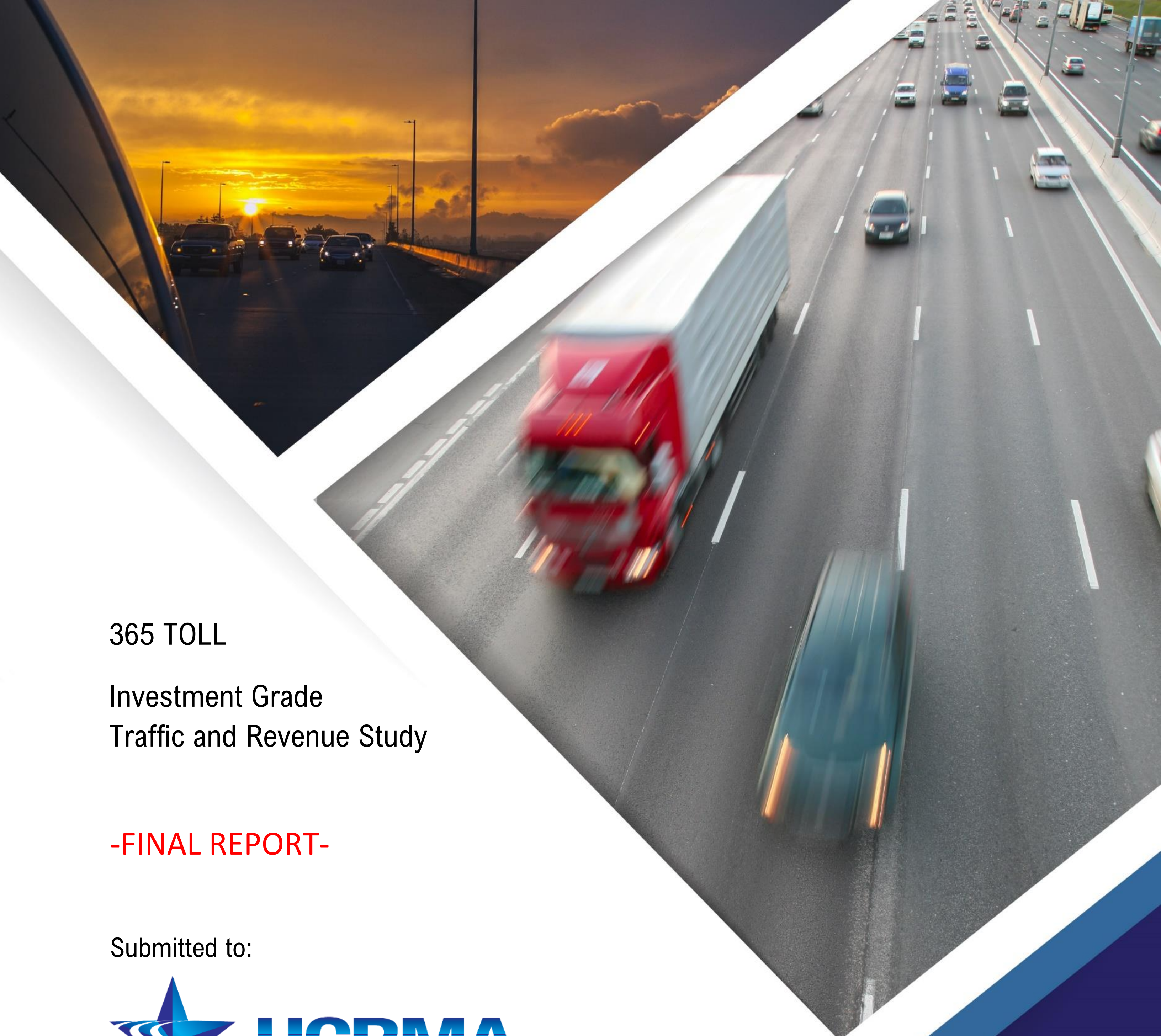


365 TOLL

Investment Grade
Traffic and Revenue Study

-FINAL REPORT-

Submitted to:

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Prepared by:

C&M
C&M Associates, Inc.

January 18, 2021

C&M Associates, Inc.
15770 North Dallas Parkway, Suite 870
Dallas, TX 75248
Tel: 214-245-5300
www.candm-associates.com

Cover Letter

Axel Herrmann, M.S. (Dipl.-Ing.)
Project Manager
aherrmann@candm-associates.com

Date: January 18, 2021

To: Mr. Eric Davila, P.E., P.M.P., C.C.M.
Chief Development Engineer
Hidalgo County Regional Mobility Authority

Subject: **365 TOLL Investment Grade Traffic and Revenue Study – Final Report**

Dear Mr. Davila,

C&M Associates, Inc. is pleased to provide you with the Final Report of the *365 TOLL Investment Grade Traffic and Revenue Study*. This report addresses comments received on the previously submitted draft and presents an overview of the project, an assessment of existing traffic conditions and socioeconomic data within the project area, an overview of field data collection and analyses, details regarding the modeling methodology and results, and the resultant traffic and revenue forecasts.

The C&M project team—including Fernando Escobar, James Liddle, Manuel Sanchez, Felix Starr, and Juan Pablo Zimbron—expresses its sincere gratitude to the Hidalgo County Regional Mobility Authority for providing the opportunity to participate in this project.

Respectfully,

Carlos M. Contreras, MBA
President

Axel Herrmann, MS (Dipl.-Ing.)
Principal Transportation Planner,
Project Manager

365 TOLL
Investment Grade Traffic and Revenue Study

Prepared For:

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Prepared By:

C&M
C&M Associates, Inc.

FINAL REPORT

January 18, 2021

DISCLAIMER

The results of this study constitute the opinion of C&M with respect to the tolled facility's future traffic and revenue. The traffic and revenue projections provided in this report were developed based on standard professional practices and the information available at the time the study was executed, subject to the time and budget constraints of the study's scope of work. C&M reasonably relied on the accuracy and completeness of information provided (both written and orally) by the Hidalgo County Regional Mobility Authority and independent parties. C&M is unaware of any material facts that would call into question the information that was received. Publicly available material has not been independently verified, and C&M does not assume responsibility for verifying such material.

As with any forecast, differences between projected and actual outcomes may occur due to future events and circumstances outside of C&M's control. C&M cannot guarantee or ensure future events in connection to this traffic and revenue forecast, though the projections and other forward-looking statements included herein are based on reasonable assumptions as of the date this study was completed.

The information and results presented in this report should be considered as a whole. Selecting portions of any individual result without considering the intent of the whole may promote a misleading or incomplete view of this study's findings and the methodologies used to obtain these findings. C&M does not endorse the value or merit of partial information extracted from this report.

TABLE OF CONTENTS

List of Tables

List of Figures

Acronyms & Abbreviations

AADT........Annual Average Daily Traffic
AAWDT........Annual Average Weekday Traffic
ACS........American Community Survey
ADT........Average Daily Traffic
ATR........Automatic Traffic Recorder

BCC........Border Crossing Card
BEA........Bureau of Economic Analysis
BPR........Bureau of Public Roads
BSIF........Border Safety Inspection Facility
BTMP........Border Transportation Master Plan
BTS........Bureau of Transportation Statistics

CAGR........Compound Annual Growth Rate
CANACAR........Cámara Nacional del Autotransporte de Carga
CAPUFE........Caminos y Puentes Federales
CBP........U.S. Customs and Border Protection
C&M........C&M Associates, Inc.
CONAPO........Consejo Nacional de Poblacion
CPI........Consumer Price Index
C-TPAT........Customs-Trade Partnership Against Terrorism
CV........Commercial Vehicle

DAP........Donations Acceptance Program

EA........Economic Area
ECV........External Commercial Vehicle
EPS........Economic & Planning Systems, Inc.
EPV........External Passenger Vehicle
ETC........Electronic Toll Collection
EXLOA........External–to–Internal Passenger Vehicle
EXLOT........External–to–Internal Commercial Vehicle

FAST........Free and Secure Trade
FHWA........Federal Highway Administration
FM #........Farm-to-Market Road #
FR........Frontage Road
FTZ........Foreign Trade Zone

GAV........Gross Added Value
GDP........Gross Domestic Product
GRP........Gross Regional Product
GSA........General Services Administration
HBC........Hidalgo Border Crossing
HBNW........Home-Based Non-Work

HBW..Home-Based Work
HCMPO...Hidalgo County Metropolitan Planning Organization
HCRB..Hidalgo County Road Builders
HCRMA ....Hidalgo County Regional Mobility Authority
HCV ....Hidalgo County International Bridges Commercial Vehicle
HH..Household
HNW ....Home-Based Non-Work
HNW-EDU ....Home-Based Non-Work School
HNW-OTH ....Home-Based Non-Work Other
HNW-RET...Home-Based Non-Work Retail
HOT ....High-Occupancy Toll
HOV...High-Occupancy Vehicle
HPV ....Hidalgo County International Bridges Passenger Vehicle

I-# ....Interstate Highway #
IBTC...International Bridge Trade Corridor
ICV ....Internal Commercial Vehicle
IIRIRA ....Illegal Immigration Reform and Immigrant Responsibility Act
IMF...International Monetary Fund
INEGI..Instituto Nacional de Estadística y Geografía
INS ....Immigration and Naturalization Service

LBS...Location-Based Services
LOS ....Level of Service
LRGV ....Lower Rio Grande Valley

MEX # ....Mexican Federal Highway #
ML..Mainlane
MLG...Mainlane Gantry
MNL ....Multinomial Logit
MSA...Metropolitan Statistical Area
MTP ....Metropolitan Transportation Plan

NAFTA ....North American Free Trade Agreement
NCTCOG ....North Central Texas Council of Governments
NEXLO ....Non-Home-Based Non-Resident
NHB...Non-Home-Based

OBIM...Office of Biometric Identity Management
OD ....Origin-Destination
OLS ....Ordinary Least Squares
OS/OW..Oversized/Overweight
OST-R ....Office of the Assistant Secretary for Research and Technology
OWCV...Overweight Commercial Vehicle

PASA ....Pre-Authorization Safety Audit
POE..Port of Entry

PV.....Passenger Vehicle

RAMMAC.....Reynosa Asociación de Maquiladoras y Manufactureras, A.C.
RFID.....Radio Frequency Identification
RGVMPO.....Rio Grande Valley Metropolitan Planning Organization
RSG.....Resource Systems Group, Inc.
RMSE.....Root Mean Square Error

SCT.....Secretaria de Comunicaciones y Transportes
SENTRI.....Secure Electronic Network for Travelers' Rapid Inspection
SH #.....State Highway #
SIAVE.....Sistema de Aforo Vehicular
SOV.....Single-Occupancy Vehicle
SP.....Stated Preference
STIP.....Statewide Transportation Improvement Program

TAZ.....Traffic Analysis Zone
TDM.....Travel Demand Model
Texas SAM.....Texas Statewide Analysis Model
TIP.....Transportation Improvement Program
TOD.....Time of Day
TPP.....Transportation Planning and Programming Division
T&R.....Traffic and Revenue
TRTX.....Internal Commercial Vehicle and Taxi
TSDC.....Texas State Data Center
TTI.....Texas Transportation Institute
TWDB.....Texas Water Development Board
TxDOT.....Texas Department of Transportation
TxDPS.....Texas Department of Safety

US #.....U.S. Route #
USDOT.....U.S. Department of Transportation
UTPA.....University of Texas Pan-American

VDF.....Volume Delay Function
VHT.....Vehicle Hours Traveled
VMT.....Vehicle Miles Traveled
VOR.....Value of Reliability
VOT.....Value of Time
VPHPL.....Vehicles per Hour per Lane

WEO.....World Economic Outlook
WHO.....World Health Organization
WHTI.....Western Hemisphere Travel Initiative
WiSE.....Wireless Signaling Extraction
W&P.....Woods & Poole Economics, Inc.

EXECUTIVE SUMMARY

This report documents the Investment Grade Traffic and Revenue (T&R) Study conducted by C&M Associates, Inc. (C&M)—acting as an independent T&R consultant—for the proposed 365 TOLL (the Project) in Hidalgo County, Texas. This study aims to support the Hidalgo County Regional Mobility Authority (HCRMA) in their effort to finance the Project by providing an investment grade T&R forecast for the Project over a 40-year period.

ES.1. Project Description

365 TOLL is a planned new 14.9-mile tolled highway in Hidalgo County extending from U.S. Route 281 (US 281)/Military Highway in the city of Pharr to Farm-to-Market Road 1016 (FM 1016)/Conway Avenue in the city of Mission, as well as 0.7 miles of toll-free freeway between US 281 and FM 2557. This facility is intended to relieve traffic congestion, facilitate international trade shipments across the U.S./Mexico border, and benefit local travelers by providing a high-speed connection between the Pharr–Reynosa International Bridge, the Anzalduas International Bridge, the McAllen Foreign Trade Zone (FTZ), and industrial areas and warehouses in McAllen, Mission, and Pharr. The Project will provide access to/from the Pharr–Reynosa International Bridge through Spur 600 at Cage Boulevard and the Border Safety Inspection Facility (BSIF) Connector at Military Highway, which is a toll-free road.

The Project consists of the following four segments:

- **Segment 1** – 5.8 miles extending from US 281/Military Highway to McColl Road (west of Jackson Road).
- **Segment 2** – 6.4 miles extending from McColl Road (west of Jackson Road) to FM 396/Anzalduas Highway.
- **Segment 3** – 0.7 miles extending from US 281/Military Highway to FM 2557/Stewart Road and the BSIF Connector. This segment is toll-free.
- **Segment 4** – 2.7 miles extending from FM 396/Anzalduas Highway to FM 1016/Conway Avenue.

The Project is planned to have two construction phases. Phase 1, which was completed in 2018, includes the construction of Segment 3 as well as improvements to a 1.15-mile segment of US 281/Military Highway and the construction of a grade-separated interchange at the intersection of US 281 and the Project. Phase 2, which consists of Segments 1 and 2, is not yet under construction but is expected to be completed and open to traffic in 2025. The construction of Segment 4 is not expected during the forecast period considered in this study.

The Project will initially be built with two mainlanes in each direction but will be expanded to three lanes per direction by 2035. Tolling along the facility is planned to begin in January 2025 and will comprise electronic and video toll gantry systems, meaning that vehicles will not need to stop at any time for tolling purposes. The Project will be operated and maintained by the HCRMA.

ES.2. General Study Details

The aim of this investment grade T&R study is to develop an updated T&R forecast for the Project with forecasts of annual toll transactions and toll revenue over a 40-year period beginning in 2025, the first year in which the facility will be tolled. The T&R forecast methods and practices utilized for this study meet common standards accepted within the T&R industry.

For the present study, which is an update to the most recent investment grade study conducted in 2016, C&M built upon the previous knowledge and efforts related to the Project with the following field work:

- Three stated preference (SP) surveys conducted to estimate VOT for each of the most important market segments of the Project:
    - Hidalgo Resident Survey
    - Hidalgo Visitor/Shopper Survey
    - Commercial Vehicle Company Survey
- A market research survey for U.S./Mexico border crossers, Hidalgo residents, and Hidalgo visitors/shoppers.
- An origin-destination (OD) survey for Hidalgo County utilizing big data.

Additionally, the scope of this study includes an independent socioeconomic review of the study area and the production of socioeconomic forecasts. These forecasts served as input for developing the traffic demand for the Project and, ultimately, the final T&R results.

The newly available TxDOT Lower Rio Grande Valley (LRGV) Travel Demand Model (TDM) was reviewed and adopted into C&M's modeling procedure. C&M updated this TDM with the latest available socioeconomic and traffic data. Additionally, C&M employed its proprietary Binational Assignment Model for Hidalgo County and the Reynosa Metropolitan area to evaluate the impact of the Project on the border-crossing volume shares of the Hidalgo County international bridges.

Unfortunately, Hidalgo County along with other counties in the Rio Grande Valley area have suffered a high incidence of per capita cases and deaths caused by the viral illness generally referred to as COVID-19, which has spread throughout the world and has been classified as a pandemic by the World Health Organization. As of September 28, 2020, Hidalgo County had 31,562 confirmed COVID-19 cases and 1,630 COVID-19-related deaths.

The COVID-19 pandemic is materially impacting global economics and significantly impacting all transportation industries, including the border crossings at the U.S/Mexico border, which have been restricted to crossings for essential business only. Toll road traffic in particular has been impacted, with vehicle volumes decreasing in response to quarantine orders, stay-at-home recommendations, and working from home. As the situation remains dynamic, the response has varied significantly from state to state and is evolving rapidly.

The consequences of the pandemic for this study, with a Project opening year of 2025, are likely to improve significantly over time. Whereas the duration and the recovery of the economic slowdown caused by the pandemic may have an impact, the current situation (e.g., stay-at-home orders, lockdowns, the number of infections, and the availability of a vaccine) will only secondarily impact the T&R forecast. More discussion of the effects of the pandemic are considered in later chapters.

ES.3. Existing Information

As presented in Chapter 2, C&M reviewed existing traffic-related data corresponding to the study area, including the historical data of nearby roadway networks and international bridges, historical trends, and the current traffic pattern, which was used for this study's traffic forecast. To analyze traffic pattern changes within the study area, C&M updated the existing traffic data collected during its previous studies for the Project.

ES.4. Field Data

As presented in Chapter 3, C&M has been collecting field data in the study area specifically related to the Project since 2008. Based on these data, C&M not only developed a user profile but also gained a comprehensive understanding of traffic characteristics and travel patterns within the study area, all of which provided critical information for travel demand model development and calibration, as detailed in Chapter 5. Importantly, C&M was able to rely on its previously collected data in lieu of some field work efforts that could not be completed for the present study due to the COVID-19 pandemic. For example, C&M utilized its previously collected traffic counts, as current traffic counts would not provide an accurate depiction of typical traffic patterns. C&M also previously performed several in-person intercept surveys to obtain critical traffic information such as OD patterns and travel characteristics of persons using the project corridor. Nevertheless, C&M's field work for the present study did include several online travel surveys, which could be carried out as proposed despite COVID-19.

Chapter 3 first summarizes the field work performed by C&M for previous studies related to the Project. The remainder of the chapter presents the field work performed by C&M for the present study, which includes the following:

- Cell phone and GPS OD data
- Online/Mail Hidalgo County Residents SP Survey
- Online Hidalgo County Visitor SP Survey
- Online/Phone Interview International Trade Truck Company Survey

ES.5. Socioeconomic Review

As presented in Chapter 4, C&M conducted a review of historical and forecasted socioeconomic data for the RGVMPO region, including Hidalgo and Cameron Counties, which are part of the travel demand modeling area (see Chapter 5). Special emphasis was placed on factors that impact transportation activities and influence traffic demand, particularly population, employment, number of households, median household income, and gross regional product (GRP).

The purpose of this socioeconomic review was to evaluate and update the socioeconomic TDM input for the present study. The socioeconomic forecasts in this study are based on an independent socioeconomic analysis carried out by Economic & Planning Systems, Inc. (EPS), including an evaluation of the COVID-19 pandemic's effects. The independent socioeconomic forecast from EPS accommodates inputs from the current economic situation, possible recovery scenarios from the COVID-19 pandemic and subsequent recession, and longer-term structural economic patterns. As such, EPS's model is structured with dual components:

- **Short-Term Forecast (through 2025):** This model component forecasts current conditions through the end of 2025 on a monthly basis, creating a linkage between the base year (2018) and the initial year of the long-term forecast component. This forecast is built on two series of ordinary least squares (OLS) regressions: 1) sales taxes by county, and 2) employment by county by industry supersector. This two-stage regression model replicates the clear relationship that personal consumer spending has on the overall economy and thus employment levels. Moreover, the short-term model allows for a quantification of the impact of the COVID-19 on the employment market.
- **Long-Term Forecast (2025–2045):** This model component forecasts employment, population, and households with an employment-based population forecast methodology. It aggregates the short-term model employment outputs at an annual level and applies additional macroeconomic and demographic assumptions to arrive at longer-term forecasts of employment, population, and

households. The layers of macroeconomic assumptions incorporate regional industry-level location quotients and national industry-level employment projections. Demographic assumptions include shifts related to in- and out-commuting patterns, unemployment, self-employed persons, group quarters, non-working populations, and shifts in average household size.

After initial review of historical data and consideration for the incorporation of COVID-19 data into the modeling parameters, EPS identified three scenarios which contain separate but intertwined assumptions and profiles regarding the current downturn, recovery, and longer-term economic and demographic outlook, as explained in Chapter 4.

In addition to the work EPS has done for the independent socioeconomic data review, C&M's socioeconomic data update included the following steps:

1) Reviewed historical and forecasted socioeconomic data in the areas of interest.
2) Supervised the socioeconomic analysis carried out by EPS.
3) Prepared traffic analysis zone (TAZ)-level socioeconomic data for all future model years, for the TAZ structure of C&M's TDM (see Chapter 5).
4) Developed the border demand forecast based on a socioeconomic regression model.

In preparing its socioeconomic update, C&M considered historical and forecasted data from the following sources, in addition to the EPS study:

- U.S. Census Bureau, American Community Survey (ACS)
- BLS
- McAllen Chamber of Commerce
- Instituto Nacional de Estadistica y Geografia (INEGI)
- Consejo Nacional de Poblacion (CONAPO)
- Moody's Analytics (Moody's)
- Woods & Poole Economics, Inc. (W&P)
- Texas State Data Center (TSDC)
- Texas Water Development Board (TWDB)
- TxDOT's Lower Rio Grande Valley (LRGV) TDM
- TxDOT's Texas Statewide Analysis Model (Texas SAM)
- Bureau of Transportation Statistics (BTS) Border Crossing Data.

Among the sources analyzed, it is important to note that besides EPS, the projections developed by Moody's and W&P also consider the impacts of the COVID-19 pandemic in the short and long term. The remaining sources served as a useful comparison point to highlight the extent of COVID-19's estimated impact.

ES.6. Travel Demand Modeling

As presented in Chapter 5, C&M adopted the existing TxDOT LRGV four-step TDM, which was developed in the TransCAD modeling software platform. C&M received the latest version of the LRGV TDM on July 16, 2020 from the RGVMPO. C&M reviewed, evaluated, and adapted all four steps of the LRGV TDM based on current transportation data, observed traffic patterns within the study area, and expected future road network improvements. C&M calibrated the adopted LRGV TDM to existing Project corridor traffic conditions (model base year 2018) within the 365 TOLL Project study area and subsequently used the calibrated model to develop future traffic forecasts for 2025, 2030, 2040, and 2045.

The latest LRGV TDM, which includes 1,565 TAZs and 25 external stations, has had some significant improvements to the previous TDMs available for this region. The LRGV TDM includes a time-of-day assignment of four time periods and an increase in the number of TAZs in Hidalgo County from 800 to 867. More detailed about the LRGV TDM are presented in Section 5.1.

Hidalgo and Cameron Counties have a high share of over-regional commercial traffic origins or destinations, which required C&M to analyze over-regional model patterns. Therefore, to further aid in revising and updating the LRGV TDM and its parameters for the current study, C&M requested and reviewed TxDOT's latest Texas Statewide Analysis Mode (Texas SAM).

Chapter 5 describes C&M's process of adopting the LRGV TDM and the development of the future model years required for this study, including the model calibration and future year traffic assignments.

