

BAYTOWN MOBILITY PLAN

URS



Adopted January 24, 2013



ACKNOWLEDGEMENTS

City Council – Mayor, Stephen H. DonCarlos

District 1 – Mercedes Renteria III
District 2 – Scott Sheley
District 3 – Brandon Capetillo
District 4 – Terry Sain
District 5 – Robert C. Hoskins
District 6 – David McCartney

Planning & Zoning Commission

2012 Members

Brandon Benoit
R.D. Burnside
Spencer Carnes
Gilbert Chambers
James E. “Bo” Cox
Lisa D. Clary
Dr. Joe C. Floyd
Shawn McDonald
Tracey Wheeler

2011 Members

Barry Bobbitt
Brandon Benoit
Gil Chambers
Dr. Joe C. Floyd
Jim Hutchison
Mary Flores
Rolando Valdez
Tracey Wheeler
Spencer Carnes

City Staff

Administration

Bob Leiper, City Manager
Ron Bottoms, Deputy City Manager
Kevin Troller, Assistant City Manager

Planning & Development Services

Kelly Carpenter, AICP, Director of Planning and Development Services
Tiffany Foster, AICP, Assistant Director
Andrew Allemand, AICP, Development Review Manager



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LIST OF ACRONYMS

AADT – Annual Average Daily Traffic	NPIAS – National Plan of Integrated Airport Systems
ACE – Arts, Cultural, and Entertainment	PPP – Public Participation Plan
ADA – Americans with Disabilities Act	RASP – Regional Aviation System Plan
AASHTO – American Association of State Highway and Transportation Officials	RDM – Roadway Design Manual
AZA – Airport Zoning Act	ROW – Right-of-Way
BNSF – Burlington Northern Santa Fe Railroad	RPZ – Runway Protection Zone
CFR – Code of Federal Regulations	RTP – Regional Transportation Plan
CIP – Capital Improvement Program	SAFETEA-LU – Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users
DRC – Development Review Committee	SH – State Highway
EIS – Environmental Impact Statement	SRTS – Safe Routes to School
ETJ – Extra Territorial Jurisdiction	STEP – Surface Transportation Program
FAA – Federal Aviation Administration	STP – Surface Transportation Program
FF – Free Flow	TASP – Texas Airport System Plan
FHWA – Federal Highway Administration	TAZ – Traffic Analysis Zone
FM – Farm-to-Market	TCSP – Transportation, Community, and Systems Preservation Program
FRA – Federal Railroad Administration	TDF – Travel Demand Forecast
FTA – Federal Transit Administration	TDM – Travel Demand Model
FY – Fiscal Year	TEU – Twenty-Foot Equivalent United
GARVEE – Grant Anticipation Revenue Vehicles	TIP – Transportation Improvement Program
H-GAC – Houston-Galveston Area Council	TWLTL – Two-Way Left-Turn Lane
HSIP – Highway Safety Improvement Program	TxDOT – Texas Department of Transportation
IH – Interstate Highway	UP – Union Pacific Railroad
JARC – Job Access Reverse Commute	U.S. – United States
LOM – Level of Mobility	USACE – United States Army Corps of Engineers
LOS – Level of Service	USC – United States Code
MAP-21 – Moving Ahead for Progress in the 21 st Century	USDOT – United States Department of Transportation
METRO – Metropolitan Transit Authority of Harris County	V/C – Volume to Capacity
MPH – Miles Per Hour	VHT – Vehicle Hours Traveled
MPO – Metropolitan Planning Organization	VMT – Vehicle Miles Traveled
NHS – National Highway System	VPD – Vehicles Per Day

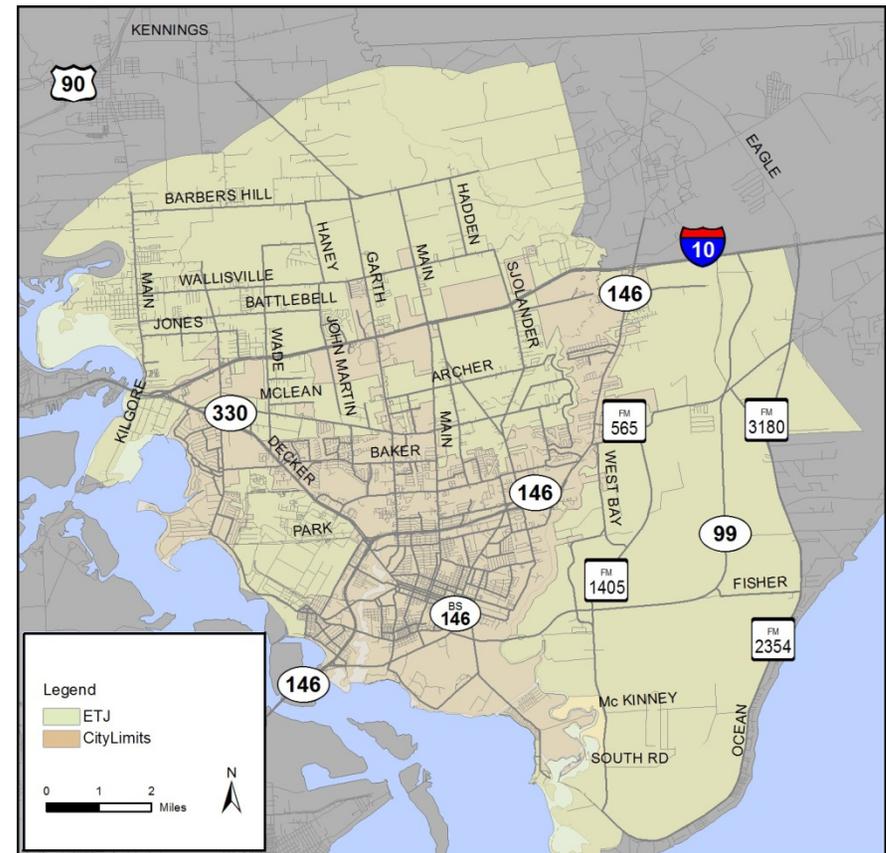


CHAPTER 1. INTRODUCTION

1.1 Study Area

Located in eastern Harris County, Baytown is the sixth largest city within the Houston metropolitan area with a 2010 population of 71,802 (Texas State Data Center, 2011). The Baytown Mobility Plan is the result of a multi-modal transportation needs analysis within the City of Baytown and its extra-territorial jurisdiction (ETJ). The ETJ includes the unincorporated communities of Highlands and McNair northwest of Baytown and a large portion of western Chambers County to the east as shown in **Figure 1-1**. The study area is approximately 103 square miles with approximately 37 square miles lying within Baytown's municipal boundaries.

Figure 1-1. Study Area



Source: City of Baytown, 2011



1.2 History of the Plan

The City of Baytown adopted a comprehensive plan update on May 22, 2007 (*Baytown 2025 Comprehensive Plan Update*). The Comprehensive Plan includes a thorough evaluation of the issues and opportunities related to establishing a long-term vision for community growth, revitalization, and road and infrastructure improvements to shape how the city will grow, while recognizing and preserving the character of the community. One of the action items from the mobility assessment was to perform “a detailed transportation study and thoroughfare plan to identify and prioritize specific improvements.”

The Baytown Mobility Plan is the result of a fifteen-month, multi-modal assessment of transportation conditions and needs. It was developed through a collaborative effort that included participation by City Council, Planning and Zoning Commission, city staff, key stakeholder groups, and the public. The Plan addresses the linkage between land use and transportation by providing a proposed future Land Use Map that reflects the long-term community vision for transit enhancements and improved facilities for pedestrians and bicyclists.

1.3 Organization

This Plan is presented in the following format:

- **Chapter 1 – Introduction**
- **Chapter 2 – Public Participation**
- **Chapter 3 – Land Use and Urban Design**
- **Chapter 4 – Travel Demand Model**
- **Chapter 5 – Reserved for Future Use**
- **Chapter 6 – Cedar Bayou Port Infrastructure Needs**
- **Chapter 7 – Multi-Modal Assessment**
- **Chapter 8 – Access Management**
- **Chapter 9 – Thoroughfare Plan Update**
- **Chapter 10 – Financing**
- **Chapter 11 – Conclusions and Recommendations**

1.4 Goals and Objectives

The mobility goals from the *Baytown 2025 Comprehensive Plan Update* include:

- A transportation network consistent with the Future Land Use Map, accommodates existing and projected growth, and meets diverse mobility needs of Baytown residents.
- A well-maintained, safe, and efficient transportation system.
- A transportation network that provides optimum connectivity between existing, upcoming, and potential destinations.

The objectives for the Baytown Mobility Plan include:

- Identify future land uses and travel patterns, as well as population and employment forecasts.
- Update the future land use, demographics, and transportation network in the regional travel demand model.
- Revise roadway design standards.
- Evaluate the needs of bicyclists and pedestrians to enhance access to schools, shopping, and transit.
- Identify enhancements to transit service.
- Evaluate potential improvements for marine freight transportation.
- Incorporate citizen participation into the planning process.
- Identify strategies for an Access Management Program.
- Identify the necessary transportation network improvements.
- Develop a short-term, a long-term (2026 and beyond), and an ultimate transportation network to serve the community needs.



1.5 Mobility Plan Elements

The framework for the Plan is based on the transportation model, which consists of the roadway network, the study area divided into Transportation Analysis Zones (TAZs), and the socioeconomic data inputs. The socioeconomic data includes population and employment numbers, which are based on the land uses throughout the study area and are input into the transportation model by TAZ. Output from the transportation model provides valuable information to the City with regard to the future travel demand.

A list of proposed roadway improvements has been developed, as well as a recommendation for the timing of these improvements, either as near-term (by 2015), mid-term (2016 to 2025), or long-term (2026 and beyond). The associated costs for the near-term improvements are also provided in 2011 dollars. The costs for the recommended roadway improvements do not include the costs for right-of-way (ROW) acquisition, relocation of utility transmission lines, nor costs associated with enclosing Harris County Flood Control ditches into the storm sewer.

Information Resources

- ✓ Baytown 2025 Comprehensive Plan Update (2007)
- ✓ H-GAC 2035 Regional Transportation Plan Update (2007)
- ✓ H-GAC Transportation Improvement Program (2011)
- ✓ TxDOT Houston Region Freight Study (2007)
- ✓ H-GAC Regional Aviation System Plan (2010)
- ✓ Baytown Liveable Communities Initiatives Study (2010)
- ✓ H-GAC Regional Transit Framework Study (2010)

The Baytown Mobility Plan is a multi-modal assessment that includes roadway improvements, bicycle and pedestrian elements, aviation uses, transit demand, and freight needs (both marine and truck).

Citizen involvement is a key element of the Plan, which provides the public an opportunity to give input about their needs and concerns as they relate to Baytown's transportation system. The Public Participation Plan (PPP) developed for the Baytown Mobility Plan is provided in **Appendix B**.



CHAPTER 2. PUBLIC PARTICIPATION

Public participation was an important part of the development of the Baytown Mobility Plan. At the beginning of the planning process, a public participation plan (PPP) was developed that outlined numerous opportunities for conducting outreach to the public, as well as a creative methodology for encouraging their active participation throughout the entire planning process. Public participation was integral to not only the transportation planning process, but also the formulation of the final recommendations, and the development of the final Baytown Mobility Plan. The goals of the public participation process were to:

- Obtain participation in the planning process from a broad spectrum of the community.
- Engage the citizens living both within the corporate limits and within the ETJ.
- Garner feedback from specific stakeholder/interest groups.

To achieve these goals, members of the public were encouraged to give feedback in person through four types of meetings: stakeholder meetings, a public stakeholder meeting, a public meeting, and a public hearing. In addition, the public was encouraged to use the City of Baytown’s website to view documents related to the development of the Baytown Mobility Plan. The input received from the public was used by the study team to: define community needs; determine which issues and concerns the Baytown Mobility Plan should address; and evaluate alternative solutions.

2.1 Stakeholder Meetings

Stakeholder meetings were held to solicit input and feedback on specific aspects of the Baytown Mobility Plan. **Table 2-1** provides the dates and topics for each stakeholder of these meeting.

Participation at each of the stakeholder meetings was good, with numerous comments and suggestions provided by participants on the materials presented. The comments and suggestions were considered by the project team and incorporated into the planning process. The following sections describe each of the stakeholder meetings in additional detail.

City Council/Planning and Zoning Commission. On January 27, 2011, a stakeholder meeting was held in the City Council chambers to solicit input from City Council members, as well as Planning and Zoning Commission members on their perceptions of the needs of the community regarding transportation. The meeting was advertised as a city council workshop and open to the general public.

At the meeting, the study team made a PowerPoint presentation to the stakeholders on the purpose, goals, methodology, and timeline of the Baytown Mobility Plan, and explained that it would evaluate the long-term multi-modal needs of the community based on:

- Population projections and the Future Land Use Map
- Regional transportation demand
- Parks, trails, and greenway connectivity
- Increased freight trips
- Need for safe sidewalks
- Partnership with Lee College
- Industrial growth

In addition, the methodology for gathering public input was outlined for the council and commission members, as described in the PPP. It was explained that participants in future meetings would be encouraged to actively participate in the planning process through group dialogue and review of both technical work products and interim recommendations.

The council and commission members were then asked to use the provided large scale aerial maps of the study area to identify community issues and areas of concern. These issues and concerns were incorporated into the subsequent technical evaluations. The study team also requested the stakeholders’ assistance in helping to get the word out that input from the members of the community were needed in the planning process.



Table 2-1 Stakeholder Meetings

Stakeholder Group	Date	Topic	Comment Summary
City Council/Planning and Zoning Commission	January 27, 2011	Kickoff Meeting – Overview of the project, obtain comments/concerns from council and commission	<ul style="list-style-type: none"> Freight movement is increasing Improvements needed for bicyclists and pedestrians Garth Road is the main commercial corridor Transit system has good ridership Correlation between land use and transportation
Community Stakeholders	March 8, 2011	Identify community issues and concerns	<ul style="list-style-type: none"> Need better accommodations for bicyclists and pedestrians Traffic on Garth Road is heavy due to all the commercial activity Residential development in the outlying areas and new high school at N. Main Street and Wallisville Road requires additional lanes on county roads
Land Use	March 9, 2011	Future Land Use Map options	<ul style="list-style-type: none"> Minimize high density development north of IH 10 Retain greenbelt areas around industrial parks Consider development patterns for future commuter rail stations
Economic Development and Distribution	April 4, 2011	Port usage and needs, industrial activity and freight	<ul style="list-style-type: none"> Cost is the main factor in shipping decisions Congestion on IH 10 is getting worse Truckers are resistant to using tollroads Port of Houston Authority beginning to explore options for their next container port
Development Review Committee	September 14, 2011	Proposed future land use, ordinance review, proposed roadway typical sections, access management strategies, Cedar Bayou Crossing	<ul style="list-style-type: none"> Sidewalks will increase width of right-of-way slightly Proposed Future Land Use Map looks good Changes in typical section and right-of-way widths will create ripple effect in a variety of city ordinances

Community Stakeholder Meeting. On March 8, 2011, fifteen residents attended a community stakeholder meeting that was held at the Baytown Civic Center. The meeting was open to the general public and advertised in the local newspaper, The Baytown Sun, and on the city’s website. A PowerPoint presentation was used to present the purpose, goals, methodologies and timeline of the Baytown Mobility Plan. The members of the public were invited to sit at round tables in groups of 6 to 8 people so that each participant could view large scale aerial maps in detail and participate in activities designed to engage the attendees in a round table discussion. Activities included:

Activity 1: How Do You Travel?

On the map in the middle of your table, place a red dot where you live and then place a green dot where you work or go to school. Then discuss the questions (listed below) with your table group. Your facilitator will record the groups’ responses.

What mode of travel do you use most often?

What other modes of travel do you use?

What modes of travel would you like to use if it was more convenient or safer?

On an average work day, how many people are in the car with you when you leave home?



Do you use a carpool or a vanpool?

How long is your commute to work/school?

When answering the questions, consider the following modes of travel:

- *Streets and Highways*
- *Sidewalks and Trails*
- *Bicycle Lanes and Trails*
- *Railroad Lines – both passenger and freight*
- *Public Transit System*
- *Intercity Bus Service*
- *Airports*
- *Water Ports and Parking Facilities*
- *Connecting Facilities – such as bus stations and airport terminals*

This activity was used to help participants think about their travel patterns and to consider all of the modes of the Baytown transportation system offers. The activity also helped the study team to understand the kinds of travelers that were participating in the meeting.

Activity 2: Goals of the Baytown Mobility Plan

- *A well-maintained, safe, and efficient mobility system.*
- *A transportation network that provides optimum connectivity between existing, upcoming, and potential destinations.*

After the moderator has finished describing the goals, please discuss with your group any questions you have about the goals. Tell us if there is anything that we have missed.

This activity was used to help define the goals of the Baytown Mobility Plan.

Activity 3: Planning for Future Growth and Changing Needs

The moderator will present a brief discussion of the anticipated outcomes of the planning process.

Outcomes:

- *Thoroughfare Plan*
- *Multimodal Standards*
- *Policy Proposals*
- *Access Management*
- *Bicycle and Pedestrian*
- *Engineering Standards*
- *Capital Projects*
- *Identification of Funding Strategies*

When you are doing the next activity, think about how your transportation needs may change in the future. Will you be living in the same place? Doing the same kind of work? Running the same kinds of errands? Have the same physical capacity?

How will the travel needs of you and your family change over the next twenty years?

How do you want to see your community grow and change over the next twenty years?

Do you want to see an increase in your access to any mode of travel over the next twenty years?



This activity was used to help the study team identify the issues and concerns that the community would like to see addressed by the Baytown Mobility Plan.

Activity 4: Next Steps in the Process of Developing the Baytown Mobility Plan

The moderator will explain the next steps in the development of the Baytown Mobility Plan. Through the Baytown website (www.baytown.org) you can:

- *Stay up to date on the progress of the plan.*
- *Continue to provide feedback and comment on the progress of the plan.*
- *See the updates on the Public Meeting to be held in August.*
- *Review proposed elements of the plan.*

This activity was used to:

- Ensure that the participants in the community stakeholder meeting understood the next steps in the planning process and where to find updates on the progress of the study.
- Ensure that each participant had an opportunity to provide any kind of comment or feedback on the project that the participant felt was important and to be able to provide that feedback in an anonymous manner.
- Solicit feedback from the participants on the methodology used in conducting the community stakeholder meeting as part of the quality control process employed by the study team.

All responses provided by the participants to the activities described above were recorded on the maps, the comment cards, or facilitator notes. These responses were then used by the study team in the technical evaluations.

Appendix B includes the following information from the public stakeholder meeting:

- Presentation
- Handouts
- Comment summary

Land Use Stakeholder Meeting. On March 9, 2011, a stakeholder meeting was held to discuss modifications to the Future Land Use Map. Developers, realtors, economic development and chamber of commerce representatives were invited to the meeting. These invited participants were selected for their unique knowledge of the future growth patterns that would be likely to occur and/or that would likely be supported by both the developers and the community. Of those invited, the participants included 10 from the private sector, 13 from various city departments and 3 from the consultant team.

At the meeting, the study team presented two options for the Future Land Use Map to the stakeholders. The consultants described the differences in the two plans and described the proposed land use categories, preliminary road extensions, and the inclusion of the ETJ in the Future Land Use Map for the first time.

The stakeholders then asked questions and offered comments on the two alternatives. Comments ranged from suggestions to identify additional streams and other points of interest on the map to information on proposed industrial developments in Chambers County. The feedback from the stakeholder indicated that Option B had more support with the modifications suggested during the meeting. Comments and notes were recorded on the maps

The study team used the input received from the stakeholders in the process of developing future land use and growth scenarios for the City. The resultant proposed future land use was then used for the demographic analysis for the travel demand modeling effort.

Appendix B includes copies of the presentation boards from this meeting.

Economic Development and Distribution Stakeholder Meeting. On April 4, 2011, a stakeholder meeting was held to discuss future economic development scenarios. Representatives from industrial parks, Port of Houston Authority, Chamber of Commerce, Economic Development Foundation, major employers, developers, and distribution companies were specifically invited to the meeting.

These stakeholders had unique knowledge of the economic development patterns of the City, especially related to: port usage and needs, industrial



activity, and freight movement. Of those invited, seven participated in the stakeholder meeting.

The discussion focused on freight movement, the modes used to move freight and the transportation options to handle the increase in freight movement that is expected over the next 25 years. The feedback from the stakeholders covered a range of topics.

- Shipping decisions are primarily cost-driven. The major distribution centers, such as Walmart and Home Depot, use cost as the determining factor to select the best way to move goods from the container ships at Port of Houston facilities to the distribution center in west Chambers County.
- There are three private barge docks and one public barge dock on Cedar Bayou, with a fifth under construction. Usage of the public dock is steadily increasing, but capacity is sufficient for now.
- If there were a yard for the containers in Baytown, it would help to reduce truck traffic from distributors returning empty containers to Port of Houston as well as truck traffic to bring empty containers to those industries producing goods that need to be transported to Port of Houston.
- The Port of Houston Authority is considering several locations for its next deep water container port that would be needed upon the complete build out of the Bayport and Barbour's Cut Terminals. Cedar Bayou and/or an area along the waterfront south of Cedar Bayou are potential candidates.
- It may be difficult to obtain federal funding for dredging a deeper channel across the bay.
- Chambers County has limited resources for maintaining their roadways.
- The high number of rail switching operations can be problematic for people trying to get to work. There are numerous at-grade railroad crossings in the industrial areas, but none warrant overpasses.
- Moving freight by truck out of Houston is becoming more challenging as the traffic increases. Distributors look for alternatives to IH 10, but their drivers/independent contractors do not want to pay tolls. Traffic on

SH 146 north of Cedar Bayou is heavy and truck traffic has shifted since tolls were activated on SH 99 in November 2011.

The study team used the input received from the stakeholders in the process of evaluating future economic patterns, land use and freight movement.

Development Review Committee Stakeholder Meeting. On September 14, 2011, a presentation was made to the Development Review Committee (DRC) to introduce proposed changes in typical roadway sections, ordinance changes that would be triggered by the recommended changes in the typical sections, proposed access management strategies, and alternatives for a new road across Cedar Bayou. Approximately 18 committee members attended the stakeholder meeting.

The study team used the input received from the stakeholders to revise the proposed roadway typical sections and proposed ordinance revisions.

Appendix B includes the presentation from this meeting.

2.2 Public Meeting

Public meetings provide an opportunity for interested residents and business owners to obtain information about the project and to provide comments and feedback on that information. A public meeting was held for this study on October 12, 2011 using a facilitated workshop format. At the meeting, the 18 attendees were given the opportunity to review exhibits that depicted:

- Future land use patterns adopted by the City for use in the study;
- Aerial map of the hike and bike trail system;
- Proposed typical sections for different types of streets; and
- Alternatives for a new road crossing of Cedar Bayou between IH 10 and Massey-Tompkins Road.



After having the opportunity to review the exhibits, the public was invited to sit in small discussion groups. The study team presented the interim results of the Baytown Mobility Plan. The primary purpose of the meeting was to obtain feedback from the public on the following aspects:

- Future Land Use Map
- Bicycle and Pedestrian Facilities
- Typical Sections
- Access Management
- New Cedar Bayou Crossing

To obtain their input, the participants were asked to review in detail the large scale maps and to participate in a round table discussion on two issues.

- **Bicycle and Pedestrian Recommendations.** The participants were first asked to provide comment on the recommendations presented. The participants were then asked to provide a list of the top four areas of the community that need sidewalks. They were also asked to provide a list of areas where they would like to ride a bike, if it were safe to do so.
- **New Cedar Bayou Crossing Alternatives.** The participants were asked the following questions: Which alternative looks better relative to impacts to the natural environment? Which alternative looks better relative to impacts to the manmade environment? Which alternative would you recommend as the best?

The participants were also asked to review exhibits and give feedback on the provided comment cards regarding the following:

- Typical Roadway Sections
- Future Land Use Map

The following is a brief summary of comments received from the public at this meeting:

- Sidewalks within 2 miles of elementary and middle schools should be first priority.
- Sidewalks should be included in neighborhoods and commercial areas, but not industrial areas.

- Trails connecting parks are a good idea.
- Widening the streets to add bike lanes will increase the developer's costs.
- Wider sidewalks may be needed in areas with high wheelchair usage.
- The northern Cedar Bayou alternatives provide better routes for high school students driving to Goose Creek Memorial High School rather than driving on IH 10.
- Consider extending route all the way to SH 99/Grand Parkway.

Appendix B includes the following information from the public meeting:

- Presentation
- Exhibits
- Handouts
- Comment summary

2.3 Public Hearing

A public hearing was held on November 12, 2011 at the regularly scheduled Planning and Zoning Commission meeting. The purpose of the public hearing was to present the results of the technical studies and the proposed update to the Thoroughfare Plan. The presentation was similar to the one used at the public meeting with new information provided on transit, port and freight considerations and the Thoroughfare Plan update. The presentation noted that a number of changes would be proposed to various ordinances to implement the Baytown Mobility Plan. There were no comments from the Planning and Zoning Commission. Attendance by the general public was low with comments relating to the additional alternative included in the group recommended for further analysis in the next phase of the Cedar Bayou crossing compared to the information provided at the public meeting in October.

Appendix B includes the following information from the public hearing:

- Presentation
- Comment Summary



CHAPTER 3. LAND USE

3.1 Introduction

Mobility and land use are intrinsically linked. Regional transportation patterns and systems are greatly influenced by land use, and vice versa. Thus, it is essential that future land use be considered in coordination with the mobility planning process. Previous Land Use Maps for Baytown have focused on areas within the city limits. Because the mobility plan is focused on both the corporate limit and the ETJ, the update to the Future Land Use Map must do the same. As detailed below, the Future Land Use Map was developed after review of significant existing information and important public review. Both items are essential to creating a plan that is built upon a solid foundation. Two preliminary Land Use Map options were developed, presented, reviewed, revised, and then combined into a single, recommended plan.

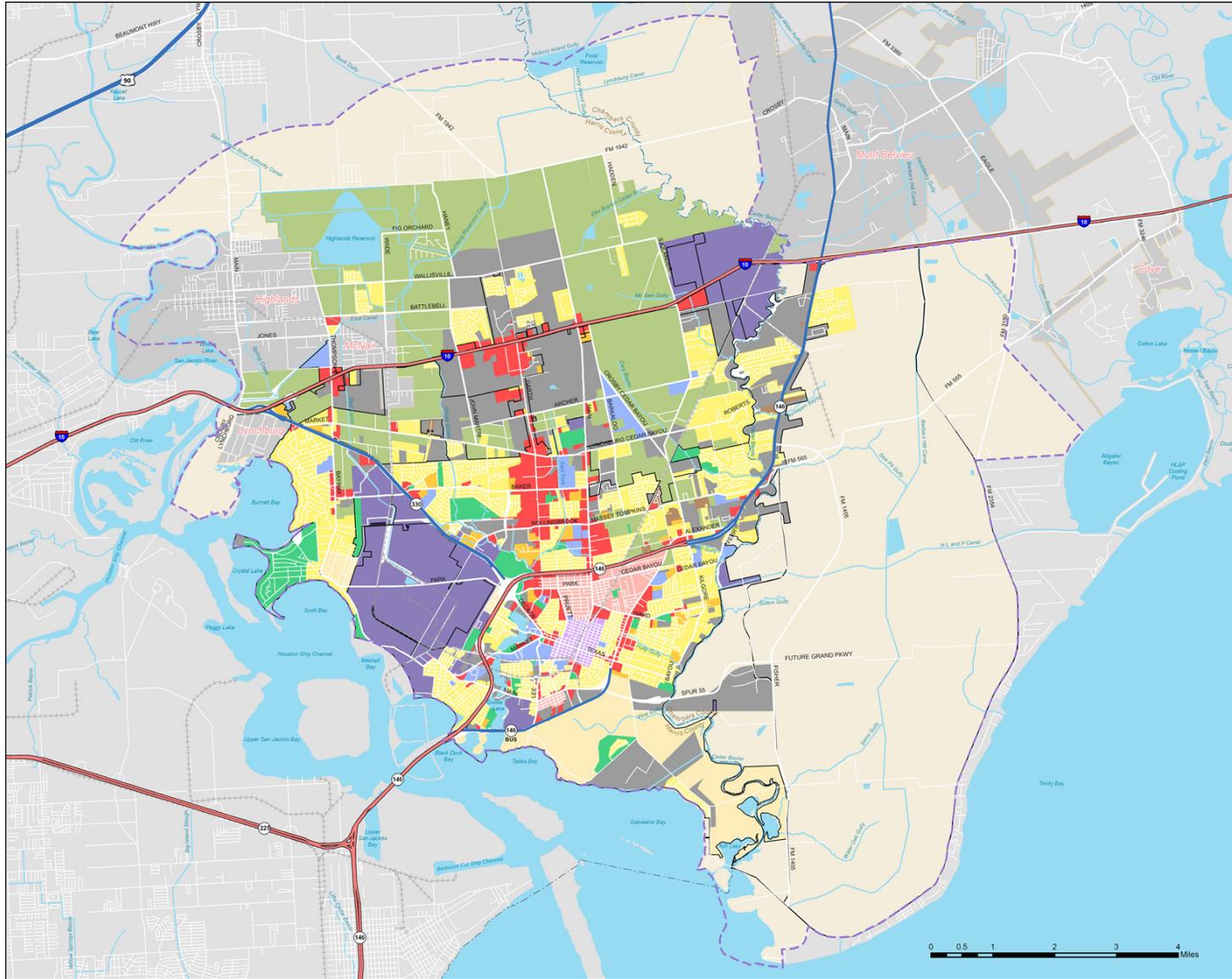
3.2 Existing Land Use

Baytown is the result of three separate communities – Baytown, Goose Creek, and Pelly—consolidating into one city in 1947. Once IH 10 was built to the north of Baytown in the 1960s, the residential and commercial developments began to move northward. As shown in **Figure 3-1**, the city limits extend along Garth Road and North Main Street, and beyond IH 10. This expansion of the city limits created a substantial amount of land in the ETJ between IH 10 and (roughly) East Cedar Bayou – Lynchburg Road, which was annexed in April 2012 and in the ETJ.

A wide variety of land uses exist within the study area – ranging from agricultural to heavy industry. Commercial property is generally located along the main commercial arteries of IH 10, Garth Road, North Main, Massey-Tompkins Road and Baker Road, with high intensity where these streets intersect. Heavy industries, such as ExxonMobil, Bayer Chemical, and ChevronPhillips Chemical, are located on large campuses adjacent to transportation arteries important to their particular distribution needs. Cedar Crossing Industrial Park, located in the Baytown ETJ in west Chambers County, is the world’s fifth largest industrial park, encompassing 15,000 acres, with existing rail, marine, and highway infrastructure.



Figure 3-1. Baytown Existing Land Use



Source: City of Baytown, 2011



3.3 Future Land Use

The proposed Future Land Use Map (**Figure 3-2**) builds upon the work of the *Baytown 2025 Comprehensive Plan* and the two updates to the Future Land Use Map adopted by the City in 2008 and 2012. It incorporates a long-range vision for Baytown that includes several major transportation improvements, including:

- Commuter rail to Houston: Leverage the existing commercial node and high-density development opportunities near the intersection of IH 10 and Garth Road by creating a commuter rail line along the existing Union Pacific (UP) railroad between Houston and Wade Road/IH 10, then parallel to IH 10 to the UP line west of SH 146.
- Improve east/west connectivity through the city: Construct new collectors and arterials, as shown in the previous Thoroughfare Plan. This work includes a new crossing of Cedar Bayou between IH 10 and Massey-Tompkins Road.
- Completion of the Grand Parkway, a future outer loop around Houston.

Some elements of the long-range transportation improvements are dependent upon the implementation of the proposed Future Land Use Map. The feasibility of commuter rail service hinges on increased density along the entire east IH 10 corridor. Inclusion of a long-range desire for commuter service improves the potential for higher residential densities adjacent to proposed stations. Conversely, construction of higher density developments along the proposed rail corridor will help to create a ridership base for the rail project.

3.3.1 Land Use Categories

Land Use Maps use color to indicate the different land use categories. The recommended Land Use Map includes the following 12 land use categories and descriptions:

Existing Residential

- Primarily conventional, single-family detached dwellings and manufactured housing.

- Limited multi-family residential and neighborhood commercial.
- Public uses to include places of worship, schools, parks, and other community facilities such as libraries.

Lower-Density Residential

- Single-family detached dwellings on platted lots of all sizes; smaller lots are satisfactory if common open space is provided.
- Manufactured housing located in planned subdivisions with adequate utilities and recreational amenities.
- Average residential densities less than five units per acre.
- Small-scale, neighborhood commercial located within a convenient walking distance of all residences.

Higher-Density Residential

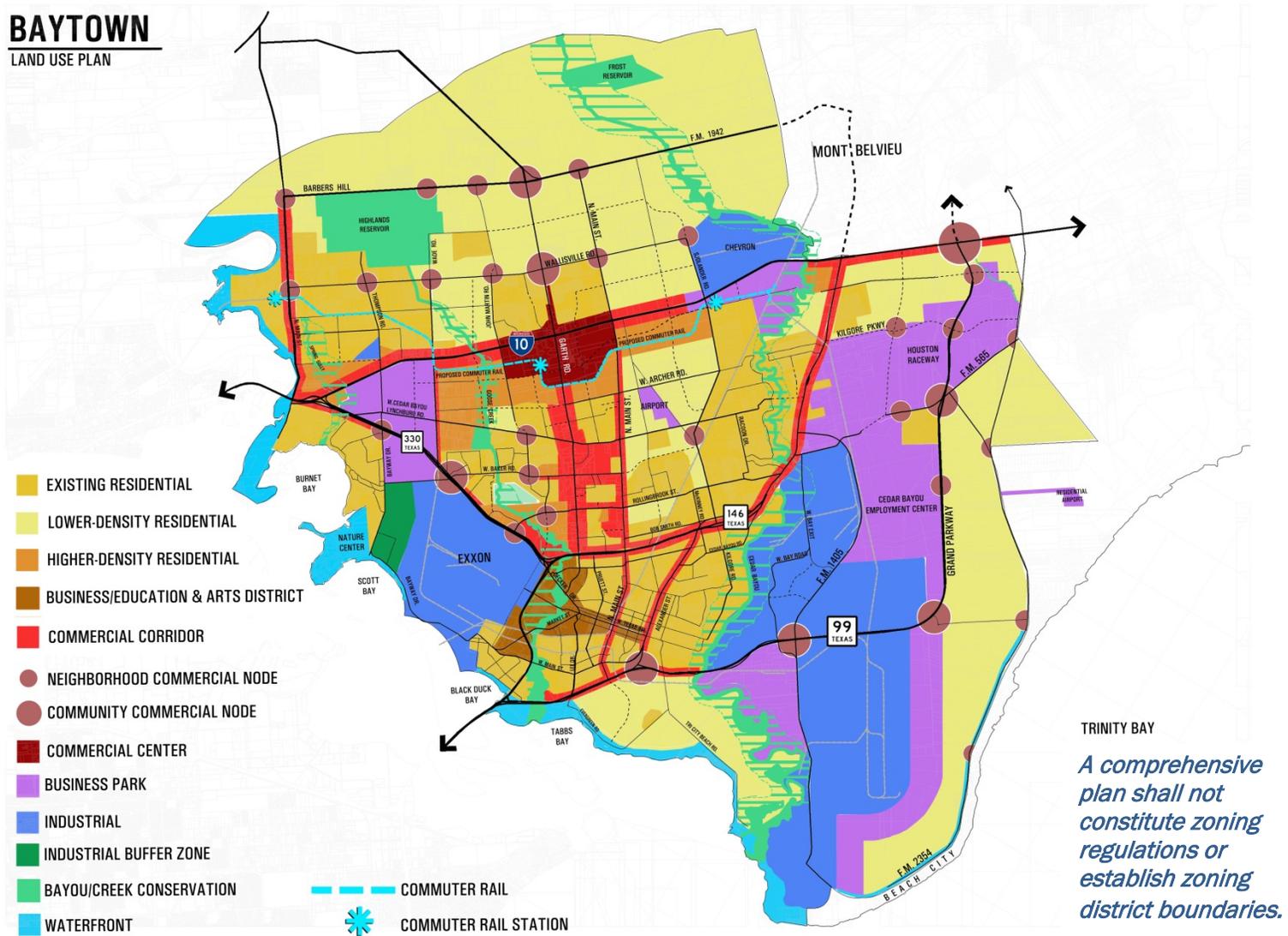
- Detached and attached residential development including patio homes, townhomes, apartments and condominiums.
- Residential densities greater than five units per acre.
- Neighborhood and community commercial within a convenient walking distance of all residences.
- Optional first-floor retail, offices, and services integrated horizontally or vertically as accessory uses within multi-family buildings and developments.

Business Education & Arts District

- Comprises “Old Baytown” and the central, historical business district.
- Concentration of small-scale commercial and office uses with specialty retail, restaurants, and cultural arts facilities.
- Major institutional and government facilities including Lee College, Sterling Municipal Library, and City Hall.



Figure 3-2. Proposed Future Land Use Map



Source: Base , City of Baytown, 2011



- Additional residential uses to support service and retail activities. Options include rehabilitation or redevelopment of older single-family homes, infilling of vacant lots with townhomes or other medium density residential uses, or multi-family over first floor commercial in multi-story buildings.
- Pedestrian-friendly network of sidewalks, trails and greenways interconnected with surrounding neighborhoods, Goose Creek, the Waterfront District, and the "Arts Cultural and Entertainment" (ACE) zoning district.

Commercial Corridor

- Primarily existing corridors of commercial activities with variable depths along major arterials and freeways.
- Key corridors: Garth Road, N. Main Street, Main Street in the Highlands, Alexander Road, SH 146, and IH 10.
- Commercial corridor proposed along the east side of Wade Road, south of IH 10, as a buffer between existing rail yards west of Wade Road and proposed residential use to the east toward Goose Creek.

Commercial Nodes – Neighborhood/Community

- Future commercial uses (retail, offices and services) concentrated at the intersections of major collectors and arterials.
- Improved traffic mobility by discouraging continuous commercial strips with numerous driveways along major streets.
- Two types of nodes to reflect their intended service area. Smaller neighborhood nodes comprise generally less than 20 acres, and larger community nodes comprise approximately 20-40 acres.
- Higher-density residential: Appropriate at or near node intersections and as a transition between commercial uses and lower-density residential.

Commercial Center

- Represents the retail, office, and commercial core of Baytown at the intersection of IH 10 and Garth Road, inclusive of San Jacinto Mall and environs.
- Most appropriate area for highest density residential uses, highest intensity nonresidential uses, and mixed use developments with medium to high-rise buildings.
- Appropriate area for pedestrian and bicycle-friendly streets.

Business Park

- Accommodates business activities in planned campus-like settings with interdependent and complementary uses.
- Preferred uses include office buildings of various heights, research and development facilities, light manufacturing, high-tech industries, warehousing, and distribution.
- Indoor and outdoor commercial activities.
- Supporting retail and service uses congregated at street intersections.

Industrial

- Accommodates the full range of industrial activities: Petrochemical, manufacturing, assembly, processing, warehousing, distribution, and maintenance of products.
- Includes three existing, major industrial employment areas: ExxonMobil facilities on Spur 330, ChevronPhillips facilities on IH 10 at Cedar Bayou, and industrial corridor along FM 1405, east of Cedar Bayou and inclusive of Cedar Crossing Industrial Park.
- Business Park type land use preferred on perimeter parcels adjacent to categories other than industrial.
- Minimal or no adjacency to residential uses desired; may necessitate landscape buffer zones.



Industrial Buffer Zone

- Located on a north-south axis between Bayway Drive and ExxonMobil's Baytown facilities on Spur 330 and located south of ExxonMobil's facilities bordering SH 146.
- Predominant land use: Open space greenbelt that buffers the adjacent heavy industrial use.
- Nonresidential development permitted that is compatible with existing residential use west of Bayway Drive.

Bayou/Creek Conservation

- Critical floodway and flood plain areas along Cedar Bayou, Goose Creek, and Spring Gully to provide flood control and recreational opportunities (solid green areas).
- Important open space and woodlands near Cedar Bayou, Goose Creek, and Spring Gully to be protected from typical urban development by providing site design standards that preserve more open space and woodlands in exchange for greater development rights (hatched green areas).
- Controlled urban development patterns along bayous and creeks to enhance waterway access and visibility. Residential lots should be in front or on the side of the waterway instead of backing up to it.
- Linear parks to be established along bayous and creeks with interconnected hike and bike trails.

Waterfront

- Baytown's extensive waterfront along the San Jacinto River, Ship Channel, and bays: A unique community asset that should be protected and enhanced.
- Preferred uses include compatible commercial, residential and recreational development that engages the waterfront and provides public access and visibility.
- Environmentally sensitive areas to be identified with appropriate levels of protection to be established.

- Development to provide a regional destination.

