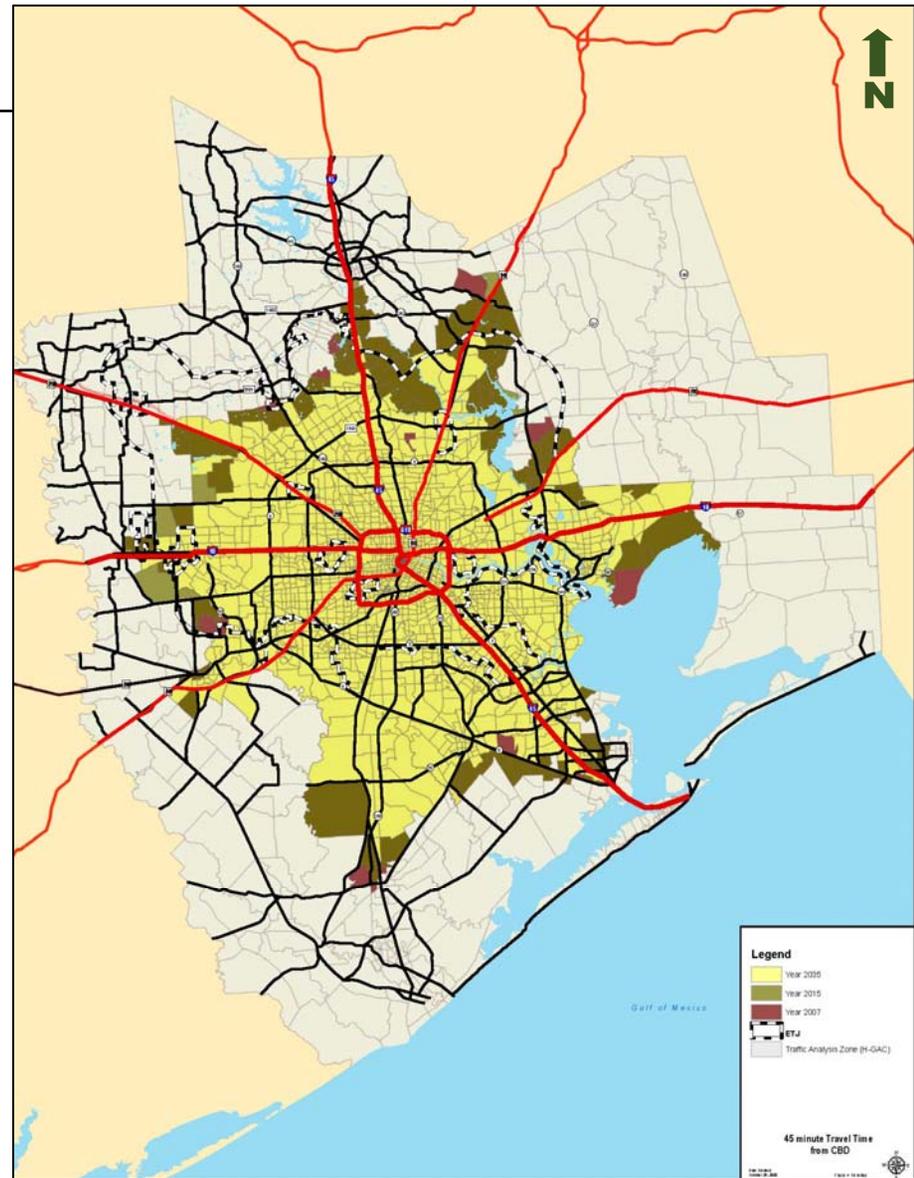


## TTI Mobility Performance Measures

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Performance Measures	1982	2005	Increase
Congested Travel	44%	73%	+66%
Congested System	31%	46%	+49%
Congested Time	6.0	7.6	+26%
Travel Time Index	1.19	1.36	+15%

