

HARRIS COUNTY TOLL ROAD AUTHORITY SYSTEMWIDE COMPREHENSIVE TRAFFIC AND REVENUE STUDY REPORT

DECEMBER 2024



 HARRIS COUNTY
TOLL ROAD AUTHORITY

**CDM
Smith**



Table of Contents

Disclaimer	D-1
Chapter 1 Introduction	1-1
HCTRA System Description	1-1
Sam Houston Tollway	1-2
Hardy Toll Road.....	1-2
Westpark Tollway.....	1-3
Fort Bend Parkway Extension.....	1-3
Tomball Tollway.....	1-3
Katy Managed Lanes.....	1-3
Planned HCTRA System Improvements	1-4
Ship Channel Bridge Replacement/Sam Houston Tollway Widening.....	1-5
Sam Houston Tollway Northeast Widening.....	1-5
Hardy Toll Road and Sam Houston Parkway Direct Connectors	1-5
Hardy Toll Road at SH 225 Direct Connectors	1-5
Hardy Downtown Connector.....	1-5
Overview of Other Future Regional Toll Road Projects.....	1-6
Additional Segments of Grand Parkway	1-6
Fort Bend County Extensions	1-6
SH 249 Extension	1-6
Study Objectives and Scope.....	1-7
Order of Presentation	1-8
Chapter 2 Data Collection and Traffic and Revenue Trends	2-1
Systemwide Annual Transactions and Revenue Trends	2-1
Systemwide Monthly Transactions and Revenue Trends	2-6
Recent Transaction and Revenue Trends by Section	2-8
Hardy Toll Road.....	2-8
Sam Houston Tollway	2-10
Other HCTRA Facilities	2-14
Monthly Traffic Variations	2-16
Daily Traffic Variations	2-17
Hourly Traffic Variations	2-18
Trends in AVI Utilization.....	2-20
Toll Rates	2-21
Traffic Data Collection	2-26
Speed Data	2-35
Origin-Destination Data.....	2-36
Chapter 3 Regional Demographic and Economic Trends	3-1
Historical Regional Trends	3-2
Historical Population Trends.....	3-2
Historical Employment Trends	3-5
Historical Personal Income Trends	3-6
Recent Economic Trends and Outlook.....	3-8
Recent Employment Trends	3-8
Factors Affecting Future Regional Economic Growth.....	3-9
Economic Geography	3-11
Regional Growth Forecasts	3-11

Table of Contents

Background Transportation Improvements..... 3-13

Evaluation of H-GAC Forecasts 3-19

 Small Area Forecast Method Overview 3-21

 Future Transportation Network Assumptions 3-22

 Contact with Area Agencies and Organizations..... 3-23

 RAZ Level Forecasts..... 3-23

 Distributing RAZ-Level Forecast Data to TAZ-Level 3-23

 CDS and H-GAC Forecasts..... 3-23

CDS Forecast Revisions..... 3-33

Summary of Independent Socioeconomic Review 3-36

Consumer Price Index 3-37

Chapter 4 Traffic and Toll Revenue Estimates..... 4-1

 Basic Assumptions 4-1

 Traffic and Revenue Forecasting Process 4-3

 H-GAC Model Information 4-4

 Highway Network Development 4-4

 Trip Table Adjustments 4-4

 Toll Diversion Methodology 4-5

 Traffic and Toll Revenue Estimation Assumptions 4-5

 Truck Traffic Shares/Truck Toll Assumptions..... 4-5

 AVI Shares..... 4-6

 Annual Revenue Days..... 4-7

 Values-of-Time and Vehicle Operating Costs..... 4-8

 Toll Rates for HCTRA Facilities 4-8

 Base Year Model Validation 4-12

 Future Toll Rates 4-14

 Estimated Annual Transactions and Revenue 4-15

 Sensitivity Analysis 4-19

Appendix A Indendent Demographic Review A-1

List of Figures

Figure 1-1. Location Map	1-2
Figure 1-2. Proposed Toll Road Improvements.....	1-4
Figure 1-3. Future Toll Road Improvements in Greater Houston Metropolitan Area	1-7
Figure 2-1. Systemwide Annual Transactions and Revenue	2-2
Figure 2-2. HCTRA System Section Locations.....	2-3
Figure 2-3. Hardy Toll Road Monthly Transactions.....	2-9
Figure 2-4. Hardy Toll Road Monthly Revenue	2-10
Figure 2-5. Sam Houston Tollway North, Central, South - Monthly Transactions	2-12
Figure 2-6. Sam Houston Tollway Southeast, Southwest - Monthly Transactions	2-13
Figure 2-7. Sam Houston Tollway East, Northeast, Ship Channel Bridge - Monthly Transactions	2-13
Figure 2-8. Sam Houston Tollway Monthly Revenue.....	2-14
Figure 2-9. Other HCTRA Facilities – Monthly Transactions.....	2-15
Figure 2-10. Other HCTRA Facilities – Monthly Revenue.....	2-16
Figure 2-11. Systemwide Daily Transactions by Month.....	2-17
Figure 2-12. Systemwide Daily Transactions by Day of Week	2-18
Figure 2-13. Percent of Weekday Total Transactions by Hour – Hardy North	2-19
Figure 2-14. Percent of Weekday Total Transactions by Hour – Sam Houston North.....	2-19
Figure 2-15. Trends in AVI Utilization.....	2-20
Figure 2-16. Toll Rates for Sam Houston Tollway and Hardy Toll Road.....	2-22
Figure 2-17. Toll Rates for Sam Houston Tollway, Westpark Tollway and Fort Bend Parkway	2-23
Figure 2-18. Toll Rates for Tomball Tollway.....	2-24
Figure 2-19. Traffic Count Screenline Locations.....	2-27
Figure 2-20. Speed and Delay Routes	2-36
Figure 2-21. Origin–Destination Analysis Zones.....	2-37
Figure 3-1. Houston MSA Historical Employment Trends from BLS	3-8
Figure 3-2. Energy Prices from CDS Report.....	3-10
Figure 3-3. CDS Small Area Forecast Methodology	3-22
Figure 3-4. Historical and Forecasted Population: H-GAC Model Area	3-27
Figure 3-5. Historical and Forecasted Employment: H-GAC Model Area	3-27
Figure 3-6. CDS Forecasted Population Growth 2025-2045	3-28
Figure 3-7. CDS Forecasted Employment Growth 2025-2045	3-29
Figure 3-8. CDS Forecasted Population Density for 2025.....	3-30
Figure 3-9. CDS Forecasted Population Density for 2045.....	3-31
Figure 3-10. CDS Forecasted Employment Density for 2025.....	3-32
Figure 3-11. CDS Forecasted Employment Density for 2045.....	3-33
Figure 3-12. Historical CPI-W Growth Comparison	3-39
Figure 4-1. Toll Rates for Sam Houston Tollway and Hardy Toll Road	4-9
Figure 4-2. Toll Rates for Sam Houston Tollway, Westpark Tollway and Fort Bend Parkway	4-10
Figure 4-3. Toll Rates for Tomball Tollway	4-11
Figure 4-4. Traffic Count Screenline Locations	4-13
Figure 4-5. Comparison of Model Traffic Volumes and Observed Traffic Counts.....	4-13
Figure 4-6. HCTRA Systemwide Annual Revenue.....	4-18
Figure 4-7. Traffic and Revenue Sensitivity Analysis 2045	4-20

List of Tables

Table 2-1. Total Cumulative Annual Transactions	2-5
Table 2-2. Annual Toll Revenue by Section	2-5
Table 2-3. Monthly Systemwide Transaction and Revenue Trends	2-7
Table 2-4. Historical Two-Axle Toll Rates Through 2024	2-25
Table 2-5. Screenline Locations.....	2-28
Table 3-1. Historical Population Growth by County	3-3
Table 3-2. Historical Total Employment Growth by County	3-6
Table 3-3. Historical Per Capita Personal Income by County.....	3-7
Table 3-4. Future Capacity Improvements Planned near the HCTRA System.....	3-14
Table 3-5. Comparison of County-Level Population Forecasts between H-GAC and CDS	3-24
Table 3-6. Comparison of County-Level Employment Forecasts between H-GAC and CDS	3-26
Table 3-7. Comparison of County-Level Population Forecasts by CDS in 2019 and 2023.....	3-34
Table 3-8. Comparison of County-Level Employment Forecasts by CDS in 2019 and 2023	3-35
Table 3-9. Consumer Price Index for All Urban Consumers	3-38
Table 4-1. Truck Shares by Facility.....	4-5
Table 4-2. Assumed AVI Percentages for Future Years.....	4-6
Table 4-3. Annual Revenue Days by Facility.....	4-7
Table 4-4. Passenger Car Operating Costs	4-8
Table 4-5. Assumed Passenger Car Toll Rates by Toll Gantry for Future Years.....	4-14
Table 4-6. Estimated Annual Transactions by Section for HCTRA Facilities	4-16
Table 4-7. Estimated Annual Revenue by Section for HCTRA Facilities.....	4-17

Disclaimer

CDM Smith used currently-accepted professional practices and procedures in the development of traffic and revenue estimates. However, as with any forecast, differences between forecasted and actual results may occur, as caused by events and circumstances beyond the control of the forecasters. In formulating the estimates, CDM Smith reasonably relied upon the accuracy and completeness of information provided (both written and oral) by Harris County Toll Road Authority (HCTRA). CDM Smith also relied upon the reasonable assurances of independent parties and is not aware of any material facts that would make such information misleading.

CDM Smith made qualitative judgments related to several key variables in the development and analysis of the traffic and revenue estimates that must be considered as a whole; therefore, selecting portions of any individual result without consideration of the intent of the whole may create a misleading or incomplete view of the results and the underlying methodologies used to obtain the results. CDM Smith gives no opinion as to the value or merit of partial information extracted from this report.

All estimates and projections reported herein are based on CDM Smith's experience and judgment and on a review of information obtained from multiple agencies, including HCTRA. These estimates and projections may not be indicative of actual or future values and are therefore subject to substantial uncertainty. Certain variables such as future developments, economic cycles, global pandemics, and impacts related to advances in automotive technology cannot be predicted with certainty and may affect the estimates or projections expressed in this report, such that CDM Smith does not specifically guarantee or warrant any estimate or projection contained within this report.

While CDM Smith believes that the projections and other forward-looking statements contained within the report are based on reasonable assumptions as of the date of the report, such forward-looking statements involve risks and uncertainties that may cause actual results to differ materially from the results predicted. Therefore, following the date of this report, CDM Smith will take no responsibility or assume any obligation to advise of changes that may affect its assumptions contained within the report, as they pertain to socioeconomic and demographic forecasts, proposed residential or commercial land use development projects and/or potential improvements to the regional transportation network.

CDM Smith is not, and has not been, a municipal advisor as defined in Federal law (the Dodd Frank Bill) to by HCTRA and does not owe a fiduciary duty pursuant to Section 15B of the Exchange Act to HCTRA with respect to the information and material contained in this report. CDM Smith is not recommending and has not recommended any action to the HCTRA. The HCTRA should discuss the information and material contained in this report with any and all internal and external advisors that it deems appropriate before acting on this information.

Chapter 1

Introduction

At the request of the Harris County Toll Road Authority (HCTRA), CDM Smith completed the development of annual traffic forecasts and toll revenue estimates for a 29-year period from FY2025 to FY2053 for the HCTRA System. This traffic and revenue (T&R) report reflects the latest HCTRA tolling and capital improvement assumptions, regional transportation plan (RTP) assumptions, updated population and employment projections, and observed traffic volumes, travel patterns, and levels of congestion. This forecast builds upon previous T&R analyses conducted by CDM Smith.

HCTRA System Description

Figure 1-1 shows the existing HCTRA toll road system which includes the following toll facilities:

- Sam Houston Tollway
- Hardy Toll Road
- Westpark Tollway
- Fort Bend Parkway Extension
- Tomball Tollway
- Katy Managed Lanes

Toll collection on the HCTRA System is operated using an all-electronic tolling (AET) approach. HCTRA accepts valid transponders for payment at all toll plazas and offers license plate-based tolling for vehicles without transponders. Transponders accepted on HCTRA's roadways include HCTRA's EZ Tag as well as TxDOT's TxTag, North Texas Tollway Authority's (NTTA's) TollTag, Oklahoma Turnpike Authority's (OTA's) PIKEPASS, and Kansas Turnpike Authority's (KTA's) K-TAG.

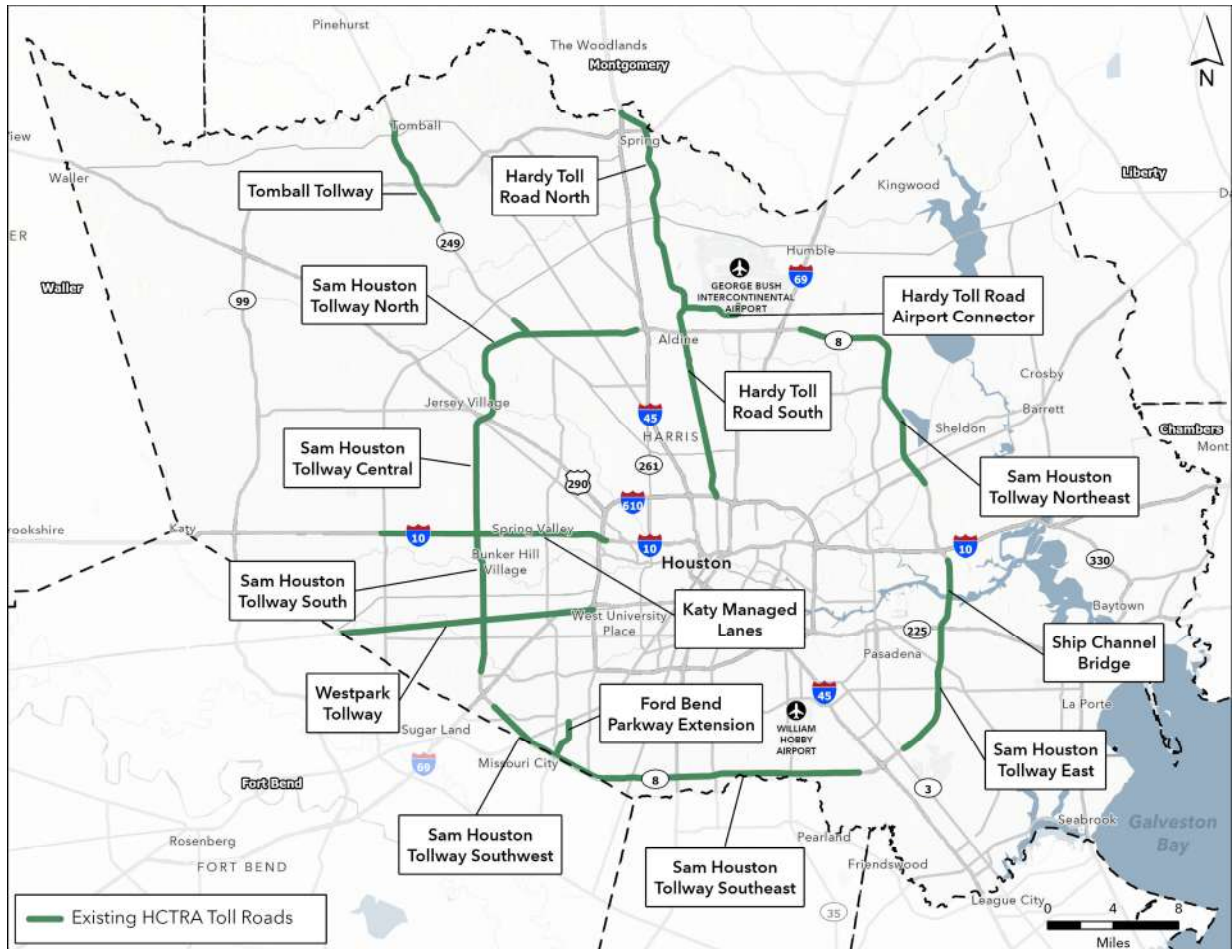


Figure 1-1
Location Map

Sam Houston Tollway

The Sam Houston Tollway forms a significant part of an 88-mile loop around Harris County. The tolled portions of the roadway include the northwest, southwest, southeast and northeast quadrants of the loop which total approximately 70 miles long. Frontage roads run along most of the Sam Houston Tollway, except at the Ship Channel Bridge. The frontage roads and certain portions of the main lanes (freeway) that are not tolled are commonly known as Beltway 8 and fall under TxDOT's jurisdiction.

Hardy Toll Road

The Hardy Toll Road is a 21-mile toll road parallel to IH 45. The northern terminus is at IH 45 just south of the Harris County/Montgomery County line and just north of SH 99/Grand Parkway. Currently, the southern terminus is IH 610, approximately 3.6 miles from Houston central business district (CBD). There is a tolled two-mile spur that connects the Hardy Toll Road to George Bush Intercontinental Airport known as the Hardy Airport Connector.

Westpark Tollway

The Westpark Tollway (HCTRA's portion) is a 13-mile toll facility extending from the Harris/Fort Bend County Line near FM 1464 to IH 610 near the Galleria. The Fort Bend County Toll Road Authority (FBCTRA) owns and operates an eight-mile extension of the Westpark Tollway in Fort Bend County from the Harris/Fort Bend County Line to west of FM 723 in Katy and Richmond. T&R estimates from only HCTRA's portion of the Westpark Tollway are included in this report.

Fort Bend Parkway Extension

The Fort Bend Parkway Extension (HCTRA's portion) connects FBCTRA's portion of the Fort Bend Parkway at the Harris/Fort Bend County Line/Sam Houston Tollway to US 90A in Harris County. FBCTRA owns and operates the remaining 6.2 miles of the Fort Bend Parkway between the Harris/Fort Bend County Line/Sam Houston Tollway and Sienna Ranch Road. Most of this roadway is in Fort Bend County and only the two-mile Fort Bend Parkway Extension, from the Sam Houston Tollway to US 90A, is in Harris County. T&R estimates from only HCTRA's portion of the Fort Bend Parkway are included in this report.

Tomball Tollway

The Tomball Tollway is the most recently constructed HCTRA facility and provides three toll lanes in each direction within the existing SH 249 corridor. SH 249 extends from IH 45 in North Houston, in Harris County, to the intersection of FM 1774 and FM 149 in Pinehurst, in Montgomery County. The Tomball Tollway opened in April 2015 as a six-mile toll road between Spring Cypress Road and FM 2920 in Tomball, with continuous toll-free frontage roads. Tomball Tollway intersects with Segment F of the Grand Parkway. A 2.2-mile extension from FM 2920 to the Harris/Montgomery County Line opened to traffic in December 2019. From the Harris/Montgomery County Line northward in Montgomery County, MCTRA constructed an additional 3.4 mile extension, including four toll lanes and continuous toll-free frontage roads from Spring Creek to just north of the Woodtrace subdivision.

Katy Managed Lanes

The Katy Managed Lanes are tolled express lanes within the median of IH 10 and opened to traffic during weekday peak hours in October 2008. The lanes were opened to single occupant vehicles (SOVs) and truck traffic in April 2009. At that time, the facility's operation was expanded to 24-hours. METRO buses and school buses can use the Katy Managed Lanes toll free, while HOVs and motorcycles can use the Katy Managed Lanes for free on weekdays from 5 to 11 AM and 2 to 8 PM. During all other times, these vehicles pay the prevailing toll rate.

Prevailing tolls are posted ahead of all entrances. SOVs and trucks are charged a toll at all times. SOVs have a higher toll rate during the weekday peak periods (5 to 11 AM and 2 to 8 PM) while trucks are charged the same rate regardless of the time of day.

Planned HCTRA System Improvements

As shown in **Figure 1-2**, there are several planned improvements to the tolled roadway network in the Greater Houston metropolitan area. Some improvements are near completion while others are in the preliminary planning stages. There are five significant improvements planned for the HCTRA system itself. Those are 1) Ship Channel Bridge Replacement/Sam Houston Tollway Widening, 2) Sam Houston Tollway Northeast Widening, 3) Hardy Toll Road at Sam Houston Parkway Direct Connector, 4) SH 225 at Sam Houston Tollway Connector, 5) Hardy Downtown Connector.

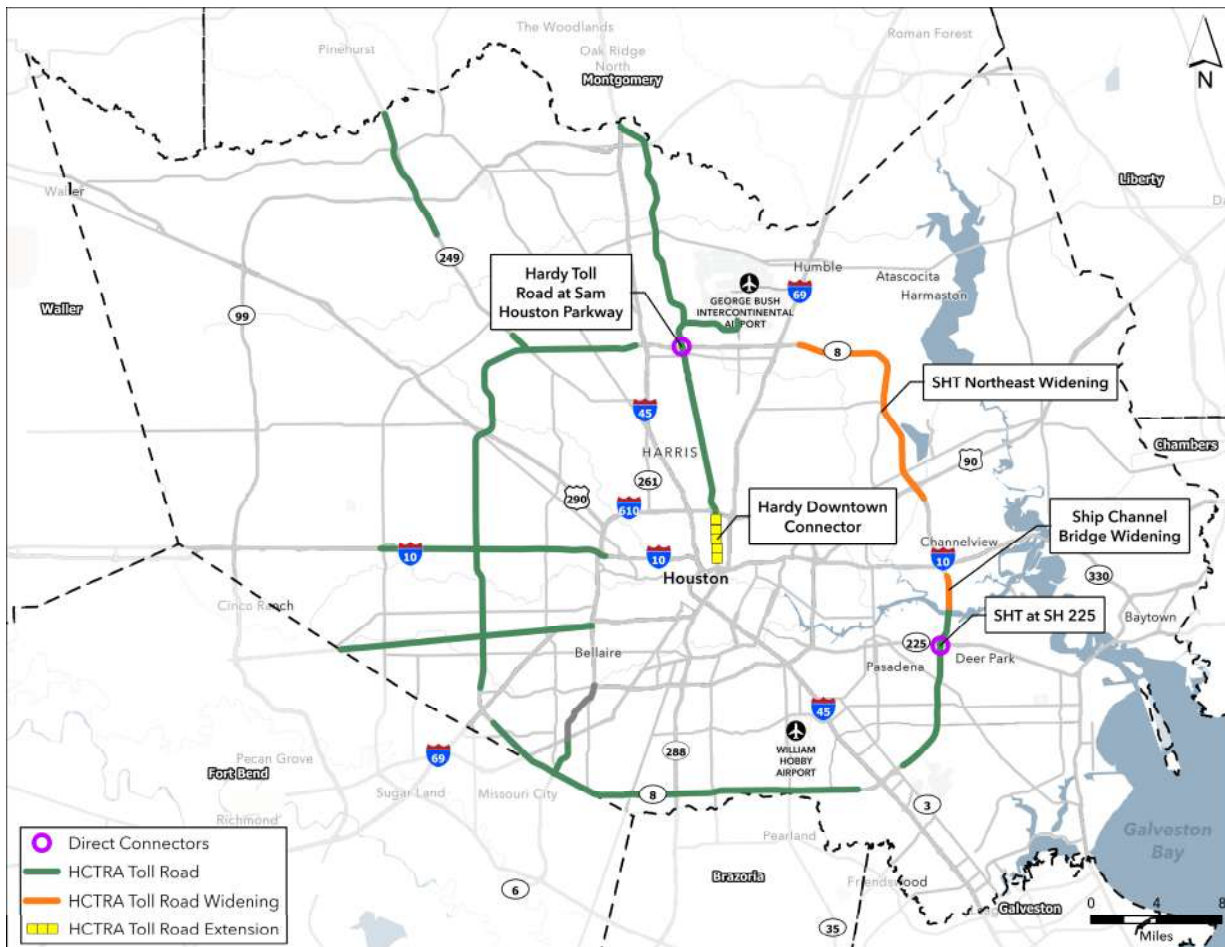


Figure 1-2
Proposed Toll Road Improvements

Ship Channel Bridge Replacement/Sam Houston Tollway Widening

The widening of the Sam Houston Tollway between SH 225 and IH 10 will consist of the construction of a new bridge span across the Houston Ship Channel providing four toll lanes and full shoulders in each direction. Construction is expected to be completed in January 2028. The proposed northbound and southbound bridges will be separate structures and is anticipated to enhance safety and improve mobility while adding capacity for traffic growth in the region.

Sam Houston Tollway Northeast Widening

The Sam Houston Tollway Northeast segment between US 90 and Old Humble Road will be widened from four lanes to six lanes. The construction is expected to be completed in January 2032.

Hardy Toll Road at Sam Houston Parkway Direct Connectors

Today there is one existing direct connector from Sam Houston Parkway to Hardy Toll Road north bound. Seven new direct connectors are planned to provide direct connections between all directions of Sam Houston Parkway and Hardy Toll roads. The new direct connectors are anticipated to be open by January 2030.

Hardy Toll Road at SH 225 Direct Connectors

Five new direct connectors between Sam Houston Tollway and SH 225 will be built to provide direct transit between the two facilities without intersection delays. The construction is expected to be completed by June 2030.

Hardy Downtown Connector

The proposed Hardy Downtown Connector, a planned 3.6-mile extension of the existing Hardy Toll Road into downtown Houston, is projected to be completed by 2028. This connector will extend the Hardy Toll Road from its current southern terminus at IH 610 to a direct connection with IH 69/US 59 and Elysian Street immediately adjacent to downtown Houston. This will provide a more direct connection from the existing Hardy to Houston's central business district (CBD) and will enable traffic to avoid the congested freeway approaches to and from downtown, namely IH 69/US 59 and IH 45. Tolling will be at a single main lane tolling location and a pair of ramps at Cavalcade Street. A detailed line diagram is provided in Chapter 4.

Overview of Other Future Regional Toll Road Projects

Figure 1-3 shows a number of planned expansions of the toll road system in the Greater Houston metropolitan area, in addition to those currently planned by HCTRA. It is important to ensure the T&R forecasts take these major regional capacity improvements into consideration. These projects may impact the HCTRA System traffic and revenue.

Additional Segments of Grand Parkway

The northwestern and northern portions of Grand Parkway (Segments D through I) were opened between 2013 and 2023. These projects are shown in blue in **Figure 1-3**. According to the H-GAC RTP 2045 update, Segment F-2 is expected to be widened to 6 lanes by year 2026 and Segment E to be widened to 6 lanes by year 2028. The southern portion, and the remaining Grand Parkway Segments B and C, in Fort Bend, Brazoria, and Galveston Counties, are still under development.

Fort Bend County Extensions

In Fort Bend County, FBCTRA is planning two extensions which may impact T&R on portions of the HCTRA System. Westpark Tollway was recently extended westward from its previous terminus at Grand Parkway to FM 723 and was opened to traffic in 2018. Additional extensions of FBCTRA's Fort Bend Parkway, which connects directly with HCTRA's portion of Fort Bend Parkway in southwest Houston, is also being considered. This is likely to be implemented in two phases but is ultimately planned to connect with the southwest portion of Grand Parkway (Segment C) in southcentral Fort Bend County pending the completion of that section of Grand Parkway south of IH 69/US 59.

SH 249 Extension

The Tomball Tollway, SH 249, is also planned for significant extension in the near future. TxDOT plans to construct Phases III and IV of SH 249 as a toll facility. That will eventually extend the tollway to SH 105 near Navasota in Grimes County. The full completion of the SH 249 facility is expected to have a positive impact on HCTRA's Tomball Tollway T&R.

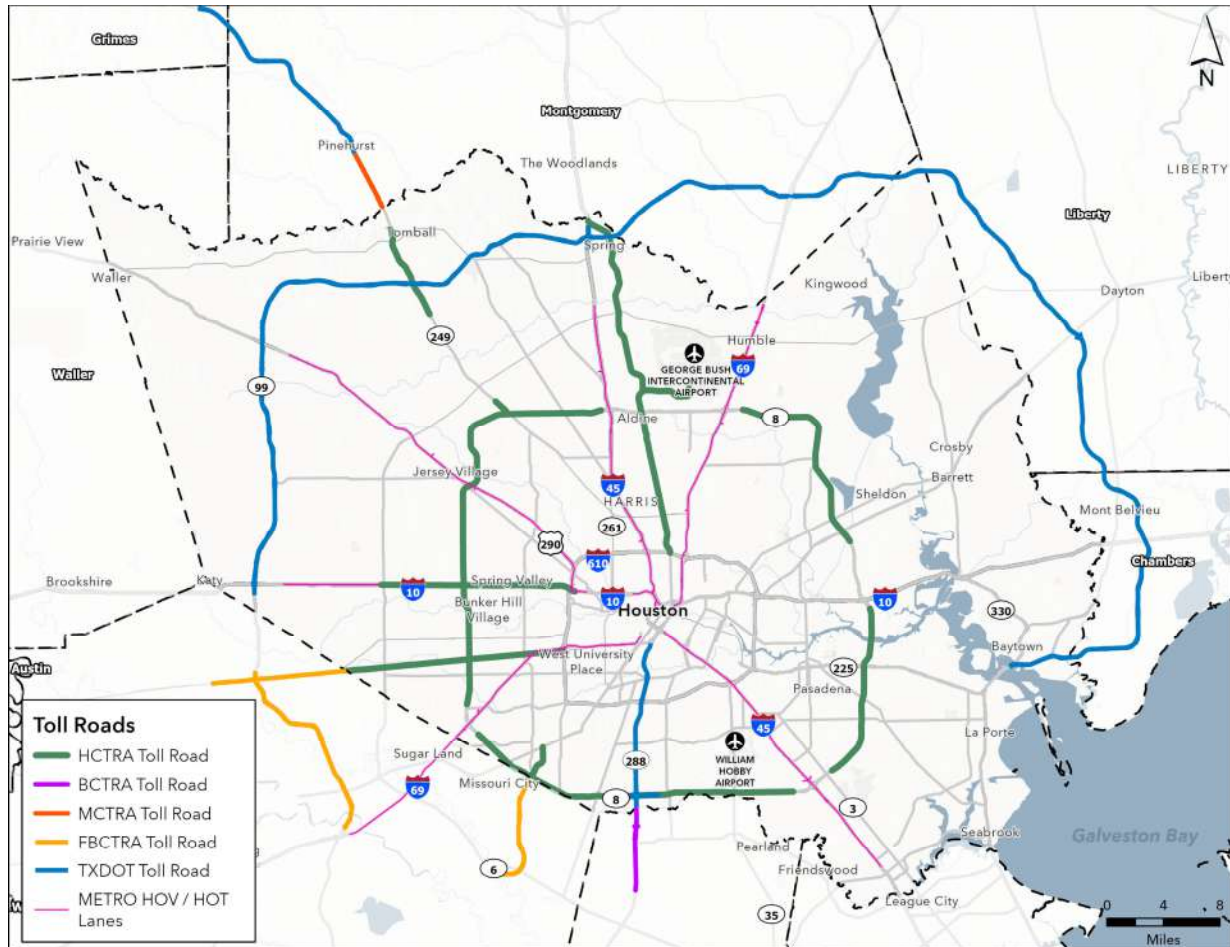


Figure 1-3
Future Toll Road Improvements in Greater Houston Metropolitan Area

Study Objectives and Scope

The objective of the effort documented in this report was to develop updated comprehensive, long-range traffic forecasts and revenue estimates for the HCTRA System. These forecasts will be suitable to support bond financing/refinancing efforts. The updated forecasts reflect the latest socioeconomic growth assumptions, the latest planned major regional roadway capacity improvements, the most recent baseline traffic levels at all toll plazas, and annual toll rate increases on the HCTRA System.

CDM Smith periodically develops systemwide T&R forecasts for the HCTRA System. The most recent systemwide forecast, prior to the current effort, was completed in 2019. This report describes various transportation and economic factors that have changed since the previous

analysis was complete. These changes have been incorporated into and form the foundation upon which these T&R forecasts have been developed.

An independent consultant was retained to review and update the socioeconomic forecasts for the entire Greater Houston metropolitan area. The independent review built upon updated underlying socioeconomic projections for the region which were developed by the Houston-Galveston Area Council (H-GAC). For this study, the latest official travel demand model datasets were obtained from H-GAC. This included the latest official demographics and input model networks used in the Regional Transportation Plan (RTP) 2045 Plan.

Using the updated socioeconomic forecasts developed by Community Development Strategies (CDS), H-GAC staff ran the regional travel demand model and developed updated trip tables for use by CDM Smith. These future year trip tables were then used as inputs to the CDM Smith toll diversion models to estimate the level of growth in traffic to be expected on each section of the HCTRA System.

A 30-year T&R forecast was developed for the HCTRA System. This forecast assumes the continuation of HCTRA's current toll rate adjustment policy, which includes annual inflation-based toll rate increases. These forecasts are included in Chapter 4 of this report.

Order of Presentation

The remaining chapters of this report are organized as follows:

Chapter 2, Data Collection and Traffic and Revenue Trends, provides a summary of existing traffic and operating conditions of the HCTRA System and includes an analysis of the impacts on HCTRA's facilities attributable to various changes in the Houston area.

Chapter 3, Regional Demographic and Economic Trends, presents an overview of regional economic trends and forecasts.

Chapter 4, Estimated Traffic and Toll Revenue, presents the results of the T&R analyses by facility for the HCTRA System as well as a series of sensitivity tests.

A detailed appendix (**Appendix A**) is also provided that summarizes the findings of the independent economist, Community Development Strategies (CDS), Inc.

Chapter 2

Data Collection and Traffic and Revenue Trends

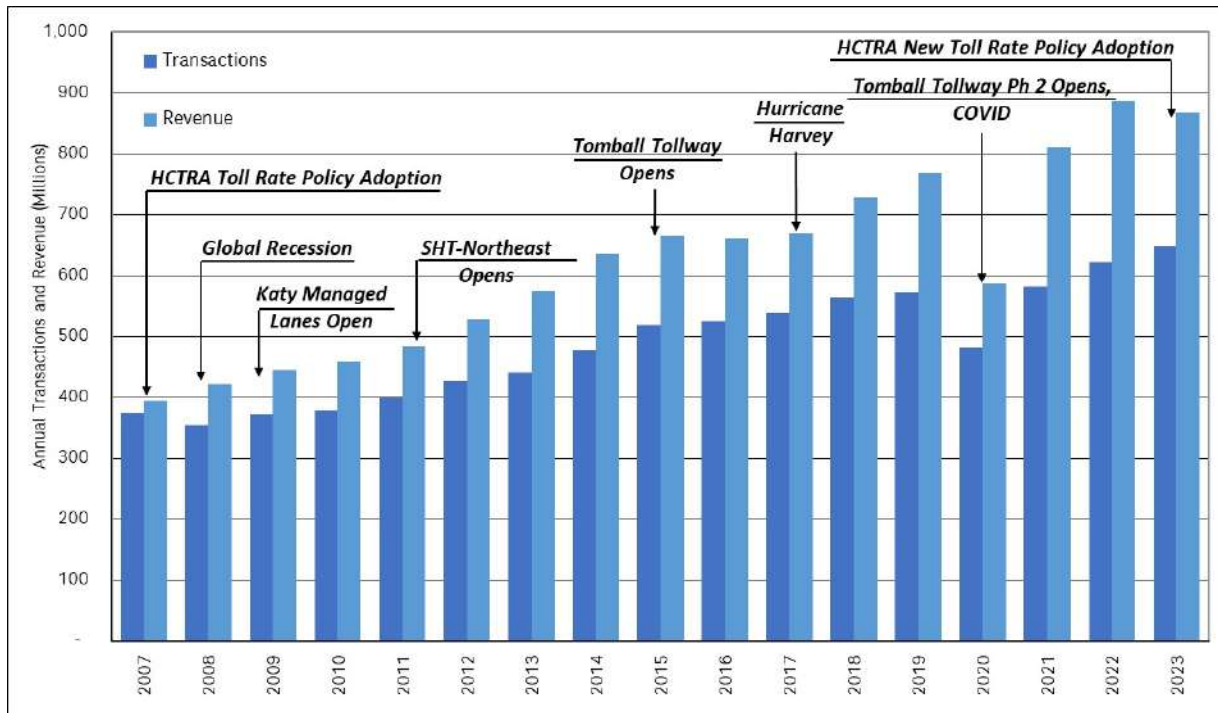
This chapter presents the historical trends in transactions and toll revenue for the existing HCTRA System. To complement the transaction and toll data, a comprehensive traffic count program was undertaken at several strategic locations and across screenlines within the HCTRA System study area. This comprehensive data collection was conducted in 2023.

Systemwide Annual Transactions and Revenue Trends

Figure 2-1 shows annual transactions and revenue, by calendar year, over the history of the HCTRA System from 2007 through 2023. Apart from COVID impacted year (2020) and 2018, which was the period immediately following the Ship Channel Bridge AVI-only conversion and during which the Hardy Toll Road was converted to AVI-only, toll revenues have consistently increased since inception.

Over the past 25 years, HCTRA has implemented several significant system expansions. This included construction since the mid-1990s of the Southeast, Southwest and Eastern Sections of Sam Houston Tollway, the acquisition of the Sam Houston Ship Channel Bridge, the construction of the George Bush Intercontinental Airport Connector from the Hardy Toll Road, and the Westpark Tollway. In 2011, HCTRA completed the Sam Houston Tollway with the addition of the Northeast section. In April 2015, HCTRA opened the first phase of the Tomball Tollway.

These additional facilities have to some extent influenced traffic and revenue growth patterns shown in **Figure 2-1** on top of the natural growth in traffic generated by increases over time in the population of the region. Annual toll revenues have increased from around \$50 million in the early 1990s to more than \$460 million in 2011. The period from 2011 to 2019 saw a continuation of revenue growth as HCTRA's toll rate policy was implemented. Annual revenues have grown to over \$720 million in 2019 which represents a 5.8 percent annual average growth since 2011. Since 2019, revenues have grown to just under \$870 million, an annual average growth rate of 3.6%.



Revenue is exclusive of IOP fees and miscellaneous admin fees.

Figure 2-1
Systemwide Annual Transactions and Revenue (Source: HCTRA Annual Financial Statements)

Figure 2-2 shows the existing HCTRA toll road system. The various segments of the HCTRA System are as follows:

- Ship Channel Bridge – opened 1982, acquisition by HCTRA in 1994
- Hardy North – opened 1988
- Hardy South – opened 1988
- Sam Houston Tollway South – opened 1988
- Sam Houston Tollway Central – opened 1989
- Sam Houston Tollway North – opened 1990
- Sam Houston Tollway East – opened 1996
- Sam Houston Tollway Southeast – opened 1997
- Sam Houston Tollway Southwest – opened 1997
- Westpark Tollway – opened 2004
- Fort Bend Parkway – opened 2005,
- Katy Managed Lanes – opened 2009
- Sam Houston Tollway Northeast – opened 2011
- Tomball Tollway – opened 2015
- Tomball Tollway phase 2 – opened December 2019

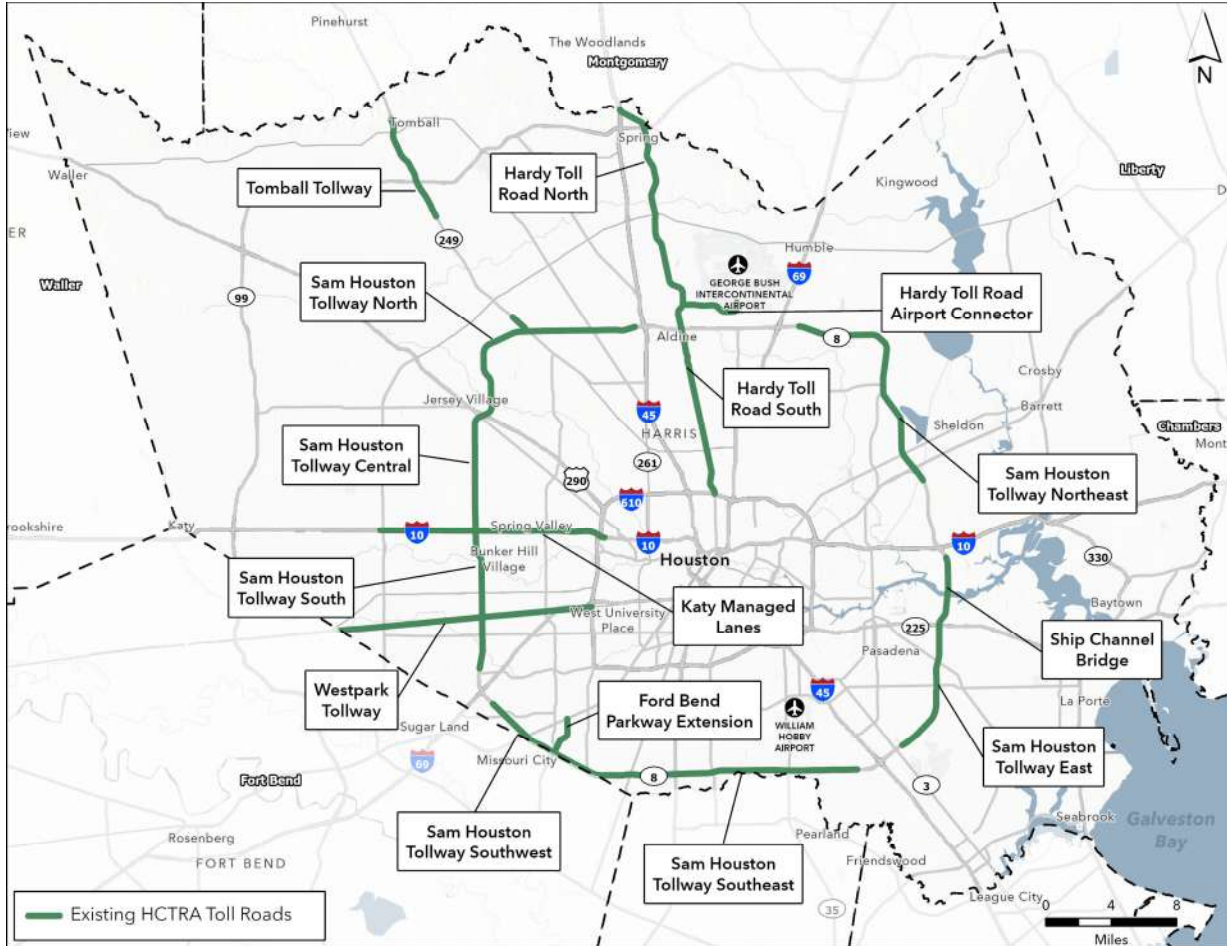


Figure 2-2
HCTRA System Section Locations

Table 2-1 summarizes annual transaction trends for the HCTRA System by sections and systemwide from 2019 through 2023. More detailed summaries for each section are provided later in this chapter. Traffic (toll transactions) and toll revenue data for each section is the sum of all transactions and revenue for all toll plazas within that section. Each section typically includes one mainline toll plaza and a series of ramp gantries. Prior to 2020, some of the HCTRA System facilities accepted both cash and electronic payments through the use of a toll transponder using automatic vehicle identification (AVI). However, the entire HCTRA System has operated as cashless since the onset of the COVID-19 pandemic.

Between 2019 and 2023, total transactions on the system increased from 563.9 million to 647.6 million, for a compound annual growth rate (CAGR) of 10 percent during this period. These figures include the Katy Managed Lanes, Sam Houston Tollway Northeast, and Tomball Tollway which opened in 2010, 2011 and 2016, respectively. These recently added facilities experienced significant ramp-up during the first few years of operation and represented about

14.8 percent of the system total in 2019. In 2023 this percentage had risen to 16.7 percent. Overall, the entire system has grown by an average of 3.1 percent from 2019 to 2023.

The Hardy Toll Road recorded 61.9 million transactions in 2023 and had an average annual growth of 1.6 percent between 2019 and 2023. The Hardy North and Hardy South sections have experienced a modest level of growth in the last four years with Hardy North showing a 2.1% average annual growth and Hardy South having a 1.2% growth. Transactions decreased between 2016 and 2017 when the Hardy Toll Road was converted to an AVI-only facility and construction began to widen the segment north of FM 1960. Transactions have since increased since construction was completed.

The Sam Houston Tollway recorded 421.9 million transactions in 2023, an increase of approximately 40.5 million since 2019 or 3.9 percent annually. All sections have experienced annual growth in the 1.2 to 5.8 percent range with The Sam Houston Tollway Northeast, East, and Southeast sections showing the largest growth.

The Westpark Tollway is continuing to show moderate growth despite peak hour capacity constraints. Between 2019 and 2023, toll transactions have grown at an average annual rate of almost 10 million or 4.2 percent per year. Continued annual growth in toll transactions on the Fort Bend Parkway Connector reflects new developments in this part of the region. Toll transactions on HCTRA's portion of the Parkway grew by 1.8 percent per year from 2019 to 2023. The IH-10 Katy Managed Lanes opened in April 2009 and experienced double-digit annual growth rates during the ramp up period through 2016, then stabilized through 2019. From 2019 to 2023 the Katy Managed Lanes have grown at an annual rate of 1.7%. The recently opened Tomball Tollway has experienced significant year-to-year growth with a yearly increase of 14.6 percent per year from 2019 to 2023 in transactions.

Table 2-1 Total Cumulative Annual Transactions (thousands)

Section	2019	Change	2020	Change	2021	Change	2022	Change	2023	2019-2023 CAGR ⁽²⁾
Hardy North	26,891	-29.3%	19,021	30.3%	24,794	14.8%	28,457	2.7%	29,234	2.1%
Hardy South	31,095	-35.5%	20,052	34.6%	26,984	13.6%	30,664	6.4%	32,634	1.2%
Hardy Toll Road Subtotal	57,986	-32.6%	39,074	32.5%	51,777	14.2%	59,121	4.6%	61,868	1.6%
SHT South	84,231	-12.7%	73,508	16.9%	85,954	1.5%	87,285	1.7%	88,741	1.3%
SHT Central	65,040	-14.9%	55,345	16.9%	64,717	3.3%	66,861	2.0%	68,201	1.2%
SHT North	84,607	-12.3%	74,238	14.6%	85,112	3.6%	88,189	1.3%	89,347	1.4%
SHT Northeast	31,251	-6.1%	29,342	19.3%	35,016	7.9%	37,777	3.6%	39,121	5.8%
Ship Channel Bridge	20,533	-13.1%	17,836	16.2%	20,716	10.4%	22,875	3.9%	23,757	3.7%
SHT East	29,807	-14.0%	25,637	15.9%	29,704	14.3%	33,963	5.2%	35,715	4.6%
SHT Southeast	37,889	-7.4%	35,096	19.6%	41,975	6.3%	44,633	2.0%	45,518	4.7%
SHT Southwest	48,561	-9.5%	43,945	17.2%	51,520	4.1%	53,624	3.0%	55,219	3.3%
Sam Houston Tollway Subtotal	401,920	-11.7%	354,947	16.8%	414,715	4.9%	435,209	2.4%	445,618	2.6%
Hardy and SHT Subtotal	459,906	-14.3%	394,021	18.4%	466,492	6.0%	494,329	2.7%	507,486	2.5%
FB Pkwy Connector (90-A)	5,755	-19.8%	4,616	16.3%	5,370	5.7%	5,674	8.8%	6,172	1.8%
Westpark Tollway	54,931	-18.1%	45,008	28.4%	57,790	7.7%	62,265	4.2%	64,874	4.2%
Katy Managed Lanes	32,976	-44.5%	18,298	46.8%	26,864	16.7%	31,362	12.4%	35,239	1.7%
Tomball Tollway ⁽¹⁾	19,610	2.1%	20,016	28.2%	25,668	9.9%	28,211	20.0%	33,842	14.6%
Systemwide Total	573,177	-15.9%	481,959	20.8%	582,185	6.8%	621,841	4.1%	647,613	3.1%

Notes:

1. Tomball Tollway phase 2 opened on December 19, 2019.
2. CAGR = Compounded Annual Growth Rate

Table 2-2 shows the annual toll revenue trends by section and systemwide from 2019 through 2023. It should be noted that all references to revenues in this chapter relate to toll revenues only and do not include certain additional revenues, such as collections resulting from violation enforcements, other sources and fees.

Table 2-2 Annual Toll Revenue by Section (thousands)

Section	2019	Change	2020	Change	2021	Change	2022	Change	2023	2019-2023 CAGR
Hardy North	\$39,177	-31.6%	\$26,803	42.9%	\$38,303	16.8%	\$44,724	-2.4%	\$43,634	2.7%
Hardy South	\$41,483	-36.9%	\$26,169	49.8%	\$39,208	14.3%	\$44,818	0.3%	\$44,960	2.0%
Hardy Toll Road Subtotal	\$80,660	-34.3%	\$52,971	46.3%	\$77,510	15.5%	\$89,542	-1.1%	\$88,594	2.4%
SHT South	\$113,239	-23.8%	\$86,309	35.6%	\$117,047	4.1%	\$121,791	-4.6%	\$116,201	0.6%
SHT Central	\$95,540	-23.8%	\$72,789	35.1%	\$98,315	5.8%	\$103,969	-4.0%	\$99,780	1.1%
SHT North	\$120,078	-22.6%	\$92,931	34.5%	\$125,022	6.3%	\$132,887	-4.7%	\$126,597	1.3%
SHT Northeast	\$40,440	-14.0%	\$34,783	35.7%	\$47,194	11.5%	\$52,641	-1.9%	\$51,643	6.3%
Ship Channel Bridge	\$33,039	-16.9%	\$27,441	35.7%	\$37,249	13.9%	\$42,445	-1.3%	\$41,902	6.1%
SHT East	\$43,595	-23.6%	\$33,324	34.6%	\$44,841	17.4%	\$52,658	-0.7%	\$52,293	4.7%
SHT Southeast	\$55,122	-18.3%	\$45,015	39.3%	\$62,694	9.6%	\$68,706	-3.8%	\$66,073	4.6%
SHT Southwest	\$64,745	-21.9%	\$50,552	38.8%	\$70,155	7.8%	\$75,601	-2.4%	\$73,764	3.3%
Sam Houston Tollway Subtotal	\$565,798	-21.7%	\$443,144	36.0%	\$602,519	8.0%	\$650,698	-3.4%	\$628,253	2.7%
Hardy and SHT Subtotal	\$646,458	-23.3%	\$496,115	37.1%	\$680,029	8.9%	\$740,240	-3.2%	\$716,847	2.6%
FB Pkwy Connector (90-A)	\$8,095	-26.1%	\$5,984	32.0%	\$7,897	6.2%	\$8,385	3.0%	\$8,639	1.6%
Westpark Tollway	\$64,798	-24.6%	\$48,839	44.3%	\$70,454	10.1%	\$77,580	-1.9%	\$76,135	4.1%
Katy Managed Lanes	\$20,117	-47.4%	\$10,589	61.7%	\$17,119	17.1%	\$20,050	2.5%	\$20,554	0.5%
Tomball Tollway ⁽¹⁾	\$28,018	-8.9%	\$25,515	40.6%	\$35,873	10.7%	\$39,711	15.6%	\$45,919	13.1%
Systemwide Total⁽²⁾⁽³⁾	\$767,485	-23.5%	\$587,041	38.2%	\$811,372	9.2%	\$885,966	-2.0%	\$868,094	3.1%

Notes:

1. Tomball Tollway phase 2 opened on December 19, 2019.
2. Section revenues include collections attributable to the interoperability programs with other agencies.
3. Administration revenues are excluded from section revenues but included in Total Operating Revenues. Non-operating revenues, such as investment income and lease revenues are completely excluded.

Between 2019 and 2023, the total revenue for the entire system increased from \$767.5 million to \$868 million. The 2019 revenues include the new sections at Sam Houston Northeast, Katy Managed Lanes and Tomball Tollway which together generated over \$82.8 million in 2019. In absolute terms, the total revenue of all the HCTRA facilities combined increased by \$142.2 million over these five years.

The Sam Houston Tollway sections collected \$628.5 million in toll revenue in 2023. This resulted in a CAGR of 2.7 percent between 2019 and 2023. The Hardy Toll Road generated \$88.6 million in toll revenue in 2023 growing on average by 2.4 percent per year between 2019 and 2023. Westpark Tollway, the Fort Bend Parkway Connector, and the Katy Managed Lanes have also seen growth in toll revenues between 2019 and 2023 with annual growth rates ranging between 0.5 percent for the Katy Managed Lanes to 13.1 percent for the Tomball Tollway.

Systemwide Monthly Transaction and Revenue Trends

Systemwide monthly transaction and toll revenue trends from 2019 to 2023 are detailed in **Table 2-3**. The period from 2019 to 2023 saw strong, sustained growth in systemwide transactions, with year-to-year growth rates exceeding 3.0 percent, except between 2019 and 2020. The largest factor contributing to this trend was the COVID-19 pandemic with a dramatic shift towards working from home jobs.

Patterns in the growth of monthly toll revenues from 2019 through 2023 are similar to transactions. Excluding the period from 2019 to 2020 there was steady growth in systemwide revenue, with an annual growth rate of 3.1 percent.

Table 2-3 Monthly Systemwide Transaction and Revenue Trends

Month	2019 ⁽¹⁾	Change	2020 ⁽²⁾	Change	2021	Change	2022	Change	2023 ⁽³⁾
Transactions									
January	46,400,645	2.7%	47,643,445	-14.7%	40,629,436	16.1%	47,159,430	8.9%	51,363,943
February	44,346,528	5.7%	46,860,395	-29.2%	33,157,626	40.9%	46,732,844	6.6%	49,823,460
March	49,235,221	-20.7%	39,026,883	26.5%	49,368,628	11.4%	55,006,341	4.3%	57,389,535
April	48,415,386	-35.6%	31,176,308	57.0%	48,957,624	9.6%	53,681,719	-0.2%	53,600,707
May	49,686,963	-31.9%	33,851,753	47.6%	49,960,218	9.6%	54,746,050	2.5%	56,109,187
June	47,082,608	-18.7%	38,258,435	35.0%	51,665,174	-0.4%	51,479,848	6.2%	54,691,924
July	48,125,318	-22.4%	37,353,054	38.1%	51,586,056	-3.3%	49,908,456	5.6%	52,707,817
August	49,570,536	-19.8%	39,780,235	29.6%	51,547,966	3.4%	53,277,836	4.6%	55,702,006
September	46,029,233	-12.7%	40,194,981	23.0%	49,435,124	6.6%	52,681,001	1.9%	53,697,933
October	50,859,752	-12.1%	44,691,493	19.9%	53,586,067	2.0%	54,639,287	3.2%	56,384,456
November	46,442,651	-11.8%	40,962,283	24.8%	51,122,658	-0.7%	50,765,831	4.4%	53,002,717
December	46,982,437	-10.3%	42,159,565	21.4%	51,168,484	1.2%	51,762,004	2.7%	53,139,070
Total	573,177,278	-15.9%	481,958,830	20.8%	582,185,061	6.8%	621,840,647	4.1%	647,612,755
Revenue									
January	\$57,386,014	12.1%	\$64,347,879	-17.2%	\$53,261,093	23.3%	\$65,669,126	8.7%	\$71,401,106
February	\$54,041,122	14.5%	\$61,893,128	-14.9%	\$52,652,131	41.1%	\$74,291,350	-7.1%	\$69,028,059
March	\$61,338,180	-29.3%	\$43,359,087	46.1%	\$63,359,505	19.3%	\$75,563,299	6.7%	\$80,617,267
April	\$66,332,185	-95.9%	\$2,716,107	2208.3%	\$62,695,505	17.2%	\$73,490,242	1.7%	\$74,708,907
May	\$69,376,341	-42.1%	\$40,164,483	67.4%	\$67,244,129	11.8%	\$75,197,284	3.6%	\$77,893,643
June	\$64,406,335	-29.5%	\$45,387,270	46.6%	\$66,548,969	15.8%	\$77,045,718	-21.8%	\$60,230,591
July	\$65,804,167	-28.3%	\$47,184,174	50.0%	\$70,794,720	-6.8%	\$65,994,206	11.1%	\$73,346,767
August	\$68,930,575	-26.2%	\$50,865,629	51.8%	\$77,194,926	10.3%	\$85,134,320	-7.5%	\$78,742,119
September	\$61,809,314	-7.4%	\$57,205,596	21.7%	\$69,646,600	7.2%	\$74,642,074	-18.4%	\$60,912,664
October	\$70,235,770	-18.6%	\$57,153,434	29.0%	\$73,741,524	4.3%	\$76,896,105	4.8%	\$80,592,973
November	\$63,446,971	-4.4%	\$60,663,256	28.1%	\$77,684,910	-9.1%	\$70,595,939	0.2%	\$70,743,382
December	\$64,378,314	-12.9%	\$56,101,281	36.4%	\$76,548,465	-6.7%	\$71,446,384	-2.2%	\$69,876,197
Total	\$767,485,288	-23.5%	\$587,041,324	38.2%	\$811,372,477	9.2%	\$885,966,047	-2.0%	\$868,093,675
\$/transaction CY	\$1.34		\$1.22		\$1.39		\$1.42		\$1.34
\$/transaction Q4	\$1.37	0.7%	\$1.38	5.4%	\$1.45	-3.5%	\$1.40	-6.7%	\$1.30

Notes:

1. Tollball Tollway Phase 2 opened on December 19, 2019.
2. HCTRA suspended cash collection from March 11, 2020. Additionally, HCTRA suspended toll collection for one month period between March 24 and April 28, 2020.
3. HCTRA new toll policy adoption - September 4, 2023

As seen in **Table 2-3**, between 2019 and 2020 there is an apparent decline in revenue month over month, which is due to decreasing transactions from the COVID-19 pandemic. Additionally, HCTRA recently upgraded their back-office system during which time they suspended violation transaction invoice production. Now that violation transactions are being processed and mailed on a routine basis, that data anomaly will not have any negative impact on the long-term forecasts.

Recent Transaction and Revenue Trends by Section

As shown earlier in **Figure 2-2**, the HCTRA system is divided into sections according to mainline toll plazas. Sections are combined into three groups (Hardy, Sam Houston and other HCTRA facilities) in the following discussion of recent monthly transaction and toll revenue trends in the HCTRA system starting in 2019.

Hardy Toll Road

Figure 2-3 shows the monthly transactions for the Hardy North and Hardy South sections from 2019 through 2023. The Hardy North section includes the Hardy North Plaza and ramp gantries at FM 1960, Richey Road, and Rankin Road. The Hardy South section consists of the Hardy South Plaza, a pass-through plaza on the Airport Connector, and ramp gantries at Central Green Boulevard, Aldine Mail Road, Little York Road, and Tidwell Road.

Between 2019 and 2023, Hardy North transactions increased from 26.9 million to 29.2 million, for a compound annual growth rate (CAGR) of 2.1 percent during this period. Hardy South transactions increased from 31.0 million in 2019 to 32.6 million in 2019, for a compound annual growth rate (CAGR) of 1.2 percent during this period.

Both Hardy North and Hardy South experienced a decline in transactions in 2020, with a negative growth rate of 32.6 percent. In 2021, Hardy North transactions grew by 30.3 percent and Hardy South transactions grew by 34.6 percent almost fully recovering. In 2023, Hardy North and Hardy South transactions continued growing by 2.7 percent and 6.5 percent, respectively.

For both the Hardy North and Hardy South sections besides 2020 there has been sustained, although decreasing growth with a CAGR of 2.1% for Hardy North and 1.2% for Hardy South.

Revenue data is also available through December 2023. **Figure 2-4** shows the monthly revenue for the Hardy North and Hardy South sections from 2019 through 2023. The Hardy North section generated \$43.6 million in toll revenue in 2023 growing on average by 2.7 percent per year between 2019 and 2023. The Hardy South section generated \$45.0 million in toll revenue in 2023 growing on average by 2 percent per year between 2019 and 2023. Similar to transaction

trends previously described, revenue decreased in 2020 by 31.6 percent on Hardy North and by 36.9 percent on Hardy South. Revenue then grew for 2021 and 2022 with a slight decrease of 1.1 percent in 2023 for the entire Hardy Toll Road.

