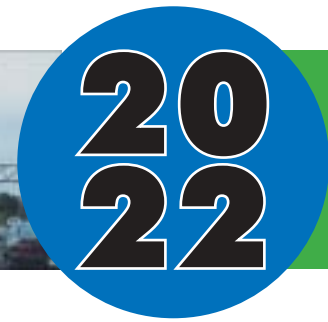


2022 METROPOLITAN TRANSPORTATION PLAN



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Houston–Galveston Transportation Management Area



The 2022 MTP is the long range transportation plan designed to meet the region's transportation needs through the year 2022. The Houston–Galveston Transportation Management Area (TMA) consists of eight counties: Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery and Waller.

UPDATE



Adopted March 22, 2002

Update of Metropolitan Transportation Plan 2022

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Overview

This document includes new and revised information that has been developed since the 2022 Metropolitan Transportation Plan (MTP) was adopted in February 2000. This update summary should be seen as a supplement to the existing 2022 plan, not a replacement. The new information involves planning assumptions for the demographic forecasts, updated financial data, and progressive work in several new areas. Some of the new focus areas include safety, transportation and land use, non-motorized travel, unmet transportation needs and major corridor summaries.

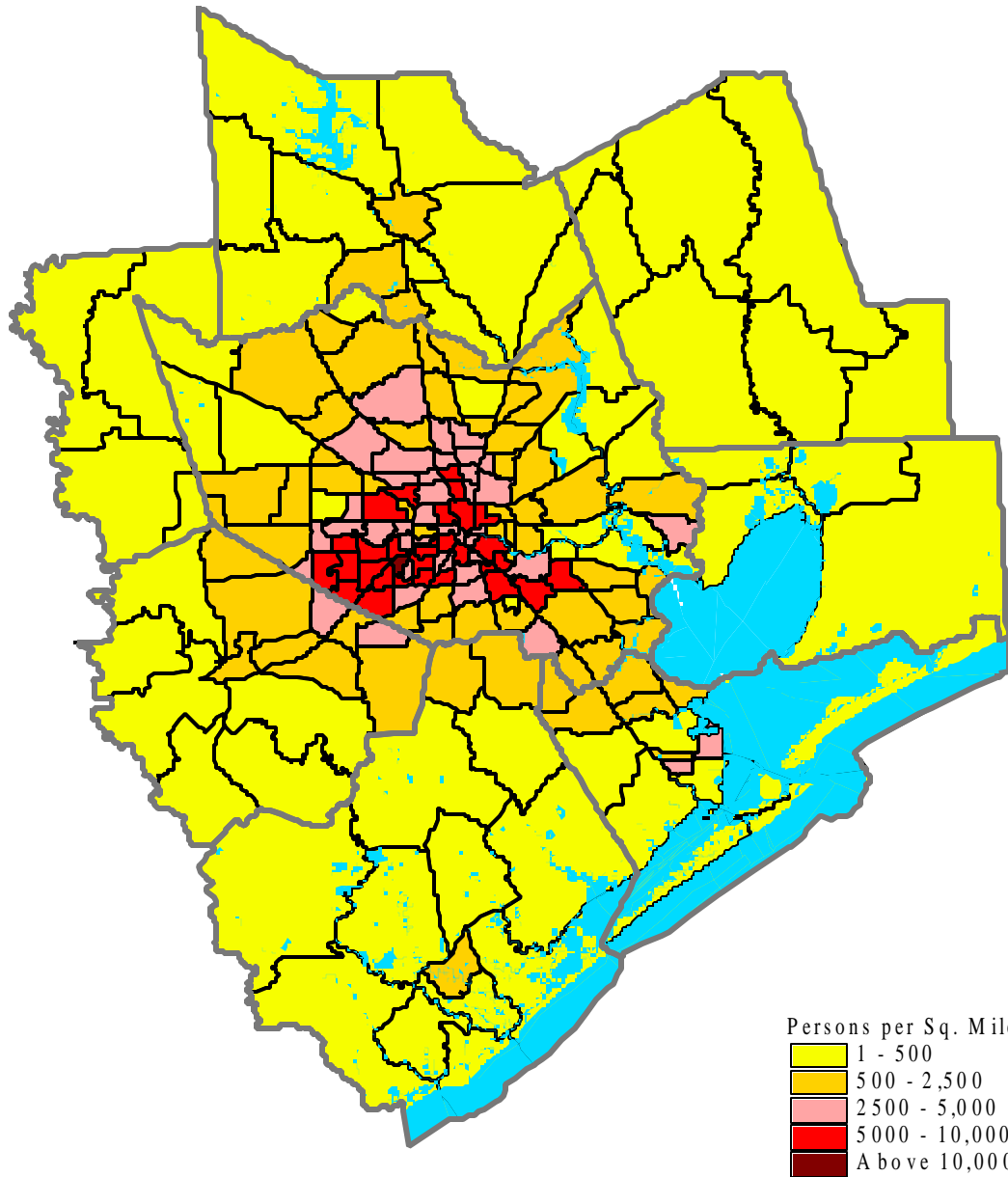
The document is a transition between the 2022 MTP and the 2025 MTP. Many of the new initiatives will be fully developed in the 2025 MTP. Recent developments related to revised guidelines for the development of the regional Bicycle and Pedestrian Plan, new directions being considered in relation to the interface between transportation and land uses, and developments in the expansion of major port facilities are included. In addition, the results of an ambitious public outreach effort during the fall of 2001 are summarized in Appendix A. A summary of the updated Air Quality Conformity analysis is presented in Appendix B and shows that the MTP for the Houston-Galveston Brazoria metropolitan area is in compliance with the Clean Air Act guidelines. The detailed Air Quality Conformity analysis is available under separate cover. Appendix C contains Corridor and Sub-area summaries. Appendix D contains a description of a framework for a consistent regional planning process. Appendix E contains the detailed project listing, available under separate cover.

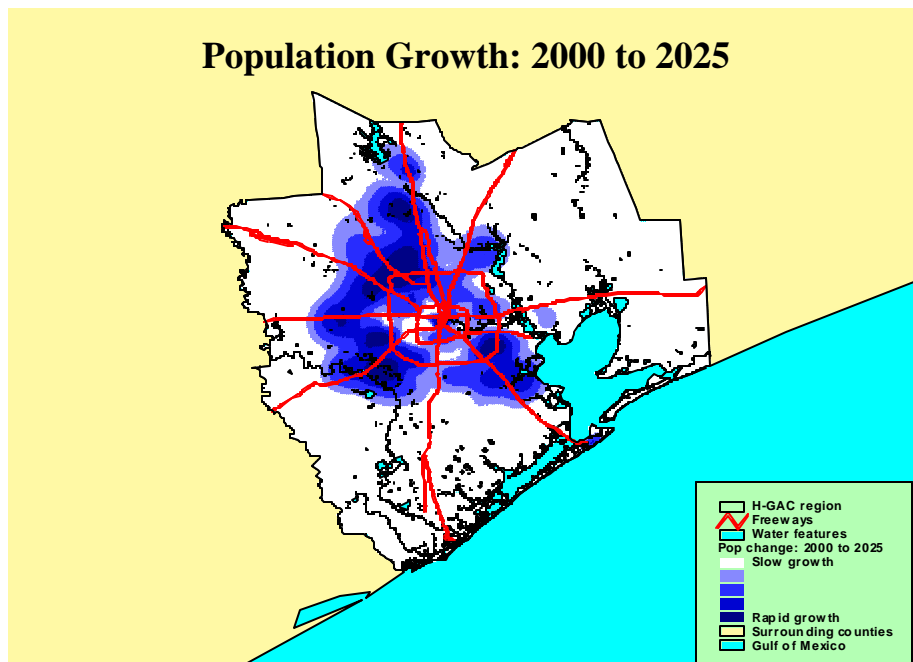
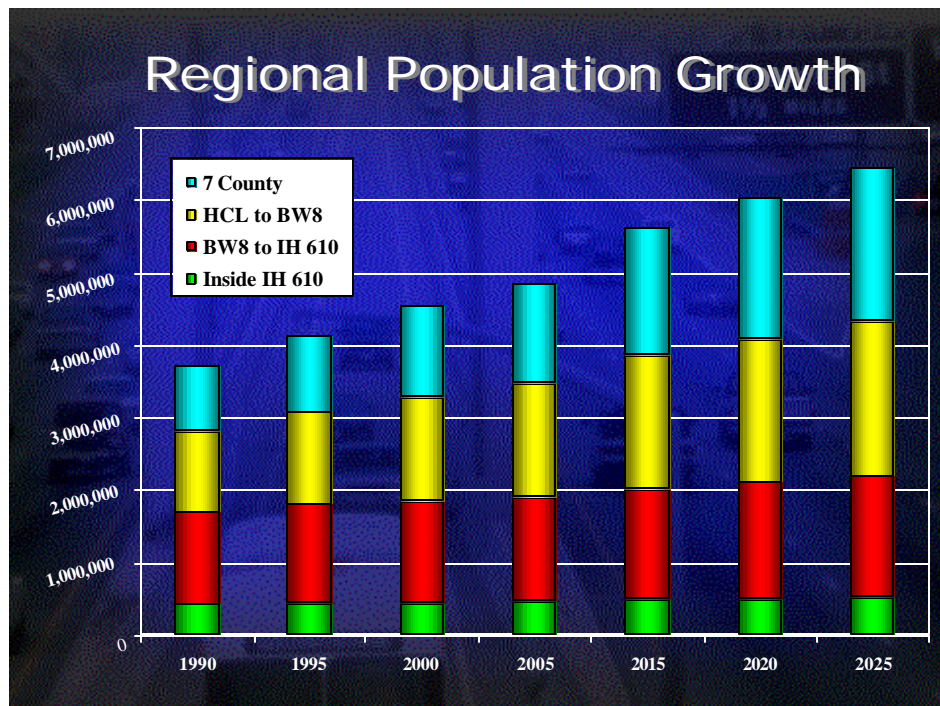
Changes Since February 2000

Several factors have intervened to require that the 2022 MTP be updated. In October 2001, the Environmental Protection Agency approved a new State Air Quality Implementation Plan (SIP) for the Houston-Galveston region. This plan calls for dramatic reductions in mobile emissions, utilizing new data and control strategies to establish strict on-road mobile emissions budgets for 2002, 2005 and 2007. In this major update of the 2022 MTP, the most recent planning data, planning tools and assumptions have been used in the analysis of the Plan's compliance with these new air quality targets.