# Travel Time Band – Downtown



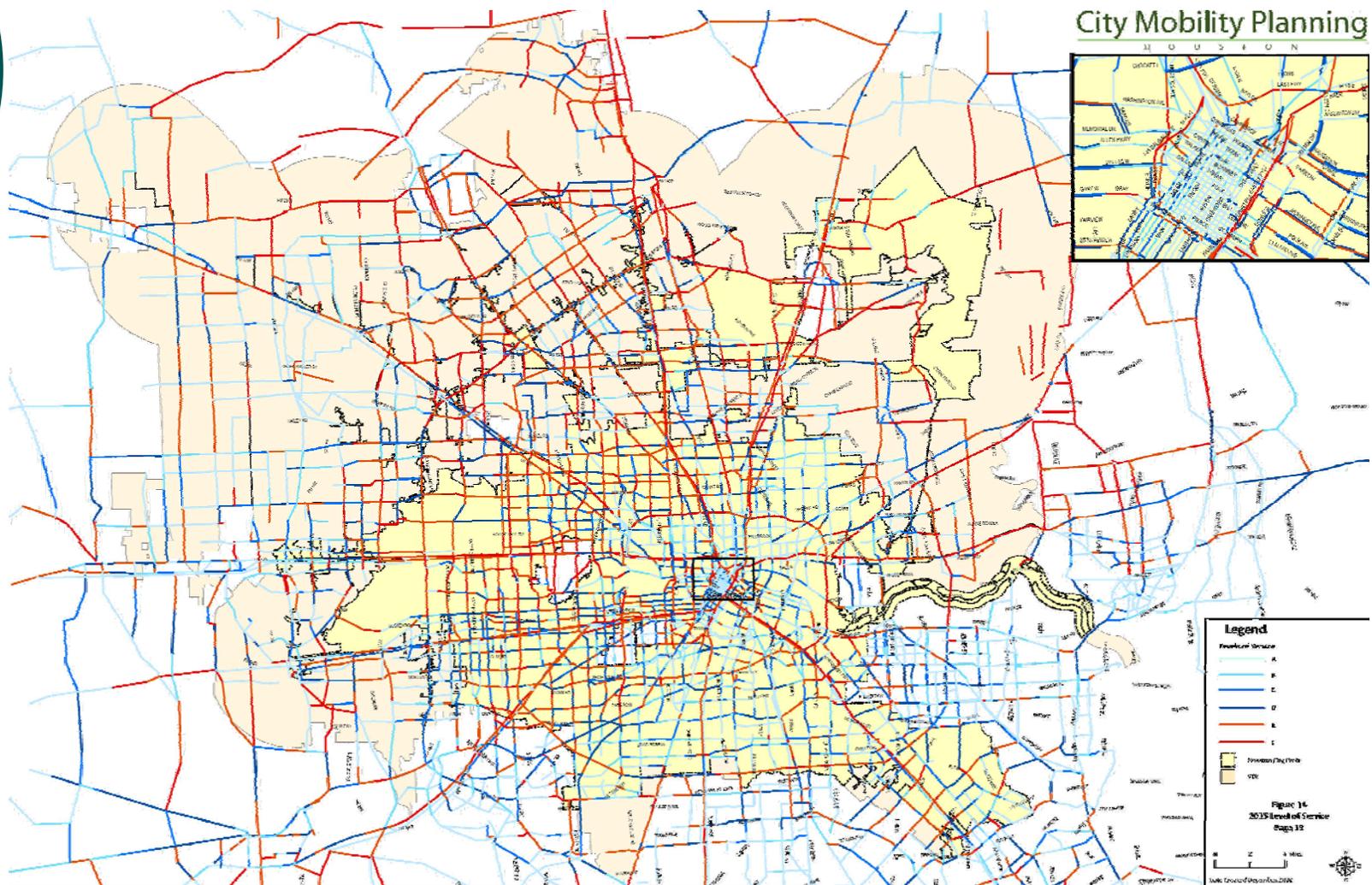
45 Minute Travel  
Time from CBD

## LOM / (v/c) / LOS

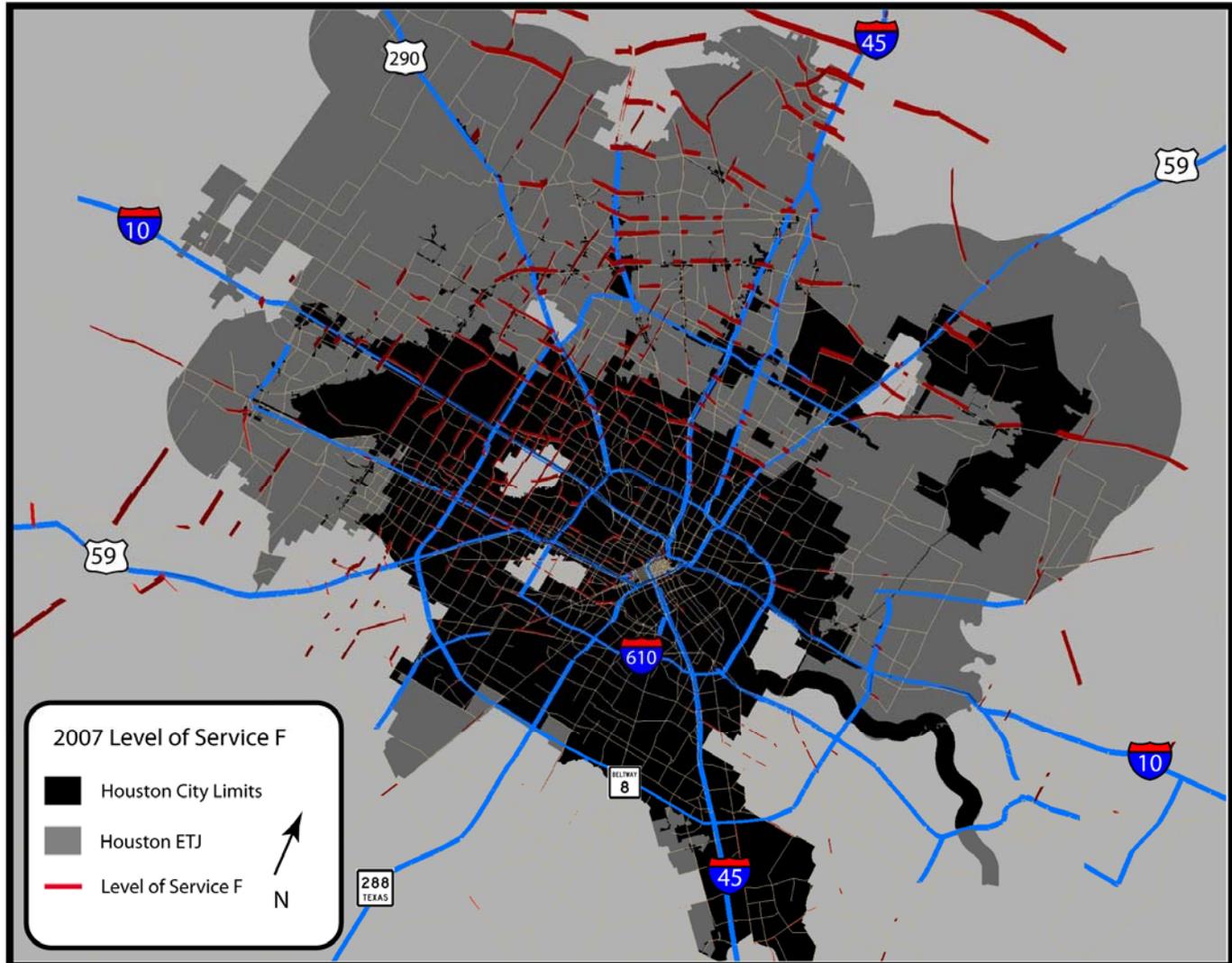
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Level of Mobility (LOM)	Volume-to-Capacity (v/c) Ratio	Level of Service (LOS)
<b>Tolerable</b>	<b>&lt;0.85</b>	<b>A, B, C, or D</b>
<b>Moderate</b>	<b>=0.85 but &lt;1.00</b>	<b>E</b>
<b>Serious</b>	<b>=1.00 but &lt;1.25</b>	<b>F</b>
<b>Severe</b>	<b>≥1.25</b>	<b>F</b>