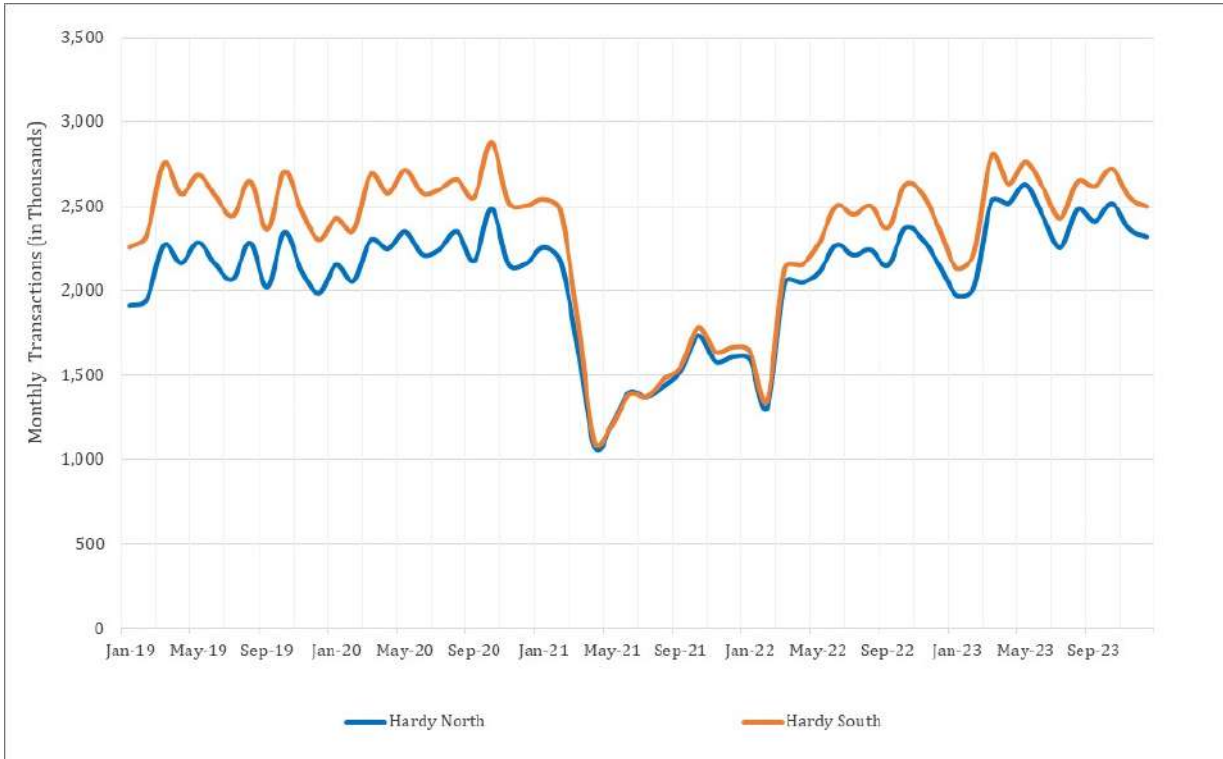


Figure 2-3
Hardy Toll Road – Monthly Transactions (January 2019 through December 2023)

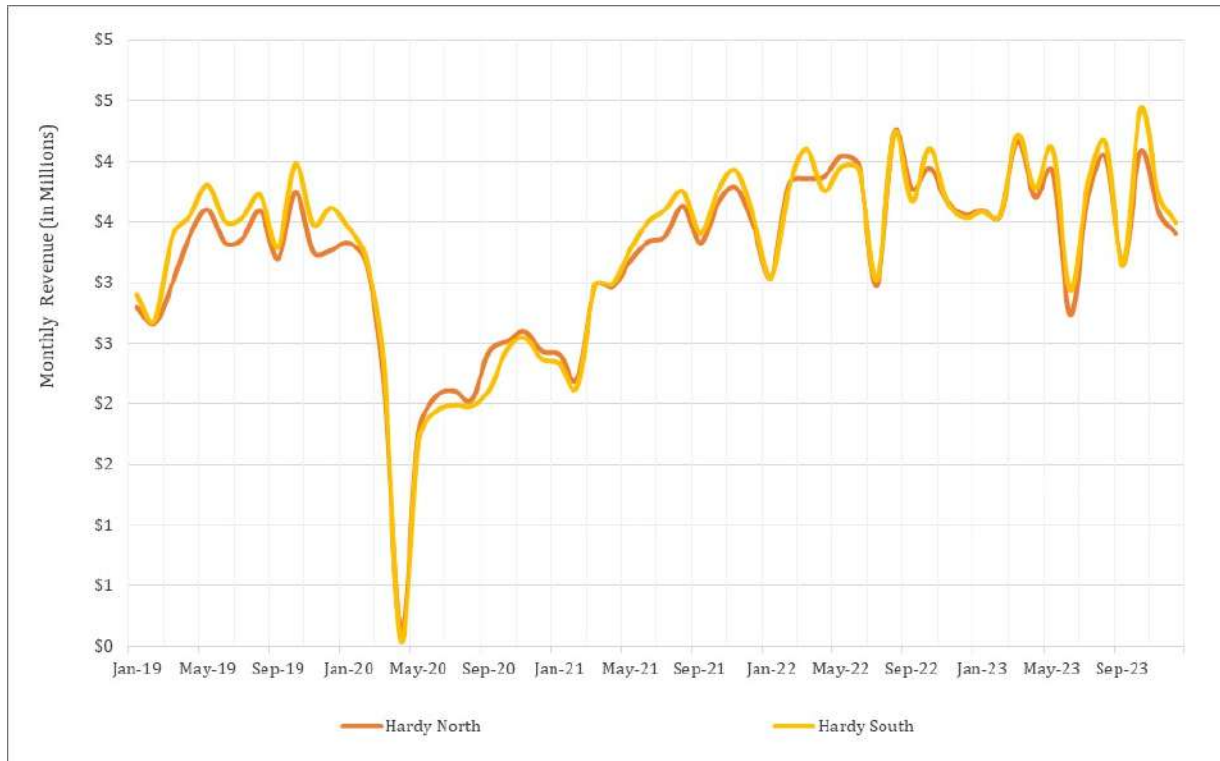


Figure 2-4
Hardy Toll Road – Monthly Revenue (January 2019 through December 2023)

Sam Houston Tollway

Figures 2-5 through 2-7 show the monthly transactions for the various sections along the Sam Houston Tollway from January 2019 through December 2023.

Sam Houston South, Central and North transactions are shown in **Figure 2-5**. Sam Houston South and North represented 40 percent of all Sam Houston Tollway transactions in 2023, with each having a 20 percent share. Between 2019 and 2023, Sam Houston South transactions grew from 84.2 million to 88.7 million, for a compound annual growth rate (CAGR) of 1.3 percent during this period. Sam Houston North grew at nearly the same level, going from 84.6 million to 89.3 million, a CAGR of 1.4 percent.

Sam Houston Central represented 15.3 percent of all Sam Houston Tollway transactions in 2023. Between 2019 and 2023, Sam Houston Central transactions increased from 65 million to 68.2 million, for a CAGR of 1.2 percent during this period.

Sam Houston Northeast represented 8.8 percent of all Sam Houston Tollway transactions in 2023. This section opened in February 2011 and therefore remains a relatively new section within the HCTRA system. Tolling is by EZ TAG only or other interoperable Texas electronic

payment tag. This section has experienced strong and sustained growth ever since it opened. Between 2019 and 2023, Sam Houston Northeast transactions grew from 31.3 million to 39.1 million, for a CAGR of 5.8 percent, exceeding the systemwide growth of 3.1 percent.

The Houston Ship Channel Bridge represented 5.3 percent of all Sam Houston Tollway transactions in 2023. Between 2019 and 2023, Ship Channel Bridge transactions grew from 20.5 million to 23.8 million, for a CAGR of 3.7 percent. The downward trend in transactions in 2017 began in January 2016 which corresponds to the conversion of this section to a cashless facility. On January 11, 2016, the Ship Channel Bridge became EZ TAG only. Motorists must have an EZ TAG or other interoperable Texas toll transponder to use this section of the tollway. Further analysis of the impact of the AVI-only conversion is provided at the end of this chapter.

Sam Houston East represented 8.0 percent of all Sam Houston Tollway transactions in 2023. Between 2019 and 2023, Sam Houston East transactions grew from 29.8 million to 35.7 million, for a CAGR of 4.6 percent which is higher than the systemwide growth of 3.1 percent. The year-over-year growth rate for this section was fairly strong through 2023, with the exception of 2020.

Sam Houston Southeast represented 10.2 percent of all Sam Houston Tollway transactions in 2023. Between 2019 and 2023, Sam Houston Southeast transactions grew from 37.9 million to 45.5 million, for a CAGR of 4.7 percent. Sam Houston Southwest represented 12.4 percent of all Sam Houston Tollway transactions in 2023. Between 2019 and 2023, Sam Houston Southwest transactions grew from 48.6 million to 55.2 million, for a CAGR of 3.3 percent which is slightly higher than the systemwide growth of 3.1 percent.

Figure 2-8 shows the monthly revenue for all Sam Houston Tollway sections from January 2019 through December 2023. Sam Houston South generated \$116.2 million in toll revenue in 2023 growing on average by 0.6 percent per year between 2019 and 2023. Revenues year-to-year decreased between 2019 to 2020 and from 2022 to 2023. Sam Houston Central generated \$99.8 million in toll revenue in 2023 increasing on average by 1.1 percent per year between 2019 and 2023. Similar to transaction trends, the year-over-year revenue growth rate for this section was negative in 2020 (-23.8 percent) and 2023 (-4.0 percent).

Sam Houston North generated \$126.6 million in toll revenue in 2023, making it the section with the highest revenue among all Sam Houston sections. Revenue grew on average by 1.3 percent per year between 2019 and 2023. The year-over-year revenue growth rate for this section were negative in 2020 (-22.6 percent) and negative in 2023 (-4.7 percent). Sam Houston Northeast

generated \$51.6 million in toll revenue in 2023 growing on average by 6.3 percent per year between 2019 and 2023. Similar to transaction trends, the year-over-year revenue growth rate for this section has always exceeded 5 percent.

The Ship Channel Bridge generated \$41.9 million in toll revenue in 2023, increasing on average by 6.1 percent per year between 2019 and 2023. Transactions have strongly recovered since the AVI conversion in January 2016. Sam Houston East generated \$52.3 million in toll revenue in 2023 growing on average by 4.7 percent per year between 2019 and 2023. This was the largest recovery systemwide since 2019. Sam Houston Southeast generated \$66 million in toll revenue in 2023 growing on average by 4.63 percent per year between 2019 and 2023. Sam Houston Southwest generated \$73.8 million in toll revenue in 2023 growing on average by 3.3 percent per year between 2019 and 2023.

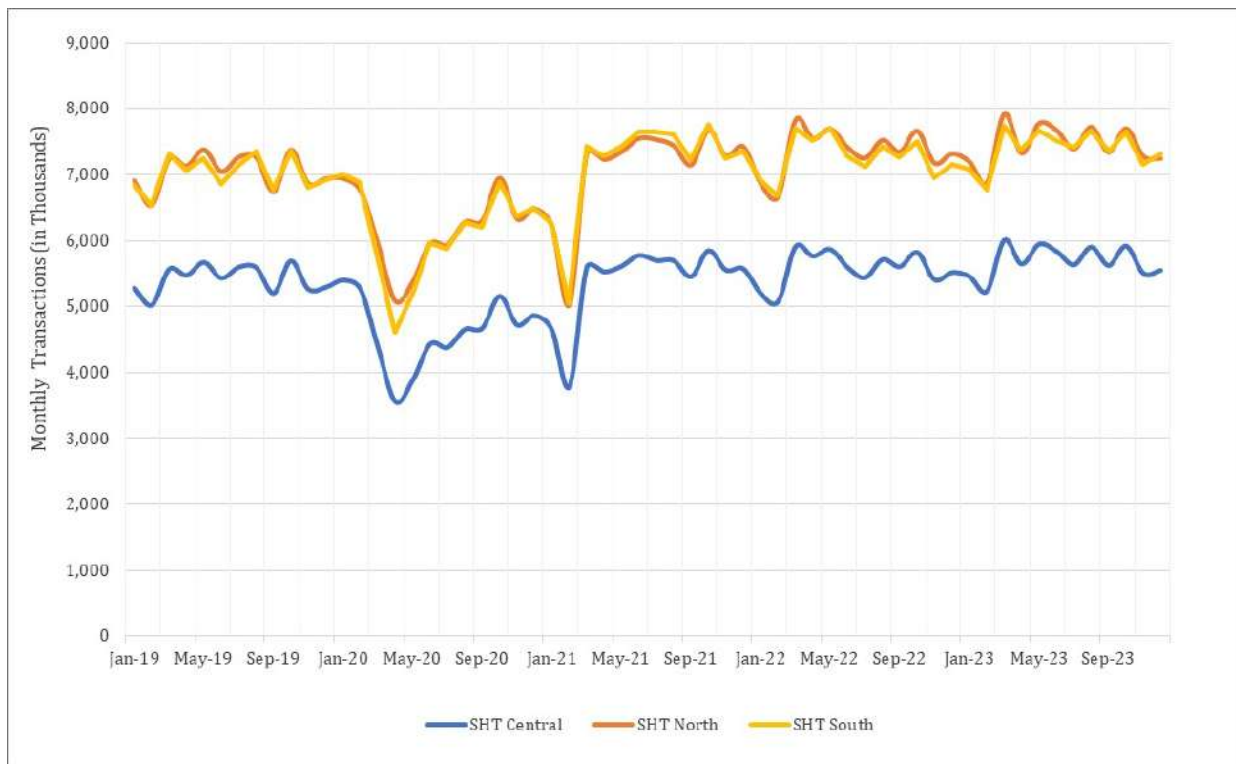


Figure 2-5
Sam Houston Tollway North, Central, South – Monthly Transactions (January 2019 through December 2023)

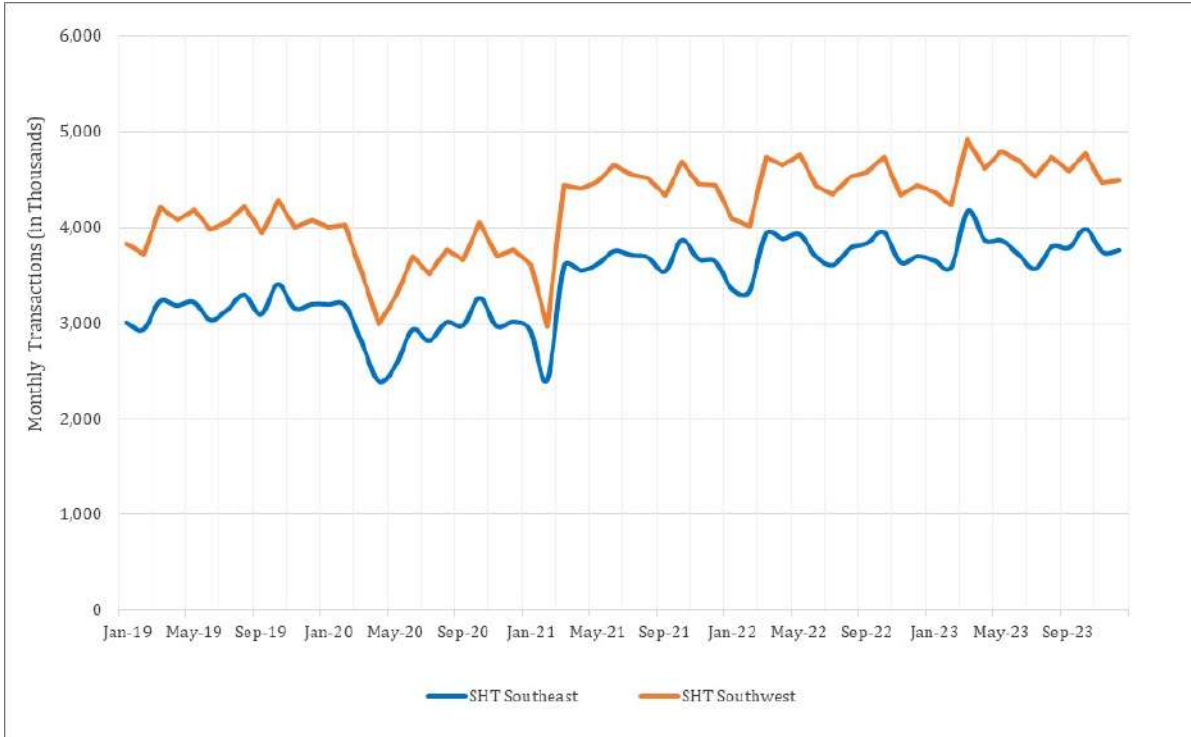


Figure 2-6
Sam Houston Tollway Southeast and Southwest – Monthly Transactions (January 2019 through December 2023)

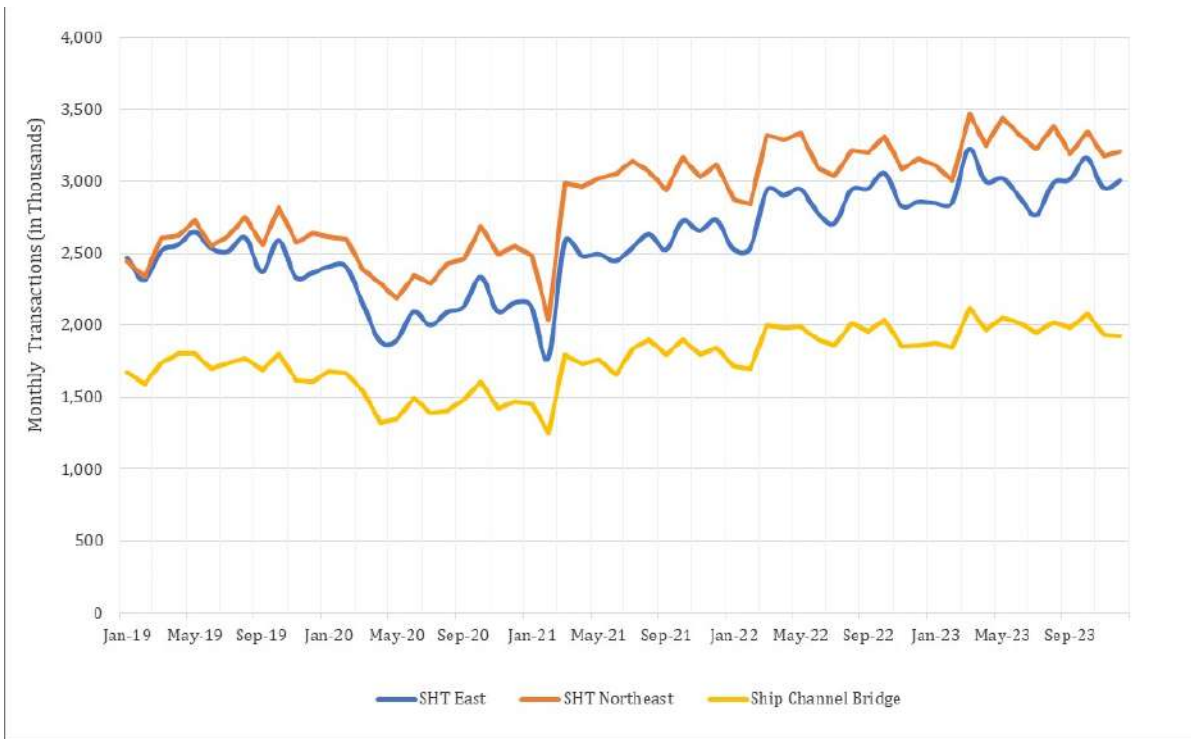


Figure 2-7
Sam Houston Tollway East, Northeast, Ship Channel Bridge – Monthly Transactions (January 2019 through December 2023)

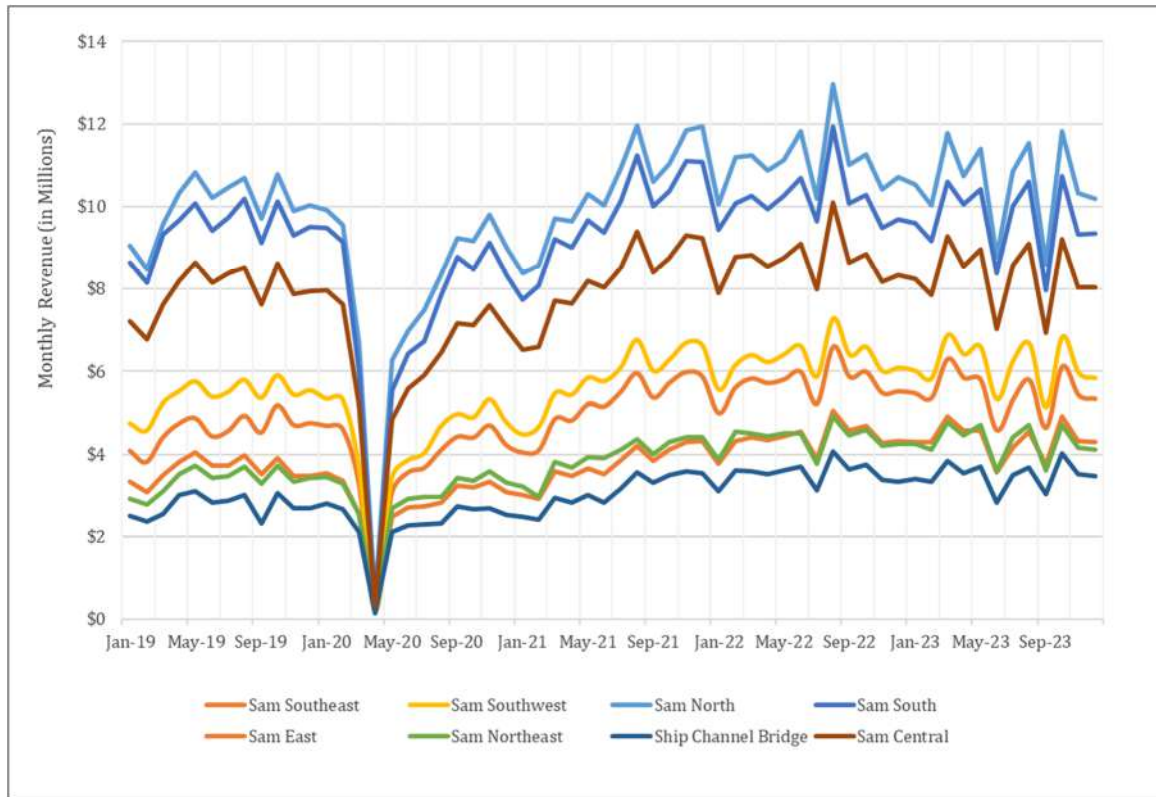


Figure 2-8
Sam Houston Tollway – Monthly Revenue (January 2019 through December 2023)

Other HCTRA Facilities

The remaining HCTRA facilities include the Fort Bend Parkway Connector, Westpark Tollway, Katy Managed Lanes, and Tomball Tollway. A listing of toll plazas or toll enforcement zones included in each of these sections is provided below:

- Fort Bend Parkway Extension: one mainlane toll plaza
- Westpark Tollway: including two mainlane toll plazas and ramp collection locations
- Katy Managed Lanes: including three toll zones
- Tomball Tollway

Figure 2-9 shows the monthly transactions for these facilities from 2019 through 2023.

Between 2019 and 2023, Fort Bend Parkway transactions grew from 5.8 million to 6.2 million, for a compound annual growth rate (CAGR) of 1.8 percent during this period. The year-over-year growth rate for this section was strongest in 2019 (higher than 16.3 percent).

Between 2019 and 2023, Westpark Tollway transactions grew from 54.9 million to 64.9 million, for a CAGR of 1.8 percent during this period. The year-over-year growth rate for this section has remained positive since 2020 (over 28.4 percent) but slowed down to 4.2 percent for 2023.

Between 2019 and 2023, Katy Managed Lanes transactions grew from 33 million to 35.2 million, for a CAGR of 1.7 percent during this period. Katy Tollway Managed Lanes opened in April 2009 and experienced double-digit growth during its ramp up period through 2016. The growth has since been stabilized and is more in line with the other segments. The growth declined in 2020 by -44.5 percent due to the COVID-19 pandemic but has since recovered to pre-pandemic levels.

Tomball Tollway opened in April 2015, and has experienced strong growth during the ongoing ramp up period. Between 2019 and 2023, Tomball Tollway transactions grew from 19.6 million to 33.8 million, for a CAGR of 14.6 percent during this period, which is significantly higher than the systemwide growth of 3.1 percent.

Figure 2-10 shows the monthly revenue for the abovementioned facilities from 2019 through 2023.

Fort Bend Parkway generated \$8.6 million in toll revenue in 2023. Revenue grew on average by 1.6 percent per year between 2019 and 2023. Similar to transaction trends, the year-over-year revenue growth rate for this section has grown past pre Covid-19 levels.

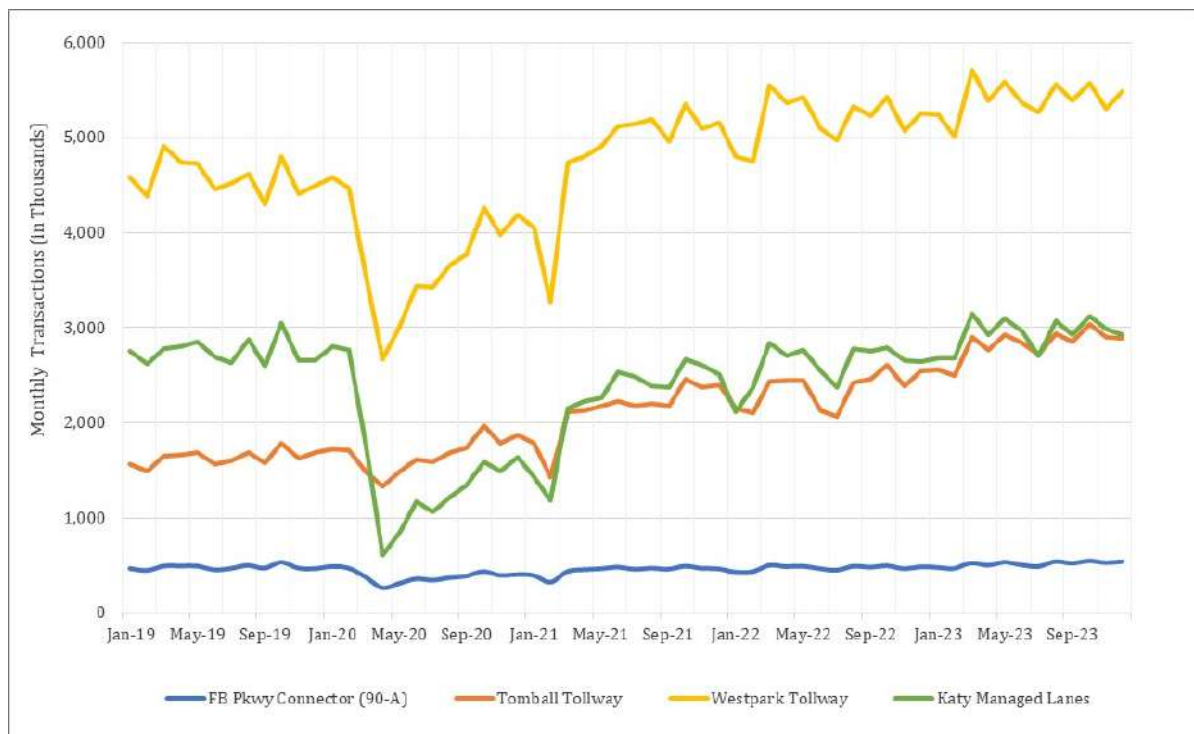


Figure 2-9
Other HCTRA Facilities – Monthly Transactions (January 2019 through December 2023)

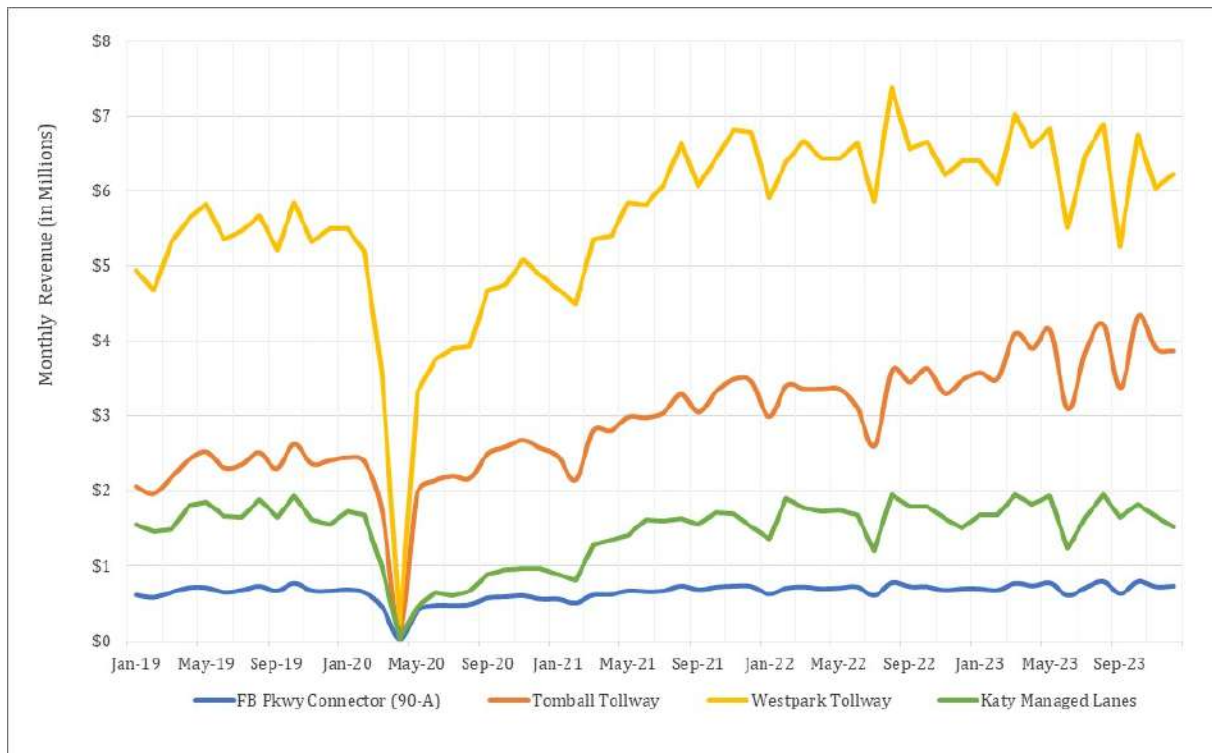


Figure 2-10
Other HCTRA Facilities – Monthly Revenue (January 2019 through December 2023)

Westpark Tollway generated \$76.1 million in toll revenue in 2023. Revenue grew on average by 4.1 percent per year between 2019 and 2023. The year-over-year revenue growth rate for this section was -24.6 percent during COVID-19 before recovering to pre-pandemic levels.

Katy Managed Lanes generated \$20.6 million in toll revenue in 2023. Revenue grew on average by 0.5 percent per year between 2019 and 2023. The year-over-year revenue growth rate was positive from 2020 through 2023.

Tomball Tollway has been experiencing strong, sustained growth in revenue since it opened in April 2015. The Tomball Tollway generated \$45.9 million in toll revenue in 2023. Revenue grew by a CAGR of 13.1% from 2019 to 2023.

Monthly Traffic Variations

Figure 2-11 shows the average number of daily systemwide transactions in each month of 2022 and 2023. Variations in the number of weekdays in a given month as well as holiday dates can explain slight variances in the overall monthly patterns. Generally, on the HCTRA System, average traffic volumes tend to be lowest in July, November, December and January and December compared to all other months because of holidays. March and October have higher monthly transaction.

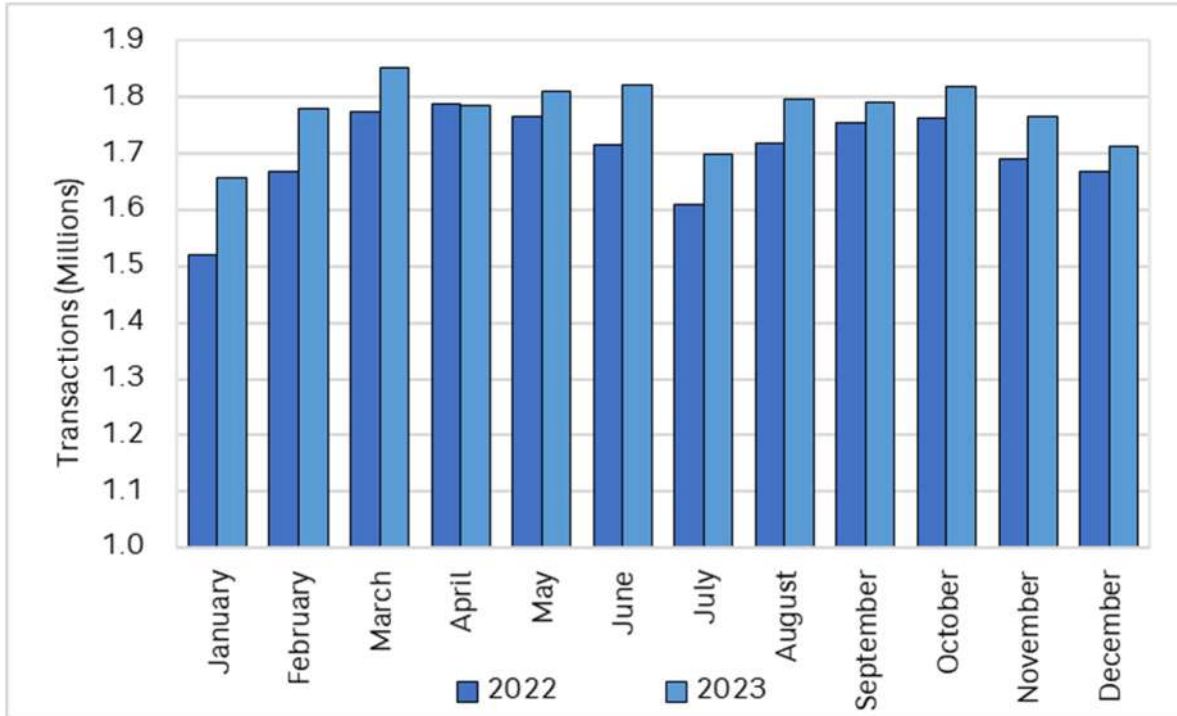


Figure 2-11
Average Systemwide Daily Transactions by Month (2022 and 2023)

Daily Traffic Variations

Figure 2-12 shows the percentage of systemwide transactions by day of the week for 2022 and 2023. The overall number of systemwide transactions is much higher on weekdays, which reflects primary use by local commuters. Starting on Monday, transactions rise each day to peak on Fridays. On Saturdays and Sundays, the number of transactions is much lower due to fewer work-related trips during the weekend. The daily patterns observed in 2022 and 2023 are very similar.

The share of weekend traffic tends to be higher on the Sam Houston Tollway, Westpark Tollway, and Tomball Tollway, and the Hardy Toll Road where weekend traffic was respectively 78 percent, 76 percent, 77 percent, and 82 percent of the average day in 2023, respectively.

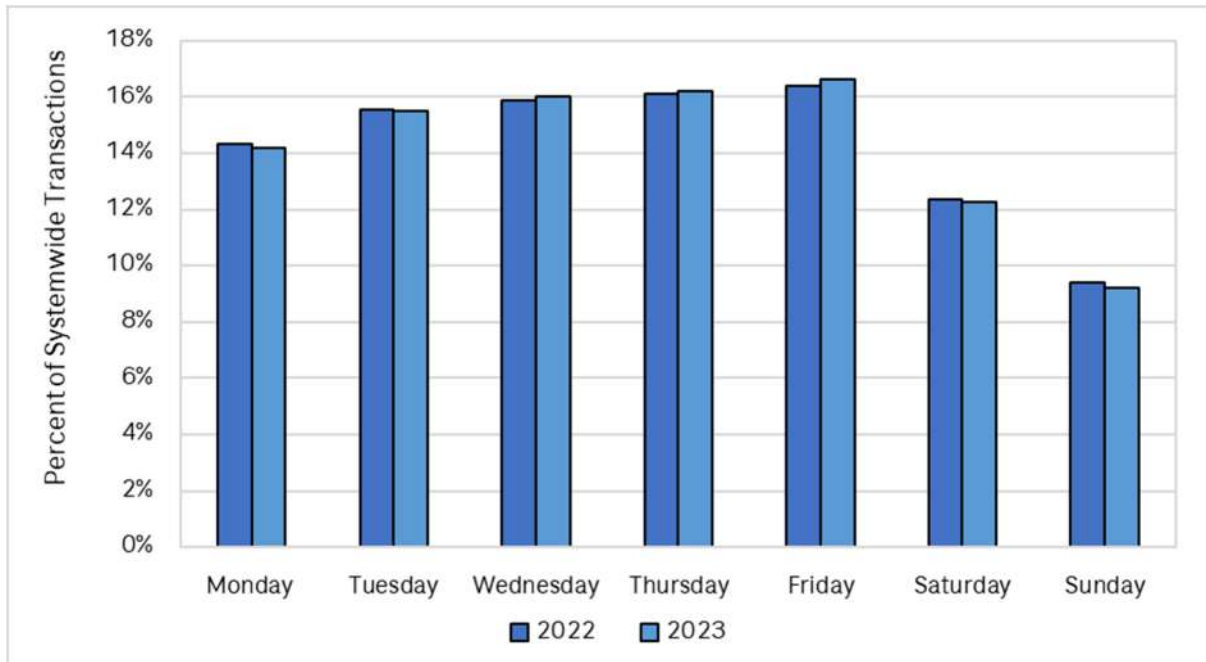


Figure 2-12
Percent of Systemwide Transactions by Day of Week (2022 and 2023)

Hourly Traffic Variations

The profile of traffic by hour of day varies widely throughout the system. In particular, the patterns are significantly different for the radial facilities and the circumferential facility (Sam Houston Tollway).

Figure 2-13 illustrates the typical hourly profile pattern for a radial facility, showing the hourly variations of transactions at the Hardy North mainlane toll plaza by direction, for a typical weekday in March 2023. Radial facilities show typical weekday commuter patterns with directional peaks occurring in the morning between 6:00 am and 9:00 am (inbound towards downtown area), and in the afternoon between 4:00 pm and 7:00 pm (outbound).

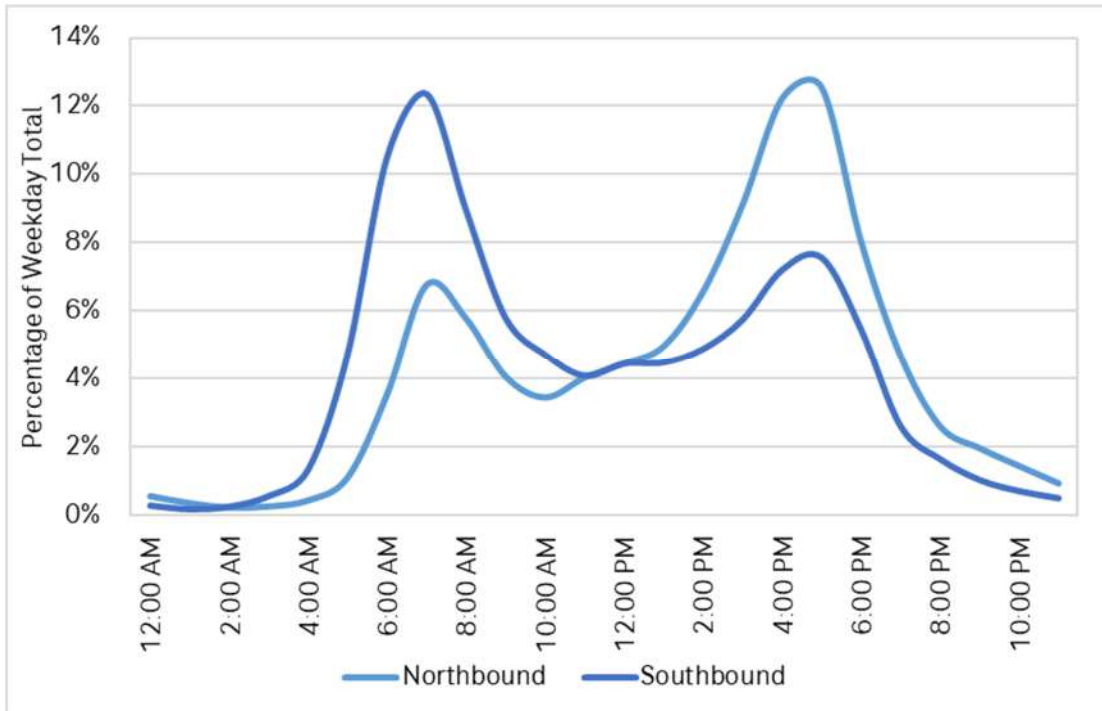


Figure 2-13
Percent of Weekday Total Transactions by Hour at the Hardy North Toll Plaza

Figure 2-14 illustrates the typical hourly profile pattern for the Sam Houston Tollway, showing the hourly variations of transactions at the Sam Houston North mainline toll plaza by direction, for a typical weekday in March 2023.

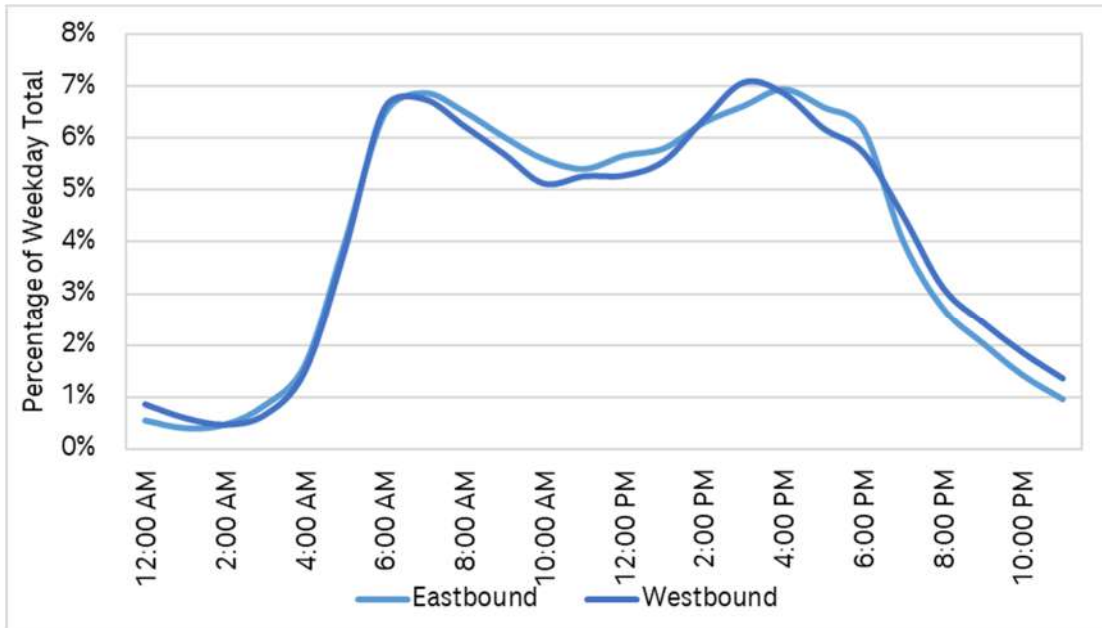


Figure 2-14
Percent of Weekday Total Transactions by Hour at the Sam Houston North Toll Plaza

The Sam Houston Tollway typical profile has a less pronounced difference by direction, with fairly balanced volumes between the morning and afternoon peak periods and a high share of midday volume.

Trends in AVI Utilization

Figure 2-15 shows the percentages of transactions using AVI and the percentage of revenue collected in those transactions. Since the adoption of license-plate based toll collection on facilities that were previously AVI-only, use of EZ TAG systemwide has increased by approximately one percent between 2019 and 2023.

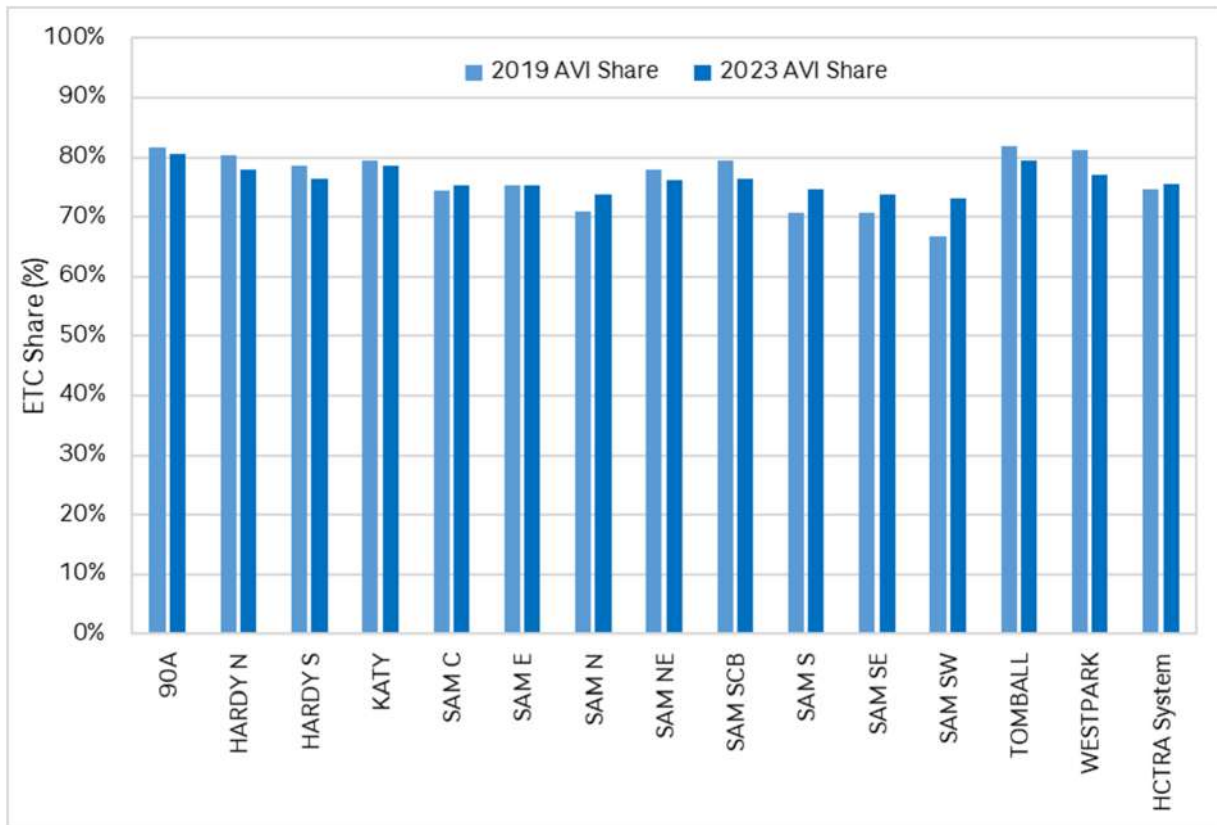


Figure 2-15
Trends in AVI Utilization

Toll Rates

The locations of the mainline plaza and ramp gantries as well as toll zones for the Sam Houston sections are shown in **Figure 2-16**, along with toll rates as of September 2023. The toll configuration for Hardy Toll Road and the Tomball Tollway are illustrated in **Figure 2-17** and **Figure 2-18**, respectively.

Table 2-4 summarizes the two-axle EZ Tag toll rates in effect at different toll gantry types across the system prior to the toll increase of September 2007 and multiple increases (an increase in the toll rate at a specific gantry compared to a previous is indicated by boxes in **Table 2-4**) since triggered by HCTRA's toll-setting policy. Harris County Commissioners Court voted at their discretion to postpone the 2012 increases for economic relief to customers. This was also decided for 2017 through 2020. Additionally, a rate reduction went into effect in September 2023.

Mainlane EZ TAG rates increased, based on nickel rounding, in 2010, 2013, 2014 and 2016. Mainlane cash rates increased only once since 2008, by \$0.25 in 2013. There were no toll increases at the mainlane plazas in 2015 and 2017 through 2020. Tolls at Ship Channel Bridge have not increased since 2007.

Figure 2-16
Toll Rates for Sam Houston Tollway, and Hardy Toll Road

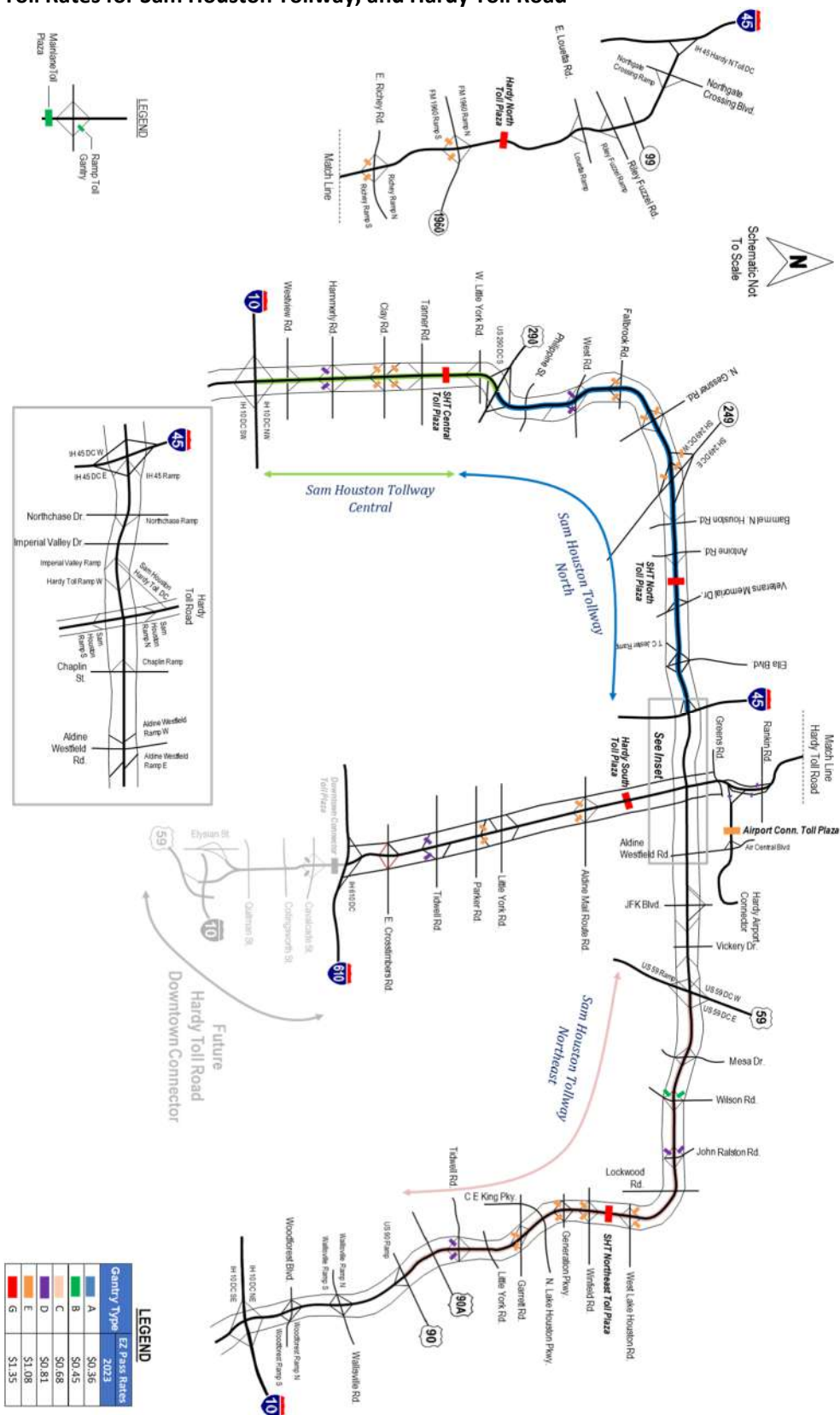


Figure 2-18
Toll Rates for Tomball Tollway

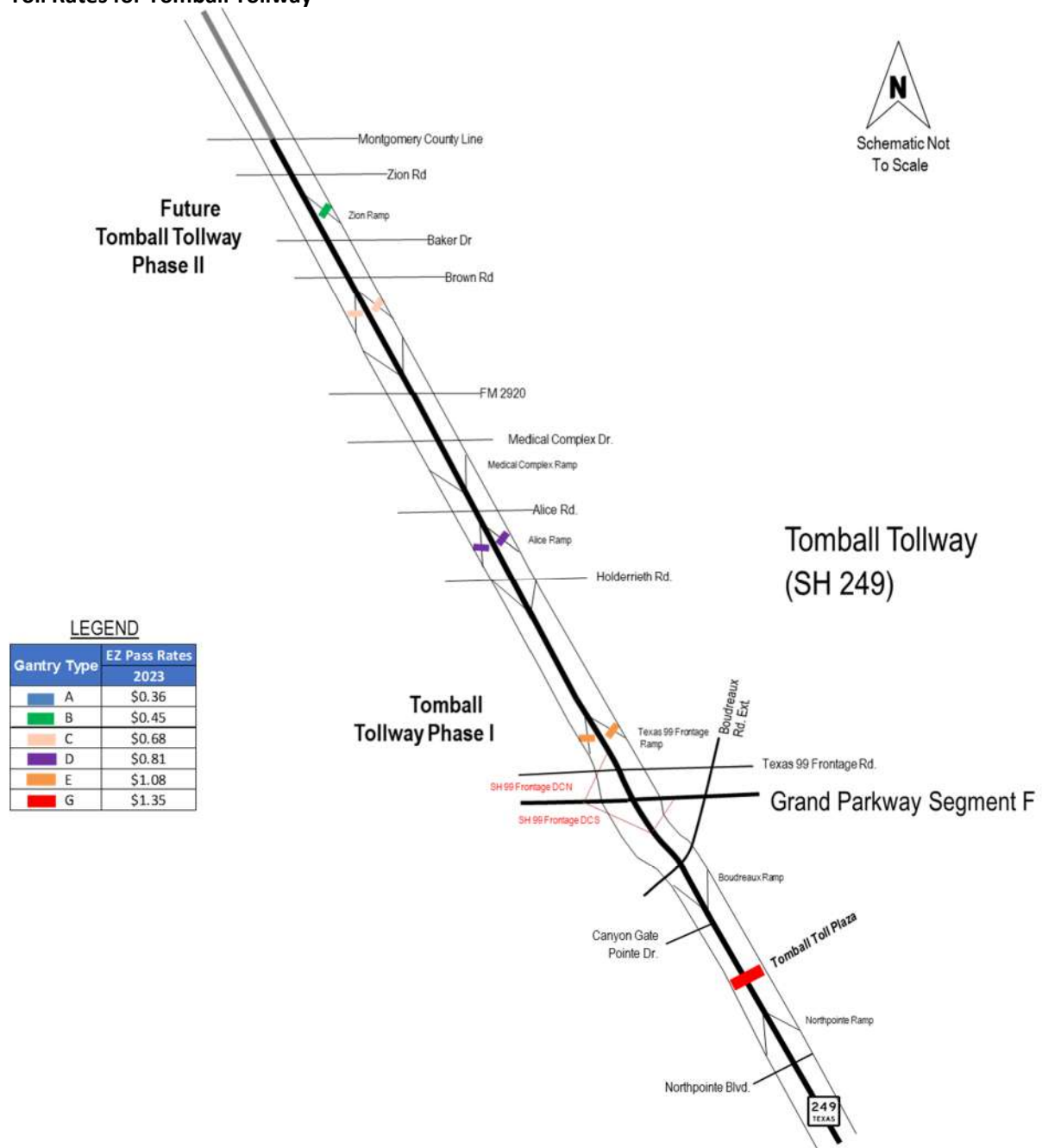


Table 2-4 Historical Two-Axle Toll Rates through 2024

Toll Facility	Pre Sept 2007	Sept 2007 to Aug 2009	Sept 2009 to Aug 2012	Sept 2012 to Aug 2013	Sept 2013 to Aug 2015	Sept 2015 to Aug 2023	Sept 2023 to Dec 2024	Conversion to AVI
Sam Houston Tollway								
Mainline Plazas ⁽²⁾	\$1.00	\$1.25	\$1.30	\$1.40	\$1.45	\$1.50	\$1.35	Sep-23
SHT Ramp Group A ⁽³⁾	\$0.75	\$1.00	\$1.00	\$1.00	\$1.15	\$1.20	\$1.08	
SHT Ramp Group B ⁽⁴⁾	\$0.50	\$0.75	\$0.75	\$0.75	\$0.75	\$0.90	\$0.81	
SHT Ramp Group C ⁽⁵⁾	\$0.35	\$0.50	\$0.50	\$0.50	\$0.50	\$0.50	\$0.45	
Ship Channel Bridge								
	\$1.50	\$1.50	\$1.50	\$1.50	\$1.50	\$1.50	\$1.35	Sep-15
Hardy Toll Road								
Mainline Plazas	\$1.00	\$1.25	\$1.30	\$1.40	\$1.45	\$1.50	\$1.35	Jul-16
HTR Ramp Group A ⁽⁶⁾	\$0.75	\$1.00	\$1.00	\$1.00	\$1.15	\$1.20	\$1.08	
HTR Ramp Group B ⁽⁷⁾	\$0.50	\$0.75	\$0.75	\$0.75	\$0.75	\$0.90	\$0.81	
Westpark Tollway								
Mainline Plazas	\$1.00	\$1.25	\$1.30	\$1.40	\$1.45	\$1.50	\$1.35	May-04
WPT Plaza Group A ⁽⁸⁾	\$0.75	\$1.00	\$1.00	\$1.00	\$1.15	\$1.20	\$1.08	
WPT Plaza Group B ⁽⁹⁾	\$0.50	\$0.65	\$0.65	\$0.75	\$0.75	\$0.75	\$0.68	
WPT Plaza Group C ⁽¹⁰⁾	\$0.35	\$0.50	\$0.50	\$0.50	\$0.50	\$0.50	\$0.45	
WPT Plaza Group D ⁽¹¹⁾	\$0.25	\$0.35	\$0.25	\$0.40	\$0.40	\$0.40	\$0.36	
Fort Bend Pky Ext.								
	\$1.00	\$1.25	\$1.30	\$1.40	\$1.45	\$1.50	\$1.35	Jul-16
Tomball Tollway								
Mainline Plaza	-	-	-	-	-	\$1.50	\$1.35	Apr-15
Boudreaux / Grand Pky	-	-	-	-	-	\$1.20	\$1.08	
SH 249/ Holderrieth	-	-	-	-	-	\$0.90	\$0.81	
FM 2920	-	-	-	-	-	\$0.75	\$0.68	
Brown Rd.	-	-	-	-	-	\$0.50	\$0.45	

Notes

(1) Image transactions are non-AVI transactions based on license plate images.

