CITY MOBILITY PLANNING-PHASE I:EXECUTIVE SUMMARY

Moving Forward in the City of Houston 2009

According to Houston's Area Survey, for seven of the last ten years, traffic has ranked as a top major issue facing the City's population. Although Houston's street network is well-developed, a decade of significant population and employment growth has increased travel. The increased travel congestion now causes frequent and lengthy delays.

In the past, traffic congestion has been dealt with by expanding street network capacity – either by building new streets or widening existing streets. However, with the Houston region's population and employment expected to grow even more rapidly than in the past, expanding street capacity will not always be an option for eliminating traffic congestion. Most land inside and outside the City limits is already significantly built-out. Demands for cost-effective and environmentally-friendly mobility solutions are increasing. As a result, improving mobility within the City and its extra-territorial jurisdiction[1] will require alternative mobility solutions. These solutions may include capitalizing on current transportation infrastructure by emphasizing multimodal mobility solutions and system improvements with a high benefit-cost ratio.

The City of Houston has developed a new process for mobility studies along with a mobility toolbox for transportation planning that will utilize existing resources and will improve mobility. The mobility study process and toolbox will:

- 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

The mobility study process with mobility toolbox can be used by traffic engineers, transportation planners, and policy-makers to develop and prioritize capital improvement projects for street/traffic, update the City's Major Thoroughfare and Freeway Plan, address traffic congestion in study areas and corridors, and monitor transportation system performance. By creating a set of best practices and integrating them into the Houston's transportation planning, traffic engineering, and street design, the City has taken a significant step towards keeping Houstonians moving forward.

1 The City's Extraterritorial Jurisdiction (ETJ) includes unincorporated land within five miles of Houston's city limit that is not within the city limits or ETJ of another city, representing the area of planning influence.

Based on expected growth patterns, the demand for vehicle travel will double [between now and 2035]. The movement of goods … may triple in volume over our network of highways and rail corridors.

Bridging our Communities, 2035. H-GAC Regional Transportation Plan 2035

Challenges to Mobility in the City

Like many other major metropolitan areas in the U.S., the City of Houston is grappling with the tensions of growth and development. Moreover, the City is working to maintain a high quality of life while keeping its cost of living affordable. Unlike other major metro areas, the City faces an additional and especially unique challenge — a densely populated ring of unincorporated land surrounding the City referred to as the ‘extraterritorial jurisdiction’ (ETJ). The ETJ is not subject to City ordinances and regulations. However in many ways, it is centered around and dependent upon the City of Houston.

The 1963 Texas Municipal Annexation Act granted home-rule cities, like Houston, an ETJ that allowed them to expand when necessary and appropriate. Houston’s ETJ is a five mile band (1,170 sq. miles) of unincorporated land within the counties (Harris, Montgomery, Fort Bend and Liberty) that are contiguous to the corporate boundaries of the City.

The combined effect of the transportation demand within the City limits and a rapidly growing population in the ETJ is straining the inadequate transportation infrastructure within the region. It is also adding additional stress on the street network inside the City. To begin to address these issues, the City’s Planning Commission established a set of Guiding Principles.

Planning Commission Guiding Principles

1. Mobility is a key factor in community’s vitality.

2. Costs associated with new development / redevelopment must be equitably allocated.

3. Access (curb cuts/medians) must be consistently and proactively managed.

4. Right-of-way standards for future major arteries must reflect “best practices,” fully recognize aesthetic concerns, and anticipate peak traffic volumes at fully developed conditions.

5. Neighborhood concerns must be carefully balanced with the need to maintain circulation (recognize the value of connectivity/ circulation).

6. Long-term “notice” provided by Major Thoroughfare and Freeway Plan must be effectively publicized and communicated.

7. Nonstructural approaches should be considered as well as new road construction.

Population and Employment Trends

Texas is one of the fastest growing states in the nation, and Harris County is the fastest growing county in the state. Today, more than 2.2 million people live in the City of Houston and another 700,000 live in the City's ETJ.[2] Houston and its ETJ's rich employment sector is home to more than 1.7 million jobs, making it the state's most populous and robust economic center.

Texas' Fastest Growing Counties, Population 2000 – 2007

County	Metro Area	2000	2007	Change	%Change
Harris	Houston-S/B	3,400,578	3,935,855	535,277	15.7%
Tarrant	DFW-A	1,446,219	1,717,435	271,216	18.8%
Collin	DFW-A	491,675	730,690	239,015	48.6%
Bexar	San Antonio	1,392,931	1,594,493	201,562	14.5%
Denton	DFW-A	432,976	612,357	179,381	41.4%
Travis	Austin-RR	812,280	974,365	162,085	20.0%
Fort Bend	Houston-S/B	354,452	509,822	155,370	43.8%
Dallas	DFW-A	2,218,899	2,366,511	147,612	6.7%
Hidalgo	McAllen-E/M	569,463	710,514	141,051	24.8%
Williamson	Austin-RR	249,967	373,363	123,396	49.4%

Chart from "Population Change in Texas" by Karl Eschbach, Texas State Data Center, 2008

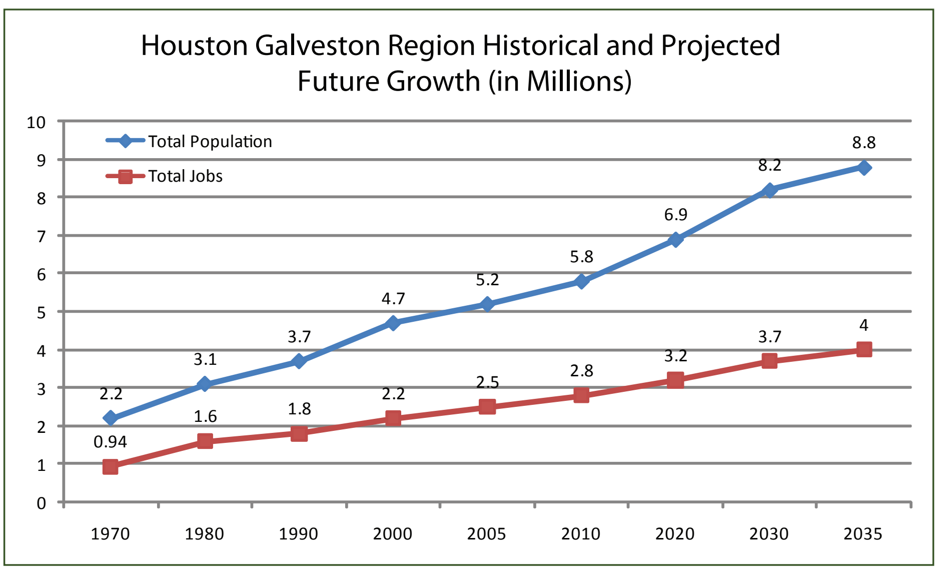
The City's low cost of living and attractive business climate is expected to generate a more rapid pace of population and employment growth over the next 26 years. By 2035, population within the City limits is projected to increase by 25% to 2.7 million residents. Reflecting statewide trends, population growth in the suburban areas of the ETJ is likely to outpace that growth rate by increasing more than 125% to nearly 1.6 million residents. Employment growth, which has outpaced national job growth for several years, is also projected to expand, though no longer at peak rates. By 2035, employment within the City is expected to grow by over 613,000 jobs (40%) and the ETJ will see an increase of 160,000 jobs (50%).[3]

