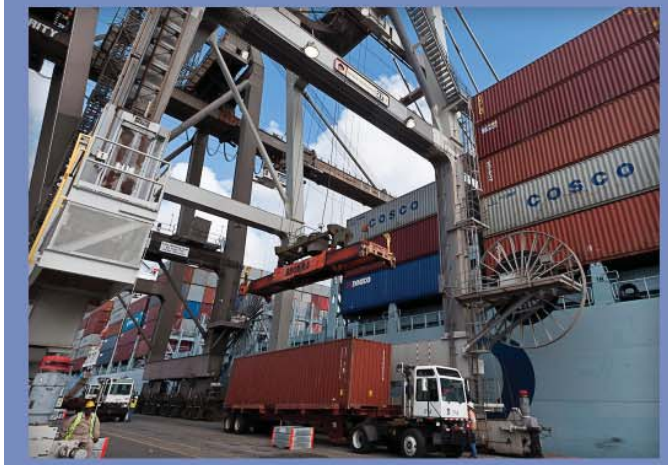


Bridging OUR COMMUNITIES

2040 RTP

THE HOUSTON-GALVESTON REGIONAL TRANSPORTATION PLAN

Revised March 30, 2016

2040 RTP OUTLINE

I. Introduction

II. 2040 RTP Vision, Goals, Performance Measures and Strategies

III. The Current Transportation System

IV. Fiscally Constrained 2040 RTP

V. Appendices

List of Maps and Figures

EXECUTIVE SUMMARY

Today the Houston-Galveston region is enjoying a dynamic metropolitan economy—leading the State of Texas in economic recovery, growth and development. Rapid economic growth is not new to this region. Since 1980, about one million new residents were added every decade. Most recent estimates suggest population growth of over 120,000 new residents each year, almost half of whom are new residents from other parts of the State, the nation or new international residents. The future outlook anticipates this region will continue its economic development:

- 4th in the nation in regional GDP, the Houston metropolitan economy grew more than any other in 2013[1]
- 1.5 million additional jobs will be added by 2040—for a total of almost 4 million
- 60% increase in vehicular travel and double the movement of freight over the next 25 years[2]
- 2% annual population growth, adding almost 4 million persons by 2040

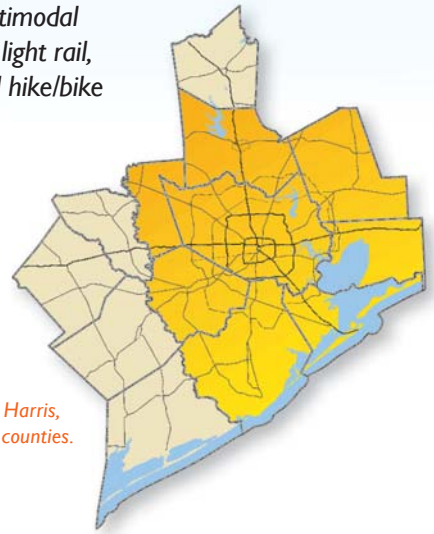
Growth has not, however, been matched with commensurate investment in state and regional transportation infrastructure, challenging the sustainability of our future economic prosperity. Therefore, establishing regional priorities for the investment of available transportation funding is essential.

The 2040 Regional Transportation Plan (RTP) provides a responsible guide for maintaining and improving the current transportation system and identifies priority transportation investments. The 2040 RTP is the latest update to a continuous planning process involving the eight central counties of the thirteen-county Houston-Galveston Area Council (H-GAC) region. The recommended investments in this plan total approximately $88 billion and are guided by the Plan's goals to:

- **Improve Safety**
- **Manage and Mitigate Congestion**
- **Ensure Strong Asset Management and Operations**
- **Strengthen Regional Economic Competitiveness**
- **Conserve and Protect Natural and Cultural Resources**

The investment priorities in the 2040 RTP represent priority investments within conservative estimates of revenues available over the next 25 years. These investments are key steps toward realization of the vision. These investments support one or more of the following strategies:

- **Improve System Management and Operations** *(Maximizing reliability and efficiency of existing assets through Intelligent Transportation Systems, Traffic Incident Management, crash avoidance technology, etc.)*
- **Enhance State of Good Repair** *(Leveraging facility maintenance or scheduled replacement and with opportunities to improve facility design or operations)*
- **Expand the Multimodal Network** *(New or expanded facilities and services)*
- **Coordinate Development** *(Proactively planning for public/private partnerships advancing multimodal investments such as regional extension of light rail, thoroughfare development, and a regional hike/bike trail system)*



The 2040 RTP includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery and Waller counties.

[1]www.houston.org/pdf/research/quickview/economy_at_a_glance.pdf
[2]2012 Regional Goods Movement Study

2040 RTP

THE HOUSTON-GALVESTON REGIONAL TRANSPORTATION PLAN

INTRODUCTION

The Houston-Galveston Area Council (H-GAC) is the designated Metropolitan Planning Organization for the eight-county Houston-Galveston Transportation Management Area. This area of more than 6 million people includes eight counties of Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller Counties and 134 cities within them.

2040 RTP Process

The 2040 RTP has been shaped by the public in almost 60 presentations and public meetings, with at least 1,500 people providing input. These activities included more than 20 meetings focused on lower-income, minority, and/or limited-English proficiency residents. In addition, two major regional surveys contributed over 9,000 responses. Please see Appendix J for more information on public outreach.

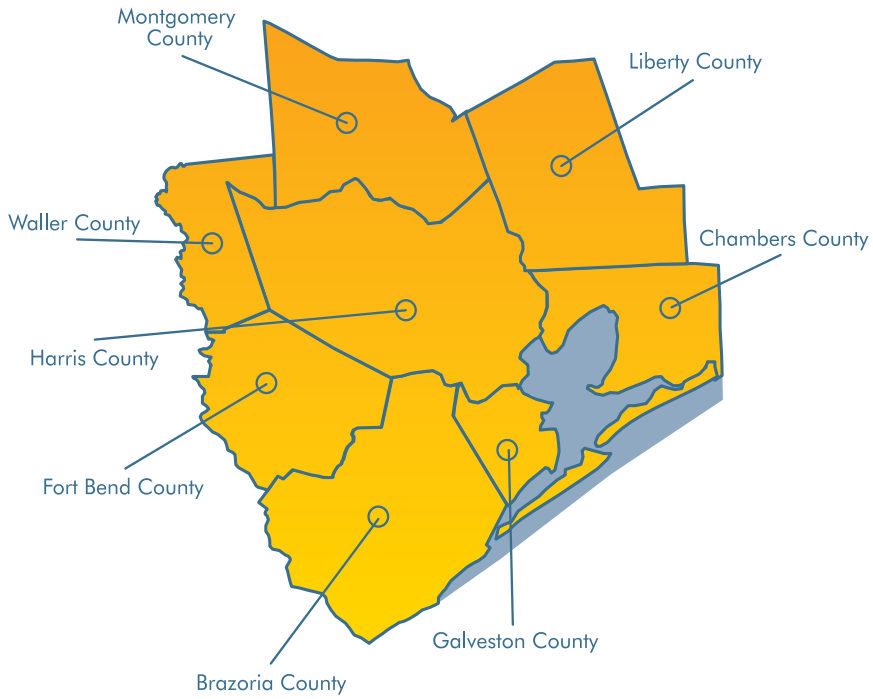
The 2040 RTP is approved and adopted by the Transportation Policy Council (TPC) of H-GAC. The TPC is advised by the Technical Advisory Committee (TAC), which formed the Regional Transportation Plan Subcommittee to direct the content and craft the message of the 2040 RTP.

The 2040 RTP will guide major transportation investments year by year through to the year 2040. These recommended investments total approximately $88 billion dollars, and include more than 1,450 unique projects which are sponsored locally by 61 different public entities.

2040 RTP Plan Document

The plan document describes a regional vision, goals, and implementation strategies; as well as describes the current transportation system. The current and future population and jobs that use the system are presented, followed by summaries of analysis completed to determine compliance with important regulatory areas: fair treatment of the diverse population, fiscal constraint, and conformity with national air quality standards. The recommended improvements follow—summarized by corridor and by regional investment program, where applicable. Lastly, the implementation of the 2040 RTP is analyzed to understand more what the future of transportation will look like.

Map 1: Map of Transportation Management Area



2040 RTP VISION, GOALS, PERFORMANCE MEASURES, AND STRATEGIES

The 2040 RTP is a long-range plan centered around a shared regional *vision*—a statement of aspiration for the transportation future. Five *goals* were crafted in order to advance toward this vision—each with performance measures to understand the rate of regional progress. The 2040 RTP uses four *strategies* to implement the goals and make the vision a reality. These strategies are investment tools to help local sponsors and decision-makers throughout the life of the 2040 RTP understand how their particular project fits within the regional planning process.

Vision

In the year 2040, our region will have a multimodal transportation system through coordinated investments that supports a desirable quality of life, enhanced economic vitality and increased safety, access and mobility.

Goals

In order to work toward this vision, the regional investments through the year 2040 will be directed by five goals.

1. **Improve Safety**
2. **Manage and Mitigate Congestion**
3. **Ensure Strong Asset Management and Operations**
4. **Strengthen Regional Economic Competitiveness**
5. **Conserve and Protect Natural and Cultural Resources**

For more information on each goal and why it was selected, refer to Appendix E.

Performance Measures

The 2040 RTP tags each goal with performance measures, which are quantifiable, and can provide clear indicators of the region's progress in this pursuit over the life of the 2040 plan.

The performance measures were crafted in light of the recent passage of federal transportation legislation Moving Ahead for Progress in the 21st Century, or MAP-21. However, federal regulators have not yet released guidance regarding the adoption of official, national performance measures. These measures are interim indicators while awaiting final ruling. Reasoning in support of the selection of each performance measure and their recent trends are available in Appendix E.

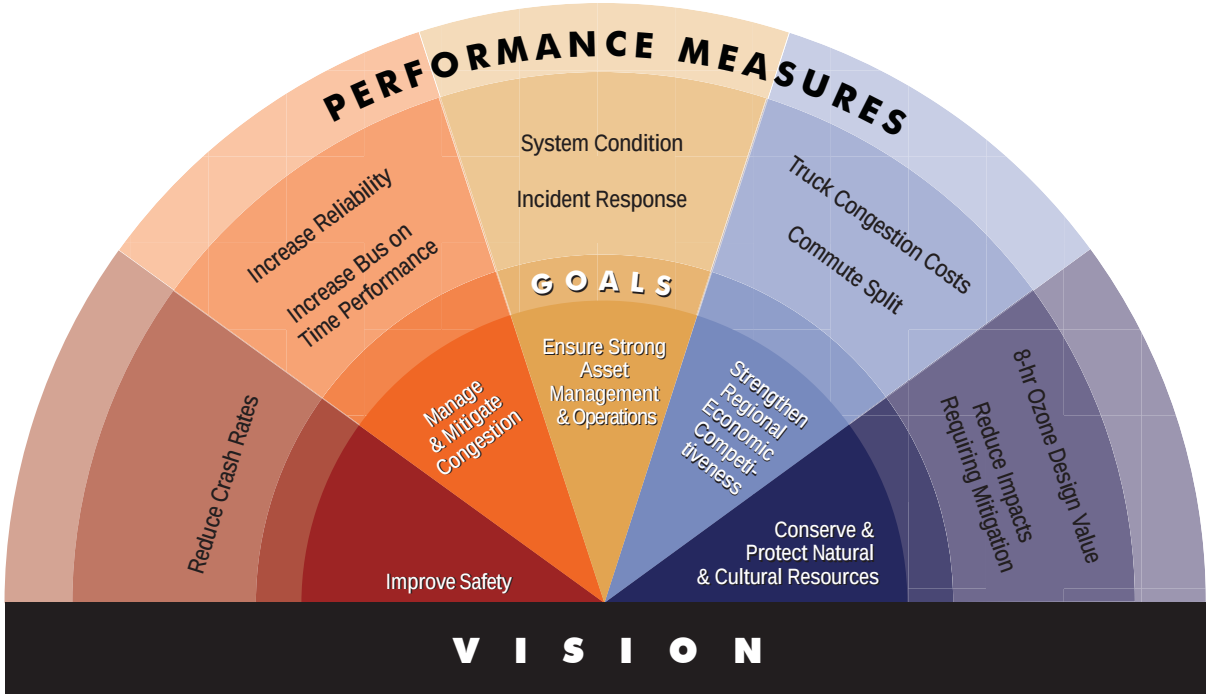
Goal 1 **Reduce Crash Rates**

Goal 2 **Increase Reliability**
Increase Bus On-time Performance

Goal 3 **System Condition**
Incident Response

Goal 4 **Truck Congestion Costs**
Incident Response

Goal 5 **8-hr Ozone Design Value**
Reduce Impacts Requiring Mitigation



Strategies

The 2040 RTP employs four strategies as implementation tools in order to realize the goals:

- Improve System Management and Operations
- Enhance State of Good Repair
- Expand the Multimodal Network
- Coordinate Development

Figure I illustrates the nature of relationship between the goals, performance measures, and strategies. Each strategy has been evaluated for how effectively it addresses each goal, with performance measures intended to quantify the outcome. Improve System Management and Operations and *Expand the Multimodal Network* both have directly supportive relationships with all five 2040 RTP goals.

