

New Tools for Measuring Livability



Conference on Performance Measures for Transportation and Livable Communities

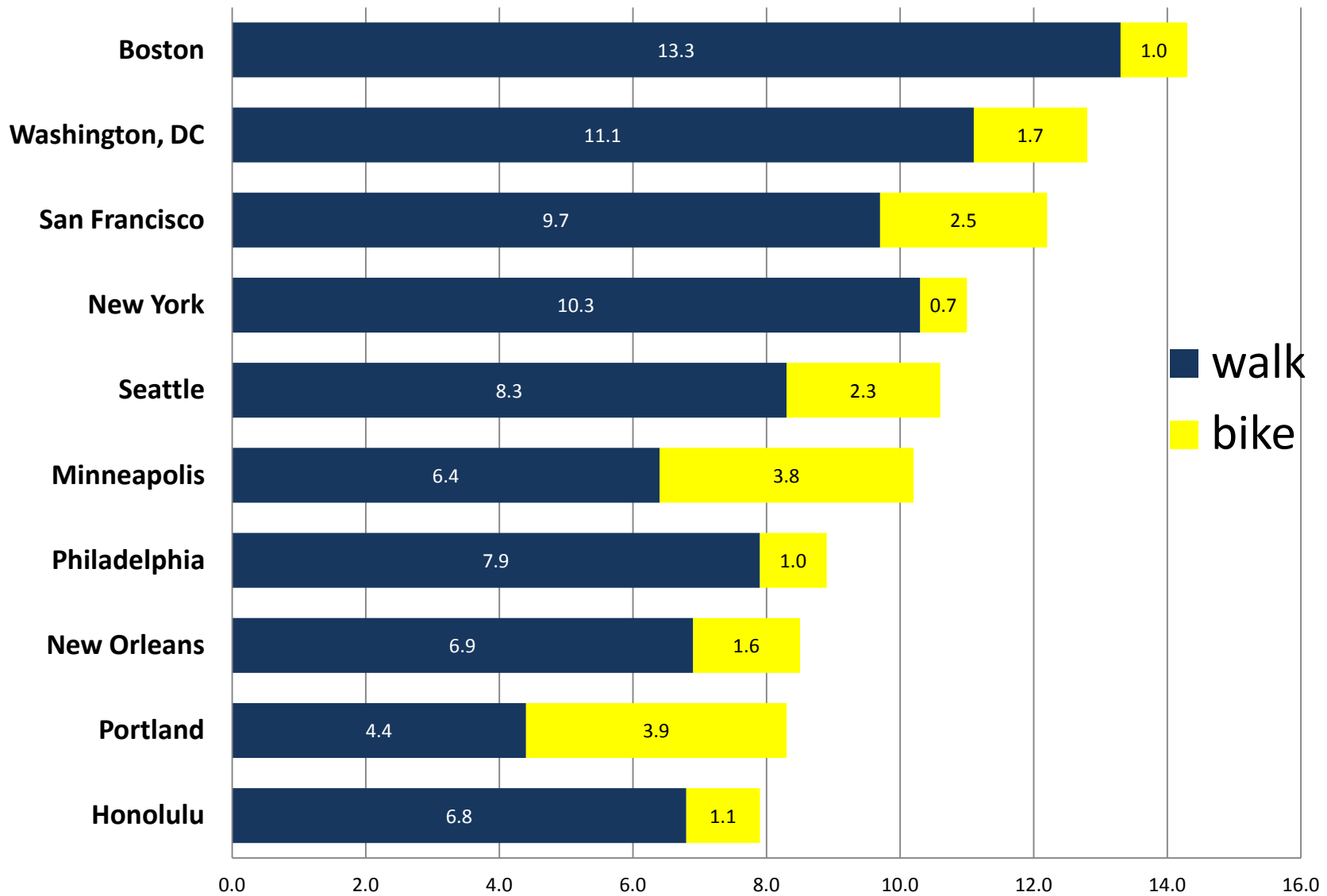
9.7.2011

Transportation and Livability

- Reduced auto dependence
- Shorter trips
- Fewer crashes
- Indirect benefits



Share of Walk/Bike Trips to Work



North Hardy Alternatives Analysis

8 lanes with 4 managed lanes (preferred alternative)
Estimated cost: \$2.113 billion

	2025 Volume No Build	Peak Speed No Build	2025 Volume Alternative 2	Peak Speed Alternative 2
IH 10 to IH 610	269,727	32 mph	250,648	35 mph
IH 610 to BW 8	314,794	27 mph	295,320	30 mph
BW 8 - FM 1960	324,991	33 mph	321,404	33 mph
FM 1960 - SH 242	242,263	33 mph	242,632	33 mph
Managed Lanes	17,456	38 mph	70,837	55 mph

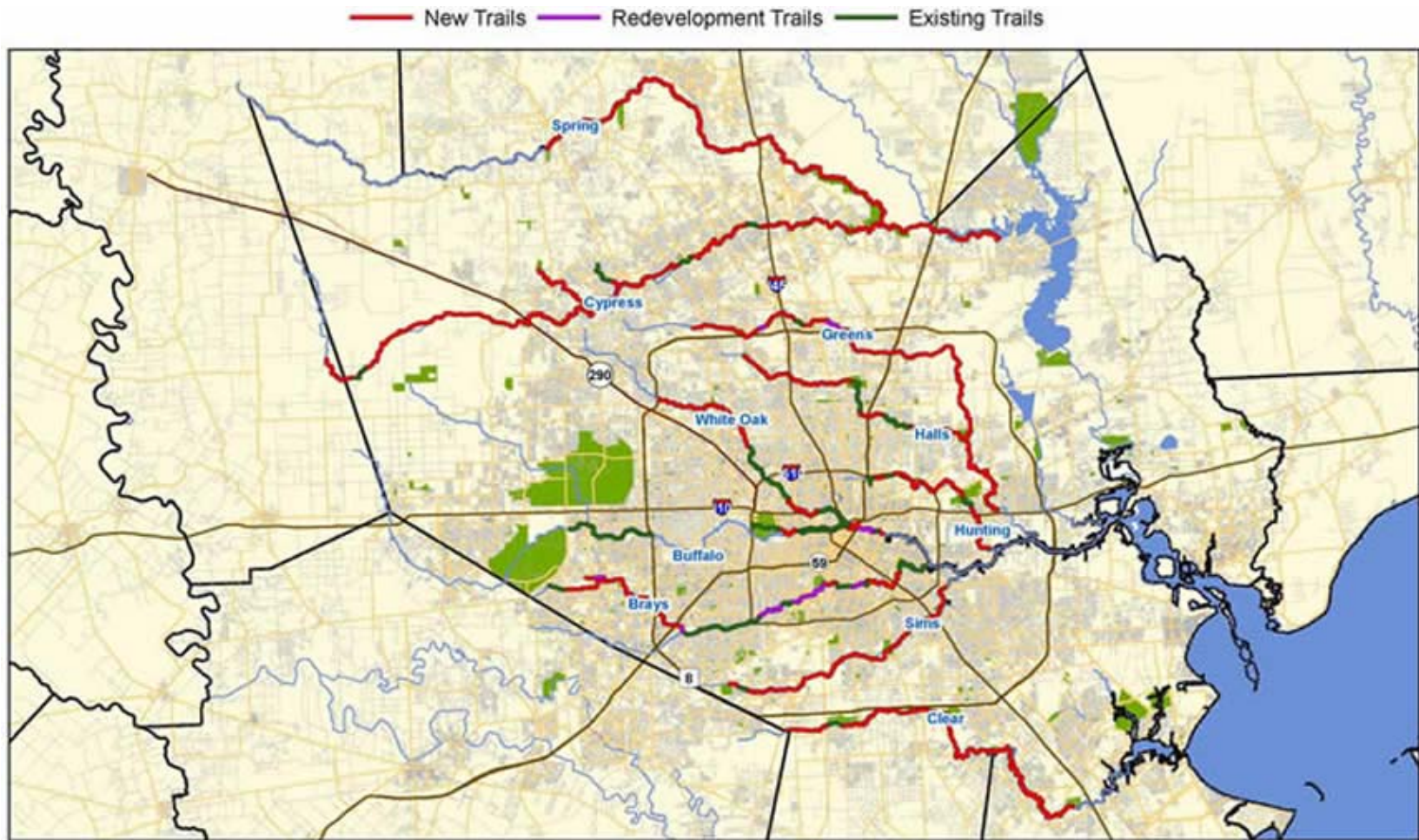
North Hardy Alternatives Analysis

8 lanes with 4 managed lanes (preferred alternative)