ES.7. Traffic and Revenue Forecast

Chapter 6 presents the traffic and revenue (T&R) estimates for the Project over a forecast period of 40 years. C&M employed the adopted TxDOT LRGV TDM to model the Project's traffic for a typical working day and to perform future scenario runs to forecast traffic for the years 2025, 2030, 2040, and 2045 (see Chapter 5 for details regarding the modeling effort). After the traffic forecast for a typical working day was developed, C&M approximated the toll rate and corresponding traffic through its toll diversion procedure and determined the T&R of the facility for each model year. C&M then incorporated this information into its post-processing model designed to estimate T&R on an annual basis. Traffic was interpolated between model years as well as extrapolated after the final model year 2045 to cover the entire forecast period of 2025 to 2064.

C&M also incorporated the results of its traffic data analysis and, based on experience with existing toll road facilities, utilized a series of assumptions regarding toll system implementation and enforcement. Furthermore, the T&R analysis was conducted with the assumption that exit ramps for the Project will be designed with proper geometric configuration and traffic control to ensure that traffic is not negatively affected. Other assumptions used in the development of the post-processing model, as well as assumptions pertaining to the toll collection system, are discussed in this chapter.

Finally, C&M modeled several T&R sensitivity scenarios to determine the forecasted revenue's sensitivity to changes in various factors—such as toll rate, VOT, VOR, and population growth, among others—and performed a risk analysis to quantify the uncertainty associated with the TDM key input variables and the impact that this uncertainty has on the confidence level of the T&R forecast.

The results of C&M's T&R forecasting, in terms of annual toll transactions and revenue for the years 2025 through 2064, are presented in Figure ES-1 and Table ES-1. All revenues are presented in nominal dollars, while the corresponding table also presents revenue in 2020 dollars. The model forecast years from the TDM were interpolated and extrapolated as needed to obtain annual transactions and revenue figures by employing a post-processing model.

For the opening year 2025, C&M forecasts that the Project will generate approximately $2.7 million in toll revenue as a result of 4.5 million toll transactions. The number of transactions is projected to increase to approximately 10.3 million by 2030, 13.0 million by 2040, and to 17.8 million by the final forecast year 2064. Annual revenue is projected to reach approximately $9.5 million by 2030, $15 million by 2040 and $35.2 million by 2064. The jump in T&R observed in 2040 is a result of the Project's expansion to three lanes per direction in 2035.

The Project's accumulated gross revenue (in 2020 dollars) is $399,370,000.

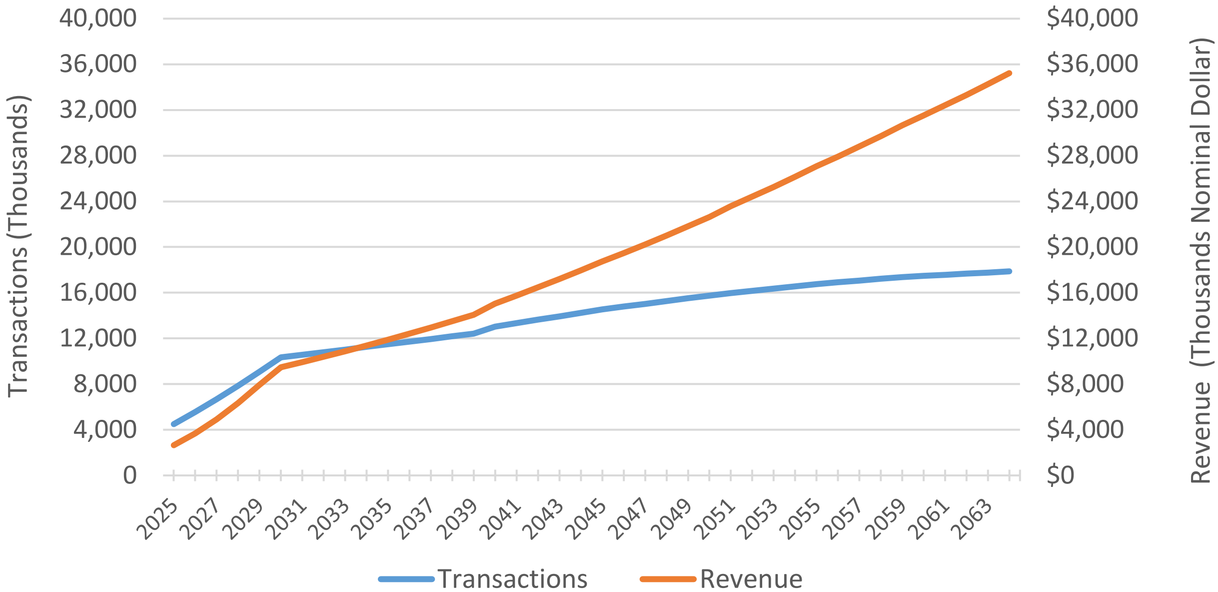


Figure ES-1. 365 TOLL Annual Transactions and Revenue

365 TOLL traffic comes primarily from the local roads of the study area. Internal passenger vehicles and the commercial vehicles from the international bridges are the main user groups of the Project. C&M estimates that 72 percent of passenger vehicles transactions in 2025 are internal passenger vehicles trips, with their ODs around the Project. The Internal vehicle trip share of the passenger vehicles is assumed to increase to 77 percent by 2045. As expected, most of the commercial vehicle transactions that use the Project are commercial vehicle trips with ODs related to Hidalgo County international bridges, representing roughly 65 percent of the total commercial vehicle transactions of the Project. The overall commercial vehicle transaction percentage of the Project grows from 12 percent in 2025 to 14 percent in 2045.

Table ES-1. 365 TOLL Annual Transactions and Revenue

Year	Transactions (in Thousands)			Revenue (in Thousands 2020 Dollars)			Revenue (in Thousands Nominal Dollars)		
	PV	CV	Total	PV	CV	Total	PV	CV	Total
2025	3,942	549	4,491	$1,590	$770	$2,360	$1,790	$870	$2,660
2026	4,873	682	5,555	$2,170	$1,030	$3,200	$2,500	$1,190	$3,690
2027	5,852	824	6,676	$2,840	$1,330	$4,170	$3,350	$1,570	$4,920
2028	6,878	975	7,853	$3,590	$1,660	$5,250	$4,340	$2,000	$6,340
2029	7,952	1,136	9,088	$4,420	$2,010	$6,430	$5,450	$2,480	$7,930
2030	9,073	1,261	10,334	$5,240	$2,270	$7,510	$6,620	$2,870	$9,490
2031	9,256	1,308	10,564	$5,340	$2,350	$7,690	$6,900	$3,040	$9,940
2032	9,440	1,356	10,796	$5,440	$2,440	$7,880	$7,180	$3,220	$10,400
2033	9,623	1,403	11,026	$5,540	$2,530	$8,070	$7,470	$3,410	$10,880
2034	9,807	1,451	11,258	$5,640	$2,610	$8,250	$7,770	$3,600	$11,370
2035	9,990	1,499	11,489	$5,730	$2,700	$8,430	$8,080	$3,800	$11,880
2036	10,174	1,546	11,720	$5,830	$2,790	$8,620	$8,400	$4,010	$12,410
2037	10,357	1,594	11,951	$5,930	$2,870	$8,800	$8,720	$4,230	$12,950
2038	10,540	1,642	12,182	$6,020	$2,960	$8,980	$9,050	$4,450	$13,500
2039	10,724	1,689	12,413	$6,120	$3,050	$9,170	$9,390	$4,680	$14,070
2040	11,249	1,783	13,032	$6,380	$3,230	$9,610	$10,000	$5,060	$15,060
2041	11,505	1,829	13,334	$6,530	$3,310	$9,840	$10,450	$5,300	$15,750
2042	11,761	1,876	13,637	$6,680	$3,390	$10,070	$10,920	$5,540	$16,460
2043	12,017	1,922	13,939	$6,820	$3,470	$10,290	$11,400	$5,790	$17,190
2044	12,273	1,969	14,242	$6,970	$3,550	$10,520	$11,900	$6,060	$17,960
2045	12,530	2,015	14,545	$7,120	$3,630	$10,750	$12,410	$6,330	$18,740
2046	12,734	2,052	14,786	$7,230	$3,690	$10,920	$12,890	$6,580	$19,470
2047	12,939	2,089	15,028	$7,350	$3,760	$11,110	$13,380	$6,850	$20,230
2048	13,144	2,127	15,271	$7,470	$3,830	$11,300	$13,880	$7,120	$21,000
2049	13,349	2,164	15,513	$7,580	$3,900	$11,480	$14,410	$7,400	$21,810
2050	13,554	2,201	15,755	$7,700	$3,960	$11,660	$14,950	$7,690	$22,640
2051	13,725	2,232	15,957	$7,800	$4,020	$11,820	$15,550	$8,020	$23,570
2052	13,895	2,263	16,158	$7,890	$4,070	$11,960	$16,100	$8,310	$24,410
2053	14,066	2,294	16,360	$7,990	$4,130	$12,120	$16,660	$8,610	$25,270
2054	14,237	2,325	16,562	$8,090	$4,190	$12,280	$17,230	$8,920	$26,150
2055	14,408	2,356	16,764	$8,180	$4,240	$12,420	$17,830	$9,240	$27,070
2056	14,536	2,379	16,915	$8,260	$4,280	$12,540	$18,390	$9,540	$27,930
2057	14,664	2,402	17,066	$8,330	$4,320	$12,650	$18,960	$9,840	$28,800
2058	14,792	2,425	17,217	$8,400	$4,370	$12,770	$19,550	$10,160	$29,710
2059	14,920	2,449	17,369	$8,480	$4,410	$12,890	$20,160	$10,490	$30,650
2060	15,005	2,464	17,469	$8,520	$4,440	$12,960	$20,730	$10,790	$31,520
2061	15,090	2,480	17,570	$8,570	$4,460	$13,030	$21,310	$11,100	$32,410
2062	15,176	2,495	17,671	$8,620	$4,490	$13,110	$21,910	$11,410	$33,320
2063	15,261	2,511	17,772	$8,670	$4,520	$13,190	$22,520	$11,740	$34,260
2064	15,347	2,526	17,873	$8,720	$4,550	$13,270	$23,150	$12,080	$35,230

Chapter 1: INTRODUCTION

This report documents the Investment Grade Traffic and Revenue (T&R) Study conducted by C&M Associates, Inc. (C&M)—acting as an independent T&R consultant—for the proposed 365 TOLL (the Project) in Hidalgo County, Texas. This study aims to support the Hidalgo County Regional Mobility Authority (HCRMA) in their effort to finance the Project by providing an investment grade T&R forecast for the Project over a 40-year period.

1.1 Project Description

365 TOLL is a planned new 14.9-mile tolled highway in Hidalgo County extending from U.S. Route 281 (US 281)/Military Highway in the city of Pharr to Farm-to-Market Road 1016 (FM 1016)/Conway Avenue in the city of Mission, as well as 0.7 miles of toll-free freeway between US 281 and FM 2557. This facility is intended to relieve traffic congestion, facilitate international trade shipments across the U.S./Mexico border, and benefit local travelers by providing a high-speed connection between the Pharr–Reynosa International Bridge, the Anzalduas International Bridge, the McAllen Foreign Trade Zone (FTZ), and industrial areas and warehouses in McAllen, Mission, and Pharr. The Project will provide access to/from the Pharr–Reynosa International Bridge through Spur 600 at Cage Boulevard and the Border Safety Inspection Facility (BSIF) Connector at Military Highway, which is a toll-free road.

As illustrated in Figure 1-1, the Project consists of the following four segments:

- **Segment 1** – 5.8 miles extending from US 281/Military Highway to McColl Road (west of Jackson Road).
- **Segment 2** – 6.4 miles extending from McColl Road (west of Jackson Road) to FM 396/Anzalduas Highway.
- **Segment 3** – 0.7 miles extending from US 281/Military Highway to FM 2557/Stewart Road and the BSIF Connector. This segment is toll-free.
- **Segment 4** – 2.7 miles extending from FM 396/Anzalduas Highway to FM 1016/Conway Avenue.

The Project is planned to have two construction phases. Phase 1, which was completed in 2018, includes the construction of Segment 3 as well as improvements to a 1.15-mile segment of US 281/Military Highway and the construction of a grade-separated interchange at the intersection of US 281 and the Project.[1] Phase 2, which consists of Segments 1 and 2, is not yet under construction but is expected to be completed and open to traffic in 2025. Construction of Segment 4 is not expected during the forecast period considered in this study.

The Project will initially be built with two mainlanes in each direction but will be expanded to three lanes per direction by 2035.[2] Tolling along the facility is planned to begin in January 2025 and will comprise electronic and video toll gantry systems, meaning that vehicles will not need to stop at any time for tolling purposes. The Project will be operated and maintained by the HCRMA.

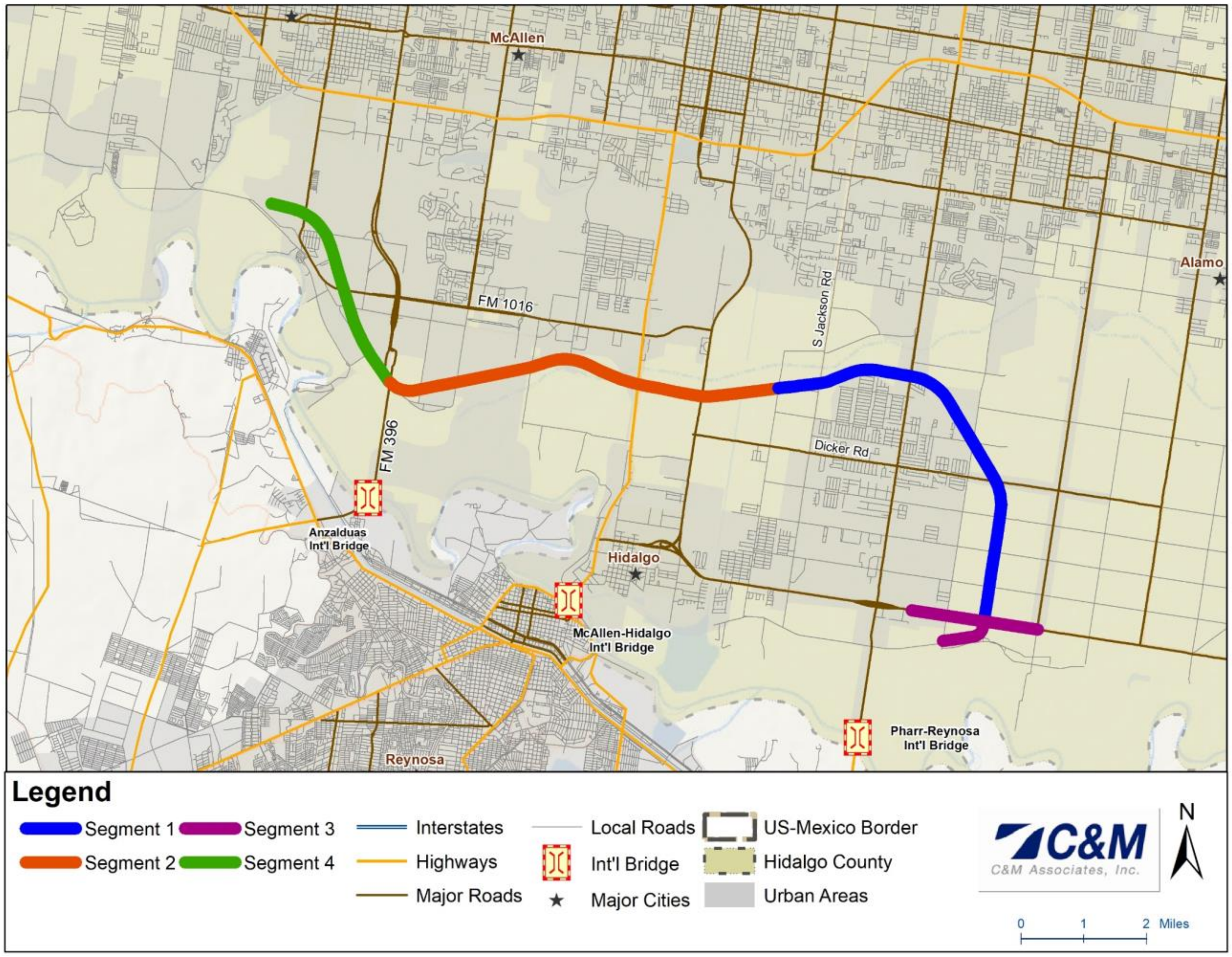


Figure 1-1. Project Location and Segments

The Project represents the first step in developing the Hidalgo County Loop System. This proposed system of facilities will eventually form a loop around the McAllen–Edinburg–Mission Metropolitan Statistical Area (MSA), which is synonymous with Hidalgo County and anchored by the cities of McAllen, Mission, Pharr, and Edinburg. The next portion of the Hidalgo Loop planned for development is the International Bridge Trade Corridor (IBTC). The proposed IBTC will be 12.3 miles long, extending from the intersection of the Project and FM 3072 (Dicker Road) and traveling east before splitting to two termini: Interstate Highway 2 (I-2) to the north and FM 493 to the east. The IBTC construction project is currently listed in the Rio Grande Valley Metropolitan Planning Organization's (RGVMPO) Metropolitan Transportation Plan (MTP) in two Phases: Phase 1 (2021) as toll-free four-lane divided at grade highway and Phase 2 (2040) as a toll-free six-lane controlled access highway with four-lane frontage roads.

Another toll-free project that forms part of the proposed Hidalgo Loop is the Texas Department of Transportation's (TxDOT) State Highway 68 (SH 68) project, which is currently in the RGVMPO MTP and the Statewide Transportation Improvement Program (STIP) as a four-lane divided rural highway facility with future mainlanes and overpasses in eastern Hidalgo County from US 83/I-2 to US 281/I-69C.[3] The facility is the northern extension of the IBTC and has a total project length of approximately 22 miles. SH 68 will improve the current north–south connectivity in the area, alleviating the increasing traffic volumes on current north–south roadways in the area as the population increases.

1.2 Project Background

The Hidalgo County Loop System was proposed in 2008 to serve future transportation needs. Originally envisioned as a single project and now split into several projects, including 365 TOLL, the Hidalgo Loop will eventually result in the formation of a loop around the McAllen–Edinburg–Mission MSA, as illustrated in Figure 1-2. Other than the three previously mentioned projects, the Hidalgo Loop has not advanced from preliminary planning stages.

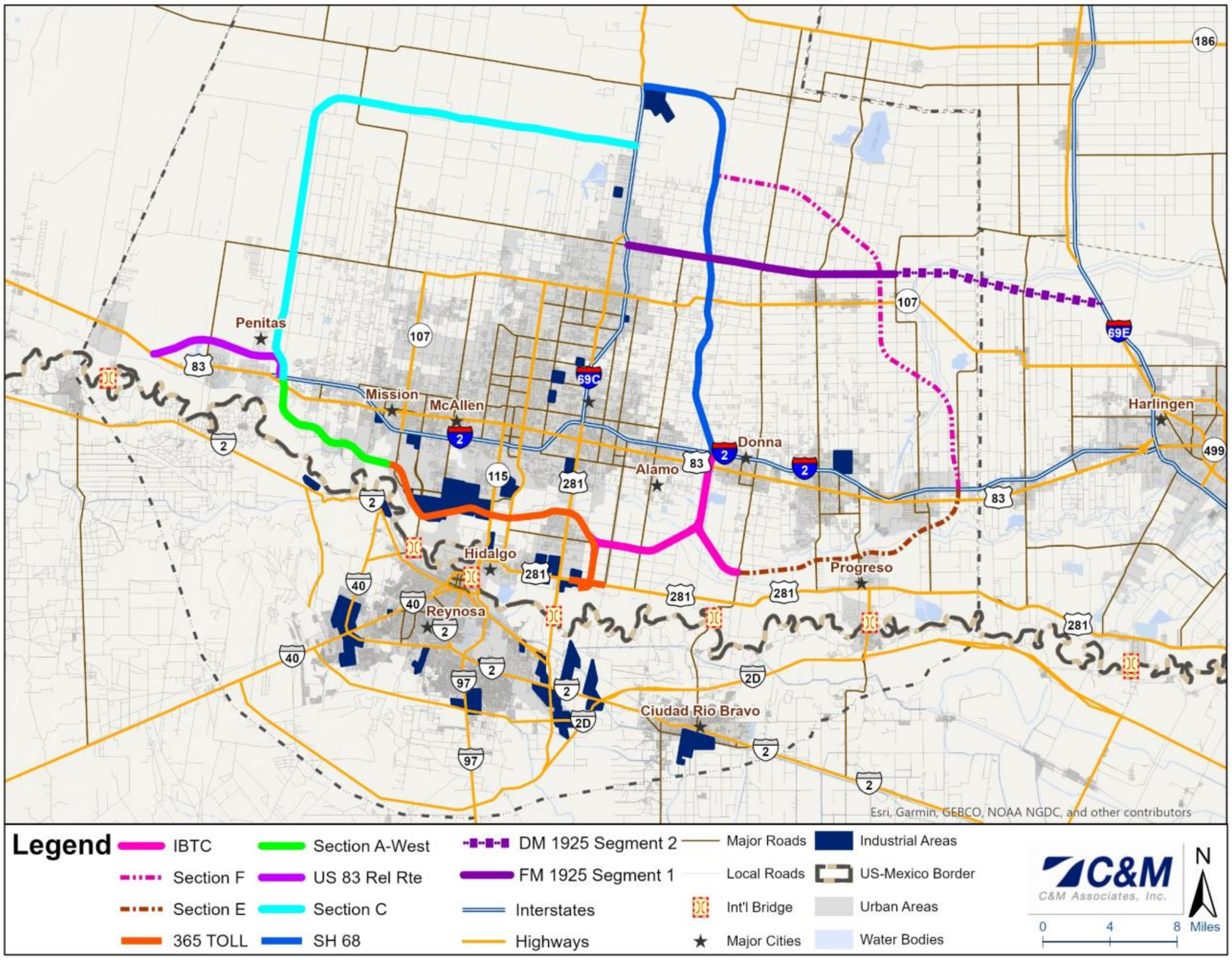


Figure 1-2. Proposed Hidalgo Loop

1.2.1 Socioeconomic Conditions

The Project's necessity is due in large part to the unique socioeconomic characteristics of the surrounding region. Hidalgo County's proximity to major industrial and retail centers on both sides of the U.S./Mexico border promotes constant economic growth in this region. Population and employment in Hidalgo County have grown faster than those of other border counties in Texas due to economic growth. According to Woods & Poole Economics, Inc. (W&P), from 2000 to 2019 population and employment exhibited compound annual growth rates (CAGR) of 2.4 and 3.4 percent, respectively. This growth is expected to continue, with W&P forecasting 2019–2040 CAGRs of 1.8 and 2.6 percent for population and employment, respectively.[4]

One component of the region's unique socioeconomic characteristics is the pool of highly skilled workers, which plays a crucial role in investments and growth in the region. In its ranking of best-performing large cities in the United States, the Milken Institute ranked the McAllen–Edinburg–Mission MSA 63rd in 2020, improving from 68th place in 2018. However, this MSA is also ranked 1st place nationwide in the "High Tech GDP Growth" category for the timeframe of 2016 to 2017, and it was ranked 6th place from 2012 to 2017.[5] This category represents knowledge-based economies—those with innovation industries and skilled labor at their core—which have performed strongly in terms of the Best-Performing Cities index by adapting to economic changes. High-profile corporate site searches, such as the SpaceX Center in Brownsville (in Hidalgo's neighboring county), increasingly highlight the importance of a strong knowledge-economy in this region. Access to a large pool of highly skilled workers is crucial to this positive trend.