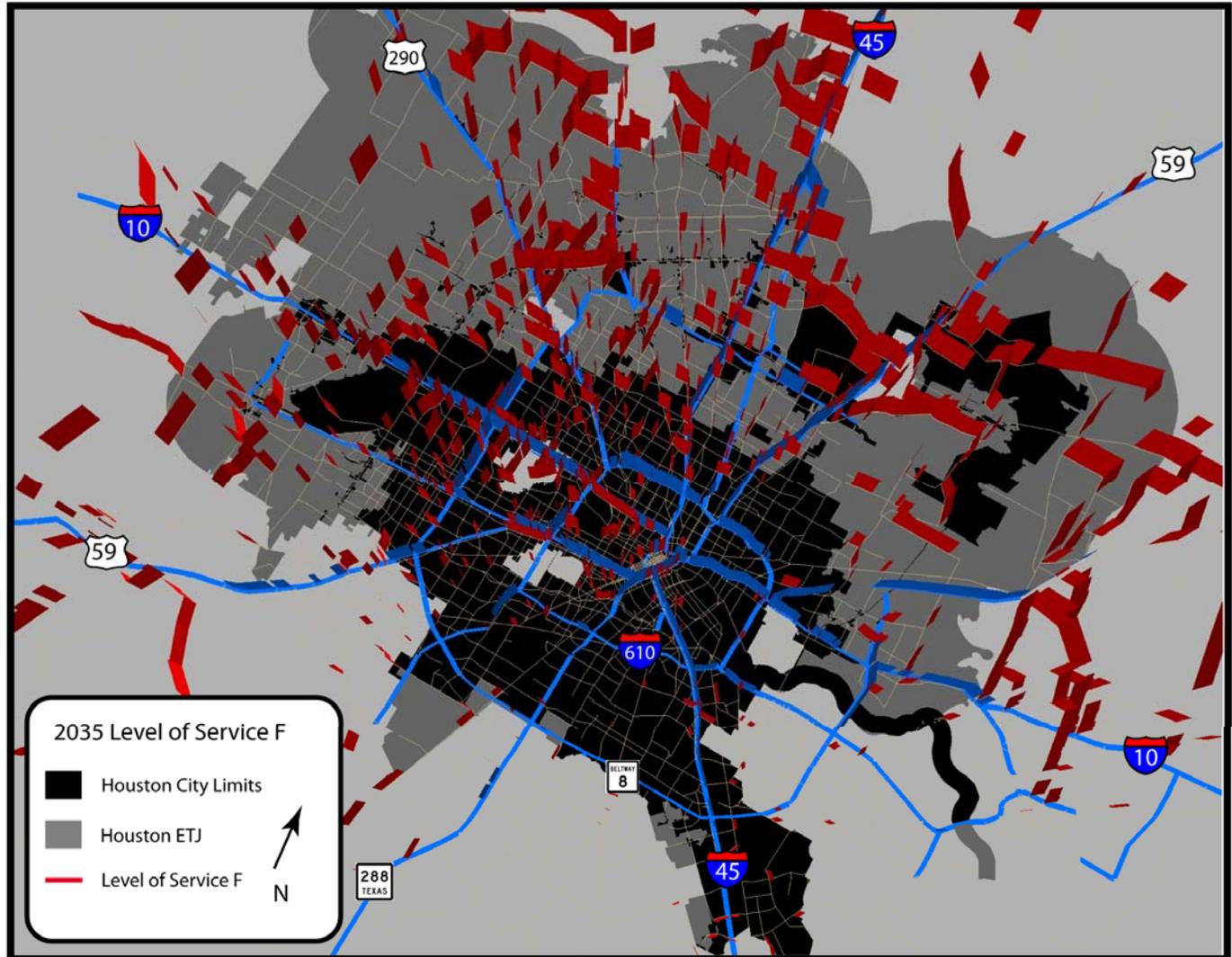
# 2035 LOS F (Average Daily Traffic)