Many projects considered by the 2040 RTP apply to more than one strategy—for instance many widening projects, which would be considered "multimodal network expansion", include extensive "state of good repair" investment. The total expenditure of the four strategies combined is an estimated $88 billion. Figure 2 illustrates the investment by strategy. Estimates include allocation of project costs across the strategies shown if appropriate.

Figure 2: Expenditures by Strategy
Total: $88 Billion

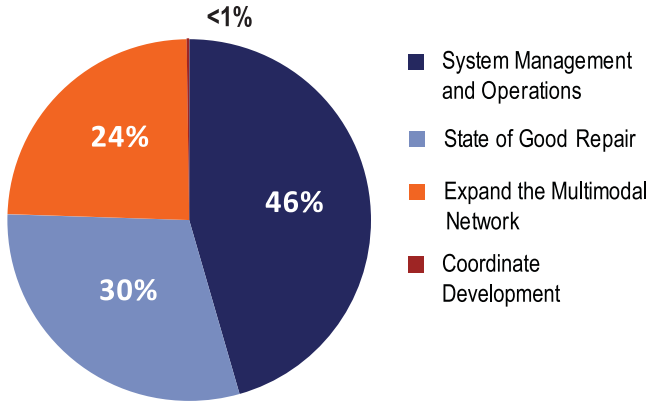


Figure 1: Relationship between Strategies, Goals and Performance Measures

GOAL	STRATEGIES: System Management & Operations	State of Good Repair	Expand Multimodal Network	Coordinate Development	PERFORMANCE MEASURE
Improve Safety	●	●	◑	◑	Reduce Crash Rates
Manage and Mitigate Congestion	●	●	●	●	Increase Reliability and Bus On-time Performance
Ensure Strong Asset Management and Operations	●	●	◑	◑	System Condition and Incident Response
Strengthen Regional Economic Competitiveness	●	●	●	◑	Truck Congestion Cost Commute Split
Conserve and Protect Natural and Cultural Resources	●	●	◑	●	8-hr Ozone Design Value. Reduce Impacts Requiring Mitigation

● Direct
◑ Related

Strategy 1: Improve System Management and Operations

Improve System Management and Operations directly supports all five goals of the plan; accounts for almost half of the total 2040 RTP expenditures; and will implement programs and projects to address congestion and safety through reduction of vehicle crashes, quick and safe removal of stalled vehicles, improved intersection operations, "bottleneck" removal and reduction in vehicular travel demand through increased use of transit, car and vanpooling, tele-working or increased use of walking and cycling.

IMPROVE SYSTEM MANAGEMENT & OPERATIONS		
GOAL	**IMPACT**	**PERFORMANCE MEASURE**
Improve Safety	●	Reduce Crash Rates
Manage and Mitigate Congestion	●	Increase Reliability and Bus On-time Performance
Ensure Strong Asset Management and Operations	●	System Condition and Incident Response
Strengthen Regional Economic Competitiveness	●	Truck Congestion Cost Commute Split
Conserve and Protect Natural and Cultural Resources	●	8-hr Ozone Design Value. Reduce Impacts Requiring Mitigation

● Direct
◑ Related

System management is designed to make best use of existing facilities. Current estimates predict that up to half of regional congestion is caused by incidents—ranging from stalled vehicles and crashes to sports events to hurricane evacuations—that can be addressed through this strategy[3]. Identified congestion needs are assessed through the Congestion Management Process, a presentation of which can be found in Appendix I which identifies the most effective and available tools in line with the goals and performance measures of the RTP. The different types of tools available and funded through this Strategy include:

A major outcome of Improve System Management and Operations is reduction of vehicle usage, delay, and emissions detrimental to air quality without constructing new travel facilities. This is accomplished through more efficient use of current facilities and managing travel demand. For example, this Strategy

SYSTEM MANAGEMENT AND OPERATIONS	EXAMPLES
Safety	Traffic or facility improvements designed to improve safety
Intelligent Transportation Systems (ITS)	Technology-based improvements to data gathering or travel monitoring and reporting
Access Management	Improve access/efficiency of major roadways
Travel demand management	Programs such as new or improved transit services, car and vanpooling, telework and other strategies to reduce peak vehicular demand
Managed Lanes	Travel-time incentive for transit and other High Occupancy Vehicles. May include congestion or occupancy based pricing

funds the *Commute Solutions* program which seeks to increase the regional transit share of travel through vanpools, carpools, tele-work, and other voluntary trip reductions. This reduces traffic congestion and improves air quality while providing cost and potential time savings. Air quality is improved through similar efforts such as the *Clean Cities/Clean Vehicles* program, which provides subsidies that promote the voluntary usage of cleaner burning fuels and engines.

Specifically, this Strategy's recommendations will reduce crash rates by enabling the optimal number of vehicles to travel reliably, with less unexpected traffic and incidents. It will increase reliability by utilizing more available facilities through projects such as signal timing and dynamic traffic alerts. Less congestion and more reliable travel will limit the damage to current facilities, extending their useful life. This Strategy can also cut down on congestion costs by giving freight operators a more reliable sense of how long a certain route will take. Finally, by maximizing the usefulness of current roadways, bikeways, railroads, and waterways the region could see a decrease in the types of congestion that negatively affect air quality.

[3]DRAFT Regional Incident Management Plan

Strategy 2: Enhance State of Good Repair

Enhance State of Good Repair includes bridges, roadways, transit facilities, railroads, port facilities, and is a basic need for our region's transportation future. This Strategy directly supports all five 2040 RTP goals and amounts to more than a third of total 2040 RTP expenditures. Adequate maintenance will extends the life and ensures safety of current facilities at a fraction of the cost of constructing new ones. Estimates completed for the 2040 RTP indicate an annual funding need of $500-700 million annually over the life of the plan to maintain what is currently on the ground, approximately $16-20 million per mile of the 2040 built-out roadway system[4]. Recent research forecasts Texas pavement condition ratings to fall from 85% rated "good" or better to less than 30% during the planning horizon of the 2040 RTP[5]. Three of the largest-populated areas of Texas—Austin, Houston, and Dallas—fell short of their pavement condition goals in the most recent year cited. Currently, TxDOT data suggest a rating of 84% for TxDOT roads in the Houston-Galveston eight-county region.[6]

ENHANCE STATE OF GOOD REPAIR		
GOAL	**IMPACT**	**PERFORMANCE MEASURE**
Improve Safety	●	Reduce Crash Rates
Manage and Mitigate Congestion	●	Increase Reliability and Bus On-time Performance
Ensure Strong Asset Management and Operations	●	System Condition and Incident Response
Strengthen Regional Economic Competitiveness	●	Truck Congestion Cost Commute Split
Conserve and Protect Natural and Cultural Resources	●	8-hr Ozone Design Value. Reduce Impacts Requiring Mitigation

● Direct
◑ Related

With regard to transit, the H-GAC expenditure model estimates each dollar invested in constructing revenue-generating transit facilities will require $4 to $9 dollars to operate and maintain, regionally adding up to around $1 billion per year including planned construction. According to TxDOT data, there are almost 3,000 working bridges in the region, the vast majority of which achieve a "sufficient" or better rating. Bridge repair must be completed according to a view for the facility's future use, and whether or not the current bridge adequately and safely accommodates pedestrian or bicycles, where appropriate.

ENHANCE STATE OF GOOD REPAIR	EXAMPLES
Roadway	Reconstruction, rehabilitation, or repaving of roadways and access facilities
Bridges	Upgrade facilities to new standards or rehabilitate for future use
Transit Facilities	Improve bus stops, transit centers, guideways, stations, or vehicle replacement or repair
Pedestrian Facilities	Upgrade to current design guidelines and ADA requirements

Maintaining high-quality and updated roadways and transportation facilities will ensure the basic safety needs of the traveling public by deploying the most current technology and construction practices. It will increase reliability because, once work is completed, less surface irregularities will force drivers to spontaneously change lanes, for instance. The system condition and incident response time will both improve as well, given that better maintained facilities are both more useful and less dangerous. Congestion costs could see a decrease through work recommended under this Strategy, given that maintained facilities will not have many of the outdated geometric features or crumbling components older examples exhibit. Finally, less network expansion or new construction would be necessary with more life-years added to repaired facilities, thus cutting down the recommendations requiring environmental mitigation.

[4]Parsons Brinkerhoff, 2014. *H-GAC State of Good Repair Technical Memo*
[5]2011 TxDOT Condition of Texas Pavements: Pavement Management Information System Annual Report
[6]TxDOT Houston District PMIS statistics, FY 2012

Strategy 3: Expand the Multimodal Network

Expand the Multimodal Network, almost a quarter of total 2040 RTP estimated expenditures, directly supports two of the 2040 RTP goals, and includes adding travel capacity on all modes of transportation. Funding for this Strategy is based on recommendation by the Congestion Management Process, and driven by 2040 RTP goals and performance measures. This Strategy directly supports the congestion and economic competitiveness goals of the 2040 RTP and includes some of the most significant, visually obvious, and long-lasting investments in the plan. According to plan recommendations, the most intensive expansion corridors will be Beltway 8, the Grand Parkway, SH 288, the Southwest Corridor (IH 69 and US 90A), and US 290—all of which will involve at least partially tolled expansions.

EXPAND THE MULTIMODAL NETWORK		
GOAL	**IMPACT**	**PERFORMANCE MEASURE**
Improve Safety	◑	Reduce Crash Rates
Manage and Mitigate Congestion	●	Increase Reliability and Bus On-time Performance
Ensure Strong Asset Management and Operations	◑	System Condition and Incident Response
Strengthen Regional Economic Competitiveness	●	Truck Congestion Cost Commute Split
Conserve and Protect Natural and Cultural Resources	◑	8-hr Ozone Design Value. Reduce Impacts Requiring Mitigation

● Direct
◑ Related

Transit system expansion would extend current light rail service to the two busiest regional airports, as well as construct new commuter lines to northwest and southwest suburban centers. Bicycle and pedestrian system expansion would operate in line with the recent 2040 Regional Bicycle and Pedestrian Plan (see Appendix F). Locally, many roadway expansion needs will be met by cities and counties, as well as private developers. Tolled roads have and will continue to provide critical additional roadway capacity.

MAJOR ADDED CAPACITY IMPROVEMENTS	
US 290	$4 billion
Grand Parkway	$4 billion
Light Rail and Bus Transit	$4 billion
IH 45 South / Gulf Freeway	$1.5 billion
Thoroughfare Development	$6 billion
Pedestrian/Bicycle Facilities	$388 million

The 2040 RTP recommends additional travel lanes on or extension of some of the most-travelled tollroads —Sam Houston Tollway (South and East), Westpark, Fort Bend Parkway, and Hardy Toll Road. The RTP also recommends the completion or construction of new toll corridors including —US 290 (partial toll/managed lanes), Hempstead Toll Road, SH 249 Toll Road (Montgomery County), SH 35 Toll Road and remaining segments of the Grand Parkway.

AGENCY	CURRENT SYSTEM	2040 SYSTEM
Harris County Toll Road Authority	106 miles	112 miles
Brazoria County Toll Road Authority	N/A	25 miles
Fort Bend County Toll Road Authority	12.2 miles	27 miles
Montgomery County Toll Road Authority	N/A	15 miles
TxDOT	66 miles	89 miles

Network expansion could reduce crashes and improve incident response by providing travel alternatives to currently congested facilities. More equally shared congestion measures could serve to distribute air quality-affecting emissions more evenly as well. Expanded facilities, based on results from the regional travel demand model, will at least temporarily increase reliability overall and lower the cost of commuting by postponing gridlock-level travel conditions.