Houston Population

	2007	2035
City	2,158,000	2,708,000
ETJ	690,000	1,560,000

Houston Employment

	2007	2035
City	1,531,000	2,115,000
ETJ	160,000	320,000



2 Population estimate from Houston-Galveston Area Council
3 Employment figures from Houston-Galveston Area Council

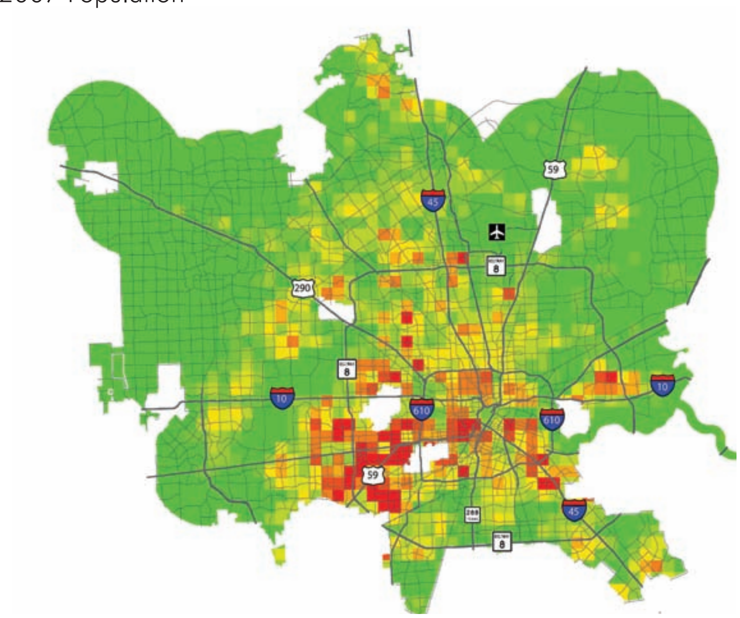
Changes in Population and Employment Centers

One of the greatest challenges to Houston's mobility is that by 2035 more than 870,000 new residents are projected to live outside the City limits in the ETJ while the major thrust of employment growth is within the City limits. The distance between population and employment centers will result in more travel, greater time traveling, and longer travel delays.

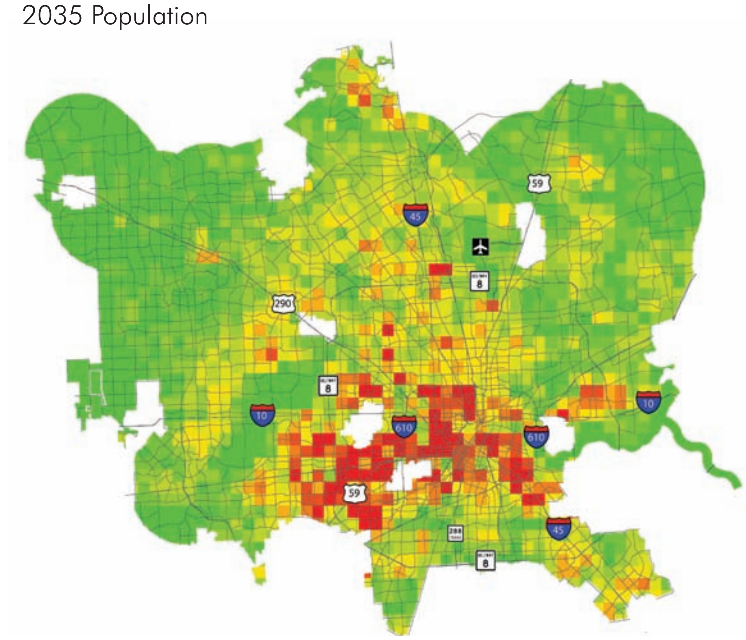
While the ETJ is growing, the City will also be taking in an additional 550,000 new residents. The most notable population growth occurs inside Loop 610. It reflects efforts to create a denser urban core through mixed-use development strategies.

The focus of employment is expected to be mostly within the City. In particular, employment growth is expected to concentrate within Loop 610 and along major transportation corridors, especially along the Interstate Highway 45 corridor and the western-section of Interstate Highway 10. Employment concentrating along transportation corridors will make mobility solutions to traffic congestion issues more challenging as the Interstate and State Highways serve as both thoroughfares and access points to employment centers.