Population characteristics such as the average size of regional households have been adjusted to more closely match the 2000 Census. The 1998 projection for the year 2000 was 4.53 million persons residing in 1.7 million housing units. Actual household population growth in the region during the 1990's was slightly more than anticipated. The 2000 Census enumerated a

2000 Population Density





regional household population of 4.6 million persons (1.4% more than was previously forecast), residing in 1.64 million housing units (3.3% less than was previously forecast). Therefore, previous planning assumptions about average household size have been revised upward.

The regional employment forecast predicts an increase of almost 700,000 new employees in the region between 2000 and 2022. Employment inside Loop 610 will remain stable, while steadily increasing outside the Loop. Regional employment continues to decentralize, with large non-Central Business District (CBD) employment centers like Uptown/Galleria, Greenway Plaza and the Texas Medical Center creating more new jobs than the Central Business District. Consistent with prior forecasts, the most dramatic employment growth rates will occur in rapidly urbanizing areas adjacent to Harris County.

Since adoption of the 2022 plan, tools used to forecast highway and transit travel have been re-validated to observed data. One important addition has been the incorporation of specific travel data for goods and persons moving to and from the region's sea and airports.

Key Transportation Needs

Traffic Congestion. The average Houston area commuter loses approximately 50 hours each year due to traffic related congestion.¹ According to the Texas Transportation Institute (TTI) data, approximately 40% of the peak period travel in the Houston-Galveston region occurred under extreme and severe congestion in 1999, a significant increase from the 26% experienced in 1982. There is a need to improve mobility through a mixture of widening and upgrading of some existing roadways, selective construction of new facilities, encouraging shorter trips and non-motorized transportation, and encouraging land use arrangements that increase transportation efficiency.

Maintenance and Preservation. There is a need to protect and maintain the existing roadway infrastructure. An aging roadway infrastructure requires substantial maintenance and re-construction. TxDOT has completed or undertaken reconstruction of some of the region's most critical roadways. Moreover, high priority has been given to reconstruction and widening of I-10 West, the I-45 South Galveston Causeway and other vital older segments of the region's freeway system. Other bridge, freeway and thoroughfare maintenance needs continue to grow, particularly as current vehicular demand exceeds desirable service levels, accelerating their maintenance needs.

¹ Texas Transportation Institute, Urban Mobility Report.

Limited Travel Options. With a few exceptions, there are few public transportation services outside of the Metropolitan Transit Authority (METRO) service area. Most of the eight county region's population resides outside of areas with scheduled transit services. This is a particular problem for those who are low income, homeless, elderly, physically impaired, mentally challenged or too young to drive a vehicle. There is a need to increase transportation choices for these populations.

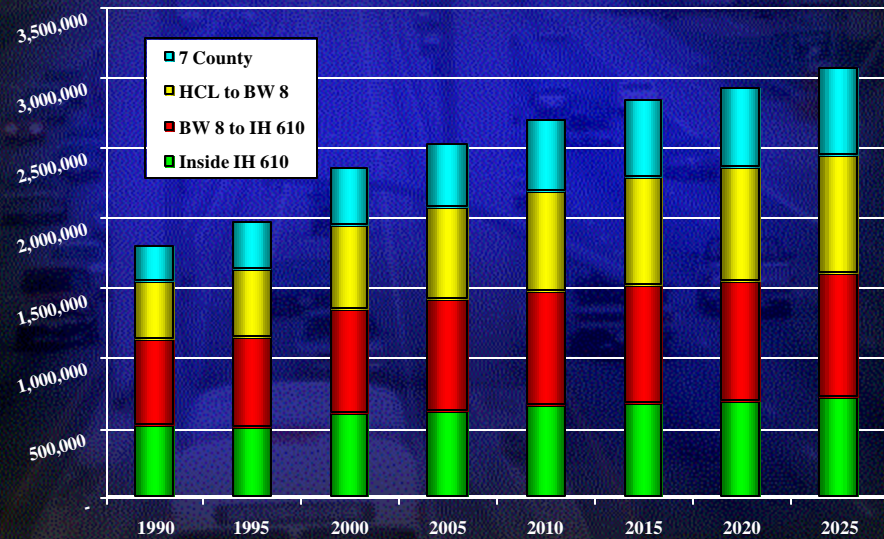
Because of financial, environmental and physical land constraints, expansion of the roadway system alone cannot keep pace with travel demands generated by future growth. Almost 121 million vehicle miles are traveled in the Houston–Galveston region daily. That number is expected to increase to more than 170 million by 2022 if the current trends continue. However, few alternatives to travel by means other than one's personal vehicle are available for most trips. In addition to limited transit access, the region lacks pedestrian and cycling friendly land use and roadway infrastructure. Delivery of goods to and from the region by rail carriers is impaired by operational conflicts with the roadway system, some capacity constraints as well as the limited size of older rail yards.

Air Quality. While improving air quality is not just a transportation issue, on-road vehicles produce approximately one quarter of the Nitrogen Oxides and man made Volatile Organic Compounds that are key ingredients to the formation of ground level ozone air pollution. By 2007, our region must be in compliance with Federal air quality standards. Stringent reductions from all pollution sources including on-road vehicles will be necessary to attain this goal.

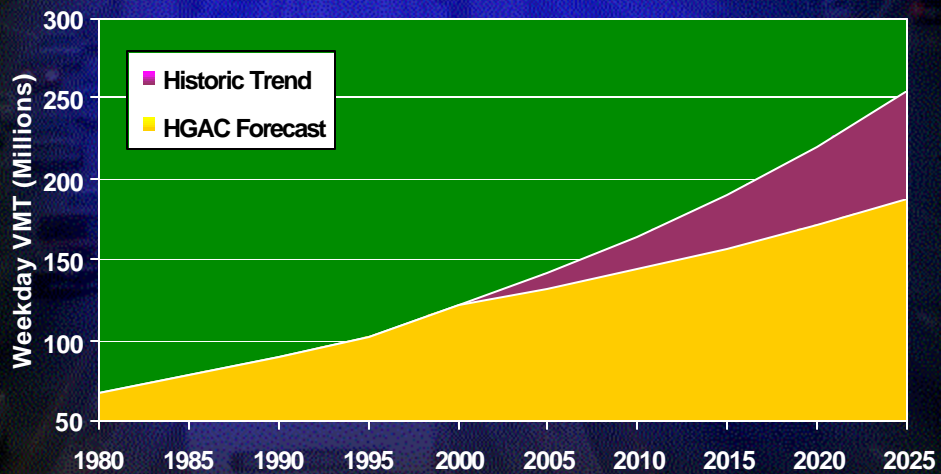
Safety and Security. There is a need to improve safety on the road system in the region. Many roads are hazardous and prone to a high number of vehicle crashes. These crashes create human costs to those involved and traffic costs to the whole region by increasing the costs of incident management, road repair, and insurance costs. Two significant safety issues are the frequency of crashes involving trains and motor vehicles traversing at grade rail crossings and traffic fatalities involving commercial trucks. Improving safety for pedestrians and bicyclists is also a high priority.

There is a need to improve security on the system through the protection of facilities (e.g. airports, bridges, underpasses), the safe transportation of hazardous materials, the ability to move people quickly during an emergency evacuation, and the general protection of drivers and pedestrians in all modes of transportation. The security of these national assets from acts of terrorism must be a continued high priority.

Regional Employment Growth



Growth in Vehicle Miles Traveled



Transportation Funding. Local commitments to transportation improvements in the form of local bond issues, toll roads and dedicated sales and property taxes have become more widespread in the eight county region, generating record levels of local investment in transportation infrastructure. State expenditures over the last five years have been variable but generally reflect a diminished commitment of new resources to the Houston-Galveston region. Although some flexibility to work with toll projects was recently granted by voters to the State Department of Transportation, efforts to expand State transportation funding within Texas have not been successful. There is a need to ensure stable and long term sources of revenue for transportation expenditures that keep up with the population growth in the region.

Meeting Regional Transportation Needs

New approaches to increase transportation services and manage the demand for more vehicular travel will be necessary to improve access, mobility and travel safety while reducing transportation's potential adverse environmental impacts. Described below are major elements of the 2022 MTP addressing the region's critical transportation needs. Also outlined are new strategies that may complement the MTP's currently planned efforts to address the growing transportation mobility challenge in the Houston-Galveston area.

Reduce Traffic Congestion. New roadway capacity will continue to be an important tool for providing congestion relief. However, construction costs and potential impacts increasingly limit this traditional approach on older facilities whose right of way is restricted by adjacent development. Improved access control including the redesign and reconstruction of access ramps, direct connectors and interchanges may provide the greatest congestion relief with increased safety to existing limited access roadways. Access management on frontage roads and major thoroughfares also can provide additional mobility. Where new limited access roadways may be constructed or where additional travel lanes may be added to existing freeways, roadway pricing should be examined as both a congestion management tool and a financing option.

Eliminating "gaps" in the thoroughfare system is critical to linking key land uses, supporting economic growth and more efficiently serving locally oriented travel. Absent, incomplete or inadequate thoroughfares burden freeway and other limited access routes with short, local trips that generate significant congestion entering and exiting the freeway system as well as creating safety hazards. Land development dependent on freeway frontage road access tends to be poorly connected to adjacent land uses, increasing the length of locally destined travel. Transit and pedestrian access to land use development on

thoroughfares is also much easier to accommodate than development along freeway frontage roads.