(2) SHT Mainline Plazas group includes all mainline plazas and SH 3

(3) SHT Ramp Group A includes Almeda Road, Briar Forest Drive, Clay Road, Fairmont Parkway, Fallbrook Dr, Garrett Road, Generation Parkway (formerly known as Winfield), North Gessner Road, SH 249, Spencer Highway, Tanner Road, Telephone Road/SH 35, W. Fuqua Street, W.Lake Houston Parkway, Wayside, Westheimer Road.

(4) SHT Ramp Group B includes Bellaire Boulevard, Cullen Boulevard, Hammerly Boulevard/Kempwood Hillcroft Avenue, John Ralston Road, Monroe/Pearland Parkway, Red Bluff/San Augustine, South Main/US 90A,

Tidwell, West Road.

(5) SHT Ramp Group C includes Wilson and exit ramp to Westpark Tollway

(6) HTR Ramp Group A includes Airport Connector, Aldine Mail Route, FM 1960, Little York, and Richey Road

(7) HTR Ramp Group B includes Central Greens Blvd, Rankin Road, and Tidwell

(8) WPT Plaza Group A includes Cook Road.

(9) WPT Plaza Group B includes Fondren East.

(10) WPT Plaza Group C includes Beltway 8, Fondren Road, and State Hwy 6.

(11) WPT Plaza Group D includes Gessner Road, South Post Oak Blvd, and Westpark Drive.

Traffic Data Collection

HCTRA retained a traffic data collection firm to collect counts along ramps and direct connectors for HCTRA facilities and along other roadways within the study area. The majority of the counts were collected for a continuous 48-hour period. Counts collected were verified for consistency with historical trends, historical seasonal variations, and overall reasonableness in the magnitude of the observed traffic demand. The automatic counts were summarized in 15-minute intervals to establish a temporal distribution of the current traffic demand. The traffic data provided current information regarding the average weekday traffic volumes, as well as the morning peak, the evening peak, and the off-peak period traffic conditions.

Data was also obtained from other sources including TxDOT traffic maps. Data obtained as part of this traffic count program was used to calibrate the travel demand model to verify and reflect existing traffic patterns. The data collection program for this study is described and summarized herein.

Figure 2-22 illustrates the 20 screenlines where traffic data was gathered along major facilities within the study area. These screenlines were selected to evaluate the existing total traffic demand characteristics within the HCTRA System study area. The screenlines encompass traffic crossing and/or accessing HCTRA facilities.

Table 2-5 summarizes the 2023 average weekday traffic volumes along each screenline, the peak hour traffic per lane (assuming a K factor of 10 percent), the estimated volume to capacity ratio, and the share of traffic along each roadway crossing the screenline. HCTRA facilities included as part of a screenline are bolded.

The volume to capacity ratio was estimated by categorizing each location by roadway type, either freeway, frontage road, arterial, or express lane. A standard volume per hour per lane was established for each roadway type. It is important to note that truck percentage was not taken into consideration for this estimate as classification data was not available for all locations. The volume to capacity ratio indicates roadways which are nearing capacity. As a road nears capacity, congestion occurs which might lead drivers to find alternative routes, likely along another roadway within the same screenline.

Screenline share indicates the percentage of drivers which currently use each roadway location compared to other roadways along the same screenline. Often, the roadway with the highest screenline share has the highest volume to capacity ratio. Screenline shares can vary in the

future from what is seen under existing conditions as other roadways reach capacity or new roadways are constructed.

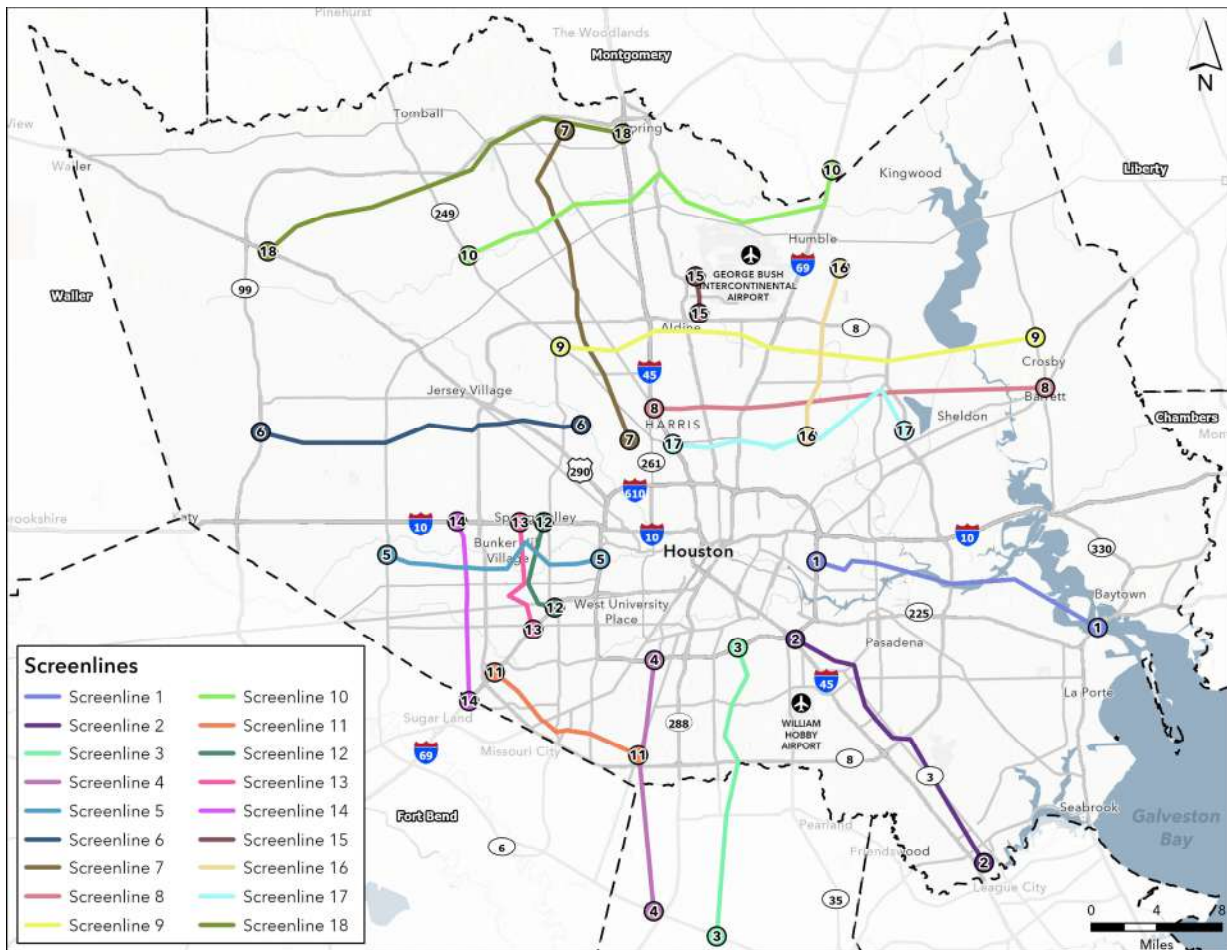


Figure 2-19
Traffic Count Screenline Locations

Table 2-5 Screenline Locations

ID	Location Description	Lanes	2023 Counts	Peak Hour Traffic-Per lane	Volume to Capacity Ratio	Screenline Share
Screenline 1: South of IH 10						
101 NB	NB I-610 Mainlane South of Market Street Rd	5	83,400	1,670	0.70	23%
101 SB	SB I-610 Mainlane South of Market Street Rd	5	89,300	1,790	0.75	25%
104	Federal Rd South of Old Industrial Rd	4	22,200	560	0.29	6%
105	NB/SB SCB Mainlane On Ship Channel Bridge	4	73,100	1,830	0.76	20%
107 NB	NB Bayport Bridge Mainlane on Bayport Bridge	4	47,200	1,180	0.49	13%
107 SB	SB Bayport Bridge Mainlane on Bayport Bridge	4	45,400	1,140	0.48	13%
Total			360,600	-	-	100%
Screenline 2: East of IH 45						
201-A	WB I-610 Frontage East of IH 45	2	11,000	550	0.28	2%
201 WB	WB I-610 Mainlane East of IH 45	5	93,800	1,880	0.78	18%
201 EB	EB I-610 Mainlane East of IH 45	5	98,200	1,960	0.82	19%
201-B	EB I-610 Frontage East of IH 45	2	10,900	550	0.28	2%
202	Allendale Road West of Forest Oaks Dr	4	6,800	170	0.09	1%
203	S Richy St West of Allen Genoa Rd	4	8,900	220	0.12	2%
204	Spencer highway Between 5th St and 6th St	6	24,000	400	0.21	5%
205	E Edge Brook Dr East of Galveston Rd	4	20,600	520	0.27	4%
206	Shaver St East of Galveston Rd	4	20,200	510	0.27	4%
207	Genoa Red Bluff Rd East of Galveston Rd	4	20,300	510	0.27	4%
208	EB/WB Sam East Mainlane East of Galveston Rd	7	74,900	1,070	0.45	14%
209-A	WB Sam East Frontage East of Galveston Rd	3	35,200	1,170	0.59	7%
209-B	EB Sam East Frontage East of Galveston Rd	3	38,000	1,270	0.64	7%
210	Farm To Market Rd 2351 East of Galveston Rd	4	25,400	640	0.34	5%
211 EB	EB Nasa Bypass Mainlane West of Galveston Rd	2	20,400	1,020	0.43	4%
211 WB	WB Nasa Bypass Mainlane West of Galveston Rd	2	21,500	1,080	0.45	4%
Total			530,100	-	-	100%
Screenline 3: East of South Freeway (Route 288)						
301-A	WB I-610 Frontage West of Mykawa Rd	3	5,400	180	0.09	1%
301 WB	WB I-610 Mainlane West of Mykawa Rd	4	82,800	2,070	0.86	21%
301 EB	EB I-610 Mainlane West of Mykawa Rd	4	82,800	2,070	0.86	21%
301-B	EB I-610 Frontage West of Mykawa Rd	3	7,000	230	0.12	2%
302	Bellfort St West of Mykawa Rd	4	12,300	310	0.16	3%
303	S Acres Dr West of Martin Luther King Jr Blvd	4	8,700	220	0.12	2%
304	Alameda-Genoa Rd West of Martin Luther King Jr Blvd	2	6,600	330	0.17	2%
305	EB/WB Sam Southeast Mainlane East of Cullen Blvd	8	108,000	1,350	0.56	27%
306-A	WB Sam Southeast Frontage East of Cullen Blvd	3	14,800	490	0.25	4%
306-B	EB Sam Southeast Frontage East of Cullen Blvd	3	16,100	540	0.27	4%

ID	Location Description	Lanes	2023 Counts	Peak Hour Traffic-Per lane	Volume to Capacity Ratio	Screenline Share
307	W Broadway St East of Cullen Blvd	4	27,500	690	0.36	7%
308	SH 6 / Morris Ave East N Masters Rd	6	31,000	520	0.27	8%
Total			403,000	-	-	100%
Screenline 4: West of South Freeway (Route 288)						
401-A	WB I-610 Frontage East of Kirdy Dr	3	14,700	490	0.25	4%
401 WB	WB I-610 Mainlane East of Kirdy Dr	6	101,200	1,690	0.70	25%
401 EB	EB I-610 Mainlane East of Kirdy Dr	6	101,500	1,690	0.70	25%
401-B	EB I-610 Frontage East of Kirdy Dr	3	7,100	240	0.12	2%
402	Holmes Rd East of Kirdy Dr	2	5,500	280	0.15	1%
403	W Orem Dr West of Alameda Rd	4	13,100	330	0.17	3%
404	EB/WB Sam Southwest Mainlane East of Farm to Market 521	9	93,300	1,040	0.43	23%
405-A	WB Sam Southwest Frontage East of Farm to Market 521	3	19,600	650	0.33	5%
405-B	EB Sam Southwest Frontage East of Farm to Market 521	3	17,100	570	0.29	4%
406	SH 6 / Morris Ave West of SH 288	6	34,900	580	0.31	9%
Total			408,000	-	-	100%
Screenline 5: North of San Felipe St/ Brair Forest Dr						
501-A	SB I-610 Frontage South of woodway Dr	3	20,500	680	0.34	3%
501 SB	SB I-610 Mainlane South of woodway Dr	5	98,900	1,980	0.83	14%
501 NB	NB I-610 Mainlane South of woodway Dr	5	108,500	2,170	0.90	15%
501-B	NB I-610 Frontage South of woodway Dr	3	18,400	610	0.31	3%
502	Chimney Rock Rd North of San Felipe St	4	14,000	350	0.18	2%
503	Voss Rd North of San Felipe St	6	33,600	560	0.29	5%
504	Balock Rd South of Taylorcrest Rd	2	35,400	1,770	0.93	5%
504-2 NB	NB S Gessner Rd North of Briar Forest Dr	2	12,100	610	0.32	2%
504-2 SB	SB S Gessner Rd North of Briar Forest Dr	2	15,100	760	0.40	2%
505	NB/SB Sam South Mainlane North of Briar Forest Dr	9	181,500	2,020	0.84	25%
506-A	SB Sam South Frontage North of Briar Forest Dr	3	16,800	560	0.28	2%
506-B	NB Sam South Frontage North of Briar Forest Dr	3	17,900	600	0.30	2%
507	Wilcrest Dr North of Briar Forest Dr	4	20,900	520	0.27	3%
508	Kirkwood Dr North of Briar Forest Dr	4	15,000	380	0.20	2%
509	Dairy Ashford Rd South of Briar Forest Dr	4	53,800	1,350	0.71	7%
510	SH 6 North of Briar Forest Dr	6	65,500	1,090	0.57	9%
Total			727,900	-	-	100%
Screenline 6: South of Freeman Dr/Spencer Rd						
601	Antoine Dr South of W Little York Rd	4	15,500	390	0.21	3%
602	Bingle Rd South of W Little York Rd	6	66,100	1,100	0.58	13%

ID	Location Description	Lanes	2023 Counts	Peak Hour Traffic-Per lane	Volume to Capacity Ratio	Screenline Share
602-2 NB	NB Fairbanks N Houston Rd North of US 290	2	19,400	970	0.51	4%
602-2 SB	SB Fairbanks N Houston Rd North of US 290	2	18,100	910	0.48	3%
603	Gessner Rd South of Hempstead Rd	4	12,800	320	0.17	2%
604	NB/SB Sam Central Mainlane South of W Little York Rd	9	163,000	1,810	0.75	31%
605-A	NB Sam Central Frontage South of W Little York Rd	3	24,300	810	0.41	5%
605-B	SB Sam Central Frontage South of W Little York Rd	3	22,600	750	0.38	4%
606	Brittmore Rd North of Tanner Rd	4	11,300	280	0.15	2%
607	Addicks Fairbanks Rd South of W Little York Rd	4	23,600	590	0.31	5%
608	SH 6 / FM 1960 North of Clay Rd	6	50,700	850	0.45	10%
609	Fry Rd North of Clay Rd	4	22,800	570	0.30	4%
610	NB/SB Grand Parkway Mainlane North of Clay Rd	4	73,800	1,850	0.97	14%
Total			524,000	-	-	100%
Screenline 7: West of IH 45						
701	Tidwell Rd West of Wheatley St	4	41,800	1,050	0.55	7%
702	West Rd West of Veterans Memorial Dr	6	51,600	860	0.45	9%
703	EB/WB Sam North Mainlane East of Antoine Dr	10	170,600	1,710	0.71	30%
704-A WB	WB Sam North Frontage East of Antoine Dr	3	20,100	670	0.34	4%
704-B EB	EB Sam North Frontage East of Antoine Dr	3	20,200	670	0.34	4%
705	Greens Rd East of Antoine Dr	2	22,800	1,140	0.60	4%
705-2 EB	EB Antoine Dr East of Veterans Memorial Dr	2	8,500	430	0.23	2%
705-2 WB	WB Antoine Dr East of Veterans Memorial Dr	2	8,600	430	0.23	2%
706	Rankin East of Veterans Memorial Dr	2	7,700	390	0.21	1%
707	FM 1960 West of T C Jester Blvd	6	48,900	820	0.43	9%
708	Cypresswood West of T C Jester Blvd	4	19,100	480	0.25	3%
709	Louetta East of T C Jester Blvd	4	30,700	770	0.41	5%
710	Spring Cypress East of T C Jester Blvd	4	55,900	1,400	0.74	10%
710-2 EB	EB FM 2920 East of Rhodes Rd	2	16,200	810	0.43	3%
710-2 WB	WB FM 2920 East of Rhodes Rd	2	17,100	860	0.45	3%
711	Riley Fuzzel West of Falvel Rd	4	22,700	570	0.30	4%
Total			562,500	-	-	100%
Screenline 8: North of Little York Road/Garret Rd						
801-A	NB I-45 Frontage North of W Little York Rd	3	12,000	400	0.20	2%
801 NB	NB I-45 Mainlane North of W Little York Rd	4	103,900	2,600	1.08	17%
801 SB	SB I-45 Mainlane North of W Little York Rd	4	103,900	2,600	1.08	17%

ID	Location Description	Lanes	2023 Counts	Peak Hour Traffic-Per lane	Volume to Capacity Ratio	Screenline Share
801-B	SB I-45 Frontage North of W Little York Rd	2	7,600	380	0.19	1%
802-A	SB US 59 Frontage North of Little York Rd	3	21,000	700	0.35	3%
802 SB	SB US 59 Mainlane North of Little York Rd	5	115,600	2,310	0.96	19%
802 NB	NB US 59 Mainlane North of Little York Rd	5	115,600	2,310	0.96	19%
802-B	NB US 59 Frontage North of Little York Rd	3	8,200	270	0.14	1%
803	Homestead Rd North of Little York Rd	6	18,700	310	0.16	3%
804-A	NB BW8 Frontage North of Garrett Rd	3	18,400	610	0.31	3%
804	Sam Houston Toll Road North of Garrett Rd	6	38,800	650	0.27	6%
804-B	SB BW8 Frontage North of Garrett Rd	3	20,400	680	0.34	3%
805	FM2100 North of Beaumont Hwy	4	35,800	900	0.47	6%
Total			619,900	-	-	100%
Screenline 9: South of Sam Houston Parkway						
901	SH 249 East of Bammel North Houston Rd	6	71,500	1,190	0.63	8%
901-2 NB	NB Veterans Memorial Dr North of West Rd	2	11,400	570	0.30	1%
901-2 SB	SB Veterans Memorial Dr North of West Rd	2	11,100	560	0.29	1%
902-A	SB I-45 Frontage South of Beltway 8	2	33,700	1,690	0.85	4%
902 SB	SB I-45 Mainlane South of Beltway 8	5	103,700	2,070	0.86	12%
902 NB	NB I-45 Mainlane South of Beltway 8	5	119,700	2,390	1.00	14%
902-B	NB I-45 Frontage South of Beltway 8	2	16,500	830	0.42	2%
903	Airline Dr South of Aldine Bender Rd	4	14,500	360	0.19	2%
904	NB/SB Hardy South Mainlane South of FM 525	6	67,000	1,120	0.47	8%
905	Aldine Westfield South of FM 525	1	9,100	910	0.48	1%
906	JFK Blvd South of FM 525	4	13,600	340	0.18	2%
907-A	SB US 59 Frontage North of Lauder Rd	4	16,000	400	0.20	2%
907 SB	SB US 59 Mainlane North of Lauder Rd	5	100,900	2,020	0.84	12%
907 NB	NB US 59 Mainlane North of Lauder Rd	4	112,500	2,810	1.17	13%
907-B	NB US 59 Frontage North of Lauder Rd	4	16,100	400	0.20	2%
908	SB BW8 Mainlane North of N Lake Houston Pkwy	6	93,900	1,570	0.65	11%
908-A	SB BW8 Frontage North of N Lake Houston Pkwy	3	15,200	510	0.26	2%
908-B	NB BW8 Frontage North of N Lake Houston Pkwy	3	16,100	540	0.27	2%
909	FM2100 North of Hare Rd	2	32,100	1,610	0.85	4%
Total			874,600	-	-	100%
Screenline 10: North of FM 1960						
1001-A	SB US 59 Frontage North of Kingwood Dr	3	9,100	300	0.15	1%
1001 SB	SB US 59 Mainlane North of Kingwood Dr	4	74,700	1,870	0.78	9%
1001 NB	NB US 59 Mainlane North of Kingwood Dr	4	74,700	1,870	0.78	9%
1001-B	NB US 59 Frontage North of Kingwood Dr	3	11,100	370	0.19	1%

ID	Location Description	Lanes	2023 Counts	Peak Hour Traffic-Per lane	Volume to Capacity Ratio	Screenline Share
1002	Cypresswood Dr North of FM 1960	4	19,700	490	0.26	2%
1003	Aldine Westfield Rd North of Treaschiwg Rd	4	26,000	650	0.34	3%
1004	NB/SB Hardy North Mainlane South of Cypresswood Dr	6	74,700	1,250	0.52	9%
1005-A	SB IH 45 Frontage North of Cypress Creek Pkwy	3	30,000	1,000	0.50	4%
1005 SB	SB IH 45 Mainlane North of Cypress Creek Pkwy	4	104,400	2,610	1.09	13%
1005 NB	NB IH 45 Mainlane North of Cypress Creek Pkwy	4	104,400	2,610	1.09	13%
1005-B	NB IH 45 Frontage North of Cypress Creek Pkwy	3	34,500	1,150	0.58	4%
1006	Kuykendahl Rd South of Cypresswood Dr	4	45,700	1,140	0.60	6%
1007	Stubener Airline Rd South of Cypresswood Dr	4	40,900	1,020	0.54	5%
1008	NB/SB US 249 Mainlane North of Cypresswood Dr	8	139,200	1,740	0.73	18%
Total			789,100	-	-	100%
Screenline 11: East of Sam Houston (South-western Segment)						
1101-A	SB US 59 Frontage East of Beltway 8	2	28,400	1,420	0.71	6%
1101 SB	SB US 59 Mainlane East of Beltway 8	4	91,100	2,280	0.95	20%
1101 Exp	NB/SB US 59 Express Lanes East of Beltway 8	1	300	30	0.02	0%
1101 NB	NB US 59 Mainlane East of Beltway 8	4	106,000	2,650	1.10	23%
1101-B	NB US 59 Frontage East of Beltway 8	2	23,000	1,150	0.58	5%
1102	Bellfort West of S Gessner Rd	4	18,500	460	0.24	4%
1103	Gessner Dr South of W Bellfort Ave	4	12,300	310	0.16	3%
1104	Fondren North of SH 90	6	14,300	240	0.13	3%
1105 EB	EB SH 90 Mainlane East of Fondren Rd	3	39,200	1,310	0.55	9%
1105 WB	WB SH 90 Mainlane East of Fondren Rd	3	42,200	1,410	0.59	9%
1105-2	Hilcroft St South of W Orem Dr	4	11,300	280	0.15	2%
1106	NB/SB Fort Bend Mainlane South of W Orem Dr	4	18,800	470	0.20	4%
1107	S Post Oak South of W Orem Dr	4	26,800	670	0.35	6%
1108	Almeda South of Anderson Rd	4	23,700	590	0.31	5%
Total			455,900	-	-	100%
Screenline 12: East of Fondren Road						
1201-A	WB I 10 Frontage West of Bingle Rd	3	15,900	530	0.27	3%
1201 WB	WB I 10 Mainlane West of Bingle Rd	5	158,700	3,170	1.32	31%
1201 EB	EB I 10 Mainlane West of Bingle Rd	5	158,700	3,170	1.32	31%
1201-B	EB I 10 Frontage West of Bingle Rd	3	15,900	530	0.27	3%
1202	Memorial Dr East of Piney Point Rd	4	25,200	630	0.33	5%
1203	Farm to market Road 1093 East of Fondren Rd	8	44,000	550	0.29	9%

ID	Location Description	Lanes	2023 Counts	Peak Hour Traffic-Per lane	Volume to Capacity Ratio	Screenline Share
1204	EB/WB Westpark tollway Mainlane West of Hillcroft St	4	93,700	2,340	0.98	18%
Total			512,100	-	-	100%
Screenline 13: West of Fondren Rd						
1301-A	WB I 10 Frontage East of Bunker Hill Rd	3	15,900	530	0.27	3%
1301 WB	WB I 10 Mainlane East of Bunker Hill Rd	6	158,700	2,650	1.10	27%
1301 EB	EB I 10 Mainlane East of Bunker Hill Rd	6	158,700	2,650	1.10	27%
1301-B	EB I 10 Frontage East of Bunker Hill Rd	3	15,900	530	0.27	3%
1303	Richmond Avenue East of S Gessner Rd	6	22,700	380	0.20	4%
1305-A	WB US 59 Frontage East of Fondren Rd	3	14,500	480	0.24	2%
1305 WB	WB US 59 Mainlane East of Fondren Rd	5	93,000	1,860	0.78	16%
1305 EB	EB US 59 Mainlane East of Fondren Rd	5	93,000	1,860	0.78	16%
1305-B	EB US 59 Frontage East of Fondren Rd	3	14,200	470	0.24	2%
Total			586,600	-	-	100%
Screenline 14: West of Beltway 8						
1401 WB	WB I 10 Mainlane West of Beltway 8	6	127,800	2,130	0.89	18%
1401 EB	EB I 10 Mainlane West of Beltway 8	6	130,200	2,170	0.90	19%
1402	Memorial Dr West of N Wilcrest Dr	4	43,800	1,100	0.58	6%
1403	Farm to market Road 1093 West of N Wilcrest Dr	8	56,900	710	0.37	8%
1404	Richmond Avenue West of N Wilcrest Dr	4	21,200	530	0.28	3%
1405	EB/WB WP Wilcrest Mainlane West of N Wilcrest Dr	4	82,000	2,050	0.85	12%
1406-A	WB US 59 Frontage West of N Wilcrest Dr	3	19,000	630	0.32	3%
1406 WB	WB US 59 Mainlane West of N Wilcrest Dr	5	112,000	2,240	0.93	16%
1406-B	EB US 59 Frontage West of N Wilcrest Dr	3	18,400	610	0.31	3%
Total			703,300	-	-	100%
Screenline 15: East of Hardy Toll						
1501	Rankin Road East of Air Center Blvd	4	8,600	220	0.12	20%
1502	EB/WB Hardy Airport Connector Mainlane East of Air Center Blvd	4	24,200	610	0.25	57%
1503	Greens Road East of Air Center Blvd	4	9,300	230	0.12	22%
Total			42,100	-	-	100%
Screenline 16: West of Mesa Dr						
1601	Tidwell South of Mesa Dr	4	19,200	480	0.25	9%
1602	Little York South of Mesa Dr	4	9,200	230	0.12	4%
1603	W Lake Houston Pkwy South of Mesa Dr	2	13,000	650	0.34	6%
1604-A	EB BW8 Frontage West of Wilson Rd	3	12,900	430	0.22	6%

ID	Location Description	Lanes	2023 Counts	Peak Hour Traffic-Per lane	Volume to Capacity Ratio	Screenline Share
1604-B	WB BW8 Frontage West of Wilson Rd	3	12,900	430	0.22	6%
1604	Sam Houston Mainlane West of Wilson Rd	8	118,200	1,480	0.62	55%
1605	Will Clayton Parkway East of Wilson Rd	4	29,900	750	0.39	14%
Total			215,300	-	-	100%
Screenline 17: South of Tidwell Road						
1701-A	SB I-45 Frontage South of E Tidwell Rd	2	18,800	940	0.47	3%
1701 Exp	NB/SB I-45 Express Lanes South of E Tidwell Rd	1	2,500	250	0.17	0%
1701	I-45 Mainlane South of E Tidwell Rd	8	246,500	3,080	1.28	42%
1701-B	NB I-45 Frontage South of E Tidwell Rd	2	14,100	710	0.36	2%
1702	Irvington Blvd South of E Tidwell Rd	4	12,700	320	0.17	2%
1703-A	SB US 59 Frontage South of E Tidwell Rd	3	4,200	140	0.07	1%
1703	US 59 Mainlane South of E Tidwell Rd	10	207,800	2,080	0.87	35%
1703 Exp	NB/SB US 59 Express Lanes South of E Tidwell Rd	1	1,100	110	0.07	0%
1703-B	NB US 59 Frontage South of E Tidwell Rd	3	4,200	140	0.06	1%
1705	N Wayside Dr South of E Tidwell Rd	4	17,200	430	0.23	3%
1706	Mesa Dr South of E Tidwell Rd	4	25,000	630	0.33	4%
1707	CE King Parkway North of Garrett Rd	2	6,200	310	0.16	1%
1708-A	SB BW8 Frontage North of Tidwell Rd	3	14,100	470	0.24	2%
1708-B	NB BW8 Frontage North of Tidwell Rd	3	14,100	470	0.24	2%
Total			588,500	-	-	100%
Screenline 18: South of Grand Parkway						
1801-A	WB US 290 Frontage West of Mason Rd	2	3,100	160	0.08	1%
1801-B	EB US 290 Frontage West of Mason Rd	2	3,200	160	0.08	1%
1801 EB	EB US 290 Mainlane West of Mason Rd	2	61,200	3,060	1.28	10%
1801 WB	WB US 290 Mainlane West of Mason Rd	2	53,600	2,680	1.12	9%
1802	Muschke Road South of Schiel Rd	4	37,200	930	0.49	6%
1803	Cypress Rosehill Rd South of Grant Rd	4	15,200	380	0.20	2%
1804	Telge Rd North of Grand Rd	2	11,100	560	0.29	2%
1805	NB/SB US 249 Mainlane North of Northpointe Blvd	8	80,500	1,010	0.42	13%
1805-A NB	NB US 249 Frontage North of Northpointe Blvd	3	20,000	670	0.34	3%
1805-B SB	SB US 249 Frontage North of Northpointe Blvd	3	19,700	660	0.33	3%
1806	Champion Forest Drive South of Grand Parkway	4	29,700	740	0.39	5%
1807	FM 2920 South of Grand Parkway	4	43,700	1,090	0.57	7%
1808	Kuykendahl South of Grand Parkway	4	21,700	540	0.28	4%
1809	Gosling Rd South of Grand Parkway	2	16,400	820	0.43	3%

ID	Location Description	Lanes	2023 Counts	Peak Hour Traffic-Per lane	Volume to Capacity Ratio	Screenline Share
1810 NB	NB I-45 Mainlane South of Grand Parkway	4	84,300	2,110	0.88	14%
1810 SB	SB I-45 Mainlane South of Grand Parkway	4	84,300	2,110	0.88	14%
1810-A	NB I-45 Frontage South of Grand Parkway	3	11,900	400	0.20	2%
1810-B	SB I-45 Frontage South of Grand Parkway	3	12,300	410	0.21	2%
Total			609,100	-	-	100%
Screenline 19: Encircling IH 610						
1901	IH 10 west of IH 610	15	247,800	1,650	0.69	38%
1902	IH 45 North of Cavalcade St	12	207,000	1,730	0.72	32%
1903	Fulton St North of Cavalcade St	4	3,400	90	0.05	1%
1904	Irvington Blvd North of Cavalcade St	4	11,100	280	0.15	2%
1905	IH 69 north of Kelly St	12	183,700	1,530	0.64	28%
Total			653,000	-	-	100%
Screenline 20: Encircling IH 610						
2001 NB	NB Decker Praire Rosehill Rd North of Coe Loop	1	1,700	170	0.09	0%
2001 SB	SB Decker Praire Rosehill Rd North of Coe Loop	1	1,600	160	0.08	0%
2002 NB	MCT - DECKER PRAIRIE NB	3	18,100	600	0.25	3%
2002 SB	MCT - DECKER PRAIRIE SB	3	17,500	580	0.24	3%
2002-A NB	NB SH 249 Frontage Rd Frontage North of Zion Rd	3	15,400	510	0.26	2%
2002-B SB	SB SH 249 Frontage Rd Frontage North of Zion Rd	3	15,200	510	0.26	2%
2003 NB	NB FM 2978 South of Dobbin-Huffsmith Rd	2	13,100	660	0.35	2%
2003 SB	SB FM 2978 South of Dobbin-Huffsmith Rd	2	13,900	700	0.37	2%
2004 NB	NB Kuykendahl Rd South of Flintridge Dr	2	13,500	680	0.36	2%
2004 SB	SB Kuykendahl Rd South of Flintridge Dr	2	12,900	650	0.34	2%
2005 NB	NB Gosling Rd North of Creekside Forest Rd	2	14,900	750	0.39	2%
2005 SB	SB Gosling Rd North of Creekside Forest Rd	1	14,000	1,400	0.74	2%
Total			151,800	-	-	100%

Speed Data

Speed and delay information was gathered by obtaining INRIX data during the peak (morning and afternoon) and off-peak (midday and night) periods. The speed and delay information was collected during the second and third weeks of September 2023. Routes were identified within the HCTRA System study area, and the corresponding speed and delay data was obtained from INRIX. The routes and their limits are illustrated in **Figure 2-20**. It should be noted that, for the

analysis purpose, speed and delay data for Tuesday through Thursday was analyzed. Additionally, it was used to identify instances where congestion may have artificially lowered the peak period hourly volumes below those observed in the off-peak periods.

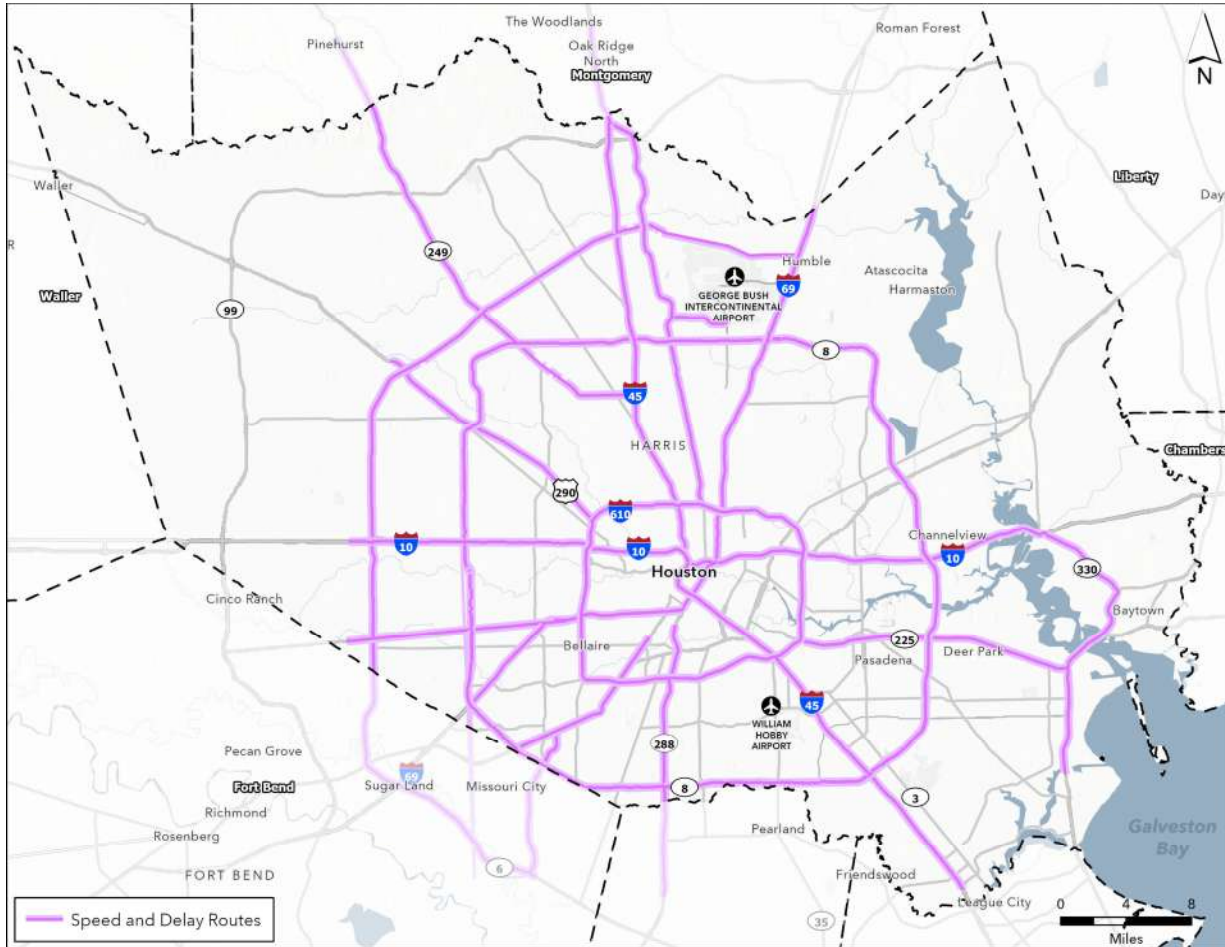


Figure 2-20
Speed and Delay Routes

Origin-Destination Data

Origin-destination (O-D) data was gathered by obtaining daily travel data from StreetLight Data, Inc. Origin-destination zones were identified for analyzing traffic movements along and around HCTRA facilities. This data was collected to complement the traffic count data collection efforts to identify daily travel movements along the major routes in the Harris County region. **Figure 2-21** shows the layout of zones that were utilized.

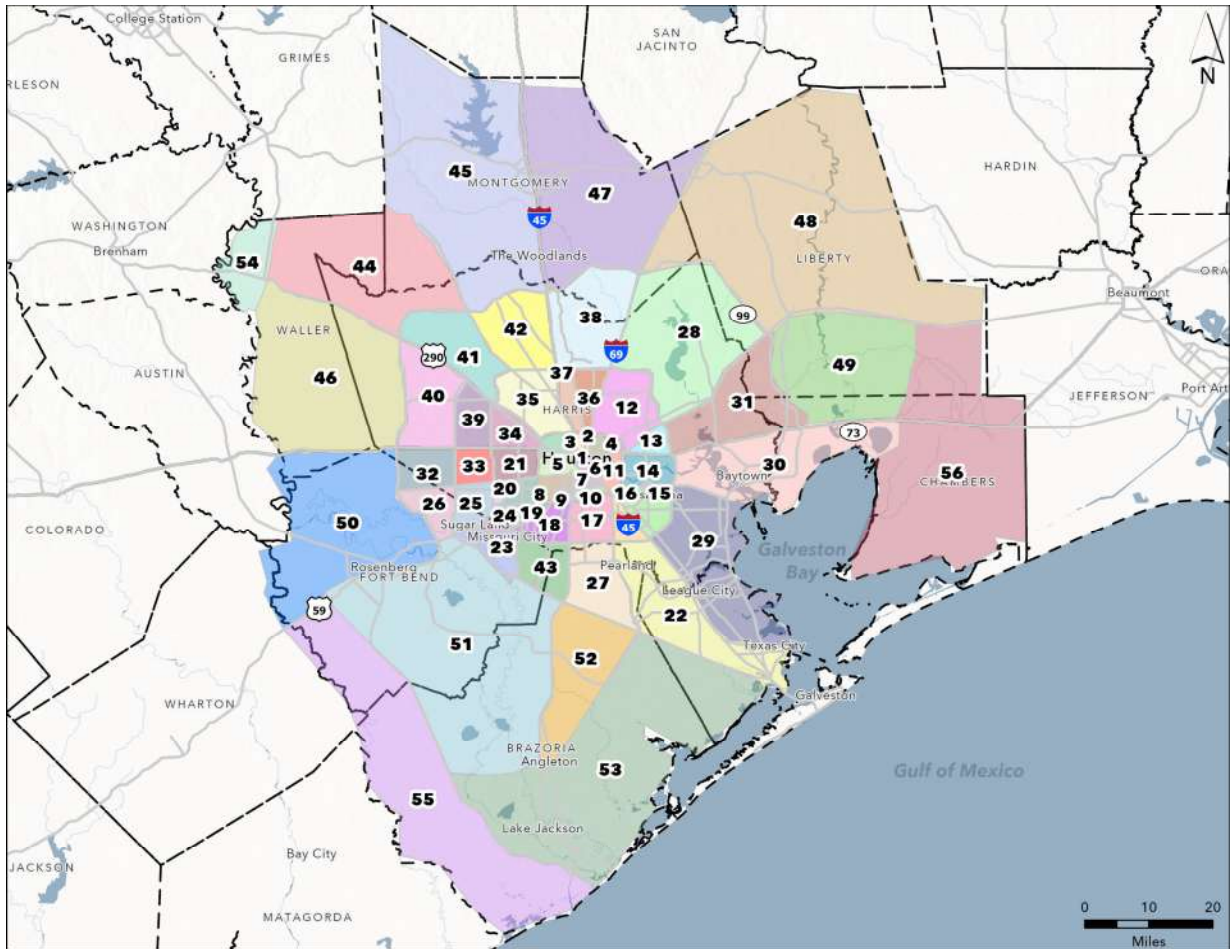


Figure 2-21
Origin-Destination Analysis Zones

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Chapter 3

Regional Demographic and Economic Trends

This chapter provides an overview of the historical regional trends in population and employment along with an overview of recent short-term economic trends and outlook in the Houston metropolitan region. It also describes the regional growth forecasts from independent sources, comparisons to the official Houston-Galveston Area Council (H-GAC) forecasts and the revised forecasts developed by independent consultant, Community Development Strategies (CDS), as part of this study.

The distribution and growth of population, households, and employment each have a significant impact on the traffic and revenue potential of a toll facility. Historical regional trends of these indicators and recent economic trends and outlook were collected from publicly available data sources. The forecasts of these indicators are key inputs into the trip generation module used to build the travel demand model trip tables. The resulting trip tables form the foundation of the travel demand model for the base year calibration and for each of the model forecast years from which the future traffic projections are derived. It is therefore critical to review these underlying demographic assumptions.

The official socioeconomic forecasts used in the regional travel demand model are developed by the designated metropolitan planning organization, specifically H-GAC. Embedded in the H-GAC's Regional Growth Forecast are estimates for population, households, and employment within an eight-county area comprising Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties. As part of this study, an independent consultant, Community Development Strategies (CDS), was retained to conduct an independent analysis of the validity of the H-GAC's socioeconomic data that is used to forecast future travel demand in the Houston metropolitan area. A separate report was prepared by CDS in February 2024 and is included as **Appendix A** of this report.

Chapter 3 is organized into the following key sections:

- Historical regional trends
- Recent economic trends and outlook
- Regional growth forecasts

- Background Transportation Improvements
- Evaluation of H-GAC forecasts
- CDS forecast revisions
- Summary of independent socioeconomic review
- Consumer price index

Historical Regional Trends

A review of the historical trends with the region's socioeconomic indicators was performed to assess growth patterns in the Houston-Galveston area as summarized herein.

Historical Population Trends

Table 3-1 shows the historical population trends for the counties within the Houston-Galveston Area Council (H-GAC) region. The total population has increased by an average annual growth rate of 2.3 percent from 1970 to 2023 for the eight-county region, adding approximately 5.3 million new residents to the area.

The eight-county region added almost 1 million people within one decade between 1970 and 1980. The rate of growth was substantially reduced by major economic recession and restructuring which occurred in the mid-1980s as a result of falling oil prices and an over dependency on the petroleum industry within the Houston economy. Subsequent to that economic downturn, the greater Houston region emerged as a much more diverse economy and strong growth resumed thereafter. In the latest decade (2010-2023), about 1.6 million people were added to the region.

Harris County as the most populous county, where all of the existing HCTRA System is located, added about 3.1 million additional residents between 1970 and 2023 (i.e., about 60 percent of the region's total growth of 4.9 million people), at an overall rate of growth of 1.9 percent per year. U.S. Census estimates that the growth rate in Harris County decreased to 0.7 percent per year over the 2020-2023 period. In 2023, about 4.8 million people lived in Harris County (i.e., about 65 percent), out of the total 7.4 million people in the eight-county region.

The recent slowdown in the population growth of Harris County is due to a shift in the population growth to outlying areas including Fort Bend and Montgomery counties, where the population growth per year between 2020 and 2023 exceeded that of Harris County. This is likely driven by the differences in vacant developable land availability and development costs across the

counties, and home/work location preferences of the residents moving to/within the region. Historically, Fort Bend and Montgomery counties were growing rapidly, averaging above 5 percent per year from 1970 to 2023. Both of these counties had populations in the range of 50,000 residents each in 1970 and have grown by approximately fourteen-fold (in total) by 2020. Also, Fort Bend County has a consistent long-term growth, even during the 1980s (after the fall of the oil market, which had a significant impact on the overall Houston area's economy). In fact, over the recent past decade of 2010-2020, Fort Bend County had the highest rate of population growth of 3.5 percent per year among all counties in the region.

H-GAC's 2015 regional building inventory snapshot showed that the number of new building constructions increased from the decade of 1996-2005 to the decade of 2006-2015 in the Outer Grand Parkway area (particularly in the land use sectors located in Fort Bend and Montgomery counties) of the HGAC region, while the number reduced for Loop (includes Houston downtown/core city), Beltway 8 and Grand Parkway areas of the HGAC region. Annual non-residential building square footage added between 2012 and 2015 in the Outer Grand Parkway area of the HGAC region remained well above the 1985-2015 average, while it has generally remained lower than the average for the other three areas. Annual residential building square footage added between 2012 and 2015 in all areas except the Grand Parkway area of the H-GAC region remained above the 1985-2015 average. Residential developments in the 2012-2015 timeframe had an increased share of multi-family residential developments compared to the years prior to this period. The share of building square footage added under multi-family residential developments out of total residential developments was the highest in the Loop area, and averaged at 71 percent over the 2012-2015 timeframe, while other areas averaged between 17 percent and 44 percent over the same period.

Table 3-1 Historical Population Growth by County

County	1970	1980	1990	2000	2010	2020	2023*
Brazoria	108,312	169,587	191,707	241,805	313,166	372,031	398,938
Chambers	12,187	18,538	20,088	26,006	35,096	46,571	53,876
Fort Bend	52,314	130,962	225,421	354,286	585,375	822,779	916,778
Galveston	169,812	195,738	217,396	250,178	291,309	350,682	361,744
Harris	1,741,913	2,409,547	2,818,101	3,401,139	4,092,459	4,731,145	4,835,125
Liberty	33,014	47,088	52,726	70,196	75,643	91,628	108,272
Montgomery	49,479	127,222	182,201	293,779	455,746	620,443	711,354
Waller	14,285	19,798	23,374	32,545	43,205	56,764	63,553
8-County Region	2,181,316	3,118,480	3,731,014	4,669,934	5,891,999	7,092,073	7,449,640

Source: U.S. Census Bureau, Decennial Census Population Counts (1970-2020) and *2023 Population Estimate

Table 3-1 Historical Population Growth by County (Continued)

County	1970-2023* CAGR	2010-2020 CAGR	2020-2023* CAGR
Brazoria	2.5%	1.7%	2.4%
Chambers	2.8%	2.9%	5.0%
Fort Bend	5.6%	3.5%	3.7%
Galveston	1.4%	1.9%	1.0%
Harris	1.9%	1.5%	0.7%
Liberty	2.3%	1.9%	5.7%
Montgomery	5.2%	3.1%	4.7%
Waller	2.9%	2.8%	3.8%
8-County Region	2.3%	1.9%	1.7%

Source: U.S. Census Bureau, Decennial Census Population Counts (1970-2020) and *2023 Population Estimate

Population growth is one of the principal measures of the economic vitality of any region because increasing population is generally the result of an increase in employment, a high level of immigration and a stable or expanding economy.

From 1970 to 2020, population in the eight-county region grew from 2.2 million to 7.1 million at a compounded annual growth rate of 2.4 percent per year. Population growth is made up of three primary components – natural increase (births minus deaths); domestic migration (from the U.S.); and international migration (from outside the U.S.). According to U.S. Census Bureau, the net in-migration, which is calculated based on the persons “moving in” against those “moving out”, has accounted for 52.3 percent of the growth in the eight-county region over the recent decade (2010-2020). International migration comprised of 29.2 percent of the total net change while domestic migration made up a share of 23.1 percent of the net change in population in the region. From 2010 to 2020, natural increase in Harris County accounted for 68.5 percent of the net population change while net migration accounted for about 31.5 percent, with growth due to international migration but decline (that began from 2016) due to domestic migration. These trends have continued between 2020 and 2022, indicative of an increasing diversity in Harris County’s population.

Based on the recent development trends discussed earlier, this study infers that some of the people migrating from Harris County to the outlying areas of the eight-county region are likely doing so to secure a new and affordable single-family residence. Growing non-residential developments and new work opportunities in the Outer Grand Parkway area are also likely attracting workforce to live closer to this area. On the other hand, new housing being offered to

the people who are remaining in Harris County or migrating to this county (mainly internationally and with diverse backgrounds) is increasingly multi-family residential type, which may often be mixed with commercial (e.g., retail stores, restaurants) and transit developments that in most cases reduce auto trips.

Historical Employment Trends

The historical employment trend in the region by county is shown in **Table 3-2**. Total employment of the eight-county region has increased by approximately 158,000 between 2019 and 2023, or an average annual growth rate of 1.3 percent. During the 2010-2019 timeframe, the region experienced the highest growth, where 558,000 jobs were created. Immediately after the onset of COVID-19 pandemic, i.e., in the period 2019-2023, the region gained 152,000 jobs, however, between 2020 and 2022, the region recovered and has grown in jobs. The region saw a net increase of 90,000 jobs between 2022 and 2023.

The employment in the eight-county region has been largely concentrated in Harris County (84 percent of the region employment in 2001 and 76 percent in 2022). Between 2001 and 2023, Harris County added approximately 547,000 jobs, which corresponds to 29 percent of the employment growth of the region. Harris County contributed to 73 percent of the job recovery and growth following the Great Recession of 2008. However, Harris County has not fully recovered from the job losses after the onset of the COVID-19 pandemic. As for population growth, employment is growing rapidly in both Fort Bend and Montgomery counties, increasing by 4.6 percent and 4.7 percent annually over the 2001-2023 time period, respectively. Toward the Great Recession of 2008 job recovery and growth, Fort Bend and Montgomery counties contributed only 5 percent each. On the other hand, toward the ongoing COVID-19 pandemic job recovery and growth, Fort Bend and Montgomery counties contributed 50 percent and 28 percent, respectively.

Table 3-2 Historical Total Employment Growth by County

County	2001	2010	2019	2020	2022	2023
Brazoria	75,655	85,904	116,571	111,076	118,102	118,985
Chambers	6,982	9,434	17,224	16,909	19,480	20,943
Fort Bend	92,236	130,712	196,218	190,182	230,396	240,742
Galveston	86,861	94,160	111,079	106,289	119,523	122,139
Harris	1,864,100	1,987,097	2,350,807	2,221,453	2,349,928	2,411,301
Liberty	15,765	16,360	18,544	17,630	18,690	19,403
Montgomery	80,344	127,250	192,400	186,567	211,218	221,442
Waller	10,430	13,559	19,859	20,950	23,153	25,582
8-County Region	2,232,373	2,464,476	3,022,702	2,871,056	3,090,490	3,180,537

Table 3-2 Historical Total Employment Growth by County (Continued)

County	2019	2010-2019 CAGR	2023	2019-2023 CAGR
Brazoria	116,571	3.5%	118,985	0.5%
Chambers	17,224	6.9%	20,943	5.0%
Fort Bend	196,218	4.6%	240,742	5.2%
Galveston	111,079	1.9%	122,139	2.4%
Harris	2,350,807	1.9%	2,411,301	0.6%
Liberty	18,544	1.4%	19,403	1.1%
Montgomery	192,400	4.7%	221,442	3.6%
Waller	19,859	4.3%	25,582	6.5%
8-County Region	3,022,702	2.3%	3,180,537	1.3%

Source: US Bureau of Labor Statistics (BLS), Quarterly Census of Employment & Wages (QCEW), Annual Average Employment Data

Historical Personal Income Trends

Travel demand in general is sensitive to, among other things, the amount of disposable income available to a household. In regard to demand for toll facilities, a reliable indicator of an individual's propensity to pay tolls compared to the benefits provided by other free alternatives is personal income. This is a key input into the assessment of the values-of-time for a motorist as there is typically a positive relationship between their values-of-time, income and the overall motorists' willingness-to-pay.

The historical per capita personal income trend in the region by county is shown in **Table 3-3**. Between 1990 and 2022, the per capita income grew between 3.8 percent (Harris County), and the remaining counties in the eight-county region ranged between 3.5 percent (Liberty County) and 4.7 percent (Montgomery County).

Considering the time series, per capita income has been increasing steadily over the years across all counties. The 2015-2019 time period saw the slowest per capita income growth, which was driven by a significant downturn and subsequent recovery of Houston's oil and gas industry. During this time period, Fort Bend County experienced the weakest growth of 0.2 percent per year. Between 2019 and 2020, due to the onset of the COVID-19 pandemic, per capita income growth remained slow for Fort Bend County (0.7 percent), Harris County (0.7 percent) and Chambers County (1.2 percent) but per capita income grew faster after 2020. In 2022, Montgomery, Fort Bend and Harris counties were leading the region with per capita personal income of approximately \$76,000, \$70,000 and \$69,000 (in 2023 dollars), respectively.

Table 3-3 Historical Per Capita Personal Income by County

County	1990	1995	1990-1995	2000	1995-2000	2005	2000-2005
Brazoria	\$17,388	\$20,393	3.2%	\$26,873	5.7%	\$31,000	2.9%
Chambers	\$15,476	\$20,047	5.3%	\$27,144	6.2%	\$31,179	2.8%
Fort Bend	\$19,925	\$24,683	4.4%	\$33,501	6.3%	\$38,771	3.0%
Galveston	\$18,208	\$22,805	4.6%	\$29,677	5.4%	\$33,832	2.7%
Harris	\$20,791	\$24,882	3.7%	\$34,458	6.7%	\$40,088	3.1%
Liberty	\$13,945	\$17,028	4.1%	\$20,918	4.2%	\$25,540	4.1%
Montgomery	\$17,734	\$23,631	5.9%	\$32,804	6.8%	\$39,240	3.6%
Waller	\$14,012	\$16,694	3.6%	\$20,147	3.8%	\$27,173	6.2%

Table 3-3 Historical Per Capita Personal Income by County (Continued)

County	2010	2005-2010 CAGR	2015	2010-2015 CAGR	2019	2015-2019 CAGR
Brazoria	\$37,672	4.0%	\$46,620	4.4%	\$50,485	2.0%
Chambers	\$40,079	5.2%	\$50,531	4.7%	\$56,854	3.0%
Fort Bend	\$48,614	4.6%	\$62,813	5.3%	\$63,240	0.2%
Galveston	\$41,510	4.2%	\$49,993	3.8%	\$54,839	2.3%
Harris	\$46,134	2.8%	\$53,611	3.0%	\$58,679	2.3%
Liberty	\$29,267	2.8%	\$35,363	3.9%	\$38,782	2.3%
Montgomery	\$50,000	5.0%	\$60,138	3.8%	\$66,826	2.7%
Waller	\$32,981	4.0%	\$37,262	2.5%	\$45,035	4.9%

Table 3-3 Historical Per Capita Personal Income by County (Continued)

County	2022	2019-2022	1990-2022
Brazoria	\$57,644	4.5%	3.8%
Chambers	\$61,694	2.8%	4.4%
Fort Bend	\$70,390	3.6%	4.0%
Galveston	\$61,246	3.8%	3.9%
Harris	\$69,154	5.6%	3.8%
Liberty	\$42,422	3.0%	3.5%
Montgomery	\$76,043	4.4%	4.7%
Waller	\$51,670	4.7%	4.2%

Per capita personal income was computed using Census Bureau midyear population estimates. Estimates reflect county population estimates available as of November 2023.

All state and local area dollar estimates are in current (i.e., 2023) dollars (not adjusted for inflation).

Source: U.S. Bureau of Economic Analysis (BEA), "CAINC1 County and MSA personal income summary: personal income, population, per capita personal income" (accessed Tuesday, November 21, 2023).

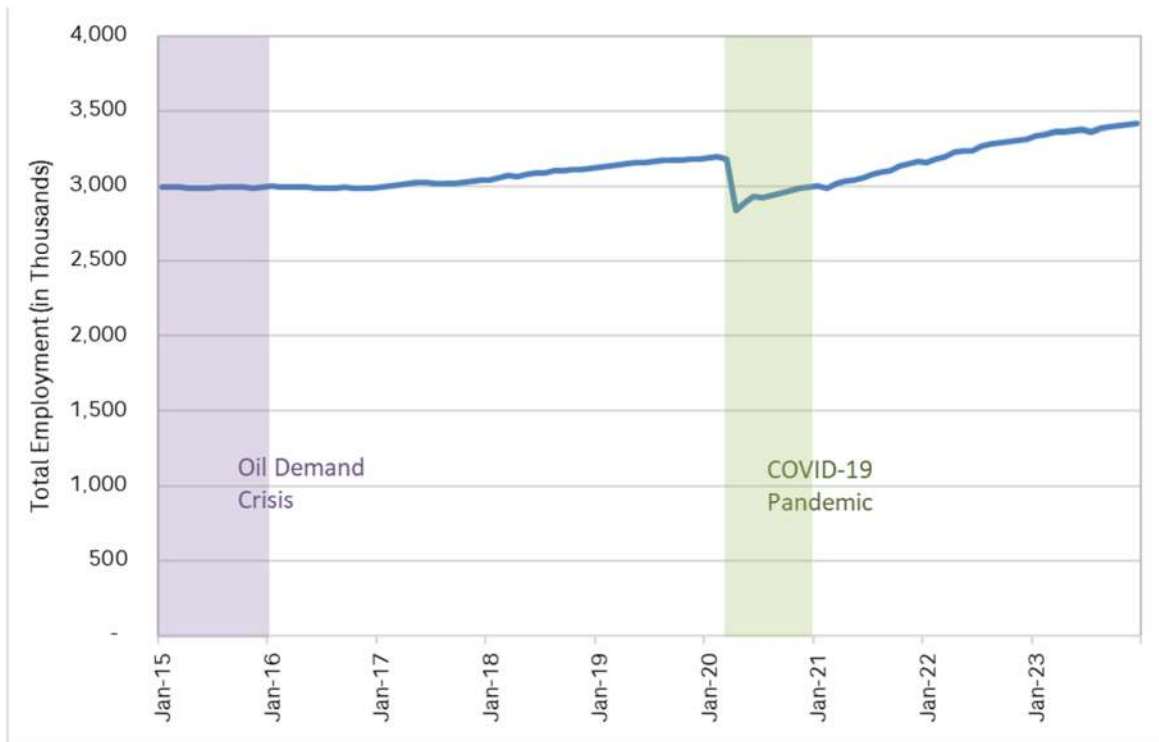
Recent Economic Trends and Outlook

CDM Smith requested CDS, as an independent consultant, to review recent economic indicators for the Houston-Galveston area to better understand how trends in Houston's market compare to national trends and also to evaluate the emerging trends within the Houston compared to their previous 2019 forecasts. CDS conducted a study that analyzed the validity of regional socioeconomic data and also focused on updating the socioeconomic trends within the HCTRA System corridor to better reflect the existing socioeconomic profile and forecasts based on recent known developments within the vicinity of the HCTRA System corridor. A brief summary of this analysis is presented in the following section and CDS's full report on local economic indicators is included as Appendix A of this report.

Recent Employment Trends

The Houston area enjoyed a boom in the 1970's during the country's energy shortages. When oil and natural gas prices declined in the early 1980's, it had a significant impact on the Houston area economy. Since 1986, Houston has diversified its economy and thereby lessened its dependence on the energy industry. According to the Texas Workforce Commission, nonfarm service employment accounted for 3.7 million jobs in the Houston area in March 2024.

Figure 3-1 shows that employment has shown consistent growth from the early 2000s up until the 2019 and 2020 with the COVID-19 pandemic as the main factor leading to recession. Afterwards, employment has grown above the 2019 peak.