3.4 Conclusion

The purpose of the proposed Future Land Use Map is to delineate a growth pattern that is based on the goals and objectives of the community, while being based on a realistic pattern of development. To achieve this, the following factors were considered:

- Existing land uses in Baytown and its ETJ
- Population and land use projections
- Current growth and development trends
- Needs expressed through coordination with City staff and relevant stakeholders

The proposed Future Land Use Map acts as a guide for development and redevelopment opportunities. Unlike the City's Official Zoning Map, which assigns a specific use to each parcel, the land use categories that have been delineated on the Future Land Use Map outline a general development pattern that Baytown desires to achieve. The Future Land Use Map recognizes the strengths and weaknesses of today's pattern of land uses and proposes changes to be made over time that will improve the character and quality of life in Baytown.

The Future Land Use Map serves as a guide for how the city's transportation system will be shaped in the future. The map covers areas outside of the city limits so that the City can get ahead of development and indicate the desired use in an area prior to development activity so that the transportation system can accommodate the anticipated growth.



CHAPTER 4. TRAVEL DEMAND MODEL

4.1 Introduction

A Travel Demand Model (TDM) is a computerized representation of the transportation system of a community or a region. These models simulate the movement of users across the transportation system under various conditions. The models are used by transportation planners to display current conditions of the transportation system, and predict which changes to the system and the environment in which it operates will affect the operation of the system. TDMs can be programmed to model all of the modes of travel that compose a regional transportation system. However, most TDMs only include the roadway network and the transit network. Because of the relatively small number of trips generated by bicycle and pedestrian travelers, these modes are rarely included in current TDMs. The Houston-Galveston Area Council (H-GAC) TDM, which includes the City of Baytown, is a typical regional model that models the roadway network and the transit system (including commuter rail). The H-GAC TDM only includes the consideration of freight rail, air, and water transportation as nodal inputs to the roadway network at ports or terminals.

4.2 Travel Demand Model Enhancements

The input data for the TDM includes information on the transportation system to represent available “supply” while demographic data and land use generate the “demand” for transportation, expressed in terms of trips. Examples of data included for roadways include number of lanes, street type (e.g., collector, arterial), and capacity. TDM’s generally do not include the local street system. To allocate demographic data and land use, the geographic region is subdivided into Traffic Analysis Zones (TAZs). TAZ boundaries are typically roadways or natural features, such as rivers and streams. Adjustments to TAZ boundaries should take into account any recently built roadways and the future Land Use Map. In general terms, a larger number of TAZs will provide a better representation of the travel demand than a model with fewer TAZs for the same geographic region because this allows for a greater level of sensitivity for the data being evaluated.

The basis for the Baytown Mobility Plan is the transportation model developed for the *H-GAC 2035 Regional Transportation Plan Update* (adopted October 2010). H-GAC is the Metropolitan Planning Organization (MPO) for the eight-county greater Houston area. H-GAC’s responsibilities include coordinating regional transportation planning with the Texas Department of Transportation (TxDOT), Federal Highway Administration (FHWA), Federal Transit Administration (FTA), and with local jurisdictions in the MPO. The H-GAC 2035 Regional TDM covers the eight-county region of Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties. The H-GAC TDM primary function is to support regional mobility planning and is the tool by which to measure the performance of the surface transportation system. Since new map demographic forecasts were being developed based on the proposed future land use, a new run of the TDM was warranted. Revisions to the TAZ and additions/revisions to the roadway networks were made to create a TDM specific to Baytown. The roadway network revisions included additional collector streets, direct connectors at Spur 330 and SH 146, and recent widening projects. Operational improvements, such as signal timing, speed limit changes, or turn bays, are not included in a TDM. **Table 4-1** provides the list of roadway network revisions.

The City of Baytown arranged for H-GAC to run the transportation model using updated existing and future roadway networks and demographics developed for this planning effort.



Table 4-1. Roadway Network Revisions

Roadway	Limits	Model Network Revision	2035 Lanes
Battlebell Road	Crosby-Lynchburg to John Martin	Collector	2 Lanes
New Roadway	E. Wallisville to Lynchburg Cedar Bayou Road	Proposed Collector	2 Lanes
New Roadway	IH 10 to Spur330/Decker	Proposed Collector	2 Lanes
New Roadway/ Morelos/Hunt	Proposed Collector to Crosby Cedar Bayou	Existing/Proposed Collector	4 Lanes
New Roadway/ Morelos/Hunt	Crosby Cedar Bayou to Sjolander	Existing/Proposed Collector	2 Lanes
McLean/Archer	From Proposed Collector to Archer	Proposed Arterial	2 Lanes
Eastpoint	Wallisville to IH 10	Collector	2 Lanes
New Roadway	E. Wallisville to Archer (termination of E Rd.)	Proposed Collector	2 Lanes
New Roadway	Main Street to Sjolander Road	Proposed Collector	2 Lanes
New Roadway	E. Wallisville Road (termination of Bulian) to Archer Road	Proposed Collector	2 Lanes
New Roadway	W Cedar Bayou-Lynchburg (near Sheppard) to IH 10	Proposed Collector	2 Lanes
Barkaloo	E Cedar Bayou-Lynchburg to Massey-Tompkins	Collector	2 Lanes
Beaumont	Cedar Bayou to Ward	Collector	2 Lanes
James Bowie	SH 146 to Cedar Bayou	Arterial	2 Lanes
West Bay	FM 565 to SH 99	Arterial	2 Lanes
W Cedar Bayou-Lynchburg	Garth to Main	Arterial	4 Lanes
E Cedar Bayou-Lynchburg	Sjolander to Raccoon	Arterial	4 Lanes
E Cedar Bayou-Lynchburg	Raccoon to Bayou	Arterial	4 Lanes
E Cedar Bayou-Lynchburg	Bayou to SH 146	Proposed Collector	4 Lanes
Barbers Hill/FM 1492	Crosby-Lynchburg to SH 146	Collector	4 Lanes
Haney	Barbers Hill to Wallisville	Collector	4 Lanes
Garth	Barbers Hill to Wallisville	Arterial	4 Lanes
Main	FM 1492 to IH 10	Arterial	4 Lanes
Wallisville	Crosby Lynchburg to Sjolander	Arterial	4 Lanes
Thompson	Wallisville to IH 10	Arterial	4 Lanes
Wade	Wallisville to Spur330/Decker	Arterial	4 Lanes
John Martin	Wallisville to IH 10	Arterial	4 Lanes
Archer	Garth to Sjolander	Arterial	4 Lanes
Massey-Tompkins	Main to SH 146	Arterial	4 Lanes
FM 565	SH 146 to IH 10	Arterial	4 Lanes
Kilgore Pkwy	SH 146 to FM 565	Proposed Arterial	4 Lanes
Spur 330 Mainlanes	Rollingbrook to SH 146	Freeway	4 Lanes



4.3 2035 Demographic Development

The study area for the City of Baytown includes the City limits and the ETJ, which involves an area of approximately 103 square miles. Two versions of the TDM were developed for year 2035:

- The current approved transportation plan as approved by H-GAC, but using an improved TDM based on recently completed projects and adjustments to TAZ boundaries, and
- The improved transportation model with revised demographic data based on the new Future Land Use Map.

Figure 4-1 shows the TAZs for the study area as modified for the Baytown Mobility Plan. Population and employment numbers by TAZ were developed for the study area for year 2035.

4.3.1 Developing Scenarios – Baytown 2035 Baseline

The first step performed in the development of Scenario 1 – Baytown 2035 Baseline was the allocation of projected demographic growth to the new, subdivided TAZs according to a distribution based on the area proportionality of each subdivided TAZ. As an example, a split TAZ with 50% of the land area of the original TAZ would receive 50% of the demographic allocations as the original TAZ.

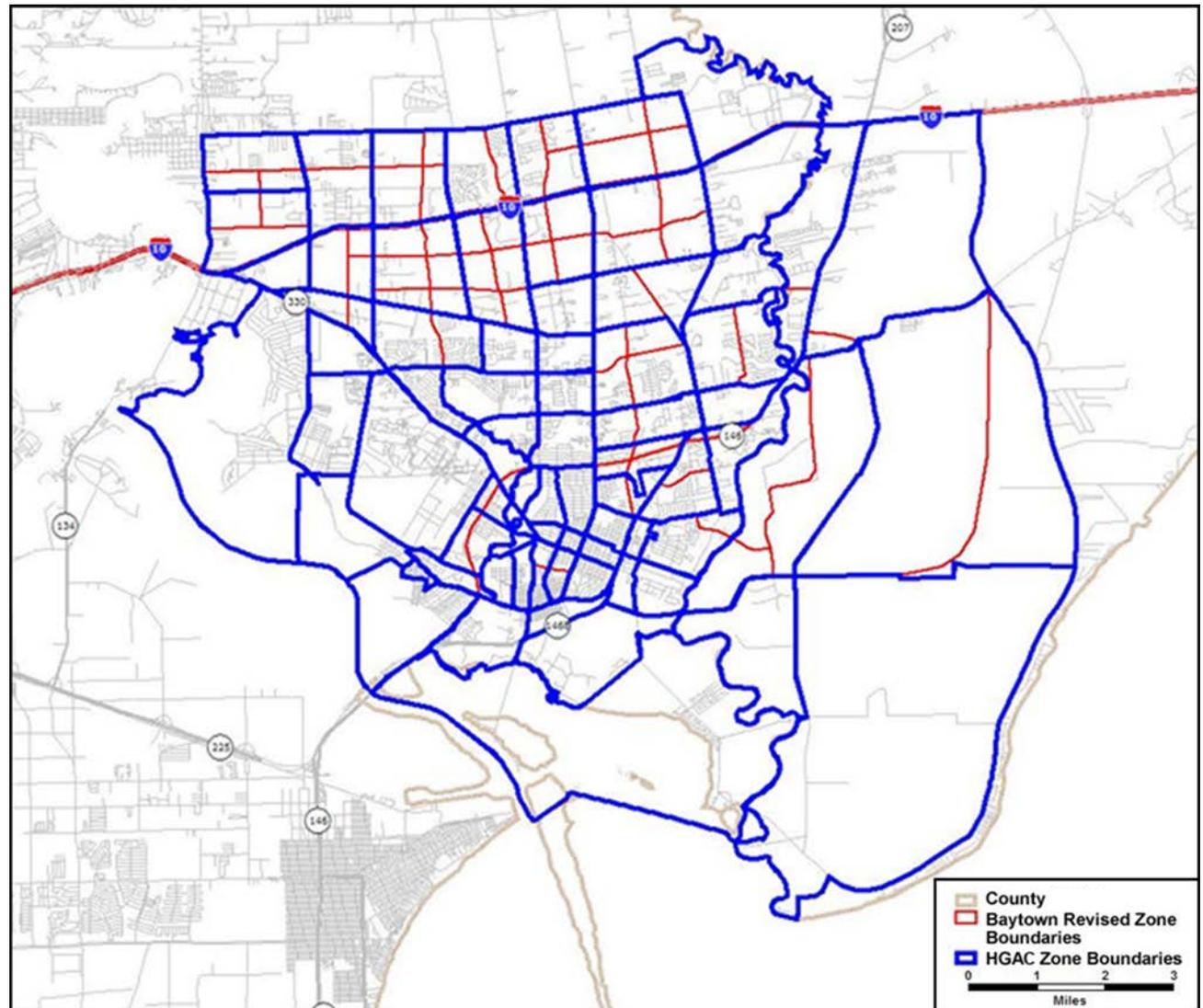
Using 2010 aerial imagery, it was then determined that the preliminary distribution of the 2035 demographic projections did not accurately reflect current development patterns in the study area. The second step performed by the project team in the development of the Scenario 1 projection was to identify existing development patterns, such as potential growth areas, undevelopable areas, and built-out areas. Using these areas as a guide, the initial demographic distributions were adjusted for each new TAZ. For instance, one side of a subdivided TAZ might have been identified as residential in character and the other side commercial in character. In this case, the population allocation was re-assigned primarily to the residential side and the employment to the commercial side.

4.3.2 Developing Scenario 2 - 2035 Future Land Use

The year 2035 Future Land Use Map was used as the basis to develop an alternative scenario for Baytown's 2035 demographics. In particular, the Future Land Use Map was overlaid with a map of TAZs and aerial photography. Each subdivided TAZ was then analyzed in the context of its designated future land use, as well as its current land use.

Utilizing the adjusted demographic distributions developed for Scenario 1, the demographic projections for each new TAZ were adjusted to reflect its associated proposed future land use. For example, if one part of a subdivided TAZ appeared urban in character and the other part rural and nothing on the future Land Use Map indicated a shift, a large percentage of the allocated demographic projections were shifted to the urban TAZ; or if the future Land Use Map indicated a new industrial district developing in an area that was currently rural, some additional employment was shifted to this TAZ.

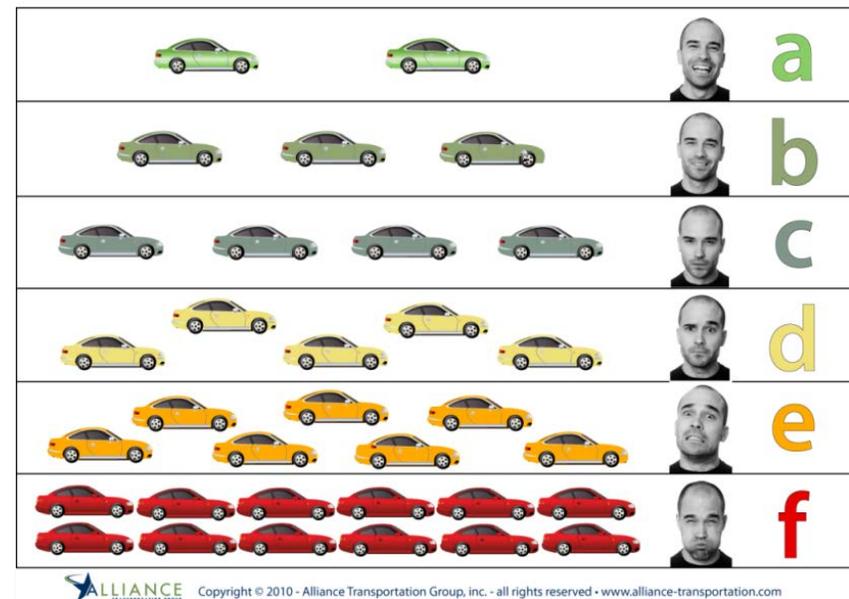
Figure 4-1. Baytown Revised TAZ Geography



Source: H-GAC as modified by ATG, 2011



Figure 4-2. Level of Service (LOS) Illustration



Source: Alliance Transportation Group, Inc., 2010

H-GAC has developed a ranking system called the Level of Mobility (LOM) similar to the typical LOS designation, but characterized exclusively by a roadway’s v/c ratio. A roadway’s v/c ratio is calculation that divides a roadway’s traffic volume by its associated design capacity.

Table 4-2 shows the H-GAC ranking system for roadway performance, as determined by v/c ratios. The LOM system was used to be consistent with how H-GAC converts LOS into terms more easily understood by the public.

Table 4-2. H-GAC Level of Mobility (LOM)

H-GAC Level of Mobility	V/C Ratio Ranges	Level of Service (LOS)
Tolerable	Less than 0.85	A, B
Moderate	0.85 to 1.00	C
Serious	1.00 to 1.25	D
Severe	Greater than 1.25	E, F

Source: H-GAC

4.4 Model Results

The population and employment numbers for each TAZ generate traffic volumes during the trip generation step of the modeling process. These trips are then distributed by mode (e.g., car, truck or transit) into and out of the various TAZs on the roadway network in the study area and on surrounding roadways. The traffic assignment process puts the traffic volumes onto the various roadways. Traffic volume forecasts for the roadway segments in the study area for the AM peak period were used to calculate the levels of service for each roadway segment. By comparing the level of demand for a roadway to its specific design capacity and safe driving conditions, the level of service (LOS) can be determined to assess the relative service quality of the facility within the overall transportation system. The LOS for a roadway is represented by an alphabetical range from “A” to “F” in standard engineering manuals, where “A” represents the best operating conditions and “F” represents the worst. **Figure 4-2** provides an illustration of LOS. For example, the Highway Capacity Manual lists the following LOS standards:

- A = Free flow
- B = Reasonably free flow
- C = Stable flow
- D = Approaching unstable flow
- E = Unstable flow
- F = Forced or breakdown flow

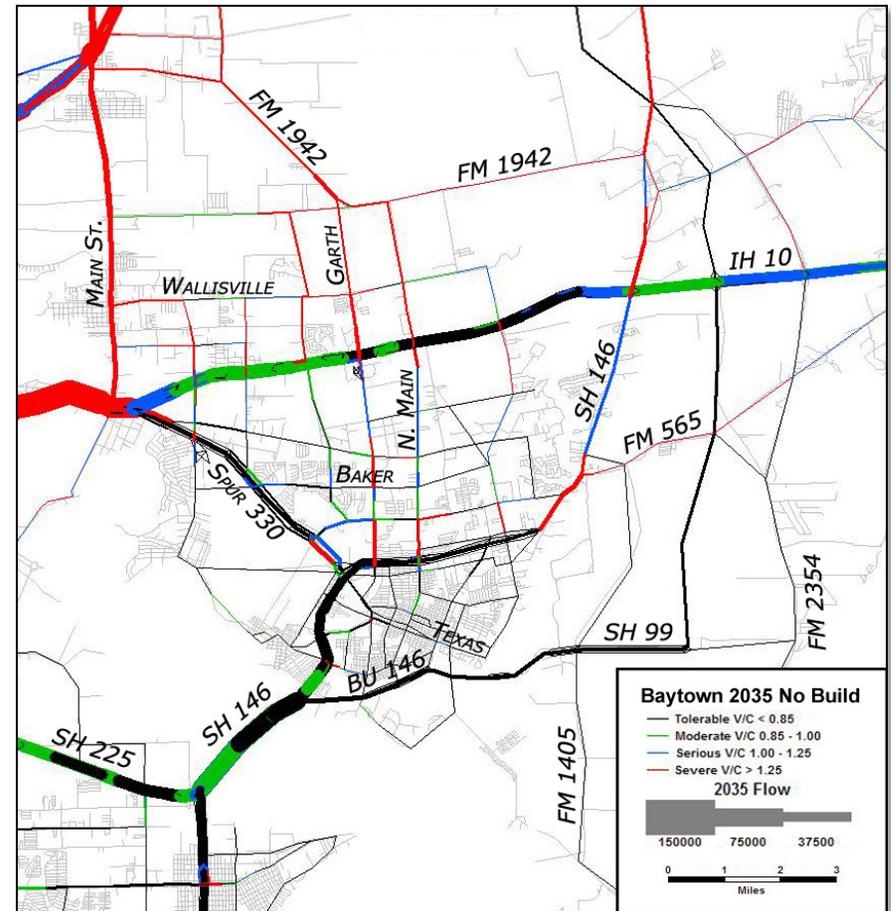


Figure 4-3. H-GAC 2035 Model Performance

Specific to the Baytown Mobility Study, **Figures 4-3 to 4-5** provide graphical information on each model scenario. The amount of traffic for each roadway is represented by the bandwidth and LOM (the v/c ratios) for each roadway displayed by different colors categorized by “tolerable” to “severe” conditions.

4.4.1 H-GAC 2035 TDM

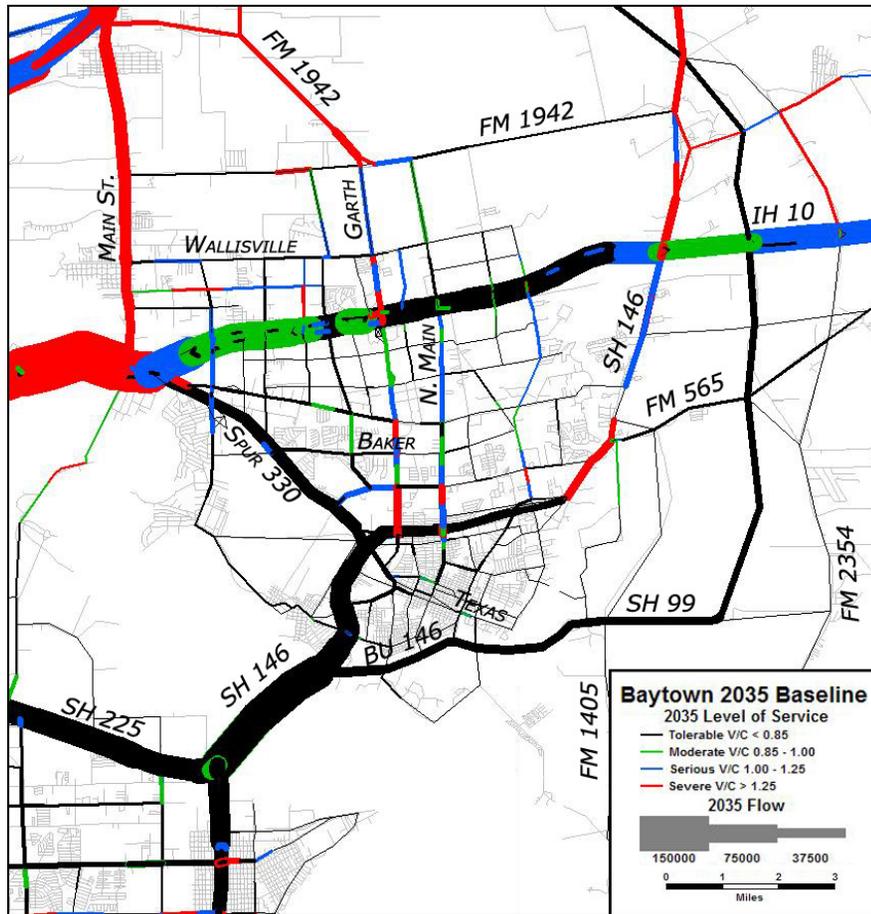
Figure 4-3 shows the level of mobility anticipated for year 2035 based on the H-GAC TDM without any corrections for recent roadway improvements, refinements in TAZs, nor adjustments to the future roadway network. Under this scenario, severe congestion is projected on Garth Road north of IH 10 and for a substantial portion between Archer Road and SH 146. Similarly, congestion is projected on SH 146 south of FM 1405 and the arterials extending north to residential neighborhoods in the ETJ north of IH 10.



Source: ATG (Work Product)



Figure 4-4. Scenario 1 Baytown 2035 - Revised Baseline Performance



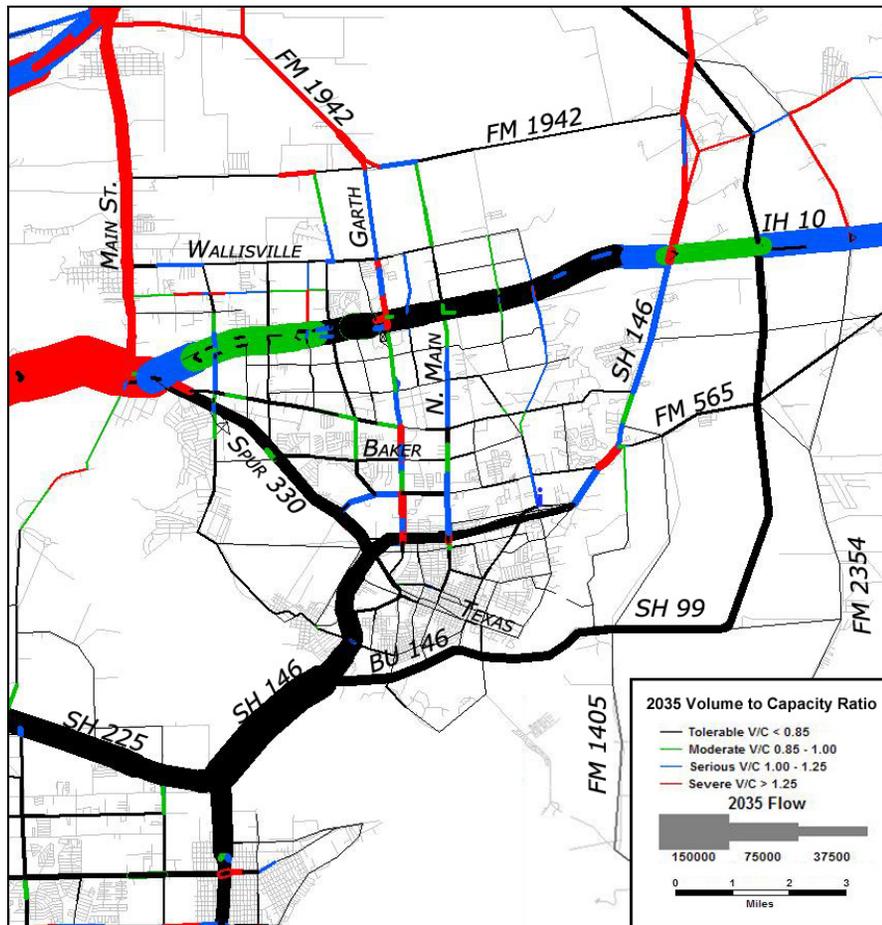
Source: ATG (Work Product)

4.4.2 Scenario 1

With the corrections and revisions to the roadway network (Table 4-1) and TAZs (Figure 4-1), the reduction in congestion reflects the additional capacity provided by the roadway network revisions to incorporate the projects listed in Chapter 9, Thoroughfare Plan Update. Figure 4-4 shows mobility improvements on Garth Road, North Main Street, E. Wallisville Road, FM 1942 and other streets. Under this scenario, severe congestion is still projected on Main Street in Highlands, at the intersection of Garth Road and IH 10, and on SH 146 south of FM 1405 to the IH 10 freeway.



Figure 4-5. Scenario 2 Baytown 2035 Proposed Future Land Use Performance



Source: ATG (Work Product)

4.4.3 Scenario 2

Scenario 2 (**Figure 4-5**) incorporated the proposed future land use and the additional projects identified for the Thoroughfare Plan Update into the Scenario 1 model. The change in future development patterns and the associated shift in future population and employment provides a reduction congestion on SH 146 south of FM 1405, on Garth Road between SH 146 and Rollingbrook Street on North Main Street at Massey-Tompkins Road, and on Crosby-Cedar Bayou Road.

4.4.4 System Comparison

The efficiency of a transportation system scenario is expressed in terms of measures that include vehicle miles traveled (VMT), vehicle-hours travelled (VHT), and average speed on the system. **Tables 4-3 to 4-5** provides this comparison between the three scenarios based on roadway functional classification.

For freeways, the network revisions in Scenario 1 provide a reduction of 6.3% in VMT and 9.8% in VHT (**Table 4-3**). By taking into account the proposed Future Land Use Map in Scenario 2, the reduction is greater, at 7.3% in VMT and 12.0% in VHT. The proposed improvements to the arterial and collector roadways remove traffic from IH 10, Spur 330 and SH 146 (freeway section). One example of type of improvement is the proposed new arterial crossing Cedar Bayou, discussed in **Chapter 5**.

Arterial roadways accommodate less VMT but higher VHT than freeways as shown in **Table 4-4**. Similar reductions in VMT occur for arterials as for freeways, but the reduction in VHT is much less, at 1.8% for Scenario 1 and 1.1% for Scenario 2.

Because of the additional TAZs, the increase in number of collectors, and the planned improvements to the collectors, there is an increase (or negative reduction) in VMT and VHT compared to H-GAC 2035 (**Table 4-5**). The improved collector network means that shorter trips can shift from arterials to collectors.



Table 4-3. Scenario Comparison - Freeways

TDM Version	Freeway				
	VMT	VMT Reduction	VHT	VHT Reduction	Avg. Speed
HGAC	5,730,800	N/A	235,000	N/A	46
Scenario 1: Baytown Revised - 2035 Base	5,372,200	6.3%	112,400	9.8%	47
Scenario 2: Baytown Revised - 2035 Future Land Use	5,310,300	7.3%	109,600	12.0%	48

Table 4-5. Scenario Comparison - Collectors

TDM Version	Collector				
	VMT	VMT Reduction	VHT	VHT Reduction	Avg. Speed
HGAC	313,400	N/A	14,000	N/A	22
Scenario 1: Baytown - 2035 Base	455,800	-45.4%	17,400	-24.3%	26
Scenario 2: Baytown Revised - 2035 Future Land Use	450,000	-43.6%	16,800	-20.0%	27

Table 4-4. Scenario Comparison - Arterials

TDM Version	Arterial				
	VMT	VMT Reduction	VHT	VHT Reduction	Avg. Speed
HGAC	2,537,600	N/A	148,800	N/A	16
Scenario 1: Baytown Revised - 2035 Base	2,389,600	5.8%	146,100	1.8%	16
Scenario 2: Baytown Revised - 2035 Future Land Use	2,355,000	7.2%	147,200	1.1%	16

Table 4-6. Scenario Comparison - Systemwide

TDM Version	Systemwide				
	VMT	VMT Reduction	VHT	VHT Reduction	Avg. Speed
HGAC	8,581,700	N/A	287,400	N/A	29
Scenario 1: Baytown Revised - 2035 Base	8,217,600	4.2%	275,900	4.0%	29
Scenario 2: Baytown Revised - 2035 Future Land Use	8,115,400	5.4%	273,600	4.8%	30

Table 4-6 provides the systemwide change in VMT and VHT if all projects in the thoroughfare plan were to be built by 2035.

While the percentage increase in both VMT and VHT is significant, the collectors carry a small percentage of the systemwide VMT and VHT as shown in **Tables 4-7** and **4-8**.



Table 4-7. Scenario Comparison - VMT by Functional Classification

TDM Version	Total VMT	Freeway VMT	% of Total VMT	Arterial VMT	% of Total VMT	Collector VMT	\$ of Total VMT
HGAC	8,581,700	5,730,800	66.8%	2,537,600	29.6%	313,400	3.7%
Scenario 1: Baytown Revised - 2035 Base	8,217,600	5,372,200	65.4%	2,389,600	29.1%	455,800	5.5%
Scenario 2: Baytown Revised - 2035 Future Land Use	8,115,400	5,310,300	65.4%	2,355,000	29.0%	450,000	5.5%

Table 4-8. Scenario Comparison - VHT by Functional Classification

TDM Version	Total VHT	Freeway VHT	% of Total VHT	Arterial VHT	% of Total VHT	Collector VHT	\$ of Total VHT
HGAC	287,400	124,600	43.4%	148,800	51.8%	14,000	4.9%
Scenario 1: Baytown Revised - 2035 Base	275,900	112,400	40.7%	146,100	53.0%	17,400	6.3%
Scenario 2: Baytown Revised - 2035 Future Land Use	273,600	109,600	40.1%	147,200	53.8%	16,800	6.1%

Table 4-9. Comparison of Model Scenario Performance

TDM Version	Freeway			Arterial			Collector			Total		
	VMT	VHT	Avg. Speed (mph)	VMT	VHT	Avg. Speed (mph)	VMT	VHT	Avg. Speed (mph)	VMT	VHT	Avg. Speed (mph)
H-GAC 2035 TDM	5,730,800	124,600	46	2,537,600	148,800	16	313,400	14,000	22	8,581,700	287,400	29
Scenario 1 - Baytown Revised - 2035 Base	5,372,200	112,400	47	2,389,600	146,100	16	455,800	17,400	26	8,217,600	275,900	29
Scenario 2 - Baytown Revised - 2035 Future Land Use	5,310,300	109,600	48	2,355,000	147,200	16	450,000	16,800	27	8,115,400	273,600	30



4.5 Implementing the Model Enhancements

The scenarios include all improvements included in the **Chapter 9, Thoroughfare Plan Update**. Financing options for building the proposed projects are presented in Chapter 10, Finance. The H-GAC TDM is limited to only those projects that are included within the financially constrained long-range plan. Consequently, Baytown will need to prioritize the mid-term and long-term projects based on reasonably anticipated funding for the H-GAC 2040 TDM.

4.6 Conclusion

As explained in the preceding text, the H-GAC TDM has been refined and augmented specifically for Baytown, which is detailed in **Section 4.2**. As a result, the updated TDM reflects an improvement in the overall VMTs and VHTs on the Baytown street network as demonstrated in **Tables 4.7 and 4.8** upon implementation of all projects in the Thoroughfare Plan Update. This improvement would also result in improved air quality benefits since vehicles are forecast to move more efficiently throughout the city. All of these factors indicate an improvement in the overall quality of life for the traveling public in and around Baytown.



CHAPTER 5. RESERVED FOR FUTURE USE



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CHAPTER 6. CEDAR BAYOU PORT INFRASTRUCTURE ANALYSIS

6.1 Introduction

There are numerous industrial facilities and developments located in Baytown and west Chambers County because of the proximity to the Houston region and its distribution capabilities, and access to the Port of Houston via Cedar Bayou. The Baytown Mobility Plan provides a high-level assessment of surface transportation infrastructure needs that would result from improvements to Cedar Bayou for barge traffic, with a long-term potential for a future deep water port and container terminal.

6.1.1 Cedar Bayou

Cedar Bayou is a coastal stream that originates in Liberty County, Texas, east of Houston. The lower 6 miles is a federal navigation channel that is maintained at 10-ft deep by 100-ft wide (see **Figure 6-1**).

The navigation channel, which is used by shallow draft barges and recreational boats, meanders along the urbanized eastern portion of the City of Baytown before entering Galveston Bay and the Houston Ship Channel (USACE, 2007).



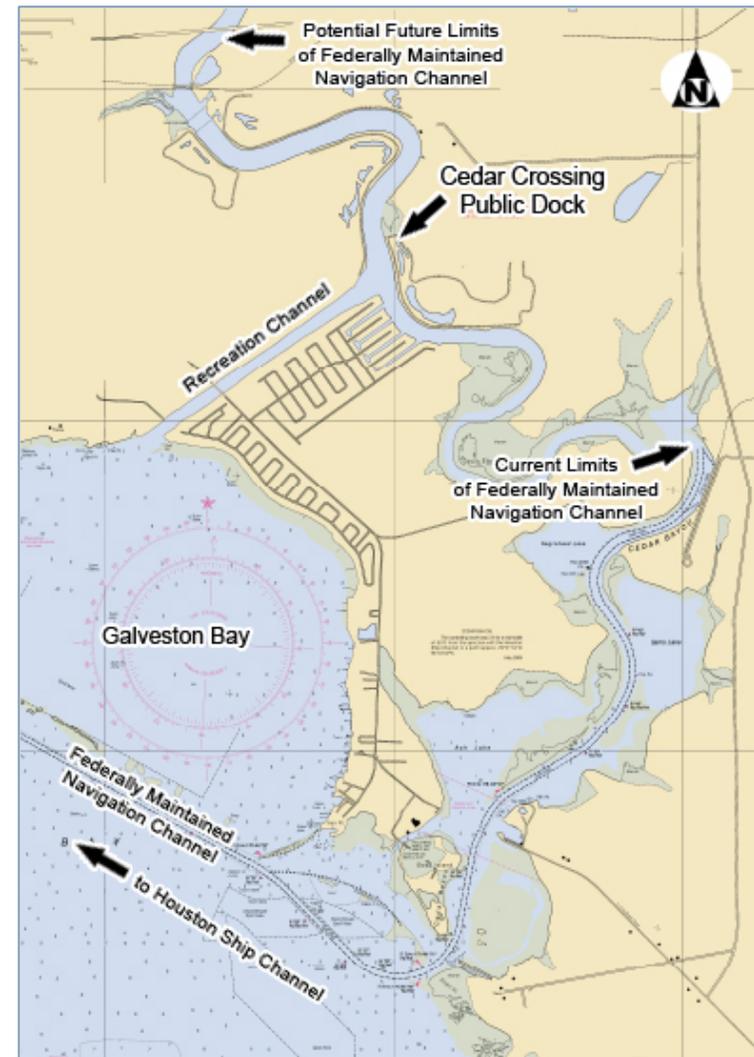
Container-on-Barge Operations

There are currently four existing and planned barge terminals on the Cedar Bayou Navigation Channel – Jindal Steel, IPSCO, Bayer, and Cedar Port, a public dock located approximately 6 miles upstream from Galveston Bay in the 15,000-acre Cedar Crossing Industrial Park. **Figure 6-1** shows the location of the public dock. The Green Barge Terminal will be located immediately north of SH 99 and across from Roseland Park. **Figure 6-2** shows the current and planned development of the Cedar Crossing Industrial Park, which is adjacent to Cedar Bayou.

6.1.2 Recreational Channel

A recreational channel intersects Cedar Bayou just south of Cedar Port as shown in **Figure 6-1**.

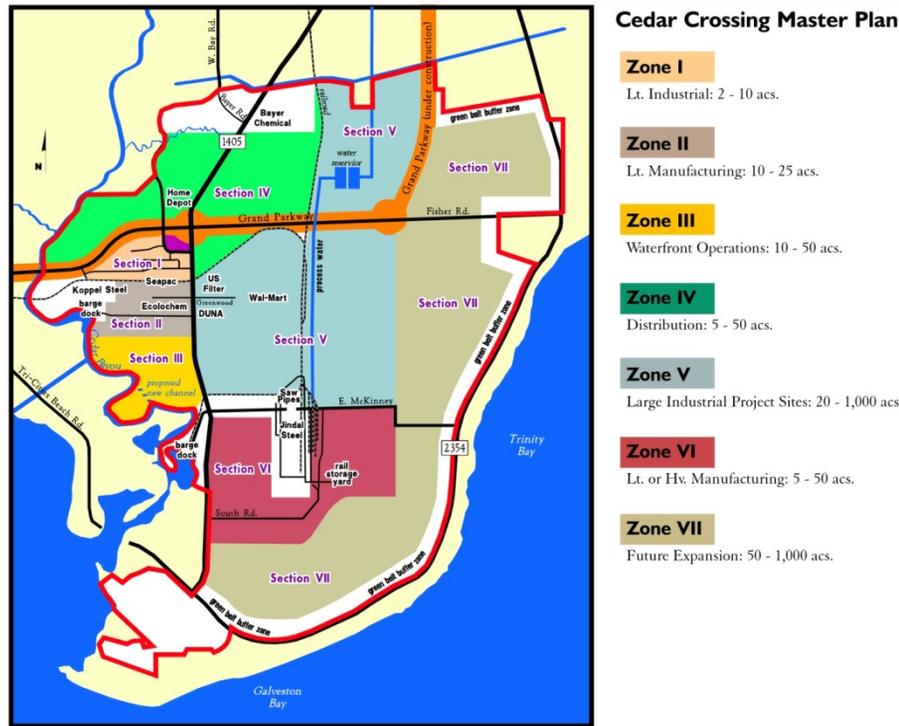
Figure 6-1. Federally Maintained Navigation on Cedar Bayou



Source: U.S. Coastal Survey, 2011



Figure 6-2. Current and Planned Development at Cedar Crossing Industrial Park



Source: Cedar Crossing Industrial Park, 2011

6.2 Potential Marine Improvements

6.2.1 Cedar Bayou

In 2000, Section 349 of the Water Resources Development Act authorized a navigation channel improvement that would expand the navigational channel to 12-feet deep by 125-feet wide, in addition to extending the navigable channel 8-miles north to approximately 14-miles upstream (USACE, 2007). This would improve existing navigation by allowing deeper draft vessels with larger payloads along the navigation channel and extend the navigable waterway. If implemented, the Bayer and IPSCO facilities would be included in the new federal limits of the Cedar Bayou navigational channel.