Strategy 4: Coordinate Development

Coordinate Development directly supports two of the 2040 RTP and is related to three. Projects funded in this Strategy seek to align transportation improvements with private and public sector economic development plans. In many instances, stakeholders have found that investments of all types should be considered holistically, rather than separated in functional silos. Transportation investments can alter the pattern of development in some areas, attracting new construction to one or densifying another.

COORDINATE DEVELOPMENT		
GOAL	**IMPACT**	**PERFORMANCE MEASURE**
Improve Safety	◑	Reduce Crash Rates
Manage and Mitigate Congestion	●	Increase Reliability and Bus On-time Performance
Ensure Strong Asset Management and Operations	◑	System Condition and Incident Response
Strengthen Regional Economic Competitiveness	◑	Truck Congestion Cost Commute Split
Conserve and Protect Natural and Cultural Resources	●	8-hr Ozone Design Value. Reduce Impacts Requiring Mitigation

● Direct
◑ Related

Where different plans can be coordinated, development can be focused in the most beneficial area. This includes the extension of transportation facilities that attract intense pedestrian activity, such as light rail lines or mixed use real estate. Also, the location of future local thoroughfares could alter investors' decisions if the new roadway were to be linked with an area's hike and bike trail system. Activities funded through this Strategy include Livable Centers—compact, mixed-use places where it is possible to get from place to place by walking, biking, and taking transit.

The long-range and multijurisdictional coordination of development could have a trans formative effect on the region. Most directly, it could increase reliability of travel and reduce vehicle emissions and environmental mitigation needs by providing more commute alternatives and jobs-housing location coordination.

COORDINATE DEVELOPMENT	EXAMPLES
Subregional Planning Initiative	Land use and transportation planning and interjurisdictional coordination
Mobility Studies	Exploration of mobility enhancement options and consensus building
Livable Centers	Compact, mixed-use pedestrian or bicyclist-focused development
Thoroughfare Planning	Long-range unconstrained roadway widening and locating plans

Less onerous use of the most traveled roadways, bikeways, and transit services could extend their efficient operation and life-use as well, thus supporting the remaining goals in turn.

Transportation Improvement Program Project Selection Process

The four 2040 RTP strategies link the performance measures to both the long-range vision and project selection in the Transportation Improvement Program (TIP). The TIP stages RTP projects in a short-term four-year window for construction. It is updated every two years, and currently contains approximately $9 billion in expenditures in eight counties. The project selection process assesses major investment-level applications based on the 2040 RTP's five goals and performance measures, in the most readily available form[7]. By incorporating 2040 RTP goals into short-range programming activity, the performance measures have achieved a strong coordination between the region's vision for the future and the investments made today.

[7]Transportation Policy Council Agenda Item 7 Background Paper, September 2014 regular meeting

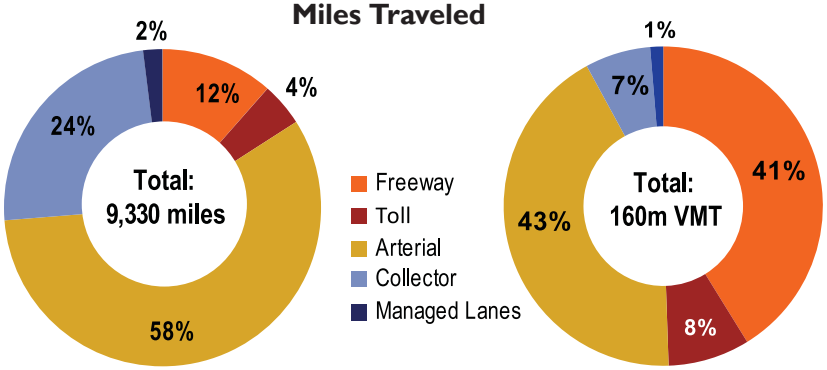
THE CURRENT TRANSPORTATION SYSTEM

The regional transportation system is composed of roadways, transit, pedestrian/bicycle facilities, and freight-focused facilities—with multiple facility types in each group and numerous functions per type. This section will present only a brief overview of the current system in order to orient the reader and set the stage for the recommended improvements that follow. The description of each component is accompanied by relevant challenges the 2040 RTP took into consideration.

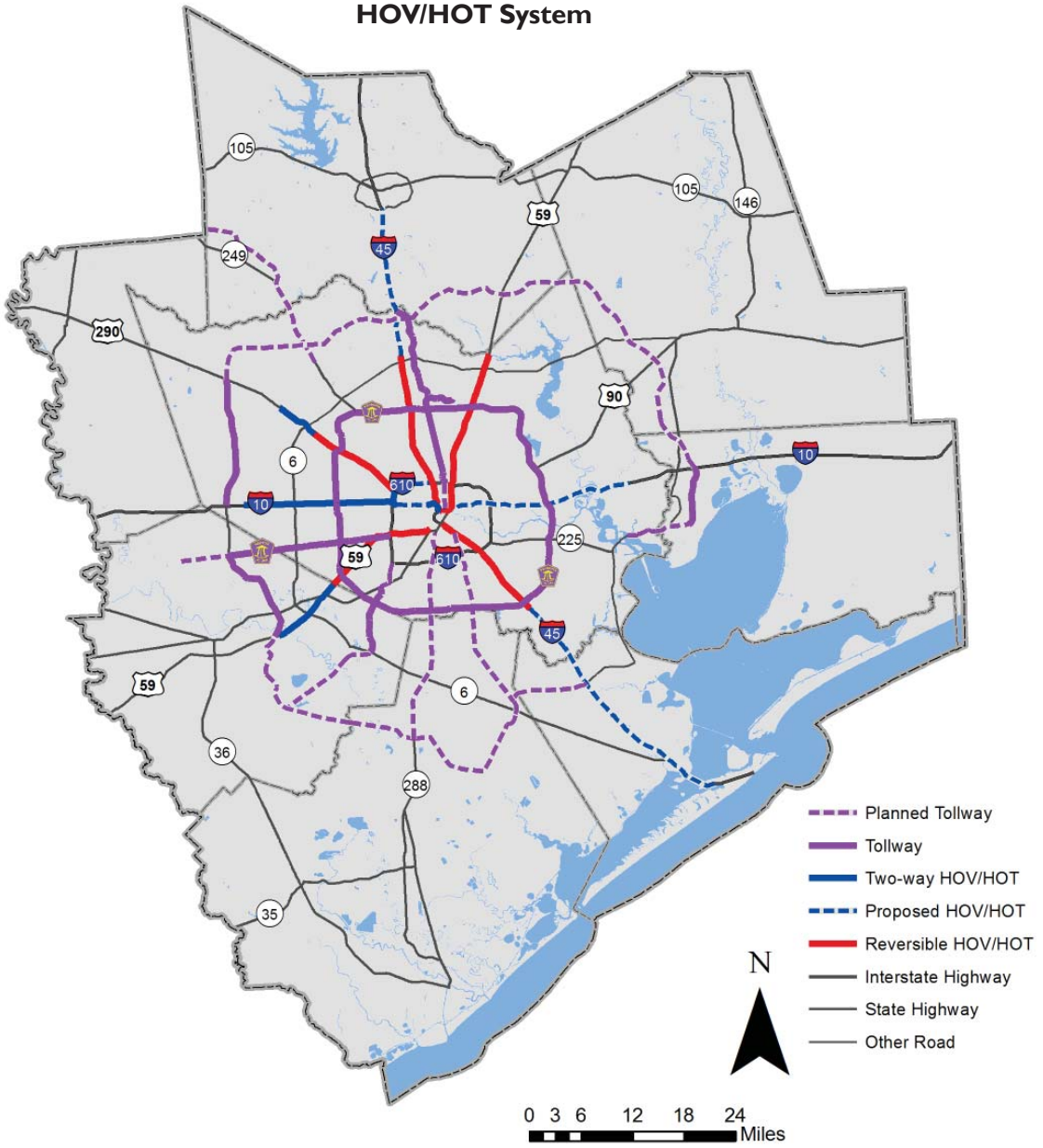
Regional Roadway System

The current transportation system includes more than 25 thousand miles of total roadway, with more than 170 million miles traveled daily in 2015[8]. The majority of the major roadway system is arterial streets—those which bring local traffic to more regional destinations or freeways. Freeways, including Interstates and other limited-access roads, make up around 10% of the roadway system, but handle more than 40% of daily traffic. Conversely, local roads known as "collectors" comprise almost a quarter of the system, but serve only 7% of daily traffic—mainly at the origin and destination-points. Approximately 180 miles of tollways are located in the region, handling about 8% of daily traffic—an opportunity for future growth in terms of their regional percentage share[9].

Figure 3: Regional Roadway System and Daily Vehicle Miles Traveled



Map 2: Freeway, Tollway, and HOV/HOT System



[8]H-GAC Travel Demand Modeling; TxDOT Standard Reports 2012
[9]Harris County Toll Road Authority, TxDOT Grand Parkway Association, Fort Bend County Toll Road Authority

In order to promote the use of mass transit and high occupancy vehicles, "Managed" lanes also known as High Occupancy Vehicle (HOV) or High-Occupancy Toll (HOT) lanes are restricted to vehicles with multiple occupants or charge a fee for use depending on the number of passengers in a vehicle and the time of day. Approximately 100 total miles of Managed/HOT lanes and around 200 miles of Managed/HOV lanes are available on four major regional freeways and account for approximately 900 thousand miles traveled or 1% of travel during peak-period, or rush hour-like, conditions.

Challenges

Safety is a grave concern for roadway travel in the region. This is reflected not only in this plans goals and performance measures, discussed later, but also in recommended improvements. In 2012, the region experienced a significant increase in the number of vehicle crashes compared to 2011[10]. Also, fatalities from impaired driving crashes are up 10% in the same time period in the region, which is home to two of the top ten counties for impaired driving-related fatalities in Texas[11].

Congestion consistently ranks highly in surveys and public input concerns. Four Interstates in the region—IH 610, IH 69, IH 45, and IH 10—contribute half of the top twenty "most congested" road segments in Texas[12]. Since 2009, miles traveled on regional roadways have grown 5%--ahead of population growth[13]. The next closest partner for carrying passengers to Interstates is local city streets. This underscores the inherent need for inter-jurisdictional coordination, for the Interstates are maintained by federal money through the State DOT, while city streets are usually the responsibility of local governments.

A related challenge to congestion is commute times, which can be compounded by development patterns. High-growth suburban areas are forecasted to experience significant population, employment, and traffic increases, while the dominant form of transportation for households is the automobile[14].

Regional Transit System

The regional transit system is composed of seven public transportation providers covering seven counties. The dominant forms of service provided are local bus routes, park and ride/commuter service, demand response, and light rail. Local bus service utilizes different sizes of vehicle depending on the route, and accesses HOV lanes and bus-priority technology where available. Currently, the region's first dedicated bus lanes are under development parallel to the state's most congested roadway, West IH 610 Loop. Park and ride service uses parking lots or transit centers as an origin and delivers workers to major employment centers using larger-capacity vehicles. Demand response service depends on contact initiated by the transit user, and may run along fixed routes or implement route flexibility. Light rail service is electric trains running on dedicated track, and differs from commuter-style long distance rail, which runs on tracks designed for heavier rail vehicles. The number of people using public transportation and other alternative modes of travel is increasing after several years of declining ridership, especially in park and ride-style service routes[15].

HOUSTON-GALVESTON REGIONAL TRANSIT RIDERSHIP BY ANNUAL BOARDINGS

SERVICE PROVIDER	2013
METRO	81,641,370
Fort Bend County	369,891
Harris County	210,479
Gulf Coast Center Connect/ Galveston County Transit District	1,431,345
Brazos Transit District/Conroe-The Woodlands	869,335
TOTAL	**84,522,420**

Estimates are for ridership within the H-GAC eight-county transportation management area only.
Source: TxDOT- PTN 128 Reports

[10]TxDOT Safety Data 2012
[11]TxDOT Safety Data 2012
[12]Texas A & M Transportation Institute, 2014 *100 Most Congested Roads in Texas*
[13]2012 TxDOT Annual Reports; 2012 American Community Survey
[14]US Census Bureau, 2012 American Community Survey Five-Year Estimates
[15]TxDOT- PTN 128 Reports

Park and ride lots provide alternative longer-distance commuting services from 34 sites, saving regional congestion from an estimated 20,000 cars[16]. These commute alternatives result in 82% driving to work alone in the region. The light rail system currently consists of one line of 13 miles through the historical core of Houston. Two more lines, adding ten miles to the system, are scheduled for opening in 2015[17].