Source: Bureau of Labor Statistics, March 2024

Figure 3-1

Houston Metropolitan Statistical Area Historical Employment Trends from BLS

Factors Affecting Future Regional Economic Growth

According to the Federal Reserve Bank and the Greater Houston Partnership, three factors have governed the state of Houston's economy for the past 10 years:

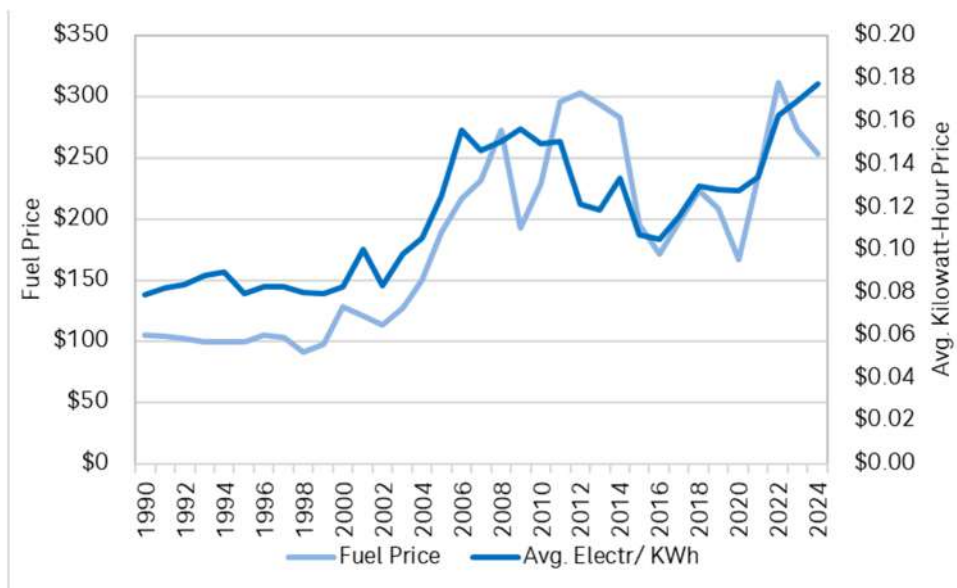
- The health of the national economy;
- The value of the U.S. dollar against foreign currencies; and
- The price of oil and gas

The Houston economy, while certainly affected by the prices of crude oil and natural gas, is less dependent today than it was in the last big oil price bust in the early to mid-1980's. While some effect of energy prices is apparent, the effect has not been a significant factor in the long-term growth of the regional economy.

All of the three important drivers of the Houston's economy started to decline in mid-2008 as real GDP began to drop, the value of the dollar began to rise, and as oil prices began a sharp decline. These factors were shown to have had an effect on the Houston economy during the recession, but it quickly recovered thereafter. In 2014-2015, the oil and gas prices plummeting along with the U.S. dollar strengthening have put some significant stress to the region's

economy. Early 2017, energy prices stabilized and have been on the rise into April 2018 which helped recover and strengthen the economy of the region.

The higher oil and gas prices prior to 2014 had stimulated demand for oil field equipment and services, which is a strong sector within the Houston economy. **Figure 3-2** presents the energy price trends of fuel and electricity. **Figure 3-2** reveals that the CPI-U for Motor Fuel in the Houston-The Woodlands-Sugar Land TX area remained near 100 through the 1990s and then began a steady climb, to a peak of over 300 in 2012. After dropping below 250 for much of the following decade, the fuel price index exceeded 300 again in 2022. Additionally, electricity rates have demonstrated similar trends, but with somewhat less volatility. The most current data (February 2024) shows that the average kilowatt-hour costs 17.8 cents slightly down from the August 2023 peak of 18.2 cents.



Source: U.S. Energy Information Administration, March 2024

Figure 3-2
Energy Price Trends from CDS Report

Currently, only one of the three factors that affect the Houston economy, national economic growth, presents a positive sign for the Houston economy. Most analysts now expect Houston’s economy to be less robust until energy prices rebound to 2010-2014 levels. Though, Houston has a long history as a growth-oriented community with conditions that are generally supportive of business expansion, including low cost of living, low real estate prices, low unionization rates, and a pro-business regulatory environment.

Additional information and references showing recent economic trends are included in CDS’s report in **Appendix A** of this document.

Economic Geography

The City of Houston has never had zoning and development governed by codes that address how property can be subdivided. The region's Central Business District presently accounts for approximately six percent of the regional employment. Loosely-defined "edge cities" comprise a large portion of the region's employment base. These are usually made up of clusters of offices, medical offices, hotels, and supportive retail land uses. Many of these clusters contain high-rise, high density buildings. Examples of major regional employers and activity centers include the Uptown/Galleria, the Texas Medical Center in the urban core, or the Energy Corridor and The Woodlands in the suburbs. The region's heavy industries are clustered around the Houston Ship Channel and the Galveston Bay area. Additionally, a significant number of jobs are spread among Houston's suburbs in numerous office parks, retail centers, and light industrial facilities. The area's large employment centers are largely dependent upon access to the regional highway system.

Regional Growth Forecasts

As the official metropolitan planning organization (MPO) for the eight-county Houston Transportation Management Area, H-GAC prepares regional and small area forecasts that are utilized in transportation and other regional planning efforts. H-GAC is using a micro-simulation of the real estate development industry which supplies residential and non-residential buildings to accommodate the growing population and employment. The population and employment forecasts are summarized in H-GAC's Regional Growth Forecast which last release was updated in 2018. Other public and private organizations that have developed population projections for the Houston metropolitan region include:

- The Texas Demographic Center
- Moody's Corporation
- The Texas Water Development Board
- Woods & Poole Economics, Inc.

Each of these forecasts demonstrates the general expectation of substantial future growth in the Houston region from a 2010 population base of 5.9 million to between 9.9 and 12.0 million residents by 2045.

Population projections for the eight counties in the region are compared in the CDS report (see Appendix A) to the following relevant data sources:

- H-GAC's Regional Growth Forecast released in 2018
- CDS forecasts from 2023
- Texas Demographic Center, previously named Texas State Data Center (TxSDC), is now only considering one migration scenario based on 100 percent of the 2010-2015 migration rate
- Moody's Corporation projections
- Woods and Poole Economics, Inc.

There have also been several recent employment projections developed for the Houston Region by the following independent sources:

- The Houston-Galveston Area Council
- Moody's Corporation

The 2020 regional employment base of approximately 3.1 million (as estimated by CDS) is expected to grow by 2045 within the range of 4.5 million to 4.7 million depending on the sources which equates to an annual average growth of approximately 66,000 new jobs per year within the 2020 to 2045 timeframe.

Taking into account the recent trends in the Houston economy, CDS revised the regional and county level forecasts taking into account the correlation between long-term employment growth and the attraction of new residents from job creation.

In preparing this new CDS 2023 forecast, the following assumptions were used:

- The short-term growth of regional employment will be affected by low energy prices. For this short-term forecast, CDS used the most recent 2023 employment growth estimates from Dr. Gilmer.
- In the long term, the Houston economy is likely to continue to grow – overcoming short-term oil price disruptions. The Houston economy is much less dependent on the upstream energy industry now than in the past and historical trends support the contention that the Houston region will continue to be a low cost, business friendly, growth-oriented community – attractive to new business start-ups and corporate relocations and expansions.

- Houston, however, should not expect to continue exponential growth at historical rates. As the region matures and attractive parcels are developed, CDS expects that growth rates will settle down to a sustainable annual rate of job growth.

For the revised long-term forecast, CDS has used a steadily decreasing annual employment growth rate: from 2.52 percent in 2018 down to 1.57 percent in 2045. This rate of growth results in payroll jobs of 4,728,000 by 2045 – an annual average increase of 62,000 jobs from 2015-2045, compared to the historical ranges of 59,000 observed recently between 2005-2015. To prepare the regional “population in households” and “household” forecasts, CDS used historical trends of the ratio of jobs to households and historical trends of average household size.

Starting with the regional forecast, the county-level forecasts were prepared using Dr. Barton Smith’s Shift-Share model whereby changing shares of regional growth were allocated to each county in the region.

Background Transportation Improvements

This section provides information regarding the existing and forecasted transportation characteristics of the study area and its surroundings within the Houston region. The information described herein draws upon the Houston-Galveston Area Council’s (H-GAC’s) 2045 Regional Transportation Plan (2045 RTP) revised in April 2023. The 2045 RTP is approved and adopted by the Transportation Policy Council (TPC) of H-GAC. The plan identifies the future transportation needs of the Houston region based on a comprehensive look at the current transportation system, the socioeconomic trends and the anticipated funding available to support future transportation projects.

Several new facilities, tolled or free, are identified in the 2045 RTP and are expected to be constructed by the 2045 timeframe. **Table 3-4** contains a comprehensive list of the future background projects and improvements within the H-GAC region that may potentially impact the HCTRA System. For all the projects, if details about project completion dates are not known, the *Analysis Year* given by the 2045 RTP is assumed as model year.

The projects listed add transportation capacity in the region and may serve either as competition or act as traffic feeders. These transportation improvements are a critical consideration to gauge the patterns of future traffic demand that is likely to funnel travel demand towards or away from the HCTRA System. Key projects listed under ‘Corridor-Based Major Investments’ were included for consideration in the study. The Fort Bend Tollway extension between US 90 and Bellfort is removed from this study.

Table 3-4 Future Capacity Improvements Planned near the HCTRA System

MPOID	Project Corridor	From Limit	To Limit	Project Description	Model Year
16316	FM 1960	E OF TWIGSWORTH LN	W OF SAN JACINTO RIVER BRIDGE	WIDEN FROM 4 TO 6 LANES AND CONSTRUCT 4 LANE OVERPASS AT THE WEST LAKE HOUSTON PKWY	2030
204	FM 1960	BF 1960A	E OF TWIGSWORTH LN	WIDEN FROM 4-LANE TO 6-LANE DIVIDED WITH RAISED MEDIAN, CHANNELIZED TURN LANES	2030
18039	FM 1960	SH 321	SH 99	WIDEN ROADWAY FROM 2 LANES TO 4 LANES	2040
11178	FORT BEND PKWY TOLL ROAD	BELLFORT	US 90 A	EXTENSION OF TOLL ROAD	2040
919	FORT BEND PKWY TOLL ROAD	SIENNA PKWY	SH 99	CONSTRUCT 4-LANE TOLL ROAD AND BRAZOS BRIDGE	2030
15208	HARDY TOLL RD	IH 610	IH 69	CONSTRUCT 4-LANE TOLL ROAD TO COMPLETE HARDY TOLL" ROAD"	2026
11565	HEMPSTEAD RD	MANGUM	43RD ST/CLAY RD	CONSTRUCT 4 MANAGED LANES WITH DC (NB - EB) TO SL 8 (TOLL)	2040
11547	HEMPSTEAD RD	JONES RD	GESSNER RD	CONSTRUCT 4 MANAGED LANES WITH DC (NB - EB) TO SL 8 (TOLL)	2040
11373	HEMPSTEAD RD	W OF HUFFMEISTER	JONES RD	CONSTRUCT 4 MANAGED LANES	2040
11372	HEMPSTEAD RD	GESSNER RD	43RD ST/CLAY RD	CONSTRUCT 4 MANAGED LANES (TOLL)	2040
13829	HEMPSTEAD RD	SH 99	RD	CONSTRUCT 4 MANAGED LANES	2040
83	HEMPSTEAD RD & WASHINGTON AVE	W OF 12TH ST	E OF WASHINGTON AVE/KATY RD SPLIT	CONSTRUCT 6-LANE DIVIDED URBAN ST FACILITY W/ AUTOMATIC PUMP STATION AND RR LINE W/ UNDERPASS (PHASE 2)	2025
11375	HEMPSTEAD RD/IH 610	W OF MANGUM/18TH ST ON HEMPSTEAD	S OF OLD KATY RD ON IH 610	CONSTRUCT INTERCHANGE WITH MANAGED LANES AND 2 DIRECT CONNECTORS (EB - SB, WB - NB)	2040
916	IH 10 W	BRAZOS RIVER	FM 359	CONSTRUCT 1 ADDITIONAL MAIN LANE IN EACH DIRECTION	2025
18402	IH 10 W	WALLER C/L	W OF SNAKE CREEK	RECONSTRUCT AND WIDEN FROM 6 TO 10 LANE (ADD 2 MANAGED LANES AND 2 GENERAL PURPOSE LANES)	2030
10334	IH 10 W	W OF SNAKE CREEK	FORT BEND / HARRIS COUNTY LINE	RECONSTRUCT AND WIDEN FROM 6 TO 10 LANES (ADD 2 MANAGED LANES AND 2 GENERAL PURPOSE LANES)	2026
6056	IH 10 W	FM 359	FORT BEND C/L	WIDEN FROM 6 TO 8 MAINLANES AND RECONSTRUCT BOTH 2-LANE FRONTAGE ROADS	2030
13864	IH 10 W	FORT BEND C/L	MASON RD	RESTRIPE AND WIDEN FROM 10 MAIN LANES TO 10 MAIN AND 2 MANAGED LANES	2026
6044	IH 45	S OF FM 1764	N OF FM 517	RECONSTRUCT AND WIDEN TO 8 MAIN LANES AND TWO 2-LANE FRONTAGE ROADS	2025

MPOID	Project Corridor	From Limit	To Limit	Project Description	Model Year
6045	IH 45	S OF FM 1764	N OF FM 519	WIDEN FROM 6 TO 8 MAIN LANES AND RECONSTRUCT BOTH 2 LANE FRONTAGE ROADS	2030
280	IH 45	S OF TEXAS CITY WYE	N OF CAUSEWAY	RECONSTRUCT AND WIDEN FROM 6 TO 8 MAIN LANES, RECONSTRUCT TWO 2-LANE FRONTAGE ROADS (FROM S OF TEXAS CITY WYE TO N OF BNSF RR) AND CONSTRUCT FRONTAGE ROADS (FROM N OF BNSF RR TO N OF CAUSEWAY)	2030
16334	IH 45	S OF WEST RD	N OF SL 8	RECONSTRUCT 8 MAIN LANES, RECONSTRUCT AND WIDEN FROM 1 TO 4 MANAGED LANES TRANSITIONING INTO TWO ENTERING AND EXITING LANES AT REVERSIBLE HOV LANE NORTH OF SL8, AND RECONSTRUCT AND WIDEN FROM TWO 2 AND 3-LANES FRONTAGE ROADS TO TWO 2- AND 3- LANES FRONTAGE ROADS (NHHIP SEG 1D)	2040
16335	IH 45 N	S OF SHEPHERD DR	S OF WEST RD	RECONSTRUCT/WIDEN FROM 8 TO 10 MAINLANES, RECONSTRUCT/WIDEN FROM 1 TO 4 MANAGED LANES; RECONSTRUCT/WIDEN FROM TWO, 2- AND 3-LANE FRONTAGE ROADS TO TWO, 2- AND 3-LANE FRONTAGE ROADS. (NHHIP SEG 1C)	2040
16331	IH 45 N	TIDWELL RD	S OF SHEPHERD DR	RECONSTRUCT MAIN LNS, CONSTRUCT 4 MANAGED LNS, AND RECONSTRUCT AND WIDEN FROM TWO 2-LN FRONTAGE RDS TO TWO 3-LN FRONTAGE RDS	2040
16332	IH 45 N	IH 610	IH 10	RECONSTRUCT AND WIDEN FROM 4 TO 5 MAIN LANES, CONSTRUCT 4 MANAGED LANES AND RECONSTRUCT AND WIDEN FROM TWO 2- AND 3-LN FRD TO TWO 3-LN FRD (NHHIP SEG 2)	2040
16333	IH 45 N	IH 610	TIDWELL RD	RECONSTRUCT AND WIDEN FROM 8 TO 12 MAIN LANES, RECONSTRUCT AND WIDEN FROM 1 TO 4 MANAGED LANES AND RECONSTRUCT AND WIDEN FROM TWO 2- AND 3-LANES FRONTAGE ROADS TO TWO 2- AND 3-LANES FRONTAGE ROADS	2040
13836	IH 45 S	HARRIS C/L	S OF FM 518	WIDEN TO 10 MAIN LANES AND TWO 3-LANE FRONTAGE ROADS	2025
6042	IH 45 S	S OF NASA 1 BYPASS	GALVESTON C/L	WIDEN TO 10 MAIN LANES, TWO 3-LANE FRONTAGE ROADS AND ACCESS INTO TWO DIAMOND LANES	2025
6046	IH 45 S	N OF FM 519	N OF TEXAS CITY WYE	RECONSTRUCT AND WIDEN FROM 6 TO 8 MAIN LANES AND RECONSTRUCT TWO 2 LANE FRONTAGE ROADS	2030
282	IH 45 S	S OF CAUSEWAY	61ST ST	RECONSTRUCT AND WIDEN FROM 6 TO 8 MAIN LANES AND RECONSTRUCT BOTH, 2-LANE FRONTAGE ROADS	2030
155	IH 69 S	SH 288	SP 527	RECONSTRUCT AND WIDEN FROM 6 TO 10 MAIN LANES (NHHIP SEG 3A)	2030
7428	IH 69 S	IH 45	SH 288	RECONSTRUCT AND WIDEN FROM 8 TO 10 MAIN LANES AND RECONSTRUCT IH 69/SH 288 INTERCHANGE (NHHIP SEG 3B)	2030

MPOID	Project Corridor	From Limit	To Limit	Project Description	Model Year
520	SH 35	BS 35C S	FM 2403	RECONSTRUCT AND WIDEN FROM 2 TO 4 LANE DIVIDED	2040
17226	SH 35	FM 2403	FM 523	RECONSTRUCT AND WIDEN FROM 2 TO 4 LANE DIVIDED	2040
12831	SH 35	BS 35C NORTH	SH 99	CONSTRUCT 4 LANE FREEWAY ON NEW LOCATION	2040
18027	SH 35	BS 35 C N (NORTH GORDON ST)	STEELE RD	CONSTRUCT 4 MAIN LANES AND OVERPASSES	2030
7867	SH 35	SH 99	BS 35C SOUTH	CONSTRUCT 4 LANE FREEWAY ON NEW LOCATION	2040
210	SH 35	DIXIE DR	LONG DR	CONSTRUCT 2 TWO LANE FRONTAGE ROADS ON NEW LOCATION	2030
18728	SH 35	FM 518	S OF SH 6	WIDEN FROM 4 TO 6 LANE DIVIDED	2040
202	SH 35 (Spur 5)	IH 45	GRIGGS RD	CONSTRUCT 8 LANE FREEWAY ON NEW LOCATION, OVERPASSES, AND SB RAMP TO OLD SPANISH TRAIL (US 90A)	2026
209	SH 35 (Spur 5)	DIXIE DR	N of GRIGGS RD	CONSTRUCT 8 LANE FREEWAY ON NEW LOCATION	2030
263	SH 36	IH 69 S	FM 2218	RECONSTRUCT AND WIDEN FROM 2 TO 4 LANES DIVIDED	2026
256	SH 36	S OF SH 35	FM 522	RECONSTRUCT TO 4 LANE DIVIDED WITH CLTL, INTERSECTION IMPROVEMENTS AND BICYCLE ACCOMMODATIONS	2030
262	SH 36	FM 2218	S OF NEEDVILLE FAIRCHILD RD	WIDEN FROM 2 TO 4 LANE DIVIDED ROADWAY WITH INTERSECTION IMPROVEMENTS AND BICYCLE ACCOMMODATIONS	2030
11562	SH 36	S OF NEEDVILLE FAIRCHILD RD	BRAZORIA C/L	WIDEN FROM 2 LANE TO 4 LANE DIVIDED	2030
253	SH 36	FORT BEND C/L	N OF SH 35	WIDEN FROM 2 TO 4 LANE DIVIDED ROADWAY WITH INTERSECTION IMPROVEMENTS AND BICYCLE ACCOMMODATIONS	2030
252	SH 36	SH 35	N OF SH 332	WIDEN FROM 2 TO 4 LANES DIVIDED	2030
14258	SH 36	SH 35	S OF SH 35	GRADE SEPARATION OVER NEW SH 35 AND RESTRIPE PAVEMENT FROM 2 TO 4 LANES	2030
255	SH 36	S OF CITY OF BRAZORIA	S OF JONES CREEK BRIDGE	RECONSTRUCT AND WIDEN FROM 2 TO 4 LANES DIVIDED ROADWAY AND GRADE SEPARATION AT FM 2004	2030
251	SH 36	S OF BRAZOS RIVER	FM 1495	WIDEN FROM 2 TO 4 LANES (SEG 15)	2030
254	SH 36	S OF JONES CREEK BRIDGE	N OF BRAZOS RIVER DIVERSION CHANNEL	RECONSTRUCT AND WIDEN FROM 2 TO 4 LANES	2030
7750	SH 36	AUSTIN C/L	SP 529 IN ROSENBERG	RECONSTRUCT AND WIDEN FROM 2 TO 4 LANE DIVIDED	2040
266	SH 99	FM 762	BRAZORIA C/L	CONSTRUCT 4-LANE TOLLWAY WITH LIMITED 2 2-LANE FRONTAGE ROADS AND INTERCHANGES (SEG C-2)	2040
10128	SH 99	IH 69	FM 762	CONSTRUCT 4-LANE TOLLWAY WITH LIMITED 2 2-LANE FRONTAGE ROADS AND INTERCHANGES (SEG C-1)	2030

MPOID	Project Corridor	From Limit	To Limit	Project Description	Model Year
258	SH 99	SH 288	FORT BEND C/L	SEG C	2030
18076	SH 99	AIRPORT BLVD W	FM 1464	WIDEN SH 99 FROM 2 TO 4 LANES	2040
18021	SH 99	N OF KINGSLAND BLVD	FORT BEND COUNTY LINE	SEG D	2026
18723	SH 99	HOLZWARTH RD	KUYKENDAHL RD	SEG F2	2026
11385	SH 99	SH 288	GALVESTON C/L	SEG B	2045
283	SH 99	IH 45 S	BRAZORIA C/L	SEG B-1	2030
18022	SH 99	HARRIS COUNTY LINE	TO FM 1093	RECONSTRUCT AND WIDEN FROM 4 TO 6 LANES (SEG D)	2026
257	SH 99	S OF FM 1462	GALVESTON C/L	SEG B	2030
18724	SH 99 SEG E	WEST RD	IH 10 W	SEG E	2030
18725	SH 99 SEG E	US 290	WEST RD	SEG E	2030
14229	BW 8	SH 225	IH 45	WIDEN FROM 4 TO 8-MAIN LANES IN SECTIONS	2030
16296	SL 8	IH 10	SH 225	WIDEN FROM 4 TO 8-LANES INCLUDING BRIDGE ACROSS HOUSTON SHIP CHANNEL	2025
16297	SL 8	IH 69	US 90	WIDEN FROM 6 TO 8-LANES	2040
18503	SL 8	W OF ALDINE WESTFIELD RD	E OF ALDINE WESTFIELD RD	RESTRIPE WESTBOUND MAIN LANES FROM 3 TO 4 LANES	2026
18727	SL 8	E OF HARDY TOLL ROAD	E OF ALDINE- WESTFIELD RD	RECONSTRUCT AND WIDEN EB AND WB FRONTAGE ROADS FROM 4 TO 6 LANES	2026
18518	SL 8	N OF US 90	WOODFOREST BLVD	WIDEN FROM 4 TO 8 LANES	2030
16344	SL 8	WOODFOREST BLVD	S OF IH 10 E	WIDEN FROM 6 TO 8 LANES (RE-STRIPE EXISTING PAVEMENT)	2030
13637	TEXAS PKWY/FM 2234	LEXINGTON BLVD	CARTWRIGHT RD	WIDEN FROM 4 TO 6-LANES DIVIDED	2030
17233	US 290	SH 6	HARRIS C/L (FM 2920/FM 362)	WIDEN FROM 4 LANES TO 6 LANES	2030
17234	US 290	WASHINGTON C/L	SH 6	RECONSTRUCT AND WIDEN FROM 4 LANES TO 6 LANES	2040
16346	US 59 N	SAN JACINTO C/L	0.65 MI S OF SL 573	CONVERT MAINLANES TO FREEWAY AND CONSTRUCT TWO 2 LANE FRONTAGE ROADS	2026
223	US 59	S END OF CLEVELAND BY-PASS	MONTGOMERY C/L	RECONSTRUCT AND WIDEN TO 6 MAIN LANES WITH FRONTAGE ROADS	2030
6051	US 59 S	W OF SP 10	W OF HAMLINK RD	WIDEN TO 6-MAIN LANES, GRADE SEPARATIONS, 2-LANE FRONTAGE ROADS, ITS & TMS	2025

MPOID	Project Corridor	From Limit	To Limit	Project Description	Model Year
6052	US 59 S	FM 360	W OF HAMLINK RD	WIDEN TO 6 MAIN LANES, W/ 2-LANE FRONTAGE ROADS, GRADE SEPARATIONS, ITS & TMS	2025
6053	US 59 S	W OF DARST RD	FM 360	WIDEN TO 6 MAIN LANE FREEWAY WITH 2-LANE FRONTAGE ROADS, GRADE SEPARATIONS, ITS & TMS	2025
6063	US 59 S	WHARTON COUNTY LINE	W OF DARST RD	WIDEN TO 6-MAIN LANES, W/ 2-LANE FRONTAGE ROADS, GRADE SEPARATIONS, ITS & TMS	2025
172	US 90	FM 563	FM 160	RECONSTRUCT AND WIDEN FROM 2 TO 4 LANE DIVIDED ROADWAY	2030
16347	US 90	FM 160	SH 61	RECONSTRUCT AND WIDEN FROM 2 TO 4 LANES DIVIDED ROADWAY	2030
18403	US 90	Waller C/L	FM 1463	WIDEN FROM A 2 LANES TO 4 LANES	2030
18328	US 90	IH 10	FM 2855	WIDEN FROM 2 LANES TO 4 LANES	2040
18114	US 90	FM 2855	FORT BEND C/L	WIDEN FROM 2 LANES TO 4 LANES	2040
18504	US 90	W OF GREENS BAYOU	E OF GREENS BAYOU	CONSTRUCT 6 MAIN LANES ON NEW LOCATION	2030
18029	US 90A	FM 359	SH 99	RECONSTRUCT AND WIDEN FROM 4 TO 6 LANES DIVIDED (PHASE 2 OF 3)	2026
17236	US 90A	SH 99	W OF SH 6	WIDEN FROM 6 LANES TO 8 LANES DIVIDED	2040
10114	US 90A	LP 762	FM 359	WIDEN FROM 4 TO 6-LANES DIVIDED (PHASE 3 OF 3)	2040
15383	SH 6	N OF BROOKS ST	LEXINGTON BLVD	WIDEN FROM 6 TO 8-LANES	2025
6065	SH 6	MEMORIAL DR	PIPING ROCK LN	RECONSTRUCT AND WIDEN FROM 6 LANES TO 8 LANES DIVIDED	2040
17227	SH 6	PIPING ROCK LN	RICHMOND AVE	WIDEN FROM 6 LANES TO 8 LANES	2040

Evaluation of H-GAC Forecasts

CDS was contracted by CDM Smith to assess the population and employment forecasts in five-year increments between the years of 2020 and 2045 in support of the Traffic and Revenue study for HCTRA. CDS based its effort upon a 2011 economic and demographic forecast and analysis which was refined in 2016 for a previous HCTRA Traffic and Revenue study and later updated in 2019.

The report attached in Appendix A provides an update and revamp of the forecasts issued in 2019 to account for major “announced” and “under construction” residential and commercial development that has happened since 2019. Information and material gathered from other updates to the original 2011 report, completed from 2011 through 2019 for HCTRA, TxDOT, the Montgomery County Toll Road Authority (MCTRA), and the Fort Bend County Toll Road Authority (FBCTRA), are also included.

CDS considered multiple independent forecasts to determine and develop their most likely case scenarios. Along with H-GAC’s regional forecast, CDS evaluated four other independent forecasts of population and two other independent forecasts of employment from respected organizations.

The H-GAC’s regional forecasts, from which their small area forecasts are derived, tended to be in the middle of the independent forecasts referenced in this study. It has been the conclusion of the CDS team that H-GAC’s 2045 regional forecasts at the eight-county regional level were generally reasonable and consistent with other credible forecasts. However, CDS suggested that the small area and county-level forecasts by H-GAC are somewhat divergent with recent observed growth trends. Therefore, CDS utilized the following general approach, as documented in their report in Appendix A:

- When compared to H-GAC’s forecast and the latest forecast model by CDS is notable for the extent to which their models account for the anticipated decentralization of both jobs and population from the core Harris County into the surrounding regional counties. This pattern is consistent with what has happened in almost every major urban area in America, including both the older cities in the Northeast and the newer ones in the South and in the West. This results in population and employment forecasts in the surrounding counties that are in majority above H-GAC’s projections, and Harris County forecasts that are lower than the official H-GAC control totals. An important reason is that the model is sensitive to two significant factors: the presence of vacant developable land (and conversely the lack

of it in the existing built-up areas within the central core) and the qualitative factors and market forces which tend to favor outlying locations for many types of new development.

- The latest CDS model, and its predecessors (based on the model developed by Dr. Barton Smith), also allows counties to capture accelerating or decelerating (non-linear) shares of growth over time – signifying “tipping points” and changes in market momentum that are similar to patterns that typically play out in the marketplace. This is done through second-degree polynomial formulas incorporated into a shift-share model.
- Dr. Smith had previously normalized the estimated coefficients to reflect changes and additional information obtained that was particularly relevant, such as the expansion of the toll road system in the region and/or the limited expansion of roadways in the urban core.
- While it is an alteration, the latest CDS forecast includes an adjustment to Dr. Smith’s 2012 forecasts to consider households and household population instead of housing units and total population but does not change the underlying methodology. Housing units were converted to households by assuming a continuation of recent historical trends in housing occupancy, while total population was converted to household population by the assumption that recent trends in the share of population outside of households (group quarters) will continue. The changes arising from these modifications did not affect the growth rates or shares in any significant way and resulted in very slight modifications to the overall key variable control total forecasts.

CDS does mention that their latest forecasts present a revised set of regional and county forecasts that have been modified to reflect on current conditions and assumptions pertaining to a slowdown of the regional economy in the short-term, both related to the price of oil and gas and an initial assessment of the impacts of the recent Hurricane Harvey. CDS evaluated that although the storm would have significant impacts to be determined at localized levels, it would not likely alter the growth trajectory of the region from recently-expected trends. It is worth noting that an extended and prolonged run of low oil prices and slowdown of the oil and gas industry beyond the short-term assumptions already envisioned by CDS has the potential to result in lower population and employment growth rates than currently being projected by the CDS baseline in the long-term.

Small Area Forecast Method Overview

In general, the methodology CDS used to develop the small area forecasts, summarized in **Figure 3-3**, includes the following steps:

1. Begin with the CDS 2019 forecasts at the regional and county levels
2. Investigate historical growth trends from:
 - The decennial US Census and other Census Bureau sources such as the American Community Survey (ACS) and Longitudinal Employer-Household Dynamics (LEHD)
 - PCensus for Arc View, a program that distributes and displays Nielsen/Claritas demographic data which included 1990, 2000, and 2010 Census data, estimates for 2005 and 2017 as well as projections to 2022 at the census block level
 - Historical employment information from the Texas Workforce Commission (TWC)/Bureau of Labor Statistics (BLS)
 - Previous H-GAC forecasting efforts
3. Investigate the opinions and forecasts of area governmental agencies, private organizations, and area experts
4. Evaluate the potential growth inducing effects of the HCTRA System and other major infrastructure improvements, including the Grand Parkway
5. Account for near-term residential and commercial developments that have been recently announced or begun
6. Implement a “shift-share” forecasting methodology at the Regional Analysis Zone (RAZ) level. CDS created new RAZs for this project, as H-GAC no longer uses these geographies. This takes into account:
 - the historical trends
 - the known historical growth areas for housing and jobs
 - announced major developments

- the land available for new development
 - likely areas in the community for new development based on locally influenced qualitative factors
7. Disaggregate the RAZ forecast into the smaller Traffic Analysis Zones (TAZ)
 8. Disaggregate the TAZ forecast for households and employment by H-GAC's data categories

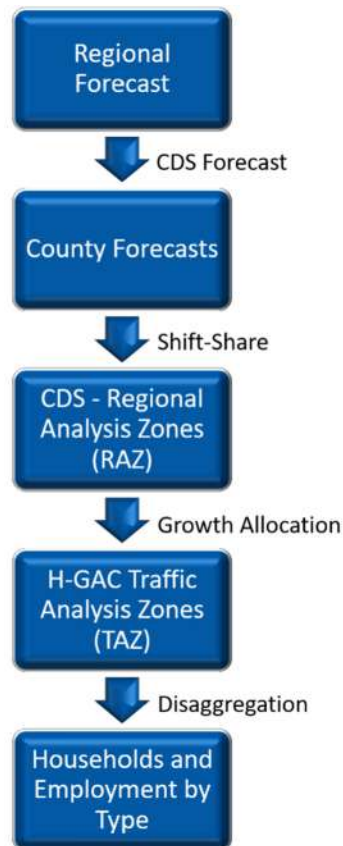


Figure 3-3
CDS Small Area Forecast Methodology

Future Transportation Network Assumptions

In preparing the small area forecasts, future transportation networks and accessibility of the small area zones are affected by transportation infrastructure improvements over time. It was beyond the scope of CDS study to develop sophisticated models that took into account all changes in the transportation network including both highways and public transit. However, recently opened and planned facilities such as the extension of the Fort Bend Parkway Toll Road and the Westpark Toll Road, the SH 249/Tomball Tollway, the Grand Parkway, the Major

Thoroughfare Plans of Houston and other area municipalities, known enhancements to existing facilities such as improvements to US 290, SH 288, I-45 South and I-45 North, and light rail extensions were included.

Contact with Area Agencies and Organizations

In the course of developing small area forecasts, CDS sought out the demographic and economic projections used by key public sector agencies and major private sector parties of interests serving both the key areas around the HCTRA system and the Houston region as a whole. The goal was to understand the projections used by these organizations and to account for knowledge and insight gained from conversations with the local organizations to support the development of CDS's socioeconomic projections.

RAZ Level Forecasts

The forecasts at the RAZ geographic level were produced using a shift-share forecasting methodology, accounting for land availability throughout the process. The methodology involved establishment of county-level forecasts from 2010 to 2045. The shares of the future county housing units, population and jobs were then estimated for each five-year period between 2010 and 2045.

Distributing RAZ-Level Forecast Data to TAZ-Level

The forecasts for the RAZ were distributed to the smaller Traffic Analysis Zones (TAZ) for the entire eight-county region. Since 2015, H-GAC TAZ forecast structure has significantly changed from 2,954 zones to the current 5,217 zones.

The methodology used to distribute the forecasts from the RAZ to the TAZ zones along with the resulting detailed population and employment forecasts are all described in the CDS report provided in Appendix A. The following is a brief comparison summary of the developed CDS forecasts.

CDS and H-GAC Forecasts

To evaluate the validity of H-GAC's forecasts of the current and anticipated growth of population and employment in the area surrounding the HCTRA System, an independent socioeconomic review was undertaken by CDS. A summary of the results from CDS and a comparison to H-GAC's forecasts are described in this section.

Table 3-5 compares the CDS population forecast to the official H-GAC's latest 2023 forecasts. At the eight-county region level, CDS projections gradually diverge with H-GAC eventually

showcasing a -8.8% difference for 2045. CDS does have higher growth rates for Chambers and Liberty Counties meaning that CDS is expecting a higher level of decentralization in the region than H-GAC.

Table 3-5 Comparison of County-Level Population Forecasts between H-GAC and CDS

CDS Adjusted Forecast	2020	2025	2030	2035	2040	2045
Brazoria	361,700	413,200	453,900	499,600	541,500	581,400
Chambers	46,300	54,000	63,300	71,600	79,100	86,400
Fort Bend	818,100	882,200	985,600	1,093,900	1,202,700	1,308,700
Galveston	345,800	394,300	420,000	444,700	463,200	490,100
Harris	4,683,100	4,942,500	5,171,800	5,387,800	5,508,100	5,718,700
Liberty	86,700	105,300	126,200	148,100	171,100	194,600
Montgomery	616,300	748,600	842,100	937,800	1,040,100	1,149,000
Waller	50,500	57,100	66,400	79,100	102,900	128,300
8-County Region	7,008,500	7,597,200	8,129,300	8,662,600	9,108,700	9,657,200
H-GAC Forecast	2020	2025	2030	2035	2040	2045
Brazoria	385,600	437,800	481,600	517,300	604,800	699,300
Chambers	44,100	47,900	51,200	52,100	63,200	84,400
Fort Bend	826,300	941,300	1,042,500	1,132,600	1,250,200	1,362,000
Galveston	358,600	384,100	411,900	441,700	472,600	504,100
Harris	4,810,300	5,188,900	5,567,400	5,958,600	6,212,300	6,434,400
Liberty	85,000	90,700	98,900	106,700	132,700	164,400
Montgomery	651,600	764,900	886,700	1,000,500	1,110,900	1,219,600
Waller	53,400	57,400	65,200	73,000	99,100	124,600
8-County Region	7,214,900	7,913,000	8,605,400	9,282,500	9,945,800	10,592,800
Difference	2020	2025	2030	2035	2040	2045
Brazoria	-6.2%	-5.6%	-5.8%	-3.4%	-10.5%	-16.9%
Chambers	5.0%	12.7%	23.6%	37.4%	25.2%	2.4%
Fort Bend	-1.0%	-6.3%	-5.5%	-3.4%	-3.8%	-3.9%
Galveston	-3.6%	2.7%	2.0%	0.7%	-2.0%	-2.8%
Harris	-2.6%	-4.7%	-7.1%	-9.6%	-11.3%	-11.1%
Liberty	2.0%	16.1%	27.6%	38.8%	28.9%	18.4%
Montgomery	-5.4%	-2.1%	-5.0%	-6.3%	-6.4%	-5.8%
Waller	-5.4%	-0.5%	1.8%	8.4%	3.8%	3.0%
8-County Region	-2.9%	-4.0%	-5.5%	-6.7%	-8.4%	-8.8%

As per the CDS forecasts, the population regrouped in Harris, Fort Bend and Montgomery counties represents the majority of the population in the 8-county region (86.5% in 2025 and 84.7% in 2045). These three counties are forecasted to have lower future (2025-2045) average

compound annual growth rates (CAGR) as per CDS forecasts (1.1%) compare to HGAC forecasts (1.35%). While Harris County will largely remain the most populated county in the region, its population share, CDS estimated the share to decrease from 65.1% in 2025 to 59.2% in 2045. Fort Bend and Montgomery counties will continue to grow to weight 13.6% and 11.9% of the population share, respectively, in 2045 from 11.6% and 9.9% of the population share, respectively, in 2025.

The counties of Liberty and Waller are expected to have the highest CAGRs of the region during the 2025-2045 period. Houston 8-county region is expected to grow at 1.2% CAGR between 2025 and 2045, whereas as per HGAC forecasts, the 8-county grows at 1.5% CAGR.

Table 3-6 compares the CDS employment forecast to the official H-GAC's latest 2018 forecasts. At the eight-county region level, the CDS employment forecast is approximately 18.7 percent lower than the H-GAC forecast in 2020 and is 11.8 percent lower in 2025 but then is 0.8 percent lower in 2045.

Table 3-6 Comparison of County-Level Employment Forecasts between H-GAC and CDS

CDS Adjusted Forecast	2020	2025	2030	2035	2040	2045
Brazoria	108,700	130,200	146,600	163,900	182,500	202,300
Chambers	16,100	23,600	29,700	36,500	43,900	51,500
Fort Bend	187,800	255,800	305,800	356,400	408,900	463,300
Galveston	104,700	128,200	145,900	163,600	181,800	200,500
Harris	2,168,000	2,432,700	2,620,400	2,801,300	2,984,700	3,169,000
Liberty	17,200	19,100	21,800	25,900	30,500	35,900
Montgomery	183,100	253,500	306,200	361,300	419,100	480,300
Waller	20,300	32,000	38,800	46,300	54,000	62,700
8-County Region	2,805,900	3,275,100	3,615,200	3,955,200	4,305,400	4,665,500
H-GAC Forecast	2020	2025	2030	2035	2040	2045
Brazoria	118,500	136,300	156,000	184,800	210,300	254,400
Chambers	24,900	26,100	26,100	26,100	26,100	30,900
Fort Bend	233,200	259,300	283,700	305,000	324,000	340,800
Galveston	134,400	136,300	138,900	140,100	142,600	147,000
Harris	2,662,400	2,853,000	3,038,900	3,213,200	3,393,900	3,544,000
Liberty	18,800	20,100	20,900	22,300	24,500	30,400
Montgomery	234,500	256,200	270,300	287,600	305,100	319,500
Waller	25,000	27,400	29,600	31,100	32,400	34,900
8-County Region	3,451,700	3,714,700	3,964,400	4,210,200	4,458,900	4,701,900
Difference	2020	2025	2030	2035	2040	2045
Brazoria	-8.3%	-4.5%	-6.0%	-11.3%	-13.2%	-20.5%
Chambers	-35.3%	-9.6%	13.8%	39.8%	68.2%	66.7%
Fort Bend	-19.5%	-1.3%	7.8%	16.9%	26.2%	35.9%
Galveston	-22.1%	-5.9%	5.0%	16.8%	27.5%	36.4%
Harris	-18.6%	-14.7%	-13.8%	-12.8%	-12.1%	-10.6%
Liberty	-8.5%	-5.0%	4.3%	16.1%	24.5%	18.1%
Montgomery	-21.9%	-1.1%	13.3%	25.6%	37.4%	50.3%
Waller	-18.8%	16.8%	31.1%	48.9%	66.7%	79.7%
8-County Region	-18.7%	-11.8%	-8.8%	-6.1%	-3.4%	-0.8%

Overall, the employment forecasts for the region for 2045 by CDS and H-GAC are similar; CDS expects 36,400 additional jobs than H-GAC (+0.8%). Yet, county-level employment growths forecasted by CDS differ from H-GAC. On the one hand, Harris County and Brazoria County are expected to be 10.6 percent lower (375,000 jobs) and 20.5 percent lower (52,100 jobs) than H-GAC's forecast, respectively. On the other hand, the other counties in the region are expected to have a higher employment forecast than H-GAC's: an approximate employment increase of 122,500 jobs in Fort Bend County (+35.9%), of 160,800 jobs in Montgomery County (+50.3%), of

53,500 jobs in Galveston County (+36.4%), of 27,800 jobs in Waller County (+79.7%), of 5,500 jobs in Liberty County (+18.1%) and of 20,600 jobs in Chambers County (+66.7%). The in employment the eight-county region is and will stay largely concentrated in Harris County (74.3% in 2025 and 67.9% in 2045). Fort Bend and Montgomery counties will continue to grow, with CAGRs to weight 9.9% and 10.3% of the employment share in 2045, respectively.

Figure 3-4 illustrates the population forecast for H-GAC model area which includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery and Waller counties. From 1990 to 2020, historical population is based on information from U.S. Census data. From 2020 to 2045, the graphic shows the population forecasts from the CDS 2023 forecast.

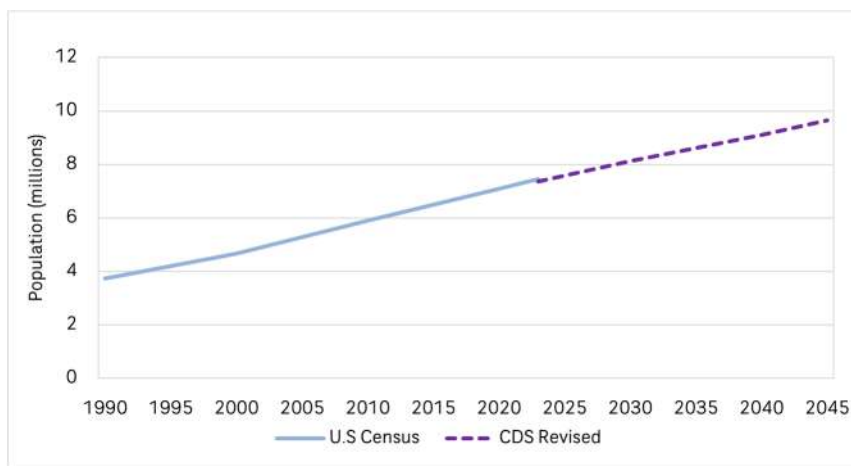


Figure 3-4
Historical and Forecasted Population: H-GAC Model Area

Figure 3-5 illustrates the different employment forecasts for H-GAC model area. From 1990 to 2020, historical employment is based on information from the Bureau of Labor Statistics (BLS). From 2020 to 2045, the graphic displays the employment forecasts from CDS 2023 forecast.

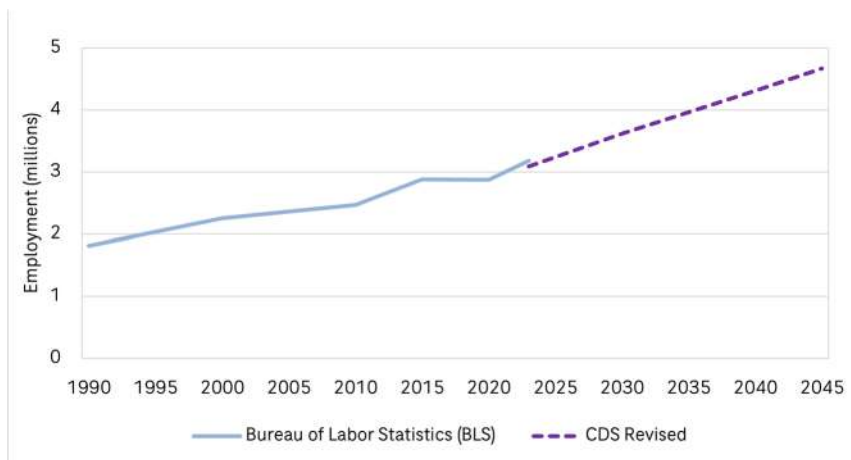


Figure 3-5 Historical and Forecasted Employment: H-GAC Model Area

The growth estimated by CDS between 2020 and 2045 are shown for population in **Figure 3-4** and for employment in **Figure 3-5**. CDS forecasted population density and household density forecasts growth between 2025 and 2045 are shown in **Figures 3-6** and **Figure 3-7**, respectively. Furthermore, population density forecasts are presented for 2025 and 2045 in **Figure 3-8** and **Figure 3-9**, respectively and employment density forecasts are presented for 2025 and 2045 in **Figure 3-10** and **Figure 3-11**, respectively. Additional details regarding the reasons for the changes made by CDS to the H-GAC forecasts are included in the CDS report included as Appendix A.

