SH 225 Major Corridor Feasibility Study

Final Report

Prepared for: Texas Department of Transportation
Houston District

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SH 225
Corridor Feasibility Study

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EXECUTIVE SUMMARY

E.1 INTRODUCTION AND OVERVIEW

In August of 2003, the Texas Department of Transportation (TxDOT) contracted with Carter & Burgess, Inc., to conduct a Major Corridor Feasibility Study (MCFS) for the SH 225 travel corridor in Harris County, Texas. The purpose of this MCFS is to answer critical questions about future transportation options within the study corridor. A MCFS is a decision-making process designed to identify transportation needs for the corridor; evaluate alternative, multi-modal solutions; and garner public confidence and support for the recommended alternative.

SH 225 is located in the eastern portion of Harris County approximately 1.5 miles south of the Houston Ship Channel. (See Exhibit E-1.) It begins just west of the Interchange with IH 610 South and extends easterly for approximately 15.5 miles to the Interchange with SH 146. The corridor is anchored on the western side by the multilevel interchange of IH 610 and IH 45, which serves as a nexus for traffic destined in all directions. The study area begins in the City of Houston, passes through the City of Pasadena and the City of Deer Park, and terminates in the City of La Porte. The development on both sides of the freeway is petrochemical plants and "tank farms" except for limited residential and business areas through the cities of Pasadena and Deer Park. The Union Pacific Railroad and the Port Terminal Railroad basically parallel the north side of the freeway for its entire length and also parallel the south side from the City of Deer Park to the terminus at SH 146. The SH 225 Corridor serves as a primary access route to the Port of Houston's Barbours Cut Container Terminal and is perceived to have a high level of truck traffic.

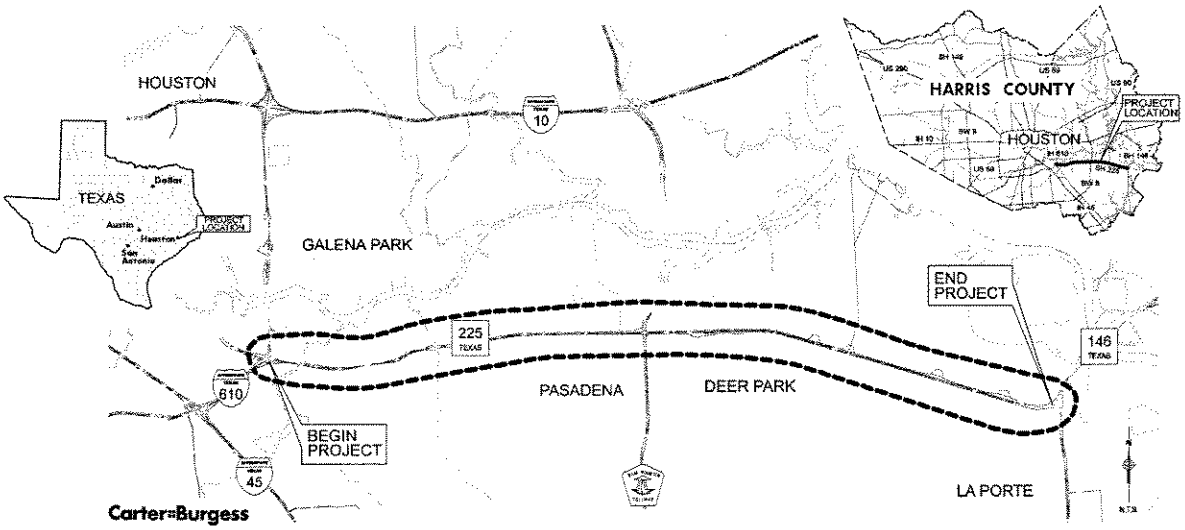


Exhibit E-1: SH 225 Corridor

E.2 PURPOSE AND NEED

There are several key problems and needs in the SH 225 Corridor illustrated through the stakeholder comments and technical review, as follows:

- Existing conditions in the corridor show that mobility and safety improvements are warranted, including but not limited to reducing the number of accidents.
- There is recurring traffic congestion, particularly at key intersections and interchanges.
- Connectivity, particularly at IH 610 and Beltway 8, should be improved.
- Additional information is needed about the travel characteristics of current carpoolers to determine whether that mode share can be increased through HOVs, priority treatments, or other incentives.
- The relationship of truck volume to other traffic, including a time-of-day, and directional assessment should be ascertained to determine the need for managed lanes or other truck lane treatment.
- A determination of short or long range public transit demand is needed.
- Hurricane and other emergency evacuation routes should be addressed.
- It is important to facilitate access for travelers destined to the historic San Jacinto landmark.
- The corridor study and any recommended improvements must be attentive to air quality and emissions levels, as well as other environmental variables. Sensitive areas, such as parks and designated open space, schools and homes will be a focus.

E.3 PUBLIC INVOLVEMENT

Three rounds of the public meetings for SH 225 MCFS were held on Thursday, December 4, 2003, at the Pasadena Convention Center, 7902 Fairmont Parkway, Pasadena, Texas; Thursday, April 29, 2004, at Pasadena High School, 206 South Shaver, Pasadena, Texas; and Wednesday, May 25, 2005, at Deer Park Activity Center, 500 W 13th Street, Deer Park, Texas. The purpose of these meetings was to present the project's purpose, process, and objectives; the project's universe of alternatives; and the project's analysis of alternatives and the draft recommended alternative. Additionally, these meetings were to provide the public, local elected officials and agencies an opportunity to voice their specific concerns and to provide TxDOT with their input and comments on the issues, alternatives, and analysis of the SH 225 MCFS. The meetings were conducted in an open house format and consisted of exhibits and large scale maps. The public was encouraged to ask questions and provide both oral and written comments at each of the meetings.

E.4 TRANSPORTATION GOALS AND OBJECTIVES

Goals and objectives are designed to address the corridor needs and anticipated future travel patterns expressed by frequent corridor travelers and area residents and identified as part of the initial technical assessment.

Goal 1: Improve traffic safety:
- Provide information to direct corridor travelers
- Provide standards with design clearances and merge distances
- Reduce accidents
- Reduce real or perceived conflict with truck traffic
- Reduce intersection conflict
- Provide a consistent and uniform driving condition

Goal 2: Improve mobility:
- Provide facility and systems that meet the travel needs of people and goods
- Facilitate access to residential and employment areas
- Relieve choke point at IH 610
- Accommodate future travel demand growth
- Maintain or improve the Level of Service (LOS)
- Improve interchanges at East Boulevard and Battleground Road

Goal 3: Improve hurricane and other emergency evacuation route:
- Provide evacuation route alternatives
- Ensure accurate signage and communication techniques to guide travels in event of an emergency
- Focus on issues of security for corridor industries

Goal 4: Improve travel choices and access:
- Provide options that increase the incentives to ridesharing or take transit
- Include provisions for non-motorized travel
- Maintain opportunities for corridor preservation
- Improve local access at frontage roads and arterials

Goal 5: Protect natural and social environment:
- Maintain or improve air quality
- Maintain or improve economic viability of the corridor
- Maintain or improve the quality of life in the corridor
- Reduce, minimize or mitigate adverse impacts any improvements may have on the natural or built environment

Goal 6: Maximize the utility of existing infrastructure:
- Optimize traffic signal timing and other low cost improvement

E.5 ALTERNATIVES CONSIDERED

The full range of conceptual alternatives was derived from the corridor goals and objectives along with the physical constraints identified and input from the public and elected officials.

Of the 15 conceptual alternatives, 12 were recommended to be carried forward into the detailed evaluation phase of this study. These 12 alternatives were further refined to produce seven viable alternatives for detailed evaluation. The No Build, No Build with Committed Projects, Widen Freeway by One General Purpose Lane in each Direction, Segregated Truck Lanes, Convert to Toll Road, and Commuter Rail alternatives were carried forward as originally defined. The High Occupancy Vehicle Lanes (HOV) and High Occupancy Toll Lanes (HOT) alternatives were combined to form an HOV/HOT Lanes alternative. The Major Interchange Modifications (IH 610/SH 225) and (Beltway 8/SH 225) alternatives along with the Minor Interchange Modifications (IH 610/SH 225) and (Beltway 8/SH 225) alternatives were combined with other ramp improvements along the SH 225 Corridor to form a Interchange/Ramp Improvements alternative.

No Build

The No Build alternative is the *de facto* alternative because it is always viable until a decision is made to implement a build alternative. The No Build alternative applies 2025 demographic data and travel demand to the 2003 modeling network. It represents an assumption that no construction or transportation projects are implemented between 2003 and 2025.

No Build with Committed Projects

The No Build with Committed Projects alternative applies 2025 demographic data and travel demand to a 2025 modeling network that includes all the committed and planned transportation projects.

Widen Freeway

The Widen Freeway alternative would add one general purpose lane in each direction from IH 610 to Beltway 8. General purpose lanes are regular freeway lanes that are open to all types of vehicles.

HOV/HOT Lanes

The HOV/HOT Lanes alternative would add a special use lane in each direction from IH 610 to SH 146. HOV lanes are used for carpools, vanpools, and buses. HOT lanes are limited-access highway lanes that provide free or reduced cost to access for qualifying HOVs, and also provide access to other paying vehicles not meeting passenger occupancy requirements.

Interchange/Ramp Improvements

The Interchange/Ramp Improvements alternative would involve major modifications to the IH 610/SH 225 interchange and the Beltway 8/SH 225 interchange. Minor ramp modifications and the addition of auxiliary lanes to SH 225 are included in this build alternative.

Segregated Truck Lanes

The Segregated Truck Lanes alternative would involve adding a single truck-only lane in each direction to SH 225 between IH 610 and SH 146.

Convert to Toll Road

The Convert to Toll Road alternative would convert SH 225 from a free facility to a toll road. Entering vehicles would be required to pay $0.10 per mile to use SH 225. In addition to converting to a toll road, this alternative would include complete reconstruction of SH 225.

Commuter Rail

The Commuter Rail alternative would involve the implementation of a commuter rail line from just west of IH 610 to SH 146. Commuter rail refers to passenger rail service between a city center and its suburbs. Commuter rail takes advantage of existing rail infrastructure and/or right-of-way, often in the form of active freight rail lines or abandoned former rail lines.

E.6 EVALUATION OF VIABLE ALTERNATIVES

The detailed screening used the same evaluation criteria as the fatal flaw screening. However, more quantitative evaluation was conducted for selected evaluation criteria. Specifically, traffic modeling of some viable alternatives was used to evaluate the effectiveness of various modes of travel. The detailed evaluation also incorporated some new variables such as conceptual level capital, operating, and maintenance costs of each alternative.

Categories of assessment are identified in order to evaluate the alternatives according to the goals established earlier in the corridor study. Within each category are objective guidelines that in combination allow an assessment of each viable alternative.
Categories of Assessment are as follows:

- Improve Traffic Safety
  - *Traveler Information*
  - *Consistency with Design Standards*
  - *Conflicts with Trucks*
  - *Ramp/Frontage Road Accessibility*
- Improve Mobility

Current Travel Demand
Addresses Current Choke Points
Future Travel Demand

- Conceptual Costs
  Capital Costs
  Maintenance Costs
  Operating Costs
  Constructability

- Benefit/Cost Ratio

- Improve Emergency Evacuation Route
  Provides Evacuation Route
  Communication for Emergency Travel

- Protect Natural and Social Environment
  Air Quality
  Economic Development
  Natural and Built Environment

- Maximize Existing Infrastructure
  Transportation Demand Management (TDM) strategies
  Transportation System Management (TSM) strategies
  Intelligent Transportation Systems (ITS) strategies

Table E-1 provides a summary of the evaluation process. The Interchange/Ramp Improvements alternative received the best ranking of all the short list build alternatives. The HOV/HOT Lanes and No Build with Committed Projects alternatives received the second highest ranking. The Widen Freeway and Segregated Truck Lanes alternatives received the third highest ranking. Convert to Toll Road alternative received the next highest ranking. The No Build alternative received the next to lowest ranking and the Commuter Rail alternative received the lowest ranking.

Table E-1: Summary of Detailed Evaluation

Alternatives	Improve Traffic Safety	Improve Mobility	Conceptual Costs	Benefit/Cost Ratio	Improve Emergency Evacuation Routes	Protect Natural & Social Environment	Maximize Existing Infrastructure	Ranking
No Build	-3	-2	+2	-1	0	-2	0	6
No Build w/Committed Projects	-2	-2	+3	-1	+1	-2	+2	2
Widen Freeway (one lane each direction)	0	0	0	0	+1	-3	0	4
Add HOV/HOT Lanes	+1	-1	-2	0	+2	-3	+2	2
Interchange/Ramp Improvements	0	+1	+2	0	+1	-3	+1	1
Segregated Truck Lanes	0	-1	+1	0	+1	-3	0	4
Convert to Toll Road	-2	-1	-3	-1	+1	-2	+2	6
Commuter Rail	-3	-1	-2	-1	+1	-2	+1	8

E.7 RECOMMENDED ALTERNATIVE(S)

The Interchange/Ramp Improvements alternative received the highest ranking of all the short list build alternatives. The HOV/HOT Lanes alternative was a close second to the Interchange/Ramp Improvements alternative. The HOV/HOT Lanes alternative, however, has a significant issue with constructability east of Beltway 8. Specifically, this alternative will require right-of-way in Deer Park adjacent to the Union Pacific Railroad. The railroad is an extremely busy freight rail line, and acquiring the needed right-of-way for the HOV/HOT Lanes alternative could prove difficult if not impossible. The Widen Freeway and Segregated Truck Lanes alternatives performed reasonably well and were ranked just below the HOV/HOT Lanes alternative.

Based on the detailed evaluation process, the recommended alternative is the Interchange/Ramp Improvements alternative. Because the No Build with Committed Projects alternative will be implemented over the next twenty years, the combination of it and the recommended alternative will provide considerable mobility, safety, and traffic operations benefits for the users of the SH 225 travel corridor.

Because traffic volumes are expected to increase beyond the twenty year planning horizon, long range (beyond 2025) considerations for the SH 225 Corridor should include further examination of the Widen Freeway by One Lane in Each Direction between IH 610 and Beltway 8 or the Segregated Truck Lanes alternative. In addition, a HOT/Managed Lane alternative between IH 610 and Beltway 8 should be considered.

1.0 PURPOSE AND NEED

1.1 STUDY AREA SETTING AND CONTEXT

1.1.1 Study Area Description

SH 225 is located in the eastern portion of Harris County approximately 1.5 miles south of the Houston Ship Channel. It begins just west of the Interchange with IH 610 South and extends easterly for approximately 15.5 miles to the Interchange with SH 146 (see Exhibit 1-1). The corridor is anchored on the western side by the multilevel interchange of IH 610 and IH 45, which serves as a nexus for traffic destined in all directions. The study area begins in the City of Houston, passes through the City of Pasadena and the City of Deer Park, and terminates in the City of La Porte. The development on both sides of the freeway is petrochemical plants and "tank farms" except for limited residential and business areas through the cities of Pasadena and Deer Park. The Union Pacific Railroad and the Port Terminal Railroad basically parallel the north side of the freeway for its entire length and also parallel the south side from the City of Deer Park to the terminus at SH 146. The SH 225 Corridor serves as a primary access route to the Port of Houston's Barbours Cut Container Terminal and is perceived to have a high level of truck traffic.

1.1.2 Regional Context

The Houston metropolitan area has just over 4.6 million people according to the 2000 census and projections show about 7.6 million residents will inhabit the region in 2025. The employment base will grow from almost 2.9 million jobs in 2000 to approximately 4.5 million in 2025. (See Table 1-1.)

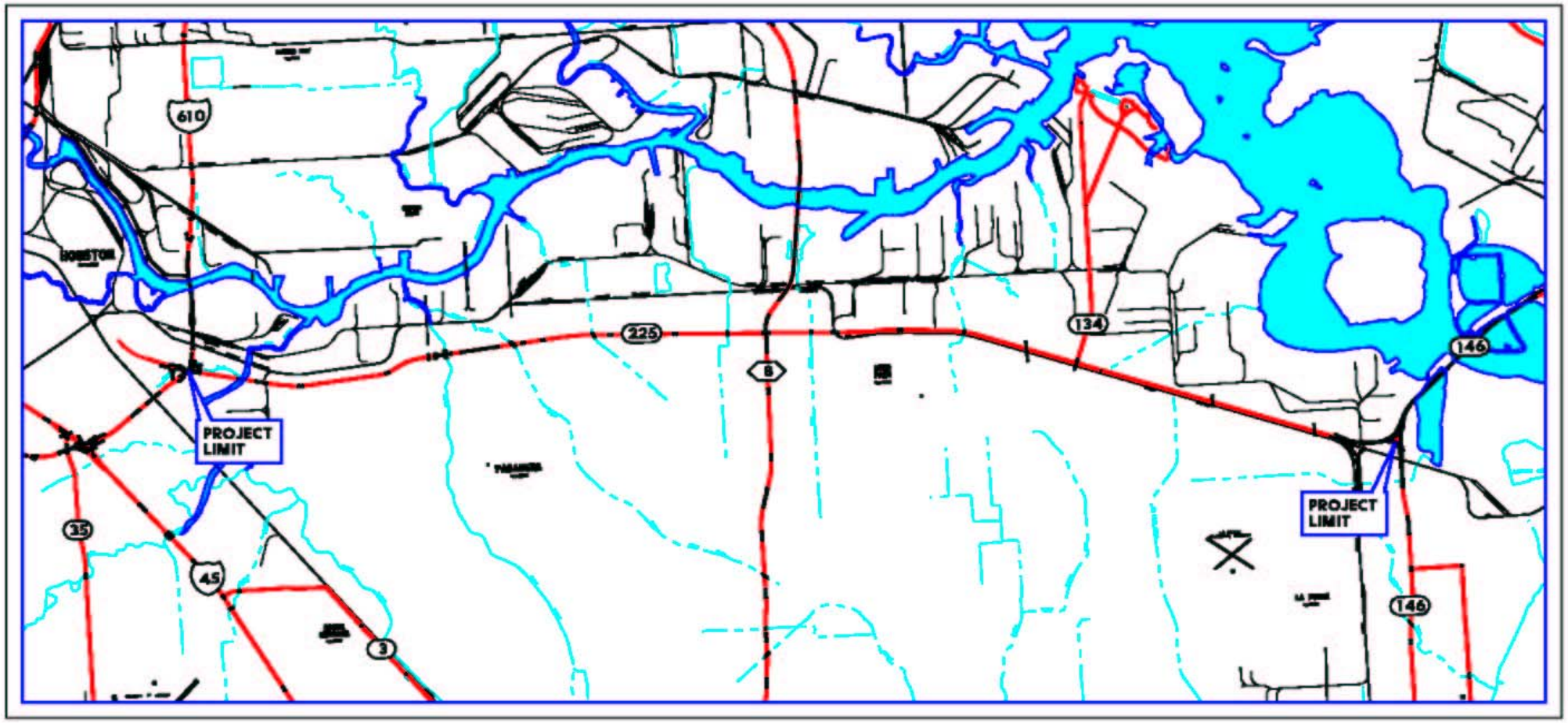
Table 1-1: Metropolitan Area Growth

	2000	2025	Change	Percent Change
Population	4,670,000	7,664,000	2,994,000	64.11%
Employment	2,863,000	4,471,000	1,608,000	56.16%

Source: 2000 US Bureau of Census, Socioeconomic Characteristics, provided by H-GAC; 2025 H-GAC-endorsed forecasts prepared by REMI Policy Insight, 2025 Forecasts. January 2003

The majority of the growth is expected in the far west and northwest sections of the region, but the south and east areas of the county, including the SH 225 Corridor, will also experience large increases in population and employment. Most travel routes in the region are already known for extreme peak hour congestion and for many of those corridors daily hours of delay are steadily increasing. According to the Texas Transportation Institute (TTI) data, approximately 40 percent of the peak period travel in the Houston-Galveston region occurred under extreme and severe congestion in 1999 compared to 26 percent in 1982 (Urban Mobility Report) The region's daily person trips are estimated at 16.1 million. New infrastructure funding is not available to maintain pace with the growth in travel movement.

Exhibit 1-1: Study Area



Transportation professionals are advocating a group of solutions including more capacity, better systems management, improved utilization of existing capacity, and a broad range of residential and employment location options that allow residents to efficiently match where they live and where they work. (Trip 2000).

1.1.3 Corridor Context

The first section of SH 225 opened in 1966 and was initially designed to enter downtown Houston from the east side. Instead, the freeway ends at IH 610 and links travelers to IH 45, IH 610, and Lawndale Street. The corridor is viewed as highly industrial and is home to a number of oil and related industry refineries. The greatest concentration of employment is in Deer Park with other concentrations of employment proximate to the freeway and in Pasadena. Housing is located throughout the corridor beginning in Houston and continuing to La Porte. Corridor population and employment are projected to increase over the next two decades with 34 percent growth in population and more than 63 percent growth in employment (Houston-Galveston Area Council [H-GAC], 2003). The growth will occur in all areas, except Deer Park, which has essentially no land for growth and does not expect redevelopment to higher density uses.

1.2 GROWTH, DEVELOPMENT, AND MOBILITY ISSUES

1.2.1 Overview of the Corridor and Land Use

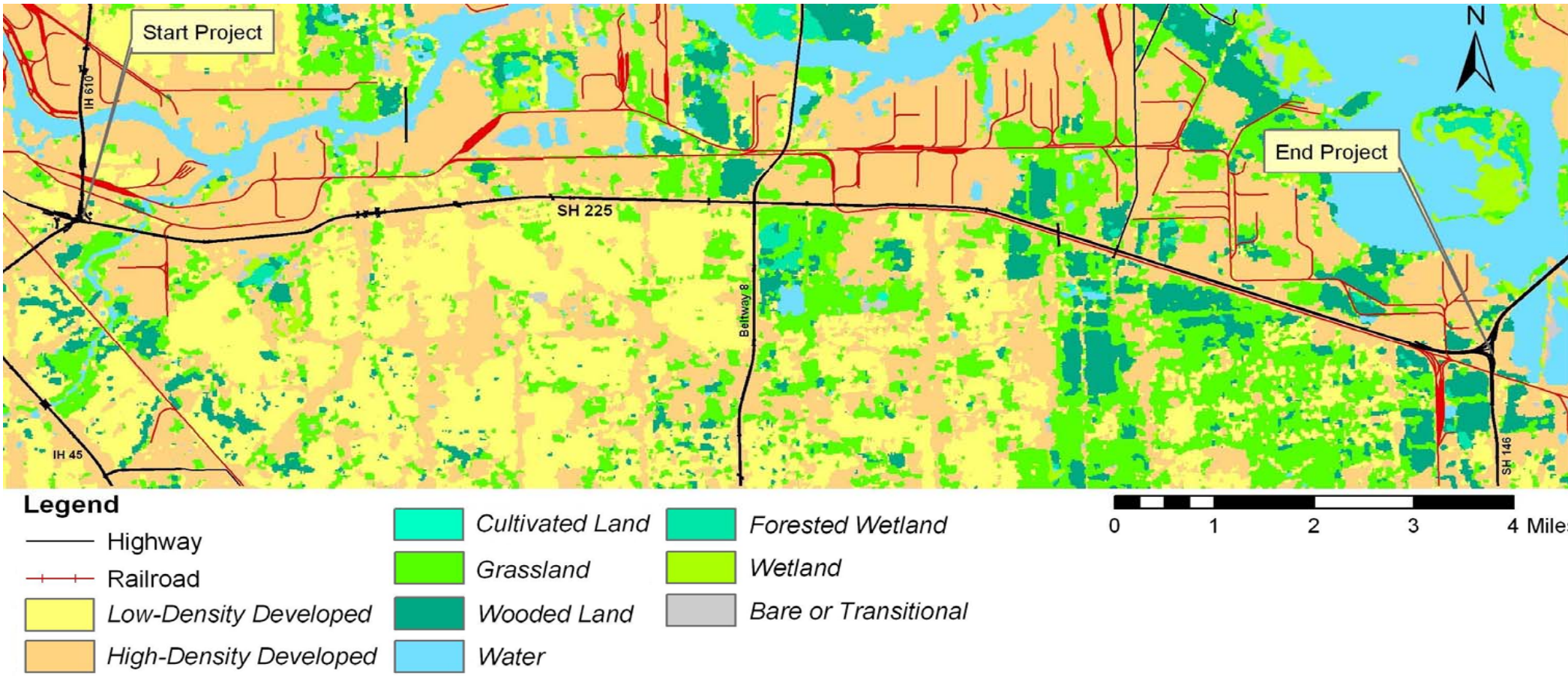
Commercial and industrial land uses dominate the SH 225 Corridor. Most of the north side of the SH 225 Corridor is industrial land use. The south side includes office buildings, retail businesses, parks, pastures, homes and vacant land. Land use is increasingly more developed on the south side as one travels from east to west on SH 225. Exhibit 1-2 shows a map of land uses in the study area that was prepared by H-GAC for the entire Houston region.

Sensitive land uses along the SH 225 Corridor include Charles H. Milby Park in Houston, Memorial Park, Deepwater Park and Pasadena High School in Pasadena, and Deer Park High School in Deer Park. There are also residential areas near the south side of SH 225 in Pasadena, Deer Park and La Porte.

The portion of Houston in the SH 225 Corridor and three incorporated cities serve as the catalysts for travel in the corridor. In addition, the San Jacinto Battleground and Monument, the site of the battle for Texas independence from Mexico, is located in the corridor.

City of Houston: Beginning at IH 610, the first 2.25 miles of the freeway are in the City of Houston. The City established an organizational structure, termed *Super Neighborhoods*, which allows traditional enclaves and communities to coalesce for more effective input into all aspects of government. Three Super Neighborhoods are within the SH 225 Corridor. The largely residential Park Place neighborhood is the westernmost large community and extends to the west across IH 45. Its 2000 population is shown as almost 10,000 (US Census Bureau, 2000).

Exhibit 1-2: Land Use



Continuing east in the corridor and north of SH 225 is the Meadowbrook/Allendale community. This Super Neighborhood has roughly 23,000 residents. Also north of SH 225 and the smallest of this corridor's Super Neighborhoods is Harrisburg/Manchester. All of the communities are largely Hispanic with 73 percent representation in Park Place and Meadowbrook/Allendale and 88 percent in Harrisburg/Manchester. This latter area north of SH 225 experienced a slight decrease of three percent between 1990 and 2000. The populations south of the freeway grew in excess of 25 percent during the same period. The City of Houston Planning and Development Department's land use maps show that the properties proximate to SH 225 are largely industrial; a small area of park and open space borders the south side of the freeway near IH 610 and adjacent to Sims Bayou (City of Houston Planning and Development Department, 2003).

Pasadena: The largest of the incorporated areas in the corridor, Pasadena is next to the City of Houston and covers almost the next five miles of the freeway. Almost the entire developed portion of Pasadena is south of the freeway, although the city limits cover a small area north of SH 225, as well. Upon entering the Pasadena city limits, an area of open space is next to Vince Bayou. Pasadena High School borders the freeway on the south side at Shaver Street, with Jackson Middle School and Kruse Elementary School nearby. Residential is the dominant land use north and south of the freeway from the Pasadena city limit to Red Bluff Road. From there, large industrial uses are proximate to SH 225 with residential south of the industrial areas. The 2000 census shows Pasadena with 132,000 residents. The greatest share of corridor growth is predicted for this city. Included in the 10 largest current employers are Pasadena Independent School District, Reliant Energy, the City of Pasadena and Bayshore Medical Center. Many of the remaining large employers are energy related.

Deer Park: Adjacent to Pasadena, Deer Park lines the next 3.25 miles of the freeway. Like Pasadena, Deer Park encompasses land north and south of the freeway, although the greatest expanse and developed portions of Deer Park are south of the freeway. This city had 32,621 residents in 2000. Deer Park residents are the corridor's most affluent as more than 60 percent earn more than $60,000 annually (US Census Bureau, 2000). In Deer Park, industrial uses border the freeway on both sides. This city's residential areas are all south of the freeway with only a few blocks near the highway. The majority of residences are more than a mile away from the freeway.

La Porte: This city of roughly 32,000 residents is situated east of Deer Park and adjacent to the Galveston Bay (US Census Bureau, 2000). The community's strength is evident as 45 percent of the housing stock has been constructed since 1980 and is more than 93 percent occupied (City of La Porte, 2003). Like its neighbors, the major employers in La Porte include energy industries and the local school district. As the corridor continues east, the dominant land use pattern proximate to the freeway is industrial through La Porte. There are some undeveloped areas next to SH 225 in La Porte, as well. The SH 225 freeway ends at La Porte at its intersection with SH 146.

San Jacinto Battleground and Monument: The Texas Parks and Wildlife's 1,200-acre San Jacinto Battleground State Historic site consists of the Battleground, Monument

and Battleship TEXAS. Each year one to 1.5 million people visit the site. The San Jacinto Battleground State Historic Site preserves the history of the State of Texas. Also at the site is The Battleship TEXAS, which was presented to the State of Texas and commissioned as the flagship of the Texas Navy. In 1983, the TEXAS was placed under the stewardship of the Texas Parks and Wildlife and is permanently anchored on the Buffalo Bayou and the Houston Ship Channel.

1.2.2 Growth in the SH 225 Corridor

The SH 225 Corridor population growth rate is expected to be lower than the metropolitan area over the next 20 to 25 years. The SH 225 Corridor population is projected to increase by just under 66,000 between 2000 and 2025. This represents a growth rate of 34 percent or about 1.4 percent per year. The employment growth rate for the SH 225 Corridor is expected to be slightly higher than the metropolitan area by 2025. The SH 225 Corridor employment is expected to grow by about 47,000 jobs, representing a 63 percent growth rate (2.5 percent per year) (US Census Bureau, 2000 and H-GAC, 2003). Table 1-2 and Exhibits 1-3 through 1-8 show the current and projected population and employment figures for the SH 225 Corridor, as well as the projected 2000 to 2025 growth.

Table 1-2: SH 225 Corridor Growth

	2000	2025	Change	Percent Change
Population	192,470	258,460	65,990	34%
Employment	75,343	122,474	47,131	63%

Source: 2000 US Bureau of Census and H-GAC. November, 2003

1.3 TRANSPORTATION FACILITIES AND SERVICES IN THE SH 225 CORRIDOR

1.3.1 Existing Roadway Facilities and Level of Service

SH 225 is the only major east-west highway facility in the study area. Major north-south highway facilities include IH 610, Beltway 8, and SH 146. Major arterials include Allen-Genoa, Pasadena Boulevard, Red Bluff, Battleground, Richey, Shaver, Tartar, South, and Center.

The SH 225 facility is six lanes immediately east of IH 610 and for a few miles just before its intersection with SH 146. For the majority of the freeway, the facility is eight lanes. During the last decade, traffic volume has increased in every section with growth between IH 610 and Beltway 8 exceeding 30 percent over the last five2 years. Volumes are highest immediately east of IH 610 with 141,000 vehicles per day in 2001 (TxDOT, 2001). This figure is comparable to the traffic volume at other high use freeways in the Houston metropolitan area. Congestion is frequently experienced near IH 610 as the volume to capacity (V/C) ratio is 1.16. The most intensive corridor movement is to and from IH 610, and to and from SH 146 heading toward Barbour's Cut Container Terminal, a part of the Port of Houston Authority. The circumferential freeway, Beltway 8, bisects SH 225 about midway between its two ends, IH 610 and SH 146.

Exhibit 1-3: SH 225 Corridor Population (2000)

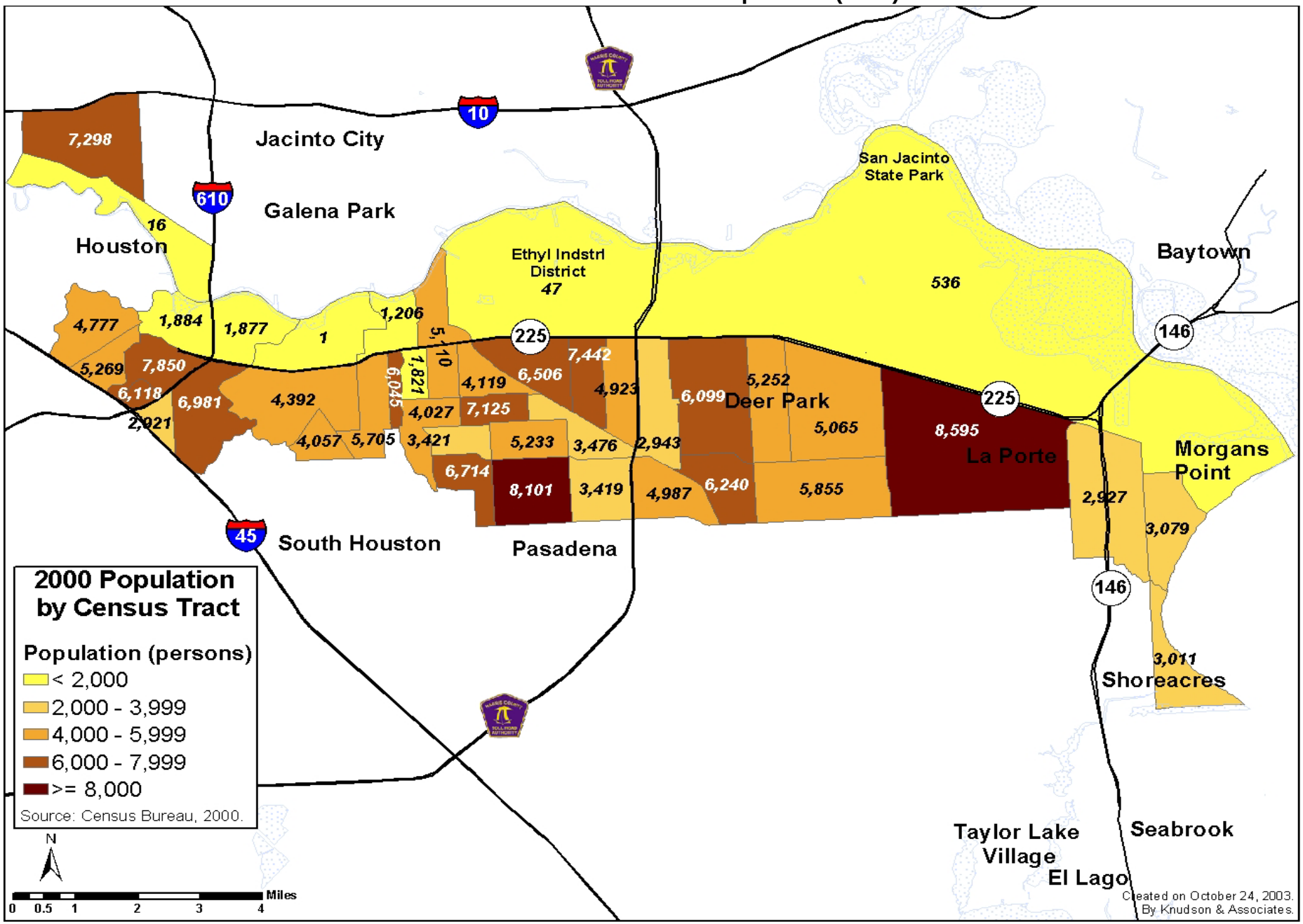


Exhibit 1-4: SH 225 Corridor Population (2025)

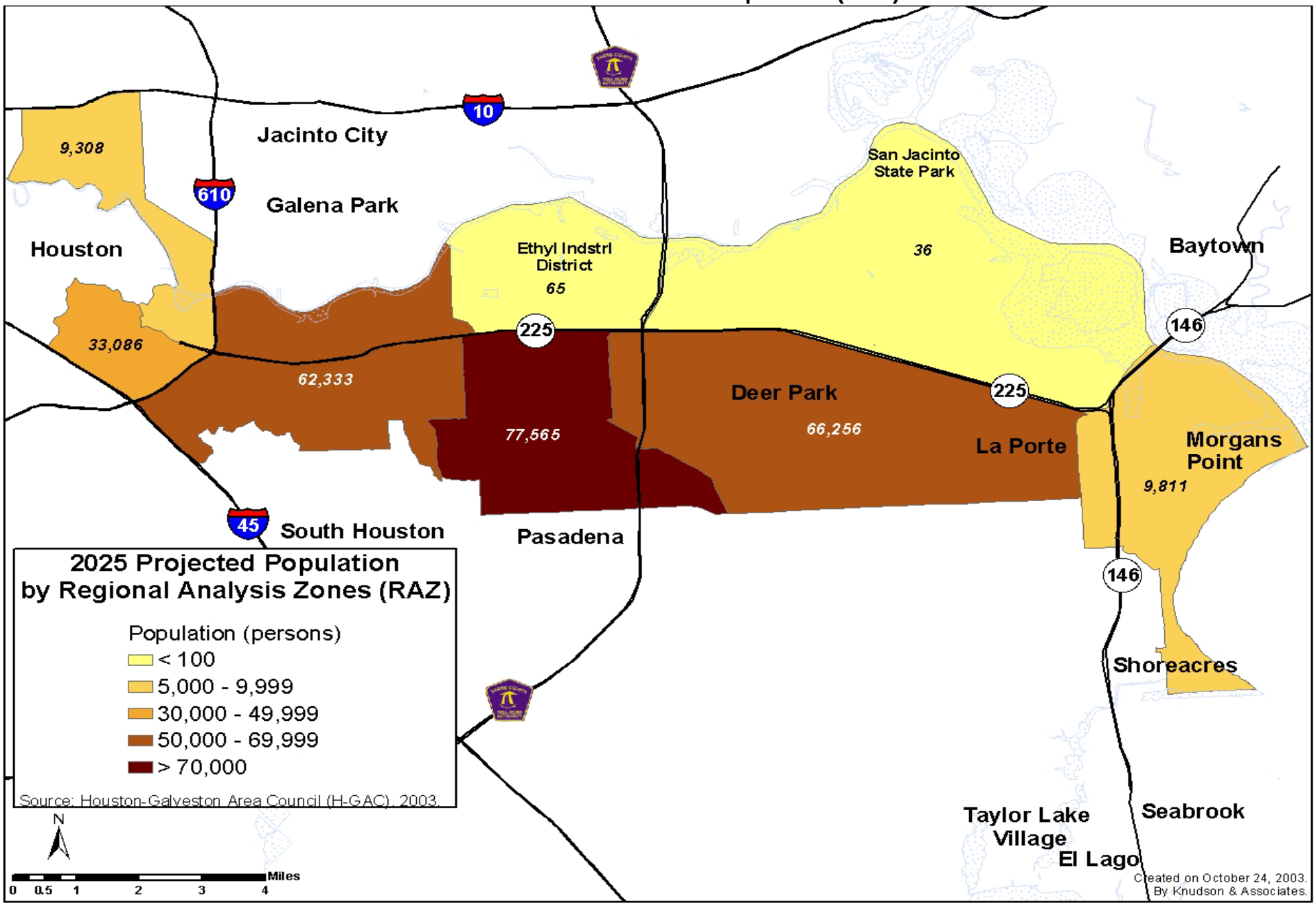


Exhibit 1-5: SH 225 Corridor Population Growth

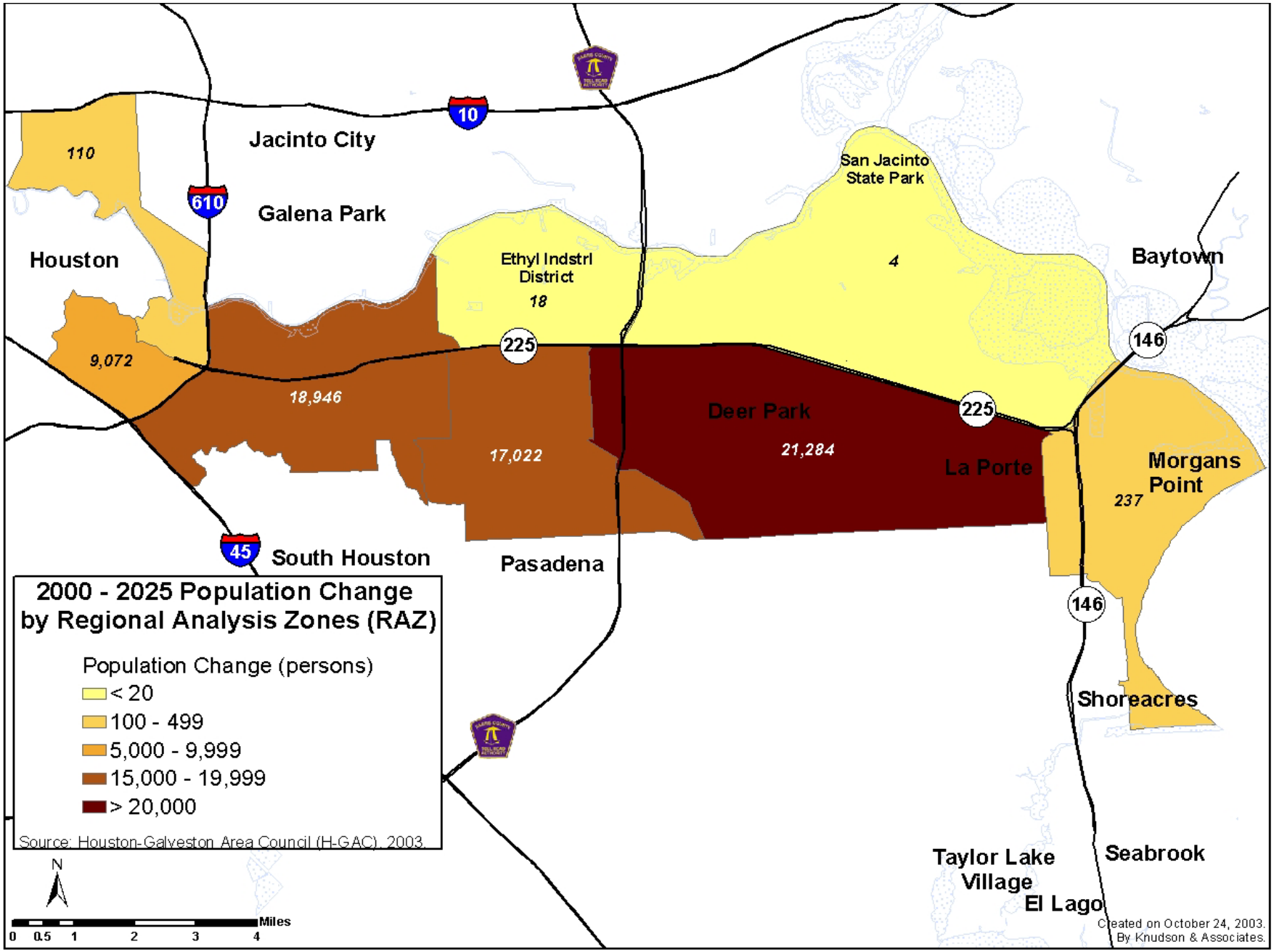


Exhibit 1-6: SH 225 Corridor Employment (2000)

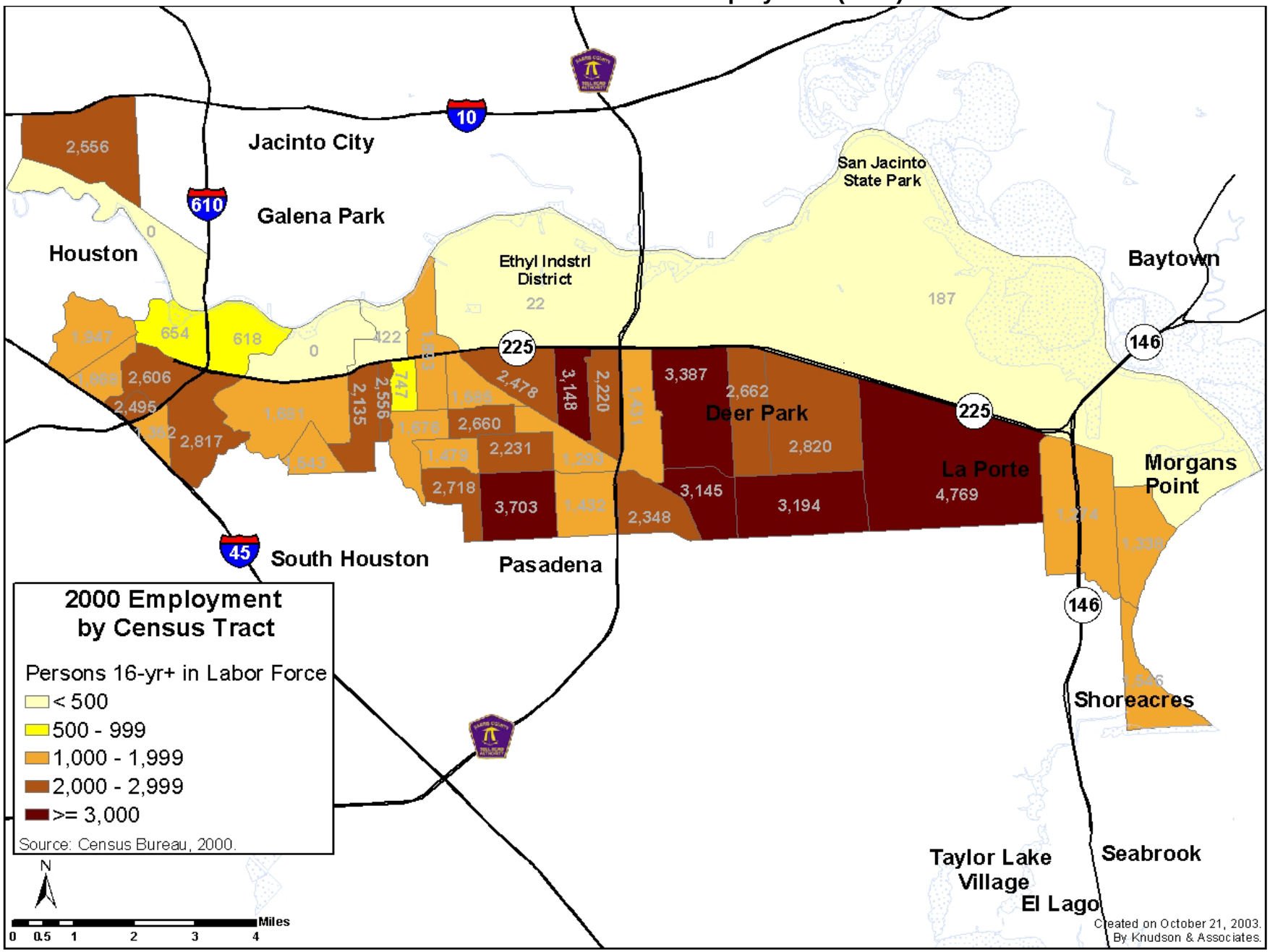


Exhibit 1-7: SH 225 Corridor Employment (2025)

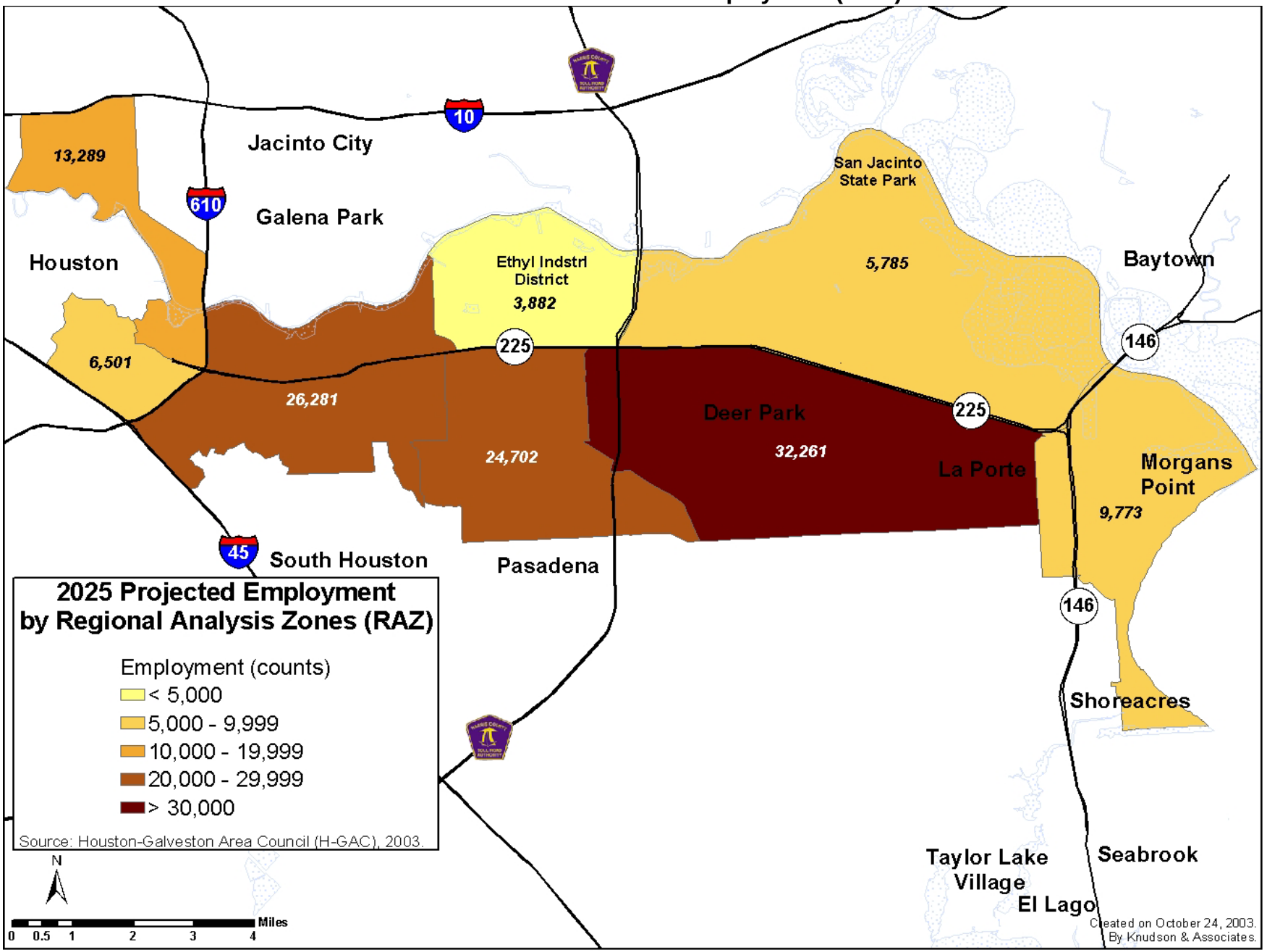


Exhibit 1-8: SH 225 Corridor Employment Growth

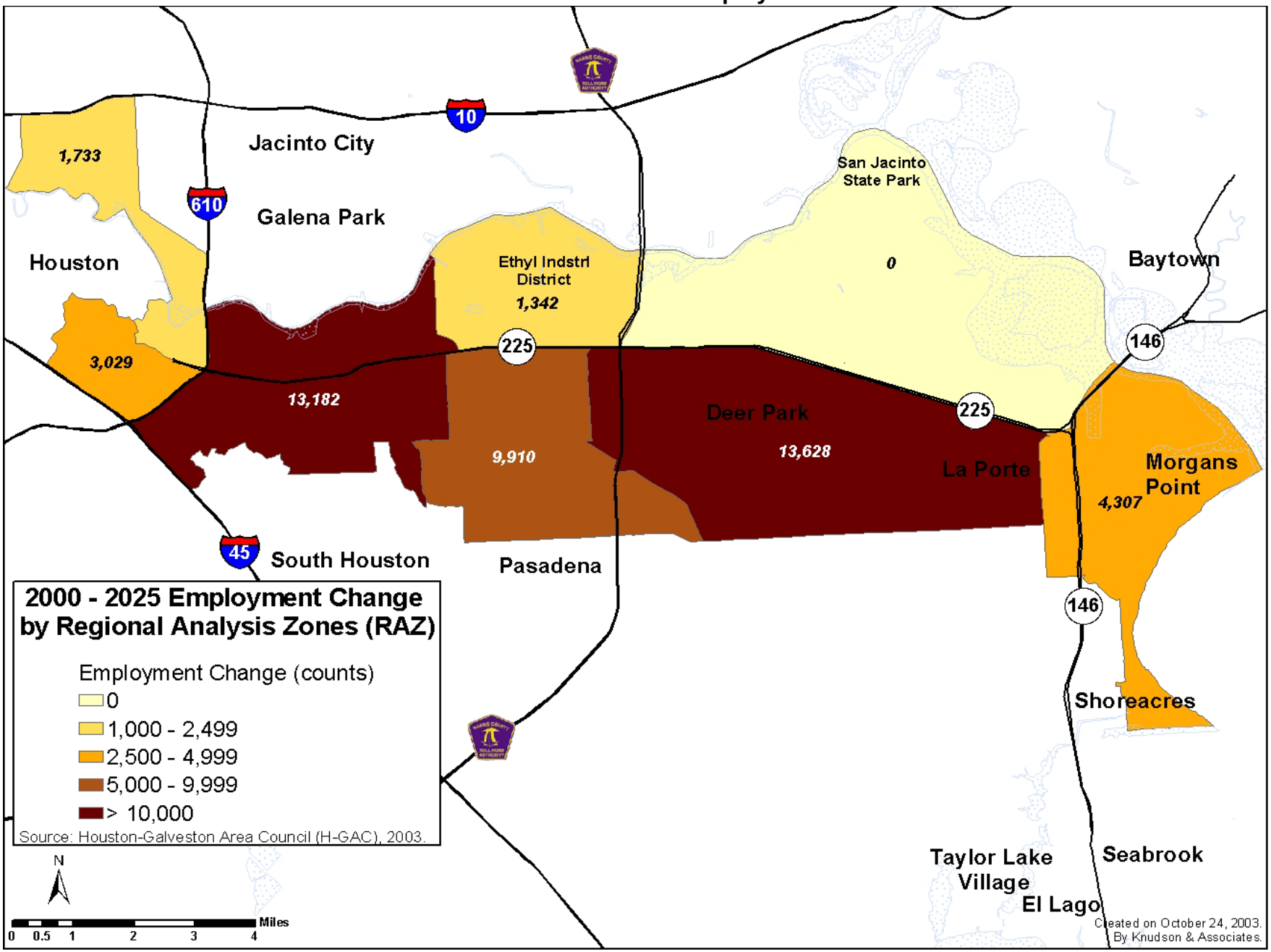


Table 1-3 and Exhibits 1-9 and 1-10 display current and projected traffic data for SH 225.