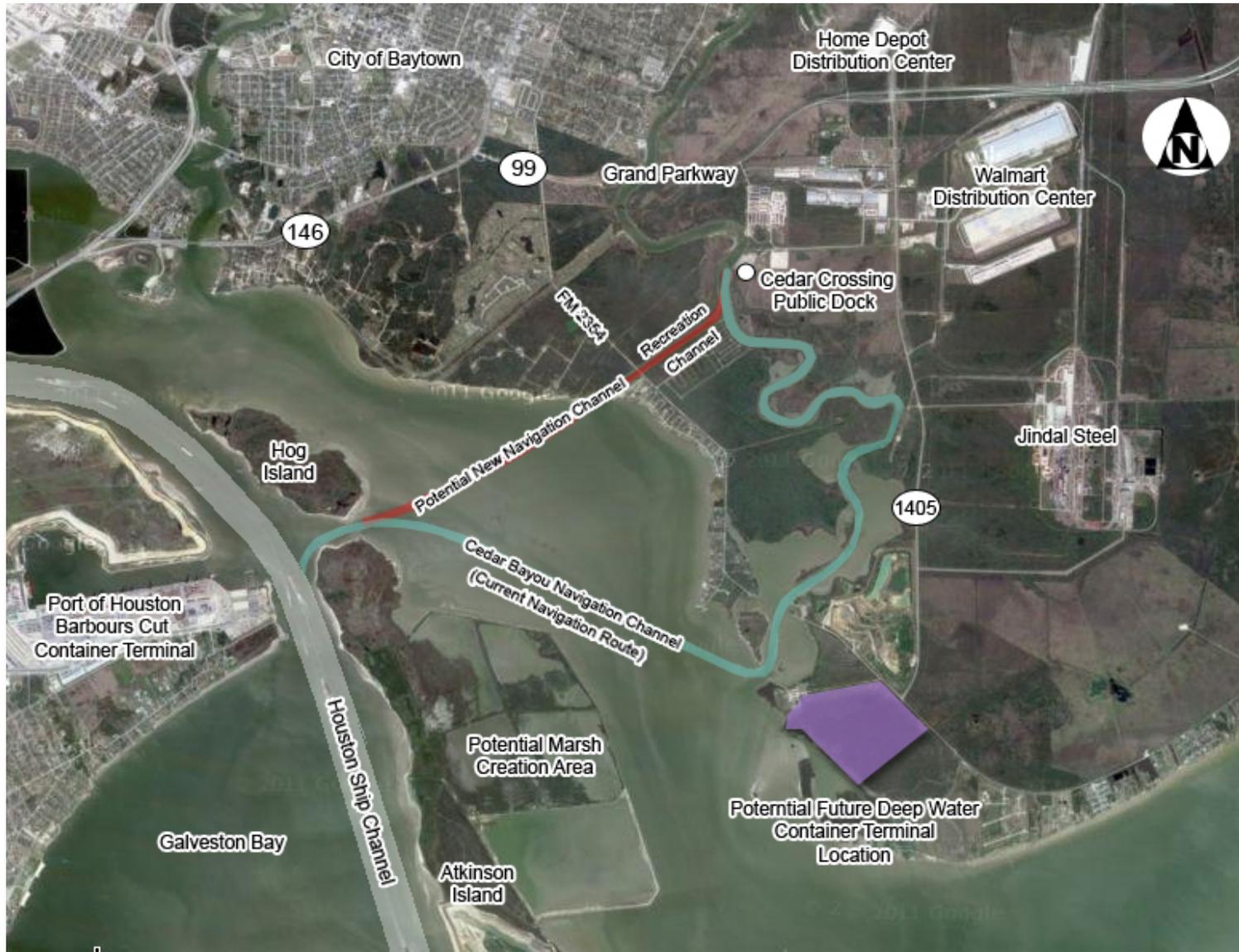
The Chambers County Cedar Bayou Navigation District and the Galveston District of the U.S. Army Corps of Engineers (USACE) initiated a Feasibility Study and Environmental Impact Statement (EIS) to evaluate various alternatives and formulate the selected plan based on national economic benefits provided by improved commercial navigation use. The EIS was approved, but the project has yet to be funded. Upon funding, and requirements being met for federal assumption of maintenance, USACE would participate in the initial project construction and assume responsibility for channel maintenance (USACE, 2007).

6.2.2 Recreation Channel

Businesses that use Cedar Bayou for shipping would like to expand, deepen, and improve an existing recreational channel to support shallow-draft/barge operations. This improvement, shown in red in **Figure 6-3**, would enable barges to depart the Cedar Crossing Public Dock, utilize the improved recreational channel and cut across to the Houston Ship Channel to the Barbour's Cut Terminal operated by the Port of Houston. Use of the recreational channel would decrease what is currently a one-way 6-mile trip to a one-way 3-mile trip. Funding has not yet been identified for this concept which would need a broad base of support from the public to move forward.



Figure 6-3. Potential Marine Improvements



Source: Background Image, Bing Maps, 2011



Two additional improvements would be needed if there were decisions to use the recreational channel for barge traffic. FM 2354 provides the only access to the Bay Oaks Harbor neighborhood. The existing fixed bridge on FM 2354 does not provide the necessary vertical clearance for container-on-barge operations. Possible replacements for the bridge include a fixed-span structure with necessary vertical clearance that would allow container-on-barge operations, or a moveable-span structure.

The second associated improvement would be a new navigation channel across Galveston Bay. The new navigation channel would need to be 12-foot deep and have a width sufficient to allow two-way barge traffic to navigate safely. The current depths in the area adjacent to the mouth of the recreational channel and across to the Houston Ship Channel are insufficient to support this kind of activity.

6.3 Potential Deep Water Port and Container Terminal

Cedar Crossing Industrial Park, local officials, and others have expressed interest in the development of a potential future deep water port and container terminal to handle containerized cargo on the east side of Galveston Bay. A preliminary location has been identified within the limits of Cedar Crossing Industrial Park, near the mouth of Cedar Bayou. It should be noted however, that formal siting and feasibility studies have not been conducted at this time. The potential future location is presented in

Figure 6-3.

According to the Port of Houston Authority, the Barbours Cut Container Terminal has the capacity to handle approximately 1.7 million twenty-foot equivalent units (TEU) per year. Current operations average approximately 1 million TEU annually, which is about 60% of capacity. The terminal has a total of six berths and 250 acres of container storage area. (Port of Houston, 2011)

Bayport, the Port of Houston's other major marine container terminal, is currently handling approximately 800,000 TEUs with 3,000 feet of dock. Expansion is planned at the Bayport Terminal, which is scheduled to be completed in 2030. When fully developed, the terminal will have a total of seven container berths with the capacity to handle 2.3 million TEUs on a complex which includes 376 acres of container marshaling yard and a 123-

acre intermodal facility (Port of Houston, 2011). Currently, the Bayport Terminal does not have rail access.

Fifty percent of the containers that come through the Port of Houston stay in the Houston area, and 70 percent stay in Texas. This is indicative of the continued growth in the Houston area, and Texas in general (Port of Houston, 2011).

As containerized cargo traffic increases based on the expansion of the Panama Canal, the diversion of additional containership traffic into the Gulf of Mexico through increased trade with Latin America, and as population in the region and state continues to grow, capacity at the two major Port of Houston container terminals could become a constraint. While there is currently capacity at both the Barbours Cut and Bayport Terminals, limited container storage area, lack of rail service, and growing demand could indicate a need to begin planning for a new container terminal in the region.

The Port of Houston is currently considering where to site its "Port Next," the next containership terminal to be built after Bayport. Based on discussions with the Port of Houston, several alternatives will be evaluated, including Cedar Crossing.

A potential key issue to container terminal development at Cedar Crossing is the development of a new deep draft navigation channel that would potentially spur off of the Houston Ship Channel to service the potential future site.

6.4 Potential Impacts of Deep Water Port/Container Terminal on Land Use and Mobility

6.4.1 Land Use

If the Cedar Bayou Navigation Channel is improved as proposed, it could attract additional industry due to the deeper channel providing improved waterfront potential. Currently, the east side of Cedar Bayou is proposed for industrial use while the west side of the bayou inside the city limits has existing residential use and is zoned for residential.



The public and private industrial dock facilities are located in Chambers County. Deepening the recreational channel and the associated replacement of the FM 2354 bridge could lead to industrial land use adjacent to the channel in Harris County.

For the potential future deep water port and container terminal, the preliminary location is identified for industrial use. The location is in proximity to residential developments to the south and east. The potential site has over 800 acres, and the use of green belts at the perimeter of the property would minimize noise, light, and visual impacts to adjacent residential areas.

6.4.2 Rail Mobility/Freight Movement

The Baytown/Cedar Crossing area is primarily serviced by UP and Burlington Northern Santa Fe (BNSF) rail lines, which both operate on the northeast side of the City of Baytown. BNSF operates in the area via a track-sharing agreement with UP. **Figure 6-4** presents the location of tracks relative to the potential deep water port and container terminal.

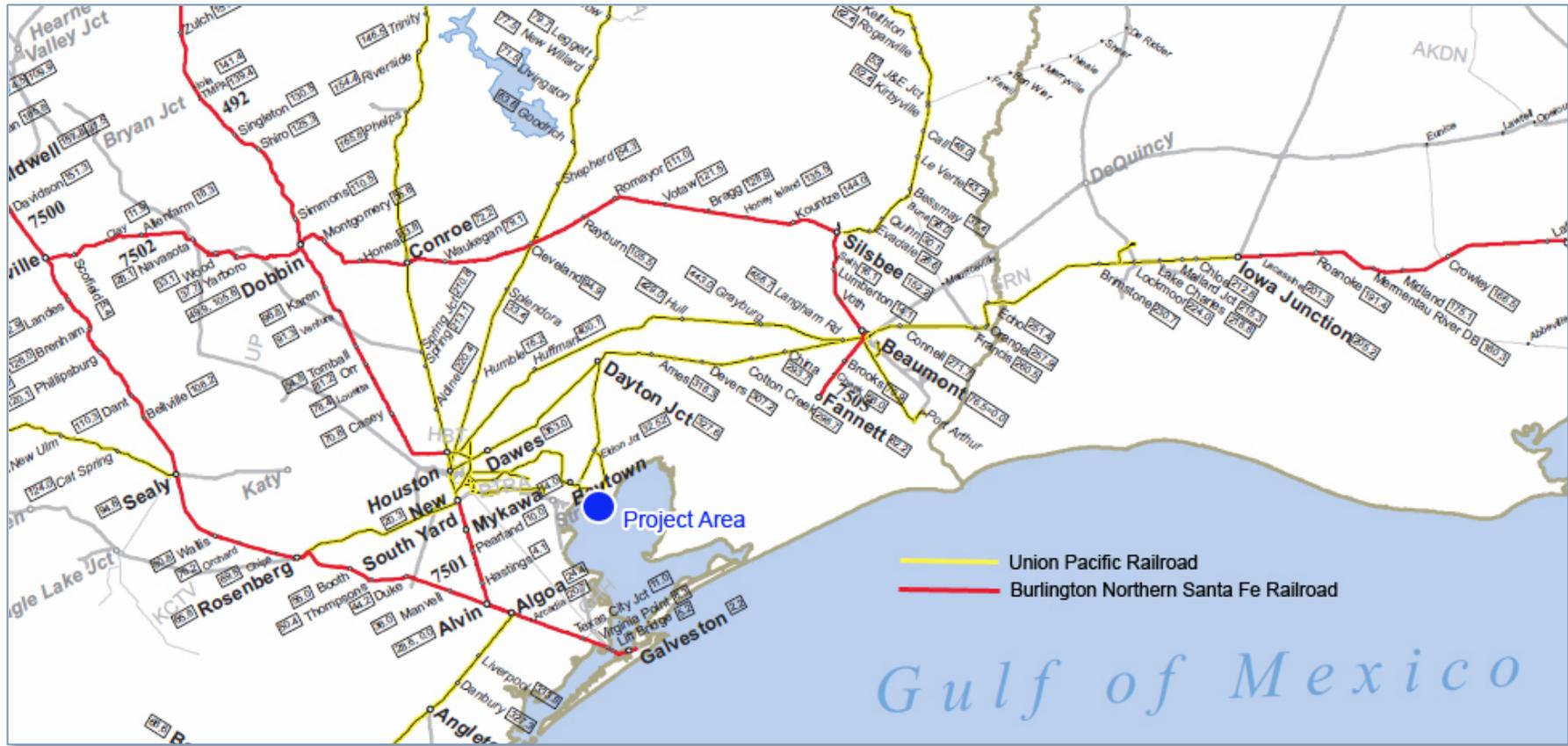
The Baytown/Cedar Crossing area can provide effective connectivity with regional trading partners and may provide some opportunities for efficiencies by avoiding some of the Houston inner-city rail congestion with northbound and eastbound movements.

As previously stated, the Port of Houston Bayport Container Terminal does not have rail access, while the Cedar Crossing Industrial Park has approximately 56 miles of existing rail infrastructure, connectivity to the UP and BNSF Railroads, and its own yards with surplus storage capacity. This existing significant freight rail infrastructure could provide incentive and opportunity for the location of additional large-scale distribution centers and a future deep water port.

The current rail usage averages 10 trains per day that serve over 20 industrial sites in Baytown. As expansion of the Cedar Crossing Industrial Park and AmeriPort continues, there could be additional traffic on the local rail network. The Houston Region Freight Study identified the long-term need for a second mainline track between Dayton and Baytown to improve the bi-directional train operations (TxDOT, 2007).



Figure 6-4. Rail Service in the Project Area



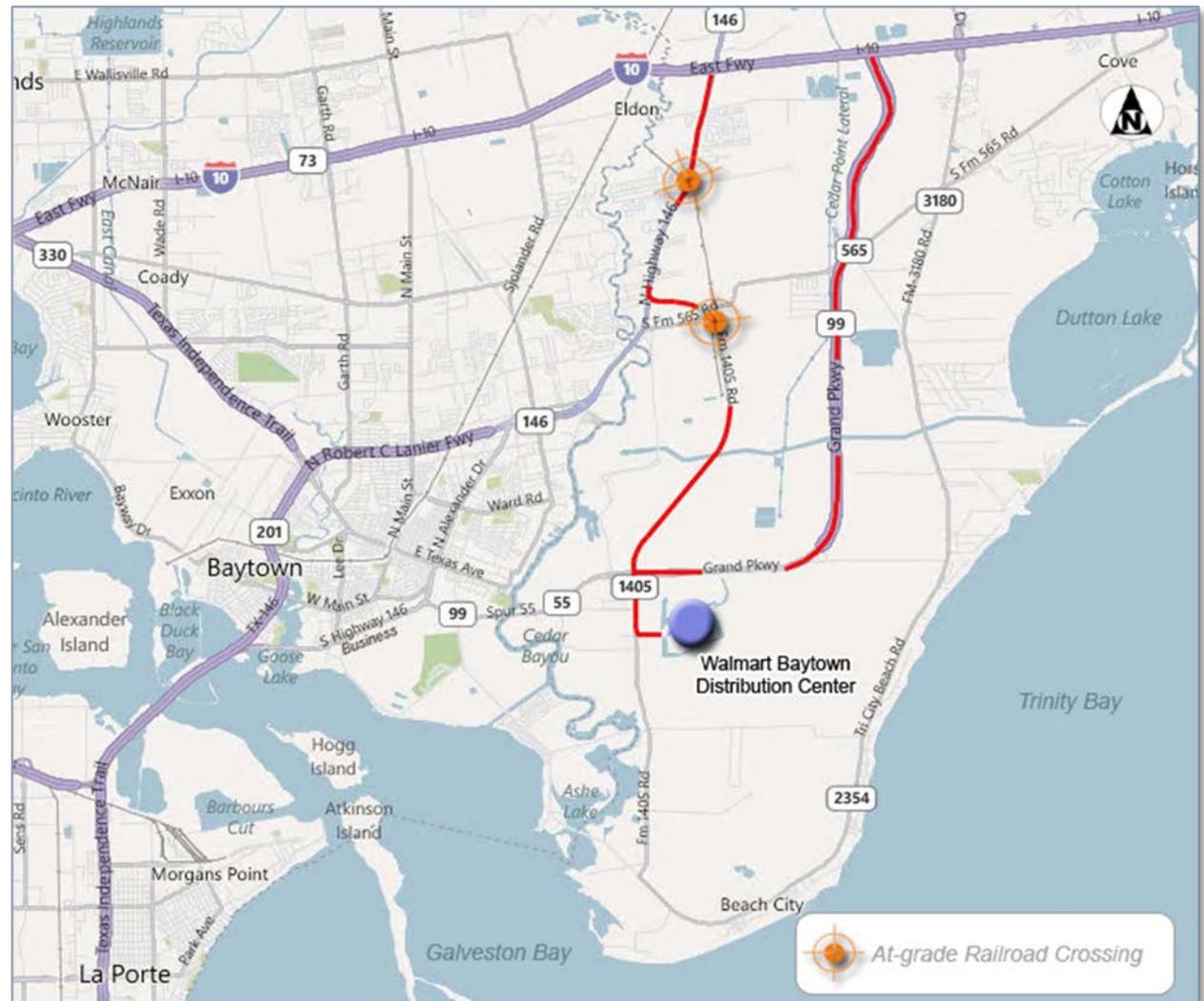
Source: BNSF Gulf Division, 2011



Figure 6-5. Access to IH 10 (Main Freight Corridor)

6.4.3 Access to IH 10

Access to IH 10 from Cedar Crossing Industrial Park is typically achieved by two routes as shown in **Figure 6-5**. One option is the route along FM 1405 to SH 146, then north on SH 146 to IH 10. However, both FM 1405 and SH 146 have numerous intersections and two at-grade railroad crossings that could cause delay. The other option is to use SH 99 (Grand Parkway) to access IH 10. There are no at-grade railroad crossings using this route.



Source: Bing Maps, 2011 (Background Image)



6.4.4 Functional Classifications and Congestion Levels

New traffic forecasts were developed based on the proposed Future Land Use Map, and the latest roadway network information prepared as part of the Baytown Mobility Plan. The forecast traffic was then compared to the capacity of proposed roadway configurations to estimate congestion levels in year 2035 (URS, 2011). The functional classifications for the state-maintained roadways are provided below.

- FM 1405, a heavy haul road, is functionally classified as a Rural Major Collector. It is a two-lane, undivided, uncontrolled access facility with sufficient ROW to widen to a four-lane divided facility.
- SH 146 north of Massey-Tompkins Road is functionally classified as an Urban Principal Arterial. It is a four-lane, divided, uncontrolled access facility.
- SH 99, The Grand Parkway, is functionally classified as an Urban Principal Arterial/Freeway and Expressway. Upon completion of the ultimate facility, it will be a four-lane, divided, controlled access toll road with discontinuous frontage roads between SH 146 and Fisher Road. The current configuration in west Chambers County includes temporary at-grade intersections at locations of planned roadways.
- FM 565 is functionally classified as a Rural Major Collector. It is a two-lane, undivided, uncontrolled access facility.
- FM 2354 is functionally classified as a Rural Major Collector. It is a two-lane, undivided, uncontrolled access facility.
- FM 3180 is functionally classified as a Rural Major Collector. It is a two-lane, undivided, uncontrolled access facility.

In year 2009, only FM 565 and the section of SH 146 between Massey-Tompkins Road and FM 565 experienced “moderate congestion”, defined by H-GAC as a v/c ratio of between 0.85 and 1.00, with FM 565 from SH 146 and east of West Bay Road having severe congestion (v/c > 1.25) (H-GAC, 2011b).

Given the continuing industrial development in west Chambers County and the Walmart distribution center’s intention to expand its operations by 20 percent per year over the next five years, intersection improvements and

traffic control devices may be needed on FM 1405 in the near- and mid-term.

Chevron expansion to be completed in 2017 will have a significant impact on traffic volumes and congestion.

Since the Grand Parkway is a new controlled access facility, improvements to capacity are not anticipated in the near-term. Once completed, the Grand Parkway will provide access to the Fred Hartman Bridge to the west and to US 59 and IH 45 north of Houston, providing commercial vehicles the opportunity to avoid Houston traffic congestion. However, since the Grand Parkway is a tolled facility, usage by vehicles may be diminished as users seek alternative roadways to avoid paying the toll. This could divert traffic onto other routes creating congestion. It is recommended the City of Baytown coordinate with TxDOT regarding traffic levels on the Grand Parkway in the future.

While there may be some reduction in LOS in the area during peak travel times due to increased truck traffic, there is good and efficient access between the Cedar Crossing Industrial Park area and IH 10.

6.4.5 Waterborne Transportation

The benefit to bypassing regional roadway traffic and moving goods via container-on-barge between the Port of Houston and the barge dock at Cedar Port is a matter of cost and time. Regular container-on-barge service going both directions would avoid Houston traffic and would be less expensive than truck drayage, especially for overweight containers. The current issue is matching imports with exports. For this type of service to be more cost effective for the container-on-barge provider, goods must flow in both directions, which is not currently the case.

Currently, the Walmart and Home Depot distribution centers import goods via the Port of Houston and have to return empty containers to the Bayport and Barbours Cut Terminals, typically by truck. Exel Logistics has to go to the Bayport and Barbours Cut terminals to pick up empty containers on barges and return for loading at their facility. A container yard at Cedar Crossing could potentially eliminate these trips and create cost advantages.



Alternatively, if there is an opportunity to coordinate the movement of empty containers between Walmart, Home Depot, and Exel Logistics by reusing empty containers, it could also reduce costs. This scenario has not been examined in detail, and would require further evaluation.

Creating a yard and/or coordinating shipping activities between the major tenants could save time, reduce costs, reduce greenhouse gas emissions, reduce congestion, and increase safety.

6.4.6 Environmental/Other Factors

If the next deep water port and container terminal is located at Cedar Crossing, it has been proposed that the Houston Ship Channel branch off below Atkinson Island (see **Figure 6-3**). This would require substantial dredging during initial construction, as well as ongoing maintenance of the channel. However, since the USACE does not want any upland dredge material placement, it could provide an opportunity for beneficial use of dredge material since the USACE would prefer island and marsh creation, thereby having the potential for ecosystem restoration, creating new habitats, and providing for coastal restoration in the area (USACE, 2007).

Other possible constraints to constructing a deep water container terminal include potential environmental impacts on resources such as wetlands, flood zones, and rookeries. However, these could be mitigated, as previously mentioned, through the beneficial use of dredged material for ecosystem restoration, habitat creation, as well as coastal restoration projects.

As mentioned previously, Cedar Crossing Industrial Park has endeavored to be a good neighbor to adjacent communities by instituting green belts as buffers to keep industry and residential land uses separated. Cedar Crossing has been committed to this principle and has chosen not to sell large swaths of land in their east tract to residential developers during the latest real estate boom.

Local neighborhoods may be concerned about expanded port operations conflicting with recreational usage. While there is some waterskiing and recreational fishing on Cedar Bayou, there is already shallow draft commercial navigation operating on the waterway. To increase recreational opportunities in the area, the City of Baytown is considering a trail system so that the Cedar Bayou area recreation can be appreciated from the shoreline trails.



6.5 Conclusions

Cedar Crossing has approximately 11,000 acres of available land for development, heavy haul roads, and 56 miles of existing rail infrastructure, which puts it in a unique position to pursue: (1) the expansion of its current container-on-barge operations, (2) the addition of new major distribution centers in the industrial parks, (3) the implementation of an intermodal rail yard, and (4) a potential deep water port and container terminal. This potential expansion could greatly enhance the intermodal capabilities of the region, create opportunities for competition, reduce transportation costs, and could provide for new opportunities in the overall economic development potential of the City of Baytown area as a whole.

Expansion of the Cedar Bayou Navigation Channel to a total of 14 miles could create opportunities for new industrial development and more waterfront development upstream of the current limits of the navigational channel. This channel expansion could create new economic development opportunities by attracting new employers to the area.

In Harris County, land use along Cedar Bayou south of Cedar Bayou Road is predominantly residential. In Chambers County, the land along Cedar Bayou is largely undeveloped with industrial or planned industrial anticipated along the entire length between Galveston Bay and SH 146. The potential for changes in land use over time depends on which of the three proposed improvements moves forward and the timing of those improvements.

The movement of goods via rail creates opportunities for the Cedar Crossing Industrial Park and could support expanded port operations and development by enhancing intermodal opportunities. Since Cedar Crossing has established connectivity with the major railroad carriers in the region (BNSF and UP), opportunities could be established. In this way, commodities would not have to travel through the congested inner-city rail network in Houston, unlike cargo from the Port of Houston, and cargo may move more efficiently to its final destination.

The existing roadway network currently provides direct access to IH 10, the major freight corridor in the area. Based on projected expansion of the larger tenants at the Cedar Crossing Industrial Park, improvements to intersections and capacity may be needed in the long-term on FM 1405, which currently has at-grade railroad crossings and numerous intersections. Also, improvements to intersections and capacity may be needed on FM 2354 and FM 3180, which currently have numerous signalized intersections.

Enhancement and expansion of current container-on-barge operations and efforts to improve efficiencies of container movement would reduce energy consumption, greenhouse gas emissions, traffic congestion and allow for the efficient movement of overweight containers. It could also increase efficiencies relative to trips moving empty containers between the Port of Houston and Cedar Crossing.

It should be noted that federal funding for new projects has become harder to acquire and will continue to be for the foreseeable future since numerous ports are competing for fewer federal dollars. Funding for projects will likely require innovative funding strategies and alternative project delivery methods.



CHAPTER 7. MULTI-MODAL ASSESSMENT

7.1 Introduction

This chapter provides an overview of existing multi-modal services, facilities, and potential expansion of services and facilities for transit, pedestrian, bicycle, rail, and aviation that may be generated from the implementation of the Future Land use map. The ownership of these services or facilities range from the privately owned Baytown Airport and the UP to the publicly-funded highway, street and transit services. Information on funding for the various modes is located in **Chapter 10, Financing**.

7.2 Bus Transit

7.2.1 Existing Transit Service

Express bus service and a Harris County partnership for a local circulator system operate in Baytown as shown in **Figure 7-1a** and **Figure 7-2**. Baytown does not participate in the Metropolitan Transit Authority of Harris County (METRO) system except for the Park & Ride express bus service to downtown Houston, which is funded by METRO and Harris County Transit.

7.2.1.1 Express Bus

Express Route 236 began service in October 2007 and is operated under a contract between Harris County Transit and METRO (see **Figure 7-1a** and **Figure 7-2**). Express Route 236 uses the west parking lot at San Jacinto Mall as the location of the Park & Ride. The route is located along IH 10 and serves the Houston central business district.

Express Route 236 operates inbound service to downtown Houston weekdays with five departures between 5:36 AM until 7:15 AM and at 5:12 PM. Weekday outbound service from downtown Houston to Baytown is provided by six departures between 4:10 PM and until 6:05 PM. Express 236 does not currently schedule morning weekday outbound service from downtown Houston. The current fare is \$4.50 per one-way trip (METRO, 2011).

7.2.1.2 Local Bus

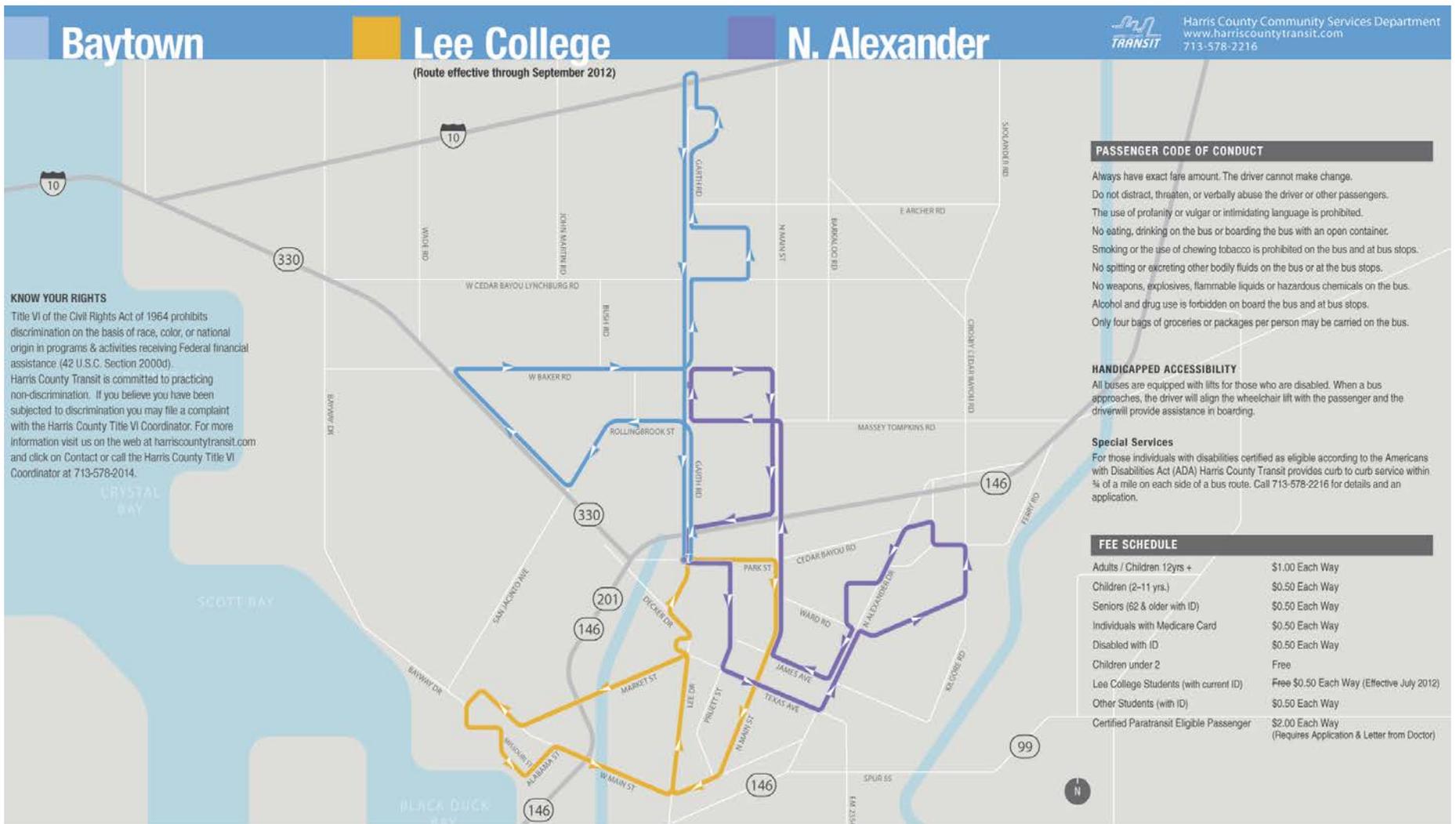
The local transit routes in Baytown were initiated in May 2008 as a two-route system operated by Harris County Transit as a joint project of Harris County, Lee College, and the City of Baytown. In July 2010, a third route was added to the system to improve coverage and reduce route times. Current hours of operation are from 7:00 AM to 6:00 PM and regular fare is \$1.00 with reduced fares of \$0.50 for children (2 to 11 years), senior citizens (65 years and older), and the disabled. Lee College students rode the system for free with college identification (Harris County, 2011) until the college withdrew funding for the system in July 2012.

A route summary for the local Baytown transit service and for Harris County Route 6 is provided below and shown on **Figure 7-1a**, **Figure 7-1b**, and **Figure 7 2**.

- Route 1 provides service along Garth Road, with a loop to Pirates Cove Water Park, a loop along Rollingbrook Drive, the Spur 330 frontage road, and West Baker Road.
- Route 2 provides service to Lee College, Baytown City Hall, Lee High School, Baytown Library, the downtown and commercial area along North Main Street to Park Street.
- Route 2 will be modified starting October 2012 as shown in Figure 7-1b to improve service to neighborhoods on West Texas Avenue between SH 146 and Market Street; improve service south of West Main along SH 146 frontage roads; and extend service to the Texas Department of Human Services office located on South Business 146 between Lee Drive and Wismer Drive.
- Route 3 serves the commercial areas on North Main and North Alexander (SR 146) with the service on North Main Street extending to West Baker Road.
- Route 6 connects Baytown to Crosby through the unincorporated communities of the Highlands and McNair. The San Jacinto Mall Park & Ride is the transfer point for this route, Express Route 236 and Route 1.



Figure 7-1a. Baytown Fixed Route Service



Source: Harris County Transit, City of Baytown

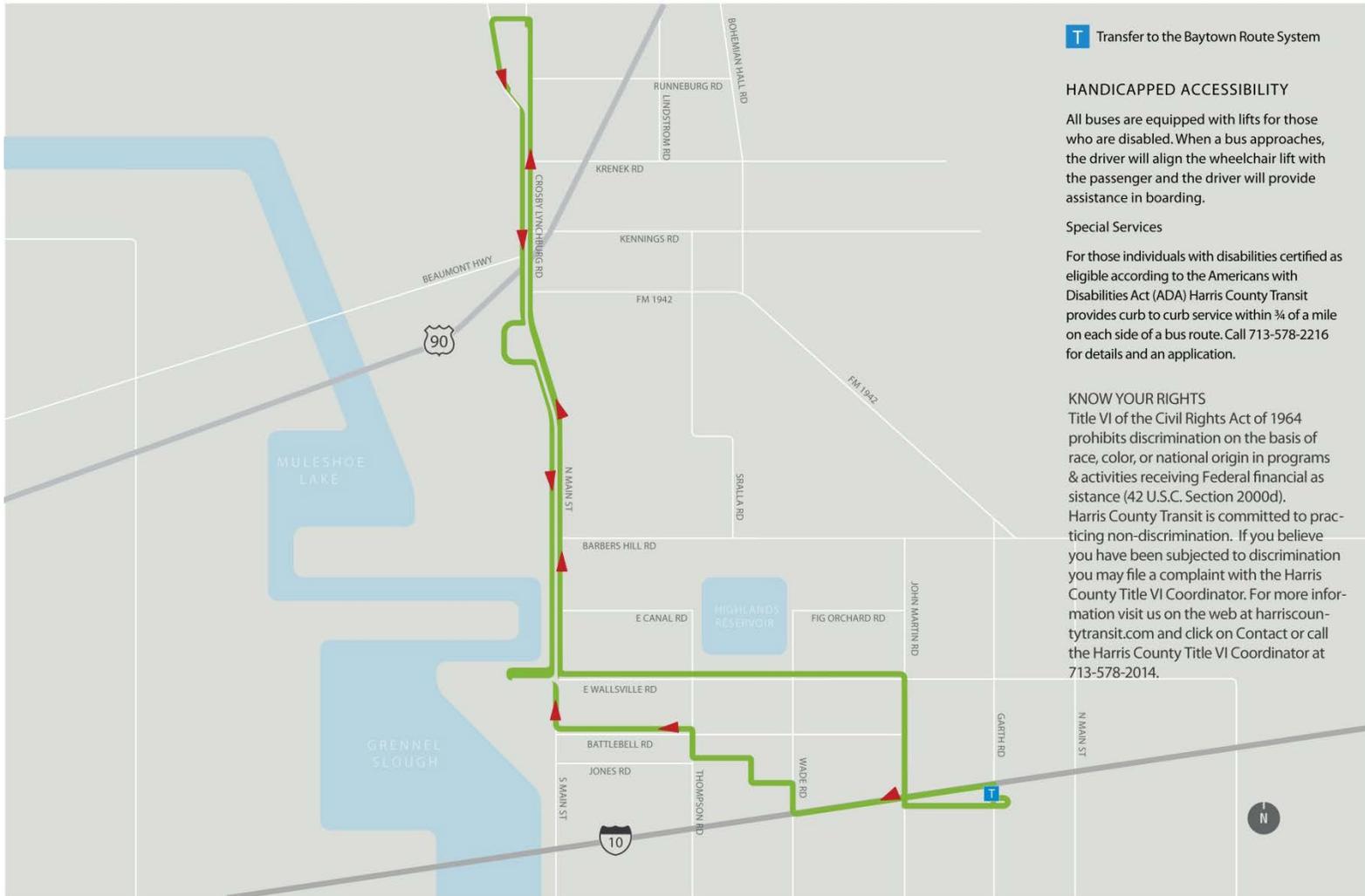


Figure 7-2. Baytown/Highland/Crosby Fixed Route Service

6 Baytown/Highlands/Crosby



Harris County Community Services Department
www.harriscountytexas.com
713-578-2216



Source: Harris County Transit



7.2.2 Future Transit

The assessment of future transit service addresses three components. First, what other programs are available to expand transit service? Second, how could transit service be integrated with the Future Land Use Map? Another consideration is the question of how potential employees can commute to an employment location when private transportation options are not available. The future transit option goal should therefore provide mode alternatives that provides the frequency and route locations that enable employees to get to work on time while considering other issues such as the number of transfers, trip time, and total fares.

7.2.2.1 Job Access Reverse Commute

The federal Job Access Reverse Commute (JARC) program was established to address the unique transportation challenges faced by welfare recipients and low-income persons seeking to obtain and maintain employment. Many new entry-level jobs are located in suburban areas, and low-income individuals have difficulty accessing these jobs from their inner city, urban, or rural neighborhoods. In addition, many entry-level jobs require working late at night or on weekends when conventional transit services are either reduced or non-existent (FTA, 2011).

JARC funds may be used to finance equipment, planning, and operating expenses. The federal share of eligible capital and planning costs may not exceed 80 percent of the net cost of the activity. The federal share of the eligible operating costs may not exceed 50 percent of the net operating costs of the activity. The local share of eligible equipment and planning costs shall be no less than 20 percent of the net cost of the activity, and the local share for eligible operating costs shall be no less than 50 percent of the net operating costs (FTA, 2011).

Express Route 236 connects Baytown with downtown Houston. The San Jacinto Mall Park & Ride lot is a transfer point for Route 1 and Route 6. This route could potentially serve more employers in the City of Baytown with reverse commute opportunities. The City could work with local businesses and METRO to establish connecting service or extensions of the existing service so that residents located in Houston could commute to work in Baytown. A portion of the funding for this additional transit service could use JARC program, but a local match is needed to fully pay for the day-to-day operations. The local match could come from public (state or local)

and/or private funding sources (area business). METRO and Harris County Transit would need to coordinate with Baytown and local employers on the application process.

7.2.2.2 Future Land Use and Commuter Rail

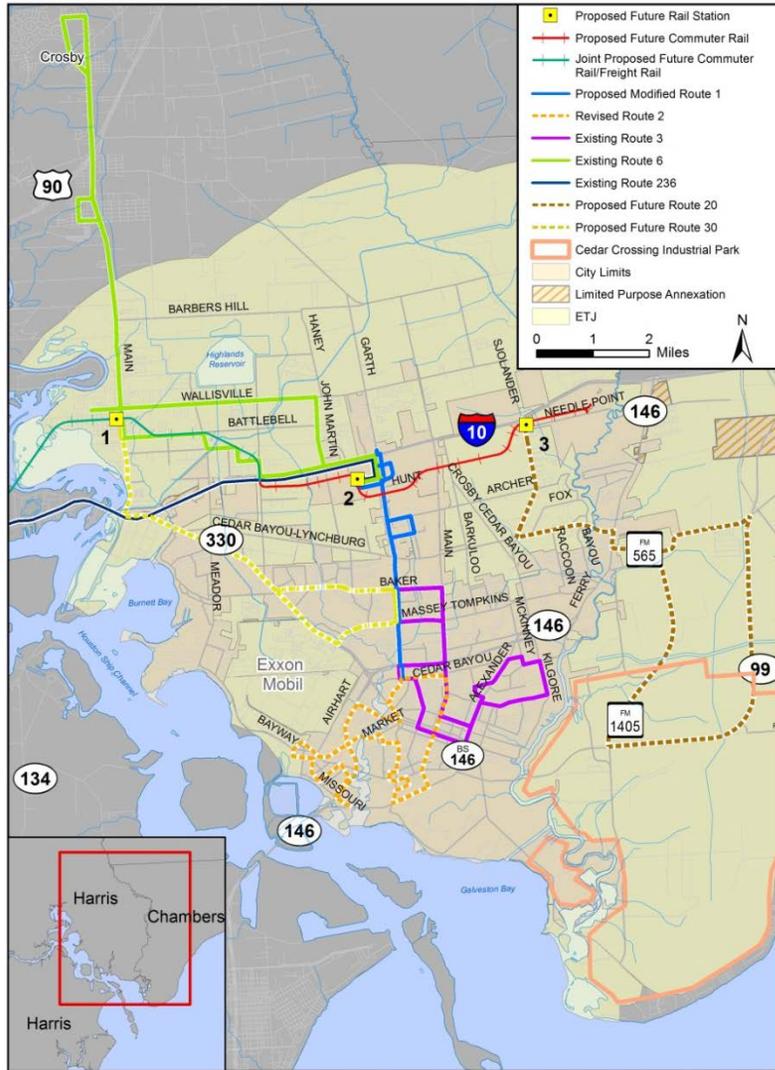
The current service provided by Harris County Transit was evaluated in relation to the Future Land Use Map described in **Chapter 3, Land Use**. Commuter rail -- a key element of the Future Land Use Map -- is proposed using a combination of existing UP freight tracks between downtown Houston and Wade Road, and on new alignment between Wade Road and the UP track west of Cedar Bayou. This future transit analysis considers station locations in the Highlands near San Jacinto Street (Station 1), at the Park & Ride lot at San Jacinto Mall (Station 2), and at Sjolander Road (Station 3). The results of this analysis include the proposal of two additional commuter rail feeder bus routes that would be implemented with the commuter rail service (discussed in **Section 7.2**. These proposed commuter rail line and stations, along with the existing and proposed bus routes are shown on **Figure 7-3**.

- A new route (Route 20) would travel south from the commuter rail terminus at Sjolander Road, then east on East Cedar Bayou Lynchburg Road and across Cedar Bayou on the proposed new arterial, south on SH 146, east on FM 565, south on FM 1405 circulating through the Cedar Crossing Industrial Park, then east on Fisher Road, and then north on the proposed Grand Parkway back to FM 565 for the reverse travel back to the commuter rail terminus at Sjolander Road (Station 3). The exact routing through Cedar Crossing would be based on future development within the industrial park. An inter-local agreement with Harris County Transit and Chambers County would be needed for transit service to extend into Chambers County.
- A new route (Route 30) would complement the existing loop on West Baker Road, the Spur 330 frontage road, San Jacinto Avenue, and Rollingbrook Drive by providing the opposite direction. This route would begin at the proposed commuter rail station in the Highlands (Station 1) and travel south on Main Street, then along the Spur 330 frontage road, the head east on Rollingbrook Drive, north on Garth Road, then west on West Baker Road back to the Spur 330 frontage road for the return trip back to the commuter rail station in the Highlands.



This new route would serve residential growth south of IH 10, as well as the Exxon Mobil facilities.

Figure 7-3. Future Fixed Route Service



Source: Base Map, City of Baytown, 2011

7.2.3 Conclusion

The transit system in Baytown provides a valuable service to the community at large by providing alternative transportation to the automobile. The existing routes connect lower income neighborhoods to commercial, industrial, and educational areas of the city.