# 2007 LOS F



# 2035 LOS F

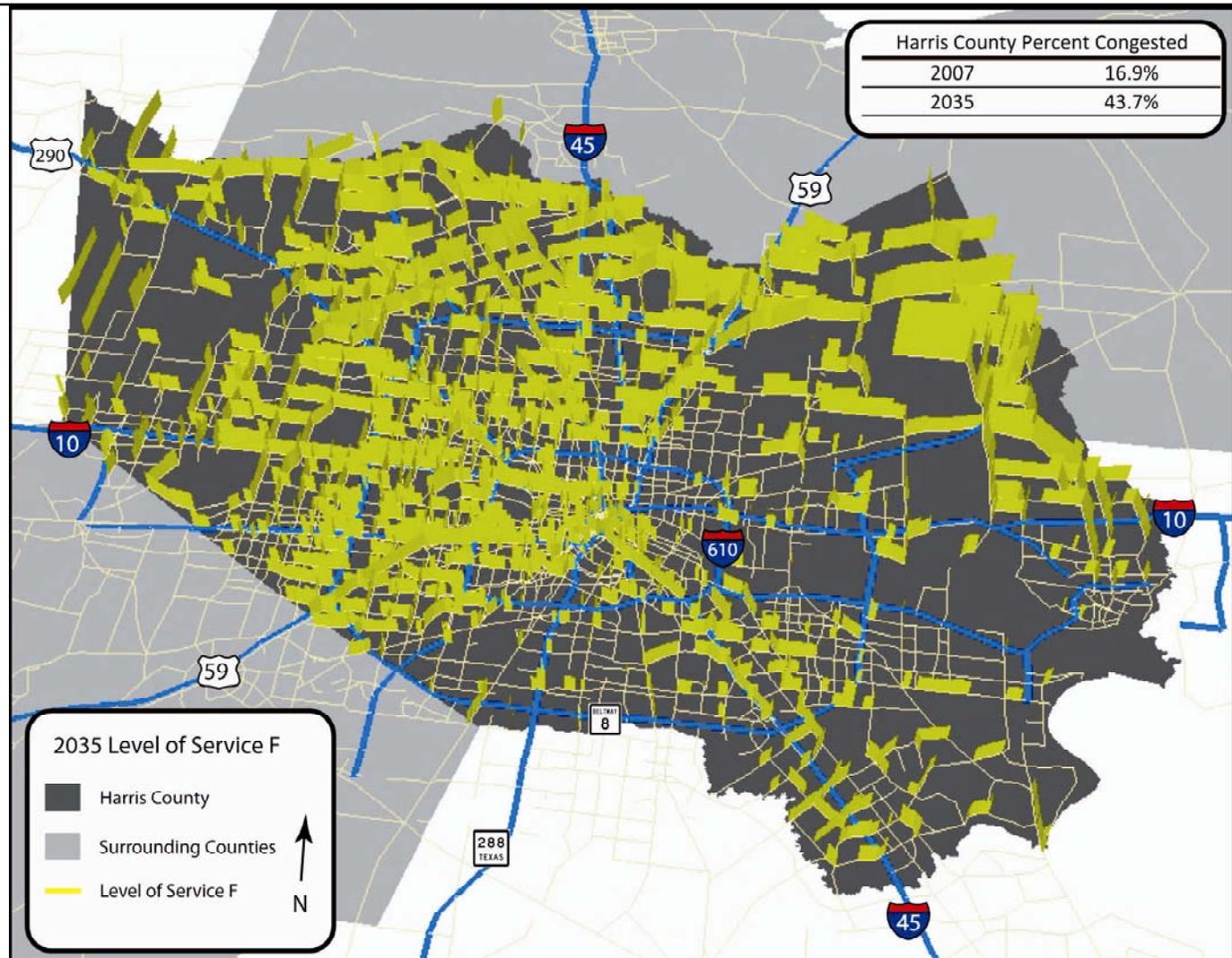


# Houston Area LOS F Congestion

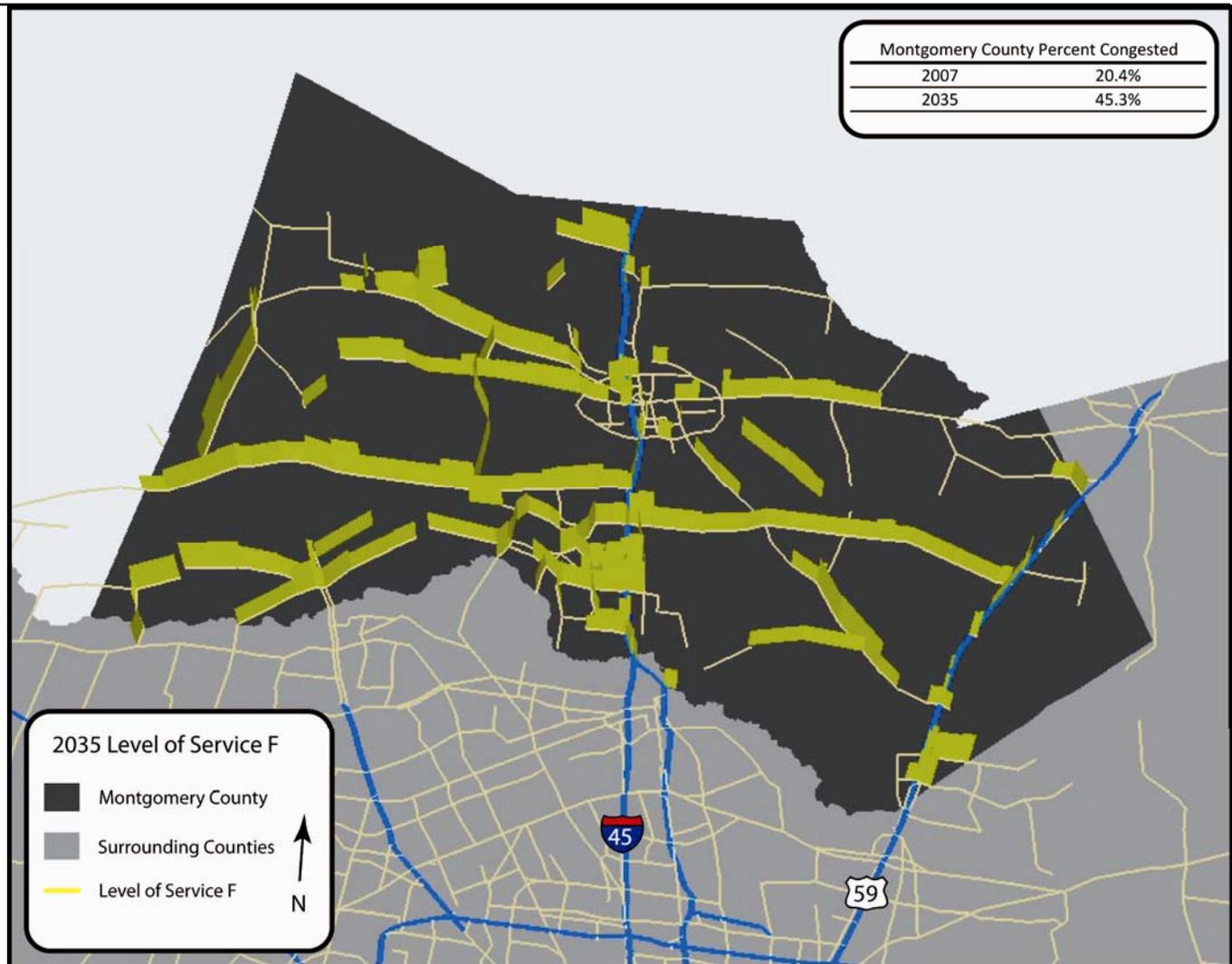
LOS F	2007	2035	Change
Harris County	17%	44%	+159%
Fort Bend County	8%	28%	+250%
Montgomery County	20%	45%	+125%
Liberty County	5%	24%	+380%