Local fixed route and demand responsive transit services will continue to comprise the largest number of transit trips—a service frequently used by older segments of the regional population.

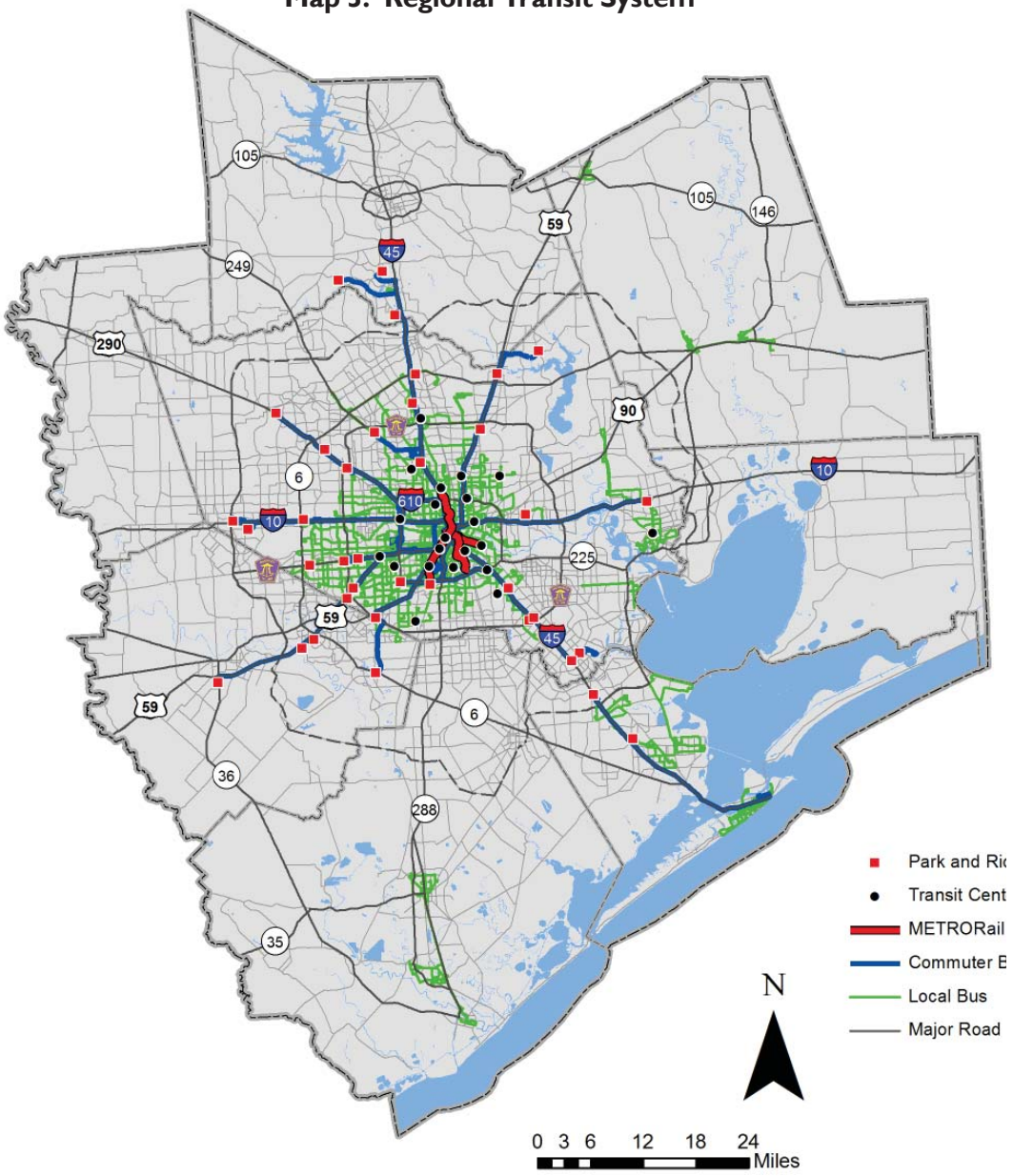
Challenges

Service area, expansion, and ridership is a prominent concern among policy makers and transit providers. Commuter transit services are an expansion opportunity in this region, given that only the Texas Medical Center has transit ridership comparable to that of downtown Houston--57% of commuters[18].

Funding also presents a challenge throughout the course of the 2040 RTP. The only dedicated local revenue source for transit is in the Metropolitan Transit Authority of Harris County (METRO) service area. As rural and suburban areas of the eight county region become increasingly developed, the need for additional transit services of all kinds will be challenged by the lack of long term local funding[19].

Transit-dependent communities are segments of the population without personal vehicles that use public transportation as their primary source of mobility. Based on recent Census data and socio-demographic analysis, many of these communities are increasingly being found outside the METRO service area. The H-GAC Regionally Coordinated Transportation Plan indicates a need of approximately $15 million annually—a funding stream that does not currently exist—to address this population.

Map 3: Regional Transit System



[16]METRO comments on draft 2040 RTP **and** Houston Express Lanes Operations Summary, June 2014, Texas A&M Transportation Institute
[17]METRO September 2014 Board Meeting materials and minutes
[18]2012 American Community Survey
[19]Regional Transit Coordination Subcommittee Action Plan 2014

Regional Bicycle/Pedestrian System

Bikeways are an integral component of the current and future regional transportation system because they provide a multitude of benefits to the region's public health, quality of life, access to employment and recreational opportunities, and safety[20]. The region currently has approximately 1,215[21] miles of bikeways, with the City of Houston currently having 300 miles of bikeway, the most extensive network in all of Texas[22]. Based on rate of construction, the region is gaining momentum in creating destinations for walking and biking, such as the Bayou Greenway Initiative, Sugar Land Town Center, The Woodlands Town Center, and City Center in west Houston. Since 2009, H-GAC has coordinated the construction of more than 87 miles of bicycle-pedestrian pathways. As the regional bike network expands, the opportunity for all residents to take better advantage of it as a mode of travel and commuting increases as well. The 2012 ACS indicates that nearly 4,000 people commute by bicycle in the City of Houston, and almost 7,000 region-wide[23].

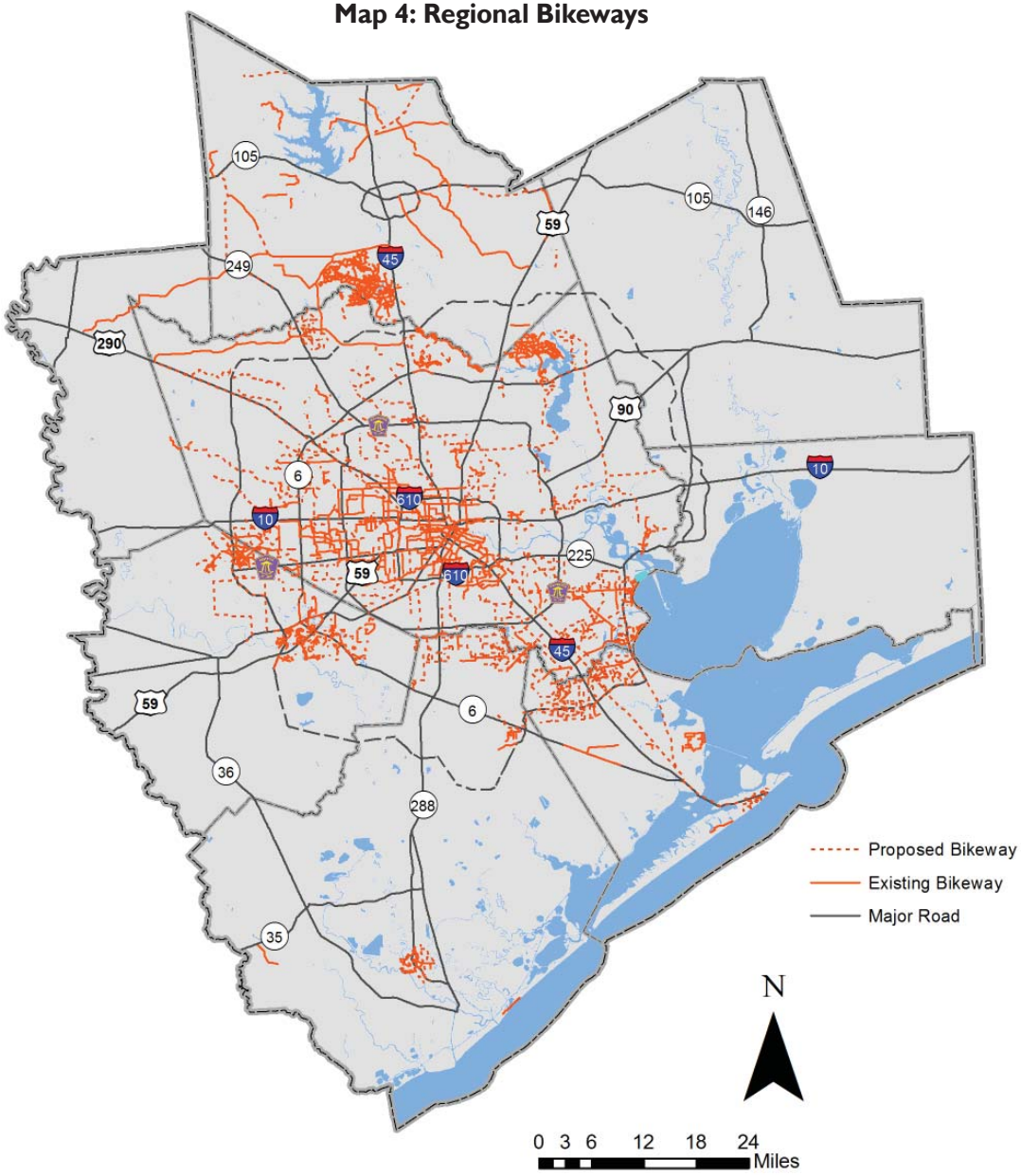
The regional pedestrian system consists of all facilities and paths designed to be used at least in part by pedestrians. Details regarding the regional vision for this important mode and specific recommendations can be found in the Regional Pedestrian and Bicycle Vision Plan in Appendix F. In addition, the health benefits of active transportation are referenced in the health planning framework located in Appendix H.

Challenges

Intermodal connectivity is vital to the success and further development of the bicycle/pedestrian system. Where interaction takes place, it should be done safely and effectively, both for the sake of the bicycle/pedestrian user as well as the other mode.

Funding for bicycle/pedestrian improvements does not enjoy a dedicated source, but exists rather as a set-aside amount.