Table 1-3: SH 225 Traffic Summary

Location	2002 Traffic	2002 V/C	2025 Traffic*	2025 V/C
At IH 610	198,000	1.16	288,600	1.55
West of BW 8	124,000	1.03	184,100	1.10
East of BW 8	98,000	0.61	183,500	0.89
West of SH 134	92,000	0.58	158,300	0.80
East of SH 134	77,000	0.48	151,600	0.76
West of SH 146	75,000	0.63	124,500	0.62

* Preliminary traffic assignment based on no improvements to SH 225.
Source: Lei Yu and Associates, Inc., December 2003

As delineated in the current Transportation Improvement Program (TIP) and the Metropolitan Transportation Plan (MTP), Table 1-4 outlines the anticipated roadway improvements over the next 20 years.

Table 1-4: Planned Roadway Improvements

Project	From	To	Description
Bay Area Blvd.	Fairmont Parkway	Spencer Highway	Construct 4 lane divided roadway
Central St. Extension	Over Manchester Train Yard		Grade separation
Fairmont Parkway	at Union Pacific Railroad		Grade separation
Main Street	Clinton	End of Main Street	Widen to 4 lanes, add truck queuing area
Sens Road	Spencer Highway	SH 225	Widen to 4 lanes, grade separation with SH 225
SH 225	at Georgia		Add turning lane
SH 225	W. Richey	Center Street	Pavement repair
SH 225	W. Richey	Beltway 8	Intersection Improvements
SH 225	SH 134	Strang Road	Install CTMS
SH 225	IH 610	East of Scarborough	Overlay
W. Richey	at Vince Bayou		Replace bridge

Source: H-GAC 2022 Metropolitan Transportation Plan and 2004-2006 Transportation Improvement Program

Frequent corridor travelers and area residents indicate that a high number of trucks move along the SH 225 freeway. This freeway is the most direct route linking the core of Houston with Barbour's Cut Container Terminal with origins and destinations of the majority of trucks traveling between the terminal and Houston. It is likely that a truck destined to Houston's core or west and southwest would choose this route. Truck lane studies for SH 225 were conducted by TTI in 2002 and 2003. These reports are delineated in Section 2.2 and indicate a five to ten percent truck volume during peak periods.

Exhibit 1-9: SH 225 Traffic Volumes (2002)

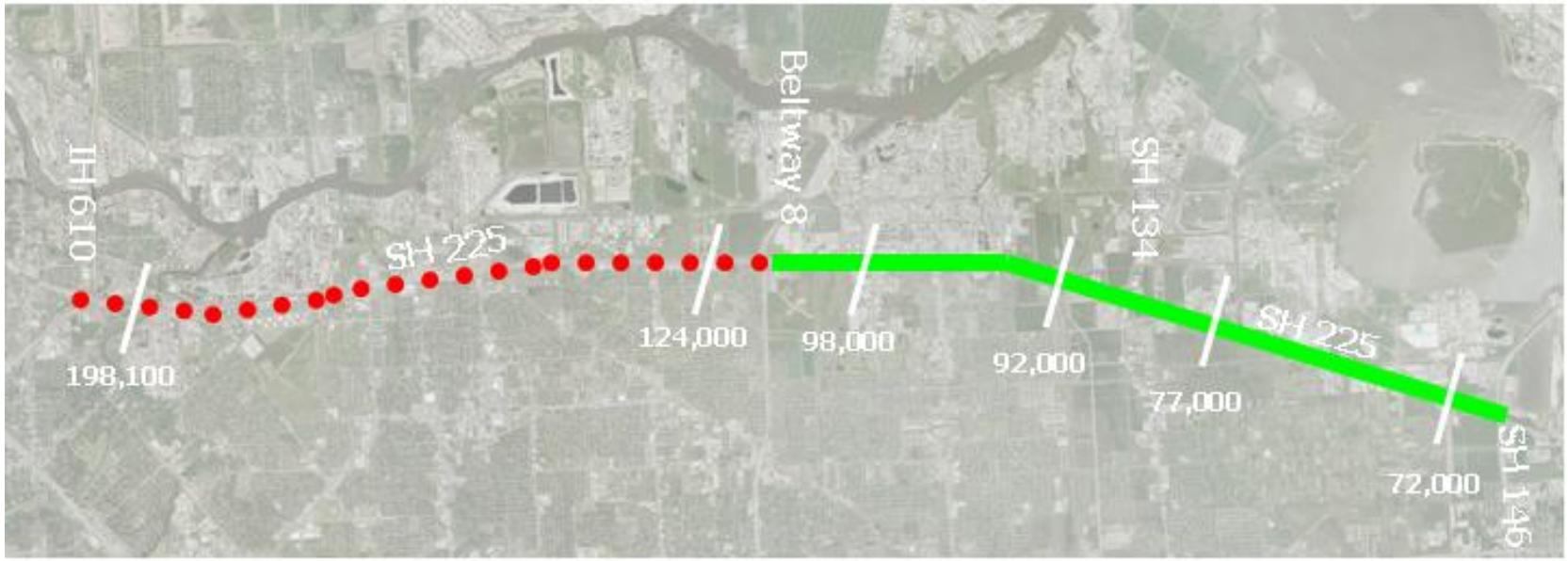
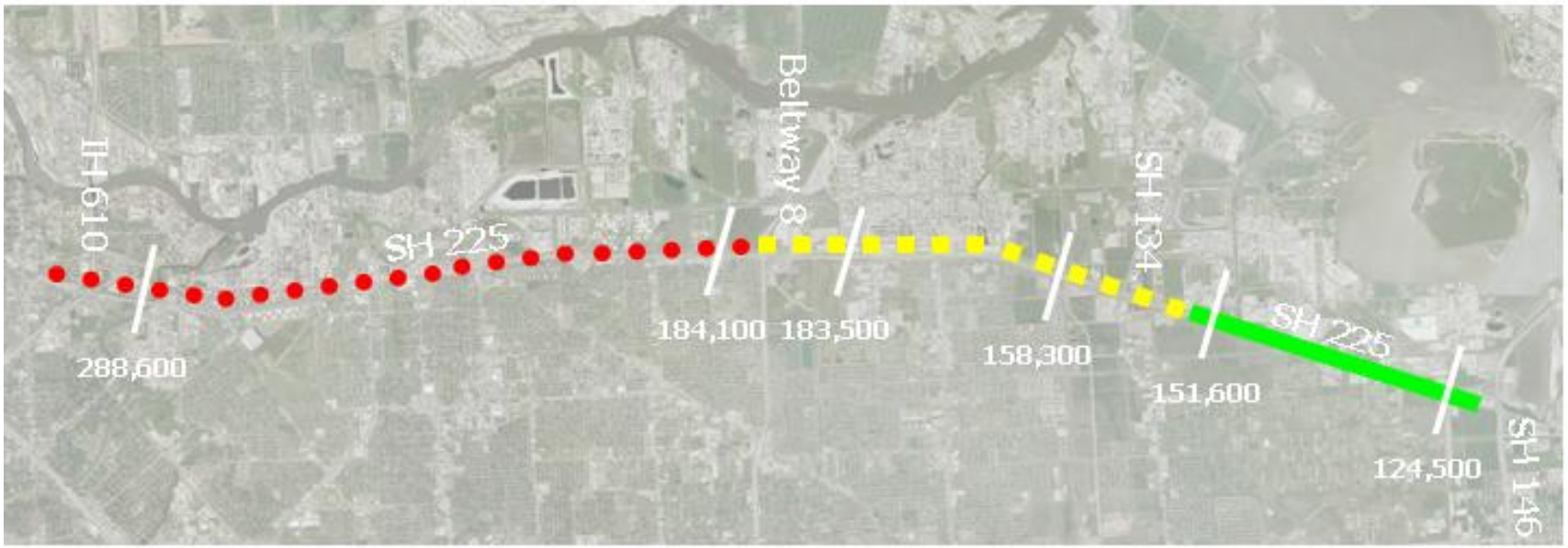


Exhibit 1-10: SH 225 Traffic Volumes (2025)



1.3.2 Existing Public Transportation

The majority of the corridor does not have conventional public transit service. The exception is the Park Place neighborhood, in the City of Houston, south of SH 225, where the Metropolitan Transit Authority operates the number 40 Park Place bus route. Outside of Houston, there is no public transportation service available to the general citizenry. Specialized transportation for elderly or medically disabled individuals is available to some persons for some trips in the cities of Pasadena, Deer Park, and La Porte, but riders must qualify to access the service. These services are contracted by Harris County to the American Red Cross and two private companies, Master Seed and Vernon. Houston-Galveston Area Council (H-GAC) is considering additional specialized service to be partially funded by Congestion Mitigation and Air Quality (CMAQ) funds.

Lynchburg Ferry:

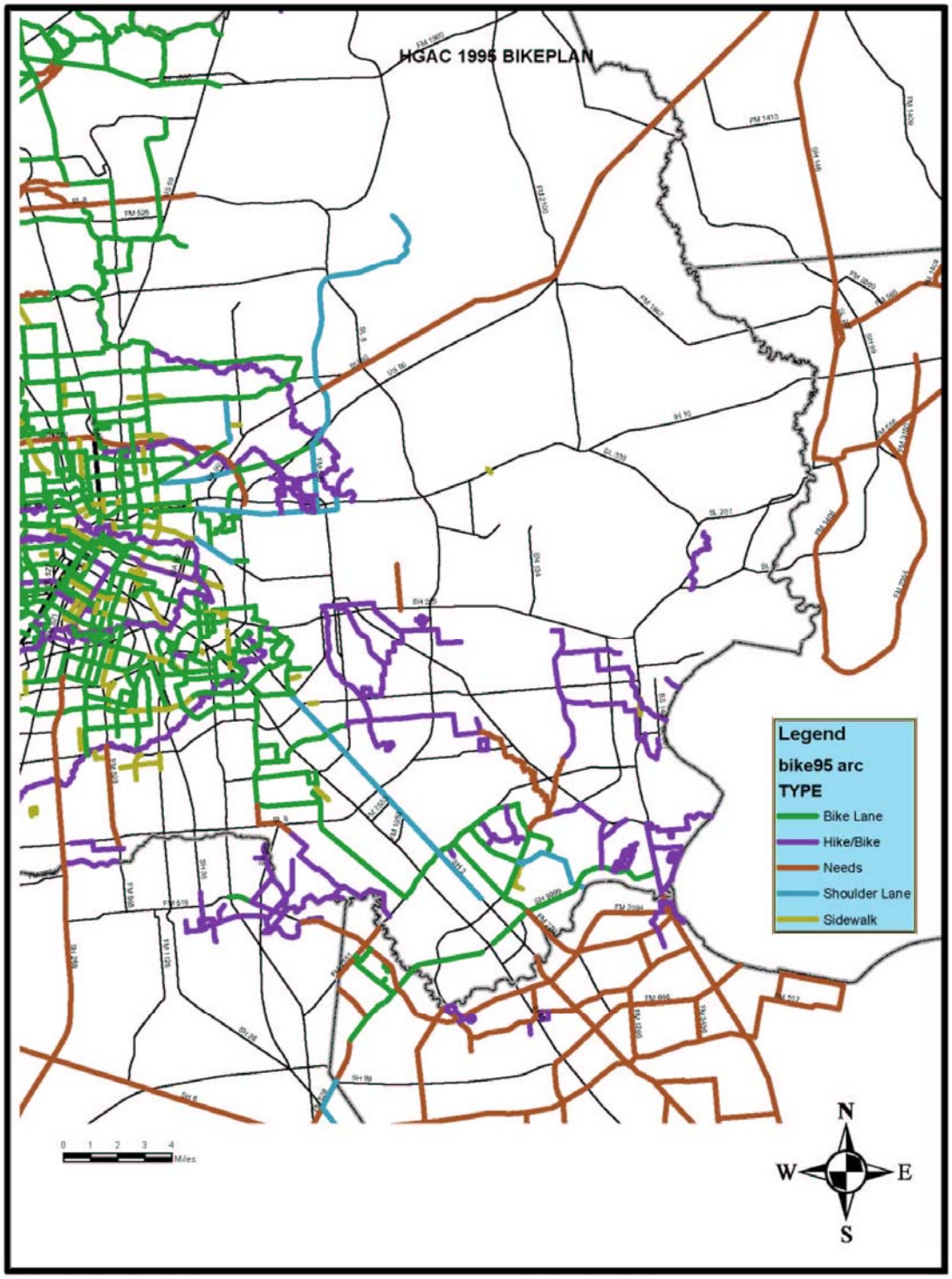
Harris County operates the Lynchburg Ferry service linking the city of Baytown with Deer Park. Harris County incurs the expense to operate the ferry and there is no charge for the ferries' continuous 24-hour service to passengers. The actual travel time for the ferry without traffic is two minutes and 38 seconds, traveling a total of 1,180 feet.

The Lynchburg Ferry transports an average of 2,300 vehicles each day. Most people who use the Lynchburg Ferry are traveling to and from their jobs at the refineries and chemical plants in Deer Park and surrounding areas. The Lynchburg Ferry also provides a way for tourists to visit the San Jacinto Monument.

Bicycle and Pedestrian Travel:

H-GAC's 2022 Mobility Plan Update establishes a comprehensive strategy for replacing enough vehicle trips with bicycle or walking to make a discernible impact on congestion, air pollution, quality of life and public health. It proposes to focus on short trips, accommodate bicycles and pedestrians on all roadways, and improve gaps, signage and other amenities in bicycle facilities. Exhibit 1-11 shows H-GAC's Bicycle Plan for the SH 225 study area

Exhibit 1-11: Bicycle Plan for SH 225 Study Area



Source: Houston-Galveston Area Council, 1995

1.4 SPECIFIC TRANSPORTATION NEEDS IN THE SH 225 CORRIDOR

The SH 225 Corridor is a vibrant growing area home to residents and businesses. It is the gateway to the Port of Houston, the nation's second largest container port, as well as the route to the historic San Jacinto Battleground. There are several key problems and needs in the SH 225 Corridor illustrated through the stakeholder comments and technical review to-date, as follows:

- Existing conditions in the corridor show that mobility and safety improvements are warranted, including but not limited to reducing the number of accidents.
- There is recurring traffic congestion, particularly at key intersections and interchanges.
- Connectivity, particularly at IH 610 and Beltway 8, should be improved.
- Additional information is needed about the travel characteristics of current carpoolers to determine whether that mode share can be increased through HOVs, priority treatments, or other incentives.
- The relationship of truck volume to other traffic, including a time-of-day, and directional assessment should be ascertained to determine the need for managed lanes or other truck lane treatment.
- A determination of short or long range public transit demand is needed.
- Hurricane and other emergency evacuation routes should be addressed.
- It is important to facilitate access for travelers destined to the historic San Jacinto landmark.
- The corridor study and any recommended improvements must be attentive to air quality and emissions levels, as well as other environmental variables. Sensitive areas, such as parks and designated open space, schools and homes will be a focus.
- Any recommended improvements in the corridor must be consistent with growth and economic plans for the municipalities along SH 225.

1.5 CONSISTENCY WITH LOCAL, STATE, AND FEDERAL PLANNING PROCESS

The Federal Highway Administration (FHWA) along with the requirements of the National Environmental Policy Act (NEPA) define the formal parameters under which major transportation investments must be developed and analyzed. NEPA was enacted to protect, maintain, and enhance the environment. As defined by NEPA, "environment" includes not only the physical environment but also the man-made environment. The role of the SH 225 MCFS in the statutorily established project development process is presented here.

The purpose of the planning study is to formally study a variety of alternatives that could address the mobility challenges identified within the SH 225 travel corridor. The SH 225 MCFS is designed to identify a broad range of alternative actions and investments, to analyze those alternatives, and to develop criteria by which to evaluate the transportation investments. This process is designed to provide critical information to the decision-making process concerning the future of the SH 225 Corridor.

A major transportation investment can be a significant improvement to the roadway system or a substantial upgrade in transit facilities or services, or both. These major transportation investments may include lower cost improvements such as pedestrian, bicycle, and transportation system management (TSM) options. Planning studies evaluate alternative transportation investments within the travel corridor and conclude with an alternative(s) known as the “Recommended Alternative(s)".

NEPA requires that an environmental document (Environmental Impact Statement [EIS] or Environmental Assessment [EA]) be prepared for all proposed Federal actions (those involving the use of Federal funds) that could significantly affect the environment. An EIS or EA will identify and address all potential environmental impacts of a project. It is anticipated that Federal funds will be sought to pay for a portion of any “build” alternative that is selected for implementation.

Throughout all phases of project development, aggressive public involvement is required. In the first development phase, a wide range of alternatives is evaluated based on planning, cost, community input and financial issues. At the conclusion of the MCFS, public meetings will be held to take comments on the Recommended Alternative(s). TxDOT will select the Recommended Alternative(s) in full consideration of public and agency input on the technical recommendation. The Recommended Alternative(s) will then be presented to the region’s Transportation Policy Council for inclusion in the Metropolitan Transportation Plan (MTP). The Recommended Alternative(s) will then be evaluated during the preparation of the environmental document. The project would be further refined and mitigation measures finalized during the preliminary engineering phase. Following receipt of environmental clearance from FHWA, and funding commitments, the project would be advanced to final design and construction.

The intent of the NEPA process is to ensure that all potential environmental impacts are identified and investigated prior to the decision-making process. NEPA also requires engaging the public in the environmental review process.

2.0 PUBLIC INVOLVEMENT

The Houston District of the TxDOT is conducting a MCFS for an approximate 16-mile segment of the SH 225 Corridor from IH 610 to SH 146, located in Harris County. The purpose of this study is to evaluate all possible modes of transportation and travel routes, and recommend a transportation alternative that will best improve existing and future safety and mobility conditions along the SH 225 Corridor. Cities along the corridor include Houston, Pasadena, Deer Park and La Porte. The study is expected to conclude in mid 2005.

TxDOT-Houston District has contracted a team of professional engineering, environmental, and public involvement consultants to perform this study. Team members include:

Carter & Burgess — Prime consultant
Lei Yu & Associates — Travel demand forecasting
Quadrant Consultants — Environmental data and analysis
Knudson & Associates — Demographic data and corridor evaluation
H & H Resources — Hydrology
Texas Southern University — Alternatives analysis
The Lentz Group — Public involvement

Regular ongoing communication with members of the community is an essential part of the study process. A variety of public involvement strategy will be used to encourage the participation of citizens, community-based organizations, environmental interest groups, businesses, neighborhood associations, local elected officials, transportation agency representatives, and any others who feel they have a vested interest in the study area. Elements of the public involvement plan include public meetings, newsletters, and comment forms.

2.1 FIRST PUBLIC MEETINGS – December 4, 2003

Meeting Purpose

The first round of the public meetings for SH 225 MCFS was held on Thursday, December 4, 2003, at the Pasadena Convention Center, 7902 Fairmont Parkway, Pasadena, Texas. The purpose of this meeting was to present an overview of the project's purpose, process, and objectives and to provide the public, local elected officials and agencies an opportunity to voice their specific concerns and to provide TxDOT with their input and comments prior to further development of this study.

Meeting Format

The meeting was conducted in an open house format and consisted of exhibits and large scale maps. Copies of the exhibits are located in Appendix A. To better accommodate the public, two meeting sessions were held - 2-4 p.m. and 6-8 p.m.

At the two identical sessions, meeting attendees were invited to review the information at their leisure. TxDOT and consultant team representatives were available to answer questions and discuss concerns. Attendees were encouraged to fill out and turn in comment forms provided at the public meeting, or send their comments by mail.

Attendance

A total of 14 people attended the meetings, including representatives from the cities of Pasadena, Deer Park, and LaPorte and representatives from the offices of U.S. Congressman Gene Green, State Senator Mike Jackson and State Representative Robert Talton. Copies of the sign-in sheets are located in Appendix A of this report.

TXDOT and consultant team representatives who attended are listed in Table 2-1.

Table 2-1: TxDOT and Consultant Team Representatives (12/4/03)

Organization	Representative
Texas Department of Transportation (TxDOT)	Pat Henry, P.E., Project Development
	Hassan Nikooei, P.E., Project Manager
Consultant Team	
Carter & Burgess, Inc.	Don Garrison, P.E., Project Manager
	Janet Kennison
	Jeff Anderson
	Scott Kirby
Quadrant Consultants	Bruce Leon, Ph.D.
Texas Southern University	Carol Lewis, Ph.D.
The Lentz Group	Carmen Houston

Comment Summary

Five (5) people turned in comment forms at the public meeting. The following summarizes the input and comments received from the public. Copies of each comment form are located in Appendix A of this report.

How often do you travel the SH 225 Corridor?
Majority of respondents said they travel the corridor two to three days a week. Others said they travel the corridor four to five days a week.

When do you typically travel the SH 225 Corridor?
Majority of respondents said they travel the corridor in the A.M. and P.M. peak period, with a few responding that they travel during non-rush hour and week-end periods.

What is the purpose of your trips?
Majority of respondents use the corridor to commute to and from work or for work related activities.

What types of improvements do you believe would be the most beneficial for SH 225?
Majority of respondents said designated truck lanes and HOV lanes would be most beneficial. Two suggested passenger train service would be a good option. Other suggestions included bus/vanpool service and interchange/alternate route improvements.

What are the biggest transportation problems in the SH 225 Corridor and where are they the worst?
Majority of respondents said traffic congestion and accidents/safety were the biggest problems in the corridor. Two cited poor access, specifically at IH 610 and Beltway 8.

Additional comments

- Use the Union Pacific Railroad right-of-way to add some type of rail service to Downtown or The Medical Center.
- Truck volume creates safety issues.
- Congestion at IH 610 is a problem.
- We need more transit options.
- More aesthetic improvements.
- Safety at some entrance ramps is an issue.
- Consider having the next public meeting at Pasadena High School.

How did you hear about this public meeting?
All those responding said, they heard about the meeting from the newsletter.

2.2 SECOND PUBLIC MEETING – April 29, 2004

Meeting Purpose

The second public meeting for SH 225 MCFS was held on Thursday, April 29, 2004, 6-8 p.m. at Pasadena High School, 206 South Shaver, Pasadena, Texas. The purpose of this meeting was to present the project's universe of alternatives and solicit the public's comments and concerns prior to further analysis of the alternatives.

Meeting Format

The meeting was conducted in an open house format and consisted of exhibits and large scale maps. (Copies of the exhibits are located in Appendix A.) Meeting attendees were invited to review the information at their leisure. TxDOT and consultant team representatives were available to answer questions and discuss concerns. Attendees were encouraged to fill out and turn in comment forms provided at the public meeting, or send their comments by mail.

Attendance

A total of 19 people signed the meeting register, including representatives from the cities of Deer Park and La Porte and representatives from the offices of U.S. Congressman Gene Green, State Senator Mike Jackson and State Senator Mario Gallegos. (Copies of the sign-in sheets are located in Appendix A.)

TXDOT and consultant team representatives who attended are listed in Table 2-2.

Table 2-2: TxDOT and Consultant Team Representatives (4/29/04)

Organization	Representative
Texas Department of Transportation (TxDOT)	Mike Tello, P.E.
	Hassan Nikooei, P.E., Project Manager
	Lisa Latham, Environmental
Consultant Team	
Carter & Burgess, Inc.	Don Garrison, P.E., Project Manager
	Janet Kennison
	Scott Kirby
Quadrant Consultants	Bruce Leon, Ph.D.
The Lentz Group	Carmen Houston

Comment Summary

Four (4) people turned in comment forms at the public meeting and one was received by mail. The following summarizes the input and comments received from the public. Copies of each comment form are located in Appendix A.

How often do you travel the SH 225 Corridor?
Half of respondents said they travel the corridor daily. The other half said they travel the corridor four to five days a week.

When do you typically travel the SH 225 Corridor?
Majority of respondents indicated they travel the corridor during the P.M. peak period and during non-rush hour.

What is the purpose of your trips?
Majority of respondents use the corridor to commute to and from work or for work related activities.

What types of improvements do you believe would be the most beneficial for SH 225?
Majority of respondents said designated truck lanes would be most beneficial. Other suggestions included adding additional lanes, HOV lanes and applying congestion management strategies.

What are the biggest transportation problems in the SH 225 Corridor and where are they the worst?
Majority of respondents said traffic congestion and accidents/safety were the biggest problems in the corridor. Other problems cited were roadway maintenance and 18-wheeler trucks.

Additional comments

- IH 45 North to IH 610 West to SH 225 — there are no distinct lanes and people cannot tell they merge.
- Accident/safety concerns regarding the intersection of SH 225 and Beltway 8.

How did you hear about this public meeting?
The majority of respondents said they heard about the meeting from the project newsletter. Other responses included from a co-worker and from the *Pasadena Citizen*.

2.3 THIRD PUBLIC MEETING – May 25, 2005

Meeting Purpose

This last in a series of three public meetings for the SH 225 MCFS was held on Wednesday, May 25, 2005, 6-8 p.m. at Deer Park Activity Center, 500 West 13th Street, Deer Park, Texas. The purpose of this meeting was to present the recommended alternatives and to solicit the public's comments and concerns.

Meeting Format

The meeting was conducted in an open house format and attendees were invited to review the exhibits at their leisure (Copies of the exhibits are located in Appendix A of this report.). TxDOT and consultant team representatives were available to answer questions and discuss concerns. Attendees were encouraged to fill out and turn in comment forms provided at the public meeting, or send their comments by mail.

Attendance

A total of 14 people signed the meeting register, including representatives from the cities of Pasadena, Deer Park and La Porte and a representative from the office of U.S. Congressman Gene Green. (Copies of the sign-in sheets are located in Appendix A of this report.)

Table 2-3: TxDOT and Consultant Team Representatives (5/25/05)

Organization	Representative
Texas Department of Transportation (TxDOT)	Mike Tello, P.E.
	Hassan Nikooei, P.E., Project Manager
	Lisa Latham
	Patrick Gant
Consultant Team	
Carter & Burgess, Inc.	Janet Kennison, Project Manager
	Todd Thurber, P.E.
Knudson & Associates	Stella Gustavson
The Lentz Group	Carmen Houston

Comment Summary

One (1) person turned in a comment form at the public meeting. The following summarizes the input and comments received from the public. Copies comment forms are located in Appendix A of this report.

General Comments

- Glad you are expanding Richey to Red Bluff over the feeder. Please avoid eminent domain.
- Be sensitive to the neighborhoods when you get to planning details like ramps.

3.0 EVALUATION OF EXISTING CONDITIONS

This chapter presents the existing socioeconomic and environmental conditions in the corridor.

3.1 SOCIOECONOMICS

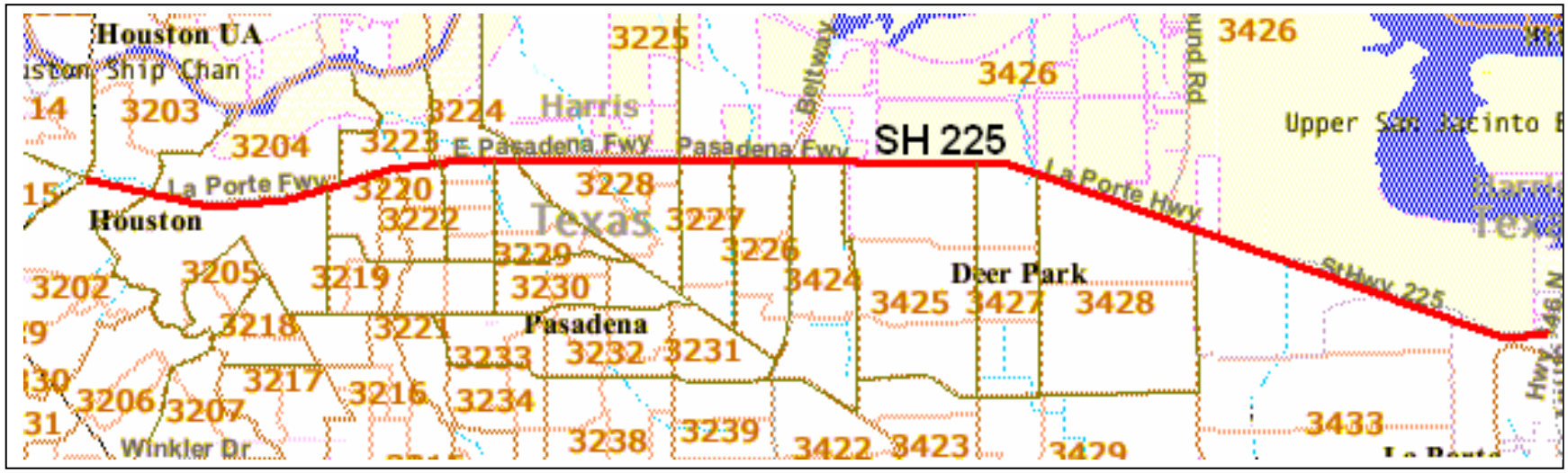
The SH 225 Corridor includes a large population of residents in the cities of Houston, Pasadena, Deer Park and La Porte. The 2000 Census shows population by census tract, which is a geographic subdivision of a county in which population characteristics are relatively homogeneous. The SH 225 Corridor crosses 18 census tracts, as shown in the map in Exhibit 3-1. Together, these tracts had 74,568 residents in 2000 (Table 3-1). This is about 3.5 percent of the combined populations of Houston, Pasadena, Deer Park and La Porte, and about two percent of the population of Harris County. Census tracts on the north side of SH 225 had 12 percent of the population.

The racial mix of the corridor census tracts in 2000 was different than many of the city, regional and state averages (Table 3-1). The proportion of whites was higher (71 percent) than that of the cities of Houston, Pasadena, Deer Park and La Porte (52 percent) or Harris County (59 percent) but similar to that of Texas (71 percent). Conversely, the proportion of blacks in the corridor census tracts was two percent, much less than that of the cities (23 percent), Harris County (18 percent) or Texas (11 percent). The proportion of Hispanics was 49 percent, more than that of the cities (38 percent), Harris County (33 percent) or Texas (32 percent). In general, the population of the SH 225 Corridor in 2000 was less racially diverse but more ethnically diverse than the city, regional or state populations.

This population had about the same economic status as residents of the cities, region and state (Table 3-2). Seventy-one percent of the residents of the SH 225 Corridor census tracts were employed in 2000, about the same percentage as in the cities of Houston, Pasadena, Deer Park and La Porte, and about the same as Harris County and Texas. Median household income (income per residence) for corridor census tracts was $44,287 in 2000, lower than the median household income in the cities of Deer Park and La Porte but slightly higher than that of Houston, Pasadena, Harris County and Texas. About three percent of households in the SH 225 Corridor census tracts had income below the federal poverty level, similar to the cities, county and state.

The SH 225 Corridor traverses established neighborhoods in Houston and Pasadena that have been bisected by the highway for at least 40 years and have grown around it. The railroad was already a dividing line between neighborhoods before SH 225 was built. Neighborhoods along SH 225 in Deer Park and La Porte developed after SH 225 was already a major highway and are not bisected by it. The project corridor includes the original central business district of Pasadena; city offices and many businesses moved farther south in the city about thirty years ago.

Exhibit 3-1: Census Tract in the SH 225 Corridor



Source: US Census Bureau, 2000 and Quadrant Consultants, 2004

Table 3-1: 2000 Population, Racial and Ethnic Composition

Census Tract or Area	Population	White	%	Black	%	American Indian	%	Asian or Pacific Islander	%	Other Race(s)	%	Hispanic (any race)	%
SH 225 Corridor	74,568	52,849	70.9	1,148	1.5	559	2.2	1,648	2.2	18,364	24.6	36,181	48.5
CT 3202	6,981	2,672	38.3	201	2.9	18	14.6	1,021	14.6	3,069	44.0	4,873	69.8
CT 3203	1,877	770	41.0	18	1.0	98	0.1	1	0.1	990	52.7	1,752	93.3
CT 3204	1	1	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
CT 3220	6,045	3,506	58.0	169	2.8	43	1.9	113	1.9	2,214	36.6	5,192	85.9
CT 3222	1,821	1,057	58.0	3	0.2	29	1.5	27	1.5	705	38.7	1,267	69.9
CT 3223	1,206	675	56.0	13	1.1	10	0.6	7	0.6	501	41.5	954	79.1
CT 3224	5,110	2,945	57.6	54	1.1	43	1.0	52	1.0	2,016	39.5	3,909	76.5
CT 3225	47	21	44.7	0	0.0	0	0.0	0	0.0	26	55.3	40	85.1
CT 3226	4,923	3,865	78.5	32	0.7	24	1.1	56	1.1	946	19.2	2,003	40.7
CT 3227	7,442	5,230	70.3	66	0.9	40	0.3	25	0.3	2,081	28.0	4,455	59.9
CT 3228	6,506	4,357	67.0	36	0.6	70	0.5	30	0.5	2,013	30.9	4,203	64.6
CT 3229	4,119	2,300	55.8	40	1.0	40	1.0	40	1.0	1,699	41.2	2,800	68.0
CT 3424	2,943	2,325	79.0	55	1.9	35	0.8	23	0.8	505	17.2	1,145	38.9
CT 3425	6,099	5,667	92.9	32	0.5	31	1.3	79	1.3	290	4.8	735	12.1
CT 3426	536	459	85.6	39	7.3	3	0.0	0	0.0	35	6.5	61	11.4
CT 3427	5,252	4,893	93.2	35	0.7	18	0.8	43	0.8	263	5.0	586	11.2
CT 3428	5,065	4,819	95.1	18	0.4	17	0.8	38	0.8	173	3.4	480	9.5
CT 3433	8,595	7,287	84.8	337	3.9	40	1.1	93	1.1	838	9.7	1,726	20.1
Houston	1,953,631	962,610	49.3	494,496	25.3	8,568	5.4	104,876	5.4	383,081	19.6	730,865	37.4
Pasadena	141,674	101,219	71.4	2,316	1.6	957	1.9	2,647	1.9	34,535	24.4	68,348	48.2
Deer Park	28,520	25,672	90.0	374	1.3	118	1.3	358	1.3	1,998	7.0	4,341	15.2
La Porte	31,880	25,946	81.4	1,993	6.3	154	1.2	384	1.2	3,403	10.7	6,520	20.5
Harris County	3,400,578	1,997,123	58.7	628,619	18.5	15,180	5.2	176,721	5.2	582,935	17.1	1,119,751	32.9
Texas	20,851,820	14,799,505	71.0	2,404,566	11.5	118,362	2.8	576,753	2.8	2,952,634	14.2	6,669,666	32.0

Source: U.S. Census Bureau

Table 3-2: 2000 Employment and Income

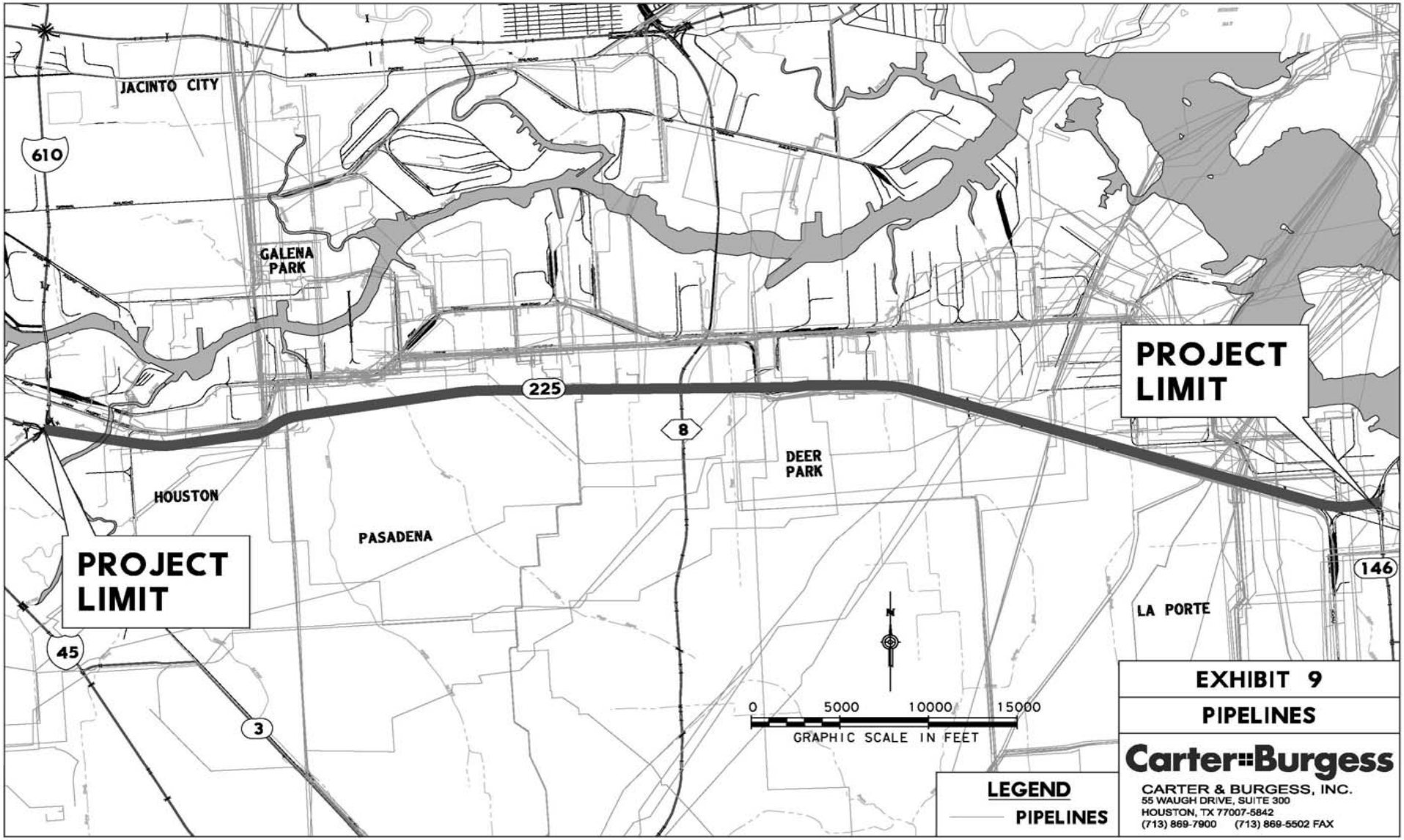
Census Area	Employees	Median Household Income	Under Poverty Level	%
SH 225 Corridor	31,390	$44,247	2,263	3.0
Census Tract 3202	2,545	$28,007	345	4.9
Census Tract 3203	516	$29,519	128	6.8
Census Tract 3204	0	na	0	0.0
Census Tract 3220	2,247	$24,988	391	6.5
Census Tract 3222	702	$32,296	59	3.2
Census Tract 3223	378	$24,219	56	4.6
Census Tract 3224	1,734	$31,264	234	4.6
Census Tract 3225	8	$34,375	4	8.5
Census Tract 3226	2,094	$44,301	70	1.4
Census Tract 3227	2,849	$40,201	230	3.1
Census Tract 3228	2,275	$36,038	198	3.0
Census Tract 3229	1,448	$29,188	195	4.7
Census Tract 3424	1,341	$39,421	87	3.0
Census Tract 3425	3,197	$63,068	51	0.8
Census Tract 3426	179	$47,969	10	1.9
Census Tract 3427	2,580	$57,446	59	1.1
Census Tract 3428	2,718	$83,508	29	0.6
Census Tract 3433	4,579	$61,087	117	1.4
Houston	860,719	$36,616	73,800	3.8
Pasadena	58,678	$38,522	4,693	3.3
Deer Park	14,350	$61,334	314	1.1
La Porte	15,753	$55,810	536	1.7
Harris County	1,547,524	$42,598	101,693	3.0
Texas	9,340,963	$39,927	632,676	3.0

Source: U.S. Census Bureau

3.2 UTILITIES, RAILROADS AND GOODS CONSIDERATIONS IN THE CORRIDOR

Numerous pipelines and underground utilities crisscross the area within the SH 225 Corridor. (See Exhibit 3-2) Many of these are transporting products from the refineries and oil related industries that are proximate to SH 225. Also, important to the corridor is the Union Pacific Railroad, which begins near the Manchester Yard. The railroad is adjacent to SH 225 on the north side from the Manchester Yard at IH 610 until it turns north, east of Lawndale. The track continues northeasterly, joins with other tracks and continues east roughly ⅜ mile north of SH 225. At Shell Company Road, the track turns south crossing under SH 225 and continues adjacent to the freeway past its end at SH 146. Other railroad tracks are near the freeway on the north side, as well.

Exhibit 3.2: Pipelines



Frequent corridor travelers and area residents indicate that a high number of trucks move along the SH 225 freeway. This freeway is the most direct route linking the core of Houston with Barbour's Cut Container Terminal. Previous analyses of origins and destinations showed the majority of trucks serving the terminal are destined to and from Houston. It is likely that a truck destined to Houston's core or west and southwest choose this route. Truck lane studies for SH 225 were conducted by TTI in 2002 and 2003. Truck volumes for all lanes showed a high of 14 percent in the eastbound direction in May 2003. Westbound truck traffic for the same month was less than 12 percent of the roadway volume. The observed volumes are insufficient, alone, to determine whether an issue exists with the trucks and other traffic. Tables 3-3 and 3-4 summarize current truck count data for the corridor.

Table 3-3: Percent Semi-Trailers on SH 225

Count	Date	Eastbound			Westbound		
		3 Hrs AM	2 Hrs Noon	3 Hrs PM	3 Hrs AM	2 Hrs Noon	3 Hrs PM
West of Richey							
A	July 2002	10.60%	17.09%	4.88%	2.89%	14.14%	10.38%
D	February 2003	9.14%	14.89%	4.29%	2.97%	14.44%	11.50%
E	May 2003	9.54%	14.56%	4.26%	3.11%	15.70%	11.20%
G	October 2003	10.00%	17.15%	4.11%	2.84%	13.94%	12.22%
H	January 2004	10.29%	15.90%	4.44%	1.66%	14.49%	8.74%
	Average	9.91%	15.92%	4.40%	2.69%	14.54%	10.81%
West of Beltway 8							
B	July 2002	10.67%	20.58%	5.32%	2.71%	18.45%	10.56%
F	May 2003	11.43%	20.21%	6.56%	4.44%	18.09%	10.39%
	Average	11.05%	20.40%	5.94%	3.58%	18.27%	10.48%
West of Miller							
C	July 2002	10.92%	19.68%	5.94%	5.42%	21.62%	13.89%

Source: Texas Transportation Institute Truck Lane Restriction Study, 2004

Table 3-4: Per Hour Per Lane Averages – Passenger Car Equivalents

Count	Date	Lane(s)	Eastbound						Westbound					
			3 Hrs AM	%	2 Hrs Noon	%	3 Hrs PM	%	3 Hrs AM	%	2 Hrs Noon	%	3 Hrs PM	%
West of Richey														
A	July 2003	Outside (2)	890	70.66	922	76.10	1,391	71.92	1,778	79.18	1,042	77.24	1,493	78.62
		Inside(1)	739	29.34	623	23.90	1,086	28.08	935	20.82	614	22.76	812	21.38
		Total(3)	2,519		2,607		3,868		4,491		2,698		3,798	
D	February 2003	Outside (2)	934	68.65	800	68.41	1,581	67.03	1,556	71.44	928	81.58	1,292	79.53
		Inside(1)	974	31.87	739	31.59	1,555	32.97	1,244	28.56	419	18.42	665	20.47
		Total(3)	2,742		2,339		4,717		4,356		2,275		3,249	
E	May 2003	Outside (2)	1,028	67.65	989	77.54	1,513	64.22	1,611	68.06	1,021	80.58	1,180	69.45
		Inside(1)	983	32.35	573	22.46	1,686	35.78	1,512	31.94	492	19.42	1,038	30.55
		Total(3)	3,039		2,551		4,712		4,734		2,534		3,398	
G	October 2003	Outside (2)	1,055	70.43	1,016	80.54	1,589	72.81	1,727	72.96	917	67.88	1,464	79.46
		Inside(1)	886	29.57	491	19.46	1,187	27.19	1,280	27.04	868	32.12	757	20.54
		Total(3)	2,996		2,523		4,365		4,734		2,702		3,685	
H	January 2004	Outside (2)	1,008	72.21	1,068	79.08	1,528	68.00	2,190	74.39	1,180	79.11	1,608	73.66
		Inside(1)	776	27.79	565	20.92	1,438	32.00	1,508	25.61	623	20.89	1,150	26.34
		Total(3)	2,792		2,701		4,494		5,888		2,983		4,366	
West of Beltway 8														
B	July 2003	Outside (2)	868	71.94	693	76.45	908	63.94	1,072	70.32	732	82.43	1,142	72.81
		Inside(1)	677	28.06	427	23.55	1,024	36.06	905	29.68	312	17.57	853	27.19
		Total(3)	2,413		1,813		2,840		3,049		1,776		3,137	
F	May 2003	Outside (2)	870	71.11	771	80.56	1,016	65.25	988	66.15	733	79.63	1,364	
		Inside(1)	707	28.89	372	19.44	1,082	34.75	1,011	33.85	375	20.37	788	72.12
		Total(3)	2,447		1,914		3,114		2,987		1,841		3,516	27.88
West of Miller														
C	July 2003	Outside (2)	791	75.48	742	84.41	1,051	71.16	885	71.86	706	82.62 22.41	1,364	77.59
		Inside(1)	514	24.52	274	15.59	852	28.84	693	28.14	297	17.38	788	22.41
		Total(3)	2096		1,758		2,954		2,463		1,709		3,516	

Source: Texas Transportation Institute Truck Lane Restriction Study, 2004

3.3 HYDRAULIC/ HYDROLOGIC/ WATER CHARACTERISTICS

3.3.1 Watersheds

The general hydrology of the study area is divided into four principal watersheds: Sims Bayou, Buffalo Bayou, Armand Bayou, and Upper San Jacinto or Galveston Bay. The Sims Bayou watershed is at the western end of the project. It encompasses approximately 87 square miles. Tributaries within the project include Plum Creek. The Buffalo Bayou watershed, also referred to as the Houston Ship Channel along the project corridor, is the largest watershed in the project corridor, although the main channel does not cross the project. Tributaries of Buffalo Bayou that cross SH 225 include Vince Bayou, Little Vince Bayou, Cotton Patch Bayou, Glenmore Ditch, Boggy Bayou, and Patrick Bayou. Big Island Slough is the only tributary of Armand Bayou within the project corridor. At the east end of the project, the area east of the Armand Bayou watershed contributes to Galveston Bay, although not through direct tributaries.

There are four bridge crossings along the existing SH 225 Corridor. Sizes of these structures are summarized in Table 3-5 below.

Table 3-5: Bridge Structures within SH 225 Corridor

Stream	Main Lanes		Eastbound Frontage Road		Westbound Frontage Road	
	# of Spans	Total Length (ft)	# of Spans	Total Length (ft)	# of Spans	Total Length (ft)
Sims Bayou	6	475				
Vince Bayou	3	174	3	160	3	150
Little Vince Bayou	3	100	3	99	3	99
Glenmore Ditch	1	100				

Source:

The other crossings along the SH 225 Corridor are culvert structures. Table 3-6 shows the existing culvert crossings in the project limits.

Table 3-6: Culvert Structures within SH 225 Corridor

Stream	Structure
Cotton Patch Bayou	3-9'x5' RCB
Boggy Bayou	2-10'x9' RCB
Patrick Bayou	EBFR: 5-10'-6"x10' RCB ML: 5-10'x10' RCB WBFR: 5-10'-6"x10' MBC
Big Island Slough	WBFR: 3-7'x3' RCB ML: 3-7'x3' RCB EBFR: 4-42" CMP
Unnamed Crossing	3-7'x3' RCB

3.3.2 Floodplains

The floodplain information shown below was obtained from the Federal Emergency Management Agency (FEMA) studies and Flood Insurance Rate Maps (FIRM). In Table 3-7, the streams that cross SH 225 are shown as well as the location, floodplain width, and elevation, and the floodway width and elevation at the crossing.

Table 3-7: Floodplains within SH 225 Corridor

Stream	Location	100-Year Floodplain		Floodway	
		Width (ft)	Elevation (ft)	Width (ft)	Elevation (ft)
Plum Creek	Near confluence with Sims Bayou	800	21.7	350	22.7
Sims Bayou	0.57 mi east of IH 610	800	13.3	400	13.5
Vince Bayou	East of Richey Rd.	600	13.4	175	14.3
Little Vince Bayou	Near Witter Rd.	100	18.9	70	19.2
Glenmore Ditch	Between Ethyl Rd. & Georgia Gulf	4,100	28.5	62	28.6
Patrick Bayou	Near Tidal Rd.	100	15.4	100	15.5

The hydraulic impacts will depend on the alignments and the proposed typical section of the roadway. The water surface profiles will be analyzed to determine the water surface elevations and potential impacts from the proposed roadway project. If any impacts are found, the increases in flow or water surface elevation will be mitigated to existing conditions. Any roadway fill within the floodway must also be mitigated.

3.4 WATER RESOURCES

3.4.1 Surface Water

The following creeks and bayous were determined to be surface waters within the SH 225 Corridor: Plum Creek, Sims Bayou, Vince Bayou, Little Vince Bayou, Cotton Patch Bayou, Glenmore Ditch, Boggy Bayou, Patrick Bayou, and Big Island Slough. All waters east of Big Island Slough drain to Upper San Jacinto or Galveston Bay. All areas west of Big Island Slough eventually drain to the Houston Ship Channel (HCFCD W100-00-00). A small area along the SH 225 Corridor drains to HCFCD channel F103-00-00. An unnamed crossing at between Miller Cut Off and Sens Road, as well as the area south of SH 225 at Sens Road, drains to HCFCD channel F101-00-00. The project area east of Big Island Slough drains by overland flow and roadside ditches off of the project limits and eventually to the Galveston Bay. The following is a detailed explanation of the creeks mentioned above.

Plum Creek (HCFCD C102-00-00) is a major tributary to Sims Bayou. It crosses SH 225 just west of the IH 610 interchange which is not within the project limits. It flows generally to the northeast through the interchange and east along SH 225 to the confluence with Sims Bayou. The confluence of Plum Creek and Sims Bayou is just downstream of the existing SH 225 Corridor. Part of the floodplain of Plum Creek

encroaches on the existing SH 225 Corridor prior to its convergence with Sims Bayou. As Plum Creek flows east, its floodplain is bound by SH 225 on the south and a retaining wall protecting a water treatment plant to the north.

Sims Bayou (HCFCD C100-00-00) is the largest stream crossing within the project corridor. It crosses SH 225 just east of the IH 610 interchange. It flows generally to the northeast through the watershed and north in the project corridor. Sims Bayou confluences with Buffalo Bayou north of SH 225 and just east of IH 610.

Vince Bayou (HCFCD I100-00-00) crosses SH 225 between Richey Road and Shaver Street. It flows generally to the north and is a tributary of Buffalo Bayou.

Little Vince Bayou (HCFCD I101-00-00) crosses the project corridor near Witter Road. It is a tributary of Vince Bayou. The channel is concrete lined throughout the project corridor.

Cotton Patch Bayou (HCFCD G110-00-00) crosses SH 225 just east of Jackson Street. The bayou flows to the north and is a tributary of Buffalo Bayou.

