

PLANNING AND ENVIRONMENTAL LINKAGES STUDY

SUMMARY OF PREVIOUS STUDIES

PROJECT LIMITS

SH 225
I-610 TO SH 146

I-610E
TELEPHONE ROAD
TO GELLHORN DRIVE

CSJ 0502-01-228



ENTECH
CIVIL ENGINEERS, INC



TABLE OF CONTENTS

1. INTRODUCTION.....	1
1.1 Study Description.....	1
1.2 Goals of the PEL.....	Error! Bookmark not defined.
2. PEL STUDY LIMITS.....	2
2.1 Existing Roadway Description.....	Error! Bookmark not defined.
3. PREVIOUS STUDIES.....	3
3.1 SH 225 at BW8 Freight Corridor Improvements Study (TxDOT, 2017).....	4
3.2 SH 225 Major Corridor Feasibility Study (TxDOT, 2005).....	4
3.3 Port Houston: Looking Ahead Presentation (HGAC, 2018).....	5
3.4 Ports Area Mobility Study Presentation (HGAC, 2020).....	5
3.5 Unified Transportation Program (UTP) 2020 (TxDOT).....	5
3.6 Port Profiles Draft Study (HGAC, 2017).....	5
3.7 Texas Freight Mobility Plan (TxDOT, 2018).....	6
3.8 Houston-Galveston 2045 Regional Transportation Plan (RTP) (HGAC, 2019).....	7
3.9 Bridging Our Communities 2040 Regional Transportation Plan (RTP) (HGAC, 2016).....	7
3.10 Hou-Galveston 2021-2024 DRAFT Transportation Improvement Plan (TIP).....	7
3.11 Hou-Galveston 2019-2022 Transportation Improvement Plan (TIP) (HGAC, 2018).....	8
3.12 Hou-Galveston Ten-Year Plan (HGAC, 2017).....	8
3.13 East Port Transportation-Land use Vision Plan & Implementation Program.....	8
3.14 SH 146 Corridor Major Investment Study (MIS) (TxDOT).....	8
3.15 State-wide Freight Resiliency Plan (TxDOT, 2011).....	9
3.16 Houston Region Freight Study (TxDOT, 2007).....	9
3.17 Regional Goods Movement Study (HGAC, 2013).....	10
3.18 Regional Goods Movement Profile Study (HGAC, 2011).....	10
3.19 Commodity Flow Analysis Study (HGAC, 2011).....	10
3.20 Regional Goods Movement – Needs Assessment Study (HGAC, 2011).....	11
3.21 SH 146 Sub regional Plan (HGAC, 2018).....	11
3.22 Houston-Galveston Regional Safety Plan (HGAC, 2018).....	12
3.23 100 Most Congested Roadways in Texas (TTI, 2019).....	12
3.24 Houston Major Thoroughfare & Freeway Plan (COH, 2019).....	12
3.25 METRONEXT Moving Forward Plan (METRO, 2019).....	12
3.26 Truck Parking Study (TxDOT, 2020).....	12
3.27 TxDOT Waterborne Freight Corridor Study (TxDOT, 2010/2011).....	13
3.28 Greater Houston Freight Committee Presentation (HGAC, 2018).....	13
3.29 Truck Lane Restriction Study (TTI, 2004).....	14
3.30 Texas Port Mission Plan – Port Connectivity Report.....	14
3.31 Ramp Metering Feasibility Study (TTI, 1994).....	14
3.32 North Pasadena Redevelopment Plan (City of Pasadena, 2009).....	14
3.33 La Porte Comprehensive Plan (City of La Porte, 2012).....	14
3.34 Parks, Recreation and Open Space Master Plan (City of Deer Park, 2013).....	15

Summary of Previous Studies

3.35 Economic Development Strategic Plan15
4. RECOMMENDATIONS FOR THE USE OF PREVIOUS STUDIES 15
5. REFERENCES..... 17

LIST OF FIGURES

Figure 1 SH 225 and I-610E PEL Study LimitsError! Bookmark not defined.

LIST OF TABLES

Table 1 Identified Projects16

1. INTRODUCTION

The following Summary of Previous Studies Report captures the study's needs, goals, objectives, and alternative solutions previously identified by other studies; and to ensure that it is inclusive of other agency planned improvements, providing overall regional transportation system coordination.

1.1 Study Description

The Texas Department of Transportation (TxDOT) has authorized Entech Civil Engineers (Entech) to conduct a Planning and Environmental Linkages (PEL) Study for both State Highway (SH) 225 and Interstate (I)-610 East (SH 225 and I-610E PEL) in Harris County, TX. This PEL study is a high-level, early planning study that helps to identify the following aspects:

- Existing environmental and socio-economic conditions
- Transportation issues and deficiencies
- Development of a purpose and need
- Evaluation of corridor alternatives

1.2 Goals of the PEL Study

The goal of this PEL study is to develop a more seamless decision-making process that minimizes the duplication of effort, promotes environmental stewardship, and streamlines project delivery. The reports, analyses, and information obtained for the SH 225 and I-610E PEL Study can be used to help document planning information and decisions for the subsequent environmental review (i.e., NEPA) process. This PEL study will streamline the process by providing a purpose and need, identifying recommended alternative(s), and eliminating unreasonable and infeasible alternatives. This study provides an early opportunity for stakeholders and the public to provide meaningful input on potential future projects identified through the study's progression.