City	19%	46%	+142%
ETJ	14%	46%	+228%

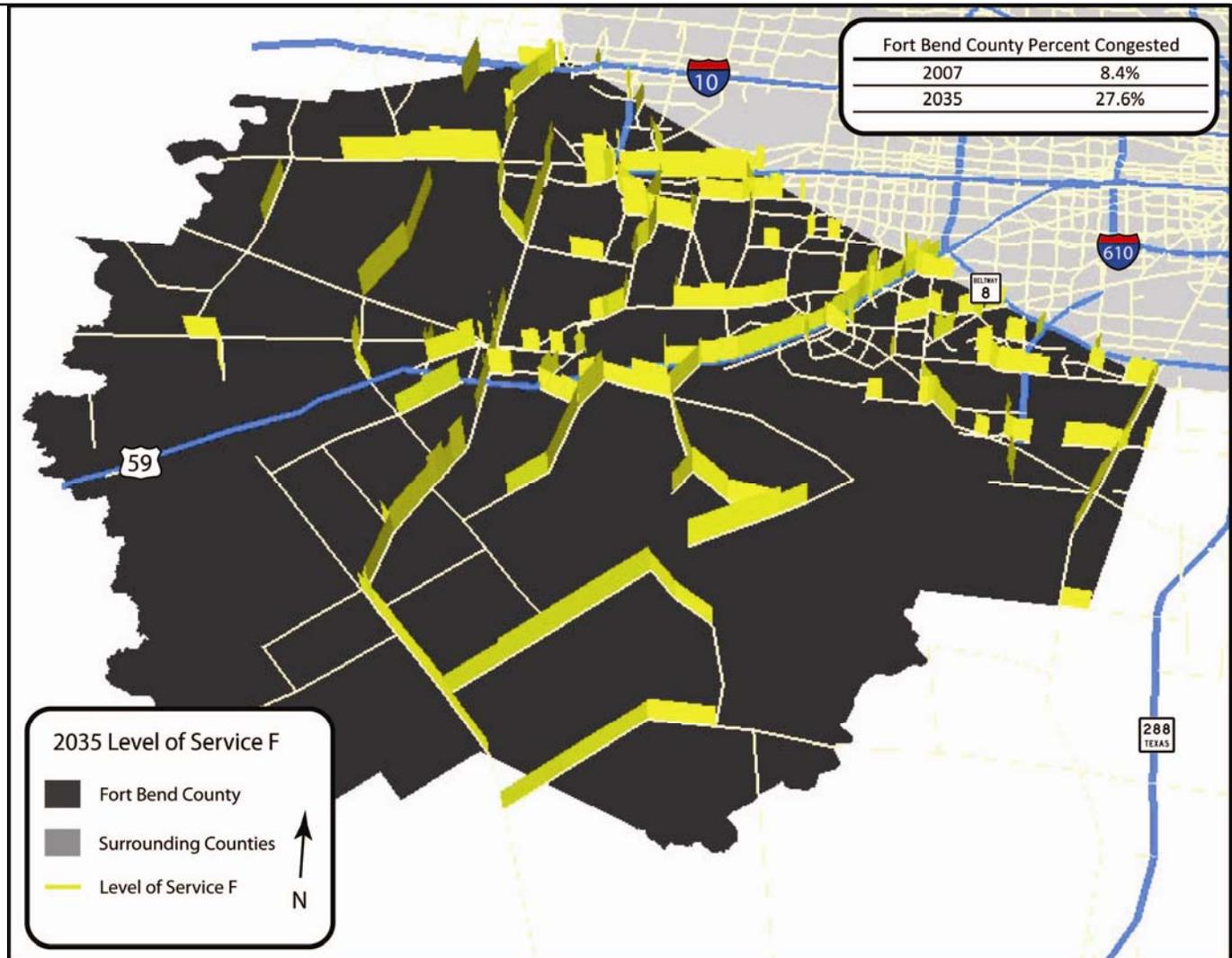
# 2035 Harris County LOS F



# 2035 Montgomery County LOS F



# 2035 Fort Bend County LOS F



## 2035 Worst Congested City Streets

STREET	BOUNDING CROSS STREETS		v/c
JFK Blvd./Will Clayton Pkwy.	Greens Rd.	Lee Rd.	3.66
FM 1960	Lake Houston Pkwy.	FM 2100	2.51
Kingwood Dr.	US-59	Woodland Hills Dr.	2.34
Northpark Dr.	US-59	W. Lake Houston Pkwy.	2.27
SH-6	I-10	Westpark Tollway	2.13
FM 1960	Aldine Westfield Rd.	US-59	1.75
Westheimer Rd.	Montrose Blvd.	Beltway 8	1.61
Richmond Ave.	Downtown	I-610 (West Loop)	1.53
Voss Rd./Hillcroft St.	Westheimer Rd.	Bellaire Blvd.	1.53
Bellaire Blvd.	Wilcrest Dr.	US-59	1.31
Galveston Rd.	Fuqua St.	Scarsdale Blvd.	1.27