Glenmore Ditch (HCFCD G108-00-00) crosses the project between Ethyl Road and Georgia Gulf. The flow is generally to the north. Glenmore Ditch is a tributary of Buffalo Bayou.

Boggy Bayou (HCFCD G105-00-00) crosses SH 225 just east of Beltway 8. It is a tributary of Buffalo Bayou and the flow is generally to the north.

Patrick Bayou (HCFCD G104-00-00) crosses SH 225 between Center Street and Tidal Road. It is a tributary of Buffalo Bayou and the flow is generally to the north.

Big Island Slough (HCFCD B106-00-00) crosses the project corridor west of Miller Cutoff Road. The flow is generally to the south. Big Island Slough is a tributary of Armand Bayou.

3.4.2 Floodplains

FEMA FIRMs, dated November 6, 1996 and April 20, 2000, were utilized to determine the floodplains and floodways within the project limits. The floodplains represent areas with a one percent chance of flood inundation in any given year, otherwise known as the 100-year floodplain. According to the TxDOT Hydraulic Design Manual, the floodway is an area within the floodplain "that will convey the 100-year flood without increasing the water surface elevation of the flood more than one foot, at any point."

Any fill placed within the floodplain limits must be mitigated through compensatory excavation within the floodplain. FEMA requires that any loss of conveyance in the floodway must be mitigated such that the 100-year flood elevation in the floodway does not increase. Further, the TxDOT Houston District allows no increase in 100-year water surface elevation in the floodplain due to proposed work within TxDOT ROW.

The following FIRMs were used to determine the base flood elevations for the project as well as the floodplain limits: 48201C0885K, 48201C0905J, 42801C0910J, and 42801C0930J in Harris County. The floodplain maps for the floodplains within the project corridor are shown in Exhibit 3-3.

Plum Creek does not cross the SH 225 Corridor within the project limits; however, the floodplain does encroach on the SH 225 right-of-way (ROW) just before its confluence with Sims Bayou. Approximately 800 feet of the floodplain is within the SH 225 ROW just east of the IH 610 interchange. None of the floodway is within the existing SH 225 ROW. The floodplain and floodway parallels the SH 225 Corridor along this area.

The Sims Bayou floodplain is approximately 800 feet wide within the project corridor. The confluence of Plum Creek and Sims Bayou is just downstream of the existing SH 225 ROW. The floodway is approximately 350' wide at SH 225.

The Vince Bayou floodplain varies in width within the existing project corridor from 400 feet to 800 feet. The floodway ranges in width from 150' at the south ROW and 175 feet at the north ROW.

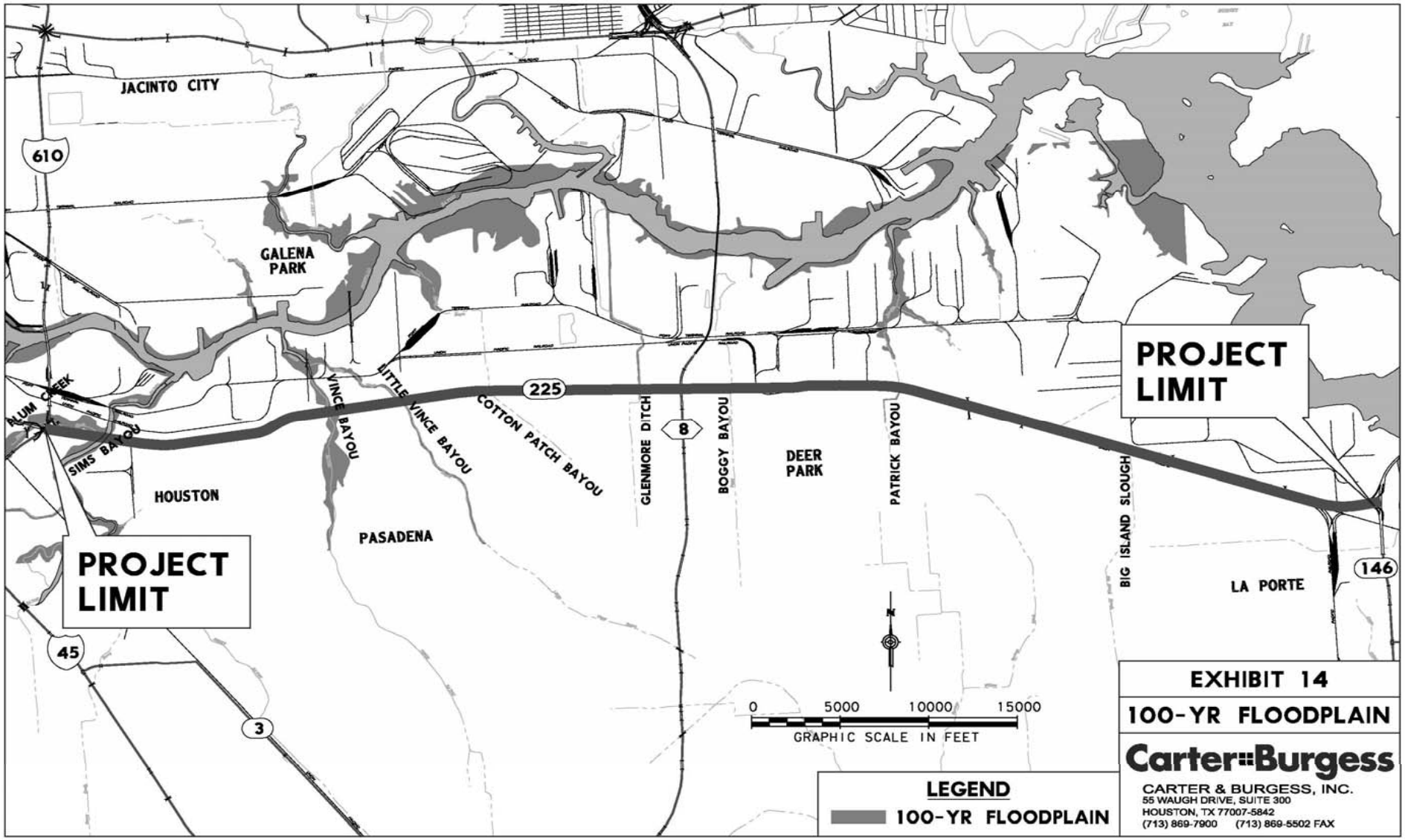
The Little Vince Bayou floodplain at SH 225 is approximately 100 feet wide. The floodway is approximately 70 feet wide though the project corridor.

The widest floodplain within the project limits is that of Glenmore Ditch. The floodplain width is approximately 4,100 feet at SH 225. The floodway is 62 feet in width.

The Patrick Bayou floodplain is approximately 100 feet wide. The floodway is described in the FEMA study as equal to the channel banks.

The entire project is located within the study area for the Tropical Storm Allison Recovery Project (TSARP). The study, completed by Harris County Flood Control District (HCFCD) with FEMA, analyzed the June 2001 storm and associated flooding within Harris County. The project concluded with new FIRM maps for several locations within Harris County. According to TSARP, the SH 225 Corridor received approximately 10 to 15 inches of rain in a 12-hour period and 20 to 25 inches in the five days Allison impacted the area. Several areas south of SH 225 experienced flooding during Tropical Storm Allison including those within the Vince, Little Vince, Cotton Patch, and Patrick Bayous. At Patrick Bayou, the FEMA map indicates that the 500-year flow is contained within the channel; however, during Tropical Storm Allison, several residences near this crossing flooded, according to City of Deer Park representatives.

Exhibit 3-3: 100-Year Floodplain



3.5 ENVIRONMENT

SH 225 traverses a mostly industrial and commercial corridor, with little undeveloped land. Large petrochemical plants line the north side of SH 225 for most of the corridor. The business districts of Pasadena and Deer Park are also adjacent to SH 225. The corridor is among the most economically important districts in the region, if not the nation, due to its concentration of petrochemical industries and businesses. The corridor is also of historical importance. SH 225 provides access to the San Jacinto Battlefield State Park, where Texas independence was won from Mexico. The state's tallest obelisk is there, and the Battleship TEXAS is berthed there.

3.5.1 General Setting

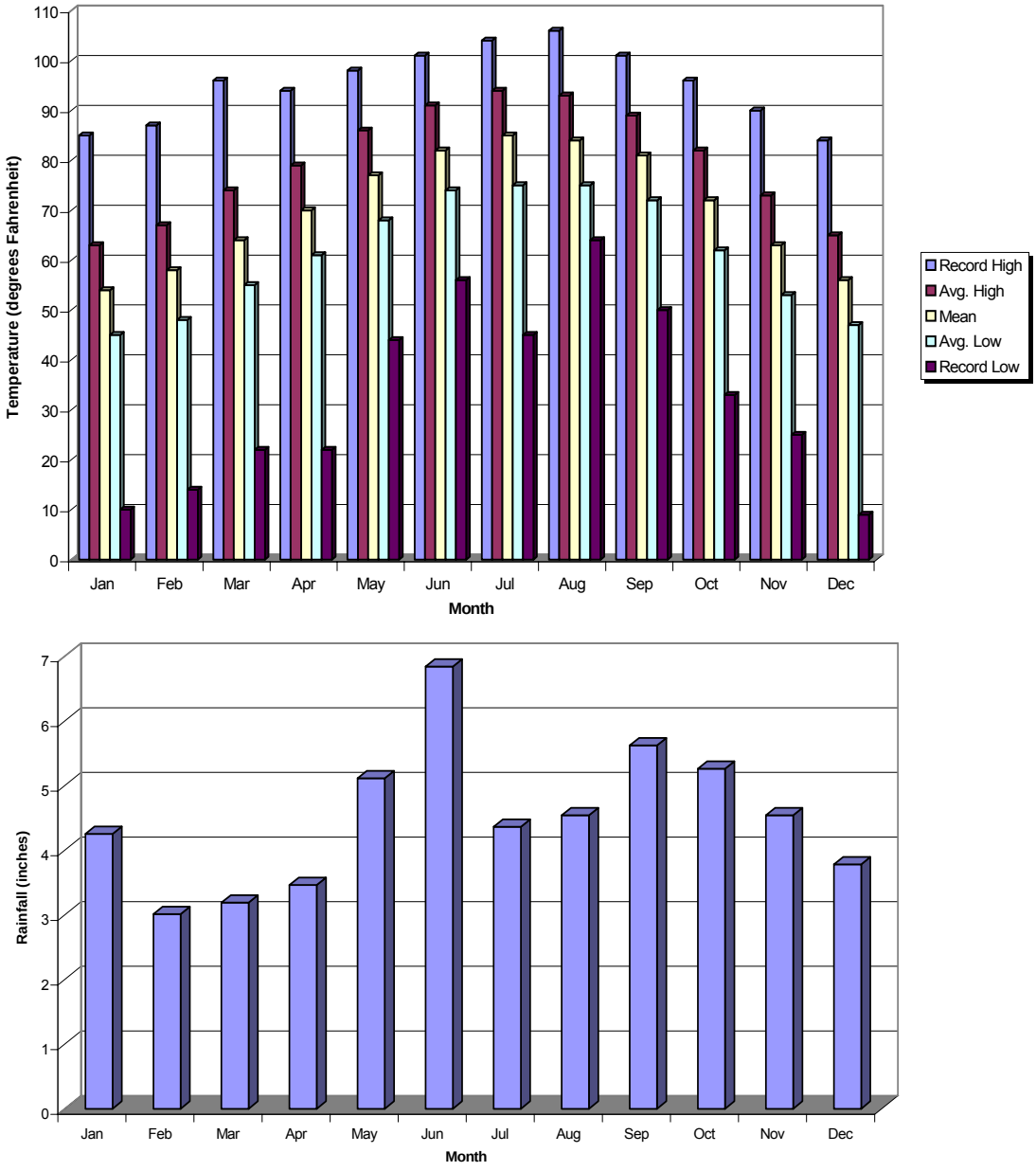
The SH 225 Corridor is in the Texas Gulf coastal plain. Temperatures in the corridor are subtropical: mild in winter and hot and humid in summer. The average annual rainfall is 45 inches, with slightly more rain during spring and fall. Measurable snowfall is rare in Houston. Exhibit 3-4 shows a graph of mean monthly temperature, average high and average low temperature in Houston over the past thirty years along with record high and low temperatures. Exhibit 3-4 also presents a graph of mean monthly rainfall.

3.5.2 Air Quality

The Houston-Galveston region, including the SH 225 Corridor, is not in attainment of the national ambient air quality standard for ozone. Air pollution in the region is caused partly by the petrochemical industries along the north side of SH 225 and the south side of the Houston Ship Channel, which are sources of volatile organic compounds, nitrogen oxides and particulate matter. These pollutants mix in the air column during specific weather conditions and react chemically with each other in the presence of sunlight to cause ozone. Motor vehicles using SH 225 also contribute these same types of pollutants and are part of the ozone problem, as well as contributing carbon monoxide.

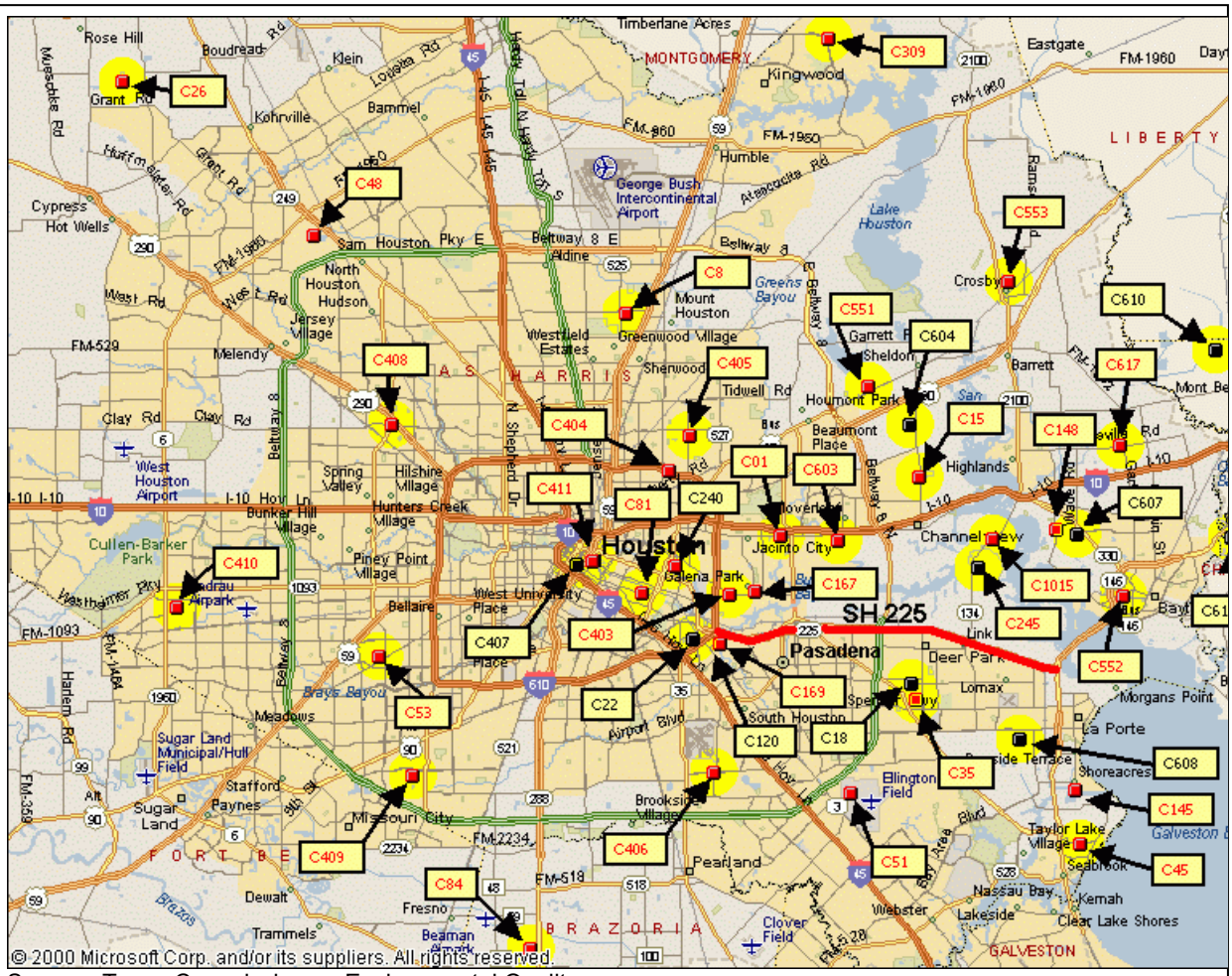
The Texas Commission on Environmental Quality and a consortium of Ship Channel industries monitors air quality throughout the Houston region. Exhibit 3-5 shows the network of air pollution monitors in Houston. Near the SH 225 Corridor, there are stations to monitor air quality in Pasadena, southeast Houston and the Houston Ship Channel, data for two of which are shown in Exhibit 3-6. Ozone levels at these stations exceed the eight-hour national ambient air quality standard of nine parts per billion for ozone most of the year, and the one-hour standard of 35 parts per billion is exceeded most months, especially in the summer when strong sunlight and high temperatures cause more ozone to be created from its precursors.

Exhibit 3-4: Average Temperature and Rainfall



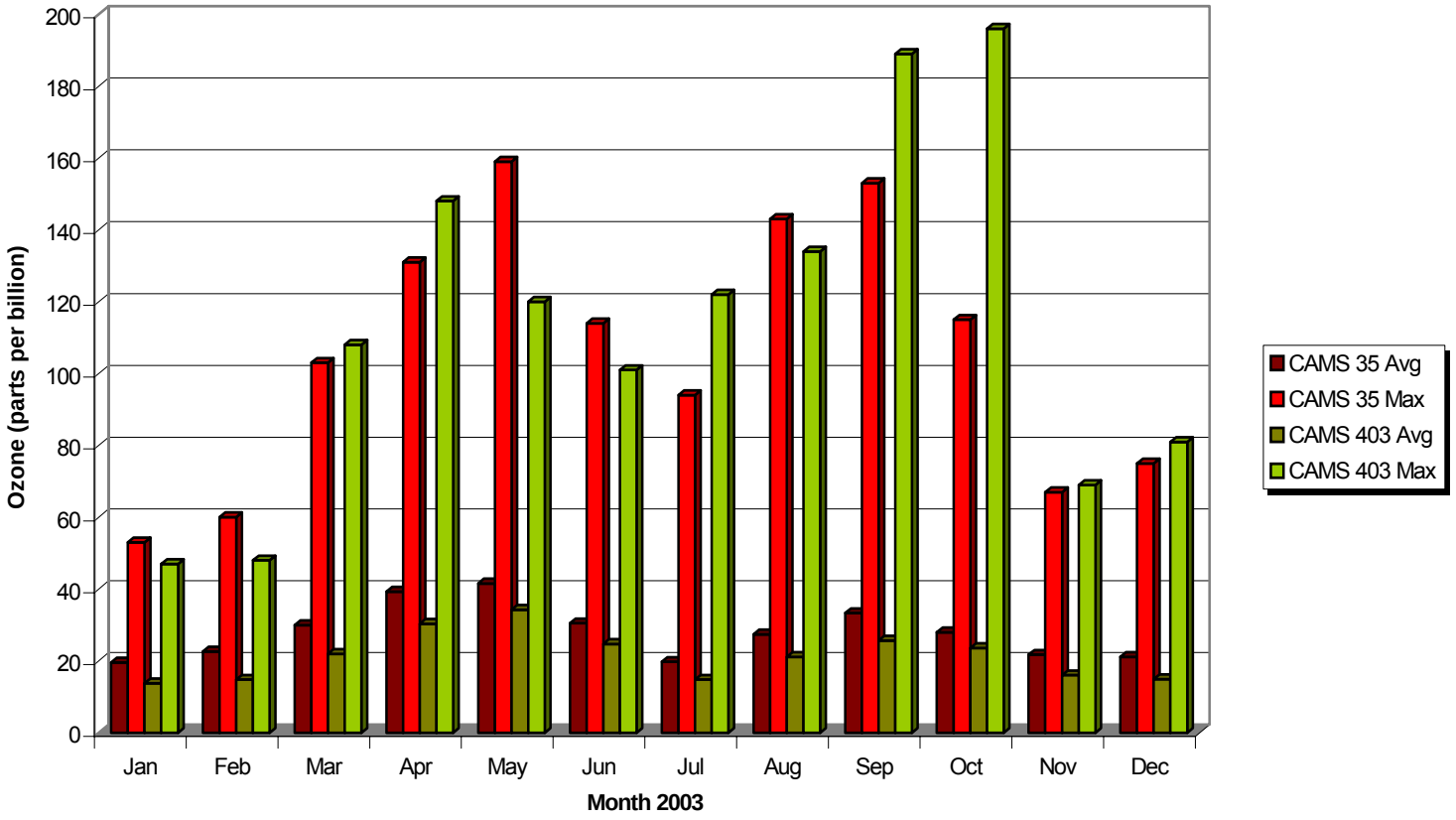
Source: National Weather Service

Exhibit 3-5: Air Pollution Monitoring Network



Source: Texas Commission on Environmental Quality

Exhibit 3-6: Ozone Concentration Near SH 225 in 2003



Source: Texas Commission on Environmental Quality and Quadrant Consultants, 2004

3.5.3 Soils

Soils in the SH 225 Corridor are typically clayey, dark soils of the Texas Gulf Coast. A map of soil series in the SH 225 Corridor is shown over an aerial photo of the corridor in Exhibit 3-7. The major soil series in the SH 225 Corridor are:

- *Lake Charles clay (LcA, LcB and Lu), consisting of deep, nearly level clayey soils on upland prairies, poorly drained with very slow permeability.*
- *Beaumont clay (Ba and Bc), consisting of deep, nearly level clayey soils on upland prairies, poorly drained with very slow permeability. This soil is a hydric soil in Harris County.*
- *Bernard clay loam (Bd, Be and Bg), consisting of deep, nearly level loamy soils on upland prairies, somewhat poorly drained with slow permeability.*
- *Midland silty clay loam (Md and Mu), consisting of deep, nearly level loamy soils on prairies, with poor drainage and very slow permeability.*
- *Vamont clay (VaA and VaB), consisting of nearly level soils on forested uplands, with slow drainage and very slow permeability.*
- *Atasco fine sandy loam (AtB), consisting of deep loamy soils on forested uplands, moderately well drained with very slow permeability.*

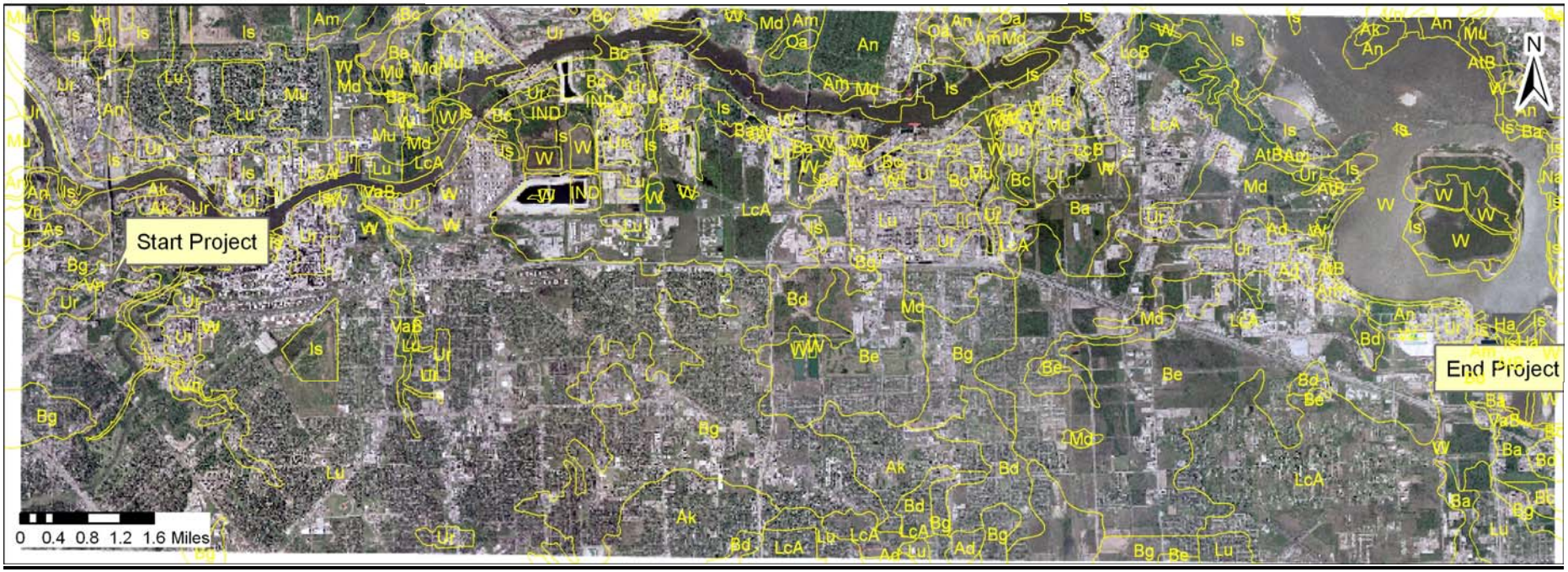
3.5.4 Vegetation

The SH 225 Corridor is in the Gulf Coast Prairies and Marshes ecoregion of Texas. The original vegetation of the SH 225 Corridor may have been a tallgrass prairie dominated by bluestem (*Schizachyrium scoparium*), but the area is now classified as Urban (46) by The Vegetation Types of Texas.

Currently, the unpaved parts of the SH 225 right-of-way (ROW) is mostly mowed grasses. Chinese tallow tree (*Sapium sebiferum*), chinaberry (*Melia azedarach*), water oak (*Quercus nigra*), and sugarberry (*Celtis laevigata*) are found along the fenced margins. Other common plants in the corridor are honeysuckle (*Lonicera japonica*), greenbrier (*Smilax bona-nox*), big bluestem (*Andropogon gerardii*), broomsedge (*Andropogon virginicus*), and switch grass (*Panicum virgatum*). Near Deer Park and Pasadena, one finds Japanese privet (*Ligustrum japonica*), crape myrtle (*Lagerstroemia indica*), and live oak (*Quercus virginiana*) trees near the right-of-way.

Some of the bayous and creeks that cross the SH 225 Corridor have marginal wetlands with plants such as flat sedge (*Cyperus virens*), spike rush (*Eleocharis montevidensis*), and cattail (*Typha angustifolia*).

Exhibit 3-7: Soil Series in SH 225 Corridor



Source: USGS and Quadrant Consultants, 2004

3.5.5 Wildlife

The SH 225 ROW has little habitat for mammals, birds, reptiles and amphibians. Most of the wildlife habitat is in the stream channels that cross the highway. The highly industrialized areas on the north and west parts of the corridor also are poor wildlife habitat. The south and east parts of the corridor, however, still have grasslands and woods that can support wildlife. Mammals most likely to occur in these areas include the Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), eastern cottontail (*Sylvilagus floridanus*), striped skunk (*Mephitis mephitis*), eastern mole (*Scalopus aquaticus*), eastern gray squirrel (*Sciurus carolinensis*), Attwater's pocket gopher (*Geomys attwaterii*), Baird's pocket gopher (*Geomys breviceps*) and white-tailed deer (*Odocoileus virginianus*).

Birds observed in the project corridor include American kestrel (*Falco sparverius*), loggerhead shrike (*Lanius ludovicianus*), red-shouldered hawk (*Buteo lineatus*) and swallows (Hirundininae). Along the creeks and streams, a black-crowned night heron (*Nycticorax nycticorax*) and a great egret (*Ardea alba*) were observed.

3.5.6 Endangered Species

Harris County has had records of 41 endangered species, species threatened with endangerment, and species of concern (Table 3-8). No habitat exists in the SH 225 ROW for these species.

Table 3-8: Endangered Species in Harris County

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Habitat Present?
Amphibians					
Houston toad	*Bufo houstonensis*	E	*	Sandy soil, breeds in ephemeral pools	No
Birds					
American peregrine falcon	*Falco peregrinus anatum*	E	*	Potential migrant, nest in west Texas	No
Arctic peregrine falcon	*Falco peregrinus tundrius*	T	*	Potential migrant	No
Attwater's greater prairie chicken	*Tympanuchus cupido attwateri*	E	*	Thick 1-3' tall grass from 0'-200' above sea level along coast	No
Bald eagle	*Haliaeetus leucocephalus*	T	T	Near water areas, in tall trees	No
Black rail	*Laterallus jamaicensis*	SOC	*	Brackish and freshwater marshes, nest at base of *Salicornia*	No
Brown pelican	*Pelecanus occidentalis*	E	*	Island near coastal areas	No

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Habitat Present?
Henslow's sparrow	*Ammodramus henslowii*	SOC	*	Weedy fields with bunch grasses	No
Mountain plover	*Charadrius montanus*	--	**	Short vegetation, bare ground, flat topography	No
Piping plover	*Charadrius melodus*	T	*	Beach and bayside mud or salt flats	No
Reddish egret	*Egretta rufescens*	T	*	Brackish marshes and tidal flats	No
Snowy plover	*Charadrius alexandrinus*	SOC	*	Beach and bayside mud or salt flats	No
Swallow-tailed kite	*Elanoides forficatus*	T	*	Lowland forest swamps	No
White-faced ibis	*Plegadis chihi*	T	*	Freshwater marshes, but some brackish or salt marshes	No
White-tailed hawk	*Buteo albicaudatus*	T	*	Coastal Prairies	No
Whooping crane	*Grus americana*	E	*	Winters in Aransas NWR	No
Wood stork	*Mycteria americana*	T	*	Prairie ponds and flooded pastures	No
Birds-Related					
Colonial waterbird nesting areas		SOC	*		No
Fishes					
Creek chubsucker	*Erimyzon oblongus*	T	*	Variety of small rivers and creeks, prefers headwaters	No
Mammals					
Black bear	*Ursus americanus*	T	*	Bottomland hardwoods; large, undisturbed forest areas	No
Louisiana black bear	*Ursus americanus luteolus*	T	T	Bottomland hardwoods; large, undisturbed forest areas	No
Plains spotted skunk	*Spilogale putorius interrupta*	SOC	*	General; woods, fields, prairies, shrubs	No
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	T	SOC	Cavity trees in hardwood forest, concrete culverts, abandoned buildings	No

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Habitat Present?
Southeastern myotis	*Myotis austroriparius*	SOC	*	Cavity trees in hardwood forest, concrete culverts, abandoned buildings	No
Reptiles					
Alligator snapping turtle	*Macroclemys temminckii*	T	SOC	Deep water of rivers and canals	No
Atlantic hawksbill sea turtle	*Eretmochelys imbricata*	E	*	Gulf and bay system	No
Green sea turtle	*Chelonia mydas*	T	*	Gulf and bay system	No
Kemp's Ridley sea turtle	*Lepidochelys kempii*	E	*	Gulf and bay system	No
Leatherback sea turtle	*Dermochelys coriacea*	E	*	Gulf and bay system	No
Loggerhead sea turtle	*Caretta caretta*	T	*	Gulf and bay system	No
Smooth green snake	*Liochlorophis vernalis*	T	*	Gulf coastal prairies, prefers dense vegetation	No
Texas diamondback terrapin	*Malaclemys terrapin littoralis*	SOC	*	Coastal marshes or tidal flats behind barrier islands	No
Texas garter snake	*Thamnophis sirtalis annectens*	SOC	*	Wet, moist micro habitats, mostly, central Texas	No
Texas horned lizard	*Phrynosoma cornutum*	T	*	Open, semi-arid regions, with bunch grass	No
Timber/Canebrake Rattlesnake	*Crotalus horridus*	T	*	Swamps/floodplains of hardwood/upland pine	No
Plants					
Coastal gay-feather	*Liatris bracteata*	SOC	SOC	Black clay soils of prairie remnants	No
Corkwood	*Leitneria floridana*	--	SOC(I)	Between brackish marsh and coastal pine-hardwood	No
Giant sharpstem umbrella-sedge	*Cyperus cephalanthus*	--	SOC	Coastal Prairie. Poorly-moderately drained.	No
Houston machaeranthera	*Rayjacksonia aurea*	SOC	SOC	Seasonally wet, saline barren areas	No
Texas meadow rue	*Thalictrum texanum*	SOC	SOC(H)	Mesic woodlands, partially shaded ditches	No

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Habitat Present?
Texas prairie dawn	*Hymenoxys texana*	E	E	Poorly drained areas in open grasslands; pimple mounds	No
Texas windmill-grass	*Chloris texensis*	SOC	SOC	Sandy/sand loam in open/barren grasslands	No
Threeflower broomweed	*Thurovia triflora*	SOC	SOC	Black clay soils of remnant grasslands	No

Source: Quadrant Consultants, 2004
*All of the species in this list occur on the State listing of threatened or endangered species, however, only those indicated in the Federal Status column are listed for this county by the Clear Lake office of the U.S. Fish and Wildlife Service (February 2003).
**Federally Potentially Threatened; this species and habitat is not an issue with USFWS.
--Not listed for Texas Parks and Wildlife for this county
E = endangered T = threatened H = historical occurrence I = introduced population C = candidate species SOC = species of concern

Several species on the list may have suitable habitat within several miles of SH 225, although they are not know to exist in the corridor:

- *Bald eagle (Haliaeetus leucocephalus), a threatened species on Texas and federal lists. The bald eagle nests in tall trees near open water and is found near rivers and lakes.*
- *White-tailed hawk (Buteo albicaudatus), a threatened species in Texas. The White-tailed hawk prefers open prairie-fields, and grasslands and feeds on rodents, rabbits, lizards and insects.*
- *Plains spotted skunk (Spilogale putorius interrupta), a species of concern in Texas. This skunk is found in open fields and farmyards with debris and brush piles, and forest edges.*
- *Alligator snapping turtle (Macroclemys temminckii), a threatened species in Texas. This species is found in deep rivers and lakes with muddy bottoms, and sometimes also enters brackish waters.*
- *Henslow's sparrow (Ammodramus henslowii), a species of concern. This sparrow is found in weedy fields and cut areas.*
- *Coastal gay feather (Liatris bracteata), a species of concern. The plant is found in dark clay soils in prairie grasslands.*
- *Corkwood (Leitneria floridana), a species of concern. The Corkwood is found in swamps and marshes in southeast Texas.*

In addition, east Harris County near the SH 225 Corridor may once have had suitable habitat for the piping plover (*Charadrius melodus*), reddish egret (*Egretta rufescens*), brown pelican (*Pelecanus occidentalis*), Attwater's greater prairie chicken (*Tympanuchus cupido attwateri*); Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), southeastern myotis (*Myotis austroriparius*), Houston machaeranthera (*Rayjacksonia aurea*), and giant sharpstem umbrella-sedge (*Cyperus cephalanthus*). However, no suitable habitat for these species still exists in the SH 225 Corridor.

3.5.7 Noise

Vehicles using SH 225 create noise, as do trains using the railroad adjacent to SH 225, factories to the north and south, ships and trains using the Houston Ship Channel, and airplanes using Hobby Airport to the southwest and Ellington Field to the south of the corridor. Noise levels from cars and trucks are relatively constant over a scale of minutes to hours, as are the factories. However, trains and airplanes cause noise only when they pass, resulting in a greater perceived noise impact. Much of factory noise is from steam vents and fluids flowing in pipelines, which tends to be at higher frequencies that do not carry as well as mid and low frequencies but are more noticeable.

3.5.8 Water Resources

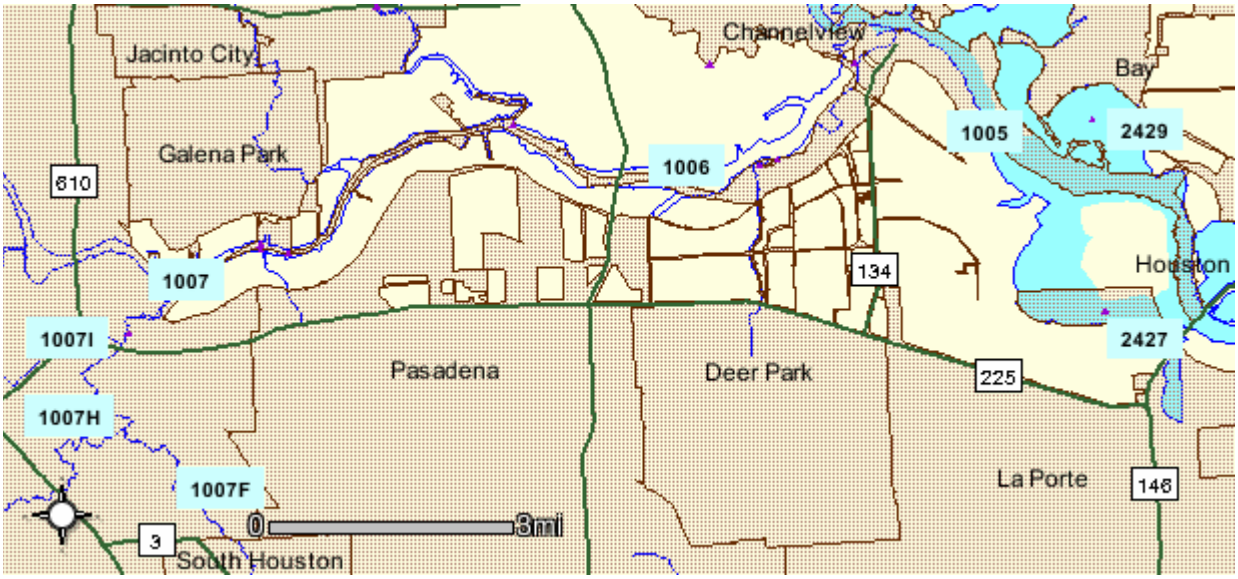
SH 225 crosses Sims Bayou, Vince Bayou, Little Vince Bayou and Big Island Slough, which are tributaries of the Houston Ship Channel. The first two streams are navigable streams in natural channels and are tidally influenced, while the second two streams are in concrete channels and are not navigable and not tidally influenced. Berry Bayou, another tributary of the Houston Ship Channel in Pasadena, does not extend south as far as SH 225.

3.5.9 Water Quality

The Texas Commission on Environmental Quality monitors stream water quality in the SH 225 Corridor. Segment 1007, Houston Ship Channel/Buffalo Bayou Tidal in the Texas Commission on Environmental Quality's stream classification system, includes the Houston Ship Channel and the tidal parts of Sims, Vince and Berry Bayous as well as the tidal parts of other tributary bayous. Exhibit 3-8 shows the location of segments for streams near the project corridor.

Water samples from Sims Bayou and Vince Bayou since 1996 indicate that Vince Bayou has had low dissolved oxygen levels in some samples, and some acute toxicity in its sediments that could affect benthic organisms. Some water samples from Vince and Berry Bayous have shown low pH levels that may be toxic to fish and other aquatic organisms. The tidal parts of Sims Bayou, Vince Bayou, Berry Bayou and the Houston Ship Channel are closed to fishing due to a history of spills of toxic chemicals. Finally, some Vince Bayou water samples have had high counts of enterococcal bacteria such as *Escherichia coli*, indicating contamination by fecal material. Segment 1007 is listed as an impaired stream in the Texas Commission on Environmental Quality's Section 303(d) list.

Exhibit 3-8: Water Quality Monitoring Stations



Source: Texas Commission on Environmental Quality

3.5.10 Cultural Resources

Cultural resources include historic and archaeological sites. The most famous historic site of the project area is the San Jacinto Battlefield, which is two miles north of SH 225 on SH 134. At this site in 1836, the Texan army under General Sam Houston defeated the Mexican army under General Santa Ana and won independence for Texas from Mexico. The site is now a state park. Near the battlefield site is the Battleship TEXAS, which served the U.S. Navy in the two World Wars of the twentieth century.

Some archaeological sites may still exist near the SH 225 Corridor, although none are likely to exist in the ROW due to previous ground disturbance.

The Texas Historical Commission lists ten sites along the SH 225 Corridor (Exhibit 3-9). These sites are described in Table 3-9. Nine of the sites are historic markers, which are not themselves historic and can be relocated by short distances. The Pasadena Historical Museum is in an historic building in Memorial Park along Vince Bayou, about 100 feet south of the SH 225 ROW.

Table 3-9: Historic Sites Near SH 225 Corridor

Site	Type	Location	Comments
1. Tod-Milby Home Site	Historical Marker	Elm and Broadway Streets	Site of the house of John Grant Tod, who served in the Republic of Texas Navy in 1837. The house was an historic landmark until demolished in 1959.
2. Holy Cross Episcopal Mission	Historical Marker	710 Medina at Erath Street	In 1865, the Rev. J. M. Curtis and 24 Harrisburg communicants met in a mission called Nativity, changed to Holy Cross about 1875. The current building was built in 1920.
3. Glendale Cemetery	Historical Marker	Manchester Road at San Saba Road	Burial place of Texas heroes and pioneers. Began as private plot of family of John R. Harris, founder of Harrisburg.
4. Old Harrisburg	Historical Marker	8100 block of Lawndale at Frio	Early Texas port and trading post. Site of state's first steam saw, grist mills and railroad terminal. Town founded in 1826 by John R. Harris, who was first settler in 1823.
5. Allen Ranch	Historical Marker	SH 225 westbound frontage road, west of Allen-Genoa Road	The Allen Ranch was one of the oldest and largest ranches in southeast Texas. Part of the land was granted to Morris Callahan in 1824 by Mexico and inherited by his niece Rebecca Jane Thomas, who married Samuel William Allen in 1844.
6. Crown Hill Cemetery	Historical Marker	813 N. Richey Road	This graveyard, originally known as Pasadena Cemetery and the town's only community burial ground, was established in 1906 on a knoll overlooking Vince's Bayou and Buffalo Bayou.
7. City of Pasadena	Historical Marker	In front of Pasadena Historical Museum	The Vince brothers, members of Stephen F. Austin's original 300 settlers, developed this area as ranch land. The armies of both Sam Houston and Santa Anna traveled through what is now Pasadena in 1836, to San Jacinto to decide the future of Texas.
8. Pasadena Historical Museum	Museum	201 Vince Street	Historic building houses displays of Pasadena area history.
9. Deer Park	Historical Marker	1402 Center Street	Illinois native Simeon Henry West (1827-1920) settled in this vicinity in 1892 hoping to develop the area, with its mild climate and proximity to waterways, into a farming and trading center.
10. Texas Army Attacked in Four Divisions	Historical Marker	One mile north of SH 225 on Battleground Road (SH 134)	The Cavalry on the right, commanded by Mirabeau B. Lamar; next, the Infantry under Lieutenant Colonel Henry Millard and the "Twin Sisters" cannon under Colonel George W. Hockley; the 1st Regiment in the center under Colonel Edward Burleson; the 2nd Regiment, the left wing, under Colonel Sidney Sherman.

Source: Texas Historical Commission

Exhibit 3-9: Historic Sites Near SH 225 Corridor

Source: Quadrant Consultants, 2004

3.5.11 Hazardous Materials

The SH 225 Corridor is one of the nation's largest petrochemical industrial complexes, and many hazardous materials are fabricated, handled, transported and stored here. Storage tanks and waste ponds holding hazardous materials are found in the corridor. The SH 225 Corridor includes a large number of high-pressure pipelines carrying crude oil, petroleum products, chemicals and natural gas to and from the industries. Railroads and trucks carry hazardous cargo along SH 225.

The SH 225 Corridor was searched on several federal and Texas databases for sites with the potential to cause hazardous contamination of the SH 225 ROW. These databases are:

- *National Priority List.* This database includes U.S. Environmental Protection Agency's National Priority List (Superfund) sites, established to fund the cleanup of the most serious uncontrolled or abandoned hazardous waste sites for possible long-term remediation.
- *Comprehensive Environmental Response, Compensation & Liability Information System.* This is the repository for Superfund information in support of the Comprehensive Environmental Response, Compensation and Liability Act. This database contains sites that have been investigated or are in the process of being investigated for potential environmental risk.
- *No Further Remedial Action Planned*. This database includes sites that were on the National Priority List that the U.S. Environmental Protection Agency has investigated and found to no longer pose a significant risk or require further remediation. These sites were not found to be contaminated, or contamination was quickly removed, or contamination was not serious enough to require federal Superfund action.
- *Resource Conservation and Recovery Act Information System*. This database includes sites that handle, generate, transport, store, treat, or dispose of hazardous wastes. It includes handlers, generators (large, small and exempt), transporters, sites with violations, sites with corrective actions, and treatment, storage and disposal facilities.
- *Emergency Response Notification System.* This database contains data on reported releases of oil and hazardous substances. The data come from spill reports to the U.S. Environmental Protection Agency, U.S. Coast Guard, the National Response Center and the Department of Transportation.
- *Texas Superfund*. The state Superfund database lists abandoned or inactive sites in Texas that pose an unacceptable risk to public health and safety or the environment, but which do not qualify for action under the federal Superfund program.
- *Petroleum Storage Tanks.* The Underground Storage Tank listing is derived from the Petroleum Storage Tank database that is administered by the Texas Commission on Environmental Quality. Both underground and aboveground storage tanks are included in this report.
- *Leaking Petroleum Storage Tanks*. The Leaking Underground Storage Tank listing includes facilities with reported leaking petroleum storage tanks. This database is derived from the Petroleum Storage Tank database and is maintained by the Texas Commission on Environmental Quality.

- *Leaking Petroleum Storage Tanks. Spills.* The Texas Commission on Environmental Quality maintains this database of releases of hazardous materials into the environment.
- *Voluntary Cleanup Program.* The Texas Voluntary Cleanup Program provides incentives to encourage companies to clean up contaminated sites in Texas. Companies or landowners participating in a voluntary cleanup receive protection from liability to the state of Texas.

The results of the database search is summarized in Table 3-10.

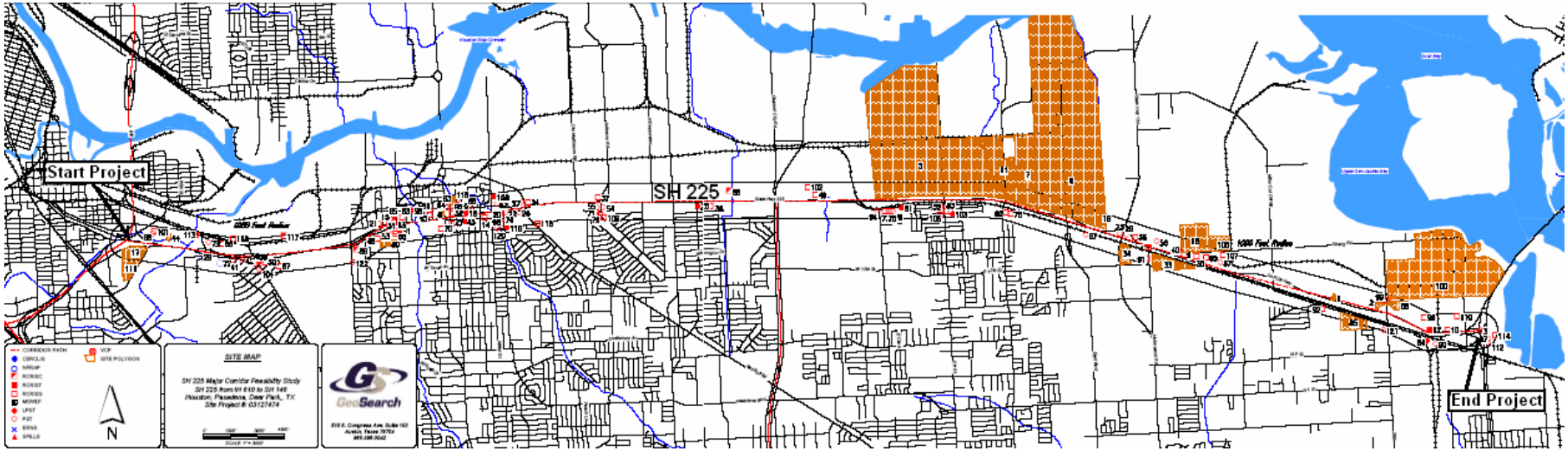
Table 3-10 : Potential Sites for Hazardous Materials

Database	Regulatory Agency	Sites
National Priority List	U.S. Environmental Protection Agency	0
Comprehensive Environmental Response, Compensation and Liability Information System	U.S. Environmental Protection Agency	1
Superfund Sites, No Further Remedial Action Planned	U.S. Environmental Protection Agency	5
Resource Conservation and Recovery Information System (RCRIS) Treatment, Storage and Disposal Facilities	U.S. Environmental Protection Agency	1
RCRIS Hazardous Waste Generators	U.S. Environmental Protection Agency	81
RCRIS Hazardous Waste Generator Violations and Corrective Action Reports	U.S. Environmental Protection Agency	8
Emergency Response Notification	U.S. Environmental Protection Agency	307
Texas Spills	Texas Commission on Environmental Quality	194
Texas Superfund	Texas Commission on Environmental Quality	0
Registered Petroleum Storage Tanks	Texas Commission on Environmental Quality	79
Leaking Petroleum Storage Tanks	Texas Commission on Environmental Quality	28
Facility Index System	U.S. Environmental Protection Agency	
Municipal Solid Waste and Landfills	Texas Commission on Environmental Quality	2
Texas Voluntary Cleanup Program	Texas Commission on Environmental Quality	5

Source: Quadrant Consultants, 2004

Exhibit 3-10 shows the locations of the potential sites in the above databases within 1,000 feet of SH 225. Of the 711 potential sites, 22 could be a source of contamination in the SH 225 ROW.

Exhibit 3-10: Potential Hazardous Materials Sites



Source: Texas Commission on Environmental Quality

The one Superfund site in the project corridor is the DuPont chemical plant on Strang Road in La Porte, 200 feet from SH 225. The site's EPA identification number is TXD008079212. This site is an active biomedical manufacturing facility with several inactive landfills, a surface impoundment and incinerators. The site has not yet started its remediation.

There are eight large-quantity generators of hazardous waste that have violated the Resource Conservation and Recovery Act and have taken corrective actions. The Shell Chemical Deer Park Complex, 5700 SH 225, is a large-quantity generator of hazardous waste and a treatment, store and disposal facility. Its EPA identification number is TXD067285973. The plant has had 40 violations since 1986 and has performed 20 corrective actions. The plant contaminated the surficial groundwater aquifer and has engaged in corrective actions as recently as January 2000 to remove the contamination, which is still present.

Rohm & Haas, on SH 225 in Deer Park, is also a large-quantity generator of hazardous waste and a treatment, store and disposal facility. Its EPA identification number is TXD065096273. The plant has had 20 violations since 1985 and has performed 20 corrective actions. The plant has caused groundwater contamination that is still present.

Lubrizol Petrochemical Plant, 4100 Tidal Road in Deer Park, is a large-quantity generator of hazardous waste and a treatment, store and disposal facility. Its EPA identification number is TXD041067638. The plant has had 23 violations since 1984 and has performed 52 corrective actions. The plant has been removing and treating contaminated groundwater at its site.

Goodyear Tire & Rubber Company, 2000 Goodyear Drive in Houston, is just south of SH 225 and is near IH 610. The plant's EPA identification number is TXD008077562. The plant is a large-quantity generator of hazardous waste. The plant has had six violations since 1985 and has performed two corrective actions related to land disposal of wastes.

Air Products, 1423 SH 225 in Pasadena, is a large-quantity generator of hazardous waste and a treatment, store and disposal facility. Its EPA identification number is TXD990757486. Since 1987, it has had 17 violations and 16 corrective actions. The plant has contaminated the surficial groundwater aquifer at its site.

Georgia Gulf Chemicals & Vinyls, 3503 SH 225 in Pasadena, is a large-quantity generator of hazardous waste and a treatment, store and disposal facility. Its EPA identification number is TXD093565653. Since 1988, it has had 12 violations and three corrective actions for land disposal, which are now rated by the Texas Commission on Environmental Quality as "low priority."

The DuPont chemical plant at 12501 Strang Road, which is listed as a Superfund site, is also a large-quantity generator of hazardous waste and a treatment, store and disposal facility. It has been cited for 14 violations of the Resource Conservation and Recovery

Act since 1989. The plant has performed 15 corrective actions, including remediation of contaminated groundwater.

The Lyondell-Citgo Refining Company, 12000 Lawndale in Houston, is about 1,000 feet north of SH 225 on the west end of the project corridor. Its EPA identification number is TXD082688979. The plant is a large-quantity generator of hazardous waste. Since 1988, the plant has had 20 violations and has performed 41 corrective actions. The plant is removing and treating contaminated groundwater on its site.

Ohmstede Company, at 12415 La Porte Road, is a treatment, store and disposal facility for hazardous waste. The plant has EPA identification number TXD008067969. The plant has had two violations of the Resource Conservation and Recovery Act from 1990 to 1992 and has no corrective actions.