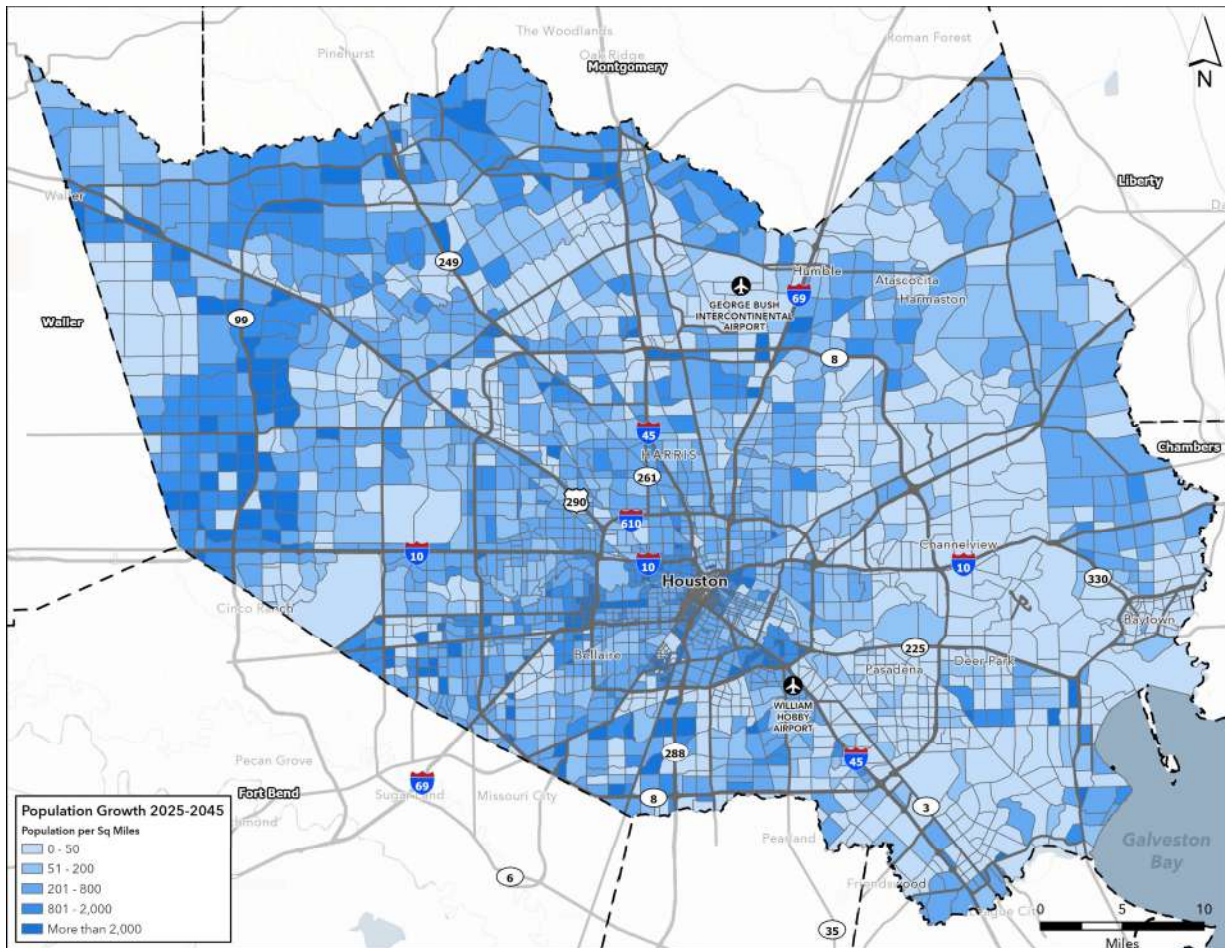


Figure 3-6
CDS Forecasted Population Growth 2025-2045

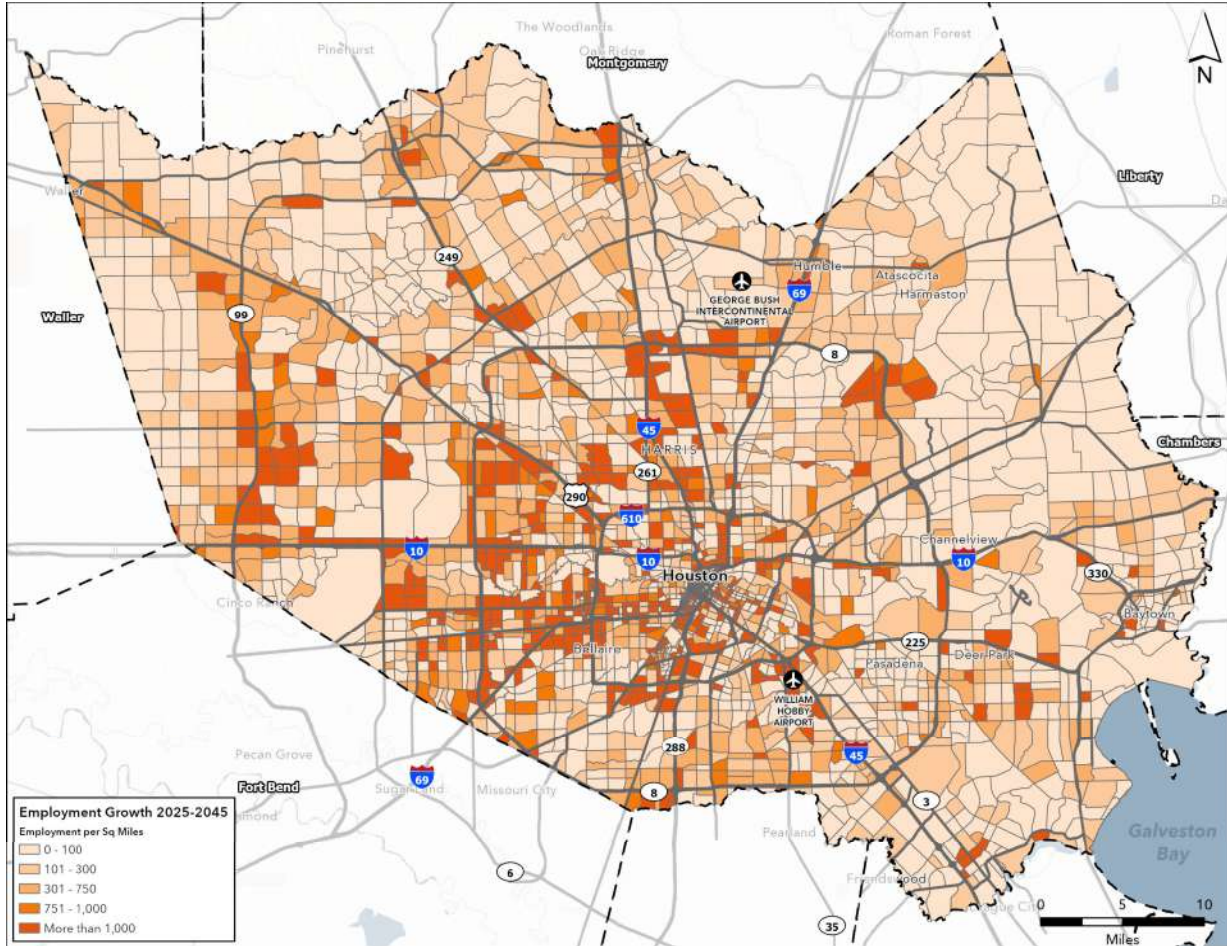


Figure 3-7
CDS Forecasted Employment Growth 2025-2045

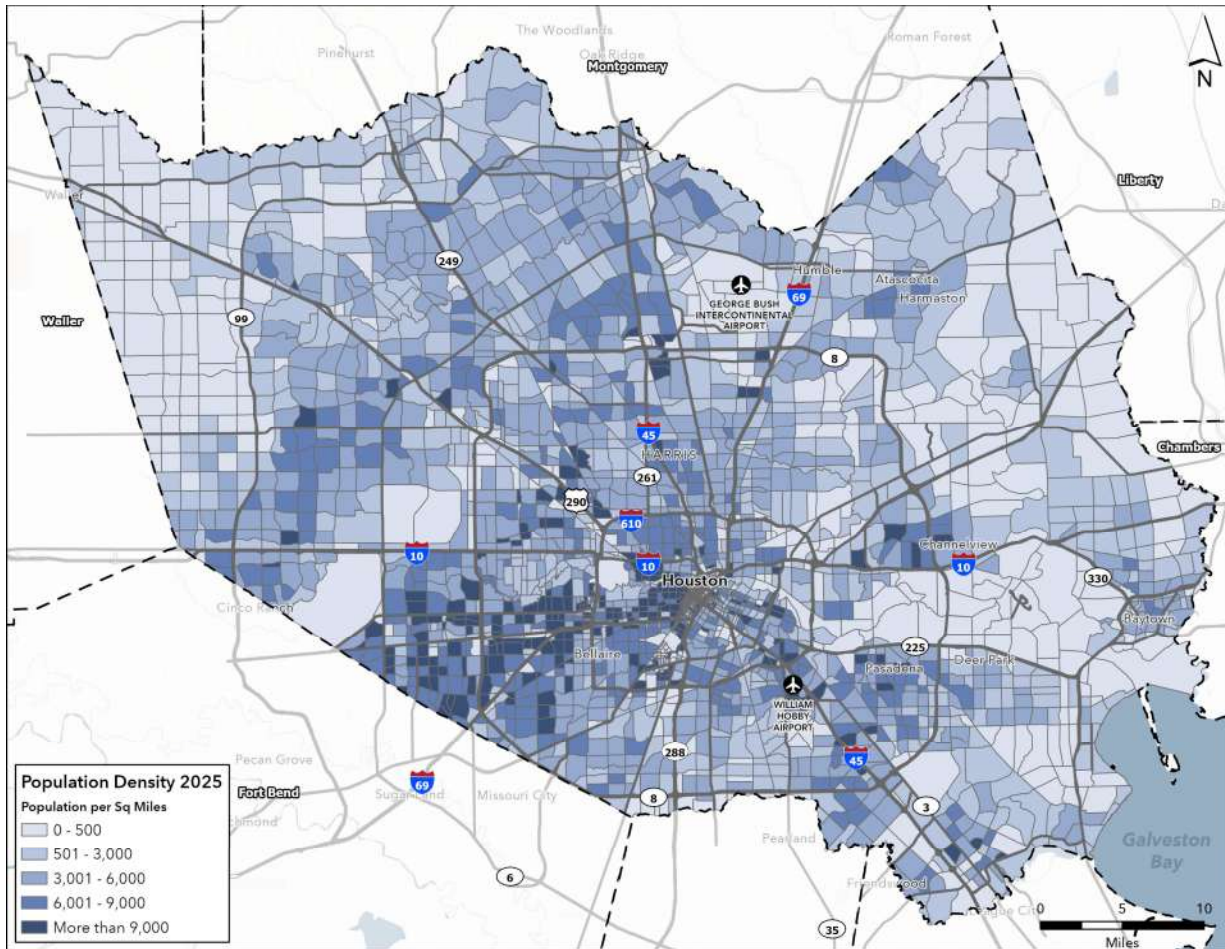


Figure 3-8
CDS Forecasted Population Density for 2025

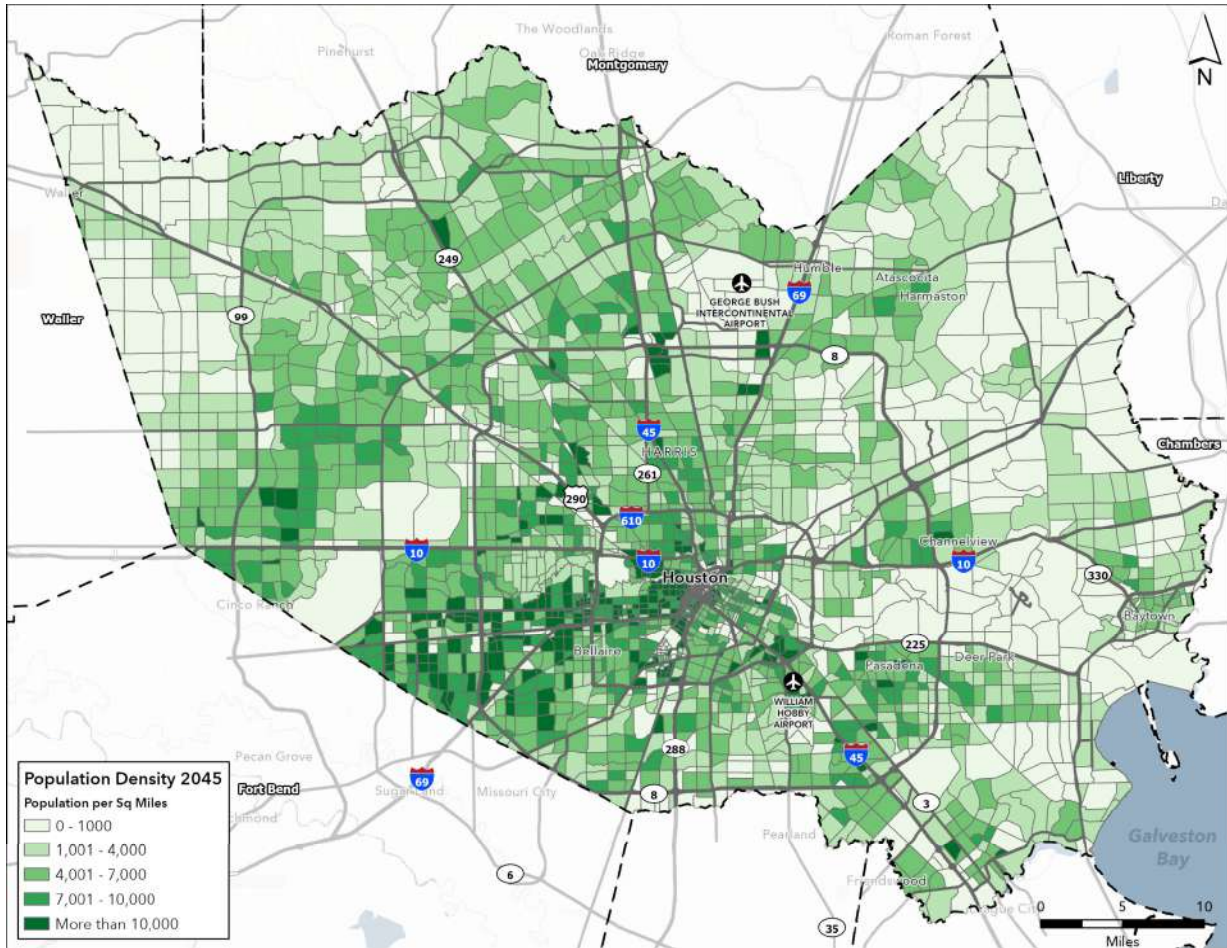


Figure 3-9
CDS Forecasted Population Density for 2045

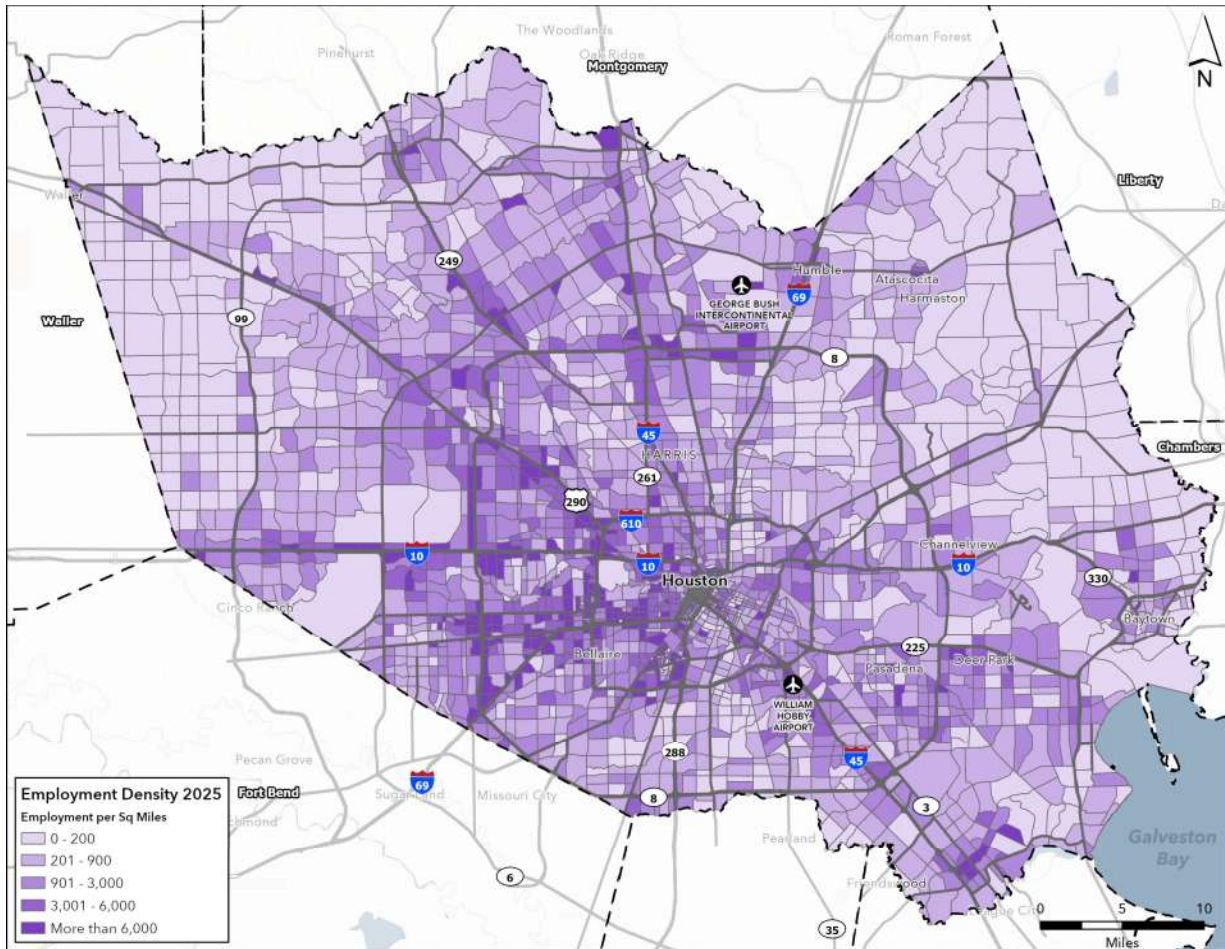


Figure 3-10
CDS Forecasted Employment Density for 2025

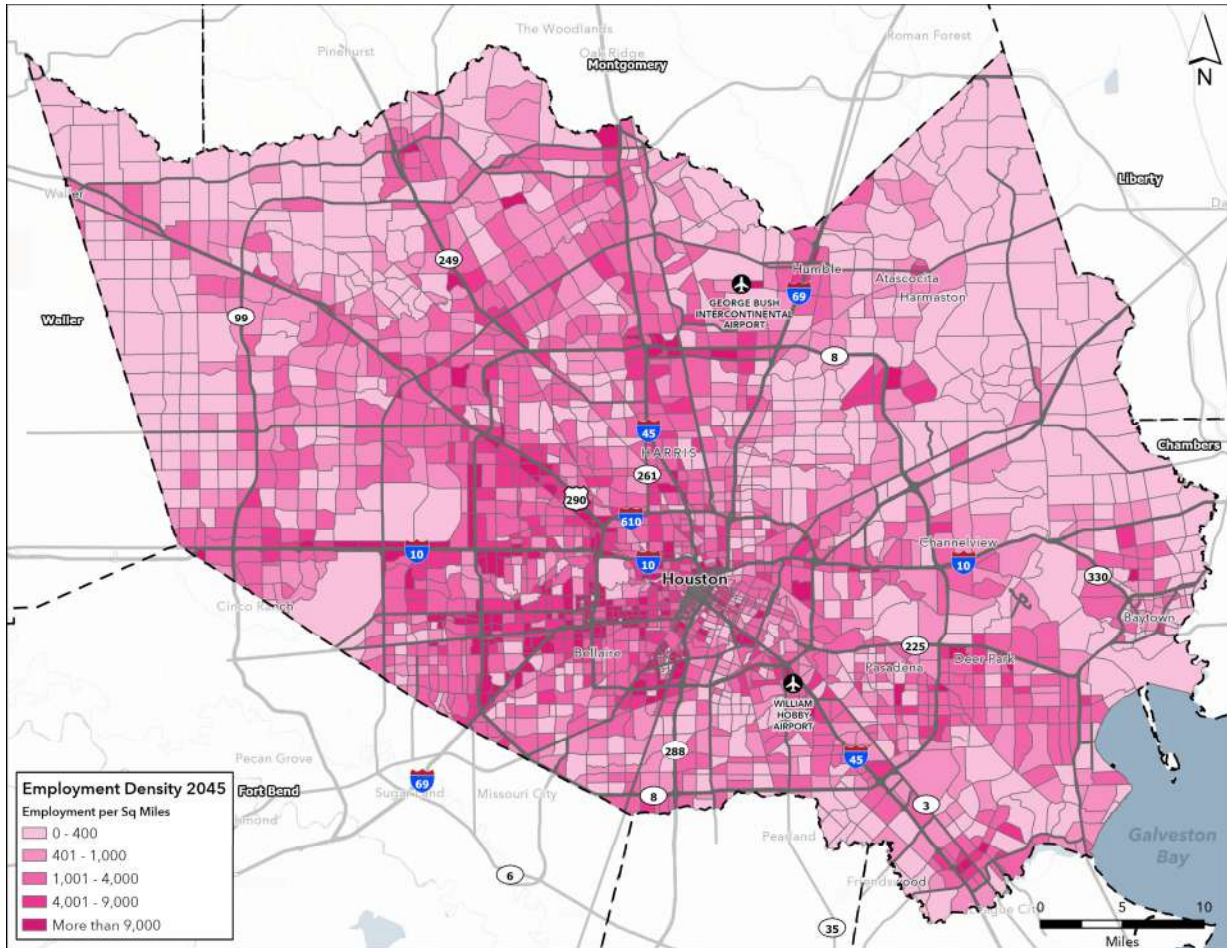


Figure 3-11
CDS Forecasted Employment Density for 2045

CDS Forecast Revisions

Socioeconomic forecasts developed by CDS previously in 2019 during the previous HCTRA Traffic and Revenue study (2019) are compared against the latest forecasts developed for the current study (2023).

Table 3-7 presents the difference in population between the two forecasts. At the eight-county region level, the CDS 2023 population forecast is approximately 1.9 percent lower than the CDS 2019 forecast for 2023 and then is 7.1 percent lower in 2045. In the current forecast, the growth is expected to be more decentralized than the previous forecast.

Table 3-7 Comparison of County-Level Population Forecasts by CDS in 2019 and 2023

CDS 2023 Forecast	2023	2025	2030	2035	2040	2045
Brazoria	392,600	413,200	453,900	499,600	541,500	581,400
Chambers	50,900	54,000	63,300	71,600	79,100	86,400
Fort Bend	856,600	882,200	985,600	1,093,900	1,202,700	1,308,700
Galveston	374,900	394,300	420,000	444,700	463,200	490,100
Harris	4,838,700	4,942,500	5,171,800	5,387,800	5,508,100	5,718,700
Liberty	97,800	105,300	126,200	148,100	171,100	194,600
Montgomery	695,700	748,600	842,100	937,800	1,040,100	1,149,000
Waller	54,400	57,100	66,400	79,100	102,900	128,300
8-County Region	7,361,600	7,597,200	8,129,300	8,662,600	9,108,700	9,657,200
CDS 2019 Forecast	2023	2025	2030	2035	2040	2045
Brazoria	402,500	421,900	474,900	549,100	632,700	719,100
Chambers	45,900	48,100	53,700	62,700	73,600	85,600
Fort Bend	878,900	923,500	1,034,700	1,181,200	1,328,900	1,463,300
Galveston	358,400	370,100	400,300	439,900	483,000	525,900
Harris	4,993,500	5,113,600	5,342,700	5,572,800	5,783,000	5,964,600
Liberty	89,400	95,000	111,700	137,900	170,500	203,200
Montgomery	678,400	718,300	829,600	976,000	1,137,800	1,275,600
Waller	57,500	62,300	80,100	104,100	131,400	159,400
8-County Region	7,504,500	7,752,800	8,327,700	9,023,700	9,740,900	10,396,700
Difference	2023	2025	2030	2035	2040	2045
Brazoria	-2.5%	-2.1%	-4.4%	-9.0%	-14.4%	-19.1%
Chambers	10.9%	12.3%	17.9%	14.2%	7.5%	0.9%
Fort Bend	-2.5%	-4.5%	-4.7%	-7.4%	-9.5%	-10.6%
Galveston	4.6%	6.5%	4.9%	1.1%	-4.1%	-6.8%
Harris	-3.1%	-3.3%	-3.2%	-3.3%	-4.8%	-4.1%
Liberty	9.4%	10.8%	13.0%	7.4%	0.4%	-4.2%
Montgomery	2.6%	4.2%	1.5%	-3.9%	-8.6%	-9.9%
Waller	-5.4%	-8.3%	-17.1%	-24.0%	-21.7%	-19.5%
8-County Region	-1.9%	-2.0%	-2.4%	-4.0%	-6.5%	-7.1%

Table 3-8 presents the difference in employment between the two forecasts. At the eight-county region level, the CDS 2023 employment forecast is approximately 5.7 percent lower than the CDS 2019 forecast in 2023 and 1.3% lower in 2045. In the current forecast, the employment growth is expected to be lower in Harris County than the previous forecast, employment in Harris County is expected to be lower in 2045 by almost 148,000 jobs (+4.5%). Conversely, Chambers

and Montgomery counties are forecasted to have more moderate growths and are expected to have in 2045 differences of 14,000 (-37.3%) and 47,300 (-10.9%) jobs, respectively.

Table 3-8 Comparison of County-Level Employment Forecasts by CDS in 2019 and 2023

CDS 2023 Forecast	2023	2025	2030	2035	2040	2045
Brazoria	121,600	130,200	146,600	163,900	182,500	202,300
Chambers	20,600	23,600	29,700	36,500	43,900	51,500
Fort Bend	228,600	255,800	305,800	356,400	408,900	463,300
Galveston	118,800	128,200	145,900	163,600	181,800	200,500
Harris	2,326,800	2,432,700	2,620,400	2,801,300	2,984,700	3,169,000
Liberty	18,400	19,100	21,800	25,900	30,500	35,900
Montgomery	225,400	253,500	306,200	361,300	419,100	480,300
Waller	27,300	32,000	38,800	46,300	54,000	62,700
8-County Region	3,087,500	3,275,100	3,615,200	3,955,200	4,305,400	4,665,500
CDS 2019 Forecast	2023	2025	2030	2035	2040	2045
Brazoria	122,600	128,900	145,900	162,400	180,400	200,300
Chambers	16,400	17,700	21,700	26,000	31,200	37,500
Fort Bend	218,600	235,900	284,100	335,500	394,000	459,300
Galveston	118,200	123,400	138,600	153,100	169,700	187,400
Harris	2,547,500	2,629,600	2,809,600	2,974,800	3,146,800	3,317,000
Liberty	19,100	20,100	24,000	29,100	36,000	44,000
Montgomery	208,700	223,900	268,100	316,300	371,400	433,000
Waller	21,600	23,600	28,700	34,500	41,400	49,400
8-County Region	3,272,700	3,403,100	3,720,700	4,031,700	4,370,900	4,727,900
Difference	2023	2025	2030	2035	2040	2045
Brazoria	-0.8%	1.0%	0.5%	0.9%	1.2%	1.0%
Chambers	25.6%	33.3%	36.9%	40.4%	40.7%	37.3%
Fort Bend	4.6%	8.4%	7.6%	6.2%	3.8%	0.9%
Galveston	0.5%	3.9%	5.3%	6.9%	7.1%	7.0%
Harris	-8.7%	-7.5%	-6.7%	-5.8%	-5.2%	-4.5%
Liberty	-3.7%	-5.0%	-9.2%	-11.0%	-15.3%	-18.4%
Montgomery	8.0%	13.2%	14.2%	14.2%	12.8%	10.9%
Waller	26.4%	35.6%	35.2%	34.2%	30.4%	26.9%
8-County Region	-5.7%	-3.8%	-2.8%	-1.9%	-1.5%	-1.3%

Summary of Independent Socioeconomic Review

The region, and more specifically Harris, Montgomery and Fort Bend counties, has sustained high growth rates in population, employment and other key demographic and economic variables over the past 45 years.

Relatively high levels of growth are expected to continue and the H-GAC's Regional Growth Forecast release in 2018 estimates that the region will grow from 7.2 million inhabitants in 2020 to 10.6 million inhabitants by 2045. This outlook is consistent with a number of key forecasting sources that were reviewed. CDS as part of this update found the H-GAC forecasts to be generally reasonable at the regional level, but further dampened the regional level growth rates in lieu of current and observed economic conditions within the Houston area. In addition, CDS was more divergent in their allocation of growth among the various small area and county-level regions compared to those indicated in H-GAC's 2045 forecast to account for more decentralization of both employment and population. This pattern is consistent with what has happened locally with other surrounding counties within the Houston region and in almost every major urban area in America, including both the older cities in the Northeast and the newer ones in the South and in the West. This results in population and employment forecasts in the surrounding counties that are in majority above H-GAC's projections, and Harris County forecasts that are lower than the official H-GAC control totals. An important reason is that the model is sensitive to two significant factors: the presence of vacant developable land (and conversely the lack of it in existing built-up areas) and the qualitative factors and market forces which tend to favor outlying locations for many types of new development.

The CDS revised forecasts therefore assume a higher share of the growth for small area zones along the HCTRA System corridor than the latest H-GAC forecasts that is consistent with observed trends within these respective regions. Based on the historical growth trends and detailed growth profiling undertaken by CDS within the Houston region and along the HCTRA System facilities, adjustments were undertaken to better align the current base and future forecasts with current observed trends and existing development occurring within the corridor. CDM Smith used the CDS forecasts as an input for base case scenario T&R estimates presented in the subsequent **Chapter 4**.

Consumer Price Index

The consumer price index for all urban consumers (CPI-U) is the most widely used measure of inflation and serves as an economic indicator. The CPI-U determines the aggregate price level of a specific market basket of goods and services that are consumed by typical urban households. This is done by calculating the average going price of each item in the market basket. Food, clothing, housing, transportation (including tolls) and entertainment are all included in the basket. Income taxes and investment items such as stocks and bonds are not included. The Bureau of Labor and Statistics (BLS) of the U.S. Department of Labor calculates the CPI-U every month.

The consumer price index for Urban Wage Earners and Clerical Workers (CPI-W) is a variation of the consumer price index, as compiled by the BLS that measures the consumer prices certain workers are exposed to such as to reflect changes in the cost of benefits. CPI-W is calculated using the same data collected by BLS but includes information from only certain demographics: those households with at least 50 percent of the household income coming from clerical or wage paying jobs and at least one of the household earners must have been employed for at least 37 weeks of the previous 12 months.

The consumer price index for the base time frame (1982-1984) is 100. Inflation is determined by finding the percentage change in the CPI-U or CPI-W from one year to the next. **Table 3-9** gives the historical trends for CPI-U and CPI-W from 1985 to 2023 for Houston-The Woodlands-Sugar Land region and the United States. As indicated in **Table 3-9**, the CPI-U in Houston-The Woodlands-Sugar Land region has continually increased at a similar rate to the CPI-U for the United States. This indicates that the inflation rate in Houston-The Woodlands-Sugar Land is consistent with the rate of inflation seen nationwide. In Houston-The Woodlands-Sugar Land, the CPI-U and CPI-W has grown at an average annual rate of 2.5 and 2.4 percent per year since 2012 which is a lower rate of growth experienced by the nation during that time. The assumptions regarding toll rate, values-of-time and operating costs are presented in **Chapter 4**. The toll rate policy for the HCTRA System prescribes the use of the most recently published non-revised index of CPI-W, before seasonal adjustment as published by the Bureau of Labor Statistics (BLS), for toll rate escalation. **Figure 3-12** shows year over year CPI-W growth for Houston-The Woodlands-Sugar Land and United States.

Table 3-9 Consumer Price Index for All Urban Consumers

Year	CPI-U				CPI-W			
	Houston-The Woodlands-Sugar Land, TX	Growth	United States	Growth	Houston-The Woodlands-Sugar Land, TX	Growth	United States	Growth
1985	104.9		107.6		104.6		106.9	
1986	103.8	-1.0%	109.6	1.9%	103.6	-1.0%	108.6	1.6%
1987	106.7	2.7%	113.6	3.7%	106.6	2.9%	112.5	3.6%
1988	109.7	2.9%	118.3	4.1%	109.8	3.1%	117.0	4.0%
1989	114.3	4.1%	124.0	4.8%	114.6	4.3%	122.6	4.8%
1990	120.9	5.8%	130.7	5.4%	121.3	5.8%	129.0	5.3%
1991	125.3	3.7%	136.2	4.2%	125.5	3.5%	134.3	4.0%
1992	129.2	3.1%	140.3	3.0%	129.0	2.9%	138.2	2.9%
1993	133.8	3.5%	144.5	3.0%	133.3	3.3%	142.1	2.8%
1994	137.9	3.1%	148.2	2.6%	137.5	3.2%	145.6	2.5%
1995	140.0	1.5%	152.4	2.8%	139.5	1.5%	149.8	2.8%
1996	142.8	2.0%	156.9	2.9%	142.2	1.9%	154.1	2.9%
1997	145.5	1.8%	160.5	2.3%	144.6	1.7%	157.6	2.2%
1998	146.8	0.9%	163.0	1.6%	145.4	0.6%	159.7	1.3%
1999	148.9	1.5%	166.6	2.2%	147.6	1.5%	163.2	2.2%
2000	154.5	3.7%	172.2	3.4%	153.1	3.7%	168.9	3.5%
2001	158.8	2.8%	177.1	2.8%	157.2	2.7%	173.5	2.7%
2002	159.4	0.4%	179.9	1.6%	157.4	0.1%	175.9	1.4%
2003	163.9	2.8%	184.0	2.3%	162.0	3.0%	179.8	2.2%
2004	169.7	3.6%	188.9	2.7%	167.5	3.4%	184.5	2.6%
2005	176.0	3.7%	195.3	3.4%	174.2	4.0%	191.0	3.5%
2006	180.7	2.7%	201.6	3.2%	179.4	3.0%	197.1	3.2%
2007	184.1	1.9%	207.3	2.9%	182.7	1.8%	202.8	2.9%
2008	190.0	3.2%	215.3	3.8%	189.2	3.5%	211.1	4.1%
2009	190.7	0.4%	214.5	-0.4%	188.3	-0.5%	209.6	-0.7%
2010	194.3	1.9%	218.1	1.6%	192.5	2.2%	214.0	2.1%
2011	200.7	3.3%	224.9	3.2%	199.8	3.8%	221.6	3.6%
2012	204.3	1.8%	229.6	2.1%	203.3	1.7%	226.2	2.1%
2013	207.9	1.8%	233.0	1.5%	206.0	1.3%	229.3	1.4%
2014	213.5	2.7%	236.7	1.6%	210.6	2.2%	232.8	1.5%
2015	213.1	-0.2%	237.0	0.1%	209.2	-0.7%	231.8	-0.4%
2016	216.6	1.6%	240.0	1.3%	211.9	1.3%	234.1	1.0%
2017	221.0	2.0%	245.1	2.1%	216.4	2.1%	239.1	2.1%
2018	226.4	2.4%	251.1	2.4%	222.4	2.8%	245.1	2.5%
2019	228.9	1.1%	255.7	1.8%	223.9	0.7%	249.2	1.7%
2020	229.1	0.1%	258.8	1.2%	223.7	-0.1%	252.2	1.2%
2021	239.8	4.7%	271.0	4.7%	235.4	5.3%	265.5	5.3%
2022	259.4	8.2%	292.7	8.0%	255.1	8.4%	288.0	8.5%
2023*	268.4	3.5%	304.7	4.1%	264.3	3.6%	299.0	3.8%
Compound Annual Growth Rate (CAGR)								
1985-2023		2.5%		2.8%		2.5%		2.7%
2012-2023		2.5%		2.6%		2.4%		2.6%

Source: US Bureau of Labor Statistics (BLS), Annual Average Consumer Price Index – All Items, All Urban Consumers (CPI-U) and Consumer Price Index - All Items, Urban Wage Earners and Clerical Workers (CPI-W); Base period: 1982-84=100

* 2023 CPI values are average over January-October 2023; 2023 CPI growths are compared with the January-October 2022 period

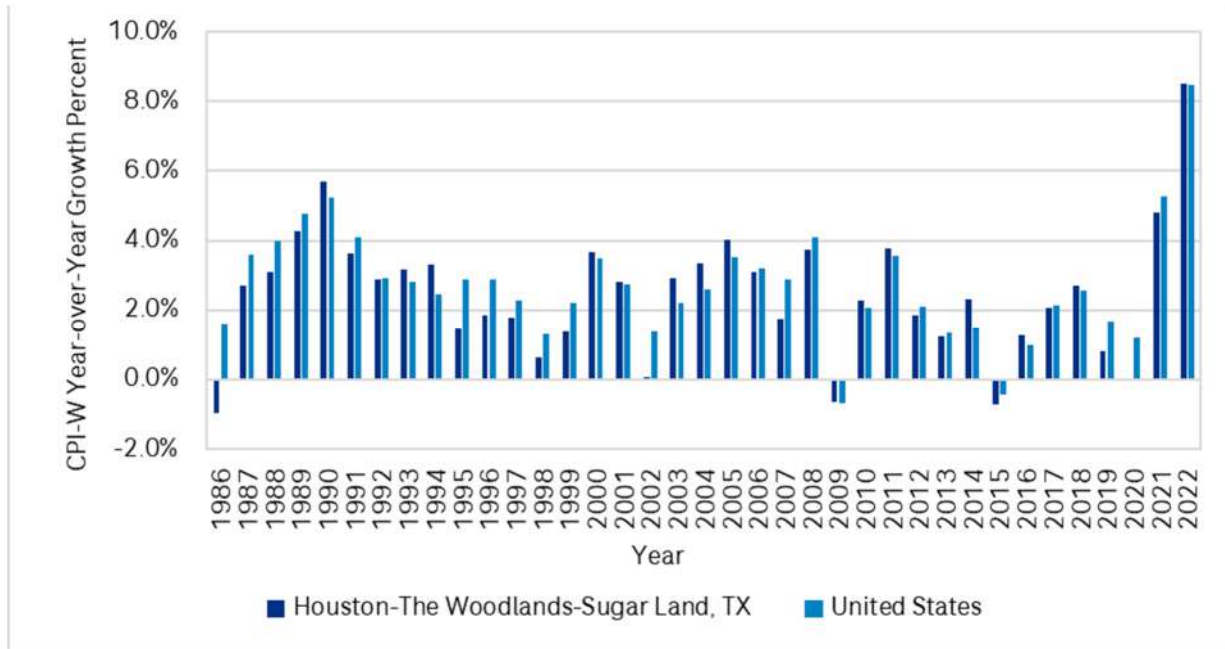


Figure 3-12
Historical CPI-W Growth Comparison

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Chapter 4

Traffic and Toll Revenue Estimates

This chapter presents the traffic and revenue (T&R) estimates for the Harris County Toll Road Authority System (HCTRA System) for a 29-year forecast period from FY2025 through FY2053. The HCTRA System facilities currently in operation are the Hardy Toll Road, Sam Houston Tollway (including eight separate sections), Fort Bend Parkway, Westpark Tollway and Tomball Tollway. In addition to these toll facilities, HCTRA also operates the IH 10 Katy Managed Lanes.

The T&R estimates presented in this chapter will include the traffic and revenue associated with existing sections of the HCTRA system and future expansions and extensions including Hardy Toll Road into downtown (referred to as the Hardy Downtown Connector).

This chapter includes a description of the basic assumptions made for traffic and revenue forecasting purposes for this study. In the following sections, the T&R forecasting process is outlined by explaining the development processes of toll modeling components. Assumptions on highway improvement projects and other traffic and revenue assumptions are also described. The final section of this chapter provides a summary of the annual traffic and revenue forecasts produced from a series of future year model runs.

Basic Assumptions

Traffic and revenue estimates for the existing and proposed sections of the HCTRA System are predicated on the following basic assumptions, all of which are considered reasonable for purposes of this analysis:

1. The Base Case revenue forecast for the existing HCTRA System includes those facilities which are currently in operation, plus the Hardy Downtown Connector (HDC). Also included in this analysis is the traffic and revenue from the IH 10 Katy Managed Lanes, which is managed by HCTRA.
2. Traffic and revenue forecasts in this chapter include impacts from those transactions which occur at new toll gantries on the HDC, as well as net impacts at other toll plazas on the existing HCTRA System. The traffic and toll revenue for these proposed facilities have been adjusted downward in the early years to reflect “ramp up” to account for the fact that it takes typically several years after toll commencement to reach normal operating conditions and realize the full toll revenue potential on these new facilities.

3. The proposed HDC is assumed to be opened by January 2028.
4. The socioeconomic forecasts prepared previously by the Houston-Galveston Area Council (H-GAC) were reviewed. For purposes of T&R analysis, modifications to those forecasts were made by CDS (documented in **Appendix A**), and the T&R forecasts are based on these revised socioeconomic forecasts.
5. Toll rates shown for the various HCTRA facilities are in future year dollars and will be as shown subsequently in this chapter. Commercial vehicle rates will be proportionately higher than passenger cars consistent with HCTRA's toll rate policy. It is assumed for this study there will be no variation in toll rates by time of day over the forecast horizon, except on the Katy Managed Lanes.
6. Toll rates have been set according to the toll rate policy approved by Harris County Commissioners Court effective September 4, 2023. There will be a ten percent discount for 2-axle EZ Tag transactions, while non-EZ tag transponders will pay the base AVI rate. Additionally, the following multipliers on the base AVI rate will apply for all non-tag transactions: Registered plate – 1.2, 3rd party service – 1.25; and image-based transaction – 2.0.
7. Rate increases will occur every year beginning January 1, 2025.
8. Only those highway improvements which are committed in the regional transportation improvement plan will be implemented during the projection period. Specific improvements assumed in future year networks are described subsequently. Expansions or extensions of HCTRA System facilities are included only as specifically noted in this report.
9. Several segments of the Grand Parkway, a proposed loop around the greater Houston region located several miles outside of the Sam Houston Tollway, is assumed to be constructed in phases as a toll facility. Portions of the Grand Parkway (Segments D through I) opened in phases between 2013 and 2023. The remaining segments B and C are assumed to be completed in phases for purposes of estimating the traffic and revenue forecasts of the HCTRA System.
10. Several other new toll facility improvements, currently within the jurisdiction of the Texas Department of Transportation and other counties, have also been assumed to be implemented within the timelines specified in the regional transportation plan.

11. Travel demand modeling was performed through estimating weekday travel on the HCTRA system. For purposes of annualization of transactions and revenue, annual transactions and revenue for each section were assumed to be a factor consistent with specific historical factors for that section multiplied by the weekday transactions.
12. The HCTRA system will be well-maintained, efficiently-operated and effectively signed and promoted to encourage maximum usage. Effective promotion, both before and after opening of the proposed sections of the system, is critical to minimizing the negative revenue impacts of “ramp up” during early operations.
13. Growth in vehicle operating costs (which include fuel, maintenance, and tires) will not significantly deviate from the assumed inflation rate.
14. No local, regional or national emergency will arise which would abnormally restrict the use of motor vehicles, or substantially alter economic activity or freedom of mobility.

These basic assumptions are considered reasonable for purposes of this traffic and revenue study. Any significant departure from these basic assumptions could materially affect estimated traffic and revenue for the HCTRA facilities.

Traffic and Revenue Forecasting Process

The H-GAC travel demand model was utilized to develop T&R forecasts and was used as the foundation for developing a toll diversion model. The model was then fine-tuned for the base year through an application of appropriate model validation measures. After the base year model validation, future year model datasets including future year networks and trip tables were developed.

Future year traffic assignments were conducted for various model years developed for the HCTRA system. For each scenario, the future year network and trip tables were then input to the validated toll diversion model to produce traffic forecasts for future years. Based on these forecasts, the forecasts for intermediate and years beyond the modeling horizon were interpolated and extrapolated. Toll transaction forecasts for all the various tolling locations were extracted from the toll model runs. Toll revenues were estimated from the transaction forecasts and toll rates applied at the toll gantries.

H-GAC Model Information

For this study, the latest official travel demand model datasets were obtained from H-GAC. This included the latest official demographics and input model networks used in the Regional Transportation Plan (RTP) 2045 Plan. The H-GAC model data included:

- H-GAC 5,263-zone Cube model network structure including 46 external stations and 5,217 internal zones. H-GAC model years are 2023, 2030, 2040 and 2045.
- Socioeconomic information for the 5,217 internal zones level for the years 2023, 2030, 2040, and 2045.
- H-GAC Trip tables by vehicle-class, vehicle occupancy and time period for 2023, 2030, 2040, and 2045. These trip tables were provided for the four time periods: AM peak (6:00 to 9:00 AM), PM peak (3:00 to 7:00 PM), midday (9:00 AM to 3:00 PM) and night (7:00 PM to 6:00 AM) periods.

Highway Network Development

The model network encompasses eight counties: Harris, Brazoria, Chambers, Fort Bend, Galveston, Liberty, Montgomery and Waller counties. The base year model network was reviewed and adjusted based on current speed observations, number of lanes, and other link attributes including facility type, capacity and link distance.

The future year networks were also reviewed against the current H-GAC regional transportation plan (RTP 2045) to confirm that committed and funded improvements were included. Modifications to various base year model network attributes including speed, capacity and distance were applied appropriately to the future year model networks.

Trip Table Adjustments

The travel demand model used for the revenue estimation process is based on the forecasts of socioeconomic variables such as population, households, and employment. The revised socioeconomic forecasts, as provided by the independent economist, CDS, were used to generate vehicular trips that are, in turn, assigned on the transportation network.

For this study, CDM Smith requested H-GAC to run the base and future year four-step travel demand models with the revised CDS socioeconomic forecasts to generate the future year trip tables used in this study. CDM Smith utilized these vehicular trips from the H-GAC travel demand model and applied the toll diversion methodology as described below.

Toll Diversion Methodology

A toll diversion model was used to estimate the market share of toll and non-toll facilities based on factors such as value of time, operating cost, toll cost, and congestion. A CDM Smith-developed algorithm was used to determine the minimum time path between each zone pair. The minimum time path for each Origin-Destination (O-D) pair may or may not include the use of toll facilities. For those trips that may potentially use toll facilities, travel time and distance of the toll facility routing was compared with that of the best alternative route not involving a toll payment. A share of the total traffic moving between each pair of zones is then assigned to the toll facility routing, while the remaining portion is assigned to the best toll-free alternative route. The model's estimate of the toll facility's market share is a function of time savings, distance, toll rates, and estimates of perceived value-of-time and vehicle operating costs by motorists. As the cost of the toll facility route increases compared to the toll-free route, the share of traffic using the toll road decreases. Trip tables used for the toll diversion traffic assignments were classified into distinct market segments for the HCTRA system based on different modes and methods of payment (AVI and video) and vehicle classification. The appropriate toll rates were applied for each of these categories of vehicles as part of the multi-class user equilibrium traffic assignment process.

Traffic and Toll Revenue Estimation Assumptions

The transaction and toll revenue estimates for the HCTRA System facilities are predicated on several assumptions, which are consistent with observed trends and are considered reasonable for this study.

Truck Traffic Shares/Truck Toll Assumptions

Truck traffic (vehicles with greater than two axles) shares are applied on a plaza-by-plaza basis, based on the recent historical truck share trends as shown in **Table 4-1**. Multipliers for truck toll rates were based on an "N-1" methodology, where N is the number of axles (e.g. a five-axle truck would be tolled at a multiplier of four).

Table 4-1 Truck Shares by Facility

Facility Name	% Truck (*)
Hardy North	6.7%
Hardy South	5.9%
Sam Houston South	3.4%
Sam Houston Central	4.9%
Sam Houston North	5.3%

Facility Name	% Truck (*)
Ship Channel Bridge	8.8%
Sam Houston East	5.9%
Sam Houston Southeast	5.7%
Sam Houston Southwest	5.5%
Sam Houston Northeast	6.7%
Fort Bend Parkway Extension	2.0%
Westpark Tollway	1.9%
Katy Managed Lanes	3.1%
Tomball Tollway	4.1%

(*) Based on fiscal year 2023 observed data

AVI Shares

AVI transaction shares are applied on a plaza-by-plaza basis, and the averages assumed in 2023 and 2045 for each facility are shown in **Table 4-2**. It is assumed that AVI shares systemwide will continue to increase modestly, approaching 80 percent at most locations.

Table 4-2 Assumed AVI Percentages for Future Years

Facility	2023	2045
Fort Bend Extension	80.8%	81.1%
Hardy North	78.0%	78.2%
Hardy South	76.3%	76.9%
Hardy Downtown Connector	76.3%	76.9%
Sam Central	75.7%	78.7%
Sam East	75.5%	78.5%
Sam North	74.3%	77.3%
Sam South	75.2%	78.2%
Sam Southeast	74.1%	77.1%
Sam Southwest	73.8%	76.8%
SAM NE Mainlane	76.4%	79.4%
SCB	76.9%	79.9%
Tomball Parkway	79.7%	79.9%
Westpark	77.4%	77.6%
Tomball Parkway Phase 2	79.7%	79.9%
Katy Managed Lanes	79.1%	79.5%

Annual Revenue Days

“Annual revenue days” is a parameter used in the revenue estimation to convert the weekday transactions/revenue to annual transactions/revenue. Annual revenues by facility are shown in **Table 4-3**.

The basic travel demand estimates from the regional modelling are developed at an average weekday level. Historically, traffic and revenue on weekend days on the HCTRA system are somewhat lower than average weekdays. Hence, observed ratios of the weekend to weekday traffic on the HCTRA System facilities from historical data are used to estimate the annual revenue days. The revenue day factors are used to expand average weekday estimates to annual transaction and revenue estimates; since weekend day traffic is lower than weekday traffic, the annualization factors are typically lower than 365.

Annual revenue days are also applied on a gantry-by-gantry basis. There is variation between HCTRA facilities. For example, on the “Sam South” section of the system, the annualization factor was computed at 342 equivalent weekdays. By comparison, on the Hardy North section, which tends to have a higher concentration of demand on weekdays and lower on weekend days, the annualization factor is estimated at 311 equivalent weekdays.

Table 4-3 Annual Revenue Days by Facility

Facility Name	Revenue Days
Fort Bend Mainline	331
Hardy North Mainline	311
Hardy South Mainline	315
Hardy Downtown C SB	315
Sam Central Mainline	333
Sam East Mainline	326
Sam North Mainline	333
Sam South Mainline	342
Sam Southeast Mainline	331
Sam Southwest Mainline	339
SAM NE Mainlane	336
SCB Mainline	328
Tomball Parkway Mainlane	333
WP Wilcrest Mainline	342
WP Fondren Mainline	342
Tomball Phase 2	333
Katy Managed Lanes	298

Values-of-Time and Vehicle Operating Costs

Motorists' value of time (VOT), or willingness to pay tolls to reduce travel time and receive an improved level of service of travel, is estimated based on motorists' income level, work hours, and trip purpose. Several stated preference surveys have been conducted on behalf of CDM Smith in the greater Houston region. In the immediate areas where surveys had been undertaken, value of time information from the surveys was used directly; after adjustment for income changes since the surveys were originally performed. In other parts of the greater Houston region, zone level VOT's were developed from household income data included in the latest H-GAC socioeconomic data set. While the VOT used varied by location within the region, for 2025, the overall average passenger car VOT of the entire area was estimated to be about \$28.51 per hour for the eight-county H-GAC region. The VOTs for future years were estimated by inflating to the respective year using a 2.0 percent annual growth rate. The VOT estimates vary by traffic analysis zone (TAZ) based on the median household income for each zone.

The vehicle operating cost used in the analysis was calculated by taking into account the average per-mile costs of gasoline and oil, and to a lesser extent, maintenance, and wear and tear of tires for vehicles in the area. For this study, it was assumed that fuel efficiency of vehicles would improve in future years. The average fuel efficiency of passenger cars was assumed to increase to about 56 miles per gallon by 2025. The resulting passenger car operating costs adopted for this study are shown in **Table 4-4**. The passenger car operating costs vary from \$0.23 per mile in 2025 to about \$0.31 per mile in 2045.

Table 4-4 Passenger Car Operating Costs (nominal dollars per mile)

Year	PC VOC (cents/mile)
2025	22.54
2030	23.48
2035	25.92
2040	28.41
2045	31.36

Toll Rates for HCTRA Facilities

This section presents the toll rates for the various sections of each of the HCTRA facilities for 2023. Toll rates for the various gantries on Hardy Toll Road, Sam Houston Tollway, Westpark Tollway and Fort Bend Parkway Extension are depicted in **Figure 4-1** and **4-2**. The tolling configuration for the future Hardy Downtown Connector is also illustrated in **Figure 4-1**. The tolling locations and rates for Tomball Parkway are summarized in **Figure 4-3**.

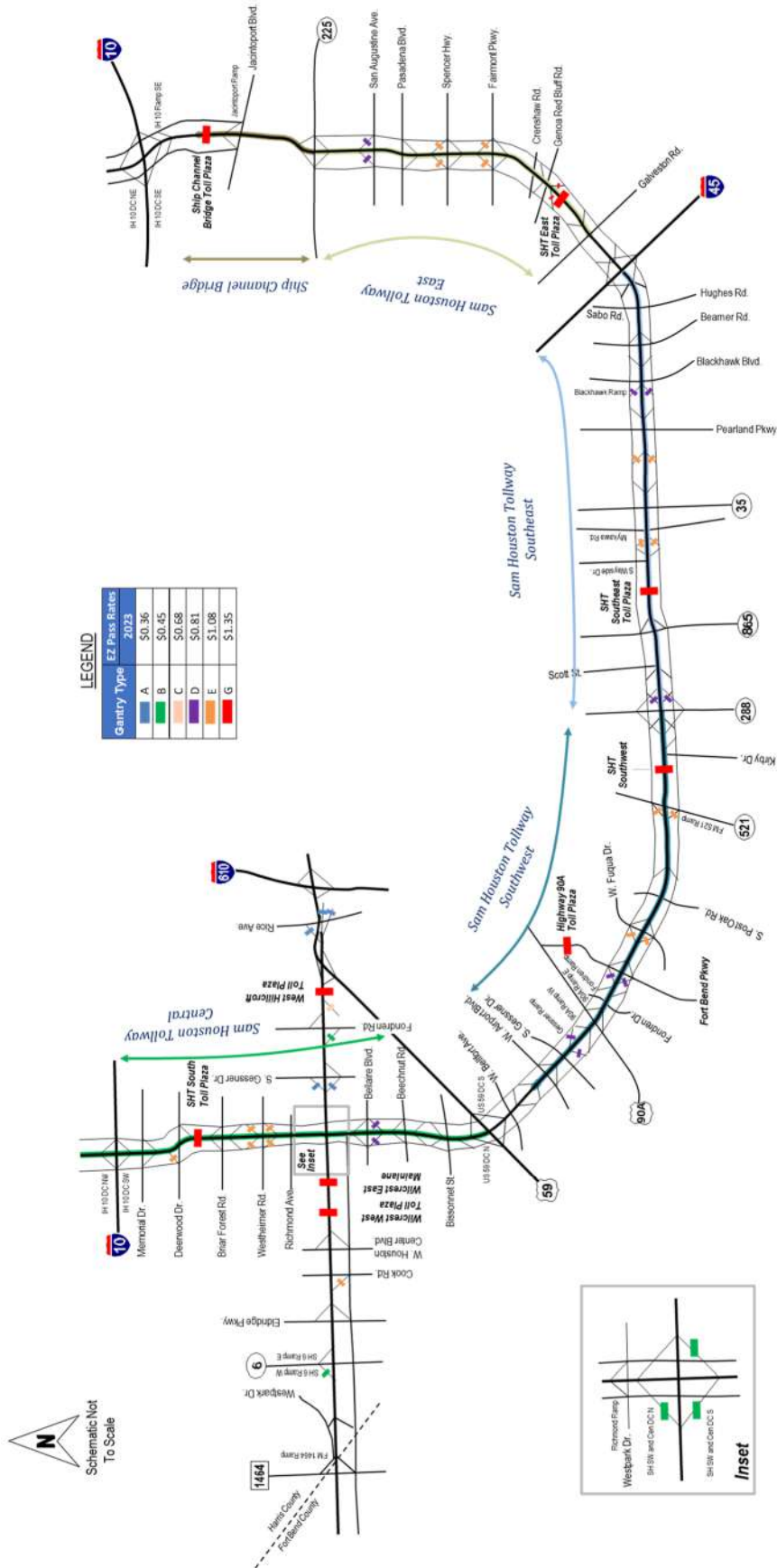


Figure 4-2 Toll Rates for Sam Houston Tollway, Westpark Tollway and Fort Bend Parkway Connector

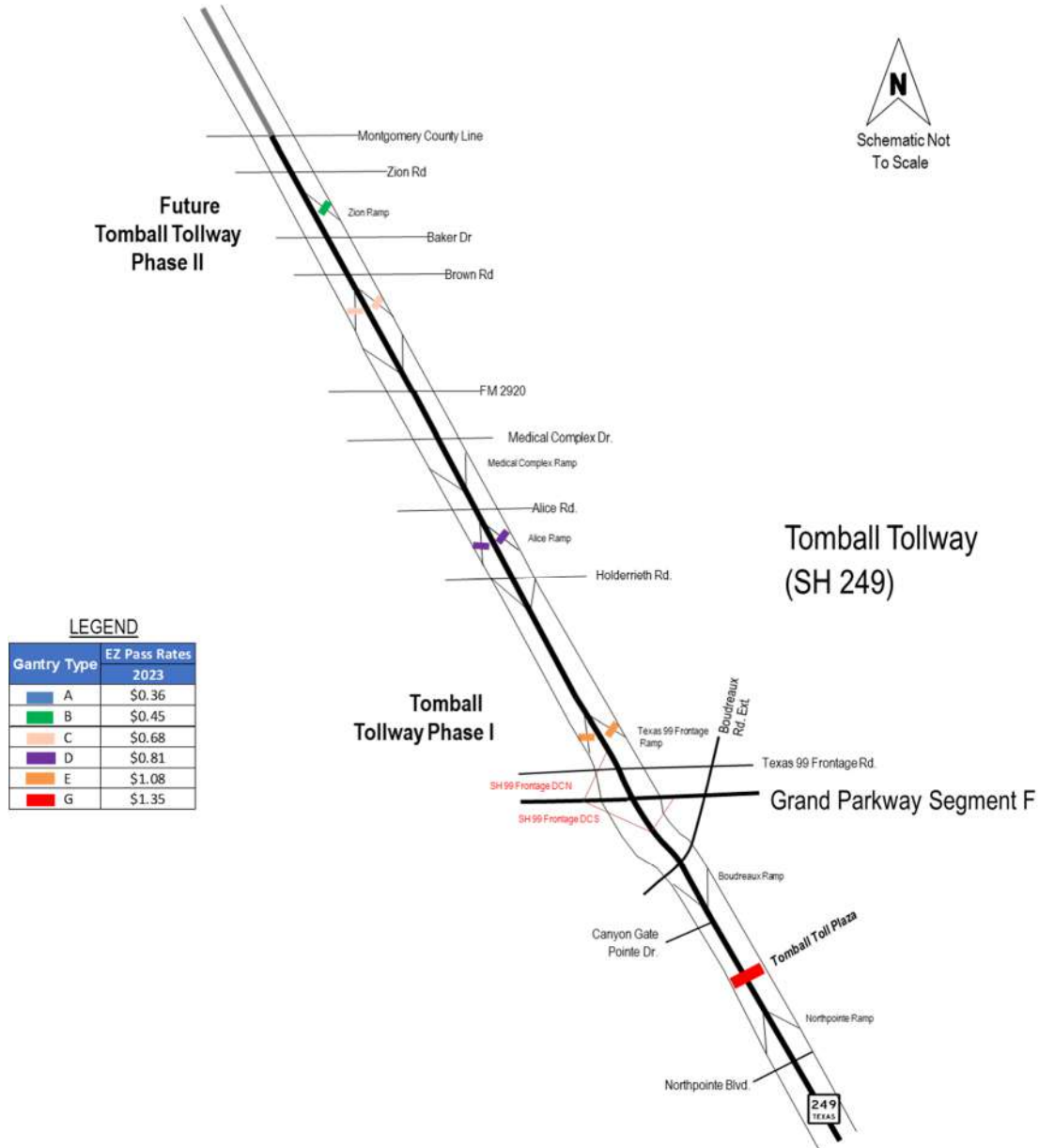


Figure 4-3 Toll Rates for Tomball Tollway

Base Year Model Validation

Model validation tests the ability of the model to closely replicate the existing travel patterns before it can be used to estimate reliable forecasts. The model validation was performed for 2023 as the base year by comparing observed counts with estimated traffic volumes obtained from the base year model run. Before validation, screenlines were selected at locations across the HCTRA model area to capture traffic profiles in the area.

On each of these screenlines, traffic counts were obtained from various sources and coded in the base year highway network. In addition to collected count data, the screenline counts were supplemented with HCTRA transaction data and available TxDOT count information along each screenline. **Figure 4-4** illustrates the location of the various traffic count screenlines for which detailed traffic data was collect. A subset of eighteen unique screenlines were developed for the base year validation process.

A series of base year model adjustments were made to obtain reasonable matches between the observed and estimated traffic volumes at each of the model validation screenlines. These included a detailed review of the model network attributes including the number of lanes, roadway functional classification, hourly capacity and speeds along key corridors in the study area.

In addition to the screenlines, the base year travel demand model was calibrated to ensure a better match to the various tolling locations along the HCTRA facilities.

Various criteria, including minimizing the root mean square error (RMSE), volume count comparisons and R-Squared statistics were used to test model refinements as subsequent calibration steps were performed. **Figure 4-5** depicts a comparison between the modeled traffic volumes and observed traffic volume data collected from 2023 at the various screenline count locations.

The plot of model volumes compared to observed traffic volumes indicates that the base year model reasonably matches the observed traffic at the majority of locations. In addition to comparing the model estimated traffic volumes to the observed traffic counts at the screenlines, the base year model congested speeds were also compared to observed speed data from INRIX data. Adjustments were made to model base year networks to better match observed speeds.

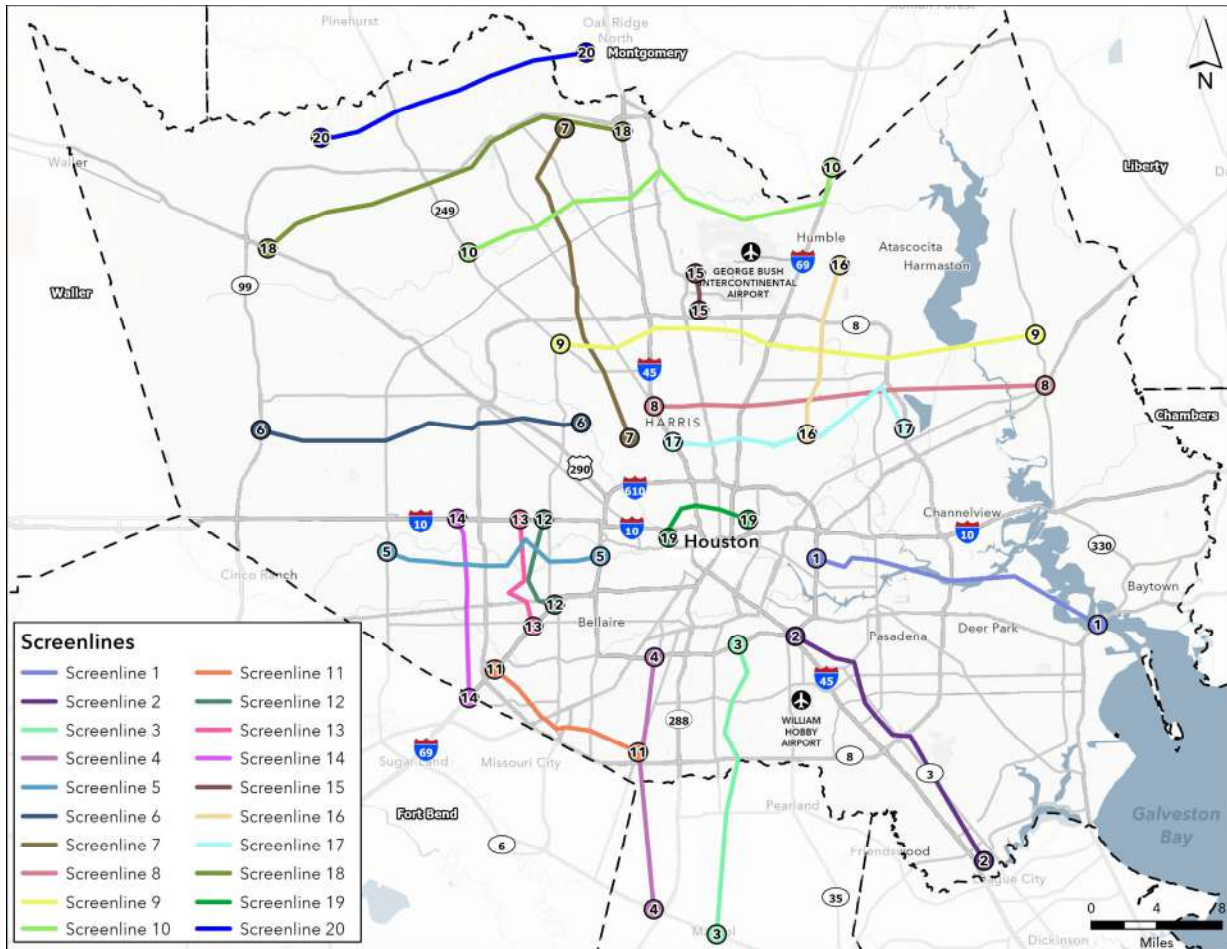


Figure 4-4
Traffic Count Screenline Locations

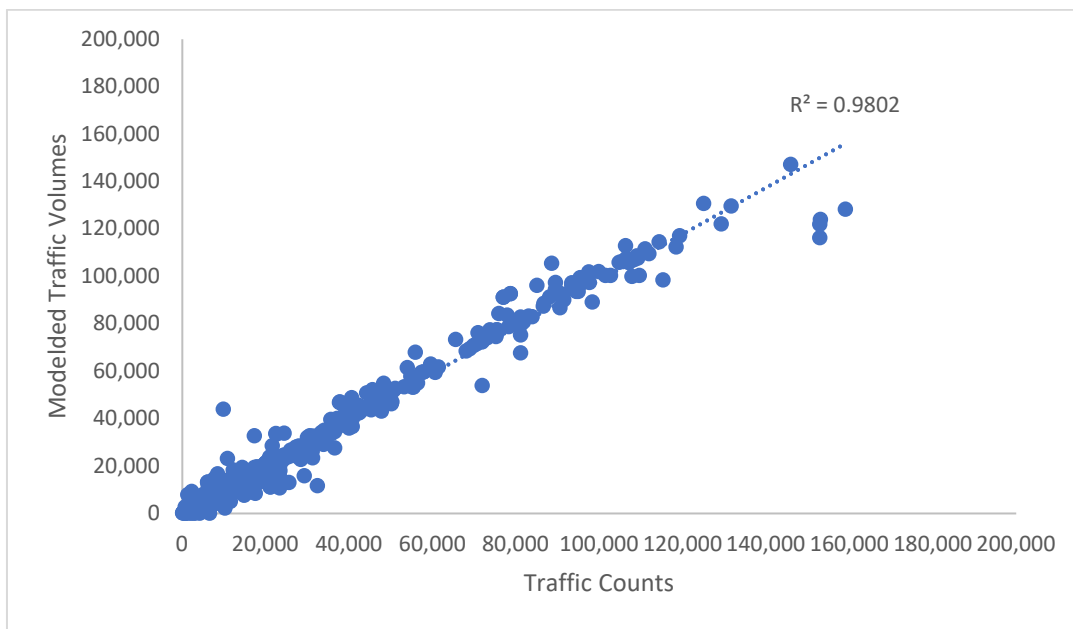


Figure 4-5
Comparison of Model Traffic Volumes and Observed Traffic Counts

Future Toll Rates

Future toll rates were developed as described by HCTRA's current toll rate policy, which approved by Harris County Commissioners Court and went into effect in September 2023. **Table 4-5** summarizes the future year base AVI rates for passenger cars including the planned annual rate increases. It is assumed Ship Channel Bridge tolls will increase in future years at the same rate as the remaining mainlane plazas on the other Sam Houston Tollway sections. Toll rates for other toll roads including Fort Bend Parkway and Westpark Tollway (Fort Bend County portions), and various segments of Grand Parkway were also coded into the models appropriately. Future tolls were computed using a nominal CPI of 2.0 percent per year starting in 2025.

Table 4-5 Assumed Passenger Car Toll Rates by Toll Gantry for Future Years

January Adjustment	2024	2025	2030	2040	2045
Sam Houston Tollway					
Mainline Plazas	\$1.50	\$1.53	\$1.69	\$2.06	\$2.27
SHT Ramp Group A	\$1.20	\$1.22	\$1.35	\$1.65	\$1.82
SHT Ramp Group B	\$0.90	\$0.92	\$1.01	\$1.24	\$1.36
SHT Ramp Group C	\$0.50	\$0.51	\$0.56	\$0.69	\$0.76
Ship Channel Bridge					
Mainline Plazas	\$1.50	\$1.53	\$1.69	\$2.06	\$2.27
Hardy Toll Road					
Mainline Plazas	\$1.50	\$1.53	\$1.69	\$2.06	\$2.27
HTR Ramp Group A	\$1.20	\$1.22	\$1.35	\$1.65	\$1.82
HTR Ramp Group B	\$0.90	\$0.92	\$1.01	\$1.24	\$1.36
Westpark Tollway					
Mainline Plazas	\$1.50	\$1.53	\$1.69	\$2.06	\$2.27
WPT Plaza Group A	\$1.20	\$1.22	\$1.35	\$1.65	\$1.82
WPT Plaza Group B	\$0.75	\$0.77	\$0.84	\$1.03	\$1.14
WPT Plaza Group C	\$0.50	\$0.51	\$0.56	\$0.69	\$0.76
WPT Plaza Group D	\$0.40	\$0.41	\$0.45	\$0.55	\$0.61
Fort Bend Pkwy Ext.					
Mainline Plaza	\$1.50	\$1.53	\$1.69	\$2.06	\$2.27
Tomball Tollway					
Mainline Plaza	\$1.50	\$1.53	\$1.69	\$2.06	\$2.27
Boudreaux / Grand Pkwy	\$1.20	\$1.22	\$1.35	\$1.65	\$1.82
SH 249/ Holderrieth	\$0.90	\$0.92	\$1.01	\$1.24	\$1.36
FM 2920	\$0.75	\$0.77	\$0.84	\$1.03	\$1.14
Brown Rd.	\$0.50	\$0.51	\$0.56	\$0.69	\$0.76

Estimated Annual Transactions and Revenue

Tables 4-6 and 4-7 show the estimated annual transactions and revenue for each section of the various HCTRA facilities from FY2025 to FY2053. The estimates include 29-year forecasts for the Hardy Toll Road, Sam Houston Tollway (including the Ship Channel Bridge), Westpark Tollway, the Fort Bend Parkway, Tomball Tollway, and the Katy Managed Lanes.

As shown in **Table 4-7**, the estimated annual revenue on the Hardy Toll Road is expected to increase from \$97.5 million in FY2025 to \$242.9 million in FY2045. The Hardy Downtown Connector is expected to account for 16 percent of total Hardy Toll Road revenue in FY2045. Revenue on the Sam Houston Tollway is expected to be \$664.8 million in FY2025, increasing to \$1.26 billion in FY2045. The North section of Sam Houston Tollway is expected to be the facility's largest revenue producer, generating \$232.6 million in FY2045.

Revenue on the Westpark Tollway is expected to be \$78.5 million in FY2025, increasing to \$150.1 million in FY2045. The Fort Bend Extension is anticipated to generate \$9.2 million in toll revenue in FY2025, increasing to \$23.8 million by FY2045.