Estimated cost: \$2.113 billion

	Peak time Savings vs No Build Main Lanes	Peak time Savings vs No Build Managed Lanes
IH 10 to IH 610	26 seconds	1 minute, 18 seconds
IH 610 to BW 8	2 minutes 6 seconds	4 minutes, 30 seconds
BW 8 - FM 1960	None	2 minutes, 42 seconds
FM 1960 - SH 242	None	6 minutes, 18 seconds

Bayou Greenway Initiative



New trails 236 miles
Rebuilt trails 10 miles
Existing trails 52 miles
Total system 298 miles

Estimated cost: \$490 million

**Estimated annual benefit:
\$117.1 million**



Category	Average of Cost Effectiveness (ton/\$)	Project Life	Annual Days of Use Per Yr
TELECOMMUTING	\$19,640	4.5	260
CLEAN VEHICLES	\$45,296	11	260
OUTREACH/PRICING/FARE STRATEGIES	\$80,965	1.5	260
INTELLIGENT TRANSPORTATION SYSTEMS	\$171,746	11	260
TRANSIT-NEW BUSES	\$203,725	11	260
PARK & RIDE	\$416,375	11	260
VAN POOL	\$465,233	1.5	260
COMMUTE SOLUTIONS	\$1,226,327	1.5	260
TURN LANES	\$1,324,111	3	260
TRANSIT-SERVICE	\$1,334,215	1.5	260
RAIL FACILITIES	\$1,904,875	32	260
TRAFFIC SIGNAL IMPROVEMENTS	\$2,276,234	3	260
PEDESTRIAN/BICYCLE	\$3,013,153	11	170
HIGH OCCUPANCY VEHICLE LANES	\$4,751,441	20	260
ACCESS MANAGEMENT	\$5,928,332	20	260
INTERSECTION IMPROVEMENTS	\$8,395,256	3	260
GRADE SEPARATION	\$28,675,768	20	260
INTERCHANGE IMPROVEMENTS	\$52,124,996	20	260

Cost-Effectiveness

Example CMAQ Projects

Project	Total Cost	Category	VOC Reduced (tons/yr)	NOX Reduced (tons/yr)	Cost Effectiveness (\$/ton)
Clean Air Action Public Outreach Program	\$814,938	Outreach, Pricing, Fare Strategies	64.41	90.718	\$12,836
Construct Columbia Tap Rail to Trail Bikeway	\$3,024,869	Pedestrian Bicycle	0.174	0.247	\$4,377,904