2. PEL STUDY LIMITS

This PEL study is comprised of two roadways, one along SH 225 and another along I-610E. SH 225 begins at I-610 and ends at SH 146 (approximately 14.60 miles). I-610E begins at Telephone Road and ends at Gellhorn Drive (approximately 8 miles). The limits of the SH 225 and I-610E PEL Study are represented in **Figure 1**.



Figure 1 SH 225 and I-610E PEL Study Limits

2.1 Existing Roadway Description

SH 225 is primarily a 6-lane divided freeway between I-610 and Deerwood Glen Dr. as well as between Miller Cut-off Rd. and SH 146. Between Deerwood Glen Dr. and Miller Cut-off Rd., SH 225 widens to an 8-lane divided freeway. SH 225 is an east to west roadway within the PEL study limits. I-610E is primarily a 10-lane divided freeway that is a north-to-south roadway within the PEL study limits.

3. PREVIOUS STUDIES

Numerous studies have been conducted within the project study area, spanning from 2004 to present, 2020. Studies have been conducted by TxDOT, as well as several other agencies including, HGAC, TTI, HCTRA, METRO, and the Port of Houston.

Previous studies summarized in this study include the following:

- SH 225 at BW8 Freight Corridor Improvements Study (TxDOT, 2017)
- SH 225 Major Corridor Feasibility Study (TxDOT, 2005)
- Port of Houston: Looking Forward Presentation (HGAC, 2018)
- Port Area Mobility Study Presentation (HGAC, 2020)
- 2020 Unified Transportation Program (UTP) (TxDOT, 2020)
- Port Profiles Draft Study (HGAC, 2017)
- Texas Freight Mobility Plan (TxDOT, 2018)
- HGAC 2045 RTP (HGAC, 2019)
- Bridging Our Communities 2040 RTP (HGAC, 2016)
- HGAC 2021-2024 Draft TIP (HGAC, 2020)
- HGAC 2019-2022 TIP (HGAC, 2018)
- HGAC 10-YEAR Plan (HGAC, 2017)
- East Port Transp.-Land Use Vision Plan (HGAC, 2010)
- SH 146 Corridor MIS (TxDOT)
- State-wide Freight Resiliency Plan (TxDOT, 2011)
- Houston Region Freight Study (TxDOT, 2007)
- Regional Goods Movement Study (HGAC, 2011-2013) (4 separate study reports in total)
- SH 146 Sub Regional Plan (HGAC, 2018)
- Houston-Galveston Regional Safety Plan (HGAC, 2018)
- 100 Most Congested Roadways in Texas (TTI, 2019)
- Houston Major Thoroughfare & FWY Plan (COH, 2019)
- METRONEXT Moving Forward Plan (METRO, 2019)
- Truck Parking Study (TxDOT, 2020)
- TxDOT Waterborne Freight Corridor Study (TxDOT, 2011)
- Greater Houston Freight Committee Presentation (HGAC, 2018)
- Truck Lane Restriction Study (TTI, 2004)
- Texas Port Mission Plan-Port Connectivity Plan (TxDOT Maritime, 2020)
- Ramp Metering Feasibility Study (TTI, 1994)
- North Pasadena Redevelopment Plan (City of Pasadena, 2009)
- La Porte Comprehensive Plan (City of La Porte, 2012)
- Parks, Recreation & Open Space Master Plan (City of Deer Park, 2013)
- Economic Development Strategic Plan (Pasadena Economic Development Corp, 2018)

Summary of Previous Studies

3.1 SH 225 at BW8 Freight Corridor Improvements Study (TxDOT, 2017)

The TxDOT Houston District completed the SH 225 at BW8 Freight Corridor Improvements Study in 2017, to improve safety, congestion, and system reliability of freight movement to/from the Port of Houston. (1) As a result of the opening of the newly constructed \$962 Million BW8 Houston Ship Channel Bridge, the SH 225 and BW8 Interchange is experiencing increasing congestion, becoming a major traffic chokepoint in the regional transportation system. Both SH 225 and BW8 are major freight corridors and evacuation routes, Connecting to the Port of Houston and numerous major industrial terminals along the Houston Ship Channel (Over 150 Private and Public Industrial Terminals).

The Study's findings recommended the construction of a fully directional interchange at the SH 225/BW8 Interchange to address the needs and goals identified in the Study, with phased improvements to meet fiscal constraints. As a result of the Study, TxDOT has completed the schematic design for the Southbound (SB) to Eastbound (EB) and the Westbound (WB) to Northbound (NB) direct connectors, with a tentative project letting date scheduled in late 2020.

3.2 SH 225 Major Corridor Feasibility Study (TxDOT, 2005)

The Houston District completed the SH 225 Major Corridor Feasibility Study in 2005, to identify transportation needs along the 15.5-mile corridor, from West of I-610 to SH 146. (2) The Study identified key problems and needs along the corridor including: mobility and safety improvement needs; connectivity needs at BW8 and I-610; added HOV/HOT lanes and separate truck lanes to address heavy freight traffic (Port of Houston); public transit needs; Evacuation Route Needs; and access to the historic San Jacinto Monument. (2) The Study identified and evaluated 6 short list alternatives, in addition to the No Build alternative.

The Study short list alternatives were ranked based on Measures of Effectiveness (MOE's), resulting in the following findings/recommendations:

- Highest Ranked and Recommended Alternative – Interchanges at BW8 & I-610; & Ramp Improvements
- Second Ranked and Recommended Alternative - Add HOV/HOT Lanes
- Third Ranked and Recommended Alternative – Widen Freeway 1 lane in each direction with segregated truck lanes

The Study's findings for the SH 225 Corridor recommended interchange improvements at BW8 and I-610, along with entrance/exit ramp improvements and added auxiliary lanes. The Study's recommendations also noted that long range needs (Beyond 2025) should consider further examination of the freeway corridor widening by one lane in each direction between I-610 and BW8 with segregated truck lanes and HOV/HOT Lanes.