Map 4: Regional Bikeways



[20]Krizek, Kevin 2006. *Two Approaches to Valuing some of Bicycle Facilities' Presumed Benefits,* University of Minnesota, Twin Cities **and** US Dept of Health and Human Services 2002. *Physical Activity Fundamental to Preventing Disease* **and** Garret-Peltier, Heidi 2011. *Pedestrian and Bicycle Infrastructure: A National Study of Employment Impacts,* University of Massachusetts Amherst

[21]H-GAC 2040 Regional Bikeway Plan

[22]City of Houston website, 2013

[23]2012 ACS data

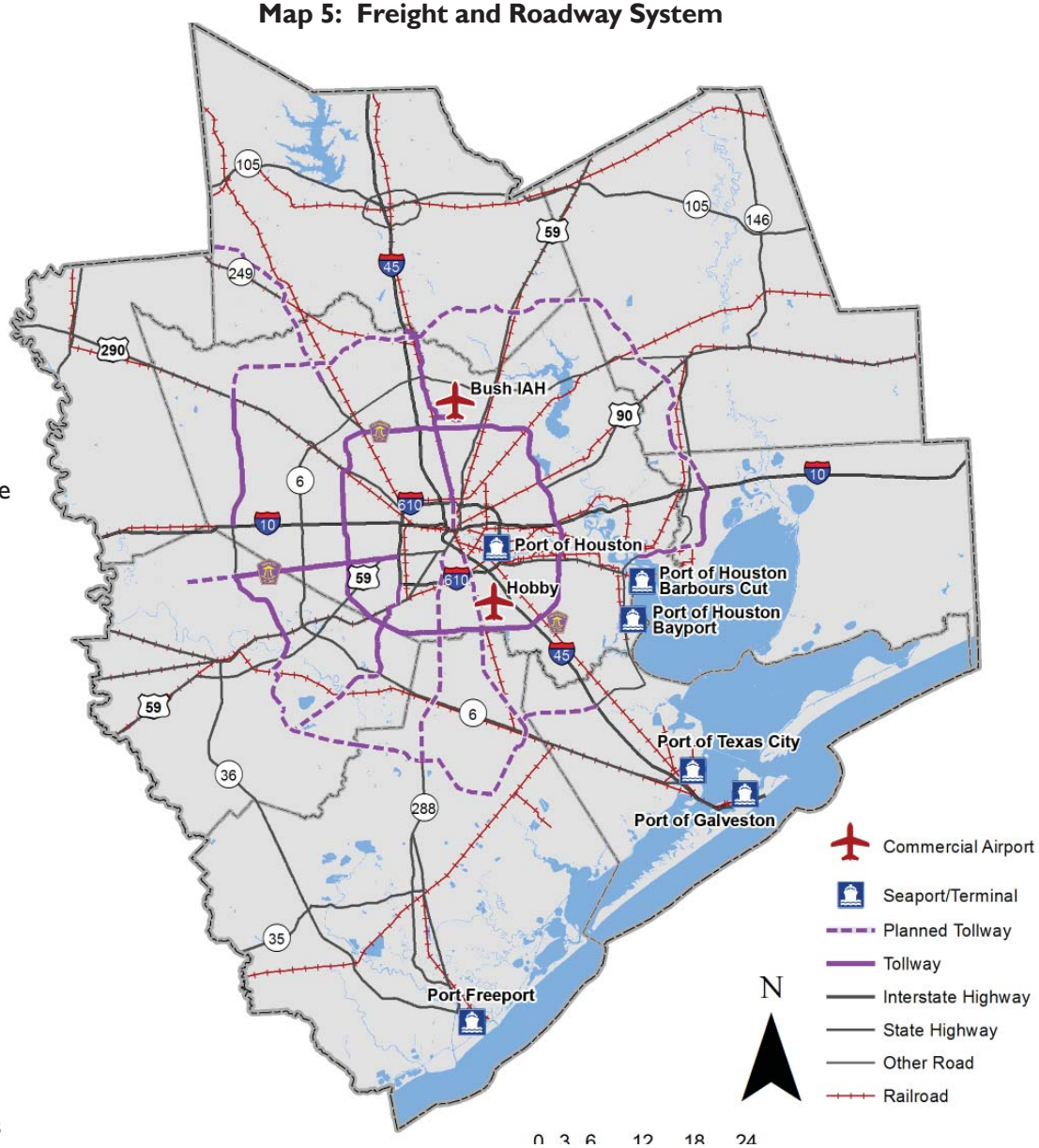
Regional Freight System

Another major function of the transportation system is to move goods and services for commercial purposes. Improvements to the most freight-intensive roadways and infrastructure have potential to benefit both commuters and freight providers. The H-GAC region is an international hub of port traffic, and the Port of Houston Authority ranked as the nationwide leader in handling foreign tonnage in 2014[24]. The Port of Texas City serves major petrochemical producers and refiners along the eastern half of the region. The Port of Galveston, in addition to direct rail service and produce handling, has one of the most robust cruise passenger programs in the country. Port Freeport, in southern Brazoria County, enjoys natural deep-water access and is positioned to benefit long-term from billions of dollars of energy-related investment in its vicinity and cargo handling capacity. There are more than 1,000 miles of freight-carrying railroad track in the region, with two Class 1 railroads (Union Pacific and Burlington Northern-Santa Fe) operating approximately 2,000 trains of all types across almost 1,200 at-grade roadway crossings[25]. Pipelines carrying liquids and gases total almost 21,500 miles—with sizes ranging from less than 10 inches to 42 inches in diameter. Of the billions of dollars of tradable goods that enter Texas every month, the Houston-Galveston region carries 82% by trucks[26]. Given the Houston region's strategic location to numerous ports and strong population growth, truck-borne freight traffic--already the majority of goods movement--is expected to be a much larger factor impacting congestion and maintenance on the region's roadways.

Due to the concentration of petrochemical industries in the region, hazardous material routes play a notable role in supporting freight needs, with more than 130 million tons of petrochemical products moving across the highway system in 2012[27]. They travel daily over 38 designated routes. Evacuation routes share mileage with most of the region's critical freight facilities. According to FEMA and the US Army Corps of Engineers, there are 1,636 centerline miles of evacuation routes in the metropolitan planning region, allowing a total evacuation of the most at-risk population in less than 40 hours. Please refer to Appendix A for maps regarding these topics.

The region's 26 airports also serve freight needs. Annual air cargo measured almost a billion pounds in 2012, an increase of more than 5% from 2010. This activity was in addition to the 25 million passengers Bush IAH and Hobby handled in 2012[28]. According to the Regional Aviation System Plan (RASP),

Map 5: Freight and Roadway System



[24] *PHA Market Development,* USACE Navigation Data Center
[25] Regional Freight Profile, H-GAC 2011
[26] 2012 H-GAC Regional Goods Movement Study
[27] 2012 H-GAC Regional Goods Movement Study
[28] 2012 H-GAC Annual Mobility Report

the 26 airports are expected to grow from 1.9 million operations and 2,938 based aircraft in 2008 to more than 2.4 million operations and 3,839 based aircraft in 2030. This growth is at a slightly higher rate than general aviation in the nation and the state.

Challenges

Increasing demand on the transportation freight network will contribute to increasing bottlenecks within the system. Sustaining access to ports and manufacturing sectors within and through our region will be critical in ensuring economic competitiveness.

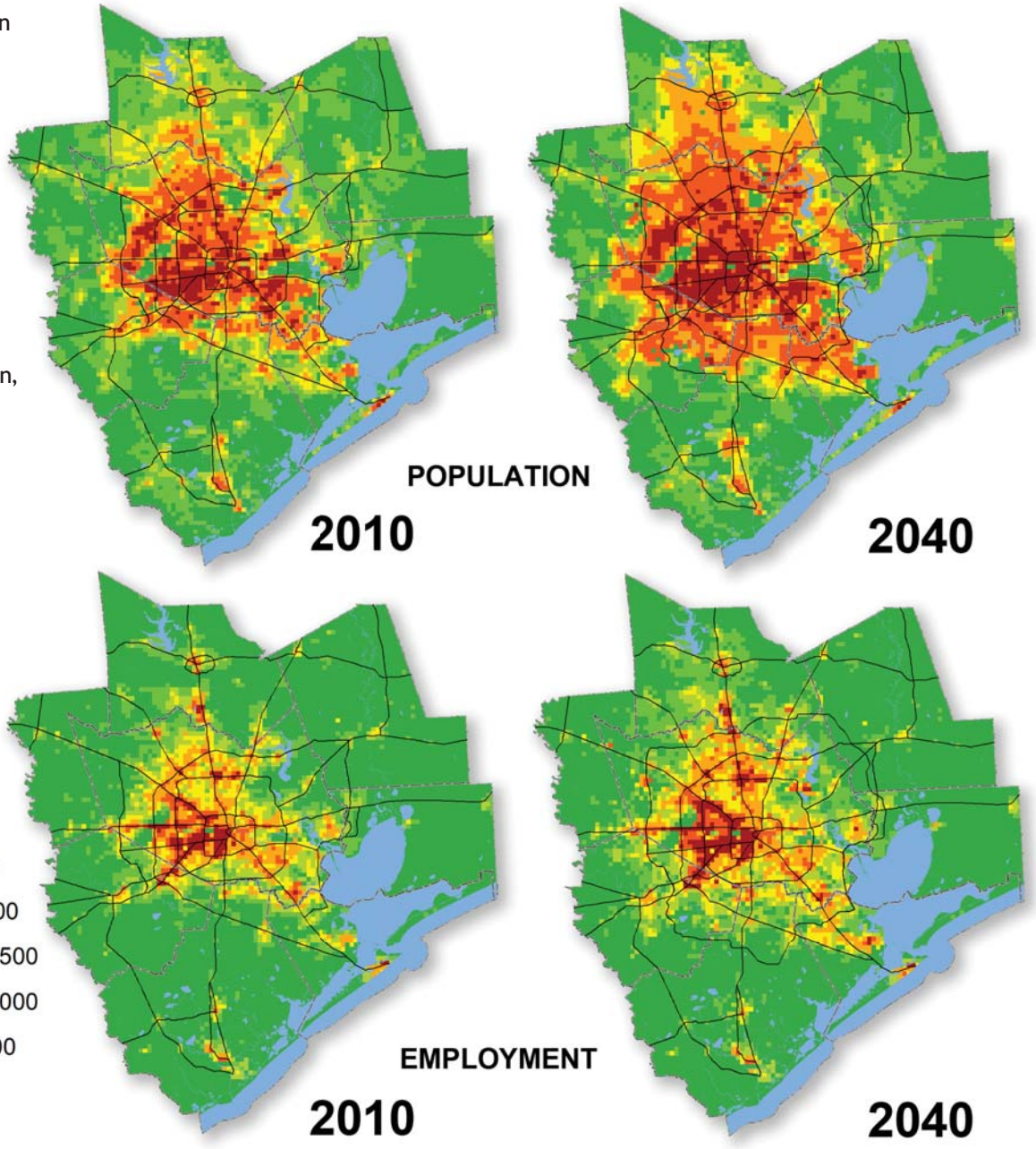
Similar to challenges confronting the roadway and transit systems, the increase of suburban employment centers will result in the rise of suburb-to-suburb commute patterns, compounding existing congestion, safety, and cost of delivery issues for freight providers.

Population and Jobs Forecast

The 2040 RTP updates regional planning assumptions regarding future population and jobs. This supplied the planning process with a fresh perspective on what to expect regarding future travel demand and service area location. The population and employment growth forecast for the Houston-Galveston Area Council region is impressive. Population in households will grow from 5.8 million in 2010 to 9.6 million by 2040, an increase of 3.7 million of new-born, migrants and immigrants, or 64% of population growth for the next 26 years. Employment will grow from 2.7 million in 2010 to 4.2 million by 2040, an increase of 1.5 million of workers, or 53% total employment growth over the next 26 years.

This level of growth will cast challenges for local and state government planning, especially for transportation planning. Among the many challenges, how to serve an aging population is a top issue. The share of population ages 65 plus will grow from 8% in 2010 to about 20% by 2040. Another issue is how to deal with

Map 6: Population and Employment 2010 and 2040



population and employment decentralization. The share of population inside Loop 610 will decrease by 2% by 2040, and the share of employment inside Loop 610 will decrease by 4%.

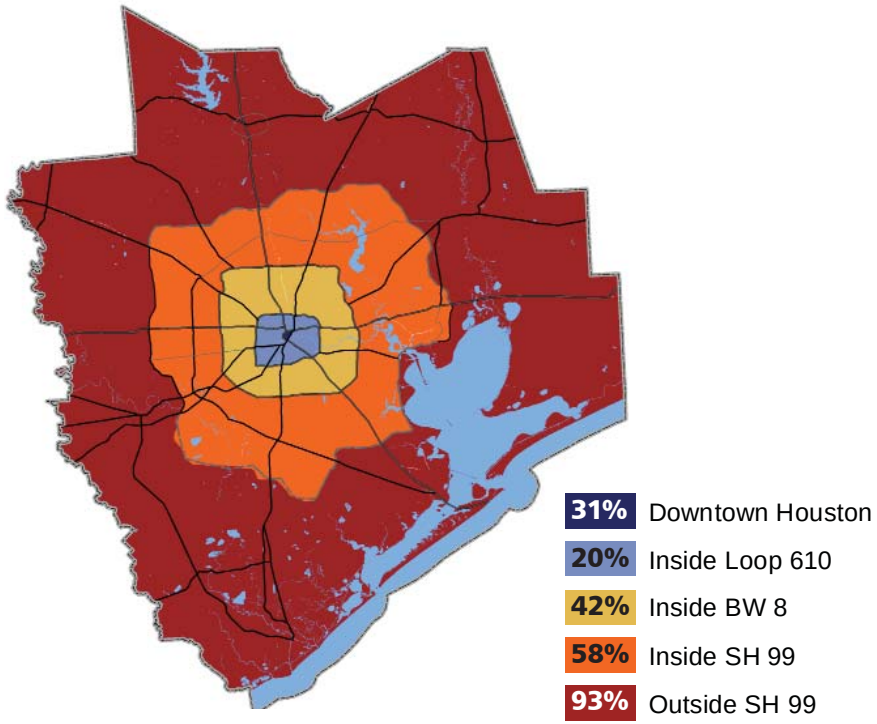
Merely knowing the size of the population does not adequately address the various travel needs a region has. Technical analysis of the status and nature of the population today and in 2040 gives a more full impression of future travel demand and current transportation system performance. Furthermore, federal regulations require analysis to determine the fair treatment of all segments of the relevant population, regardless of nature or degree of diversity. The eight county Transportation Management Area (TMA) is 60% minority, with three counties whose majority is made up of all racial and ethnic minority groups—a "majority minority" population. Almost 14% of the regional population is classified as "low income", with almost 20% limited educational achievement. Regionally, an average of 6% of households does not have a car, which is the main mode of transportation to work by far in the region. Ten percent of the regional population does not speak English proficiently, and almost 9% of the region is over 65. These statistics reveal a widely diverse population, all with distinct transportation needs according to their life-situation. This reality has been considered in the drafting and implementation of the 2040 RTP. The plan has demonstrated compliance with regulations regarding Title VI and Environmental Justice based on the analysis completed in Appendix B.