As Baytown continues to grow in population and in job opportunities, periodic reviews of the ridership and routes should continue to be performed to see if adjustments to routes or hours of operation are needed.



Exhibit 7-4. Commuter Rail Alternatives

7.3 Commuter Rail

7.3.1 Introduction

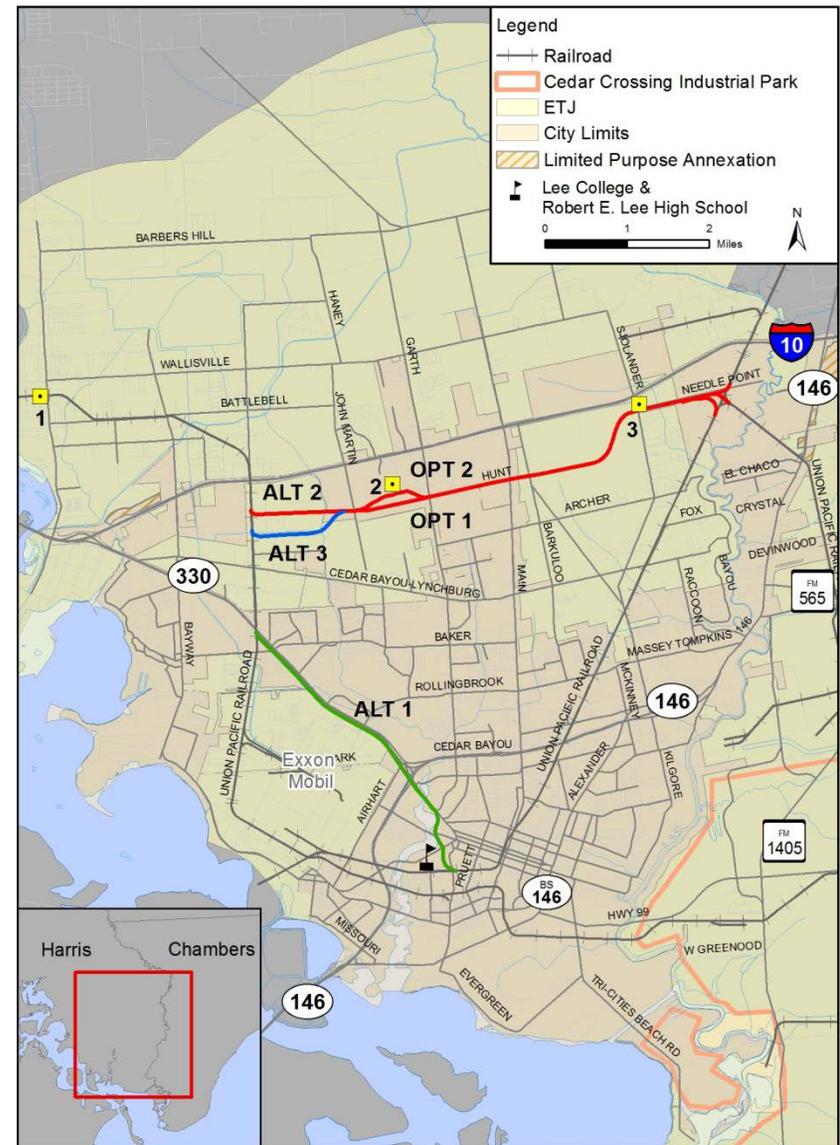
H-GAC completed the *Regional Transit Framework Study (2010)*, which evaluated four transit service strategies based on demographic projections for year 2035 with the objective of prioritizing transit improvements throughout the region for the year 2040 Regional Transportation Plan (RTP).

The IH 10 East Corridor was one of 21 corridors evaluated for high-capacity transit, such as peak hour commuter rail service or all-day commuter rail service. Eleven of the corridors were grouped as Tier 1, meaning the corridors are the most likely to be the highest performing investments for the H-GAC region. The IH 10 East Corridor and four other corridors are included in the Tier II, while the last five fall into Tier III. Tier II corridors would be moderate performing investments for the H-GAC region, while Tier III corridors would be the least performing investments. Details of the evaluation methodology are provided in *Working Paper 6: Evaluation of Potential High Capacity Transit Corridors (HGAC, 2010)*.

As part of the Baytown Mobility Plan, a conceptual-level commuter rail alignment was developed to use the existing UP tracks to downtown Houston. The goal was to demonstrate the potential for higher density land use near proposed commuter rail stations to improve ridership forecasts needed to meet the minimum FTA ridership funding threshold (HGAC, 2010).

7.3.2 Commuter Rail Conceptual Alternatives

The Baytown Subdivision of the UP serves the ExxonMobil facilities and petrochemical plant and other industrial complexes in Baytown and the ETJ. Consequently, the first consideration in developing alternatives was to bypass the ExxonMobil complex to provide passenger rail access to the east side historic downtown Baytown. Three alternatives were developed as shown on **Figure 7-4**.



Source: Base Map, City of Baytown, 2011



Alternative 1 (shown in green on **Figure 7-4**) would use the UP track until south of Spur 330, where it would turn southeasterly to parallel to Spur 330 and rejoin the UP tracks south of Lee College. This alternative would have potential impacts to four city parks, Robert E. Lee High School baseball field and the parking lot for the football stadium. While this alternative provided the desired connection to the UP tracks along the east side of downtown, the impacts to parks and the high school property would be difficult to mitigate. Therefore this conceptual alternative was not considered further.

The IH 10 East Corridor was rated as lacking sufficient future ridership in the H-GAC Regional Transit Framework Study. The next alternatives were created on new alignment parallel to IH 10 so that a higher density future land use could be established. The initial alignments coincided with proposed thoroughfare plan arterials and would create residential impacts based on current land use.

Alternative 2, the northern alternative (shown in red on **Figure 7-4**), would be located along the proposed Hunt Road in close proximity to San Jacinto Mall. At San Jacinto Mall, were two options considered. One option remaining along Hunt Road and a second option shifting northward adjacent to the mall property to take advantage of the parking available under the current arrangement with San Jacinto Mall.

Alternative 3, the southern alternative (shown in blue on **Figure 7-4**), would be parallel to the proposed west extension of Baker Road and then shift northeast to match the northern alternative near San Jacinto Mall. The tie-in to the existing UP track would be along or in close proximity to the Hunt Road extension and would make use of the existing railroad bridge over Cedar Bayou.

7.3.3 Conceptual Alignment

The preferred conceptual alternative is a ‘greenfield’ alignment that has fewer residential impacts than either Alternative 2 or Alternative 3, and is shown on **Figure 7-5**. To minimize residential impacts, the starting point for the new location alignment was placed just south of IH 10 through largely undeveloped property. This adjustment also brought the alignment along the west side of the San Jacinto Mall for the potential of a transit-oriented development project.

The portion of the alignment along the eastern extension of Hunt Road was shifted north to allow for developable frontage along Hunt Road. The portion of the alignment following the ‘S’ curve west of Sjolander Road was placed north of Needlepoint Road to shift the alignment away from a residential neighborhoods.

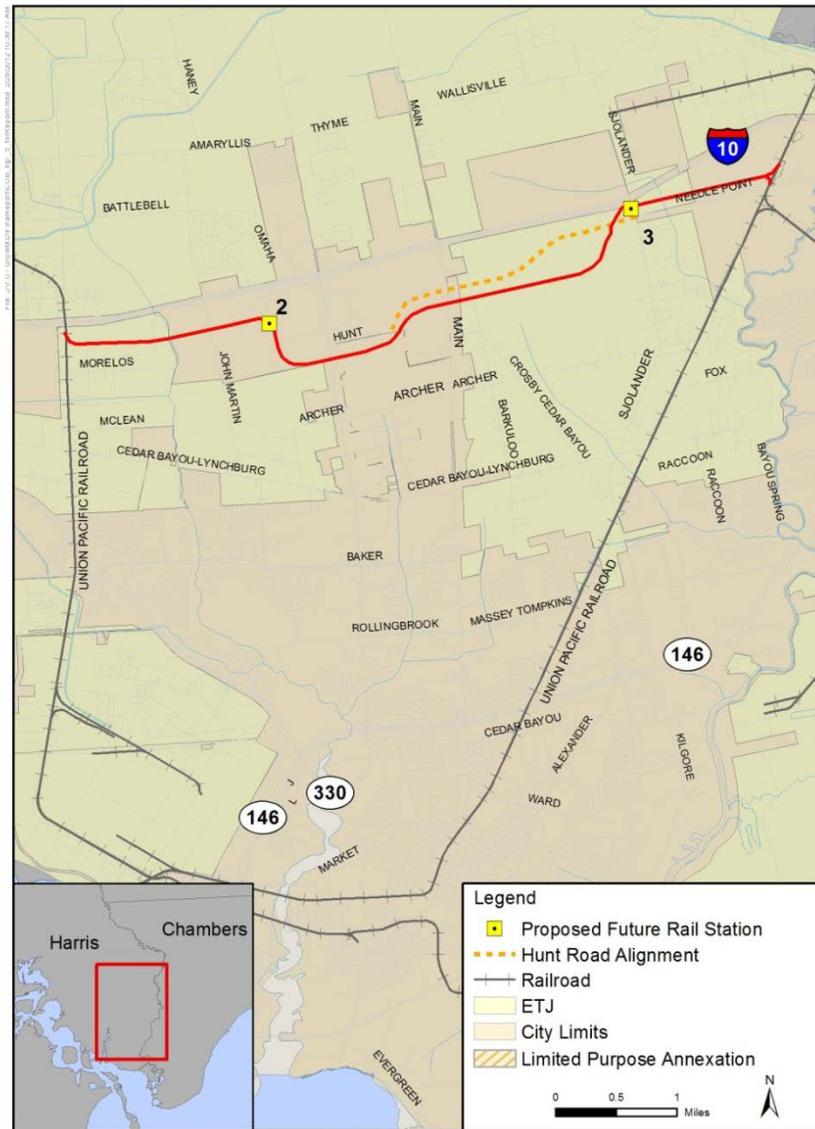
The alternative analysis was based on readily available public information and did not include any detailed quantification of impacts. When the region is ready to proceed with developing high capacity transit or commuter rail along IH 10, a thorough environmental and engineering feasibility analysis would be required to determine the exact location of the alignment.

7.3.4 Station Locations

For illustrative purposes, three stations were identified on the proposed Future Land Use Map .The proposed locations are west of Main Street in Highlands, and at San Jacinto Mall and east of Sjolander Road. Additional stations in Baytown as well as the station locations in Houston would be considered during the engineering and environmental feasibility analysis.



Exhibit 7-5. Commuter Rail Conceptual Alignment



Source: Base Map, City of Baytown, 2011

7.3.5 Conceptual Costs

The capital costs associated with commuter rail service include the following:

- Track upgrade
- Rail siding
- Communication and signal systems
- Train stations
- Train cars.

The recently opened 21-mile Denton County A Train that provides service between Denton and DART Green Line light rail had construction costs of \$191 million or approximately \$9.1 million per mile, without the rolling stock or stations (Denton County, 2011). The A Train provides service in an existing freight corridor.

The proposed commuter rail extension to Baytown would have additional costs associated with ROW acquisition and track construction for approximately 7 miles between Wade Road and the UP tracks east of Sjolander Road.

Since Baytown is outside the Houston METRO service area, a service agreement with Harris County and/or City of Baytown would be needed to operate the train service. The H-GAC Regional Transit Framework Study provides additional information on how service to suburban communities could be provided.

7.3.6 Conclusion

The inclusion of a future commuter rail alignment provides an important aspect of the long-term vision for the City of Baytown. The proposed Future Land Use Map, provided in **Chapter 3, Land Use**, recognizes the benefit of higher density land use, such as transit-oriented development, around the proposed San Jacinto Mall station. The proposed Future Land Use Map based on this transit vision will need to be provided to H-GAC to inform the demographic projections for the development of the 2040 RTP.

Exhibit 7-6. Railroad Crossing Locations

7.4 Freight Rail

7.4.1 Introduction

Baytown is served by the Baytown Subdivision of UP Railroad and two switching railroads that provide access to the commercial and industrial businesses in the area. When combined with the city’s roadway system and access to area waterways, freight rail provides a critical link for industrial development opportunities. This section of the Baytown Mobility Plan provides information on the following topics: existing usage; freight rail crossing data, including accidents; and future needs.

7.4.2 Existing Usage

The Federal Railroad Administration (FRA) maintains a national database of operational and safety information. The database includes the number of trains per day at each crossing. In 2010, the number of trains per day range from 4 to 8 per day depending on location of the crossing (FRA, 2011).

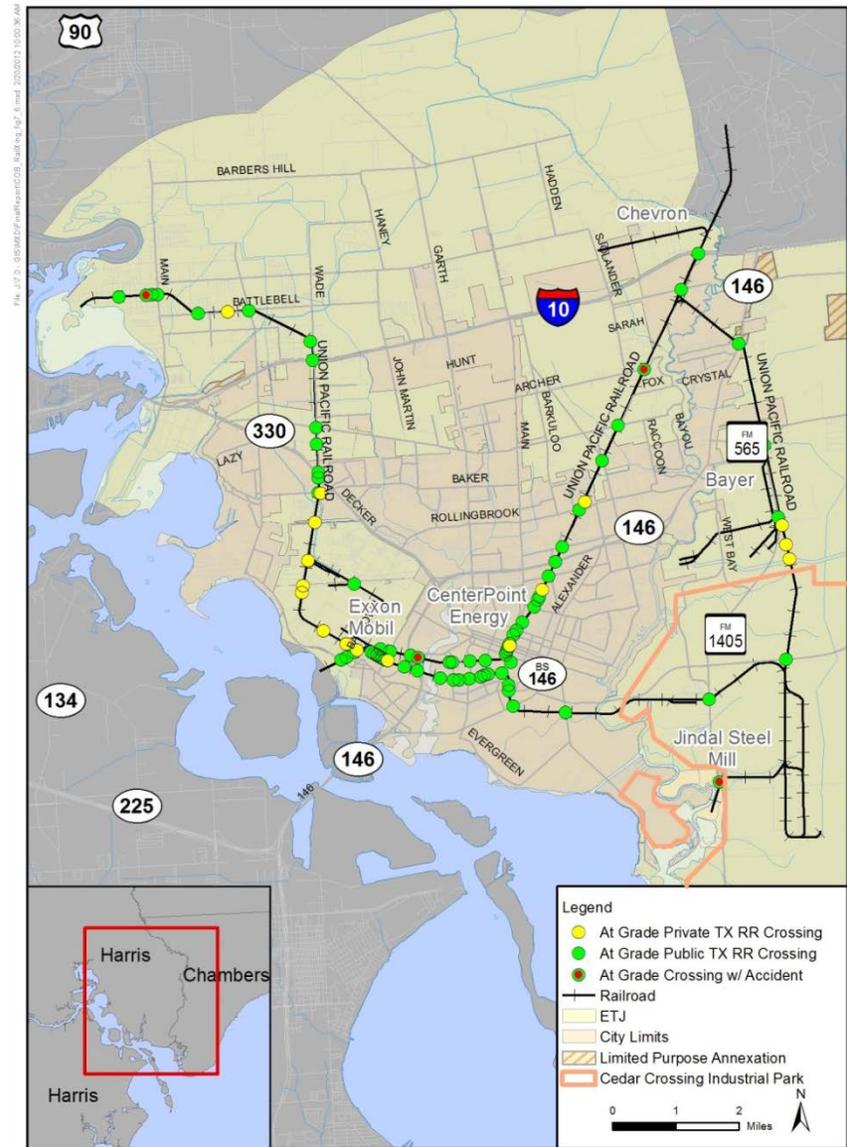
The railroads serve a variety of businesses and industries, including major employers ExxonMobil, ChevronPhillips, Bayer, CenterPoint Energy and Jindal Steel Mill. Third-party switching service is provided by TSG, formerly Econorail. Rail Logix serves the Ameriport industrial park located south of FM 565 and east of FM 1405.

The existing track south of downtown, extending from SH 146 to Cedar Bayou, is currently unused per the FRA records. Service to Cedar Crossing Industrial Park is provided by an UP spur off the mainline south of IH 10 and east of Cedar Bayou.

7.4.3 Freight Rail Crossing Data

Crossing inventory and crossing accident data were downloaded from the FRA website to evaluate the need for additional grade separations in Baytown (FRA, 2011; FRA, 2010). The crossing inventory and accident data were linked using the crossing identification numbers.

Each crossing of a public or private road is recorded in the FRA database. There are 89 crossings in Baytown and the ETJ, with 73 crossings on public roads and 16 on private roads, as shown on **Figure 7-6**.



Source: Base Map, City of Baytown, 2011 and FRA, 2010



Accident information for the public road crossings in Baytown and the ETJ was obtained from the FRA database for the period of 2004 – 2010. Incidents were reported at five locations as shown in **Table 7-1**.

Table 7-1. Accident History at Public Crossings

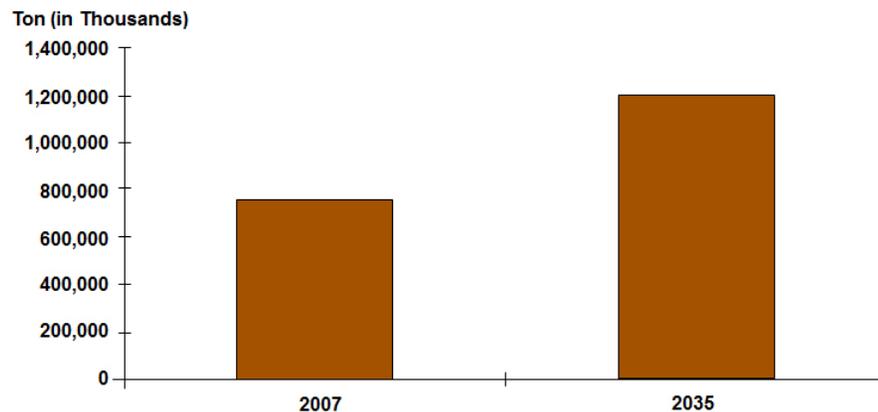
Year	Roadway	Location	Type (Number of injuries/fatalities)
2004	FM 1405	North of E. McKinney Rd.	Injury (1)
2005	FM 565	At UP east of FM 1405	Injury (1)
2007	East Archer	At UP	Fatality (4) Injury (2)
2008	Market Street	North of SH 146	Non-injury
2009	South Third	At UP in Highlands	Injury (1)

Source: FRA, 2010

7.4.4 Future Needs

Non-pipeline freight movement in the eight-county H-GAC region is expected to grow from 800 million to 1,200 million tons annually by 2035 (H-GAC, 2010) as shown on **Figure 7-7**. The potential growth in Baytown could be a higher percentage due to the large amount of developable land available in west Chambers County.

Figure 7-7. Projected Growth in Region’s Freight Volumes



Source: H-GAC, 2010

While the *Regional Goods Movement Study* did not indicate how much of the project increase in freight would be by rail, improvements to crossings and tracks may be necessary over time in response to the increase in rail traffic. The types of projects could range from new planking and installation of crossing arm gates to construction of grade separations. The TxDOT Rail Division manages statewide safety programs for crossing improvements and construction of railroad grade separations.

In 2007, TxDOT published *Houston Region Freight Study* (HNTB, 2007) which is a comprehensive assessment of highway and rail improvement needs to meet the anticipated freight forecast for year 2025. That study proposed a second mainline track between Dayton (which is located 15 miles northeast of Baytown) and Baytown as a long-range improvement with a preliminary cost estimate of \$137 million.

7.4.5 Conclusion

Freight rail is a critical component of the transportation system that serves the industrial areas of Baytown and the ETJ. Freight rail traffic is projected to increase as the industrial parks in west Chambers County continue to add new tenants. The City of Baytown should continue to monitor accidents and the number of trains per day to assess the impact of the freight service on traffic.



7.5 Bicycle and Pedestrian

7.4.1 Introduction

The City of Baytown recognizes the importance of improving facilities for bicyclists and pedestrians within the city's existing transportation system, both within city limits and ETJ.

Stakeholder input from the members of the City of Baytown's City Council, Planning and Zoning Commission, and the members of the public who participated in meetings for the Baytown Mobility Plan was used to further define the need for improvements as listed below:

- Residential neighborhoods should connect to the existing hike and bike trails, as well as elementary and middle schools, through the use of sidewalks.
- Additional facilities to allow bicyclists and pedestrians to use the primary commuting and commercial corridors within the city.

7.5.2 Current Status

7.5.2.1 Existing Sidewalks

Recent aerial photography of the area was used to determine the general distribution of bicycle and pedestrian infrastructure within the city and ETJ. The preliminary findings were discussed with members of the City of Baytown's Planning Department, elected officials, and members of the community who attended the first two stakeholder meetings for the Baytown Mobility Plan to refine the picture of the current status of bicycle and pedestrian infrastructure in the area. The two stakeholder meetings were held on January 27, 2011 and March 8, 2011.

Field observations along the primary commercial corridors, such as Garth Road, North Main Street, and Alexander Drive, verified there are no sidewalks to connect businesses or to connect transit stops to destinations along the corridor. As a result, pedestrians were observed walking in/near the roadway to traverse the corridors.

In addition to the lack of sidewalks in commercial corridors, many older residential neighborhoods do not have any sidewalks. Some new residential single family neighborhoods have sidewalks, but these sidewalks do not

connect to existing or planned hike and bike trails. Additionally, elementary and middle schools have limited or no sidewalk connections to the residential neighborhoods they serve.

7.5.2.2 Existing Trails in Baytown

The city has an existing set of hike and bike trails that are not presently connected to bicycle and pedestrian infrastructure in residential neighborhoods, nor are the hike and trails connected to one another. Therefore, in addition to evaluating the existing bicycle and pedestrian infrastructure, a review of city planning documents, including *The Strategic Parks and Recreation Master Plan for the City of Baytown (Playbook)* (Baytown, 2010) was performed to determine the plans for current and future hike and bike trails for the area or other bicycle and pedestrian infrastructure.

- The *Playbook* laid out a strategic master plan that envisioned a system of trails that connects all of Baytown by allowing “travelers to go from one end of the City to the other in a fun and healthy way”.
- The *Playbook* identified key trail corridors and laid out a vision for the creation of a citywide trails network. Therefore, the policy and ordinance recommendations included in **Chapter 11, Conclusions and Recommendations**, have been designed to support this established vision.
- The *Playbook* indicated that in 2010, Baytown had 4.07 miles of city developed trails, or 1 mile of trail for every 19,240 residents of the City. Another 3.06 miles of trails were located within the city or its ETJ that were owned by homeowner associations or were developed by Harris County. In total, 7.13 miles are available, resulting in a combined total of 1 mile of trail for every 10,980 residents of Baytown.

Those existing trails included the following:

- **Goose Creek Trail corridor (3 miles)** – extending from Bayland Park northward along the banks of Goose Creek to Goose Creek Park in central Baytown, connecting four parks, and linking portions of Central Baytown to the Waterfront.



Figure 7-8. New Trails Development

- **Jenkins/Holloway Park Trail (1.5 miles)** – extending from Holloway Park along Raccoon Street in northeast Baytown westward towards the little league fields at Jenkins Park.
- **Nature Center Trails (2 miles+/-)** – consisting of trails in the nature center

7.5.2.3 Proposed Trails

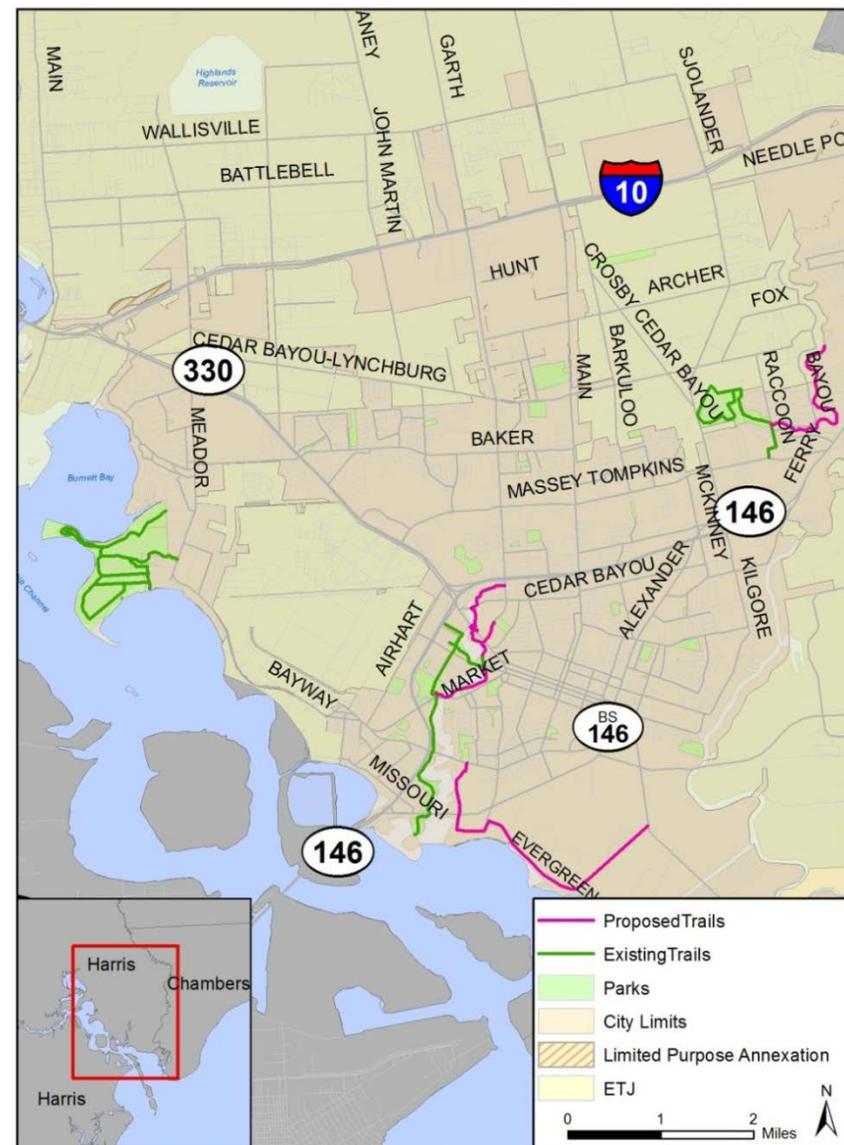
The *Playbook* included the recommendations for the extension of existing trails and/or the development of new trails (see **Exhibit 7-8**) listed below:

- Extending the Holloway/Jenkins Park trail to allow for additional use.
- Extending the Goose Creek trail north to the Wayne Gray Sports Complex and the Pirates Bay Aquatic Center.
- Connecting existing trails to the Eddie V. Gray Wetlands Education and Recreation Center which extends the trails from Goose Creek Park and N.C. Foote Park to the Wetlands Center along Market Street.
- Developing a waterfront trail along Evergreen Road.
- Developing a trail or corridor along a roadway that connects Jenkins Park and the Wayne Gray Sports Complex.
- Acquiring ROW or easements for nature trails along the upper reaches of Cedar Bayou.

7.5.2.4 Proposed Programs

In addition to listing specific trails, the *Playbook* described a vision for a regional structure of bicycle and pedestrian facilities that would interconnect recreational uses with mobility uses of the city's non-motorized infrastructure for various classifications of trails listed below:

- **Regional or Arterial Trails** – designed to be community wide trails, and intended to provide access from one part of the city to another for bicyclists and pedestrians.



Source: The *Playbook*, City of Baytown



- **Neighborhood Trails** – provide access from each neighborhood to the larger arterial trails for bicycles and pedestrians. Access points to the trails are from neighborhoods, streets, parks, and/or schools.
- **Natural Corridor Trails** – designed for recreational use to facilitate the enjoyment of natural settings, especially within parks or nature preserves. Potential natural corridors exist along many of the bayous, creeks, and drainage corridors in the city.
- **Parkway Sidewalks** – located adjacent to major collector or boulevard streets. Unlike neighborhood sidewalks, the parkway sidewalks are wider with a minimum width of 10 feet preferred. The overall parkway sidewalks should be at least 15 to 20 feet wide to allow for at least 6 feet of clearance between the street curb and the walkway, and another 4 feet between the walkway and the adjacent property line. In many cases, additional width may be required to accommodate drainage or other utilities.
- **Paddling Trails** – the trails themselves are natural waterways and not intended for bicycles and pedestrians. However, paddling trails along Cedar Bayou and Goose Creek would necessitate access points that should be linked to regional hike and bike trails.
- **On-Street Bicycle Lanes** – are striped lanes in the roadway cross-section specifically designated for bicycle use only. Specific facilities for cyclists include striped bicycle lanes that are a minimum of four feet in width from the street edge. The *Playbook* also discusses the use of "sharrow" lanes, which are a shared use lane.
- **Pedestrian Bridges and Underpasses** – provide access across barriers that would otherwise hinder connectivity of the system, and other bicycle and pedestrian infrastructure.

7.5.3 Review of Policies and Ordinances from Other Jurisdictions and FHWA Publications

The review of existing policies and ordinances included several Texas cities (Houston, Dallas, Fort Worth, Austin, San Antonio, San Angelo, Grand Prairie, and Texarkana) and several cities and counties from other states with proactive bicycle and pedestrian policies (Charlotte, NC; Boulder, CO;

Brevard County, FL; Urbandale, IA; Portland, OR; and Mercer, NJ). The recommended policies and ordinances from PedSafe (FHWA, 2004) and other FHWA funded studies such as *An Examination of Practices for Retrofitting Existing Roads with Sidewalks in the United States* (Kastenhofer, 2010) were also reviewed to develop recommendations for policy and ordinances that will support the *Playbook* related to bicycle and pedestrian infrastructure and Baytown's need for improved multi-modal access and interconnectivity.

Based on the review of these documents, it is recommended that the bicycle and pedestrian components of the *Playbook* be augmented by an inventory of existing infrastructure throughout the city as the basis for a comprehensive master plan which would be adopted by ordinance. The comprehensive master plan should include the current condition of the existing infrastructure and whether or not the infrastructure is compliant with state and federal regulations, especially the American's with Disabilities Act (ADA).

The master plan should include an evaluation process to prioritize which new and retrofitted infrastructure based on the priorities of the community. This process should include significant opportunities for public participation to obtain comments throughout the master planning effort.

It should also include an evaluation process to prioritize which new and retrofitted infrastructure based on the priorities of the community obtained through a significant public participation program to obtain comments throughout the master planning effort.

Additionally, Pedsafe contains numerous examples and recommendations for addressing specific design issues related to pedestrian infrastructure. FHWA also sponsors resources such as the Pedestrian and Bicycle Program (FHWA, 2011) to provide information on a wide variety of engineering, encouragement, education, and enforcement topics, which was established with funding from the U.S. Department of Transportation (USDOT), and is operated by the University of North Carolina Highway Safety Research Center, in cooperation with the Association of Pedestrian and Bicycle Professionals (www.apbp.org).

These documents can be used as starting point for determining how the City of Baytown wants to create a bicycle and pedestrian master plan designed to



meet the needs of its unique community. Additional reference materials are available from the following organizations:

American Association of State Highway and Transportation Officials (AASHTO) is a non-profit non-partisan group that represents transportation departments across the United States and provides guidelines for the design of five modes of transportation: air, highways, public transit, rail, and water. These guidelines are reviewed and updated periodically. The primary goal of AASHTO is to foster development, operation, and maintenance of an integrated national transportation system (see **Appendix D** for pedestrian standards).

Houston-Galveston Area Council (H-GAC) – H-GAC has a Pedestrian-Bicyclist Program which includes policies relative to improved mobility and safety for bicyclists and pedestrians in the eight-county region that includes the City of Baytown and its ETJ.

State of Texas – The Texas Transportation Code establishes the transportation laws in Texas. Chapter 551 of Title 7 addresses the operation of bicycles, mopeds, and play vehicles. Also, the Texas Transportation Code §544.001 requires that the Texas Transportation Commission adopt a “manual and specifications for a uniform system of traffic-control devices consistent with this chapter that correlates with and to the extent possible conforms to the system approved by the American Association of State Highway and Transportation Officials.”

Federal Government – The ADA sets standards for construction of sidewalks and other facilities that are accessible to persons with disabilities. All new construction must meet the standards established through this Act. The review of these documents ensured that the final recommendations made in this chapter and in **Chapter 11, Conclusions and Recommendations**, are consistent with federal and state standards and regulations.

7.5.4 Retrofitting Sidewalks in Existing Neighborhoods

The FHWA-funded report, *An Examination of Practices for Retrofitting Existing Roads with Sidewalks in the United States* (Kastenhofer, 2010), provides a comprehensive review of existing practices throughout the country.

Many communities in the United States are moving toward developing more walkable communities, and are also encouraging the development of infrastructure that encourages active transportation (e.g., walking, bicycle riding, etc.). More communities are planning for “complete streets” in which all users are accommodated in a safe, attractive, and comfortable environment (i.e., automobile users, transit riders, bicyclists, pedestrians, disabled citizens, school children, tourists, and local citizens).

In Texas, support for complete streets has been strong in many urban areas. In March 2011, TxDOT released a memorandum whose subject was: “Guidelines Emphasizing Bicycle and Pedestrian Accommodations”. This memorandum adopted a policy to proactively plan, design, and construct facilities to safely accommodate bicyclists and pedestrians on state maintained roads. However, the Texas legislature failed to adopt a complete streets bill in May 2011. This has not precluded cities from adopting complete streets policies on their own.

In addition to the idea of creating walkable communities with complete streets, many communities, including the City of Baytown, are now trying to develop Safe Routes to Schools for elementary and middle school students so that these young people can use alternative means of transportation to get to and from school. The development of Safe Routes to Schools serves two goals. First, the students participate in a more active life style that has lifelong health benefits. Second, the traffic congestion on the roadways near the schools is significantly reduced during peak morning and afternoon pickup times.

7.5.5 Conclusion

Pedestrians and bicyclists have often been overlooked in the planning of roadways. Several public comments were received asking for more bicycle lanes and sidewalks, particularly in the vicinity of elementary and middle schools. Additional facilities are also needed in the major commercial corridors. The current mobility planning effort provides the opportunity for the City of Baytown to consider changes to several policies and ordinances to acknowledge the importance of these transportation modes. The specific policy and ordinance recommendations are included in **Chapter 11, Conclusions and Recommendations**.

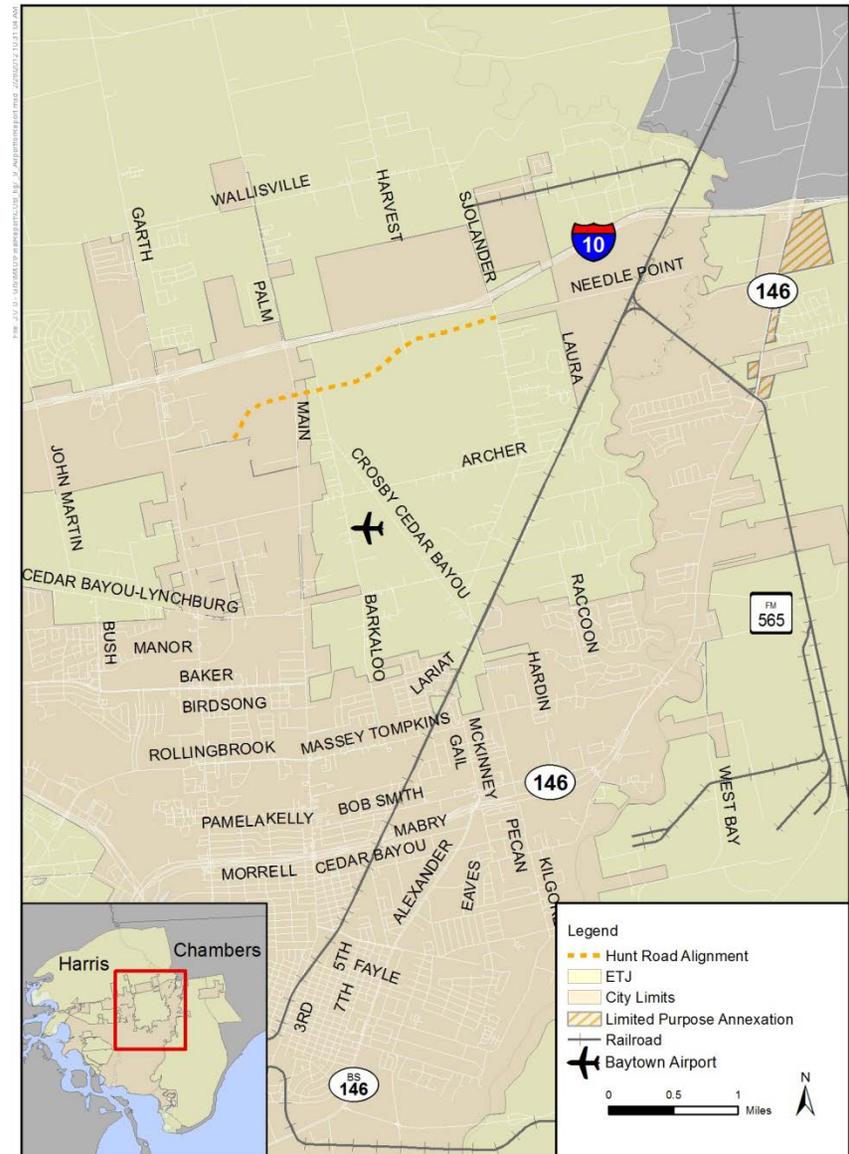
Figure 7-9. Baytown Airport Location

7.6 Airport

7.6.1 Introduction

Baytown Airport (HPY) is privately owned and operated by Raceco, Inc. The airport is located between East Archer Road on the North, Crosby Cedar Bayou Road on the East, East Cedar Bayou-Lynchburg Road on the South, and North Main Street on the West as shown on **Figure 7-9**.

The following discussion identifies the current status of Baytown Airport and its development goal, and the potential impacts of implementation of the development goals on area land use and mobility. The airport is currently classified as “community service”¹ and the long-term goal of the owner is to upgrade the status to “reliever airport status”². The conditions for designation as a reliever airport are described in this section. Also discussed in this section are State of Texas Regulations relating to the zoning of land around the airport. Such zoning regulations are directed at protecting surrounding land owners from undesirable airport noise as well as protecting aeronautically sensitive approaches around airports from potentially unsafe construction activities.



Source: City of Baytown, 2011

¹ Community service airports provide access for single and light twin-engine aircraft, and limited number of business jets.

² Reliever airports are designated by the FAA to relieve congestion at commercial service airports and to provide improved general aviation access to the overall community. Reliever airports may be publically or privately-owned. Reliever airports provide the next level of service by relieving congestion at commercial service airports through the provision of alternative general aviation facilities.



7.6.2 Current Status

While Baytown Airport is not currently listed in the *Texas Airport System Plan* (TASP), it is considered a valuable community asset. Baytown Airport is not currently listed in the National Plan of Integrated Airport Systems, which identifies airports that are significant to the national air transportation system and thus eligible to receive federal grants the Federal Aviation Administration's (FAA's) Airport Improvement Program.

Baytown Airport is located on 125 acres, and has one northwest/southeast oriented asphalt runway that is 4,334-long and 60-feet-wide (Runway 14/32). The close proximity to county roads limits the useable runway distance for takeoff to 3,612 feet on Runway 14 and 3,548 feet on Runway 32. These restrictions are needed to provide adequate safety areas and approach surfaces clear from obstructions and other hazards to aviation. For general aviation community service airports the recommended minimum runways lengths should be either 5,000-feet-long and 75-feet-wide or 4,000-feet-long and 60-feet-wide without displaced thresholds (TxDOT, 2010).

Facilities at the airport include aircraft refueling, aircraft hangars, helipad, parking for transient aircraft, rental-car counter, a pilot's lounge and associated support services (Baytown Airport, 2010). According to an Airport Facilities Questionnaire conducted by H-GAC in 2008, there were 30 based aircraft, including one jet aircraft and one helicopter (H-GAC, 2009). By early 2010, the number of based aircraft had grown to approximately 60 aircraft due to the proximity of Baytown Airport to the Houston metropolitan area and completion of planned improvements to airport facilities, including new hangar construction (Danley, 2011).

According to the results of the FAA's *Airport Design Runway Length Analysis* for a runway a meeting the existing elevation at Baytown Airport (34 feet), slope and temperatures conditions, a runway length of 5,000 feet would accommodate 100 percent of small aircraft, small business jets, and at least 75 percent of aircraft weighing 60,000 pounds or less at 60 percent useful loading (FAA, 1990).