Summary of Previous Studies

3.3 Port Houston: Looking Ahead Presentation (HGAC, 2018)

The presentation highlights upcoming expansion projects at Barbours Cut, Bayport Container Terminal and the Turning Basin Terminals. (3) The presentation also lists both the SH 225 Expansion Project & the SH 225/BW8 Interchange Project as important projects needed to support the Port of Houston surface freight traffic. In addition to traditional rail, roadway and waterway improvements, the presentation also discusses future freight movement modes of transportation, from the Hyperloop to the Port of Houston Autonomous Freight Shuttle.

3.4 Ports Area Mobility Study Presentation (HGAC, 2020)

The Ports Area Mobility Study presentation noted the following two important projects within the SH 225 Study limits needed to facilitate the growing freight traffic to and from the Port of Houston: 1) I-69 Bypass (The completion of the SH 99/Grand Parkway); and 2) Independence Parkway Bridge and directional interchanges at both termini – SH 225/Independence Parkway interchange and I-10/Independence Parkway Interchange. (4)

3.5 Unified Transportation Program (UTP) 2020 (TxDOT)

The Unified Transportation Plan (UTP) is a 10-Year plan for Texas that guides the development of transportation projects state-wide. (5) The UTP links the planning activities of the State-wide Long-Range Transportation Plan (SLRTP) with Metropolitan Transportation Plans (MPO) and the Rural Transportation Plan with programming under the State-wide Transportation Improvement Program (STIP). The UTP is a list of projects that are programmed to be constructed or developed within the first ten years of the 24-Year SLRTP.

Significant projects within the PEL Study area that are currently included and recommended for implementation in the 2020 UTP include: the SH 225/BW8 interchange (DC's) (Estimated letting date of 2020-2023) and the SH 146 Corridor widening project, from Fairmont Parkway to Red Bluff Road.

3.6 Port Profiles Draft Study (HGAC, 2017)

HGAC completed the Port Profiles Draft Study in 2017, to develop the Houston Port Region Freight Improvement Strategic Plan. (6) Critical projects identified in the strategic plan to improve landside movement of freight through the HGAC region included:

1. Barbours Cut Direct Connectors (TxDOT/TTI Origin-Destination Study between Barbour's Cut Terminal and the SH 146/SH 225 Interchange)
2. SH 146 Widening – Spencer Highway to Port Road (Design underway by TxDOT for anticipated letting in 2023)
3. SH 225 Expansion and Improvements (TxDOT Feasibility Study)
4. Broadway Double Track Project
5. Grand Parkway (SH 99) NE Segment (TxDOT)
6. BW8/SH 225 Direct Connectors (SB-EB & WB to NB) (TxDOT / HCTRA)
7. SH 146, from I-10 to Bus 146 (Alexander Dr) (TxDOT)
8. Penn City Connector

Summary of Previous Studies

9. Barbour's Cut Blvd Expansion to 6 Lanes (Harris County)
10. I-69 Bypass (TxDOT Design-Build Contract for SH 99 Segments H & I, from I-69 to SH 146) (HGAC is considering a southern section of the I-69 Bypass)
11. Fairmont Parkway Improvements (Harris County & City of La Porte with TxDOT Grant)
12. SH 225/I-610 Interchange Study (TxDOT SH 225 Feasibility Study)
13. I-610 Bridge over Houston Ship Channel Reconstruction
14. Independence Parkway improved NB connectivity to SH 225

The HGAC Port Profiles study findings recommended several projects highlighted above within the PEL study area.

3.7 Texas Freight Mobility Plan (TxDOT, 2018)

TxDOT completed the Texas Freight Mobility Plan in 2018. (7) The purpose of the Freight Mobility Plan Study was:

1. To identify multi-modal challenges, policies, programs, investment strategies, and data needed to enhance freight mobility
2. To provide efficient, reliable, and safe freight transportation
3. To improve the state's economic competitiveness

The Plan's goals included safety, economic competitiveness, asset preservation and utilization, mobility and reliability, multimodal connectivity, stewardship, customer service, and sustainable funding.

The Plan identified the 2045 needs to address the projected near doubling of truck traffic on the Texas Transportation network, as well as a 5-year plan with over 500 needed transportation improvements. The Plan meets all federal requirements in the "Fixing America's Surface Transportation (FAST) Act of 2015." The Study notes Texas is #1 in the nation in exports for the past 14 consecutive years. The Study also noted changing technology trends to be considered including expanding ITS, autonomous vehicles, alternative delivery systems, and increasing demands for same day deliveries

Some of the Study's needs and challenges included:

1. Congestion: Dallas-Fort Worth and Houston are among the top 10 in U.S. for trucking congestion costs, with Texas including 6 of the top 25 US freight bottlenecks in 2016 with a lack in overall alternative routes
2. Safety: Noting over 23,000 truck involved crashes in 2016
3. Asset limitations: Texas has 291 bridges with vertical clearance under 15 feet on the Texas Freight Network

The Study anticipates the Texas freight volumes will grow from 2.2 billion tons to 4 billion tons in 2045, with goods moved from origins and destinations within the state projected to nearly double. A key outcome of the Study was the development of the Texas Multimodal Freight

Summary of Previous Studies

Network (TMFN) (Both SH 225 and SH 146 are included in the Network). The Plan identified 2 key potential strategic freight projects:

1. The I-69 Bypass (From Grand Parkway to I-69 in Wharton County)
2. The I-27 Corridor (From Lubbock to Laredo)

3.8 Houston-Galveston 2045 Regional Transportation Plan (RTP) (HGAC, 2019)

The RTP identifies priority transportation projects within the 8-county Houston-Galveston Area Council (HGAC) region. (8)

The RTP includes several key projects for the region relative to the SH 225 and I-610E PEL Study, including:

- The SH 225/BW8 Interchange
- The SH 225/SH 146 Interchange
- New express bus lanes along SH 225,
- A proposed transit center along SH 225 & a Park and Ride facility in La Porte

3.9 Bridging Our Communities 2040 Regional Transportation Plan (RTP) (HGAC, 2016)

The RTP is a 20-YR projection plan that identifies priority transportation projects within the 8-county Houston-Galveston Area Council (HGAC) region. (9) The RTP includes several key projects for the region in the I-10 East/Ship Channel Corridor including: the SH 225 corridor, from Broadway to SH 146, proposing the widening of one lane in each direction from Broadway to Red Bluff Road; and interchange improvements at SH 225/I-610. The Study noted the HGAC region is an international hub for port traffic with the Port of Houston ranked #1 as the nationwide leader in handling foreign tonnage.

The Study also notes the need for entrance/exit ramp improvements along the SH 225 corridor, between I-610 and BW8 (This project is currently unfunded), as well as identifies the need for further study of a potential candidate rail line along SH 3 (Parallels I-45, from Galveston to BW8) crossing I-610 near the SH 225/I-610 interchange.

Additionally, the Study identified the need for further considerations to expand the region's future vision to include a new Regional Port Connector Route with intermodal connector improvements and relief routes, as well as the need to complete the SH 99 Loop (Grand Parkway).

3.10 Hou-Galveston 2021-2024 DRAFT Transportation Improvement Plan (TIP) (HGAC, 2020)

The TIP is a four-year program for priority projects funded within the HGAC region. (10) The 2021-2024 TIP includes several key projects for the region relative to the PEL, including:

- SH 225/BW8 Interchange
- Red Bluff Road Reconstruction Project, from SH 225 to Bearle Street

Summary of Previous Studies

- Proposed Signal at SH 225/Red Bluff Intersection

3.11 Hou-Galveston 2019-2022 Transportation Improvement Plan (TIP) (HGAC, 2018)

The TIP is a four-year program for priority projects funded within the HGAC region. (11) The 2019-2022 TIP includes several key projects for the region relative to the PEL, including:

- SH 225/BW8 Interchange
- BW8 Improvement Project, from I-10 to I-45
- Clinton Drive Reconstruction Project, from Port of Houston Gate 8 to I- 610

3.12 Hou-Galveston Ten-Year Plan (HGAC, 2017)

The HGAC Ten-Year plan includes the following regionally significant funded projects (12):

- BW8 widening from 4 to 8-lanes, from I-10 to SH 225, with reconstruction of the BW8/Ship Channel Bridge (HCTRA)
- BW8 widening from 4 to 8-lanes, from SH 225 to I-45 (HCTRA)
- Completion of SH 99 (Grand Parkway) Segment I-2 (A 4-lane Toll Road with frontage roads, from Bus 146 to SH 146)
- Clinton Drive reconstruction, from Port of Houston Gate 8 to I-610

3.13 East Port Transportation-Land use Vision Plan & Implementation Program (HGAC, 2010)

The East Port Plan was the first sub regional Planning Initiative (SPI) intended to bring multi-jurisdictions in a region together to identify sub regional needs. (13) The East Port SPI Study included local cities/communities, including Houston, Deer Park, Pasadena, La Porte, Galena Park, and Morgan's Point.

The Study identified the following needs/recommendations relative to the PEL:

- SH 225 widening to 8-lanes, from Broadway to Red Bluff
- East San Augustine Street extension to connect with SH 225

3.14 SH 146 Corridor Major Investment Study (MIS) (TxDOT)

The SH 146 Major Investment study was conducted by TxDOT for the southern segment along SH 146, from Fairmont Parkway to I-45 South. Although this study is just south of the SH 225 and I-610E PEL study limits, it does change the overall system operations that reaches the SH 225 corridor. (14) The Study identifies the need to widen and improve the SH 146 Corridor.

The SH 146 Corridor, like the SH 225 Corridor, is an important freight and hurricane evacuation route in the Houston-Galveston Region. This study evaluated numerous improvement alternatives, including a Truck Lane Alternative – exclusive truck lanes, as well as full freeway section expansion with frontage roads and intersection operational improvements.

3.15 State-wide Freight Resiliency Plan (TxDOT, 2011)

TxDOT completed the State-wide Freight Resiliency (SFR) Plan in 2011. (15) TxDOT recognizes the states highway system as a major component of a resilient freight network. The Study's scope included developing a plan to provide a comprehensive framework for identifying key freight infrastructure corridors and strategies to ensure a resilient freight transportation network in Texas.

Texas ranks as the 12th largest economy in the world and second largest in the US, the Texas freight transportation network is critical to both the state and the nation. The purpose of the SFR Plan was to determine the overall systems ability to absorb consequences of disruptions (hurricanes, floods, etc) and to reduce impacts of disruptions through maintenance of freight movement.

The Study identifies both the SH 225 and SH 146 facilities as main highway access points to the Port of Houston terminals, both critical to the Texas freight system.