Regional Transportation/Livability Measures

Direct Measures

- Trip distance
- Travel time
- Mode split
- Per capita crashes

Indirect Measures

- Community
- Economy
- Environment

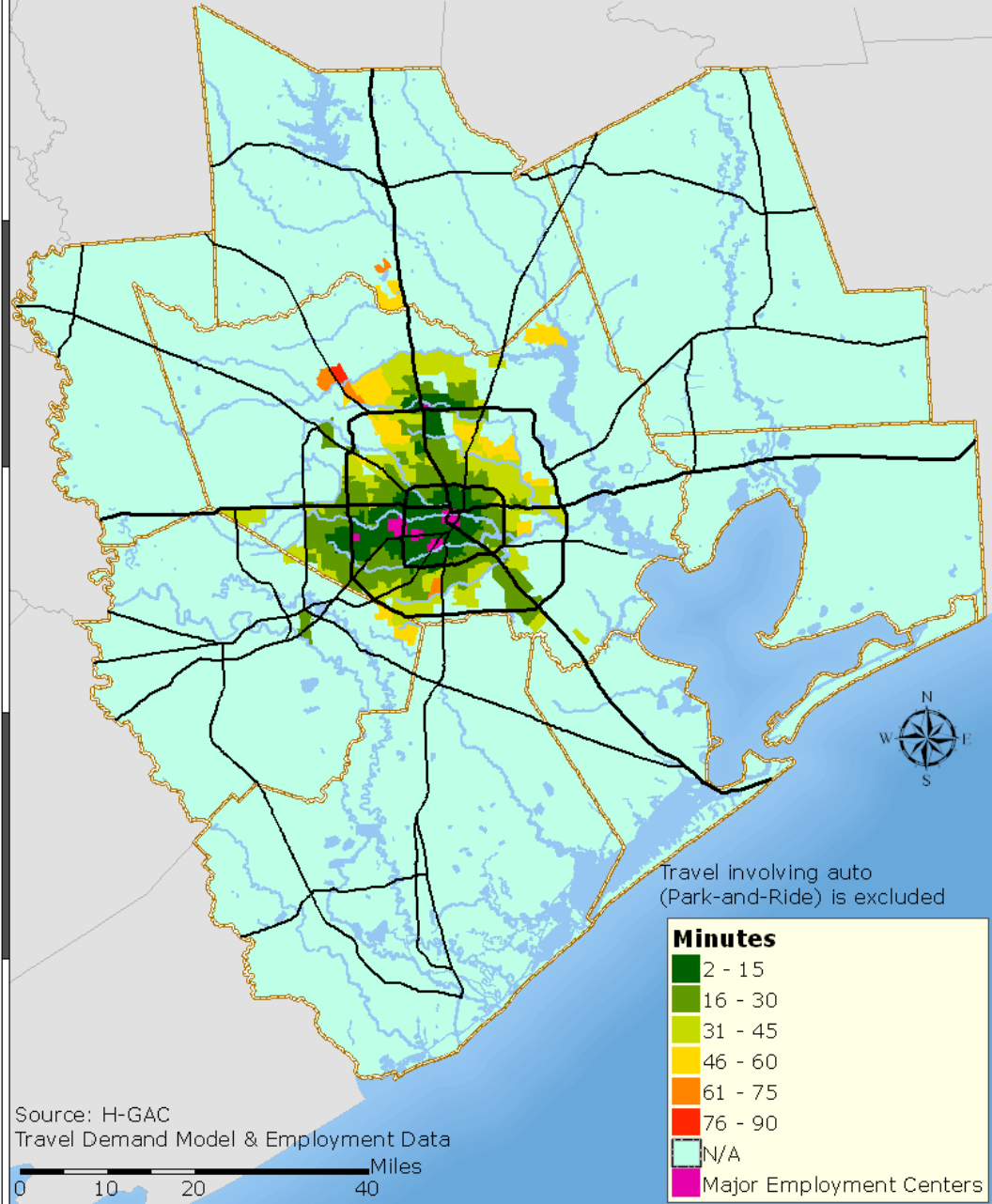


Implementation Metrics

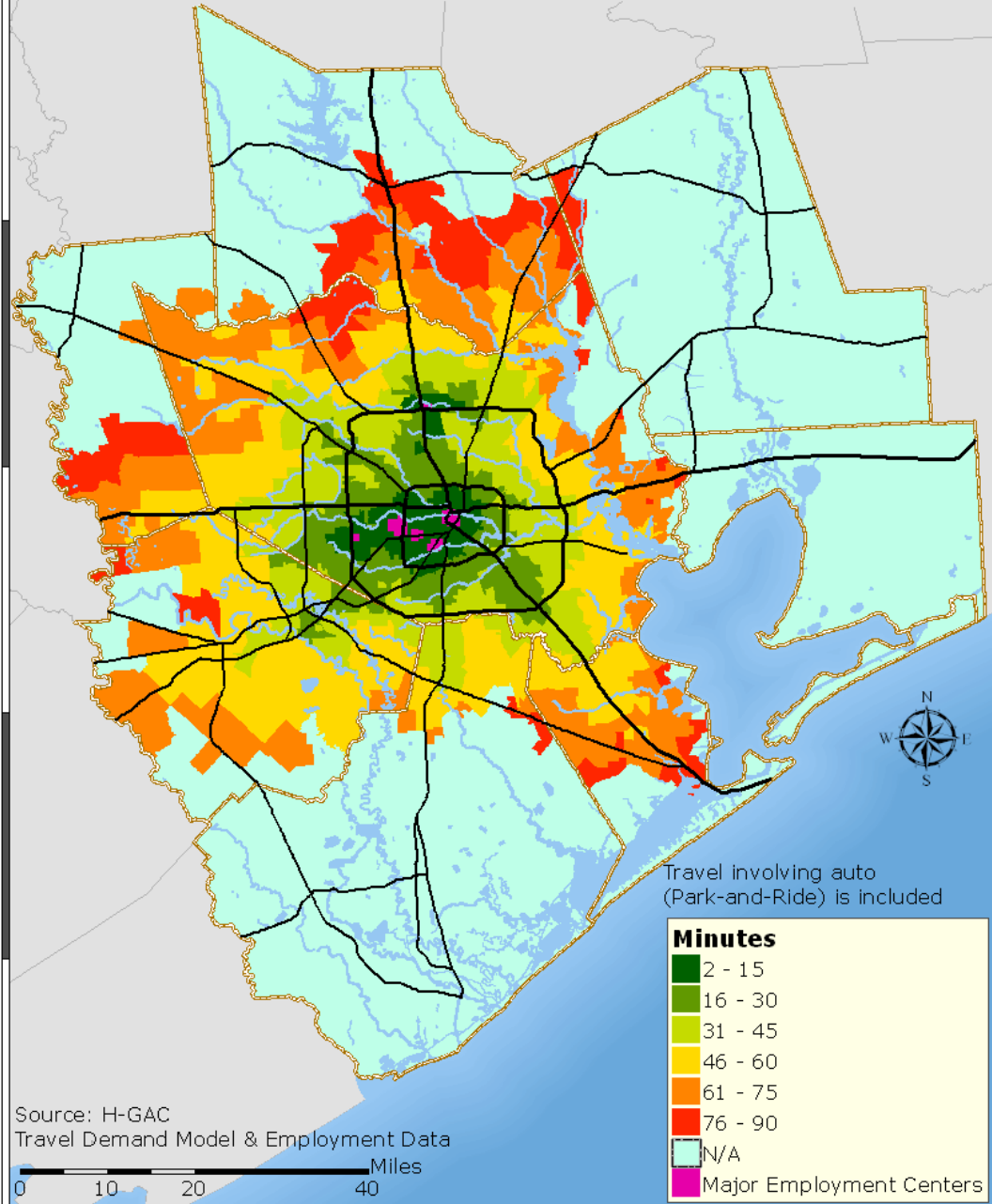
- Funding spent on:
 - Transit
 - Sidewalks
 - Bicycle
 - Safety
- Funding spent in sustainable locations



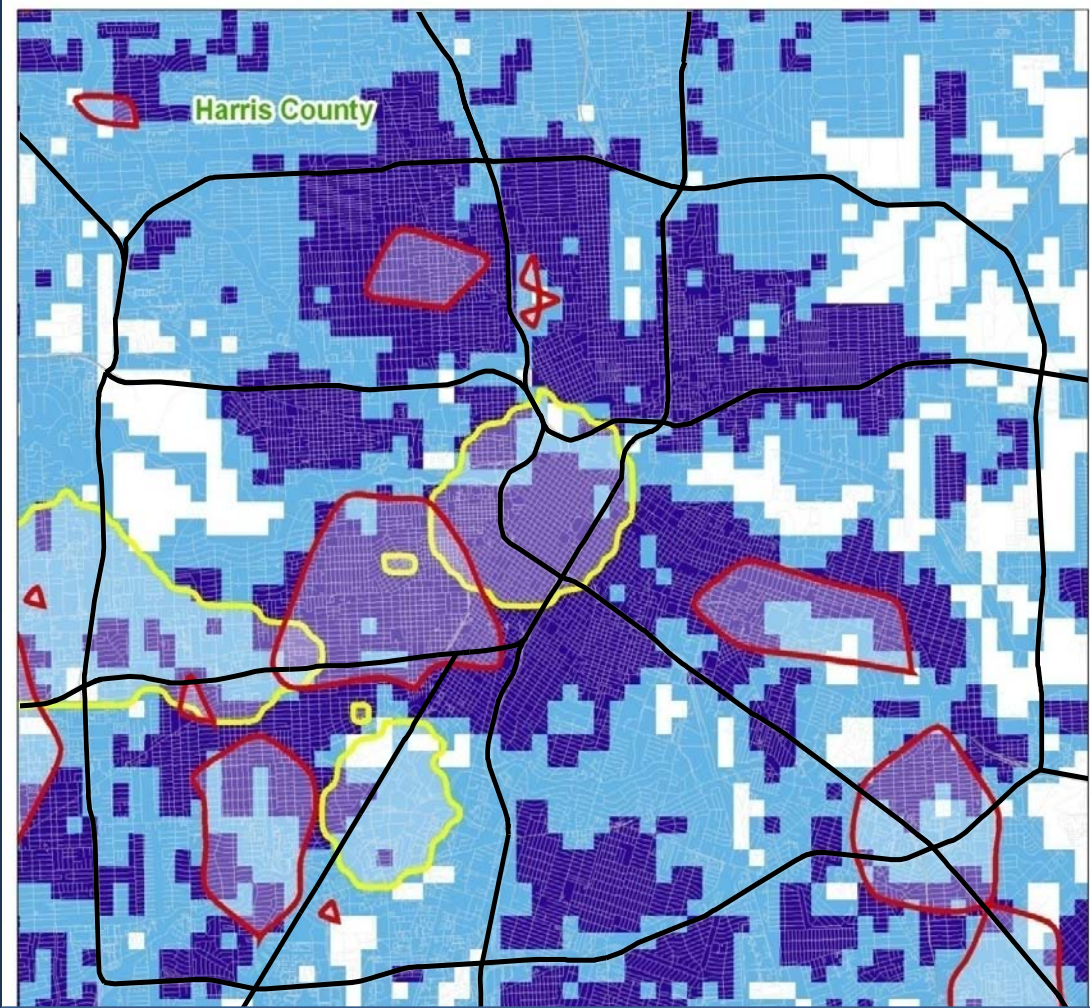
Travel Time on Transit to the Nearest Major Employment Center (Top 25)



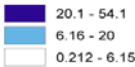
Travel Time on Transit to the Nearest Major Employment Center (Top 25)