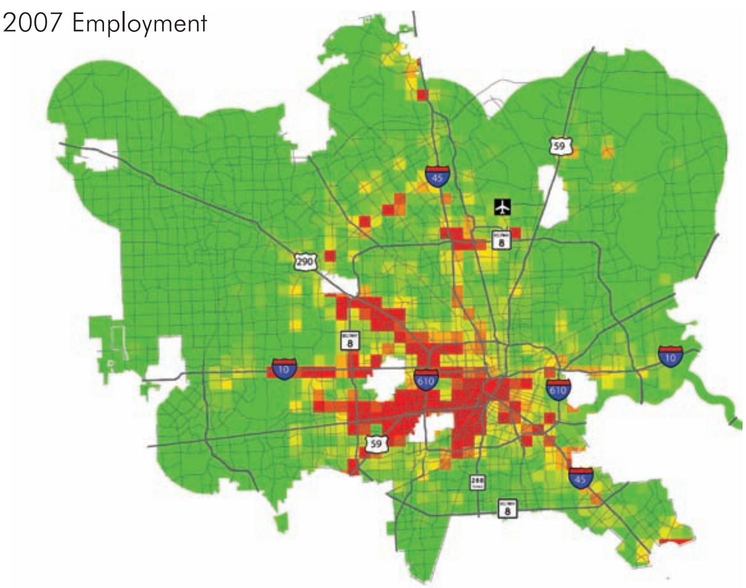
2007 Population



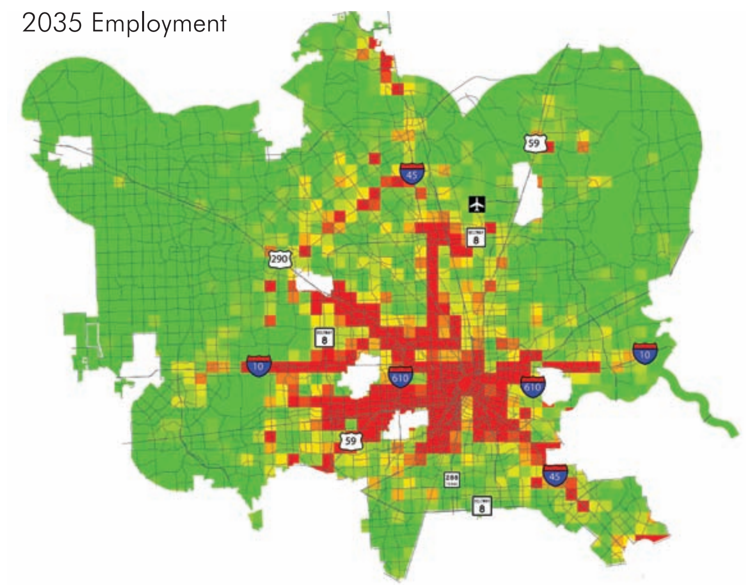
2035 Population

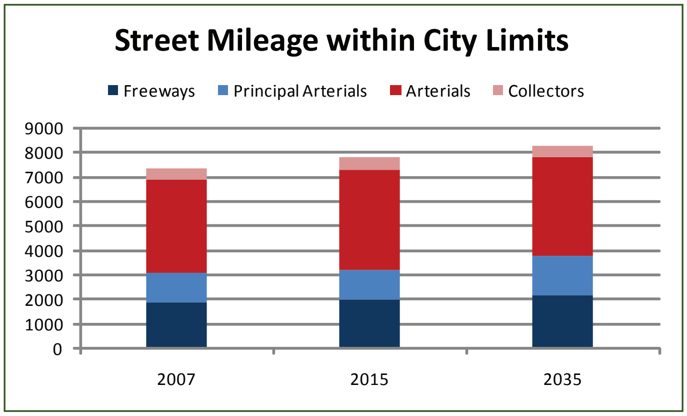


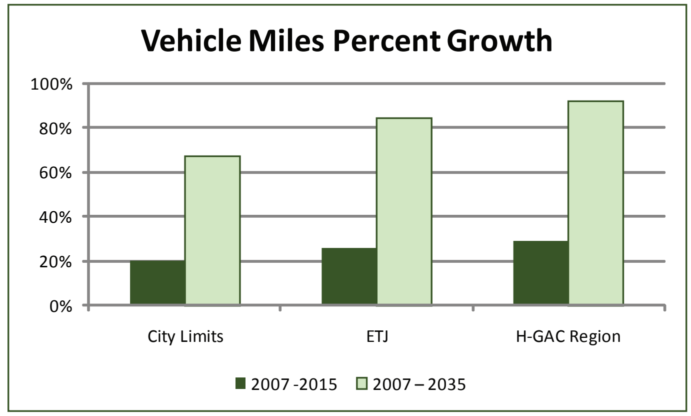
2007 Employment

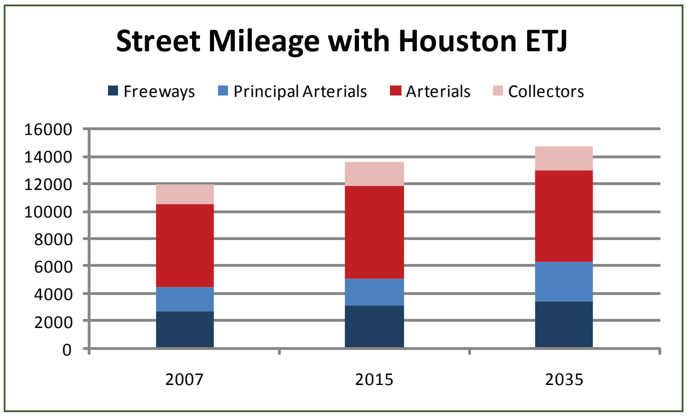


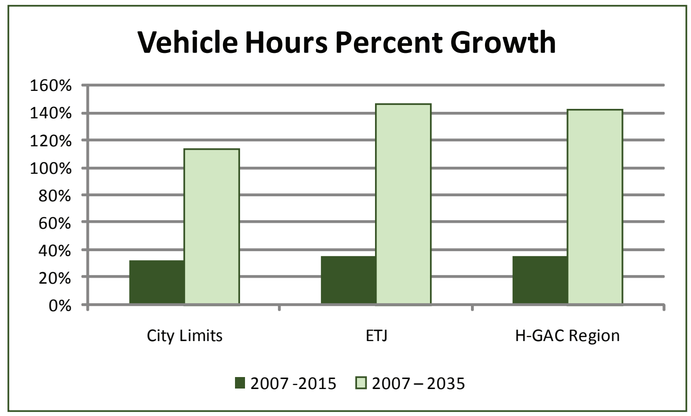
2035 Employment



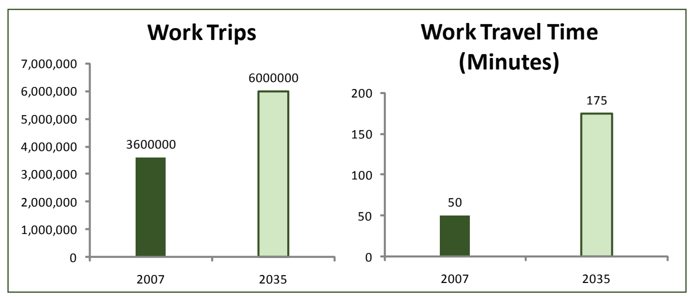








Implications for Travel around the City



To identify current mobility bottlenecks and to assess the potential impact of future population and employment growth on mobility within the City, the Houston–Galveston Area Council's (HGAC) travel demand model was adapted and refined into the City Mobility Planning Travel Demand Model. A travel demand model typically uses information about street, highway, and transit networks, and population and employment data. It calculates the expected demand for transportation facilities. The HGAC travel demand model was revised to include the population and employment projections and to reflect the existing street network within the City. Additionally, all funded transportation projects in HGAC's 2035 Regional Transportation Plan along with METRO Solutions were included to determine future street capacity and connectivity.

Adopted Improvements

Based on these inputs, and despite plans to add 8,256 street lane miles or 13% in the City and 14,705 or 23% more street lane miles in the ETJ – representing a 14% increase in overall street capacity over the next 26 years, mobility conditions are expected to worsen.

Travel Consequences

The amount of travel and the time spent traveling in the City and its ETJ are projected to increase. By 2035, the number of work trips in the City and ETJ is expected to increase by 67%. Travel time in the City and ETJ is expected to increase by two hours.