3.16 Houston Region Freight Study (TxDOT, 2007)

TxDOT completed the Houston Freight Study in 2007. (16) The purpose of this study was to identify potential infrastructure improvements for the Houston Region, primarily focusing on needed rail grade separations and at-grade crossing closures. The Study emphasizes regional congestion is on the rise along with expected increased commodity movement growth, necessitating the need for a regional vision to improve circulation.

The Study details the entire Houston-Galveston region rail network. Of specific relevance, is the UPRR Strang Subdivision rail line that runs primarily parallel to the SH 225 Corridor. The UPRR Strang Sub rail line is noted to serve 25 to 30 average daily trains. The UPRR Strang rail line was constructed in 1903. This line primarily serves the Port of Houston Barbour's Cut facility, the principal water/rail intermodal container transfer facility (ICTF) in Houston.

The study analysis included freight modeling utilizing the Texas Statewide Analysis Model (SAM), a travel demand simulation modeling package used by TxDOT to evaluate the movement of people and freight throughout Texas. The study concluded truck traffic volume projections for IH-610, east of I-45, to be 15,908 ADT (7%) in year 2025; and for SH 225, east of BW8, to be 6,310 (13.1%). The SAM network included the Trans Texas Corridor (TTC), which concluded the I-69 improvements could provide needed relief to the Houston region. Noting the creation of truck only lanes and a high-speed rail corridor within the I-69 Corridor, would not only reduce congestion, but create increased efficiency. The Study states the interaction of trucks and passenger cars can decrease the capacity of a roadway. By separating truck traffic from passenger cars, the roadways could operate more efficiently and result in safer driving conditions. Roadways that provide separate truck lanes would provide benefits to both truck and passenger mobility.

3.17 Regional Goods Movement Study (HGAC, 2013)

HGAC completed the Regional Goods Movement Study in 2013. (17) The Study presents a priority short term, interim and long-range system plan for goods movement within the Houston-Galveston region. The Study identified critical issues and identified strategies for improving mobility and access in the region. The study determined that increased truck traffic will be the dominant mode of freight movement within the region, with a projected 54% increase in truck traffic by 2035. The Study identified that the majority of Intermodal Port Facilities located in the HGAC region are between SH 225 and I-10 (Both major parallel landside facilities to the Ship Channel); Connecting to both SH 225 and I-10 via Intermodal Connectors and the Port Terminal Railroad Network. The Study established an Intermodal Connector Screening Process Metrics and was able to reduce the list of Intermodal Connectors and bottlenecks from 50 to 35.

The Study notes the section of SH 225 located within the City of Deer Park is identified as a Federal Motor Carrier Safety Administration (FMCSA) designated Hazardous Materials Route. In summary, the Study recommends implementation of additional signage along SH 225; implementation of a freight ITS regional system; and future consideration of a Port Connector/Urban Core Reliever Route.

3.18 Regional Goods Movement Profile Study (HGAC, 2011)

HGAC completed the Regional Goods Movement Profile Study in 2011. (18) The Study highlights that trucking accounts for 57% of the total volume of goods and freight moving in the HGAC region compared to 22% by rail, 21% by water and less than 1% by air. In 2007 more than 465 tons of freight valued at over \$1.3 Trillion was hauled by truck over the HGAC region roadway infrastructure. Noting that volumes along I-10 across the entire state of Texas could rise to 20,000 average daily truck traffic (ADTT) by 2035. This increased truck traffic is causing accelerated pavement structure wear per the Study.

The Study notes that both the I-610 and SH 225 corridors have over 46% of their pavement structure rated as poor to very poor conditions. The Study also notes both the I-610 and SH 225 corridors as designated Hazardous Materials Routes. The Study states the I-10 and proposed I-69 Corridors are both Federally designated “Corridors of the Future.” The Study summary includes a list of needed transportation system improvements under “Issues and Concerns of Port Access Routes,” which includes the SH 225 Corridor, “SH 225 – Poor Connectivity (I-610 and BW8) and safety issues along the SH 225 Corridor.”

3.19 Commodity Flow Analysis Study (HGAC, 2011)

HGAC completed the Commodity Flow Analysis Study in 2011. (19) The Study’s executive summary states, “The Houston-Galveston region is a freight hub of national importance. Houston ranks 4th in truck volumes, 1st in pipeline volumes, 2nd in port volumes and 11th in air cargo volumes. Recognizing the potential impacts of these movements on the region’s transportation system and its economic vitality, the HGAC has commissioned a Regional Goods Movement Study in order to evaluate the region’s extensive multi-modal goods movement system, identify critical issues, and develop strategies and recommendations for

Summary of Previous Studies

improving mobility and access for both commuters and freight. This report is one in a series of technical reports. It analyses the amount and type of commodities moving across the Houston-Galveston region's transportation system. The Study data and findings from this analysis will serve as a building block for assessing the goods movement system's deficiencies and future needs.”

The Study notes freight utilizes five modes of transportation: roadways, railways, water, air, and pipelines, with trucks on roadways carrying the most freight by both weight and value. Based on this the key findings of the Study are summarized below:

- 90% of all freight tonnage moving in the HGAC region is serving the local economy, meaning it is either being picked up from or delivered to a local business or resident
- 6 of the region's top ten trading partners are within the State of Texas, requiring a reliable and efficient transportation system. By 2035, freight movement by truck mode is projected to be 92%
- The top three commodities account for nearly half of all freight moving within the region
- Harris County is the largest freight generator and receiver in the region. It accounts for more than 77% of all inbound tonnage and more than 74% of all outbound tonnage. Harris County is projected to be similarly dominant in 2035

3.20 Regional Goods Movement – Needs Assessment Study (HGAC, 2011)

HGAC completed the Regional Goods Movement Needs Assessment Study in 2011. (20) This study notes the top 15 freight significant roadways within the region, including: I-610, SH 225, BW8, I-10 and SH 146.