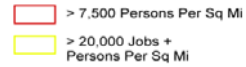
Street Activity/Density



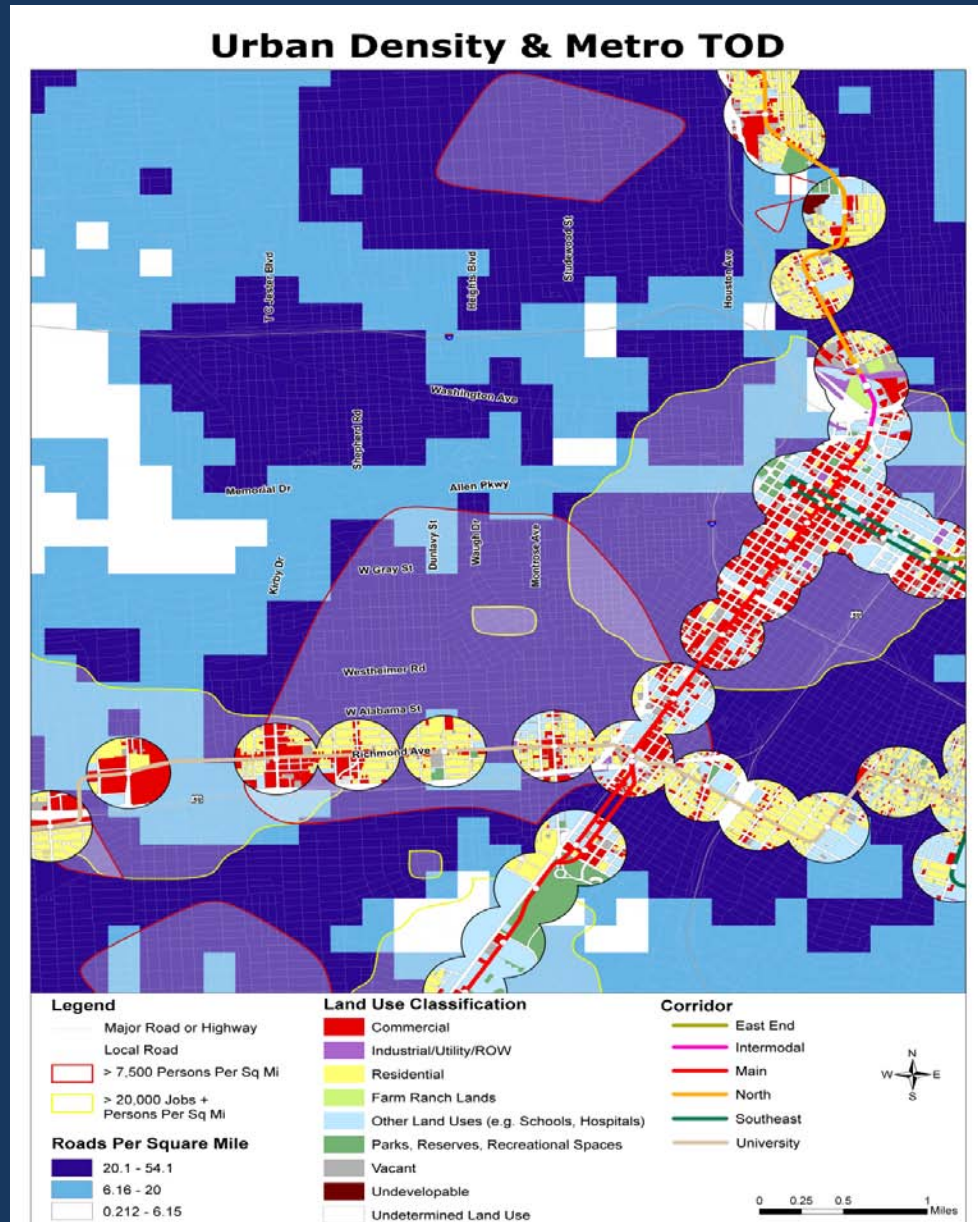
Street Density: roads per sq mi



Activity Density



Walkable Urbanism + TOD

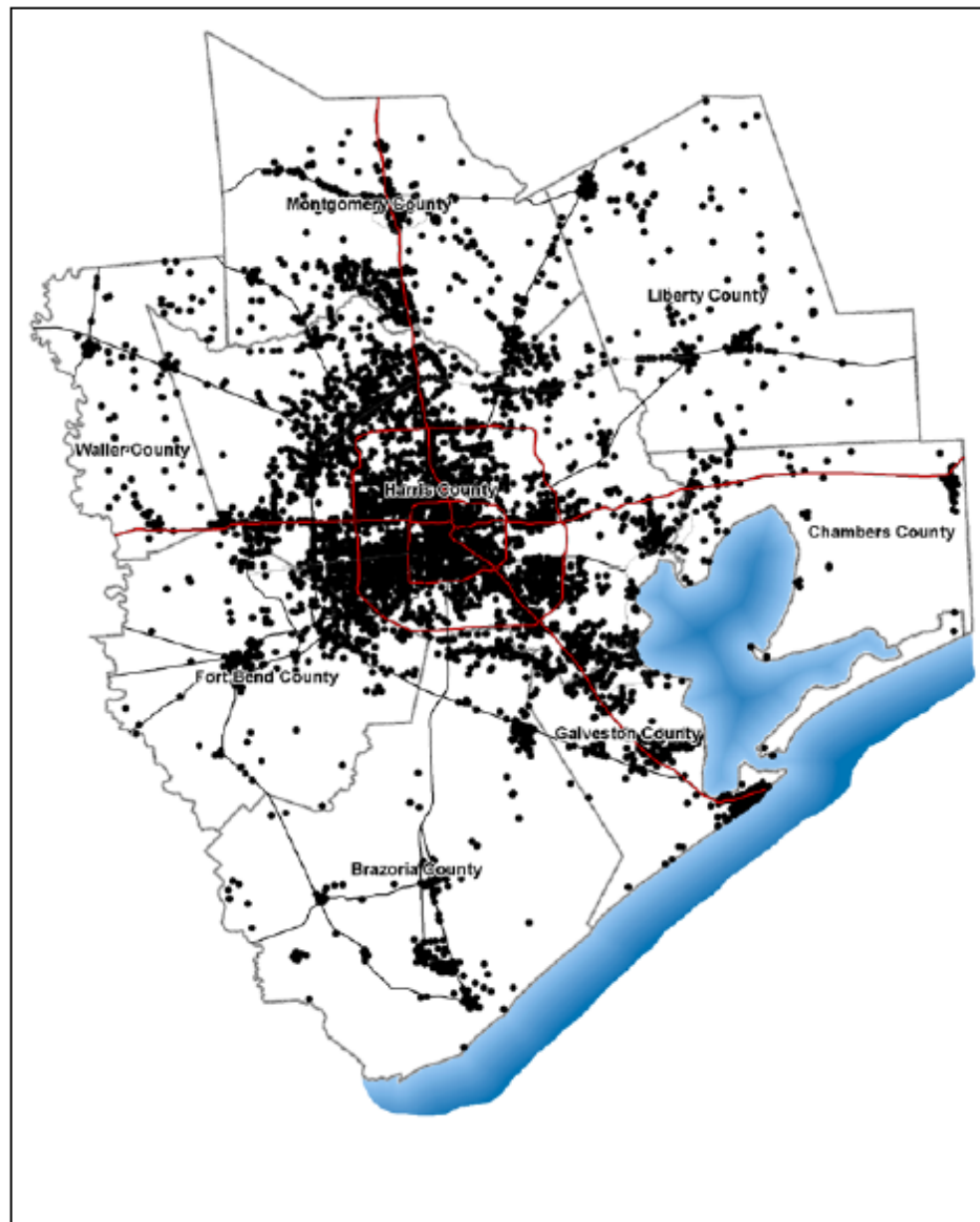


Pedestrian-Bicyclist Special Districts

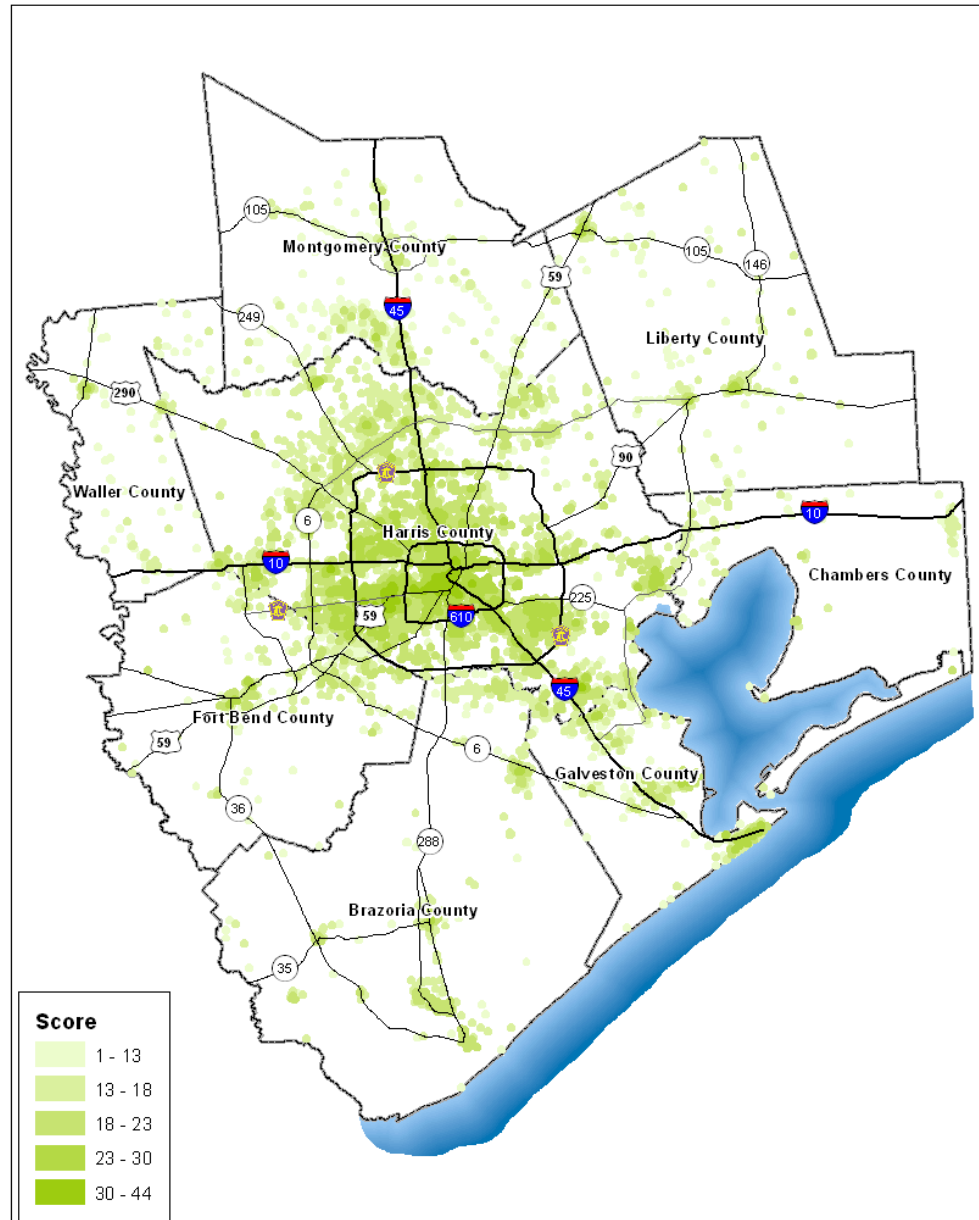
- Improve **CIRCULATION** and safety in areas where non-motorized travel is in high demand
 - Key Elements
 - Improve the **on-street network** for pedestrians and cyclists
 - **Upgrade** intersections/crossings
 - Ensure **ADA Accessibility** and remove physical barriers