Another positive trend that indicates healthy growth in the region—and with it, a positive outlook for the Project—is an increase in wages, which translates to an increase in value of time (VOT). The McAllen Chamber of Commerce reported a CAGR of 2.2 percent in wage and salary employment from 2006 to 2019 for McAllen, which is the largest city in the McAllen–Edinburg–Mission MSA.[6] Furthermore, the average home sales price in McAllen exhibited a CAGR of 2.1 percent during the same period, and new home permits have been growing since 2013 at a CAGR of 3.9 percent.

It is also important to consider the socioeconomic trends on the Mexican side of the border, as Hidalgo County and northern Mexico represent a highly integrated economic unit. Reynosa, the largest Mexican municipality near Hidalgo County, has exhibited rapid population growth in recent decades. Based on data from the Instituto Nacional de Estadística y Geografía (INEGI), Reynosa exhibited the second-highest population growth rate in all of Mexico from 1990 to 2000 with a CAGR of 4.1 percent.[7] From 2000 to 2010, Reynosa was one of the fastest-growing municipalities in Mexico with a reported CAGR of 3.8 percent.[7] Recent population estimates from INEGI show a decrease in the population CAGR to 1.4 percent from 2015 to 2020. [8]

1.2.2 International Trade and Transportation

The U.S./Mexico border region is unique, and each region along the U.S./Mexico border has its own specific characteristics and markets. In the case of the Reynosa/Hidalgo County region, international trade is primarily driven by two different market segments: the local maquiladora trade[i] and produce exports from Mexico to the United States.[9] There are more than 40 industrial and maquiladora parks in the Hidalgo County/Reynosa Metropolitan binational region. In recent years, produce imports from Mexico over the Hidalgo County international bridges have played an increasingly important role in Hidalgo County's economy. In fact, Hidalgo has recently surpassed the Nogales, AZ port as the leading port of entry (POE) for Mexican fresh produce, measured in dollar value.[10] In this context, it is important to note that the Durango-Mazatlán Highway, which opened to traffic in 2013, cuts a direct route across the Sierra Madre Occidental Mountains and grants the Hidalgo County bridges access to the seaports of the Mexican Pacific Coast (Mazatlán) and, more importantly, to the Mexican commercial agricultural produce regions in the states of Sinaloa, Sonora, Jalisco, and Michoacán.

---

[i] A maquiladora in Mexico is a factory that operates under preferential tariff programs established and administered by the United States and Mexico. Materials, assembly components, and production equipment used in maquiladoras are allowed to enter Mexico duty-free. Products made can be exported to the U.S. at lower tariffs than those from other countries. The Maquiladora Program, which allowed maquiladoras to be 100% foreign owned, was initiated in Mexico in 1964 and followed the National Border Industrialization Program, which began in 1961. The Industrialization Program was created to increase foreign investment and stimulate Mexico's internal market. The Maquiladora Program was developed to foster border region employment rates as well as further attract foreign investment. A 1989 decree relaxed Mexico's foreign investment laws even more, allowing maquiladoras to sell up to 50 percent of their products to Mexican domestic markets.

In April 2014, to support shipping of perishable fresh produce from Mexico, the HCRMA designated several roads connecting the international bridges that accommodate commercial vehicles and the distribution centers in Hidalgo County as part of an oversized/overweight (OS/OW) commercial vehicle corridor. With the appropriate permit,[11] Mexican commercial vehicles that are heavier and larger than U.S. commercial vehicles can cross directly from Mexico to the distribution centers in Hidalgo County. The proposed 365 TOLL Project will be part of the Hidalgo County OS/OW corridor, being the only limited-access highway on this corridor.

The number of OS/OW permits has been steadily growing since 2014, adding an average of 350 permits each month for the last 6 years and resulting in 4,016 monthly permits in June 2020. The required fee to use the Hidalgo County OS/OW corridor is currently $200 per commercial vehicle per trip.

1.2.3 Traffic Conditions

In addition to the commercial vehicle traffic associated with the maquiladora industry and produce imports, many other vehicles travel the roadways of the study area on a daily basis. These vehicles include regular cross-border commuters destined for universities and other education centers or commuters driving to their places of employment. Others cross the border on their way to the many retail outlets located within the region or for other non-work-related trips. In short, the combination of various traffic generators is unique to this region and continues to contribute to significant traffic growth in Hidalgo County. According to TxDOT, annual average daily traffic (AADT) on the two major roadways in the urban area—US 83 and US 281—grew by more than 2 percent annually during the 2000–2018 period.[12]

Over the last decade, Hidalgo County has exhibited a discrepancy between roadway expansion and the growth of traffic congestion. According to the TxDOT's Road Inventory Report, Hidalgo County's lane miles have increased from 1,392.37 in 2011 to 1,448.94 in 2018, or 4 percent, whereas the daily vehicles miles traveled (VMT) increased from 7,515,929 to 8,768,395, or 16 percent during the same period.[13] As part of its study on emission trends in different Texas counties, the Texas Transportation Institute (TTI) estimated that VMT for Hidalgo County would grow annually by an average rate of 3.4 percent between 2000 and 2015, which is an increase of 66 percent.[14] They also estimated that VMT in Hidalgo County will grow by approximately 65 percent between 2015 and 2040. These conditions are expected to lead to increased congestion and pollution over time due to a lack of state funds with which to expand the existing and already congested traffic network.

1.3 Study Details

1.3.1 Study Area

As illustrated in Figure 1-3, the study area consists of Hidalgo County on the U.S. side of the border and the cities of Reynosa and Rio Bravo on the Mexican side of the border. Major U.S. cities located within the study area include McAllen, Pharr, Mission, Alamo, and Donna. The study area features significant transportation generators such as industrial zones, warehouses, maquiladoras, and shopping malls.

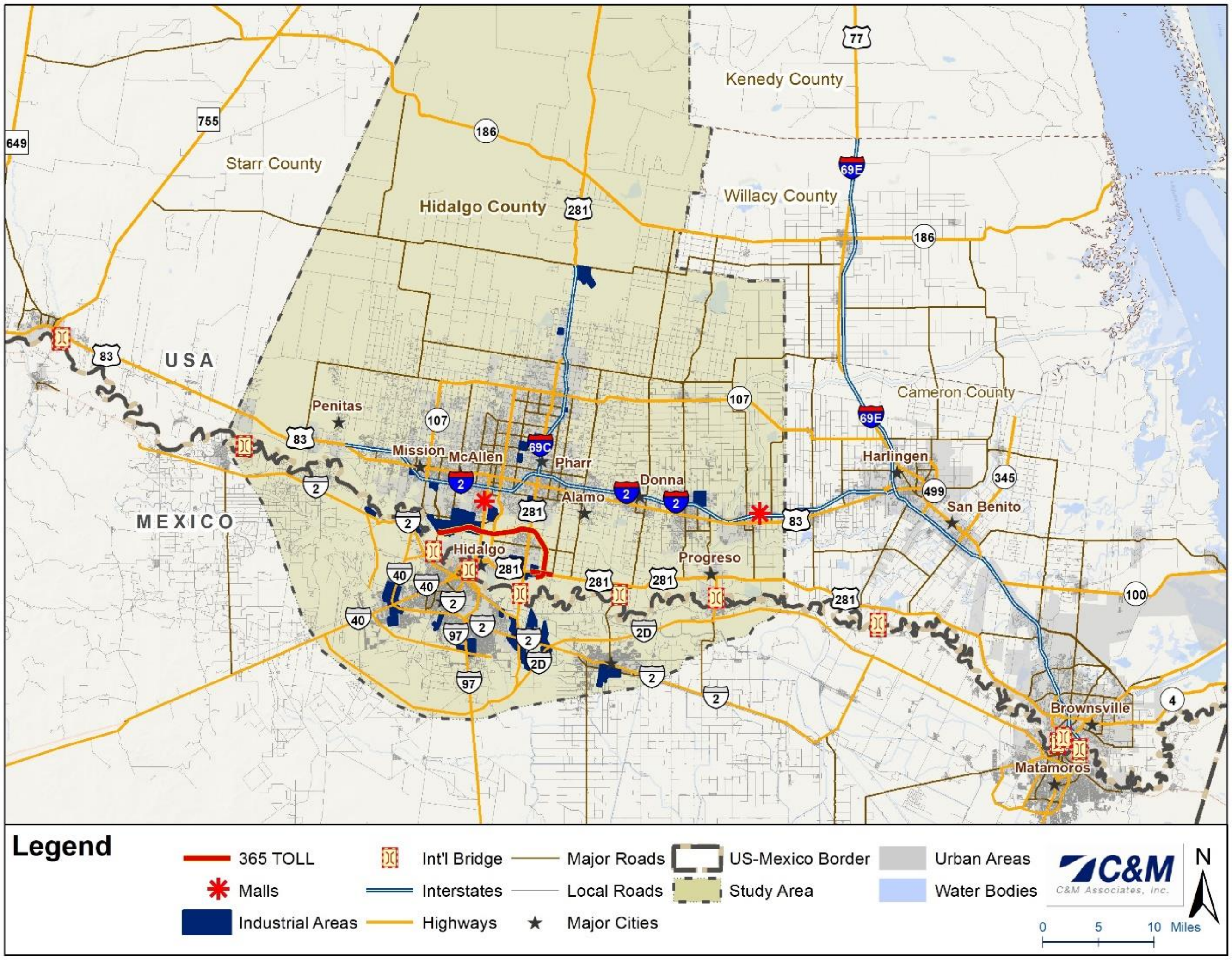


Figure 1-3. Study Area

The area is served by three major roads: I-2/US 83, I-69C/US 281, and Military Highway. I-2/US 83 is a major east–west travel corridor connecting the urban areas of Hidalgo County with those of neighboring Cameron County to the east and Starr County to the west. Many residential and commercial developments are located along the I-2 corridor.

I-69C is a north–south travel corridor that intersects I-2 just north of the city of Pharr, linking that city to the Pharr-Reynosa International Bridge located further south at the U.S./Mexico border. North of I-2, I-69C becomes a high-speed roadway that connects Hidalgo County to northern destinations throughout the state of Texas and to the broader United States.

Military Highway runs east–west along the U.S./Mexico border from Mission in Hidalgo County to Brownsville in Cameron County. The Military Highway alignment extends primarily through rural areas but also through warehouse and commercial areas in Hidalgo County. The facility connects all international bridges in the region and is adjacent to the McAllen FTZ. Due to its location, the percentage of commercial vehicle traffic and agricultural vehicles is higher on Military Highway than on other major roads.

1.3.2 Previous Studies

In 2008, on behalf of Hidalgo County Road Builders (HCRB), C&M performed an intermediate level T&R study for the Hidalgo Loop, which was presented in early 2009.[15] In the second half of 2009, C&M analyzed two southern sections of the Loop—an east section and a west section—and presented the HCRMA and First Southwest Company with an update to the intermediate T&R study.[16] In 2010, C&M presented the first investment grade study of the system, this time focusing on the IBTC.[17] In 2013, C&M conducted a new intermediate T&R study of both 365 TOLL and the IBTC, followed by an investment grade T&R study of these facilities in 2014[18,19] and an investment grade study for the 365 TOLL Project in 2016 on behalf of the HCRMA.[20]

Based in part on the results of these studies, the HCRMA decided to finance and build the 365 TOLL facility.

1.3.3 Objectives and Scope

The aim of this investment grade T&R study is to develop an updated T&R forecast for the Project with forecasts of annual toll transactions and toll revenue over a 40-year period beginning in 2025, the first year in which the facility will be tolled. The T&R forecast methods and practices utilized for this study meet common standards accepted within the T&R industry.

For the present study, which is an update to the most recent investment grade study conducted in 2016, C&M built upon the previous knowledge and efforts related to the Project with the following field work:

- Three stated preference (SP) surveys conducted to estimate VOT for each of the most important market segments of the Project:
    - Hidalgo Resident Survey
    - Hidalgo Visitor/Shopper Survey
    - Commercial Vehicle Company Survey
- A market research survey for U.S./Mexico border crossers, Hidalgo residents, and Hidalgo visitors/shoppers.
- An origin-destination (OD) survey for Hidalgo County utilizing big data.

Additionally, the scope of this study includes an independent socioeconomic review of the study area and the production of socioeconomic forecasts. These forecasts served as input for developing the traffic demand for the Project and, ultimately, the final T&R results.

The newly available TxDOT Lower Rio Grande Valley (LRGV) Travel Demand Model (TDM) was reviewed and adopted into C&M's modeling procedure. C&M updated this TDM with the latest available socioeconomic and traffic data. Additionally, C&M employed its proprietary Binational Assignment Model for Hidalgo County and the Reynosa Metropolitan area to evaluate the impact of the Project on the border-crossing volume shares of the Hidalgo County international bridges.

1.3.4 COVID-19 Impact

Unfortunately, Hidalgo County along with other counties in the Rio Grande Valley area have suffered a high incidence of per capita cases and deaths caused by the viral illness referred to as COVID-19, which has spread throughout the world and has been classified as a pandemic by the World Health Organization. As of September 28, 2020, Hidalgo County had 31,562 confirmed COVID-19 cases and 1,630 COVID-19-related deaths.[21]

The COVID-19 pandemic is materially impacting global economics and significantly impacting all transportation industries, including the border crossings at the U.S/Mexico border, which have been restricted to crossings for essential business only. Toll road traffic in particular has been impacted, with vehicle volumes decreasing in response to quarantine orders, stay-at-home recommendations, and working from home. As the situation remains dynamic, the response has varied significantly from state to state and is evolving rapidly.

The consequences of the pandemic for this study, with a Project opening year of 2025, are likely to improve significantly over time. Whereas the duration and the recovery of the economic slowdown caused by the pandemic may have an impact, the current situation (e.g., stay-at-home orders, lockdowns, the number of infections, and the availability of a vaccine) will only secondarily impact the T&R forecast. More discussion of the effects of the pandemic is presented in later chapters.

1.4 Organization of the Report

This report is organized into six chapters, with the remaining chapters consisting of the following:

- **Chapter 2** provides a review of existing traffic information, historical traffic trends, and characteristics of existing traffic within the study area, including those typical of traffic crossing the U.S./Mexico border. The chapter also provides background information regarding the Mexican traffic network in proximity to the border, as well as a description of programs and policies that impact cross-border travel.
- **Chapter 3** describes C&M's previous field data collection efforts and the results of its field data analysis, including findings from SP surveys conducted for the present study.
- **Chapter 4** summarizes and evaluates the study area's historical and forecasted socioeconomic data and the border demand forecast.
- **Chapter 5** explains the travel demand modeling procedure undertaken by C&M in its effort to develop T&R results based on socioeconomic inputs and traffic characteristics within the study area.
- **Chapter 6** summarizes the toll transactions and toll revenue projected by C&M for the Project and outlines the results of sensitivity tests and a risk analysis performed during the development of the T&R forecast.

---

[1] Harvey, C. (2016, April 29). Phase 1 of $200 million SH 365 reconstruction project begins. Retrieved from http://www.constructionequipmentguide.com/phase-1-of-200m-sh-365-reconstruction-project-begins/28756

[2] Rio Grande Valley, Metropolitan Planning Organization (2020). 2020 - 2040 RGVMPO MTP Amendment #2 - Revisions - Adopted July 24, 2020. Retrieved from https://www.rgvmpo.org/civicax/filebank/ blobdload.aspx?blobid=24016

[3] Texas Department of Transportation (n.d.). SH 68. Retrieved September 9, 2020 from https://www.txdot.gov/inside-txdot/projects/studies/pharr/sh68.html.

[4] Woods & Poole Economics, Inc. (2019, September). [2019 Regional Projections and Database]. Purchased data.

[5] Lin, M.C.Y., Lee, J., & Wong, P. (2020). *Best-Performing Cities 2020 - Where America's Jobs are Created and Sustained*. Retrieved from https://milkeninstitute.org/sites/default/files/reports-pdf/BPC-2020%20Report.pdf

[6] McAllen Chamber of Commerce (n.d.). Economic Pulse. Retrieved September 25, 2020 from https://mcallen.org/business-community/economicpulse/

[7] Instituto Nacional de Estadistica y Geografia (n.d.). Datos de la Población Mexicana. Retrieved September, 2020 from https://en.www.inegi.org.mx/

[8] Consejo Nacional de Poblacion (n.d.). Proyecciones de la Población de los Municipios de México, 2015-2030. Retrieved September, 2020 from https://www.gob.mx/conapo/documentos/proyecciones-de-la-poblacion-de-los-municipios-de-mexico-2015-2030.

[9] Manufacturing in Mexico, What is a Maquiladora. Retrieved September 15, 2020 from https://manufacturinginmexico.org/maquiladora-in-mexico/

[10] Pavlakovich-Kochi, V. (2016, March 9). Nogales, Arizona: Still the main gateway for fresh produce from Mexico? Retrieved from https://azmex.eller.arizona.edu/news-article/09mar2016/nogales-az-still-main-gateway-fresh-produce-mexico

[11] Hidalgo County Regional Mobility Authority (n.d.). Specialized Overweight Permits. Retrieved September 29, 2020 from https://texas.promiles.com/hidalgo/Default.aspx

[12] Texas Department of Transportation (n.d.). Traffic Count Database System. Retrieved September 30, 2020 from https://txdot.ms2soft.com/tcds/tsearch.asp?loc=Txdot&mod=tcds&local_id=57CC441

[13] Texas Department of Transportation (2019). Roadway Inventory Annual Reports – 2018. Retrieved from http://ftp.dot.state.tx.us/pub/txdot-info/tpp/roadway-inventory/2018.pdf

[14] Texas Transportation Institute (2008, August). *County population, VMT, CO, CO, VOC, NOx, SO, NH, and PM trends for 1990–2040*.

[15] C&M Associates, Inc. (2009). *Hidalgo County Loop Intermediate Traffic and Revenue Study*.

[16] C&M Associates, Inc. (2009). *Hidalgo County Loop Intermediate Traffic and Revenue Forecast Update* [Memorandum].

[17] C&M Associates, Inc. (2010). *Hidalgo County International Bridge Trade Corridor Investment Grade Traffic and Revenue Study*.

[18] C&M Associates, Inc. (2013). *Hidalgo County Loop (SH 365 and IBTC) Intermediate Traffic and Revenue Study*.

[19] C&M Associates, Inc. (2014). *Investment Grade Traffic and Revenue Analysis for SH 365 and the IBTC*.

[20] C&M Associates, Inc. (2016). *Investment Grade Traffic and Revenue Update Study*.

[21] The New York Times (n.d.). Texas Coronavirus Map and Case Count. Retrieved September 30, 2020 from https://www.nytimes.com/interactive/2020/us/texas-coronavirus-cases.html

Chapter 2: Review of Existing Information

This chapter presents an overview of existing traffic-related data corresponding to the study area, including the historical data of nearby roadway networks and international bridges, historical trends, and the current traffic pattern, which was used for this study's traffic forecast. To analyze traffic pattern changes within the study area, C&M updated the existing traffic data collected during its previous studies of the Project. This chapter begins with a review of the existing roadway networks and related historical traffic data in Hidalgo County, the Mexican city of Reynosa, and their surrounding areas.

After presenting the existing situation through the pre-pandemic period, this chapter concludes by presenting the observed-to-date impacts of COVID-19 on travel in the region and border crossings.

2.1. Existing Roadway Network: Hidalgo County

As shown in Figure 2-1, Hidalgo County has two major traffic corridors: I-2/US 83 traveling east–west and I-69C/US 281 traveling north–south. Military Highway/US 281 is an additional east–west corridor that serves as the major connection between Hidalgo County and Cameron County after I-2/US 83. Military Highway connects all the international bridges in the region, important commercial areas, industrial parks, and the McAllen FTZ. In addition to these corridors, the high proportion of commercial vehicle traffic in the study area necessitates analyzing specific roads that are used as commercial vehicle routes/corridors within Hidalgo County. The following sections describe the characteristics of these corridors and provide corresponding historical traffic data, which were summarized from TxDOT's annual average daily traffic (AADT) maps on Project-relevant locations, as presented in Figure 2-2.[1]