Key study findings included the identification of the region's top 10 freight interchange Bottleneck Locations – listing the I-45/I-610 (S) (#6) and the I-10/I-610 (E) (#7). The Study notes the highest concentrations of crashes throughout the region are at major intersections and most commonly where major highways interchange with I-610. I-610 is a critically important link in the system route planning and safety improvements for the region due to its designation and use as a Hazardous Materials Route. The Study notes that the Grand Parkway (SH 99) completion could play a key role in serving the freight movement in both the east and west, as well as connect the regions Deepwater ports and heavy industrial developments to key markets to the north/south, providing a bypass of the urban core (I -610 Relief).

3.21 SH 146 Sub regional Plan (HGAC, 2018)

The SH 146 study was conducted by HGAC in 2018 for the northern segment along SH 146, from SH 199 to I-10 East. (21) Although this study is just north of the SH 225 and I-610E PEL study limits, it does change the overall system operations that reaches the SH 225 corridor.

The Study identified the need to widen and improve access management along the SH 146 Corridor. The SH 146 Corridor, like the SH 225 Corridor, is also an important freight and hurricane evacuation route in the Houston-Galveston Region. The SH 146 Sub regional Plan

Summary of Previous Studies

identified the need for a Diamond Intersection at the SH 146/SH 99 interchange. The SH 146/SH 99 interchange is a regionally funded project.

3.22 Houston-Galveston Regional Safety Plan (HGAC, 2018)

The Houston-Galveston Regional Safety Plan (RSP) conducted by HGAC in 2018 is the first regional safety plan developed for the Houston-Galveston region and will be updated every four years in conjunction with the SHSP (State Highway Strategic Plan). (22) The 2018 HGAC RSP noted that from 2012 to 2016, vehicle crashes in the region increased by more than 40%.

The Study recommended strategies and goals to support state and local agency collaboration to improve safety and reduce crashes, from access management to operational improvements. The Study identified the regions highest crash intersections which included the SH 225/BW 8 intersection and the SH 225/Red Bluff Road intersection.

3.23 100 Most Congested Roadways in Texas (TTI, 2019)

In 2009, in response to increased state-wide roadway congestion, the Texas Legislature mandated that TxDOT annually produce a ranked list of the most congested roadways in the state of Texas. (23) This list measures congestion by the average number of hours (Hours lost/Hours of delay) a typical commuter spends to complete a commute along a roadway facility segment.

The document recommends the prioritizing of study, design, and implementation of improvements of all projects included in the top 100 most congested roadways in Texas. I-610E, between I-45 and I-10 is ranked #63 on the most congested roadways in Texas.

3.24 Houston Major Thoroughfare & Freeway Plan (COH, 2019)

The City of Houston annually updates its Major Thoroughfare and Freeway Plan (MTFP) to include all existing facilities, needed roadway extensions/reclassifications, as well as identify new needed facilities. (24) Both the existing I-610 and SH 225 Corridors are classified as freeways and included in the COH MTFP.

3.25 METRONEXT Moving Forward Plan (METRO, 2019)

The Houston Metropolitan Planning Organization (METRO) completed the METRONEXT study in 2019 to update the regions transit plan. (25) The Plan proposes the connection of the Green and Purple lines with an extension of the combined lines to Hobby Airport. This new proposed extension would cross the I-610 Corridor, between SH 225 and I-45.

3.26 Truck Parking Study (TxDOT, 2020)

The purpose of the Study is to prepare a state-wide truck parking plan that will assess the current supply and demand for truck parking in Texas, develop actionable strategies to meet truck parking needs, promote partnerships with local governments and the private sector,

Summary of Previous Studies

enhance safety, reduce congestion, and improve efficiency on the Texas Multimodal Freight Network. (26)

The Study findings concluded there are only 27,000 available truck parking spaces state-wide, both public and private, with 32,000 trucks needing parking space. The Study notes while there are four existing privately owned truck parking facilities adjacent to the SH 225 corridor, new expanded parking facilities are needed along both SH 225 and I-610 to meet current and future needs.

3.27 TxDOT Waterborne Freight Corridor Study (TxDOT, 2010/2011)

TxDOT completed the Waterborne Freight Corridor Study in 2011. (27) The Study identified critical landside chokepoints to/from the major Texas ports. Cargo volumes are expected to increase more than 50% by 2035, exacerbating existing congestion problems along critical corridors and access facilities. The Study highlighted that many of the Texas ports do not have direct or sufficient access. Acknowledging the existing access roads often are not physically capable of efficiently serving large volumes of truck traffic due to inadequate clearances, poor turning radii, and substandard pavement conditions.

SH 225, Spencer Highway and Red Bluff Road are examples of critical port access roads with insufficiencies. The Study notes in the “Issues and Concerns of Port Access Routes” the following findings relative to the PEL:

- SH 225 – Poor connectivity (I-610 & BW8) and safety issues
- SH 146 – Poor pavement conditions, congestion issues and grade crossings
- Spencer Hwy and Red Bluff Road – Poor pavement conditions, low bridge clearances along some segments, lack of access controls, and poor turning radii

The Study also identified the following constraints impacting freight movement in the Houston region:

1. SH 225, SH 146, Spencer Highway, and Red Bluff Road are major Landside Chokepoints for the Port of Houston
2. “High fees” at container-on-barge facilities
3. 24-ton container weight limits
4. Roadway congestions significantly limits competitiveness of container movement between Texas Ports

3.28 Greater Houston Freight Committee Presentation (HGAC, 2018)

The presentation provided a description of the Ports Area Mobility Study Update and identifies needed improvements in the Plan. (28) It includes the Regional Goods Movement Plan Update and the Houston-Beaumont Freight Rail Study. The presentation discussed the need for the I-69 bypass project.