Effective management of both transportation facilities and services is critical to maintaining system mobility, reliability and recovery from traffic crashes, roadway repair, during special events or as a consequence of severe weather. The 2022 MTP supports a variety of investments designed to monitor and manage the transportation system and then inform both transportation providers and users seeking alternative routes, travel locations or travel modes. Increasing the number of trips taken by walking and by bicycle will add more efficiency in our transportation system. To do this will require that communities develop areas that are compact and integrated.

Even the most aggressive plans to expand and manage our region's transportation system will be inadequate to meet all future travel needs. Therefore, it is also vital that continued growth in vehicular travel be slowed by encouraging greater use of mass transit, ridesharing, vanpooling, tele-working and other demand-management programs. Driver education is also important as motorists need to be encouraged to 'trip chain' their travel, thereby reducing the vehicle miles of travel required to accomplish desired activities. Pricing roadway use commensurate with the costs of roadway congestion will be possible with the use of "managed" or toll lanes developed as part of corridor expansion projects.

Over the long-run, improved transportation/land use patterns can make the transportation system more efficient, safer, and more equitable. Working in partnership with local governments, great potential exists to integrate transit and pedestrian compatible design with land development and re-development. Developing suburban employment centers for the growing suburban population will reduce the number of long distance trips. As the region's population increases, there will be an increasing demand for employment in the suburbs as well as a demand for relief from the growing congestion on the existing road system. Distributed employment centers can help meet that demand and can help relieve the load on the system.

Increased Maintenance and Preservation Funding. To help maintain and preserve the existing road system, the 2022 MTP calls for a 24% increase in roadway maintenance and rehabilitation over the historic maintenance expenditures by State and local governments. It will be necessary to increase maintenance investment in order to repair roads that have deteriorated.

Improve Travel Options. The 2022 MTP will address the transportation needs of all persons in our region, particularly those who have difficulties in

access: the disabled, the elderly, children and youth, and those who are dependent on transit but have difficulty in accessing it. These populations need to be identified and transportation services improved to address their needs.

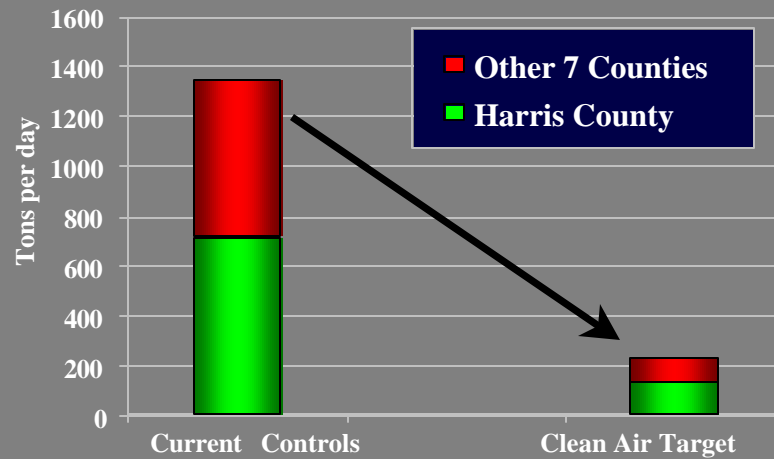
It is imperative that the future transportation system make best use of all available modes of transportation. It must be balanced and inclusive of roadway, freight rail, mass transit and technological improvements to provide more choices transporting people and goods. To reach those goals will require a variety of transportation efficiency improvements, such as more ridesharing, more transit use, more telecommuting, and the substitution of shorter trips for longer trips (e.g., reducing the distance between home and work, encouraging multiple use developments, increasing chained trips). As the ports and airports expand their capacity, the need to link these facilities with the roadway, transit and freight rail systems will require coordination, funding, and facilitation

Air Quality Compliance. The 2022 MTP demonstrates compliance with strict new air quality targets set by the State of Texas in December 2000 and approved by the Environmental Protection Agency in October of 2001. As compared to 1993 on-road vehicle emissions inventory, a 62% reduction in Nitrogen Oxides and a 74% reduction in Volatile Organic Compound emissions are required to meet the 2007 motor vehicle emissions budget. These goals are particularly challenging as the vehicle miles of travel are expected to increase 36% between 1993 and the 2007, the air quality attainment year.

Safety and Security Planning. Efforts are underway to systematically monitor motor vehicle crashes on the transportation system, identify factors contributing to the crashes, and improve safety at those locations. Particular attention is needed for local governments who often lack the budget or staff to address safety problems. The safety needs of particular sub-populations also should be addressed: pedestrian, bicyclists, and the elderly. The 2022 MTP creates a safety planning program for improving safety on the roadway system.

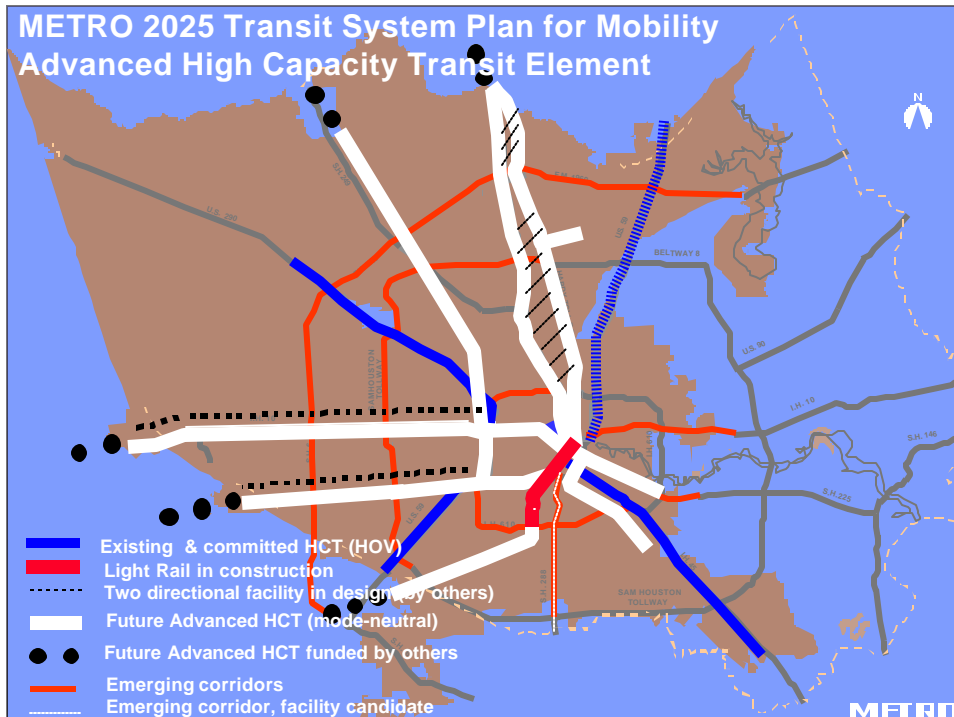
There is also a need to improve security on the system through the protection of facilities (e.g. airports, bridges, underpasses), the safe transportation of hazardous materials, the ability to move people quickly during an emergency evacuation, and the general protection of drivers and pedestrians in all modes of transportation.

2007 NO_x Emissions by County 8-County Nonattainment Area



Source: TNRCC 1998 (revised to reflect corrected mobile source estimates)

METRO 2025 Transit System Plan for Mobility Advanced High Capacity Transit Element



Stable Funding. The 2022 MTP will work to obtain a *fairer share* of state and Federal transportation funds. The Houston-Galveston region's share of TxDOT's funds have declined over the last decade when compared to the state's share of population in the Houston area. The Houston-Galveston region accounted for 22% of the State's population in 2000 but only 16% of TxDOT's funds. The declining percentage of funds means that there are proportionately fewer resources available to accommodate the travel needs of the growing population.

Financial Analysis

The financial analysis for the 2022 MTP has been reviewed and refined. Some cost and revenue adjustments have been made. Additionally, updated financial information has been incorporated for the major agencies and cities in the region. Financial information related to the expansion of the Houston Airport System and the Port of Houston is also added in this update to the 2022 MTP.

These forecasts were developed separately for each major transportation provider in the region. For most providers, forecasts were based on historical data and assumptions developed in direct coordination with the provider. Forecasts of funds and project costs were incorporated directly in the analysis, once the data were obtained from the project sponsor.²

Forecasted expenditures are categorized by the effects of the expenditure on the existing system, such as operations and maintenance (O/M), capital preservation, and expansion. These costs are then compared to the forecast revenue that is available to the region during the planning period. System O/M and preservation must be funded before system expansion, and in calculating the shortfall.

Table 1 summarizes the programmed expenditures by county while table 2 summarizes the programmed expenditures by categories. Local funding may or may not be included in the projects, which accounts for the slight discrepancy between the totals of the two tables.

The following are the principal findings of the analysis:

² These estimates were based on data provided by H-GAC, the Texas Department of Transportation (for the Houston District and part of the Beaumont District), the counties of Brazoria, Fort Bend, Galveston, Harris, and Montgomery, the Cities of Houston, Conroe, La Porte, and Texas City, the Harris County Toll Road Authority, the Metropolitan Transit Authority of Harris County, the Brazos Transit System, the Gulf Coast Center, and Colorado Valley Transit Incorporated.

1. The region's expected annual expenditure on transportation will average approximately \$2.1 billion for the 2002-2022 period, based on projected needs.
2. Of this \$2.1 billion per year, \$944 million is required to operate and maintain the system, \$330 million is required for capital preservation and \$856 million is required to complete planned system expansions.
3. The average annual revenue available for transportation from federal, state, local, borrowing, and other sources is approximately \$2.1 billion during the 2002-2022 period.³
4. Based on the estimated expenditures and revenues, the region faces an average potential funding shortfall of about \$4 million per year during the 2002-2022 period. This shortfall can be made up with proposed bond issues based on a statewide proposition that was passed in November 2001.
5. Roadway/bridge expenditures are approximately 44 percent of the total projected expenditures of the transportation system (\$931 million per year).
6. Transit expenditures are approximately 40 percent of the total projected expenditures (\$857 million per year).
7. Pedestrian/bicycle annual expenditures are less than 1 percent of the total projected expenditures (\$7 million per year).
8. The Port of Houston and the Houston Airport system annual expenditure are approximately 16% of total project expenditure (\$335 million per year).