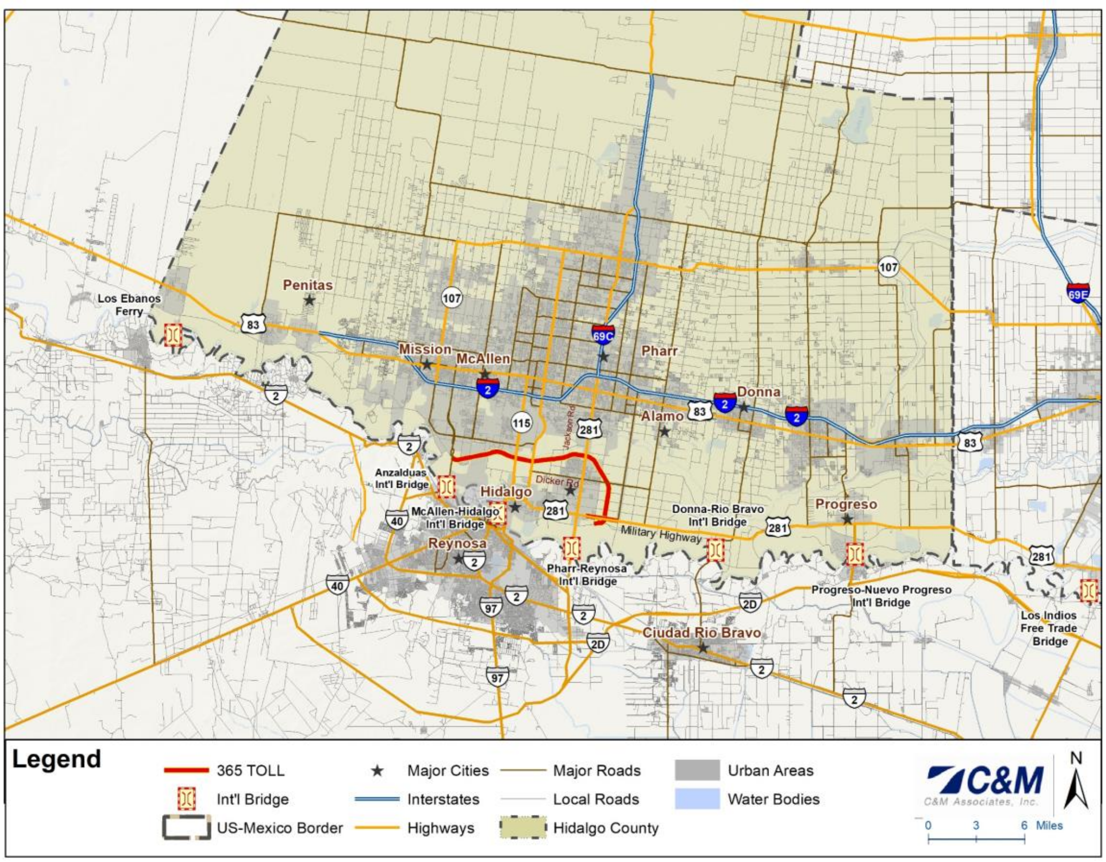
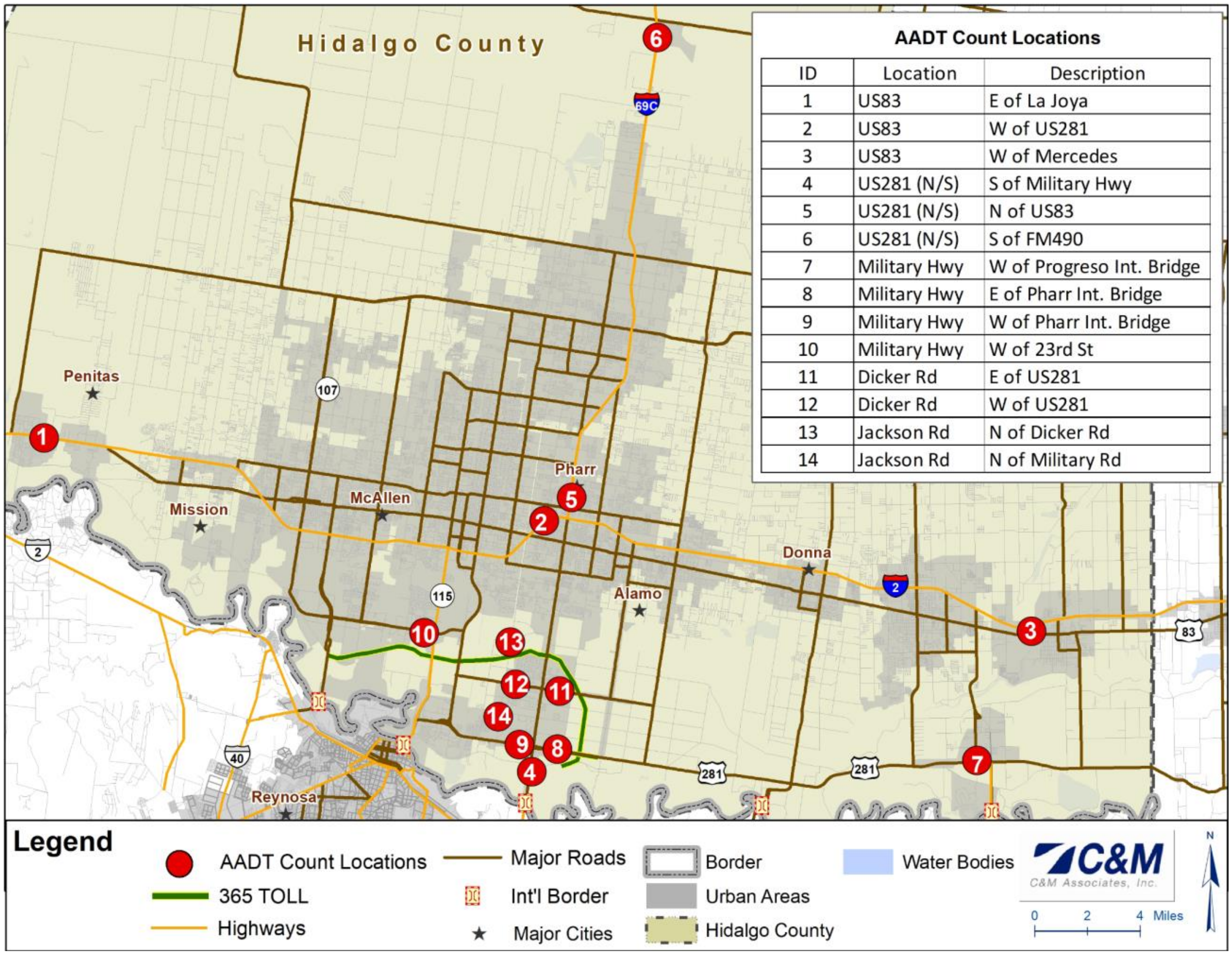


Figure 2-1. Roadway Network



AADT Count Locations

ID	Location	Description
1	US83	E of La Joya
2	US83	W of US281
3	US83	W of Mercedes
4	US281 (N/S)	S of Military Hwy
5	US281 (N/S)	N of US83
6	US281 (N/S)	S of FM490
7	Military Hwy	W of Progreso Int. Bridge
8	Military Hwy	E of Pharr Int. Bridge
9	Military Hwy	W of Pharr Int. Bridge
10	Military Hwy	W of 23rd St
11	Dicker Rd	E of US281
12	Dicker Rd	W of US281
13	Jackson Rd	N of Dicker Rd
14	Jackson Rd	N of Military Rd

Figure 2-2. Selected AADT Locations in Hidalgo County

As illustrated in Figure 2-3, the most significant changes in AADT from 2010 to 2018 took place on I-2 and US 281 (north–south), with differences of over 5,000. Second, several segments exhibited differences of 3,000 to 5,000: FM 493, FM 2557, and part of I-2 close to the city of Mission. US 281 (west–east), FM 495, and the I-2 segment between US 281 (north–south) and FM 115 exhibited moderate AADT changes ranging from 1,000 to 3,000. The smallest AADT change (below 1,000) was on US 83 east of US 281 (north–south) and the multiple arterials running north–south that link US 83 and US 281 (west–east).

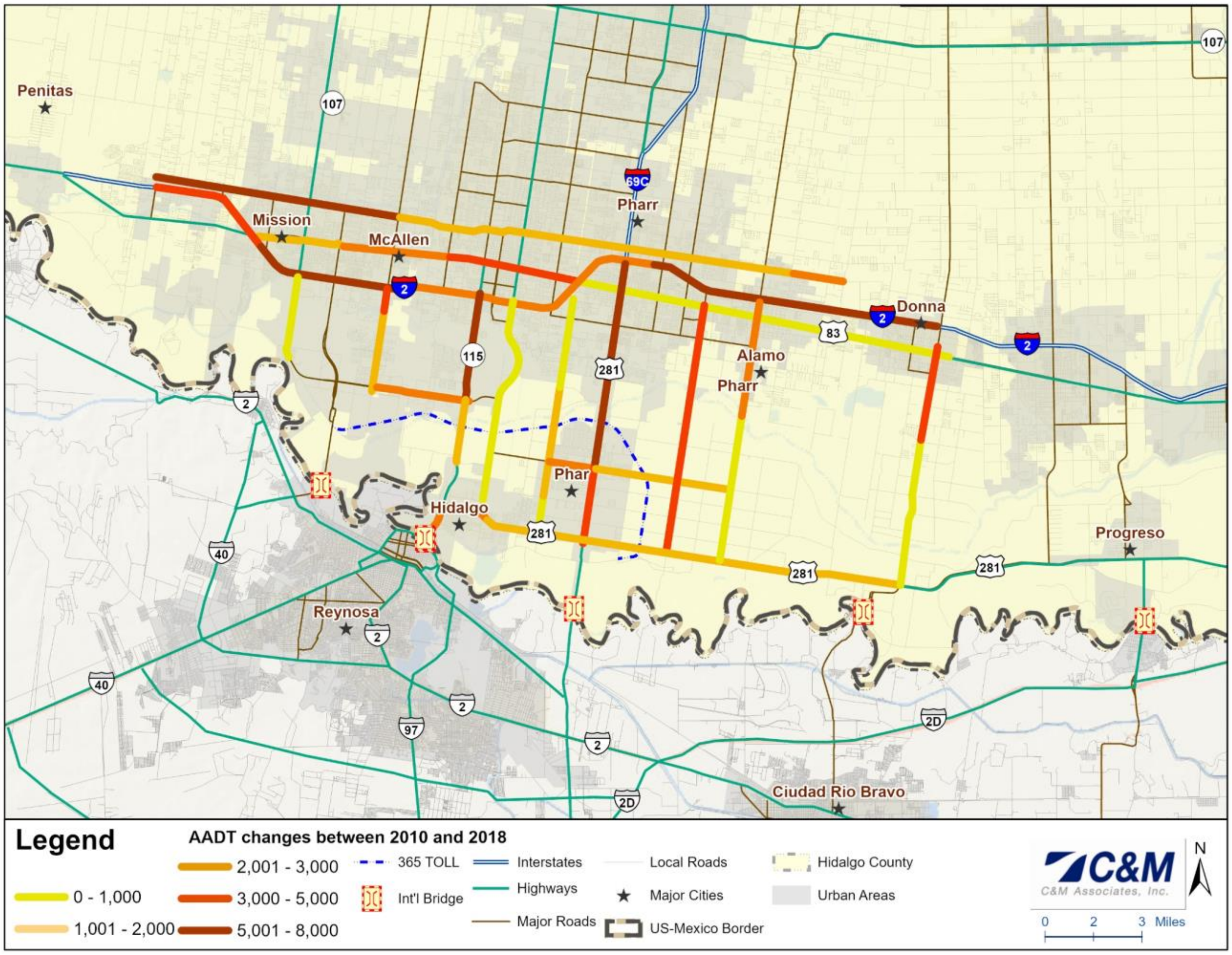


Figure 2-3. Changes in AADT, 2010–2018

2.1.1. I-2/US 83

I-2/US 83 is the major east–west limited-access regional highway in Hidalgo County, running parallel to the border with Mexico for approximately 48 miles. Within the study area of Hidalgo County, I-2/US 83 extends from Sullivan City at the Starr County line in the west to the city of Mercedes at the Cameron County line in the east. Starting from the east, at the Cameron County line, I-2/US 83 begins as a six-lane road with a speed limit of 75 mph and then changes to 70 mph about 1 mile before Exit 160. The speed limit drops to 65 mph after Exit 144. Later, I-2/US 83 briefly becomes an eight-lane road about 3 miles before Exit 142 and then resumes as a six-lane road about 2 miles before Exit 142. I-2/US 83 becomes a four-lane road about 4 miles before Exit 141 and once again becomes a six-lane road 1 mile before Exit 138. When West Palma Drive's ramp merges into I-2/US 83, I-2/US 83 becomes a four-lane road and the speed limit drops to 55 mph shortly after. When entering the outskirts of the city of La Joya, the speed limit drops to 45 mph. Beyond the study area, the road continues out of Hidalgo County into the city of Harlingen in Cameron County to the east and the city of Laredo in Webb County to the west.

I-2/US 83 connects major cities in Hidalgo County with outlying counties to the west and with Brownsville and South Padre Island to the east, making it a crucial industrial, retail, and recreational link within the region. Its traffic pattern is influenced not only by commercial vehicles traveling to/from the industrial zones and warehouses within the study area but also by retail shoppers driving to malls along the expressway, vacationers traveling to South Padre Island resorts, and daily commuters.

The only interstate highway interchange along I-2/US 83 within the study area is located at the junction of I-69C/US 281, a major highway that provides access to northern destinations in Hidalgo County and the rest of Texas, as well as to southern destinations in Mexico. This interchange is currently working near capacity, with low speeds during peak periods.

Within the study area, I-2/US 83 functions as an expressway with overpasses, frontage roads, and entrance and exit ramps at major crossroads. Figure 2-4 presents historical AADT volumes at both ends of I-2/US 83 within Hidalgo County and near its interchange with I-69C/US 281. As expected, traffic increases with proximity to the interchange. The corridor at the western end of the study area has exhibited growth of about 3.7 percent from 2000 to 2018. Over the same period, traffic exhibited a CAGR of about 2.1 percent near the more densely populated areas west of I-69C/US 281 and about 2.7 percent west of Mercedes. The drop in traffic in 2006 is related to construction work on the I-2/US 83 in Mercedes, expanding I-2/US 83 to three lanes in each direction and to the expansion of I-69C/US 281 north of I-2/US 83.

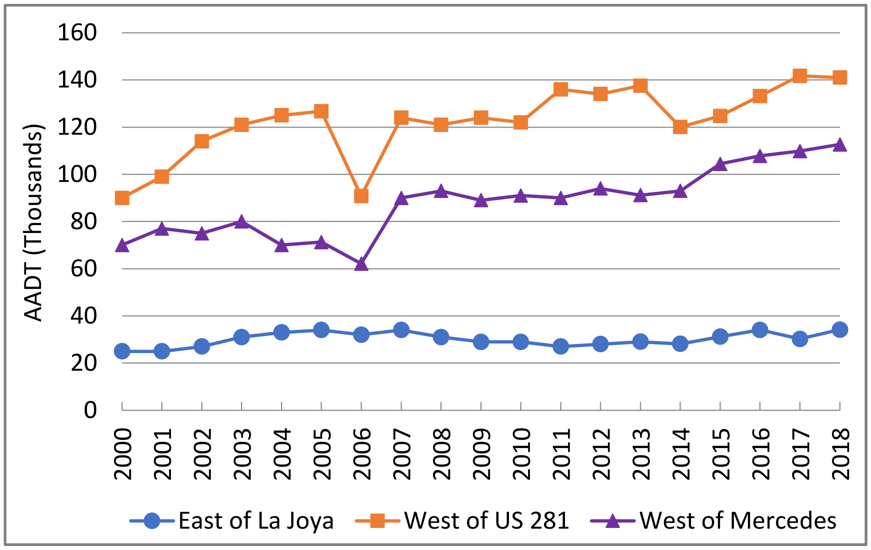


Figure 2-4. I-2/US 83 AADT at Selected Locations, 2000–2018

2.1.2. US 281

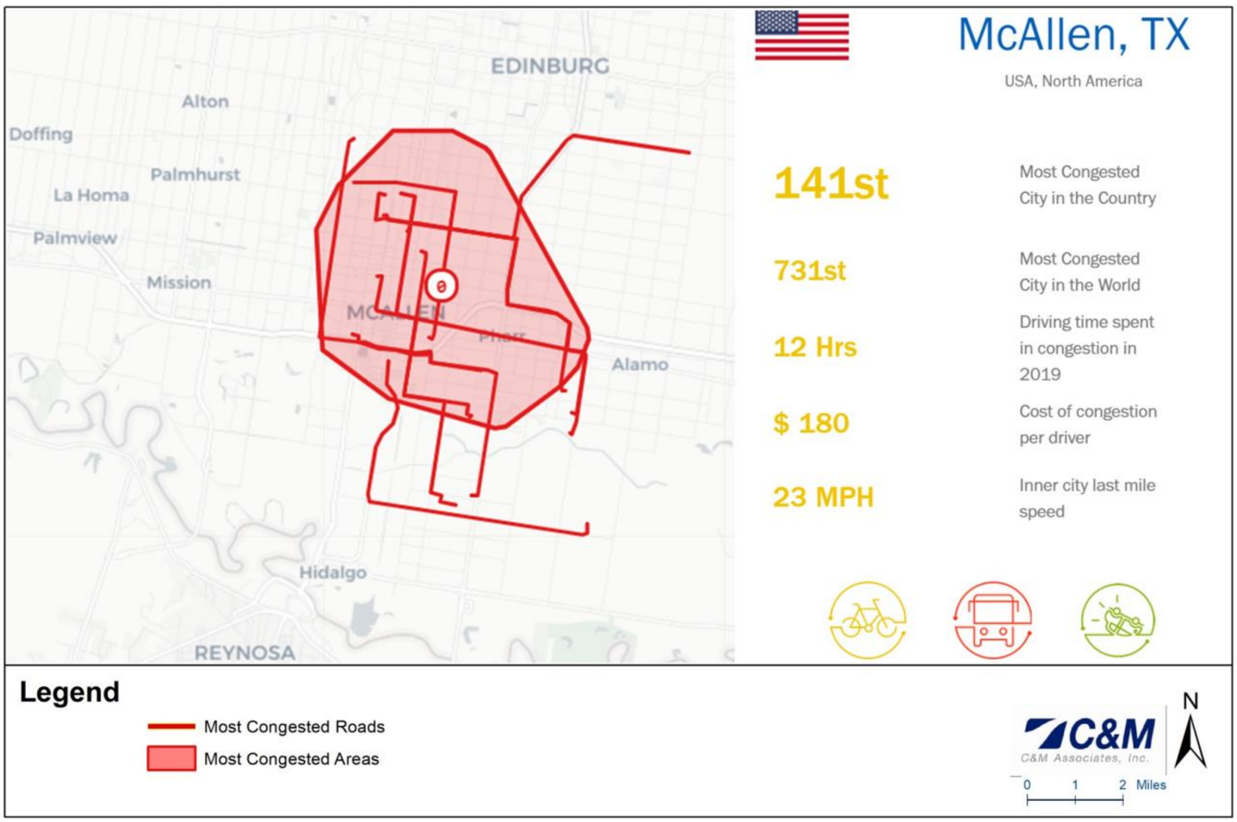
This section focuses on the north–south direction of US 281 from the Pharr–Reynosa International Bridge to the northern Hidalgo County line. The east–west portion of US 281 known as Military Highway is described in the next section.

Just south of its interchange with I-2/US 83, US 281 serves as a signalized main thoroughfare in the city of Pharr. In addition to the numerous retail properties located near this corridor, there are also low-density residential areas scattered along the southbound direction of US 281, as well as agricultural and industrial zones where it approaches the international bridge at the U.S./Mexico border. North of I-2/US 83, US 281 shares its alignment with I-69C and becomes a limited-access highway. This crucial north–south route connects Hidalgo County not only to San Antonio and other northern Texas cities but also to the rest of the country.

In the northbound direction, US 281 begins as a four-lane road with a speed limit of 55 mph. Once entering residential zones near the city of Las Milpas, the speed limit drops to 45 mph; once outside of residential areas, it resumes its limit of 55 mph. The speed limit drops to 30 mph when approaching downtown Pharr. After passing Ferguson Avenue, US 281 becomes a six-lane road with a speed limit of 50 mph. Shortly after passing East Canton Road and entering the outskirts of the city of Edinburg, US 281 becomes a four-lane road. Its speed limit returns to 55 mph after passing East Richardson Road.

US 281 plays a critical role in Hidalgo County: This single roadway is the county's link to the Pharr–Reynosa International Bridge, major industrial parks, retail centers, I-2/US 83, and—by way of San Antonio—to the rest of Texas and the interstate highway system. Because US 281 is the only major roadway within the study area by which long-haul commercial vehicles can reach their nationwide destinations, its traffic pattern is greatly influenced by international commercial vehicles traveling to and from the study area's industrial zones. Traffic on US 281 is also significantly affected by the large number of retail shoppers who use this roadway to access area malls, as well as by daily commuters.

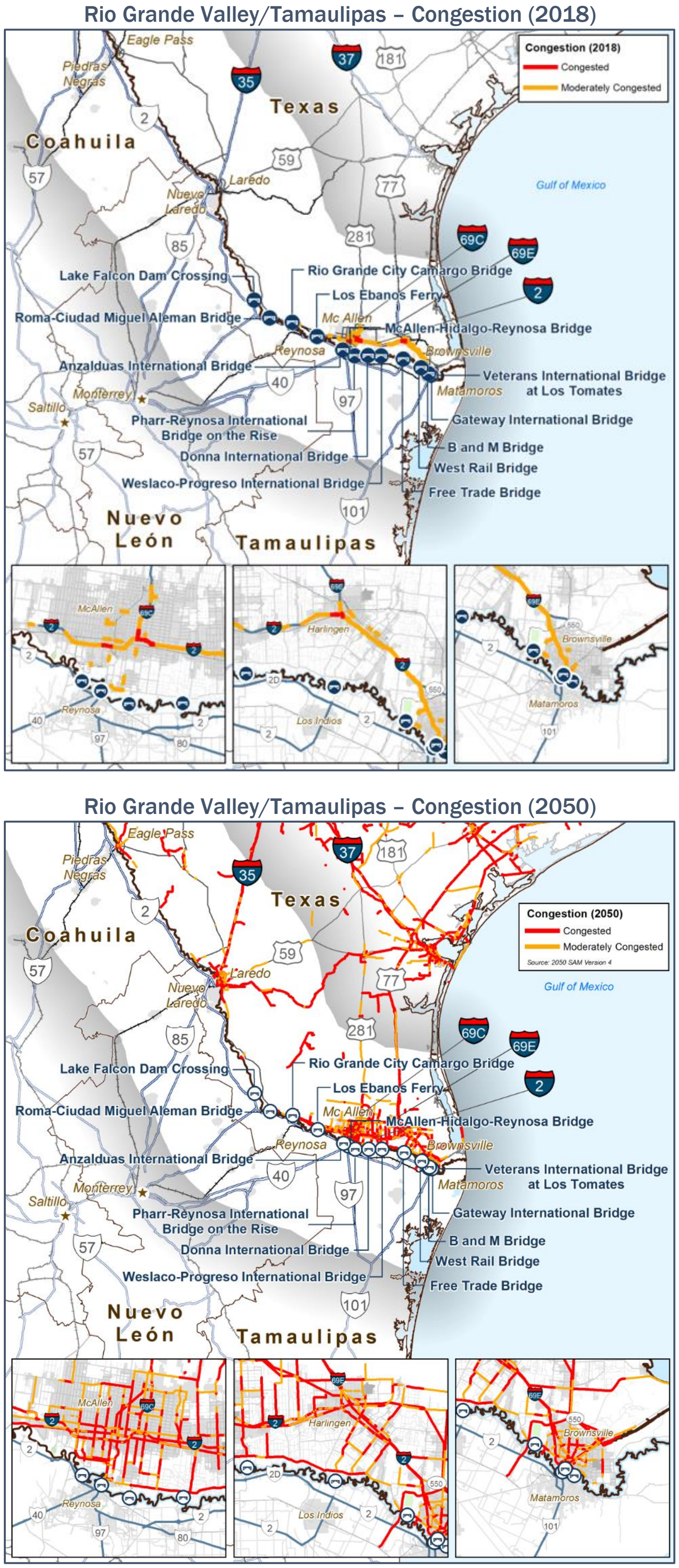
Within the study area, the only major highway interchange along US 281 is where it connects with I-2/US 83. This interchange is currently working near or above capacity. According to INRIX's 2013 national traffic scorecard, the McAllen-Edinburg-Mission MSA was ranked 78th in national congestion based on the congestion at this interchange.[2] Traffic congestion is mostly a result of the high volume of traffic from I-2/US 83 that merges with US 281. According to the 2019 INRIX city scorecard, the city of McAllen is the 141st worst congested city in the U.S. and the 731st most congested city in the world, as shown in Figure 2-5.



Source: INRIX[2]

Figure 2-5. 2019 INRIX Score Card – McAllen

In the Texas–Mexico Border Transportation Master Plan, TxDOT identified areas of congestion in Hidalgo County similar to those presented by INRIX.[3] Additionally, TxDOT expects an increase in congestion for nearly the entire urban area in Hidalgo County by 2050, as presented in Figure 2-6.



Source: TxDOT[3]

Figure 2-6. Actual (2018) and Future (2050) Congestion in the Rio Grande Valley

Figure 2-7 presents historical AADT volumes at selected locations along US 281: south of Military Highway near the Pharr-Reynosa International Bridge, north of I-2/US 83, and south of FM 490. As expected, AADT is highest near I-2/US 83, exhibiting a 2000–2010 CAGR of 2.4 percent and 1.9 percent form 2010-2018. The drop in traffic volumes in 2006 is related to the I-69C/US 281 expansion north of I-2/US 83.