Violations have occurred at ten small-quantity generators and waste handlers: Sunoco Company, 8811 Strang Road in La Porte (EPA ID TXD098200637), Professional Services Industries, 6913A SH 225 in Deer Park (EPA ID TXD988065850), Aqua Solutions, 6913B SH 225 in Deer Park (EPA ID TXD988078879), Rollins Leasing Corporation, 2809 E 13th Street in Deer Park (EPA ID TXD988071346), Enron Methanol Company, 4403 SH 225 in Pasadena (EPA ID TXD982555468), Mobil Chemical Olefins Plant, 9822 SH 225 (EPA ID TXD096035274), Gyro Chemicals and Equipment, 5206 Railroad Avenue (EPA ID TXT982813578), Hickham Industries, 11518 Old La Porte Road in La Porte (EPA ID TXD107654261), Allwaste Container Services, 11110 SH 225 in La Porte (EPA ID TXD099799074), and Quality Carriers, 1710 Central Street in Houston (EPA ID TXD048900013).

Most of the leaking underground storage tanks for petroleum products are associated with gasoline stations, but some are at chemical plants and other industrial sites. All but four have been fully remediated to the satisfaction of the Texas Commission on Environmental Quality. Remediation is still pending for the Chevron station at 10104 SH 225 in Houston (LPST ID 099497, EPA ID 0013467), the Exxon station at 10010 SH 225 in Houston (LPST ID 091573, EPA ID 0026705), the Strang yard of Union Pacific Railroad 12414 SH 225 in La Porte (LPST ID#: 115174, EPA ID 0057394) and Ronco Oil Company, 126 North Witter Street in Pasadena (LPST ID 100283, EPA ID 0024155).

4.0 TRANSPORTATION GOALS AND OBJECTIVES

Goals and objectives are designed to address the corridor needs and anticipated future travel patterns expressed by frequent corridor travelers and area residents and identified as part of the initial technical assessment.

Goal 1: Improve traffic safety:

- Provide information to direct corridor travelers
- Provide standards with design clearances and merge distances
- Reduce accidents
- Reduce real or perceived conflict with truck traffic
- Reduce intersection conflict
- Provide a consistent and uniform driving condition

Goal 2: Improve mobility:

- Provide facility and systems that meet the travel needs of people and goods
- Facilitate access to residential and employment areas
- Relieve choke point at IH 610
- Accommodate future travel demand growth
- Maintain or improve the Level of Service (LOS)
- Improve interchanges at East Boulevard and Battleground Road

Goal 3: Improve hurricane and other emergency evacuation route:

- Provide evacuation route alternatives
- Ensure accurate signage and communication techniques to guide travels in event of an emergency
- Focus on issues of security for corridor industries

Goal 4: Improve travel choices and access:

- Provide options that increase the incentives to ridesharing or take transit
- Include provisions for non-motorized travel
- Maintain opportunities for corridor preservation
- Improve local access at frontage roads and arterials

Goal 5: Protect natural and social environment:

- Maintain or improve air quality
- Maintain or improve economic viability of the corridor
- Maintain or improve the quality of life in the corridor
- Reduce, minimize or mitigate adverse impacts any improvements may have on the natural or built environment

Goal 6: Maximize the utility of existing infrastructure:

- Optimize traffic signal timing and other low cost improvement

5.0 ALTERNATIVES CONSIDERED

5.1 INITIAL MODAL CONCEPTUAL ALTERNATIVES

The full range of conceptual alternatives was derived from the corridor goals and objectives along with the physical constraints identified in Chapter 3 and input from the public and elected officials.

5.1.1 No Build

The No Build alternative is the *de facto* alternative because it is always viable until a decision is made to implement a build alternative. The No Build alternative also serves as a baseline condition, which is the description of projected, study-year conditions even if no major transportation improvements are made in the corridor. The No Build alternative applies 2025 demographic data and travel demand to the 2003 modeling network. It represents an assumption that no construction or transportation projects are implemented between 2003 and 2025. This alternative is intended to demonstrate what will happen to the traffic in the network when the population and employment continue to grow normally while the transportation network remains unchanged.

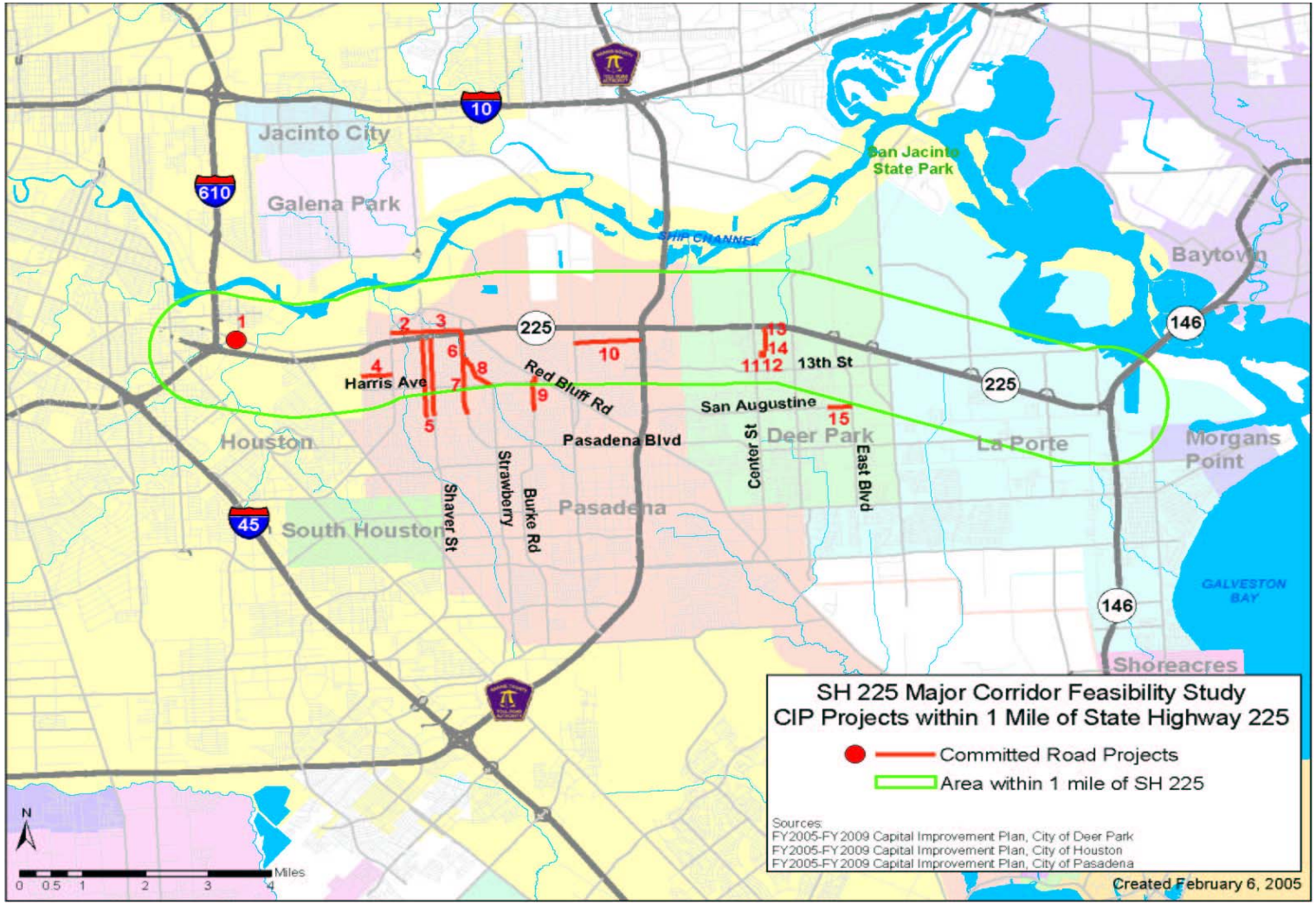
5.1.2 No Build with Committed Projects

The No Build with Committed Projects alternative applies 2025 demographic data and travel demand to a 2025 modeling network that includes all the committed and planned transportation projects. Committed projects for the SH 225 Corridor are shown in Table 1-4 in Chapter 1 and displayed in Exhibit 5-1. Most notable of the committed projects is the CTMS for the corridor. This project will provide an improved traveler information system for SH 225.

5.1.3 Widen Freeway by One General Purpose Lane in each Direction

This alternative would add one general purpose lane in each direction from IH 610 to Beltway 8. General purpose lanes are regular freeway lanes that are open to all types of vehicles. Analysis of the No Build alternative travel demand results indicates there is sufficient current capacity on SH 225 between Beltway 8 and SH 146 to accommodate the projected 2025 traffic. Because of the age of the pavement between IH 610 and Beltway 8, this alternative would require the complete reconstruction of SH 225 where the general purpose lanes would be added. In addition, major ramp reconfiguration and reconstruction would be required at the Pasadena Boulevard and Richey Road ramps.

Exhibit 5-1: Committed Projects



5.1.4 High Occupancy Vehicle (HOV) Lanes

The HOV Lanes alternative would add a special use lane in each direction from IH 610 to SH 146. HOV lanes are used for carpools, vanpools, and buses. Access to the lanes may be directly from the freeway or from transit centers, which are facilities that include passenger amenities, parking spaces for bus riders or carpoolers, and stops for local and express bus service. Authorization to travel in these HOV lanes would be determined by vehicle occupancy. For analysis purposes, it is assumed that 2+ person carpools and transit vehicles would have access to the SH 225 HOV lanes. HOV Lanes Alternative assumes these lanes would be diamond lanes with access restricted to certain locations. This build alternative would include reconstruction of the freeway from IH 610 to Beltway 8. From Beltway 8 to SH 146 the existing pavement could be preserved and widened to accommodate the HOV lanes. However, to add the HOV lanes through Deer Park, ROW may be required. Acquisition of ROW in this section could be problematic because the property is own by Union Pacific Railroad and is a very active railroad. This alternative also assumes the addition of park and ride (or pool) lots in the corridor to facilitate ridesharing.

5.1.5 High Occupancy Toll (HOT) Lanes

The HOT Lanes alternative would add a special use lane in each direction from IH 610 to SH 146. The facility would include a single diamond lane in each direction from IH 610 to SH 146, and would include reconstruction of the freeway, resulting in a wider cross-section. HOT lanes are limited-access highway lanes that provide free or reduced cost to access for qualifying HOVs, and also provide access to other paying vehicles not meeting passenger occupancy requirements. Therefore, authorization to travel in these HOT lanes would be determined by either vehicle occupancy or toll or both. By using price and occupancy restrictions to manage the number of vehicles traveling on them, HOT lanes maintain volumes consistent with uncongested levels of service even during peak travel periods. HOT lanes utilize sophisticated electronic toll collection and traffic information systems that also make variable, real-time toll pricing of non-HOV vehicles possible. Information on price levels and travel conditions is normally communicated to motorists via variable message signs, providing potential users with the facts they need in order to decide whether or not to utilize the HOT lanes or the parallel general-purpose lanes that may be congested during peak periods. For analysis purposes, it is assumed that 2+ carpools, transit vehicles, and single occupancy vehicles willing to pay a $0.10 per mile toll would have access to the SH 225 HOT lanes. This build alternative would include reconstruction of the freeway from IH 610 to Beltway 8. From Beltway 8 to SH 146 the existing pavement could be preserved and widened to accommodate the HOT lanes. Acquisition of ROW in this section could be problematic because the property is own by Union Pacific Railroad and is a very active railroad. This alternative assumes the addition of park and ride (or pool) lots in the corridor to facilitate ridesharing.

5.1.6 Major Interchange Modifications (IH 610/SH 225)

Major modifications to the IH 610/SH 225 interchange would involve replacing the two lane existing left-hand exit ramp from westbound SH 225 to southbound IH 610 with a right hand two lane direct connector. The existing left-hand ramp causes slower exiting traffic to travel in the fast lane and causes congestion east of the interchange during the AM peak hour. If the connector was reconstructed as a right-hand exit the slower exiting traffic would not interfere with the fast lane traffic thereby easing this choke point.

5.1.7 Major Interchange Modifications (Beltway 8/SH 225)

Major modifications to the Beltway 8/SH 225 interchange would involve the construction of a full directional multi-level interchange to connect all movements of traffic.

5.1.8 Minor Interchange Modifications (IH 610/SH 225)

Minor modifications to the IH 610/SH 225 interchange would involve re-striping the eastbound SH 225 main lanes from two to one lane as they approach the intersection with the northbound IH 610 to eastbound SH 225 entrance ramp. Currently, eastbound SH 225 coming from Lawndale is two lanes. The southbound IH 610 to eastbound SH 225 direct connector is two lanes and merges with the SH 225 eastbound main lanes to from four lanes. Moving east, the northbound IH 610 to eastbound SH 225 two-lane direct connector merges with eastbound SH 225. At this point the traffic volumes from the southbound IH 610 to eastbound SH 225 direct connector are far greater than the eastbound through movement traffic on SH 225, especially during the PM peak. Re-striping would give the entering direct connector traffic two lanes of capacity in order to merge into the main lanes.

5.1.9 Minor Interchange Modifications (Beltway 8/SH 225)

Minor modifications to the Beltway 8/SH 225 interchange would include converting the existing one lane entrance and exit ramps to two lane ramps. In addition, the entrance and exit ramps on westbound SH 225 just west of Beltway 8 could be grade separated to eliminate the weave between the two. Another candidate for grade separation would be the westbound exit and entrance ramps just east of Beltway 8.

5.1.10 Segregated Truck Lanes

This alternative would involve adding a single truck-only lane in each direction to SH 225 between IH 610 and SH 146. The goals of truck lanes are to improve traffic operations, improve safety, and facilitate the flow of goods. FHWA identifies five categories of truck lanes: lane restrictions, separated roadways, dedicated roadways, interchange bypass lanes, and climbing lanes. Lane restrictions typically prohibit trucks from using the far left lane of a roadway. These restrictions are already in place in the SH 225 Corridor. Restrictions can also be applied in other ways, such as regarding time of day, speed, and routing. Separated roadways offer parallel facilities for passenger

vehicles only and for mixed commercial and non-commercial traffic. Dedicated roadways provide facilities for commercial traffic only. Interchange bypass lanes route trucks around a major merge. Climbing lanes separate slow-moving heavy vehicles from traffic on grades. Fully segregated truck lanes act as separated roadways and permit only truck access, with no interaction with regular traffic, including at cross-street intersections. The lanes are physically separated from regular traffic, and access points are limited. On SH 225, access to truck-only lanes can only occur at IH 610, Beltway 8, Miller Cut-Off Road, and SH 146. These lanes would be elevated in the outer separation between the main lanes and the frontage roads.

5.1.11 Parallel and Relief Routes

The Parallel and Relief Route alternative involves improvements to parallel arterials in order to attract traffic from SH 225 to those arterials. Only one arterial, Lawndale, is in close proximity to SH 225 and could operate as a reliever route. However, Lawndale only extends for about half the corridor. Several arterials parallel SH 225 and could be candidates for parallel routes. These include: Pasadena Boulevard, Spencer Highway, and Fairmont Parkway.

5.1.12 Convert to Toll Road

With TxDOT's traditional "pay as you go" financing only ⅓ of the needed transportation improvement projects statewide can be funded at the current time. With HB 3588, the Texas Legislature gave TxDOT new financing tools including the option to toll both new and existing facilities. In order to bridge the funding gap in Texas, all appropriate highway improvement projects are now tested for toll potential.

In addition, the conversion of a freeway to a toll road is a transportation demand management (TDM) tool for addressing issues on the demand side of the transportation supply and demand equation through increasing the generalized cost of travel. This alternative would convert SH 225 from a free facility to a toll road. Entering vehicles would be required to pay $0.10 per mile to use SH 225. In addition to converting to a toll road, this alternative would include complete reconstruction of SH 225.

5.1.13 Transit

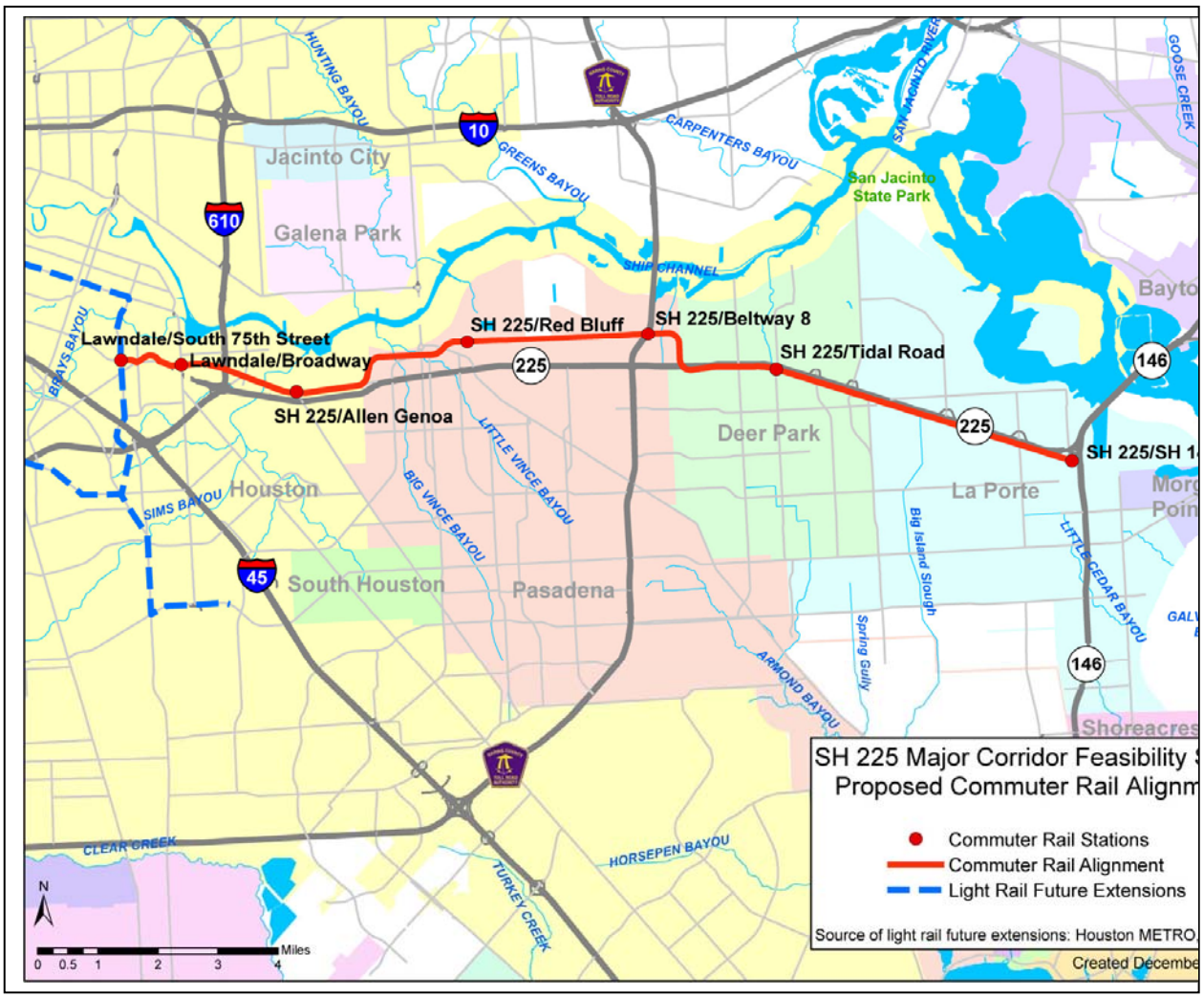
The Transit alternative would involve creating a local and express bus network for the SH 225 study area. Currently, no public transportation provider currently operates in the study area. In order for this alternative to be viable, a transit operator would need to be identified.

5.1.14 Commuter Rail

The Commuter Rail alternative would involve the implementation of a commuter rail line from just west of IH 610 to SH 146. Commuter rail refers to passenger rail service between a city center and its suburbs. It may use locomotives to pull passenger cars, self-propelled passenger vehicles, or overhead-electric supplied vehicles. Commuter

rail takes advantage of existing rail infrastructure and/or ROW, often in the form of active freight rail lines or abandoned former rail lines. As the name implies, it is oriented towards the commuter trip. The proposed commuter rail line would use the existing Union Pacific railroad along SH 225. The western part of the railroad corridor is north of SH 225 from IH 610 to east of Beltway 8. The eastern part of the rail line in the project corridor is south of SH 225. The commuter rail line would connect to METRO's planned Harrisburg light rail line and would have the following station locations: Lawndale/South 75th Street; Lawndale/Broadway; SH 225/Allen Genoa; SH 225/Red Bluff; SH 225/Beltway 8; SH 225/Tidal Road; and SH 225/SH 146. (See Exhibit 5-2.) In addition to stations along the rail line, park and ride facilities would also be constructed.

Exhibit 5-2: Conceptual Alternative - Commuter Rail



Source: Knudson & Associates, 2005

5.1.15 Non-motorized Modes

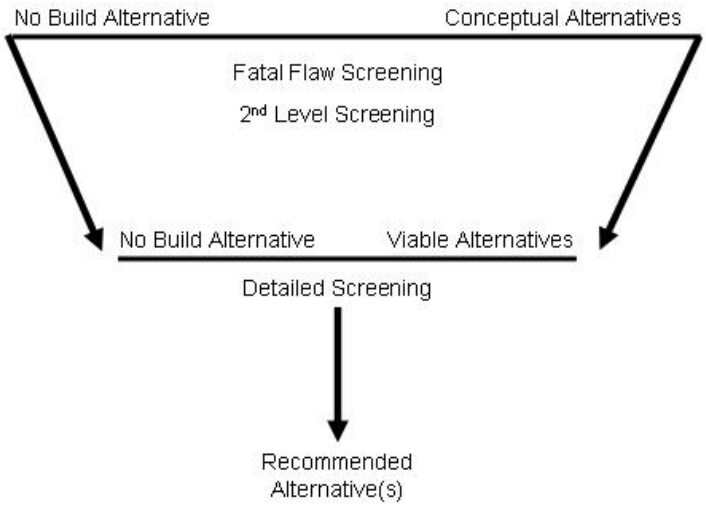
The Non-motorized Modes alternative would include the addition of pedestrian and bicycle facilities in and along the SH 225 Corridor. Exhibit 1-11 on page 1-17 shows H-GAC's Bicycle Plan for the SH 225 study area

5.2 THE SCREENING PROCESS

The purpose of this section is to present the screening methodology used to evaluate the alternatives for the SH 225 Corridor. This methodology was the basis for the screening process. By applying the screening process, alternatives were evaluated with respect to the established goals and objectives for this study. The screening process was used to evaluate the different options and choose the alternative(s) that best address the corridor's purpose, needs, and goals.

Evaluation criteria were developed to assist in evaluating each corridor alternative. The evaluation consisted of a three level screening process: an initial Fatal Flaw analysis designed to eliminate non-viable alternatives and establish the initial alternatives; a second level of screening to establish the viable alternatives, and a third detailed level of screening and refinement to establish the recommended alternatives. Exhibit 5-3 illustrates the screening process.

Exhibit 5-3: Screening Process



5.2.1 Fatal Flaw and Second Level Screening

The full range of conceptual alternatives was evaluated in relation to the goals and objectives of the project according to a series of screening criteria, as described below. These criteria are a translation of the objectives of the MCFS and provide a concrete way of evaluating each alternative in an accurate and specific manner.

Improve Traffic Safety:

An important goal within the MCFS is the ability to improve traffic safety. In order to evaluate the contribution of each alternative to traffic safety, four different evaluation criteria were established:

- consistency with current design standards
- ability to reduce conflicts between automobile and truck traffic
- ability to reduce ramp/frontage conflicts
- effectiveness of traveler information systems

Alternatives must conform to both state and federal design guidelines, as well as the transportation engineering industry's accepted and suggested practices. These guidelines have evolved through time, are the result of a large number of studies, and are aimed at providing the physical conditions for smooth and safe driving at the posted speeds.

Alternatives must address the truck traffic and its real or perceived conflicts with general traffic. This criterion was evaluated how the different alternatives deal with this issue and are relatively able to provide both types of traffic the space and flow patterns required to minimize actual or apparent conflicts.

The availability of travel information along the corridor is an important component of traffic safety. This criterion was evaluated how the different alternatives can accommodate the required travel information improvements, such as signage and changeable message boards.

Improve Mobility:

The second goal that was taken into consideration to evaluate the alternatives is the ability to improve mobility along the corridor. The evaluation of this goal focused on the ability to relieve any congestion in the SH 225 Corridor. Evaluation measures used to identify alternatives that would preserve mobility in the SH 225 Corridor included:

- ability to meet current travel needs
- ability to relieve current choke points
- ability to accommodate future travel demand

Improve Hurricane and Other Emergency Evacuation Route:

Another important goal within the Study was the ability to improve emergency evacuation routes for the region. Because of its proximity to the Gulf of Mexico and the numerous refineries and chemical plants along the corridor, the SH 225 Corridor must have adequate emergency evacuation route capacity. In order to evaluate the contribution of each alternative to this goal, two different criteria were established:

- effectiveness of traveler information systems for emergency situations
- provision for evacuation route

Each alternative was evaluated in terms of how well it serves emergency evacuation for a hurricane or a plant calamity.

Protect Natural and Social Environment:

Any improvement to a travel corridor must avoid or minimize adverse impacts to the natural and social environment. Evaluation measures for this goal included:

- ability to maintain or improve air quality
- ability to maintain or improve economic viability of the corridor
- ability to maintain or improve the quality of life in the corridor
- ability to reduce, minimize or mitigate adverse impacts any improvements may have on the natural or built environment

Maximize Utility of Existing Infrastructure:

Current funding levels for transportation improvements make the need to maximize the use of existing facilities essential. Low cost improvements that allow existing infrastructure to accommodate additional travel demand should be integral elements in any corridor improvements. These measures are:

- Transportation Systems Management (TSM) strategies
- Transportation Demand Management (TDM) strategies
- Intelligent Systems Management (ITS)

Screening Approach:

The fatal flaw evaluation addressing the four primary needs and goals were applied to the full range of conceptual alternatives. The non-viable alternatives were discussed and eliminated from further evaluation. Table 5-1 outlines the fatal flaw evaluation criteria.

Table 5-1: Fatal Flaw Evaluation Criteria

Goal	Evaluation Criteria	Conceptual Alternative 1	Conceptual Alternative 2	Etc.
Improve Traffic Safety	Design standards			
	Conflicts with truck traffic			
	Reduces ramp/frontage road conflict			
	Traveler information systems			
Improve Mobility	Current travel demand			
	Current choke points			
	Future travel demand			
Improves Emergency Evacuation Route	Provides evacuation route			
	Ensures accurate communication for emergency travel			
Protect Natural and Social Environment	Air quality			
	Economic viability			
	Reduces, minimizes, or mitigates impacts on natural or built environment			

5.2.2 Detailed Screening

The detailed screening used the same evaluation criteria as the fatal flaw screening. However, more quantitative evaluation was conducted for selected evaluation criteria. Specifically, traffic modeling of some viable alternatives was used to evaluate the effectiveness of various modes of travel. The detailed evaluation also incorporated some new variables such as conceptual level capital, operating, and maintenance costs of each alternative. In order to develop the conceptual cost estimates for each viable alternative, more complete development of the design concept and project scope was done. Benefit-cost and cost-effectiveness transportation analyses of each alternative were performed, with a more detailed analysis of the socio-economic, environmental, and hydraulic impacts. Table 5-2 outlines the detailed level evaluation criteria.

Table 5-2: Detailed Level Evaluation Criteria

Goal	Evaluation Criteria	Viable Alternative1	Viable Alternative 2	Etc.
Improve Traffic Safety	Traveler information systems			
	Design standards			
	Conflicts with truck traffic			
	Ramp/Frontage Road Accessibility			
Improve Mobility	Current travel demand			
	Current choke points			
	Future travel demand			
Conceptual Costs	Capital costs			
	Operating costs			
	Maintenance costs			
	Constructability			
Benefit/Cost Ratio	User benefit/conceptual costs			
Improves Emergency Evacuation Route	Provides evacuation route			
	Ensures accurate communication for emergency travel			
Protect Natural and Social Environment	Air quality			
	Economic viability			
	Reduces, minimizes, or mitigates impacts on natural or built environment			
Maximize Existing Infrastructure	TSM strategies			
	TDM strategies			
	ITS strategies			

5.3 FATAL FLAW ANALYSIS

5.3.1 No Build

The No Build alternative received the lowest rating of all of the conceptual alternatives. It fails to improve traffic safety. Although the No Build alternative marginally meets current travel demand, it fails to relieve choke points and meet anticipated future travel demand. SH 225 in its current configuration functions as an emergency evacuation route. However, the No Build alternative does nothing to improve the communication system with the public during emergency evacuation situations. The No Build alternative is expected to have an adverse impact on air quality and economic development.

With such a low rating from the Fatal Flaw Evaluation, this alternative would not be recommended for further consideration. However, the No Build alternative is the

baseline against which all other build alternatives are compared. Therefore, the No Build alternative will be carried forward into the detailed evaluation phase of this study.

5.3.2 No Build with Committed Projects

The No Build with Committed Projects alternative received the next to the lowest rating of all of the conceptual alternatives. This alternative does improve the traveler information system, but fails to improve other aspects of traffic safety. Like the No Build alternative, this alternative marginally meets current travel demand. It fails to relieve choke points and meet anticipated future travel demand. SH 225 in its current configuration functions as an emergency evacuation route. The No Build with Committed Projects alternative does improve the communication system with the public during emergency evacuation situations. The No Build with Committed Projects alternative is expected to have an adverse impact on air quality and economic development.

With such a low rating from the Fatal Flaw Evaluation, this alternative would not be recommended for further consideration. However, the No Build with Committed Projects alternative is the likely configuration for the No Build condition. Since the No Build alternative is the baseline against which all other build alternatives are compared, the No Build with Committed Projects alternative will be carried forward into the detailed evaluation phase of this study.

5.3.3 Widen Freeway by One Lane in Each Direction

The Widen Freeway alternative received a positive rating from the Fatal Flaw Evaluation. This build alternative is expected to have a positive impact on traffic safety, mobility, and SH 225 as an evacuation route. Widening the freeway would allow for upgrades to current design standards and should improve the ramp/frontage road interchanges. Based on analysis of the No Build travel demand runs, the Widen Freeway alternative would be expected to meet future travel demand. Without other major improvements, just widening the freeway will not relieve current choke points. This alternative is expected to have a neutral impact on the environment. The Widen Freeway alternative is recommended to be carried forward into the detailed evaluation phase of this study.

5.3.4 High Occupancy Vehicle (HOV) Lanes

The High Occupancy Vehicle (HOV) Lanes alternative received the highest positive rating from the Fatal Flaw Evaluation. This build alternative is expected to have a positive impact on traffic safety, mobility, and SH 225 as an evacuation route. The addition of HOV lanes would include a traveler information system for communicating authorized use information as well as operating conditions for the HOV lanes. This communication system would improve SH 225's ability to function as an emergency evacuation route. Widening the freeway to accommodate HOV lanes would allow for upgrades to current design standards and should improve the ramp/frontage road

interchanges. Based on analysis of the No Build travel demand runs, the HOV alternative would be expected to meet future travel demand. Without other major improvements, just adding HOV lanes will not relieve current choke points. This alternative is expected to have a neutral impact on the environment. The HOV Lanes alternative is recommended to be carried forward into the detailed evaluation phase of this study.

5.3.5 High Occupancy Toll (HOT) Lanes

The High Occupancy Toll (HOT) Lanes alternative is a variation of the HOV Lanes Alternative and as such also received the highest positive rating from the Fatal Flaw Evaluation. This build alternative is expected to have a positive impact on traffic safety, mobility, and SH 225 as an evacuation route. The addition of HOT lanes would include a traveler information system for communicating authorized use information as well as operating conditions for the HOT lanes. This communication system would improve SH 225's ability to function as an emergency evacuation route. Widening the freeway to accommodate HOT lanes would allow for upgrades to current design standards and should improve the ramp/frontage road interchanges. Based on analysis of the No Build travel demand runs, the HOT Lanes alternative would be expected to meet future travel demand. Without other major improvements, just adding HOT lanes will not relieve current choke points. This alternative is expected to have a neutral impact on the environment. The HOT Lanes alternative is recommended to be carried forward into the detailed evaluation phase of this study.

5.3.6 Major Interchange Modifications (IH 610/SH 225)

The Major Interchange Modifications (IH 610/SH 225) alternative received a positive rating from the Fatal Flaw Evaluation. This build alternative would have a positive impact on design standards and would improve the ramp/frontage road interchanges. By relieving a current choke point, this alternative would be expected to meet current travel demand. However, the interchange modification alone would not be sufficient to meet future travel demand. The Major Interchange Modifications (IH 610/SH 225) alternative would be expected to have a positive impact on SH 225 as an evacuation route, and should improve air quality. This build alternative is recommended to be carried forward into the detailed evaluation phase of this study.

5.3.7 Major Interchange Modifications (Beltway 8/SH 225)

The Major Interchange Modifications (Beltway 8/SH 225) alternative received a positive rating from the Fatal Flaw Evaluation. This build alternative would have a positive impact on design standards and would improve the ramp/frontage road interchanges. By relieving a current choke point, this alternative would be expected to meet current travel demand. However, the interchange modification alone would not be sufficient to meet future travel demand. The Major Interchange Modifications (Beltway 8/SH 225) alternative would be expected to have a positive impact on SH 225 as an evacuation

route, and should improve air quality. This build alternative is recommended to be carried forward into the detailed evaluation phase of this study.

5.3.8 Minor Interchange Modifications (IH 610/SH 225)

The Minor Interchange Modifications (IH 610/SH 225) alternative received a positive rating from the Fatal Flaw Evaluation. This build alternative would have a positive impact on design standards and would improve the ramp/frontage road interchanges. This alternative would be expected to have a neutral impact on current travel demand. However, the interchange modification alone would not be sufficient to meet future travel demand. The Minor Interchange Modifications (IH 610//SH 225) alternative would be expected to have a positive impact on SH 225 as an evacuation route, and should improve air quality. This build alternative is recommended to be carried forward into the detailed evaluation phase of this study.

5.3.9 Minor Interchange Modifications (BW 8/SH 225)

The Major Interchange Modifications (Beltway 8/SH 225) alternative received a positive rating from the Fatal Flaw Evaluation. This build alternative would have a positive impact on design standards and would improve the ramp/frontage road interchanges. This alternative would be expected to have a neutral impact on current travel demand. However, the interchange modification alone would not be sufficient to meet future travel demand. The Major Interchange Modifications (Beltway 8/SH 225) alternative would be expected to have a positive impact on SH 225 as an evacuation route, and should improve air quality. This build alternative is recommended to be carried forward into the detailed evaluation phase of this study.

5.3.10 Segregated Truck Lanes

The Segregated Truck Lanes alternative received a positive rating from the Fatal Flaw Evaluation. The build alternative would have a positive impact on design standards and, most notably, on conflicts with trucks. This alternative would be expected to have a positive impact on current travel demand, but would not relieve current choke points. The truck lanes would be expected to have a neutral impact on future travel demand. This alternative would have a positive impact on SH 225 as an evacuation route, as well as a positive impact on air quality. Construction of the truck lanes would most likely have a negative impact on the environment. This build alternative is recommended to be carried forward into the detailed evaluation phase of this study.

5.3.11 Parallel and Relief Routes

The Parallel and Relief Routes alternative received a negative rating from the Fatal Flaw Evaluation. The build alternative would not improve traffic safety on SH 225. This alternative would be expected to have a neutral impact on current travel demand, but would not relieve current choke points. Any parallel or reliever routes would not be expected to meet future travel demand. This alternative would have a positive impact

on SH 225 as an evacuation route. Its impact on air quality would be neutral. Parallel and reliever routes would most likely have a negative impact on the environment and would not be supported by the communities along SH 225. This build alternative is not recommended to be carried forward into the detailed evaluation phase of this study.

5.3.12 Convert to Toll Road

The Toll Road Conversion alternative received a positive rating from the Fatal Flaw Evaluation. The build alternative would require a traveler communication system and would therefore improve every day as well as emergency communications with the traveling public. Converted to a toll road, SH 225 would be expected to have sufficient capacity to accommodate both current and future travel demand. Toll road conversion, by itself, would not relieve the current choke points. This alternative would be expected to have a positive impact on air quality and a neutral impact on the environment. This build alternative is recommended to be carried forward into the detailed evaluation phase of this study.

5.3.13 Transit

The Transit alternative received a negative rating from the Fatal Flaw Evaluation. The build alternative would not improve traffic safety on SH 225. This alternative would be expected to have a neutral impact on current travel demand, but would not relieve current choke points or satisfy future travel demand. The Transit alternative would have a neutral impact on SH 225 as an evacuation route as well as a neutral impact on the environment. Air quality would be positively impacted. This build alternative is not recommended to be carried forward into the detailed evaluation phase of this study.

5.3.14 Commuter Rail

The Commuter Rail alternative received a negative rating from the Fatal Flaw Evaluation. The build alternative would not improve traffic safety on SH 225. This alternative would be expected to have a neutral impact on current travel demand, but would not relieve current choke points or satisfy future travel demand. The Commuter Rail alternative would have a positive impact on SH 225 as an evacuation route because it would provide additional capacity to move people out of the corridor in an emergency. Construction of a commuter rail line would be expected to have a negative impact on the environment. Both air quality and economic development would be positively impacted. Although this build alternative received a negative rating, it is recommended to be carried forward into the detailed evaluation phase of this study. Its negative rating was just below one, and there was interest expressed by stakeholders in exploring this alternative more fully.

5.3.15 Non-motorized Modes

The Non-motorized Modes alternative received a negative rating from the Fatal Flaw Evaluation. Because pedestrian and bicycle improvement do very little to increase

person-moving capacity in major corridors, this build alternative received the most negative rating of all the conceptual alternatives. Although this build alternative is not recommended to be carried forward into the detailed evaluation phase of this study, it would have a positive impact on air quality as well as overall quality of life. This alternative could be pursued by the individual community along the SH 225 Corridor as an enhancement to the recommend alternative.

5.3.16 Fatal Flaw Evaluation

Table 5-3 summarizes the evaluation rating for all of the conceptual alternatives.

Table 5-3: Fatal Flaw Evaluation

Initial Conceptual Alternatives	Improve Traffic Safety				Improve Mobility			Improves Emergency Evacuation Routes		Protect Natural and Social Environment			
	Traveler Information System	Consistency with Design Standards	Conflicts with Trucks	Ramp/ Frontage Roads Access	Meets Current Travel Demand	Relieves Current Choke Points	Meets Future Travel Demand	Provides Evacuation Route	Communication for Emergency Travel	Air Quality	Maintains or Improves Economic Development	Impacts on Natural or Build Environment	Rating
No Build	0	–	–	–	0	–	–	–	0	–	–	0	–
No Build with Committed Projects	+	–	–	–	0	–	–	–	+	–	–	0	–
Widen Freeway (one lane each direction)	0	+	0	+	+	–	+	+	0	+	+	–	+
High Occupancy Vehicle Lanes (HOV)	+	+	0	+	+	–	+	+	+	+	+	–	+
High Occupancy Toll Lanes (HOT)	+	+	0	+	+	–	+	+	+	+	+	–	+
Major Interchange Modifications (I-610/SH 225)	0	+	0	+	+	+	–	+	0	+	0	–	+
Major Interchange Modifications (BW 8/SH 225	0	+	0	+	+	+	–	+	0	+	0	–	+
Minor Interchange Modifications (I 610/SH 225)	0	+	0	+	0	+	–	+	0	+	0	0	+
Minor Interchange Modifications (BW 8/SH 225)	0	+	0	+	0	+	–	+	0	+	0	0	+
Segregated Truck Lanes	0	+	+	+	+	–	0	+	0	+	0	–	+
Parallel and Relief Routes	0	–	–	–	0	–	–	+	0	0	0	–	–
Convert to Toll Road	+	–	0	–	+	–	+	+	+	+	0	0	+
Transit	0	–	–	–	0	–	–	0	0	+	0	0	–
Commuter Rail	0	–	–	–	0	–	0	+	0	+	+	–	0
Non-motorized Modes	0	–	–	0	–	–	–	–	0	+	0	+	–

+ Positive 0 Neutral – Negative

5.4 VIABLE ALTERNATIVES CARRIED FORWARD

Of the 15 conceptual alternatives, 12 were recommended to be carried forward into the detailed evaluation phase of this study. These 12 alternatives were further refined to product seven viable alternatives for detailed evaluation. The No Build, No Build with Committed Projects, Widen Freeway by One General Purpose Lane in each Direction, Segregated Truck Lanes, Convert to Toll Road, and Commuter Rail alternatives were carried forward as originally defined. The High Occupancy Vehicle Lanes (HOV) and High Occupancy Toll Lanes (HOT) alternatives were combined to form an HOV/HOT Lanes alternative. The Major Interchange Modifications (IH 610/SH 225) and (Beltway 8/SH 225) alternatives along with the Minor Interchange Modifications (IH 610/SH 225) and (Beltway 8/SH 225) alternatives were combined with other ramp improvements along the SH 225 Corridor to form a Interchange/Ramp Improvements alternative. The viable build alternatives carried forwarded were:

- Widen Freeway by One General Purpose Lane in each Direction from IH 610 to Beltway 8
- Convert to Toll Road
- HOV/HOT Lanes
- Commuter Rail
- Interchange/Ramp Improvements
- Segregated Truck Lanes

5.4.1 Conceptual Costs of Viable Alternatives

Conceptual capital costs were developed based on per mile unit cost provided by TxDOT. **These conceptual costs are preliminary, planning-level estimates developed to allow comparisons between the alternatives and not to serve as a final engineered cost for any of the alternatives.** Table 5-4 summarizes the conceptual capital costs for the viable build alternatives.

Table 5-4: Conceptual Capital Costs of Alternatives

Conceptual Alternative	Conceptual Capital Costs	Conceptual Capital Cost per Mile
No Build with Committed Projects	$151,970,000	$9,804,500
Widen Freeway (one lane each direction)	$230,756,300	$35,501,000
Convert to Toll Road	$504,326,500	$32,537,200
HOV/HOT Lanes	$268,727,900	$17,337,300
Commuter Rail	$534,215,400	$34,456,500
Interchange/Ramp Improvements*	$85,530,900	$21,382,700
Segregated Truck Lanes	$357,178,100	$23,043,700

Source: Carter & Burgess, 2005
* Does not include the cost of directional interchange at Beltway 8

Annual conceptual maintenance costs were based on per mile unit cost provided by TxDOT. Table 5-5 summarizes the annual costs for the viable build alternatives.

Table 5-5: Annual Maintenance Costs of Alternatives

Conceptual Alternative	Conceptual Maintenance Costs
No Build with Committed Projects	$1,251,881
Widen Freeway (one lane each direction)	$1,392,844
Convert to Toll Road *	$16,193,882
HOV/HOT Lanes	$16,563,070
Commuter Rail*	$4,880,520
Interchange/Ramp Improvements	$1,251,881
Segregated Truck Lanes	$1,621,069

Source: Carter & Burgess, 2005

* includes maintenance and operating costs

Annual conceptual revenues for the Convert to Toll Road and HOV/HOT Lanes alternatives are shown in Table 5-6. Revenues were based on a maximum $1.60 toll for the entire length of the corridor.

Table 5-6: Annual Conceptual Revenue for Alternatives

Conceptual Alternative	Conceptual Annual Revenue
Convert to Toll Road *	$84,404,750
HOV/HOT Lanes	$4,599,750

Source: Carter & Burgess, 2005

6.0 TRAFFIC MODELING AND FORECASTS

6.1 DEVELOPMENT OF THE BASE MODELING NETWORKS

The base modeling networks for this project were developed based on H-GAC regional travel model for eight counties: Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery and Waller. The study area for this project includes the SH 225 Corridor from IH 610 to SH 146. The entire H-GAC regional model was used in the modeling of the SH 225 Corridor in order to maintain the integrity of the original modeling network structure and the capability to predict the region-wide impact of transportation alternatives.

The original H-GAC travel demand model was structured to have a total of 2,680 zones. This model was updated to a 3,000 zone network in October 2003. The final approved model by H-GAC for the SH 225 MCFS was structured to include a total of 3,072 zones.

The H-GAC travel demand model was developed on the EMME/2 platform with a complicated chaining process. This model follows the traditional four-step process of trip generation, trip distribution, mode split and traffic assignment. The trip generation models yield person trip estimates for homebased work, homebased school, homebased shopping, homebased other and non-homebased purposes. Estimates of vehicle trips by trucks and taxis, external-local, and external-through purposes are generated. Trip distribution is performed for each of the internal trip purposes using the Atomistic Trip Distribution Module, which is the variation of the gravity model that controls trip length frequency as well as productions and attractions. The peak period models are applied to provide estimates of peak period highway travel times for input to the mode choice process. Following the base year mode split analysis, the vehicle trip tables are prepared, which are then combined and converted from production-to-attraction (P-A) format to origin-to-destination (O-D) format for assignment to the 24-hour network. Finally, the peak–hour assignments are performed based on the peak-hour factors.

The base modeling networks that were provided by H-GAC included all the demographic and network related files describing the 2002 and 2025 networks. The 2002 network was currently considered as the H-GAC base-year network that has already been calibrated. The 2025 network is the H-GAC horizon-year network which includes all the committed and planned projects to be completed between 2002 and 2025.

The base modeling networks provided by H-GAC were carefully examined to determine the necessary corrections for the SH 225 Corridor area. Examination was also conducted through on-site driving and verification of the network structures. Identified corrections fell into the following categories:

- Incorrect coding of the number of lanes on the freeway main lanes, frontage roads, and ramps;

- Incorrect coding of the connections between the frontage roads and the freeway main lanes;
- Incorrect coding of the intersecting streets; and
- Need of additional nodes and links to provide greater details of the networks.

The above corrections to the base modeling networks affected the node files, link files, and the turn penalty files. After all the above corrections were made, the base modeling networks for both 2002 and 2025 were completed and ready to run.

The running of the H-GAC models involves a sequence or correlated steps that represent the complicated chaining process of the travel demand models. The primary steps of the model execution include:

- Loading network and related input data to the data bank,
- Building a separation matrix for input to the trip generation and trip distribution,
- Trip generation,
- Trip distribution,
- Person-to-vehicle trip table conversion,
- Pre-mode choice 24-hour assignment,
- Pre-mode choice peak period assignment,
- Pre-mode choice peak period speed estimation,
- Transit walk-access to link development,
- Transit drive-access to link development,
- Mode choice,
- Post-mode choice 24-hour assignment, and
- Post-mode choice time-of-day assignment.

6.2 VALIDATION OF THE BASE YEAR NETWORK

Two important components to ensure the accuracy and consistency in any travel demand forecasting process are calibration and validation. The calibration is a process to determine various model parameters that make the model outputs consistent with the field observations. The common calibration techniques for travel demand forecasting include the regression models for trip generation, trip length frequency analysis for trip distribution, logit model analysis for modal choice, and travel time adjustment for the traffic assignment.

For the H-GAC travel demand models, the calibration process had already been completed by H-GAC staff based on the historical surveyed data. In order to ensure the consistency in performing the travel forecasts with other similar studies, the basic model parameters related to the sequential modeling processes remain unchanged. At the same time, in order to make the forecasts from the model consistent with the observed traffic in the study area, a validation approach was designed.

Validation is a process to determine a series of adjustment factors based on the comparison of the model outputs with the field observed traffic for the base year. The

adjustment factors are applied to the horizon year forecasts to correct the systematic differences between the model outputs and "real-world" traffic.

Traffic counts were obtained on some of the main lanes, all the direct connectors and all the entrance/exit ramps along SH 225 between IH 610 and SH 146 in late 2003 for 24 hours on an hourly basis at 32 locations on both eastbound and westbound directions. Based on these traffic counts, the traffic volumes on the main lanes of SH 225 were calculated. Three traffic diagrams were generated: 2003 24-hour traffic, 2003 AM traffic and 2003 PM traffic. Volume to Capacity (V/C) ratios were calculated by dividing the 2003 traffic counts by their corresponding facility capacity.

Since the 2002 network is the H-GAC base-year network, the traffic forecasts from the 2002 network were used to compare with the 2003 traffic counts in order to establish the validation methodology. Although this is not perfectly accurate, after discussion with H-GAC modelers, it was decided that potential errors would be very small, considering the fact that there are almost no transportation network changes between 2002 and 2003.

Adjustment factors were derived by dividing the 2002 traffic volume assignments from the model run by the actual 2003 traffic counts on all ramps and main lane locations for the 24-hour run, AM run and PM run. An examination of the resulting validation adjustment factors indicated that the traffic forecasts on the main lanes are more consistent with the traffic counts on the ramps (factors calculated to be from 0.8 to 1.2). For the ramps where a large difference between the traffic forecasts and the actual traffic count occurred, formulas were developed to re-calculate the traffic. The formulas developed were based locations where the main lanes traffic forecasts showed the greatest correlation to actual traffic counts.

The validation process developed the following steps that were applied to the horizon-year traffic forecasts:

- The traffic forecasts for the horizon-year for the locations where there was a very good correlation between the forecasts and the traffic counts for the base-year were multiplied by the validation adjustment factors to produce the final traffic forecasts.
- The traffic forecasts of the horizon-year for the locations where there was not as good correlation between the forecasts and the traffic counts of the base-year were re-calculated based on the formulas developed.

The application of the above validation methodology will ensure both accuracy and consistency in the traffic forecast for the horizon-year.

6.3 FORECASTS OF THE HORIZON-YEAR SCENARIOS

Table 6-1 summarizes the travel demand modeling results for all the SH 225 alternatives. Assigned volumes in Table 6-1 are for main lanes only. Table 6-2 summarizes the assigned volumes for the truck and HOV/HOT lanes.