Mileage and time traveled are expected to grow moderately in the near term (through 2015). Within the next 26 years, miles traveled will increase by 67%. Time spent traveling will increase by 113%. For those traveling within the City's ETJ, miles traveled are expected to increase by 84%. Travelers will spend 145% more time in their cars.

Percent of LOS F Congestion in the Houston Region		
	2007	2035
Harris County	17%	44%
Fort Bend County	8%	28%
Montgomery County	20%	45%
Liberty County	5%	24%

Level of Street Congestion

The anticipated increase in street congestion will also have a significant impact on the City and ETJ. The increased travel demand will be met by inadequate street network capacity and connectivity. As demonstrated in the street congestion map (represented by the red lines), there is significant street congestion across the City and ETJ, particularly in the north/northwest-sectors of the area. The red lines indicate level of service (LOS) of F.[4]

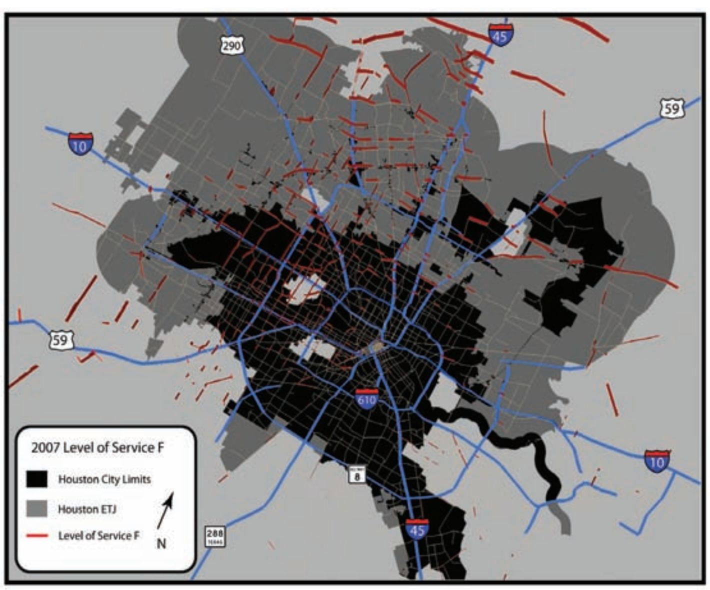
The worst congested segment of streets in the City and ETJ were also identified. The below tables provide a short list of streets that far exceed level of service F in the year 2035. Many other streets in the City and ETJ could have made this list but the streets presented here represent some of the highest levels of street congestion.

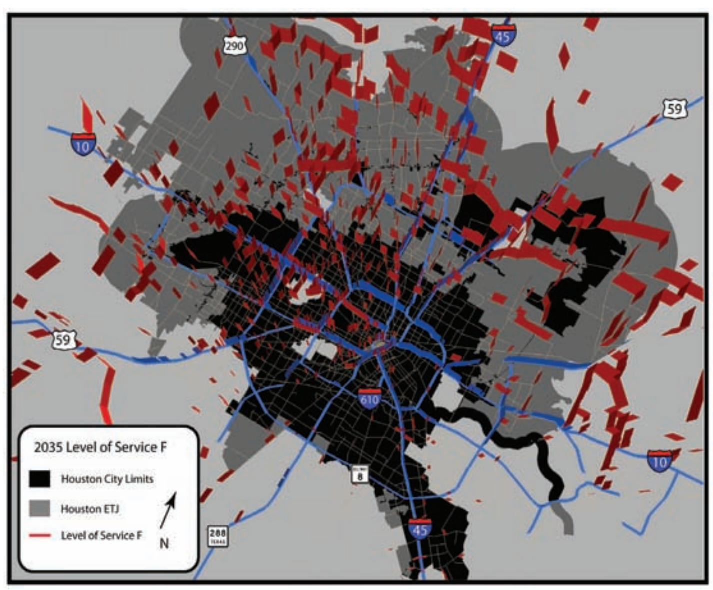
Worst Congested Streets in the City by Year 2035

Street	Between	and
Bellaire Blvd.	Wilcrest Dr.	US 59
FM 1960	Aldine Westfield Rd.	US 59
FM 1960	Lake Houston Pkwy.	FM 2100
Galveston Rd.	Fuqua St.	Scarsdale Blvd.
JFK/Will Clayton Pkwy.	Greens Rd.	Lee Rd.
Kingwood Dr.	US 59	Woodland Hills Dr.
Northpark Dr.	US 59	W. Lake Houston Pkwy
Richmond Ave.	Downtown	Loop 610
SH 6	IH 10	Westpark Tollway
Voss Rd./Hillcroft St.	Westheimer Rd.	Bellaire Blvd.
Westheimer Rd.	Montrose Blvd.	Beltway 8

Worst Congested Streets in the ETJ by Year 2035

Street	Between	and
Woodlands Pkwy	IH 45	Gosling Rd.
43rd St /Clay Rd.	SH 249	Fry Rd.
Veterans Memorial Dr.	Cypresswood Dr.	W. Mount Houston Rd.
FM 2100	Kingwood Dr.	Beaumont Rd.
Foley Rd.	West of FM 2100	
FM 2920	Telge Rd.	Bauer Rd.





4 LOS has six letter grades from A through F, representing various degrees of traffic flow. LOS A represents free-flow conditions, LOS F represents failing conditions. LOS D is considered an acceptable LOS for urban areas such as Houston.

Finding Solutions to Mobility Challenges

With these projections, by the year 2035, it is clear that Houston's mobility challenges cannot be resolved simply by adding street capacity. To make significant improvements to mobility in Houston, the City will need to optimize current transportation infrastructure by emphasizing multimodal mobility solutions and prioritizing future multimodal transportation projects. These projects will have the most effective impact on mobility in the overall transportation system.

Limited resources in terms of available right-of-way and funding led several peer cities to place a heightened interest in multimodal transportation and low-cost system improvements. The results have minimized the need for major street capacity improvements.