10,429 Ped-Bike Destinations



“Scored” by Ped-Bike Demand Factors



Aggregated into Districts

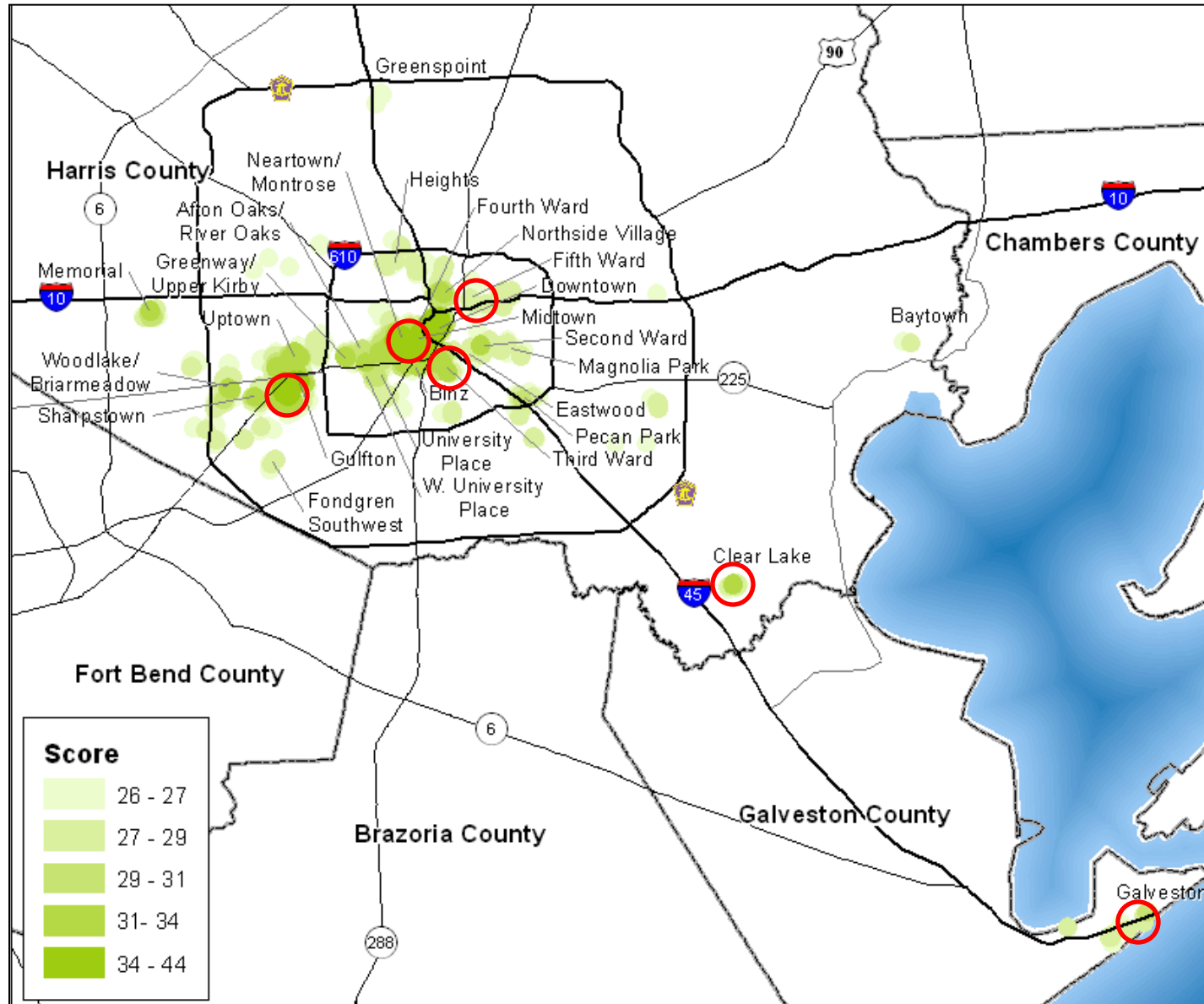


Harris County

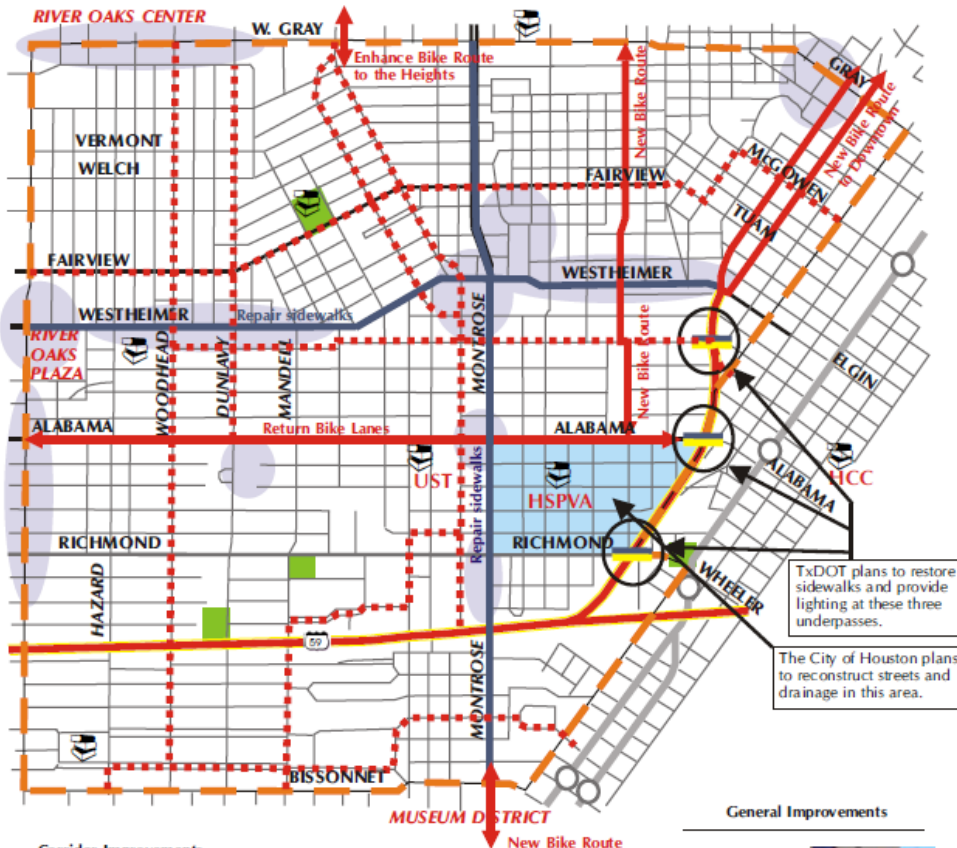
Score

- 26 - 27
- 27 - 29

Top Ped/Bike Districts and Study Areas



Montrose Special Districts Study



- Corridor Improvements**
- Drainage Improvements
 - Sidewalk Improvements
 - Lighting Improvements
 - Bicycle Improvements

- Existing Attractors**
- Parks
 - Schools
 - Commercial Areas
 - Bikeways

"Short-Term" improvements identified on this map are the projects with the ten highest scores, based on a combination of public support (measured by number of survey votes), expected cost, and implementation time.

General Improvements

- Add bike racks near businesses and other destinations
- Add bike racks to METRO buses
- Stripe crosswalks and stop bars at all traffic signals and 4-way stops



Livable Centers



Waller Livable Center Study

Figure 37: Main Street Re-design and Reconstruction

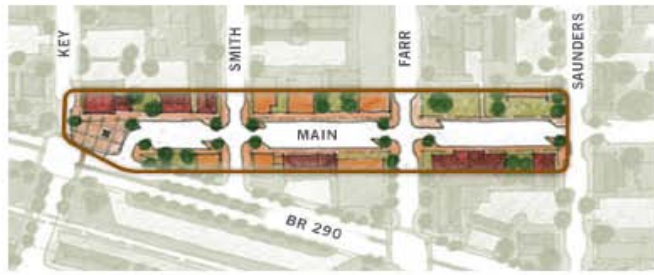


Figure 38: Main / Key / BR 290 Intersection



Figure 39: Waller Heritage Trail



Figure 40: Field Store Road Extension



Centers Benefits Calculator

Microsoft Excel - TOD_TDM_Impacts_Calculator_Version_2.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

100% Arial 10

Reply with Changes... End Review...

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	A	Walking speed (miles per hour)	3													
2	B	Distance (ft) covered in one minute	263													
3	C	Walking time (minutes) needed to cover 1000 ft	4													
4																
			Neighbor hood Center (NC)	Town Center (TC)	Regional Center (RC)	Urban Core (UC)	Outside Centers (OC)	Region Total (RT)								
5																
6	D	Residents Per Dwelling Unit*	2.92	2.92	2.92	2.92	2.92	2.92								
7	E	Workers per Dwelling Unit*	1.38	1.38	1.38	1.38	1.38	1.38								
8	F	Dependents (non-working) per Worker*	1.11	1.11	1.11	1.11	1.11	1.11								
9	G	Percent of Resident Workers who also work here**	0.33	0.33	0.33	0.33	0.33	0.33								
10	H	Percent of Workers who also reside here**	0.33	0.33	0.33	0.33	0.33	0.33								
11																
12	I	Assumed Share of Work Trips in All Trips***	16%	16%	16%	16%	16%	16%								
13	J	Assumed Average Work trips per week (both ways)**	8	8	8	8	8	8								
14	K	Average Work trips per day	1.14	1.14	1.14	1.14	1.14	1.14								
15	L	Non-work trips per day (also: this is how many non-work trips each job attracts)	5.98	5.98	5.98	5.98	5.98	5.98								
16	M	All Trips per day	7.12	7.12	7.12	7.12	7.12	7.12								
17	N	Factor by which attractiveness of C destinations (for non-work trips) exceeds OC attractiveness**	2	2	2	2	2	2								
18	O	Average Attracted Daily Non-Work Trips per Job	11.97	11.97	11.97	11.97	11.97	4.4								
19	P	Percent of non-work trips served by destinations inside C (for residents of C)	30%	30%	30%	30%										
20																
21	Q1	Share of Auto (SOV and carpool) in all Work Trips****											92.25%			
22	Q2	Share of Transit in all Work Trips****											3.31%			
23	Q3	Share of Walking/Biking in all Work Trips****											1.94%			
24	Q4	Share of Telecommuting in all Work Trips****											2.50%			
25													100.000%	The cell to the left must equal to 100		
26	R1	Share of Auto in all physical work trips (excludes telecommuting) for residents of a center who also work in the same center**	0%	0%	0%	0%										
27	R2	Share of Transit in all physical work trips (excludes telecommuting) for residents of a center who also work in the same center**	0%	0%	0%	0%										
28	R3	Share of Walking/Biking in all physical work trips (excludes telecommuting) for residents of a center who also work in the same center**	100%	100%	100%	100%										
29																
30	S	For residents, factor by which the likelihood of taking transit for commute increases if the job (destination) is located in a center**	3	3	3	3										
31																
		Share of Auto (SOV only) in all Non-Work														

Read Me / Input 1 / Assumptions_1 / Assumptions_2 / Results / Work Trips / Non-Work Trips / All Trips

Ready Microsoft Excel - TOD_TDM_Impacts_Calculator_Version_2.xls

start Microsoft Excel - TOD...