This financial analysis does not consider additional projects that are not in the financially constrained part of the MTP. Previous estimates indicated that about \$2 billion more would be needed. In addition, this analysis does not consider METRO's 2025 High Capacity Transit Concept which could require an additional \$3-\$4 billion, subject to public approval.

³The Harris County Toll Road Authority (HCTRA) and the Fort Bend county toll road authority are expected to generate an annual operating surplus of approximately \$37 million per year. However, this surplus is not available to fund the transportation needs of other providers in the region due to bond covenants that currently prohibit these funds from being used for non-toll authority needs. Therefore, the surplus has been excluded from the total annual revenue available to the region.

Table 1

2022 MTP UPDATE PROJECT SUMMARY

Projects by Counties

County	TIP	Short-range	Long-range	Total by Category
Brazoria	\$224,792,387	\$219,448,953	\$446,126,315	\$890,367,655
Chambers	\$70,333,000	\$56,640,250	\$79,640,000	\$206,613,250
Fort Bend	\$283,753,820	\$887,463,651	\$587,420,778	\$1,758,638,249
Galveston	\$138,110,375	\$407,440,491	\$625,961,000	\$1,171,511,866
Harris	\$1,825,951,532	\$2,352,381,008	\$1,545,686,415	\$5,724,018,955
Liberty	\$48,408,700	\$66,003,500	\$106,955,000	\$221,367,200
Montgomery	\$225,100,085	\$332,477,407	\$715,039,102	\$1,272,616,594
Waller	\$18,729,969	\$99,547,000	\$41,672,000	\$159,948,969
Multi-county		\$114,723,458	\$521,184,408	\$635,907,866
Total by Schedule	\$2,835,179,868	\$4,536,125,718	\$4,669,685,018	\$12,040,990,604

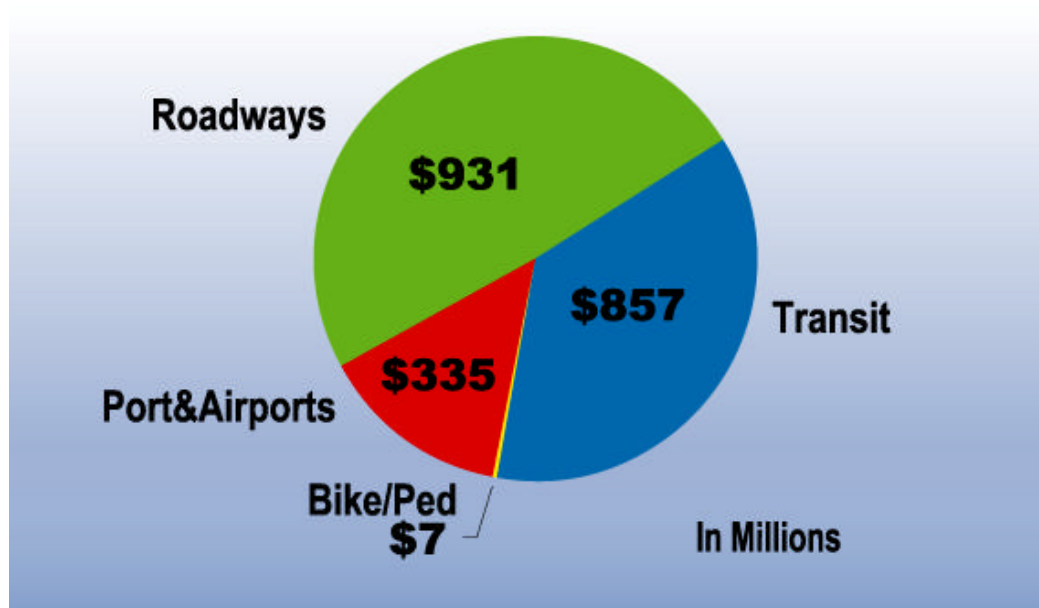
Table 2

2022 MTP UPDATE PROJECT SUMMARY

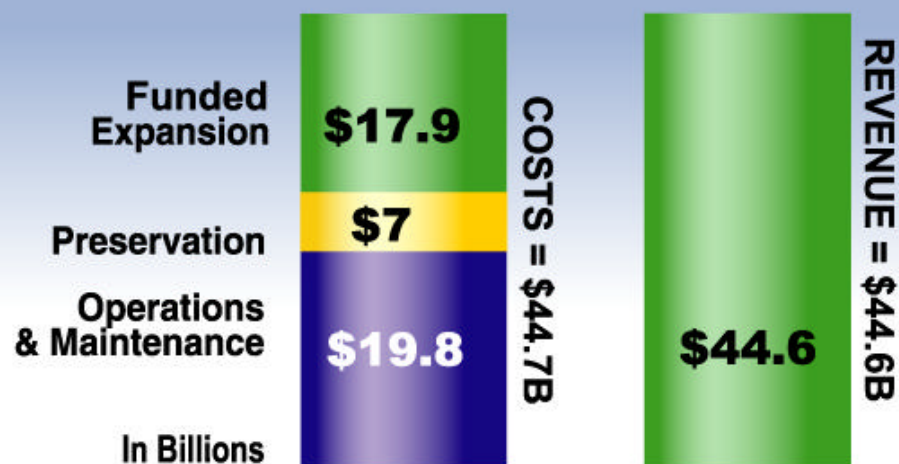
Projects by Categories

Category	TIP	Short-range	Long-range	Total by Category
Area-wide TCMS	\$322,054,120	\$239,341,385	\$451,377,042	\$1,012,772,547
Bicycle/Pedestrian	\$73,105,783	\$26,218,431	\$39,325,701	\$138,649,915
Intermodal	\$20,278,000	\$28,768,415	\$89,988,889	\$139,035,304
SOV/Added-capacity	\$2,040,045,863	\$4,120,750,212	\$4,058,287,609	\$10,219,083,684
Safety	\$19,903,300	\$9,302,400	\$0	\$29,205,700
Transit	\$346,677,247	\$57,146,298	\$76,805,229	\$480,628,774
Planning	\$125,000	\$556,250	\$0	\$681,250
Total by Schedule	\$2,822,189,313	\$4,482,083,391	\$4,715,784,470	\$12,020,057,174

Annual Expenditure by Mode



Transportation Costs vs. Available Revenue



New Transportation Initiatives

Since the 2022 plan was first approved (February 2000), H-GAC has initiated several new programs to widen our transportation focus in order to concentrate on improving the quality of life for our citizens. The following is a brief description of these initiatives.

Transportation and Land Use

Developing a better understanding of the relationship between land use patterns and transportation system performance will be an essential step towards meeting the challenge of maintaining regional mobility. H-GAC has initiated the development of a series of two types of scenarios in order to understand how different types of land use arrangements could impact regional travel time and air quality. These are:

1. Land use-transportation scenarios, which are shown in the matrix on page 21 and described later in this section. Each of these scenarios will be analyzed, using the regional traffic model, to assess the impact on total travel time in the region as well as travel time along particular corridors. Other potential outcomes of each scenario, such as safety, environmental impacts, environmental justice, and effect on the region's overall quality of life will also be assessed. The aim of this scenario evaluation is to look at the potential **effects** of various planning approaches. The most promising of these will be proposed for incorporation into the 2025 MTP.
2. Transportation system scenarios are also shown in the matrix below and described below. Keeping the forecast land use scenario constant, H-GAC will evaluate how different alternative transportation networks could affect regional travel.

Thus, each type of scenario – land use or transportation system, will be evaluated separately. For each type of scenario, the other variable will be constrained to the 2025 baseline forecast. Only after each of these has been evaluated separately will interactions between alternative land use arrangements and transportation systems be evaluated.

Land Use Scenarios

Five land use and transportation systems scenarios will be constructed:

1. The **current H-GAC accepted forecast** (baseline).
2. **Transit-oriented development:** This scenario will examine the impact of building high capacity transit lines in the metropolitan area on total travel times. METRO has adopted a plan to develop high capacity transit facilities in seven corridors in the region. If light rail is identified as a viable technology in any of those corridors there will likely be opportunities for higher density developments proximate to proposed station locations. The existence of rail lines should concentrate employment more closely towards the proposed rail stations and, possibly, population. The transit-oriented development scenario involves increasing employment by 50% from the baseline forecast within a quarter mile from each station and by 25% between a quarter mile and a half mile from each station. In addition, the population living within a quarter mile of each station is increased by 25%. The additional population and employment around the planned rail stations are then subtracted from other areas within the county in which the station is placed.
3. **Expanded transit-oriented development:** The expanded transit-oriented development scenario uses the METRO planned high capacity transit corridors but adds new potential stations to the plan based on assumed population densities and the location of populations in need of transportation.
4. **Reduction in flood-plain development:** This scenario will examine the effects of reducing growth in the 100-year flood plain to reduce damage and liability costs. In this scenario, forecast population growth within the 100-year flood plain will be reduced by 25% and re-assigned to other areas within the same county.
5. **Suburban employment center development.** This scenario examines the effects of increased concentrated employment in regional centers. As the region increases in size and area, employment will slowly shift to suburban areas. Twelve to fifteen centers have been identified in which employment is growing substantially and commercial space is being constructed. To test

the scenario, forecast employment in these centers will be increased by 25% over the baseline forecast for 2025 and reduced in other areas.