3.29 Truck Lane Restriction Study (TTI, 2004)

TTI conducted a study in 2004 which included demonstration projects along I-10 and SH 225 to evaluate the restriction of trucks from use of the inside left lane during peak times. (29) The Study's findings concluded that truck lane restrictions do have a long-term impact on reducing crashes, as well as public support for the need of truck restrictions on Texas freeways. The Study concluded with recommendations for truck lane restrictions to be maintained along SH 225 and recommended along I-610, siting truck percentages as high as 13.6%.

3.30 Texas Port Mission Plan – Port Connectivity Report (TxDOT Maritime Division, 2020)

The Port Connectivity Report was developed to assess the current state of inland connectivity and focuses on roadway connections between the port gates and major freight corridors. (30)

The Study's findings recommended increased capacity of Barbour's Cut Blvd to 6-lanes with a new proposed interchange at Barbour's Cut Blvd/SH 146.

3.31 Ramp Metering Feasibility Study (TTI, 1994)

TTI conducted the Ramp Metering Study along SH 225 at the request of TxDOT. (31) The Study findings concluded freeway ramp control systems have been proven effective in reducing congestion and accidents while maintaining acceptable traffic patterns.

As a result of the Study, TxDOT installed a Computerized Transportation Management System (CTMS) along SH 225 that included installation of video surveillance, changeable message signs, main lane vehicle detection, frontage road signal operations, and freeway entrance ramp control.

3.32 North Pasadena Redevelopment Plan (City of Pasadena, 2009)

The North Pasadena Redevelopment Plan is a comprehensive plan to identify needed and prioritized capital improvement projects within North Pasadena. (32) The Plan identified increased development along the SH 225 Corridor, Red Bluff Road, and BW8.

The Plan proposes the need for creation of a community gateway along SH 225, as well as a retail/entertainment complex near the Captain Theater located at the SH 225/Pasadena Blvd intersection. A community gateway typically consists of signage, hardscape and landscape branding that highlights a community's heritage.

3.33 La Porte Comprehensive Plan (City of La Porte, 2012)

The La Porte Comprehensive Plan is a 20-Year master plan for the City. (33) The Plan identifies key issues including truck traffic, connectivity needs, trails, sidewalks, and the airport. The Plan shows increasing warehouse and distribution center development along both the SH 225 and SH 146 corridors, resulting in increased heavy truck traffic.

Summary of Previous Studies

The Plan identifies the SH 225, SH 146, Fairmont Parkway, and Underwood Road as primary corridors in its Strategic Corridors Program. The Plan recommends testing the idea of creating a special logistics park adjacent to both SH 225 and SH 146.

3.34 Parks, Recreation and Open Space Master Plan (City of Deer Park, 2013)

The Plan inventories existing parks, facilities, and programs needed to maintain quality of life in Deer Park. (34)

Within the Plan, the SH 225 corridor is identified as a corridor where pedestrian and bicycle amenities should be provided through coordinated efforts with the City of Deer Park.

3.35 Economic Development Strategic Plan (Pasadena Economic Development Corp, 2018)

The Plan identified key indicators and challenges to economic development within Pasadena. It is a 10-Year Plan to guide planning and development over the next decade. (35)

Strategies and actions recommended in the Plan relevant to the SH 225 Corridor include:

1. Create a Gateway along the SH 225 corridor at major entry points to Pasadena
2. Stimulate development along major corridors in the City including Pasadena Blvd and Red Bluff Road

4. RECOMMENDATIONS FOR THE USE OF PREVIOUS STUDIES

The studies reviewed and summarized conclusively agree that connectivity along the SH 225 Corridor is a key need, along with improved capacity, operations, safety, evacuation, and accommodation of heavy truck traffic volumes. It is recommended that all the previous study transportation needs, goals, and recommended projects identified in the previous studies section of this report be carried forward and incorporated into the SH 225 and I-610E PEL Study.

Below is a summary of the previous study findings to be carried forward in the PEL Study, specific to Public Involvement, Purpose & Need, Universe of Alternatives and Conceptual Alternatives Development:

- Improved Connectivity (Both Freeway to Freeway and Port Connectors)
- Congestion Relief (Multi-modal considerations of Express Lanes, Truck/Freight Lanes, General Purpose Lanes, Freight Rail, Port of Houston Hyperloop/Autonomous Freight Shuttle, Bus/Commuter Facilities and Bicycle/Pedestrian)
- Operational Improvements
- Safety
- Evacuation Route
- Hazardous Material Route
- Accommodation of Heavy Truck Volumes

Summary of Previous Studies

- Pedestrian and Bicycle Accommodations
- Create Community Gateways (City of Pasadena, City of Houston, City of Deer Park, and City of La Porte)

The SH 225 and I-610E PEL Study will consider the recommendations from the previous studies within the region and coordinate with the agencies (HGAC, HCTRA, METRO, City of Houston, City of La Porte, Port of Houston, City of Pasadena, and City of Deer Park) overseeing the development of those studies. Since the SH 225 and I-610E Corridor are vital connections to the Ship Channel Terminals, it will also address regional Port of Houston terminal origin/destination travel patterns and future planned expansion needs, as well as local and regional traffic projections and needs.