Travel Forecast

Forecasting travel patterns in the future reveals the adequacy of planned investments in confronting current trends and future needs. It is calculated based on the expected changes in geographic location, size, and mobility of population and employment. Also, it takes into account the diversity presented in the previous section. For example, if all the region's zero-car households were forecasted to locate in one specific area, plans directing relevant services should be adapted accordingly.

All areas of the H-GAC region will experience increased travel over the next 25 years. Driven by the location of jobs and residents, vehicular travel will increase from 170 million vehicle miles of travel on an average weekday to 285 million, an increase of 64 percent. Travel patterns will also continue to change during the plan horizon. As growth in suburban Harris County and adjacent counties continues, travel to, from or within the area outside Beltway 8 will represent 70% of all trips. The largest increase in travel will be trips that both begin and have their destination in the area outside the Grand Parkway, forecasted to double by 2040.

Map 7: Percent Change in Trip Attraction Across the Region



The growth of employment beyond the IH 610 loop has led to significant commuting in traditionally non-peak directions on many of the regions freeways and toll roads. This trend will continue with as the peak travel direction reverses in some major travel corridors such as parts of IH 69 (US 59) South, IH 10 West and IH 45 North. Although the development of major employment centers in formerly suburban (or rural) areas leads to effective use of major road capacity, it presents new challenges for efficiently serving suburban destined commuters with competitive transit alternatives.

The 2040 RTP is the vehicle through which these recommendations, and the vision they represent, become a reality. Regionally significant, added capacity highway and transit projects programmed in the 2040 RTP must meet both air quality and fiscal constraints. Discussion regarding the reasonably available resources for implementation of the 2040 RTP and its support of the attainment of federal air quality standards is described below as well as in Appendices D and C.

Air Quality Conformity Determination

Our region is currently designated "nonattainment" for federal ground-level ozone standards under the Clean Air Act. As a consequence, the State must develop a plan which demonstrates how emissions critical to the formation of ground-level ozone will be reduced to achieve federal air quality standards. This plan is known as the State Implementation Plan, or "SIP." Transportation conformity is the process that links the SIP with the 2404 RTP.

Conformity is demonstrated when the projected regional emissions from on-road vehicles are less than emissions budgets for on-road vehicles contained in the State Implementation Plan. In addition, the 2040 RTP must support the timely implementation of specific transportation control measures designed to reduce on-road emissions. A conformity determination demonstrates that implementation of the 2040 RTP will not cause any new violations of the air quality standard, increase the frequency or severity of violations of the standard, or delay timely attainment of the federal standard interim goals[1]. The 2040 RTP has demonstrated conformity with the guidelines and limitations, as shown in the below table. See Appendix C for more detail. For each year calculation is required, the forecasted measures for both Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOC) fall below the budgets set for the region. Both NOx and VOC are known to be detrimental to general air quality and the health of the environment and regional residents.

AIR QUALITY CONFORMITY RESULTS				
YEAR	NOX BUDGET	NOX	VOC BUDGET	VOC
2015	171.63	124.92	71.56	52.76
*2017	130.00	109.66	59.76	50.07
*2018	103.34	102.74	50.13	48.77
2025	103.34	65.12	50.13	40.60
2035	103.34	65.77	50.13	43.45
2040	103.34	71.39	50.13	46.27

*2017 and 2018 were interpolated from 2015 and 2025 MOVES analysis.

Fiscal Constraint Analysis

Fiscal constraint analysis is performed in order to exercise prudence in planning for the transportation future of the regional public. Revenues for future investment are not limitless, and proper governance requires a conservative fiscal approach when considering which improvements are necessary, and in what timeframe. Federal and state regulations establish this principle into an enforceable requirement of every update to the RTP.

Practically, the analysis to demonstrate fiscal constraint limits the total investment to combined reasonably expected revenues. H-GAC estimated revenues and expenditures through the year 2040, including federal, state, and local revenue sources. Expenditure estimates include construction, operating, and maintenance.

As shown in Figure 4, the 2040 RTP expenditures are less than expected revenue over the life of the plan. Estimates of reasonably available revenue for investment include recently approved state-level sources Proposition 1, Proposition 7, and the ending of non-public safety diversions from the State Highway Fund. Before these revenue enhancements, proposed by successive state legislative sessions in 2012 and 2014 and later approved by voters, the nominal value of revenues for the 2040 RTP was approximately $104 billion. With these additional revenues available, the total estimate projection increases to $124 billion. See Appendix D for more detail.

Figure 4: Fiscal Constraint Summary

REVENUE SOURCE	COLLECTION RATE
Federal	18.4 cents/gallon
State[1]	20 cents/gallon
Local	Varies
METRO Sales Tax[2]	1%
Transit Farebox	Agency Rate
Tolls	Facility Rate
TOTAL[3]	**$124 billion**

EXPENDITURE TYPE	INVESTMENT AMOUNT
System Management and Operations	$40 billion
State of Good Repair	$27 billion
Coordinate Development	$200 million
Expand the Multimodal Network[4]	$21 billion
TOTAL[3]	**$88 billion**

[1]Includes Fuel tax, Proposition 1, Proposition 7 and State Highway Fund adjustments
[2]With a portion diverted to the General Mobility Program
[3]Nominal value
[4]Portions of this strategy are considered "State of Good Repair" dollars

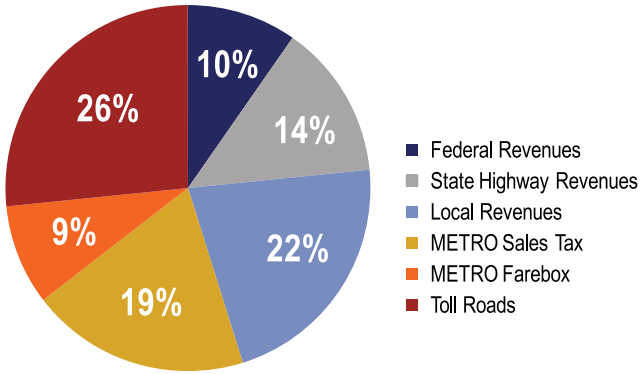
FISCALLY CONSTRAINED 2040 RTP

While the regional vision represents an ideal level of investment, the 2040 RTP applies today's fiscal reality: federal and state revenues, those most susceptible to income from the gasoline tax, have steadily decreased in the last few years. Meanwhile, expenditures have remained steady, approximately $2-3 billion dollars annually. The gap in investment has been bridged by local revenue sources.

Reasonably Available Revenue

Reasonably available revenue is estimated by annual financial reports from local agencies, relevant TxDOT data and projections, and trends related to debt financing and regional revenues. The total estimated revenues over the course of the 2040 RTP is approximately $124 billion.

Figure 5: 2040 RTP Revenue by Source
Total: $124 Billion



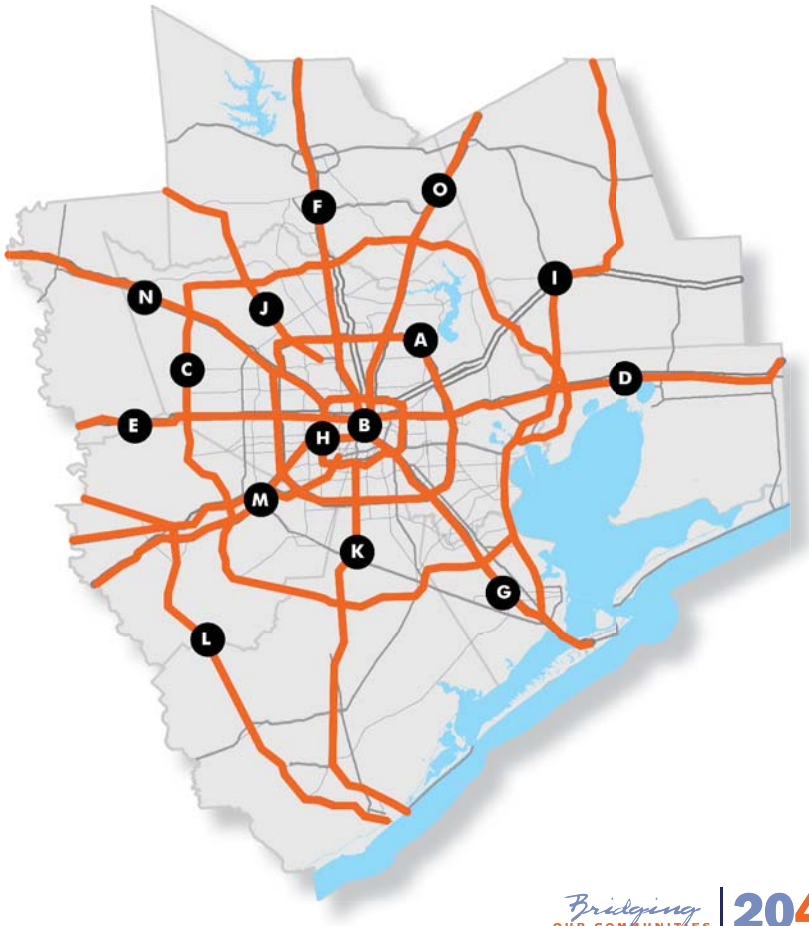
Federal revenues are provided by the Highway Trust Fund, whose major source is the federal fuel tax of 18.4 cents per gallon of gasoline. Expenditures from the Fund have outpaced revenues and required congressional intervention to remain solvent over the last five years. State Highway Revenues refer to taxes assessed on the sale of gasoline and diesel fuel at a fixed-rate of 20 cents on every gallon. These taxes are dependent on fuel consumption and have not been adjusted since 1991. Increases in vehicle fuel efficiency and a lower rate of VMT growth will impact total revenues generated from this source during the planning horizon. The average fuel efficiency of the light vehicles is forecast to increase from about 21 miles per gallon (MPG) in 2012 to about 29 MPG in 2040[29]. When compared to the 2035 RTP Update, revenues from federal and state sources are down significantly, while local toll revenue share of the regional total increases 10 percentage points. This comparison is line with the overall funding outlook nationally for transportation—that without new revenue sources, state and federal revenues are projected to decrease in absolute and relative terms in the future.

Summary of Major Investments

The four 2040 RTP strategies recommend $88 billion dollars of investment. Major investments, such as a freeway extension or light rail line construction, can mostly be identified along the corridor where they are located. For example, all 2040 RTP recommended improvements along IH 45 South can easily be shown together. Remaining investments fit within a regional investment program.