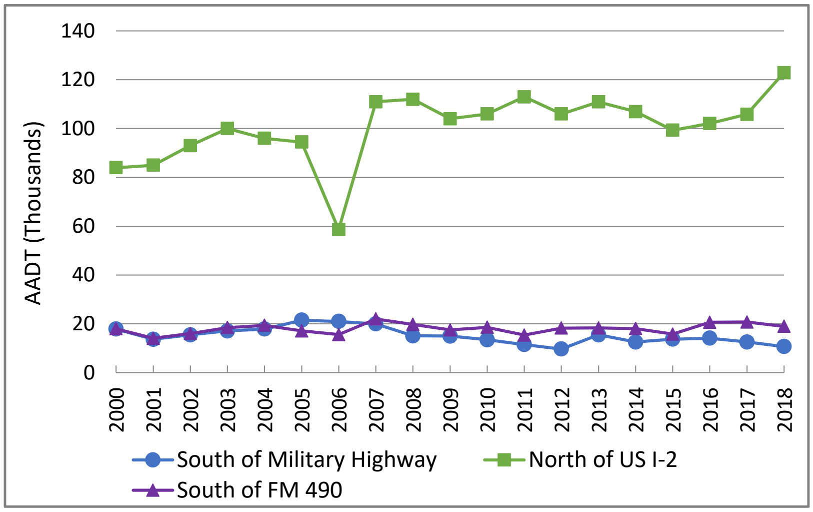


Figure 2-7. US 281 AADT at Selected Locations, 2008–2018

2.1.3. Military Highway/US 281

Military Highway/US 281 runs east–west between the Pharr–Reynosa International Bridge and the eastern county line. In the past, Military Highway/US 281 was a major east–west commercial vehicle corridor, but recently its traffic pattern has become more closely aligned with that of commuters, tourists, and retail shoppers. Commercial vehicles now encounter large numbers of passenger cars traveling to and from the many residential and retail developments between the Pharr–Reynosa International Bridge and the McAllen–Hidalgo–Reynosa International Bridge. This has significantly increased travel times for truckers, forcing many of them to opt for alternative routes. However, recent improvements on Military Highway east of US 281/Cage Boulevard, in the form of bypass lanes, have reduced the congestion level and improved travel times for a few segments.

West of the Pharr–Reynosa International Bridge, Military Highway is a four-lane local access road with traffic signals and turning bays at all major intersections and a speed limit of 45 mph. This section of the road is located near major shopping outlets, business centers, and industrial parks. East of the Pharr–Reynosa International Bridge, Military Highway is a two-lane farm-to-market road primarily serving the agricultural needs of local farmers. Figure 2-8 presents historical AADT volumes at selected locations along Military Highway from 2000 to 2018. As with the previous two corridors, traffic exhibited high growth in the more densely populated area west of 23rd Street and almost no growth along the rest of the facility during the observed period. In the years 2014–2018, the growth west of 23rd Street and east of the Pharr–Reynosa International Bridge increases significantly. In 2014, the AADT west of 23rd Street was 21,418 and increased to 27,008 in 2018. In 2014, the AADT east of the Pharr–Reynosa International Bridge was 6,753 and increased to 13,702 in 2018.

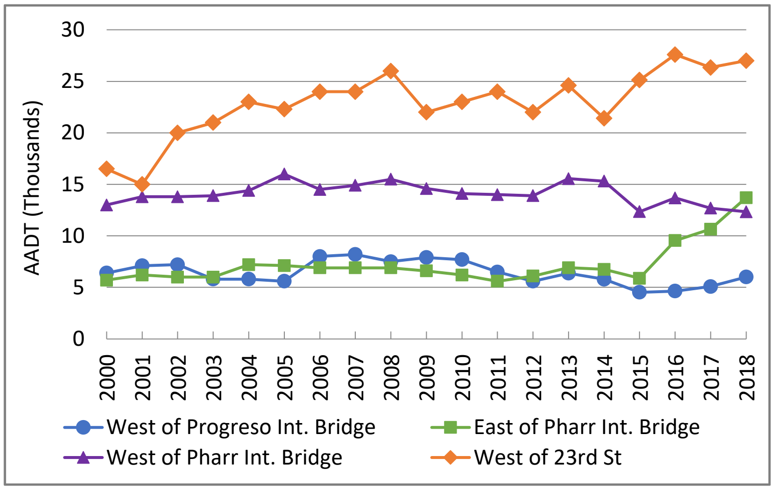


Figure 2-8. Military Highway/US 281 AADT at Selected Locations, 2000–2018

2.1.4. Dicker Road/Jackson Road Corridor

Dicker Road and Jackson Road provide an alternate route to the congested Military Highway/US 281 for heavy commercial vehicles traveling north from the Pharr–Reynosa International Bridge. Typically, after crossing the Pharr–Reynosa International Bridge, most truckers will proceed north onto Jackson Road and then west on Dicker Road until they reach the warehouses and industrial parks around 10th Street and the McAllen FTZ. Jackson Road is a four-lane road with a speed limit of 55 mph, and various school zones with a 35-mph speed limit on the way to the intersection with Dicker Road. Dicker Road is a two-lane road with a speed limit of 50 mph west of Jackson Road.

Both facilities are two-lane local access roads with traffic signals at major intersections. Although they have succeeded in helping reduce the high volume of commercial vehicle traffic on Military Highway, the spillover of that traffic has caused these roadways to suffer the effects of increased heavy commercial vehicle traffic, including a reduced level of service (LOS) and conflicts with passenger vehicles. Figure 2-9 depicts historical AADT volumes at selected locations along the Dicker Road/Jackson Road commercial vehicle corridor from 2000 to 2018. The highest CAGR is observed on Dicker Road west of US 281 exhibiting a 2000–2010 CAGR of 7.3 percent and 2.5 percent form 2010-2018.

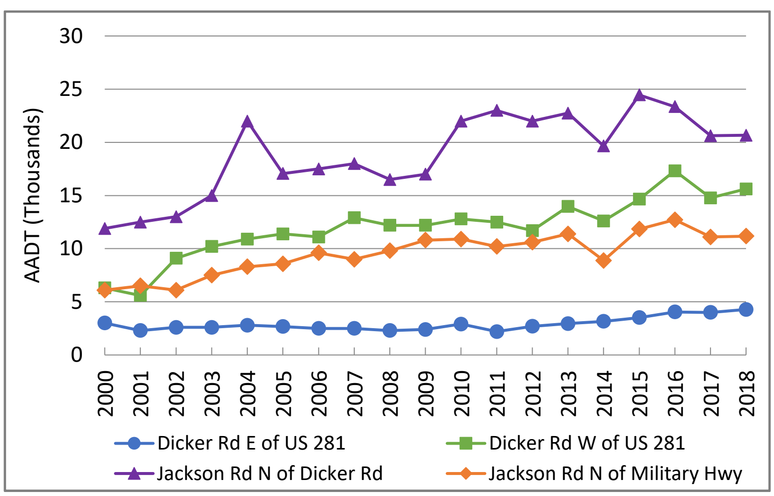


Figure 2-9. Dicker Road/Jackson Road AADT at Selected Locations, 2000–2018

2.2. Existing Roadway Network: Reynosa, Mexico

The traffic network in and around the Mexican city of Reynosa comprises three major federal roads (Mexican Federal Highway 40 [MEX 40], MEX 2, and MEX 97) and two important toll roads (MEX 40D and MEX 2D). The following sections discuss these major Mexican roads and the Reynosa Loop, all of which impact the study area. Corresponding AADT data were obtained from the Secretaria de Comunicaciones y Transportes (SCT).[4]

2.2.1. MEX 40 and MEX 40D: Cadereyta – Reynosa

MEX 40 and MEX 40D connect the city of Reynosa to the city of Monterrey—Mexico's leading industrial center—in the state of Nuevo Leon. MEX 40 is a four-lane facility with turning bays and traffic signals in the vicinity of Reynosa and a speed limit of 80 km/h (50 mph). This road meets MEX 2, thereby allowing access to the McAllen–Hidalgo–Reynosa International Bridge and the Pharr–Reynosa International Bridge. Near the state line between Tamaulipas and Nuevo Leon, this roadway splits into MEX 40 and MEX 40D, which is a toll road. MEX 40D is a four-lane road with a speed limit of 110 km/h (68 mph).

AADTs on MEX 40 in Reynosa, east of Revolución and west of Avenida Tecnologico, were approximately 63,000 in 2018, whereas the AADT near the Nuevo Leon-Tamaulipas border, which is a more rural area, was approximately 9,500.

2.2.2. MEX 2 and MEX 2D: Reynosa-Matamoros

MEX 2 connects Reynosa to Nuevo Laredo, Tamaulipas in the west and Matamoros, Tamaulipas in the east. This highway is a four-lane facility with turning bays and traffic signals in the vicinity of Reynosa with a speed limit of 80 km/h (50 mph) for the portion between Nuevo Laredo and Reynosa. A portion of MEX 2 runs through downtown Reynosa, connecting it to the McAllen–Hidalgo–Reynosa International Bridge by way of local streets. A major interchange east of Reynosa connects MEX 2 to the Pharr–Reynosa International Bridge. Further east, minor access roads provide access to the Weslaco–Progresso International Bridge. AADT on MEX 2 near General Lucio Blanco International Airport was approximately 70,000 in 2018.

East of Reynosa, MEX 2 divides into the non-tolled MEX 2 and the tolled MEX 2D; these two roads join again west of the city of Matamoros. MEX 2D is a four-lane limited-access toll road with overpasses at major crossroads in the area with a speed limit of 110 km/h (68 mph). It links with the Weslaco–Progreso International Bridge and the maquiladora area of Rio Bravo, Tamaulipas. AADT on MEX 2D was approximately 4,100 in 2018.

2.2.3. MEX 97

MEX 97 not only connects the city of Reynosa with Ciudad Victoria, the capital city of the state of Tamaulipas, but it also provides access to Mexican ports along the Gulf of Mexico and the rest of the state. MEX 97 is a four-lane facility with turning bays and traffic signals in the vicinity of Reynosa with a speed limit of 60 km/h (37 mph). This road connects to MEX 2, thereby allowing access to the McAllen–Hidalgo–Reynosa International Bridge and the Pharr–Reynosa International Bridge. AADT on this road (south of Viaducto Reynosa highway) was approximately 8,800 in 2018.

2.2.4. Reynosa Loop (Libramiento Reynosa Sur II)

The Reynosa Loop is a toll road operated by the federal department Caminos y Puentes Federales (CAPUFE). Travelers previously had to use the congested local streets of the city of Reynosa on their way to the McAllen–Hidalgo–Reynosa International Bridge. With the opening of the Anzalduas International Bridge, the Donna–Rio Bravo International Bridge, and the Reynosa Loop (Libramiento Sur II), travelers from outside Reynosa can avoid the local streets of Reynosa on their way to the United States. Commercial vehicles also have a direct connection between the Pharr–Reynosa International Bridge and the Reynosa Loop, which has significantly improved the connection for commercial vehicles traveling to/from Monterrey. The average travel speed is estimated to be approximately 56 mph. Due to the wide shoulder, this operates as a super-2 highway, which gives slower vehicles the possibility to move to the far right of the extra-large shoulder to let faster vehicles pass. AADT on this loop was approximately 3,700 in 2018.[5]

2.2.5. Historical AADTs of Mexican Facilities

Table 2-1 and Figure 2-10 present the AADT of Mexican highway facilities at selected locations in and around Reynosa from 2006 to 2018. Overall, the trends show an increase in vehicle traffic in recent years, particularly on MEX 2 north of Lucio Blanco Airport and MEX 40 west of Avenida Tecnologico. For analytical purposes, general trends were considered rather than the actual annual growth rate of any specific location because of inconsistencies in the available data.

Table 2-1. AADT of Selected Locations in Reynosa, Mexico by Facility

ID	Road	Location	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1	MEX-2	East of Rio Bravo	21,236	21,531	21,748	22,499	23,972	19,049	19,803	19,324	19,104	19,657	21,633	23,084	22,284
2	MEX-2	North of Lucio Blanco Airport	35,846	37,638	38,418	40,975	47,946	56,541	60,025	58,954	56,339	62,515	64,717	69,416	69,551
3	MEX-2	West of MEX-40	10,491	11,643	12,144	12,247	12,370	7,056	6,335	6,855	7,423	7,700	8,212	8,632	8,776
4	MEX-2	North of MEX-40	-	-	-	-	-	9,482	9,875	10,942	11,044	11,861	12,700	13,555	14,082
5	MEX-2D	West of Cd. Rio Bravo - Matamoros	-	-	-	-	-	3,290	3,404	3,502	3,856	3,865	3,697	3,696	4,100
6	MEX-40	East of Revolucion	37,721	33,169	32,033	33,414	35,186	44,234	45,692	47,175	52,591	59,526	58,589	63,442	63,214
7	MEX-40	West of Tecnologico	21,955	18,547	19,842	21,039	27,060	41,337	44,678	50,827	59,364	60,359	63,093	70,302	74,385
8	MEX-40	East of La Vaquita	-	-	-	-	-	7,511	8,712	8,697	8,088	8,989	8,660	8,959	9,595
9	MEX-97	South of Viaducto Reynosa	5,578	6,449	5,984	6,414	6,676	7,089	7,328	6,842	7,352	7,654	8,791	9,668	10,166
10	TAM-12	South of MEX-2	4,036	4,932	5,137	5,557	5,650	6,449	7,347	7,216	7,567	8,434	8,344	8,815	8,508
11	Reynosa Loop	8 miles from Providencias	-	-	-	-	-	-	-	935	897	1,105	1,891	-	3,652

Source: SCT, CAPUFE[4,5]

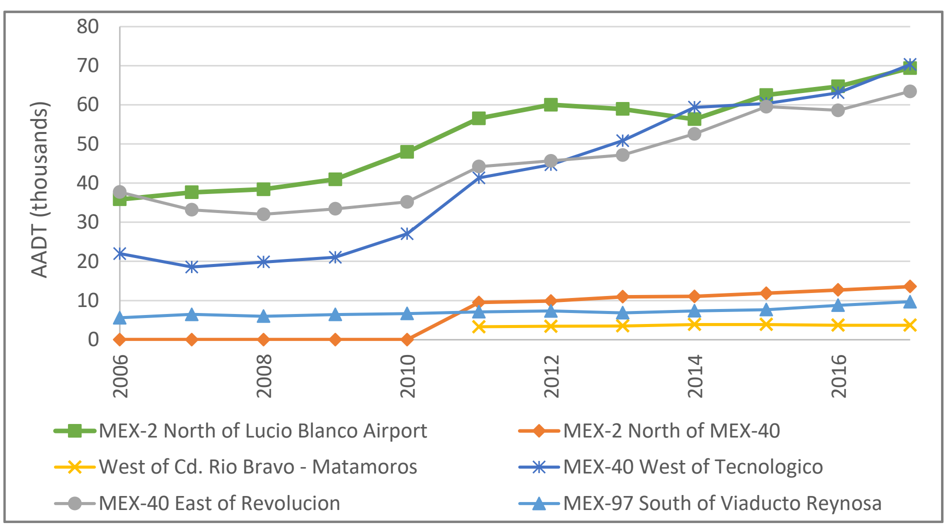


Figure 2-10. AADT of Select Mexican Facilities

2.3. International Bridges

2.3.1. Hidalgo County Bridges

As illustrated in Figure 2-11, there are five international bridges connecting Hidalgo County to the city of Reynosa, providing access to retail, industrial, and educational centers on both sides of the border. Information about each of these bridges, based on visits, interviews with stakeholders, and information obtained from TxDOT and U.S. Customs and Border Protection (CBP) is summarized below.[6,7]

- The **Anzalduas International Bridge** is operated by the city of McAllen and was opened on December 15, 2009. It is 3.2 miles in length and connects the McAllen FTZ and surrounding industrial areas (via a new access road at Bryan Road and US 83) to Reynosa's western maquiladora parks and MEX 40. Its hours of operation are from 6:00 a.m. to 10:00 p.m. The bridge has a single four-lane span with two lanes in each direction, a pedestrian walkway, and two safety bump-out spaces for disabled vehicles. The bridge has CBP and Texas Department of Safety (TxDPS) facilities, and the U.S. portion of the bridge has a Secure Electronic Network for Travelers' Rapid Inspection (SENTRI) lane and Ready Lanes, which use Radio Frequency Identification (RFID) technology to speed up the border crossing process. The northbound lanes feed into a maximum of four inspection booths for entry into the United States.

  The bridge currently only serves passenger vehicles and southbound empty commercial vehicles. The bridge's Presidential Permit, issued in July of 1999, barred commercial traffic on the span until 2015, or until the Pharr–Reynosa International Bridge averages 15,000 northbound commercial vehicles per week. However, at the time of the present study's completion, the unrestricted commercial vehicle allowance has yet to be put into practice, due in part to the high cost of the necessary infrastructure.[8]

- The **McAllen–Hidalgo–Reynosa International Bridge** is operated by the city of McAllen and connects Hidalgo County to downtown Reynosa. It is operational 24 hours a day and has two spans, with four lanes in each direction. The northbound bridge lanes feed into a maximum of 12 inspection booths. This bridge has processed the highest passenger car volumes in Hidalgo County since its opening in 1965.

  Northbound commercial vehicles have not been allowed to use the bridge since 1996 and are instead directed to the Pharr–Reynosa International Bridge. Southbound commercial vehicles are permitted to use either this bridge or the Pharr–Reynosa International Bridge.

- The **Pharr–Reynosa International Bridge** is operated by the city of Pharr and connects Reynosa's eastern maquiladora parks and MEX 2 to the Pharr Industrial Park, the McAllen FTZ, and local retail and tourist centers. Its hours of operation are from 6:00 a.m. to midnight for passenger vehicles, 7:00 a.m. to 10:00 p.m. for commercial vehicles Monday through Friday, and 9:00 a.m. to 5:00 p.m. for commercial vehicles Saturday and Sunday.

  The Pharr–Reynosa International Bridge is currently the busiest commercial vehicle crossing bridge within the study area, since all northbound commercial vehicle traffic is directed here from the McAllen–Hidalgo–Reynosa International Bridge. It has one four-lane span (three northbound lanes, one southbound lane), a pedestrian walkway, and CBP and TxDPS facilities. The Free and Secure Trade (FAST) lane program began to operate in late 2004. This bridge also has a SENTRI lane and two Ready Lanes. The northbound lanes feed into 12 inspection booths: six for passenger vehicles and six for commercial vehicles.

The Pharr–Reynosa International Bridge started a pilot program in July 2019 prohibiting passenger vehicles from crossing at this POE during certain times periods to improve crossing times for commercial vehicles.[9]

The Pharr–Reynosa International Bridge Pilot Program consists of the following:

- Southbound traffic (to Mexico) service remains the same as before.
- Northbound traffic (from Mexico) service reflects the following:
    - General commercial vehicle lane configuration and hours of operation remain the same as before.
    - Small empty trucks and short trucks (no trailers) are authorized to cross via the passenger vehicle lanes Monday through Friday (8:00 a.m. to 4:00 p.m.).
    - Empty tanker trailer trucks are authorized to cross via the passenger vehicle lanes Monday through Friday (8:00 a.m. to 4:00 p.m.).
    - Passenger vehicle lanes are open to passenger vehicles from 6:00 a.m. to 8:00 a.m. and from 4:00 p.m. to 6:00 p.m. during the week. Operational hours on Saturday and Sunday have not changed.

The Pharr–Reynosa International Bridge estimates that about 250–300 commercial vehicles will be processed through the passenger vehicle lanes daily. The pilot program will be reviewed by Pharr International Bridge staff, trade partners, and relevant stakeholders to discuss feedback regarding the program's success and may be adjusted or expanded if necessary.

- The **Donna–Rio Bravo International Bridge**, also known as the Alliance International Bridge, was completed in 2010 and is operated by the City of Donna. It links Donna to the maquiladora industrial area in the Mexican city of Rio Bravo, as well as to the tolled MEX 2D in Mexico. The bridge has four lanes in each direction and includes CBP and TxDPS facilities. The northbound lanes feed into four inspections booths.

  The opening of the bridge to empty commercial vehicles was approved in 2016 for southbound traffic and early 2017 for northbound traffic, but the required infrastructure has not yet been implemented on both sides of the border.[10] For the present study, the Donna–Rio Bravo POE is assumed to allow fully-operational loaded commercial vehicles in both directions by November 2022.

- The **Weslaco–Progreso International Bridge** is privately owned and operated by the B&P Bridge Company. It connects the U.S. border city of Progreso with the Mexican border city of Nuevo Progreso, linking the retail, medical, and tourist centers of both sides. Within the study area, this bridge is mostly used by commercial vehicles that transport bulk materials across the border. This bridge has two spans: a passenger vehicle bridge with two lanes in each direction and pedestrian sidewalks, and a commercial vehicle bridge with one lane in each direction. Both spans have CBP facilities. The northbound passenger vehicle lanes feed into a maximum of five inspection booths, and the northbound commercial vehicle lane feeds into one inspection booth. The bridge is operational 24 hours a day for personal vehicles. For commercial vehicles, it is open from 8:00 a.m. to 4:00 p.m. Monday through Friday and from 10:00 a.m. to 12:00 p.m. on Saturday.