Table 6-1: Summary of Travel Demand Analysis for Viable Alternatives

Alternative	Location on SH 225	24 Hour Volume	24 Hour Capacity	Volume/ Capacity Ratio	Speed (mph)	Level of Service	AM Peak Hour* Volume	AM Peak Hour* Capacity	Volume/ Capacity Ratio	Speed (mph)	Level of Service	PM Peak Hour* Volume	PM Peak Hour* Capacity	Volume/ Capacity Ratio	Speed (mph)	Level of Service
Existing Conditions (2003)	Goodyear	136,071	239,500	0.57	53	C	6,317	8,890	0.71	53	C	6,927	8,890	0.78	47	D
	Scarborough	112,905	179,500	0.63	53	C	4,682	6,670	0.70	53	C	5,345	6,670	0.80	47	D
	Main/Shaver	102,610	179,500	0.57	53	C	4,491	6,670	0.67	53	C	4,842	6,670	0.73	47	D
	Beltway 8	70,207	212,500	0.33	58	B	2,658	6,670	0.40	58	B	2,733	6,670	0.41	58	B
	SH 146	60,290	212,500	0.28	64	A	2,591	8,770	0.30	64	A	3,305	8,770	0.38	58	B
No Build (2025)	Goodyear	209,000	239,500	0.87	47	D	7,302	8,890	0.82	47	D	8,788	8,890	0.99	41	E
	Scarborough	170,077	179,500	0.95	41	E	5,227	6,670	0.78	47	D	6,521	6,670	0.98	41	E
	Main/Shaver	156,580	179,500	0.87	47	D	5,945	6,670	0.89	47	D	6,015	6,670	0.90	41	E
	Beltway 8	106,089	212,500	0.50	58	B	2,920	6,670	0.44	58	B	3,517	6,670	0.53	53	C
	SH 146	93,597	212,500	0.44	58	B	3,507	8,770	0.40	58	B	4,601	8,770	0.52	53	C
Add General Purpose Lanes (2025)	Goodyear	211,763	299,400	0.71	53	C	7,550	11,110	0.68	53	C	9,274	11,110	0.83	47	D
	Scarborough	174,904	239,500	0.73	53	C	5,861	8,990	0.65	53	C	6,942	8,990	0.77	47	D
	Main/Shaver	151,476	239,500	0.63	53	C	6,283	8,990	0.70	53	C	6,126	8,990	0.68	53	C
	Beltway 8	104,013	239,500	0.43	58	B	3,077	8,990	0.34	58	B	3,742	8,990	0.42	58	B
	SH 146	104,669	212,500	0.49	58	B	3,697	8,770	0.42	58	B	5,419	8,770	0.62	53	C
Convert to Toll Road (2025)	Goodyear	194,007	239,500	0.81	47	D	4,311	8,890	0.48	58	B	4,792	8,890	0.54	53	C
	Scarborough	155,834	179,500	0.87	47	D	3,547	6,670	0.53	53	C	3,939	6,670	0.59	53	C
	Main/Shaver	139,927	179,500	0.78	47	D	3,435	6,670	0.51	53	C	3,741	6,670	0.56	53	C
	Beltway 8	96,676	212,500	0.45	58	B	2,209	6,670	0.33	58	B	2,462	6,670	0.37	58	B
	SH 146	97,512	212,500	0.46	58	B	2,286	8,770	0.26	64	A	3,892	8,770	0.44	58	B
Segregated Truck Lanes (2025)	Goodyear	190,403	239,500	0.80	47	D	6,485	8,890	0.73	47	D	8,384	8,890	0.94	41	E
	Scarborough	149,570	179,500	0.83	47	D	4,820	6,670	0.72	47	D	5,803	6,670	0.87	47	D
	Main/Shaver	125,395	179,500	0.70	53	C	5,160	6,670	0.77	47	D	5,171	6,670	0.78	47	D
	Beltway 8	86,777	212,500	0.41	58	B	2,626	6,670	0.39	58	B	3,175	6,670	0.48	58	B
	SH 146	95,269	212,500	0.45	58	B	3,497	8,770	0.40	58	B	4,920	8,770	0.56	53	C
HOV/HOT Lanes (2025)	Goodyear	185,917	239,500	0.78	47	D	6,125	8,890	0.69	53	C	8,217	8,890	0.92	41	E
	Scarborough	151,992	179,500	0.85	47	D	4,683	6,670	0.70	53	C	5,790	6,670	0.87	47	D
	Main/Shaver	131,124	179,500	0.73	47	D	5,361	6,670	0.80	47	D	5,096	6,670	0.76	47	D
	Beltway 8	88,547	212,500	0.42	58	B	2,407	6,670	0.36	58	B	3,121	6,670	0.47	53	C
	SH 146	95,610	212,500	0.45	58	B	3,492	8,770	0.40	58	B	4,698	8,770	0.54	58	B
Commuter Rail (2025)	Goodyear	190,970	239,500	0.80	47	D	6,658	8,890	0.75	47	D	8,174	8,890	0.92	41	E
	Scarborough	152,525	179,500	0.85	47	D	4,741	6,670	0.71	53	C	5,898	6,670	0.88	47	D
	Main/Shaver	132,217	179,500	0.74	47	D	5,407	6,670	0.81	47	D	5,259	6,670	0.79	47	D
	Beltway 8	94,968	212,500	0.45	58	B	2,674	6,670	0.40	58	B	3,331	6,670	0.50	58	B
	SH 146	96,003	212,500	0.45	58	B	3,380	8,770	0.39	58	B	4,998	8,770	0.57	53	C
Interchange/Ramp Improvements (2025)	Goodyear	199,472	239,500	0.83	47	D	7,177	8,890	0.81	47	D	8,661	8,890	0.97	41	E
	Scarborough	159,229	179,500	0.89	47	D	5,160	6,670	0.77	47	D	6,180	6,670	0.93	41	E
	Main/Shaver	138,400	179,500	0.77	47	D	5,586	6,670	0.84	47	D	5,475	6,670	0.82	47	D
	Beltway 8	94,018	212,500	0.44	58	B	2,848	6,670	0.43	58	B	3,486	6,670	0.52	53	C
	SH 146	98,648	212,500	0.46	58	B	3,493	8,770	0.40	58	B	5,151	8,770	0.59	53	C

* Peak Direction

Table 6-2: Traffic Assignments for Truck and HOV/HOT Lanes

Alternative	Location on SH 225	24 Hour Volume	24 Hour Capacity	Volume/ Capacity Ratio	Speed (mph)	Level of Service	AM Peak Hour* Volume	AM Peak Hour* Capacity	Volume/ Capacity Ratio	Speed (mph)	Level of Service	PM Peak Hour* Volume	PM Peak Hour* Capacity	Volume/ Capacity Ratio	Speed (mph)	Level of Service
Segregated Truck Lanes Truck Traffic (2025)	Allen-Genoa	13,884	30,000	0.46	58	B	345	1,500	0.71	53	C	300	1,500	0.20	64	A
	Main/Shaver	10,663	30,000	0.36	58	B	240	1,500	0.67	58	B	195	1,500	0.13	64	A
	Beltway 8	7,562	30,000	0.25	64	A	255	1,500	0.40	58	B	210	1,500	0.14	64	A
	SH 146	4,345	30,000	0.14	64	A	210	1,500	0.30	64	A	180	1,500	0.12	64	A
HOV/HOT Lanes Traffic (2025)	Allen-Genoa	11,799	30,000	0.39	58	B	1,110	1,500	0.73	47	D	525	1,500	0.35	58	B
	Main/Shaver	11,799	30,000	0.39	58	B	1,110	1,500	0.73	47	D	525	1,500	0.35	58	B
	Beltway 8	5,574	30,000	0.19	64	A	840	1,500	0.56	53	C	390	1,500	0.26	64	A
	SH 146	1,091	30,000	0.04	64	A	30	1,500	0.07	64	A	300	1,500	0.20	64	A

6.3.1 No Build and No Build with Committed Projects

The validation process has generated the traffic forecasts for the base-year (2003) that are consistent with the actual traffic counts. The horizon-year (2025) travel demand models were run for two initial scenarios:

- 2025 no-build scenario, and
- 2025 with all committed scenario.

The 2025 no-build scenario applies 2025 demographic data to the 2003 modeling network. It represents an assumption that no construction or transportation projects are implemented between 2003 and 2025. The scenario is intended to demonstrate what will happen to the traffic in the network when the population and employment continue to grow normally while the transportation network remains unchanged.

The 2025 with all committed scenario applies 2025 demographic data to the 2025 modeling network. This represents a traffic network with all the committed and planned transportation projects in place along with the anticipated population and employment growth between 2003 and 2025.

The No Build Alternative forecasts congestion and high V/C ratios around Goodyear during the PM peak hour. Also the ramps just east of IH 610 and the interchange with IH 610 show high V/C ratios during both the AM and PM peak hours. The No Build with Committed Projects alternative shows no significant improvement in congestion levels over the No Build Alternative.

6.3.2 Widen Freeway by One General Purpose Lane in each Direction

As described in Chapter 5, this alternative involves adding general purpose capacity to SH 225 bringing the facility to eight main lanes from IH 610 to SH 146. This build alternative does improve the V/C ratios for main lanes of SH 225 around Goodyear. However, the alternative does not relieve the congestion on the ramps just east of IH 610 and the interchange with IH 610.

6.3.3 HOV/HOT Lanes

This build alternative adds an HOV/HOT lane in each direction on SH 225. The main lanes are slightly improved over the No Build Alternative, but are still congested around Goodyear and the IH 610 interchange. V/C ratios and level of service in the HOT/HOV lanes is forecast to be good.

6.3.4 Interchange/Ramp Improvements

The Interchange/Ramp Improvements Alternative does show improvements to the ramps just east of IH 610 and the interchange with IH 610, but does not significantly improve congestion on the main lanes.

6.3.5 Segregated Truck Lanes

This build alternative adds a truck lane in each direction on SH 225. The main lanes are slightly improved over the No Build Alternative, but are still congested around Goodyear and the IH 610 interchange. Level of service and V/C ratios in the truck lanes is forecast to be good.

6.3.6 Convert to Toll Road

The Convert to Toll Road Alternative would improve the V/C ratios and congestion on SH 225 because traffic would divert from SH 225.

6.3.7 Commuter Rail

This build alternative would add a commuter rail line in the SH 225 Corridor. The main lanes are slightly improved over the No Build Alternative, but are still congested around Goodyear and the IH 610 interchange. Ridership on the commuter rail line is projected to be about 9,000 passengers per day.

7.0 ENVIRONMENTAL SCREENING OF VIABLE ALTERNATIVES

A goal of the SH 225 MCFS is to minimize impacts on socioeconomic and environmental conditions. This section identifies major environmental, economic and social impacts of 15 preliminary alternatives to help determine which would proceed to detailed analysis. There are three topics:

- Air quality;
- Economic development; and
- Natural and built environment.

Results of the analysis are graded on a three-point scale:

+ = Positive environmental impact;
0 = Neutral environmental impact; and
- = Negative environmental impact.

Table 7-1 is a summary of the evaluation results for each topic. Numeric values are not assigned for socioeconomic and environmental conditions, as impacts are not comparable from category to category. This preliminary screening considers only direct impacts. Secondary impacts (impacts caused by events brought on by the alternative) are not evaluated at this level. The parameters to estimate impacts include future traffic levels, distance from the proposed facility, and locations of sensitive sites.

The following is a review of the evaluation results for the three topics.

7.1 AIR QUALITY

Traffic on SH 225 contributes air pollution to Houston, Pasadena, Deer Park and La Porte. Motor vehicle exhaust produces air pollutants such as carbon monoxide, nitrogen oxides, volatile organic compounds and particulate matter. Carbon monoxide is a toxic gas that can cause dizziness and shortness of breath in low concentrations. Nitrogen oxides and hydrocarbons can react in air over time, in the presence of sunlight, to form ozone (a tissue irritant) and polycyclic aromatic hydrocarbons (the main ingredient in smog). Particulate matter can lower visibility and interfere with breathing in susceptible people.

Table 7-1: Summary of Environmental Screening of Viable Alternatives

Alternative	Air Quality	Economic Development	Natural and Built Environment							
			Social Impacts	Section 4(f) Lands	Noise Impacts	Vegetation and Wildlife Habitat	Endangered Species	Wetlands	Water Quality	Hazardous Materials
No Build	-	0	0	-	-	0	0	0	0	0
Widen Freeway (One Land Each Direction)	-	-	0	-	-	0	0	0	-	-
HOV/HOT Lanes	-	-	0	-	-	0	0	0	-	-
Interchange/Ramp Improvements	-	-	0	-	-	0	0	0	-	-
Segregated Truck Lanes	-	-	0	-	-	0	0	0	-	-
Convert to Toll Road	-	0	0	-	-	0	0	0	0	-
/Commuter Rail	-	0	0	-	-	0	0	0	-	-

+ Positive **0** Neutral **-** Negative

Corridor population is projected to increase by 34 percent over the next two decades. Traffic is expected to increase in response to population growth, increasing the amount of pollutants emitted. However, as older vehicles are replaced with newer, cleaner vehicles over the next twenty years, emissions per vehicle-mile will decline, and air pollution would not increase as fast as the traffic growth. Over the next 20 years, emissions per vehicle-mile may decline by 44 percent due to cleaner vehicles. Therefore, traffic growth must be greater than 44 percent (plus or minus a four percent margin of error) to have a negative effect on local air quality. If traffic volume grows less than 40 percent in a segment of SH 225 in the next twenty years, the impact on air quality would be positive. Likewise, if traffic volume grows more than 48 percent, there would be a negative impact on air quality. Traffic volume in 2025 has been projected for seven of the 15 alternatives. The remaining alternatives are similar to these seven and are assumed to have comparable effects on air quality. The percentage increase from 2003 traffic volume to 2025 traffic volume are calculated at five intersections along SH 225 for each alternative. (See Table 7-2.) The greatest percentage growth at any of these intersections determines the impact of the alternative.

Table 7-2: Forecast Traffic Increase 2003–2025, by Viable Alternative

Alternative	Direction	SH 225/ Goodyear	SH 225/ Scarborough	SH 225/ Main	SH 225/ Beltway 8	SH 225/ SH 146
1 No Build	EB	54%	52%	53%	51%	53%
	WB	53%	49%	50%	51%	58%
3 General-Purpose Lanes	EB	56%	54%	48%	54%	81%
	WB	55%	56%	47%	41%	65%
4 HOV/HOT Lanes	EB	40%	34%	28%	33%	64%
	WB	33%	35%	28%	18%	51%
5 Ramp Improvements	EB	46%	39%	35%	40%	71%
	WB	47%	43%	35%	27%	55%
6 Segregated Truck Lanes	EB	43%	29%	22%	29%	62%
	WB	36%	36%	28%	18%	53%
7 Conversion to Toll Road	EB	43%	37%	31%	39%	69%
	WB	42%	39%	32%	36%	53%
8 Commuter Rail	EB	40%	34%	29%	38%	67%
	WB	40%	36%	30%	32%	50%

Source: Quadrant, August 2004

Alternative 1 (no build), Alternative 3 (additional general-purpose lanes), Alternative 7 (toll road), Alternative 4 (high-occupancy vehicle/high-occupancy/toll lanes), Alternative 8 (commuter rail), Alternative 5 (interchange and ramp improvements) and Alternative 8 (segregated truck lanes) would increase traffic volumes more than 48 percent along SH 225, negatively affecting air quality.

Future traffic volumes for Alternative 5 (interchange and ramp improvements) would have a maximum of 70 percent traffic volume increase. Alternative 8 (commuter rail) would have similar effects on future traffic volumes with a maximum of 69 percent increase in traffic volume.

7.2 ECONOMIC DEVELOPMENT

Land acquisition and displacement of businesses would have potentially negative effects on economic conditions along the corridor by closing businesses or removing them from the corridor. Even if land were taken from parking lots, the decrease in parking area would reduce the number of customers able to park at the business, potentially hindering the performance of the business. Adding land or improving access to businesses would be a positive impact, while acquiring land from businesses, displacing businesses or restricting access to businesses would be a negative impact. A neutral impact would result from not acquiring land or displacing businesses.

Alternative 1 (no build) and Alternative 7 (toll road) would not require additional land for ROW. Alternative 5 (interchange and ramp improvements) would only acquire land at the affected intersections. Alternative 4 (high-occupancy vehicle/high-occupancy toll lanes) and Alternative 6 (segregated truck lanes) would require up to 24 feet of additional pavement along the corridor.

Alternative 4 (high-occupancy vehicle/high-occupancy toll lanes) and Alternative 8 (commuter rail) would acquire land for seven stations and park-and-ride lots. These facilities would be built at Lawndale Avenue and 75th Street, Lawndale Avenue and Broadway, SH 225 and Allen Genoa, SH 225 and Red Bluff, SH 225 and Beltway 8, SH 225 and Tidal, and SH 225 and SH 146. Some of these sites could displace businesses and may have negative effects on economic development. However, commuter rail stations could present opportunities for joint development and could spur transit oriented development.

7.3 NATURAL AND BUILT ENVIRONMENT

7.3.1 Social Impacts

Social impacts refer to changes in important neighborhood features, including community centers, schools, businesses and residences. Neighborhoods may be affected if the alternative bisects the community, adds traffic to local streets or closes community centers or services. However, neighborhoods in Houston, Pasadena, Deer Park and La Porte would not bisected by SH 225 expansion. These communities have developed around the freeway, which has been in its current location for at least 40 years. A positive social impact would result from enhancement of neighborhoods, a neutral impact would not affect neighborhoods, and a negative impact would bisect neighborhoods, add traffic to residential streets, or close community centers or services. Alternatives 3 through 6 would require modifications to SH 225 or the frontage roads. Alternative 8 would run along the existing Union Pacific Railroad line adjacent to SH 225. These alternatives would result in neutral social impacts because communities would not be affected or bisected.

7.3.2 Section 4(f) Lands

Section 4(f) of the Department of Transportation Act of 1996 specifies that publicly owned parks, recreation areas and wildlife and waterfowl refuges and historic sites of significance may not be taken by transportation projects if there is a feasible and prudent alternative. Impacts to these lands include converting Section 4(f) land to highway or causing noise impacts or air quality impacts. A positive effect on Section 4(f) lands would add parkland or reduce traffic volume, thereby reducing noise and carbon monoxide levels. A negative effect on Section 4(f) lands would take parkland or result in noise or air quality impacts due to increased traffic volume. Otherwise, the alternative would have a neutral impact on Section 4(f) lands.

Two Section 4(f) lands are near the project corridor. Charles H. Milby Park, at SH 225 and Sims Bayou, is owned by the City of Houston. Memorial Park, at SH 225 and Vince Bayou, includes the Pasadena Historical Museum and Strawberry House, which is an historic building. The building is about 100 feet south of SH 225. No alternative would take land from these properties. However, each alternative involves an increase in traffic volumes along SH 225 and may cause noise or air quality impacts to the parks and historic site.

7.3.3 Noise Impacts

As traffic increases due to population growth and increased roadway capacity, sensitive receivers along SH 225, including homes, parks and schools, could be affected by increased noise levels. Noise impacts can occur if traffic volume increases, or new lanes bring traffic closer to noise-sensitive receivers, or new noise sources, such as rail, are built. Decreased noise levels would be a positive impact resulting from decreased peak hour traffic volume, or traffic lanes moved away from receivers. An alternative would have a neutral impact if peak hour traffic volume would not be affected and traffic would not be brought closer to receivers. A negative noise impact would result from increased peak hour traffic volume or traffic moved closer to receivers.

All of the alternatives with the exception of Alternative 7 (toll road) increase peak hour traffic volume, which may cause negative noise impact. Alternative 3 (additional general-purpose traffic lanes), Alternative 4 (high-occupancy vehicle/high-occupancy/toll lanes), and Alternative 6 (segregated truck lanes) would bring traffic closer to sensitive receivers.

Alternative 5 (interchange and ramp improvements) would have similar effects on peak hour traffic volumes along SH 225. This alternative would also increase the capacity of the interchanges and bring traffic closer to adjacent properties. Negative noise impacts would result.

The proposed commuter rail line (Alternative 8) would use the existing Union Pacific railroad along SH 225 and would add noise to the surrounding communities. The western part of the railroad corridor is north of SH 225 from IH 610 to east of Beltway 8.

Most of the area around this railroad is industrial land. The eastern part of the rail line in the project corridor is south of SH 225. Adjacent areas are residential, institutional and vacant land. Residential and institutional properties are sensitive to noise. The quality of the noise would be similar to that of trains currently using this route, but the amplitude would be lower than the freight trains and the number of commuter trains per day would be higher.

7.3.4 Vegetation and Wildlife Habitat

SH 225 traverses mostly developed land, and little natural habitat is left in the ROW of the highway. The Memorandum of Agreement between the TxDOT and the Texas Parks & Wildlife Department requires that the following areas be considered for compensatory mitigation:

- Habitat for federal candidate species;
- Rare vegetation series;
- Unusual or special habitat features;
- Bottomland hardwood, native prairie, and riparian areas; and
- Locally important habitat.

In addition to these habitats, the following areas were also considered when evaluating impacts to vegetation:

- Essential wildlife habitat; and
- Established forests.

Creating or enhancing the habitats listed above would be a positive impact. Removing or disturbing habitats listed above would be a negative impact. Alternatives that would not affect habitats listed above would have neutral impact.

All alternatives would have neutral vegetation and wildlife impacts. Alternative 1 (no build) and Alternative 7 (toll road) would not require additional ROW. Alternative 3 (additional general-purpose lanes), Alternative 4 (high-occupancy vehicle/high-occupancy/toll lanes) and Alternative 6 (segregated truck lanes) would affect 47 acres of mowed grass within the existing ROW. Alternative 5 (interchange and ramp improvements) would involve modifications within the existing ROW at the interchanges or ramps, which consists of mowed grass only.

Alternatives 4 and 8 would include proposed Park and Ride lots and stations outside the existing ROW at seven intersections. Most of the land outside of intersection ROW is commercial or industrial. The SH 225/Beltway 8 intersection is bordered by mowed grass, shrubs, forest and pasture. The SH 225/SH 146 intersection is surrounded by forest, mowed grass and railroad property. Building these lots and stations may affect forests. Forest land should be avoided when locating the Park and Ride lots. Except for this forest land, the affected plant communities are not suitable habitat for most wildlife, and the alternatives would not affect wildlife.

7.3.5 Endangered Species

The Endangered Species Act of 1973 conserves the ecosystems on which endangered species depend, and conserves and recovers such species. Endangered species and their habitat are not present along the SH 225 Corridor, so the alternatives would not affect endangered species or their habitat.

7.3.6 Wetlands

Wetlands are areas that are inundated or saturated with water for at least two weeks of the growing season, and have developed soils and vegetation typical of saturated conditions. The U.S. Army Corps of Engineers considers projects that fill less than ½ acre of wetlands per crossing to have minor impacts on wetlands. Therefore, the alternatives are evaluated based on the area of permanently affected wetlands. An alternative that affects less than ½ acre of wetlands per crossing has a neutral effect on wetlands. Alternatives that enhance at least ½ acre of wetlands would have a positive impact and alternatives that fill or damage at least ½ acre of wetlands would have a negative impact.

Wetlands are present in the SH 225 Corridor at the Sims Bayou and Vince Bayou crossings. Alternative 3 (additional general-purpose lanes), Alternative 4 (high-occupancy vehicle/high-occupancy and toll lanes), and Alternative 6 (segregated truck lanes) would expand the SH 225 bridges that cross Sims Bayou and Vince Bayou. These alternatives would build new bridge piers, possibly in wetlands, but the total area would be far less than ½ acre per crossing. Construction could also affect wetlands temporarily.

Alternative 5 (interchange and ramp improvements) would modify the intersections of SH 225 and Beltway 8 and IH 610. Wetlands are not present at these intersections, and these alternatives would not affect wetlands. Alternative 8 (commuter rail) would use the Union Pacific Railroad and would affect wetlands. Alternatives 4 and 8 would also build seven Park and Ride lots and stations. These lots and stations would not affect wetlands.

7.3.7 Water Quality

Motor vehicles deposit pollutants on roads through automobile exhaust emission and deposition of oils, fuels, wastes, metal scrapings and brake linings during travel and while braking. Storm water runoff carries pollutants deposited by vehicles onto SH 225 into streams, contributing to the overall decline of water quality. Traffic is projected to increase, which would increase pollutant discharges. Therefore, water quality degradation due to highway runoff may continue under any alternative. However, the amount of highway runoff is correlated positively to the area of pavement on the roadway. Increasing the amount of pavement on SH 225 would increase the amount of pollutants entering streams.

Impacts to water quality are based on how much additional paved area would be created by alternatives. Decreasing paved area would have a positive impact, while increasing paved area would have a negative impact. No change in the paved area would have a neutral impact.

The SH 225 Corridor crosses Sims Bayou and Vince Bayou, which flow into the Houston Ship Channel. Sims Bayou, Vince Bayou and the Houston Ship Channel are impaired streams on the 2002 Clean Water Act Section 303(d) list for Texas. Water samples from these bayous show nutrient enrichment, and biological sampling shows that PCBs and pesticides are in fish tissue and dioxin is in catfish and crab tissue. These types of pollution are due to runoff from agricultural, residential and industrial land, not highways. Therefore, the alternatives are not likely to contribute to water quality impairment of Sims Bayou and Vince Bayou.

Alternative 1 (no build) and Alternative 7 (toll road) do not add pavement to the existing roadway and would not directly affect water quality.

Alternative 3 (additional general-purpose lanes), Alternative 6 (segregated truck lanes), Alternative 5 (high-occupancy vehicle/high-occupancy and toll lanes), Alternative 5 (interchange and ramp improvements) would add pavement to the existing highway, which may increase the amount of pollutants entering the adjacent waterways. Alternative 8 (commuter rail) would use the existing rail line and would not increase pavement area.

Alternatives 4 and 8 include seven new Park and Ride lots, which would add pavement at the proposed lot locations.

The action alternatives may affect water quality during construction, while the ground surface is disturbed and sediments and spilled fuels and oils could enter streams. Normal measures to control erosion and spills would eliminate or reduce the severity of these impacts.

7.3.8 Hazardous Materials

Hazardous materials may cause a threat to construction workers building the alternative if contamination migrates to the ROW. Each alternative is evaluated on whether hazardous materials sites affecting soil or groundwater are adjacent to or within the proposed ROW. Hazardous materials sites include sites identified in regulatory agency databases. A negative impact would occur if sites with potential hazardous materials affecting soil or groundwater are within or adjacent to the proposed ROW. A neutral impact would occur if such sites are not within or adjacent to the proposed ROW. Alternatives cannot cause positive impacts for hazardous materials.

Alternative 1 (no build) would not require construction activities and would have no impacts for hazardous materials. Alternative 3 (additional general-purpose lanes),

Alternative 7 (toll road), Alternative 6 (segregated truck lanes), Alternative 4 (high-occupancy vehicle/high-occupancy and toll lanes) Alternative 5 (interchange and ramp improvements) would modify SH 225, frontage roads or interchanges. Hazardous materials sites affecting soil or groundwater are adjacent to or within the proposed ROW and may pose a threat to construction workers. In addition, hazardous materials sites affecting soil or groundwater are near the locations of the Park and Ride lots and stations required by Alternatives 4 and 8 may pose a threat to construction workers.

8.0 EVALUATION OF VIABLE ALTERNATIVES

Categories of assessment are identified in order to evaluate the alternatives according to the goals established earlier in the corridor study. Within each category are objective guidelines that in combination allow an assessment of each viable alternative. Categories of Assessment are as follows:

- Improve Traffic Safety
- Improve Mobility
- Conceptual Costs
- Benefit/Cost Ratio
- Improve Emergency Evacuation Route
- Protect Natural and Social Environment
- Maximize Existing Infrastructure

8.1 IMPROVE TRAFFIC SAFETY

8.1.1 Detailed Criteria

Four guidelines form the basis for assessing the level of traffic safety provided by each alternative. Each guideline provides a "+", "0", or "-" rating based on the criteria definition shown.

Traveler Information – Rates the alternative's contribution to improved safety by clearly marking decision-making options for roadway users. Utilization of state-of-the industry dynamic messaging should be included in each alternative.

RATINGS:

+ Includes high technological capabilities.
0 Normal (typical) application of signing for a TxDOT project.
- Less than typical signage for a TxDOT project.

Consistency with Design Standards – Alternatives may vary in how closely they match state and federal guidelines and the engineering industry's suggested practice. Design standards include elements such as length of ramps, width of lanes and turning radii.

RATINGS:

+ Plans and profiles meet minimum design guidelines in all sections and exceed guidelines or suggested practice in one or more locations.
0 Plan and profiles meet minimum design guidelines and suggested practice in all sections.
- Plan and profiles meet minimum design guidelines in all sections, may not meet suggested practice in some locations.

Conflicts with Trucks – Because the corridor is one of the principal routes serving the Port of Houston Authority, limiting real and perceived conflicts with trucks is an important aspect of a selected alternative.

RATINGS:

+ Few points of interface between trucks and other vehicles.
0 Trucks and other vehicles are still in mixed flow, but design upgrades improve current condition.
- Interfaces between trucks and other vehicles remain essentially unchanged from the base condition.

Ramp/Frontage Road Accessibility – Access to the freeway is preceded by travel along frontage roads to the ramps, and vice versa, which must function efficiently in order to achieve desired levels of corridor movements. [For definition of LOS, please see next section.]

RATINGS:

+ All frontage roads/ramps function at LOS C or better during rush hour.
0 Half or more of the frontage roads/ramps function at LOS C or better during rush hour; remaining frontage roads/ramps function at LOS D.
- More than half of the frontage roads/ramps function at LOS D or worse during rush hour.

8.1.2 Detailed Evaluation

No Build Alternative

SH 225 currently has typical signage for a State Highway and the No Build alternative does not include any improvements to the traveler information system. Therefore the No Build alternative received a neutral rating for traveler information systems.

The No Build alternative received negative ratings for the other three categories under the Traffic Safety criterion. Without improvements to SH 225, design standards would not be upgraded, current conditions with truck conflict would continue, and congestion at ramp/frontage road intersection would continue.

No Build with Committed Projects

The No Build with Committed Projects alternative does include improvements projects for the traveler information system. Therefore the No Build with Committed Projects alternative received a positive rating for traveler information systems.

The No Build with Committed Projects alternative received negative ratings for the other three categories under the Traffic Safety criterion. None of the other committed project

will improve SH 225 design standards. Current conditions on SH 225 with truck conflict would and congestion at ramp/frontage road intersection would be expected to continue.

Widen Freeway by One General Purpose Lane in each Direction

This build alternative would incorporate normal (typical) application of signing for a TxDOT project. As such the Widen Freeway alternative received a neutral rating for traveler information systems.

Widening of the freeway would also involve reconstruction of SH 225. Therefore the new plans and profiles would meet minimum design guidelines in all sections and most likely exceed guidelines or suggested practice in one or more locations. The Widen Freeway alternative received a positive rating for design standards.

With this build alternative trucks and other vehicles would still operate in mixed flow. However, the design standard upgrades associated with widening the freeway would be expected to improve current condition. The Widen Freeway alternative received a neutral rating for conflicts with trucks.

Although the Widen Freeway alternative would add a lane in each direction on the main lanes of SH 225, ramp and frontage road improvements are not included in this build alternative. As a result more than half of the frontage road/ramp intersections are forecast to function at LOS D or worse during peak travel times. The Widen Freeway alternative received a negative rating for ramp/frontage road accessibility.

HOV/HOT Lanes

The HOV/HOT alternative would include signage and a traveler communications system with high technological capabilities. As a result this build alternative received a positive rating for traveler information systems.

Widening of the freeway to accommodate the HOV/HOT lanes would also involve reconstruction of SH 225. Therefore the new plans and profiles would meet minimum design guidelines in all sections and most likely exceed guidelines or suggested practice in one or more locations. The HOV/HOT Lanes alternative received a positive rating for design standards.

With this build alternative trucks and other vehicles would still operate in mixed flow. However, the design standard upgrades associated with widening the freeway to accommodate the HOV/HOT lanes would be expected to improve current condition. The HOV/HOT Lanes alternative received a neutral rating for conflicts with trucks.

Although the HOV/HOT Lanes alternative would add a special purpose lane in each direction on the main lanes of SH 225, ramp and frontage road improvements are not included in this build alternative. As a result more than half of the frontage road/ramp

intersections are forecast to function at LOS D or worse during peak travel times. The HOV/HOT Lanes alternative received a negative rating for ramp/frontage road accessibility.

Interchange/Ramp Improvements

SH 225 currently has typical signage for a State Highway and the Interchange/Ramp Improvements alternative does not include any improvements to the traveler information system. Therefore the Interchange/Ramp Improvements alternative received a neutral rating for traveler information systems.

Reconstruction of the major interchanges with SH 225 as well as upgrades to numerous exit and entrance ramp would require new plans and profiles that would meet minimum design guidelines. The Interchange/Ramp Improvements alternative received a positive rating for design standards.

With this build alternative trucks and other vehicles would still operate in mixed flow. However, the design standard upgrades associated with reconstructing the interchanges and making improvements to ramps would be expected to improve current condition. The Interchange/Ramp Improvements alternative received a neutral rating for conflicts with trucks.

Although the Interchange/Ramp Improvements alternative would vastly improve the operation of the major interchanges and the improved ramps, more than half of the frontage road/ramp intersections are still forecast to function at LOS D or worse during peak travel times. The Interchange/Ramp Improvements alternative received a negative rating for ramp/frontage road accessibility.

Segregated Truck Lanes

SH 225 currently has typical signage for a State Highway and the Segregated Truck Lanes alternative does not include any improvements to the traveler information system. Therefore the No Build alternative received a neutral rating for traveler information systems.

Widening of the freeway to accommodate the segregated truck lanes would also involve reconstruction of portions of SH 225. The newly constructed sections would have plans and profiles would meet minimum design guidelines. The Segregated Truck Lanes alternative received a neutral rating for design standards.

The intent of this build alternative is to provide truck traffic with an exclusive lane. Therefore the potential points of interface between trucks and other vehicles would be greatly reduced. Therefore the Segregated Truck Lanes alternative received a positive rating for conflict with trucks.

Although the Segregated Truck Lanes alternative would add a special purpose lane in each direction on the main lanes of SH 225, ramp and frontage road improvements are not included in this build alternative. As a result more than half of the frontage road/ramp intersections are forecast to function at LOS D or worse during peak travel times. The Segregated Truck Lanes alternative received a negative rating for ramp/frontage road accessibility.

Convert to Toll Road

The Convert to Toll Road alternative would include signage and a traveler communications system with high technological capabilities. As a result this build alternative received a positive rating for traveler information systems.

The Convert to Toll Road alternative received negative ratings for the other three categories under the Traffic Safety criterion. Conversion to a toll road could be accomplished without significant improvements to SH 225. Therefore, design standards would not be upgraded, current conditions with truck conflict would continue, and congestion at ramp/frontage road intersection would continue.

Commuter Rail

The Commuter Rail alternative does not include any improvements to SH 225. The freeway currently has typical signage for a State Highway and would not change with this build alternative. Therefore the Commuter Rail alternative received a neutral rating for traveler information systems.

The Commuter Rail alternative received negative ratings for the other three categories under the Traffic Safety criterion. This build alternative would be accomplished without any improvements to SH 225. Therefore, design standards would not be upgraded, current conditions with truck conflict would continue, and congestion at ramp/frontage road intersection would continue.

8.2 IMPROVE MOBILITY

8.2.1 Detailed Criteria

The goal of improved mobility is assessed based on the handling of current travel demand and existing choke points, as well as the accommodation of future travel demand. A common measure of mobility is highway Level of Service (LOS). The LOS ratings define highway performance in terms of traffic flow characteristics and traffic volume to roadway capacity ratio. Table 8-1 provides the Highway Capacity Manual's definitions for LOS. For the SH 225 MCFS, LOS is used to evaluate both current operating conditions and anticipated future conditions based on travel demand forecasting results for the various viable alternatives.

Table 8-1: Level of Service Definitions for Roadways

LOS	Description of Traffic Flow	Volume/Capacity Ratio
A	Free flow speeds; low volumes	0.34
B	Reasonable free flow speeds with speeds being affected by traffic volumes	0.56
C	Stable traffic flow with limitations on traffic maneuvers	0.76
D	Approaching unstable traffic flow; minor incidents cause traffic queuing	0.90
E	Unstable to forced flow; volume at or near roadway capacity; long traffic queues and significant delay	1.00

Source: 2000 Highway Capacity Manual

Current Travel Demand – Facilitates access to residential and employment areas and addresses the need to move people and goods through the corridor.

RATINGS:

+ Majority of freeway sections have 24-hour LOS of B or better and peak hour LOS of C or better
0 Majority of freeway sections have 24-hour LOS of C and peak hour LOS of D or better
- Majority of freeway sections have 24-hour LOS of D or worse and peak hour LOS of E

Addresses Current Choke Points – Several highly congested interchanges in the corridor are choke points that exert a domino effect, resulting in delays in other portions of the corridor. The junction with IH 610, Beltway 8 and SH 146 are the principal locations under consideration as choke points.

RATINGS:

+ Future volumes at key choke points show improved levels of service over the existing conditions.
0 Future volumes at key choke points show similar levels of service compared to the existing conditions.
- Future volumes at key choke points show diminished levels of service over the existing conditions.

Future Travel Demand – Not only is it important to improve existing conditions, but added capacity that will accommodate a portion of corridor growth is important.

RATINGS:

+ Majority of freeway sections have 24-hour LOS of B or better and peak hour LOS of C or better
0 Majority of freeway sections have 24-hour LOS of C and peak hour LOS of D or better
- Majority of freeway sections have 24-hour LOS of D or worse and peak hour LOS of E

8.2.2 Detailed Evaluation

No Build Alternative

The No Build alternative operates at LOS C for current travel demand over the 24-hour period. However during the PM peak hour the LOS just east of Scarborough is D. Therefore, the No Build alternative received a neutral rating for meeting current travel demand.

For the No Build alternative the current interchange and ramp choke points are projected to operate at LOS E in 2025. Several ramps and direct connectors are expected to have V/C ratios well in excess of 1 by 2025 without improvements. A negative rating for addressing current choke points was given to the No Build alternative because future volumes at key choke points are expected to show diminished levels of service over the existing conditions.

Future travel demand for the No Build alternative is projected to result in 24-hour LOS of D. During the PM peak hour, sections of SH 225 are expected to operate at LOS E. As a result, the No Build alternative received a negative rating for meeting future travel demand.

No Build with Committed Projects

The No Build with Committed Projects alternative operates at LOS C for current travel demand over the 24-hour period. However during the PM peak hour the LOS just east of Scarborough is D. Therefore, the No Build with Committed Projects alternative received a neutral rating for meeting current travel demand.

The No Build with Committed Projects alternative does not include projects that would improve the current choke points on SH 225. Therefore, the current interchange and ramp choke points are projected to operate at LOS E in 2025. Several ramps and direct connectors are expected to have V/C ratios well in excess of 1 by 2025 without improvements. A negative rating for addressing current choke points was given to the No Build with Committed Project alternative because future volumes at key choke points are expected to show diminished levels of service over the existing conditions.

Future travel demand for the No Build with Committed Projects alternative is projected to result in 24-hour LOS of D. During the PM peak hour, sections of SH 225 are expected to operate at LOS E. As a result, the No Build with Committed Projects alternative received a negative rating for meeting future travel demand.

Widen Freeway by One General Purpose Lane in each Direction

The additional general purpose capacity associated with this build alternative would easily accommodate the current travel demand on SH 225. The most congested sections, expected during the PM peak hour, would be LOS C. Therefore, the Widen Freeway by One General Purpose Lane in each Direction alternative received a positive rating for meeting current travel demand.

Although the Widen Freeway alternative would add a general purpose lane in each direction on the main lanes of SH 225, ramp and frontage road improvements are not included in this build alternative. Although some ramps and direct connector are projected to operate better than the No Build alternative, this build alternative would have LOS E at choke points with V/C ratios in excess of 1. A negative rating for addressing current choke points was assigned to the Widen Freeway alternative.

Future congestion levels on SH 225 with the Widen Freeway alternative would be an improvement over the No Build alternative. Travel demand in the majority of freeway sections would have 24-hour LOS of C and peak hour LOS of D or better. The Widen Freeway alternative received a neutral rating for meeting future travel demand.

HOV/HOT Lanes

The HOV/HOT Lanes alternative is projected to operate at LOS C for current travel demand over the 24-hour period in the general purpose lanes. The HOV/HOT lanes would operate at LOS A, both over the 24-hour period and during peak hours. However during the PM peak hour the general purpose lane LOS just east of Scarborough is expected to be D. Therefore, the HOV/HOT Lanes alternative received a neutral rating for meeting current travel demand.

Although the HOV/HOT Lanes alternative would add a special purpose lane in each direction on the main lanes of SH 225, ramp and frontage road improvements are not included in this build alternative. Although some ramps and direct connector are projected to operate better than the No Build alternative, this build alternative would have LOS E at choke points with V/C ratios in excess on 1. A negative rating for addressing current choke points was assigned to the HOV/HOT Lanes alternative.

Future congestion levels on general purpose lanes SH 224 with the HOV/HOT Lanes alternative would be better than the No Build alternative. The HOV/HOT lanes would operate at LOS A, both over the 24-hour period and during peak hours. Travel demand in the majority of general purpose freeway sections would have 24-hour LOS of C and

peak hour LOS of D or better. The HOV/HOT Lanes alternative received a neutral rating for meeting future travel demand.

Interchange/Ramp Improvements

With the Interchange/Ramp Improvements alternative SH 225 is projected to operate at LOS C for current travel demand over the 24-hour period. However during the PM peak hour the LOS just east of Scarborough is D. Therefore, the Interchange/Ramp Improvements alternative received a neutral rating for meeting current travel demand.

This build alternative involves the reconstruction of the major interchanges with SH 225 as well as upgrades to numerous exit and entrance ramp. With these improvements in place future volumes at key choke points are projected to show improved levels of service over the existing conditions. As a result this build alternative received a positive rating for addressing current choke points

The Interchange/Ramp Improvements alternative would vastly improve the operation of the major interchanges and the improved ramps. Travel demand in the majority of freeway sections would have 24-hour LOS of C and peak hour LOS of D or better. The Interchange/Ramp Improvements alternative received a neutral rating for meeting future travel demand.

Segregated Truck Lanes

The Segregated Truck Lanes alternative is projected to operate at LOS C for current travel demand over the 24-hour period in the general purpose lanes. The segregated truck lanes would operate at LOS A or B, both over the 24-hour period and during peak hours. However during the PM peak hour the general purpose lane LOS just east of Scarborough is expected to be D. Therefore, the Segregated Truck Lanes alternative received a neutral rating for meeting current travel demand.

Although the Segregated Truck Lanes alternative would add a special purpose truck lane in each direction on the main lanes of SH 225, ramp and frontage road improvements are not included in this build alternative. Although some ramps and direct connector are projected to operate better than the No Build alternative, this build alternative would have LOS E at choke points with V/C ratios in excess on 1. A negative rating for addressing current choke points was assigned to the Segregated Truck Lanes alternative.

Future congestion levels on general purpose lanes SH 224 with the Segregated Truck Lanes alternative would be better than the No Build alternative. The segregated truck lanes would operate at LOS A or B, both over the 24-hour period and during peak hours. Travel demand in the majority of freeway sections would have 24-hour LOS of C and peak hour LOS of D or better. The Segregated Truck Lanes alternative received a neutral rating for meeting future travel demand.

Convert to Toll Road

Conversion to a toll road could be accomplished without significant improvements to SH 225. Therefore the Convert to Toll Road alternative operates at LOS C for current travel demand over the 24-hour period. However during the PM peak hour the LOS just east of Scarborough is D. Therefore, the Convert to Toll Road alternative received a neutral rating for meeting current travel demand.

For the Convert to Toll Road alternative the current interchange and ramp choke points are projected to operate at LOS E in 2025. Several ramps and direct connectors are expected to have volume to capacity (V/C) ratios well in excess of 1 by 2025 without improvements. A negative rating for addressing current choke points was given to the Convert to Toll Road alternative because future volumes at key choke points are expected to show diminished levels of service over the existing conditions.

Future travel demand for the Convert to Toll Road alternative is projected to result in 24-hour LOS of D. During the peak hours, however, SH 225 is expected to operate at LOS A and B with only one section operating at LOS C. As a result, the Convert to Toll Road alternative received a neutral rating for meeting future travel demand.

Commuter Rail

With the Commuter Rail alternative SH 225 is projected to operate at LOS C for current travel demand over the 24-hour period. However during the PM peak hour the LOS just east of Scarborough is D. Therefore, the Commuter Rail alternative received a neutral rating for meeting current travel demand.

This build alternative would be accomplished without any improvements to SH 225. For the Commuter Rail alternative the current interchange and ramp choke points are projected to operate at LOS E in 2025. Several ramps and direct connectors are expected to have volume to capacity (V/C) ratios well in excess of 1 by 2025 without improvements. A negative rating for addressing current choke points was given to the Commuter Rail alternative because future volumes at key choke points are expected to show diminished levels of service over the existing conditions.

Future congestion levels on general purpose lanes SH 224 with the Commuter Rail alternative would be better than the No Build alternative. Travel demand in several sections of SH 225 would have 24-hour LOS of D or worse and PM peak hour LOS of E. The Commuter Rail alternative received a neutral rating for meeting future travel demand.

8.3 CONCEPTUAL COSTS

8.3.1 Detailed Criteria

The conceptual costs criteria allows for the comparison of alternatives with regards to capital costs, maintenance costs, operating costs, as well as constructability.

Capital Costs – Capital costs include ROW acquisition, construction, engineering design, purchase of rolling stock, construction management costs, and all other expenses related to creating the functioning long-term asset associated with each alternative.

RATINGS:

+ Relative capital costs per mile out-perform other alternatives
0 Relative capital costs per mile are typical with other alternatives
- Relative capital costs per mile lacking versus other alternatives

Maintenance Costs – Maintenance costs include resurfacing, re-striping, pothole filling, cleaning, inspections, and all other expenses associated with preservation and general upkeep of the long-term asset.

Operating Costs – Operating costs include staffing of trains and stations, staffing of roadway maintenance crews, electrical and communications costs, and other expenses related to the long-term asset's ability to function

RATINGS:

+ Relative maintenance and operating costs per mile out-perform other alternatives
0 Relative maintenance and operating costs per mile are typical with other alternatives
- Relative maintenance and operating costs per mile lacking versus other alternatives.

Constructability – This refers to a review of construction issues and project sequencing for each alternative.

RATINGS:

+ Alternative characterized by ease of constructability
0 Constructability of alternative is typical
- Alternative presents significant challenges regarding constructability

8.3.2 Detailed Evaluation

No Build Alternative

Because the No Build alternative does not offer any improvements to the SH 225 travel corridor, its relative capital costs per mile out-perform other alternatives. As such this alternative received a positive rating for capital costs.

Relative maintenance and operating costs per mile for the No Build alternative out-perform the other alternatives. This alternative received a positive rating for operating and maintenance costs.

Because the No Build alternative does not offer any improvements to the SH 225 travel corridor, there is no construction. As such this alternative did not receive a rating for constructability.

No Build with Committed Projects

Because the No Build with Committed Projects alternative does offer relatively low capital cost improvements to the SH 225 travel corridor, its relative capital costs per mile outperform other alternatives. As such this alternative received a positive rating for capital costs.

Relative maintenance and operating costs per mile for the No Build with Committed Projects alternative out-perform the other alternatives. This alternative received a positive rating for operating and maintenance costs.

The No Build with Committed Projects alternative involves relatively low capital cost improvements to the SH 225 travel corridor without significant construction difficulties. As such this alternative received a positive rating for constructability.

Widen Freeway by One General Purpose Lane in each Direction

The relative capital costs per mile for the Widen Freeway alternative are higher than most of the other alternatives. The alternative received a negative rating for capital costs.

Relative maintenance and operating costs per mile for the Widen Freeway alternative out-perform the other alternatives. This alternative received a positive rating for operating and maintenance costs.

The Widen Freeway alternative presents some challenges regarding constructability. These challenges were accounted for in the capital cost estimates. This alternative received a neutral rating for constructability.

HOV/HOT Lanes

The relative capital costs per mile for the HOV/HOT Lanes alternative are typical with other alternatives. The alternative received a neutral rating for capital costs.

The HOV/HOT Lanes alternatives does involve significant operating cost, however the maintenance costs are typical of the other alternatives. This alternative received a negative rating for operating and maintenance costs.

The HOV/HOT Lanes alternative presents significant challenges regarding constructability especially through Deer Park where the existing ROW is constrained by Union Pacific Railroad ROW. This alternative received a negative rating for constructability.

Interchange/Ramp Improvements

The relative capital costs per mile for the Interchange/Ramp Improvements alternative are typical with other alternatives. The alternative received a neutral rating for capital costs.

Relative maintenance and operating costs per mile for the Interchange Ramp Improvements alternative out-perform the other alternatives. This alternative received a positive rating for operating and maintenance costs.

The Interchange/Ramp Improvements alternative involves improvements to the SH 225 travel corridor that do not present significant construction difficulties. As such this alternative received a positive rating for constructability.

Segregated Truck Lanes

The relative capital costs per mile for the Segregated Truck Lanes alternative are typical with other alternatives. The alternative received a neutral rating for capital costs.

Relative maintenance and operating costs per mile for the Segregated Truck Lanes alternative out-perform the other alternatives. This alternative received a positive rating for operating and maintenance costs.

The Segregated Truck Lanes alternative presents some challenges regarding constructability. These challenges were accounted for in the capital cost estimates. This alternative received a neutral rating for constructability.

Convert to Toll Road

The relative capital costs per mile for the Convert to Toll Road alternative are higher than the other alternatives' capital costs. This alternative received a negative rating for capital costs.

The Convert to Toll Road alternatives does involve significant operating cost, however the maintenance costs are typical of the other alternatives. This alternative received a negative rating for operating and maintenance costs.

The Convert to Toll Road alternative involves relatively low capital cost improvements to the SH 225 travel corridor without significant construction difficulties. However, this alternative is expected to be extremely unpopular with current user of SH 225. TxDOT now has a policy of not pursuing the conversion of a free roadway facility to a tolled facility. As such this alternative received a negative rating for constructability.

Commuter Rail

The relative capital costs per mile for the Commuter Rail alternative are higher than the other alternatives' capital costs. This alternative received a negative rating for capital costs.

Relative maintenance and operating costs per mile for the Commuter Rail alternative are typical or average when compared to the other alternatives. This alternative received a neutral rating for operating and maintenance costs.

Because this alternative would require significant ROW acquisition and cooperation from Union Pacific Railroad, the Commuter Rail alternative presents significant challenges regarding constructability. As such this alternative received a negative rating for constructability.

8.4 BENEFIT/COST RATIO

8.4.1 Detailed Criteria

The relative economic advantages and disadvantages of a transportation investment can be evaluated through a benefit-cost analysis. A popular method for performing a benefit-cost analysis to compare competing alternatives is the benefit/cost ratio. The benefit/cost ratio is a calculation that considers user benefits and conceptual costs.

User benefits are defined as the annual travel time savings, converted to dollars, of each alternative compared to the No Build alternative. Project costs are defined as annualized capital costs and are detailed in Chapter 5.

RATINGS:

+ The ratio of user benefits to conceptual costs outperforms other alternatives
0 The ratio of user benefits to conceptual costs is typical with other alternatives
- The ratio of user benefits to conceptual costs is lacking versus other alternatives

8.4.2 Detailed Evaluation

No Build Alternative

Because there are no user benefits associated with the No Build alternative, the ratio of user benefits to conceptual costs is lacking versus other alternatives. Therefore this alternative received a negative rating for this criterion.

No Build with Committed Projects

Because there are minimal user benefits associated with the No Build with Committed Projects alternative, the ratio of user benefits to conceptual costs is lacking versus other alternatives. Therefore this alternative received a negative rating for this criterion.

Widen Freeway by One General Purpose Lane in each Direction

The ratio of user benefits to conceptual costs for the Widen Freeway alternative is typical with other alternatives. Therefore this alternative received a neutral rating for this criterion.

HOV/HOT Lanes

The ratio of user benefits to conceptual costs for the HOV/HOT Lanes alternative is typical with other alternatives. Therefore this alternative received a neutral rating for this criterion.

Interchange/Ramp Improvements

The ratio of user benefits to conceptual costs for the Interchange/Ramp Improvements alternative is typical with other alternatives. Therefore this alternative received a neutral rating for this criterion.

Segregated Truck Lanes

The ratio of user benefits to conceptual costs for the Segregated Truck Lanes alternative is typical with other alternatives. Therefore this alternative received a neutral rating for this criterion.

Convert to Toll Road

Because of the high capital cost of this alternative, the ratio of user benefits to conceptual costs for the Convert to Toll Road alternative is lacking versus other alternatives. Therefore this alternative received a negative rating for this criterion.

Commuter Rail

Because of the high capital cost of this alternative, the ratio of user benefits to conceptual costs for the Commuter Rail alternative is lacking versus other alternatives. Therefore this alternative received a negative rating for this criterion.

8.5 IMPROVE EMERGENCY EVACUATION ROUTE

8.5.1 Detailed Criteria

Two different guidelines are included to support this goal: providing evacuation route alternatives and ensuring accurate communication for emergency travel.

Provides Evacuation Route – Because the corridor is a primary travel route for coastal communities as well as for petrochemical industries and surrounding areas, providing an evacuation route is an important aspect of the selected alternative. Example measures for improving the evacuation route include contra-flow lane capabilities, increased capacity, and raised roadways in flood-prone areas.

RATINGS:

+ Provides an improved evacuation route
0 Neither improves nor hinders performance as an evacuation route
- Hinders performance as an evacuation route

Communication for Emergency Travel – An important aspect of improving evacuation routes is improving communication for emergency travel. Examples of improving communications along evacuation routes include variable message boards, evacuation route signage, and highway advisory radio (HAR).

RATINGS:

+ Improves communications for emergency travel
0 Neither improves nor hinders communications for emergency travel
- Hinders communications for emergency travel

8.5.2 Detailed Evaluation

No Build Alternative

SH 225 is currently an emergency evacuation route. The No Build alternative would neither improve nor hinder this corridor's performance as an evacuation route. This alternative does not include any upgrades in signage or communication systems. Therefore the No Build Alternative received a neutral rating for the evacuation route and communications for emergency travel criteria.

No Build with Committed Projects

SH 225 is currently an emergency evacuation route. The No Build with Committed Projects alternative would neither improve nor hinder this corridor's performance as an evacuation route. This alternative received a neutral rating for the evacuation route criterion.

The No Build with Committed Projects alternative does improve communications for emergency travel because of the addition of the CTMS improvements. This alternative received a positive rating for the communications for emergency travel criterion.

Widen Freeway by One General Purpose Lane in each Direction

The added capacity associated with the Widen Freeway alternative does improve SH 225 as an evacuation route. As such, this build alternative received a positive rating for the evacuation route criterion.

This build alternative does not include any upgrades in signage or communication systems. Therefore the Widen Freeway alternative received a neutral rating for the communications for emergency travel criterion.

HOV/HOT Lanes

The added capacity associated with the Widen Freeway alternative does improve SH 225 as an evacuation route. The HOV/HOT lanes could be made available to all traffic during an emergency situation. As such, this build alternative received a positive rating for the evacuation route criterion.

The HOV/HOT Lanes alternative does include an improved communication system necessary for managing and operating the special use lanes. The improved communication system could also be used during emergency situation. This alternative received a positive rating for the communications for emergency travel criterion.