The principles of multimodal street design ensure that a street:

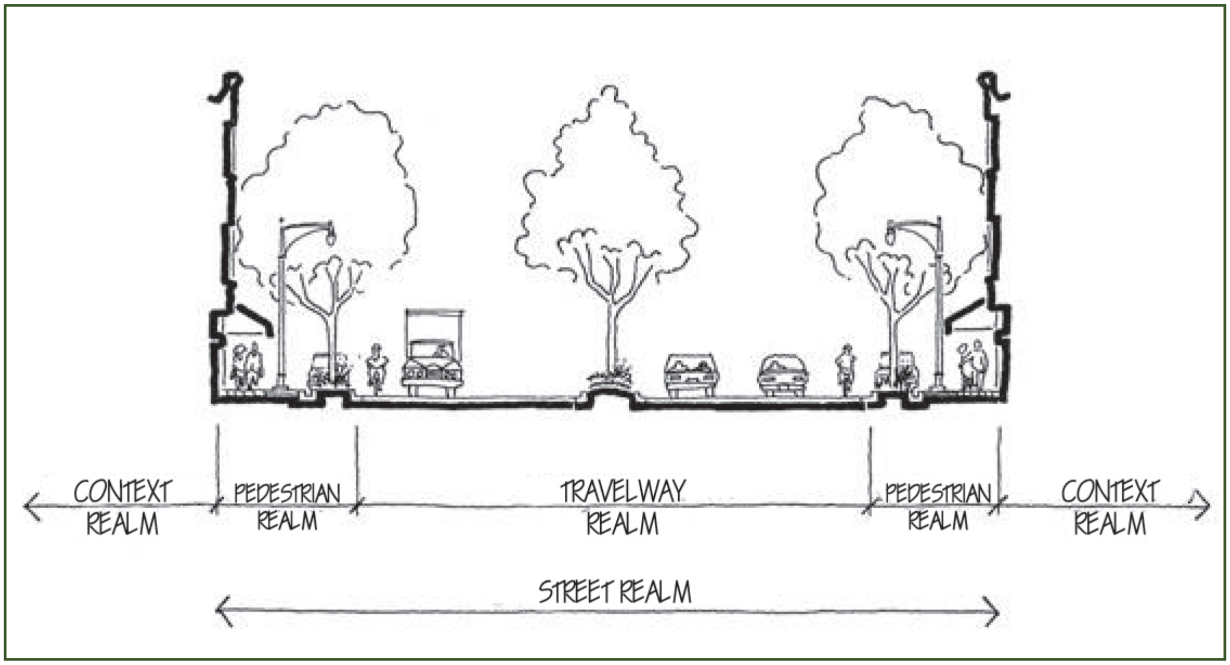
- Satisfies the purpose and needs of all stakeholders
- Is safe for users and the community
- Involves the efficient and effective use of resources
- Is designed and built with minimal disruption to the community
- Has a lasting value to the community

After extensive review of existing transportation assets and analysis of transportation best practices in peer cities, the City of Houston has created a unique mobility study process that will identify and prioritize mobility solutions within the City. The process is guided by a set of principles that recognizes mobility as a key factor in the City's vitality. It emphasizes equitable allocation of costs, recognize neighborhood and aesthetic concerns, reflect best practices, and considers non-structural approaches to mobility as well as new street construction. Used properly, the mobility study process offers policy makers, transportation planners, traffic engineers and community residents a way to work together to identify the right solution for each particular mobility challenge.

Redefining Streets for Multimodal Mobility Solutions

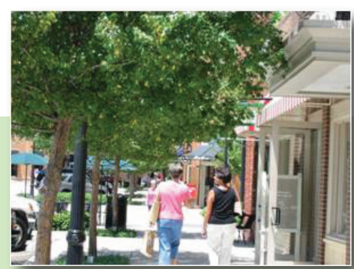
Underpinning the City's multimodal approach is a new understanding that streets should connect to their surrounding environment by adjusting street elements and functions. Traditionally, streets in Houston have taken a 'one size fits all' approach in the Infrastructure Design Manual. Streets have been designed solely with vehicle traffic demand in mind. Often this approach does not address all of the concerns of the community. It has resulted in a street design that is not always compatible in context with its surroundings.

Multimodal street design includes four distinct street elements. Each element works together to accommodate the various functional needs of automobiles, pedestrian, and land uses. The following page describes the four different street elements in the street realm.



The Travelway Realm

Defined by the travel lanes between the curb lines. While the travelway realm is primarily for automobile traffic, it can be shared with bicycle use, depending on the function of the street.



The Pedestrian Realm

Defined by the area between the curb line and right-of-way line. The pedestrian realm is intended for pedestrian use. It offers opportunity to incorporate urban design elements, based on the adjacent land use.

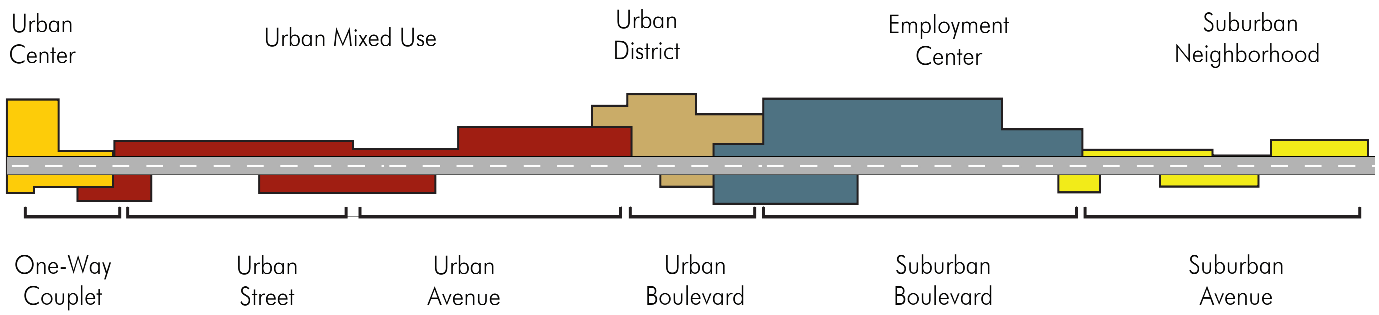
The Context Realm

Defined by the area adjacent to the street and entirely within private property. Typically the context realm is dictated by the building forms that are present. This may include residential, retail, or mixed-used buildings. The street designs are often reflective of the context.

The Intersection Realm

Defined by the area that is within the public right-of-way and involves abutting private property. This intersection realm is typically characterized by a high-level of activity and shared uses, multimodal conflicts, and complex movements. The intersection realm includes clearly marked pedestrian crosswalks and curb ramps, street lighting, landscaping, and special public art or monuments.