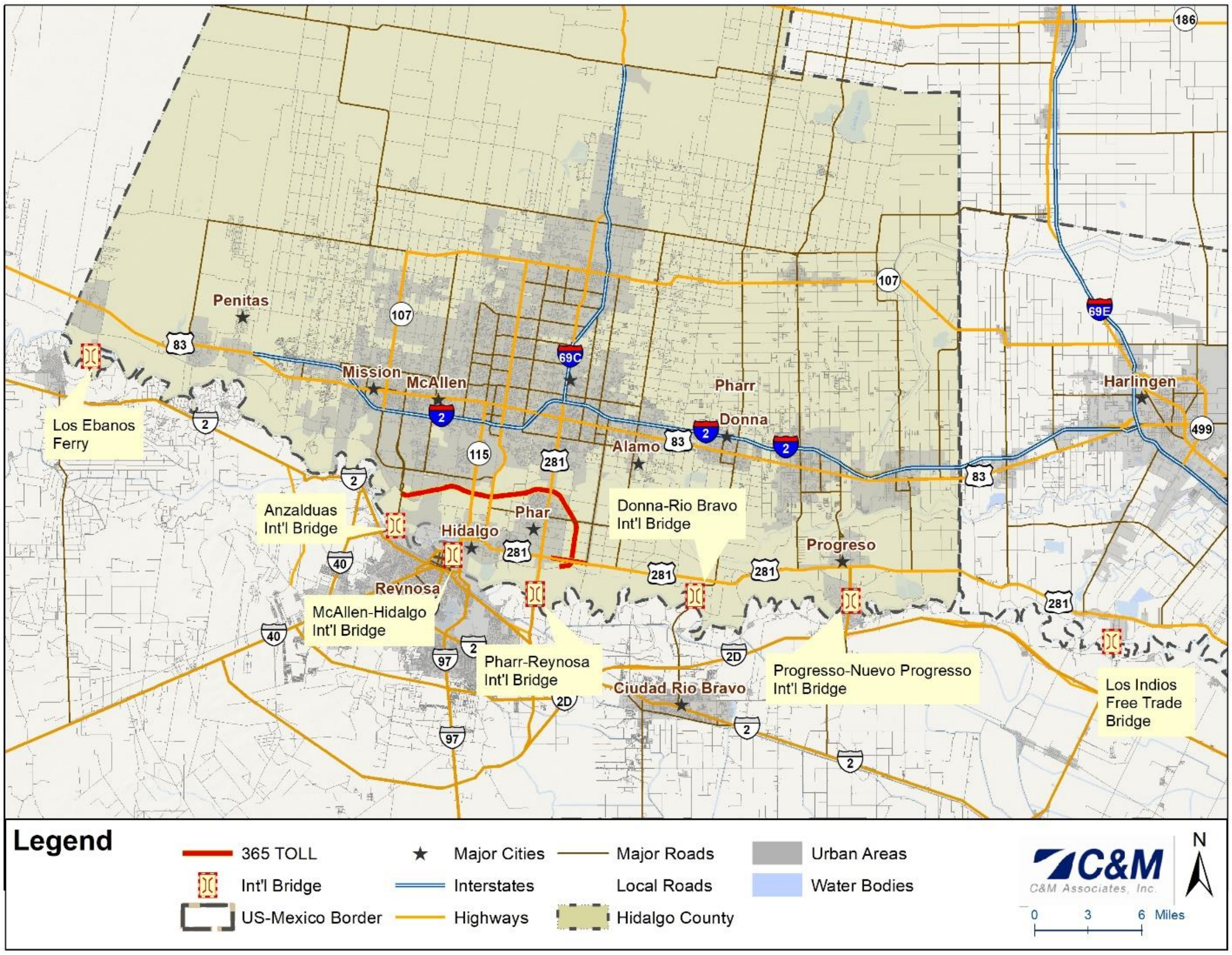


Figure 2-11. Study Area International Bridges

Table 2-2 presents annual data obtained from the Bureau of Transportation Statistics (BTS) Office of the Assistant Secretary for Research and Technology (OST-R) and from the CBP Laredo Field Office regarding northbound passenger vehicles and commercial vehicles crossing Hidalgo County international bridges.[11,12] The data indicate a noticeable decline in passenger car crossings after the events of September 11, 2001, when excessive delays at the border became commonplace and forced many travelers to consolidate their trips. The Great Recession also appears to have played a role in reducing the number of passenger cars crossing bridges at the border. In contrast, aside from 2009, commercial vehicle crossings have experienced relatively steady growth rates since 1994, when the North American Free Trade Agreement (NAFTA) went into effect. Nevertheless, commercial vehicle traffic did suffer under the pressure of the economic downturn, as indicated by a decline of -10.6 percent between 2008 and 2009—a considerable reversal of the positive trend it had enjoyed since 1995. While this downward trend was cause for concern, it has shown signs of reversal since 2010.

Table 2-2. Annual Northbound Traffic for Hidalgo County International Bridges

Year	Passenger Vehicles (Thousands)		Commercial Vehicles (Thousands)	
	Volume	% Change	Volume	% Change
1995	6,553	-	198	-
1996	7,122	8.7%	229	15.3%
1997	7,599	6.7%	254	11.0%
1998	8,192	7.8%	282	11.2%
1999	9,471	15.6%	342	21.2%
2000	9,866	4.2%	386	13.0%
2001	8,685	-12.0%	388	0.5%
2002	9,350	7.7%	414	6.7%
2003	8,321	-11.0%	426	2.8%
2004	8,305	-0.2%	477	12.2%
2005	7,974	-4.0%	515	7.8%
2006	7,491	-6.1%	489	-5.0%
2007	7,819	4.4%	528	7.8%
2008	7,859	0.5%	520	-1.3%
2009	6,969	-11.3%	465	-10.6%
2010	6,172	-11.4%	503	8.0%
2011	5,706	-7.5%	496	-1.3%
2012	5,849	2.5%	526	6.1%
2013	5,848	0.0%	553	5.2%
2014	5,739	-1.9%	572	3.3%
2015	5,665	-1.3%	583	2.0%
2016	5,966	5.3%	617	5.8%
2017	5,619	-5.8%	673	9.0%
2018	5,702	1.5%	698	3.7%
2019	5,245	-8.0%	706	1.2%

Source: BTS OST-R, CBP[11,12]

Table 2-3 shows the northbound traffic share of Hidalgo County bridges. The Pharr–Reynosa International Bridge opened in 1995, attracting trips from the other two area bridges, especially the McAllen–Hidalgo–Reynosa International Bridge, which no longer accepts northbound commercial vehicles. The Pharr–Reynosa International Bridge is now the main POE for international commercial vehicles in the area, averaging a CAGR of 3.8 percent between 2010 and 2019. Since the opening of the Anzalduas International Bridge and the Donna–Rio Bravo International Bridge, the McAllen–Hidalgo–Reynosa International Bridge has lost almost 40 percent of its passenger car market share.

Table 2-3. Hidalgo County International Bridge Northbound Traffic Shares

POE	Passenger Vehicles	Commercial Vehicles
McAllen-Hidalgo-Reynosa	40%	N/A
Pharr-Reynosa	20%	93%
Anzalduas	18%	N/A
Weslaco-Progreso	10%	7%
Donna-Rio Bravo	12%	N/A
Total	**100%**	**100%**

Source: FHWA[13]

2.3.2. Shipment Types by POE/Bridge

C&M has noted in previous studies that when forecasting commercial vehicle traffic, it is crucial to not only look at the overall growth pattern of commercial vehicle traffic but to observe the growth trends of the *goods* that are shipped on every bridge. Along the entire U.S./Mexico border, different POEs are specialized for processing certain types of goods. This specialization affects historical growth rates as well as the future forecasting of commercial vehicle crossings. Figure 2-12 and Figure 2-13 illustrate historical trends regarding the weight of goods (by category) imported by commercial vehicle across POEs within the study area. The Hidalgo POE refers to the Pharr–Reynosa International Bridge, and the Progreso POE refers to the Weslaco–Progreso International Bridge.

As shown, the majority of Hidalgo POE commercial vehicle imports are vegetable products, followed by machinery/electrical products and foodstuffs. Similarly, more than 80 percent of commercial vehicle imports at the Progreso POE consist of vegetable products.

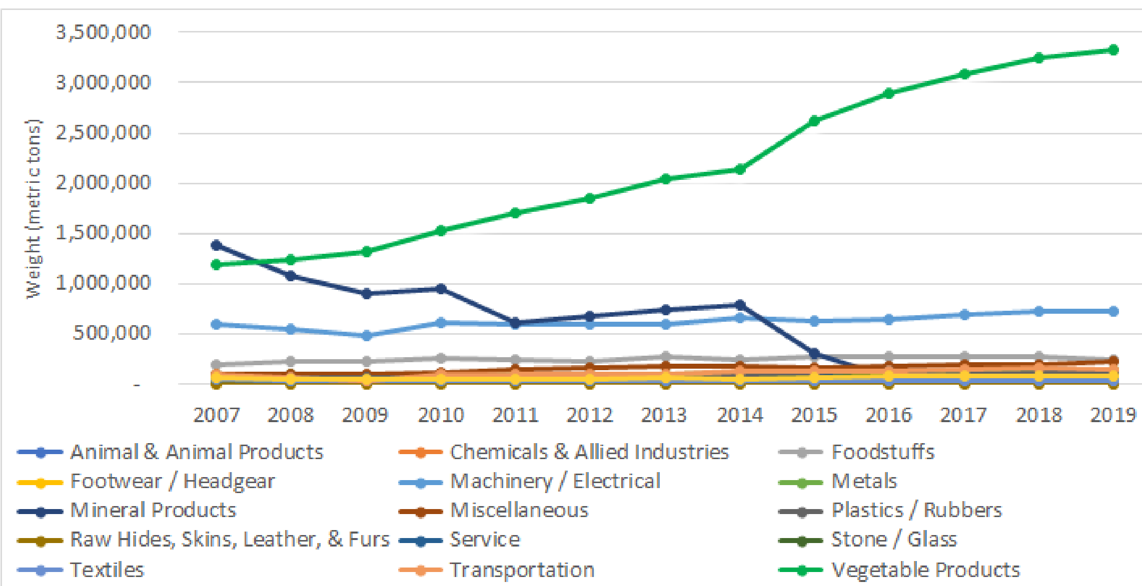


Figure 2-12. Hidalgo POE Historical Imports

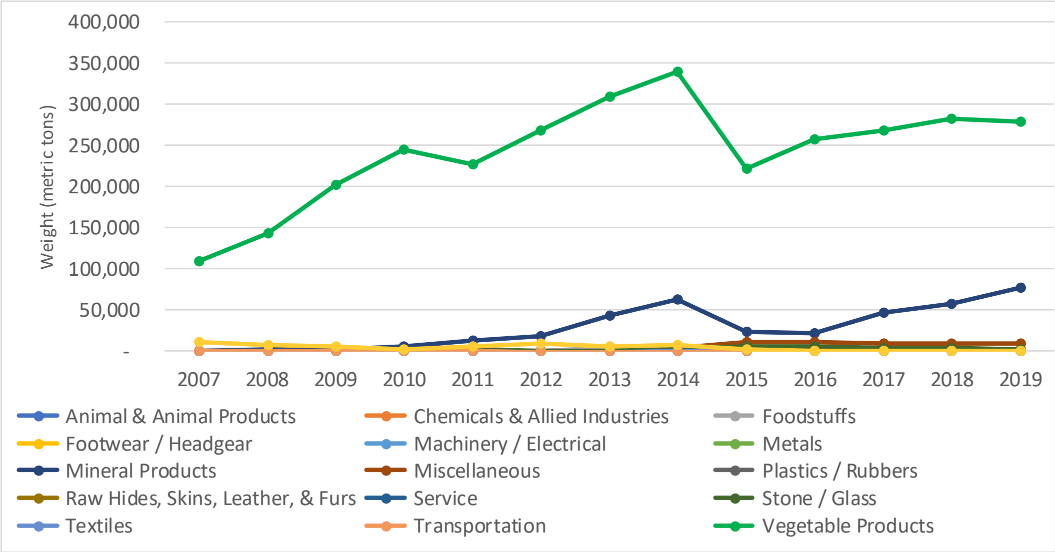
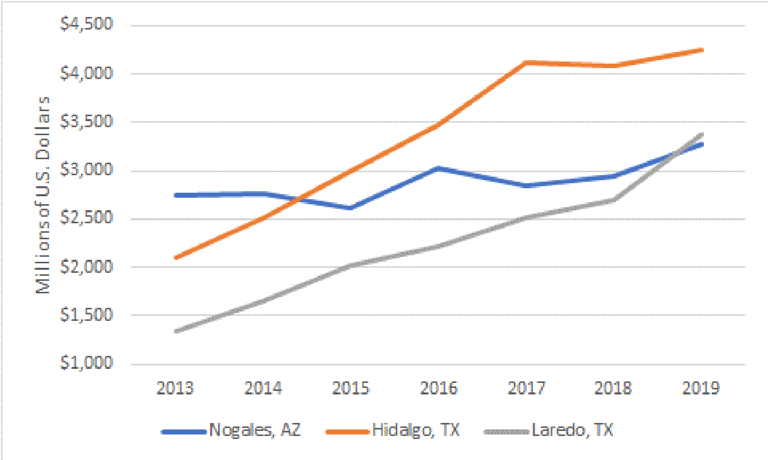


Figure 2-13. Progreso POE Historical Imports

It is also important to note that the Durango–Mazatlán Highway, which opened to traffic in 2013, is a high-performance east–west connection between the Pacific Coast near the Mexican cities of Mazatlán and Durango in the northern/center of Mexico. This road cuts a direct route across the Sierra Madre Occidental Mountains and grants the Pharr–Reynosa International Bridge access to the seaports of the Mexican Pacific Coast (Mazatlán) and, more importantly, to the main Mexican fresh produce production region in the states of Sinaloa, Sonora, Jalisco, and Michoacán.

Furthermore, the weight magnitude of imports is much higher at Hidalgo compared to other POEs. In fact, as shown in Figure 2-14, the Hidalgo POE surpassed the Nogales, Arizona POE in 2015 as the top importer of fresh produce from Mexico in terms of dollar value.[14] This change has primarily been driven by fruit imports to Hidalgo County. This is also due to produce shippers using the existing transportation and logistics infrastructure that allows Texas—as one of the primary U.S. agricultural producers—to distribute produce imported from Mexico throughout the entire United States. Additionally, many Texas produce shippers have invested in farming operations in Mexico as produce crosses the border into the Lower Rio Grande Valley for distribution throughout the United States and Canada.[15]



Source: The University of Arizona[14]

Figure 2-14. Mexican Fresh Produce Imports (millions$) by Selected POEs – 2013 to 2019

The majority of Hidalgo POE commercial vehicle imports are field products (e.g., live trees and plants, edible fruits and vegetables, cereals, animal and vegetable fats, vegetable textile fibers, etc.), followed by liquid products and machinery. Similarly, more than 85 percent of commercial vehicle imports at the Progreso POE consist of field products.

2.4. Seasonality

Seasonal variation is an important factor to consider when making annual projections, as it can have a significant impact on traffic patterns. The following sections outline the seasonal changes in traffic patterns within the study area.

2.4.1. International Bridge Crossing Seasonality

Figure 2-15 depicts monthly passenger vehicle seasonality factors for Hidalgo County bridges from 2015 to September 2020, while Figure 2-16 presents corresponding data for commercial vehicles.

Passenger vehicle patterns indicate an increase in traffic during the Christmas and Easter months as well as in July, when Mexican citizens typically go on holiday. From 2015 to 2020, the seasonal traffic is highest in December overall. Average monthly factors for passenger vehicles typically range from 0.90 to 1.11, indicating a moderate impact of seasonality.

For corresponding commercial vehicle data, monthly factors range from 0.88 to 1.17, also indicating strong seasonality. Commercial vehicle volumes are at their lowest during the summer months and during the December holiday season; the highest volumes are observed primarily in March and October.

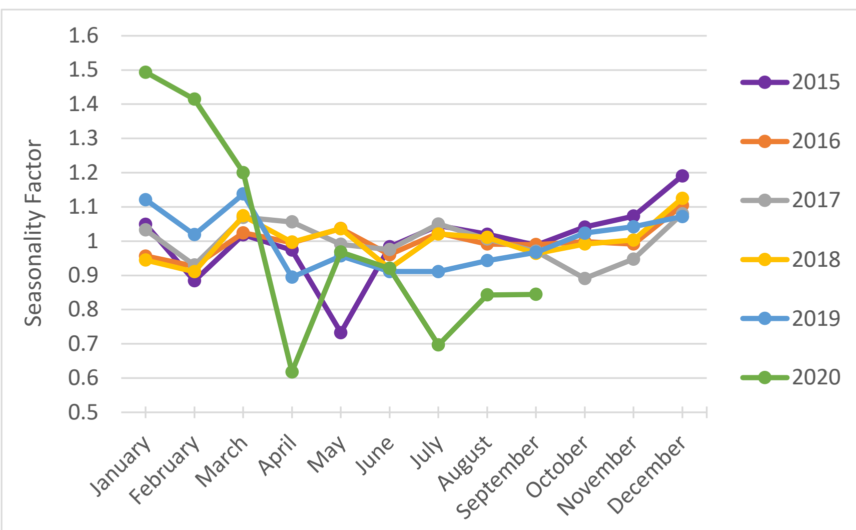


Figure 2-15. Passenger Vehicle Seasonality Factors at Hidalgo County Bridges

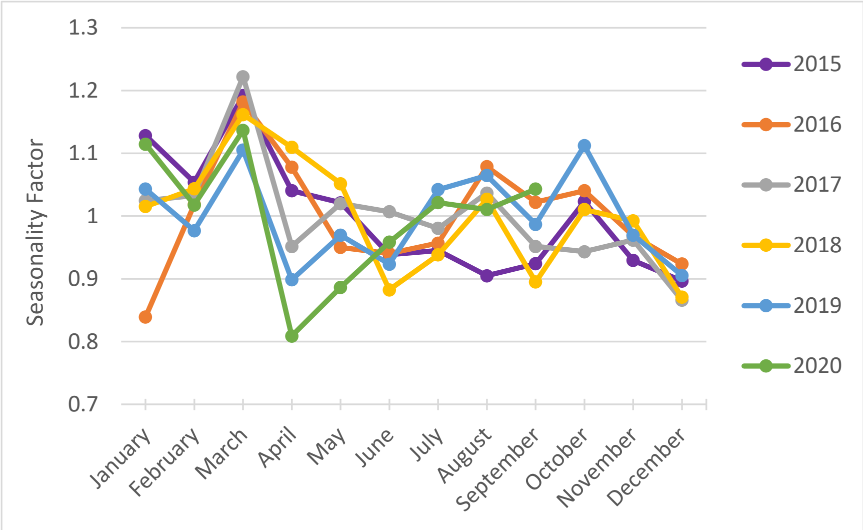


Figure 2-16. Commercial Vehicle Seasonality Factors at Hidalgo County Bridges

2.4.2. Seasonal Data in Other Locations of the Study Area

TxDOT maintains 10 permanent counting stations in the Pharr District.[16] Selected stations relevant to this study, and for which adequate data were available, are listed below and illustrated in Figure 2-17:

- Station S69: SH 336, 3.5 miles south of SH 107 in McAllen
- Station S143: US 83, 0.2 miles west of FM 1426 in Pharr
- Station S159: US 83, 0.2 miles west of Business U.S. Route 83 (BUS 83) in Mission
- Station S173: US 281, 7.4 miles south of US 83 in Pharr
- Station S235: US 281, 9.3 miles north of SH 186, north of San Manuel-Linn
- Station S300: FM 396, 0.6 miles south of FM 1016 in Hidalgo
- Station A327: BUS 83S, 1.3 miles east of US 281 in Pharr

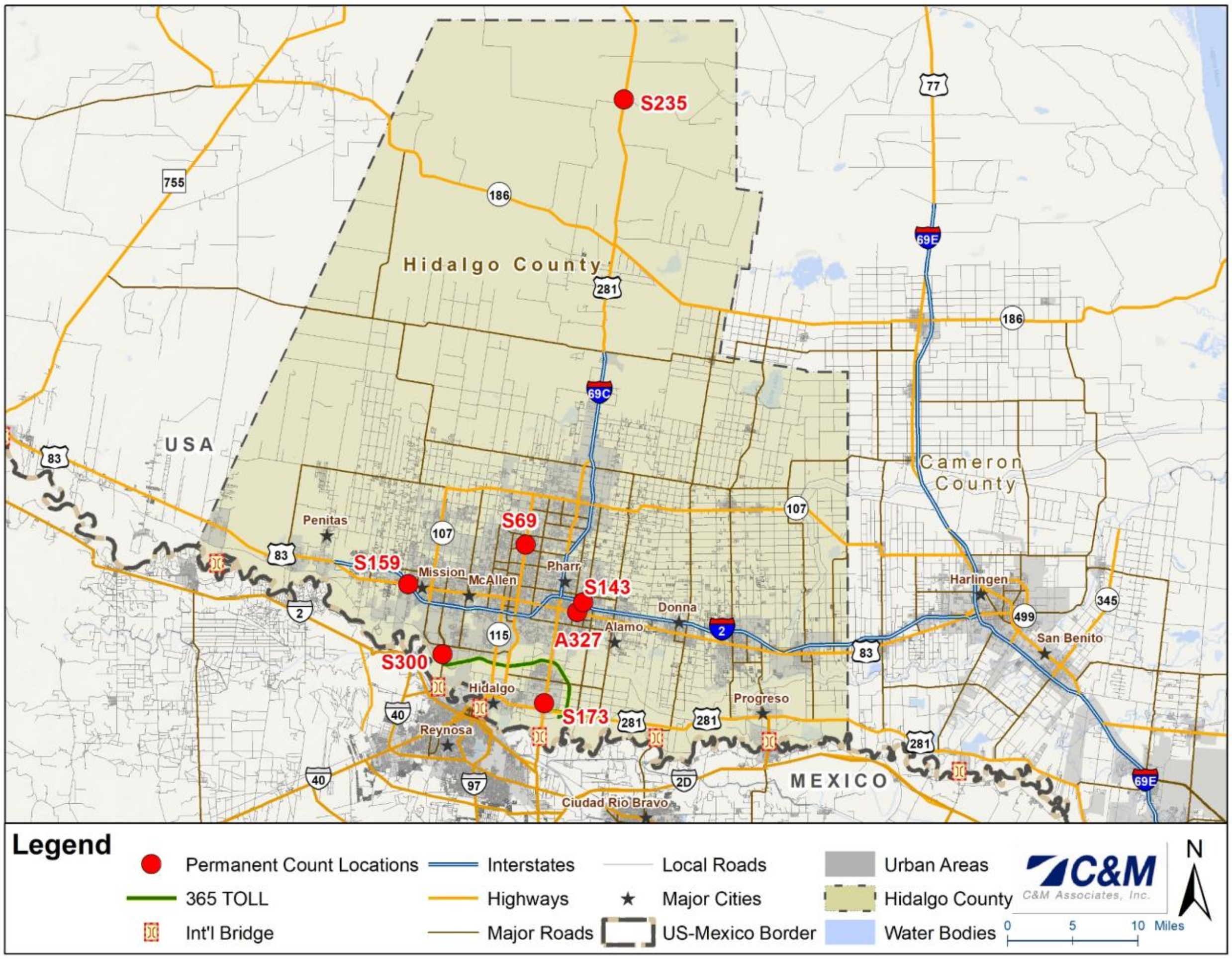


Figure 2-17. Selected Permanent Count Locations

Data from these locations are reported as seasonal variations in average daily traffic (ADT) by month, and their patterns are characteristic of both commuter and commercial traffic.

Figure 2-18 shows seasonal variations at selected stations within the study area from 2001 to 2018. Years with unavailable, incomplete, or irregular data were excluded from the analysis. The average monthly factors for most locations range from 0.83 to 1.18, which indicate strong seasonality, with the Christmas and Easter seasons standing out as high traffic periods and the summer months typically exhibiting the lowest volumes. However, traffic on US 281 is relatively higher during the summer months and decreases in the fall, especially on the segment north of San Manuel-Linn.