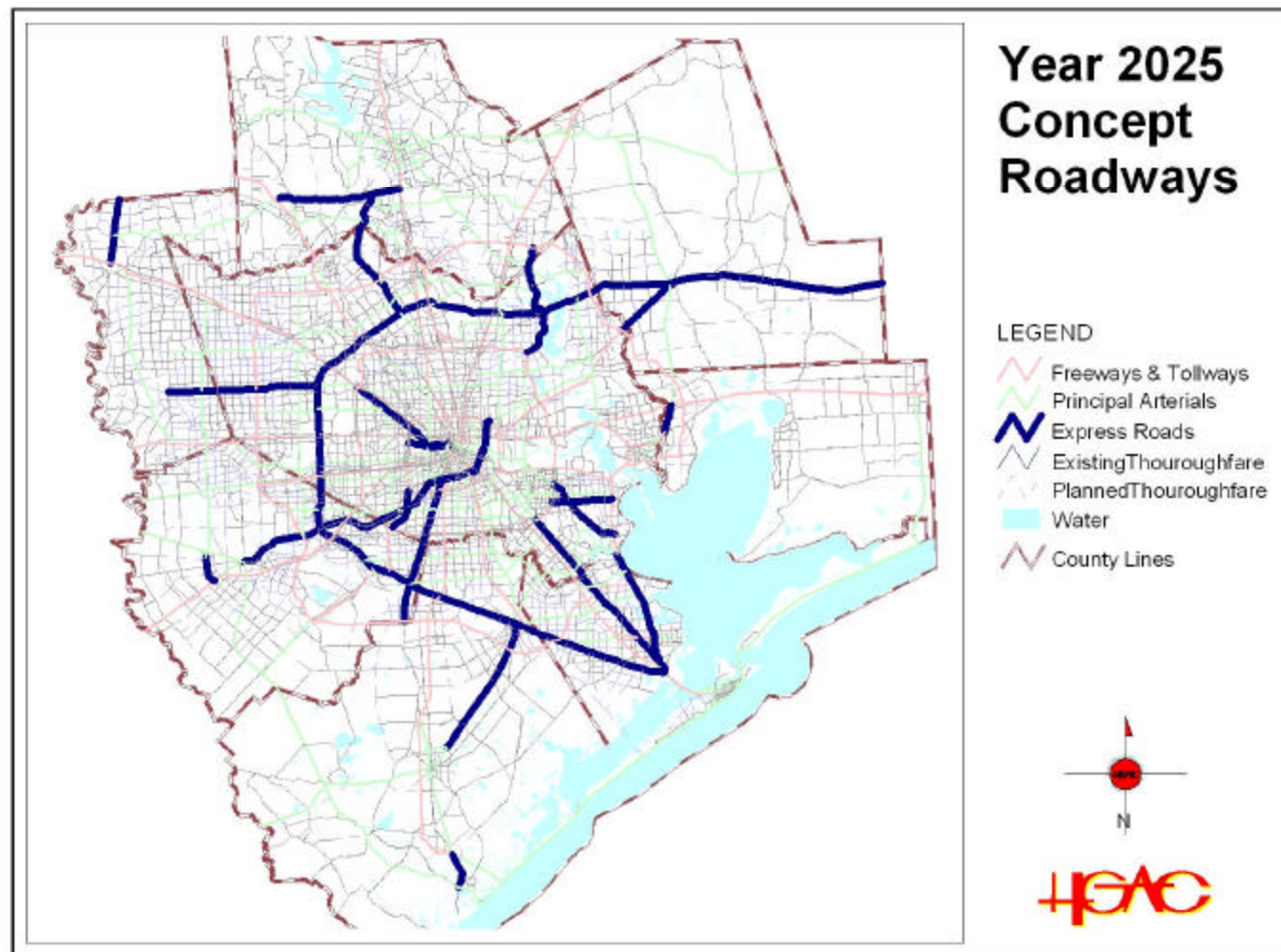
Transportation System Scenarios

Several conceptual operating plans are being considered for transportation system options that will be evaluated with the varying land use scenarios discussed above and summarized in the matrix. In general they follow an approach from the least expensive baseline scenario, which includes existing and committed projects, to low cost Transportation System Management (TSM) applications. The most expensive *Max Highway* option envisions the extent of roadway capacity that would be needed to address the projected growth in traffic if the financial resources were available. The most likely options are discussed briefly below:

1. **Manage It Better** –Implement more system management and operational strategies to improve the effectiveness of the current transportation system. The proposed 2022 transportation system includes METRO's *CBD to Dome* Light rail line and bi-directional High Occupancy Vehicle (HOV) lanes in some major corridors. Programs and projects to optimize the utilization of the current HOV system will be developed and employed. Increased System Management would include more extensive incident management on freeways with expanded Computerized Traffic Monitoring Systems (CTMS) and expansion of the Motorist Assistance Program (MAP) outside of Harris County. It would also include more arterial traffic management systems (ATMS) throughout the region to synchronize traffic signals along high volume routes. More emphasis would be placed on more timely implementation of the regional computerized traffic signal system (RCTSS) to provide proactive signal control through the TRANSTAR emergency management center. Strategies and incentives to increase transit usage and expand Transportation Demand Management (TDM) programs such as carpooling, vanpooling and teleworking would also be emphasized.
2. **Transit Emphasis** 2025 MTP- Same as the proposed 2022 MTP roadway system with METRO's 2025 Transit Plan concept incorporated (see the figure on page 21).

POTENTIAL TRANSPORTATION PLAN SCENARIOS

	Land Use Scenarios				
Transportation System Options	Current Trends	Transit-oriented Development (TOD)	Expanded TOD + (Change it)	Densify Suburban Employment Centers	Reduced Floodplain Development
E + C Baseline	X				
2022 MTP with TSM Manage it Better	X				
2022 MTP with Transit Emphasis (METRO 2025 Plan)	X	X	X	X	X
2022 MTP with Roadway Emphasis—Express Streets	X	Secondary	Secondary	X	X
2022 MTP Maximum Highway Build it	X				X



3. **Arterial Street Improvements/Express Streets** - Efforts have started to identify potential major arterial roadways and proposed thoroughfares in the region that could become express streets. Existing high volume arterial roadways would be widened if the right of way is available. When expansion of an existing arterial road is not feasible, such as FM 1960 in northern Harris County, access management techniques would be employed to increase the traffic flows along the roadways.

In some instances driveway access would be reduced and entrances to commercial or office centers would be routed to use nearby intersecting roadways. Projects to synchronize the traffic signals along the express streets and construct grade separations over high volume intersections would also help to improve the traffic flows. Potential express streets are shown in the figure on page 21.

The tradeoffs of the varying land-use arrangements and transportation system options will be presented in the 2025 MTP. Thoroughfare plan expansion could be based on a two-mile grid pattern of arterial roads in the fastest growing areas of the 5 urbanized counties (Harris, Galveston, Brazoria, Fort Bend and Montgomery). A measure of current and projected population density such as 2000 or more persons per square mile could be used to guide the development of future thoroughfare networks.

Intermodal Congestion Quick Response Team

The Inter-modal Congestion Quick Response Team (QRT) is in its second year of a three year demonstration project. The purpose of QRT is to provide immediate, low-cost solutions to congestion problems associated with the transportation of freight cargo. The QRT Advisory Committee selected six projects for immediate remedial action and endorsed the following recommendations:

1. Telephone Road and Brisbane intersection. Committee recommendations: optimize existing traffic signal timing, increase NW corner radii, relocate the NW corner signal pole, re-stripe Brisbane Street, and implement new vehicle detection devices.
2. Barbours Cut Boulevard from SH 146 to Vinsonia Street. Committee recommendations: improve overall arterial and adjacent freeway(s) signage.

3. Jacinto Port Boulevard and Peninsula Boulevard intersection. Committee recommendations: realign (widen) the existing intersection and install exclusive left-turn lanes.
4. IH 610 South Frontage Road and Clinton Drive intersection. Committee recommendations include roadway geometry and operational improvements: increase NW curb return radii, increase left-turn storage bay, implement shared lane assignments, and upgrade existing traffic signal and timing.
5. 9600 Clinton Drive. Committee recommendations: change existing signal timing to actuated and upgrade vehicle detection devices and signage.
6. IH 610 East and Wallisville Road intersection. Committee recommendation: optimize traffic signal timing.

Bicycle and Pedestrian Plan

Replacing a vehicle trip with a bicycle or pedestrian trip conserves roadway capacity while reducing air emissions. A good bicycling and walking environment is also increasingly seen as an important quality of life asset in the competition among regions for talented workers. Increased levels of physical activity, such as bicycling and walking, will provide health benefits for the region's residents as well.

The purpose of this element of the MTP is to establish a comprehensive strategy for replacing enough vehicle trips within the TMA by bicycle and/or pedestrian travel over the next 25 years to make a discernible impact on congestion, air pollution, "quality of life" and public health. H-GAC is proposing two goals to govern non-motorized transportation:

1. Double the share of trips made by bicycling or walking in the region by 2022
2. Significantly increase bicycle and pedestrian system user safety

Doubling the share of bicycle and pedestrian trips within the TMA and significantly increasing safety appear to be achievable goals within 25-year time horizon of the MTP. In evaluating the challenges to meeting these goals, the following appear to be the most effective course of action.

Focus on short trips

It appears that the best opportunity for getting people out of their cars and onto their feet or bicycles is to concentrate on shorter trips (less than 1/2-mile for walking; less than 2 miles for bicycling). The key to this strategy will be the development of more mixed land use areas that allow for shorter trips to retail, school and recreation destinations, to be made on foot or by bicycle. While the MPO does not have any direct authority in this area, it can provide technical assistance and encourage local governments and developers to adopt policies and best practices that will further this aim. Since development patterns are well-established, achieving major changes in the urban scheme of the TMA will likely take longer than 25 years. However, if such policies and practices are implemented now, progress can be made during the time horizon of the MTP.

Accommodate bicycles and pedestrians on all roadways

Providing maximum convenience and connectivity will also require changing the focus of bicycle and pedestrian planning from widely-spaced networks of bicycle lanes and off-road paths to the accommodation of these modes, where feasible, on all roadways. Since retrofitting the entire existing roadway system is not financially feasible, it appears that the best alternative is to ensure that such accommodations are made as a part of future MTP projects involving the development of new roadways or the reconstruction or expansion of existing facilities. It is important that this policy shift occur now so major roadway projects do not become future barriers, requiring costly retrofits. Similarly, local governments can ensure that sufficient right of way and design considerations are made in local street planning and in the layout of new subdivisions.