## 2035 Worst Congested ETJ Streets

STREET	BOUNDING CROSS STREETS		v/c
FM 2100	Kingwood Dr.	Beaumont Rd.	5.11
Foley Rd.	West of FM 2100		4.24
Woodlands Pkwy.	I-45	Gosling Rd.	1.76
FM 2920	Telge Rd.	Bauer Rd.	1.48
43 <sup>rd</sup> St. / Clay St.	SH-249	Fry Rd.	1.45
Veterans Memorial Dr.	Cypresswood Dr.	W. Mount Houston Rd.	1.42



## Year 2035 Horizon Conclusions

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- Congested Streets
- Poor Connectivities in Street Network
- Jobs – Housing Imbalance

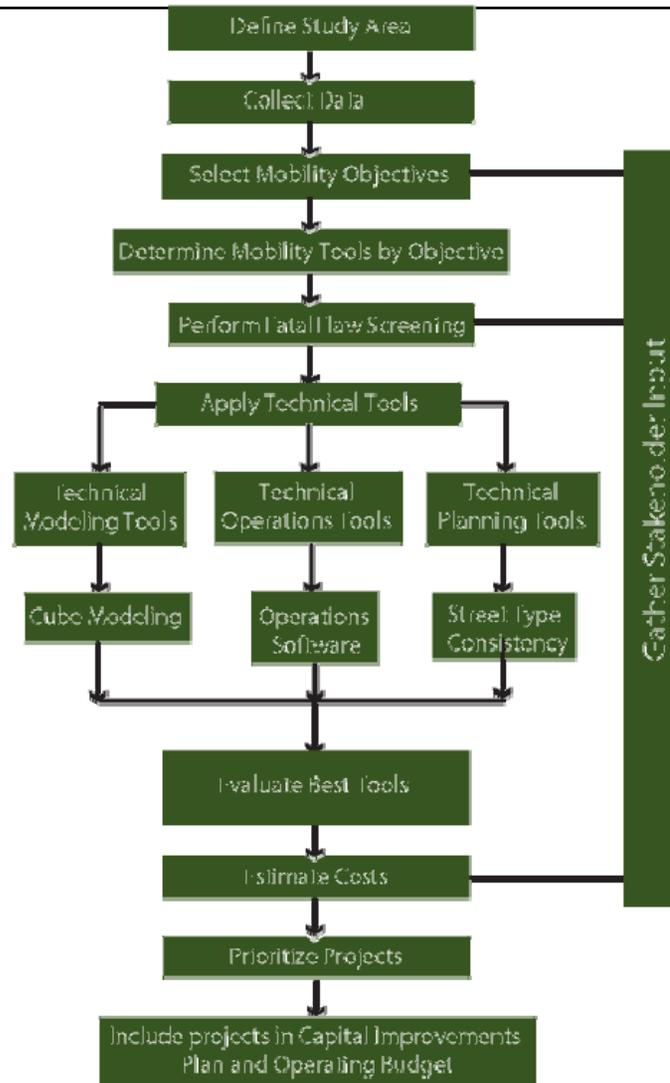


# Solutions

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- **Examine Multi-Modal Tools**
- **Use Mobility Study Process**
- **Update Functional Street Classifications**

# Mobility Study Process with Mobility Toolbox





# Mobility Study Process with Mobility Toolbox

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- Coordinate transportation planning among various public agencies;
- Identify the full range of mobility solutions for an area or corridor in collaboration with the public;
- Apply a full range of technical tools to study an area or corridor;
- Utilize an enhanced travel demand model with measures of effectiveness to assess the traffic impacts of a proposed mobility solution.



## Next Steps (CMP Phase II)

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- CIP Prioritization Criteria
- MTFP Update (Chapter 42)
- Mobility Studies – West Loop/ Mercury Drive / MTFP Amendment



## Next Steps (Continuous)

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- CMP Travel Demand Model
- Transportation System Performance
- Counties Coordination

# Questions?

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