Interchange/Ramp Improvements

The Interchange/Ramp Improvements alternative would improve overall traffic and safety operations on SH 225. This alternative would provide improvements to SH 225 as an evacuation route. As such, this build alternative received a positive rating for the evacuation route criterion.

This build alternative does not include any upgrades in signage or communication systems. Therefore the Interchange/Ramp Improvements alternative received a neutral rating for the communications for emergency travel criterion.

Segregated Truck Lanes

The added capacity associated with the Segregated Truck Lanes alternative does improve SH 225 as an evacuation route. The segregated truck lanes could be made available to all traffic during an emergency situation. As such, this build alternative received a positive rating for the evacuation route criterion.

This build alternative does not include any upgrades in signage or communication systems. Therefore the Segregated Truck Lanes alternative received a neutral rating for the communications for emergency travel criterion.

Convert to Toll Road

The Convert to Toll Road alternative would not add capacity to SH 225. Therefore this build alternative would neither improve nor hinder this corridor's performance as an evacuation route. However, the toll lanes could be made available to all traffic during an emergency situation. Therefore the Convert to Toll Road Alternative received a neutral rating for the evacuation route and communications for emergency travel criteria.

The Convert to Toll Road alternative does include an improved communication system necessary for managing and operating the toll lanes. The improved communication system could also be used during emergency situation. This alternative received a positive rating for the communications for emergency travel criterion.

Commuter Rail

The added person-moving capacity associated with the Commuter Rail alternative does improve the SH 225 Corridor as an evacuation route. The commuter rail line could be made available to move citizens during an emergency situation. As such, this build alternative received a positive rating for the evacuation route criterion.

This build alternative does not include any upgrades in signage or communication systems. Therefore the Commuter Rail alternative received a neutral rating for the communications for emergency travel criterion.

8.6 PROTECT NATURAL & SOCIAL ENVIRONMENT

Chapter 7 details the evaluation of alternatives with respect to the natural and social environment. The overall evaluation matrix reflects the ratings found in Table 7-1.

8.7 MAXIMIZE EXISTING INFRASTRUCTURE

8.7.1 Detailed Criteria

Three guidelines form the basis for this assessment. The screening process will evaluate the degree to which the alternatives allow the implementation of these kinds of improvements.

Transportation Demand Management (TDM) strategies – TDM refers to techniques for reducing the demand for transportation within a corridor or shifting that demand to times, modes, or locations that have surplus supply or are more efficient. There are many different types of TDM strategies, including:

- Alternative Mode Support Strategies: public education and promotion, vanpool services, park and ride lots, HOV facilities, transit services, bicycle and pedestrian improvements, and ride-matching services.
- Land Use Strategies: transit and pedestrian-oriented design, compact residential development, compact employment and activity centers, and mixed land uses.
- Pricing Strategies: road/congestion pricing, parking pricing, gasoline tax increases, and transit and vanpool fare subsidies.
- Traffic constraints: convert single-occupancy lanes to HOV, truck-only lanes, truck traffic prohibition during specified times, and ramp elimination.
- Worksite-Based Strategies: alternative work schedules, parking management, monetary incentives, employee transit pass program, telecommuting, and ridesharing

RATINGS:

+ Alternative reflects or facilitates implementation of TDM strategies
0 Alternative neither facilitates nor hinders implementation of TDM strategies
- Alternative hinders implementation of TDM strategies

Transportation System Management (TSM) strategies – TSM measures are enhancements to existing transportation facilities and services that can improve operational efficiency.

- Access management: driveway design / location / spacing, median openings / location / spacing, ramp reconfigurations, ramp metering
- Arterial widening
- Freeway system improvements: auxiliary lanes, ramp closures, re-striping to add lanes and improve weave/merge areas
- Intersection improvements: addition of turn lanes, addition of through lanes, signalization, grade separation
- Traffic operations and signal system improvements: signal coordination and optimization, signal-warrant program (for signal additions and removals), traffic operations safety review program

RATINGS:

+ Alternative reflects or facilitates implementation of TSM strategies
0 Alternative neither facilitates nor hinders implementation of TSM strategies
- Alternative hinders implementation of TSM strategies

Intelligent Transportation Systems (ITS) strategies – ITS covers a broad range of activities and systems that use advanced technology to increase overall transportation system efficiency. ITS technologies are applied to infrastructure, vehicles, travelers, and the operators of the transportation system components. Categories of ITS include:

- Advanced Traffic Management Systems: Ramp meters, traffic network flow monitoring, HOV lane management, traffic information dissemination, regional traffic control, reversible lane management, road weather information system, and variable speed limit.

- Advanced Traveler Information Systems: in-vehicle navigation systems, variable message signs, pre-trip travel information, and dynamic route guidance.

- Advanced Vehicle Control and Safety Systems: pre-crash restraint deployment, longitudinal collision avoidance, lateral collision avoidance, intersection collision avoidance, driver vision enhancement, driver safety monitoring, vehicle safety monitoring, adaptive cruise control, and automated vehicle operation.

- Commercial Vehicle Operations: commercial vehicle electronic clearance, automated roadside safety inspection, on-board safety monitoring, commercial vehicle administrative processes, hazardous material planning and incident response, automated mileage and fuel reporting, weigh-in-motion, freight in-transit monitoring, international border crossing clearance, and commercial fleet management.

- Electronic Payment: electronic toll payment services (for example, EZ Tag)

- Emergency Management: emergency notification, emergency vehicle routing, personal security and mayday support, and disaster information dissemination.

- Public Transportation Management: transit vehicle tracking, in-route transit information, demand-responsive transit, public travel security, and passenger and fare management.

  RATINGS:

  + Alternative reflects or facilitates implementation of ITS strategies
  0 Alternative neither facilitates nor hinders implementation of ITS strategies
  - Alternative hinders implementation of ITS strategies

8.7.2 Detailed Evaluation

No Build Alternative

Because the No Build alternative involves no improvements to the SH 225 Corridor, the alternative neither facilitates nor hinders implementation of TDM, TSM, or ITS strategies. As a result, the No Build alternative received a neutral rating in all categories defined for maximizing existing infrastructure.

No Build with Committed Projects

The No Build with Committed Projects alternative neither facilitates nor hinders implementation of TDM strategies. Therefore, this alternative received a neutral rating for TDM strategies.

Because the No Build with Committed Projects alternative does include the CTMS system, this alternative would facilitate the implementation of both TSM and ITS strategies. For the TSM and ITS categories the No Build with Committed Projects alternative received positive ratings.

Widen Freeway by One General Purpose Lane in each Direction

Because the Widen Freeway alternative adds only general purpose capacity, it would neither facilitate nor hinder implementation of TDM, TSM, or ITS strategies. As such this build alternative received neutral ratings for all of these strategies.

HOV/HOT Lanes

One purpose of the HOV/HOT Lanes alternative is to encourage higher occupancy vehicles. Another purpose of this build alternative is to implement congestion pricing strategies. This alternative clearly supports alternative modes and pricing strategies. The HOV/HOT Lanes alternative received a positive rating for TDM strategies.

This build alternative does not include specific TSM improvements. Therefore it neither facilitates nor hinders implementation of TSM strategies. The HOV/HOT Lanes alternative received a neutral rating for TSM strategies.

The HOV/HOT Lanes alternative does include an improved communication system necessary for managing and operating the special use lanes and an electronic toll payment system. These features are the implementation of ITS strategies. The HOV/HOT Lanes alternative received a positive rating for ITS strategies.

Interchange/Ramp Improvements

Because the Interchange/Ramp Improvements alternative adds only improves ramp and interchange capacity, it would neither facilitate nor hinder implementation of TDM or ITS strategies. As such this build alternative received neutral ratings for these two strategies.

The Interchange/Ramp Improvements alternative involves freeway system improvements such as auxiliary lanes, ramp closures, re-striping to add lanes and improve weave/merge areas in addition to major interchange reconfigurations. This build alternative reflects or facilitates implementation of TSM strategies and as such received a positive rating for TSM strategies.

The Interchange/Ramp Improvements alternative neither facilitates nor hinders implementation of ITS strategies. Therefore this alternative received a neutral rating for ITS strategies.

Segregated Truck Lanes

Because the Segregated Truck Lanes alternative adds capacity for trucks only, it would neither facilitate nor hinder implementation of TDM, TSM, or ITS strategies. As such this build alternative received neutral ratings for all of these strategies.

Convert to Toll Road

The primary purpose of the Convert to Toll Road alternative is to implement congestion pricing strategies. This alternative clearly supports pricing strategies. The Convert to Toll Road alternative received a positive rating for TDM strategies.

This build alternative does not include specific TSM improvements. Therefore it neither facilitates nor hinders implementation of TSM strategies. The Convert to Toll Road alternative received a neutral rating for TSM strategies.

The Convert to Toll Road alternative does include an improved communication system necessary for managing and operating the toll facility and an electronic toll payment

system. These features are the implementation of ITS strategies. The Convert to Toll Road alternative received a positive rating for ITS strategies.

Commuter Rail

One purpose of the Commuter Rail alternative is to encourage transit use and provide an alternative to single occupancy vehicles. As such this build alternative reflects or facilitates implementation of TDM strategies and received a positive rating for this category.

Because the Commuter Rail alternative adds transit capacity to the SH 225 Corridor, it would neither facilitate nor hinder implementation of TDM or ITS strategies. As such this build alternative received neutral ratings for these two strategies.

8.8 DETAILED SCREENING MATRIX

Table 8-2 provides a summary of the evaluation process. The Interchange/Ramp Improvements alternative received the best ranking of all the short list build alternatives. The HOV/HOT Lanes and No Build with Committed Projects alternatives received the second highest ranking followed by the Widen Freeway and Segregated Truck Lanes alternatives receiving the third highest ranking. The No Build and Convert to Toll Road alternatives received the next to lowest ranking. The Commuter Rail alternative received the lowest ranking.

Table 8-2: Detailed Evaluation Matrix for Viable Alternatives

Criteria	Improve Traffic Safety				Improve Mobility			Conceptual Costs			Benefit /Cost Ratio	Improve Emergency Evacuation Route		Protect Natural & Social Environment			Maximize Existing Infrastructure			Ranking
Alternative	Traveler Information	Consistency with Design Standards	Conflicts with Trucks	Ramp/ Frontage Road Accessibility	Current Travel Demand	Relieves Current Choke Points	Future Travel Demand	Capital Costs	Operating & Maintenance Costs	Constructability	User Benefits/ Conceptual Costs	Provides Evacuation Route	Communication for Emergency Travel	Air Quality	Economic Vitality	Impacts on Environment	TDM Strategies	TSM Strategies	ITS Strategies	
No Build	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**+**	**+**	**N/A**	**-**	**0**	**0**	**-**	**0**	**-**	**0**	**0**	**0**	**6**
No Build with Committed Projects	**+**	**-**	**-**	**-**	**0**	**-**	**-**	**+**	**+**	**+**	**-**	**0**	**+**	**-**	**0**	**-**	**0**	**+**	**+**	**2**
Widen Freeway (One Lane Each Direction)	**0**	**+**	**0**	**-**	**+**	**-**	**0**	**-**	**+**	**0**	**0**	**+**	**0**	**-**	**-**	**-**	**0**	**0**	**0**	**4**
Add HOV/HOT Lanes	**+**	**+**	**0**	**-**	**0**	**-**	**0**	**0**	**-**	**-**	**0**	**+**	**+**	**-**	**-**	**-**	**+**	**0**	**+**	**2**
Interchange/Ramp Improvements	**0**	**+**	**0**	**-**	**0**	**+**	**0**	**0**	**+**	**+**	**0**	**+**	**0**	**-**	**-**	**-**	**0**	**+**	**0**	**1**
Segregated Truck Lanes	**0**	**0**	**+**	**-**	**0**	**-**	**0**	**0**	**+**	**0**	**0**	**+**	**0**	**-**	**-**	**-**	**0**	**0**	**0**	**4**
Convert to Toll Road	**+**	**-**	**-**	**-**	**0**	**-**	**0**	**-**	**-**	**-**	**-**	**0**	**+**	**-**	**0**	**-**	**+**	**0**	**+**	**6**
Commuter Rail	**0**	**-**	**-**	**-**	**0**	**-**	**0**	**-**	**0**	**-**	**-**	**+**	**0**	**-**	**0**	**-**	**+**	**0**	**0**	**8**

9.0 RECOMMENTED ALTERNATIVE(S)

A summary of the evaluation process may be found in Chapter 8. The Interchange/Ramp Improvements alternative received the highest ranking of all the short list build alternatives. The HOV/HOT Lanes alternative was a close second to the Interchange/Ramp Improvements alternative. The HOV/HOT Lanes alternative, however, has a significant issue with constructability east of Beltway 8. Specifically, this alternative may be require right-of-way in Deer Park adjacent to the Union Pacific Railroad. The railroad is an extremely busy freight rail line, and acquiring the needed right-of-way for the HOV/HOT Lanes alternative could prove difficult if not impossible. The Widen Freeway and Segregated Truck Lanes alternatives performed reasonably well and were ranked just below the HOV/HOT Lanes alternative.

Based on the detailed evaluation process, the recommended alternative is the Interchange/Ramp Improvements alternative. Because the No Build with Committed Projects alternative will be implemented over the next twenty years, the combination of it and the recommended alternative will provide considerable mobility, safety, and traffic operations benefits for the users of the SH 225 travel corridor.

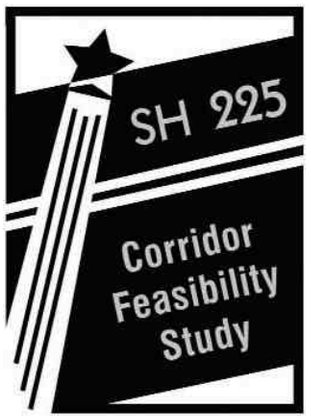
Because traffic volumes are expected to increase beyond the twenty year planning horizon, long range (beyond 2025) considerations for the SH 225 Corridor should include further examination of the Widen Freeway by One Lane in Each Direction between IH 610 and Beltway 8 or the Segregated Truck Lanes alternative. In addition, a HOT/Managed Lane alternative between IH 610 and Beltway 8 should be considered.

Appendix A: Public Involvement Materials

SH 225 Public Meeting

December 4, 2003

PUBLIC MEETINGS



Texas Department of Transportation (TxDOT) is conducting a major corridor feasibility study of SH 225 from IH 610 to SH 146. This is the first round in a series of public meetings, all of which will be conducted in open house format. The purpose of these initial meetings is to present a study overview to the public and obtain their input to assist in future planning. TxDOT and consultant team members will be available for questions and comments. For your convenience, there will be two meeting sessions.

DECEMBER 4

PASADENA CONVENTION CENTER
7902 FAIRMONT PARKWAY
PASADENA, TX 77507
2-4 p.m. & 6-8 p.m.

The meetings are being held in a handicap accessible location and will be conducted in English. Persons with special communication or physical accommodation needs should contact TxDOT's public affairs office at 713/802-5072 at least 48 hours prior to the meetings. Reasonable accommodations will be made to meet these needs. Written comments may be mailed to Mr. Pat Henry, P.E., Director of Project Development, TxDOT, P.O. Box 1386, Houston, Texas 77251-1386.

WE NEED YOUR INPUT

Your attendance is encouraged at this first round of public meetings for the project. TxDOT and consultant team members will be available for questions and comments during these open house sessions. For your convenience, two sessions are being held.

Thursday, December 4, 2003
2-4 p.m. & 6-8 p.m.
Pasadena Convention Center
7902 Fairmont Parkway
Pasadena, TX 77507

The meetings are being held in a handicap accessible location and will be conducted in English. Persons with special communication or physical accommodation needs should contact TxDOT's public affairs office at 713/802-5072 at least 48 hours prior to the meetings. Reasonable accommodations will be made to meet these needs.

Written comments may be submitted via mail to Mr. Pat Henry, P.E., Director of Project Development, TxDOT, P.O. Box 1386, Houston, Texas 77251-1386.

NECESITAMOS SU APORTACIÓN

Animamos su asistencia en esta primera ronda de reuniones públicas para el proyecto. El TxDOT y los miembros del equipo de asesores estarán disponibles para preguntas y comentarios durante estas sesiones de reuniones públicas. Para su conveniencia, habrá dos sesiones.

jueves, 4 de diciembre de 2003
2-4 p.m. & 6-8 p.m.
Pasadena Convention Center
7902 Fairmont Parkway
Pasadena, TX 77507

Se celebrarán reuniones en un sitio accesible para las personas minusválidas y serán conducidas en inglés. Las personas con necesidades especiales físicas o de comunicación deben comunicarse con la oficina de asuntos públicos de TxDOT al 713/802-5072 al menos 48 horas antes de las reuniones. Se harán adaptaciones razonables para satisfacer estas necesidades. Se pueden presentar comentarios por escrito por correo al Director de desarrollo del proyecto: Sr. Pat Henry, P.E., Director of Project Development, TxDOT, P.O. Box 1386, Houston, Texas 77251-1386.

Texas Department of Transportation
c/o The Lentz Group
2600 Citadel Plaza Drive, Suite 115
Houston, Texas 77008

SH 225 Corridor Feasibility Study

Corridor News

Issue 1, Fall 2003 | **Edición 1, Otoño 2003**

In this Issue:

The Houston District of the Texas Department of Transportation (TxDOT) is conducting a Major Corridor Feasibility Study for an approximate 15-mile segment of SH 225, located in Harris County, from IH 610 to SH 146. Cities and communities along the corridor include Houston, Pasadena, Deer Park and La Porte. The study is expected to conclude in August 2004.

STUDY PURPOSE AND PROCESS

The purpose of the study is to evaluate the current capacity of the existing corridor and identify possible ways that mobility and safety along the corridor can be improved. The study consists of three major phases: **Phase 1 –** Gather data and identify needs; **Phase 2 –** Identify and evaluate transportation alternatives; and **Phase 3 –** Select a recommended alternative.
During each phase, the study team will hold public meetings to involve the public in the decision-making process.

...identify possible ways that mobility and safety along the corridor can be improved.

During the initial phase, the study team will gather and examine all data pertaining to the corridor, including traffic numbers, population and growth forecasts and environmental constraints, to determine the needs of the corridor and set goals and objectives for the study.

WHO IS PERFORMING THE STUDY?

TxDOT-Houston District has contracted a team of professional engineering, environmental, and public involvement :consultants to perform the study. Team members include:
Carter & Burgess – Prime consultant
Lei Yu & Associates – Travel demand forecasting
Quadrant Consultants, Inc. – Environmental data and analysis

(continued on page 2)

El Distrito de Houston del Departamento de Transporte de Texas (TxDOT) lleva a cabo un Estudio de viabilidad de eje de tráfico principal para un segmento aproximado de 15 millas de la carretera SH 225, localizado en el Condado de Harris, de IH 610 a SH 146. Las ciudades y las comunidades a lo largo del eje de tráfico incluyen Houston, Pasadena, Deer Park y La Porte. Se espera que el estudio concluya en agosto de 2004.

OBJETIVO Y PROCESO DEL ESTUDIO

El objetivo del estudio es de evaluar la capacidad actual del eje de tráfico existente e identificar las maneras posibles que se puedan mejorar la movilidad y la seguridad a lo largo del eje de tráfico. El estudio consiste en tres fases principales: Fase 1 – Reunir datos e identificar necesidades; Fase 2 – Identificar y evaluar alternativas de transporte; y Fase 3 – Seleccionar una alternativa recomendada. Durante cada fase, el equipo de estudio celebrará reuniones públicas para incluir al público en el proceso de la toma de decisiones.

Durante la fase inicial, el equipo de estudio reunirá y examinará todos los datos que se refieren al eje de tráfico, incluso números de tráfico, pronósticos de población y crecimiento y limitaciones ambientales, para determinar las necesidades del eje de tráfico y establecer los objetivos y metas para el estudio.

¿QUIÉN REALIZA EL ESTUDIO?

El Distrito de Houston de TxDOT ha contratado un equipo de asesores profesionales de ingeniería, de ingeniería ambiental y de participación pública para realizar el estudio. Los miembros del equipo incluyen:
Carter & Burgess – Asesor principal
Lei Yu & Associates – Pronóstico de demanda de viajes
Quadrant Consultants, Inc. – Datos y análisis ambientales
Knudson & Associates – Datos demográficos y evaluación del eje de tráfico
H & H Resources – Hidrología
Texas Southern University – Análisis de alternativas
The Lentz Group – Participación pública

(continuada en pájina 3)

Knudson & Associates – Demographic data and corridor evaluation
H & H Resources – Hydrology
Texas Southern University – Alternatives analysis
The Lentz Group – Public involvement

OFFICIAL INVOLVEMENT

To aid in the decision-making process, TxDOT has established a Steering Committee. The committee will meet periodically throughout the process to provide coordination among the agencies, assess the study's progress and provide oversight of the major activities associated with the study. Committee members include representatives from TxDOT, Houston-Galveston Area Council, Federal Highway Administration, Federal Transportation Agency, Texas Commission on Environmental Quality, Harris County Flood Control District, Port of Houston Authority, Harris County and cities along the corridor (Houston, Pasadena, Deer Park and La Porte).

Regular, ongoing communication with members of the community is an essential part of the study process.

PUBLIC PARTICIPATION IS KEY

Regular, ongoing communication with members of the community is an essential part of the study process. The comprehensive public involvement plan includes:

Public Meetings – A series of three rounds of meetings, all conducted in workshop format, will be held to update you on the study's progress and provide a forum for your comments and concerns. Attendees can engage in informal discussions with TxDOT staff and consultant team members, view project information and provide valuable feedback for the study. The public meetings are anticipated to be held as follows:

December 4, 2003. Topic: Study Purpose, Process and Objectives (See back panel for details)
Spring 2004. Topic: Preliminary Alternatives
Summer 2004. Topic: Recommended Alternative

Newsletters – Three newsletters will be mailed during the course of the study to update you on the project and provide notification for upcoming public meetings. The final newsletter will contain a summary of the study's results.

Written Comments – Written comments are welcome and encouraged at any time during the study. You may submit comments at public meetings or via mail to: Mr. Pat Henry, P.E., Director of Project Development, TxDOT, P.O. Box 1386, Houston, Texas 77251-1386.

TxDOT Website – At www.dot.state.tx.us, look for SH 225 under Transportation Studies to view the latest newsletter and get up-to-date information on public meeting schedules and locations.

PARTICIPACIÓN OFICIAL

Para ayudar en el proceso de la toma de decisiones, el TxDOT ha establecido un Comité de Dirección. El comité se reunirá periódicamente durante todas partes del proceso para proporcionar la coordinación entre las agencias, evaluar el progreso del estudio y proporcionar supervisión de las actividades principales asociadas con el estudio. Los miembros del comité incluyen a representantes de TxDOT, Consejo del área de Houston y Galveston, METRO, Administración Federal de carreteras, Agencia federal de transporte, Comisión de Texas sobre la calidad ambiental, Distrito de prevención de inundaciones del Condado de Harris, el Puerto de Autoridades de Houston, el Condado de Harris y ciudades a lo largo del eje de tráfico (Houston, Pasadena, Deer Park y La Porte).

LA PARTICIPACIÓN PÚBLICA ES FUNDAMENTAL

La comunicación regular, en curso con los miembros de la comunidad es una parte esencial del proceso de estudio. El plan completo la de participación pública incluye:

Reuniones públicas – se celebrará una serie de tres rondas de reuniones, todas llevadas a cabo en el formato de taller, para actualizarle sobre el progreso del estudio y proporcionarle un foro para sus comentarios y preocupaciones. Los asistentes pueden participar en
discusiones informales con el personal de TxDOT y los miembros del equipo de asesores, examinar la información del proyecto y proporciona retro-información valiosa para el estudio. Se espera que las reuniones públicas, sean celebradas como sigue:

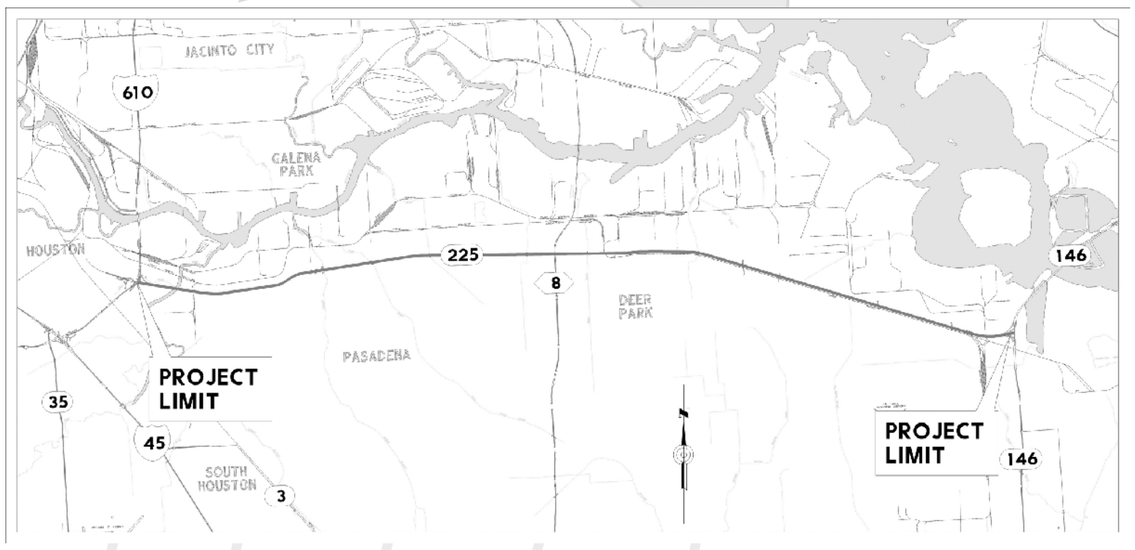
4 de diciembre de 2003. Tema: Objetivo, proceso y metas del estudio (Véase el panel dorso para mayor detalle)
Primavera de 2004. Tema: Alternativas preliminares
Verano de 2004. Tema: Alternativa recomendada

La comunicación regular, en curso con los miembros de la comunidad es una parte esencial del proceso de estudio.

Boletines de noticias – Se enviarán tres boletines de noticias durante el curso del estudio para actualizarle sobre el proyecto y proporcionarle notificación para las próximas reuniones públicas. El boletín de noticias final contendrá un resumen de los resultados del estudio.

Comentarios escritos – Los comentarios escritos se reciben con agrado y le animamos enviarlos en cualquier momento durante el estudio. Usted puede presentar sus comentarios en las reuniones públicas o por correo al Director de desarrollo del proyecto: Sr. Pat Henry, P.E., Director of Project Development, TxDOT, P.O. Box 1386, Houston, Texas 77251-1386.

El Sitio Web de TxDOT – En www.dot.state.tx.us, busque SH 225 bajo Estudios de transporte para ver el último boletín de noticias y conseguir la información actualizada sobre los. programas y sitios de las reuniones públicas.



SH 225 Corridor Feasibility Study

SIGN IN SHEET

Name & Organization	Address	City & Zip	Phone Numbers (direct & fax)	Email Address
City of DEER PARK	P.O. Box 700	DEER PARK 77536	281-478-7293	SBECKHAM@DEERPARKTX.ORG
CINDI HARRISON STATE REP ROBERT TALTON	3622 FAIRMONT PASA 77504		281.487.8818	
SANDRA LEWIS SENATOR MIKE JACKSON	1002 FAIRMONT PASADENA, TX 77504		713 941-8111	
City of Pasadena	901 Curtis Pasadena, TX 77502		713-475-5543	tvazquez@ci.pasadena.tx.us

Public Meeting December 4, 2003, 2-4 p.m.

SH 225 Corridor Feasibility Study

SIGN IN SHEET

Name & Organization	Address	City & Zip	Phone Numbers (direct & fax)	Email Address
T. J. JACOBS City of LA PORTE	2963 N. 23rd LA PORTE TX 77571		281-471-9650	
JEFF KAUFMAN H-GAC	PO BOX 22777 HOUSTON 77227-2777		832-681-2533	JEFF.KAUFMAN@H-GAC.com
TIM TIETJENS CITY OF PASADENA	PO BOX 672 PASADENA TX 77501		713 475 5543	TTIETJENS@CI.PASADENA.TX.US

Public Meeting December 4, 2003, 2-4 p.m.

SH 225 Corridor Feasibility Study

SIGN IN SHEET

Name & Organization	Address	City & Zip	Phone Numbers (direct & fax)	Email Address
JOE E REYNA	11811 I 10 EAST.			
CONG. GENE GREEN	SUITE 430	H. T. 77029	713 330 0761	
Capt Earl Starnes	POB 700		" " 0807	
Deer Park LEPC / DPPD	Deer Park, TX 77536	Deer Park TX 77536	281-478-2010	

Public Meeting December 4, 2003, 2-4 p.m.

SIGN IN SHEET

Name & Organization	Address	City & Zip	Phone Numbers (direct & fax)	Email Address
Cecil Ghormley / SDF	2907 Bunker Ct	Pas 77502	713-944-8803 FAX 713-944-0746	cghor24528@aol.com

Public Meeting December 4, 2003, 6-8 p.m.

SIGN IN SHEET

Name & Organization	Address	City & Zip	Phone Numbers (direct & fax)	Email Address
RHONDA BLAND	2601 REPSDORPH RD	SEABROOK 77586	281-471-4022	rbland@hcpl.net

Public Meeting December 4, 2003, 6-8 p.m.

SIGN IN SHEET

Name & Organization	Address	City & Zip	Phone Numbers (direct & fax)	Email Address
BILL HARRY	3918 PANAMA	PASADENA 77504	713-941-4344 713-941-4346 (FAX)	CHARRY2198@AOL.COM
Marc Stanley	P.O. Box 4261	Pasadena 77502	713-854-8441	marcs@ventech-eng.com
Nancy Edmonson	601 Shoreacres Blvd	Shoreacres 77571	281-471-8955 (fax) 281-471-2244	mayor@cityofshoreacres.com

Public Meeting December 4, 2003, 6-8 p.m.

Questionnaire & Comment Form

Public Meeting, December 4, 2003

Texas Department of Transportation (TxDOT) and the consultant team are interested in your concerns and suggestions regarding this project. Comments received by **Friday, December 19** will be included in the public record for this meeting. You may drop your form in the comment box or fold and mail this form to the address on the reverse side.

How often do you travel the SH 225 Corridor? (check all that apply)

- ☐ Daily
- ☒ 2-3 days a week
- ☐ 4-5 days a week
- ☐ Weekends only

When do you typically travel the SH 225 Corridor? (check all that apply)

- ☒ AM peak period (6:00 a.m. to 9:00 a.m.)
- ☐ PM peak period (4:00 p.m. to 7:00 p.m.)
- ☒ Non-rush hour
- ☐ Weekend

What is the purpose of your trips? (check all that apply)

- ☐ Commuting to and from work
- ☒ Performing work related activities
- ☐ Shopping, recreational, school activities
- ☐ Other (specify)_____

What types of improvements do you believe would be the most beneficial for SH 225? (check those you prefer or add your own)

- ☐ Additional lanes
- ☒ Designated truck lane
- ☒ High Occupancy Vehicle (HOV) lane
- ☐ Passenger train service
- ☐ Bus or vanpool service
- ☐ Congestion Management Strategies (Park & Ride lots, compressed work week, staggered work hours, telecommuting, etc.)
- ☐ Other (specify)_____

What are the biggest transportation problems in the SH 225 Corridor and where are they the worst?

- ☒ Traffic congestion at peak commute hours_____
- ☐ Traffic congestion in off-peak hours_____
- ☐ Accidents/Safety_____
- ☐ Poor access_____
- ☐ Roadway maintenance_____
- ☐ Other _____

Please use space below for additional comments:

Additional comments:

How did you hear about this public meeting?

- ☐ Advertisement, where? _____
- ☒ Newsletter
- ☐ TxDOT web site
- ☐ Another person
- ☐ Other _____

Please include your information if you'd like to be added to the project mailing list:

Name: Cecil Ghormley
Address: 2902 Burke Rd
City, Zip: Pasadena Tx 77502
Email: cghor24528@aol.com

fold here

Please place postage here.

Mr. Pat Henry, P.E.
Director of Project Development
Texas Department of Transportation
P.O. Box 1386
Houston, Texas 77251-1386

RE: SH 225 Corridor Feasibility Study

Questionnaire & Comment Form

Public Meeting, December 4, 2003

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- ☒ PM peak period (4:00 p.m. to 7:00 p.m.)
- ☒ Non-rush hour
- ☒ Weekend

What is the purpose of your trips? (check all that apply)

- ☐ Commuting to and from work
- ☒ Performing work related activities
- ☒ Shopping, recreational, school activities
- ☒ Other (specify) TRAVEL TO MEDICAL CENTER

What types of improvements do you believe would be the most beneficial for SH 225? (check those you prefer or add your own)

- ☐ Additional lanes
- ☐ Designated truck lane
- ☐ High Occupancy Vehicle (HOV) lane
- ☒ Passenger train service
- ☐ Bus or vanpool service
- ☐ Congestion Management Strategies (Park & Ride lots, compressed work week, staggered work hours, telecommuting, etc.)
- ☐ Other (specify)_____

What are the biggest transportation problems in the SH 225 Corridor and where are they the worst?

- ☒ Traffic congestion at peak commute hours EXIT TO SOUTH BOUND 610
- ☐ Traffic congestion in off-peak hours_____
- ☐ Accidents/Safety_____
- ☒ Poor access EXIT 610 ONTO SH 225
- ☐ Roadway maintenance_____
- ☐ Other_____

Please use space below for additional comments:

NOW WOULD BE THE TIME TO PROPOSE USE OF THE UNION PACIFIC R.R. RIGHT-OF-WAY TO ADD SOME TYPE OF RAIL SERVICE TO DOWN TOWN HOUSTON OR THE MEDICAL CENTER. THIS SERVICE COULD BE LIGHT RAIL OR MONO RAIL TYPE EQUIPMENT. THE CURRENT RAILS COULD BE USE OR OTHER EQUIPMENT ADDED TO THE RIGHT OF WAY AS A SECOND SERVICE.

Additional comments:

How did you hear about this public meeting?

- ☐ Advertisement, where? _____
- ☒ Newsletter
- ☐ TxDOT web site
- ☐ Another person
- ☐ Other _____

Please include your information if you'd like to be added to the project mailing list:

Name: JACK BECKHAM
Address: P.O. Box 703
City, Zip: DEER PARK, TX 77536
Email: _____

fold here

Please place postage here.

Mr. Pat Henry, P.E.
Director of Project Development
Texas Department of Transportation
P.O. Box 1386
Houston, Texas 77251-1386

RE: SH 225 Corridor Feasibility Study

Questionnaire & Comment Form

Public Meeting, December 4, 2003

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- ☐ Commuting to and from work
- ☑ Performing work related activities
- ☐ Shopping, recreational, school activities
- ☐ Other (specify)_____

What types of improvements do you believe would be the most beneficial for SH 225? (check those you prefer or add your own)

- ☐ Additional lanes
- ☑ Designated truck lane
- ☐ High Occupancy Vehicle (HOV) lane
- ☐ Passenger train service
- ☐ Bus or vanpool service
- ☐ Congestion Management Strategies (Park & Ride lots, compressed work week, staggered work hours, telecommuting, etc.)
- ☐ Other (specify)_____

What are the biggest transportation problems in the SH 225 Corridor and where are they the worst?

- ☐ Traffic congestion at peak commute hours_____
- ☐ Traffic congestion in off-peak hours_____
- ☑ Accidents/Safety Ramp Frontage @ E. Blvd's Battleground Rds.
- ☐ Poor access_____
- ☐ Roadway maintenance_____
- ☐ Other_____

Please use space below for additional comments:

Additional comments:

How did you hear about this public meeting?

- ☐ Advertisement, where? _____
- ☑ Newsletter
- ☐ TxDOT web site
- ☐ Another person
- ☐ Other _____

Please include your information if you'd like to be added to the project mailing list:

Name: C/o EARL STURROCK
Address: POBox # 700
City, Zip: Deer Park TX 77536
Email: esturrock@deerpark-tx.org

fold here

Please place postage here.

Mr. Pat Henry, P.E.
Director of Project Development
Texas Department of Transportation
P.O. Box 1386
Houston, Texas 77251-1386

RE: SH 225 Corridor Feasibility Study

Questionnaire & Comment Form

Public Meeting, December 4, 2003

Texas Department of Transportation (TxDOT) and the consultant team are interested in your concerns and suggestions regarding this project. Comments received by **Friday, December 19** will be included in the public record for this meeting. You may drop your form in the comment box or fold and mail this form to the address on the reverse side.

How often do you travel the SH 225 Corridor? (check all that apply)

- ☐ Daily
- ☑ 2-3 days a week
- ☐ 4-5 days a week
- ☐ Weekends only

When do you typically travel the SH 225 Corridor? (check all that apply)

- ☑ AM peak period (6:00 a.m. to 9:00 a.m.)
- ☑ PM peak period (4:00 p.m. to 7:00 p.m.)
- ☑ Non-rush hour
- ☑ Weekend

What is the purpose of your trips? (check all that apply)

- ☑ Commuting to and from work
- ☑ Performing work related activities
- ☐ Shopping, recreational, school activities
- ☐ Other (specify)_____

What types of improvements do you believe would be the most beneficial for SH 225? (check those you prefer or add your own)

- ☐ Additional lanes
- ☐ Designated truck lane
- ☑ High Occupancy Vehicle (HOV) lane
- ☐ Passenger train service
- ☑ Bus or vanpool service
- ☐ Congestion Management Strategies (Park & Ride lots, compressed work week, staggered work hours, telecommuting, etc.)
- ☐ Other (specify) interchange improvements alt route improvements (Lawndale)

What are the biggest transportation problems in the SH 225 Corridor and where are they the worst?

- ☑ Traffic congestion at peak commute hours_____
- ☐ Traffic congestion in off-peak hours_____
- ☑ Accidents/Safety_____
- ☐ Poor access_____
- ☐ Roadway maintenance_____
- ☐ Other_____

Please use space below for additional comments:

Truck volume creates safety problems

Choke point at Loop 610

Need for transit

More aesthetic improvements

Questionnaire & Comment Form

Public Meeting, December 4, 2003

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- ☒ Shopping, recreational, school activities
- ☐ Other (specify)_____

What types of improvements do you believe would be the most beneficial for SH 225? (check those you prefer or add your own)

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- ☒ Passenger train service
- ☐ Bus or vanpool service
- ☐ Congestion Management Strategies (Park & Ride lots, compressed work week, staggered work hours, telecommuting, etc.)
- ☐ Other (specify)_____

What are the biggest transportation problems in the SH 225 Corridor and where are they the worst?

- ☒ Traffic congestion at peak commute hours @ 610
- ☐ Traffic congestion in off-peak hours_____
- ☐ Accidents/Safety_____
- ☒ Poor access @ Beltway 8
- ☐ Roadway maintenance_____
- ☐ Other_____

Please use space below for additional comments:

Some entrance ramps dump vehicles right into traffic. This causes many accidents / slow traffic.

Study Area

6 Main Lanes | 8 Main Lanes | 6 Main Lanes

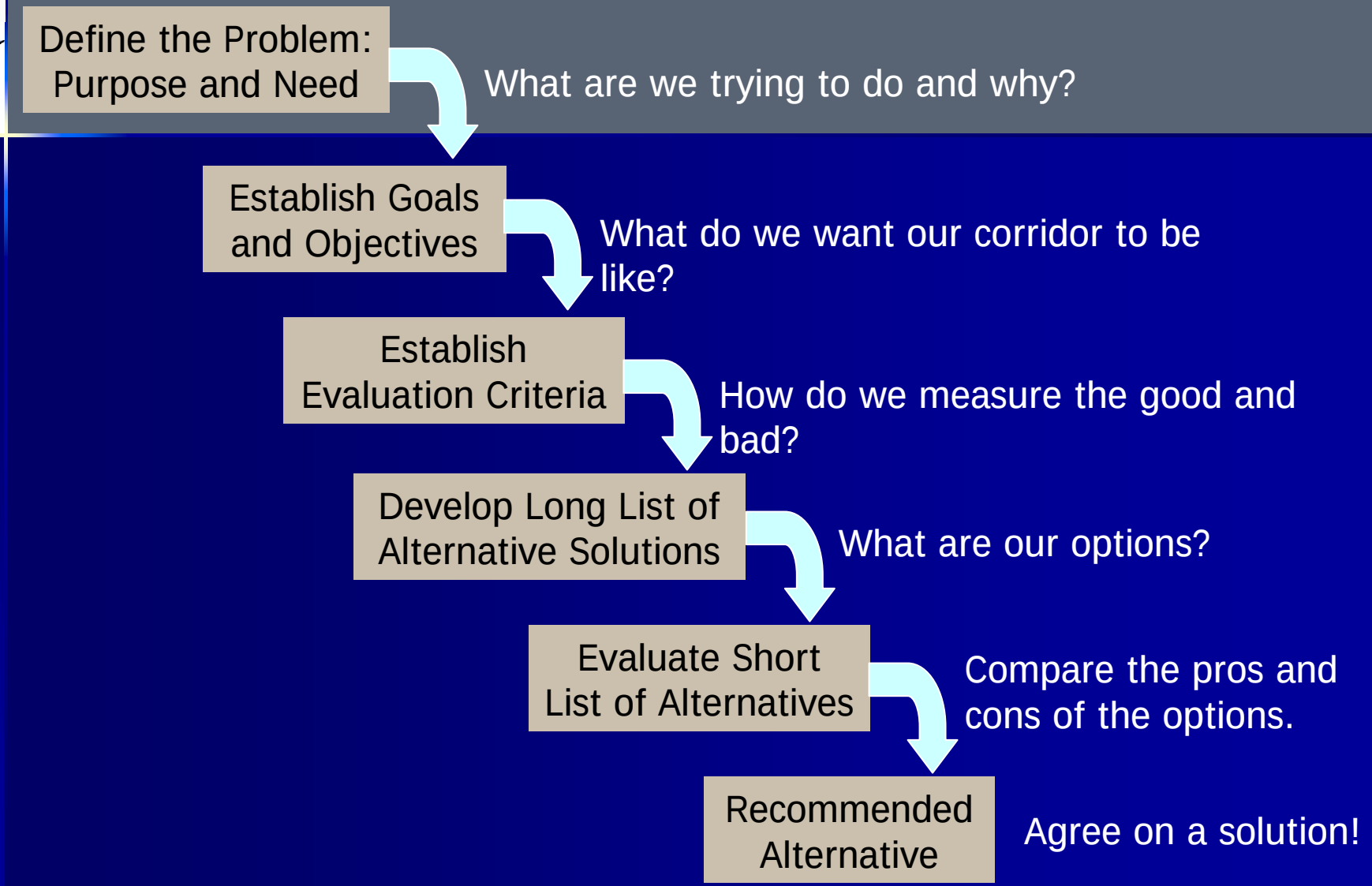
Carter Burgess

What is a Major Corridor Feasibility Study?

- A Major Corridor Feasibility Study answers critical questions about transportation options – design concept and scope

- It's a decision-making process designed to:
  - identify transportation needs for the corridor
  - evaluate alternative, multi-modal solutions
  - garner public confidence and support for a recommended alternative

Study Process



Potential Funding Sources for Major Corridor Improvements

- A Major Corridor improvement may be implemented using both traditional and innovative funding sources such as:
  - Federal funds from the Federal Highway Administration
  - State funds from the Texas Department of Transportation
  - Local funds from Toll Road Authority

Study Approach and Schedule

WE ARE HERE

Data Gathering and Evaluation of Existing Corridor

1st Round of Public Meetings

December 4, 2003

Pasadena Convention Center

2-4 pm & 6-8 pm

Fall/Winter 2003

Winter/Spring 2004

Develop Alternatives

2nd Round of Public Meetings

Analyze Short List of Alternatives

3rd Round of Public Meetings

Recommended Alternative

Summer/Fall 2004

Carter Burgess

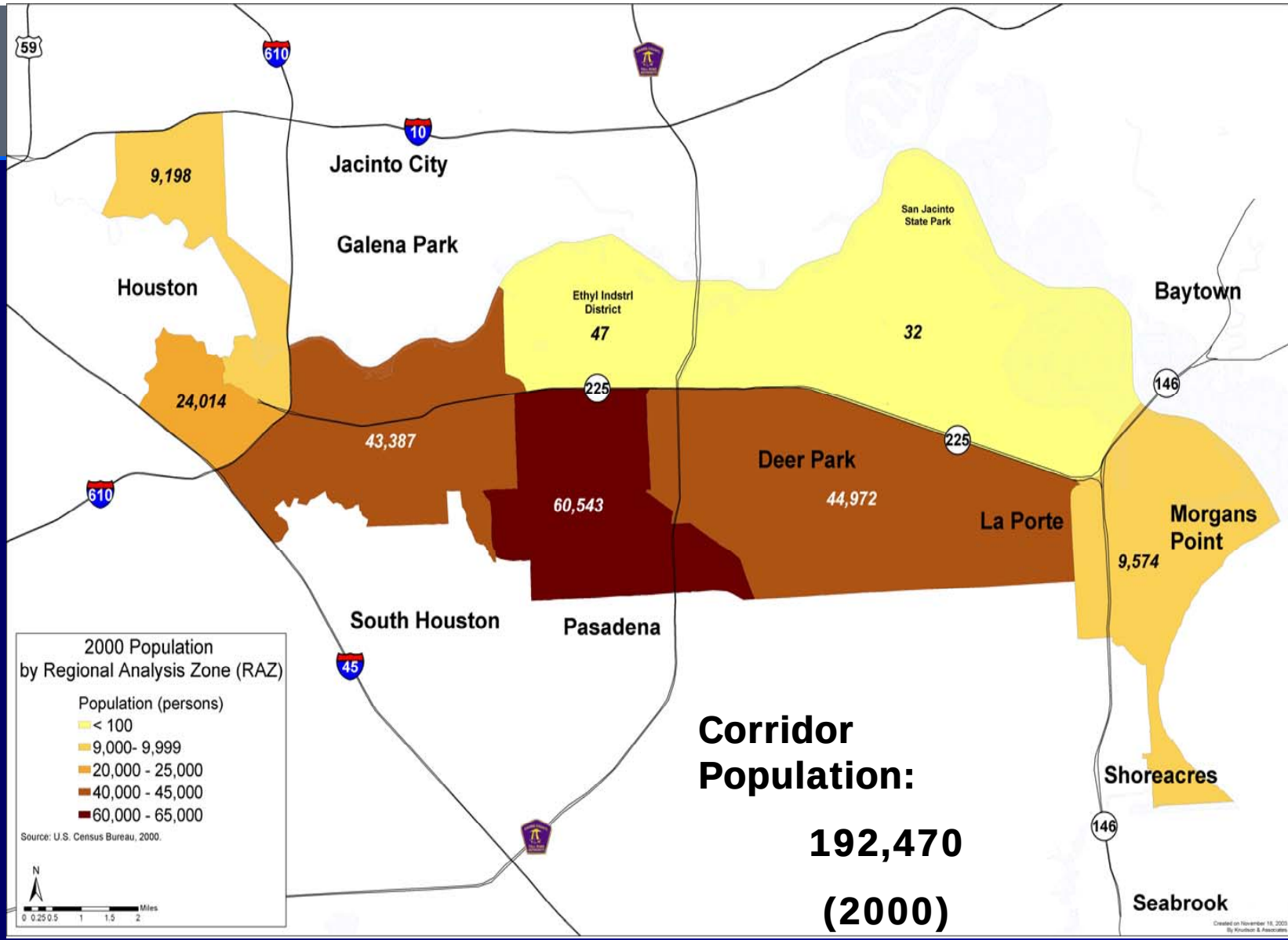
Steering Committee

- City of Deer Park
- City of Houston
- City of La Porte
- City of Pasadena
- Harris County
- Harris County Flood Control District
- Harris County Toll Road Authority
- Deer Park ISD
- Pasadena ISD
- Deer Park LEPC
- La Porte LEPC
- Pasadena LEPC
- Port of Houston

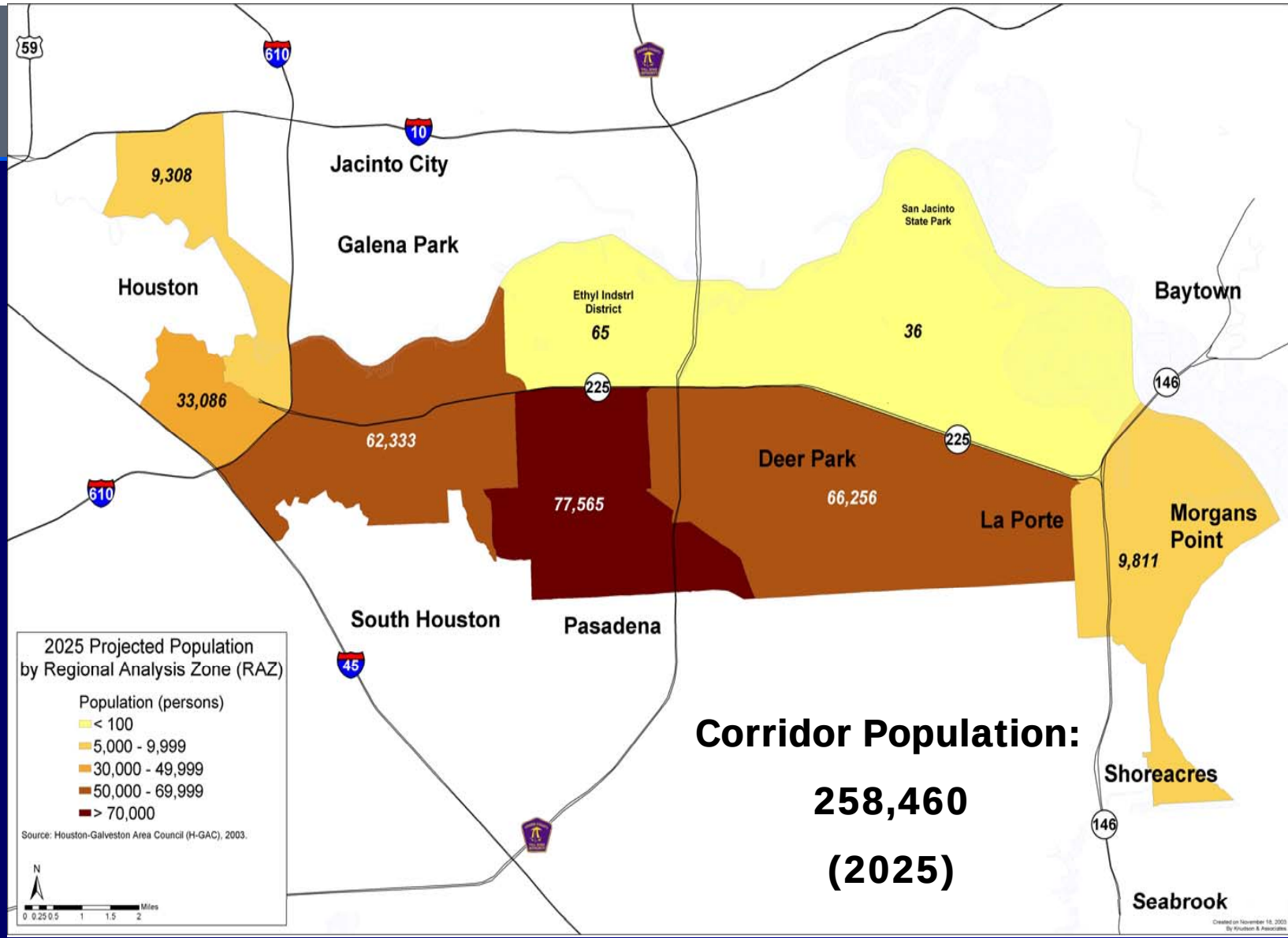
- Federal Highway Administration
- Federal Transit Administration
- Texas Department of Transportation
- METRO
- Houston-Galveston Area Council
- Port of Houston
- Texas Commission on Environmental Quality
- US Army Corps of Engineers
- Texas Office of Homeland Security

OTHERS?