The major investment corridors are listed first, followed by regional investment programs with descriptions. This presentation format allows project sponsors

Map 8: Regional Investment Corridors



[29]H-GAC Revenue Model

	STRATEGY 1 SYSTEM MANAGEMENT AND OPERATIONS	STRATEGY 2 STATE OF GOOD REPAIR	STRATEGY 3 MULTIMODAL NETWORK EXPANSION WIDENING	STRATEGY 3 MULTIMODAL NETWORK EXPANSION CONSTRUCTION	STRATEGY 4 DEVELOPMENT COORDINATION	TOTAL
CORRIDOR-BASED MAJOR INVESTMENTS						
A. BW 8	N/A	N/A	$1,289,400,000	N/A	N/A	$1,289,400,000
B. Downtown Loop	$44,309,000	N/A	N/A	N/A	N/A	$44,309,000
C. GPW	$801,300,000	N/A	$86,600,000	$3,108,409,037	N/A	$3,996,309,037
D. IH 10E	N/A	N/A	$32,900,000	N/A	N/A	$32,900,000
E. IH 10W	$17,000,000	$3,779,400	$911,308,063	$98,094,299	N/A	$1,030,181,762
F. IH 45 North of IH 10	$64,641,007	N/A	$87,858,553	$236,538,991	N/A	$444,875,822
G. IH 45S	$7,581,898	N/A	$817,521,365	N/A	N/A	$1,478,937,116
H. IH 610	$142,101,000	$169,300,000	N/A	$24,300,000	N/A	$335,701,000
I. SH 146	$69,511,758	N/A	$576,000,000	$47,090,744	N/A	$692,602,502
J. SH 249	N/A	N/A	$436,310,000	$638,495,210	N/A	$1,074,805,210
K. SH 288	$129,500,000	$325,100,000	$1,012,936,045	$261,000,000	N/A	$1,728,536,045
L. SH 36	$17,167,217	N/A	$609,500,000	$14,317,318	N/A	$640,984,535
M. Southwest Corridor	$35,683,000	$58,129,440	$1,185,650,670	$320,861,162	N/A	$1,600,324,272
N. US 290	$496,108,665	N/A	$1,225,084,876	$2,330,915,184	N/A	$4,052,108,725
O. US 59N	$10,126,696	$140,300,000	$36,250,000	N/A	N/A	$186,676,696
REGIONAL INVESTMENT PROGRAMS						
Freight *Includes roadwork on the Freight Significant Network; freight rail, intermodal terminals, grade separations, etc*	$362,861,306	$22,700,000	$171,426,487	$31,380,000	N/A	$588,367,793
ITS/Safety *Includes certain roadway improvements, installation of computerized traffic control systems, Incident Management*	$679,082,552	$13,033,372	N/A	N/A	N/A	$692,115,924
Land Use/ Transportation Planning *Includes Subregional Planning, transit planning, studies*	$4,954,313	N/A	N/A	N/A	N/A	$4,954,313
Local High Capacity Transit *Includes non-corridor light rail, park and ride, transit centers, demand management strategies*	$593,457,524	$31,441,623	$3,938,403,019	N/A	$41,329,486	$4,604,631,652

	STRATEGY 1 SYSTEM MANAGEMENT AND OPERATIONS	STRATEGY 2 STATE OF GOOD REPAIR	STRATEGY 3 MULTIMODAL NETWORK EXPANSION WIDENING	STRATEGY 3 MULTIMODAL NETWORK EXPANSION CONSTRUCTION	STRATEGY 4 DEVELOPMENT COORDINATION	TOTAL
Regional Roadway Expenditures *Includes debt service, administration, and management/operations estimates*	$10,139,075,823	$11,480,705,512	$5,017,941,370	N/A	N/A	$26,637,722,705
Air Quality Related	$310,065,000	N/A	N/A	N/A	N/A	$310,065,000
Pedestrian/Bicycle *Includes on-street facilities, hike and bike trails and paths, and reconstructions*	$21,393,516	$39,074,940	$129,437,651	$67,109,263	$131,523,775	$388,539,145
Other Major Roadway Improvements *Non-Corridor work on Principal Arterials*	$1,362,767	$13,474,784	$478,355,264	$94,398,458	N/A	$1,796,039,244
Thoroughfare Development *All other roadway improvements*	$281,791,922	$1,475,991,616	$2,899,036,884	$838,060,705	N/A	$5,494,881,127
Transit Capital *Includes all other new or expanded facilities, services, and vehicles*	$273,830,784	$3,553,124,603	$102,102,580	$8,267,379	$20,800,000	$3,958,125,346
Transit Other *Includes non-capital transit expenditures*	$25,137,139,782	$131,130,875	N/A	N/A	N/A	$25,268,270,657
TOTAL	**$39,940,863,160**	**$17,538,497,096**	**$22,571,070,369**	**$8,128,278,301**	**$193,653,261**	**$88,372,344,187**

flexibility to adjust minor details of their project without compromising the representative integrity of the 2040 RTP. In many cases, especially for projects not planned for construction for 20 years, future conditions are not knows, and it may be necessary to update certain aspects of a plan. By representing related investments as programs, and summarizing major investments by corridors, the public can be aware of future changes, while local agencies can adapt to the unexpected. The summarized costs shown have been estimated based on the 2040 RTP expenditure model, previous history, and total cost estimates submitted by project sponsors.

Corridor-Based Major Investments

Corridor-based summary sheets of major investments have been prepared to present the main improvements. The Pull-sheets show investments based on the region's chief transportation corridors—and amount to about $18 billion dollars, 21% of the total cost of the 2040 RTP. These investments will be among the most obvious, easy to understand, impactful, and costly the region undertakes in the next few decades. In order to compare the vision with the fiscally constrained plan, the 2040 RTP improvements are in green and vision-level investments previously identified yet unfunded are in red. In some cases, the red-line vision-level projects outnumber the 2040 RTP planned improvements. For all Corridor Summary Sheets, see Appendix G.

Regional Investment Programs

The remainder of the fiscally constrained 2040 RTP expenditures do not fit into one of the above corridors, and are represented in programs such as ITS, Safety, thoroughfare development, suburban connectors, freight, pedestrian/bicycle improvements, transit, and land use coordination—with descriptions accompanying each program in the table above.

Some transit expenditures fall within this category as well, including at least: the regional vanpool program; ADA accessibility and paratransit service; preventative maintenance, enhancements, and replacements to the bus and rail systems and vehicles; IT system improvements; and work regarding passenger shelters, facility maintenance, transit centers, and Park & Rides.

The corridor summary sheets make extensive use of the *Eco-Logical* tool. *Eco-Logical* is an interactive, Geographic Information Systems (GIS) based mapping tool used in the corridor pull-sheets. It identifies high value environmental resources in the region, and was developed with the assistance of an advisory committee and funded in part through a grant from FHWA. Methodology detail may be found on the project website: www.h-gac.com/go/eco-logical or in Appendix G.

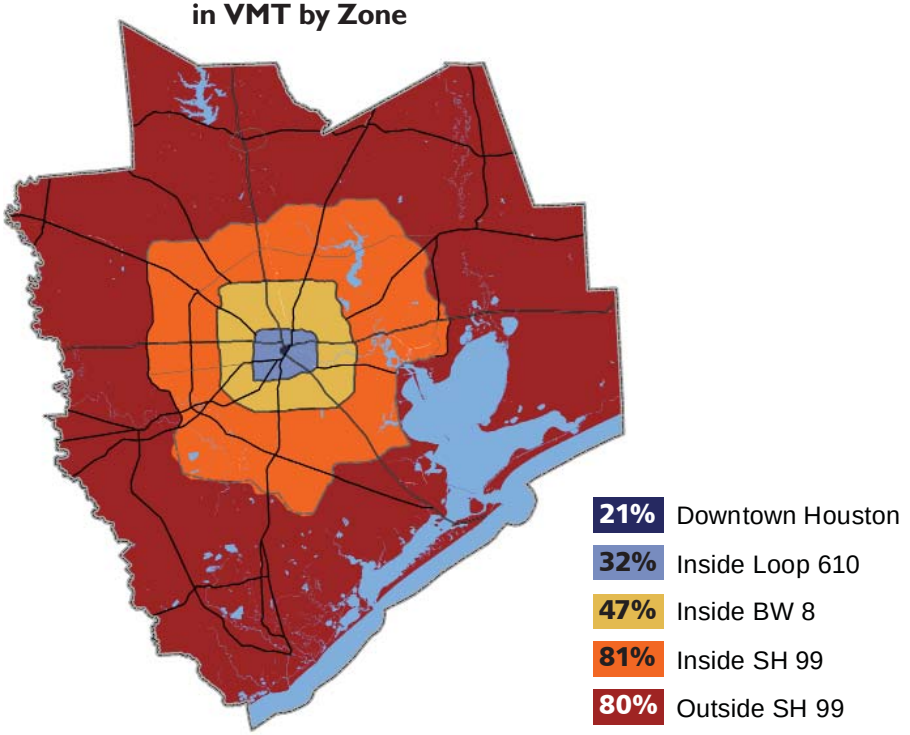
Analysis of the 2040 RTP

The implementation of the 2040 RTP has been modeled to provide an initial impression of the future performance of the system. For this, the region was divided into logical geographic zones, such as those presented in Map 9. These zones comprise most of the region's activity, and capture travel statistics in a convenient way. The following table displays percent changes in Total Volume and Vehicle Miles Traveled (VMT) over the life of the plan. The largest percentage increases are in the areas between Beltway 8 and the Grand Parkway (SH 99), and outside the Grand Parkway (OUTSIDE SH 99). With so much travel shifting further away from the historic regional core of downtown Houston, local stakeholders should take note of the appropriate 2040 RTP programs and strategies. This trend is emphasized by comparable data regarding the location of population growth in the year 2040. Analysis suggests much of the future regional growth will be concentrated outside Beltway 8, especially in relation to current regional population share.

Meanwhile, the VMT per capita, a measure of each resident's travel share, is 27 miles per person in 2015. In 2040, this increases 11% to 30 miles per person. The increase per capita in vehicle hours traveled, a measure of time spent on the road, increases at a much higher rate over the same period, indicating a significant jump in how long it will take to travel one mile in the future. Recall that travel capacity on the most-traveled roads is only increasing 5% in the same period. Such disparities indicate major changes to the available travel options and congestion mitigation methods will be necessary in the future. For example, commuter rail could help to alleviate the roadway travel share. This region is home to 40% of the state's most congested roadways, not all of which can be widened. Commuter rail has a significantly higher carrying capacity than highway lanes serving predominantly single occupant vehicles. Currently, the Gulf Coast Rail District is studying possibilities along three regional corridors, providing a framework in which the transportation community could advance development of the type of options that will be necessary in the future.

Current funding for development and implementation of trasportation improvements has not grown in line with jobs and population in the metropolitan area. However, even if it had, a simple extension of current transportation investment and commuting patterns would still not feasible. In some cases, it is a question of available real estate, or the pace of job growth--whatever the obstacle, new travel options and greatly increased investment in mass transportation seem to be the most viable transportation future for the greater Houston region. While the 2040 RTP recommendations do not reach outside the current regional policy framework, and do not recommend land use policy or development control methods toward this end, future updates to this plan will require a re-assessment of current trends and available tools in order to recommend improvements that will be needed to provide acceptable levels of mobility and accessibility.

Map 9: 2040 Percent Change in VMT by Zone



	2015 POPULATION	2040 POPULATION	PERCENT CHANGE
CBD	5,501	12,927	135%
IH 610	505,413	583,872	16%
BW8	1,680,851	2,166,884	29%
SH99	2,932,889	4,308,476	47%
OUTSIDE SH99	1,327,857	2,485,284	87%