The Tomball Tollway is expected to generate \$49.0 million in toll revenue in FY2025, increasing to \$122.2 million by FY2045. The Katy Managed Lanes are anticipated to generate \$21.4 million in toll revenue in FY2025, increasing to \$38.0 million by FY2045.

Total revenue on the HCTRA System is expected to increase from about \$920.3 million in FY2025 to \$1.84 billion in FY2045. Driven by nominal traffic growth and annual toll rate increase, annual revenue on the HCTRA System is expected to reach more than \$2 billion per year in FY2049.

The estimated average annual rate of growth in revenue is somewhat higher than transactions. This reflects the assumption of toll increases based on a CPI increase of 2.0 percent each year beginning in January 2025. These toll increases compound the effect of revenue growth. The HCTRA Systemwide annual transactions and annual toll revenue are illustrated graphically on **Figure 4-6**, with both transactions and revenue showing consistent year over year growth.

Table 4-6 Estimated Annual Transactions by Section for HCTRA Facilities (in thousands)

Fiscal Year (1)	HCTRA System Annual Transactions Forecast (thousands)																HCTRA System Total	
	Hardy Toll Road				Ship Channel Bridge				Katy Managed Lanes				Fort Bend Westpark Tollway					
	Hardy North	Hardy South	Hardy Downtown Connector	HTR Total	SHT South	SHT Central	SHT North	SHT Northeast	SHT Bridge	SHT East	SHT Southeast	SHT Southwest	SHT Total	Extension	Tollway	Managed Lanes		Tollway
2025 (2)	30,826	33,587	0	64,413	91,046	70,820	92,339	42,593	24,057	37,669	46,952	58,221	463,696	6,326	67,633	35,123	36,833	674,023
2026	31,594	34,227	0	65,821	92,453	72,257	93,882	44,451	24,297	38,854	47,779	59,858	473,831	6,487	69,300	35,544	38,938	689,922
2027	32,355	34,862	0	67,217	93,859	73,695	95,425	46,310	24,540	40,038	48,606	61,495	483,968	6,649	70,953	35,971	40,999	705,758
2028	33,838	36,998	10,904	81,740	95,137	74,958	96,846	48,644	26,131	42,093	49,565	63,174	496,548	6,798	72,515	36,402	43,050	737,053
2029	35,159	38,483	14,915	88,556	96,488	76,143	98,136	50,398	27,356	43,182	50,676	64,924	507,302	6,949	73,859	36,839	44,569	759,075
2030	36,315	39,599	15,820	91,734	97,767	77,161	99,261	51,737	28,382	43,877	51,685	66,405	516,276	7,949	75,152	37,281	45,976	774,368
2031	37,238	40,762	16,951	94,952	98,692	77,974	100,301	52,960	29,516	44,586	52,601	67,752	524,381	8,311	76,241	37,728	47,400	789,013
2032	37,882	41,782	18,030	97,695	99,308	78,634	101,261	55,862	30,017	45,491	53,362	68,880	532,816	8,537	77,346	38,142	48,824	803,360
2033	38,430	42,316	18,604	99,350	99,959	79,149	101,966	57,489	30,337	45,991	53,860	69,876	538,627	8,762	78,296	38,543	50,121	813,698
2034	38,951	42,690	19,107	100,748	100,623	79,620	102,590	58,552	30,573	46,336	54,274	70,833	543,401	8,983	79,309	38,939	51,178	822,558
2035	39,472	43,065	19,581	102,118	101,287	80,091	103,213	59,615	30,809	46,681	54,688	71,791	548,174	9,202	80,322	39,335	52,236	831,386
2036	39,993	43,439	20,024	103,456	101,951	80,561	103,836	60,679	31,045	47,025	55,102	72,748	552,948	9,416	81,335	39,731	53,293	840,179
2037	40,514	43,813	20,433	104,760	102,615	81,032	104,459	61,742	31,281	47,370	55,516	73,705	557,721	9,626	82,348	40,127	54,351	848,933
2038	41,035	44,188	20,805	106,027	103,279	81,503	105,083	62,805	31,517	47,715	55,930	74,663	562,494	9,831	83,361	40,523	55,408	857,645
2039	41,555	44,562	21,138	107,255	103,943	81,973	105,706	63,868	31,753	48,060	56,344	75,620	567,268	10,031	84,374	40,919	56,466	866,313
2040	42,072	44,932	21,476	108,480	104,606	82,444	106,329	64,932	31,989	48,404	56,758	76,578	572,041	10,225	85,387	41,316	57,523	874,972
2041	42,587	45,299	21,806	109,692	105,255	82,904	106,938	66,000	32,224	48,747	57,170	77,535	576,772	10,412	86,383	41,710	58,565	883,534
2042	43,100	45,662	22,127	110,889	105,889	83,352	107,532	67,073	32,457	49,087	57,578	78,492	581,459	10,592	87,362	42,103	59,589	891,995
2043	43,610	46,023	22,439	112,071	106,506	83,789	108,111	68,150	32,688	49,425	57,984	79,448	586,101	10,764	88,323	42,495	60,594	900,349
2044	44,117	46,380	22,740	113,237	107,108	84,214	108,674	69,230	32,918	49,760	58,387	80,403	590,695	10,928	89,265	42,884	61,579	908,689
2045	44,621	46,734	23,031	114,386	107,693	84,627	109,222	70,315	33,146	50,093	58,787	81,357	595,240	11,083	90,187	43,272	62,542	916,710
2046	45,122	47,083	23,311	115,516	108,262	85,029	109,754	71,402	33,372	50,423	59,184	82,309	599,734	11,230	91,088	43,658	63,481	924,707
2047	45,619	47,430	23,580	116,628	108,813	85,418	110,270	72,492	33,596	50,750	59,577	83,259	604,175	11,366	91,968	44,041	64,396	932,575
2048	46,112	47,772	23,836	117,721	109,348	85,794	110,769	73,584	33,819	51,074	59,967	84,207	608,562	11,493	92,826	44,423	65,284	940,308
2049	46,602	48,110	24,080	118,792	109,864	86,158	111,252	74,678	34,039	51,395	60,354	85,152	612,893	11,610	93,660	44,802	66,144	947,900
2050	47,087	48,444	24,312	119,843	110,363	86,510	111,718	75,774	34,258	51,714	60,737	86,094	617,166	11,716	94,470	45,178	66,974	955,348
2051	47,567	48,774	24,540	120,882	110,855	86,855	112,176	76,864	34,473	52,027	61,115	87,027	621,392	11,816	95,271	45,550	67,795	962,706
2052	48,043	49,099	24,767	121,908	111,338	87,195	112,627	77,946	34,686	52,337	61,487	87,951	625,567	11,911	96,062	45,918	68,606	969,972
2053	48,513	49,420	24,990	122,923	111,813	87,529	113,070	79,021	34,895	52,642	61,854	88,866	629,690	12,000	96,844	46,280	69,406	977,143
Average annual percent change																		
	3.2%	3.1%		6.5%	1.5%	1.8%	1.5%	4.1%	3.0%	3.1%	1.9%	2.7%	2.2%	4.3%	2.2%	1.2%	4.8%	2.7%
2030-40	1.5%	1.3%	3.1%	1.7%	0.7%	0.7%	0.7%	2.3%	1.2%	1.0%	0.9%	1.4%	1.0%	2.5%	1.3%	1.0%	2.3%	1.2%
2040-53	1.1%	0.7%	1.2%	1.0%	0.5%	0.5%	0.5%	1.5%	0.7%	0.6%	0.7%	1.2%	0.7%	1.2%	1.0%	0.9%	1.5%	0.9%
2024-53	1.7%	1.4%		2.3%	0.8%	0.8%	0.8%	2.3%	1.3%	1.3%	1.0%	1.6%	1.1%	2.3%	1.3%	1.0%	2.4%	1.4%

(1) Fiscal year: twelve months ending September 30 of years shown.

(2) Starting January 2025 a toll adjustment is assumed based on a maximum of nominal CPI or 2.0 percent each year.

Table 4-7 Estimated Annual Revenue by Section for HCTRA Facilities (in thousands)

Fiscal Year (1)	Hardy Toll Road										HCTRA System Annual Toll Revenue Forecast (thousands)										HCTRA System Total
	Hardy					Ship					SHT Total	SHT Southeast	SHT Southwest	SHT Total	Fort Bend Extension	Westpark Tollway	Katy Managed Lanes	Tomball Tollway			
	Hardy North	Hardy South	Hardy Downtown Connector	HTR Total	SHT Northeast	Ship Channel	SHT Northwest	SHT East	SHT Southeast	SHT Southwest											
2025 (2)	47,850	49,689	0	97,538	121,473	104,814	132,841	57,822	41,422	56,398	69,886	80,140	664,795	9,154	78,454	21,393	48,971	920,305			
2026	50,120	51,697	0	101,817	125,699	109,033	137,643	61,657	42,710	59,428	72,629	84,146	692,944	9,588	81,659	22,048	52,945	961,001			
2027	52,429	53,738	0	106,166	129,994	113,335	142,525	65,598	44,019	62,534	75,426	88,247	721,677	10,031	84,917	22,724	57,007	1,002,522			
2028	55,547	58,264	12,521	126,332	134,150	117,453	147,421	70,456	47,633	66,838	78,488	92,525	754,966	10,466	88,127	23,422	61,185	1,064,498			
2029	58,724	62,087	18,387	139,198	138,461	121,511	152,350	74,985	50,980	69,938	81,851	97,030	787,106	10,853	91,093	24,142	64,605	1,116,998			
2030	61,750	65,096	19,876	146,721	142,835	125,399	157,177	79,050	53,670	72,574	85,148	101,265	817,118	12,673	94,081	24,865	67,849	1,163,307			
2031	64,659	68,341	21,636	154,636	146,929	129,163	161,917	82,579	57,265	75,290	88,407	105,449	846,999	13,576	97,158	25,648	71,045	1,209,061			
2032	67,149	71,355	23,414	161,919	150,522	132,709	166,567	88,112	59,324	78,331	91,380	109,302	876,246	14,219	100,419	26,428	74,326	1,253,556			
2033	69,439	73,619	24,652	167,709	154,261	136,112	170,922	92,452	61,120	80,760	93,981	112,919	902,526	14,862	103,545	27,221	77,730	1,293,594			
2034	71,745	75,661	25,860	173,267	158,236	139,602	175,428	96,114	62,795	82,958	96,520	116,591	928,245	15,529	106,871	28,032	80,846	1,332,789			
2035	74,113	77,761	27,100	178,975	162,297	143,167	180,068	99,887	64,509	85,212	99,113	120,360	954,613	16,206	110,266	28,864	84,036	1,372,960			
2036	76,518	79,886	28,325	184,729	166,396	146,763	184,752	103,734	66,241	87,489	101,734	124,187	981,296	16,891	113,712	29,718	87,289	1,413,634			
2037	78,981	82,055	29,527	190,563	170,577	150,434	189,517	107,681	68,012	89,813	104,415	128,109	1,008,568	17,586	117,237	30,595	90,628	1,455,167			
2038	81,502	84,268	30,699	196,469	174,845	154,178	194,364	111,732	69,821	92,183	107,155	132,127	1,036,405	18,290	120,845	31,495	94,056	1,497,560			
2039	84,232	86,656	31,835	202,724	179,530	158,292	199,573	116,051	71,811	94,764	110,151	136,425	1,066,596	19,055	124,801	32,419	97,770	1,543,365			
2040	87,053	89,111	33,000	209,164	184,361	162,556	204,935	120,513	73,878	97,432	113,252	140,859	1,097,807	19,843	128,914	33,368	101,627	1,590,722			
2041	89,908	91,618	34,180	215,706	189,246	166,841	210,347	125,097	75,963	100,140	116,388	145,452	1,129,473	20,629	133,040	34,360	105,613	1,638,820			
2042	92,808	94,158	35,367	222,334	194,135	171,149	215,809	129,793	78,068	102,880	119,555	150,137	1,161,525	21,421	137,202	35,378	109,666	1,687,524			
2043	95,772	96,741	36,558	228,070	199,083	175,517	221,331	134,620	80,211	105,669	122,786	154,942	1,194,160	22,216	141,434	36,421	113,786	1,737,088			
2044	98,794	99,361	37,752	235,907	204,083	179,937	226,907	139,570	82,391	108,504	126,075	159,851	1,227,319	23,014	145,734	37,490	117,964	1,787,427			
2045	101,862	102,023	38,978	242,862	209,107	184,380	232,550	144,641	84,590	111,376	129,397	164,849	1,260,889	23,806	150,059	38,585	122,170	1,838,371			
2046	105,005	104,741	40,217	249,963	214,215	188,900	238,292	149,868	86,838	114,312	132,793	169,977	1,295,194	24,602	154,461	39,708	126,445	1,890,373			
2047	108,223	107,517	41,470	257,210	219,407	193,500	244,135	155,253	89,137	117,314	136,264	175,236	1,330,246	25,398	158,940	40,858	130,787	1,943,439			
2048	111,517	110,352	42,735	264,605	224,685	198,179	250,078	160,800	91,487	120,383	139,812	180,630	1,366,054	26,193	163,494	42,036	135,191	1,997,573			
2049	114,888	113,247	44,011	272,146	230,046	202,937	256,123	166,513	93,891	123,521	143,439	186,160	1,402,629	26,987	168,123	43,242	139,655	2,052,782			
2050	118,338	116,202	45,296	279,835	235,493	207,775	262,269	172,396	96,347	126,728	147,145	191,829	1,439,981	27,776	172,825	44,478	144,173	2,109,068			
2051	121,865	119,217	46,610	287,692	241,046	212,711	268,540	178,434	98,855	130,002	150,927	197,628	1,478,144	28,573	177,629	45,741	148,799	2,166,577			
2052	125,473	122,294	47,952	295,719	246,709	217,746	274,938	184,631	101,416	133,344	154,788	203,557	1,517,129	29,377	182,534	47,032	153,532	2,225,323			
2053	129,160	125,433	49,324	303,917	252,481	222,883	281,464	190,988	104,030	136,756	158,727	209,618	1,556,947	30,186	187,543	48,352	158,373	2,285,319			
Average annual percent change																					
2030-40	5.2%	5.6%	5.2%	8.5%	3.3%	3.7%	3.4%	6.5%	5.3%	5.2%	4.0%	4.8%	4.2%	6.7%	3.7%	3.1%	6.7%	4.8%			
2040-53	3.5%	3.2%	5.2%	3.6%	2.6%	2.7%	2.7%	4.3%	3.2%	3.0%	2.9%	3.4%	3.0%	4.6%	3.2%	3.0%	4.1%	3.2%			
2025-53	3.1%	2.7%	3.1%	2.9%	2.4%	2.5%	2.5%	3.6%	2.7%	2.6%	2.6%	3.1%	2.7%	3.3%	2.9%	2.9%	3.5%	2.8%			
2025-53	3.6%	3.4%	3.1%	4.1%	2.6%	2.7%	2.7%	4.4%	3.3%	3.2%	3.0%	3.5%	3.1%	4.4%	3.2%	3.0%	4.3%	3.3%			

(1) Fiscal year: twelve months ending September 30 of years shown.

(2) Starting January 2025 a toll adjustment is assumed based on a maximum of nominal CPI or 2.0 percent each year.

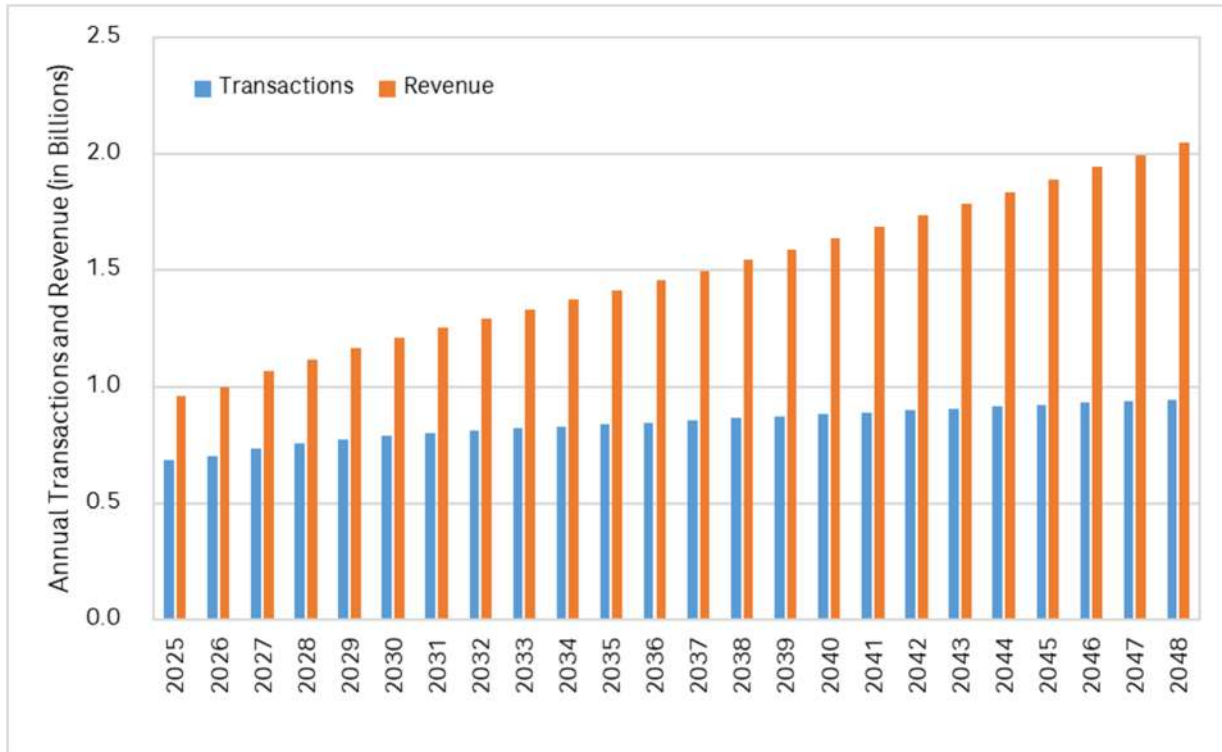


Figure 4-6
HCTRA Systemwide Annual Transactions and Revenue (in billions)

Sensitivity Analysis

The purpose of sensitivity analysis of the HCTRA System was to quantify the range under which the toll revenue generation potential of the system may change based on varying assumptions regarding key variables influencing the toll revenue potential. While a full account of the overall sensitivity associated with forecasting into the future is difficult to quantify, the following analysis, undertaken as part of this study, identifies the impact of some of the key variables on the HCTRA System toll revenue potential. Six unique sensitivity scenarios that were conducted for the year 2045.

Scenario 1: Reduction in Value-of-Time (VOT)

This scenario tested the impact of a 15 percent reduction in the assumed value-of-time (VOT) of both automobile users and truck traffic in the region. Under this scenario the VOT for both automobile users and trucks was reduced to 85 percent of that assumed under the Base Case.

Scenario 2: Increase in Value-of-Time (VOT)

This scenario tested the impact of a 15 percent increase in the assumed value-of-time (VOT) of both automobile users and truck traffic in the region. Under this scenario the VOT for both automobile users and trucks was increased to 115 percent of that assumed under the Base Case.

Scenario 3: Reduced Socioeconomic Growth

This scenario tested the impact of a reduction in socioeconomic growth in the region as compared to the Base Case. For this scenario, the TDC 0.5 migration scenario was used for the demographic forecasts, which reduced the overall demographic growth in the region by 43 percent.

Scenario 4: Reduction in Revenue Days

This scenario tested the impact of a 10 percent reduction in revenue days for the entire HCTRA System compared to the Base Case. To reflect the reduced weekend demand profiles compared to the typical weekday, annual revenue days are used to compute annual revenue estimates.

Scenario 5: Increase in Revenue Days

This scenario tested the impact of a 10 percent increase in revenue days for the entire HCTRA System compared to the Base Case. To reflect the reduced weekend demand profiles

compared to the typical weekday, annual revenue days are used to compute annual revenue estimates.

Scenario 6: HCTRA System with No Toll Escalation

This scenario tested the impact of a change in toll rate policy, where no toll rate escalation is assumed. The Base Case assumed an annual toll rate escalation of 2.0 percent beginning in January 2025.

To evaluate the impact of changes in key input variables, the resulting traffic and revenue forecasts for each sensitivity scenario were compared against the Base Case scenario. Except for the variables tested in the different scenarios, all other assumptions remained the same as in the Base Case. **Figure 4-7** summarizes the results of the sensitivity analysis for the HCTRA System. As shown in **Figure 4-7**, transactions and toll revenues decreased with decreasing VOT’s (Scenario 1), lowering demand growth (Scenario 3) or reducing revenue days (Scenario 4) as compared to the Base Case. Reducing future year toll rates (Scenario 6) positively affected transactions, but revenues are reduced significantly.

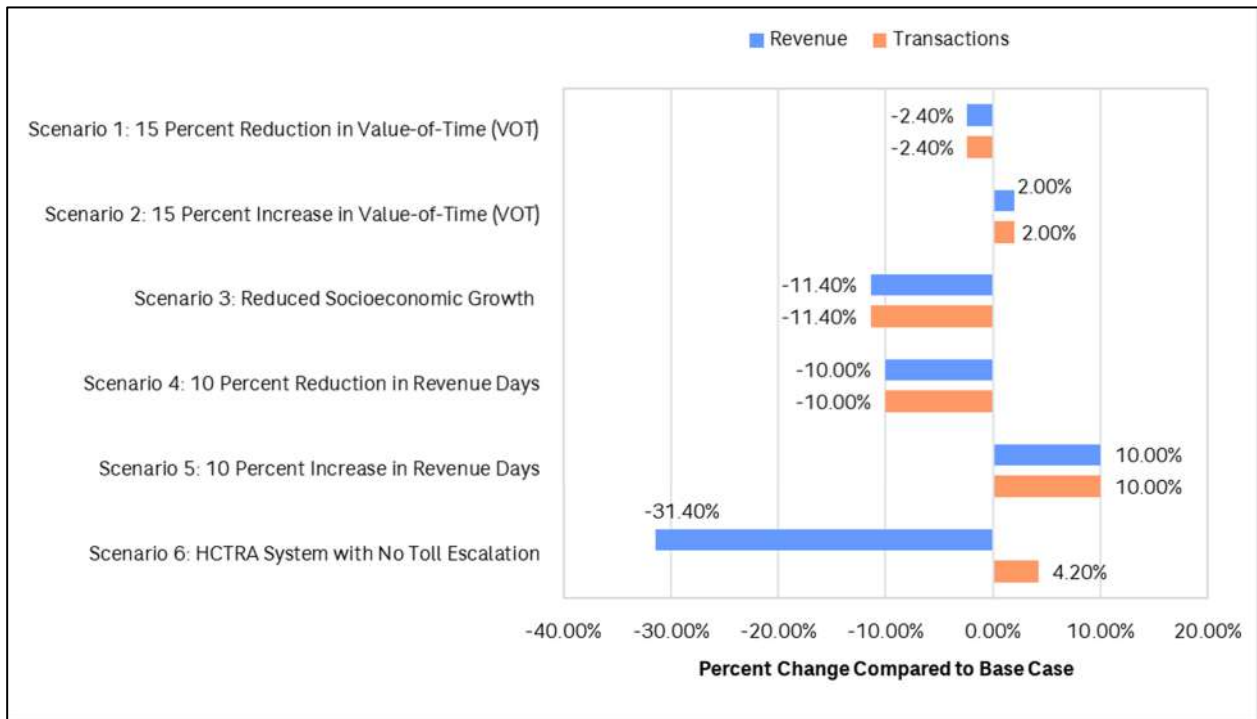


Figure 4-7
Traffic and Revenue Sensitivity Analysis - 2045

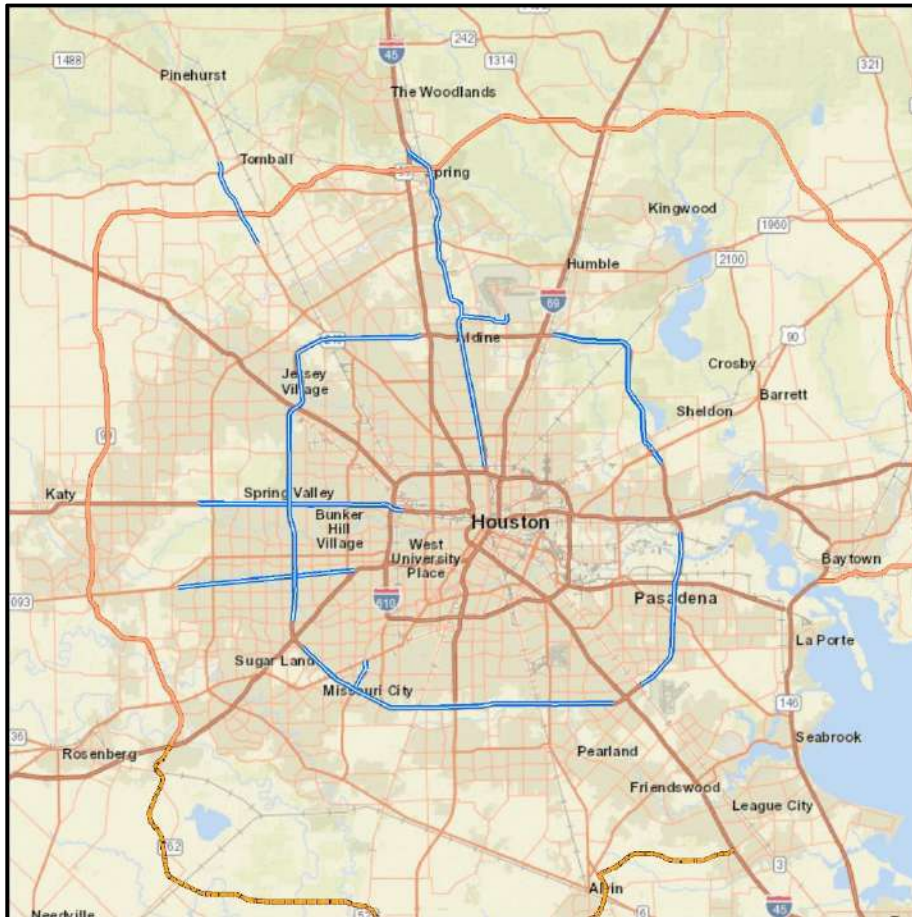
Appendix A

Independent Demographic Review

This appendix contains the documentation of the independent demographic review as provided by the subconsultant, Community Development Strategies. This report was provided to CDM Smith in February 2024.

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HARRIS COUNTY TOLL ROAD AUTHORITY ECONOMIC AND DEMOGRAPHIC FORECAST 2023 UPDATE



Prepared For:

CDM Smith

8140 Walnut Hill Lane,
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Dallas, TX 75231

Prepared By:



TABLE OF CONTENTS

Table of Contents..... i

Table of Exhibits iii

Introduction and Objectives 1

New Regional and County Forecasts 2

 Current Data Updates and Other Forecast Sources 2

 Recent Economic and Demographic Trends 2

 Regional Economist Projections..... 3

 CDS 2023 Forecast 4

CDS 2023 Forecast Compared With Other Projections..... 6

 Forecast Shares 8

Small Area Forecast Method Overview 10

Forecasting Population and Jobs – County Control Totals 11

 Use of the CDS-defined Regional Analysis Zones (RAZ) 12

 Starting with Historical and Forecast Data at the RAZ and TAZ levels..... 13

The 2020 Base TAZ-Level Forecast 13

2020 Data Updates – Sources and Methodology..... 13

 Future Transportation Network Assumptions..... 14

 Contact with Area Agencies and Organizations..... 14

 The RAZ-Level Forecasts 15

 Distributing RAZ-Level Forecast Data to the TAZ and SAZ..... 16

RAZ to TAZ Allocation..... 16

 Summary of Considered Adjustments 17

 Disaggregation of Households and Employment by Type 30

Project Deliverables 34

Appendix A – RAZ-Level Forecasts 35

 Population..... 35

Harris County Population (RAZ 1 to 127) 35

Montgomery County Population (RAZ 128 to 139) 38

Waller County Population (RAZ 140 to 143) 38

Fort Bend County Population (RAZ 144 to 158)..... 38

Brazoria County Population (RAZ 159 to 172)..... 39

Galveston County Population (RAZ 173 to 188) 39

Chambers County Population (RAZ 189 to 192) 40

Liberty County Population (RAZ 193 to 199) 40

 Jobs 41

Harris County Jobs (RAZ 1 to 127) 41

Montgomery County Jobs (RAZ 128 to 139)..... 44

Waller County Jobs (RAZ 140 to 143) 44

Fort Bend County Jobs (RAZ 144 to 158) 44

Brazoria County Jobs (RAZ 159 to 172) 45
Galveston County Jobs (RAZ 173 to 188)..... 45
Chambers County Jobs (RAZ 189 to 192)..... 46
Liberty County Jobs (RAZ 193 to 199)..... 46

Households 47

Harris County Households (RAZ 1 to 127) 47
Montgomery County Households (RAZ 128 to 139) 50
Waller County Households (RAZ 140 to 143) 50
Fort Bend County Households (RAZ 144 to 158) 50
Brazoria County Households (RAZ 159 to 172)..... 51
Galveston County Households (RAZ 173 to 188)..... 51
Chambers County Households (RAZ 189 to 192)..... 52
Liberty County Households (RAZ 193 to 199) 52

TABLE OF EXHIBITS

2011 and 2016 HCTRA Reports	1
2019 HCTRA Report	1
CDS 2023 Regional and County-Level Forecast	5
Comparative Regional Job Growth Projections	6
Comparative Population Growth Projections	7
Shares of Historical and Future Growth by County – CDS 2023 Forecast	8
County Shares of Historical and Future Population and Employment – CDS 2023 Forecast	9
County-Level and Regional Growth Projections	11
Map of Regional Analysis Zones	12
TAZ Forecast Areas used for the 2019 HCTRA Study	16
Population and Housing Adjustments	17
Employment Adjustments	24
Household Disaggregation	30
Example Household Disaggregated Data File Structure	30
H-GAC Income Range Categories	30
H-GAC Employment Categories	31
Employment Disaggregation	31
2020 – 2045 Projected Population Growth per Square Mile by TAZ	32
2020 – 2045 Projected Job Growth per Square Mile by TAZ	33

INTRODUCTION AND OBJECTIVES

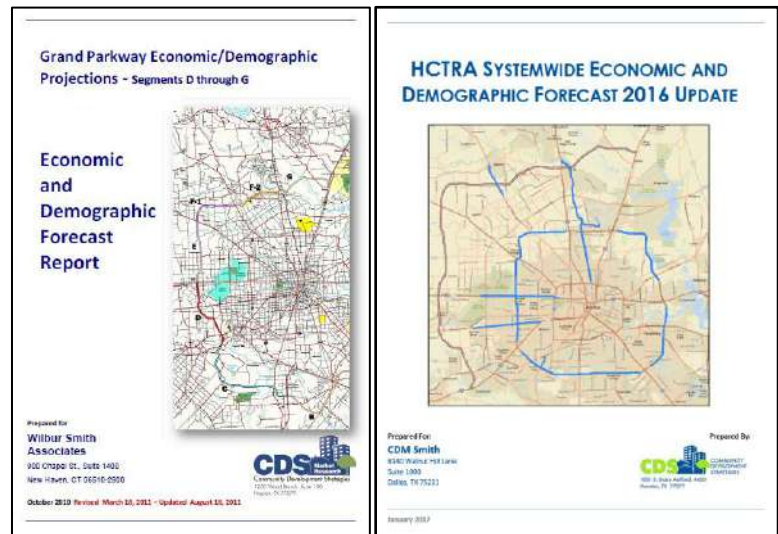
The following work is in support of the Traffic and Revenue Study for the Harris County Toll Road Authority (HCTRA).

In order to estimate the potential traffic and revenue on the toll lanes, CDM Smith contracted with CDS to provide small area forecasts of population and jobs in five-year increments between the years of 2020 and 2045.

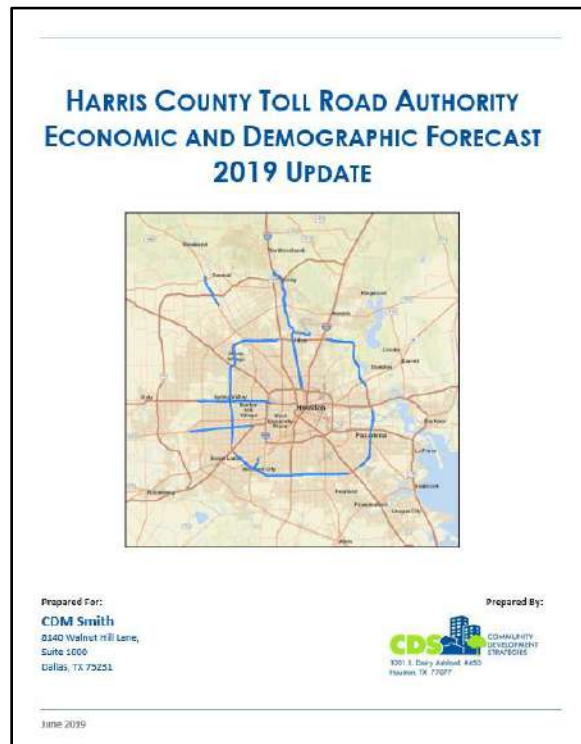
This effort builds upon a 2011 economic and demographic forecast and analysis for the original tolled sections of Grand Parkway Segments D through G. The 2011 analysis and forecast were further refined in a 2013 report focused on the HCTRA System. The 2013 project was updated in 2016 and again in 2019 to account for new construction and changed conditions.

This report provides an update and revamp of the forecasts issued in June 2019 to account for changing market conditions in the Houston area and major “announced” and “under construction” residential and commercial development that has happened since 2019. The forecast covered in this report also incorporates population and household data from the 2020 US Census for the first time. Information and material from other updates to the original 2011 report, completed from 2011 through 2020 for HCTRA, TxDOT, the Montgomery County Toll Road Authority (MCTRA), and the Fort Bend County Toll Road Authority (FBCTRA) is also included.

2011 and 2016 HCTRA Reports



2019 HCTRA Report



NEW REGIONAL AND COUNTY FORECASTS

For 2023, CDS updated its regional and county-level forecasts which provide the foundation for the growth share allocation among TAZs within each county in the TAZ-level forecast. To produce this regional and county-level forecast, CDS considered recent economic and demographic trends, the general long term structure and patterns of industry and real estate development, and the opinions of local economic experts.

Current Data Updates and Other Forecast Sources

CDS collected recent data up to 2022 on employment, households, and household population from a mix of sources as follows:

- **Employment** – Texas Workforce Commission Quarterly Census of Employment and Wages (QCEW), annual 3rd quarter (payroll employment only)
- **Households** – Bureau of the Census (2010 Decennial Census, 2019 5-Year American Community Survey, 2020 Decennial Census), Woods & Poole Economics
- **Population** – Bureau of the Census (2010 Decennial Census, 2020 Decennial Census, Census Population Estimates Program 2021 and 2022), Texas Water Development Board, Texas Demographic Center, Woods & Poole Economics (*note: Decennial Census and Woods & Poole provided household population, other sources are total population*)

For comparative forecasts, CDS compiled data series from the following sources:

- **Employment** – CDS previous CDM Smith forecast, Woods & Poole Economics
- **Households** – Woods & Poole Economics
- **Population** - CDS previous CDM Smith forecast, Texas Water Development Board, Texas Demographic Center (0.5 and 1.0 migration scenarios), Woods & Poole Economics

Recent Economic and Demographic Trends

The Houston region's economy, particularly its employment patterns, has been significantly influenced in the last decade by two major factors: the expansion and contraction of the upstream oil and gas industry and the COVID-19 pandemic from 2020 to 2022. These factors also impacted household and population growth, though in perhaps a less obvious manner.

In terms of employment, the region experienced strong growth from 2011 to 2014, followed by stagnation through 2016, and then moderate growth into 2019. The upstream oil and gas industry started weakening again during the latter half of 2019, followed the next spring by the COVID-19 pandemic, which caused further crisis in that industry, plus massive job losses in other sectors such as Accommodations, Retail, Health Care, and Food Services. Thus 2020 was a profoundly negative year for jobs overall, a performance shared by the rest of the nation. However, many sectors began rehiring and growing by 2021, with the exception of upstream oil and gas. This continued through 2022, to the point that overall job growth during those two years exceeded the massive losses from 2020. While upstream oil and gas has not and is not expected to resume substantial employment growth, the sector is not likely to contract its Houston job base meaningfully, as it has become much more labor efficient than it was during the early 2010s boom.

Meanwhile, nascent sectors in biotech and new generation aerospace show expansion, though they are not yet significant economic drivers. Other sectors tied to serving the local population have been expanding concurrently with the region's population growth.

The Houston region and Texas generally have been recipients of domestic migration from more expensive regions of the U.S. as well as neighboring states such as Louisiana. This has continued in addition to internally generated growth (births over deaths). International migration to the region likely slowed during the pandemic, but it should otherwise continue to be a major factor in regional population growth, as Houston is one of the nation's primary gateway cities for such immigration.

These factors have caused continued overall population growth in the region. During the pandemic, growth shifted to suburban counties from Harris County, but 2022 estimates indicate that Harris County is once again receiving growth. This makes sense, because the Cypress – Hockley area in the northwestern portion of the county is a major area for greenfield suburban development, so the county should still expect to experience substantial growth over at least the medium term and likely at least to 2040. Fort Bend and Montgomery counties are continuing the trend of rapid population and household growth and will likely continue to do so as they have large areas eligible for future development. Large new residential developments are also underway in Brazoria County, so it should remain on a long term growth trend.

Perhaps the most recent substantial changes to growth patterns are in the smaller suburban counties – Waller, Liberty, and Chambers. Waller County began to experience rapid job growth in the late 2010s as industrial / warehouse development took place in the southern end of the county, and now has a number of large residential developments occurring just to the north. Chambers County also had rapid job growth during the same period, which will continue in the near to middle term, along with large-scale new residential projects. Liberty County has had rapid residential population growth for the last several years, primarily due to a single developer, and this should continue.

Regional Economist Projections

CDS gathered the most recent employment outlook updates from two of the Houston's most prominent regional economists:

- Dr. Bill Gilmer, University of Houston Institute for Regional Forecasting at the Bauer College of Business, April 6, 2023 Update
- Patrick Jankowski, Greater Houston Partnership, Houston Region Economic Outlook, December 2022

Both economists were concerned about the possibility of the onset of a recession during some point in 2023. This followed the wild swings of the COVID-19 period from 2020 to 2022 and, starting in 2022, the rapid escalation of the Federal Funds Rate by the U.S. Federal Reserve as an attempt to slow inflation. However, while inflation has begun to ease and some economic indicators have shown signs of anticipated reductions in business activity, labor markets have remained strong and a significant recession does not appear to be imminent as of summer 2023, though it could be a possibility later in the calendar year. Both the regional economists believe that the impact of any recession in Houston could range from minimal to substantial, so there has been great variability in their publicly issued regional job market outlooks.

Dr. Gilmer tied the region's job growth range for the next few years to oil price levels, with a low of 61,500 jobs from 2022 to 2025 to a high of 224,800. Based on the oil price trends through mid-2023, generally staying near \$80 per barrel, his corresponding forecast was for growth of 173,500 jobs.

Mr. Jankowski, as of December 2022, forecasted 2023 job growth ranging from 30,400 to 79,200, with growth of 60,800 indicated as most likely. His forecast did not go beyond 2023. In both his and Dr. Gilmer's forecasts, the extreme growth experienced during the 2021 and 2022 pandemic recovery ends as of 2023.

CDS 2023 Forecast

In considering the recent trends and economist's opinions, CDS has produced the following forecast for regional and county-level growth in employment (payroll employment only), households, and household population. Our forecast assumes a relatively moderate pace of employment growth until 2025, assuming some weakness in the national economy in late 2023 into 2024, with growth resuming near or slightly above long term averages thereafter.

Household and population growth, while perhaps somewhat detached from job growth during the pandemic, will resume correlation with job growth over the next few years. Persons per household, which have been lower in Harris and Galveston counties compared to the other counties in the region, will decrease slightly from their current levels. The county-level data from this forecast is located in the table on the following page.

CDS 2023 Regional and County-Level Forecast

	2020	2025	2030	2035	2040	2045
EMPLOYMENT						
Brazoria	108,656	130,242	146,562	163,902	182,452	202,252
Chambers	16,120	23,628	29,748	36,548	43,898	51,458
Fort Bend	187,753	255,796	305,776	356,436	408,936	463,296
Galveston	104,731	128,194	145,874	163,554	181,754	200,474
Harris	2,168,040	2,432,703	2,620,383	2,801,263	2,984,663	3,168,983
Liberty	17,233	19,110	21,830	25,910	30,460	35,860
Montgomery	183,143	253,532	306,232	361,312	419,062	480,262
Waller	20,310	32,042	38,842	46,322	54,022	62,662
TOTAL	2,805,986	3,275,247	3,615,247	3,955,247	4,305,247	4,665,247
HOUSEHOLDS						
Brazoria	127,464	140,556	154,394	169,915	186,715	203,995
Chambers	15,623	18,368	21,547	24,352	27,292	30,316
Fort Bend	263,128	300,082	335,238	372,077	414,707	459,203
Galveston	132,819	143,377	152,727	161,703	171,573	181,509
Harris	1,692,730	1,797,258	1,880,660	1,959,200	2,040,050	2,118,026
Liberty	29,469	35,804	42,910	50,390	59,000	68,288
Montgomery	219,796	254,639	286,429	318,967	358,657	403,153
Waller	17,298	19,410	22,589	26,890	35,500	45,004
TOTAL	2,498,327	2,709,494	2,896,494	3,083,494	3,293,494	3,509,494
HH POPULATION						
Brazoria	361,717	413,236	453,919	499,551	541,475	581,387
Chambers	46,343	54,002	63,349	71,595	79,147	86,401
Fort Bend	818,097	882,242	985,601	1,093,907	1,202,651	1,308,729
Galveston	345,781	394,288	420,000	444,684	463,248	490,075
Harris	4,683,148	4,942,459	5,171,815	5,387,800	5,508,135	5,718,670
Liberty	86,722	105,264	126,155	148,147	171,100	194,621
Montgomery	616,277	748,638	842,100	937,762	1,040,104	1,148,985
Waller	50,516	57,064	66,411	79,056	102,949	128,260
TOTAL	7,008,601	7,597,193	8,129,350	8,662,502	9,108,809	9,657,129

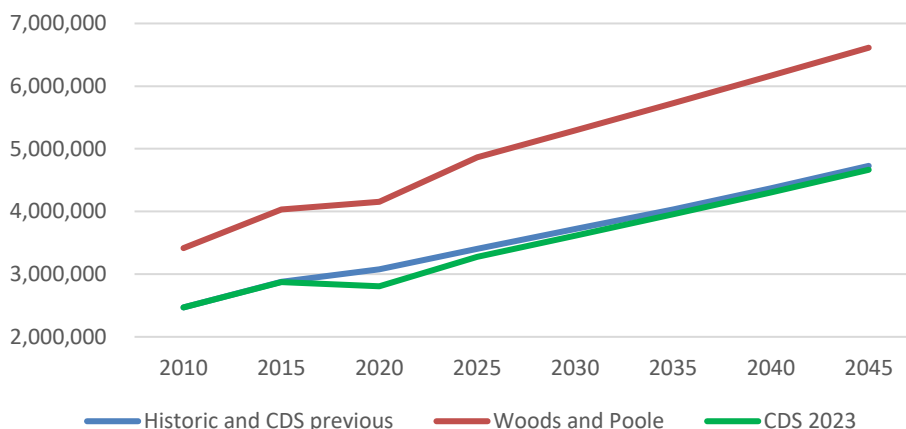
CDS 2023 Forecast Compared With Other Projections

The following charts compare the CDS 2023 forecasts for regional employment and household population with our previous forecast from 2019 and with others obtained for research purposes. The comparative forecasts displayed on these charts are:

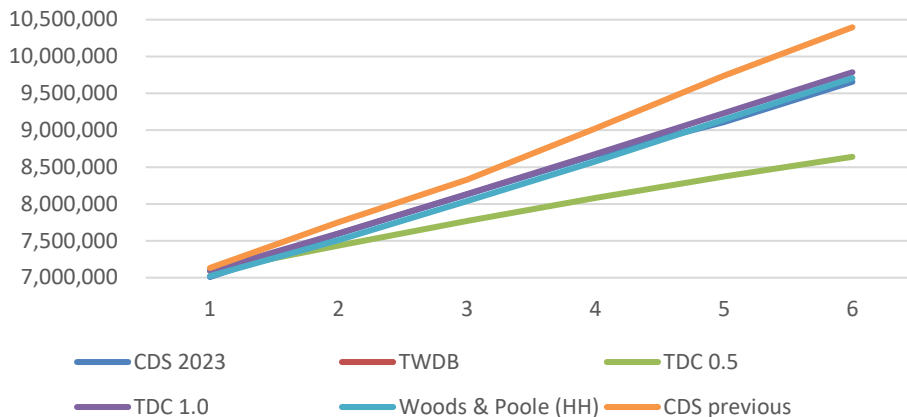
- **Employment** – CDS previous CDM Smith forecast, Woods & Poole Economics
- **Population** - CDS previous CDM Smith forecast, Texas Water Development Board, Texas Demographic Center (0.5 and 1.0 migration scenarios), Woods & Poole Economics

It should be noted that CDS did not compare the most recent forecast from the Houston-Galveston Area Council (H-GAC) for this 2023 regional and county forecast, as has been done in past projects. The most recent H-GAC regional forecast available is their 2018 forecast, which was also the most recent H-GAC forecast available when CDS last updated the forecast for the HCTRA system in 2019. As this forecast is now 5 years past its issue date and does not consider recent developments on the ground or updated data from the US Census and the Texas Workforce Commission, CDS opted not to examine it as a point of comparison for this work.

Comparative Regional Job Growth Projections



Comparative Population Growth Projections



Note 1: TWDB = Texas Water Development Board; TDC 0.5 = Texas Demographic Center 0.5 migration scenario; TDC 1.0 = Texas Demographic Center 1.0 migration scenario

Note 2: CDS and Woods & Poole forecasts are for household population; all others are for total population.

Forecast Shares

The tables below illustrate the shift-share results for both population and employment in the CDS 2023 forecast. The percentages in the table represent the county shares of the regional growth in each time period. Historical data is included and the bold type is the forecast shares.

Shares of Historical and Future Growth by County – CDS 2023 Forecast

County Share of Regional Population Change

Period	Brazoria	Chambers	Ft. Bend	Galveston	Harris	Liberty	Montgomery	Waller
1970 to 1980	6.5%	0.7%	8.4%	2.8%	71.2%	1.5%	8.3%	2.1%
1980 to 1990	3.6%	0.3%	15.4%	3.5%	66.7%	0.9%	9.0%	0.6%
1990 to 1995	5.1%	0.5%	13.4%	2.5%	63.3%	1.7%	12.7%	0.9%
1995 to 2000	5.5%	0.7%	13.9%	3.9%	61.5%	1.9%	11.5%	1.0%
2000 to 2005	6.9%	0.7%	17.0%	5.1%	56.2%	0.5%	12.8%	0.7%
2005 to 2010	5.1%	0.8%	20.2%	2.2%	56.9%	0.4%	13.6%	1.0%
2010 to 2015	4.5%	0.5%	17.9%	4.1%	60.6%	0.6%	11.2%	0.7%
2015 to 2020	5.6%	1.6%	23.1%	6.2%	42.0%	2.6%	17.6%	1.3%
2020 to 2025	8.8%	1.3%	10.9%	8.2%	44.1%	3.2%	22.5%	1.1%
2025 to 2030	7.6%	1.8%	19.4%	4.8%	43.1%	3.9%	17.6%	1.8%
2030 to 2035	8.6%	1.5%	20.3%	4.6%	40.5%	4.1%	17.9%	2.4%
2035 to 2040	9.4%	1.7%	24.4%	4.2%	27.0%	5.1%	22.9%	5.4%
2040 to 2045	7.3%	1.3%	19.3%	4.9%	38.4%	4.3%	19.9%	4.6%

County Share of Regional Employment Change

Period	Brazoria	Chambers	Ft. Bend	Galveston	Harris	Liberty	Montgomery	Waller
1970 to 1980	4.8%	0.6%	3.3%	2.0%	85.8%	0.8%	2.4%	0.4%
1980 to 1990	1.5%	-0.7%	6.6%	3.8%	79.1%	0.2%	8.6%	0.9%
1990 to 1995	1.4%	0.8%	10.3%	3.3%	72.7%	0.6%	10.2%	0.7%
1995 to 2000	1.5%	0.4%	11.5%	1.2%	73.9%	0.4%	10.6%	0.5%
2000 to 2005	3.7%	0.5%	14.9%	1.9%	56.2%	0.4%	19.0%	3.5%
2005 to 2010	4.0%	0.5%	11.7%	3.7%	65.9%	0.1%	13.5%	0.6%
2010 to 2015	4.4%	0.8%	9.7%	2.0%	72.8%	0.1%	9.3%	0.8%
2015 to 2020*	-7.0%	-4.7%	-24.9%	-2.6%	170.6%	-1.0%	-24.9%	-5.6%
2020 to 2025	4.6%	1.6%	14.5%	5.0%	56.4%	0.4%	15.0%	2.5%
2025 to 2030	4.8%	1.8%	14.7%	5.2%	55.2%	0.8%	15.5%	2.0%
2030 to 2035	5.1%	2.0%	14.9%	5.2%	53.2%	1.2%	16.2%	2.2%
2035 to 2040	5.3%	2.1%	15.0%	5.2%	52.4%	1.3%	16.5%	2.2%
2040 to 2045	5.5%	2.1%	15.1%	5.2%	51.2%	1.5%	17.0%	2.4%

* Regional employment change and employment change in Harris County was negative between 2015 and 2020 due to job losses incurred during the COVID-19 pandemic, which creates the odd shares seen in this period.

The tables below illustrate the forecast shift-share results for both population and employment in the Houston MSA for the CDS 2023 forecast. The percentages in the table represent the county shares of the total 8-county region in each time period. Historical data is included and the bold type is the forecast shares.

County Shares of Historical and Future Population and Employment – CDS 2023 Forecast

County Share of Regional Population

Year	Brazoria	Chambers	Ft. Bend	Galveston	Harris	Liberty	Montgomery	Waller
1970	5.0%	0.6%	2.4%	7.8%	79.9%	1.5%	2.3%	0.7%
1980	5.4%	0.6%	4.2%	6.3%	77.3%	1.5%	4.1%	0.6%
1990	5.1%	0.5%	6.0%	5.8%	75.5%	1.4%	4.9%	0.6%
1995	5.1%	0.5%	6.6%	5.6%	74.7%	1.4%	5.5%	0.7%
2000	5.2%	0.6%	7.6%	5.4%	72.8%	1.5%	6.3%	0.7%
2005	5.4%	0.6%	8.5%	5.3%	71.2%	1.4%	6.9%	0.7%
2010	5.2%	0.6%	10.0%	4.9%	69.6%	1.2%	7.8%	0.7%
2015	5.1%	0.6%	10.8%	4.8%	68.6%	1.1%	8.2%	0.7%
2020	5.2%	0.7%	11.7%	4.9%	66.8%	1.2%	8.8%	0.7%
2025	5.4%	0.7%	11.6%	5.2%	65.1%	1.4%	9.9%	0.8%
2030	5.6%	0.8%	12.1%	5.2%	63.6%	1.6%	10.4%	0.8%
2035	5.8%	0.8%	12.6%	5.1%	62.2%	1.7%	10.8%	0.9%
2040	5.9%	0.9%	13.2%	5.1%	60.5%	1.9%	11.4%	1.1%
2045	6.0%	0.9%	13.6%	5.1%	59.2%	2.0%	11.9%	1.3%

County Share of Regional Employment

Year	Brazoria	Chambers	Ft. Bend	Galveston	Harris	Liberty	Montgomery	Waller
1970	3.8%	0.4%	1.6%	6.5%	85.5%	0.9%	1.0%	0.4%
1980	4.2%	0.5%	2.3%	4.5%	85.6%	0.9%	1.6%	0.4%
1990	3.9%	0.3%	2.8%	4.4%	84.9%	0.8%	2.4%	0.4%
1995	3.8%	0.4%	3.2%	4.4%	84.2%	0.8%	2.8%	0.4%
2000	3.4%	0.4%	4.4%	3.9%	82.7%	0.7%	4.0%	0.4%
2005	3.5%	0.4%	4.8%	3.8%	81.8%	0.7%	4.5%	0.6%
2010	3.5%	0.4%	5.3%	3.8%	80.7%	0.7%	5.2%	0.5%
2015	3.6%	0.4%	5.9%	3.6%	79.6%	0.6%	5.7%	0.6%
2020	3.9%	0.6%	6.7%	3.7%	77.3%	0.6%	6.5%	0.7%
2025	4.0%	0.7%	7.8%	3.9%	74.3%	0.6%	7.7%	1.0%
2030	4.1%	0.8%	8.5%	4.0%	72.5%	0.6%	8.5%	1.1%
2035	4.1%	0.9%	9.0%	4.1%	70.8%	0.7%	9.1%	1.2%
2040	4.2%	1.0%	9.5%	4.2%	69.3%	0.7%	9.7%	1.3%
2045	4.3%	1.1%	9.9%	4.3%	67.9%	0.8%	10.3%	1.3%

SMALL AREA FORECAST METHOD OVERVIEW

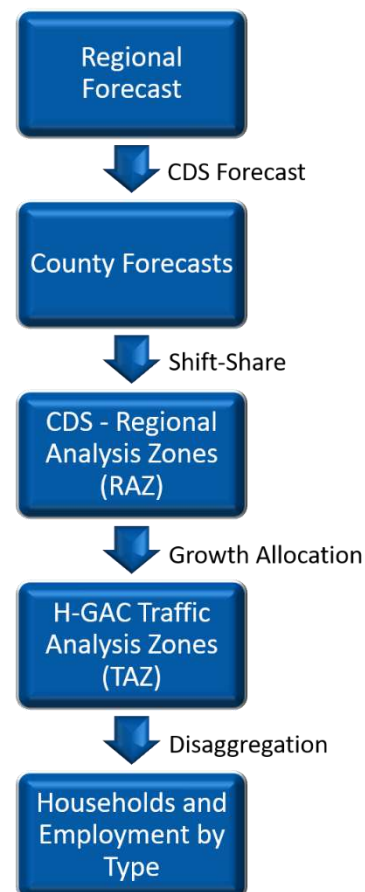
The previously mentioned Houston Galveston Area Council (H-GAC) forecast is available at smaller geographic areas in addition to its county and region-wide levels. CDS was tasked with providing an independent forecast using H-GAC’s geographic forecasting structure and providing values for the same forecasting data variables. This meant that CDS would need to create datasets for all of H-GAC’s Traffic Analysis Zones (TAZs) that include values for all output variables required by the agency’s newest traffic model. In general, the methodology to create these independent forecast datasets included the following steps.

1. Begin with the CDS 2023 forecast at the regional and county levels.
2. Investigate historical growth trends from:
 - the decennial US Census and other Census Bureau sources such as the American Community Survey (ACS) and Longitudinal Employer-Household Dynamics (LEHD).
 - PCensus for ArcView, a program that distributes and displays Nielsen/Claritas demographic data which included 1990, 2000, and 2010 Census data, estimates for 2005 and 2017 as well as projections to 2022 at the census block level
 - historical employment information from the Texas Workforce Commission (TWC)/Bureau of Labor Statistics (BLS)
 - previous the H-GAC forecasting efforts
3. Investigate the opinions and forecasts of area governmental agencies, private organizations, and area experts.
4. Evaluate the potential growth inducing effects of the HCTRA System and other major infrastructure improvements, including the Grand Parkway.
5. Account for near-term residential and commercial developments that have been recently announced or begun.

6. Implement a “shift-share” forecasting methodology at the Regional Analysis Zone (RAZ) level. CDS created new RAZs for this project, as H-GAC no longer uses these geographies. This takes into account:

- the historical trends
- the known historical growth areas for housing and jobs
- announced major developments
- the land available for new development
- likely areas in the community for new development based on locally influenced qualitative factors

7. Disaggregate the RAZ forecast into the smaller Traffic Analysis Zones (TAZ).
8. Disaggregate the TAZ forecast for households and employment by H-GAC’s data categories.