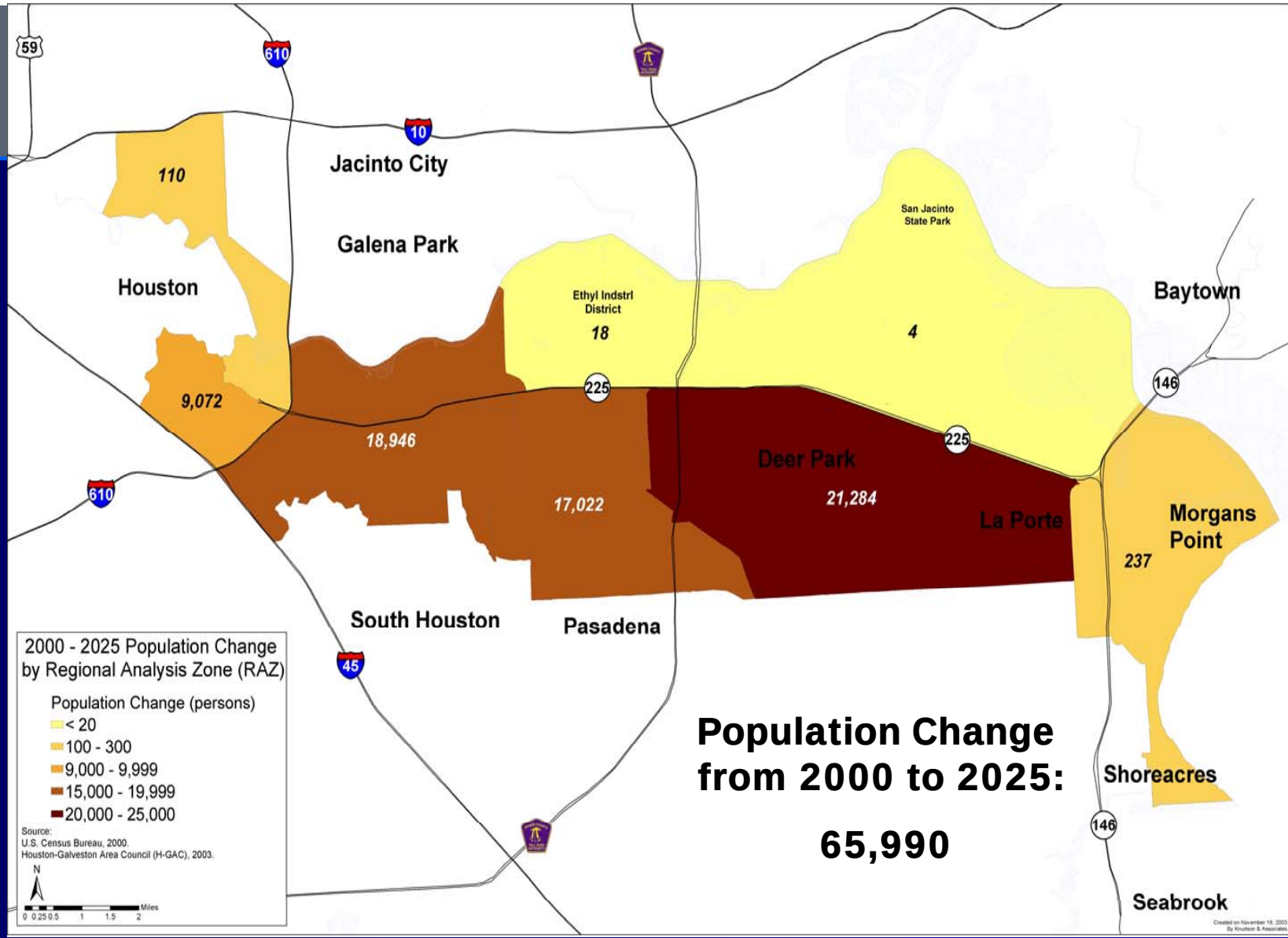
SH 225 Corridor Population (2000)



SH 225 Corridor Population (2025)



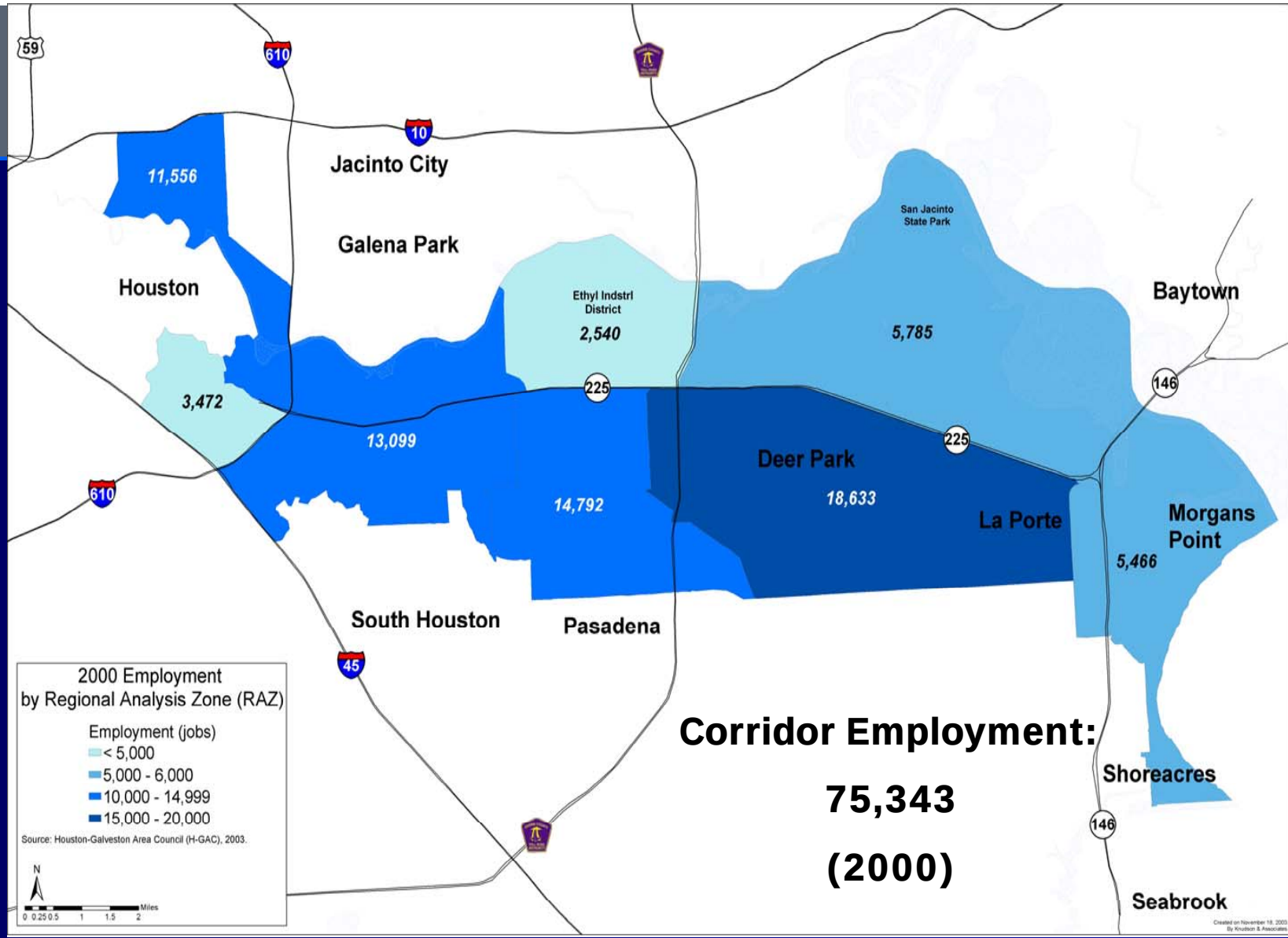
SH 225 Corridor Population Growth



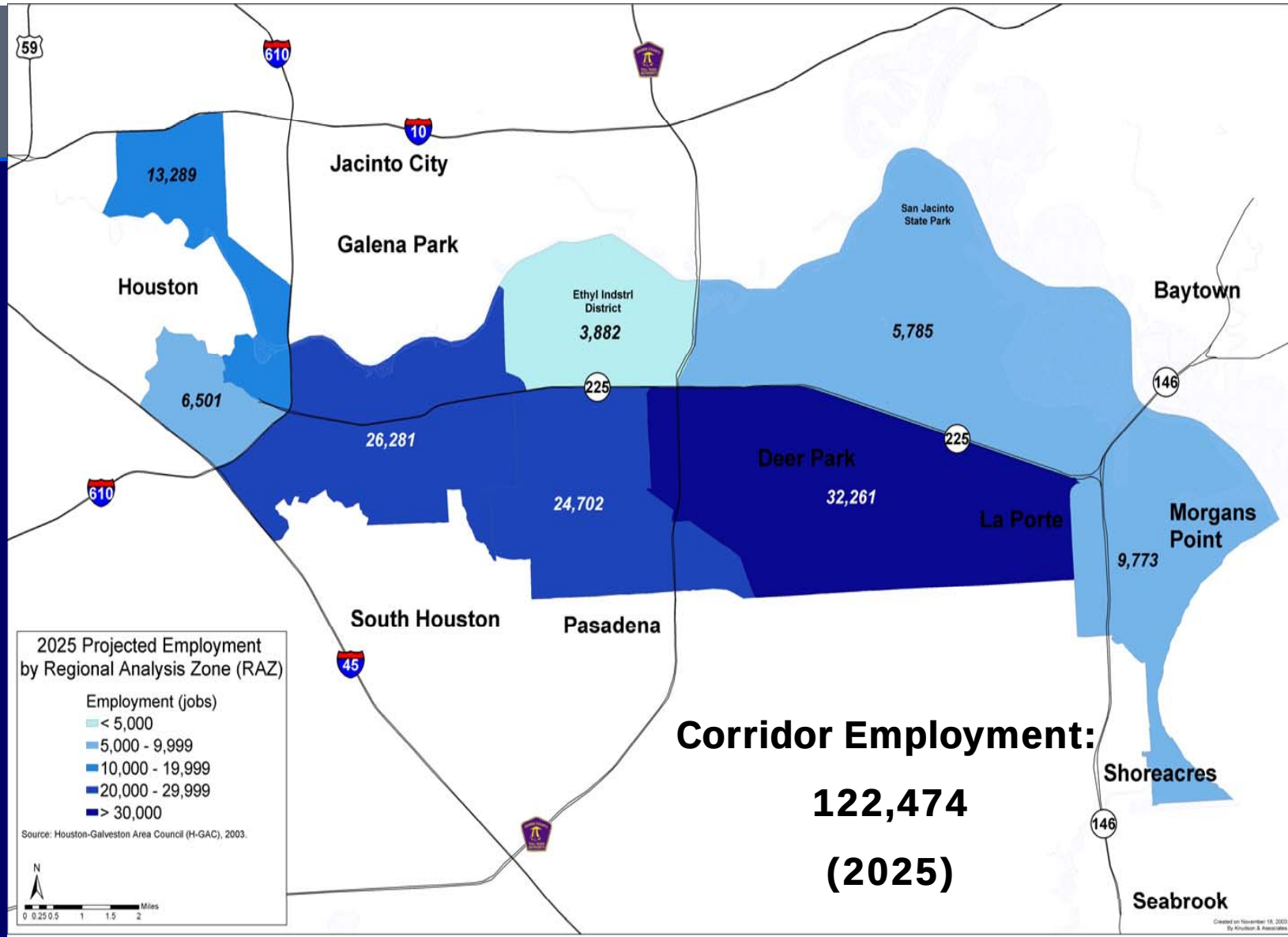
Population Change from 2000 to 2025:

65,990

SH 225 Corridor Employment (2000)

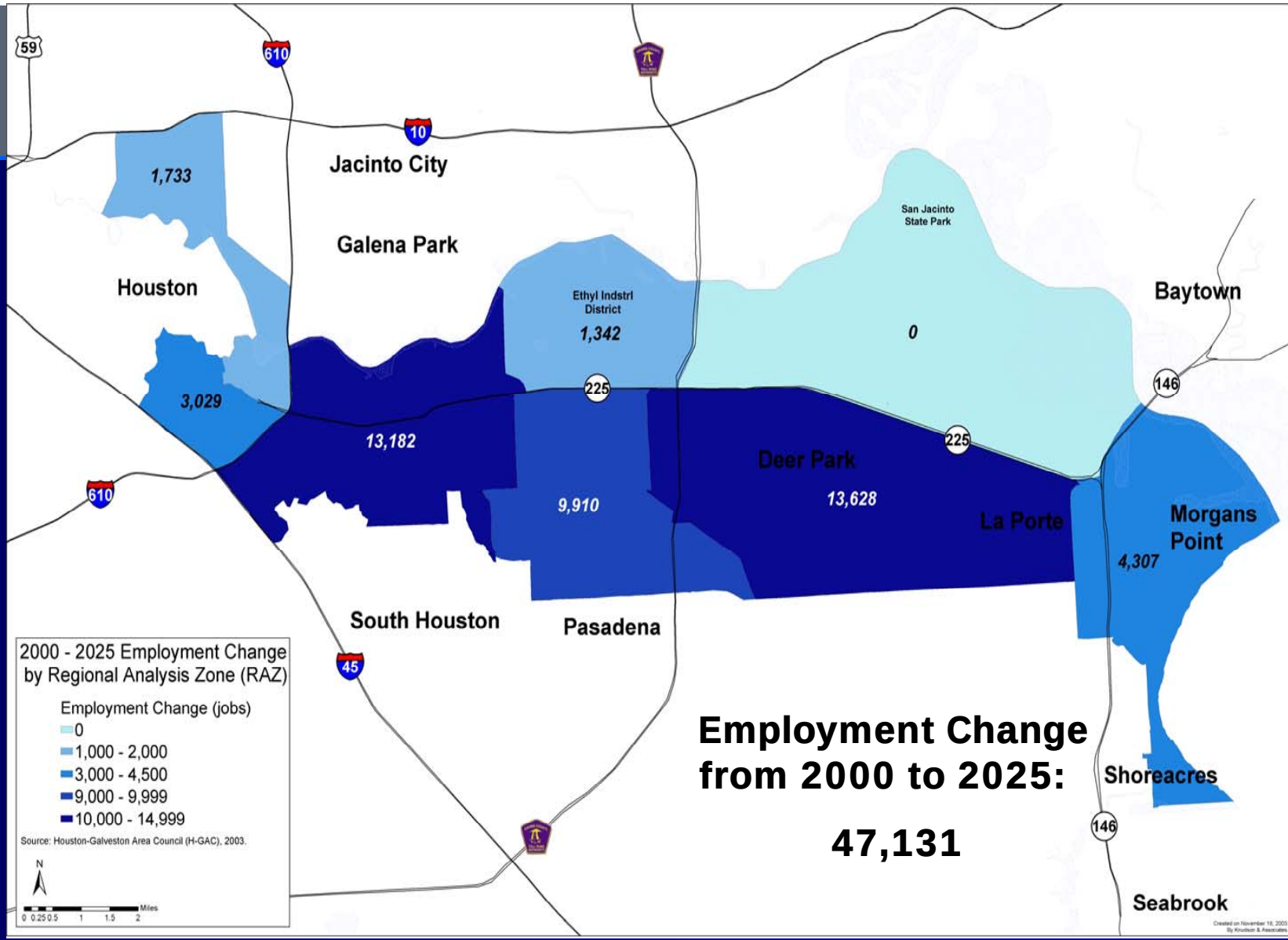


SH 225 Corridor Employment (2025)



Carter Burgess

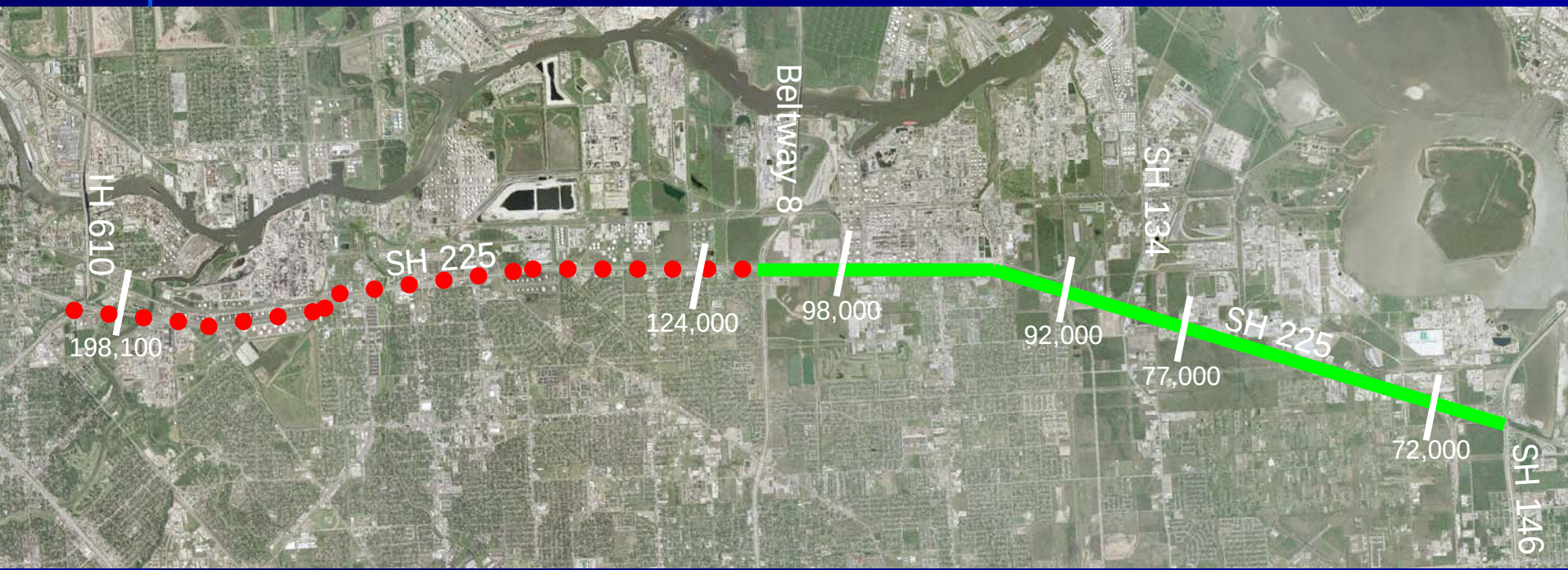
SH 225 Corridor Employment Growth



Employment Change from 2000 to 2025:

47,131

SH 225 Traffic Volumes (2002)



6 Main Lanes — 8 Main Lanes — 6 Main Lanes

Heavy Traffic

Low Traffic

SH 225 Traffic Volumes (2025)

SH 225 Traffic Summary

Location	2002 Traffic	2002 V/C	2025 Assignment*	2025 V/C
At IH 610	198,000	1.16	288,600	1.55
West of BW 8	124,000	1.03	184,100	1.10
East of BW 8	98,000	0.61	183,500	0.89
West of SH 134	92,000	0.58	158,300	0.80
East of SH 134	77,000	0.48	151,600	0.76
West of SH 146	75,000	0.63	124,500	1.15

* Preliminary traffic assignment with no improvements to SH 225

Carter Burgess

Traffic Comparisons

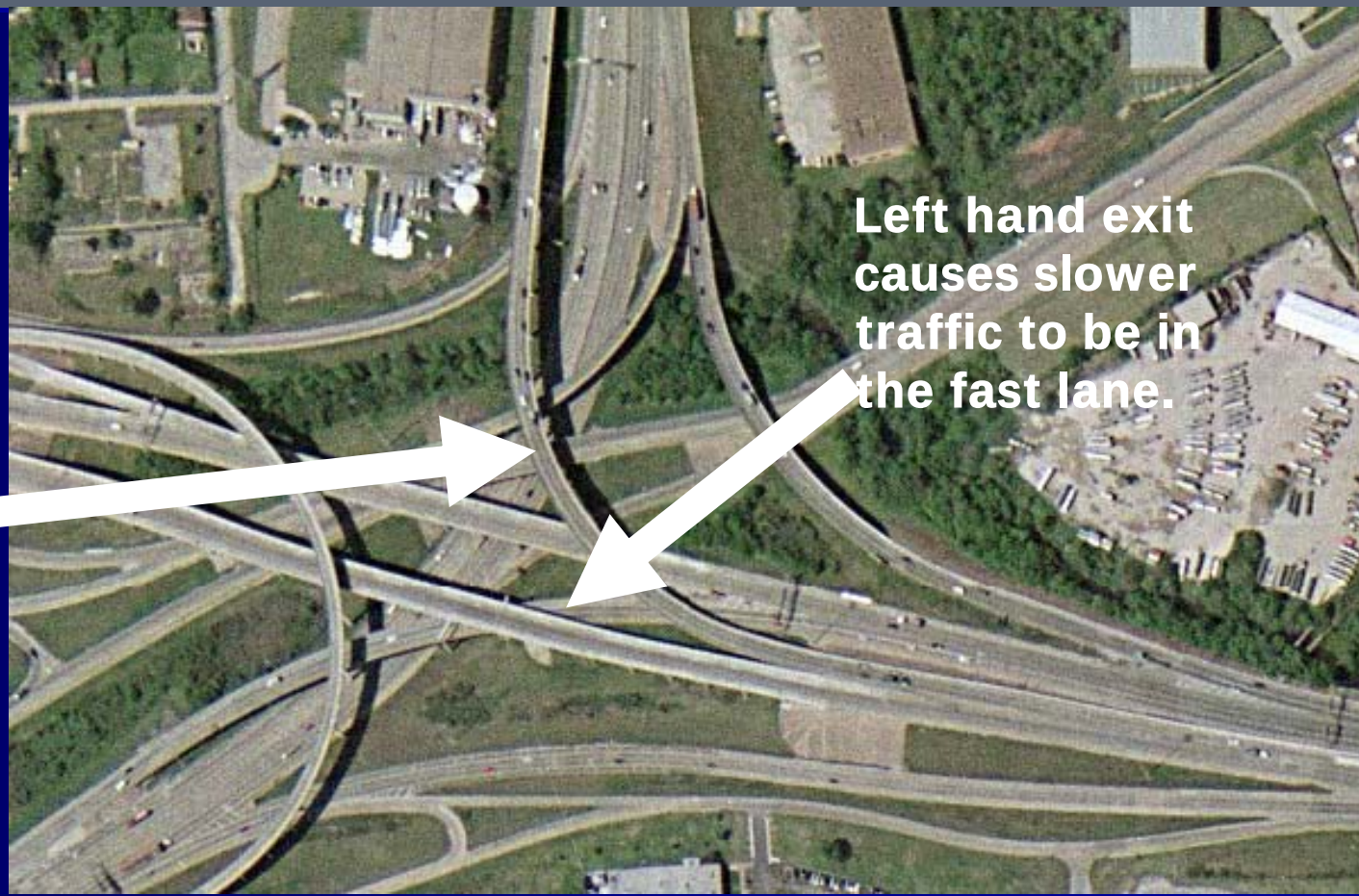
Location	Current Traffic	Number of Main Lanes
US 59 (Southwest Freeway)	337,000	14
IH 610 (West Loop)	288,000	8
IH 45 (North Freeway)	281,000	8
IH 45 (Gulf Freeway)	266,000	8
US 290 (Northwest Freeway)	245,000	8
IH 10 (Katy Freeway)	219,000	6
IH 10 (East Freeway)	206,000	6
IH 610 (North Loop)	199,000	8
SH 225 (La Porte Freeway)	198,100	6
US 59 (Eastex Freeway)	191,000	6
IH 610 (South Loop)	188,000	8
SH 288 (South Freeway)	161,000	8
IH 610 (East Loop)	133,000	8

Preliminary Corridor Issues & Concerns

- Can SH 225 be extended to the west?

Preliminary Corridor Issues & Concerns

- IH 610 interchange: left hand exits, truck safety, signage



Preliminary Corridor Issues & Concerns

SH 225 at Scarborough

- Overall mobility – now and in future

Preliminary Corridor Issues & Concerns

- Pipelines and railroads adjacent to right of way

Pipelines and railroads will make it difficult to widen the right of way.

SH 225 at Scarborough

SH 225 between East Blvd. & SH 134

Carter Burgess

Preliminary Corridor Issues & Concerns

- Potential parallel routes?

Small constricted section

Lawndale

Broad boulevard section

Preliminary Corridor Issues & Concerns

- Sensitivity to existing landscaping

SH 225 at Richey

SH 225 at SH 134

Carter Burgess

Preliminary Corridor Issues & Concerns

- Restricted right of way especially at western end of corridor

Preliminary Corridor Issues & Concerns

- Sensitive land uses along right of way: parks

Pasadena Historical Museum

Memorial Park

SH 225 at Vince Bayou

Preliminary Corridor Issues & Concerns

- Sensitive land uses along right of way: schools

SH 225 at Shaver

Carter Burgess

Preliminary Corridor Issues & Concerns

- Beltway 8 interchange: future direct connectors?

Will we need a complete, high speed interchange in the future between Beltway 8 and SH 225?

Carter Burgess

Preliminary Corridor Issues & Concerns

- Sufficient clearance for future widening

SH 225 at East Blvd.

Preliminary Corridor Issues & Concerns

- Truck traffic: potential need for dedicated truck facility

SH 225 at Richey

SH 225 at Sens

Summary Issues & Concerns

- Hurricane evacuation route
- Can SH 225 be extended to the west?
- IH 610 interchange – left-hand exits, truck safety, signage
- Overall mobility – now and in future
- Pipelines and railroads adjacent to right-of-way
- Potential parallel routes?
- Sensitivity to existing landscaping
- Restricted right-of-way especially at western end of corridor
- Sensitive land uses along right-of-way – schools, parks, etc.
- Beltway 8 interchange – future direct connectors?
- Sufficient clearance for future widening
- Truck traffic – potential need for dedicated truck facility
- Economic development
- Emergency access/egress

OTHERS?

SH 225
Corridor Feasibility Study

Comments?

What issues and concerns have we missed?

What potential solutions should we consider?

Please tell us by completing a questionnaire/comment card before you leave.

Thank you for attending!

Carter Burgess

SH 225 Corridor Study Team

Carter & Burgess Team

Dr. Lei Yu – travel demand forecasting

Lentz Group – public involvement

Knudson & Associates – corridor evaluation

Quadrant Consultants – environmental data & analysis

Texas Southern University – alternatives analysis

H & H Resources - hydrology

SH 225 Public Meeting

April 29, 2004

SH 225 Corridor Feasibility Study

Corridor News

Issue 2, Winter 2004 | Edición 2, primavera de 2004

In this Issue:

The Houston District of the Texas Department of Transportation (TxDOT) is conducting a Major Corridor Feasibility Study for an approximate 15-mile segment of SH 225, located in Harris County, from IH 610 to SH 146. The purpose of the study is to evaluate the current capacity of the existing corridor and identify possible ways to improve mobility and safety along the corridor. Cities and communities along the corridor include Houston, Pasadena, Deer Park and La Porte. The study is expected to conclude in August 2004.

PUBLIC MEETING RECAP

On December 4, 2003, initial project public meetings were held to obtain public input on SH 225. The meetings were held at the Pasadena Convention Center, 7902 Fairmont Parkway, in two different sessions – 2-4 p.m. and 6-8 p.m.

The study team asked meeting attendees to fill out a questionnaire to identify specific concerns and suggestions for the SH 225 corridor. The majority of

The majority of respondents identified traffic congestion and accidents/safety as the biggest problems along the corridor.

(continued on page 2)

El Distrito de Houston del Departamento de Transporte de Texas (TxDOT) lleva a cabo un Estudio de viabilidad de eje de tránsito principal para un segmento aproximado de 15 millas de SH 225, localizado en el Condado de Harris, de IH 610 a SH 146. El propósito del estudio es evaluar la capacidad corriente del eje de tránsito existente e identificar las maneras posibles que se puedan mejorar la movilidad y la seguridad a lo largo del eje de tránsito. Las ciudades y las comunidades a lo largo del eje de tránsito incluyen Houston, Pasadena, Deer Park y La Porte. Se espera que el estudio concluya en agosto de 2004.

RECAPITULACIÓN DE LA REUNIÓN PÚBLICA

El 4 de diciembre de 2003, se realizaron reuniones públicas iniciales del proyecto para obtener la opinión pública sobre SH 225. Las reuniones fueron celebradas en el Centro de Convenciones Pasadena, 7902 Fairmont Parkway, en dos sesiones diferentes – de 2 a 4 de la tarde y de 6 a 8 de la tarde.

El equipo de estudio les pidió a los comparecientes que llenaran un cuestionario para identificar las preocupaciones específicas y sugerencias para el eje de tránsito SH 225. La mayoría de las personas relataron que la congestión de tráfico y los accidentes /seguridad eran los problemas más grandes en el eje de tránsito. Cuando se les pidió que identificaran las mejoras que serían las más beneficiosas, citaron

(continuada en pájina 3)

respondents identified traffic congestion and accidents/safety as the biggest problems along the corridor. When asked to identify what improvements would be most beneficial, respondents cited designated truck lanes, high-occupancy vehicle (HOV) lanes, passenger train service, bus/vanpool service and interchange/alternate route improvements.

STUDY PROCESS CONTINUES

The study is currently in its second phase – identifying and evaluating transportation alternatives. The team has reviewed the data and input gathered during the initial phase of the study and has produced a "universe" of alternatives for SH 225.

These include a range of transportation options – "no build;" traffic system management/travel demand management systems such as ramp metering and adding auxiliary lanes; roadway improvements such as toll lanes, HOV lanes and interchange improvements; transit; and non-motorized modes. At the upcoming April 29 meeting (see back panel for details), the public will have an opportunity to review and discuss the possible alternatives with TxDOT and the study team prior to further analysis.

During the latter phases of the study, the team will take the input from the public and local elected officials and stakeholders into consideration when selecting Recommended Alternatives for SH 225. TxDOT will hold a public meeting on the Recommended Alternatives to allow for public comments prior to finalizing the study.

PUBLIC PARTICIPATION IS KEY

Regular, ongoing communication with members of the community is an essential part of the study process. The comprehensive public involvement plan includes:

Public Meetings: Three rounds of meetings, all conducted in workshop format, will be held to update you on the study's progress and provide a forum for your comments and concerns. Attendees can engage in informal discussions with TxDOT staff and consultant team members, view project information and provide valuable feedback for the study. The public meetings schedule:

December 4, 2003. Topic: Study Purpose and Process

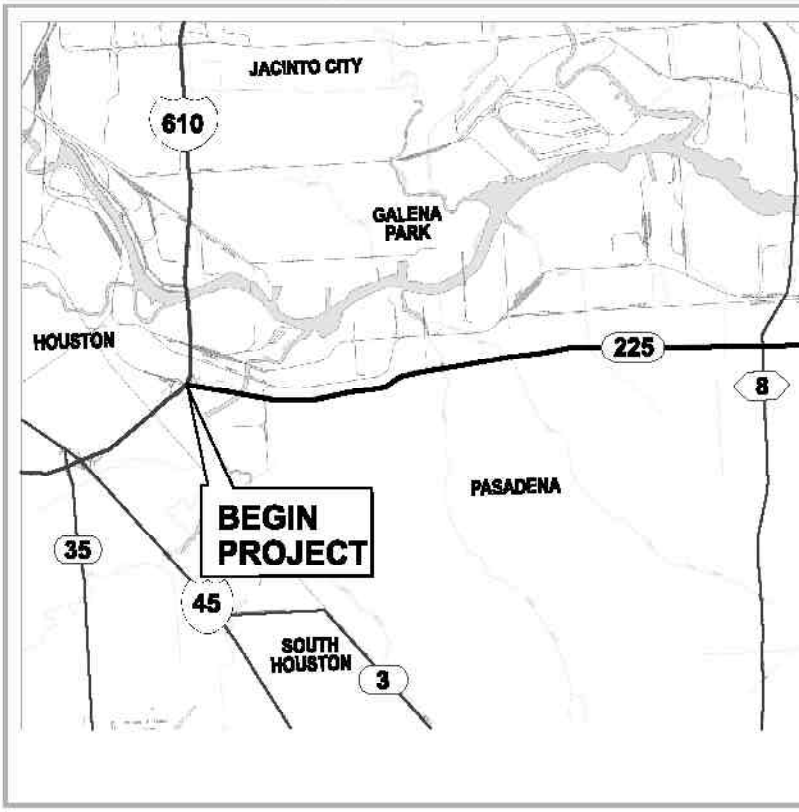
April 29, 2004. Topic: Present Universe of Alternatives (See back panel for details)

Summer 2004. Topic: Recommended Alternatives

Newsletters: Three newsletters will be mailed during the course of the study to update you on the project and provide notification for upcoming public meetings. The final newsletter will contain a summary of the study's results.

Written Comments: Written comments are welcome and encouraged at any time during the study. You may submit comments at public meetings or via mail to: Mr. Pat Henry, P.E., Director of Project Development, TxDOT, P.O. Box 1386, Houston, Texas 77251-1386.

TxDOT Website: At www.dot.state.tx.us, look for SH 225 under Transportation Studies to view the latest newsletter and get up-to-date information on public meeting schedules and locations.

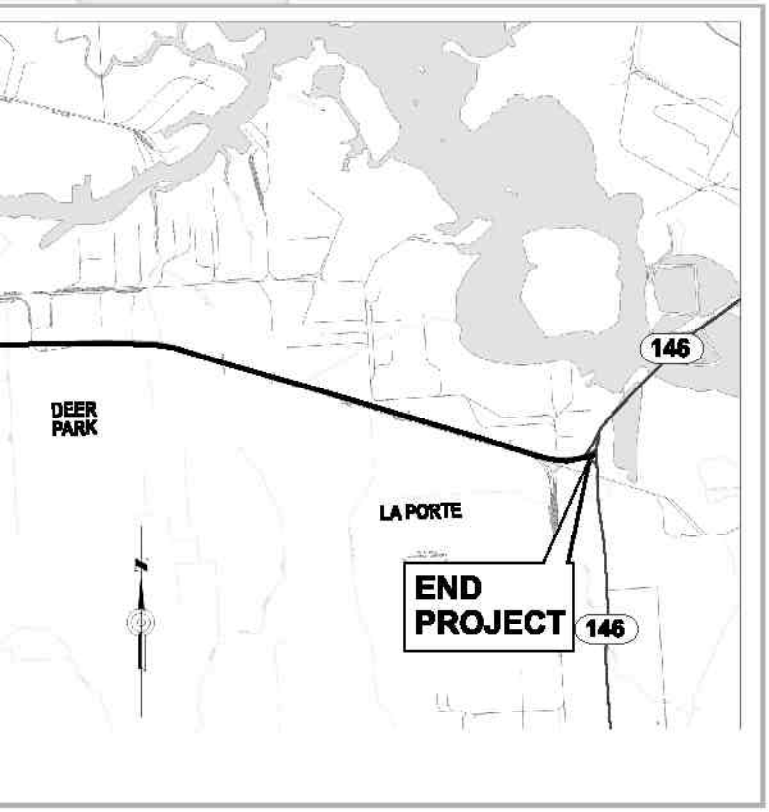


carriles designadas para camiones, vehículo de ocupación alta (HOV) carriles, servicio de tren de pasajeros, servicio de autobús/furgoneta y mejoras de ruta de intercambio/desvío.

EL PROCESO DE ESTUDIO SIGUE

El estudio está actualmente en su segunda fase – identificando y evaluando alternativas de transporte. El equipo ha examinado los datos y las opiniones reunidas durante la fase inicial del estudio y ha producido "una amplitud" de alternativas para SH 225.

Estos incluyen una variedad de opciones de transporte – "no construir;" la dirección de sistema de tráfico/sistemas de dirección de exigencia de viajes tal como medición de rampa y agregación de carriles auxiliares; mejoras de carretera como carriles de peaje, carriles de HOV y mejoras de intercambio; tránsito; y modos no motorizados. En la próxima reunión del 29 de abril (véase el dorso para mayor detalle), el público tendrá una oportunidad de examinar y hablar de las alternativas posibles con TxDOT y el equipo de estudio antes del análisis adicional.



Durante las últimas fases del estudio, el equipo tomará en cuenta las opiniones del público y de los funcionarios locales elegidos y depositarios al seleccionar las Alternativas Recomendadas para SH 225. El TxDOT llevará a cabo una reunión pública sobre las Alternativas Recomendadas para tomar en cuenta los comentarios públicos antes de la finalización del estudio.

LA PARTICIPACIÓN PÚBLICA ES IMPORTANTE

La comunicación regular, en curso con los miembros de la comunidad es una parte esencial del proceso de estudio. El plan completo de participación del público incluye:

Reuniones Públicas: tres rondas de reuniones públicas, todos llevadas a cabo en el formato de taller, serán realizadas para actualizarle sobre el progreso del estudio y proporcionar un foro para sus comentarios y preocupaciones. Los comparecientes pueden entrar en conversaciones informales con el personal de TxDOT y los miembros de equipo de asesoría, ver la información sobre el proyecto y proporcionar opiniones valiosas para el estudio. El programa de reuniones públicas:

El 4 de diciembre de 2003. Tema: Propósito y proceso del estudio
29 de abril de 2004. Tema: la Amplitud de alternativas presentes (Véase el dorso para mayor detalle)
Verano de 2004. Tema: Alternativas recomendadas

Boletines de noticias: Tres boletines de noticias serán enviados durante el curso del estudio para actualizarle sobre el proyecto y notificarle sobre las próximas reuniones públicas. El boletín de noticias final contendrá un resumen de los resultados del estudio.

Comentarios por escrito: Los comentarios por escrito son bienvenidos y bien recibidos en cualquier momento durante el estudio. Usted puede presentar sus comentarios en las reuniones públicas o por correo: Sr. Pat Henry, P.E., Director de Desarrollo de Proyecto, TxDOT, P.O. Box 1386, Houston, Texas 77251-1386.

El Sitio Web de TxDOT: En www.dot.state.tx.us, busque SH 225 en Estudios de Transporte para ver el último boletín de noticias y conseguir información actualizada sobre el programa de reuniones públicas y sitios.

WE NEED YOUR INPUT

Your attendance is encouraged at this crucial public meeting regarding potential improvements for SH 225. At this upcoming meeting, which will be conducted in open house format, a universe of alternatives will be presented for comments and discussion prior to further analysis of their viability. TxDOT and consultant team members will be available for questions and comments during the open house session. The meeting will be held:

Thursday, April 29, 2004
6-8 p.m.
Pasadena High School Cafeteria
206 South Shaver
Pasadena, TX 77506

The meeting is being held in a handicap accessible location and will be conducted in English. Persons with special communication or physical accommodation needs should contact TxDOT's public affairs office at 713/802-5072 at least 48 hours prior to the meetings. Reasonable accommodations will be made to meet these needs. Written comments may be submitted via mail to Mr. Pat Henry, P.E., Director of Project Development, TxDOT, P.O. Box 1386, Houston, Texas 77251-1386.

NECESITAMOS SU APORTACIÓN

Se anima su presencia en esta reunión de público crucial en cuanto a las posibles mejoras para SH 225. En esta próxima reunión, que será realizada en el formato de reunión informal, se presentará una amplitud de alternativas para comentarios y consideración antes del análisis adicional de su viabilidad. El TxDOT y los miembros del equipo de asesoría estarán disponibles para sus preguntas y comentarios durante la sesión de reunión informal. La reunión se realizará:

El jueves, 29 de abril de 2004, 6 a 8 p.m.
Pasadena High School Cafeteria
206 South Shaver, Pasadena, TX 77506

La reunión se realizará en un sitio accesible para los minusválidos y será conducida en inglés. Las personas con necesidades especiales para la comunicación o acomodaciones físicas deben comunicarse con la oficina de asuntos públicos de TxDOT al 713/802-5072 al menos 48 horas antes de las reuniones. Se harán las acomodaciones razonables para cumplir con estas necesidades. Se pueden enviar comentarios por escrito al Sr. Pat Henry, P.E., Director de Desarrollo de Proyecto, TxDOT, P.O. Box 1386, Houston, Texas 77251-1386.

c/o The Lentz Group
2600 Citadel Plaza Drive, Suite 115
Houston, Texas 77008

The Pasadena Citizen – Online
Houston Community Newspapers

Top Stories

Public meeting set to discuss future of 225

By HEATHER L. NICHOLSON, Citizen staff April 29, 2004

The 15 miles of Texas Highway 225 from Houston to La Porte has the potential to become a major traffic headache in 25 years.

The Texas Department of Transportation will hold a public meeting at Pasadena High School tonight at 6 p.m. to discuss future goals to improve congestion.

"Any time we have a corridor that we think needs to make improvement and involves high costs and high impact we always involve the community," said TxDOT Spokesman Hassan Nikooei.

Tonight's meeting will give an overview of the Major Corridor Feasibility Study planned for several miles of 225 between Loop 610 and State Highway 146. TxDOT consultants will be on hand to discuss the purpose, need and goals to change 225 congestion.

"We're looking at many alternatives to take congestion away from 225. Data has indicated there is need for improvement," Nikooei said.

The state agency has recorded problematic areas at the 225 and 610 exchange, the Beltway 8 and 225 exchange and several entrance and exit ramps reaching as far as 146.

A project to improve the traffic in Pasadena would be a multi-million dollar deal that TxDOT hopes to involve citizens with.

"We need a lot of public involvement and for people in Pasadena to let us know their concerns and give input," Nikooei said.

A similar public meeting was held in December at the Pasadena Convention Center, but the community response was far lower than expected, Nikooei said.

"What's going to happen if we don't do anything to 225? What will is be like in 2025?" asks Nikooei. "It will be bogged down and a traffic headache."

Reader Opinions

SH 225 Corridor Feasibility Study

SIGN IN SHEET

Texas Department of Transportation

Name & Organization	Address	City & Zip	Phone Numbers (direct & fax)	Email Address
[illegible] Homeowner	1216 Scott St	Pasadena, 77506		
Floyd D. Scurry Cobb Fendley & Associates	5300 Hollister Houston TX 77040		(713) 462-3242	fscurry@cobbfen.com
Joel Schramm	5757 Woodway Hou, Tx 77057		713-202-9901	joel.schramm@tcb.aecom.com
Craig Hester	5757 Woodway Houston, Tx. 77057		713-267-2881	craig.hester@tcb.aecom.com
Mashhood Shah	5757 Woodway Houston, TX 77057		713-267-2774	mashhood.shah@tcb.aecom.com
Michael Blasdel	654 N. Sam Houston Pkwy Houston, TX 77060		281.931.9220	Mblasdel@ckmail.com
Ron Crabtree City of Deer Park	710 E. San Augustine Deer Park, TX 77536		281.478.7245	rcrabtree@deerparktx.org

Public Meeting April 29, 2004, 6-8 p.m.

SH 225 Corridor Feasibility Study

SIGN IN SHEET

Name & Organization	Address	City & Zip	Phone Numbers (direct & fax)	Email Address
Doug & Chloe Lewis	5806 Lucy	Pas 77505	281-487-7119	
Joe Reyna = Gene Green Con.	11811 I-10 E. Suite 430 H. T 77029	Hou	713 330 0761	
Earl Sturrock Deer Park LEPC	PO Box 700 Deer Park	Deer Park TX 77536	281-478-2000	
Mr & Mrs Seay	5026 Rainwater Pasadena Tx	Pasadena TX 77505	281-487 6192	Robseal234@Aol.com
Cecil Ghormley	2902 Myrtle Rd Pas 77502		713-944-8803	
Carroll Smith	3940 Pasadena Freeway	Pasadena 77503	713-473-7601	csmith@monumentchevrolet.com
Kari Hackett/HGAC	P.O. Box 22777	Houston 77227	713 993 4576	Kari.Hackett@h-gac.com

Public Meeting April 29, 2004, 6-8 p.m.

SH 225 Corridor Feasibility Study

SIGN IN SHEET

ELECTED OFFICIALS

Name & Organization	Address	City & Zip	Phone Numbers (direct & fax)	Email Address
BARBARA LEWIS/ SENATOR MIKE JACKSON	1109 FAIRMONT PKWY	PASADENA, TX 77504	713-948-9111	BARBARA.LEWIS @SENATE.STATE.TX.US
Chuck Engelken City of La Porte	604, W Fairmont Pky	La Porte, Tx 77571	281-471-5020	
Debra Gonzales Senator Mario Gallegos	2205 Clinton Dr.	Galena Park, Tx		

Public Meeting April 29, 2004, 6-8 p.m.

Questionnaire & Comment Form

Public Meeting, April 29, 2004

Texas Department of Transportation (TxDOT) and the consultant team are interested in your concerns and suggestions regarding this project. Comments received by **Friday, May 14** will be included in the public record for this meeting. You may drop your form in the comment box or fold and mail this form to the address on the reverse side.

How often do you travel the SH 225 Corridor? (check all that apply)

- ☑ Daily
- ☐ 2-3 days a week
- ☐ 4-5 days a week
- ☐ Weekends only

When do you typically travel the SH 225 Corridor? (check all that apply)

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- ☑ PM peak period (4:00 p.m. to 7:00 p.m.)
- ☐ Non-rush hour
- ☐ Weekend

What is the purpose of your trips? (check all that apply)

- ☑ Commuting to and from work
- ☐ Performing work related activities
- ☐ Shopping, recreational, school activities
- ☐ Other (specify)_____

What types of improvements do you believe would be the most beneficial for SH 225? (check those you prefer or add your own)

- ☑ Additional lanes
- ☑ Designated truck lane
- ☐ High Occupancy Vehicle (HOV) lane
- ☐ Passenger train service
- ☐ Bus or vanpool service
- ☑ Congestion Management Strategies (Park & Ride lots, compressed work week, staggered work hours, telecommuting, etc.)
- ☐ Other (specify)_____

What are the biggest transportation problems in the SH 225 Corridor and where are they the worst?

- ☑ Traffic congestion at peak commute hours_____
- ☐ Traffic congestion in off-peak hours_____
- ☐ Accidents/Safety_____
- ☐ Poor access_____
- ☐ Roadway maintenance_____
- ☐ Other _____

Please use space below for additional comments:

_____

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Additional comments:

_____

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_____

How did you hear about this public meeting?

- ☐ Advertisement, where? _____
- ☐ Newsletter
- ☐ TxDOT web site
- ☐ Another person
- ☐ Other _____

Please include your information if you'd like to be added to the project mailing list:

Name: _____

Address: _____

City, Zip: _____

Email: _____

fold here

Please place postage here.

Mr. Pat Henry, P.E.
Director of Project Development
Texas Department of Transportation
P.O. Box 1386
Houston, Texas 77251-1386

RE: SH 225 Corridor Feasibility Study

Questionnaire & Comment Form

Public Meeting, April 29, 2004

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- ☒ Other (specify) travel to UH

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- ☐ Accidents/Safety_____
- ☐ Poor access_____
- ☐ Roadway maintenance_____
- ☒ Other 18-wheelers

Please use space below for additional comments:

Where: 45 N [illegible] to 610W to 225 there are no distinct lanes & people cannot tell that the lane merges. I suggest a white line for a few feet then a dashed white. The 2 lanes merge, but other people begin switching lanes & I've been so close to wrecking. Thanks!

Additional comments:

_____

_____

_____

_____

_____

_____

How did you hear about this public meeting?

- ☐ Advertisement, where? _____
- ☐ Newsletter
- ☐ TxDOT web site
- ☐ Another person
- ☒ Other Work

Please include your information if you'd like to be added to the project mailing list:

Name: _____

Address: _____

City, Zip: _____

Email: _____

fold here

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Mr. Pat Henry, P.E.
Director of Project Development
Texas Department of Transportation
P.O. Box 1386
Houston, Texas 77251-1386

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Questionnaire & Comment Form

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- [ ] Weekends only

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- [ ] AM peak period (6:00 a.m. to 9:00 a.m.)
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- [x] Shopping, recreational, school activities
- [ ] Other (specify)_____

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- [ ] Bus or vanpool service
- [ ] Congestion Management Strategies (Park & Ride lots, compressed work week, staggered work hours, telecommuting, etc.)
- [ ] Other (specify)_____

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- [ ] Traffic congestion at peak commute hours_____
- [ ] Traffic congestion in off-peak hours_____
- [x] Accidents/Safety Beltway 8
- [ ] Poor access_____
- [ ] Roadway maintenance_____
- [ ] Other_____

Please use space below for additional comments:

Additional comments:

How did you hear about this public meeting?

- ☐ Advertisement, where? _____
- ☐ Newsletter
- ☐ TxDOT web site
- ☐ Another person
- ☒ Other Pas Citizen

Please include your information if you'd like to be added to the project mailing list:

Name: W.D. Lewis
Address: 5306 Lucy
City, Zip: Pas. Tex. 77505
Email: _____

fold here

Please place postage here.

Mr. Pat Henry, P.E.
Director of Project Development
Texas Department of Transportation
P.O. Box 1386
Houston, Texas 77251-1386

RE: SH 225 Corridor Feasibility Study

Questionnaire & Comment Form

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- ☐ Other (specify)_____

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- ☐ Poor access_____
- ☐ Roadway maintenance_____
- ☐ Other_____

Please use space below for additional comments:

Additional comments:

_____

_____

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_____

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- ☒ Newsletter
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- ☐ Another person
- ☐ Other _____

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Address: _____

City, Zip: _____

Email: _____

fold here

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Mr. Pat Henry, P.E.
Director of Project Development
Texas Department of Transportation
P.O. Box 1386
Houston, Texas 77251-1386

RE: SH 225 Corridor Feasibility Study

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- ☒ Roadway maintenance_____
- ☐ Other_____

Please use space below for additional comments:

DPD

Additional comments:

How did you hear about this public meeting?

- ☐ Advertisement, where? _____
- ☒ Newsletter
- ☐ TxDOT web site
- ☐ Another person
- ☐ Other _____

Please include your information if you'd like to be added to the project mailing list:

Name: GENE GREEN
Address: 11811 I-10 EAST, SUITE 430
City, Zip: HOUSTON, TEXAS 77029
Email: _____

fold here

Please place postage here.