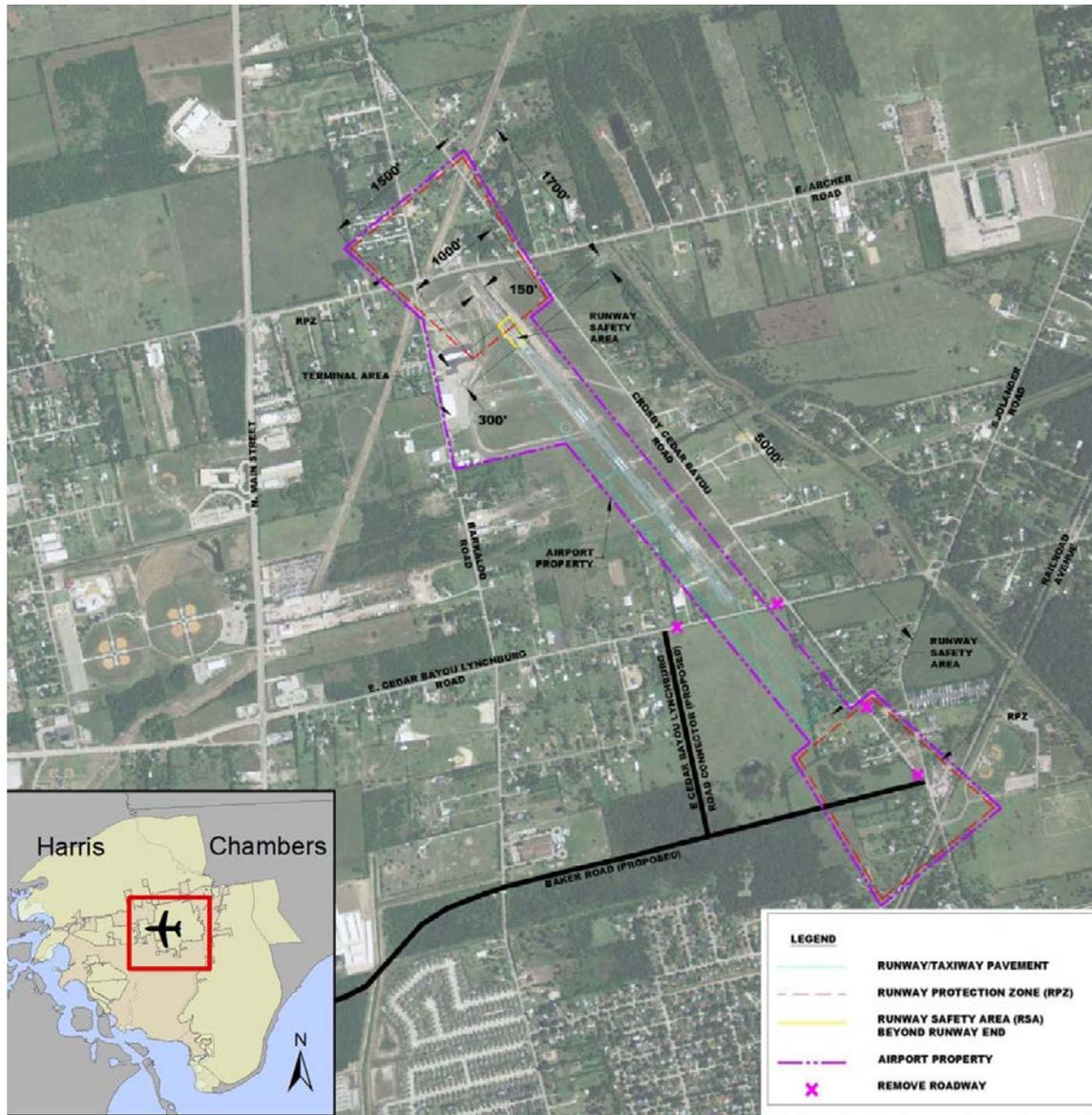
7.6.3 Airport Development Goal

A master plan was prepared by the owner, Raceco, Inc. with the objective of upgrading it to reliever status (Baytown Airport Master Plan, 2008). Designation as a reliever airport requires an airport be listed in the National Plan of Integrated Airport Systems, be open for public usage, have 100 based aircraft, 25,000 annual itinerant operations³ and serve population areas of greater than 250,000 (FAA, 2010).

To gain reliever airport status, a number of improvements would be required at Baytown Airport, including the high probability of a runway extension such as that shown on **Figure 7-10**. Due to property and roadway restrictions on the north side of the airport, the Runway 14/32 extension is shown extending in the southeasterly direction and crossing East Cedar Bayou – Lynchburg Road.

³ An itinerant aircraft operation is defined as either a takeoff or landing. An itinerant operation is one that originates or is destined for an airport different from the airport in question.

Figure 7-10. Baytown Airport with 5,000 Foot Runway Extension



Source: City of Baytown, 2011 (Background Photography)



7.6.4 Implementation of Development Goal on Land Use and Mobility

Planning for a runway extension must take into account the location of the adjacent roadways. If a roadway is immediately at the end of a runway, like Archer Road, truck traffic on the road may create an obstruction in the approach glide slope established by FAA. The possible obstructions to the defined glide slopes occur at the following locations for a runway extension.

- Crosby Cedar Bayou Road at the south end of the runway and at the north end of the runway.
- East Archer Road and Barkaloo Road fall within the approach surface for the north end.
- The height of buildings and residences located immediately to the north and south of the runway ends may also exceed the approach slope surface.

The function of the Runway Protection Zone (RPZ) is to enhance the protection of people and property on the ground. Such control of the RPZ is accomplished through airport ownership of the property. RPZ controls include clearing of objects and activities incompatible with aviation practices. Restricted land uses within an RPZ include residences, places of public assembly, schools, hospitals, office buildings, shopping centers, and fuel storage facilities. Automobile parking facilities are discouraged within the limits of the RPZ, but are allowed provided they are located outside the central portion of the RPZ. Some uses for RPZ property may be permitted provided they do not attract wildlife (FAA, 1989). The baseball fields in W. L. Jenkins Park would preclude extension of the runway beyond 5,000 feet without relocation of the baseball fields outside of the RPZ.

7.5.5 State of Texas Airport Zoning Regulations

The following section presents general information on the application of zoning laws in areas adjacent to Texas airports. Most of this material was extracted from *Compatible Land Use Zoning & Hazard Zoning for Airports in Texas* (TxDOT, 2003). Recognizing the problem and the shortcomings of the standard community planning and zoning laws as they applied to airports, the Texas Legislature created and over the years enhanced the Texas Airport Zoning Act (AZA), Chapter 241 of the Texas Local Government Code. The AZA provides an effective tool for local

governments to regulate the development of land and protect the airspace surrounding an airport.

What are Compatible Uses? Airport compatible land uses are uses of adjacent properties that are not adversely affected by airport operations. Residential development is most sensitive to airport operations and is nearly always an incompatible land use if located close to an airport. Land uses where people congregate such as schools, churches, theaters, and hospitals are also typically incompatible.

Some uses are incompatible because they actually represent a danger to aircraft using an airport. Examples of these include tall structures, as well as commercial or industrial activities that generate bright lights, smoke, or electronic interference that may affect aircraft radios and navigation equipment. Landfills and water features, which attract birds and other wildlife, can also be dangerous. The most serious hazards are tall structures that extend into the air around airports where aircraft are operating close to the ground.

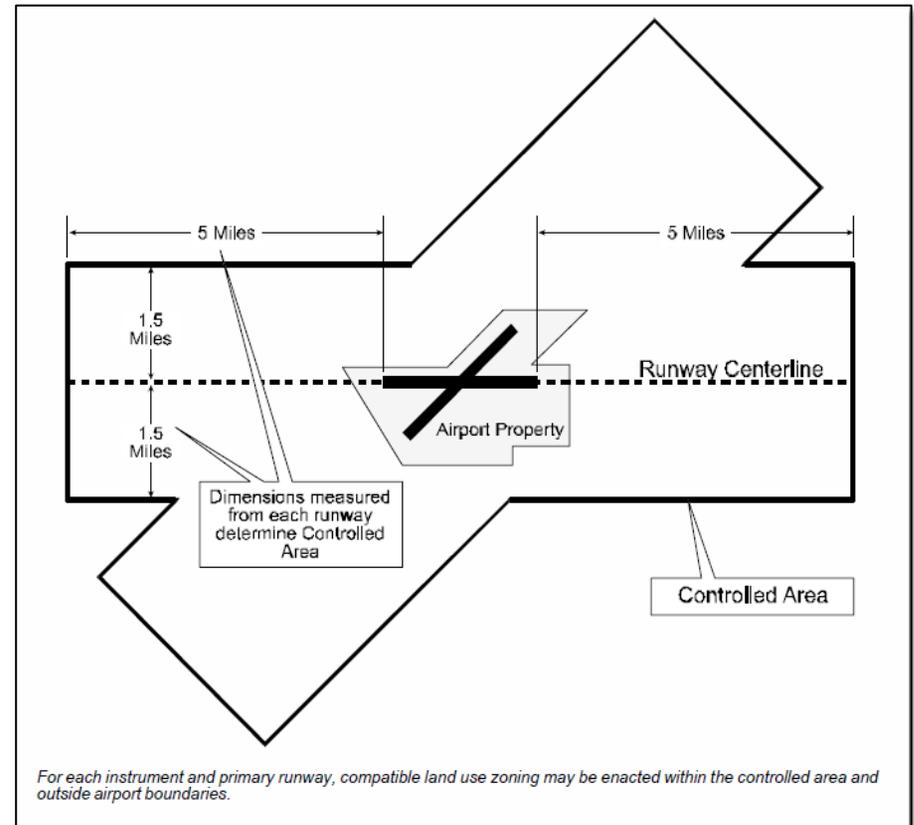
When Is Airport Zoning Applicable? Airport compatible land use zoning regulations or hazard zoning regulations may be adopted for airports or other areas used in the tracking or data acquisition of flights. Such areas may be owned by cities, towns, counties, the Federal Government, the State of Texas, or be privately owned and used in the interest of the public (i.e., open to the public). While zoning is not required by any specific law, many municipalities enact zoning regulations to protect airports and the sensitive areas near airports (e.g., the end of a runway) from non-compatible land uses from encroaching. If left unprotected, land uses that encroach upon airports and their sensitive areas could pose problems should an airport decide to expand a runway or add aviation support facilities. Zoning regulations also assist current adjacent landowners in specifically determining what is allowed and not allowed near airports.

What Areas Are Eligible for Zoning? The area that can be zoned for airport compatible land uses is called the “controlled compatible land use area” and is applicable to any instrument or primary runway. These runway categories are defined as follows.

- An instrument runway is defined as a runway of at least 3,200-feet in length for which there is an existing or planned standard instrument approach procedure.
- A primary runway is defined as a runway of at least 3,200-feet in length on which a majority of an airport's operations take place.
- To be eligible for compatible land use zoning under the AZA, an instrument and/or primary runway must have or be planned to have a paved surface. These eligibility criteria can, and often do, apply to the same physical runway. Future runways may also be zoned if they are identified on an approved airport layout plan or other planning document and meet the above eligibility criteria.

The controlled compatible land use area extends 5 miles beyond each end of an eligible runway and 1.5 miles on each side of the extended runway centerline. **Figure 7-11** illustrates an example controlled compatible land use area. These are the maximum limits of the area that can be zoned, not necessarily the limits of the areas that must be zoned.

Figure 7-11. Example of Controlled Compatible Land Use Area



Source: TxDOT, 2003



Figure 7-12. Example of Controlled Compatible Land Use Area for Baytown Airport



Source: Base Map, City of Baytown, 2011

How do these issues apply to Baytown Airport (HPY)? With the potential expansion of the primary runway being considered at Baytown Airport, compatible land uses must be considered. **Figure 7-12** shows an approximate Controlled Compatible Land Use Area for Baytown Airport.

An airport zoning ordinance should be considered to control land use in the vicinity of the airport once a determination on expansion has been reached. The Texas Legislature, through the AZA, has provided authority to cities or counties to enact airport zoning ordinances. The appropriate zoning strategy is up to the jurisdictional entity and should be carefully planned and considered, as well as undergo review by counsel.

A typical zoning ordinance for use by municipality and counties is provided in the TxDOT *Compatible Land Use Zoning & Hazard Zoning for Airports in Texas* manual in **Appendix D**.

7.6.6 Conclusion

In conclusion, the extension of the runway in its current location to a length of 5,000 feet at Baytown Airport requires significant land acquisition, and would impact the roadway system surrounding the airport. East Cedar Bayou - Lynchburg Road would require rerouting to the south to connect with the proposed Baker Road extension. Portions of East Archer Road, Barkaloo Road, and Crosby Cedar Bayou Road fall within the RPZs and the runway approach surfaces. Portions of Crosby Cedar Bayou and East Cedar Bayou - Lynchburg Road would need to close and residential properties within the RPZs would need to be acquired.



CHAPTER 8. ACCESS MANAGEMENT

8.1 Introduction

The presence of numerous driveways, signalized intersections, and access points can have a negative impact on the traffic operations of a roadway. Access management encompasses the physical improvements, ordinances, and policies that control access to a roadway facility. Generally, an access management program includes a combination of tools that can be applied onto existing and future roadways. These tools assist in reducing conflict points within the roadway system, thereby decreasing collision rates and improving traffic flow. Public and stakeholder education, acceptance, and buy-in are ultimately needed to successfully implement recommended improvements.

This chapter provides descriptions of several strategies as tools that can be used in developing an Access Management Program for the City of Baytown. The first section is the toolbox and includes examples of physical improvements as well as a sample access management ordinance. Following the toolbox are examples of how the tools could be used on a sample corridor in Baytown.

8.2 Toolbox: Physical Improvements

Physical improvements or changes to streets, driveways and traffic control devices can be used individually or in a combination of several improvements, depending on the severity of the congestion.

8.2.1 Non-traversable (Raised) Medians

A raised median is a barrier between opposite travel directions, elevated to prevent vehicles from crossing over. (See **Figure 8-1**).

Figure 8-1. Raised Median



Raised medians restrict driveway and cross street access and direct motorists where to access properties. As a positive trade-off, they allow better mobility for through traffic on the main roadway, improve overall safety due to the reduction in conflict points, and can provide pedestrian refuges. As a center lane treatment, a raised median is an alternative to the two-way left-turn lanes (TWLTLs) that exist on multiple facilities in Baytown, such as Garth Road. The TxDOT Roadway Design Manual (RDM) suggests the use of raised medians where the Average Daily Traffic (ADT) exceeds or is anticipated to exceed 20,000 vehicles per day (VPD).

Median openings should be provided periodically, approximately every ¼ mile for high speed facilities (e.g., 50 mph or more) and typically at intersections or prominent driveways.

In redesigning streets to use raised medians, the spacing of median openings becomes an access management issue. Median openings do not always

allow full purpose movements. For example, an opening may not allow a left turn from a side street. These movements would then need to be moved downstream to U-turn lanes.

Research has shown that raised median treatments provide better safety and mobility than TWLTLs (Iowa State University, 2009). **Figure 8-2** represents a typical intersection where the streets have raised medians and all turning movements are permitted. A traffic signal is needed to control the turning and through movements.

Figure 8-2. Full Access Median Break

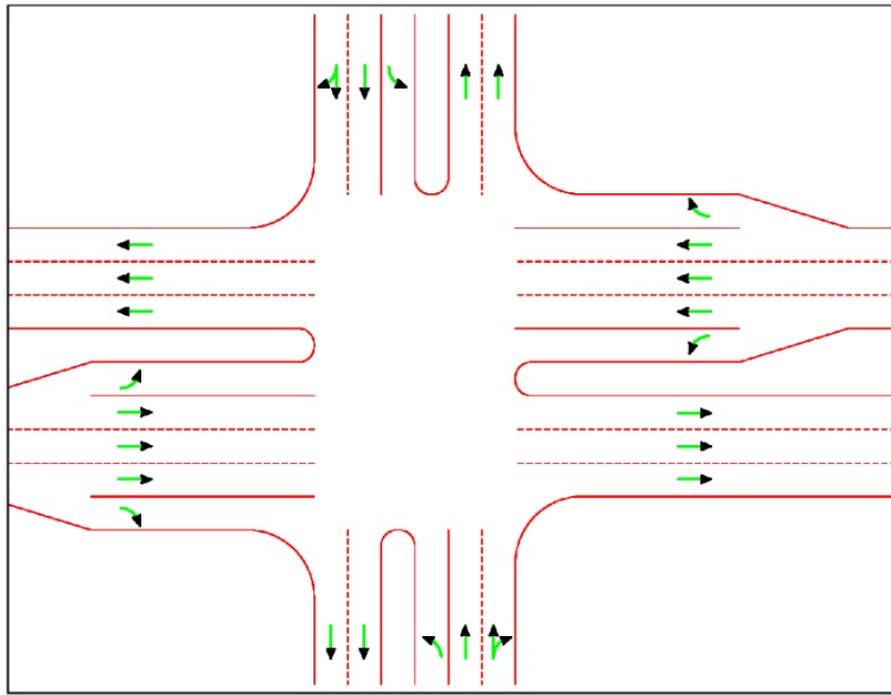


Figure 8-3 shows an intersection treatment that allows left turns from the major street to the side street/driveway, but prohibits left turns from the side street/driveway to the major street. Those drivers on the side street/driveway that want to go left or straight would need to turn right and then make a U-turn at a median break. This option reduces the number of phases in the traffic signal thereby improving efficiency of the intersection for the major street.

Figure 8-3. Hooded Median Break

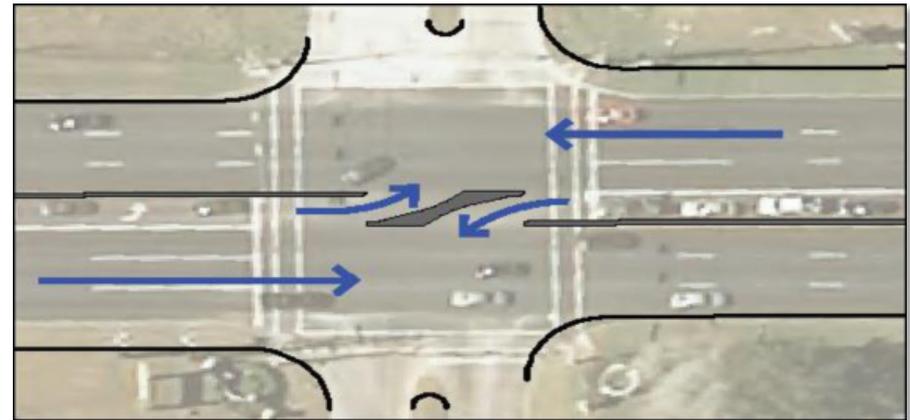




Figure 8-4 shows treatment for a T-intersection that allows left turns. The median would be used as an acceleration lane to receive the left-turning traffic from the side street/driveway. This option could eliminate the need for one direction of the major street the through traffic to stop, thereby reducing traffic delays in that direction.

Figure 8-4. High-T Intersection

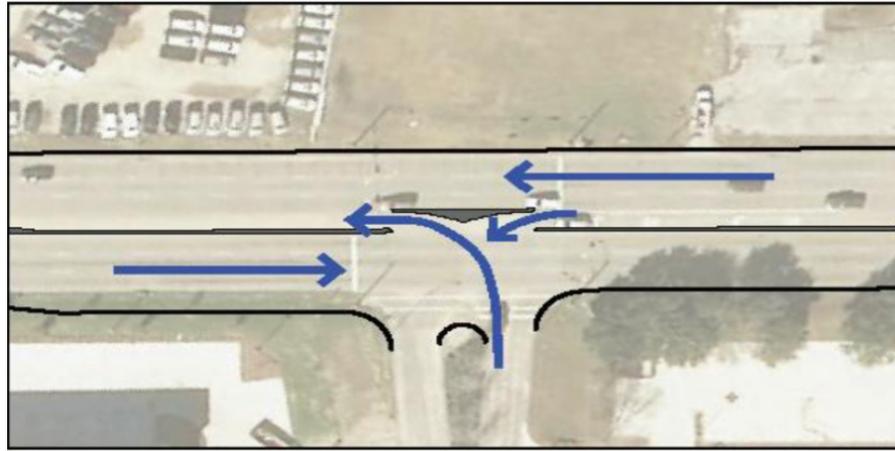
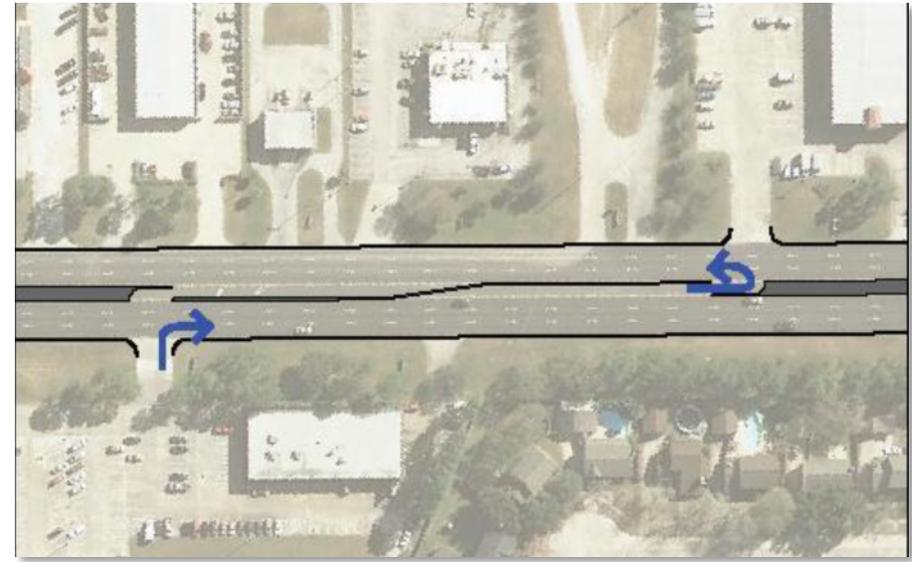


Figure 8-5 shows a median treatment that could be used along a major street where driveways are spaced close together. Left turns from the major street are provided at a limited number of high-volume driveways/intersections. All driveway/side street traffic must turn right and then use a median break to make a U-turn if the desired movement was a left-turn onto the major street.

Figure 8-5. Hooded Median Pair



8.2.2 Turn Lanes or Auxiliary Lanes

One way to improve mobility for intersections experiencing significant delay is by adding turn or auxiliary lanes (See **Figure 8-6**).

Figure 8-6. Example of Two-Way Left-Turn Lane (TWLTLs)



An auxiliary lane is defined as a lane striped as an acceleration lane, deceleration lane, right-turn lane or left-turn lane, but not for through traffic. If a turn lane already exists, a second one may be added or existing lane may be extended in length to “free up” through movements by providing more queuing spaces for vehicles making turning movements. Turn lanes can be added by reconfiguring existing lanes or by adding new lanes.

The addition of turn lanes generally requires the acquisition of additional ROW at an intersection. The addition of acceleration or deceleration lanes also may require additional ROW adjacent to the roadway, which adds additional costs to the roadway project. The TxDOT Access Management Manual presents thresholds for the incorporation of auxiliary lanes.

8.2.3 Driveway Spacing Consolidation

Driveway density (i.e., the number of driveways along a length of road) is a major factor in the road’s functionality. (see **Figure 8-7**). As shown in the

example roadway segment, there are 22 driveway entry/exit points, with the red dots indicating driveways that appear suitable for consolidation upon redevelopment of the property.

Figure 8-7. Street with Multiple Driveways



Studies have shown that when driveway access is granted to too many properties without considering future traffic volumes and roadway classifications, the too many driveways result in an increase in the rate of accidents and decrease the efficiency of the roadway.



TxDOT has for several years now been implementing access management criteria found in the TxDOT Access Management Manual. This document requires new developments, or redevelopment of existing parcels, comply with the driveway spacing and access criteria for all new or relocated site drives.

In 2011, TxDOT implemented new, more stringent requirements for access to state highways, including limitations on number of driveways per parcel, driveway spacing requirements based on roadway functional classification, limitations on median breaks (both full and partial access), and the promotion of shared access and use of frontage and backage roads⁴.

Additionally, H-GAC has authored numerous access management studies, teaming with TxDOT, Harris County and the City of Houston. Results of these studies are in various stages of implementation, including some that are built and under traffic which include driveway consolidation. Links to these studies may be found at this website: <http://www.h-gac.com/taq/access%20management/default.aspx>.

For new development or new roadways, driveway spacing is typically achieved through ordinance and development guidelines that mandate minimum spacing, cross parcel access, etc. The City of Flower Mound enacted an access management policy in 2005 that requires shared driveways for new developments where feasible. Access spacing criteria is based on functional classification and assumed operating speed of the street.

One clear way to address this issue on existing corridors or properties is driveway consolidation which may be concurrent with an improvement to

the existing roadway. The two main reasons for consolidation or removal of a specific driveway are:

- A driveway is located close to the functional area of an intersection; or
- A driveway provides redundant parcel access and does not meet spacing criteria as defined in the local access management ordinance or the TxDOT Access Management Manual.
- Driveway consolidation requires several concurrent efforts: (1) existing driveways typically cannot be closed without the property owner's consent; (2) most closures require agreements among adjacent parcel owners for shared maintenance and cross parcel access; and (3) the provision of alternate access roads may assist in discussions about consolidation and access. Jurisdictions may enforce more stringent access management criteria over time as parcels redevelop and effect closures in that manner.

8.2.4 Freeway Access Management

Access points are not recommended in near entrance/exit ramp junctions due to the conflicts created when a vehicle makes a quick weave maneuver either into or out of a driveway or side street. Consolidation of driveways along an existing frontage road depends upon the type of businesses and the size of delivery trucks servicing those businesses, and adequate access for fire trucks. Reconfiguration of existing driveways would typically occur when major improvements are made to the frontage road.

8.2.5 Signal Modification

Modifications to existing traffic signals are one of the most cost-effective ways to improve traffic movement and increase safety.

⁴ Backage roads provide access to properties along the back side of the parcel as opposed to the front of properties along controlled access highways.

Figure 8-8. Congested Signalized Intersection



The more signals are coordinated and properly spaced, the greater the reduction in overall travel time and roadway capacity. Typically traffic signal spacing is recommended approximately ½-mile apart. Consolidation or removal of traffic signals can work in tandem with other strategies to increase the traffic flow along a corridor. Often signal removal can be accomplished in combination with median modifications and other access modifications. In addition to signal consolidation, signal timing, and coordination may be applied as an effective access management tool. To provide efficient progression, the signal timing (cycle length and coordination) should be optimized based on the signal spacing and travel speed.

8.2.6 Driveway Permitting

Driveway permitting is a mechanism that can control the location and design of new driveways and proposed improvements to existing driveways. Typically when a new or improved driveway is proposed at a property, an application is made in writing to the city engineer and/or the building supervisor, accompanied by a drawing of the geometry of the driveway and the spacing of the driveway with respect to adjacent driveways, adjacent intersections, parking and other relevant information.

8.3 Toolbox: Ordinances and Policies

A sample Access Management Ordinance for the City of Baytown is provided in **Appendix D**. Best access management practices in other municipalities were reviewed in the development of this proposed ordinance. The intent of the ordinance is to provide and manage access to land development, while preserving the regional flow of traffic in terms of safety, capacity, and speed. This sample ordinance balances the right of reasonable access to private property, with the right of the citizens of Baytown and the State of Texas to safe and efficient travel. It is recommended that the sample be reviewed for applicability and modified as appropriate for the City's use.

Some key criteria addressed in the sample ordinance include the following: driveway access spacing, median placement and configuration, safe sight distance, corner clearance, joint and cross access for traffic generators, driveway design, permitting, and non-conforming access features.

Driveway access spacing for proposed driveways is a key element for addressing access management, and as such, is a key focus of the sample ordinance. Driveway spacing is addressed for both adjacent driveways (i.e., on the same side of the road), as well as for driveways on the opposite side of the roadway. The driveway spacing is a function of the street classification of the roadway; the higher the classification the greater the proposed minimum spacing distance.



8.4 Sample Roadway Corridor for Application of Access Management Criteria: Existing Conditions and Recommendations

As part of the access management analysis, a segment of Garth Road between Cedar Bayou Lynchburg Road and IH 10 was analyzed. The figures shown below depict the location of the segment (see **Figure 8-10** through **Figure 8-13**).

8.4.1 General Recommendations

General recommendations for this corridor were made considering changes that can reasonably be made for the existing access points. Because existing driveways typically cannot be closed without a property owner's consent, it recommended that the process of obtaining agreements among adjacent parcel owners for shared maintenance and cross parcel access be started for Garth Road. For Garth Road, the suggested addition of raised medians and recommended median openings should coincide with the consolidation of existing driveways and placement of future driveways. The proposed City of Baytown Access Management Ordinance, the TxDOT Access Management Manual, and the TxDOT RDM were utilized in making these recommendations.

Future traffic signals should, to the extent possible, be spaced approximately ½ mile apart, a distance which typically allows for good traffic progression.

Figure 8-9 provides a legend for **Figure 8-10** through **Figure 8-13**. The specific access management improvements for consideration on Garth Road are listed below. This analysis is an initial large scale review that resulted in ideas for consideration, and not specific recommendations for implementation.

Existing Condition:

Segment 3: Garth Road between Cedar Bayou Lynchburg Road & IH 10

Garth Road from Cedar Bayou Lynchburg Rd to Independence Boulevard (Section 3A) is a 4-lane divided major arterial with a two-way left-turn lane (TWLTL). From Independence Boulevard to IH 10 (Section 3B), the 4-lane divided major arterial has a striped median with right and left turn lanes at

the various intersections along the length of San Jacinto Mall. The following intersections are signalized: IH 10 frontage road, Sharon Ln., Independence Boulevard and Cedar Bayou Lynchburg Road. This is a commercial corridor with a variety of adjacent businesses and access driveways beginning at Cedar Bayou Lynchburg Road and ending with San Jacinto Mall on the northern end. This segment had year 2006 traffic counts of 24,800 VPD on the southern end and 17,350 VPD on the northern end. The 2035 travel demand model forecasts 27,500 VPD on the northern end of this segment.

Recommendations:

Section 3A Cedar Bayou Lynchburg Road to Independence Boulevard

The ADT for this section of Garth Road exceeds 20,000 VPD, which is threshold for determining when to convert a TWLTL to a raised median according to the TxDOT RDM. A raised median is suggested within these limits with a full median break at Archer Road High-T median breaks are recommended at Hunt Road, 0.55 mi south of Independence Boulevard, North Road and South Road. Hooded median pairs are recommended approximately ¼ mile south of Independence Boulevard and 0.2 mi. north of Cedar Bayou Lynchburg Road (see **Figures 8-10 – 8-13**, at the end of this chapter, for recommended applications in these limits).

Additionally, due to high trip generation characteristics and frequent access points, a continuous right-turn auxiliary lane is recommended from the entrance to the Lowes north of Cedar Bayou Lynchburg Road to approximately 0.125 miles further north (see **Figure 8-10**). This auxiliary lane would allow additional acceleration and deceleration opportunities for the large traffic generators in these limits. There is currently a shoulder between 5 to 10 ft. in width in this segment which could be utilized for this auxiliary lane and widened as needed. Possible drainage considerations due to the minor widening would need to be addressed due to the abutting open channel ditch and the safety end treatments at the respective driveways.

Section 3B Independence Boulevard to IH 10 Frontage Road

This portion of Garth Road is characterized by San Jacinto Shopping Mall on the west side and various retail and service developments (fast food, hotel, gas, etc.) on the east side. Currently this 4-lane divided arterial has a striped median with right- and left-turn lane opportunities at the



intersections and primary driveway access points. The recommendations for this section include construction of a raised barrier median in the same location as the current striped median and maintaining the locations of the current median breaks.

8.5 Conclusions

Access management is a process that consolidates access to roadways, channelizes traffic flow, optimizes signal timings and consequently reduces conflict points in the roadway system. The result is a safer roadway system that allows better access opportunities and improves overall traffic flow.

The implementation of the access management procedures and the approval of the proposed Access Management Ordinance will enable the City of Baytown to address future growth and development without compromising the safety of the traveling public. It is important to note that any final implementation plans that are developed should include a detailed traffic engineering study (including turning movement counts, accident analysis, review of delivery truck and fire truck access/maneuverability, and public involvement, etc.).

Figure 8-9. Legend for Improvements

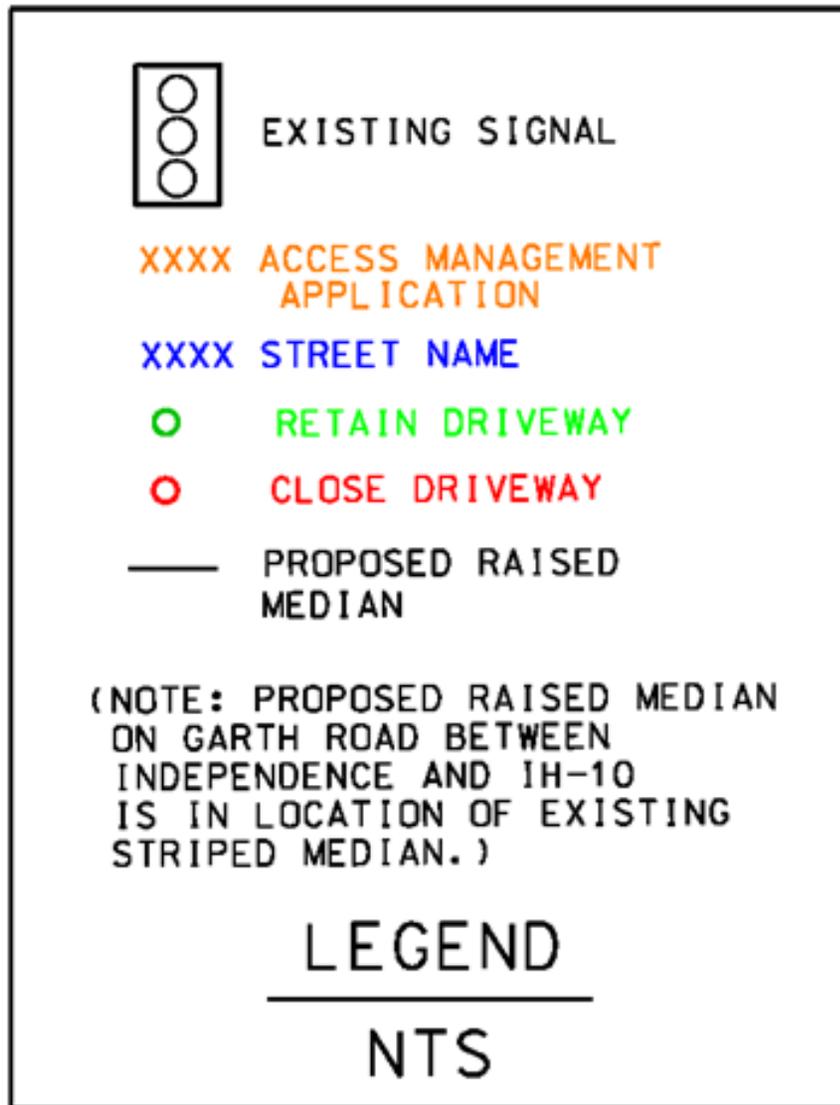


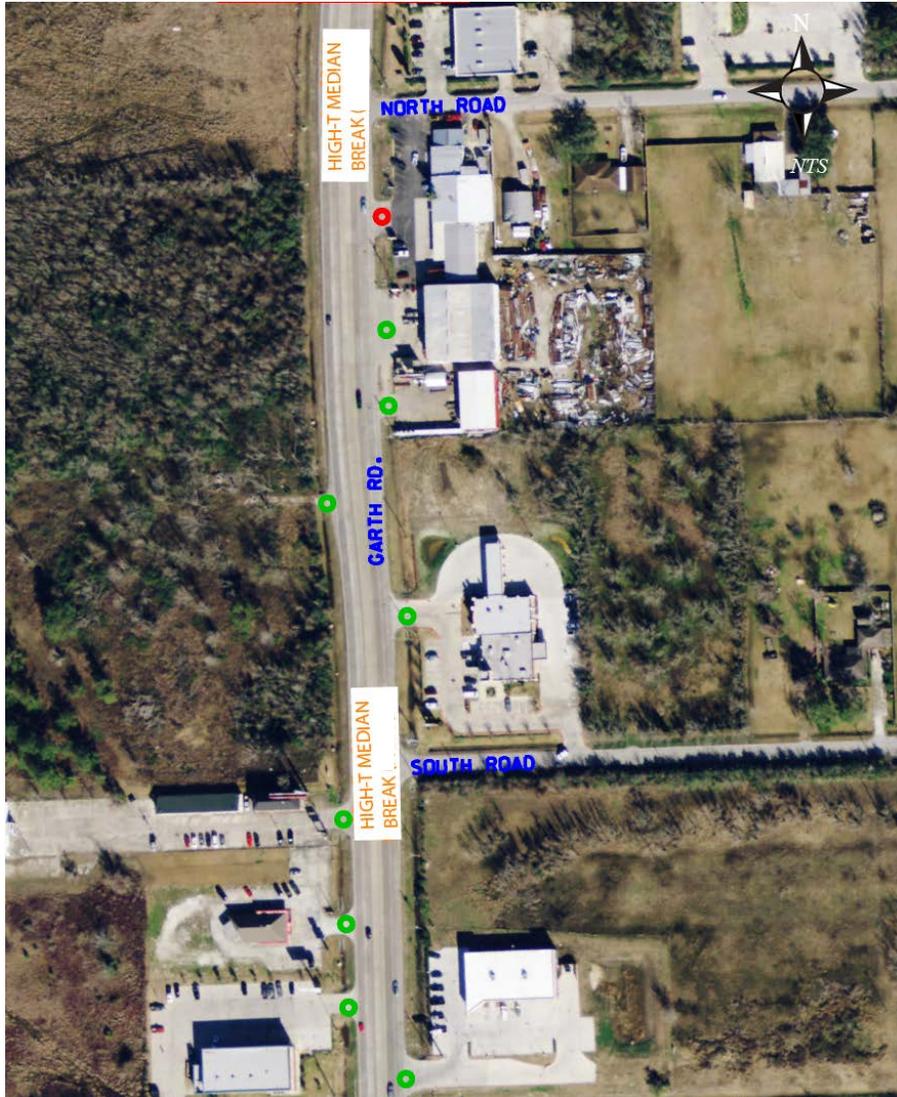
Figure 8-10. Cedar Bayou Lynchburg Rd.



Source: Photography, City of Baytown, 2010



Figure 8-11. Garth Rd. between South Rd. and North Rd.



Source: Photography, City of Baytown, 2010

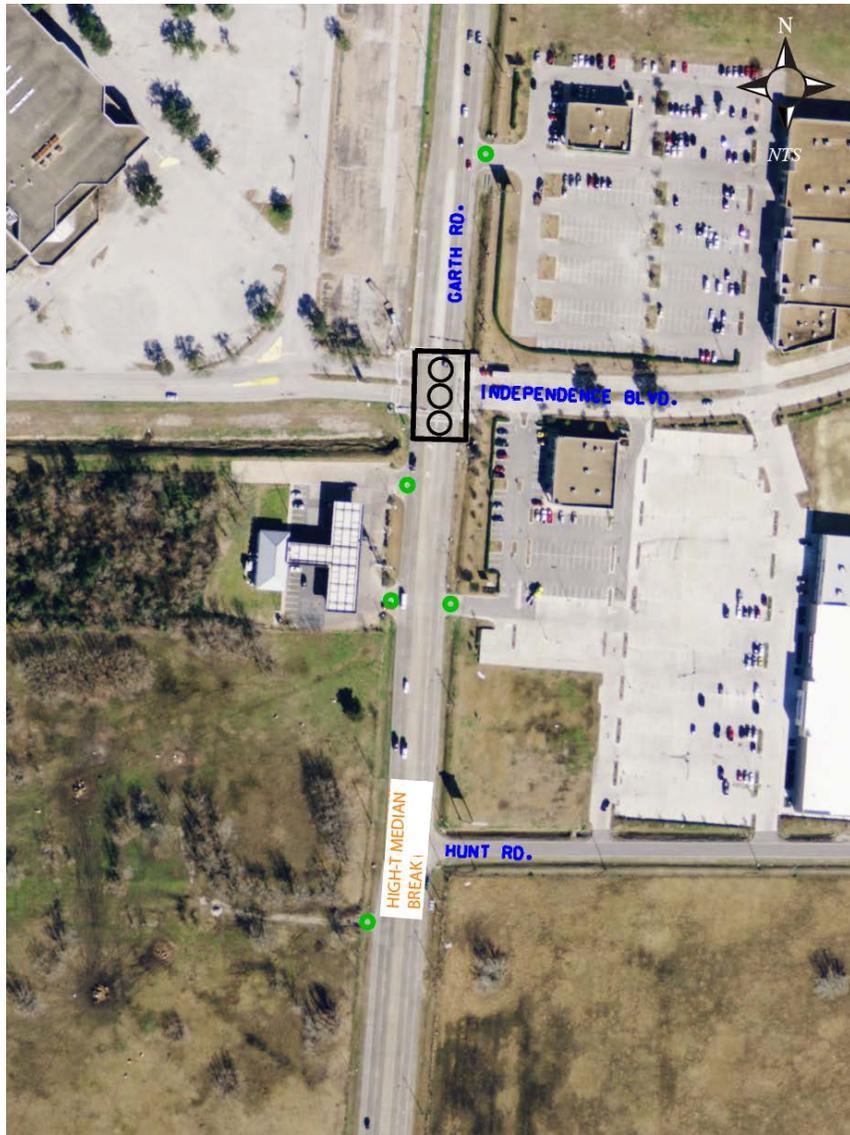
Exhibit 8-12. Garth Rd. at Archer



Source: Photography, City of Baytown, 2010



Figure 8-13. Garth Rd. at Independence Blvd.