Also critical to this effort will be the establishment of appropriate guidelines for accommodating bicycles and pedestrians through street and intersection design and access management. Similarly, adequate levels of maintenance must be factored into the design and cost estimation of bicycle and pedestrian facilities.

Make Capital Investments in High Yield facilities

There are areas that currently have population or employment densities capable of supporting greater bicycle and pedestrian travel, such as the Downtown, Uptown and Midtown areas of Houston, the Texas Medical Center and areas where there already is high bicycle usage (e.g., the Rice Village area, Montrose). Additional areas need to be identified that have the greatest existing or potential demand so that concentrated investments encompassing street and sidewalk improvements, intersection design, signage and end-of-trip facilities can

be made. It appears that a bicycle or pedestrian district strategy has the potential to yield the greatest number of trips for the investment and also provide the greatest safety gains.

The next capital investment priority should be completing and addressing gaps and barriers in the system of regional bicycle and pedestrian facilities already under development by local governments in the TMA. Better evaluation tools will be needed to prioritize these improvements and determine the cost-effectiveness of such investments.

Sustained Education Efforts

Finally, there will need to be a sustained education effort if a change in travel behavior of this magnitude is to be achieved. As with successful campaigns to promote recycling, a long-term approach, involving all segments of the community, will be necessary. This effort should stress safety for motorists, cyclists and pedestrians alike, and should also emphasize the health and air quality benefits associated with non-motorized travel. It is doubtful that any such program would be successful without broad support by local and state agencies, school districts, the private sector and community organizations. To this end, it appears that the best use of MTP-directed resources would be to help develop coalitions among these groups and attempt to leverage additional funding to implement the education program.

Safety Plan

H-GAC will play a coordinating role in seeking to improve safety on our road system. H-GAC is just starting its program, but H-GAC will work with TxDOT and local governments to address safety concerns. In particular, H-GAC aims to become a resource for local governments to help them identify hazardous locations and road stretches, to develop countermeasures for improving safety, and to work with TxDOT in funding the improvements.

There are six tasks that H-GAC will accomplish over the next few years.

1. Develop a region-wide crash information system. Data have been obtained from the Accident Records Bureau of the Department of Public Safety on all reported crashes in the region. H-GAC will geo-reference these crashes to our extensive GIS systems to identify hazardous locations;
2. Develop safety applications. H-GAC will examine different types of transportation safety problems, such as pedestrian and bicycle crashes, elderly safety, and safety for commercial motor vehicles. Another application concerns safety at railroad-highway grade

crossing. Crashes that occur at rail crossings are rare, but those that do occur are often calamitous. TxDOT has developed a railroad safety program to address unsafe railroad crossings. Over \$43 million was programmed in TxDOT's 2000 Unified Transportation Program for railroad grade separations in the Houston District for the years 2000-2003;

3. Develop a methodology for addressing safety concerns as specified in Federal law and regulations - the Hazard Elimination Program (HEP; Section 152) and the Railroad-Highway Grade Crossing Program (Section 130). H-GAC will work with both TxDOT and local governments to help fund projects under the HEP for improving safety at hazardous locations on local roadways. To this aim, H-GAC will utilize the TxDOT methodology for HEP funds and will help educate its member constituencies on the steps involved in applying the methodology;
4. For non-HEP projects, H-GAC will incorporate safety as an additional planning factor. Again, the aim is to improve safety throughout the transportation system, whether or not the project is funded by the HEP and Section 130 or not. The public expects the roads to be safe and H-GAC must work toward ensuring that safety is considered at all times in transportation projects;
5. Develop safety services. Eventually, H-GAC intends to provide safety materials and short courses on safety planning to local governments, elected officials, and other relevant parties. This, of course, will take time to develop but H-GAC sees the education role as being critical in improving transportation safety throughout the region; and
6. Develop working partnerships with public, non-profit and private organizations on transportation safety issues. Among the partners who H-GAC will work with are TxDOT, local governments, TranStar, AAA, FHWA, NHTSA, Operation Lifesaver, road safety organizations (e.g., the Road Safety Foundation) and insurance companies.

Progress To Date

To date, H-GAC has started four activities:

1. First, H-GAC is starting to build a region-wide safety (crash/accident) information system. Data have been obtained on all crashes in the region from the Texas Department of Public

Safety (DPS) for 1998 and are in the processing of geo-referencing the crashes to our extensive GIS system. One of the major obstacles is that DPS is using an old 1970s database that does not properly identify roads, particularly local roads. H-GAC is developing a coding system that will translate their codes into geographically-specific information that can be displayed on a GIS. So far, H-GAC has been able to geocode about 50% of the crashes, but the aim is to achieve a nearly 100% matching rate.

2. Second, H-GAC is prototyping two high crash locations, both on Westheimer Road. This is part of a larger Westheimer Corridor study, but the identified locations have crash levels and risks far in excess of other intersections. Westheimer Road is a good example since it is technically defined as a state road, but is managed by the City of Houston. H-GAC wants the prototype to illustrate how safety concerns can be addressed on both state and local roads. H-GAC is releasing an RFP for a consultant to produce a pilot study of the two intersections and to develop countermeasures. H-GAC will conduct a formal benefit-cost analysis of the countermeasures in accordance with the HEP legislation and codes.
3. Third, H-GAC is building safety partnerships with TxDOT and the Houston Police Department to address truck safety concerns on several major roads. It is still an early stage in the partnership, but it is hoped that specific projects will be developed that can reduce the number of truck crashes in the region.
4. Fourth, a methodology has been outlined for identifying high crash locations and for evaluating proposed countermeasures to reduce crashes at those locations. The methodology is described below.

Safety Index Methodology

The proposed plan for developing the safety index will involve the following steps:

- Step 1. Identify and select high crash locations. The high crash locations will be based on crash volumes, severity levels, or crash risk.
- Step 2. Determine a crash pattern from available records.
- Step 3. Conduct a site visit, make a visual inspection, and perform a preliminary engineering analysis.

- Step 4. Develop a list of recommended countermeasures.
- Step 5. Analyze associated crash reduction factors (CRF) for each recommended countermeasure and estimate the assumed benefits of the measure.
- Step 6. Estimate the total costs of the countermeasure.
- Step 7. Develop a benefit-cost ratio and select the CRF that produces the greatest benefit.

The theoretical foundation for the safety index was summarized in TAC Agenda Item 8 dated 07/11/01. Additionally, the proposed safety index will incorporate the Hazard Elimination Program (HEP) and Benefit-Cost (B-C) Analysis. The HEP methodology is required for HEP funds, Section 152 of Title XXIII. This procedure is also considered to be a good methodology for Railroad-Highway Grade Crossing funds, Section 130 of Title XXIII.

The B-C methodology calculates an annualized net present value of benefits relative to annualized cost. The end result is a numerical ratio.

Safety Improvement Index (SII)

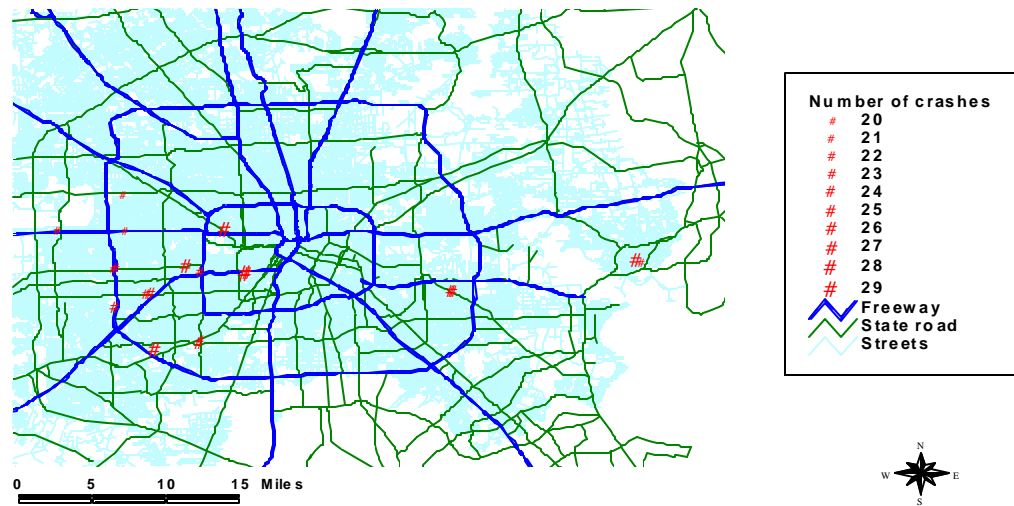
$$SII = B/C = \frac{\text{Benefits over \# years}}{\text{Cost of project}}$$

SII is a quantitative measure of the relative ability to reduce the potential for vehicular crashes by implementing a safety countermeasure. SII is a variable less than, greater than, or equal to 1. When $SII < 1$ the improvement is not warranted. When $SII > 1$ the improvement is warranted. When $SII = 1$ the improvement is marginal.