FORECASTING POPULATION AND JOBS – COUNTY CONTROL TOTALS

County-Level and Regional Growth Projections

	Year	8-County CMSA	Brazoria	Chambers	Ft. Bend	Galveston	Harris	Liberty	Montgomery	Waller
POPULATION										
Population by Year	1970	2,181,316	108,312	12,187	52,314	169,812	1,741,913	33,014	49,479	14,285
	1980	3,118,480	169,587	18,538	130,962	195,738	2,409,547	47,088	127,222	19,798
	1990	3,731,131	191,707	20,088	225,421	217,399	2,818,199	52,726	182,201	23,390
	2000	4,669,589	241,767	26,031	354,452	250,158	3,400,578	70,154	293,786	32,663
	2005	5,109,124	273,338	29,122	451,391	272,316	3,604,232	75,104	367,857	35,764
	2010	5,814,383	302,607	34,867	579,439	287,012	4,047,935	70,499	452,522	39,502
	2015	6,534,571	335,147	38,547	708,446	316,497	4,484,093	74,599	532,889	44,353
	2020	7,008,601	361,717	46,343	818,097	345,781	4,683,148	86,722	616,277	50,516
	2025	7,597,193	413,236	54,002	882,242	394,288	4,942,459	105,264	748,638	57,064
	2030	8,129,350	453,919	63,349	985,601	420,000	5,171,815	126,155	842,100	66,411
	2035	8,662,502	499,551	71,595	1,093,907	444,684	5,387,800	148,147	937,762	79,056
	2040	9,108,809	541,475	79,147	1,202,651	463,248	5,508,135	171,100	1,040,104	102,949
2045	9,657,129	581,387	86,401	1,308,729	490,075	5,718,670	194,621	1,148,985	128,260	
Annual Average Pop. Growth by Period	'00-'10	1,144,794	60,840	8,836	224,987	36,854	647,357	345	158,736	6,839
	'10-'20	1,194,218	59,110	11,476	238,658	58,769	635,213	16,223	163,755	11,014
	'20-'35	1,653,901	137,834	25,252	275,810	98,903	704,652	61,425	321,485	28,540
	'35-'45	994,627	81,836	14,806	214,822	45,391	330,870	46,474	211,223	49,204
	'20-'45	2,648,528	219,670	40,058	490,632	144,294	1,035,522	107,899	532,708	77,744
JOBS										
Jobs by Year	1970	904,142	33,873	3,509	14,159	58,934	772,907	7,919	9,403	3,438
	1980	1,616,123	68,052	7,482	37,545	72,799	1,384,104	13,854	26,388	5,899
	1990	1,811,944	70,950	6,048	50,546	80,224	1,539,045	14,251	43,268	7,612
	2000	2,252,103	77,472	8,288	99,768	94,138	1,855,051	17,901	89,634	9,851
	2005	2,343,072	80,250	8,787	112,936	96,956	1,906,019	18,862	108,484	10,778
	2010	2,469,888	85,761	9,385	130,168	94,522	1,993,657	16,201	127,153	13,041
	2015	2,878,025	103,634	12,748	169,844	102,856	2,290,937	16,543	165,177	16,289
	2020	2,805,986	108,656	16,120	187,753	104,731	2,168,040	17,233	183,143	20,310
	2025	3,275,247	130,242	23,628	255,796	128,194	2,432,703	19,110	253,532	32,042
	2030	3,615,247	146,562	29,748	305,776	145,874	2,620,383	21,830	306,232	38,842
	2035	3,955,247	163,902	36,548	356,436	163,554	2,801,263	25,910	361,312	46,322
	2040	4,305,247	182,452	43,898	408,936	181,754	2,984,663	30,460	419,062	54,022
2045	4,665,247	202,252	51,458	463,296	200,474	3,168,983	35,860	480,262	62,662	
Annual Average Jobs Growth by Period	'00-'10	217,785	8,289	1,097	30,400	384	138,606	-1,700	37,519	3,190
	'10-'20	336,098	22,895	6,735	57,585	10,209	174,383	1,032	55,990	7,269
	'20-'35	1,149,261	55,246	20,428	168,683	58,823	633,223	8,677	178,169	26,012
	'35-'45	710,000	38,350	14,910	106,860	36,920	367,720	9,950	118,950	16,340
	'20-'45	1,859,261	93,596	35,338	275,543	95,743	1,000,943	18,627	297,119	42,352

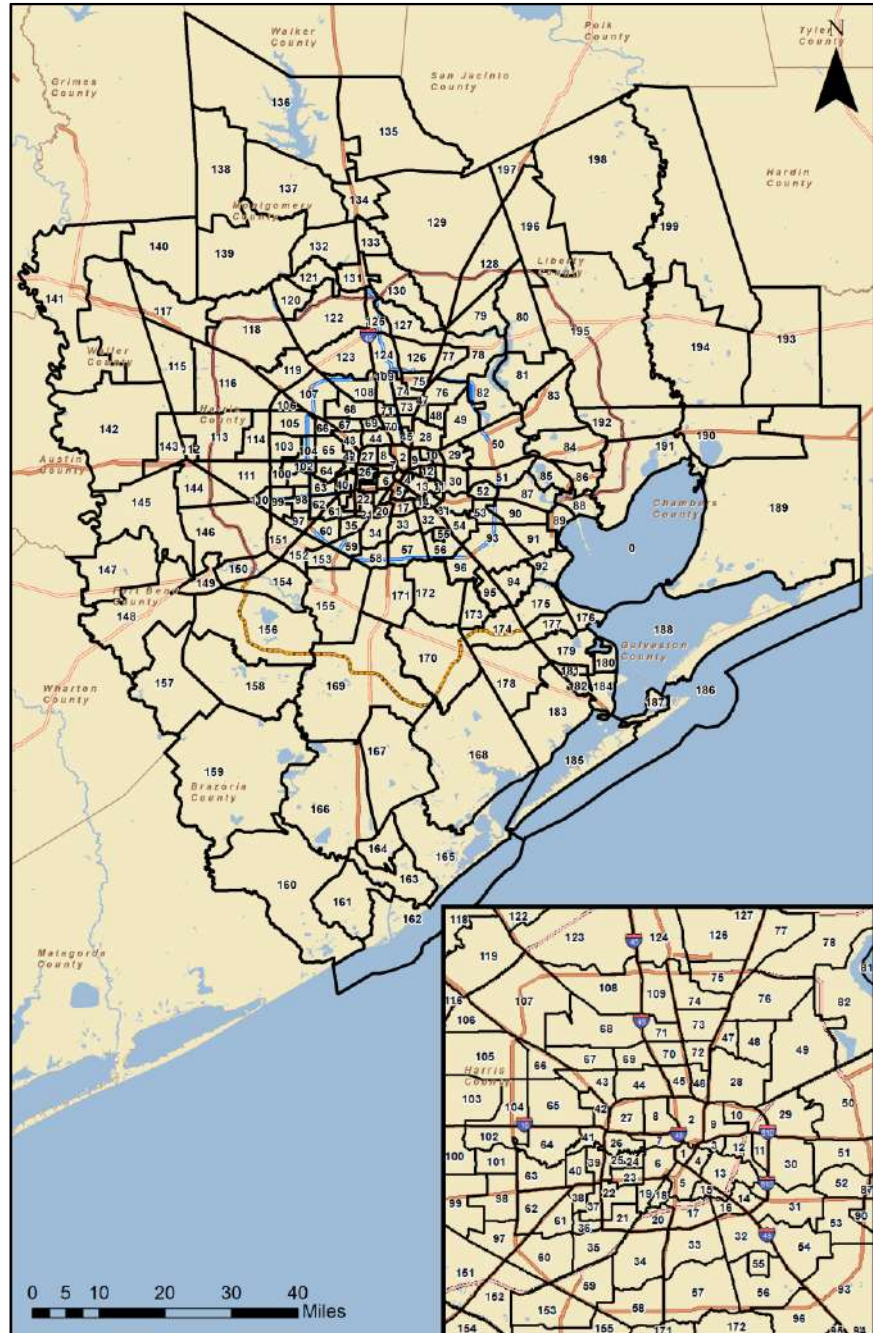
Use of the CDS-defined Regional Analysis Zones (RAZ)

In past forecasting projects, CDS used H-GAC’s Regional Analysis Zones (RAZ) as an intermediate step in the shift-share process between the county-level control totals and the smaller TAZ geographies. Several years ago, H-GAC discontinued the use of RAZs for issuing and analyzing forecasts. Despite this, CDS continued to use RAZs as an intermediate step in the shift-share process as the TAZ structure H-GAC and CDM-Smith continued to use remained consistent with the RAZ boundaries.

H-GAC has also since developed a new TAZ structure, which CDS is now using for all forecasts going forward. Unlike the old TAZs, this new structure does not conform precisely to the boundaries of the previous RAZs, though the differences are generally fairly minor. Despite these minor differences, the new TAZs can be matched relatively well with a RAZ geography. CDS matched up the new TAZs as closely as possible to the old RAZ boundaries and created a redefined set of RAZs (map to right) fitted to the boundaries of the new TAZs. These zones are similar to H-GAC’s RAZs but are not identical. This was done in order to continue to use the RAZ-level as an intermediate step in the shift-share process and to better enable the use of CDS’ previous forecast work done for the old TAZ structure into the new structure.

Map of Regional Analysis Zones

Eight County Region



Starting with Historical and Forecast Data at the RAZ and TAZ levels

It was beyond the scope of this report and the models available to the project team to produce a complete forecast for the entire Houston metropolitan region and every Traffic Analysis Zone (TAZ) from scratch. CDS began this forecasting process, as it has every forecast since the original 2011 Grand Parkway project, by using its most recent previous forecast as a starting point in terms of shift-share allocations at the RAZ and TAZ levels. This is done to incorporate and build upon previous work and expectations, as none of the transportation projects CDS has been asked to consider are assumed to be planned in lieu of others. The TAZ-level data was evaluated and adjustments were made to the forecasts using a variety of methods.

The 2020 Base TAZ-Level Forecast

For the 2023 updated TAZ-level forecast, CDS first updated the 2020 TAZ-level figures to match the 2020 data from the US Census Bureau and the Texas Workforce Commission (TWC). The forecast, rooted the TAZ-level growth expectations from the most recent CDS forecast issued in January 2020, was then built on top of these updated 2020 figures. Adjustments were made to the forecast at the TAZ-level based on feedback received from several government organizations after CDS met with these groups and presented them with a draft forecast to review.

2020 Data Updates – Sources and Methodology

CDS assembled 2020 data at the TAZ-level on employment, households, and household population at the TAZ level from the following sources using the following methodologies:

- **Employment** – Texas Workforce Commission Quarterly Census of Employment and Wages (QCEW) 2020 3rd quarter (payroll employment only) was assembled at the county level, then disaggregated to the TAZ-level. This was done by using the US Census Longitudinal Employer-Household Dynamic (LEHD) program's 2020 data on the Census Block geography level location of jobs, aggregating this data to the TAZ-level based on the geographic fit of Census Blocks into TAZs, and then establishing each TAZ's share of its county's employment. These shares were then applied to the Texas Workforce Commission 2020 QCEW figures to disaggregate the county-level totals to the TAZ level.
- **Households** – Bureau of the Census (2020 Decennial Census) household figures at the Census Block geography level were aggregated to the TAZ-level based on the geographic fit of Census Blocks into TAZs.
- **Population** – Bureau of the Census (2020 Decennial Census) household population figures (includes only population in households and excludes group quarters population) at the Census Block geography level were aggregated to the TAZ-level based on the geographic fit of Census Blocks into TAZs.

Future Transportation Network Assumptions

In preparing the small area forecasts, it is clear that future transportation networks and the accessibility of the small area zones are affected by transportation infrastructure improvements over time. It was beyond the scope of this work to develop sophisticated models that took into account all changes in the transportation network including both highways and public transit. Therefore, for this analysis it was assumed that transportation improvements would continue over time to serve the existing and new residents of the community and that any transportation funding crisis, regardless of how real it may seem today, will be ultimately resolved because of citizen demands. Therefore, for the purposes of this effort, it was assumed that the relative accessibility of the various zones in the region would not significantly change over time. However, recently opened and planned facilities such as the extension of the Fort Bend Toll Road and the Westpark Toll Road, the SH 249/Tomball Tollway, the Grand Parkway, the Major Thoroughfare Plans of Houston and other area municipalities, known enhancements to existing facilities such as improvements to US 290, SH 288, I-45 South and I-45 North, and light rail extensions were included.

Contact with Area Agencies and Organizations

In the course of developing small area forecasts for previous traffic and revenue studies, CDS sought out key public sector agencies and officials and major private sector parties of interest serving both the key areas around the toll roads in question and the Houston region as a whole. CDS's goal was to account for the opinions of these groups and use the knowledge and insight gained from conversations with the local organizations to inform the forecast. Data from these organizations was collected both by contacting the organizations directly and researching publicly available data offered on their websites and other sources. The comments made by these offices and organizations were factored into many of the adjustments made to the small-area forecasts for this project.

CDS spoke with and reviewed an initial forecast with the following organizations for this HCTRA Update (listed in the order in which meetings took place):

- City of Deer Park
- Economic Alliance Houston Port Region
- Harris County Precinct 1
- Harris County Precinct 2
- Lake Houston Partnership
- Memorial District
- North Houston District
- Pasadena Economic Development Corporation
- Pearland Economic Development Corporation
- Spring Branch District
- Tax Increment Reinvestment Zone (TIRZ) 25 – Hiram Clarke

The RAZ-Level Forecasts

The forecasts at the RAZ level of geography were produced using a shift-share forecasting methodology accounting for land availability throughout the process. The methodology involved establishment of county-level forecasts from 2010 to 2045. Then the shares of the future county housing units, population and jobs were estimated for each 5-year period. An example of the methodology, for Waller County is shown below.

Shift Share Analysis Example

RAZ Shares – Share of County Job Growth in Each 5-Year Period

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
140		21.9%	0.8%	13.8%	22.2%	22.4%	22.7%	23.8%	24.3%	24.3%
141		6.9%	4.7%	9.5%	11.1%	10.5%	10.1%	9.7%	9.5%	9.5%
142		67.1%	44.0%	68.1%	33.3%	34.1%	34.1%	34.7%	35.0%	36.0%
143		4.1%	50.5%	8.6%	33.3%	33.0%	33.1%	31.8%	31.1%	30.2%
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

$$\text{Jobs}_{\text{Year } n} = \text{Jobs}_{\text{Year } n-5} + \text{RAZ Share}_{\text{Year } n} \times [\text{County Jobs}_{\text{Year } n} - \text{County Jobs}_{\text{Year } n-5}]$$

Jobs – Total Number of Jobs in the RAZ in the Year Shown

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
140	4,238	4,729	4,737	5,010	5,868	7,297	9,152	11,140	13,102	14,927
141	1,874	2,029	2,072	2,260	2,691	3,361	4,186	4,995	5,760	6,473
142	1,227	2,729	3,137	4,487	5,774	7,951	10,734	13,634	16,458	19,159
143	274	365	833	1,004	2,291	4,400	7,099	9,750	12,261	14,523
Total	7,612	9,851	10,778	12,761	16,623	23,008	31,172	39,518	47,581	55,082

In each case, the shares of future growth were based on:

- recent history of growth capture
- information on growth from area agencies and organizations
- expected future capture of the growth
- estimation of the capacity of the vacant developable or redevelopable land in the RAZ for new development

Distributing RAZ-Level Forecast Data to the TAZ and SAZ

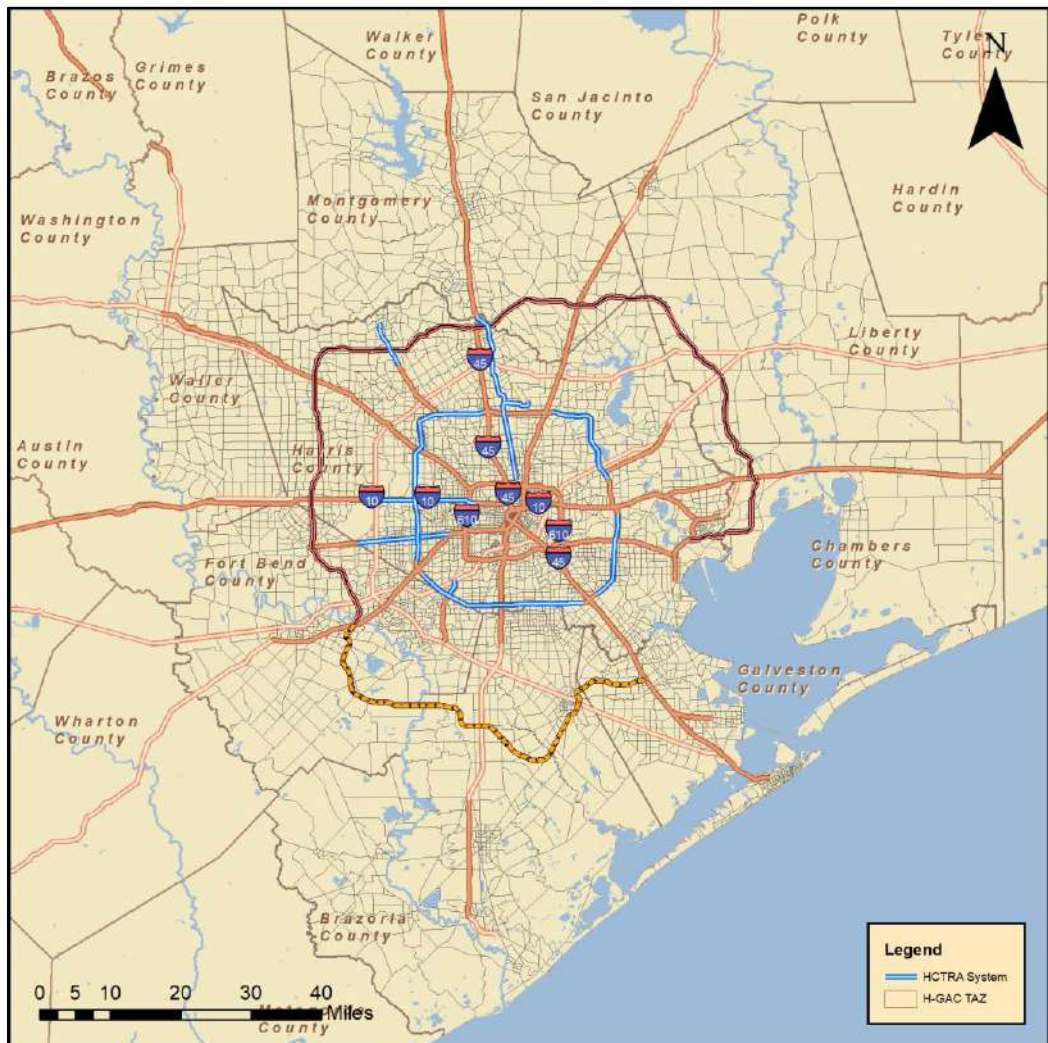
RAZ to TAZ Allocation

The forecasts for the 199 RAZs were distributed to the smaller TAZs, for the entire 8-county region. The map on the right illustrates the 5,217 H-GAC TAZs in the region.

The methodology for the distribution of the expected growth within the RAZs to the smaller TAZs was straightforward. For this effort, the CDS team:

1. Reviewed information for each RAZ, including aerial photographs, data from the appraisal districts, information from area agencies and previous TAZ-level forecasts prepared by the H-GAC;
2. Made an assessment as to the current distribution of housing units, jobs and population within each TAZ as a percentage of the total RAZ (using the team knowledge of trends and development plans); and
3. Made an assessment of the future growth of housing and jobs in each TAZ of the expected growth of the entire RAZ; and applied those growth percentages to the expected RAZ total growth to produce estimates of future growth of housing, population and jobs in the smaller zones.

TAZ Forecast Areas used for the 2019 HCTRA Study



Summary of Considered Adjustments

The following tables illustrate the considered changes in the forecasts at the small area (RAZ and TAZ) level. The base from which these changes were considered is the forecast that CDS issued in July 2023 for TxDOT and the Grand Parkway Segments D through I route. In some cases, change in the forecast was required, in other cases, the original projections adequately included the growth from the newly announced projects or changing conditions. There are two tables, one for adjustments related to population and housing (residential developments) and one for adjustments related to employment (commercial developments). A total of 180 TAZ-level and 10 RAZ-level examinations and adjustments were made to population and housing projections. For employment projections, 113 TAZ-level examinations and adjustments were made for this forecast.

Population and Housing Adjustments

County	RAZ	TAZ	Action	Adjustment/Comment
Harris	2	457	Adjusted Up	New flood control infrastructure could facilitate development
Harris	11	519	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	12	489	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	12	595	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	14		Adjusted Down	Limited room for new development or redevelopment within the RAZ
Harris	24		Adjusted Down	Limited room for new development or redevelopment within the RAZ
Harris	25		Adjusted Down	Limited room for new development or redevelopment within the RAZ
Harris	26		Adjusted Down	Limited room for new development or redevelopment within the RAZ
Harris	30	1210	Adjusted Down	Limited room for new development or redevelopment
Harris	30	1215	Adjusted Down	Limited room for new development or redevelopment
Harris	31	1301	Adjusted Down	Limited room for new development or redevelopment
Harris	31	1309	Adjusted Down	Limited room for new development or redevelopment
Harris	34	1490	Adjusted Up	Med Center Apartments multifamily development under construction now
Harris	34	1522	Adjusted Up	Ongoing development of small lot single family housing in this area
Harris	34	1537	Adjusted Up	Expectation for residential development at this intersection
Harris	35	1545	Adjusted Down	Limited room for new development or redevelopment
Harris	35	1596	Adjusted Down	Limited room for new development or redevelopment
Harris	35	1598	Adjusted Down	Limited room for new development or redevelopment
Harris	40	765	Adjusted Down	Limited room for new development or redevelopment
Harris	41	757	Adjusted Down	Limited room for new development or redevelopment
Harris	41	762	Adjusted Down	Limited room for new development or redevelopment
Harris	41	763	Adjusted Down	Limited room for new development or redevelopment
Harris	41	764	Adjusted Down	Limited room for new development or redevelopment
Harris	42	865	Adjusted Up	Mixed use development planned for former grain silos site

County	RAZ	TAZ	Action	Adjustment/Comment
Harris	42	907	Forecast Sufficient	Mixed use part of plan at high speed rail station
Harris	43	902	Adjusted Down	Brickhouse Gully flood control challenges should limit development and redevelopment
Harris	43	911	Adjusted Down	Brickhouse Gully flood control challenges should limit development and redevelopment
Harris	48	1158	Adjusted Slightly Up	New single family homes being built along Wayside and Little York
Harris	48	1159	Adjusted Slightly Up	New single family homes being built along Wayside and Little York
Harris	48	1166	Adjusted Significantly Up	New single family homes being built along Wayside and Little York
Harris	50	1246	Adjusted Up	Residential growth expected through multiple new trailer homes being added to former single family lots
Harris	50	1247	Adjusted Up	Residential growth expected through multiple new trailer homes being added to former single family lots
Harris	50	1248	Adjusted Up	Residential growth expected through multiple new trailer homes being added to former single family lots
Harris	50	2470	Forecast Sufficient	Expectation for redevelopment of pipeyards and other light industrial into residential when land values along US 90 justify it
Harris	50	2471	Forecast Sufficient	Expectation for redevelopment of pipeyards and other light industrial into residential when land values along US 90 justify it
Harris	50	2473	Adjusted Up	Expectation for redevelopment of pipeyards and other light industrial into residential when land values along US 90 justify it
Harris	50	2476	Adjusted Up	Expectation for redevelopment of pipeyards and other light industrial into residential when land values along US 90 justify it
Harris	50	2477	Adjusted Up	Expectation for redevelopment of pipeyards and other light industrial into residential when land values along US 90 justify it
Harris	50	2494	Adjusted Up	Expectation for redevelopment of pipeyards and other light industrial into residential when land values along US 90 justify it
Harris	50	2496	Adjusted Up	Expectation for redevelopment of pipeyards and other light industrial into residential when land values along US 90 justify it
Harris	51	2492	Adjusted Down	Limited room for new development or redevelopment
Harris	52	1312	Forecast Sufficient	Limited room for new development or redevelopment
Harris	52	1316	Forecast Sufficient	Limited room for new development or redevelopment
Harris	52		Adjusted Down	Check RAZ
Harris	53	1322	Adjusted Up	Macroplaza Mall redevelopment is not imminent, but seems inevitable, residential seems most likely reuse of land
Harris	55	1397	Adjusted Down	Limited room for new development or redevelopment
Harris	55	1398	Forecast Sufficient	Limited room for new development or redevelopment
Harris	55	1399	Forecast Sufficient	Limited room for new development or redevelopment

County	RAZ	TAZ	Action	Adjustment/Comment
Harris	55	1400	Forecast Sufficient	Limited room for new development or redevelopment
Harris	57	1438	Adjusted Down	Flood control infrastructure will limit development
Harris	58	1519	Adjusted Up	Ongoing development of small lot single family housing in this area
Harris	58	1529	Adjusted Down	Likely commercial as planned housing here was cancelled
Harris	58	1532	Adjusted Up	Kirby Drive extension should facilitate growth
Harris	58	1535	Adjusted Slightly Down	Landfill located here will limit residential growth
Harris	59	1506	Adjusted Down	Power plant presence could limit residential growth
Harris	59	1507	Adjusted Down	Limited room for new development or redevelopment
Harris	59	1509	Adjusted Down	Limited room for new development or redevelopment
Harris	59	1510	Adjusted Down	Limited room for new development or redevelopment
Harris	59	1516	Adjusted Up	Ongoing development of small lot single family housing in this area
Harris	59	1517	Adjusted Up	Ongoing development of small lot single family housing in this area
Harris	64	827	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	828	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	829	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	830	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	831	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	834	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	835	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	836	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	837	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	838	Adjusted Significantly Down	Limited room for new development or redevelopment

County	RAZ	TAZ	Action	Adjustment/Comment
Harris	64	839	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	840	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	841	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	842	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	843	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	844	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	845	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	847	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	849	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	850	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	854	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	855	Forecast Sufficient	Townhomes under construction at Memorial Green
Harris	64	856	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	65	858	Adjusted Up	New apartment complex being built on site of former church
Harris	65	874	Adjusted Down	Brickhouse Gully flood control challenges should limit development and redevelopment
Harris	65	875	Adjusted Down	Brickhouse Gully flood control challenges should limit development and redevelopment
Harris	65	876	Adjusted Down	Brickhouse Gully flood control challenges should limit development and redevelopment

County	RAZ	TAZ	Action	Adjustment/Comment
Harris	65	877	Adjusted Down	Brickhouse Gully flood control challenges should limit development and redevelopment
Harris	65	885	Adjusted Significantly Up	New Frank Liu development near Colby Farms, 500 to 1,000 homes
Harris	65	886	Adjusted Significantly Up	Meritage Homes subdivision on former golf course will have over 1,000 homes upon completion
Harris	65	887	Adjusted Down	Limited room for new development or redevelopment
Harris	65	889	Adjusted Down	Limited room for new development or redevelopment
Harris	66	914	Adjusted Slightly Down	Residential development will occur here but be limited
Harris	68	980	Adjusted Down	Limited room for new development or redevelopment
Harris	68	981	Adjusted Down	Limited room for new development or redevelopment
Harris	68	982	Adjusted Down	Limited room for new development or redevelopment
Harris	68	990	Adjusted Down	Limited room for new development or redevelopment
Harris	68	993	Adjusted Down	Limited room for new development or redevelopment
Harris	68		Adjusted Down	Limited room for new development or redevelopment within the RAZ
Harris	71		Adjusted Down	Limited room for new development or redevelopment within the RAZ
Harris	72	1047	Adjusted Up	Potential redevelopment at METRO Tidwell Park & Ride facility
Harris	72	1056	Adjusted Up	New flood control infrastructure could facilitate development
Harris	72	1057	Adjusted Up	New flood control infrastructure could facilitate development
Harris	74	1071	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	74	1077	Forecast Sufficient	New Section 8 housing development on Lauder
Harris	74		Adjusted Down	Limited room for new development or redevelopment within the RAZ
Harris	75	2278	Forecast Sufficient	Limited room for new development or redevelopment
Harris	76	1191	Adjusted Slightly Up	New flood control infrastructure could facilitate development
Harris	76	1194	Adjusted Up	New flood control infrastructure could facilitate development
Harris	76	1203	Adjusted Down	Flood control infrastructure will limit development
Harris	77	2379	Adjusted Down	Limited room for new development or redevelopment
Harris	78	2403	Adjusted Down	Limited room for new development or redevelopment
Harris	78	2404	Adjusted Down	Limited room for new development or redevelopment
Harris	78	2406	Adjusted Down	Limited room for new development or redevelopment
Harris	78	2408	Adjusted Up	Apartments planned
Harris	78	2412	Adjusted Significantly Up	New apartment complex under construction now
Harris	81	2451	Adjusted Significantly Up	Meritage Homes acquired 241 acres for Sundance Cove, expected to have nearly 1,000 homes

County	RAZ	TAZ	Action	Adjustment/Comment
Harris	82	2364	Adjusted Down	Limited room for new development or redevelopment
Harris	82	2469	Adjusted up	New subdivision along Garrett
Harris	89	2670	Adjusted Down	Limited room for new development or redevelopment
Harris	89		Adjusted Down	Limited room for new development or redevelopment within the RAZ
Harris	90	1320	Adjusted Down	Limited room for new development or redevelopment
Harris	90	1321	Adjusted Down	Limited room for new development or redevelopment
Harris	90	2624	Adjusted Down	Limited room for new development or redevelopment
Harris	90	2635	Adjusted Up	Zoning allows for as many as 200 SF homes
Harris	90	2637	Adjusted Up	A new 300 unit apartment complex under construction
Harris	91	2682	Adjusted Down	Limited room for new development or redevelopment
Harris	91	2683	Adjusted Down	Limited room for new development or redevelopment
Harris	91	2688	Adjusted Down	Limited room for new development or redevelopment
Harris	91	2689	Adjusted Down	Limited room for new development or redevelopment
Harris	92	2690	Adjusted Down	Limited room for new development or redevelopment
Harris	92	2691	Adjusted Down	Limited room for new development or redevelopment
Harris	92	2692	Adjusted Down	Limited room for new development or redevelopment
Harris	92	2693	Adjusted Down	Limited room for new development or redevelopment
Harris	92	2694	Adjusted Down	Limited room for new development or redevelopment
Harris	92	2695	Adjusted Down	Limited room for new development or redevelopment
Harris	93	1368	Adjusted Up	Discussion of apartments being built here
Harris	95	2747	Adjusted Up	Beamer partners has purchased 134 acres for the Clearwater subdivision, 357 homes planned in phase 1
Harris	95	2781	Adjusted Slightly Up	Tannos Development Group, in partnership with Friendswood-based Wolfgramm Capital, plans to break ground in January on infrastructure for Friendswood City Center, a 106 acre mixed-use district with 150,000 square feet of retail space, 200,000 square feet medical and office space, a 500-unit apartment complex and a nationally branded boutique hotel with 150 rooms, a restaurant and 5,000-square-foot convention center.
Harris	96	2738	Adjusted Down	Limited room for new development or redevelopment
Harris	102	852	Adjusted Slightly Up	Luxury multifamily building breaking ground on former Crème De La Crème site
Harris	104	901	Adjusted Slightly Up	Old silos site was sold by Hope City church to a private developer
Harris	104	1761	Adjusted Slightly Up	New apartment complex being built at Hammerly and Brittmore
Harris	104	1763	Adjusted Down	No residential development likely here
Harris	104	1764	Adjusted Down	Hines Development property, development not expected in near term
Harris	104	1766	Adjusted Slightly up	New homes being built along Brittmore
Harris	104	1767	Adjusted Slightly up	New apartment complex being built at Hammerly and Brittmore
Harris	105	1860	Forecast Sufficient	Landfill permit was renewed, development should remain limited

County	RAZ	TAZ	Action	Adjustment/Comment
Harris	107	1034	Adjusted Down	Limited room for new development or redevelopment
Harris	107	1035	Adjusted Down	Limited room for new development or redevelopment
Harris	107	1977	Adjusted Down	Limited room for new development or redevelopment
Harris	107	1979	Adjusted Down	Limited room for new development or redevelopment
Harris	107	1983	Adjusted Down	Limited room for new development or redevelopment
Harris	107	1984	Adjusted Down	Limited room for new development or redevelopment
Harris	108	1004	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	108	1013	Adjusted Down	Limited room for new development or redevelopment
Harris	108	1014	Adjusted Down	Limited room for new development or redevelopment
Harris	108	1015	Adjusted Down	Limited room for new development or redevelopment
Harris	108	1016	Adjusted Down	Limited room for new development or redevelopment
Harris	108	1017	Adjusted Down	Limited room for new development or redevelopment
Harris	108	1018	Adjusted Down	Limited room for new development or redevelopment
Harris	108	1020	Adjusted Down	Limited room for new development or redevelopment
Harris	108	1021	Adjusted Down	Limited room for new development or redevelopment
Harris	108	1023	Adjusted Down	Limited room for new development or redevelopment
Harris	108	1025	Adjusted Down	Limited room for new development or redevelopment
Harris	109	1111	Adjusted Significantly Up	Multiple apartment complexes being built on the Greenspoint Mall site
Harris	109	1112	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	109	1114	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	109	1115	Adjusted Down	Limited room for new development or redevelopment
Harris	109	1117	Adjusted Down	Limited room for new development or redevelopment
Harris	109		Adjusted Down	Limited room for new development or redevelopment within the RAZ
Harris	123	2165	Forecast Sufficient	Multiple new housing projects going on now, more than 100 units under development
Harris	123	2171	Adjusted Up	New subdivision under construction on south side of Spears
Harris	124	2289	Adjusted Down	Limited room for new development or redevelopment
Harris	124	2323	Adjusted Down	No development plan for the available property in this site
Harris	124	2324	Adjusted Up	Two new LITCH apartments have been opened recently
Harris	124	2326	Forecast Sufficient	Arbor Court and Biscayne Apartments being torn down for flood control
Harris	126	2301	Adjusted Significantly Down	Limited room for new development or redevelopment
Brazoria	171	2822	Adjusted Down	Limited room for new development or redevelopment
Brazoria	171	2833	Adjusted Up	Apartment development planned or expected
Brazoria	171	2836	Adjusted Down	Limited room for new development or redevelopment

County	RAZ	TAZ	Action	Adjustment/Comment
Brazoria	171	2837	Adjusted Down	Limited room for new development or redevelopment
Brazoria	171	2838	Adjusted Down	Limited room for new development or redevelopment
Brazoria	171	2840	Adjusted Down	Limited room for new development or redevelopment
Brazoria	171	2844	Adjusted up	Apartment development planned or expected
Brazoria	171	2845	Adjusted Up	Apartment development planned or expected
Brazoria	171	2846	Adjusted Up	Apartment development planned or expected
Brazoria	172	2887	Adjusted Down	Limited room for new development or redevelopment
Brazoria	172	2911	Adjusted Down	Oil field will limit growth to 300 homes
Brazoria	172	2913	Adjusted Down	Oil field will limit growth to 300 homes

Employment Adjustments

County	RAZ	TAZ	Action	Adjustment/Comment
Harris	29	1223	Forecast Sufficient	New retail and commercial growth seen here recently
Harris	29	1224	Forecast Sufficient	New retail and commercial growth seen here recently
Harris	31	1265	Forecast Sufficient	Lyondell major expansion will add a few jobs
Harris	31	1300	Adjusted Up	Port-related job growth expected
Harris	31	1304	Forecast Sufficient	County Annex recently moved to Richey and SH 225
Harris	31	1309	Adjusted Slightly Up	Port-related job growth expected, former post office has been redeveloped as office
Harris	31	1311	Adjusted Down	Limited room for new development or redevelopment
Harris	34	1503	Adjusted Down	Limited room for new development or redevelopment
Harris	41	763	Adjusted Down	Limited room for new development or redevelopment
Harris	42	865	Adjusted Significantly Up	Mixed use development planned for former grain silos site
Harris	47	1147	Adjusted Slightly Up	Recent retail growth
Harris	51	1255	Adjusted Slightly Up	New retail and commercial growth seen here recently
Harris	52	1312	Forecast Sufficient	Chevron redeveloping some refinery facilities and is expected to add some jobs
Harris	53	1322	Adjusted Slightly Up	Macroplaza Mall redevelopment is not imminent, but seems inevitable
Harris	53	1332	Adjusted Slightly Up	Pasadena ISD administration recently moved all offices to office at Strawberry and Cherry Brook
Harris	54	1290	Adjusted Up	Gordon Food Service store opening at Shaver and Spencer Hwy

County	RAZ	TAZ	Action	Adjustment/Comment
Harris	57	1438	Adjusted Down	Flood control infrastructure will limit development
Harris	57	1444	Adjusted Up	Vault Partners distribution center, 185,000 SF warehouse built and leased
Harris	57	1450	Adjusted Up	Hillwood has built the 66 acre 4 building Beltway 66 Logistics Park here, includes a 1.2 million SF Target distribution center with 300-400 employees
Harris	57	1453	Adjusted Up	Greystar developing 91 acre Beltway 35 business park
Harris	58	1529	Forecast Sufficient	Levey Group building a 650,000 SF distribution center in the Lower Kirby District
Harris	58	1532	Adjusted Up	Kirby Drive extension should facilitate growth
Harris	58	1533	Adjusted Up	Kirby Drive extension should facilitate growth
Harris	58	1534	Adjusted Up	Kirby Drive extension should facilitate growth
Harris	58	1535	Adjusted Slightly Down	Kirby Drive extension should facilitate growth
Harris	58	5180	Adjusted Up	Capacity for more jobs here, there will be 10,000+ in the Lower Kirby district in the 2030s
Harris	59	1507	Adjusted Significantly Down	Institutional uses here will limit commercial development
Harris	59	1508	Adjusted Up	New Road Runner trucking facility being built, new logistics facility being built behind METRO site, potential redevelopment at METRO Missouri City Park & Ride site
Harris	59	1510	Adjusted Up	Expected commercial or education development on tract south of the present KIPP campus
Harris	59	1511	Adjusted Up	Amazon facility and other industrial buildings recently opened
Harris	59	1512	Adjusted Up	Large industrial and logistics park located here
Harris	59	1513	Adjusted Up	Large industrial and logistics park located here
Harris	59	1514	Adjusted Up	Meninger Clinic expansion and two industrial park facilities being built
Harris	59	1516	Adjusted Down	Limited room for new development or redevelopment
Harris	64	828	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	829	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	830	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	834	Adjusted Significantly Down	Limited room for new development or redevelopment

County	RAZ	TAZ	Action	Adjustment/Comment
Harris	64	835	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	836	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	837	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	838	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	839	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	840	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	841	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	842	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	843	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	844	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	845	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	846	Adjusted Up	Office building remodels planned, Memorial City Mall expansion/redevelopment expected to be underway by 2030
Harris	64	847	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	854	Adjusted Significantly Down	Limited room for new development or redevelopment
Harris	64	856	Adjusted Slightly Down	Limited room for new development or redevelopment
Harris	71	1107	Adjusted Up	Industrial development expected along the Hardy Toll Road
Harris	72	1047	Adjusted Significantly Up	Potential redevelopment at METRO Tidwell Park & Ride facility

County	RAZ	TAZ	Action	Adjustment/Comment
Harris	73	1059	Adjusted Up	Industrial development expected along the Hardy Toll Road
Harris	73	1061	Forecast Sufficient	Expanding educational facilities, Idea Academy and YES Prep
Harris	73	1063	Adjusted Up	Industrial development expected along the Hardy Toll Road
Harris	73	1067	Forecast Sufficient	New retail opened recently, Ojos Locos and Planet Fitness
Harris	74	1077	Adjusted Up	New retail center recently built here
Harris	74	1078	Adjusted Significantly Up	More commercial expected
Harris	75	2279	Adjusted Up	More commercial expected
Harris	76	1190	Adjusted Slightly Up	More commercial expected
Harris	76	1191	Adjusted Slightly Up	More commercial expected
Harris	76	1203	Forecast Sufficient	Flood control infrastructure will limit development
Harris	78	2383	Adjusted Slightly Up	More commercial expected
Harris	78	2409	Adjusted Up	More commercial expected
Harris	78	2410	Adjusted Down	Lots of existing retail here
Harris	79	2418	Adjusted Down	Limited room for new development or redevelopment
Harris	82	2465	Adjusted Significantly Up	New section of Generation Park planned east of current site
Harris	85	2557	Forecast Sufficient	ExxonMobil building hydrogen plant in their existing footprint
Harris	87	2639	Adjusted Up	Port-related job growth expected
Harris	87	2645	Adjusted Up	New industrial development could employ as many as 100 people
Harris	87	2649	Adjusted Significantly Up	Vacant property receiving interest for a cobalt refinery, could add 200-400 jobs in the next 5 years
Harris	90	2624	Adjusted Up	Shell Federal Credit Union building recently opened, 400 employees with capacity for nearly 700
Harris	90	2628	Adjusted Up	Wholesome Sweetneers facility recently opened, 350,000 SF
Harris	90	2635	Adjusted Up	Retail expansion possible near Walmart on south end of TAZ
Harris	90	2636	Adjusted Up	Recently built 200,000 SF tiltwall industrial building, retail expansion possible near HEB on south end of TAZ
Harris	91	2671	Adjusted Down	Limited room for new development or redevelopment
Harris	91	2674	Adjusted Up	Two new industrial facilities will add 100-150 employees
Harris	91	2679	Forecast Sufficient	Two new industrial facilities will add 100-150 employees

County	RAZ	TAZ	Action	Adjustment/Comment
Harris	91	2680	Forecast Sufficient	Pasadena Convention Center redevelopment and new arena planned to be finished in 2025 or 2026, additional commercial development in the area expected as well
Harris	92	2693	Adjusted Slightly Up	Bayport expansion and plant expansions seen in recent years
Harris	92	2701	Adjusted Up	Residential development expected, zoned by City of Seabrook
Harris	93	1363	Adjusted Down	Limited room for new development or redevelopment
Harris	93	2718	Forecast Sufficient	Commercial development and space port development expected in the future at Ellington
Harris	95	2781	Adjusted Up	Tannos Development Group, in partnership with Friendswood-based Wolfram Capital, plans to break ground in January on infrastructure for Friendswood City Center, a 106 acre mixed-use district with 150,000 square feet of retail space, 200,000 square feet medical and office space, a 500-unit apartment complex and a nationally branded boutique hotel with 150 rooms, a restaurant and 5,000-square-foot convention center.
Harris	102	853	Adjusted Slightly Up	Midway planning to build a 310,000 SF office tower called City Centre 6, which includes 11,000 sf of retail, they also plan another office tower called City Centre 7 on the site of the former Sheraton hotel with specifics to be determined
Harris	104	901	Forecast Sufficient	Old silos site was sold by Hope City church to a private developer, Vacant commercial sites owned by LLCs waiting for purchase by developers
Harris	108	1005	Adjusted Up	Planned industrial facility at 500 N. Sam Houston Parkway from Brennan Investment Group, Redevelopment of office into industrial is occurring
Harris	108	1007	Adjusted Significantly Down	Pinto Business Park building out
Harris	108	1009	Adjusted Significantly Down	Pinto Business Park building out
Harris	109	1110	Adjusted Up	New tenants signing up the Greenspoint office buildings
Harris	109	1111	Adjusted Up	Expectation for new commercial development to supplant the existing mall
Harris	109	1114	Adjusted Up	Planned industrial facility at 309 Aldine Bender from Provident Realty Advisors, Industrial development expected along the Hardy Toll Road
Harris	109	1118	Adjusted Slightly Up	Industrial development expected along the Hardy Toll Road
Harris	109	1120	Adjusted Up	Industrial development expected along the Hardy Toll Road
Harris	109	1121	Adjusted Slightly Down	Industrial development expected along the Hardy Toll Road
Harris	123	2164	Adjusted Up	New YES Prep elementary school planned

County	RAZ	TAZ	Action	Adjustment/Comment
Harris	123	2170	Forecast Sufficient	Planned industrial facility at 1444 Greens Parkway from Griffin Partners
Harris	124	2321	Adjusted Up	Spec 20,000 SF warehouse buing built at 13616 Rankin Circle
Harris	126	2296	Adjusted Slightly Up	Some addition employment at Intercontinental Airport
Montgomery	129	4160	Forecast Sufficient	Methodist Hospital owns property for a new hospital facility
Brazoria	171	2847	Adjusted Down	Limited room for new development or redevelopment
Brazoria	171	2848	Adjusted Down	Limited room for new development or redevelopment
Brazoria	171	2882	Adjusted Slightly Up	New Harmony School campus being built
Brazoria	171	5185	Adjusted Significantly Up	Room for additional commercial development
Brazoria	171	5187	Adjusted Significantly Up	Room for additional commercial development
Brazoria	171	5192	Adjusted Down	Limited room for new development or redevelopment
Brazoria	171	5193	Adjusted Significantly Down	Limited room for new development or redevelopment
Brazoria	172	2894	Adjusted Slightly Up	New international school being built near city hall
Brazoria	172	2895	Adjusted Slightly Up	Industrial development expected along SH 35
Liberty	195	4480	Forecast Sufficient	Angel Lagoon 40 acre water park and entertainment district under construction as of November 2023

Disaggregation of Households and Employment by Type

In addition to producing forecasts using H-GAC’s TAZ structure, CDS was tasked with providing disaggregated forecasts for households and employment as H-GAC does. The household forecast was disaggregated by multiple characteristics: household size, number of workers living in household, and household income level. The employment disaggregation is more straightforward, dividing up the total number of jobs into ten industry-specific categories. All of these categories and disaggregation were defined by H-GAC, and CDS was tasked with matching H-GAC’s format in the data that was delivered. The process CDS used to produce these disaggregated forecasts is described in the figures below.

Household Disaggregation

Task	Step	Action
Create master file of households by size, by TAZ for CDS projections	1	Create 2010 base file of number of HHs by size by TAZ from Census
	2	Compute average HH size by TAZ
	3	Create table of breakdown of HHs by size for typical TAZs by average HH size
	4	Using average HH size for each TAZ in future periods, compute distribution of HHs by size by TAZ in all future periods
Create starting Base Demographic File	5	Use H-GAC file percentages of workers per HH and HH income by HH size to compute TAZ breakdowns of all variables for all future periods – using our number of HHs by size – rounded to integers
	6	Locate TAZs where the CDS forecast contains data but the H-GAC forecast does not and fill these gaps with shares from similar nearby TAZs
Make adjustments in the Focus Area based upon reasonable expectation of demographic shifts	7	From the Base Demographic File completed in 5, Compute the average number of workers per household and the average income of each TAZ into future periods
	8	Evaluate each TAZ in the Focus Area on future average income projections and make adjustment to the Base Demographic File based on CDS expectations of future income shifts.
	9	Evaluate each TAZ in the Focus Area on future average workers per HH projections and make adjustment to the Base Demographic File based on CDS expectations of future demographic shifts.

Example Household Disaggregated Data File Structure

The resultant file for each TAZ may look like this, with a maximum of 70 records per TAZ. There are 5 categories for HH size, 3 for workers, and 5 for income (see chart to the right for income category definitions).

TAZ	HHSZ	WORKERS	HH INCOME	HHS
1	1	0	0	2
1	1	1	0	3
1	1	1	1	1
1	1	1	3	9
1	2	0	4	4
1	2	1	1	6
1	2	2+	2	12
1	2	2+	3	25
1	3	1	2	11
1	3	2+	3	6
1	4	1	0	11
1	4	2+	1	2
1	4	2+	2	5
1	5+	1	0	1
1	5+	2+	2	1

H-GAC Income Range Categories

Income Code	Household Income Range
0	\$0- 22K
1	\$23-40K
2	\$41-65K
3	\$66-100K
4	\$101K+

H-GAC Employment Categories

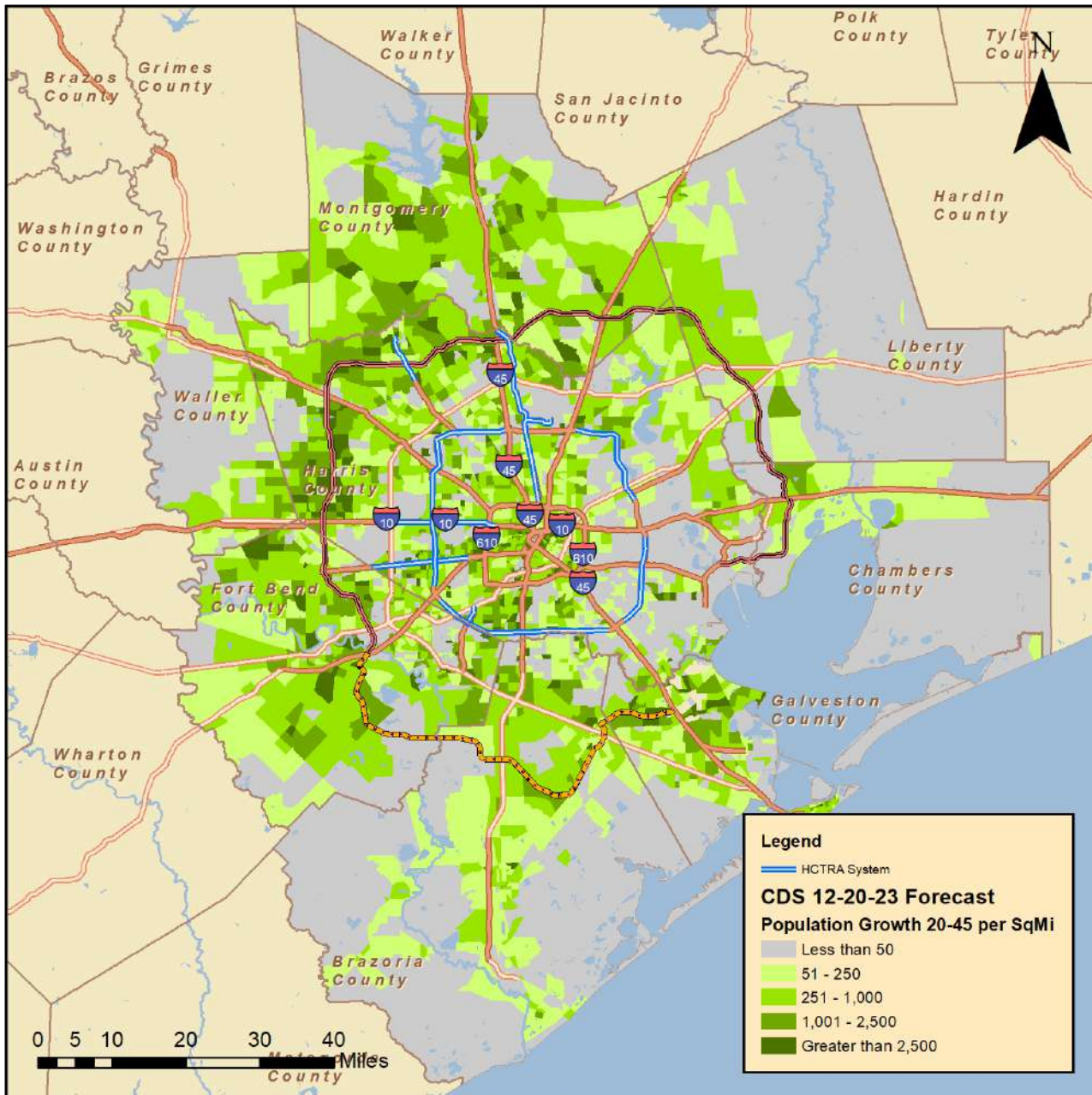
Abbreviation	Description
EDUK12	Primary and secondary education
EDUPOST	Post-secondary education
ENTERTAIN	Entertainment and media *
RESTAUR	Restaurant and hospitality *
RETAIL	Retail
INDUST	Industrial and manufacturing
OFFICE	Office, non-medical
MED1	Hospital and clinic
MED2	Medical professional
GOVERN	Government, public agency

* These two categories remain in H-GAC’s disaggregated forecast structure but contain no data throughout every TAZ and forecast year. CDS also does not forecast jobs for these categories, but retains their place in the table structure. Jobs that would fall in these two categories are assumed to be located in the retail category.

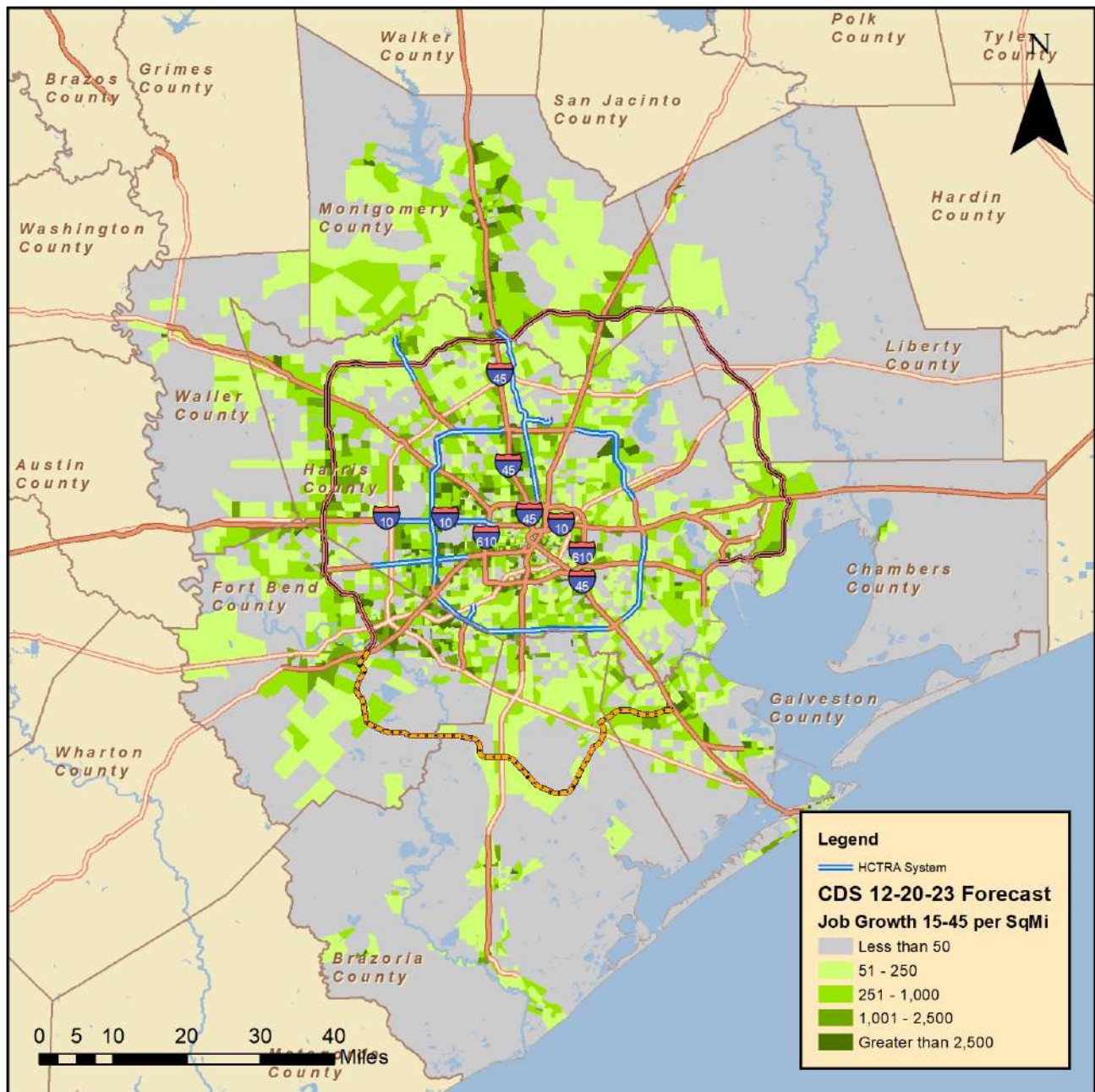
Employment Disaggregation

Task	Step	Action
Create starting Base Employment File	1	Use H-GAC file percentages of jobs by land use category and apply to CDS jobs forecast to compute TAZ breakdowns of all categories for all future periods.
	2	Locate TAZs where the CDS forecast contains data but the H-GAC forecast does not and fill these gaps with shares from similar nearby TAZs
Make adjustments in the Focus Area	3	Within the focus area only, evaluate each TAZ to determine if the distribution of jobs by category is reasonable based on current trends and CDS expectations.
	4	Make adjustments as necessary and create the final jobs file.

2020 – 2045 Projected Population Growth per Square Mile by TAZ



2020 – 2045 Projected Job Growth per Square Mile by TAZ



PROJECT DELIVERABLES

In addition to this report, several electronic datasets were produced and sent to CDM Smith. A list of the delivered files is below.