One Size Does not Fit All

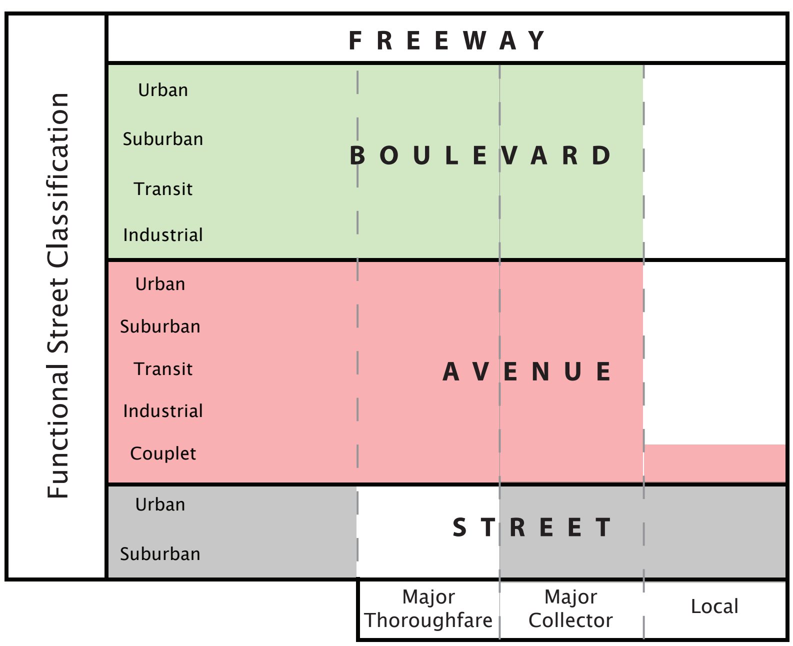


By considering each street element during street design phases, a variety of opportunities are presented to increase mobility as well as address aesthetic and environmental concerns for the street.

Additionally, a multimodal approach to street design changes as the environment changes. In designing a street under these conditions, street function and travel demand are considered. Objectives, as they relate to the environment, historical preservation, or economic development also are taken into consideration.

To accomplish this in Houston, a new functional street classification system, consistent with national best practices, was developed. This system allows the street design to change as it passes through areas that are urban or suburban, regardless of land use type. The chart below illustrates the new multimodal functional street classification system and relates it to the conventional functional street classification system.

The functional street classification system distinguishes between Freeways, Boulevards, Avenues, and Streets.



Understood properly, each street is functional while also adding lasting value to the community. On the following pages are the guidelines for each new functional street classification:

Freeways/Expressways/Parkways

Allen Parkway

Freeways are high speed (50 mph +), controlled-access thoroughfares with grade-separated interchanges and no pedestrian access. (includes tollways) Expressways and Parkways are high- or medium-speed (45 mph +), limited-access thoroughfares with some at-grade intersections. Finally, Parkways landscaping is generally located on each side and has a landscaped median. Truck access on Parkways may be limited.

Boulevards

Post Oak Boulevard

Urban Boulevards are walkable, lower speed (35 mph or less) divided thoroughfares in urban environments designed to carry both through and local traffic, bicyclists and pedestrians. Urban Boulevards may also be high ridership transit corridors. Urban Boulevards are routes for primary goods movement, emergency response, and they utilize access management techniques. The *pedestrian* and *context realms* of Urban Boulevards are oriented towards the pedestrian and building frontages. Most often the buildings are close to the street with wide sidewalks and tree wells forming space where pedestrians feel comfortable and safe. The building height to street ratio often exceeds a 3:1 ratio. This ratio creates a comfort level for pedestrians crossing wide thoroughfares.

Suburban Boulevards are high-speed (40-45 mph) divided thoroughfares in suburban environments. They are designed to carry primarily higher speed, long distance traffic. Suburban Boulevards serve separated single land uses such as residential subdivisions, shopping centers, industrial areas, and business parks. They may be transit corridors and accommodate pedestrians with sidewalks or separated paths. However, some high-speed boulevards may offer limited pedestrian facilities. In these cases, Suburban Boulevards are generally goods-movement routes, emergency response routes. They utilize access management techniques. Suburban Boulevards emphasize traffic movement, and signalized pedestrian crossings. Cross-streets may be widely spaced. In the *context realm*, buildings or parking lots adjacent to Suburban Boulevards typically have large landscaped setbacks.

Kirby Drive

Main Street

Transit Streets-Boulevards / Avenues, much like the Urban Boulevard, Transit Streets-Boulevards/Avenues are very walkable, lower speed (35 mph or less) divided thoroughfares in urban environments. They are designed to carry both through- and local-traffic, pedestrians, and bicyclists. Boulevards are designed to provide space in the median for transit facilities. Additionally, Boulevards are designed to provide the pedestrian with more walkable space. The buildings are often close to the street with wide sidewalks and tree wells. The wide sidewalks and tree wells provide a feeling of safety and comfort for pedestrians. The building height to street ratio often exceeds a 3:1 ratio which also creates a comfort level for pedestrians who cross the wide thoroughfares.

Industrial Boulevard/Avenues vary in speed from 30 to 45 mph in both urban and suburban areas. Streets with an industrial designation are designed to connect heavy vehicles to and from major highways and industrial areas. These streets have wide travel lanes with large turning radii to accommodate truck movements and limited pedestrian elements.

Industrial Avenue

Avenues

West Gray Street

Urban Avenues are walkable, low-to medium-speed (25-35 mph) urban arterials or collector thoroughfares. They are generally shorter than Urban Boulevards and give access to adjacent land. Urban Avenues serve as primary pedestrian and bicycle routes and may serve local transit routes. Urban Avenues do not exceed four-lanes and are primarily constructed to provide access to adjacent land. Goods movement is typically limited to local routes and deliveries. Some Urban Avenues feature a raised landscaped median. Urban Avenues may serve commercial or mixed-use sectors and often provide on-street parking. The *pedestrian realm* is normally a continuous sidewalk from the back of curb to the building face with tree wells spaced near the curb lines.

Yoakum Boulevard

Suburban Avenues are walkable, low-to medium-speed (30-35 mph) suburban arterial or collector thoroughfares, generally shorter in length than Suburban Boulevards, serving access to adjacent land. Suburban Avenues serve as primary bicycle and pedestrian routes and may serve local transit routes. Goods movement is typically limited to local routes and deliveries. Some Suburban Avenues feature a raised landscaped median. Suburban Avenues may serve commercial or mixed-use sectors. They can also provide curb parking. The *pedestrian realm* is distinguished by a landscape buffer separating the street from the sidewalk. Trees are located outside of the sidewalk area.

Streets

Urban Streets are walkable, low-speed (30 mph) thoroughfares in urban areas primarily serving adjacent property. Urban Streets are designed to connect neighborhoods with commercial and other districts, and connect local streets to thoroughfares. These Urban Streets may serve as the main street of commercial or mixed-use sectors and emphasize on-street parking. Goods movements are restricted to local deliveries only.

Urban Street

Dunlavy Street

Suburban Streets are walkable, low-speed (30 mph) thoroughfare in suburban areas primarily serving abutting property. A Suburban Street is designed to connect neighborhoods with commercial and other districts, and local streets to thoroughfares. Suburban Streets may serve as the main street for commercial or mixed-use sectors and emphasize curb parking. The *context realm* is defined by a landscape buffer of trees with a separated sidewalk. Goods movements are often restricted to local deliveries only.