Source: Photography, City of Baytown, 2010



CHAPTER 9. THOROUGHFARE PLAN UPDATE

9.1 Introduction

In 2007, an update to the Thoroughfare Plan was included in the Baytown 2025 Comprehensive Plan with an action item to perform a thorough analysis using a travel demand model to provide more detailed analysis in support of the projects included in the plan. The proposed update to the Thoroughfare Plan described below reflects an updated Future Land Use Map, roadway improvements completed since 2007, results from the travel demand model, and the proposed adjustments to the city's typical roadway sections to include facilities for pedestrians and cyclists.

9.2 Purpose of a Thoroughfare Plan

A Thoroughfare Plan indicates the anticipated roadway network based on future land use in order to preserve adequate ROW to provide traffic circulation and mobility as a community grows, either through in-fill development or expansion into the ETJ. The Thoroughfare Plan shown in **Figure 9-1** shows the existing roads and proposed improvements that will be needed as development occurs or as land use changes over time.

The City of Baytown can use the Thoroughfare Plan to demonstrate the anticipated roadway needs to H-GAC for developing RTP. The RTP process is described in **Chapter 10, Financing**.

A Thoroughfare Plan is:

- ✓ A forward-looking tool for facilitating orderly urban and suburban development in and around the community.
- ✓ A long-term outlook for the area's overall roadway network based on anticipated development trends and patterns.
- ✓ A long-range plan that identifies the projected location and type of roadway facilities needed over time.
- ✓ A tool to assist the city in preserving future corridors for transportation improvements as the needs arise.
- ✓ A tool that evaluates traffic circulation and congestion in a general manner and in conjunction with other long-range factors such as land use and utility infrastructure. Based on the anticipated and logical role of particular roadways within the context of the area road network, supported by readily available information on traffic and development patterns and trends.

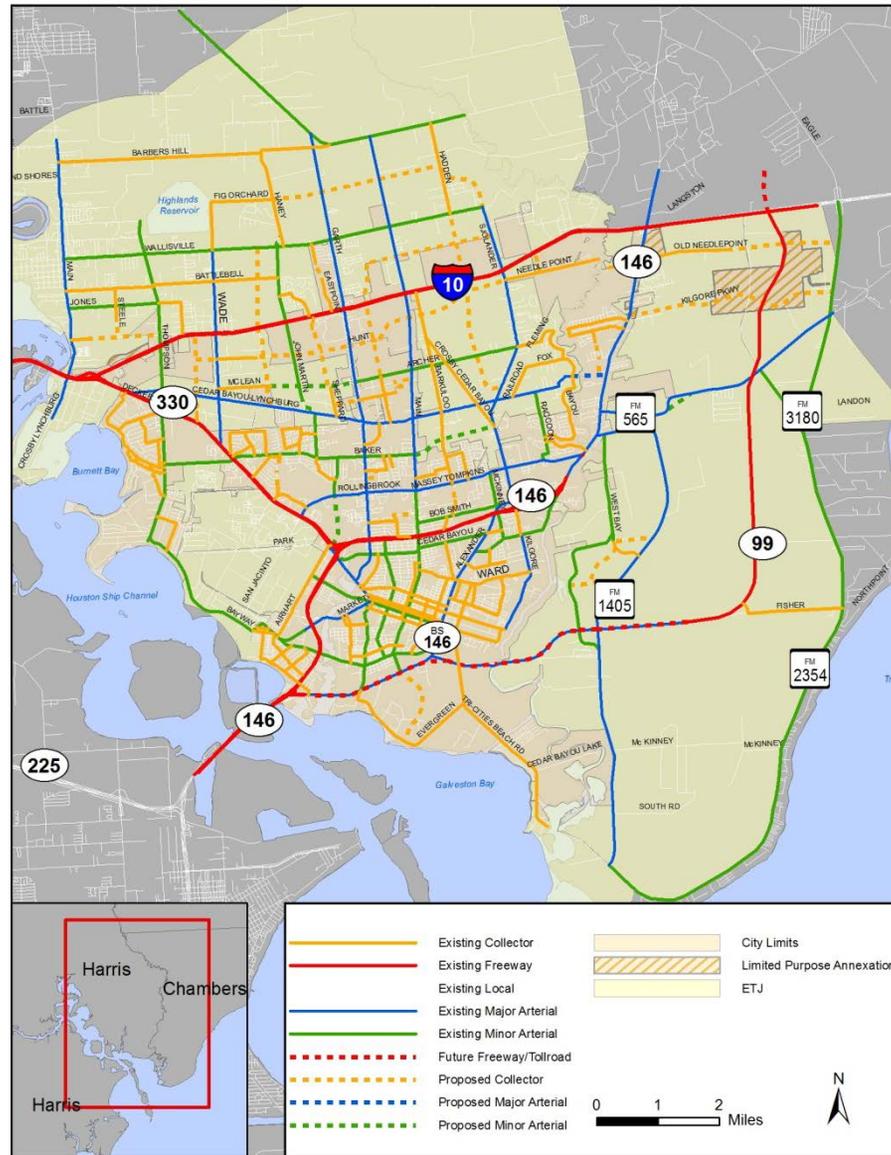
A Thoroughfare Plan is not:

- ✓ A list of specific construction projects.
- ✓ A document with the level of technical analysis found in a detailed, communitywide transportation study.
- ✓ Intended to indicate immediate need.
- ✓ Some of the arterial and collector streets identified on the Thoroughfare Plan, particularly in the outlying portions of the City's ETJ, will likely not be needed or constructed within the next 20, 30, 40, or even 50 years.
- ✓ A commitment to build a specific project in a particular location or in a given time frame.

Source: Baytown 2025 Comprehensive Plan



Exhibit 9-1. Proposed Thoroughfare Plan



NOTE: 2007 Thoroughfare Plan as updated by Baytown Mobility Plan.



9.3 Functional Classification

The functional classification system is a hierarchical organization used to describe the function of a roadway relative to the mobility and access to adjacent properties. Freeways and arterial facilities provide high mobility, while collectors and local roads provide higher access to adjacent property. **Table 9-1** provides a summary of the urban functional classifications (FHWA, 1989). Functional classification is based on the usage of the roadway, not the number of travel lanes.

Table 9-1 Urban Functional Classifications

Functional Classification	Primary Purpose	Typical Spacing (miles)
Major Arterials	Longer distance trips; main routes into the city	1 to 5
Minor Arterials	Moderate distance trips; connect to principal arterials	< 0.5 to 2
Collector	Equal service to access and mobility; connects neighborhoods to arterial system	0.25 to 0.5
Local Street	Access to adjacent property	NA

FHWA Functional Classification Guidelines, 1989

9.3.1 Major Arterials

Major arterials provide rapid and efficient movement of large volumes of traffic between regions or within a city. These facilities range from controlled-access facilities, such as IH 10 and Spur 330, to major city streets, such as Garth Road and Alexander Drive. Major arterials typically provide the main corridors into a community, provide connections to commercial and industrial areas, and serve as truck routes. Speed limits are generally high (45 mph or greater) and are continuous over long distances. Since the focus is on traffic movement, driveway spacing may be regulated by ordinance or by roadway design, as is the case for freeways. Major arterials in developing or fringe areas of the city may be two lanes, while the commercial corridors are more likely to be 4 or more lanes.

9.3.2 Minor Arterials

Similar to major arterials, minor arterials typically serve shorter trips and moderate traffic volumes, while providing slightly more access to adjacent properties. They provide the connection between the major arterials and the collectors with speed limits in the range of 30 mph to 45 mph. Minor

arterials serve as corridors for moving traffic between major arterials, such as Wade Road or John Martin Road between IH 10 and Spur 330.

9.3.3 Collectors

Collector streets provide an equal balance between property access and traffic movement. These streets funnel traffic from local streets in a neighborhood to minor or major arterials. Compared to arterials, the traffic volumes and speed limits are lower, generally in the 30 mph to 35 mph range. Collectors serve an essential role in collecting and distributing traffic between the arterials and local streets. Therefore, it is critical to identify future locations early so that future developments consider circulation within and between both neighborhoods and commercial/industrial areas.

9.3.4 Local Streets

The primary function of local streets is to provide access to the abutting property and to funnel traffic to and from collectors. Traffic volumes are low, trips are short and speeds are low, typically 20 mph to 30 mph. Local streets include all roadways not otherwise classified. Local streets usually total 65 to 85 percent of the total roadway system within in a city or region.

9.4 Typical Roadway Sections

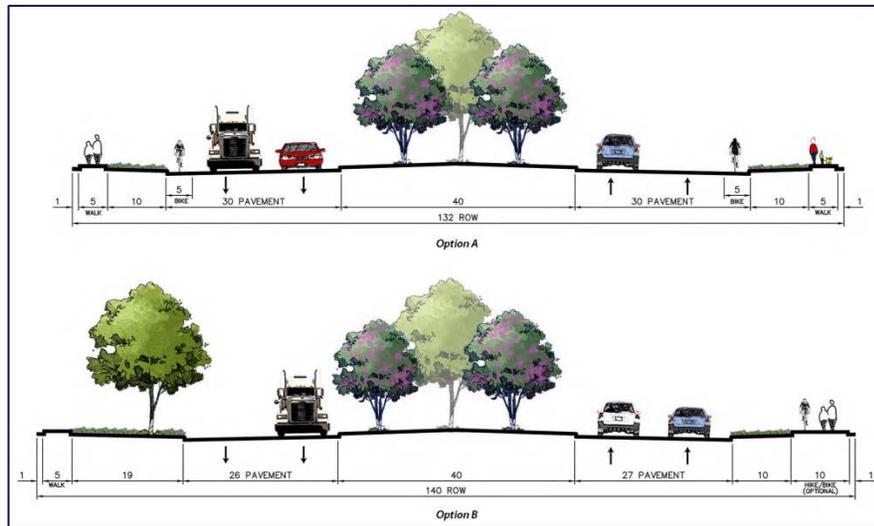
Typical roadway sections were developed for each functional classification to provide a description of the ROW width, number of lanes, and type and location of facilities for pedestrians and bicyclists. The typical sections are based on the following variables: available ROW, necessary roadway capacity, sidewalk configuration, and adequate space for utilities and landscaping. The typical sections include 10 feet for a utility corridor between the curb and sidewalk. Where landscaping with trees is proposed, the width between the curb and sidewalk has been increased to 19 feet to minimize damage to tree roots when access to utilities is needed for maintenance or repairs.

Design parameters for roadways in new developments are typically negotiated with the City of Baytown during the platting process and are contingent on adjacent existing or planned land use. Each functional classification has options for final design that depend upon the requirements for sidewalks and bicyclists that are in effect at the time of platting. Conceptual cost estimates for the typical sections are provided in **Appendix E**.

9.4.1 Major Arterials

ROW for major arterials are recommended to be 140 feet. The wide median provides room for left-turn storage bays at intersections and ample room for passenger vehicles and trucks to make u-turns at breaks in the median. The typical sections shown in **Figure 9-2** provide 4 travel lanes with options for sidewalks on both sides or one sidewalk and one multi-use path. Sidewalks are recommended in residential and most commercial areas, depending upon the specific type of land use (e.g., retail or office). Most industrial areas of the city would not need sidewalks. Option B provides a wide outside lane for bicyclists that may choose to ride in the street instead of the multi-use path.

Figure 9-2 Major Arterials – Options A and B



Source: TBG Partners, 2012

Major Arterial, Option A

- 140-foot ROW
- Four 12-foot travel lanes plus two 1-foot median curbs
- 30-foot median
- Two 5-foot bike lanes (includes one foot for outside curb)
- Two 19-foot buffers for utilities and landscaping
- If landscaping is not proposed, the utility buffer may be 10 feet
- Two 5-foot sidewalks
- Two 1-foot outside curb and gutter

Major Arterial, Option B

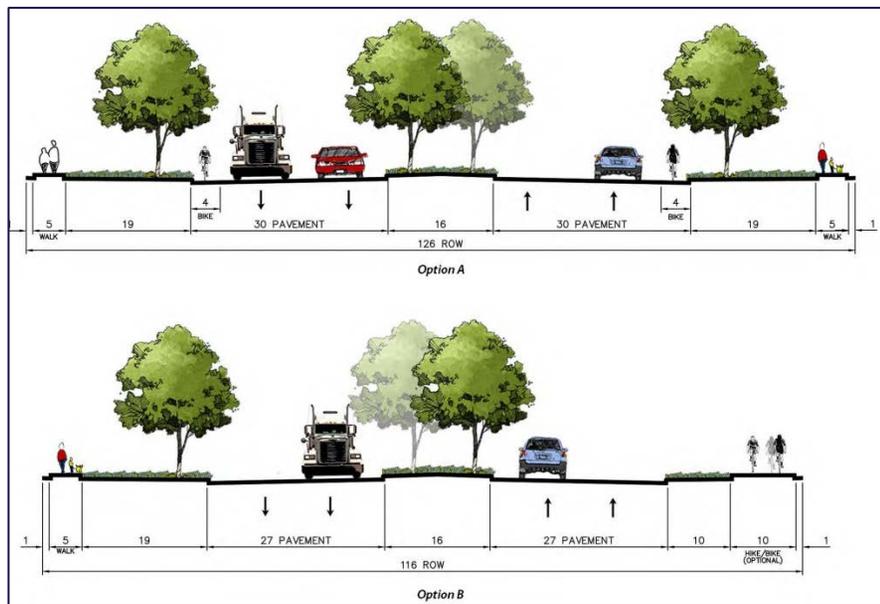
- 140-foot ROW
- Four travel lanes (two 12-foot inside and two 13.5-foot outside) plus 3 feet (total) for curbs
- 40-foot median
- One 5-foot sidewalk
- One 10-foot multi-use path
- One 19 foot buffer for utilities and landscaping
- One 10 foot utility buffer
- Two 1-foot outside curb and gutter



9.4.2 Minor Arterials

ROW width for minor arterials is recommended to be 126 feet (maximum). Sidewalks are recommended in residential and most commercial areas, depending upon the specific type of land use (e.g., retail or office). Most industrial areas in Baytown would not need sidewalks. The typical sections for minor arterials are shown for four lanes of traffic. Option B provides a wide outside lane for bicyclists that may choose to ride in the street instead of the multi-use path. For those existing 2-lane minor arterials located along the fringe areas of Baytown, the ultimate configuration should be used for ROW acquisition to allow for future expansion to four lanes. There are two options for minor arterials provided in **Figure 9-3**.

Figure 9-3 Minor Arterials – Options A and B



Source: TBG Partners, 2012

Minor Arterial, Option A

- 126-foot ROW
- Four 12-foot travel lanes plus two 1-foot median curbs
- 16-foot median
- Two 5-foot bike lanes (includes one foot for outside curb)
- Two 19-foot buffers for utilities and landscaping
- Two 5-foot sidewalks
- Two 1-foot outside curb and gutter

Minor Arterial, Option B

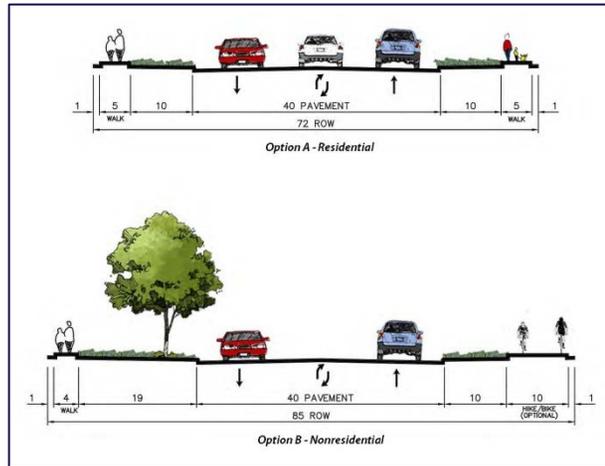
- 116-foot ROW
- Four travel lanes (two 12-foot inside and two 13.5-foot outside) plus 3 feet (total) for curbs
- 16-foot median
- One 5-foot sidewalk
- One 10-foot multi-use path
- One 19-foot buffer utilities and landscaping
- One 10-foot buffer for utilities
- Two 1-foot outside curb and gutter

9.4.3 Collectors

ROW width for collectors is recommended to be 72 feet for residential neighborhoods and 85 feet minimum to 96 feet maximum for non-residential areas depending on the median, accommodations for pedestrians and bicyclists, as well as space required for utilities as shown in **Figures 9-4** and **9-5**. Since collectors are needed in residential, commercial and industrial areas, there are six options offered for consideration.

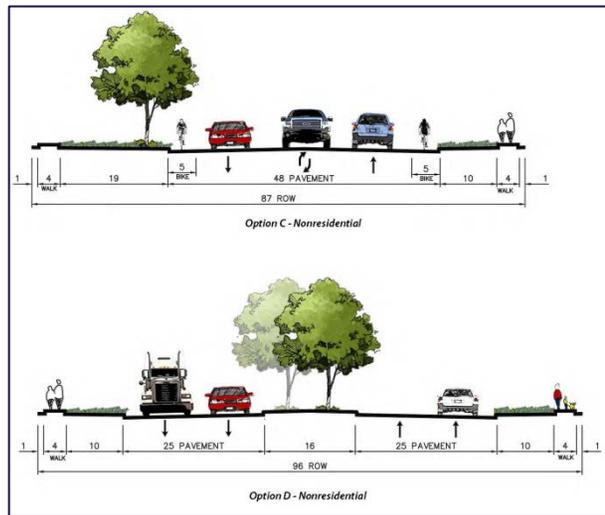
Sidewalks are recommended in residential and most commercial areas, depending upon the specific type of land use (e.g., retail or office). Most industrial areas of the city would not need sidewalks. Sidewalks less than five feet wide require 60"x60" passing pads every 200 feet to meet ADA requirements.

Figure 9-4 Collector Streets – Options A and B



Source: TBG Partners, 2012

Figure 9-5 Collector Streets – Options C and D



Source: TBG Partners, 2012

Collector, Option A - Residential

- 72-foot ROW
- Two 12-foot travel lanes plus 2 feet (total) for curbs
- One 14-foot TWLTL
- Two 4-foot sidewalks
- Two 10-foot utility buffers
- Two 1-foot outside curb and gutter

Collector, Option B - Nonresidential

- 85-foot ROW
- Two 12-foot travel lanes plus 2 feet (total) for curbs
- One 14-foot TWLTL
- One 4-foot sidewalk
- One 10-foot multi-use path
- One 10-foot utility buffer
- one 19-foot utility and landscaping buffer
- Two 1-foot outside curb and gutter

Collector, Option C - Nonresidential

- 87-foot ROW
- Two 12-foot travel lanes
- One 14-foot TWLTL
- Two 5-foot bike lanes (includes one foot for outside curb)
- Two 4-foot sidewalks
- One 10-foot utility buffer
- One 19-foot utility and landscaping buffer
- Two 1-foot outside curb and gutter

Collector, Option D - Nonresidential

- 96-foot ROW
- Four 12-foot travel lanes plus two 1-foot median curbs
- 16-foot median
- Two 4-foot sidewalks
- Two 10-foot utility buffers for
- Two 1-foot outside curb and gutter

9.4.4 Local Streets

ROW width for local streets is 75 feet minimum as shown in **Figure 9-6**.

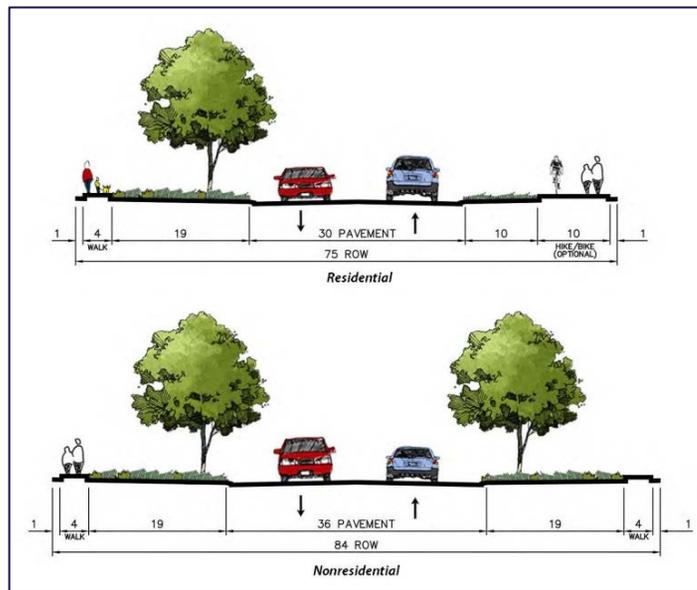
Residential, Option A

- 75-foot ROW
- Two 14-foot travel lanes plus 2-foot (total) for curbs
- One 4-foot sidewalk
- One 10-foot multi-use path
- One 10-foot utility buffer
- One 19-foot utility and landscaping buffer
- Two 1-foot outside curb and gutter

Residential, Option B

- 84-foot ROW
- Two 17-foot travel lanes plus 2 feet (total) for curbs
- Two 4-foot sidewalks
- Two 19-foot utility and landscaping buffers
- Two 1-foot outside curb and gutter

Figure 9-6 Local Streets



Source: TBG Partners, 2012

9.5 Proposed Projects Listing

The Thoroughfare Plan provides the framework for the ultimate roadway network for Baytown and the ETJ. It will take many years to make all of the improvements included on the map. Individual projects may be funded and built by the city, the county, TxDOT, or developers as land adjacent to a roadway is improved or redeveloped.

Based on the Thoroughfare Plan provided in **Figure 9-1**, a list of proposed roadway projects is provided in **Tables 9-2, 9-3, and 9-4** to identify improvements anticipated over the next 25 years or more.

To anticipate the funding needs, projects have been placed into one of three timeframes:

- **Near-term:** Projects that will be constructed by 2016
- **Mid-term:** Projects that are proposed for 2017 to 2025
- **Long-term:** Projects that are proposed for 2026 and beyond

Table Notes:

- Projects are arranged alphabetically by roadway name.
- Jurisdiction refers to the facility owner.
- Sponsor refers to the entity responsible for implementing the proposed project.
- RTP Status indicates when federally-funded and regionally-significant local projects are anticipated to move to construction, such as:
 - **TIP 2013, 2014, 2015, or 2016.**
 - **RTP 2020, 2025, 2030, or 2035** – the timeframe identified in a financially-constrained regional planning effort in which funding will be available.
 - **Unfunded** – previously identified projects that have been removed from the financially-constrained RTP due to funding shortage.
 - **Environmental** – the list of projects undergoing environmental evaluation, but not necessarily with construction funds identified.



This is a list of possible projects developed from travel demand models and current programs of work for Baytown, Harris County, Chambers County and the 2035 Regional Transportation Plan from H-GAC. The project list reflects April 2012 TIP amendments.

Table 9-2. Near-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Length (mile)	Preliminary Construction Cost*	Potential Developer Participation
Archer Road	Garth Road to Main Street	Widen to 4 lanes with median	Harris County	Un-sponsored	2007 TPlan	None	Minor Arterial 2	Minor Arterial Divided 4	Minor Arterial Divided 4	0.9	\$5,380,000^	
Archer Road	Main Street to Sjolander Road	Widen to 4 lanes with median	Harris County	Un-sponsored	2007 TPlan	None	Minor Arterial 2	Minor Arterial Divided 4	Minor Arterial Divided 4	1.8	\$10,775,000^	
Archer Road	John Martin Road to Garth Road	Construct 2-lane roadway on new location and reconstruct McLean	Harris County	Un-sponsored	2007 TPlan	None	N/A	Minor Arterial 2	Minor Arterial 2	0.9	\$5,388,000	
Baker Road	N. Main Street to Sjolander Road	Construct 4 lanes with TWLTL, curb and gutter and storm sewer	Baytown	City of Baytown	2013-2016 TIP	TIP 2013	N/A	Minor Arterial, Divided 4	Minor Arterial, Divided 4	1.4	\$8,935,540	
E. Cedar Bayou-Lynchburg Road	N. Main Street to Sjolander Road	Widen to 4 lanes with TWLTL	Baytown	City of Baytown	2013-2016 TIP	TIP 2013	Collector 2	Major Arterial, Divided 4	Major Arterial, Divided 4	1.5	\$6,307,440	
W. Cedar Bayou-Lynchburg Road	Bush Road to Decker Drive/ Spur 330	Widen to 4 lanes with TWLTL	Baytown	City of Baytown	2013-2016 TIP	TIP 2014	Minor Arterial 2	Major Arterial, Divided 4	Major Arterial, Divided 4	3.0	\$20,172,855	
W. Cedar Bayou-Lynchburg Road	Garth Road to Bush Road	Widen to 4 lanes with TWLTL	Baytown	City of Baytown	2013-2016 TIP	TIP 2014	Minor Arterial 2	Major Arterial, Divided 4	Major Arterial, Divided 4	0.8	\$5,379,427	
FM 565	0.305 mi W. of FM 2354 to 0.018 mi E. of FM 1405	Realign roadway	TxDOT Beaumont District	TxDOT Beaumont District	2013-2016 TIP	TIP 2013	Collector 2	Collector 4	Collector 4	1.9	\$6,763,226	
Garth Road	At IH 10	Improve intersection geometry at EB frontage road	Baytown	Un-sponsored	City	None	Major Arterial Divided 4	Major Arterial Divided 4	Major Arterial, Divided 4	0.1	\$300,000	



Table 9-2. Near-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Length (mile)	Preliminary Construction Cost*	Potential Developer Participation
Garth Road	From SH 146 to IH 10	Improve signal coordination	Baytown	Un-sponsored	BMP	None	Major Arterial Divided 4	Major Arterial Divided 4	Major Arterial Divided 4	3.7	\$375,000	
Garth Road	At Baker Road	Widen and redesign of Garth Road and Baker Road area	Baytown	City of Baytown	2013-2016 TIP	TIP 2012	Major Arterial, Divided 4	Major Arterial, Divided 4	Major Arterial, Divided 4	0.1	\$5,000,000	
Hunt Road West Extension	John Martin Road to West of Garth Road	Construct 3-lane roadway on new location	Baytown	City of Baytown	2007 TPlan	None	N/A	Collector 2	Collector 2	0.9	\$5,081,000	
IH 10 East	Spur 330 to Chambers County Line	Install Traffic Management Technology	TxDOT Houston District	TxDOT Houston District	HGAC TIP	TIP 2014	Freeway 6	Freeway 6	Freeway 6	8.8	\$2,585,889	
IH 10 East	From Thompson Road to Garth Road	Install wayfinding signs for westbound traffic going to Spur 330 via Thompson Road	TxDOT Houston District	Un-sponsored	BMP	None	Freeway 6	Freeway 6	Freeway 6	3.1	\$75,000	
John Martin Road	IH 10 to W. Cedar Bayou-Lynchburg Road	Widen from 2 lanes to 4 lanes with TWLTL, realign intersection at Bush Road	Harris Co / Baytown	City of Baytown	2013-2016 TIP	TIP 2013	Minor Arterial 2	Minor Arterial 4	Minor Arterial 4	1.5	\$11,278,000	
John Martin Road	At W. Cedar Bayou-Lynchburg Road	Realign John Martin to intersect W. Cedar Bayou-Lynchburg at Bush Rd.	Baytown	Un-sponsored	City	Environmental Assessment	Minor Arterial 2	Minor Arterial 2	Minor Arterial 2	0.4	\$2,650,000	
Kilgore Parkway	Needlepoint Road to 1,500 ft E of SH 99	Construct new location roadway	Chambers County	Developer	CC TP 2010	None	N/A	Collector 2	Collector 4	0.6	\$2,750,000	✓
N. Main Street	From SH 146 to IH 10	Improve signal coordination	Baytown	Un-sponsored	BMP	None	Major Arterial 4, Divided	Major Arterial 4, Divided	Major Arterial 4, Divided	3.9	\$125,000	
S. Main Street Extension	BS 146E/SH 99 to Evergreen Road	Construct 2 lane roadway	Baytown	Un-sponsored	BMP	None	N/A	N/A	Collector 2	1.2	\$1,430,000	
SH 146	W. Texas Avenue to Missouri Street	Base repair and asphaltic concrete pavement overlay	TxDOT Houston District	TxDOT Houston District	HGAC TIP	TIP 2014	Freeway 6	Freeway 6	Freeway 6	2.0	\$300,000	
SH 146	At Spur 330	Construct direct connector ramp C (EB to NB)	TxDOT Houston District	TxDOT Houston District	UTP Revision	Funded TTC June 28, 2012	Freeway 6	Freeway 6	Freeway 6	0.2	\$10,368,000	



Table 9-2. Near-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Length (mile)	Preliminary Construction Cost*	Potential Developer Participation
SH 99	Harris C/L to FM 1405	Grand Parkway Segment I-2: Widen to 4-lane tollway with 2-lane frontage roads and interchanges	TxDOT Beaumont District	TxDOT Beaumont District	2013-2016 TIP	TIP 2013	Major Arterial 2	Tollway 4	Tollway 4	1.5	\$60,200,000	
SH 99	At Fisher Road	Grand Parkway Segment I-2: Construct interchange	TxDOT Beaumont District	TxDOT Beaumont District	2013-2016 TIP	TIP 2013	Major Arterial 2	Tollway 4	Tollway 4	0.5	\$23,500,000	
SH 99	BS 146E to Chambers County Line	Grand Parkway Segment I-2: Widen to 4-lane tollway with 2-lane frontage roads and interchanges	TxDOT Houston District	TxDOT Houston District	2013-2016 TIP	TIP 2013	Major Arterial 2	Tollway 4	Tollway 4	1.1	\$30,700,000	
Sjolander Road	E. Wallisville to 0.4 mi N of IH 10	Widen 2-lane roadway to 4 lanes with median	Harris County	Un-sponsored	BMP	None	Major Arterial 2	Major Arterial 2	Major Arterial 4	0.6	\$3,932,000	
Sjolander Road	0.4 mi N of IH 10 to 0.4 mi S of IH 10	Widen 2-lane roadway to 4 lanes with median	Harris County/ TxDOT/City	Un-sponsored	BMP	None	Major Arterial 2	Major Arterial 4	Major Arterial 4	0.8	\$5,200,000	
Sjolander Road	0.4 mi S of IH 10 to Crosby Cedar Bayou	Widen 2-lane roadway to 4 lanes with median	Harris County	Un-sponsored	BMP	None	Major Arterial 2	Major Arterial 4	Major Arterial 4	2.3	\$15,037,000	
Spur 330	Crosby Lynchburg Road to Bayway Drive	Resurfacing	TxDOT Houston District	TxDOT Houston District	2013-2016 TIP	TIP 2013	Freeway 4	Freeway 4	Freeway 4	1.5	\$2,800,000	
E. Wallisville Road	From N. Main Street to Garth Road	Widen from 2 lanes to 4 lanes with TWLTL	Harris County	Harris County w/Baytown participation in ROW	County	NA	Minor Arterial 2	Minor Arterial, Divided 4	Minor Arterial, Divided 4	1.0	\$4,000,000	

Notes:

City of Baytown 2007 Bond Program – 2007 TFare and City Chambers County Thoroughfare Plan – CC TP 2010
H-GAC Transportation Improvement Program – HGAC TIP
Texas Department of Transportation – TxDOT

Harris County Precinct 2 – County
H-GAC Regional Transportation Plan – HGAC RTP
H-GAC List of Unfunded Projects –HGAC Unfunded
Baytown Mobility Plan analysis – BMP

*Cost information provided from project source document (e.g., TIP, HGAC RTP, etc.)

^ Includes 2-5 bike lanes and two 5 foot sidewalks.



This is a list of possible projects developed from travel demand models and current programs of work for Baytown, Harris County, Chambers County and the 2035 Regional Transportation Plan from H-GAC.

Table 9-3. Mid-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Potential Developer Participation
4 Intersection Improvements	IH 10 at N. Main Street; Garth Road and E. Wallisville Road; FM 1942 at N. Main Street and N. Main Street at Wallisville Road	Intersection improvements	Baytown/Harris County	Un-sponsored	County	Environmental Assessment	Varied	Varied	Varied	
Barbers Hill	N Main St/Crosby-Lynchburg to FM 1942	Widen from 2 lanes to 4 lanes with median	Harris County	Un-sponsored	2007 TPlan	None	Collector 2	Collector 2	Collector 2	
Baytown Central Blvd	At Garth Road	Realign Baytown Central Blvd to match Manor Road at Garth Road	Baytown	Un-sponsored	2007 TPlan	None	Local 2	Collector 2	Collector 2	
E. Cedar Bayou-Lynchburg	Sjolander Road to Raccoon Drive	Widen from 2 lanes to 4 lanes with median	Harris County	Un-sponsored	2007 TPlan	None	Major Art 2	Major Arterial, Divided 4	Major Arterial, Divided 4	
E. Cedar Bayou-Lynchburg Road	Raccoon to SH 146	Widen from 2 lanes to 4 lanes with median	Baytown/Harris Co	Un-sponsored	2007 TPlan	None	Major Art 2	Major Arterial, Divided 4	Major Arterial, Divided 4	
Collector 2	Birdsong Street to Garth Road north of Victoria Plaza	Construct 2 lane collector	Baytown	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	✓
Crosby Cedar Bayou Road	Massey-Tompkins Road to SH 146	Widen 2-lane roadway to 3 lanes	Baytown	Un-sponsored	2007 TPlan	None	Major Arterial 2	Major Arterial 2	Major Arterial 2	
Crosby-Lynchburg Road	Barbers Hill Road to IH 10	SMART Street Improvements	Harris County	Un-sponsored	2007 TPlan	Unfunded	Minor Arterial 2, Minor Arterial 4	Major Arterial, Divided 4	Major Arterial, Divided 4	



Table 9-3. Mid-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Potential Developer Participation
Evergreen Road/Lee Drive	Lee Drive at BU 146/SH 99 to 0.56 mi. S. of Bay Hill Drive	Construct 2 lane collector	Baytown	Un-sponsored	BMP	Unfunded	Local 2/ Collector 2	Collector 2	Collector 4	✓
Garth Road	From Archer Road to Baker Raod	Convert to raised median	Baytown	Un-sponsored	BMP	None	Major Arterial Divided 4	Major Arterial Divided 4	Major Arterial Divided 4	
Garth Road	From Baker Road to Rolingbrook Drive	Convert to raised median	Baytown	Un-sponsored	BMP	None	Major Arterial Divided 4	Major Arterial Divided 4	Major Arterial Divided 4	
Haney Road	At E. Wallisville Road	Realign Haney Road to meet John Martin Road	Harris County	Un-sponsored	2007 TPlan	None	Local 2	Collector 2	Collector 2	
Kilgore Parkway	SH 146 to FM 2354 (Needlepoint Road)	Construct 4-lane roadway on new location	Chambers County	Un-sponsored	CC TP 2010	Unfunded	N/A	Collector 2	Collector 4	✓
Kilgore Parkway	From 1500 ft. E of SH 99 to FM 3180	Construct 4-lane roadway on new location	Chambers County	Un-sponsored	CC TP 2010	Unfunded	N/A	Collector 2	Collector 4	
N. Main Street	IH 10 to E. Wallisville Road	Widen from 2 lanes to 4 lanes with median	Harris County	Un-sponsored	BMP	None	Minor Arterial 2	Major Arterial, Divided 4	Major Arterial, Divided 4	
N. Main Street	From Archer Road to Baker Raod	Convert to raised median	Baytown	Un-sponsored	BMP	None	Major Arterial 4, Divided	Major Arterial 4, Divided	Major Arterial 4, Divided	
N. Main Street	From Baker Road to Rolingbrook Drive	Convert to raised median	Baytown	Un-sponsored	BMP	None	Major Arterial 4, Divided	Major Arterial 4, Divided	Major Arterial 4, Divided	
S. Main Street Extension/ Wisner Road	S. Alexander to BS 146E/SH 99	Widen to 4 lanes	Baytown	Un-sponsored	BMP	None	Collector 2	Collector 4	Collector 4	
North Road	From end of North Road, approx. 900 ft east of East Road to N. Main Street	Construct 2 lane collector	Baytown	Un-sponsored	BMP	None	N/A	Collector 2	Collector 2	✓
SH 146	BS 146E to Ferry Road	Construct main lanes and interchange	TxDOT Houston District	City of Baytown	HGAC RTP	RTP 2020 and Environmental Assessment	Major Arterial 4	Freeway 4	Freeway 4	



Table 9-3. Mid-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Potential Developer Participation
Spur 330	At IH 10	Construction NB to EB connector	TxDOT	Un-sponsored	BMP	None	Freeway 4	Freeway 4	Freeway 4	
Texas Avenue	Gaillard Street to Ashbel Street	Pedestrian/Streetscape	Baytown	Un-sponsored	City	None	Collector 2	Collector 2	Collector 2	
Texas Avenue	Ashbel Street to Commerce Street	Pedestrian/Streetscape	Baytown	Un-sponsored	City	None	Collector 2	Collector 2	Collector 2	
Thompson Road	E. Wallisville Road to Ellis School Road	Widen from 2 lanes to 4 lanes with median	Baytown/Harris Co	Un-sponsored	BMP	None	Minor Arterial 2	Minor Arterial 4	Minor Arterial 4	
Wade Road	IH 10 to Spur 330	Widen from 2 lanes to 4 lanes with median	Baytown/Harris Co	Un-sponsored	BMP	None	Major Arterial 2	Major Arterial 2	Major Arterial, Divided 4	

Notes:

City of Baytown 2007 Bond Program – 2007 Tfare and City Chambers County Thoroughfare Plan – CC TP 2010
H-GAC Transportation Improvement Program – HGAC TIP
Texas Department of Transportation – TxDOT

Harris County Precinct 2 – County
H-GAC Regional Transportation Plan – HGAC RTP
H-GAC List of Unfunded Projects –HGAC Unfunded
Baytown Mobility Plan analysis – BMP



This is a list of possible projects developed from travel demand models and current programs of work for Baytown, Harris County, Chambers County and the 2035 Regional Transportation Plan from H-GAC.