Table 1 shows a summary of projects and studies identified in this report that have potential impacts on the findings for the SH 225 and I-610E PEL Study. The team will continue to coordinate with the following agencies to monitor the status of these projects.

Table 1 Identified Projects

Project	Limits	Status	Agency	References
SH 225/BW 8 Interchange	Interchange	Design	HCTRA	5
SH 225/SH 146 Interchange	Interchange	Study	TxDOT	8
SH 225 Express Bus Lanes	I-610 to La Porte Center	Study	METRO	8
SH 225 Transit Center	La Porte Transit Center	Design	METRO	8
SH 225/I-610 Interchange	Interchange	Study	TxDOT	6
SH 225 Ramp Improvements	I-610 TO BW8	Study	TxDOT	2
BW8 Ship Channel Bridge	N & S of Channel	Constructed	HCTRA	12
BW8 Improvements	I-10 to I-45	Constructed	HCTRA	12
I-610 Improvements	I-45 to I-10	Study	TxDOT	23
SH 146 Widening	Spencer Hwy to Port Rd	Design	TxDOT	5
SH 225 Expansion	I-610 to SH 146	PEL Study	TxDOT	2
SH 99 (H&I)(I-69) Bypass	I-69 N to SH 146	Design/Build	TxDOT	4
SH 99 (A,B,C)(I-69 Bypass)	I-45 to I-69 S	Study	TxDOT	4
Barbours Cut Blvd Widening	Barbours Cut Terminal	Design	Harris Co.	6
Barbours Cut Direct Conn.'s	Barbours Cut to SH 225	Study	TxDOT/TTI	6
Fairmont Parkway Widening	BW 8 to 7 th Street	Design	Harris Co.	6
I-610 Ship Channel Bridge	N & S of Channel	Study	TxDOT	6
Independence Parkway	SH 225 to I-10	Design	Harris Co.	4
SH 146/SH 99 Interchange	Interchange	Design	TxDOT	21
Red Bluff Rd.	SH 225 to Bearle St.	Design	Harris Co.	10
Clinton Dr.	POH to I-610	Design	COH	11
Green/Purple LRT Extension	I-610 to Hobby Airport	Design	METRO	25
Logistics Parks @ SH 225	POH Area	Study	POH	33
Barbours Cut Terminal Exp.	Barbours Cut Terminal	Design	POH	3
Bayport Container Term. Exp.	Bayport Terminal	Design	POH	3
Turning Basin Terminal Exp.	Turning Basin	Design	POH	3
Autonomous Freight Shuttle	POH Area	Study	POH	3

5. REFERENCES

- 1.TxDOT. SH 225 at BW8 Freight Corridor Improvements. 2017.
- 2.Carter & Burgess, Inc. SH 225 Major Corridor Feasibility Study. Houston: TxDOT, 2005.
- 3.HGAC. Port of Houston: Looking Forward Presentation. 2018.
- 4.HGAC. Ports Area Mobility Study Presentation. 2020.
- 5.TxDOT. Unified Transportation Program. 2020.
- 6.HGAC. Port Profiles Draft Report. 2017.
- 7.TxDOT. Texas Freight Mobility Plan. 2018.
- 8.HGAC. 2045 Regional Transportation Plan. 2019.
- 9.HGAC. Bridging Our Communities 2040 RTP. 2016.
- 10.HGAC. 2021-2024 Draft Transportation Improvement Plan. 2020.
- 11.HGAC. 2019-2022 Transportation Improvement Plan. 2018.
- 12.HGAC. 10-Year Plan. 2017.
- 13.HGAC. East Port Transp.-Land Use Vision Plan. 2010.
- 14.TxDOT. SH 146 Corridor MIS.
- 15.Transsystems. Statewide Freight Resiliency Plan. TxDOT, 2011
- 16.HNTB Corporation. Houston Region Freight Study. TxDOT, 2007.
- 17.Cambridge Systems. Regional Goods Movement. HGAC, 2013.
- 18.Cambridge Systems. Regional Goods Movement Profile. HGAC, 2011.
- 19.Cambridge Systems. Commodity Flow Analysis. HGAC, 2011.
- 20.Cambridge Systems. Needs Assessment. HGAC, 2011.
- 21.HGAC. SH 146 Sub Regional Plan. 2018.
- 22.HGAC. Houston-Galveston Regional Safety Plan. 2018.
- 23.TTI. 100 Most Congested Roadways in Texas. 2019.
- 24.CO.H. Houston Major Thoroughfare & Freeway Plan. 2019.
- 25.METRO. METRONEXT Moving Forward Plan.2019.
- 26.TxDOT. Truck Parking Study. 2020.
- 27.Cambridge Systems. TxDOT Waterborne Freight Corridor Study. 2010.
28. HGAC. Greater Houston Freight Committee Presentation. 2018.
- 29.Darrell W. Borchardt, P.E. Truck Lane Restriction Study. TTI, 2004.
- 30.TxDOT. Texas Port Mission Plan-Port Connectivity Report. 2020.
- 31.TTI. Ramp Metering Feasibility Study. 1994.
- 32.City of Pasadena. North Pasadena Redevelopment Plan. 2009.
- 33.City of La Porte. La Porte Comprehensive Plan. 2012.
- 34.City of Deer Park. Parks, Recreation, and Open Space Master Plan. 2013.
- 35.Pasadena Economic Development Corp. Economic Development Strategic Plan.2018.