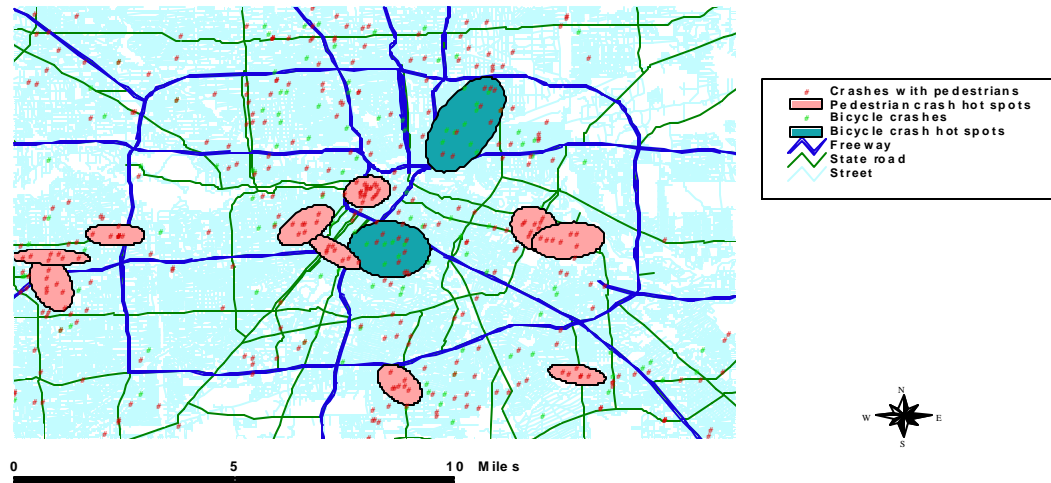
HEP Definitions

1. There are five levels of crash severity:
 - a. Fatalities
 - b. Incapacitating injuries requiring hospitalization
 - c. Serious injuries requiring hospital admittance

**Top Twenty Crash Locations:
Houston Police Department Database: 1998**



**Pedestrian and Bicycle Crashes: 1998
Hot Spot Locations**



- d. Minor injuries requiring treatment
- e. Property damage only

Some agencies combine fatalities and incapacitating injuries to produce a more stable value.

2. Crash locations are identified as having a high number of crashes, a high number of severe crashes (fatalities and incapacitating injuries) or a high *crash risk* (crashes per 100 million VMT). These locations can be road segments or spot locations.

For each high crash location, the type of crash is identified and one or more countermeasures are proposed. The estimate of the net reduction is applied to crashes that fit the pattern for which the mitigation was designed. For example, if there are 30 crashes at an intersection of which 24 occur while one vehicle is turning left, a mitigation that improves safety for vehicles turning left will only reduce crashes for the 24 that occurred while turning left.

3. For each proposed countermeasure, a crash reduction factor (CRF) is calculated based on the assumed reduction in crashes that will occur for a particular mitigation. CRF is a variable between 10% and 95% and is a quantitative measure of the percentage that a specific countermeasure will reduce or mitigate the number of crashes at a particular location under a specific set of circumstances. CRFs are typically documented by State agencies as work codes and TxDOT has developed the following five basic categories:

- ? Signing and Signals
- ? Roadside Obstacles and Barriers
- ? Resurfacing and Roadway Lighting
- ? Pavement Markings
- ? Roadway Work

National tables of CRF's are also available. Some specific examples are:

- | | |
|---------------|------------------------------------|
| 10% reduction | ? Install a curbed sidewalk |
| | ? Install a pedestrian crosswalk |
| | ? Interconnect two traffic signals |
| 95% reduction | ? Remove a tree |
| | ? Install a pedestrian bridge |
| | ? Install a railroad overpass |

5. CRFs are converted into a reduction in fatalities, injuries, and property damage only crashes. For each type, the crash reduction is calculated as:

$$\begin{array}{rcl} F & = & F(B) - F(A) \\ I & = & I(B) - I(A) \\ P & = & P(B) - P(A) \end{array}$$

where F are fatal crashes, I are injury crashes, P are property damage only crashes, B is the time period before the mitigation and A is the time period after the mitigation (usually 3 years).

6. Benefits are a return over a number of years or a *stream of benefits*. They are calculated as the total value of the *reduced* number of fatalities, injuries and PDO crashes by type of crash over a specific number of years (e.g., 20).
7. Benefits are calculated separately for fatalities, injuries, and PDO crashes and then combined to form a total benefit. For each type of injury level, the benefit is obtained by multiplying the expected number of reduced fatalities, injuries, and property damage only crashes over the time period by a dollar value that estimates the total lifetime cost of a fatality, injury, or property damage crash. Usually, the benefits are applied to *victims*, not crashes, with the exception of PDO crashes. For example, if the expected crash reduction is three fewer fatal crashes involving five individuals and six fewer serious injury crashes involving ten individuals, the benefits are calculated for the individuals, not for crashes. Usually National Safety Council estimates or some variant are used for the dollar values. In 2001, the dollar value of a fatality was around \$2.1 million, of an incapacitating injury around \$600,000, of a serious injury around \$75,000, and of a PDO crash around \$6000. Thus, the benefits are calculated separately for each type of crash and then combined to form a single benefit value.
8. Costs are calculated as the total costs involved in implementing the countermeasure. Usually, only the construction costs are included and not the maintenance, operating or administrative costs. In some documents, FHWA has suggested only using construction costs. However, some agencies calculate comprehensive costs if there are other costs that will continue for the life of the countermeasure (e.g., traffic signal maintenance).

9. Finally, once the total benefits produced by the countermeasure and the total costs of implementing it are determined, the ratio of benefits to costs can be calculated. This has the advantage of standardizing comparisons. Thus, different proposed countermeasures at a single high crash location can be compared by their benefit/cost ratios. Similarly, improvements to different sites can be compared by their relative benefit/cost ratios.

Expanded and Improved Transit Service

The Metropolitan Transit Authority has developed a conceptual plan for regional transit system development for the 2025 planning horizon. It is depicted in the map on page 11. It includes a network of integrated high capacity transit facilities in or between several major travel corridors. The conceptual plan has been approved by METRO's Board of Directors. Comprehensive studies are underway to further refine the locally preferred alternatives for the highest priority corridors and determine the preferred technology. H-GAC staff is incorporating the METRO 2025 Conceptual Transit Plan into the regional 2025 transportation plan and also considering the transit needs outside of the METRO service area. The goal is to plan, develop and implement a comprehensive regional transit system that will improve the mobility options and provide better connectivity between the urban, suburban and rural areas of the region.

Unmet Transportation Needs

In conjunction with the guidelines for ensuring equity in the transportation systems under Environmental Justice and Title VI requirements, efforts are underway to analyze the travel time accessibility of several sub-populations in the region. This approach focuses on basic mobility needs rather than a more traditional assessment of existing and forecasted levels of service on roadways.

There are people for whom the current transportation system does not meet their needs. Among these are people with special transportation needs, such as the disabled. Others for whom the existing transportation system poses difficulties are children, non-driving youth, the elderly, and still individuals who depend completely on the transit system but who have difficulty in accessing it. As part of the MTP, H-GAC is examining ways in which the planned future transportation system will help to meet the special transportation needs of the individuals mentioned above. There are two major initiatives:

1. **Environmental Justice.** Environmental Justice is the process of identifying and addressing disproportionately high and adverse health or environmental impacts on minority and low-income populations. Executive Order 12898 (February 11, 1994) requires

that each Federal agency, to the greatest extent allowed by law, shall administer and implement its programs, policies, and activities to identify and avoid such impacts. When a project results in adverse impacts, mitigation and enhancement measures will be issued by the DOT and the FHWA to the non-compliant agency.

Environmental Justice Methodology

The proposed methodology for Title VI Analysis involves using travel times to measure accessibility. The purpose of the analysis is to demonstrate equity (or lack of discrimination) in terms of accessibility to various activities by the transportation system. The same analysis will also show changes in accessibility with the implementation of a proposed system of transportation improvements.

H-GAC will conduct an evaluation of its compliance with Title VI and Environmental Justice. The collection, evaluation, and analysis of data and public involvement activities enables the MPO to facilitate, encourage, and ultimately secure the active participation of all communities in its 8-county transportation management area (TMA), with increased focus on minority, low-income, disabled, and sub populations where unmet transit needs exists.

Past work involves the public involvement process for the Metropolitan Transportation Plan, public awareness campaigns for Clean Air in the form of advertorials – broadcasting information via radio, the H-GAC website, and through print media about various regional programs. This information directly or indirectly involves regional transportation concerns and issues.

2. **Unmet transit needs.** Transit is an important transportation mode for a region as large as the Houston-Galveston area. Five transit agencies and social service providers serve the region. METRO's service area extends into the most densely populated areas of Harris County, yet, many residents, especially those who are low-income, elderly or disabled **and** who live outside transit service areas 1) are not having their transportation needs met or 2) having very few of their transportation needs met. Other transit agencies such as Colorado Valley Transit, and Gulf Coast Center provide demand response, or paratransit service in less urbanized areas of the region. Brazos Transit System provides this type of service and also a commuter park-and-ride service from the Woodlands to Houston employment centers. These services are often limited and duplicative with low productivity. Consequently, some transportation needs of the general public are not being met.