Table 9-4. Long-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Potential Developer Participation
Barbers Hill/ FM 1942	Garth Road to SH 146	Widen from 2 lanes to 4 lanes with median	TxDOT	Un-sponsored	2007 TPlan	None	Minor Arterial 2	Minor Arterial, Divided 4	Minor Arterial, Divided 4	
Barkaloo Road	Crosby Cedar Bayou Road to Massey--Tompkins Road	Widen existing 2-lane roadway to 3-lane collector	Harris Co/ Baytown	Un-sponsored	2007 TPlan	None	Collector 2	Collector 2	Collector 2	
Battlebell Road	Crosby-Lynchburg Road to John Martin Road	Reconstruct to 2 lane local to 2 lane collector, construct bridge over drainage channel east of Wade Road	Harris County	Un-sponsored	2007 TPlan	None	Collector 2	Collector 2	Collector 2	✓ (partial)
Beaumont Road	Cedar Bayou Road to Ward Road	Widen existing 2-lane roadway to 3-lane collector	Baytown	Un-sponsored	2007 TPlan	None	Collector 2	Collector 2	Collector 2	
BS 146	SH 99 to SH 146	Smart Street Improvements	Baytown	Un-sponsored	HGAC RTP	Unfunded	Major Arterial 6	Major Arterial 6	Major Arterial 6	
Chambers County EW 4	From West Bay to FM 1405	Construct 2-lane collector	Chambers County	Un-sponsored	BMP	None	N/A	Collector 4	Collector 4	✓
Collector 1A	IH 10 north (east of Preston Place) then east, to N. Main Street (north of Brae Meadows)	Construct 2 lane collector	Harris Co / Baytown	Un-sponsored	BMP	None	N/A	N/A	Collector 2	✓
Collector 1B	From Collector 1A at N. Main Street to Sjolander Road	Construct 2 lane collector	Harris County	Un-sponsored	2007 TPlan	None	N/A	N/A	Collector 2	✓
Collector 3	IH 10 to Needlepoint Road	Construct 4-lane roadway on new location	Baytown	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	✓
Collector 4 (Chambers County)	IH 10 to FM 565, east of SH 146	Construct 4 lane collector	Chambers County	Un-sponsored	RTP Model	None	N/A	Collector 2	Collector 2	✓



Table 9-4. Long-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Potential Developer Participation
Collector 6 (Chambers County)	EW 4 to FM 1405	Construct 2-lane collector	Chambers County	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	✓
Collector 8 (Chambers County)	West Bay to Collector 6	Construct 2-lane collector	Chambers County	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	✓
Crosby Cedar Bayou Road	Barkaloo Road to Sjolander Road	Widen from 2 lanes to 3 lanes	Harris County	Un-sponsored	2007 TPlan	None	Major Arterial 2	Major Arterial 2	Major Arterial, Divided 4	
Crosby Cedar Bayou Road	Sjolander Road to Massey-Tompkins Road	Widen 2-lane roadway to 4 lanes with median	Baytown	Un-sponsored	2007 TPlan	None	Major Arterial 2	Major Arterial 2	Major Arterial 4	
East Road North Extension	IH 10 to W. Archer Road	Construct 3-lane roadway on new location	Harris Co / Baytown	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	✓
Eastpoint Blvd	Shale Drive to Eastpoint stub-out N. of Seabird Street	Construct 2 lane collector	Baytown	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	✓
Ellis School Road	Crosby-Lynchburg Road to Thompson Road	Construct 2 lane collector	Harris County	Un-sponsored	2007 TPlan	None	Collector 2 for 1500 ft, then new location	Collector 2	Collector 2	✓
Emmett Hutto Blvd. South Extension	Rollingbrook Street to Decker Drive	Construct 4-lane roadway on new location	Baytown	Un-sponsored	2007 TPlan	None	N/A	Minor Arterial, Divided 4	Minor Arterial, Divided 4	
Fig Orchard Road	Wade Road to Haney Road	Widen 2-lane roadway to 3-lane roadway	Harris Co	Un-sponsored	2007 TPlan	None	Local 2	Collector 2	Collector 2	
Fig Orchard Road Extension	Haney Road to Hadden Road	Construct 3-lane roadway on new location	Harris Co	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	
FM 1405	SH 146 to FM 565	Widen 2 lanes to 4 lanes, divided	TxDOT Beaumont District	Un-sponsored	2007 TPlan	None	Major Arterial 2	Major Arterial 2	Major Arterial, Divided 4	
FM 1405	FM 565 to SH 99	Widen 2 lanes to 4 lanes, divided	TxDOT Beaumont District	Un-sponsored	2007 TPlan	None	Major Arterial 2	Major Arterial 2	Major Arterial, Divided 4	
FM 1405	SH 99 to FM 2354	Widen 2 lanes to 4 lanes, divided	TxDOT Beaumont	Un-sponsored	2007 TPlan	None	Major Arterial 2	Major Arterial 2	Major Arterial, Divided 4	



Table 9-4. Long-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Potential Developer Participation
			District							
FM 1942	Bohemian Hill Road to Barbers Hill Road	Widen from 2 lanes to 4 lanes w/bridges	TxDOT Houston District	Un-sponsored	HGAC RTP	Unfunded	Collector 2	Minor Arterial 2	Minor Arterial 4	
FM 2354	SH 99 to Fisher Road	Widen from 2 to 4 lanes	TxDOT Beaumont District	Un-sponsored	2007 TPlan	None	Collector 2	Minor Arterial 2	Minor Arterial 4	
FM 2354	Fisher Road to FM 1405	Widen from 2 to 4 lanes	TxDOT Beaumont District	Un-sponsored	2007 TPlan	None	Collector 2	Minor Arterial 2	Minor Arterial 4	
FM 3180	IH 10 to FM 565, east of SH 146	Widen from 2 to 4 lanes	TxDOT Beaumont District	Un-sponsored	2007 TPlan	None	Collector 2	Minor Arterial 2	Minor Arterial 4	
FM 565	SH 146 to FM 3180	Widen from 2 lanes to 4 lanes with median	TxDOT Beaumont District	Un-sponsored	CC TP 2010	None	Collector 2	Collector 4	Collector 4	
Frank Road Extension North	IH 10 to E. Wallisville Road	Construct 3 lane collector	Harris County	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	✓
Frank Road Extension South	IH 10 to W. Cedar Bayou-Lynchburg Road	Construct 3 lane collector	Harris Co / Baytown	Un-sponsored	2007 TPlan	None	Local 2 and New Alignment	Collector 2	Collector 2	✓
Garth Road	Barbers Hill Road/ FM 1942 to E. Wallisville Road	Widen from 2 lanes to 4 lanes w/bridges	Baytown	Un-sponsored	HGAC RTP	Unfunded	Minor Arterial 2	Minor Arterial, Divided 4	Minor Arterial, Divided 4	
Garth Road	From IH 10 to Archer Road	Convert to raised median	Baytown	Un-sponsored	BMP	None	Major Arterial Divided 4	Major Arterial Divided 4	Major Arterial Divided 4	
Hadden Road	FM 1942 to E. Wallisville Road	Widen existing 2-lane local roadway to 3-lane collector	Harris County	Un-sponsored	2007 TPlan	None	Local 2	Collector 2	Collector 2	✓
Hadden Road Extension	E. Wallisville Road to IH 10	Construct 3-lane collector	Harris County	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	✓
Hadden Road Extension	IH 10 to E. Archer Road	Construct 3-lane collector	Harris County	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	✓



Table 9-4. Long-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Potential Developer Participation
Hadden Road Extension	E. Archer Road to Sjolander Road via Sylvan Lane	Construct 3-lane collector	Harris County	Un-sponsored	BMP	None	N/A	Collector 2	Collector 2	✓
Haney Road	Fig Orchard Road to E. Wallisville Road	Widen from 2 lanes to 4 lanes with median	Harris County	Un-sponsored	2007 TPlan	None	Local 2	Collector 2	Collector 2	
Hunt Road East Extension	Garth Road to N. Main Street	Construct 3-lane roadway on new location and widen existing 2-lane roadway	Baytown/ Harris Co	City of Baytown	2007 TPlan	None	Collector & New Alignment	Collector 2	Collector 2	
Hunt Road East Extension	N. Main Street to Sjolander Road	Construct 3-lane roadway on new location	Harris County	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	
IH 10 East	Spur 330 to Chambers County Line	Install Traffic Management Technology	TxDOT Houston District	Un-sponsored	RTP	Unfunded	Freeway 6	Freeway 6	Freeway 6	
John Martin Road	E. Wallisville Road to Battlebell Road	Widen from 2 lanes to 2 lanes with median	Harris Co / Baytown	Un-sponsored	2007 TPlan	None	Minor Arterial 2	Minor Arterial 2	Minor Arterial 2	
John Martin Road	Battlebell Road to IH 10	Widen from 2 lanes to 4 lanes	Harris Co / Baytown	Un-sponsored	BMP	None	Minor Arterial 2	Minor Arterial 4	Minor Arterial 4	
Jones Road	Crosby-Lynchburg Road to Thompson Road	Widen to 4 lanes	Harris County	Un-sponsored	BMP	None	Minor Arterial 2	Minor Arterial 4	Minor Arterial 4	
Little Road Extension	IH 10 to Reddell Road	Construct 3-lane roadway on new location	Baytown/ Harris Co	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	
Morelos Road East Extension	End of Morelos Road to John Martin Road	Construct 3-lane roadway on new location	Baytown/ Harris Co	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	
Morelos Road West Extension	Little Road Extension to Wade Road	Construct 3-lane roadway on new location	Baytown/ Harris Co	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	
N. Main Street	FM 1942 to E. Wallisville Road	Widen from 2 lanes to 4 lanes with median	Baytown/ Harris Co	Un-sponsored	BMP	None	Minor Arterial 2	Major Arterial, Divided 4	Major Arterial, Divided 4	
Newcastle Drive	Massey-Tompkins Road to existing Newcastle Drive	Construct 3-lane roadway on new location	Baytown	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	



Table 9-4. Long-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Potential Developer Participation
Old Needlepoint Road	SH 146 to FM 565	Reconstruct/construct to 3 lane collector	Chambers County	Un-sponsored	CC TP 2010	None	Local 2 and New Alignment	Collector 2	Collector 2	✓
San Jacinto Blvd. South Extension	Pavement stub out south of IH 10 to existing Sheppard Road	Construct 4-lane roadway on new location	Baytown/ Harris Co	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 4	
SH 99	BS 146 E to SH 146	Grand Parkway Segment I-2: Widen to 4-lane tollway with non-continuous 2-lane frontage roads and interchanges	TxDOT Houston District	TxDOT Houston District	HGAC RTP	RTP 2030	Major Arterial 4	Tollway 4	Tollway 4	
SH 99	At IH 10 East	Construct 4 direct connectors	TxDOT Beaumont District	TxDOT Beaumont District	HGAC RTP	RTP 2030	Tollway 4	Tollway 4	Tollway 4	
Sheppard Road	W. Archer to W Cedar Bayou-Lynchburg Road	Widen existing 2-lane local roadway to 3-lane collector	Harris Co	Un-sponsored	2007 TPlan	None	Local 2	Collector 2	Collector 2	
Sjolander Road	E. Wallisville to IH 10	Widen 2-lane roadway to 4 lanes with median	Harris County	Un-sponsored	BMP	None	Major Arterial 2	Major Arterial 2	Major Arterial 4	
Sjolander Road	IH 10 to Crosby Cedar Bayou	Widen 2-lane roadway to 4 lanes with median	Harris County	Un-sponsored	BMP	None	Major Arterial 2	Major Arterial 2	Major Arterial 4	
Sjolander Road North Extension	Hadden Road to E. Wallisville Road	Construct 2-lane roadway on new location	Harris County	Un-sponsored	BMP	None	N/A	N/A	Collector 2	✓
South Main Street Extension	BU 146/SH 99 to Evergreen Road	Construct 2 lane roadway on new location	Baytown	Un-sponsored	BMP	None	N/A	N/A	Collector 2	
Steele Road	Battlebell to Ellis School Road Extension	Reconstruct to 2 lane collector	Harris County	Un-sponsored	2007 TPlan	None	Local 2	Collector 2	Collector 2	
Tejas Street Extension	End of Tejas Street to proposed E Cedar Bayou-Lynchburg Road	Construct 3-lane roadway on new location	Baytown	Un-sponsored	2007 TPlan	None	N/A	Collector 2	Collector 2	



Table 9-4. Long-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Potential Developer Participation
W. Wye Drive	Columbia Street to N. Main Street	Reconstruct to 2 lane collector	Baytown	Un-sponsored	BMP	None	Local 2	Collector 2	Collector 2	
Wade Road	Fig Orchard Road to Battlebell Road	Widen from 2 lanes to 3 lanes	Harris County	Un-sponsored	2007 TPlan	None	Major Arterial 2	Major Arterial 2	Major Arterial 2	
Wade Road	Battlebell Road to IH 10	Widen from 2 lanes to 4 lanes with median	Harris County	Un-sponsored	BMP	None	Minor Arterial 2	Major Arterial, Divided 4	Major Arterial, Divided 4	
Ward Road	Alexander Drive to Kilgore Road	Widen from 2 lanes to 3 lanes	Baytown	Un-sponsored	2007 TPlan	None	Collector 2	Collector 2	Collector 2	
E. Wallisville Road	Crosby-Lynchburg Road to Thompson Road	Widen from 2 lanes to 4 lanes with median	Harris County	Un-sponsored	BMP	None	Minor Arterial 2	Minor Arterial, Divided 4	Minor Arterial, Divided 4	
E. Wallisville Road	Thompson Road to Garth Road	Widen from 2 lanes to 2 lanes with TWLTL	Harris County	Un-sponsored	2007 TPlan	None	Minor Arterial 2	Minor Arterial 2	Minor Arterial, Divided 2	
E. Wallisville Road	N Main Street to Sjolander Road	Widen from 2 lanes to 2 lanes with median	Harris County	Un-sponsored	2007 TPlan	None	Minor Arterial 2	Minor Arterial 2	Minor Arterial, Divided 2	
West Bay	FM 1405 to FM 565	Widen from 2 lanes to 3 lanes	Chambers County	Un-sponsored	2007 TPlan	None	Collector 2	Collector 2	Collector 2	

Notes:

City of Baytown 2007 Bond Program – 2007 Tfare and City
Chambers County Thoroughfare Plan – CC TP 2010
H-GAC Transportation Improvement Program – HGAC TIP
Texas Department of Transportation – TxDOT

Harris County Precinct 2 – County
H-GAC Regional Transportation Plan – HGAC RTP
H-GAC List of Unfunded Projects –HGAC Unfunded
Baytown Mobility Plan analysis – BMP



9.6 Conclusions

The Thoroughfare Plan provides the framework for future roadway improvements in Baytown and in the ETJ. It indicates the approximate locations for new roadways in undeveloped areas and the typical sections available for each type of roadway. Since the locations of future roadways are approximations based on future land use, it is anticipated that amendments will be needed over time to reflect the results of the engineering efforts on individual projects. The Thoroughfare Plan should be reviewed every five years to match the update cycle of the Regional H-GAC RTP.

Information on financing options for projects is included in **Chapter 10, Financing.**



CHAPTER 10. FINANCING

10.1 Introduction

To build any of the projects proposed in the Thoroughfare Plan Update as described in **Chapter 9** or any of the transit, bicycle, pedestrian, freight rail, or port projects, the project sponsor must identify a source of funding for the preliminary engineering, environmental analysis, design and construction. This chapter provides an overview of various funding sources, general information on the regional transportation planning process for use of federal funds, and then provides information on the preliminary capital improvement program (CIP) from the list of near-term roadway improvements. Funding sources for transit, bicycle, pedestrian, freight rail, and port projects are also summarized. Funding for mid-term and long-term roadway projects are not considered in this document due to the speculative nature of their implementation at this time.

10.2 Traditional Funding Sources

Traditional federal, state, and local funding sources are among the most attractive alternatives for paying for a variety of transportation projects. These funding sources provide a definable, predictable flow of financial resources. They come with a clearly defined set of rules, requirements, and how-to manuals to secure the funds. They also provide established institutional forums with clear lines of authority for achieving and carrying out stakeholder consensus.

However, the federal transportation funding program administered by H-GAC has to be based on a financially constrained long-range transportation plan that defines project and programmatic use of the anticipated federal funding.

To a similar extent, certain local funding resources, such as bond offerings are also bound by programmatic constraints. Most jurisdictions have bond caps or are limited by bond ratings that make general obligation bond financing for large projects difficult.

The traditional funding sources described below include a summary of those available from the USDOT and USACE, as well as local sources.

10.2.1 U.S. Department of Transportation Funding Sources

There are various federal transportation resources available for the funding of street and highway, public transit, and bicycle and pedestrian improvements. The USDOT channels financial assistance for transportation facilities and operations through FHWA, FTA, FRA, and FAA. Most of these programs require an 80 percent federal share and 20 percent non-federal match.

The new federal surface transportation bill, Moving Ahead for Progress in the 21st Century (MAP-21) enacted July 2012, provides transportation funding through October 1, 2014. The information provided below reflects the changes included in the new bill. Approximately 60 programs have been eliminated or combined.⁵⁶

The administration of federal transportation funds is the responsibility of H-GAC. Being part of the MPO region means that federal funds for City of Baytown transportation projects can only be obtained if those projects are part of the financially constrained long-range transportation plan, and if they have been programmed for implementation in the Transportation Improvement Program (TIP). For projects to be considered for inclusion in the TIP, each project is ranked based on systematic procedures to determine whether the project provides the greatest achievement of desired regional outcomes for every dollar expended. Since STP funding is limited, the competition among regional transportation improvement projects is fierce.

If the City of Baytown has a project that is located on a federally-classified roadway⁷ and is of regional significance, coordination with H-GAC staff must occur for such a project to be evaluated for inclusion in the regional

⁵ Ehl, Larry, 2012. Cheat Sheet for MAP-21, New Federal Transportation Bill. Transportation Issues Daily. <http://www.transportationissuesdaily.com/cheat-sheet-for-map21-new-federal-transportation-bill/>. June 29. Website accessed July 1, 2012.

⁶ www.transportationissuesdaily.com/part-2-cheat-sheet-for-map21-new-federal-transportation-bill/. Accessed June 30, 2012.

⁷ A map showing the Houston-Galveston area functionally classified roadways can be obtained from - http://www.h-gac.com/taq/tip/docs/2011-14/call%20for%20projects/Houston_District_Functional_Classification_Maps.pdf



long-range transportation plan⁸ and TIP, or to be considered for funding through other federal transportation grant programs. A general overview of applicable FHWA, FTA, FRA, and FAA related funding programs is provided in the following sections.

10.2.1.1 Federal Highway Administration

Federal and state roadways in the City of Baytown are maintained by TxDOT, and coordination of funding for vehicular transportation services must occur with the appropriate TxDOT staff. TxDOT provides transportation planning assistance, financial assistance to local communities, and capital improvement funding. Listed below are the available FHWA funding sources based on preliminary summaries of the new federal surface transportation programs July 1, 2012. Current allocation of the various FY 2012 FHWA funds to TxDOT Districts, MPOs, and projects is described in detail in TxDOT's *2012 Unified Transportation Program (UTP)* and amendments (TxDOT, 2011).

National Highway Performance Program. The previous National Highway System's (NHS) (23 United States Code [USC] § 103) funding program provided assistance for improvements on all interstate routes and a large percentage of urban principal arterials. The federal/local funding ratio for arterial routes was 80 federal/20 local. ***The new program combines the previous Interstate Maintenance, NHS and Highway Bridge programs into one program.***⁹ The U.S. Congress passed the NHS bill in 1996 (FHWA, 2011a).

Transportation Mobility Program¹⁰. This program replaces the current Surface Transportation Program but retains the same block grant funding program with subcategories for states and urban areas. These funds can be

⁸ A complete listing of H-GAC regional transportation projects can be obtained from - <http://www.h-gac.com/taq/plan/default.aspx>

⁹ Ehl, Larry, 2012. Cheat Sheet for MAP-21, New Federal Transportation Bill. Transportation Issues Daily. <http://www.transportationissuesdaily.com/cheat-sheet-for-map21-new-federal-transportation-bill/>. June 29. Website accessed July 1, 2012.

¹⁰ U.S. Senate, 2012. Committee on Environment and Public Works. Summary of Moving Ahead for Progress in the 21st Century (MAP-21). http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=6d1e2690-6bc7-4e13-9169-0e7bc2ca0098. Website accessed July 1, 2012.

used for any road (including NHS) that is not functionally classified as a local road or rural minor collector. The funding ratio has been 80 federal/20 local. As mentioned above, to allow the programming of projects, coordination with H-GAC has to occur (FHWA, 2011a).

National Freight Network Program. ***This new core program will provide funding to states for projects that improve regional and national freight movements on highways, including freight intermodal connectors (EPW, 2012).***

Transportation Enhancement Program. The Transportation Enhancement Program (SAFETEA-LU Sec. 1112, 1113, 6003), a former subcategory of STP funding, was designed to assist states with enhancing the aesthetics, diversity, and environmental condition of the nation's multimodal transportation system. Each state was required to dedicate 10 percent of their STP funds to transportation enhancement activities. Eligible projects for Transportation Enhancement Program funding include the striping of bike lanes, promotion of bicycle safety along roadways designated as federal-aid highways, acquisition of scenic easements and scenic or historic sites, and any aesthetic or environmental improvements to roadways. States administer Transportation Enhancement Program grants through a competitive application process (FHWA, 2011a). ***This program has been merged with the Safe Routes to School, Recreational Trails and Scenic Byways for a new Transportation Alternatives Program that is under a modified Congestion Mitigation and Air Quality Improvement Program (EPW, 2012).***

Metropolitan Planning Funds. MPO (23 USC § 505) planning grants are available for providing financial assistance to the planning of future highway programs and local public transportation systems, as well as the planning of the financing of such programs and systems. ***MAP-21 increases the allocation to MPOs from 12.5 % to 14% of highway funding.***

Highway Bridge Program. Under the previous Highway Replacement and Rehabilitation Program, funding is set aside through the Highway Bridge Program (23 USC § 144) to help states repair or replace bridges that are categorized as "structurally deficient" or "functionally obsolete". Resources from the Highway Bridge Program were distributed to each state based on their need or estimated cost of repair and rehabilitation of hazardous



highway bridges (FHWA, 2011a). TxDOT prioritizes need based on the results of biennial inspection of all bridges located on public roadways. For *NHS routes, this program has been consolidated with the National Highway Performance Program. Those bridges not on the NHS will be funded under the new Transportation Mobility Program (EPW, 2012).*

Highway Safety Improvement Program. The Highway Safety Improvement Program (HSIP) (23 USC § 148) provides assistance to states to dramatically reduce traffic related fatalities and injuries on all public access roadways. Each state must initially apply HSIP funding to improve rural roadways that are at a high risk for traffic related crashes. Once states have met the federal requirements for improving safety on their high risk rural roads, they can utilize the remaining funding for any safety related improvement (FHWA, 2011a). *The program will receive and increase in funding under MAP-21(EPW, 2012).*

Congestion Mitigation and Air Quality. Urban areas that do not meet national ambient air quality standards are designated as non-attainment areas by the U.S. Environmental Protection Agency. The eight-county Houston-Galveston-Brazoria non-attainment region has been categorized as “Severe” for the 1997 eight-hour Ozone standard – with an attainment date of June 15, 2019. Congestion Mitigation and Air Quality (CMAQ) (23 USC § 149) funds are apportioned to non-attainment urban areas for use on projects that contribute to the reduction of mobile source air pollution through reducing vehicle miles traveled, fuel consumption, or other identifiable factors. The matching ratio for this program is 80 federal/20 local, except for traffic signal systems, park & ride lots, and ridesharing projects which are 100 percent federally funded (FHWA, 2011a). *MAP-21 adds particulate matter as one of the pollutants to be addressed by proposed projects and requires a performance plan for large urban area to track the improvements in air quality (EPW, 2012).*

Recreational Trails Program. The Recreational Trails Program (23 USC § 206) was a funding resource dedicated to constructing and maintaining motorized and non-motorized trails. Half of this resource was equally divided among all states, and the other half is distributed to qualifying states that have non-highway recreational fuel consumption. State agencies, such as transportation or parks and wildlife departments, were responsible for administering the associated Rails to Trails Program through a competitive

application process. Eligible recipients of the Recreational Trails Program financial assistance included local and regional agencies, and non-profit organizations (FHWA, 2011a). *This program has been merged under MAP-21 into the Transportation Alternatives Program under CMAQ (EPW, 2012).*

Safe Routes to School. Safe Routes to School (SRTS) (SAFETEA-LU Sec. 1404) was a federal grant program that was designed to fund improvements in safety and air quality near primary, elementary, and middle schools. Other goals of SRTS were to encourage children to use alternative travel modes to school including biking and walking, and fund the planning and implementation of projects that meet the program’s objectives. Resources from this program were distributed to every state based on need or enrollment of students. Each state department of transportation was responsible for administering the SRTS program through a competitive grant application. Eligible recipients of SRTS financial assistance included any state, local, regional, and non-profit organization that exhibited need and met the planning and implementation requirements of the program. Potential projects that met SRTS funding requirements included infrastructure improvements such as traffic calming, constructing sidewalks, and other bike and pedestrian pathways. The SRTS program also provided funding for non-infrastructure programs such as education and outreach programs; signage, security and other enforcement measures; and program administration costs. In most states, it was necessary to have a SRTS Infrastructure Plan before improvements can qualify for funding under the SRTS program (FHWA, 2011a). *SRTS has been consolidated under Transportation Alternatives in MAP-21 (EPW, 2012).*

10.2.1.2 Federal Transit Administration

The City of Baytown is served by Harris County Transit to provide transit service to those urban portions of Harris County outside of the METRO service area. FTA provides transportation planning assistance, financial assistance to transit operators in urban communities, and capital improvement funding. These resources are formula based and distributed according to population size and density. MAP-21 includes modifications to FTA programs as noted.



Planning – FTA Section 5303. Funds are available for planning activities that support the economic vitality of a metropolitan area, increase the safety and security of the transportation system, and increase the accessibility and mobility across and between modes. (FTA, 2011a). *MAP-21 requires the planning process to incorporate a more comprehensive performance-based approach.*¹¹

Urbanized Area – FTA Section 5307. The Urbanized Area Formula Funding Program makes federal resources available to urbanized areas for transit planning, transit capital, and operating assistance in urbanized areas with a population of 50,000 or more (FTA, 2011a). *MAP-21 moves the Job Access and Reverse Commute program to this section (US Senate, 2012).*

Bus and Bus Facilities/Major Capital Investments/Fixed Guideway Modernization –Section 5309/5309(b)(1)/5309(b)(2). Similar to the other funding sources, the FTA capital grant program requires an 80 percent federal funding share and a minimum 20 percent non-federal match. Eligible recipients for FTA capital formula grants include any publically owned transit operator or governmental agency that has the authority to accept and disperse federal resources. Most capital improvement projects that qualify for FTA funding include vehicle, computer, and software acquisition, and the construction of maintenance and transit centers. Other capital improvements that enhance multimodal connections to transit also qualify for this FTA grant funding (FTA, 2011b).

Eligible activities include commuter rail, a busway/high-occupancy vehicle facility, or an extension of these. Projects become candidates for funding under this program by successfully completing the appropriate steps in the major capital investment planning and project development process. To modernize or improve existing fixed guideway systems, including purchase and rehabilitation of rolling stock, 5309 (b)(2) funds can be used (FTA, 2011b).

¹¹ Congressional Conference Committee on Transportation. Joint Explanatory Statement of the Committee of the Conference. <http://docs.house.gov/billsthisweek/20120625/HR4348crJES.pdf>. Need the web address. Website accessed July 1, 2012.

There are a few changes to this program in the new federal bill. *MAP-21 streamlines the New Starts process to expedite the review of projects under \$100 million. Another modification is an expanded definition of Bus Rapid Transit.*

Elderly and Disabled – FTA Section 5310. This funding provides support the special transportation needs of elderly individuals and individuals with disabilities (FTA, 2011a). *MAP-21 merges this program with New Freedom (FTA Section 5317) and increases the funding levels compared to current levels.*

Job Access Reverse Commute – FTA Section 5316. This funding was available for transportation projects that support the development and maintenance of transportation services designed to transport low-income individuals to and from jobs and activities related to their employment and to support reverse commute projects (FTA, 2011a). *This program has been merged under FTA Section 5307, Urbanized Area Grants.*

New Freedom – FTA Section 5317. This funding was available for transportation projects that support new public transportation services and alternatives beyond those required by the Americans with Disabilities Act (ADA) that are designed to assist individuals with disabilities with accessing transportation service, including transportation to and from jobs, and employment support services (FTA, 2011a). *This program has been merged with FTA Section 5310 program serving elderly and disabled populations.*

10.2.1.3 Federal Railroad Administration

Railroad Rehabilitation and Improvement Financing Program. The FRA created the Railroad Rehabilitation and Improvement Financing Program to provide direct loans and loan guarantees for railroad projects. Eligible projects may include new rail facilities, rehabilitation of existing equipment, and bridges, tracks, yards, and buildings. According to the FRA, the lifecycle of these loans can be up to 35 years with the same interest rates as the cost of borrowing to the government (FRA, 2011a).

Rail Line Relocation and Improvement Capital Grant Program. In addition to loans, the FRA provides financial assistance via the Rail Line Relocation and Improvement Capital Grant Program. This program only



applies to states, cities, or counties. Construction projects that serve to alleviate the negative effects of rail lines are eligible for these grants. Relocations of rail lines are also considered under this program (FRA, 2011b).

In addition to the federal resources, a number of state funding options are listed in the Texas Rail Plan, including the Railroad Relocation and Improvement Fund, the State Infrastructure Bank, the Texas Emissions Reduction Program, the Texas Economic Development Bank, and Transportation Reinvestment Zones (TxDOT, 2010a).

10.2.1.4 Federal Aviation Administration

For an airport to be eligible for federal grants through the FAA’s Airport Improvement Program, it must be listed in the National Plan of Integrated Airport Systems (NPIAS). The NPIAS publishes a Report to Congress that outlines multiple guiding principles that airports must follow in order to be listed. NPIAS airports can include general aviation airports if they meet the following criteria: (1) 10 locally based aircraft; and (2) at least 20 miles from nearest NPIAS airport (FAA, 2010).

TxDOT administers these federal grants for general aviation airports through their TASP which further classifies airports based on their benefit to the state and national transportation system (TxDOT, 2010b).

Baytown Airport is currently not included in either the NPIAS or TASP. However, in the Regional Aviation System Plan produced by H-GAC in 2010, it was recommended that Baytown airport be included in the TASP as a community service airport. H-GACs Regional Air System Plan also noted that Baytown Airport has been pursuing reliever status with the FAA (H-GAC, 2011).

10.2.2 U.S. Army Corps of Engineers Funding Sources

The USACE Inland Waterway Trust Fund distributes money for new construction projects. In addition, the Harbor Maintenance Trust Fund supports routine dredging and

State funding for highway projects is used primarily as match for federal funding. Highway projects that are built with 100% state funds are generally preventative maintenance rehabilitation projects.

maintenance activities. These trust funds are supported by a variety of revenue sources, including user fees, waterway fuel taxes, domestic commerce taxes, and import taxes (USACE, 2010).

10.2.3 Local Funding Sources

Any costs for street and highway, public transit, and bicycle and pedestrian improvements not covered by federal and/or state programs are the responsibility of the local governmental jurisdictions. Local funding can come from a variety of sources including property taxes, sales taxes, user fees, special assessments, and impact fees. The most common potential sources are discussed below.

Property Taxes. Property taxation has historically been the primary source of revenue for local governments in the United States. Property taxes account for more than 80 percent of all local tax revenues. Property is not subject to federal government taxation, and state governments have, in recent years, shown an increasing willingness to leave this important source of funding to local governments.

General Sales Taxes. The general sales tax is also an important revenue source for local governments. The most commonly known form of the general sales tax is the retail sales tax, which is imposed on a wide range of commodities. The rate is usually a uniform percentage of the selling price.

Baytown’s base sales tax rate is 1.25 percent. There is an additional one-quarter percent street maintenance.

User Fees. User fees are fees collected from those who utilize a service or facility. The fees are collected to pay for the cost of a facility, finance the cost of operations, and/or generate revenue for other uses. User fees are commonly charged for public parks, water and sewer services, transit systems, and solid waste facilities. The theory behind the user fee is that those who directly benefit from these public improvements pay for the associated cost.

Special Assessments. Special assessment is a method of generating funds for public improvements, whereby the cost of a public improvement is collected from those who directly benefit from it. In many instances, new streets are financed by special assessment. The owners of property located adjacent to the new streets are assessed a portion of the cost of the roadway,



based on the amount of footage they own adjacent to the transportation improvement. Special assessments have also been used to generate funds for general improvements within special districts, such as central business districts. In some cases, these assessments are paid over a period of time, rather than as a lump sum payment.

Impact Fees. Development impact fees have been generally well received in other states and municipalities in the United States. New developments create increased traffic volumes on the streets around them. Development impact fees are a way of attempting to place a portion of the financial burden on developers who are creating or adding to the need for improvements.

Bond Issues. Property tax and sales tax funds can be used on a pay-as-you-go basis, or the revenues from them can be used to pay off general obligation or revenue bonds. Bonds are issued by local governments upon approval of the voting public.

The most recent general obligation bond election in Baytown was November 6, 2007 for the improvements listed shown in Table 10-1.

Table 10-1. Baytown November 2007 Bond Election

Proposition No.	Description	Amount	Outcome
1	Streets	\$36,850,000	Passed
2	Public Safety	\$22,995,000	Passed
3	Parks & Recreation	\$10,940,000	Passed
4	East Baker Road	\$7,170,000	Passed
5	Texas Avenue	\$2,525,000	Failed
6	Drainage	\$2,020,000	Passed

Source: City of Baytown, 2012

Additional funding sources for pedestrian and bicycle facilities are identified in **Chapter 8, Implementation Plan**, of the *Playbook* (City of Baytown, 2010).

10.3 Innovative Financing

Revenue bonds may hold some promise, but they require a revenue stream that can be used to underwrite the repayment over time. One way to combine the federal funding with revenue bonds or other financing is

through the use of various innovative finance strategies, which are described in the following sections.

10.3.1 Integration of Anticipated Federal Funds with Debt Instruments

The USDOT has authorized various innovative finance strategies that can be used to leverage federal program funds. These approaches apply techniques used in the private sector banking and capital finance to leverage public sector funding. Although attractive in concept, it should be noted that except in limited cases, these techniques do not provide additional funds; they primarily provide leverage to existing funds by allowing federal program dollars to be integrated in some way with debt instruments. Although careful attention must be given to how much of future year funding can safely be dedicated, the primary benefit of these approaches is the ability to complete projects in the short term by dedicating future program funds to long-term repayment. These financial mechanisms include:

- Advanced construction funding allows state DOTs to encumber future federal dollars to fund current projects.
- Innovative use of federal-aid highway funds to retire debt using Grant Anticipation Revenue Vehicles or "GARVEE" bonds. To date, Texas has not been granted this capability by the legislature.
- Subsidized or sponsored revolving loan funds such as the State Infrastructure Bank. Numerous cities, counties, and toll authorities have borrowed funds from the Texas State Infrastructure Bank to pay for items ranging from ROW acquisition and utility adjustments to construction. (TxDOT, 2011b).
- Transportation Infrastructure Finance and Innovation Act of 1998 loans, lines of credit, or loan guarantees that can be used by transportation sponsors to complete a project's funding package. These loans are for large projects and are granted by FHWA.

Although these approaches introduce an element of modest, but predictable risk not normally associated with the federal funding program, they also provide substantial benefit. Among these benefits are:

- The ability to complete an entire project in a reasonable time frame and begin receiving full benefits at a much earlier stage than if the project was implemented in multiple phases.



- The project sponsor can avoid the escalation of construction costs associated with delay, significantly counterbalancing and in some cases offsetting the cost of debt financing.
- These approaches provide a mechanism for more measured use of federal program dollars by spreading a series of smaller payments over the life of the metropolitan transportation plan as opposed to large expenditures in a given fiscal year.

10.3.2 Direct or Indirect User Fees

Non-federal sources of revenue to provide a funding stream for bonding or other debt strategies include user fees such as tolls or value capture.

Tolls. Tolls are considered a direct user fee and provide a reliable, predictable revenue stream for repayment over time. Except for projects where volumes are high and alternative routes are inconvenient due to distance or high levels of congestion, tolls typically provide only a portion of the total revenue needed to fully fund a project. For this reason, most toll projects are either in heavily congested urban areas, or are associated with a bridge across a river or other physical constraint. Indirect user fees such as pass-through tolls through which per vehicle amounts are paid to a facility operator by a third party, such as a sponsoring governmental entity and not by facility users.

These potential funding sources often require cooperation and voluntary participation of other governmental entities.

Value Capture. If a project is being billed as an economic development project, then by definition, some sector of the community should benefit economically by the implementation of the project. Value capture strategies leverage the increase in economic value that the project brings to the community and apply this increase to paying for the transportation improvements. A common mechanism in this category is described:

- Tax increment financing mechanisms use future gains in taxes, usually ad valorem property taxes to finance the current improvements that will create those gains. This strategy works best in an environment where development levels are low or where development is taking place at a relatively slow pace. This strategy is most effective when the development that brings about the incremental increase in tax revenue would clearly not have taken place without the existence of the

roadway, such as the development of office or industrial parks in a previously rural area.

Tax increment financing mechanisms are most commonly associated with land use development or redevelopment projects. While transportation improvements can be included as they benefit the land use projects, they are not the sole focus as transportation projects do not generate ad valorem property taxes. Baytown created a tax increment reinvestment zone for the Garth Road/San Jacinto Mall area (Baytown, 2012).

Value capture strategies are among the hardest to carry out, but may be a viable option for generating local funds to help with major projects, such as a transit oriented development project. They require the cooperation of more government entities and the consensus of a broader set of stakeholders than any of the other approaches. Typically, a tax referendum is required. Value capture strategies also require an in-depth understanding of the potential economic impacts of the project. This deeper understanding is required both to:

- Mitigate risks that would accrue if the anticipated tax revenues do not materialize.
- Quantify the anticipated increase in tax revenue or economic benefit, and to demonstrate to the stakeholders that this benefit is not only real, but is derived directly and exclusively from the implementation of the transportation project.

Despite the higher hurdles, when associated with a well thought-out project, value capture strategies are among the most sustainable because they are community based and do not dip into existing programmatic resources or revenue streams to the detriment of other initiatives. The value capture strategies are particularly powerful and persuasive when combined with State Infrastructure Bank Financing.

10.3.3 Municipal Economic Development Tools

Similar to previously discussed indirect user fees, there are additional economic development tools available, including venue project taxes, interlocal agreements, or various “economic development” districts (Texas AG, 2008).



Interlocal Agreements. Rather than undertaking individual initiatives, city and county leaders can work together to try to attract and retain business development. Such cooperation is formalized with an interlocal agreement, which outlines each entity’s respective duties. The Interlocal Cooperation Act (Government Code – Chapter 791) also allows local governments to contract with the state or a council of governments to allow for the joint pursuit of governmental functions often related to economic development.

Public Improvement District. Similar to the previously discussed value capture strategy, the Public Improvement District Assessment Act (Local Government Code - Chapter 372) allows a city to finance needed public improvements by levying and collecting special assessments on property within its jurisdiction. By forming a Public Improvement District, cities can establish a funding source for the upgrade of substandard utility and public services as well as public facilities, including street, sidewalk, and transit improvements. The Public Improvement District must be petitioned, an improvement plan developed, and a resolution adopted which authorizes the creation of the Public Improvement District. Baytown has two public improvement districts as shown in **Table 10-2**.

Table 10-2. Baytown Special Purpose Districts

Name	District Boundary	Date Created	Expiration Date	Rate
Crime Control and Prevention District (CCPD)	City of Baytown	May 13, 2006	May 2016	0.125%
Fire Control, Prevention and Emergency Services District (FCPEMSD)	City of Baytown	May 13, 2006	May 2016	0.125%

Source: City of Baytown, 2012

On May 14, 2011, Baytown citizens voted to extend the CCPD and FCPEMSD for another five years (Baytown, 2012).

Municipal Management District. Municipal Management Districts (Local Government Code - Chapter 375) are fairly new and are created within an existing commercial area to finance facilities and infrastructure enhancements beyond those already provided by the governing entity. Improvements are paid for by assessment, property tax, or impact fee

charged to property owners located within the district. Municipal Management Districts are petitioned by affected property owners. There are additional revenue vehicles available, such as Municipal Development Districts (Local Government Code - Chapter 377), Neighborhood Empowerment Zones (Local Government Code - Chapter 378), or Local Government Corporations (Texas Transportation Code - Section 431.101). Baytown has an MDD for the portion of the city located within Harris County, as listed in **Table 10-3**.

Table 10-3. Baytown Municipal Development District

Name	District Boundary	Date Created	Rate
Municipal Development District (MDD)	City of Baytown within Harris County	May 5, 2001	0.50 %

Source: City of Baytown, 2012

10.3.4 Public Private Partnerships and Joint Development Agreements

Public Private Partnerships allow private companies to take on traditionally public roles in infrastructure projects, while keeping the public sector accountable for the project and the overall service to the public. This type of agreement has been successfully used in multiple states, as local and state governments are struggling with limited revenue streams and increased funding needs.

Other potential funding sources can include joint development agreements with private sector developers, earning revenue from advertising, naming-rights, or the leasing of parking spaces.

10.4 Integration with H-GAC Regional Transportation Planning

10.4.1 Planning Documents

One of the primary purposes of an MPO is to oversee the distribution and use of any federal transportation funds described in **Section 10.2.1**. H-GAC produces the RTP every five years in accordance with federal planning regulations (23 CFR Part 450 and 49 CFR Part 613) to identify all regionally significant transportation projects that are planned for construction during the next 25 years. The RTP must be fiscally-constrained, meaning only



those projects that can be built with reasonably expected funding can be included in the plan.

A companion document to the RTP is the TIP which is a four-year plan that includes the projects that are anticipated to advance to construction—or in the case of transit construction activities and equipment purchases—in the first four years of the RTP. The TIP is updated annually or every two years depending on the MPO.

While the transportation planning process is a continuous effort, the analysis performed in the development of a new RTP provides the opportunity for member jurisdictions to review their previous priorities with respect to the current economic, demographic, and development trends. Planning efforts such as the Baytown Mobility Plan provide cities with a local plan that takes a more refined look at the community’s anticipated needs. Results of the local plans for the member jurisdictions may then be used during the development of the next RTP to reassess the priority of projects on a regional basis.

Because the H-GAC region is in non-attainment for ozone, locally-funded mobility projects that add lanes for single-occupant vehicles are included in the RTP for the air quality conformity analysis. The conformity analysis will need to demonstrate the proposed transportation projects will provide a measureable reduction in air pollutant emissions in order to qualify for federal and state funding sources.

Non-attainment areas like the H-GAC region are eligible for federal Congestion Mitigation and Air Quality funds that can be used for projects that demonstrate locally beneficial effects, such as reducing congestion and vehicle idling at intersections by improving signal timing and/or adding right-turn bays, improving transit operations or improvements to alternative modes, such as walking and bicycling.

10.4.2 Merging the Baytown Mobility Plan into the RTP

Once the Baytown Mobility Plan is accepted by City Council and the draft Future Land Use Map and Thoroughfare Plan are adopted, both will be forwarded to H-GAC. The documentation will include updates to the travel demand model based on recently completed projects, requested changes in functional classification for some of the roadways, and the adjusted demographics for 2035. H-GAC will review the information and coordinate

with Baytown and the adjoining jurisdictions of Harris and Chambers Counties to make sure the roadway typical sections match at the jurisdiction boundaries for the planning horizons that will be considered in the preparation of the 2040 RTP.

H-GAC will use the Future Land Use Map to develop the demographic forecasts for the planning horizon of 2040, as well as selected interim years. Financial constraints may shift a previously identified federally-funded project to local funds if the timeframe for securing federal funds is not acceptable to the City of Baytown, Harris County, and/or Chambers County, depending on the specific project.