Future Vision

Map 10

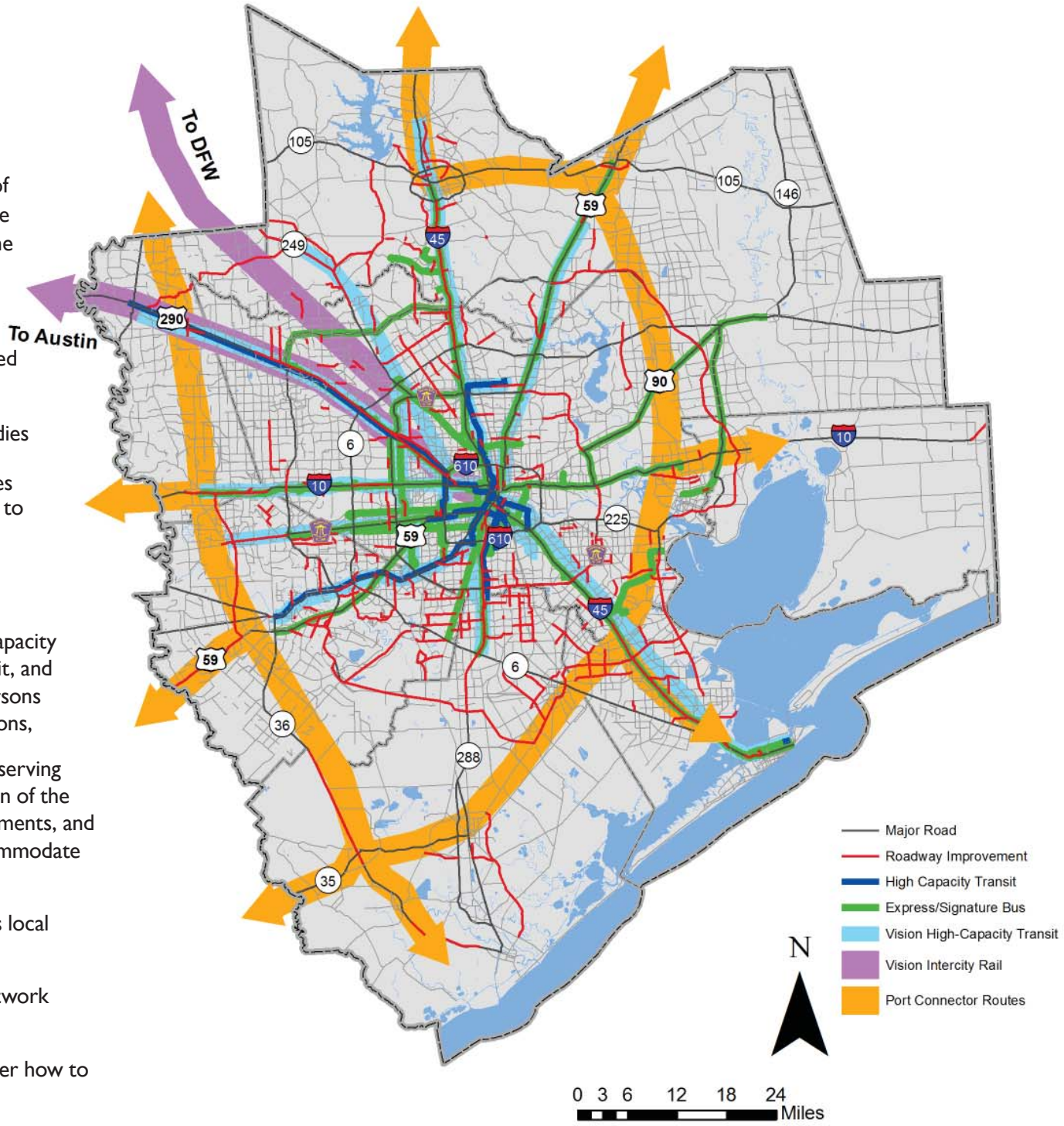
Not all needs identified through this process are included in the 2040 RTP recommendations. Many of the improvements with the most potential to change "transportation" as we know it today are outside the reach of available investment dollars—making them "unfunded" with respect to the 2040 RTP. When compiled together, they represent a vision for the future of regional transportation, and are represented conceptually in Map 10.

The recommendations come from more than 20 studies assisted by H-GAC as well as local governments and state and local transportation agencies. It also includes projects that were removed from previous plans due to fiscal constraint.

Examples of projects that support the vision include:

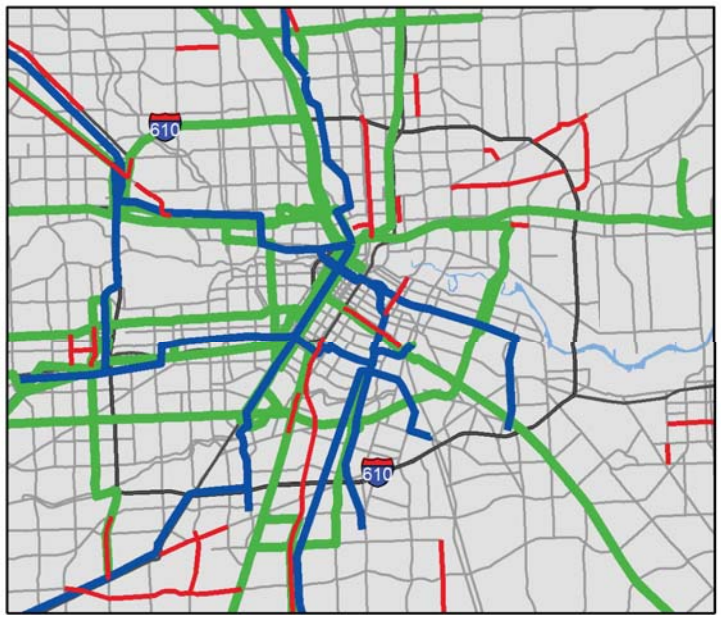
- Extensive transit network—700 miles of high-capacity transit, light rail, commuter rail, bus-rapid transit, and high-speed inter-city passenger rail to move persons within the region and between neighboring regions,
- Significant investment in major travel corridors serving both travelers and freight such as the completion of the Grand Parkway, intermodal connector improvements, and the construction of freight relief routes to accommodate ports-area mobility,
- A completed network of more than 2,600 miles local thoroughfares; and
- A robust, interconnected pedestrian/bicycle network of more than 986 miles.

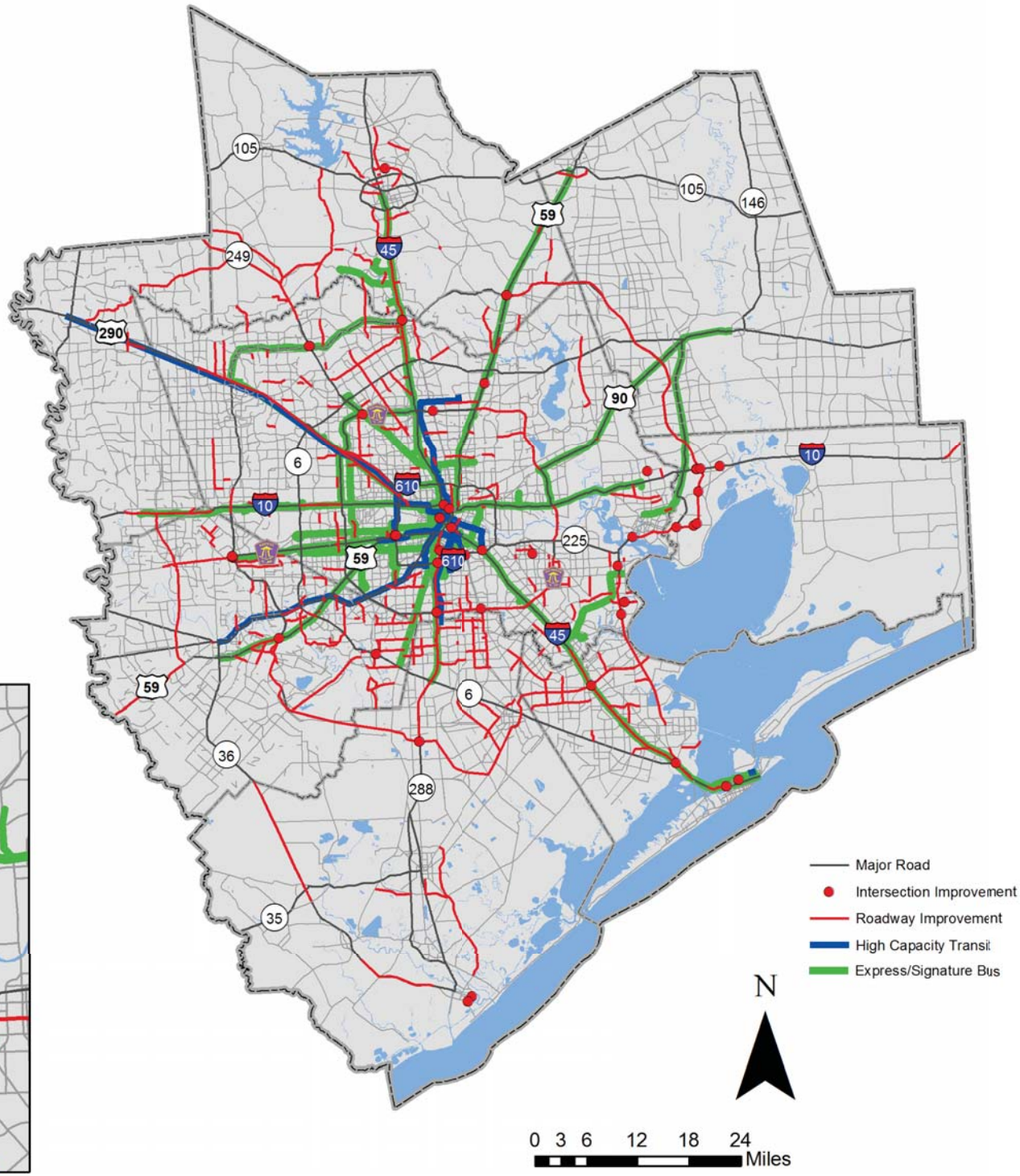
Future updates to the 2040 RTP will need to consider how to advance the regional system closer to this vision.



Constrained 2040 RTP

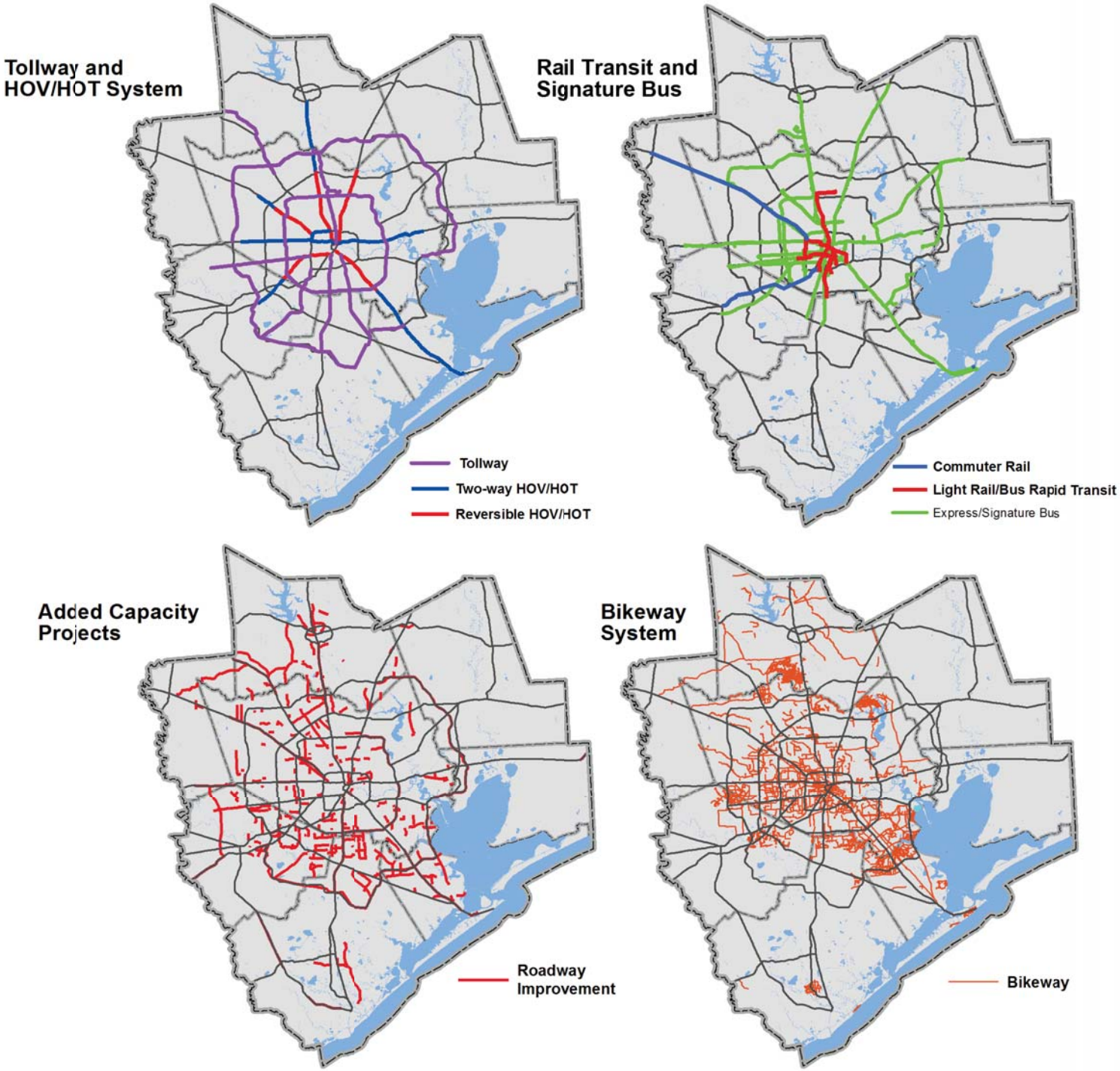
Map 11





2040 RTP System Features

Map 12



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