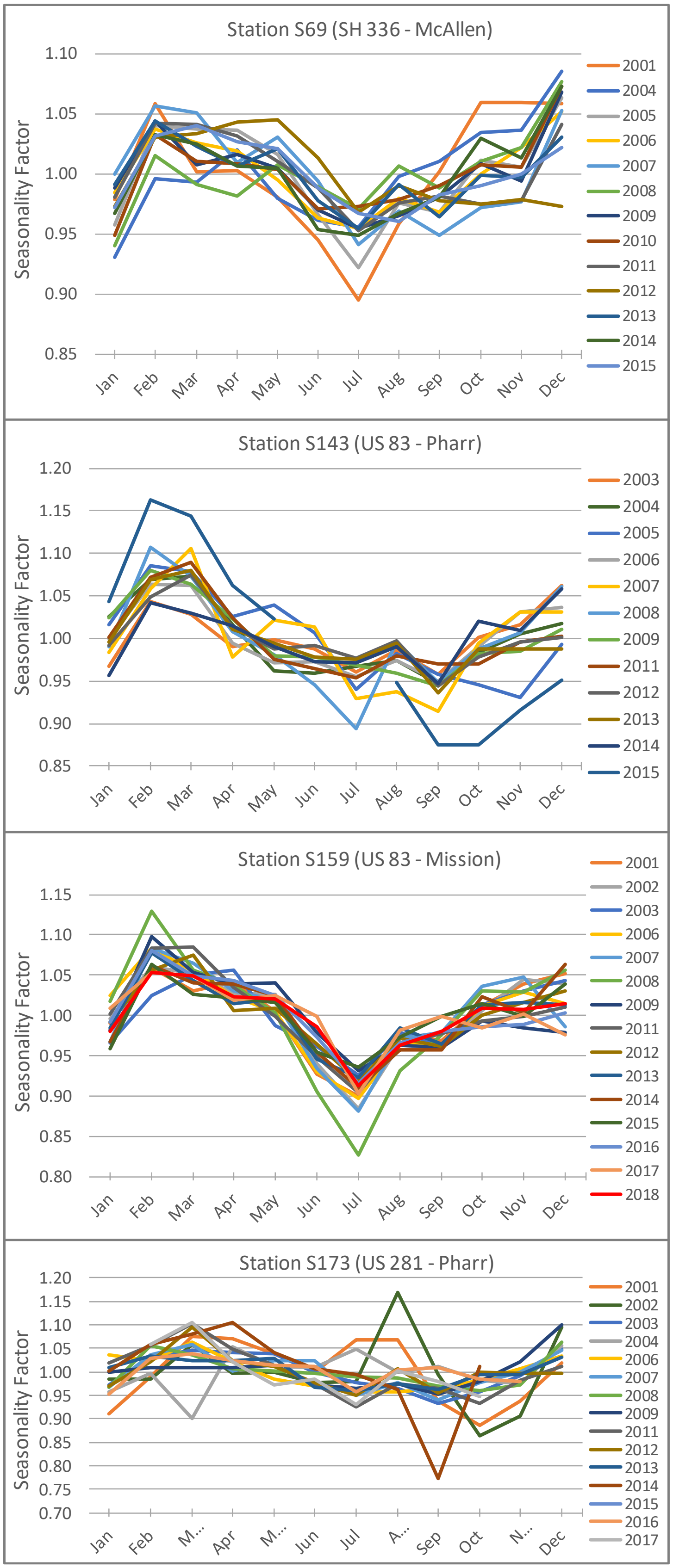


Figure 2-18. Seasonal Variations at Selected Permanent Count Stations

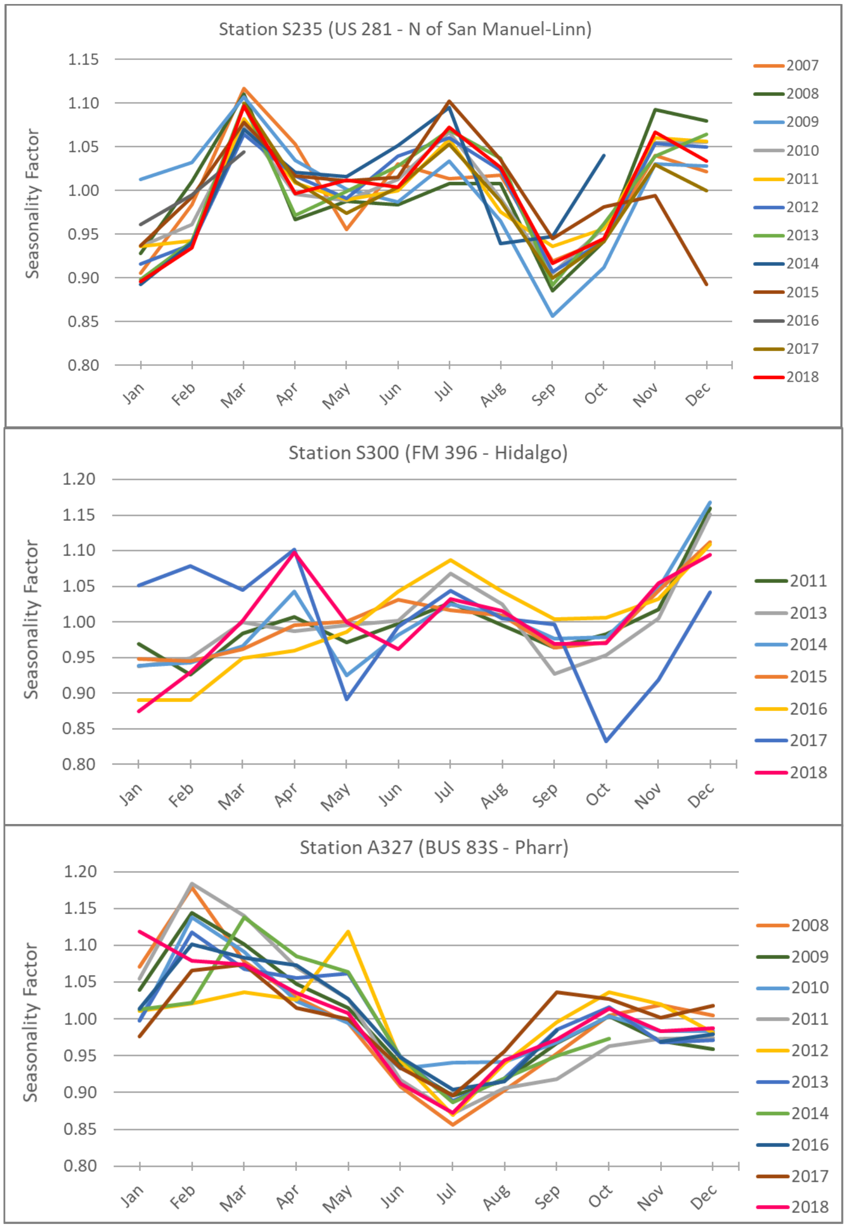


Figure 2-18. Seasonal Variations at Selected Permanent Count Stations (Cont'd.)

Figure 2-19 presents the annual average hourly traffic profiles of these stations in selected years. Weekday traffic shares and patterns have not significantly changed over time, indicating that the trip purpose distribution (e.g., commuter, recreational, leisure/shopping) has remained relatively stable. Furthermore, results indicate there were no significant network improvements over these years within the study area, and the origin-destination (OD) pattern has remained roughly the same. Traffic volumes, on the other hand, have significantly changed over time; results indicate increased volumes for every hour of the day at almost all stations compared to previous years. One notable exception is Station S173 on US 281, which shows volumes decreasing over time. Given the station's proximity to the Pharr–Reynosa International Bridge, this decrease is most likely due to a decrease in passenger vehicle border crossings over time (see Table 2-2).

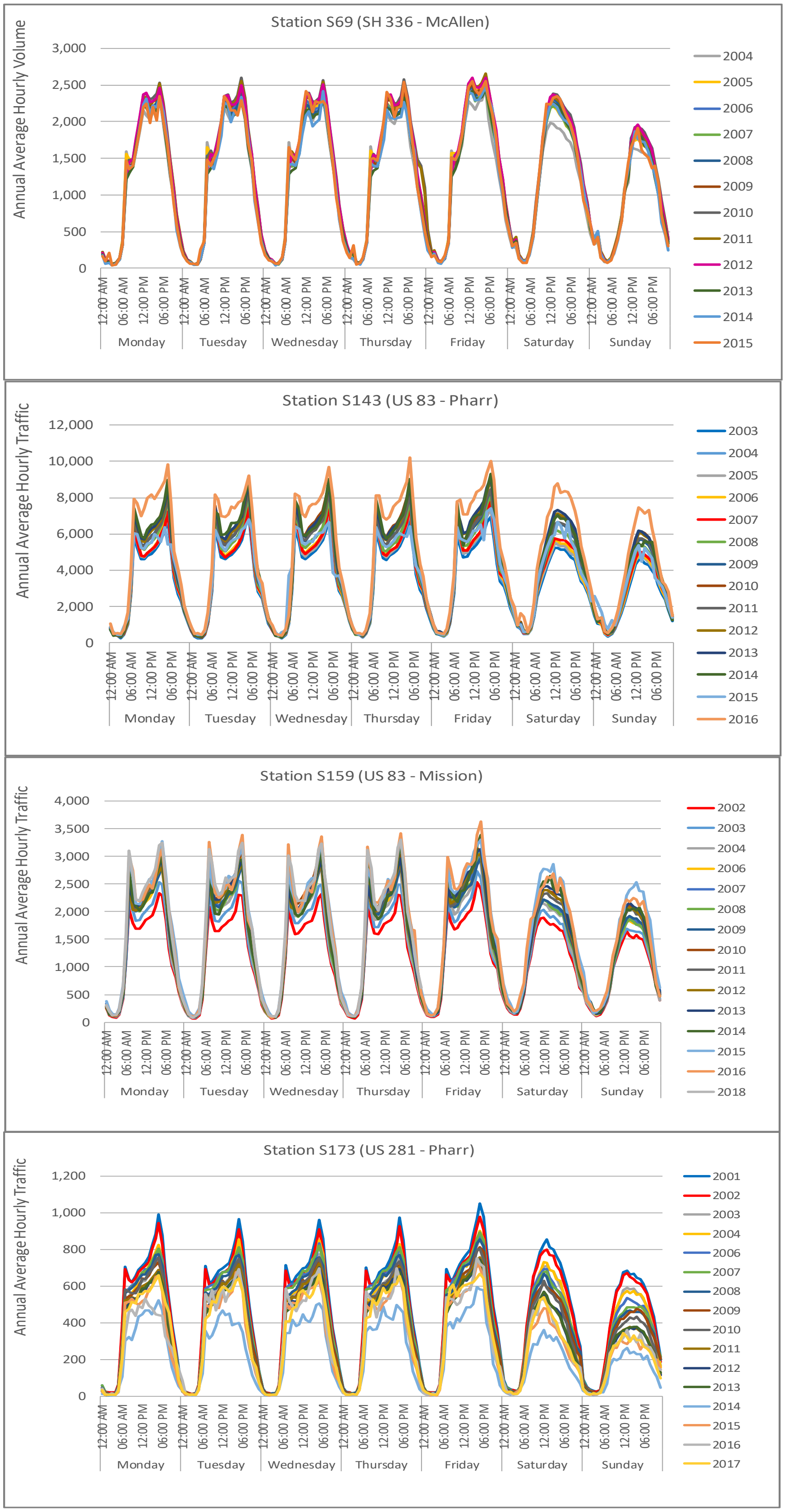


Figure 2-19. Annual Average Hourly Traffic by Year

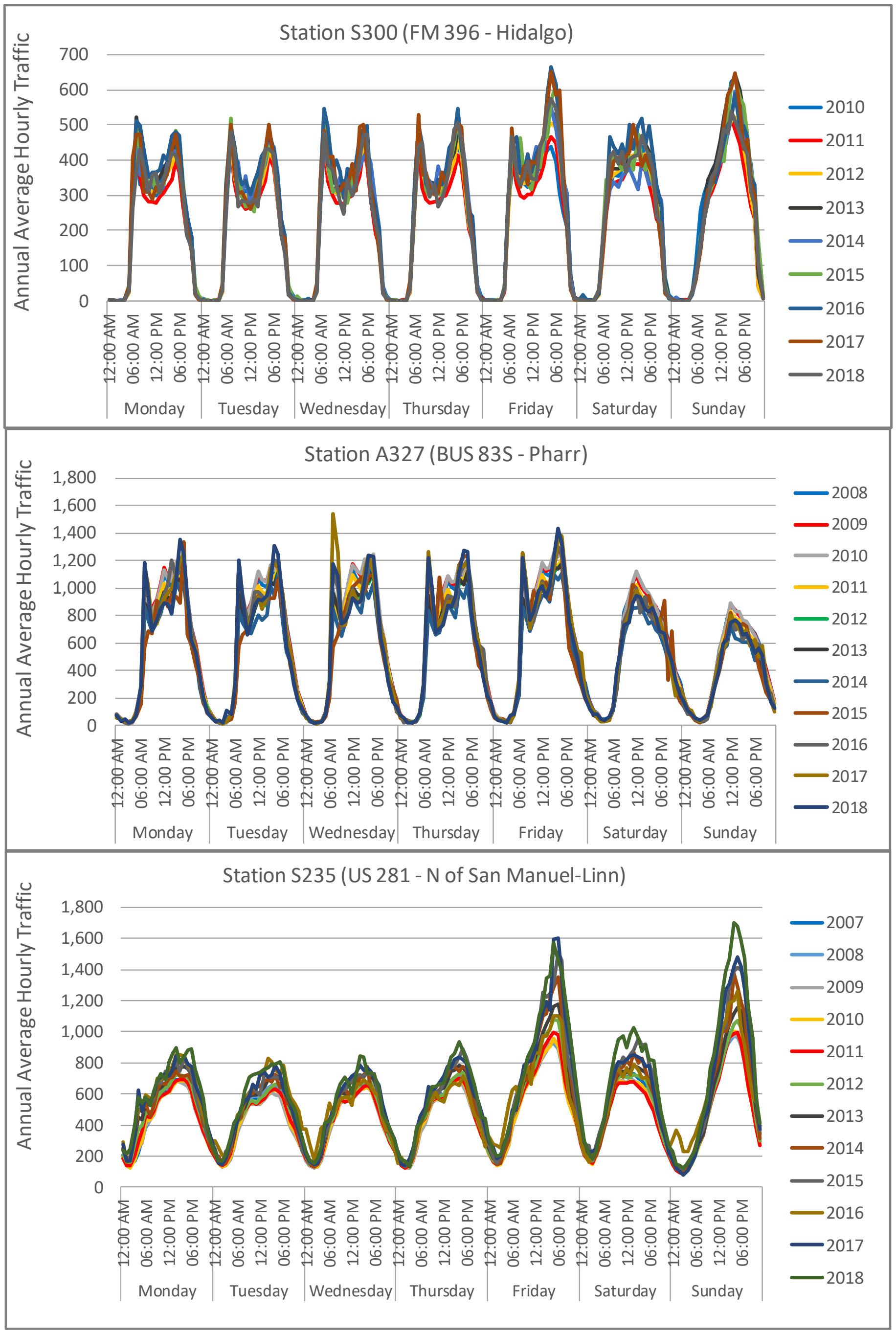


Figure 2-19. Annual Average Hourly Traffic by Year (Cont'd.)

2.5. Border Traffic

Given that the traffic characteristics of the study area are heavily influenced by the U.S./Mexico border, it is important to consider trends and policies that impact border traffic, which are summarized in the following sections.

2.5.1. Passenger Vehicle Traffic

The McAllen–Edinburg–Mission MSA has a unique traffic composition consisting of local commuters and national and international visitors. Local vehicles exhibit typical commuter patterns of home-to-work trips in the morning and afternoon. Major origins and destinations are concentrated on the urban areas along I-2/US 83. Visitor traffic heading to the shopping and recreational destinations in the study area makes up an important part of the economy in Hidalgo County, and of particular interest are passenger cars from Mexico. In 2012, the McAllen-Edinburg-Mission MSA was ranked by the Texas Comptroller as 1st in Texas for sales tax collections per household and 2nd in per capita sales tax, which demonstrates the large contribution from non-local visitors to the area.[17]

Passenger car crossings on the international bridges tend to be higher during the weekends, due mostly to Mexican visitors traveling to retail malls in the study area, with a smaller fraction on their way to tourist attractions such as South Padre Island. Passenger cars from the United States and Mexico also use these bridges in typical commuter patterns, such as workers traveling to industrial parks on both sides of the border in the morning and returning home in the afternoon. In addition, some Mexican drivers travel north to American schools and universities, creating regular school trip patterns across the bridges. These traffic patterns also impact other roadways within the traffic network, such as I-2/US 83 and US 281.

2.5.2. Commercial Vehicle Traffic

Regarding the composition of international trade and commercial vehicle travel patterns, each region along the U.S./Mexico border has unique characteristics and markets. In the case of the Reynosa/Hidalgo County region, international trade is primarily driven by two market segments: the local maquiladora trade and produce imports from Mexico to the United States. Figure 2-20 and Table 2-4 present the industrial parks in the United States and the maquiladora parks in Mexico.[18,19] Since 2010, Hidalgo County has seen a greater amount of imported produce shares. As mentioned earlier, in 2015 the Hidalgo POE surpassed Arizona's Nogales POE as the major entry point for fresh produce from Mexico. This is partially due to produce shippers using the already-existing transportation and logistics infrastructure that allows Texas, as one of the primary U.S. agricultural producers, to distribute produce imported from Mexico throughout the entire United States. Additionally, many Texas produce shippers have invested in farming operations in Mexico, as produce crosses the border into the Lower Rio Grande Valley for distribution throughout the United States and Canada.[20]

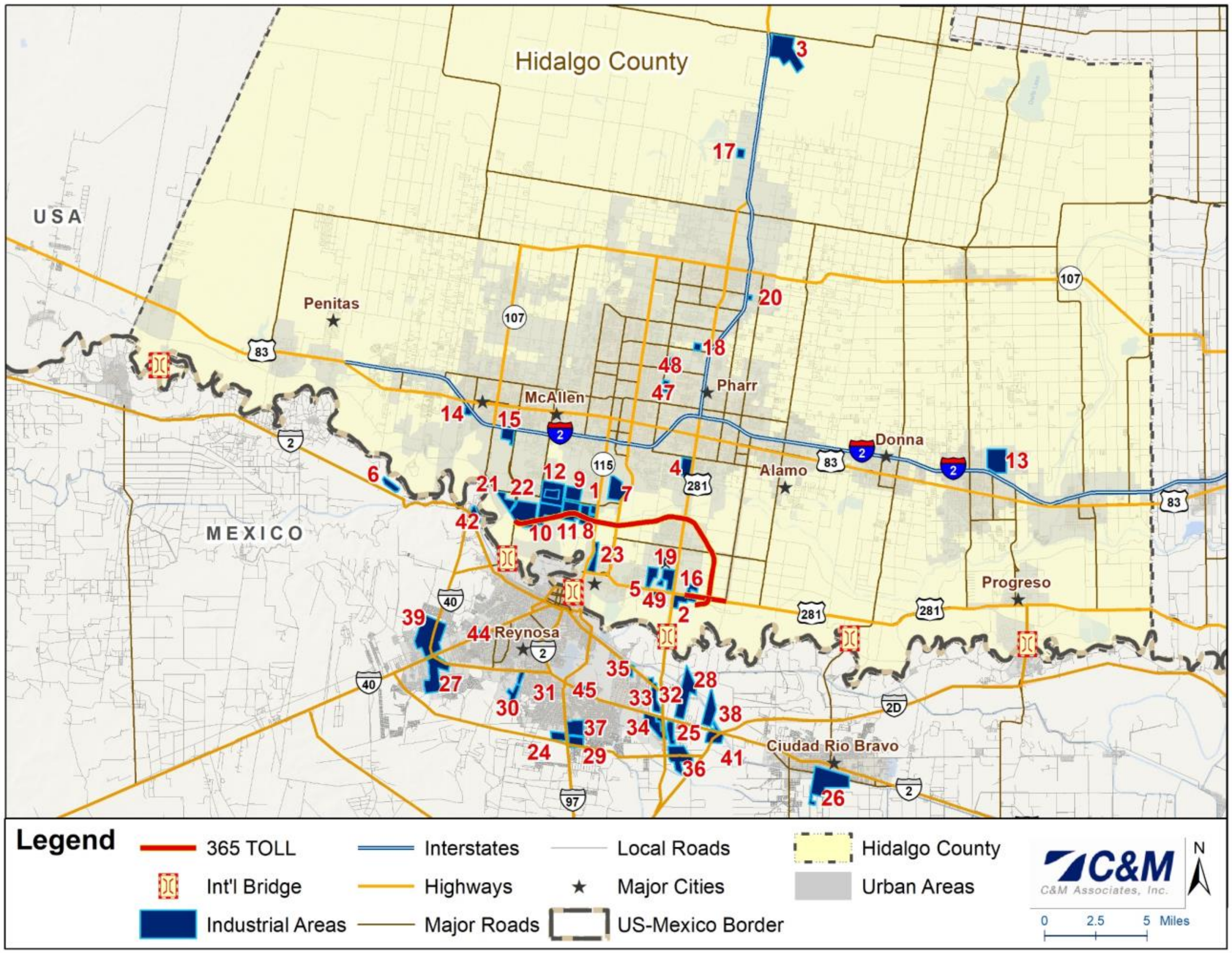


Figure 2-20. Industrial and Maquiladora Parks in the Study Area

Table 2-4. Industrial and Maquiladora Parks in the Study Area

Site ID	Name	Site ID	Name
1	Botelo Industrial Park	26	Cpa Rio Bravo Industrial Park
2	Capote International Business Park	27	Del Norte Industrial Park
3	Edinburg Int. Airport Industrial Park	28	El Puente Industrial Park
4	Industrial Area	29	Landus Industrial Park
5	Keystone Industrial Park	30	Moll Industrial Park
6	Maquilpark Industrial Park	31	Moll Industrial Park
7	McAllen Airport	32	Pharr Bridge Prologis Park
8	McAllen Free Trade Zone	33	Reynosa (North) Industrial Park
9	McAllen Southwest Industrial Park	34	Reynosa (South) Industrial Park
10	McAllen Southwest Industrial Park	35	Reynosa Industrial Center Industrial Park
11	McAllen Southwest Industrial Park	36	Ridge Commerce Center
12	McAllen Southwest Industrial Park	37	Stiva Industrial Park
13	Mid Valley Business Park North Ind Park	38	Verde Pharr Bridge Industrial Park
14	Mission Business Park	39	Villa Florida Industrial Park
15	Mission Expwy Business Park	40	Pharr Bridge Business Park II
16	Monarch Business Park	41	Las Ventas Incoming Industrial Park
17	North Industrial Park	42	FINSA Reynosa Maquilpark
18	Owasso Business Park	43	FINSA Reynosa East
19	Pharr Industrial Park	44	Fabricacion de Equipos Maquiladora
20	Renaissance Industrial Park	45	Montacargas & Racks Industrial Park
21	Sharyland Business Park	46	Liebert Business Park
22	Sharyland Business Park	47	Summit Park North Business Park
23	Tres Puentes Business Park	48	Lakes Business Park
24	American Industrial Kimco Reynosa Ind. Park	49	Pharr Produce Park
25	Colonial Industrial Park		

Commercial vehicle travel patterns between the Mexican city of Reynosa and Hidalgo County in the United States are generally short haul in nature, known within the industry as “cartage” or “transfer” hauling. The less frequent long-haul commercial vehicle movements typically originate further south in Monterrey, Mexico’s leading industrial city and capital of the northern state of Nuevo Leon. The maquiladora trade activity is accomplished by means of short-haul commercial vehicle movements. Typically, these commercial vehicles pick up products from their origins at maquiladora plants in the Mexican city of Reynosa and haul them across the border to interim distribution centers in Hidalgo County and surrounding areas. Conversely, commercial vehicles on the U.S. side of the border pick up components from warehouses in Hidalgo County and surrounding areas and deliver them to maquiladora plants in Reynosa to the south.

Long-haul commercial vehicle movements are also attractive for the produce industry because commercial vehicles in Mexico are allowed to carry 125,000 pounds, whereas commercial vehicles in the United States are limited to a gross weight of 80,000 pounds. When overweight produce commercial vehicles arrive at the border from Mexico, they typically re-distribute their cargo to other commercial vehicles in order to cross the border. Table 2-5 presents the current commercial vehicle regulations in the United States and Mexico.