Locally-funded mobility projects are generally funded through general obligation bonds; however, there are a variety of options described in **Section 10.3.3**. The City of Baytown may include transportation projects in the next bond election to be sure that essential near-term mobility and safety projects have funding.

10.5 Capital Improvement Program Recommendations

The CIP recommendations were developed based on a review of available information from the TIP, the RTP, the 2007 Baytown Bond Program, and needs identified in the Baytown Mobility Plan for the next five fiscal years (FY) – FY 2013 through FY 2017.

Additional information, including ROW costs and utility adjustments, will need to be determined for each project to determine total project cost. The Bond Advisory Committee will need to evaluate cost, public input, and other factors to select a recommended group of projects, including pedestrian and bicycle projects, to be funded under a future bond program.

10.5.1 Methodology for Cost Estimates

Conceptual level construction costs for reconstructing/constructing roadways were based on the costs associated with one mile of roadway for typical sections provided in **Chapter 9, Thoroughfare Plan Update**. Cost estimates were determined by estimating quantities for standard roadway bid items and applying current unit prices for each bid item. Unit prices were derived from past experience with similar type projects in Baytown and from 2008 TxDOT bid item prices (TxDOT, 2008). The average unit cost for bridge (per square foot) was obtained from the 2010 TxDOT average unit costs (TxDOT, 2010).



The cost estimates do not include ROW estimates, potential relocations, the costs associated with pipeline adjustments/protection, or the costs of enclosing Harris County Flood Control ditches in storm sewer. Several items were estimated as a percentage of the pavement and utility adjustment. A 20 percent contingency was applied to the construction cost estimates to account for unknown conditions, including but not limited to soil type, pipeline crossings, and number of driveways. The conceptual costs also include 10 percent for survey, design, and construction engineering and inspection. Additional costs include percentages of the total construction cost for the following: demolition/ROW preparation (1 percent); traffic control (5 percent on roadway items and 2 percent on Cedar Bayou bridge items); and mobilization (10 percent). **Appendix E** includes the basis of estimates for the various typical sections.

10.5.2 Cost Estimates for Near Term Roadway Projects

A comprehensive list of possible and planned projects, located in Baytown, was compiled from various sources including current programs of work for Baytown, Harris County, Chambers County, the H-GAC RTP and TIP, and the analysis performed for the Baytown Mobility Plan. Based on the need for additional capacity and other operational improvements, the projects were categorized as near-term, mid-term, and long term. The near-term projects are presented in **Table 10-1**, and were developed from travel demand model analysis and current programs of work for Baytown, Harris

County, Chambers County, and the 2035 RTP from H-GAC. When available, the preliminary construction cost was obtained from the project source. For new projects, conceptual construction estimates for operational improvements were prepared in collaboration with the City Engineering Department.

Table Notes:

- Projects are arranged alphabetically by roadway name.
- Jurisdiction refers to the facility owner.
- Sponsor refers to the entity responsible for implementing the proposed project.
- RTP status indicates when federally-funded and regionally-significant local projects are anticipated to proceed to construction, such as:
 - **TIP 2013, 2014, 2015, or 2016.**
- **RTP 2020, 2025, 2030, or 2035** – the timeframe identified in a financially-constrained regional planning effort in which funding will be available.
- **Unfunded** – previously identified projects that have been removed from the financially-constrained RTP due to funding shortage.
- **Environmental** – the list of projects undergoing environmental evaluation, but not necessarily with construction funds identified.

Table 10-1. Near-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Length (mile)	Preliminary Construction Cost*
Archer Road	Garth Road to Main Street	Widen to 4 lanes with median	Harris County	Un-sponsored	2007 TPlan	None	Minor Arterial 2	Minor Arterial Divided 4	Minor Arterial Divided 4	0.9	\$5,380,000^
Archer Road	Main Street to Sjolander Road	Widen to 4 lanes with median	Harris County	Un-sponsored	2007 TPlan	None	Minor Arterial 2	Minor Arterial Divided 4	Minor Arterial Divided 4	1.8	\$10,775,000^
Archer Road	John Martin Road to Garth Road	Construct 2-lane roadway on new location and reconstruct McLean	Harris County	Un-sponsored	2007 TPlan	None	N/A	Minor Arterial 2	Minor Arterial 2	0.9	\$5,388,000



Table 10-1. Near-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Length (mile)	Preliminary Construction Cost*
Baker Road	N. Main Street to Sjolander Road	Construct 4 lanes with TWLTL, curb and gutter and storm sewer	Baytown	City of Baytown	2013-2016 TIP	TIP 2013	N/A	Minor Arterial, Divided 4	Minor Arterial, Divided 4	1.4	\$8,935,540
E. Cedar Bayou-Lynchburg Road	N. Main Street to Sjolander Road	Widen to 4 lanes with TWLTL	Baytown	City of Baytown	2013-2016 TIP	TIP 2013	Collector 2	Major Arterial, Divided 4	Major Arterial, Divided 4	1.5	\$6,307,440
W. Cedar Bayou-Lynchburg Road	Bush Road to Decker Drive/ Spur 330	Widen to 4 lanes with TWLTL	Baytown	City of Baytown	2013-2016 TIP	TIP 2014	Minor Arterial 2	Major Arterial, Divided 4	Major Arterial, Divided 4	3.8	\$20,172,855
W. Cedar Bayou-Lynchburg Road	Garth Road to Bush Road	Widen to 4 lanes with TWLTL	Baytown	City of Baytown	2013-2016 TIP	TIP 2014	Minor Arterial 2	Major Arterial, Divided 4	Major Arterial, Divided 4	0.8	\$5,379,427
FM 565	0.305 mi W. of FM 2354 to 0.018 mi E. of FM 1405	Realign roadway	TxDOT Beaumont District	TxDOT Beaumont District	2013-2016 TIP	TIP 2013	Collector 2	Collector 4	Collector 4	1.9	\$6,763,226
Garth Road	At IH 10	Improve intersection geometry at EB frontage road	Baytown	Un-sponsored	City	None	Major Arterial Divided 4	Major Arterial Divided 4	Major Arterial, Divided 4	0.1	\$300,000
Garth Road	From SH 146 to IH 10	Improve signal coordination	Baytown	Un-sponsored	BMP	None	Major Arterial Divided 4	Major Arterial Divided 4	Major Arterial Divided 4	3.7	\$375,000
Garth Road	At Baker Road	Widen and redesign of Garth Road and Baker Road area	Baytown	City of Baytown	2013-2016 TIP	TIP 2012 (02/2012)	Major Arterial, Divided 4	Major Arterial Divided 4	Major Arterial, Divided 4	0.1	\$5,000,000
IH 10 East	Spur 330 to Chambers County Line	Install Traffic Management Technology	TxDOT Houston District	TxDOT Houston District	HGAC TIP	TIP 2014	Freeway 6	Freeway 6	Freeway 6	8.8	\$2,585,889
IH 10 East	From Thompson Road to Garth Road	Install wayfinding signs for westbound traffic going to Spur 330 via Thompson Road	TxDOT Houston District	Un-sponsored	BMP	None	Freeway 6	Freeway 6	Freeway 6	3.1	\$75,000



Table 10-1. Near-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Length (mile)	Preliminary Construction Cost*
John Martin Road	IH 10 to W. Cedar Bayou-Lynchburg Road	Widen from 2 lanes to 4 lanes with TWLTL, realign intersection at Bush Road	Harris Co / Baytown	City of Baytown	2013-2016 TIP	TIP 2013	Minor Arterial 2	Minor Arterial 4	Minor Arterial 4	1.5	\$11,278,000
John Martin Road	At W. Cedar Bayou-Lynchburg Road	Realign John Martin to intersect W. Cedar Bayou-Lynchburg at Bush Rd.	Baytown	Un-sponsored	City	Environmental Assessment	Minor Arterial 2	Minor Arterial 2	Minor Arterial 2	0.4	\$2,650,000
Kilgore Parkway	Needlepoint Road to 1,500 ft E of SH 99	Construct new location roadway	Chambers County	Developer	CC TP 2010	None	N/A	Collector 2	Collector 4	0.6	\$2,750,000
N. Main Street	From SH 146 to IH 10	Improve signal coordination	Baytown	Un-sponsored	BMP	None	Major Arterial 4, Divided	Major Arterial 4, Divided	Major Arterial 4, Divided	4.0	\$401,500
S. Main Street Extension	BS 146E/SH 99 to Evergreen Road	Construct 2 lane roadway	Baytown	Un-sponsored	BMP	None	N/A	N/A	Collector 2	1.2	\$1,430,000
SH 146	W. Texas Avenue to Missouri Street	Base repair and asphaltic concrete pavement overlay	TxDOT Houston District	TxDOT Houston District	HGAC TIP	TIP 2014	Freeway 6	Freeway 6	Freeway 6	2.0	\$300,000
SH 146	At Spur 330	Construct direct connector ramp C (EB to NB)	TxDOT Houston District	TxDOT Houston District	UTP Revision	Funded TTC June 28, 2012	Freeway 6	Freeway 6	Freeway 6	0.2	\$10,368,000
SH 99	Harris C/L to FM 1405	Grand Parkway Segment I-2: Widen to 4-lane tollway with 2-lane frontage roads and interchanges	TxDOT Beaumont District	TxDOT Beaumont District	2013-2016 TIP	TIP 2013	Major Arterial 2	Tollway 4	Tollway 4	1.5	\$60,200,000
SH 99	At Fisher Road	Grand Parkway Segment I-2: Construct interchange	TxDOT Beaumont District	TxDOT Beaumont District	2013-2016 TIP	TIP 2013	Major Arterial 2	Tollway 4	Tollway 4	0.5	\$23,500,000



Table 10-1. Near-Term Project List

Roadway Name	Project Limit	Project Description	Jurisdiction	Sponsor	Project Source	RTP Status	Existing Condition	2035 Condition (Proposed)	Proposed Classification/ TYP Section (Ultimate)	Length (mile)	Preliminary Construction Cost*
SH 99	BS 146E to Chambers County Line	Grand Parkway Segment I-2: Widen to 4-lane tollway with 2-lane frontage roads and interchanges	TxDOT Houston District	TxDOT Houston District	2013-2016 TIP	TIP 2015	Major Arterial 2	Tollway 4	Tollway 4	1.1	\$30,700,000
Sjolander Road	E. Wallisville Road to 0.4 mi N of IH 10	Widen 2-lane roadway to 4 lanes with median	Harris County	Un-sponsored	BMP	None	Major Arterial 2	Major Arterial 4	Major Arterial 4	0.6	\$3,932,000
Sjolander Road	0.4 mi N of IH 10 to 0.4 mi S of IH 10	Widen 2-lane roadway to 4 lanes with median	Harris County/TxDOT/City	Un-sponsored	BMP	None	Major Arterial 2	Major Arterial 2	Major Arterial 4	0.8	\$5,200,000
Sjolander Road	0.4 mi S of IH 10 to Crosby Cedar Bayou Road	Wide 2-lane roadway to 4 lanes with median	Harris County	Un-sponsored	BMP	None	Major Arterial 2	Major Arterial 2	Major Arterial 4	2.3	\$15,037,000
Spur 330	Crosby Lynchburg Road to Bayway Drive	Resurfacing	TxDOT Houston District	TxDOT Houston District	2013-2016 TIP	TIP 2013	Freeway 4	Freeway 4	Freeway 4	1.5	\$2,800,000
E. Wallisville Road	From N. Main Street to Garth Road	Widen from 2 lanes to 4 lanes with TWLTL	Harris County	Harris County w/ Baytown participation in ROW	County	NA	Minor Arterial 2	Minor Arterial, Divided 4	Minor Arterial, Divided 4	1.0	\$4,000,000

Notes:

City of Baytown 2007 Bond Program – 2007 Tfare and City Chambers County Thoroughfare Plan – CC TP 2010 H-GAC Transportation Improvement Program – HGAC TIP

Harris County Precinct 2 – County H-GAC Regional Transportation Plan – HGAC RTP H-GAC List of Unfunded Projects –HGAC Unfunded

Texas Department of Transportation – TxDOT Baytown Mobility Plan analysis – BMP

* = Cost information provided from project source document (e.g., TIP, HGAC RTP, etc.)

^ Includes 2-5 bike lanes and two 5 foot sidewalks.



10.6. Funding Needs

10.6.1 Roadway

10.6.1.1 Near-Term Roadway Needs

As of August 2012, there are 31 roadway project included in the Near Term Roadway Project List totaling \$236.6 million. Funding has been identified for 80 percent of the near term roadway needs based on project cost. The City of Baytown has funding commitments for \$50.9 million or nearly 20% of the value of the work as shown in **Figure 10-1**.

The near-term roadway list includes three unfunded projects on Sjolander Road needed to improve access for the \$ 3 billion ethylene plant construction at Chevron Phillips Chemical Co. announced in December 2011. The three projects on Sjolander Road represent 47% of the unfunded needs as shown in **Figure 10-2**. One of these projects is to widen 0.8 mile of Sjolander at IH 10. Funding for this project is assumed to be a combination of city, county and TxDOT funds. The other two projects on Sjolander Road, totaling \$19.0 million is assumed to be county funding for the purpose of this analysis.

10.6.1.2 Mid-Term Roadway Needs

The initial focus of the Thoroughfare Plan Update was to identify all roadway needs and to help develop a potential group of near-term project for the next bond elections. Consequently, the lists of mid-term and long-term projects do not include the construction cost estimates. The analysis compares the number of projects by jurisdiction. There are 25 mid-term projects listed in **Table 9-3**. Only one of the projects are considered to have funding commitments:

- SH 146 – from BS 146E to Ferry Road (Baytown)

SH 146 is shown in the RTP as moving to construction in 2020 and currently in the environmental studies phase for construction mainlanes and an interchange. Since Baytown is listed as the sponsor of this project in the RTP, the implication is that Baytown would finance the project. As Baytown coordinates with H-GAC and TxDOT on the development of the 2040 RTP, the funding commitment for the project should be re-visited.

E. Cedar Bayou –Lynchburg Road is included in the mid-term list to allow the environmental studies to be performed, but it has not been assigned a target construction year yet. The project is shown in the H-GAC RTP as widening to a four-lane roadway with a two-way left-turn lane. Upon adoption of the new typical sections, this description and the construction cost estimate may need to be revised.



Figure 10-1. Value of Near Term Projects by Jurisdiction

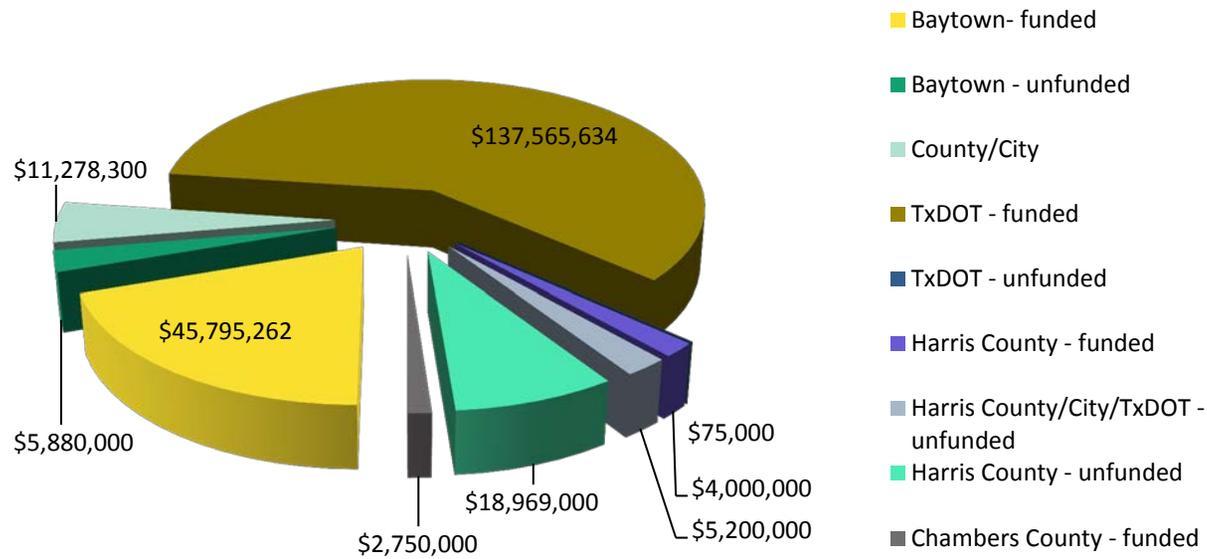


Figure 10-2. Value of Unfunded Near Term Projects by Jurisdiction

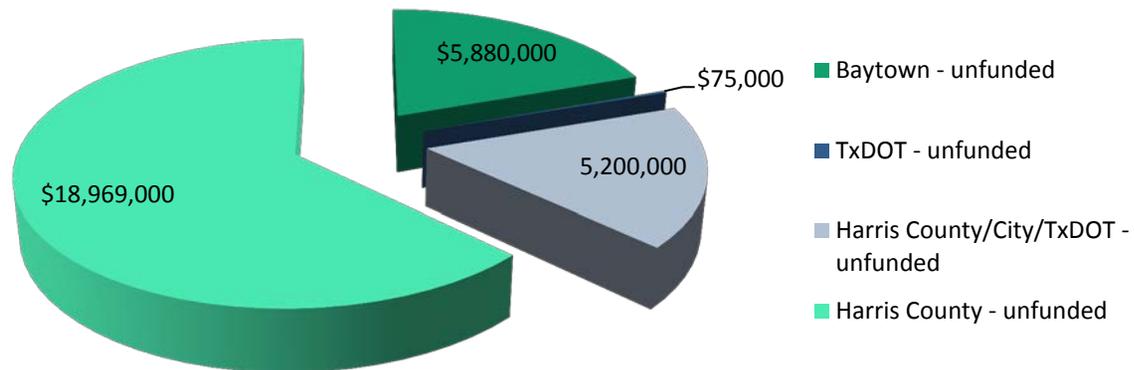




Figure 10-3 shows the number of proposed mid-term projects by jurisdiction. Nearly one-half of the projects fall within the city’s jurisdiction.

Figure 10-3. Number of Mid-Term Projects by Jurisdiction

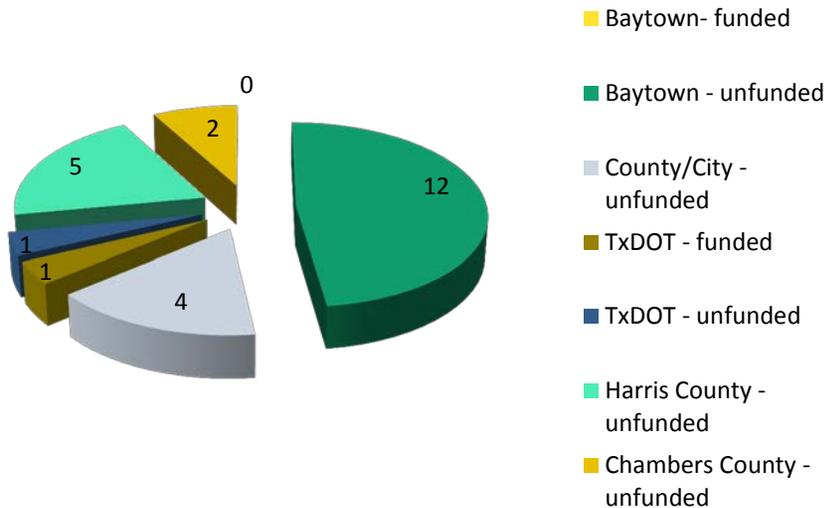
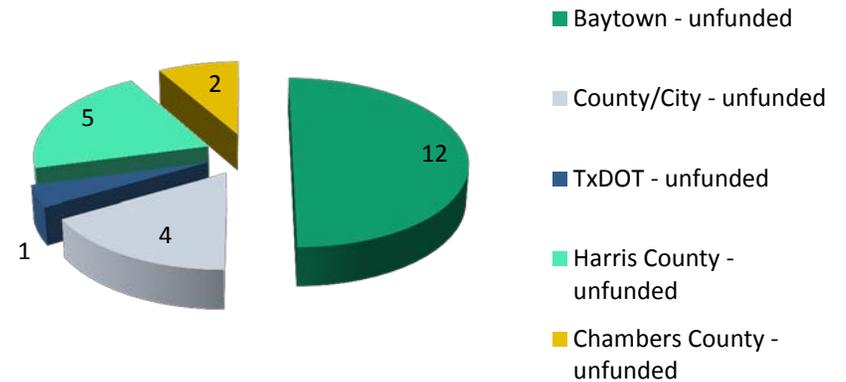


Figure 10-4 shows the distribution of the unfunded projects by jurisdiction. Twelve of the projects are city projects that currently do not yet have funding identified. Since the city finances major roadway projects by general obligation bonds funding commitments are typically considered two to four years prior to the proposed year of construction. Similarly, the unfunded county projects would be candidates for future county bond packages.

Both the city and the county need to pursue agreements with developers to help pay for roadway improvements as new developments are platted along the two-lane roadways in the ETJ.

Figure 10-4. Number of Unfunded Mid-Term Projects by Jurisdiction



10.6.1.3 Long Term Projects

Figure 10-5 shows the distribution of the long-term projects included in the Thoroughfare Plan Update. Most of the unfunded projects were included in earlier versions of the RTP, but were removed from the RTP due to the federal requirement that RTP’s only list projects that can be constructed with reasonably anticipated future funding. H-GAC chose to move unfunded projects into a separate list. There are 68 long-term projects identified but only the two projects on SH 99 have funding commitments. The distribution of the unfunded projects is shown in Figure 10-6.



Figure 10-5. Number of Long-Term Projects by Jurisdiction

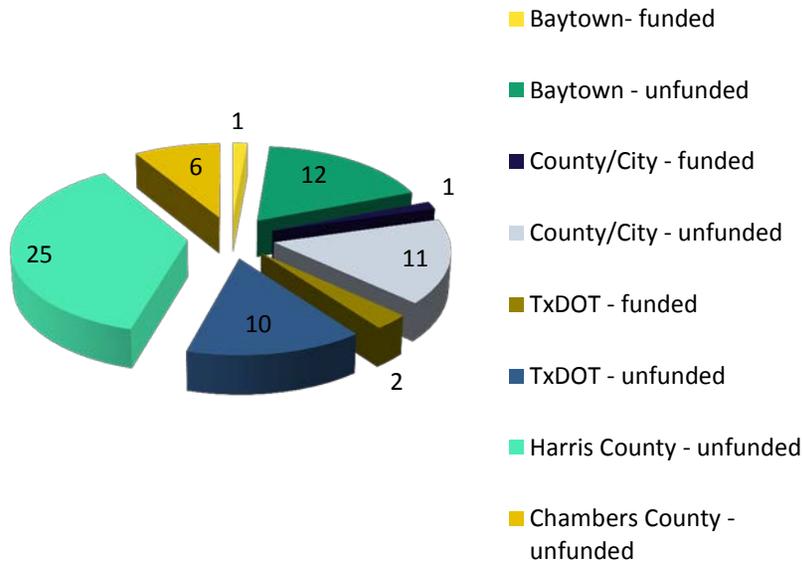
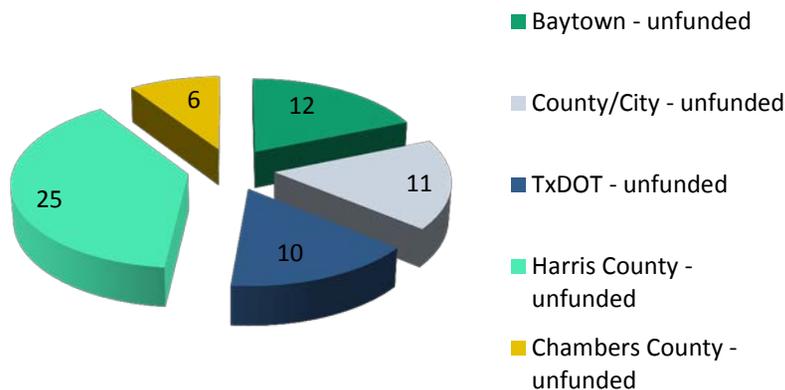


Figure 10-6. Number of Unfunded Long-Term Projects by Jurisdiction



10.6.2 Pedestrian and Bicycle Funding Needs

The *Playbook* identified several types of improvements to increase mobility for pedestrians and bicyclists. The need range from adding sidewalks in proximity to elementary and middle schools to adding sidewalks along commercial corridors. There is a limited amount of trails in Baytown and its ETJ. It also recommended developing a network of non-motorized facilities that would interconnect the recreational uses with mobility uses. As described in **Section 7.4**, the types of facilities can be described as:

- Regional or Arterial Trails
- Neighborhood Trails
- Natural Corridor Trails
- Parkway Sidewalks
- Paddling Trails
- On-Street Bicycle Lanes
- Pedestrian Bridge and Underpasses (*Playbook*, 2010)

The City should work with a stakeholder/advisory group to identify priorities within each type of facility, recommended funding levels and timing of specific projects.

10.6.3 Transit Needs

Bus

Funding for the circulator bus service is currently provided under a cost-sharing agreement between the City of Baytown. The local share of the METRO express bus service is provided by Harris County Transit as the city is outside of the METRO service area.

Commuter Rail

The conceptual cost for creating a commuter rail service on existing freight tracks is estimated a \$9.1 million per mile. As the population density along IH East increases over time, the prioritization of commuter rail corridors needs to be revisited and adjusted accordingly. The proposed Future Land Use Map provides for increased density around the proposed commuter rail stations to generate potential transit users. As the pool of potential commuters increases, the City would need to begin discussions through



H-GAC with the commuter rail operator - either METRO or Gulf Coast Rail District – to determine if the city would be asked to help finance capital and/or operating costs to extend service to Baytown.

10.7 Financing Options

Baytown already uses several innovative financing options for funding transportation and other community needs. The following suggestions are additional funding options that should be considered.

10.7.1 Pass-Through Financing

If there is an improvement on the state system that is a high local priority, but low TxDOT priority, Baytown should consider Pass-Through Finance to get the project done more quickly. TxDOT currently expects the local jurisdictions to pay for the design and environmental analyses and typically does not reimburse the full construction cost. The benefit is the interest rates are generally below market value and the repayment terms (price per vehicle and length of term) is negotiated on a case-by-case basis. The projects generally follow the federal requirements for professional services procurement and environmental analyses.

10.7.2 State Infrastructure Bank

This fund can be used for a variety of elements of qualifying transportation projects, from ROW acquisition to utility adjustments to construction. The

interest rates are generally lower than market rates and the repayment terms are negotiated on a case-by-case basis.

10.7.3 Tax Increment Finance

Expand use of tax increment finance districts to capture the property tax on the increased value as development occurs to pay for major transportation improvements. This would be particularly beneficial around future commuter rail stations to generate any needed local match.

10.7.4 Public Improvement Districts

Another option for funding major transportation projects would be to establish a public improvement district to assess a tax on the property to recover the cost of the improvements. As an example, this option could be used pay for widening a two-lane roadway to four-lanes in addition to the water and wastewater lines to a new large residential, commercial, or industrial development.

10.7.5 Direct User Fee

Some cities collect a modest fee, \$5 to \$15-per year on vehicles owned by residents and businesses located within the city limits. These funds could be used variety of purposes, including street maintenance, roadside beautification, construction, etc.



CHAPTER 11. CONCLUSIONS AND RECOMMENDATIONS

11.1 Introduction

The Baytown Mobility Plan encompasses the full range of transportation options currently available in Baytown, as well as the long-range vision for commuter rail service to downtown Houston. This chapter provides a concise summary of conclusions related to the various modes and needs as well as recommendations for implementing the various elements of the plan.

Within each section, the recommendations are presented in a recommended order for implementation. **Figure 11-1**, Next Steps, is provided at the end of this chapter to show the relationship between the various recommendations.

11.2 Proposed Future Land Use Map

Transportation planning and land use planning are interrelated activities that must be balanced so the transportation system is able to adequately support the land use with appropriate facilities and capacities. Conversely, transportation investments should be planned to encourage the development of the desired land use.

The transportation demand developed in this planning effort was derived from the proposed Future Land Use Map shown in **Figure 3-4**. The proposed Future Land Use Map was developed in close collaboration with city staff and several elements of the plan have already been considered by the Planning and Zoning Commission.

Conclusion: The proposed Future Land Use Map provides a balanced approach for future residential, commercial and industrial development within the City of Baytown and the ETJ.

Recommendations:

- Adopt the proposed Future Land Use Map.
- Upon adoption, submit proposed Future Land Use Map to provide H-GAC for use in developing the demographic forecast for the 2040 RTP.

11.3 Travel Demand Model

The H-GAC travel demand model for the 2035 RTP was used as the basis for developing a model specific for Baytown and its ETJ for 2035. Several enhancements were made to the model to include recently completed highway projects and to reflect the proposed Future Land Use Map. To maintain consistency with H-GAC's 2035 population forecast, the same total population for Baytown was used for this effort.

To comply with federal requirements, only those regionally significant projects that can be constructed within the reasonably anticipated funding can be included in the 2040 RTP. Therefore, some of the improvements included in the Baytown TDM may not be reflected in H-GAC's 2040 TDM.

Conclusion: The travel demand model for the next iteration of the RTP needs to be updated to reflect the existing roadway network, the proposed redistribution of population and employment based on the proposed Future Land Use Map and the recommended changes to the transportation network. The proposed improvements to the roadways in the Thoroughfare Plan Update in conjunction with the proposed Future Land Use Map provide a 5.4% reduction in VMT and 4.8% reduction in VHT compared to the current 2035 RTP model.

Recommendations:

- Adopt the Baytown Mobility Plan.
- Submit the updates to the existing transportation network to H-GAC.
- Collaborate with H-GAC on the new demographic forecasts based on the proposed Future Land Use Map.

11.4 Thoroughfare Plan Update

The proposed update to the Thoroughfare Plan provides a blueprint for roadway improvements that will be needed in response to the anticipated growth in Baytown and the ETJ over the next 25 years.



Conclusions: The proposed 2035 Thoroughfare Plan Update is the first such plan to include improvements in the ETJ. The implementation of the proposed improvements will provide the system capacity necessary to serve the anticipated growth forecast in H-GAC's 2035 RTP.

Recommendations:

- Adopt the proposed Thoroughfare Plan Update.
- Submit the Thoroughfare Plan Update and the proposed typical sections to H-GAC. Revise the various city ordinances to reflect the new typical sections. A comprehensive list of affected ordinances is provided in **Appendix F**.
- Prioritize projects based on reasonably anticipated funding to prepare for H-GAC's 2040 RTP planning effort.

11.5 Bicycle and Pedestrian Facilities

Public comments regarding providing more facilities for bicyclists and pedestrians were received at all of the activities open to the public and at several stakeholder meetings. The recent adoption of The *Playbook* provides the basis for developing a plan for adding to the network of trails, sidewalks and bicycle lanes.

Conclusion: Residents support the need for additional bicycle and pedestrian facilities to connect residential areas to neighborhood schools and to connect neighborhoods, particularly multi-family areas, to adjacent commercial centers.

Recommendations:

- Adopt the new typical sections for new residential and commercial development.
- Inventory existing sidewalks including ADA compliance.
- Develop a policy for retro-fitting sidewalks where needed along commercial and neighborhood streets. Design standards from AASHTO and a sample ordinance are included in **Appendix D**.
- Develop the following recommendations:

- Establish target funding levels for the proposed pedestrian and bicycle programs identified in **Section 7.5.2.5, Proposed Programs**.
- Prioritize projects within each program in accordance with recommendations in the *Playbook*.

11.6 Access Management

Access management is a process that consolidates access to roadways, channelizes traffic flow, optimizes signal timings and consequently reduces conflict points in the roadway system. The result is a safer roadway system that allows better access opportunities and improves overall traffic flow.

Conclusion: Key commercial corridors in Baytown will be candidates for access management treatments as traffic continues to increase. Adoption of an access management policy could limit the potential for another highly congested commercial corridor.

Recommendations:

- Expand the current access management policy through adoption of the proposed Access Management Ordinance provided in **Appendix D**.
- Revise ordinances relating to commercial developments to incorporate reference to the proposed Access Management Ordinance.
- Monitor crash data to identify any trends or high accident locations or corridors that might benefit from access management.

11.7 Financing and CIP

Funding for transportation improvements can come from a variety of federal, state, local and private sources. The new federal surface transportation bill, MAP-21, was enacted in July 2012 at the end of this planning effort. There are substantial changes in the federal programs that will need to be monitored as the new bill is put into effect. State funding can either be traditional (e.g., rehabilitation and preventive maintenance) or non-traditional (e.g., grants from Texas Parks and Wildlife) or economic development incentives (e.g., the early segment of SH 99). Private sources are typically cost sharing for improvements in or to commercial and/or residential developments.



Conclusion: Baytown should continue to expand the range of non-traditional funding sources to leverage available federal, state and local funds while continuing to submit candidate local projects for federal funds.

Recommendations:

- Coordinate developing a methodology for prioritizing roadway, bicycle and pedestrian projects by the Bond Committee in preparation for the next bond election for capital improvements.
- Identify timeframes and candidate projects for each of the funding sources identified in Chapter 8, The Home Stretch, of the *Playbook*.
- Consider Pass-Through Financing as a funding mechanism for high priority projects on the state system.
- Consider the State Infrastructure Bank as an alternative to general obligation bonds for financing ROW, utility adjustments and/or construction of transportation improvements.
- Consider expanding the use of tax increment finance districts and including transportation improvements in addition to water and wastewater infrastructure.

11.8 Transit Service

Baytown currently has a local circulator bus route and express bus service to downtown Houston. Harris County Transit provides three fixed routes in Baytown and a fourth route that connects the Highlands/McNair/Crosby area to a transfer point located at the park & ride lot at San Jacinto Mall. Express bus service operated by METRO runs between San Jacinto Mall and downtown Houston.

The proposed Future Land Use Map includes a long-range vision for commuter rail service to Houston using a combination of the existing Union Pacific tracks and new location rail parallel to IH 10 between Wade Road and Sjolander Road.

Conclusion: Ridership on the transit service is good for a small system, however there is not enough residential density east of Houston in the IH 10 corridor to support commuter rail at this time.

Recommendations:

- Upon adoption, provide H-GAC the following documents for their use in developing the 2040 RTP:
 - Recently adopted Unified Land Development Code.
 - Proposed Future Land Use Map
 - Baytown Mobility Plan
- Monitor ridership trends quarterly with Harris County Transit to assess the need for route adjustments.
- Coordinate with Harris County Transit to assess the potential for JARC funding to help offset the cost of a reverse commute from Houston to Baytown using the express bus service.
- Explore other grant opportunities to provide the local match for candidate JARC projects.
- Monitor the implementation of MAP-21 related to FTA.

11.9 Cedar Bayou Port Infrastructure Needs

Cedar Bayou is used for both recreational and commercial purposes and is maintained by the Chambers County Cedar Bayou Navigation District. Commercial usage is limited to barge traffic due to the shallow depth of the navigable channel.

Additional marine facilities along Cedar Bayou can be developed by the navigation district, Cedar Crossing Industrial Park, or any of the land owners along the waterway but improvements are subject to the approval of the U.S. Army Corps of Engineers. A potential long-range project would be development of a new deep water port which could be located near the mouth of Cedar Bayou or along the waterfront.

There is sufficient land-side infrastructure (roads and rail service) to support moderate expansion of any of the existing dock facilities. New facilities, such as the potential deep water port would require extension of the rail service and utilities.

Conclusion: Continued industrial development in western Chambers County may generate the need for additional marine facilities along Cedar Bayou, as well as additional land-side improvements, such as utilities, roadway improvements, and additional rail service.



Recommendations:

- Continue to collaborate with the Baytown Economic Development Foundation on industrial development trends.
- Track expansion plans for the Port of Houston Authority.
- Monitor the application by Chambers County to designate Cedar Bayou as a marine highway (Municipal Development District, 2012).

11.10 Aviation

Baytown Airport is a privately-owned facility located among low-density residential land use in the ETJ. The airport recently increased the number of hangers which led to an increase in the number of aircraft based at the facility. Additional improvements that would be needed to upgrade the airport's status to a reliever airport were considered in this planning effort.

The Airport Zoning Act provides cities and counties the ability to zone land near airports for compatible land uses. The appropriate zoning strategy is up to the jurisdictional entity and should be carefully planned and considered, as well as undergo review by counsel.

Conclusion: The Baytown Airport provides access to Baytown and the major businesses for general aviation. Low-density residential development

is located immediately adjacent to the airport. Any additional expansion of the runway would impact either East Archer Road or East Cedar Bayou-Lynchburg Road.

Recommendations:

- Meet with the airport manager to track airport usage and improvement plans.
- Consider an airport zoning ordinance to control future land use in the vicinity of the airport.

11.11 Next Steps

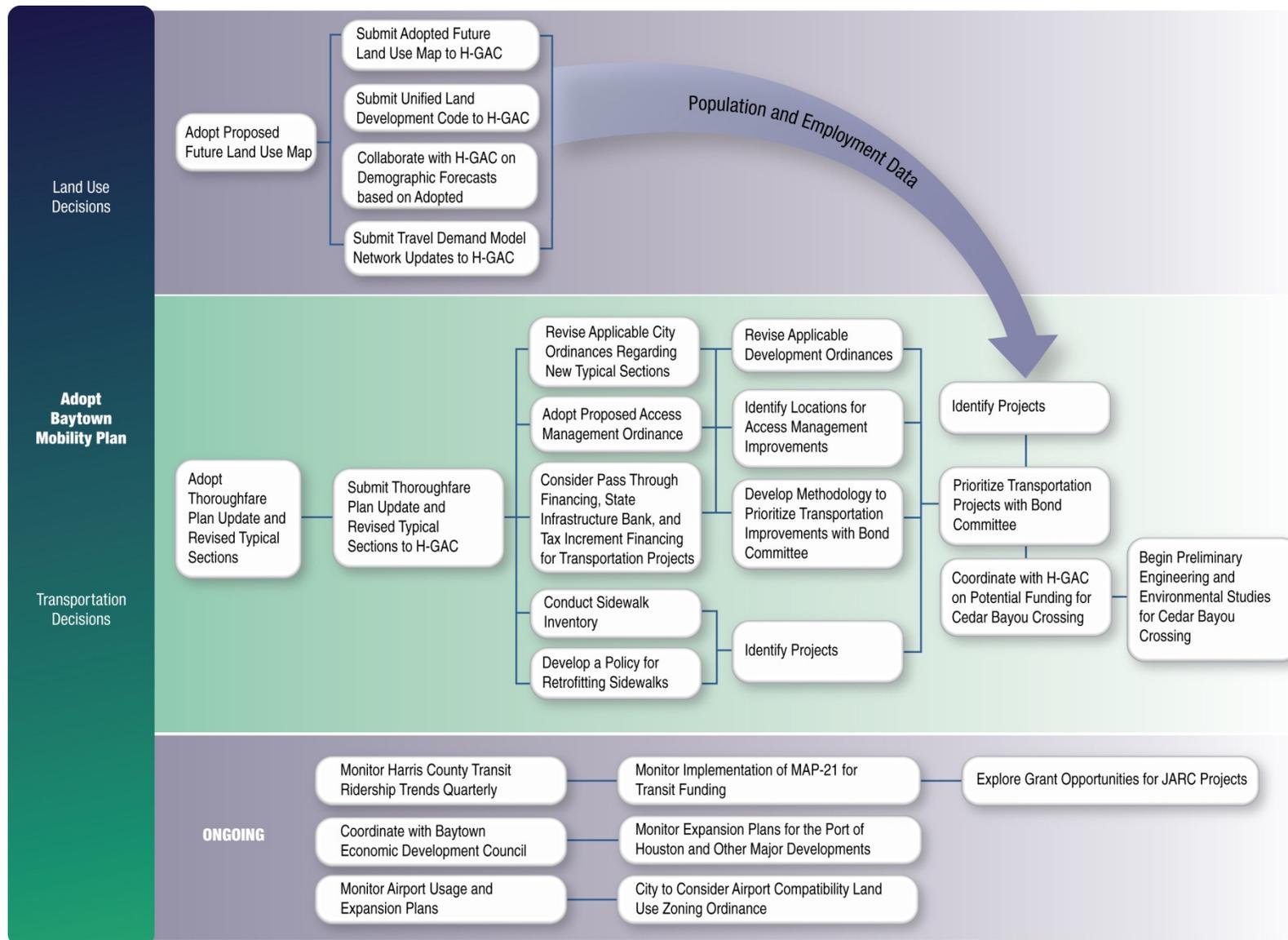
There are a number of interrelated recommendations included in this chapter. **Figure 11-1** shows the relationship between sequential events that will begin upon adoption of the Baytown Mobility Plan and the ongoing monitoring/coordinating activities that are proposed.

11.12 Plan Update

The Baytown Mobility Plan should be reviewed periodically and updated to reflect the ongoing development in Baytown. The Thoroughfare Plan should be updated in conjunction with the H-GAC RTP cycle, which is every five years, to reassess priorities as Baytown and the ETJ continues to develop.



11-1. Next Steps



Baytown Mobility Plan Consulting Team



URS

T B G

 **ALLIANCE**
TRANSPORTATION GROUP

Baytown Mobility Plan Consulting Team