1:42 PM

Measuring Impacts



**SOV Trip
Reduction: 10%**

36% New Growth Capture

250 Neighborhood Centers



OR

85 Town Centers



OR

18 Regional Centers



OR

10 Urban Cores



= 10%

36% New Growth Capture

50 Neighborhood Centers



AND

25 Town Centers



AND

7 Regional Centers



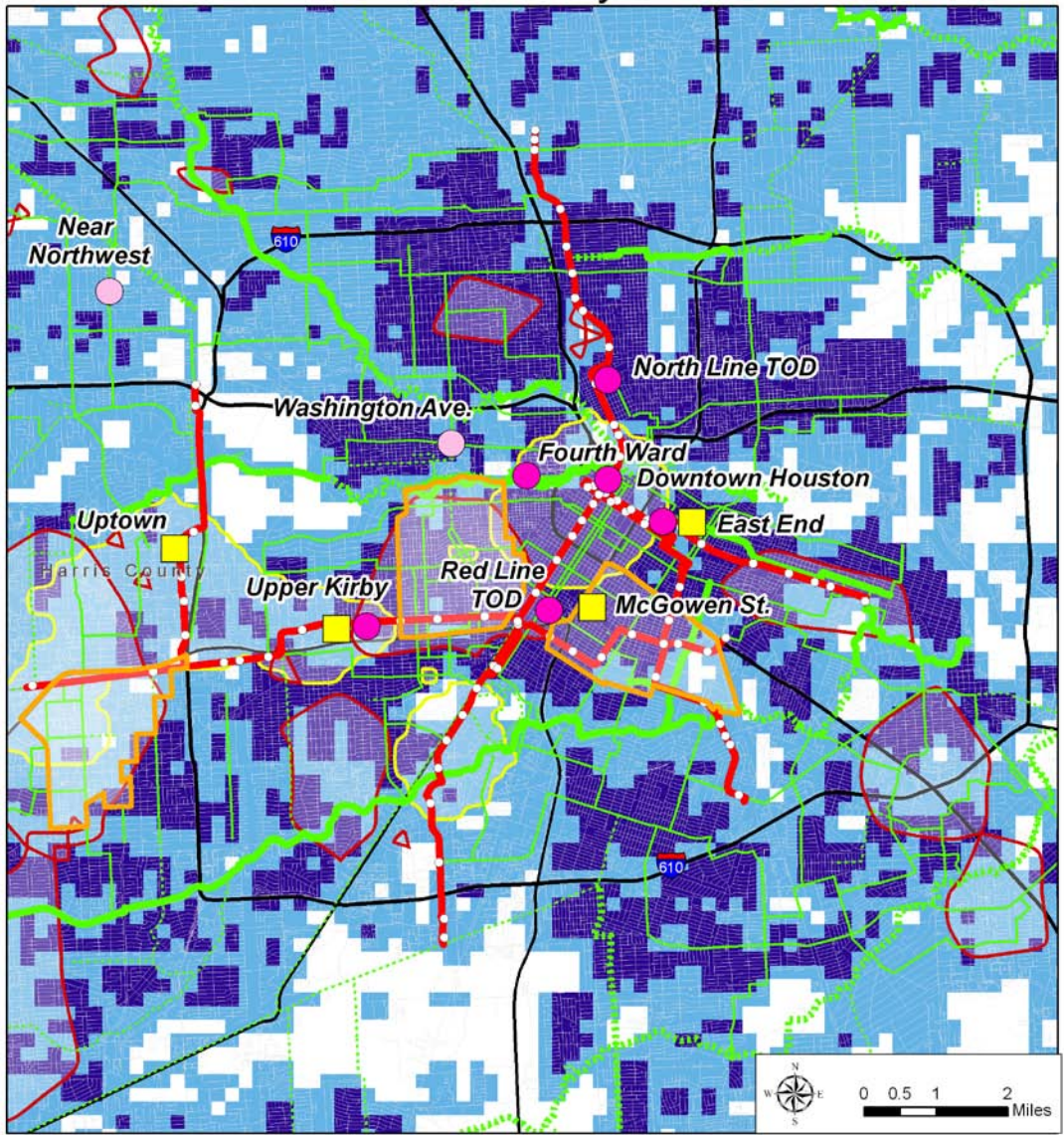
AND

1 Urban Core



= 10%

Sustainable Mobility Network



Livable Centers

- Implementation Project
- Study Project
- Study Project - 2011 Completion

Transit

- METRO Light Rail

Bikeway Network

- Regional Bikeway
- Proposed Regional Bikeway
- Existing Route
- Proposed Route
- Bike Walk District

Activity Density

- > 7,500 persons / Square Mile
- > 20,000 Jobs + Persons / Square Mile

Roads Per Square Mile

- 20.1 - 54.1
- 6.16 - 20
- 0.212 - 6.15

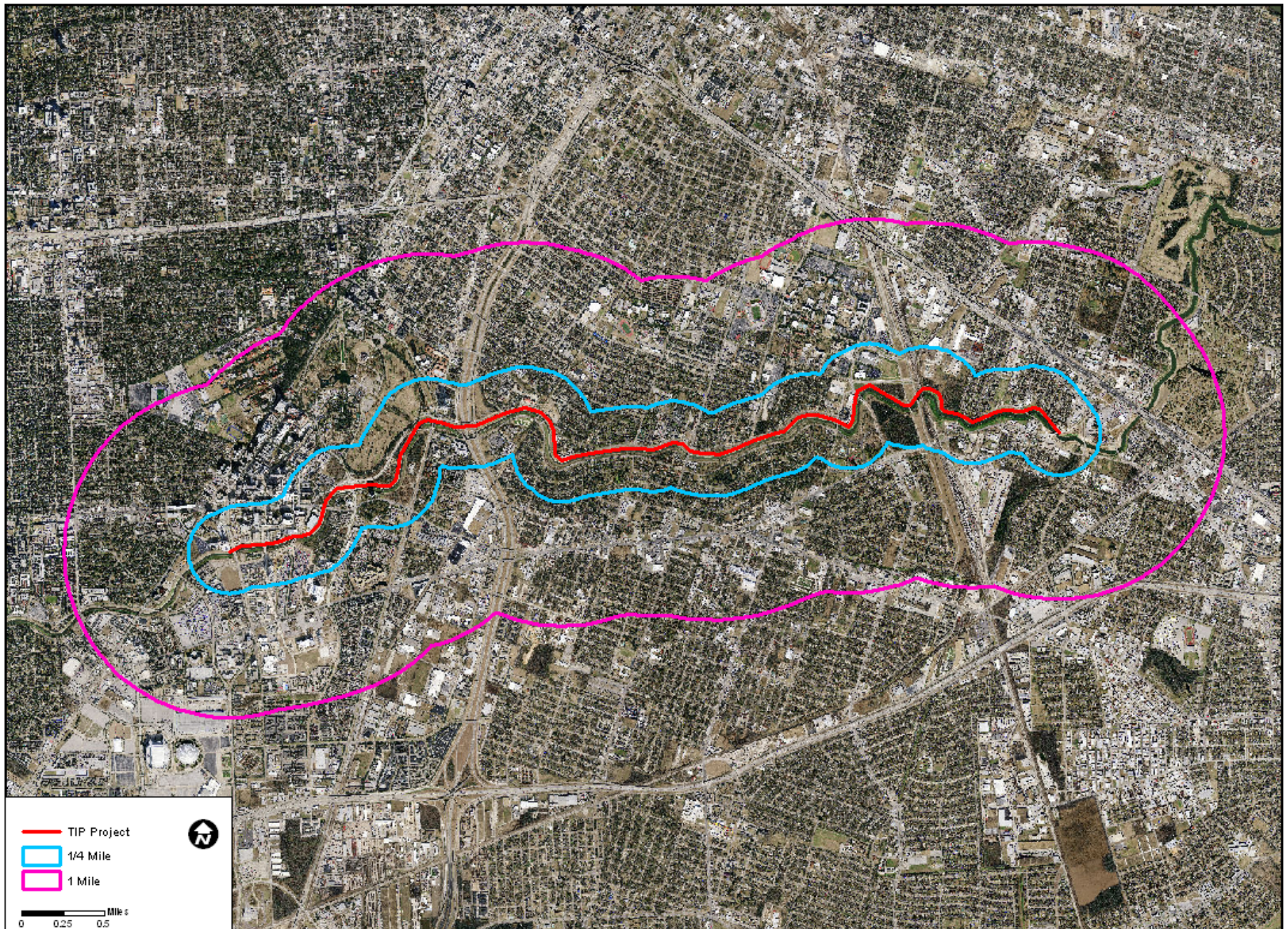
TIP Call for Projects Evaluation

	Pedestrian	Bicycle	Source
Service Area	¼ mile radius	1 mile radius	
Regional Mode Split	1.5%	0.3%	American Community Survey
Average Trip Length	0.7 mile	2.26 mile	2009 National Household Travel Survey