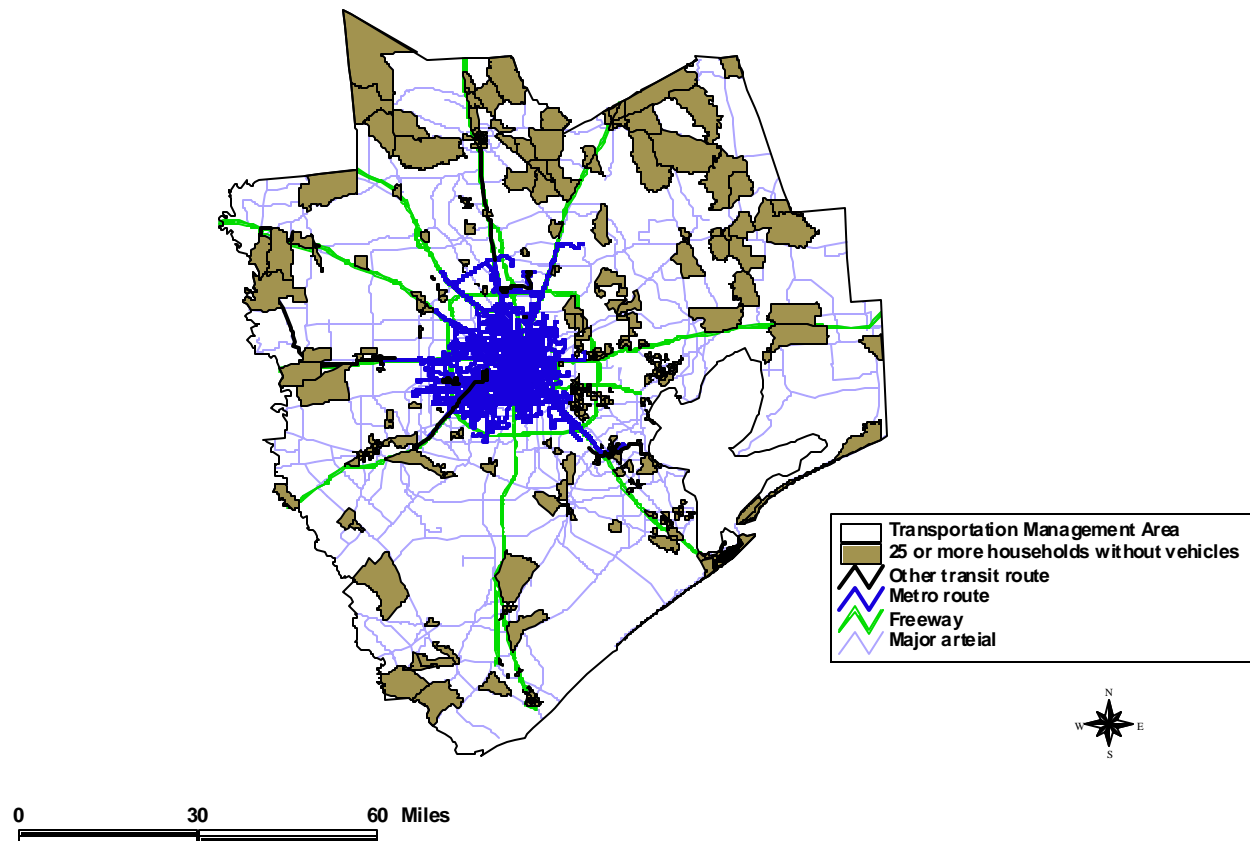
Unmet Transit Needs Methodology

In order to assess where there are potential transit users that currently do not have access to transit, H-GAC staff have examined various sub-populations who may need specialized transportation services. The focus is on persons living farther than 0.25 miles from an existing transit route, park and ride facility and future transit station. The assumption is that these persons don't have access to public transportation even if they want to use it, and may need specialized services. To date, four populations have been examined:

1. **Households who do not own a motor vehicle.** This variable has been shown to correlate most strongly with transit use in those areas where there is transit availability. Based on the 1990 Census data, approximately 12% of the Houston-Galveston region's households do not own a vehicle. Based on the distribution of households who do not own motor vehicles and the accessibility of existing transit lines, H-GAC will identify communities where there are a sufficient number of potential transit users but where there are not currently existing transit routes. Fixed route service may be appropriate for these populations, but tailored to the demand.
2. **Low income persons.** While the low income population generally includes households who do not own a motor vehicle, it is a much broader concept and includes a number of communities in rural areas. Many of these groups do own vehicles, but there may be selective pockets where either there are many households without vehicles or the available vehicle is being used by one member of the family and there is no transit available for emergency, medical or shopping trips for the other members. Fixed or specialized transit service may be appropriate for these populations.
3. **Elderly persons.** The elderly have specialized transportation needs; the 'young' elderly (55-70) are more independent and capable of transporting themselves than the 'older' elderly (75 or older). While some elderly use public transportation, most do not. Several studies have shown that lifetime travel patterns are maintained as people age.⁴ As people age, they tend to withdraw

⁴ K. Warner Schaie and Martin Pietrucha (eds), *Mobility and Transportation in the Elderly*. Springer: New York. 2000; Raynard Kington, David Reuben, Jeannette Rogowski, and Lee A. Lillard, "Sociodemographic and Health Factors in Driving Patterns After Fifty Years of Age," *American Journal of Public Health*, 84(8):1327-1329, 1994; Genevieve Giuliano, "Travel Patterns of the elderly". Study funded by National Center for Metropolitan Transportation Research

**Unmet Transit Needs:
Locations With High Concentration of Households with No Vehicles (1990) and
That are Farther than 0.25 Mile from Local Bus Route and Future Transit Facility**



(METRANS). 2001. <http://www.metrans.org/Research/00-8.htm>; Martin Wachs, *Transportation for the Elderly: Changing Lifestyles, Changing Needs*. University of California Press: Berkeley. 1979.

from travel, rather than shift modes. Putting in fixed transit service for elderly populations will generally not be very successful. On the other hand, demand response service that picks elderly persons up at their homes is a possibility.

4. **Mobility-limited persons.** Persons with a disability frequently have difficulty in driving or in negotiating a public transit system. There are specialized transportation services available, but many mobility-limited persons, particularly in the more suburban areas of the region, may have difficulty in traveling. Flexible or demand response systems may be appropriate for these populations.

There are other sub-groups that have specialized transportation needs – youth who don't drive, students who need after-school transportation, and welfare-to-work recipients who need transportation to their jobs. H-GAC's strategy is to: first, identify concentrations of these populations who are not near to existing transit facility; second, assess whether these concentrations represent a sufficient demand to fund some type of transportation service; and, third, identify whether there is local political support from the jurisdictions for subsidizing these services. H-GAC will then work with the local governments to obtain funding to expand these specialized transportation services.

Goods Movement and its Importance

A strong and vital economy requires efficient and reliable movement of goods. Just as national and regional commerce depends on quick and efficient movement of people, the same holds true for movement of goods. The value and volume of goods transported is one indicator of how our economy performs from year to year.

In general, variable costs like freight transportation contribute to a business's cost of production. Moreover, participants in the market whether small or large businesses want to minimize their transportation costs to compete and to remain viable. Business make a number of decisions concerning geographic location, transport mode choice and others to minimize costs, maximize profits, while satisfying market demands for products.

Industry employs carriers/shippers that deploy trucks, trains, ships and/or airplanes to transport various goods across the nation. An enormous amount of goods move across the nation for great distances as freight transportation continues to grow. In 1997 the nation's transportation system carried 14 billion tons of goods worth more than \$8 trillion for a total distance greater than 4 trillion ton-miles. Freight transportation in the United States, measured in ton-miles, grew an average of 2 % annually from 1970 to 1996.

Throughout the country, trucks prevail as the most widely used mode. Trucks move nearly three-quarters of all freight value covered in the Commodity Flow Survey (CFS), and 53 % by tonnage followed by, in order of magnitude, rail, water, pipeline and air transport. In 1997, 27.9% of the total revenue ton-miles of freight were transported on highways compared to 24.4 % in 1993.

Goods Movement in the Region

The Houston–Galveston area is considered by many as a national hub and an international gateway for goods movement. Major airport, interstate highway, port, and rail facilities exist here. The role that these facilities play in moving goods will increase in importance with major market forces and industry trends such as globalization, new transportation services and not to mention the North American Foreign Trade Agreement (NAFTA).

As domestic and international trade continues to grow, the Houston – Galveston region will continue its role in moving domestic and international freight. According to Reebie Associates, in 1991 annual tons freight tonnage moved through the Houston-Galveston Area totaled approximately 276 million tons. Water modes such as ocean tankers, barges and other ships moved a little less than half the total tonnage. Rail car, truck and airplane modes follow in order of magnitude.

Measured in total tons, materials such as coal, petroleum products and food products top the list as cargo moved in the region. Petroleum and crude oil are the two main imports and exports.

Intermodal Facilities in the Region and Goods Movement

Goods move on an extensive network that connects the region's Intermodal facilities to distribution routes. By definition, an Intermodal facility accommodates and links two or more modes of transportation for intrastate, interstate, and international movement of passengers and/or freight. There are 71 Intermodal terminals in the Houston-Galveston TMA including:

1. Commercial Airports,
2. Ports,
3. Truck/Rail terminals,
4. Pipeline Terminals,
5. Amtrak Stations,
6. Intercity Bus terminals,
7. Public Transit Centers, and
8. Ferries

Mobility and access improvements provide the greatest opportunity to enhance the efficient movement of goods throughout the region. The National Highway System (NHS) forms the cornerstone of the Intermodal network that distributes goods throughout the region by truck. Access to the NHS from the Intermodal facilities is the most critical performance measure of the efficient operation of the Intermodal network.

Access characteristics include direct routing to the NHS, routing to the NHS via connector, route restrictions, vehicle queuing, and signage from the NHS to the facility. Because Intermodal facilities vary significantly according to function (passenger or freight), transportation mode, and ownership (public or private), it is difficult to develop standards or performance measures to evaluate the efficiency of the region's Intermodal facilities and the routes that connect these facilities to the NHS.

MTP Development Process

When selecting projects for the plan we considered strategies from both management systems: Congestion Management Systems (CMS) and Intermodal Management Systems (IMS). Several outreach meetings were held with participants who represent the region's Freight community to improve roadside access to regional significant intermodal facilities in the region. From these meetings staff produced some findings and recommendations. The document, *HGAC Strategic Freight Corridors Intermodal Facility Access Needs and Recommendations*, lists all findings and recommendations.

Outreach to Freight moving or Logistics Community

During the later part of 1999, HGAC procured consultants to facilitate a partnership between the Houston-Galveston Area Council and freight moving. The agency *Intermodal Congestion Quick Response Team* issued a Request for Qualification to develop an Intermodal Congestion Quick Response Team (QRT) and program to respond to congestion problems identified by the goods movement industry. The main purposes of the QRT program were to demonstrate sensitivity to freight congestion issues by the public sector agencies; to increase opportunities for public/private partnerships; and to provide low-cost, fast, and/or temporary solutions. Upon selection of a consultant (Wilbur Smith Associates), a QRT Advisory was created consisting of staff from the City of Houston, Harris County, the Texas Department of Transportation, the Port of Houston, Burlington Northern Santa Fe (BNSF) Railway, H-GAC, and other freight stakeholders as needed; the program is in the second year.

Corridor and Sub-regional Studies

A comprehensive review of the major roadways and major activity centers in the region has been completed. Summaries of the results of that review process are included in Appendix C and will be used to develop further recommendations for needed mobility improvements.