One-Way Couplets are pairs of one-way streets that function as a single higher-capacity street. One-way Couplets are usually separated by one city block, allowing travel in opposite directions. One-way Couplets serve many different areas of Houston from higher-density commercial and mixed-use areas such as Downtown and regional centers to lower-density residential areas and main streets. One-way Couplets are designed to have a higher transportation capacity than an equivalent two-way street. Both parallel and angled parking are appropriate for these streets.

Prairie Street

Utilizing a Framework for Selecting the Right Mobility Solution

Designing multimodal mobility solutions that meet existing and future transportation demands facing the City requires a well defined process. This process begins with a clear definition of the mobility goals and objectives and ends with the right mobility solution for a particular area or corridor. A mobility study process with mobility toolbox was created to identify and develop transportation projects that meet desired goals and objectives.

(A) Define Study Area

The mobility study process begins defining and documenting the mobility problem.

(B) Collect Data

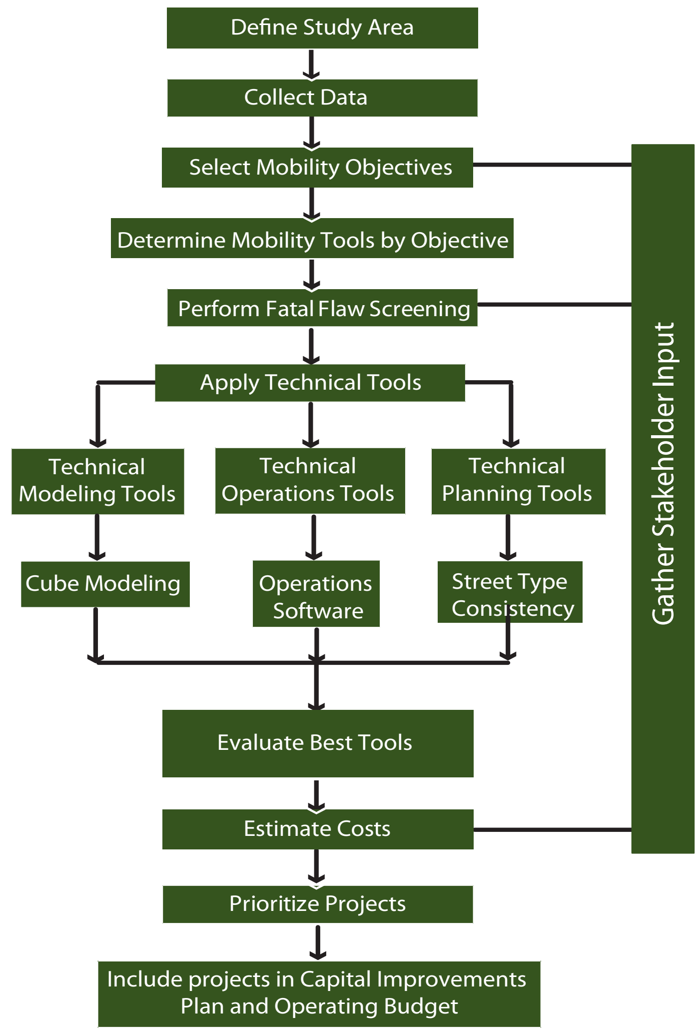
Data collection is conducted in various forms. Collection efforts may include collecting traffic volumes, street geometrics, aerial photos, property boundaries, sidewalk and land use inventory.

(C) Select Mobility Objectives

With the specific mobility problem, mobility objectives for resolving the issue are developed and tied to the relevant City mobility goals. Selecting the appropriate mobility objectives will lead to choosing the right mobility tool.

(D) Determine Mobility Tools by Objectives

Once mobility objectives are established, the mobility toolbox is reviewed, and the appropriate tools are identified. The tools are sorted into three major categories: Technical Modeling Tools, Technical Operations Tools, and Technical Planning Tools (Page 14). Technical modeling tools can be modeled using the City's new travel demand model and prioritized based on objective measures. Technical operations tools are used to enhance the efficiency of the current transportation system. A technical operations tool might be used to improve the signal timing along a corridor. Technical planning tools are not modeled but are selected based on the overall mobility objectives of the area and their ability to complete the optimum street cross-section. These tools will play a major role in meeting the specific mobility goals of an area or corridor. The tools that best meet the established mobility objectives are selected.



(E) Perform Fatal Flaw Screening

Various mobility solutions are reviewed and selected. In order to remove infeasible solutions, a 'fatal flaw screening' is performed before selecting the final mobility solutions.

(F) Apply Technical Tools

1 Technical Modeling Tools

Technical modeling tools are run to illustrate the impact of the proposed tools. They also evaluate whether or not the intended objectives are met. During a confirmation process, the benefit-cost ratio for each mobility tool is refined. From there, selected projects are moved into the final stage of mobility study.

2 Technical Operations Tools

Technical operations tools can improve the efficiency of a given area. These tools can provide additional options to improve mobility and can be paired with Technical Modeling Tools.

3 Technical Planning Tools

Technical planning tools, while equally important, are not modeled. Technical planning tools are evaluated based on their consistency with the optimum street functional classification and context. This allows for the technical planning tools, those tools outside of the travel lanes, to be given equal standing with the technical modeling and operations tools. In order to have a complete street in Houston, all of the desired tools need to be in place.

(G) Evaluate Best Tools

The evaluation of each tool is completed by comparing alternative ideas. The MOE's for each will be weighed. Preferred options will emerge as the most effective tools.

(H) Estimate Costs

Detailed cost estimates are prepared for each mobility option to be pursued with a program of prioritized tools.

(I) Prioritize Projects

The next step in the mobility study process is to evaluate how each street/traffic project performs against other projects within the City. The selection of the best projects to fund requires that a prioritization process be developed for the Capital Improvement Plan. The prioritization process should be tailored around the mobility goals and objectives of the City.

(J) Include projects in Capital Improvement Plan and Operating Budget

Final step. Once the cost estimates are completed and the project priorities are recommended, projects can then move forward in the Capital Improvement Plan and operating budget.

Gather Stakeholder Input

Stakeholder input is needed throughout this process. Refer to the mobility study flow chart on page 12 as a starting point to determine the appropriate times to meet with stakeholders. The exact number of meetings and best time to meet must be tailored for each specific mobility study.

Uses for the Mobility Study Process

The mobility study process can be used when examining areas or corridors within the City that are experiencing traffic congestion, to assess the implications of changes to the Major Thoroughfare and Freeway Plan, to prioritize street/traffic projects in the City's Capital Improvement Plan, and to monitor the performance of the transportation system. The framework is designed to encourage interdepartmental coordination within the City and among County and regional transportation planning agencies.