1. Excel spreadsheet files:

- a. 12-20-2023 CDS Forecast 2020-2045 Data and Summary.xlsx
- b. taz5217_employment_2020_CDS_12-20-23.xlsx
- c. taz5217_employment_2025_CDS_12-20-23.xlsx
- d. taz5217_employment_2030_CDS_12-20-23.xlsx
- e. taz5217_employment_2035_CDS_12-20-23.xlsx
- f. taz5217_employment_2040_CDS_12-20-23.xlsx
- g. taz5217_employment_2045_CDS_12-20-23.xlsx
- h. taz5217_households_tad_2020_CDS_12-20-23.xlsx
- i. taz5217_households_tad_2025_CDS_12-20-23.xlsx
- j. taz5217_households_tad_2030_CDS_12-20-23.xlsx
- k. taz5217_households_tad_2035_CDS_12-20-23.xlsx
- l. taz5217_households_tad_2040_CDS_12-20-23.xlsx
- m. taz5217_households_tad_2045_CDS_12-20-23.xlsx

2. ARC GIS shape files:

- a. 12_20_2023_CDS_Forecast_2020_2060_8_County.cpg
- b. 12_20_2023_CDS_Forecast_2020_2060_8_County.dbf
- c. 12_20_2023_CDS_Forecast_2020_2060_8_County.prj
- d. 12_20_2023_CDS_Forecast_2020_2060_8_County.sbn
- e. 12_20_2023_CDS_Forecast_2020_2060_8_County.sbx
- f. 12_20_2023_CDS_Forecast_2020_2060_8_County.shp
- g. 12_20_2023_CDS_Forecast_2020_2060_8_County.shx

APPENDIX A – RAZ-LEVEL FORECASTS

Population

Harris County Population (RAZ 1 to 127)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
1	7,059	6,733	2,298	4,309	7,242	8,526	9,723	10,856	11,456	12,460
2	34,882	40,537	30,622	31,868	28,492	29,188	29,733	30,206	30,450	30,842
3	3,451	3,310	3,691	4,529	4,261	5,462	6,611	7,695	8,267	9,217
4	5,224	5,819	6,466	8,944	8,072	10,175	12,385	14,473	15,578	17,429
5	23,136	23,668	20,031	22,045	22,450	24,246	26,026	27,726	28,643	30,209
6	30,347	32,828	36,071	38,535	46,487	48,056	49,774	51,423	52,347	53,981
7	10,008	10,263	15,368	19,559	21,733	24,542	25,895	27,181	27,876	29,061
8	32,026	30,313	28,984	30,660	33,334	34,190	35,545	36,826	37,517	38,694
9	31,094	32,503	27,745	28,362	27,403	27,808	28,196	28,568	28,768	29,107
10	5,500	5,171	4,780	5,067	4,137	4,528	4,925	5,307	5,510	5,849
11	4,305	3,948	3,610	4,185	3,792	4,169	4,531	4,878	5,064	5,382
12	9,001	9,230	8,408	8,695	7,509	7,698	7,879	8,053	8,146	8,304
13	53,057	54,171	44,820	46,433	40,273	40,647	41,007	41,351	41,536	41,851
14	22,863	24,108	21,761	23,029	19,826	20,614	21,318	21,983	22,356	23,010
15	6,816	7,133	4,797	5,160	4,653	4,934	5,205	5,461	5,600	5,838
16	7,891	10,180	10,077	13,301	9,721	11,003	12,457	14,053	15,035	16,937
17	23,623	24,055	25,495	28,852	27,498	29,274	30,961	32,549	33,386	34,775
18	4,360	4,387	4,918	6,956	7,477	8,333	9,146	9,914	10,328	11,034
19	13,164	12,918	11,944	12,750	14,631	15,065	15,507	15,932	16,158	16,535
20	16,649	19,881	20,746	23,050	22,156	23,540	24,868	26,138	26,821	27,981
21	17,650	20,123	22,611	25,029	25,025	25,795	26,287	26,756	27,009	27,442
22	21,524	25,383	27,444	27,856	29,975	30,245	30,503	30,751	30,884	31,112
23	11,567	14,906	18,139	22,976	23,626	24,658	25,150	25,619	25,872	26,305
24	5,799	6,304	6,227	6,514	6,191	7,000	7,723	8,407	8,655	9,091
25	7,210	8,413	8,057	11,578	10,654	11,363	11,832	12,276	12,408	12,640
26	4,247	4,315	6,293	7,341	8,384	8,647	8,881	9,103	9,227	9,445
27	16,446	16,375	19,927	24,361	27,303	27,747	28,057	28,313	28,442	28,644
28	36,343	35,346	32,781	33,587	35,886	36,912	38,457	39,919	40,692	41,978
29	17,507	18,981	18,219	19,872	17,383	17,580	17,756	17,924	18,017	18,178
30	22,071	23,223	23,448	24,296	24,606	25,289	25,962	26,603	26,942	27,508
31	36,736	43,658	40,868	41,190	37,107	37,312	37,506	37,687	37,785	37,952
32	43,282	50,987	49,203	50,353	46,863	47,894	48,918	49,895	50,412	51,276
33	42,160	40,988	42,021	45,467	44,740	46,558	48,286	49,911	50,768	52,191
34	13,848	15,958	22,329	27,166	27,022	32,895	37,830	42,527	45,064	49,398
35	31,636	34,003	32,165	33,405	31,816	33,064	34,231	35,332	35,916	36,891
36	12,130	12,633	12,095	12,180	11,971	12,027	12,081	12,133	12,160	12,208
37	7,537	8,327	8,720	8,925	11,110	11,557	12,017	12,462	12,698	13,095
38	32,158	45,475	42,538	44,956	40,177	40,947	41,916	42,916	43,443	44,325
39	10,144	10,860	14,922	20,564	19,293	22,763	25,186	27,465	28,694	30,788
40	28,108	33,039	39,480	41,544	43,346	45,055	46,773	48,165	48,903	50,136
41	8,433	9,898	10,165	10,363	8,923	9,050	9,170	9,282	9,595	10,594
42	4,128	5,086	5,063	5,924	6,301	6,635	6,940	7,223	7,371	7,615
43	27,826	31,932	30,018	30,824	29,524	29,768	30,050	30,334	30,485	30,742

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
44	31,464	32,420	29,582	31,593	32,443	33,547	34,599	35,591	36,114	36,982
45	17,983	21,232	20,698	21,303	19,355	19,838	20,292	20,717	20,942	21,313
46	9,300	10,846	11,708	12,196	11,610	11,875	12,127	12,365	12,490	12,698
47	9,240	9,568	9,559	9,769	10,478	10,759	10,894	11,022	11,091	11,209
48	17,151	16,225	15,531	16,721	17,037	17,813	18,567	19,280	19,657	20,285
49	17,404	21,503	29,302	33,019	40,404	40,657	40,884	41,100	41,219	41,426
50	70,823	84,595	101,675	108,490	119,301	119,863	120,367	120,607	120,740	121,429
51	8,193	9,263	9,144	9,186	7,623	7,639	7,653	7,666	7,674	7,687
52	22	47	0	42	0	26	49	70	83	104
53	53,656	60,887	60,762	60,762	54,313	54,363	54,407	54,450	54,474	54,514
54	53,537	62,017	63,936	65,091	68,689	68,818	68,935	69,045	69,106	69,212
55	60	34	33	48	52	80	215	343	413	531
56	17,586	23,450	38,284	43,241	41,706	43,101	44,393	45,634	46,329	46,447
57	21,080	21,826	28,176	33,818	38,734	42,565	44,653	46,657	47,352	48,580
58	12,928	15,404	22,417	26,448	29,668	33,516	37,397	39,744	40,984	43,044
59	12,759	14,774	25,604	30,561	27,221	29,587	31,796	33,651	34,634	36,279
60	62,877	79,845	76,613	77,188	79,701	80,862	82,054	83,204	83,815	84,840
61	30,861	38,268	34,689	34,717	38,583	38,602	38,620	38,637	38,647	38,664
62	51,030	70,290	69,126	70,467	71,329	72,201	73,009	73,784	74,248	75,399
63	37,548	43,258	48,956	51,777	55,170	57,979	60,404	62,713	63,711	64,957
64	22,154	22,884	23,460	24,321	25,823	26,396	26,948	27,474	27,757	28,241
65	72,139	85,193	81,823	83,514	81,761	83,440	84,947	86,145	86,542	87,231
66	6,814	8,137	9,878	11,118	10,916	11,705	12,441	13,137	13,506	14,123
67	22,112	27,488	24,664	27,825	30,742	32,550	34,282	35,917	36,779	38,213
68	59,259	67,714	73,030	75,313	79,700	81,277	82,451	83,338	83,710	84,146
69	10,621	10,940	11,590	13,183	12,846	13,743	14,602	15,410	15,836	16,546
70	21,482	26,282	28,847	29,184	27,892	28,144	28,387	28,619	28,743	28,955
71	11,795	15,152	17,466	18,086	15,935	16,460	16,930	17,373	17,622	18,058
72	10,895	12,591	11,639	11,681	11,276	11,304	11,386	11,489	11,558	11,702
73	17,838	21,347	23,000	23,085	23,896	24,009	24,278	24,535	24,673	24,909
74	17,412	20,111	20,003	21,689	21,316	22,104	22,808	23,695	24,192	25,282
75	6,373	7,181	10,334	13,208	11,091	13,194	15,404	17,607	18,836	21,006
76	9,999	11,306	16,440	19,458	24,360	25,392	26,313	27,161	27,605	28,336
77	11,110	12,956	16,118	19,490	19,638	22,267	24,967	27,518	28,993	31,690
78	25,001	41,496	72,936	84,985	98,851	103,209	106,979	110,079	111,526	113,445
79	41,486	52,748	56,280	57,966	60,105	61,474	62,693	63,847	64,492	65,622
80	7,404	9,538	13,812	16,430	16,553	20,691	23,942	26,576	27,875	30,139
81	9,955	11,421	15,976	18,535	21,259	23,184	25,161	27,282	28,321	29,906
82	2,682	3,263	13,009	17,894	27,054	27,843	29,064	30,709	31,748	33,551
83	8,368	8,830	9,977	11,713	12,980	15,317	17,788	20,381	21,810	24,074
84	18,022	20,803	29,482	34,257	40,595	44,789	48,525	52,060	54,036	57,498
85	8,937	7,745	6,376	6,616	5,956	6,079	6,188	6,291	6,349	6,450
86	45,135	47,632	50,263	53,137	57,570	58,434	59,124	59,699	59,978	60,391
87	25	32	8	8	3	3	3	3	3	3
88	6,305	6,204	6,095	6,262	7,310	7,433	7,542	7,645	7,703	7,804
89	10,041	9,574	8,431	9,581	9,142	9,667	10,371	10,815	11,063	11,281
90	42,301	44,920	49,553	52,857	54,709	56,116	57,067	57,967	58,471	59,133
91	13,449	16,266	18,956	19,782	20,308	22,508	24,469	26,328	27,368	29,192
92	14,593	18,368	20,793	22,804	23,467	24,763	26,018	27,206	27,834	28,881
93	45,634	67,185	79,010	85,385	84,609	85,426	85,735	85,861	85,930	86,050

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
94	42,359	46,270	48,821	49,666	55,022	56,232	57,315	58,344	58,900	59,850
95	16,485	21,585	27,042	29,361	29,189	30,255	31,205	31,880	32,258	32,921
96	39,003	38,650	53,903	59,077	61,448	62,322	62,959	63,497	63,770	64,201
97	43,968	53,531	53,320	55,619	57,518	58,847	60,121	61,324	61,958	63,013
98	34,559	43,660	50,289	53,237	53,232	55,191	57,615	60,199	61,790	65,118
99	41,111	55,811	71,838	79,263	78,464	81,545	84,400	87,138	88,673	91,385
100	16,362	23,565	32,537	33,857	43,006	43,558	44,058	44,297	44,562	45,024
101	31,343	36,953	34,231	34,231	36,553	36,611	36,664	36,716	36,759	36,836
102	30,719	31,640	32,535	34,836	36,752	38,025	39,240	40,387	40,991	41,994
103	114	543	463	521	1,147	1,837	1,869	1,901	2,099	2,130
104	21,795	25,103	23,639	25,703	26,752	28,066	29,294	30,453	31,068	32,095
105	23,533	36,702	46,426	49,730	47,854	49,925	51,803	53,600	54,594	56,328
106	8,865	12,732	17,342	19,025	18,339	19,030	19,657	20,257	20,589	20,975
107	42,190	67,320	84,329	92,952	89,008	92,951	96,388	99,403	100,632	101,996
108	29,336	38,191	51,738	56,282	55,671	58,622	61,357	62,649	63,084	63,596
109	25,313	30,555	31,592	34,483	34,743	36,582	37,990	39,099	39,596	40,249
110	18,157	22,395	29,334	32,057	32,092	33,945	35,708	37,373	38,271	39,800
111	29,835	48,607	61,266	63,270	77,651	79,183	80,638	82,024	82,773	84,050
112	6,359	9,611	11,330	13,599	11,974	14,331	16,690	18,948	20,145	22,147
113	27,234	45,245	110,533	139,990	169,180	190,724	210,002	230,788	242,934	265,590
114	27,372	39,961	67,026	77,500	77,766	80,617	81,973	83,254	83,944	85,121
115	665	1,392	2,062	4,076	2,927	8,057	13,546	20,381	25,297	35,943
116	21,618	34,912	90,894	121,061	142,367	163,553	185,836	206,861	218,479	238,618
117	3,312	5,084	6,440	8,454	12,364	16,089	20,645	25,688	29,187	35,990
118	18,576	46,091	100,709	121,639	143,170	162,923	180,761	198,760	209,411	229,306
119	41,607	51,629	68,047	76,108	73,207	76,029	78,498	80,580	81,612	83,201
120	7,587	10,429	11,709	15,399	20,191	23,215	26,675	30,318	32,917	38,075
121	2,329	5,813	14,152	20,430	38,265	43,344	48,833	54,298	57,185	61,996
122	69,796	91,845	150,318	189,305	191,198	215,314	228,853	240,424	246,815	257,985
123	93,646	121,457	150,909	162,091	174,637	178,995	181,688	182,979	183,559	184,326
124	13,861	17,941	44,226	56,783	52,934	55,711	56,617	57,240	57,584	57,950
125	15,643	17,505	26,658	31,685	33,509	34,829	35,459	36,056	36,222	36,515
126	2,905	3,638	4,832	6,088	5,151	5,365	5,483	5,595	5,657	5,764
127	32,857	35,788	57,461	68,773	70,648	75,266	80,640	85,065	87,952	93,072
Total	2,818,203	3,400,582	4,048,360	4,484,518	4,683,382	4,942,459	5,171,815	5,387,800	5,508,135	5,718,670

Montgomery County Population (RAZ 128 to 139)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
128	16,590	22,420	29,312	34,245	44,780	53,893	60,734	68,377	75,490	82,600
129	27,814	40,085	60,822	70,687	81,086	102,957	118,350	134,485	151,377	169,390
130	3,633	7,026	31,203	40,389	63,933	77,467	85,872	96,139	106,384	118,241
131	24,567	31,077	35,781	38,833	37,030	39,460	41,170	42,008	42,852	43,711
132	21,022	51,447	81,725	93,169	93,039	99,114	102,535	105,083	106,861	107,809
133	4,263	4,778	10,698	13,456	17,710	23,603	27,853	32,810	38,956	46,581
134	22,636	28,640	33,979	36,946	40,363	46,694	50,996	55,240	59,621	64,237
135	17,623	25,523	35,285	38,962	44,920	52,210	58,196	64,404	71,175	78,433
136	18,028	33,425	53,802	67,155	73,918	85,524	91,676	96,726	101,625	105,970
137	6,171	12,641	21,298	28,927	44,561	64,002	79,394	94,681	112,462	131,423
138	2,612	5,142	6,426	7,248	8,477	11,774	14,570	17,524	20,790	24,375
139	17,244	31,582	52,290	62,971	66,423	91,939	110,752	130,285	152,511	176,213
Total	182,203	293,786	452,621	532,988	616,240	748,638	842,100	937,762	1,040,104	1,148,985

Waller County Population (RAZ 140 to 143)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
140	11,236	16,032	18,128	19,761	20,520	22,634	25,907	30,492	39,179	47,886
141	5,709	7,573	9,117	9,416	9,536	9,963	10,679	11,870	14,556	17,788
142	5,155	7,684	9,663	10,786	10,729	12,080	14,163	17,366	24,095	31,667
143	1,290	1,374	2,508	4,304	9,697	12,388	15,661	19,328	25,120	30,919
Total	23,390	32,663	39,416	44,267	50,482	57,064	66,411	79,056	102,949	128,260

Fort Bend County Population (RAZ 144 to 158)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
144	2,686	19,074	77,420	102,276	123,917	128,691	133,246	135,661	136,919	136,840
145	3,059	4,656	10,372	22,297	43,694	55,978	79,911	104,989	126,487	138,382
146	31,624	51,744	111,193	141,008	181,867	191,080	205,440	220,487	236,609	254,452
147	1,575	1,865	1,948	2,676	1,826	2,398	3,406	5,511	8,749	13,421
148	4,407	5,655	7,704	10,190	12,184	16,129	22,798	29,457	36,376	43,793
149	29,234	33,803	35,273	37,387	36,001	36,778	38,061	39,297	40,591	41,989
150	4,335	21,407	33,705	38,677	44,381	47,871	53,697	58,662	62,580	65,362
151	30,468	40,185	51,943	55,672	53,229	54,830	57,471	58,780	60,136	61,586
152	16,656	30,337	36,383	39,201	36,640	38,053	40,385	41,039	41,694	41,959
153	38,817	45,727	50,280	51,523	51,496	52,296	52,429	52,559	52,695	52,841
154	23,718	44,277	61,389	73,636	75,738	80,083	86,027	92,063	98,353	105,117
155	28,563	41,940	78,382	97,025	114,890	124,103	137,973	151,478	164,206	177,733
156	2,341	3,343	11,135	20,933	28,286	36,975	51,836	70,534	89,627	108,525
157	4,798	5,843	6,754	8,935	7,320	8,921	12,223	16,149	21,573	28,924
158	3,140	4,594	5,799	7,253	6,695	8,056	10,697	17,240	26,055	37,806
Total	225,421	354,450	579,680	708,687	818,164	882,242	985,601	1,093,907	1,202,651	1,308,729

Brazoria County Population (RAZ 159 to 172)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
159	11,591	11,937	12,036	13,073	12,228	14,026	15,450	17,010	18,464	19,889
160	16,761	17,949	16,742	17,512	16,380	17,539	18,586	19,730	20,993	22,418
161	2,998	3,026	2,844	3,196	2,927	3,406	3,592	3,795	4,022	4,267
162	6,931	7,131	6,593	7,220	5,149	5,806	6,236	6,723	7,252	7,862
163	9,784	13,052	13,619	14,933	14,985	15,949	16,444	16,912	17,323	17,691
164	31,015	33,090	33,770	34,694	33,591	34,055	34,404	34,785	35,146	35,502
165	1,377	1,785	1,672	1,826	2,151	2,383	2,557	2,748	2,928	3,106
166	10,860	13,137	13,503	15,662	15,884	19,830	23,016	26,644	30,072	33,540
167	18,756	20,668	20,083	22,242	21,139	25,317	28,503	32,322	35,931	39,688
168	1,917	2,297	2,727	2,903	2,984	3,319	3,692	4,504	5,636	7,213
169	11,299	15,111	11,324	13,880	20,910	30,996	40,513	52,638	65,640	78,517
170	31,835	38,268	41,776	46,256	44,906	54,512	62,931	72,227	81,022	89,900
171	8,164	21,190	65,628	74,589	98,543	109,056	116,987	124,906	130,041	133,433
172	28,419	43,126	60,140	67,010	69,596	77,042	81,008	84,607	87,004	88,361
Total	191,707	241,767	302,457	334,997	361,373	413,236	453,919	499,551	541,475	581,387

Galveston County Population (RAZ 173 to 188)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
173	15,214	21,432	25,319	27,015	31,446	32,343	32,651	32,941	33,150	33,323
174	13,089	17,610	38,985	47,316	52,897	69,457	77,131	83,177	87,527	92,467
175	20,133	32,714	47,881	55,487	65,141	72,375	74,551	75,349	75,924	76,680
176	9,641	12,215	14,387	15,597	16,407	19,106	20,926	22,779	24,183	26,243
177	16,382	18,387	21,382	23,418	21,956	25,243	27,391	29,553	31,187	33,558
178	16,471	19,615	22,073	23,594	26,857	31,766	34,610	38,318	40,986	45,280
179	4,059	5,643	8,180	10,208	12,447	16,929	20,554	24,855	28,350	34,220
180	24,800	25,325	25,748	26,255	25,040	25,130	25,168	25,199	25,221	25,244
181	9,756	8,806	9,263	10,078	10,686	10,888	11,005	11,050	11,082	11,125
182	11,848	11,197	10,673	11,076	11,260	12,159	12,680	13,169	13,521	13,984
183	7,786	8,916	9,794	10,601	12,897	16,172	18,586	21,423	23,726	27,576
184	5,006	5,146	4,766	5,173	4,389	4,924	5,234	5,525	5,735	6,011
185	4,661	6,453	6,679	7,488	8,163	9,074	9,487	9,838	10,088	10,381
186	53,504	50,213	39,043	39,890	42,941	44,117	44,661	45,199	45,583	46,106
187	1,740	1,976	622	703	524	1,364	1,850	2,535	3,028	3,676
188	3,310	4,511	2,397	2,778	2,768	3,241	3,515	3,773	3,958	4,202
Total	217,400	250,159	287,192	316,677	345,819	394,288	420,000	444,684	463,248	490,075

Chambers County Population (RAZ 189 to 192)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
189	7,780	9,788	9,936	10,442	9,771	10,061	10,541	11,056	11,627	12,255
190	2,941	3,188	2,885	3,629	3,077	4,355	6,240	8,075	9,889	11,776
191	5,052	7,797	15,558	16,500	22,946	25,162	27,698	29,866	31,796	33,638
192	4,315	5,258	6,506	7,994	10,625	14,425	18,870	22,598	25,835	28,732
Total	20,088	26,031	34,885	38,565	46,419	54,002	63,349	71,595	79,147	86,401

Liberty County Population (RAZ 193 to 199)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
193	545	723	795	840	629	788	968	1,158	1,438	1,759
194	12,006	12,549	11,915	12,138	12,492	12,934	13,433	13,968	14,521	15,104
195	13,936	24,746	24,107	25,447	27,445	37,013	48,696	60,590	73,061	84,848
196	6,192	8,244	9,516	11,430	20,853	27,882	34,723	41,687	48,397	55,528
197	6,014	7,148	6,586	6,652	6,716	7,176	7,862	8,968	10,277	11,822
198	6,245	7,824	8,774	9,157	10,534	11,124	11,792	12,564	13,385	14,589
199	7,787	8,920	8,836	8,965	8,053	8,347	8,682	9,212	10,020	10,971
Total	52,725	70,154	70,529	74,629	86,722	105,264	126,155	148,147	171,100	194,621

Jobs

Harris County Jobs (RAZ 1 to 127)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
1	131,096	143,372	144,954	157,867	133,813	144,454	152,636	160,622	169,041	177,710
2	14,428	14,288	17,063	22,854	8,786	13,030	16,204	19,295	22,552	25,903
3	12,904	4,411	4,714	5,296	1,173	1,140	1,085	1,021	950	874
4	10,732	10,053	11,642	14,274	5,127	7,202	8,764	10,289	11,896	13,551
5	13,624	12,600	15,481	18,113	8,395	10,675	12,403	14,095	15,880	17,718
6	35,281	34,724	34,673	36,108	36,701	39,235	41,108	42,920	44,764	46,597
7	16,882	17,668	13,775	16,380	21,449	22,466	22,842	23,207	23,396	23,402
8	14,287	13,813	16,549	20,094	23,220	25,049	26,365	27,630	28,957	30,316
9	4,014	3,899	3,775	4,387	2,262	2,866	3,328	3,781	4,260	4,754
10	8,720	8,249	8,844	10,621	8,159	9,066	9,718	10,345	11,002	11,674
11	5,024	4,185	5,937	8,806	5,007	7,541	9,414	11,226	13,104	15,005
12	11,079	10,268	11,431	14,112	7,413	8,508	9,268	9,989	10,743	11,511
13	23,191	21,600	23,947	26,629	11,792	12,887	13,647	14,368	15,122	15,890
14	3,914	3,739	6,602	7,180	1,915	2,435	2,623	2,805	2,994	3,185
15	12,399	8,294	14,473	16,009	8,470	10,146	11,436	12,705	14,046	15,430
16	5,787	4,968	7,640	10,530	5,238	5,747	5,935	6,117	6,306	6,497
17	8,275	7,908	12,060	15,993	5,167	6,751	7,849	8,889	9,975	11,084
18	45,099	60,437	72,914	76,453	80,061	88,460	92,919	96,360	99,647	102,915
19	15,931	15,109	23,656	26,451	12,678	13,717	14,427	15,095	15,792	16,502
20	20,386	24,252	28,173	32,477	43,919	47,719	50,529	53,248	56,064	58,915
21	7,225	4,880	7,024	8,386	7,772	7,772	7,773	7,864	7,958	8,055
22	11,020	8,790	13,186	14,960	11,319	13,343	14,905	16,443	18,068	19,746
23	52,916	64,887	51,490	52,935	76,645	77,917	78,856	80,678	82,565	84,475
24	4,347	4,213	4,425	7,963	3,576	5,508	6,385	7,225	7,909	8,766
25	10,951	12,440	17,525	20,289	18,364	20,615	22,314	23,973	25,723	27,527
26	3,319	4,158	4,206	4,707	3,152	3,321	3,435	3,541	3,651	3,762
27	24,641	21,351	29,975	34,803	28,977	30,586	31,659	32,662	33,704	34,761
28	6,823	5,415	6,521	7,638	3,824	4,508	5,010	5,496	6,007	6,533
29	7,787	9,683	12,015	13,692	8,846	9,754	10,412	11,045	11,710	12,391
30	5,425	7,306	12,252	13,685	6,537	7,825	8,721	9,583	10,447	11,300
31	19,908	17,061	13,796	15,726	8,527	9,869	10,867	11,838	12,860	13,911
32	16,392	15,253	20,695	23,391	16,246	19,197	21,470	23,706	26,069	28,507
33	6,840	5,779	7,983	8,939	5,914	6,432	6,807	7,168	7,548	7,936
34	10,858	10,543	15,870	18,739	11,620	14,660	16,908	19,627	22,443	25,294
35	7,561	7,764	11,911	12,778	6,232	7,249	8,001	8,548	9,114	9,687
36	2,757	2,845	3,365	3,494	2,611	2,650	2,663	2,669	2,675	2,678
37	5,686	7,704	7,745	8,435	9,895	10,721	11,360	11,990	12,655	13,343
38	15,362	14,034	16,444	17,022	8,188	9,974	11,352	12,708	14,142	15,622
39	57,417	65,455	70,787	82,581	62,633	69,877	74,264	78,466	82,741	86,679
40	28,207	29,849	30,120	31,564	26,916	28,188	29,127	30,039	30,983	31,939
41	6,195	7,593	7,492	7,550	6,485	7,757	7,794	7,831	7,868	7,907
42	16,160	22,261	21,433	23,481	21,311	22,911	24,114	25,288	26,526	27,800
43	19,039	25,482	21,446	23,833	19,489	22,369	24,599	26,796	29,120	31,519
44	18,672	20,100	19,889	23,028	12,980	15,445	17,301	19,111	21,020	22,985
45	8,097	7,621	8,555	9,991	6,504	8,111	9,350	10,569	11,858	13,188
46	3,072	4,864	3,425	3,957	1,684	2,111	2,433	2,747	3,078	3,420

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
47	2,181	1,638	4,046	4,485	1,883	1,982	2,041	2,094	2,147	2,201
48	1,693	2,173	2,204	2,630	840	1,252	1,567	1,876	2,202	2,539
49	3,466	4,141	5,458	6,267	4,020	9,315	14,863	20,204	25,579	29,248
50	16,632	18,561	20,087	22,400	25,446	26,622	27,466	28,277	29,127	29,997
51	6,754	12,297	14,955	16,800	13,147	15,465	17,258	18,981	20,881	22,759
52	2,645	1,059	1,437	1,543	1,867	2,125	2,483	2,828	3,173	3,515
53	17,293	15,650	22,002	25,102	26,830	27,095	27,280	27,458	27,637	27,820
54	13,992	17,993	24,475	28,264	15,703	16,100	16,378	16,645	16,913	17,188
55	5,382	5,823	2,114	2,298	1,765	2,062	2,295	2,525	2,769	3,021
56	12,243	11,348	13,282	15,489	15,421	16,967	18,118	19,237	20,416	21,629
57	3,172	3,071	5,419	8,288	5,871	8,405	10,278	12,090	13,968	15,869
58	3,063	3,666	4,790	6,854	6,302	9,200	11,481	13,330	15,039	16,238
59	3,626	3,524	4,993	6,039	4,193	5,064	5,346	5,621	5,899	6,173
60	10,970	16,157	12,609	14,573	12,137	13,823	15,100	16,350	17,668	19,027
61	17,964	13,058	21,325	23,385	10,610	12,423	13,763	15,062	16,408	17,769
62	29,433	32,187	33,161	35,472	36,619	38,908	40,787	44,433	48,416	52,650
63	31,034	39,113	41,598	45,530	36,584	41,288	45,129	48,978	53,234	57,636
64	12,549	14,767	16,101	17,807	25,108	27,816	29,939	32,039	34,263	36,563
65	26,716	31,206	33,999	37,770	27,075	30,085	32,353	34,567	36,902	39,306
66	15,903	27,599	26,322	29,531	26,753	30,330	33,088	35,801	38,669	41,630
67	9,398	16,571	17,295	19,231	18,194	19,822	21,054	22,259	23,530	24,839
68	7,959	9,380	12,636	14,889	7,002	8,419	9,462	10,474	11,538	12,631
69	4,609	3,965	5,366	6,328	4,208	4,957	5,520	6,069	6,649	7,245
70	6,038	5,316	5,860	6,857	3,915	4,709	5,308	5,892	6,508	7,142
71	5,785	6,435	5,927	7,057	4,568	5,765	6,685	7,590	8,545	9,532
72	2,991	2,823	5,473	6,341	2,920	3,102	3,207	3,300	3,394	3,487
73	6,566	4,731	5,068	6,082	3,729	4,343	4,794	5,230	5,688	6,160
74	6,439	10,235	12,670	14,889	8,026	9,267	10,169	11,039	11,953	12,891
75	6,094	14,867	13,099	14,791	31,999	34,058	35,653	37,225	38,887	40,604
76	1,535	1,550	2,746	3,323	3,648	3,742	3,791	3,831	3,870	3,909
77	9,531	10,367	10,299	11,427	8,135	9,669	10,555	11,155	11,759	12,377
78	3,450	7,206	9,250	10,974	17,164	19,172	20,575	21,925	23,284	24,675
79	7,462	10,852	9,866	10,913	7,914	8,742	9,365	9,973	10,615	11,276
80	916	1,576	1,534	2,235	2,006	2,346	2,588	2,820	3,063	3,311
81	1,068	1,366	1,486	2,347	2,139	2,348	2,493	2,633	2,775	3,332
82	1,910	993	2,184	3,759	4,338	7,308	11,456	16,370	22,601	26,783
83	1,557	2,890	2,528	3,251	2,688	3,181	3,381	3,573	3,767	3,965
84	7,134	7,814	7,299	8,855	12,068	13,397	14,528	15,800	16,909	18,208
85	6,700	7,091	4,239	4,710	8,105	8,675	9,117	9,552	10,012	10,486
86	17,590	19,394	20,039	22,408	13,510	14,080	14,522	14,957	15,417	15,891
87	18,213	9,220	6,803	7,354	13,307	14,595	15,671	16,704	17,741	18,936
88	449	1,461	1,665	3,100	792	1,768	2,460	3,128	3,672	4,219
89	9,472	7,764	6,417	7,329	8,128	8,643	9,002	9,346	9,692	10,033
90	6,028	19,940	16,740	18,734	34,234	36,157	37,627	39,069	40,592	42,161
91	5,739	9,865	7,758	8,755	15,638	17,441	18,696	19,902	21,284	22,650
92	3,663	10,075	6,549	7,413	5,873	6,683	7,301	7,906	8,545	9,204
93	14,408	27,825	27,668	31,383	32,572	33,997	35,222	36,578	38,002	39,460
94	44,760	36,687	40,386	42,598	38,999	39,723	40,722	41,219	42,198	42,706
95	5,367	7,378	9,836	10,839	7,553	7,727	7,856	7,980	8,105	8,230
96	5,973	8,476	11,566	13,291	6,527	7,412	8,048	8,659	9,300	9,957

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
97	12,637	17,139	15,344	17,335	21,956	23,551	24,752	25,926	27,163	28,438
98	16,275	22,769	24,624	26,502	39,918	41,953	43,832	45,655	47,543	49,454
99	9,702	10,929	10,420	11,668	11,555	12,849	14,158	15,413	16,690	17,959
100	9,665	15,192	23,549	38,292	25,075	31,175	35,535	39,258	40,968	42,680
101	10,966	16,968	14,693	16,016	14,487	15,150	15,625	16,080	16,558	17,048
102	29,548	21,214	23,508	24,953	37,261	39,335	40,905	42,597	43,709	44,665
103	879	557	1,433	2,299	658	3,201	5,081	6,903	9,156	11,794
104	15,980	27,527	26,635	29,291	34,054	37,226	39,842	42,380	44,519	46,393
105	6,603	22,725	30,459	33,529	38,575	42,723	45,863	49,077	52,328	55,448
106	1,763	7,136	10,802	11,872	14,623	15,372	15,930	16,473	17,045	17,633
107	11,316	31,415	29,721	33,656	61,528	64,660	67,020	69,323	71,752	74,253
108	5,996	15,264	15,943	17,886	29,927	32,611	34,355	35,878	37,076	38,183
109	24,333	33,477	31,431	35,507	26,172	31,605	35,833	40,006	44,420	48,981
110	5,623	4,753	3,472	3,968	3,052	3,263	3,411	3,552	3,699	3,849
111	6,501	15,291	13,848	15,581	25,160	26,697	27,837	28,931	30,633	32,326
112	4,294	3,866	3,911	4,497	3,147	3,629	3,986	4,244	4,514	4,789
113	2,065	6,248	9,218	12,734	22,414	30,249	35,888	41,759	48,009	58,269
114	6,052	17,100	21,038	29,006	27,584	30,756	33,198	36,546	40,139	43,526
115	38	236	793	1,965	550	1,996	3,067	4,099	5,178	6,280
116	2,226	6,849	7,945	9,703	15,574	23,409	29,594	35,881	43,024	53,169
117	171	893	1,273	2,738	2,039	9,566	13,110	14,828	16,367	17,737
118	1,836	8,867	11,234	14,163	28,148	31,763	34,440	37,021	39,718	42,472
119	13,495	27,605	16,476	19,240	24,202	26,128	27,570	28,976	30,457	31,981
120	5,668	9,165	9,610	11,924	12,894	15,754	17,524	18,930	20,411	21,697
121	48	447	700	1,872	3,385	4,108	4,643	5,160	5,699	6,250
122	10,178	21,715	24,288	38,937	59,618	78,685	85,765	92,494	96,090	96,281
123	34,009	44,302	49,931	61,498	59,335	66,389	71,616	74,025	76,183	78,039
124	9,575	14,194	19,730	21,781	24,348	25,312	25,669	26,013	26,193	26,203
125	5,168	7,207	5,797	6,969	5,737	6,287	6,695	7,091	7,508	7,938
126	15,816	27,792	12,696	13,563	32,553	33,316	33,880	34,427	34,993	35,566
127	5,374	5,900	4,628	5,800	7,443	8,648	9,540	10,143	10,779	11,432
Total	1,539,045	1,855,054	1,993,657	2,290,937	2,168,037	2,432,700	2,620,380	2,801,260	2,984,660	3,168,980

Montgomery County Jobs (RAZ 128 to 139)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
128	1,058	6,400	8,488	12,450	10,748	18,249	23,783	30,174	37,249	45,383
129	9,741	6,848	6,982	9,183	12,317	19,349	24,827	30,869	37,920	46,051
130	207	527	1,723	2,604	4,473	7,598	9,914	12,354	14,822	17,391
131	5,155	13,348	22,302	25,410	20,983	25,294	27,986	30,210	31,958	33,047
132	879	20,041	23,530	28,813	55,836	63,650	68,732	72,799	75,736	77,176
133	2,571	952	2,937	5,586	6,572	12,244	16,660	21,080	25,549	30,045
134	9,432	16,260	19,751	26,926	15,272	26,116	34,104	42,882	51,887	61,581
135	2,915	6,844	8,318	13,023	11,279	19,339	25,484	31,822	39,106	47,167
136	9,044	11,448	14,941	17,583	27,139	32,540	37,006	41,731	46,634	51,892
137	110	1,668	3,631	5,392	5,832	9,739	12,732	16,101	19,627	23,516
138	651	740	644	1,084	2,166	3,113	3,901	4,835	6,046	7,546
139	1,505	4,558	13,906	17,124	10,525	16,300	21,103	26,456	32,527	39,468
Total	43,268	89,634	127,153	165,177	183,142	253,531	306,231	361,311	419,061	480,261

Waller County Jobs (RAZ 140 to 143)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
140	4,238	4,729	5,120	5,841	7,546	10,213	11,832	13,652	15,525	17,628
141	1,874	2,029	2,310	2,672	2,826	4,012	4,671	5,381	6,112	6,932
142	1,227	2,729	4,585	5,668	4,727	8,727	11,089	13,709	16,482	19,677
143	274	365	1,026	2,108	5,212	9,091	11,250	13,580	15,903	18,425
Total	7,612	9,851	13,041	16,289	20,311	32,043	38,843	46,323	54,023	62,663

Fort Bend County Jobs (RAZ 144 to 158)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
144	1,071	5,672	6,491	10,461	28,821	35,044	39,128	42,769	46,018	49,386
145	323	925	2,497	3,477	3,151	5,593	7,944	10,120	11,917	13,851
146	6,359	5,763	6,445	11,538	12,285	21,342	28,021	34,817	41,890	49,220
147	90	365	652	1,145	214	1,152	1,894	2,701	3,633	4,681
148	484	1,948	3,618	4,934	3,952	6,453	8,431	10,583	13,067	15,862
149	10,100	12,870	22,330	25,791	16,313	20,131	22,399	24,184	25,499	26,215
150	609	6,528	5,929	8,051	11,847	17,192	21,728	27,082	33,072	39,519
151	12,881	21,542	23,244	27,488	36,458	41,040	43,874	46,254	48,507	50,535
152	11,046	23,221	29,667	35,246	30,065	39,792	46,059	51,545	56,067	59,297
153	4,103	4,813	8,459	10,622	4,137	8,247	11,497	15,035	19,117	23,710
154	1,159	8,726	8,410	11,873	27,039	33,437	38,223	43,662	49,652	56,099
155	1,348	4,048	6,008	9,036	8,263	14,017	18,567	23,520	29,235	35,666
156	403	1,939	3,464	6,059	4,052	8,984	12,884	17,129	22,028	27,540
157	516	790	1,706	2,139	687	1,509	2,159	2,867	3,683	4,602
158	56	619	1,250	1,984	469	1,864	2,967	4,168	5,553	7,112
Total	50,548	99,769	130,168	169,844	187,753	255,796	305,776	356,436	408,936	463,296

Brazoria County Jobs (RAZ 159 to 172)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
159	13,316	3,510	3,221	3,375	4,190	5,171	6,043	6,587	7,398	8,140
160	2,216	3,740	2,506	3,003	1,941	2,531	3,039	3,567	4,219	4,989
161	125	272	165	170	156	325	395	416	431	466
162	9,642	1,429	1,090	1,918	1,197	1,885	2,394	2,771	3,178	3,435
163	9,158	16,650	11,671	13,361	16,272	18,629	20,058	21,647	23,103	24,867
164	9,373	11,582	15,717	17,830	13,289	14,458	15,707	17,972	20,060	22,712
165	191	1,038	400	467	419	498	541	586	628	662
166	1,794	4,228	5,214	6,354	3,636	5,339	7,219	8,503	9,878	10,835
167	4,931	6,548	6,783	7,970	3,511	4,421	5,053	6,030	7,257	8,892
168	4,229	1,795	364	1,192	188	778	1,214	1,515	1,841	2,183
169	89	2,819	1,322	2,979	6,436	8,795	10,539	12,801	15,245	17,811
170	9,330	11,200	11,524	13,495	16,509	18,876	20,301	21,996	24,476	27,669
171	130	1,455	5,598	8,233	18,318	23,853	27,751	31,430	35,165	38,667
172	6,426	11,226	20,186	23,285	22,595	24,684	26,309	28,080	29,574	30,926
Total	70,950	77,492	85,761	103,634	108,657	130,243	146,563	163,903	182,453	202,253

Galveston County Jobs (RAZ 173 to 188)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
173	2,455	5,573	3,547	4,387	6,740	8,615	9,826	10,847	11,924	13,028
174	1,475	3,563	2,525	3,911	6,362	11,025	14,528	18,074	21,761	25,504
175	8,695	9,705	11,475	12,453	24,562	27,629	29,957	32,311	34,834	37,455
176	1,643	2,757	5,175	5,386	2,473	2,755	2,943	3,125	3,324	3,526
177	4,734	4,052	3,435	4,183	4,900	7,434	9,348	11,288	13,433	15,714
178	730	3,643	8,426	8,946	4,633	6,279	7,519	8,773	10,095	11,452
179	2,077	4,584	2,533	3,945	3,760	6,975	9,599	12,457	15,686	19,220
180	6,212	6,454	2,796	3,140	3,877	4,713	5,137	5,565	5,794	6,030
181	965	2,628	2,003	2,686	3,846	5,185	5,993	6,605	7,036	7,478
182	3,240	2,714	1,749	1,790	1,718	1,857	1,962	2,068	2,186	2,311
183	1,155	2,676	5,483	5,530	2,186	2,453	2,654	2,856	3,080	3,318
184	11,834	6,926	5,257	5,517	5,354	6,177	6,898	7,628	8,320	8,967
185	474	2,461	2,683	2,855	2,664	3,487	4,122	4,764	5,453	6,169
186	32,604	32,759	31,166	31,253	26,377	26,659	26,872	27,088	27,320	27,561
187	1,806	3,283	4,826	5,259	4,200	5,846	7,391	8,956	10,338	11,547
188	125	360	1,442	1,616	1,079	1,106	1,127	1,148	1,170	1,194
Total	80,224	94,138	94,522	102,856	104,731	128,194	145,874	163,554	181,754	200,474

Chambers County Jobs (RAZ 189 to 192)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
189	2,174	2,997	1,184	1,422	2,355	2,594	2,884	3,276	3,736	4,241
190	100	197	373	522	257	576	834	1,190	1,573	2,039
191	2,292	2,497	3,324	4,961	7,640	11,490	14,579	17,934	21,542	25,196
192	1,482	2,597	4,504	5,843	5,867	8,967	11,450	14,146	17,046	19,981
Total	6,048	8,288	9,385	12,748	16,119	23,627	29,747	36,547	43,897	51,457

Liberty County Jobs (RAZ 193 to 199)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
193	1	27	39	42	202	225	260	313	382	483
194	7,233	7,228	6,461	6,544	4,028	4,281	4,707	5,455	6,399	7,580
195	1,826	3,828	3,861	3,968	5,265	6,226	7,522	9,371	11,379	13,588
196	8	1,077	732	774	2,204	2,609	3,272	4,277	5,277	6,524
197	3,634	4,828	4,132	4,214	3,184	3,336	3,510	3,729	3,999	4,397
198	985	77	50	64	1,731	1,779	1,857	1,999	2,187	2,415
199	564	839	925	938	619	653	703	765	836	874
Total	14,251	17,904	16,201	16,543	17,233	19,110	21,830	25,910	30,460	35,860

Households

Harris County Households (RAZ 1 to 127)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
1	374	1,619	1,736	2,450	5,015	5,533	5,968	6,380	6,783	7,155
2	10,542	11,538	10,140	10,583	10,988	11,269	11,467	11,639	11,803	11,948
3	1,078	1,158	1,324	1,622	1,663	2,147	2,565	2,959	3,343	3,695
4	1,446	1,699	2,949	3,829	4,253	5,101	5,904	6,663	7,406	8,092
5	9,045	11,087	9,434	10,150	11,063	11,787	12,434	13,052	13,669	14,248
6	16,219	21,213	21,916	22,791	27,654	28,286	28,911	29,511	30,132	30,737
7	3,367	4,536	8,311	9,800	12,187	13,319	13,811	14,279	14,746	15,185
8	12,969	14,627	14,061	14,656	16,168	16,513	17,006	17,472	17,935	18,371
9	10,003	11,452	9,195	9,414	9,814	9,977	10,118	10,254	10,388	10,513
10	1,762	1,940	1,675	1,777	1,506	1,664	1,808	1,947	2,083	2,209
11	1,532	1,577	1,386	1,590	1,405	1,557	1,689	1,815	1,940	2,058
12	2,362	2,690	2,396	2,498	2,447	2,523	2,589	2,652	2,715	2,773
13	14,790	16,918	14,261	14,834	15,258	15,409	15,540	15,665	15,789	15,906
14	6,450	6,839	6,325	6,775	6,581	6,899	7,155	7,397	7,647	7,889
15	1,600	1,818	1,978	2,107	2,366	2,479	2,578	2,671	2,764	2,852
16	2,299	2,795	2,900	4,045	3,232	3,749	4,278	4,858	5,518	6,222
17	8,147	9,627	10,040	11,233	11,267	11,983	12,596	13,174	13,736	14,251
18	1,753	2,322	2,711	3,435	4,230	4,575	4,871	5,150	5,428	5,690
19	5,525	6,152	5,825	6,112	7,124	7,299	7,460	7,614	7,766	7,906
20	9,011	12,015	11,886	12,705	12,889	13,447	13,930	14,392	14,851	15,280
21	8,821	11,044	11,208	12,067	12,004	12,314	12,493	12,664	12,834	12,994
22	9,188	10,872	10,770	10,916	11,451	11,560	11,654	11,744	11,834	11,918
23	7,104	10,645	11,431	13,149	14,283	14,699	14,878	15,048	15,219	15,379
24	2,671	3,144	2,800	2,902	2,608	2,934	3,197	3,446	3,612	3,774
25	3,798	4,993	4,461	5,712	5,968	6,254	6,424	6,586	6,674	6,760
26	2,056	3,045	3,465	3,837	4,393	4,499	4,584	4,665	4,748	4,829
27	6,666	7,110	9,719	11,294	13,288	13,467	13,580	13,673	13,760	13,834
28	11,507	12,889	11,023	11,310	11,997	12,411	12,972	13,504	14,023	14,500
29	5,475	6,122	5,591	6,178	5,789	5,868	5,932	5,994	6,056	6,116
30	6,884	7,280	6,877	7,178	7,451	7,726	7,971	8,204	8,432	8,642
31	12,082	13,410	11,573	11,687	11,271	11,354	11,424	11,490	11,556	11,618
32	15,495	17,122	15,486	15,894	15,822	16,237	16,610	16,965	17,313	17,633
33	13,286	14,835	14,527	15,751	15,593	16,326	16,954	17,545	18,120	18,648
34	4,150	4,854	7,252	8,970	10,041	12,408	14,203	15,911	17,616	19,220
35	11,968	13,643	12,835	13,275	12,737	13,240	13,664	14,065	14,457	14,818
36	5,453	5,677	5,201	5,231	4,876	4,898	4,918	4,937	4,956	4,973
37	3,086	3,219	3,108	3,181	3,998	4,178	4,346	4,507	4,666	4,813
38	12,302	17,052	14,208	15,067	14,696	15,006	15,359	15,722	16,077	16,403
39	5,562	6,901	8,701	10,705	11,141	12,539	13,421	14,249	15,075	15,851
40	16,015	20,912	19,854	20,587	21,887	22,576	23,201	23,707	24,203	24,659
41	4,214	5,599	5,244	5,314	4,457	4,508	4,552	4,593	4,803	5,173
42	1,388	1,627	1,691	1,997	2,520	2,655	2,765	2,868	2,968	3,058
43	11,146	12,679	11,503	11,790	11,941	12,039	12,142	12,245	12,347	12,442
44	11,715	13,028	11,639	12,353	12,780	13,225	13,608	13,968	14,320	14,641
45	5,814	6,826	6,437	6,652	6,632	6,827	6,992	7,146	7,297	7,435
46	2,967	3,584	3,586	3,759	3,703	3,810	3,902	3,988	4,072	4,149

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
47	2,666	3,040	2,850	2,925	3,113	3,226	3,275	3,322	3,368	3,412
48	4,816	5,357	5,339	5,762	5,766	6,079	6,353	6,612	6,866	7,098
49	5,222	6,664	8,386	9,707	11,667	11,769	11,851	11,930	12,010	12,087
50	23,744	28,681	30,774	33,195	36,606	36,832	37,016	37,103	37,192	37,448
51	2,642	3,003	2,573	2,588	2,301	2,307	2,312	2,317	2,322	2,327
52	0	14	0	15	0	10	19	27	35	43
53	18,273	20,795	18,756	18,756	17,344	17,364	17,380	17,396	17,412	17,427
54	18,281	20,855	19,149	19,559	21,733	21,785	21,827	21,868	21,909	21,948
55	20	19	15	20	18	29	78	125	172	215
56	6,504	8,488	11,589	13,350	13,041	13,603	14,073	14,524	14,991	15,035
57	6,599	7,901	9,950	11,954	13,471	15,015	15,775	16,503	16,970	17,425
58	3,714	4,711	6,858	8,290	9,261	10,812	12,223	13,077	13,910	14,673
59	3,728	4,581	7,436	9,197	8,300	9,254	10,057	10,732	11,392	12,001
60	24,817	30,700	27,662	27,866	29,323	29,791	30,224	30,643	31,053	31,433
61	12,561	14,390	12,202	12,212	13,323	13,331	13,337	13,343	13,350	13,356
62	21,980	27,244	23,891	24,368	26,458	26,809	27,103	27,385	27,697	28,123
63	20,752	25,388	24,484	25,486	26,642	27,774	28,656	29,495	30,166	30,628
64	9,024	10,094	9,108	9,414	10,079	10,310	10,511	10,702	10,892	11,071
65	24,874	29,351	27,307	27,908	29,183	29,860	30,408	30,843	31,110	31,365
66	3,107	3,546	3,428	3,868	4,080	4,398	4,666	4,919	5,167	5,395
67	9,470	12,181	9,685	10,808	11,901	12,630	13,260	13,854	14,433	14,965
68	19,653	22,598	22,767	23,578	25,452	26,088	26,514	26,837	27,087	27,249
69	3,459	4,018	3,973	4,539	4,640	5,002	5,314	5,608	5,894	6,157
70	6,770	7,940	7,944	8,064	8,276	8,378	8,466	8,550	8,634	8,712
71	3,784	4,538	4,497	4,717	4,300	4,512	4,682	4,844	5,011	5,172
72	3,055	3,447	2,973	2,988	3,193	3,204	3,234	3,272	3,318	3,371
73	4,918	5,926	5,814	5,844	6,575	6,620	6,718	6,812	6,905	6,992
74	4,937	5,850	5,249	5,848	5,961	6,279	6,535	6,857	7,191	7,595
75	2,108	2,468	3,590	4,611	3,881	4,729	5,532	6,333	7,159	7,963
76	3,116	3,774	5,549	6,621	8,052	8,468	8,803	9,111	9,410	9,680
77	4,228	5,018	5,462	6,660	6,838	7,898	8,880	9,807	10,798	11,797
78	7,411	13,141	23,928	28,208	32,359	34,116	35,486	36,614	37,586	38,297
79	13,346	18,983	20,650	21,249	21,527	22,079	22,522	22,942	23,375	23,793
80	2432	3,543	4,713	5,643	5,641	7,309	8,491	9,449	10,322	11,160
81	3,387	4,213	5,589	6,498	7,330	8,106	8,825	9,596	10,294	10,881
82	886	1,150	4,330	6,066	8,622	8,940	9,384	9,982	10,681	11,348
83	2,768	3,378	3,479	4,096	4,366	5,308	6,207	7,149	8,110	8,948
84	6,031	7,741	10,079	11,775	13,466	15,156	16,515	17,800	19,128	20,410
85	3,041	3,066	2,250	2,335	2,083	2,132	2,172	2,210	2,248	2,286
86	16,157	18,770	17,717	18,738	20,819	21,167	21,418	21,627	21,815	21,968
87	12	4	3	3	1	1	1	1	1	1
88	1996	2,306	2,005	2,064	2,526	2,575	2,615	2,653	2,691	2,729
89	3,454	3,908	3,274	3,682	3,567	3,779	4,035	4,196	4,363	4,444
90	13,662	15,795	17,129	18,303	19,051	19,618	19,964	20,291	20,630	20,875
91	4,363	5,823	6,643	6,937	7,383	8,270	8,983	9,659	10,357	11,033
92	6,091	8,160	8,308	9,022	9,669	10,191	10,648	11,080	11,502	11,889
93	16,891	24,924	28,383	30,648	30,752	31,081	31,194	31,239	31,286	31,331
94	18,643	22,377	22,276	22,576	25,024	25,512	25,905	26,280	26,654	27,005
95	5,913	8,084	9,988	10,812	10,830	11,260	11,605	11,851	12,104	12,350
96	12,693	13,212	17,912	19,750	20,315	20,667	20,899	21,095	21,278	21,437

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
97	17,196	19,628	17,370	18,187	19,259	19,795	20,258	20,695	21,121	21,512
98	13,321	17,850	18,702	19,749	19,952	20,742	21,623	22,563	23,632	24,865
99	16,312	21,274	24,388	27,026	27,306	28,548	29,586	30,582	31,613	32,617
100	8,043	13,029	15,549	16,018	19,937	20,159	20,341	20,428	20,606	20,777
101	12,900	17,346	15,317	15,317	15,640	15,663	15,683	15,701	15,730	15,759
102	11,075	12,411	12,636	13,453	14,118	14,631	15,073	15,490	15,896	16,268
103	43	365	228	248	609	887	899	910	1,044	1,055
104	7,650	8,900	8,432	9,165	10,471	11,001	11,447	11,868	12,282	12,662
105	8,637	13,004	15,332	16,506	16,096	16,931	17,613	18,267	18,935	19,577
106	3,082	4,673	6,468	7,066	7,020	7,299	7,527	7,745	7,968	8,111
107	13,698	24,358	30,212	33,275	32,026	33,615	34,865	35,962	36,787	37,292
108	9,714	12,021	14,581	16,195	16,470	17,660	18,654	19,124	19,416	19,606
109	8,665	10,216	9,132	10,159	10,830	11,571	12,083	12,486	12,820	13,062
110	5,906	8,018	9,680	10,647	10,592	11,339	11,980	12,586	13,189	13,755
111	9,237	16,285	21,493	22,205	28,524	29,141	29,671	30,175	30,678	31,151
112	2,019	3,124	3,750	4,556	4,095	5,045	5,903	6,724	7,528	8,270
113	8,708	14,422	32,549	43,014	51,090	59,773	66,784	74,342	82,503	90,894
114	9,179	13,908	22,070	25,791	26,201	27,350	27,843	28,309	28,773	29,209
115	216	474	587	1,303	895	2,963	4,959	7,444	10,747	14,690
116	7,181	11,572	29,133	39,850	45,098	53,637	61,740	69,385	77,191	84,650
117	1087	1840	2,052	2,768	3,980	5,481	7,138	8,972	11,323	13,843
118	5,925	15,567	32,988	40,423	46,903	54,865	61,351	67,896	75,053	82,421
119	13,722	18,967	25,340	28,204	27,064	28,201	29,099	29,856	30,550	31,138
120	2,860	4,318	4,796	6,107	7,742	8,961	10,219	11,544	13,290	15,200
121	916	2237	4,706	6,936	12,646	14,693	16,689	18,676	20,616	22,398
122	22,100	31,153	50,854	64,704	65,393	75,113	80,036	84,244	88,538	92,675
123	36,416	49,508	55,318	59,291	62,860	64,617	65,596	66,065	66,455	66,739
124	6,102	8,045	13,770	18,231	16,768	17,887	18,217	18,443	18,674	18,810
125	5,932	7,169	9,385	11,171	11,814	12,346	12,575	12,792	12,904	13,012
126	1,174	1,624	1,910	2,356	2,013	2,099	2,142	2,183	2,224	2,264
127	10,499	12,212	18,731	22,750	22,877	24,738	26,692	28,301	30,241	32,138
Total	1,018,601	1,288,410	1,436,014	1,590,963	1,692,835	1,797,258	1,880,660	1,959,200	2,040,050	2,118,026

Montgomery County Households (RAZ 128 to 139)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
128	5,440	8,453	10,816	12,003	15,516	17,915	20,242	22,842	25,600	28,506
129	9,139	14,289	20,123	22,497	26,422	32,180	37,415	42,904	49,455	56,816
130	1,156	2,386	10,153	12,364	20,266	23,829	26,688	30,180	34,153	38,999
131	8,836	12,726	14,555	15,290	15,345	15,985	16,566	16,851	17,179	17,530
132	7,058	17,858	31,007	33,761	35,913	37,512	38,676	39,542	40,232	40,619
133	1,344	1,595	3,482	4,146	5,770	7,321	8,767	10,453	12,837	15,953
134	8,336	11,027	12,133	12,847	14,791	16,458	17,921	19,364	21,064	22,950
135	5,714	8,761	11,372	12,257	14,845	16,764	18,800	20,912	23,538	26,504
136	7,100	16,462	21,962	25,176	29,887	32,942	35,035	36,753	38,653	40,428
137	2,347	5,091	7,594	9,430	15,988	21,106	26,342	31,541	38,437	46,186
138	918	1,938	2,332	2,530	3,029	3,897	4,848	5,853	7,119	8,584
139	5,616	11,038	17,151	19,722	22,011	28,728	35,128	41,771	50,391	60,077
Total	63,004	111,624	162,680	182,023	219,783	254,639	286,429	318,967	358,657	403,153

Waller County Households (RAZ 140 to 143)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
140	3,119	5,328	6,601	7,059	7,215	7,897	9,010	10,569	13,700	16,969
141	2,126	3,128	3,422	3,506	3,580	3,718	3,961	4,366	5,334	6,548
142	1,655	2,849	3,207	3,522	3,508	3,944	4,652	5,741	8,166	11,010
143	347	431	831	1,335	2,984	3,852	4,965	6,212	8,299	10,477
Total	7,247	11,736	14,061	15,421	17,287	19,410	22,589	26,890	35,500	45,004

Fort Bend County Households (RAZ 144 to 158)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
144	990	6,336	24,220	31,449	37,570	40,322	41,872	42,693	43,186	43,153
145	1,092	1,749	3,644	7,112	13,525	20,607	28,747	37,277	45,705	50,694
146	9,069	15,572	34,470	43,141	55,831	61,142	66,027	71,145	77,465	84,949
147	480	647	695	906	696	1,026	1,368	2,085	3,354	5,314
148	1,402	1,998	2,505	3,228	3,802	6,077	8,345	10,610	13,322	16,433
149	9,046	11,083	11,754	12,369	12,473	12,921	13,357	13,778	14,285	14,871
150	1,418	6,160	10,524	11,970	14,915	16,927	18,909	20,598	22,133	23,300
151	9,625	14,008	18,001	19,085	18,925	19,848	20,746	21,191	21,723	22,331
152	5,554	10,462	13,198	14,018	13,804	14,618	15,412	15,634	15,891	16,002
153	11,551	14,114	16,019	16,380	16,845	17,306	17,351	17,396	17,449	17,510
154	7,155	13,979	20,232	23,794	24,683	27,188	29,210	31,263	33,728	36,566
155	8,475	12,920	24,452	29,874	36,534	41,845	46,563	51,156	56,146	61,821
156	807	1,450	3,582	6,431	8,735	13,744	18,799	25,159	32,644	40,571
157	1,597	2,101	2,409	3,043	2,541	3,464	4,587	5,922	8,049	11,132
158	1,041	1,634	1,988	2,411	2,262	3,046	3,945	6,170	9,626	14,555
Total	69,302	114,213	187,693	225,212	263,141	300,082	335,238	372,077	414,707	459,203

Brazoria County Households (RAZ 159 to 172)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
159	4,071	4,886	4,592	4,924	4,697	5,155	5,640	6,170	6,753	7,370
160	5,385	6,951	6,393	6,640	6,328	6,624	6,979	7,369	7,875	8,492
161	1036	1203	1,035	1,148	1,057	1,179	1,243	1,312	1,402	1,508
162	2,330	2,717	2,066	2,267	1,751	1,918	2,065	2,230	2,442	2,706
163	3,402	5,525	5,150	5,571	5,861	6,107	6,275	6,434	6,599	6,759
164	11,001	12,854	12,509	12,805	12,533	12,651	12,770	12,900	13,044	13,198
165	561	1,661	765	814	988	1,047	1,106	1,171	1,244	1,321
166	3,232	4,408	4,806	5,498	5,830	6,836	7,920	9,154	10,527	12,029
167	6,360	7,684	7,401	8,093	7,725	8,790	9,874	11,173	12,619	14,246
168	676	1,020	1,025	1,082	1,116	1,201	1,328	1,604	2,058	2,741
169	1909	3,068	3,648	4,467	6,594	9,165	12,402	16,527	21,737	27,312
170	10,898	14,138	14,691	16,126	16,207	18,656	21,519	24,681	28,206	32,050
171	2877	7,927	22,350	25,221	33,176	35,856	38,554	41,247	43,305	44,773
172	9,738	15,728	20,322	22,523	23,472	25,370	26,719	27,943	28,904	29,491
Total	63,476	89,770	106,753	117,178	127,335	140,556	154,394	169,915	186,715	203,995

Galveston County Households (RAZ 173 to 188)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
173	5,008	7,354	8,861	9,463	10,935	11,130	11,242	11,348	11,459	11,523
174	4,299	6,146	13,016	15,973	17,604	21,198	23,988	26,206	28,518	30,348
175	7,485	13,241	18,578	21,277	25,552	27,122	27,913	28,206	28,511	28,791
176	3,565	5,639	5,372	5,801	6,207	6,793	7,455	8,134	8,881	9,644
177	5,693	6,863	7,541	8,264	7,553	8,266	9,047	9,841	10,709	11,587
178	5623	7,321	8,053	8,593	9,925	10,990	12,024	13,385	14,803	16,393
179	1,563	2,242	3,302	4,022	4,934	5,907	7,225	8,803	10,660	12,834
180	8,929	9,968	9,243	9,423	9,264	9,284	9,297	9,309	9,320	9,329
181	3809	3,744	3,744	4,033	4,344	4,388	4,430	4,447	4,464	4,480
182	4,419	4,678	4,078	4,221	4,343	4,540	4,732	4,913	5,103	5,276
183	2,862	3,861	3,677	3,963	4,862	5,573	6,450	7,491	8,716	10,141
184	1,873	2,644	2,203	2,347	2,049	2,165	2,278	2,385	2,496	2,598
185	2159	6,229	3,309	3,596	4,125	4,323	4,473	4,602	4,735	4,843
186	21,731	24,590	16,892	17,193	19,588	19,843	20,041	20,239	20,442	20,636
187	421	664	274	303	242	424	601	769	1,031	1,271
188	1274	5424	1,071	1,206	1,330	1,433	1,532	1,627	1,725	1,816
Total	80,713	110,608	109,214	119,678	132,857	143,377	152,727	161,703	171,573	181,509

Chambers County Households (RAZ 189 to 192)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
189	2,758	4,016	3,567	3,764	3,560	3,664	3,827	4,003	4,225	4,487
190	1,031	1,352	1,118	1,408	1,179	1,638	2,279	2,903	3,609	4,396
191	1,675	2,899	5,061	5,428	7,392	8,187	9,050	9,787	10,539	11,307
192	1,397	1,933	2,243	2,822	3,515	4,879	6,391	7,659	8,919	10,127
Total	6,861	10,200	11,989	13,421	15,646	18,368	21,547	24,352	27,292	30,316

Liberty County Households (RAZ 193 to 199)

RAZ	1990	2000	2010	2015	2020	2025	2030	2035	2040	2045
193	197	293	290	316	234	288	349	414	519	646
194	4,262	5,000	4,428	4,477	4,644	4,795	4,965	5,147	5,354	5,584
195	4,688	7,665	8,274	8,569	9,397	12,664	16,638	20,684	25,362	30,017
196	2,174	3,129	3,262	3,684	5,961	8,361	10,688	13,057	15,574	18,390
197	1,943	2,621	2,346	2,360	2,410	2,567	2,800	3,177	3,668	4,278
198	2,211	3,267	3,128	3,212	3,819	4,021	4,248	4,510	4,818	5,294
199	2,871	4,109	3,401	3,429	3,007	3,108	3,221	3,402	3,705	4,080
Total	18,346	26,084	25,129	26,049	29,472	35,804	42,910	50,390	59,000	68,288



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