Other Assumptions:

- Regional trip production rates (6.54 trips /Household, 2.53 trips/Job)
- Estimate emissions reductions using MOSERS 11.1

Brays Trail - MacGregor Segment



Houston Ped/Bike Share

Inputs	2015	2026
Households	30,928	31,034
Employment	169,230	212,094
Total Vehicle Trips/day	730,430	853,016
New Walk Trips/day	1,500	1,702
New Bike Trips/day	1,891	2,219
VMT Reduced/day	5,324	6,206
Outputs for Project Life (11 Years)		
NOx Reduced (tons)		11.491
VOC Reduced (tons)		7.721
Total Emission Reduction (tons)		19.212

Portland Ped/Bike Share

Inputs	2015	2026
Households	30,928	31,034
Employment	169,230	212,094
Total Vehicle Trips/day	730,430	853,016
New Walk Trips/day	4,400	4,992
New Bike Trips/day	24,586	28,843
VMT Reduced/day	58,646	68,679
Outputs for Project Life (11 Years)		
NOx Reduced (tons)		80.217
VOC Reduced (tons)		59.129
Total Emission Reduction (tons)		139.346

Partnership Needed

- Engineers
- Planners
- Health professionals
- Economists
- Public agencies
- Private Sector
- Academia
- NGO's





For More Information

- **Livable Centers:**
h-gac.com/livablecenters
- **Ped/Bike:**
h-gac.com/go/pedbike
- **Subregional Planning:**
h-gac.com/go/subregional
- **Eco-Logical:**
eco-logical.h-gac.com
- **Sustainability Planning Grant:**
gosustainablenow.org

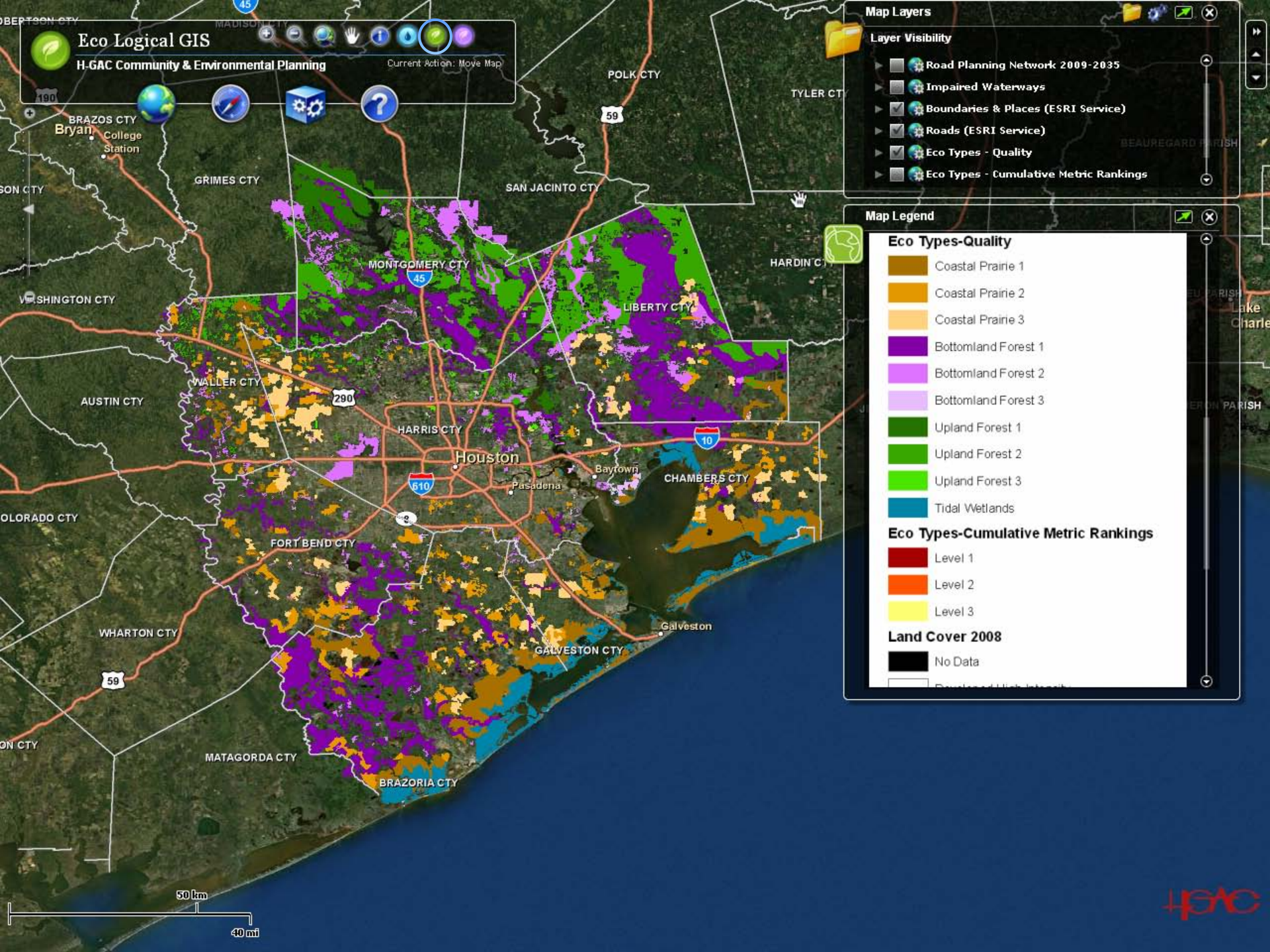


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Eco Logical GIS

H-GAC Community & Environmental Planning

Current Action: Move Map

Map Layers

Layer Visibility

- Road Planning Network 2009-2035
- Impaired Waterways
- Boundaries & Places (ESRI Service)
- Roads (ESRI Service)
- Eco Types - Quality
- Eco Types - Cumulative Metric Rankings

Map Legend

Eco Types-Quality

- Coastal Prairie 1
- Coastal Prairie 2
- Coastal Prairie 3
- Bottomland Forest 1
- Bottomland Forest 2
- Bottomland Forest 3
- Upland Forest 1
- Upland Forest 2
- Upland Forest 3
- Tidal Wetlands

Eco Types-Cumulative Metric Rankings

- Level 1
- Level 2
- Level 3

Land Cover 2008

- No Data

50 km
40 mi



Eco Logical GIS
 H-GAC Community & Environmental Planning

Current Action: Select Pathway

Map Layers

Map Legend

Eco Types - Weighted Queries

Enter buffer and importance rankings - then use a tool to define area

Buffer: 1 miles

Size	1	Isolation	3
Shape	2	T/E Species	2
Regional Scarcity	3	Diversity	3
Watershed Scarcity	1	Quality	2
Adjacency	3		

Result	Value
Query Area Acres	29,403.72
Ecotypes Impacted	9
% Impacted Min.	7.61
% Impacted Avg.	32.29
% Impacted Max.	100.00
% Impacted Index	290.62
Ecotype Acres Impacted	13,805.08
Coastal Prairie Acres	0.00
Bottomland Forest Acres	7,016.25
Upland Forest Acres	6,788.83