Mobility Objective	MODELING/OPERATONS						PLANNING							
	Increased access to transit facilities	Improve connectivity of the system	Maximize cost efficiency	Minimize travel times	Reduce increase in congestion	Neighborhood traffic	Air quality conformity	Increased access to pedestrian facilities	Increased access to bicycle facilities	Accommodate the movement of freight	Minimizing conflict points	Provide a safe and secure environment for pedestrian and bicycle safety	improve corridor aesthetics	Expand pedestrian Amenities
Technical Modeling Tools														
Roadway Widening				✓	✓									
New Roadways		✓		✓	✓									
Network Spacing	✓	✓	✓	✓	✓	✓		✓						
Grade separations				✓	✓					✓	✓			
Commuter Rail	✓			✓	✓		✓							
Light Rail	✓			✓	✓		✓							
Bus Rapid Transit	✓			✓	✓		✓							
Signature Bus	✓				✓		✓							
Local, Special Bus	✓						✓							
Park and Ride	✓		✓	✓	✓		✓							
HOV/Managed Lanes	✓		✓	✓	✓		✓							
Street Diet													✓	
Raised Medians			✓	✓	✓						✓		✓	
Intersection Design/Improvement			✓	✓	✓		✓				✓			
Technical Operations Tools														
Transit signal priority			✓	✓	✓									
Advanced Parking Signs			✓	✓	✓		✓							
Emergency vehicle preemtion				✓										
Advanced signal systems			✓	✓	✓		✓			✓				
Variable speed limts			✓	✓			✓							
Dynamic message signs			✓	✓	✓		✓			✓				
Speed enforcement			✓	✓			✓							
Evacuation and re-entry management			✓											
Signal Timing			✓	✓	✓		✓			✓	✓			
Pedestrian Phase	✓							✓	✓			✓		✓
Technical Planning Tools														
Sidewalks	✓	✓						✓	✓			✓	✓	✓
Mid-block Crossings								✓					✓	✓
Crosswalks	✓							✓				✓	✓	✓
Bike Building									✓			✓	✓	✓
Paved Shoulder		✓					✓		✓			✓	✓	
Bike Lane	✓	✓					✓		✓			✓	✓	
Multi-use Path	✓						✓		✓			✓	✓	✓
Bike Racks									✓			✓	✓	✓
Cross Access		✓	✓	✓	✓		✓				✓		✓	
Bulb-outs								✓				✓	✓	✓
Acceleration/Deceleration Lanes			✓	✓	✓						✓			
Pedestrian Islands								✓				✓	✓	✓
Lanscaping													✓	✓
Curb Ramps	✓							✓				✓		✓
Pedestrian Bridge	✓							✓	✓			✓		✓
Vanpool	✓		✓	✓	✓		✓							
Para Transit	✓													
On street Parking														
Traffic Calming Devices			✓		✓	✓					✓	✓		
Driveway Consolidation			✓	✓	✓						✓		✓	

Conclusions

By 2035, the Houston region is expected to see a significant increase in travel demand due to growth in population and employment that will result in a significant increase in traffic congestion. A jobs/housing imbalance, capacity limitations, and lack of street connectivity poses many transportation challenges. The expansion of street capacity is one mobility tool, but clearly not the only mobility tool to effectively reduce traffic congestion in the future. As the population and employment in traditionally suburban areas grows, it will be important to prepare for that increased density by embracing more urban street types and targeting multi-modal mobility improvements. Opportunities for evaluating further options could include areas such as Texas Medical Center/Rice Village, North Loop Corridor, Almeda Corridor, Energy Corridor, Uptown/Galleria, Greenspoint, Richmond/Montrose, and Downtown but no specific locations are recommended in this report. Throughout the City, a new multimodal approach is necessary to meet the mobility challenges.

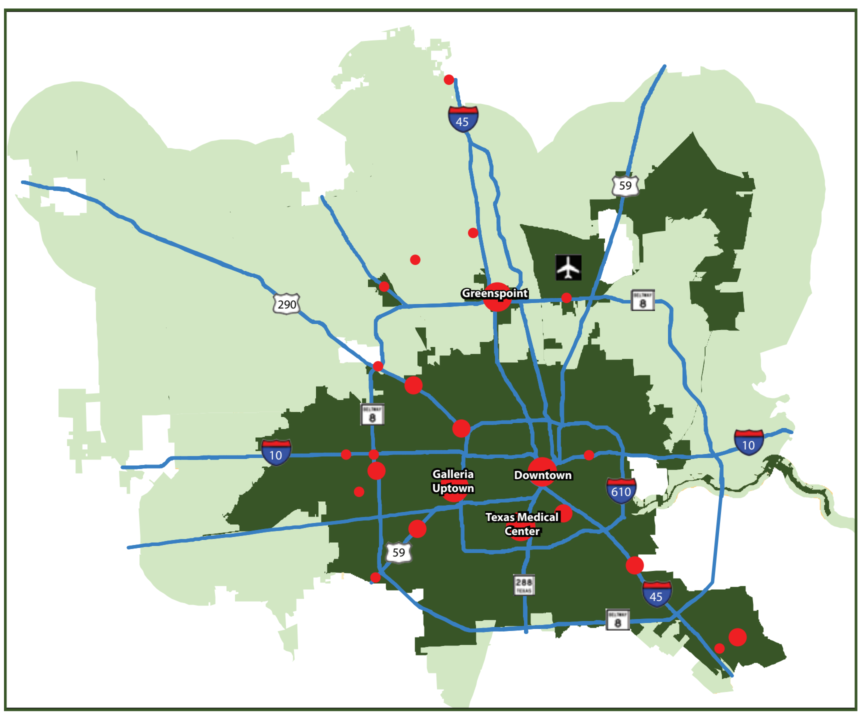
Houston is fortunate to have an extensive and well-maintained street network. By recognizing the full potential of these streets through the new multimodal functional street classification system, the City can increase mobility on existing streets and improve their function and value to the community.

Additionally, through the new mobility study process, the City has the means to identify targeted mobility improvements. The mobility study process with mobility toolbox widens the range of mobility options to be considered. They represent a model for developing an efficient and functional multimodal transportation system. Finally, measures of effectiveness gage a project's effectiveness at addressing the overall goal of improved mobility.

Together, the mobility study process with mobility toolbox reflects "best practices" in transportation planning. By inviting community input, recognizing the aesthetic as well as functional aspects of transportation facilities, and increasing opportunities for greater interagency coordination, future multimodal mobility improvements can be prioritized. These efforts will keep Houston moving forward.

Next Steps

- Develop criteria to prioritize street/traffic projects in the Capital Improvements Plan;
- Integrate mobility study process into Major Thoroughfare and Freeway Plan;
- Apply mobility study process with mobility toolbox to study focus areas and corridors;
- Develop a process to apply and update the City Mobility Planning Travel Demand Model;
- Review urban/suburban, and City Center designations for functional street classification system;
- Develop process to monitor transportation system performance;
- Use mobility study process to enhance interagency coordination on transportation planning.



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