Mr. Pat Henry, P.E.
Director of Project Development
Texas Department of Transportation
P.O. Box 1386
Houston, Texas 77251-1386

RE: SH 225 Corridor Feasibility Study

Study Approach and Schedule

Data Gathering and Evaluation of Existing Corridor

1st Round of Public Meetings

December 4, 2003

Pasadena Convention Center

2-4 pm & 6-8 pm

Fall/Winter 2003

WE ARE HERE

Develop Alternatives

2nd Round of Public Meetings

Winter/Spring 2004

Analyze Short List of Alternatives

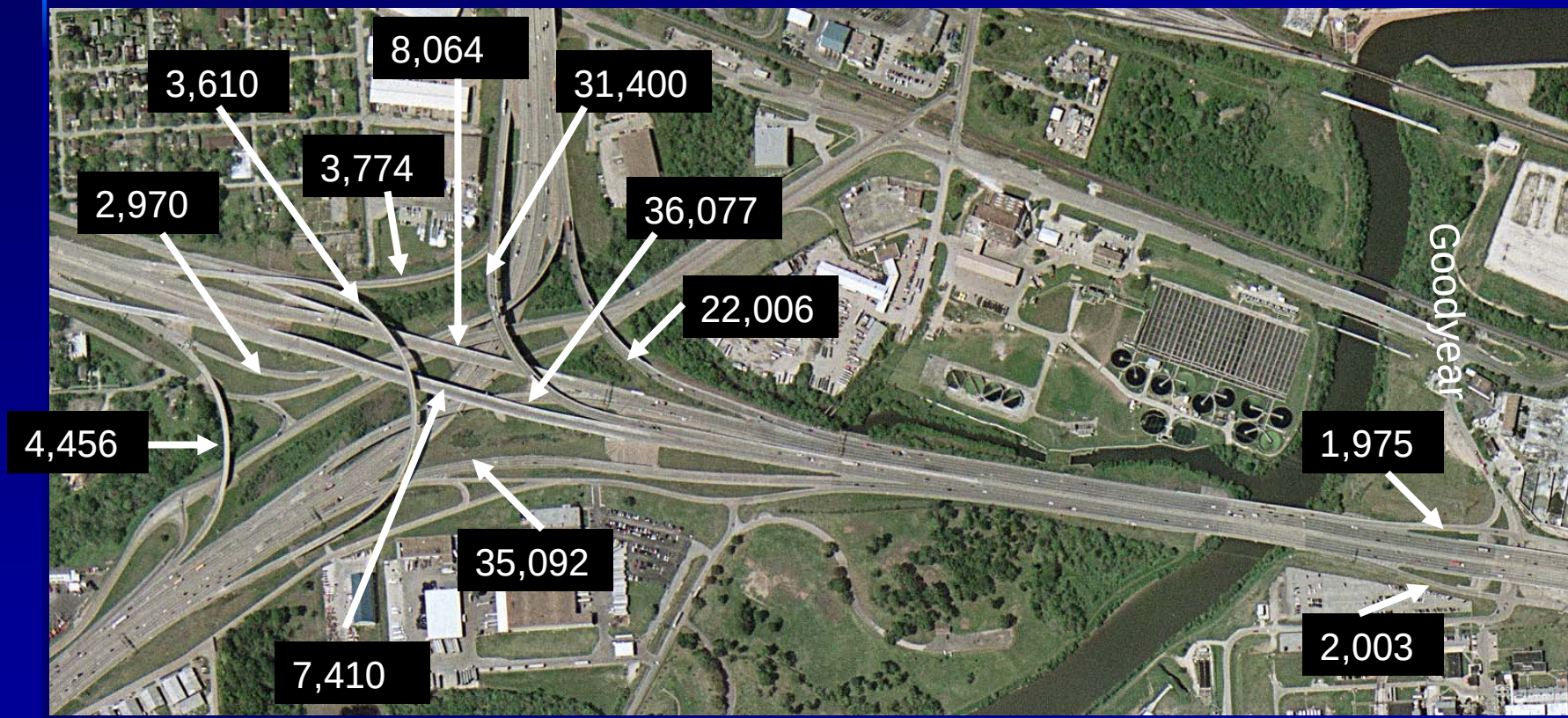
3rd Round of Public Meetings

Recommended Alternative

Summer/Fall 2004

Carter Burgess

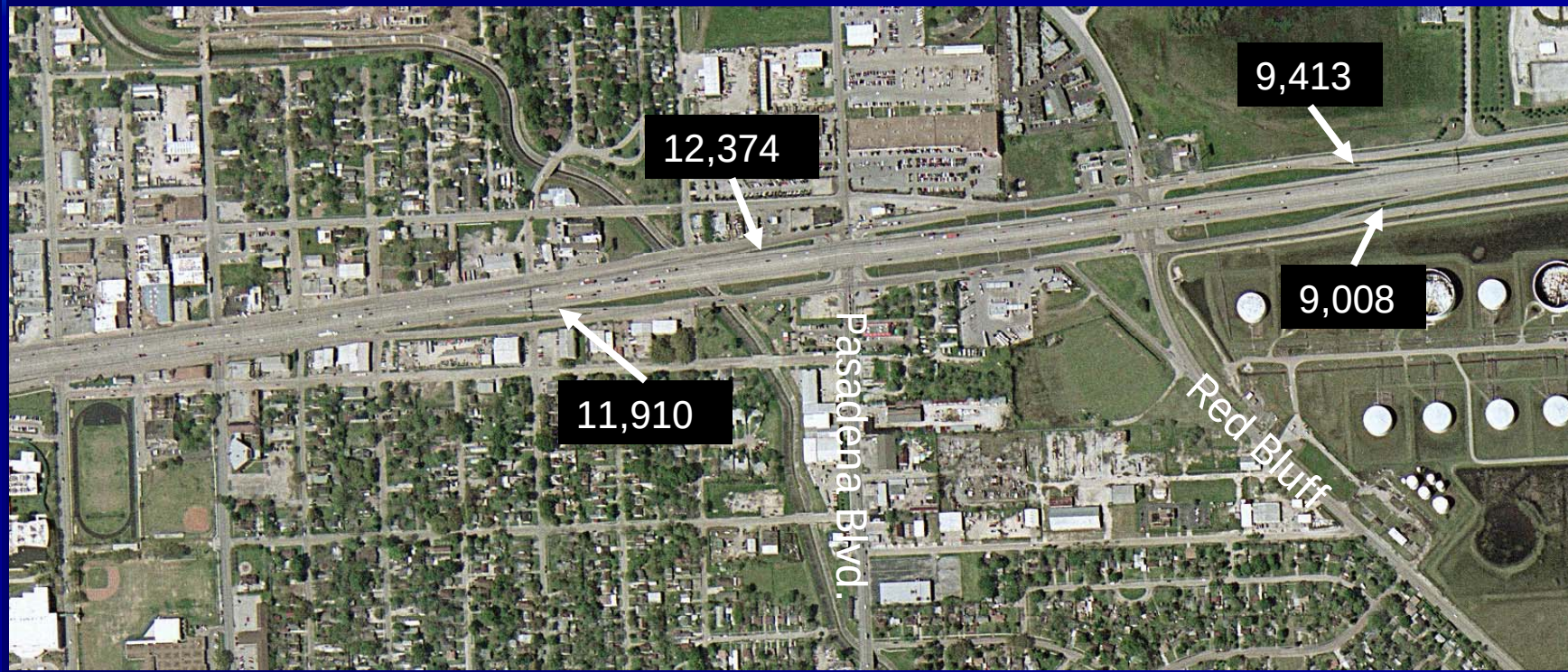
SH 225 at IH 610 Ramp Volumes



SH 225 at Allen-Genoa Ramp Volumes

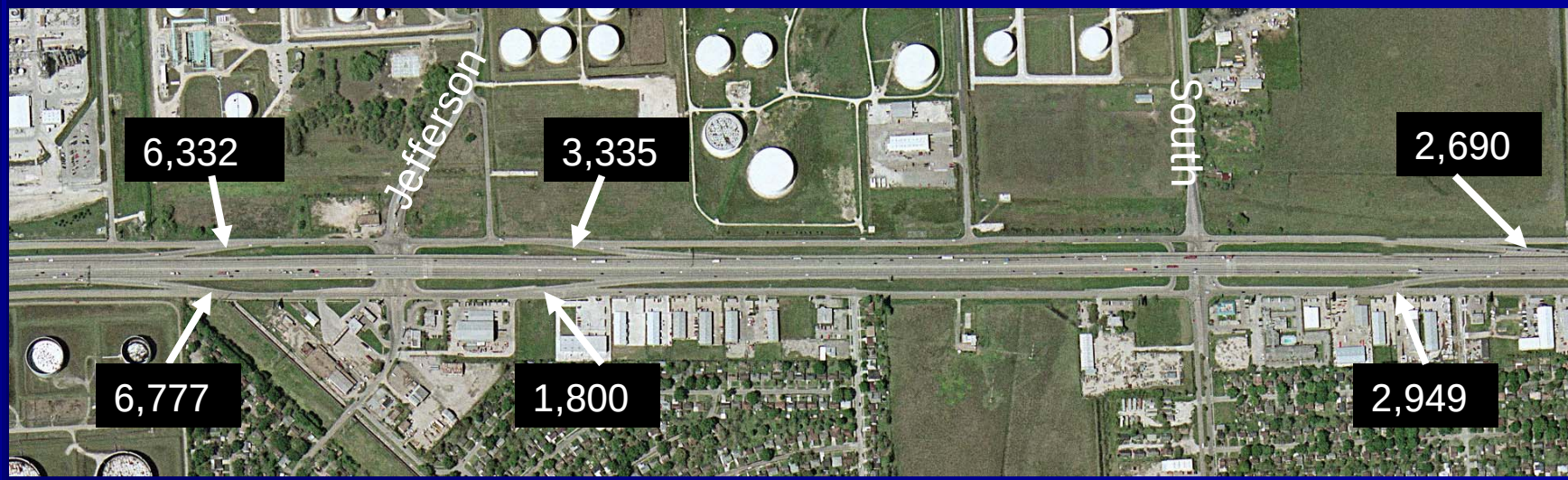
SH 225 at Richey Ramp Volumes

SH 225 at Red Bluff Ramp Volumes



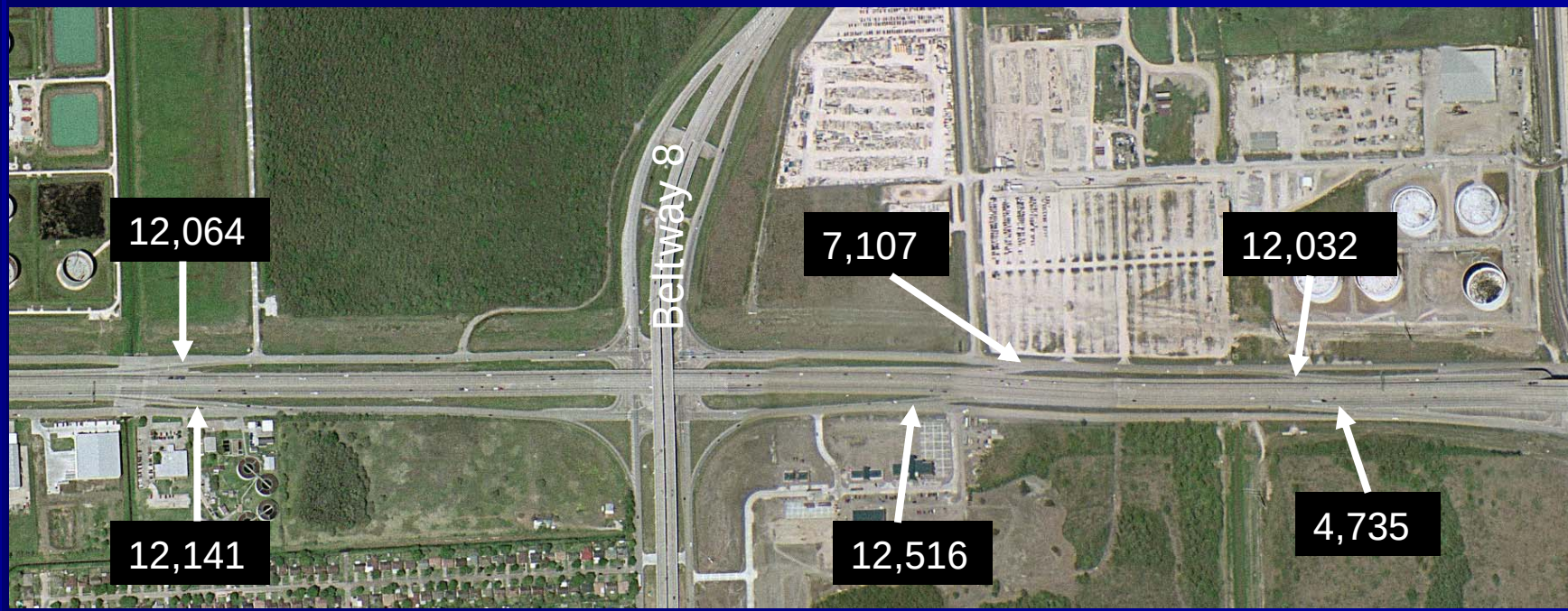
Carter Burgess

SH 225 at Jefferson Ramp Volumes



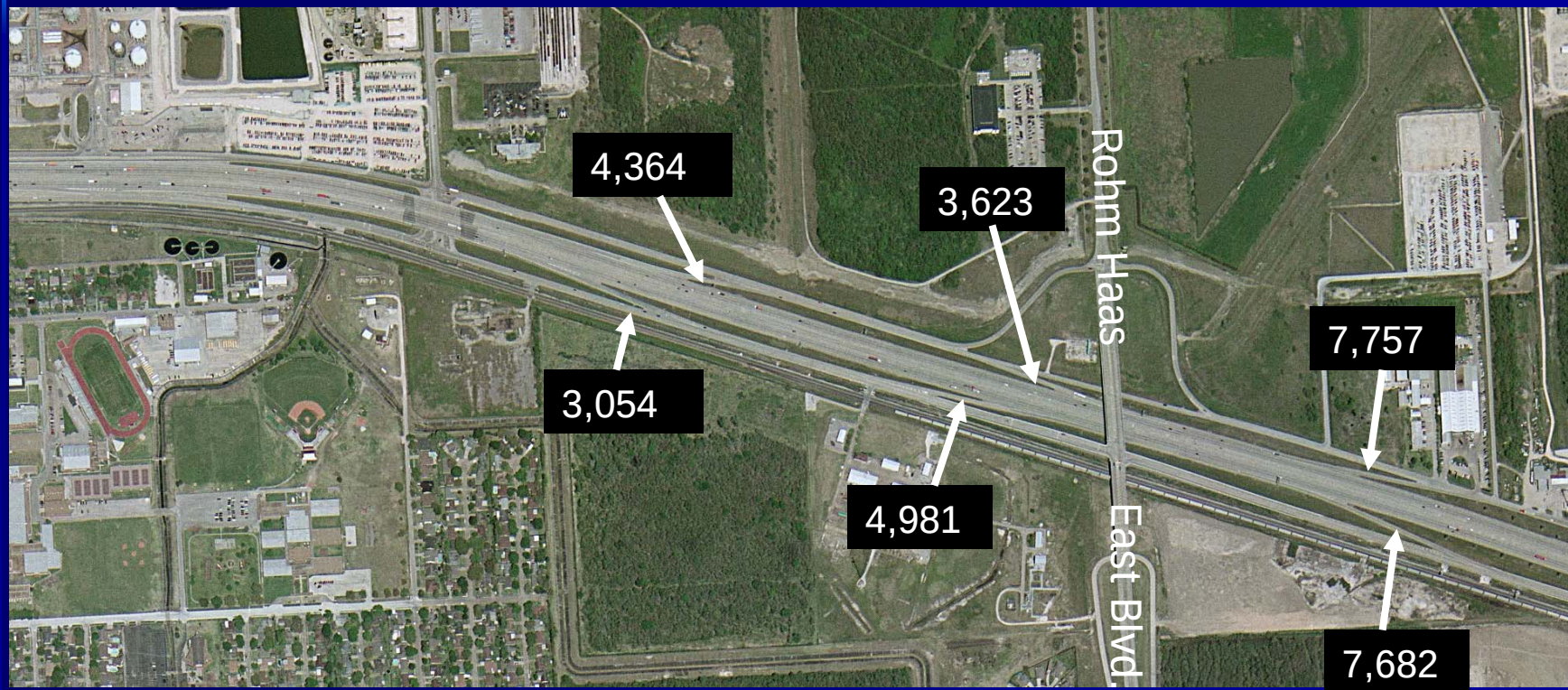
Carter Burgess

SH 225 at Beltway 8 Ramp Volumes

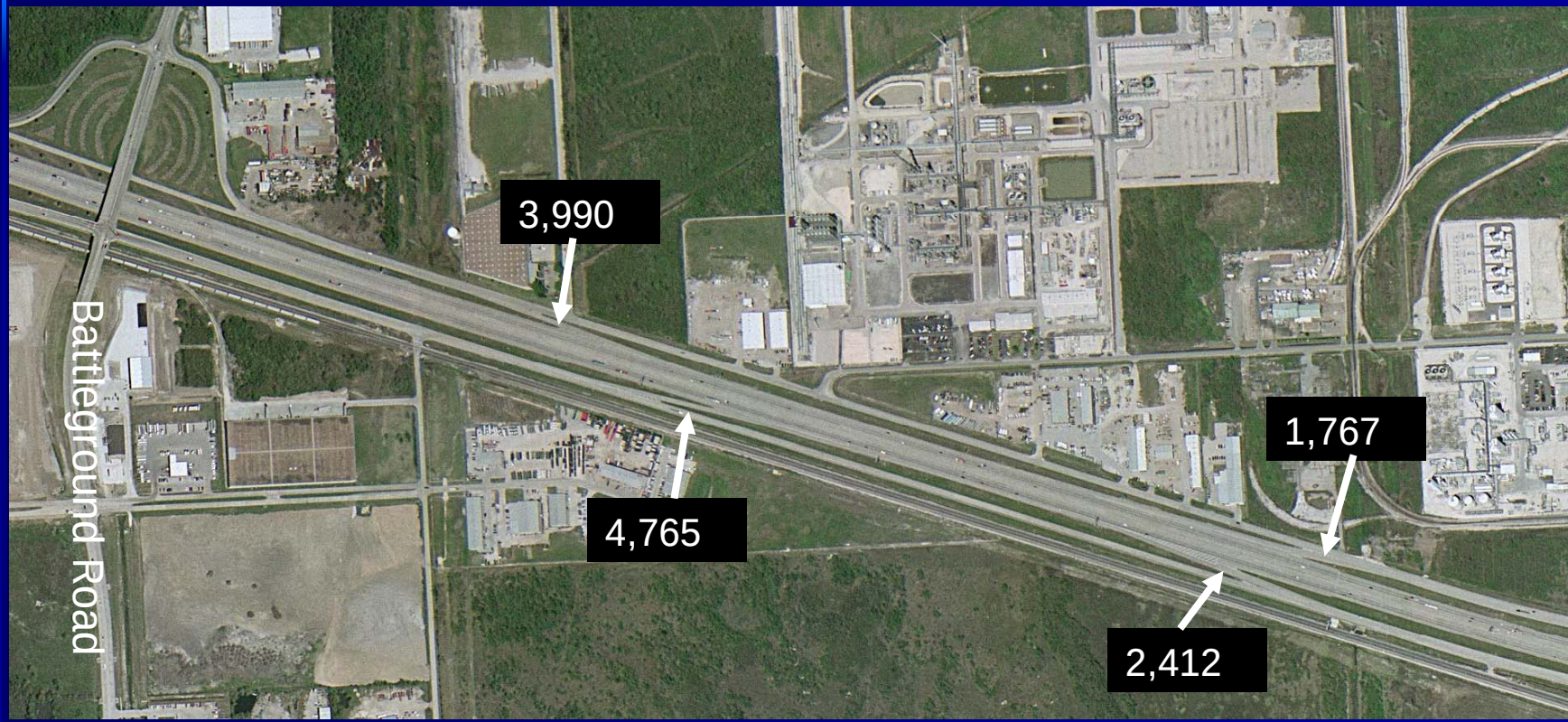


SH 225 at Center Ramp Volumes

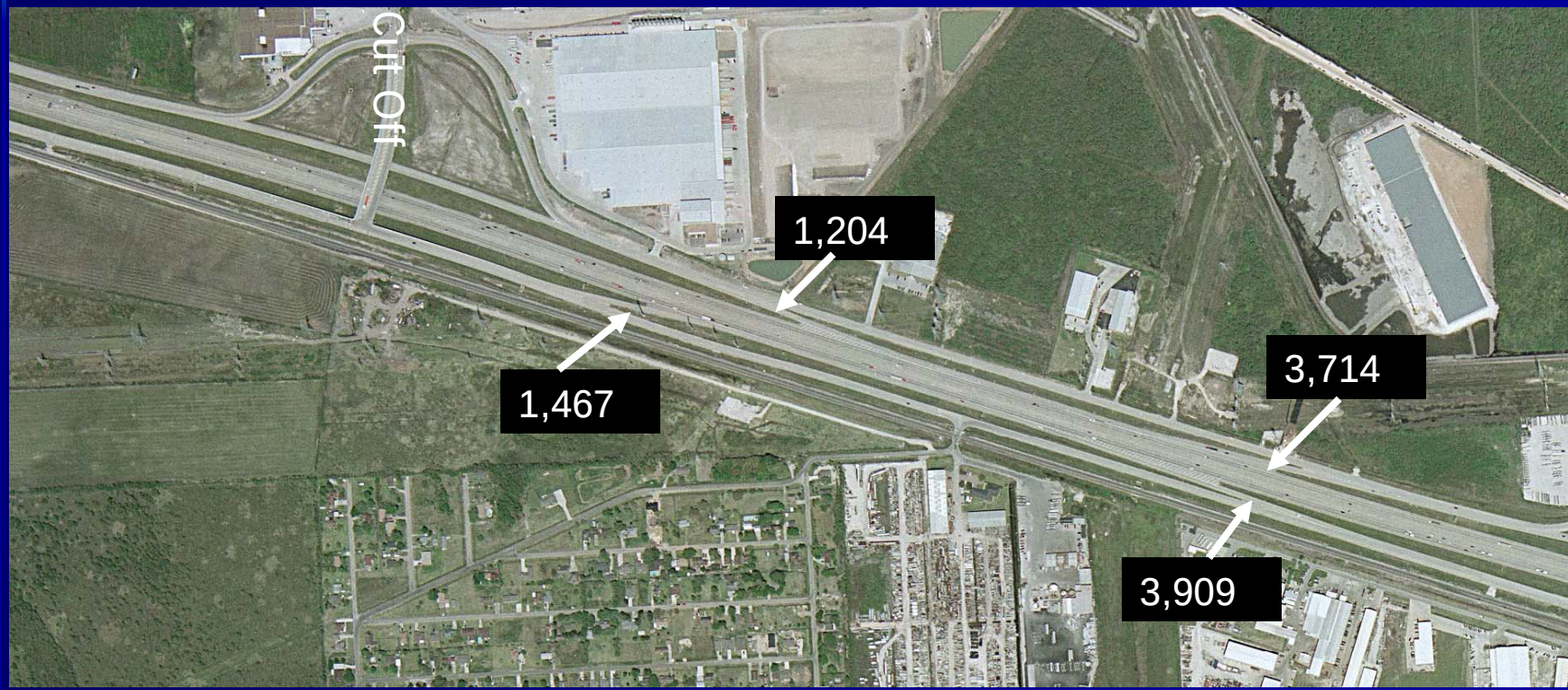
SH 225 at East Blvd. Ramp Volumes



SH 225 at Battleground Road Ramp Volumes

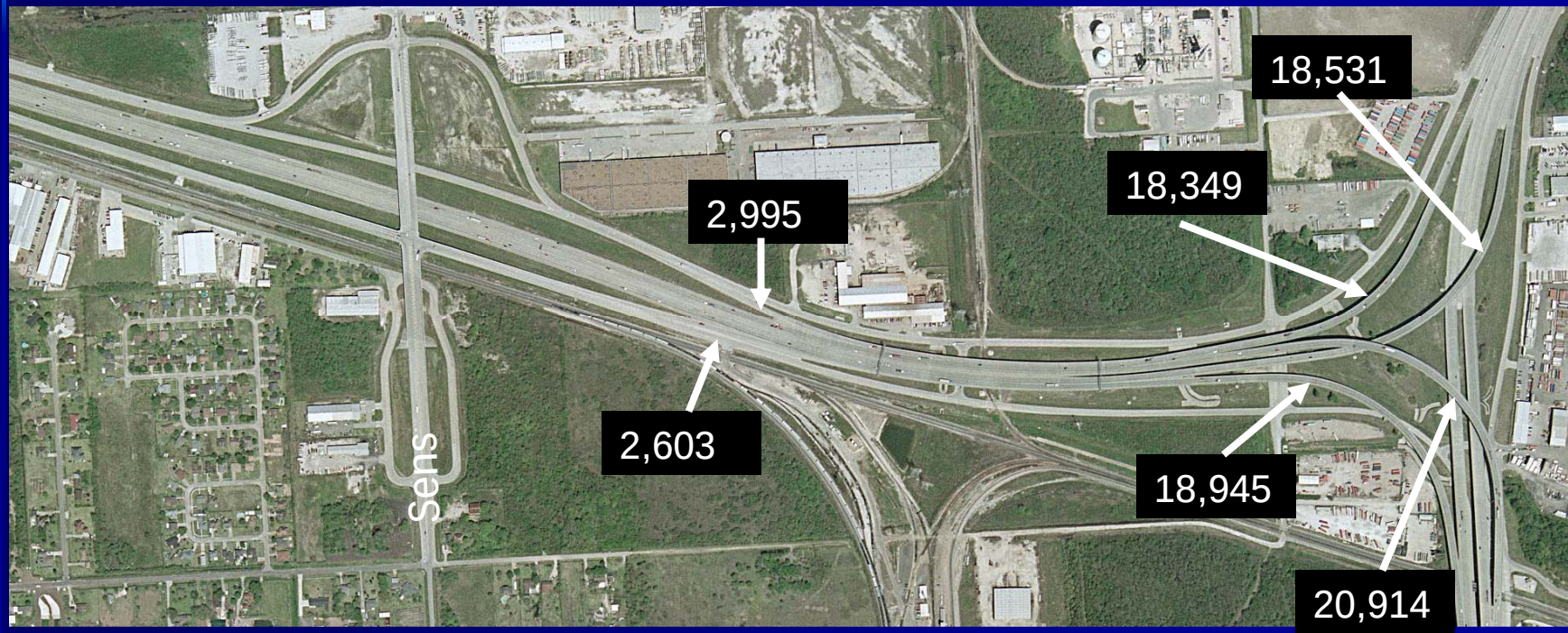


SH 225 at Miller Cut Off Ramp Volumes



Carter Burgess

SH 225 at SH 146 Ramp Volumes



Eastbound SH 225 - Truck Traffic

DIRECTION		AM Peak (6-9 am)		NOON (11am-1pm)		PM Peak (3-6 pm)	
		Percent	Number	Percent	Number	Percent	Number
WEST OF RICHEY	Semi	9.9%	761	15.9%	699	4.4%	558
	Other	90.1%	6,931	84.1%	3,691	95.6%	12,178
	Total	100.0%	7,692	100.0%	4,390	100.0%	12,736
		Percent	Number	Percent	Number	Percent	Number
WEST OF BW-8	Semi	11.1%	726	20.4%	631	6.0%	501
	Other	88.9%	5,838	79.6%	2,464	94.0%	7,898
	Total	100.0%	6,564	100.0%	3,095	100.0%	8,399
		Percent	Number	Percent	Number	Percent	Number
WEST OF MILLER	Semi	10.9%	619	19.7%	578	5.9%	497
	Other	89.1%	5,051	80.3%	2,359	94.1%	7,866
	Total	100.0%	5,670	100.0%	2,937	100.0%	8,363

Westbound SH 225 - Truck Traffic

DIRECTION		AM Peak (6-9 am)		NOON (11am-1pm)		PM Peak (3-6 pm)	
		Percent	Number	Percent	Number	Percent	Number
WEST OF RICHEY	Semi	2.6%	373	14.5%	699	10.7%	1,072
	Other	97.4%	13,776	85.5%	3,936	89.3%	8,954
	Total	100.0%	14,149	100.0%	4,605	100.0%	10,026
		Percent	Number	Percent	Number	Percent	Number
WEST OF BW-8	Semi	3.4%	350	18.3%	559	10.5%	909
	Other	96.6%	9,807	81.7%	2,499	89.5%	7,769
	Total	100.0%	10,157	100.0%	3,058	100.0%	8,678
		Percent	Number	Percent	Number	Percent	Number
WEST OF MILLER	Semi	5.4%	380	21.6%	607	13.9%	1,056
	Other	94.6%	6,629	78.4%	2,201	86.1%	6,547
	Total	100.0%	7,009	100.0%	2,808	100.0%	7,603

Issues & Concerns

- Hurricane evacuation route
- Can SH 225 be extended to the west?
- IH 610 interchange – left-hand exits, truck safety, signage
- Overall mobility – now and in future
- Pipelines and railroads adjacent to right-of-way
- Potential parallel routes?
- Sensitivity to existing landscaping
- Restricted right-of-way especially at western end of corridor
- Sensitive land uses along right-of-way – schools, parks, etc.
- Beltway 8 interchange – future direct connectors?
- Sufficient clearance for future widening
- Truck traffic – potential need for dedicated truck facility
- Economic development
- Emergency access/egress

Study Goals and Objectives

- Improve traffic safety
  - Improve signage and way-finding
  - Upgrade to current design standards
  - Reduce conflicts with truck traffic
  - Reduce intersection conflict
- Improve mobility
  - Improve facilities to meet current and future travel demand
  - Facilitate access to residential and employment areas
  - Relieve choke point at IH 610
  - Maintain or improve Level of Service (LOS)
  - Improve interchanges

Study Goals and Objectives

- Improve hurricane and other emergency evacuation route
  - Provide evacuation route alternative
  - Effective signage and communication techniques during emergencies
  - Focus on security for corridor industries
- Improve travel choices and access
  - Provide options that encourage ridesharing and transit
  - Include provisions for pedestrians and bicycles
  - Improve local access at frontage roads and arterials

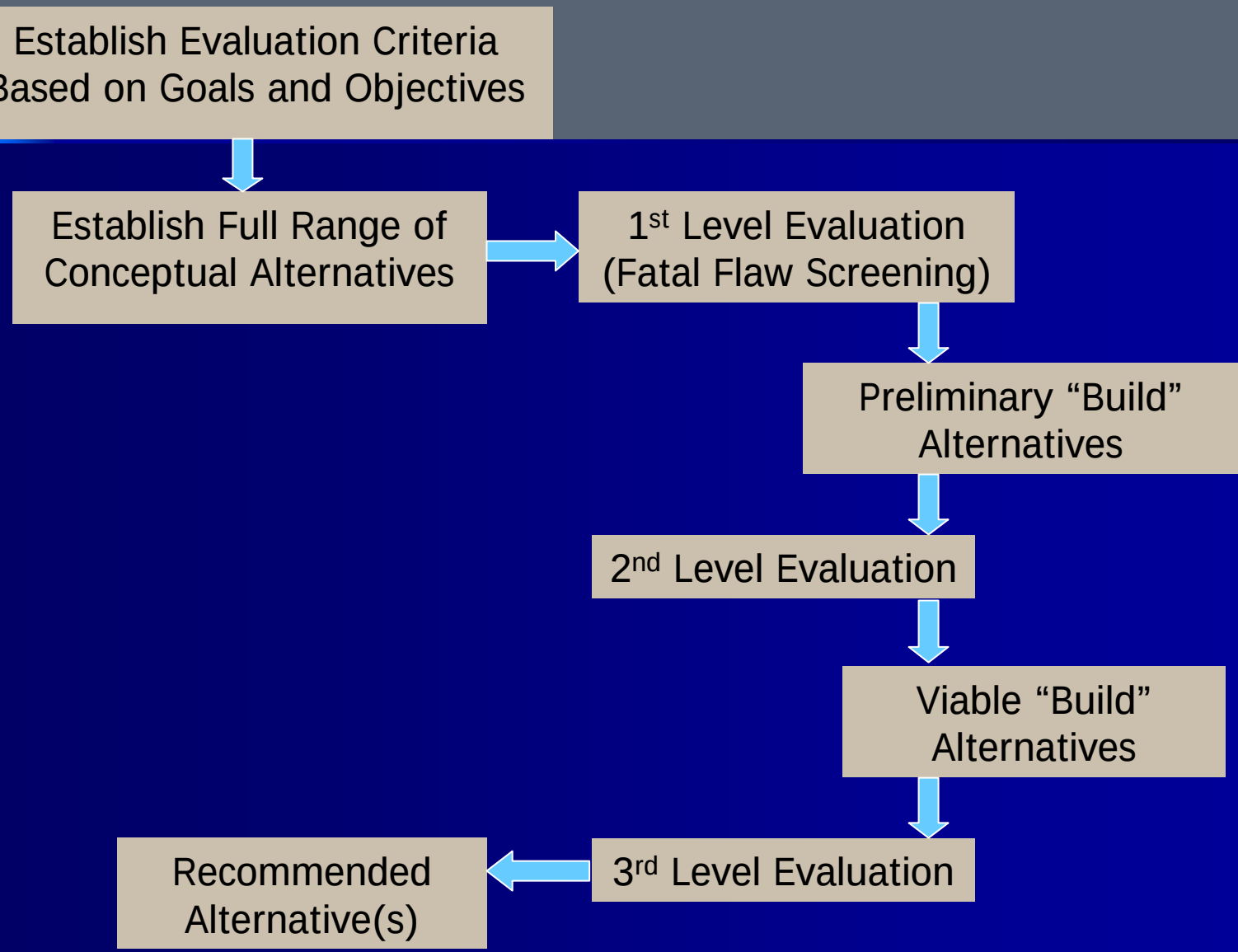
Study Goals and Objectives

- Protect natural and social environment
  - Maintain or improve air quality
  - Maintain or improve economic viability
  - Maintain or improve quality of life
  - Reduce, minimize or mitigate potential adverse impacts
- Maximize the use of existing infrastructure
  - Optimize traffic signals
  - Optimize on and off ramp configurations

Full Range of Conceptual Alternatives

- No Build Alternative
- TSM/TDM Alternative
- General Purpose Added Capacity Alternative
- Toll Lane Alternative
- Major Interchange Improvement Alternative
- High Occupancy Vehicle Alternative
- Reliever Route Alternative
- Truck Lane(s)
- Transit Alternative
- Alternative Alignment(s)
- Non-motorized Modes Alternative

Screening Process

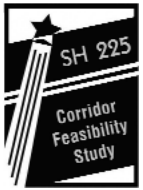


SH 225
Corridor Feasibility Study

Comments?

Carter Burgess

PUBLIC MEETING



The Texas Department of Transportation (TxDOT) is conducting a Major Corridor Feasibility Study for SH 225 from IH 610 to SH 146. This last in a series of three public meetings will be conducted in an open house format to present and discuss the recommended alternatives.TxDOT representatives and consultant team members will be available for questions and comments. The meeting will be held:

MAY 25, 2005

DEER PARK ACTIVITY CENTER
500 WEST 13TH STREET
DEER PARK, TEXAS 77536
6-8 p.m.

The meeting will be held in an accessible location for persons with disabilities and will be conducted in English. Persons with special communication or physical accommodation needs should contact TxDOT's public affairs office at 713/802-5072 at least 48 hours prior to the meetings. Reasonable accommodations will be made to meet these needs. **Written comments may be mailed to Director of Project Development, TxDOT, P.O. Box 1386, Houston, Texas 77251-1386.**

SIGN IN SHEET

Name & Organization	Address	City & Zip	Phone Numbers (direct & fax)	Email Address
Greg Holden Pinnacle Industries	407 Eagle Street	Pasadena. Tx	713-472-2222	greg@pinnind.com
Tina Phillip	601 Johnson	" "	713-475-2632	Tmphillips.com
Rod Clyatt Pinnacle Ind	407 Eagle Street	PASADENA, TX	713-472-2222	rod@pinn.ind.com
Pat Van Houte	603 Scott	Pasadena, Tx 77506	713-475-1506	

Public Meeting May 25, 2005, 6-8 p.m.

SIGN IN SHEET

Name & Organization	Address	City & Zip	Phone Numbers (direct & fax)	Email Address
City Council - Deer Park Becke Stockstill-Cobb	205 E. San Augustine	Deer Park, TX 77536	281.476.9063 ofc 281.479.0167 fax	becke@pdq.net
CITY OF PASADENA, PLANNING DEPT. TIM TIETJENS	PO BOX 672 PASADENA, TX 77501	PASADENA TX 77501	713 4755543	TTIETJENS@CI.PASADENA.TX.
MR & MRS RICHARD M. SIMS NORTH PASADENA BUS. ASSOC.	P.O. BOX 6366 P.	PASADENA, TX 77506	281 998 6159	RKHARD.SIMS@SJCD.EDU,

Public Meeting May 25, 2005, 6-8 p.m.

SIGN IN SHEET

Name & Organization	Address	City & Zip	Phone Numbers (direct & fax)	Email Address
JOE & REYNA FOR. CONG. GENE GREEN	15 S SCARBOROUGH	PAS 77502	713 472 3948	
Steve Gillette	City of La Porte			
ROBERT CUMMINGS	CITY OF LA PORTE 604 W. FAIRMONT PKWY LA PORTE, TX 77571		281-471-5020	
Sunny Stubbs - The Alliance	The Alliance 3101 Nasa Parkway, Suite C Seabrook, TX 77586		713-582-1686	sunnystubbs@houston.rr.com
Yvette Orozco Pas Citizen				
Keith Nielsen	401 Jenkins	Pasa 77506	713 477 0011	KeithL@KenMart.com

Public Meeting May 25, 2005, 6-8 p.m.

Written Comment Form

SH 225 Major Corridor Feasibility Study
From IH 610 to SH 146
Harris County

The Texas Department of Transportation is seeking your comments on the results of the SH 225 Major Corridor Feasibility Study. Your verbal and written comments are welcomed. Your comments will be given full consideration during the remainder of the planning process. Please note you will not receive a direct written response to your comments or questions. Thank you for your participation and comments.

The recommended alternatives look good. I was concerned about the area from Richey to Red Bluff, but your representative said you can expand over the feeder, which I planned to request. Please avoid eminent domain. Going west-bound into 2 lanes on 610 is good. Please be sensitive to the neighborhoods, when you get to planning the details, like ramps.

Name Pat Van Houtte

Address 603 Scott

Pasadena, TX 77506

To mail, please fold in half with this page on the inside and affix a postage stamp. Please tape (**do not staple**) closed.

Study Area

6 Main Lanes | 8 Main Lanes | 6 Main Lanes

What is a Major Corridor Feasibility Study?

- A Major Corridor Feasibility Study answers critical questions about transportation options – design concept and scope

- It's a decision-making process designed to:
  - identify transportation needs for the corridor
  - evaluate alternative, multi-modal solutions
  - garner public confidence and support for a recommended alternative

Study Approach and Schedule

Data Gathering and Evaluation of Existing Corridor
1st Round of Public Meetings
December 4, 2003
Pasadena Convention Center
2-4 pm & 6-8 pm

Winter 2003

Develop Alternatives
2nd Public Meeting
April 29, 2004
Pasadena High School
6-8 pm

Spring 2004

Analyze Short List of Alternatives

Recommended Alternative
3rd Public Meeting
May 25, 2005
Deer Park Activity Center
6-8 pm

Spring 2005

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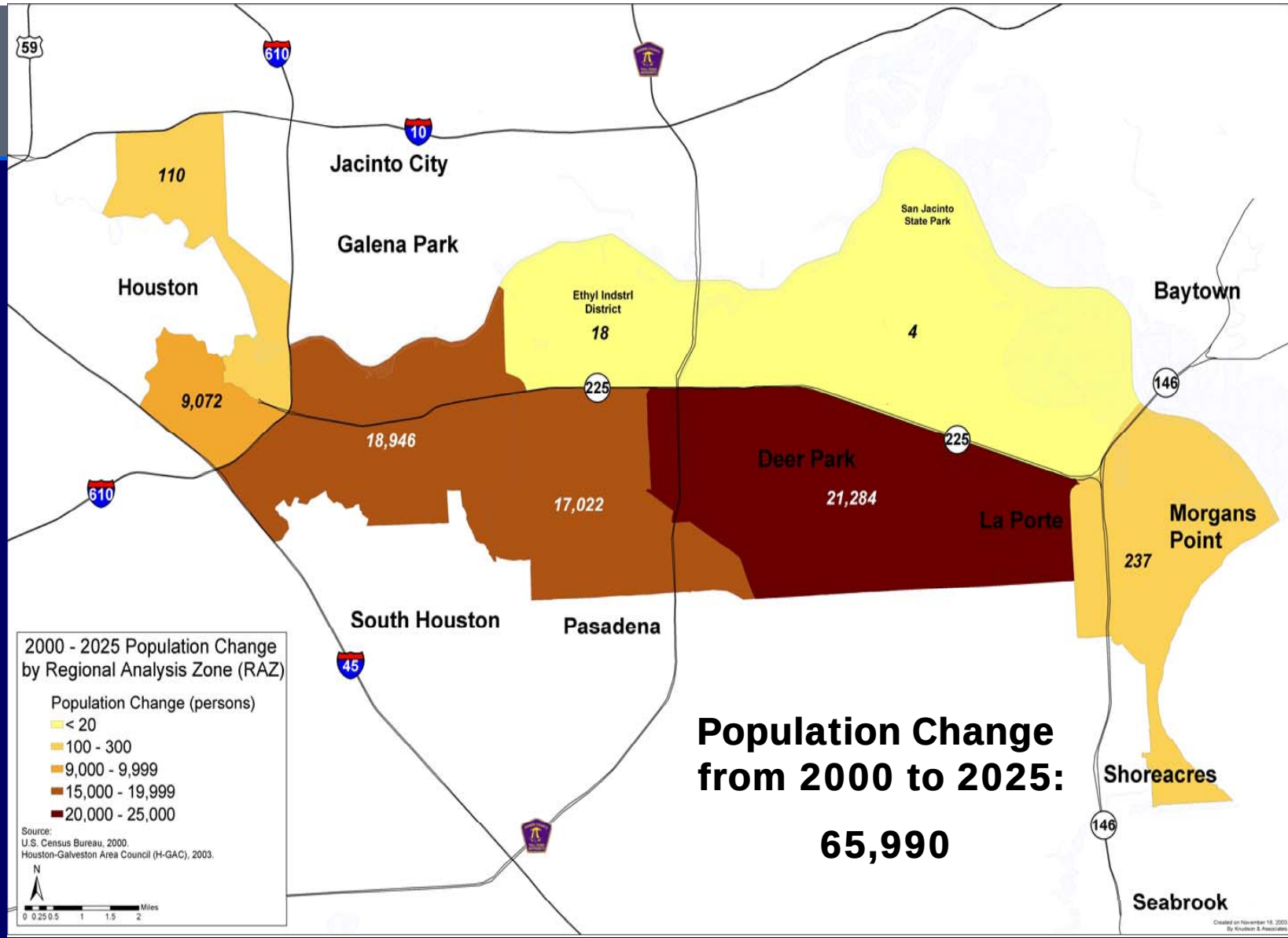
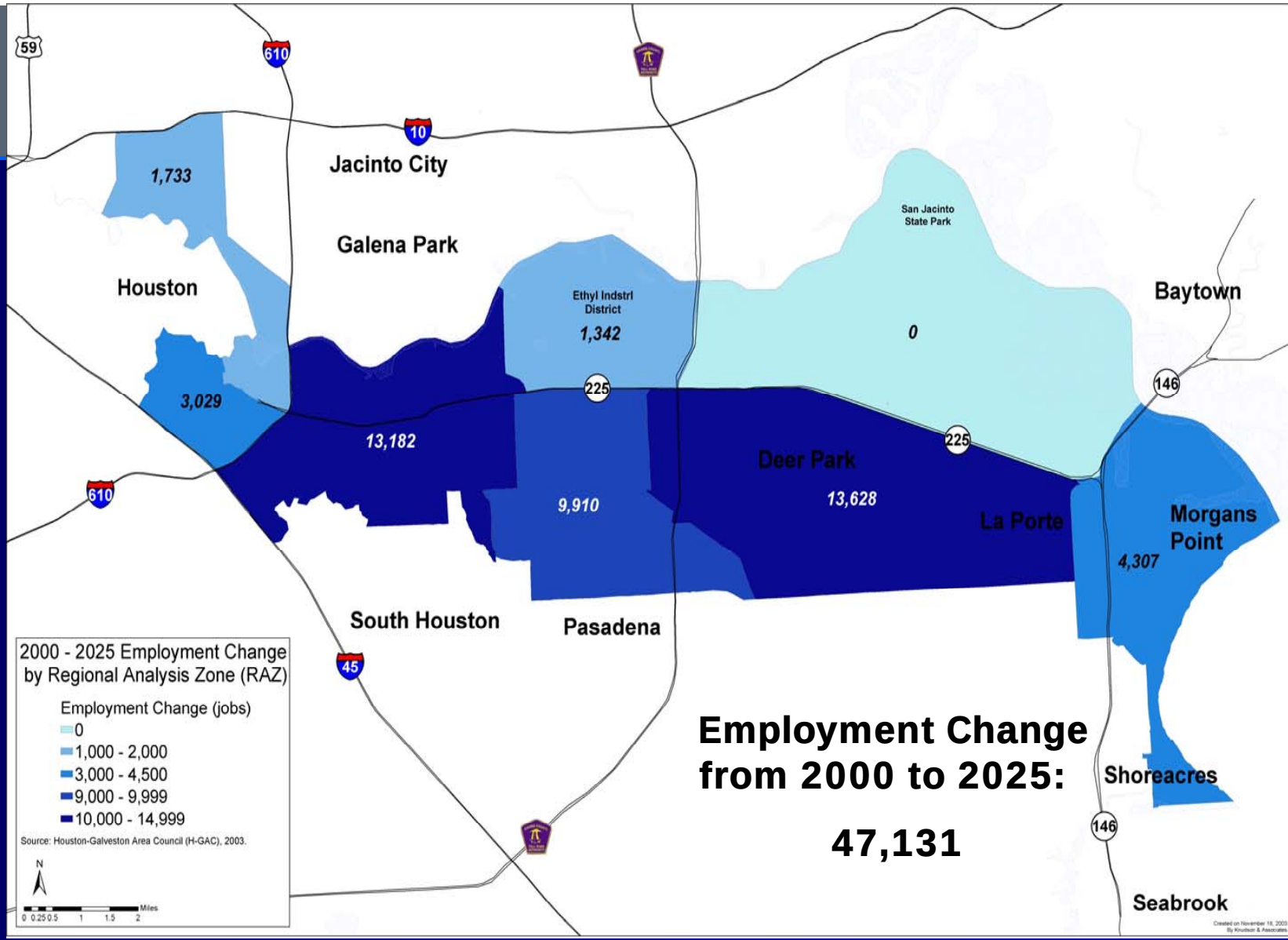
SH 225 Corridor Population Growth



Population Change from 2000 to 2025:

65,990

SH 225 Corridor Employment Growth



Employment Change from 2000 to 2025:

47,131

SH 225 Traffic Summary

Location	2002 Traffic	2002 Volume/ Capacity	2025 Assignment *	2025 Volume/ Capacity
At IH 610	198,000	1.16	288,600	1.55
West of BW 8	124,000	1.03	184,100	1.10
East of BW 8	98,000	0.61	183,500	0.89
West of SH 134	92,000	0.58	158,300	0.80
East of SH 134	77,000	0.48	151,600	0.76
West of SH 146	75,000	0.63	124,500	0.74

* Preliminary traffic assignment with no improvements to SH 225

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Study Goals and Objectives

- Improve traffic safety
  - Improve signage and way-finding
  - Upgrade to current design standards
  - Reduce conflicts with truck traffic
  - Reduce intersection conflict
- Improve mobility
  - Improve facilities to meet current and future travel demand
  - Facilitate access to residential and employment areas
  - Relieve choke point at IH 610
  - Maintain or improve Level of Service (LOS)
  - Improve interchanges

Study Goals and Objectives

- Improve hurricane and other emergency evacuation route
  - Provide evacuation route alternative
  - Effective signage and communication techniques during emergencies
  - Focus on security for corridor industries
- Improve travel choices and access
  - Provide options that encourage ridesharing and transit
  - Include provisions for pedestrians and bicycles
  - Improve local access at frontage roads and arterials

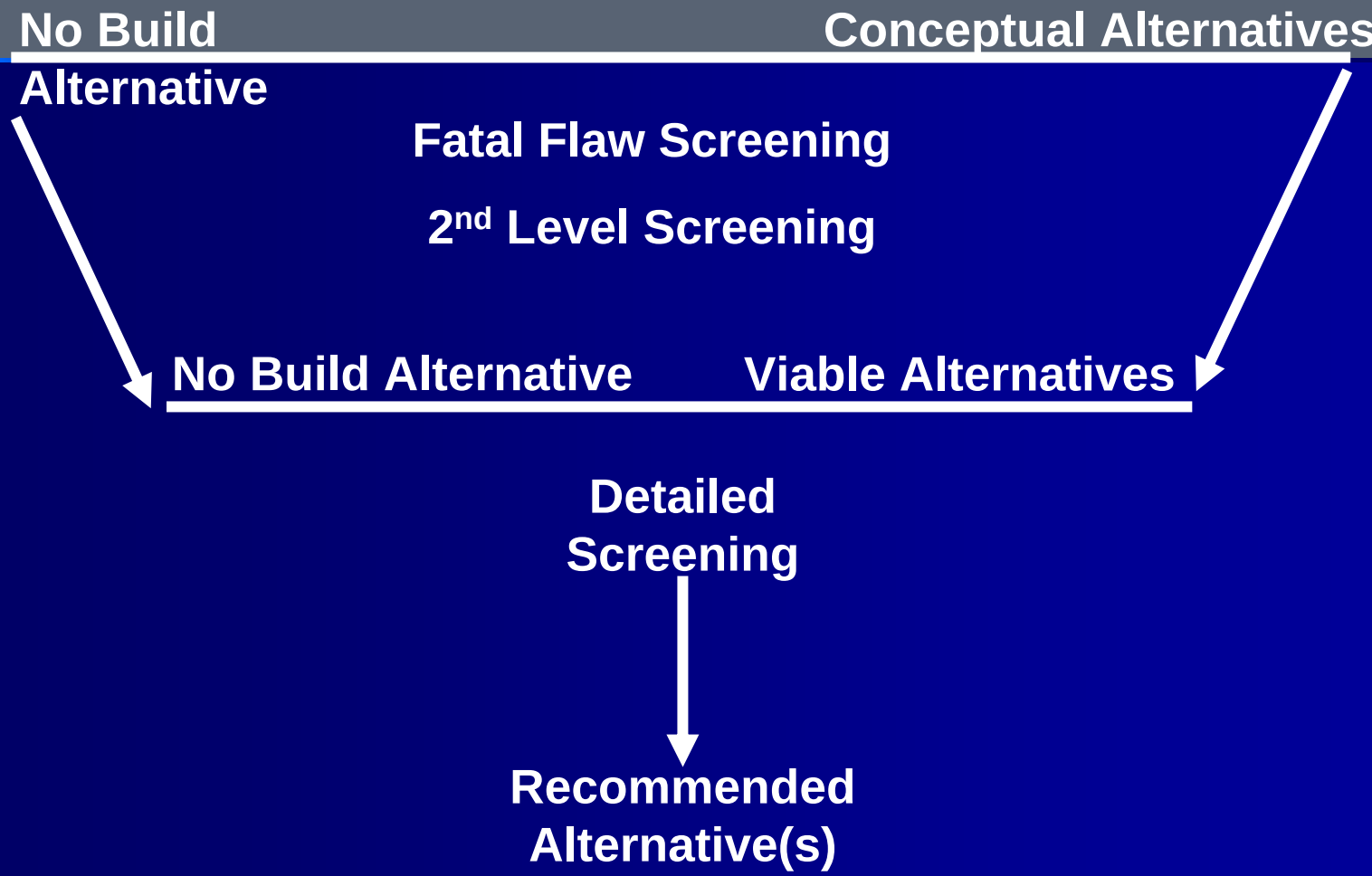
Study Goals and Objectives

- Protect natural and social environment
  - Maintain or improve air quality
  - Maintain or improve economic viability
  - Maintain or improve quality of life
  - Reduce, minimize or mitigate potential adverse impacts
- Maximize the use of existing infrastructure
  - Optimize traffic signals
  - Optimize on and off ramp configurations

Initial Modal Conceptual Alternatives

- No Build
- No Build with Committed Projects
- Widen Freeway by One General Purpose Lane in each Direction from IH 610 to Beltway 8
- High Occupancy Vehicle Lanes
- High Occupancy Toll Lanes
- Major Interchange Modifications
- Minor Interchange Modifications
- Segregated Truck Lanes
- Parallel and Relief Routes
- Convert to Toll Road
- Transit
- Commuter Rail
- Non-motorized Modes

Screening Process



Viable Alternatives

- No Build
  - demonstrates what will happen with traffic when population and employment continue to grow while the transportation network remains unchanged
  - serves as a baseline comparison for other alternatives
- No Build with Committed Projects
  - includes only transportation improvement projects that have committed funding

Viable Alternatives

- Widen Freeway by One General Purpose Lane in each Direction
  from IH 610 to Beltway 8
  - adds one regular freeway lane in each direction with major reconfiguration of ramps at key locations
- Managed Lanes
  - adds one special purpose “diamond lane” in each direction for carpools and buses
- Segregated Truck Lanes
  - adds one truck lane in each direction which would be separated from general purpose lanes

Viable Alternatives

- Interchange/Ramp Improvements
  - major modifications to IH 610/SH 225 interchange
  - minor modifications to IH 610/SH 225 interchange
  - two-lane and grade-separated entrance and exit ramps serving Beltway 8
  - two-lane entrance and exit ramps and auxiliary lanes at key locations throughout the corridor

Viable Alternatives

- Convert to Toll Road
  - convert SH 225 from a free facility to a toll road
  - freeway would be completely reconstructed
- Commuter Rail
  - establish a commuter rail line between SH 146 and METRO's Harrisburg light rail line
  - would parallel Union Pacific Railroad
  - would have 7 stations

Evaluation Criteria

- Improve Traffic Safety
- Improve Mobility
- Conceptual Costs
- Benefit/Cost Ratio
- Improve Emergency Evacuation Routes
- Protects Natural and Social Environment
- Maximize Existing Infrastructure

Detailed Level Evaluation

Summary Matrix

Alternatives	Improve Traffic Safety	Improve Mobility	Conceptual Costs	Benefit/ Cost Ratio	Improve Emergency Evacuation Routes	Protect Natural & Social Environment	Maximize Existing Infrastructure	Ranking
No Build	-3	-2	+2	-1	0	-2	0	6
No Build w/ Committed Projects	-2	-2	+3	-1	+1	-2	+2	2
Widen Freeway	0	0	0	0	+1	-3	+2	4
Add Managed Lanes	+1	-1	-2	0	+2	-3	+1	2
Interchange/ Ramp Improvements	0	+1	+2	0	+2	-3	+1	1
Segregated Truck Lanes	0	-1	+1	0	+1	-2	+2	4
Convert to Toll Road	-2	-1	-3	-1	+1	-2	+2	6
Commuter Rail	-3	-1	-2	-1	+1	-2	+1	8

Evaluation Ranking

Alternative	Ranking
No Build	6 (tied)
Committed Projects	2 (tied)
Widen Freeway	4 (tied)
Managed Lanes	2 (tied)
Interchange/Ramps	1
Truck Lanes	4 (tied)
Toll Road	6 (tied)
Commuter Rail	8

Recommended Alternative

- Interchange/Ramp Improvements

- Long Range Considerations:
  - ✓Managed Lanes from IH 610 to Beltway 8
  - ✓Widen Freeway by One General Purpose Lane in each Direction from IH 610 to Beltway 8
  - ✓ Segregated Truck Lanes

Comments?

We are interested in your opinion.

Before leaving, please complete a comment form.

Thank you for attending!