Table 2-5. U.S. and Mexican Commercial Vehicle Regulations

Standard	Height	Width	Weight
U.S.	14 ft.	8.5 ft.	80,000 lbs.
Mexico	15.5 ft.	12 ft.	125,000 lbs.

Source: U.S. Department of Transportation

In January 2014, the HCRMA established an oversized/overweight (OS/OW) permit that covers travel over selected Hidalgo County roads for vehicles weighing no more than the Mexican legal weight limit. The permit, which costs $200 and is valid for 24 hours upon activation, allows OS/OW commercial vehicles coming from Mexico to travel without having to redistribute their loads. As illustrated in Figure 2-21, the permit allows travel on the following roads:[21]

- US 281 between its intersections with the Pharr–Reynosa International Bridge and SH 336
- SH 336 between its intersections with US 281 and FM 1016
- FM 1016 between its intersections with SH 336 and Trinity Road
- Trinity Road between its intersections with FM 1016 and FM 396
- FM 396 between its intersections with Trinity Road and the Anzalduas International Bridge
- FM 2061 between its intersections with FM 3072 and US 281
- US 281 between its intersections with the Pharr–Reynosa International Bridge and Spur 29
- Spur 29 between its intersections with US 281 and Doffin Canal Road
- Doffin Canal Road between its intersections with the Pharr–Reynosa International Bridge and Spur 29
- FM 2557 (Stewart Road) from Military Highway/US 281 to I-2/US 83
- FM 3072 (Dicker Road) from Veterans Boulevard ('I' Road) to Cesar Chavez Road
- US 281 (Cage Boulevard) from Military Highway/US 281 to Anaya Road
- Military Highway/US 281 from Spur 29 to FM 1015
- FM 1015 from Military Highway/US 281 to the Weslaco–Progresso International Bridge

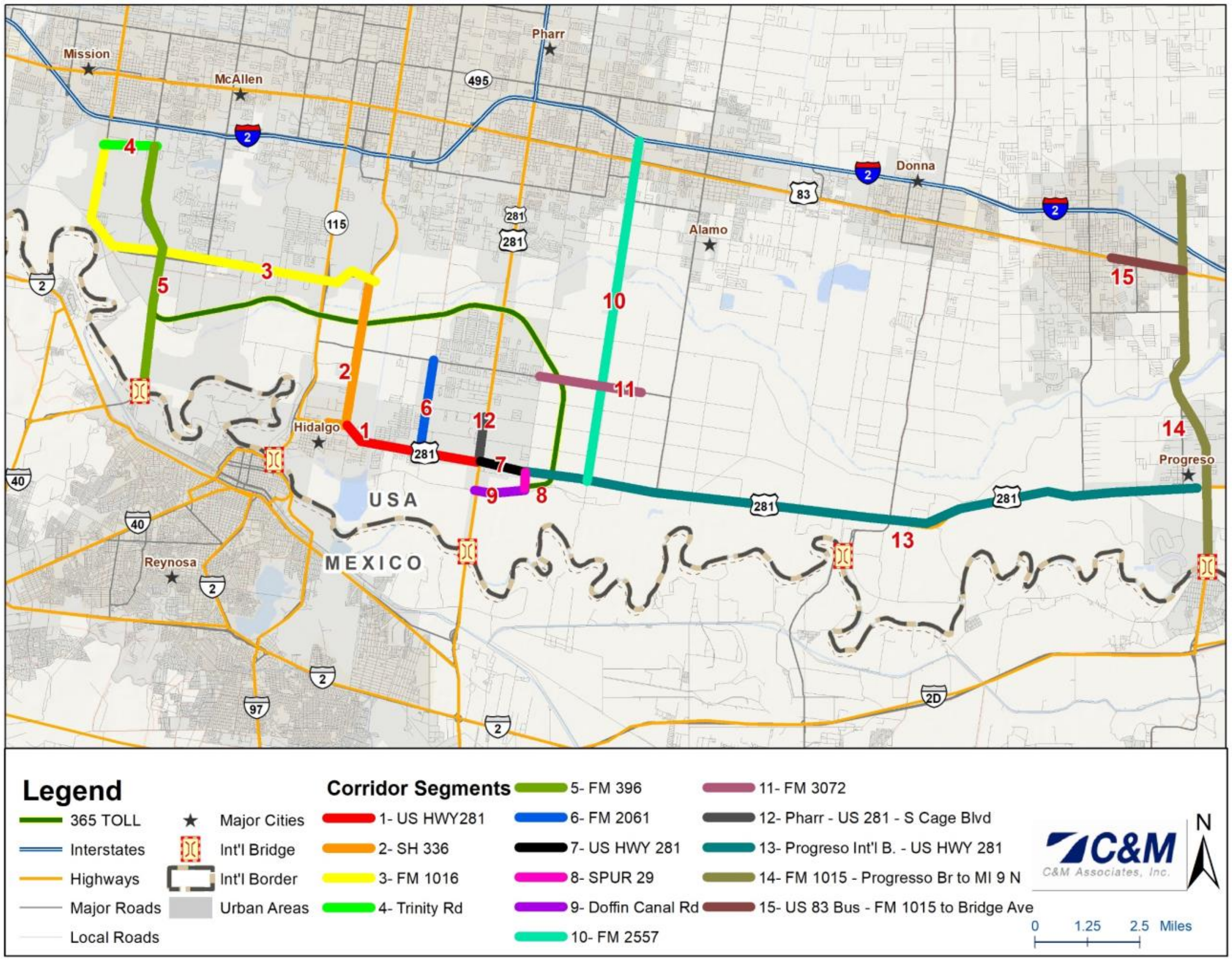


Figure 2-21. Hidalgo County Roads that Allow Commercial Vehicles with OS/OW Permits

Table 2-6 and Table 2-7 list 2018 annual data on the origins of commercial vehicles with OS/OW permits from Mexico and the destinations they travel to in the United States, as reported by the HCRMA.[22] As shown, two-thirds of the commercial vehicles with permits originated from Tamaulipas, out of which 80 percent are from Reynosa and Rio Bravo, Tamaulipas. Almost half of the commercial vehicles with OS/OW permits ended their trips at US 281 between the Pharr–Reynosa International Bridge and SH 336, where many of the cold storage warehouses are located.

Table 2-6. OS/OW Commercial Vehicle Origins in Mexico, 2018

Origins in Mexico	Percentage
Aguascalientes	0.3%
Ciudad de Mexico	0.4%
Coahuila	0.4%
Colima	1.1%
Durango	3.5%
Estado de Mexico	0.3%
Guanajuato	3.9%
Hidalgo	0.7%
Jalisco	4.0%
Michoacan	7.3%
Nuevo Leon	5.1%
Puebla	0.2%
Queretaro	0.3%
S.L.P.	0.9%
Tamaulipas	69.3%
Veracruz	1.6%
Zacatecas	0.5%
Total	**100.0%**

Source: HCRMA

Table 2-7. OS/OW Commercial Vehicle Destinations in the United States, 2018

Destinations in U.S.	%
US 281 between its intersection with the Pharr-Reynosa Int'l. Bridge and its intersection with SH 336	49%
SH 336 between its intersection with US 281 and its intersection with FM 1016	22%
FM 1016 between its intersection with SH 336 and its intersection with Trinity Road	20%
Trinity Road between its intersection with FM 1016 and its intersection with FM 396	1%
FM 396 between its intersection with Trinity Road and its intersection with the Anzalduas Int'l. Bridge	0%
FM 2061 between its intersection with FM 3072 and its intersection with US 281	3%
US 281 between its intersection with the Pharr-Reynosa Int'l. Bridge and its intersection with Spur 29	0%
Spur 29 between its intersection with Doffin Canal Road and its intersection with Military Hwy	0%
Doffin Canal Rd between its intersection w/ the Pharr-Reynosa Int'l. Bridge and its intersection w/ Spur 29	1%
FM 2557 (Stewart Road) from US 281/Military Highway to I-2 (US 83)	3%
FM 3072 (Dicker Road) from Veterans Boulevard ("I" Road) to Cesar Chavez Road	0%
US 281 (Cage Boulevard) from US 281/Military Highway to Anaya Road	0%
US 281/Military Highway from Spur 29 to FM 1015	1%
FM 1015 from Progresso International Bridge to Mile 9 North	0%
US 83 Business from FM 1015 to Pleasantview Drive	0%
Total	**100%**

Source: HCRMA

Figure 2-22 presents the number of OS/OW commercial vehicle permits issued from September 2014 through July 2020. The monthly number of permits reached a peak of 4,016 in June 2020, with the second-highest peak occurring in June 2017 with 3,918 permits. Permit counts increased 24 percent annually from 2015 to 2019 when considering complete years. Due to the OS/OW permit fee increase, the growth rate of permits issued reduced significantly from the previous years. Overall, annual permit demand saw a drop of 7 percent in 2018 compared to the previous year and 2 percent in 2019.

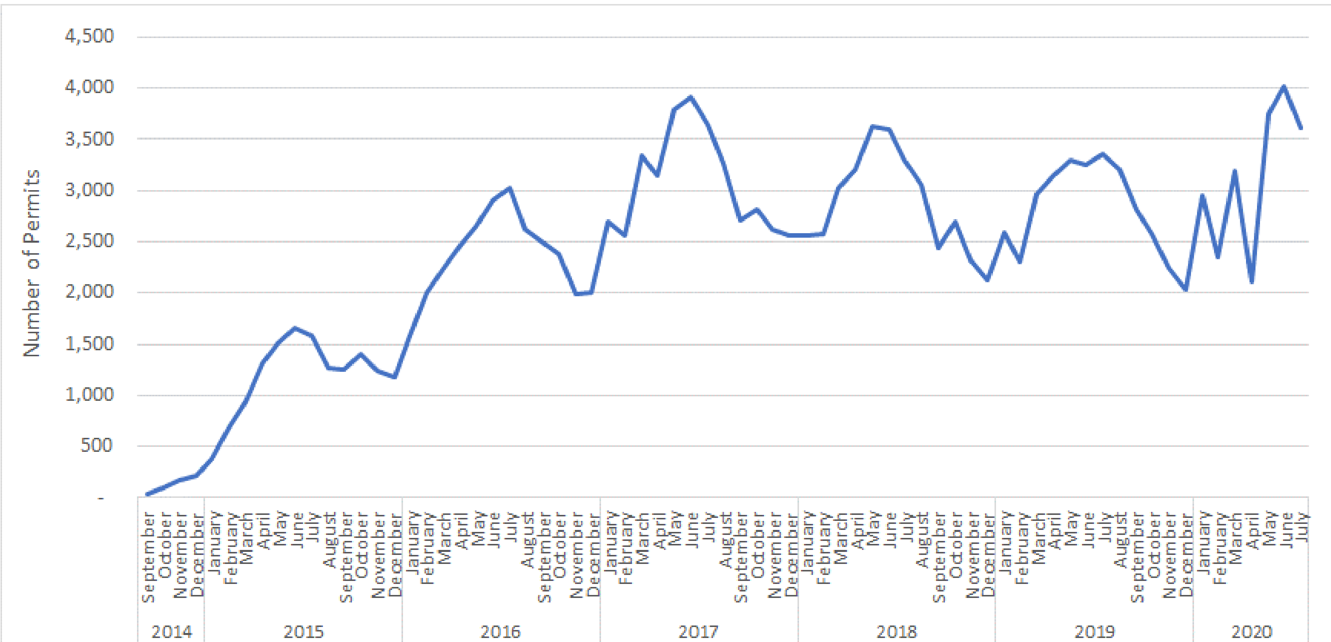


Figure 2-22. Number of Commercial Vehicle OS/OW Permits Issued Monthly

Table 2-8 lists the top 20 products associated with filed OS/OW permits. These 20 products—corresponding to approximately 15,300 permits—account for 91 percent of all permits issued from September 2014 through December 2015. Tomatoes account for the largest share of OS/OW permit products at 24.2 percent, followed by general produce, avocado, and mango, with shares of 18.4, 12.8, and 12.6 percent, respectively.

Table 2-8. Top 20 Products Associated with Filed OS/OW Permits – 09/2014 to 12/2015

Rank	Product	# of Permits	Share
1	Tomato	3,702	24.2%
2	Produce*	2,825	18.4%
3	Avocado	1,962	12.8%
4	Mango	1,933	12.6%
5	Papaya	846	5.5%
6	Broccoli	614	4.0%
7	Carrot	449	2.9%
8	Lime	427	2.8%
9	Lemon	348	2.3%
10	Juice	314	2.1%
11	Cucumber	277	1.8%
12	Persian Lime	243	1.6%
13	Pickle	233	1.5%
14	Banana	214	1.4%
15	Chili	198	1.3%
16	Tomatillo	172	1.1%
17	Pineapple	161	1.1%
18	Saladette Tomato	150	1.0%
19	Cabbage	129	0.8%
20	Orange	118	0.8%
	Total	**15,315**	**100%**

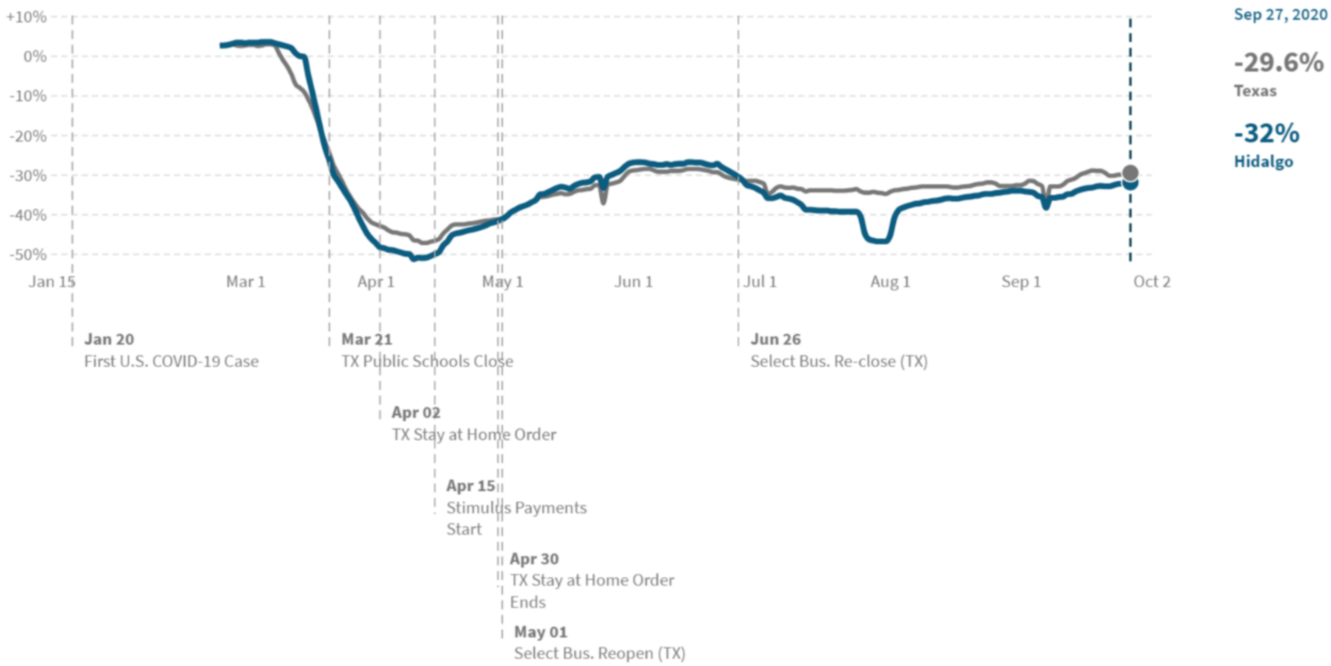
Note: * There were no additional details regarding produce content.
Source: HCRMA

2.5.3. COVID-19 Impact on Traffic in Hidalgo County and Border Crossings

In 2020, the outbreak of the viral illness COVID-19 spread throughout the world and was defined by the World Health Organization (WHO) as a pandemic. By September 28, 2020, Hidalgo County had 31,562 confirmed COVID-19 cases and 1,630 COVID-19-related deaths.

The COVID-19 outbreak is materially impacting the movement of people and, with that, traffic volumes. Due to the rising COVID-19 infection cases, people throughout the United States, including Texas and Hidalgo County, were either under restrictions limiting their travel (stay-at-home orders, lockdowns, quarantines) or chose to limit their travel and practice social distancing to reduce the virus's spread.

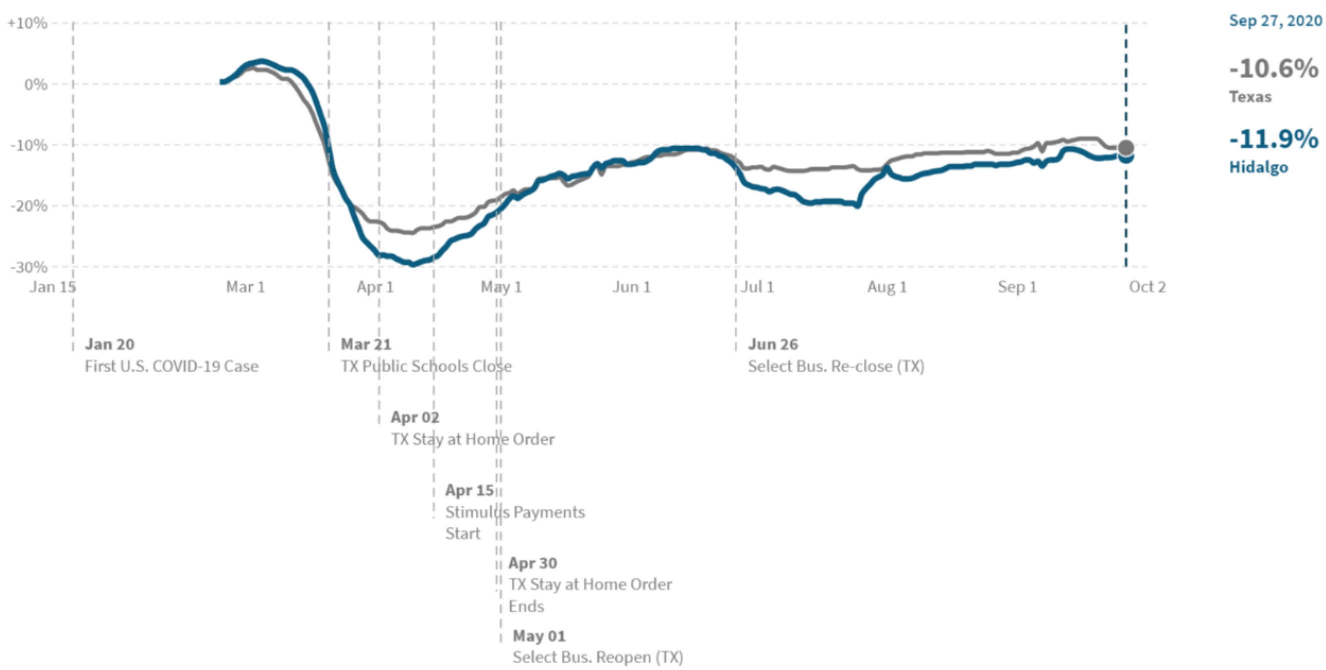
As of September 27, 2020, the total time spent at workplace locations decreased by 32 percent in Hidalgo County and by 29.6 percent in Texas compared to January 2020, as presented in Figure 2-23.[23]



Source: Opportunity Insights[23]

Figure 2-23. Percentage Change in Time Spent at Workplace Locations Compared to January 2020

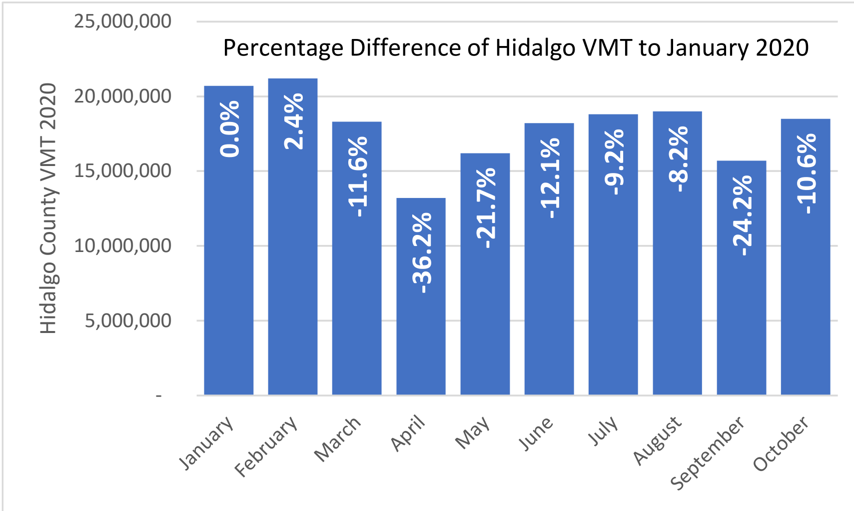
As of September 27, 2020, the total time spent away from home decreased by 11.9 percent in Hidalgo County and by 10.6 percent in Texas compared to January 2020, as shown in Figure 2-24.



Source: Opportunity Insights[23]

Figure 2-24. Percentage Change in Time Spent Away from Home Compared to January 2020

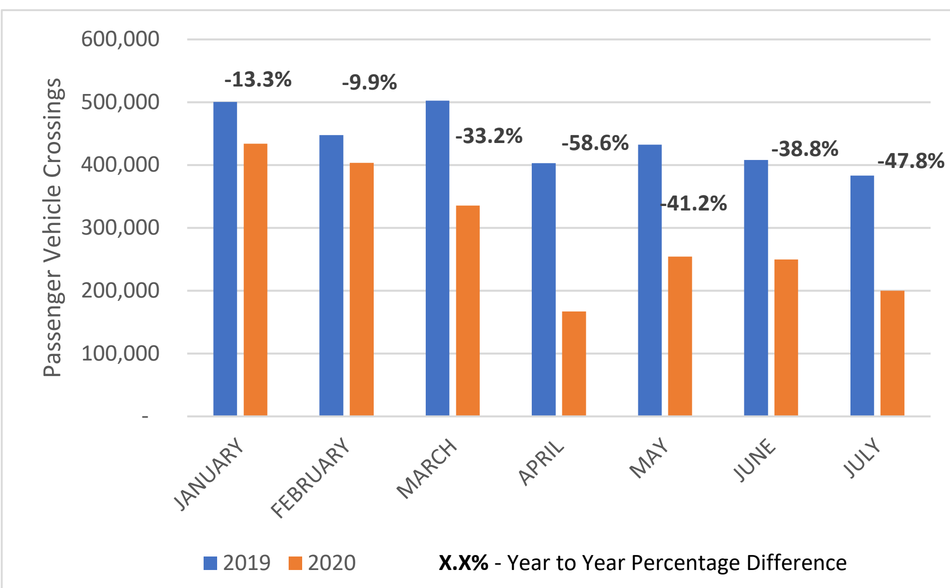
These statistics highlight the significant changes in travel demand and patterns, which resulted in less congestion on Hidalgo County's road network, particularly during peak periods. The observed vehicle-miles traveled (VMT) from StreetLight Data, Inc. in the first week of October was 10 percent less than what was observed in January 2020.[24] March and September exhibited the lowest VMTs, as presented in Figure 2-25.



Source: StreetLight[24]

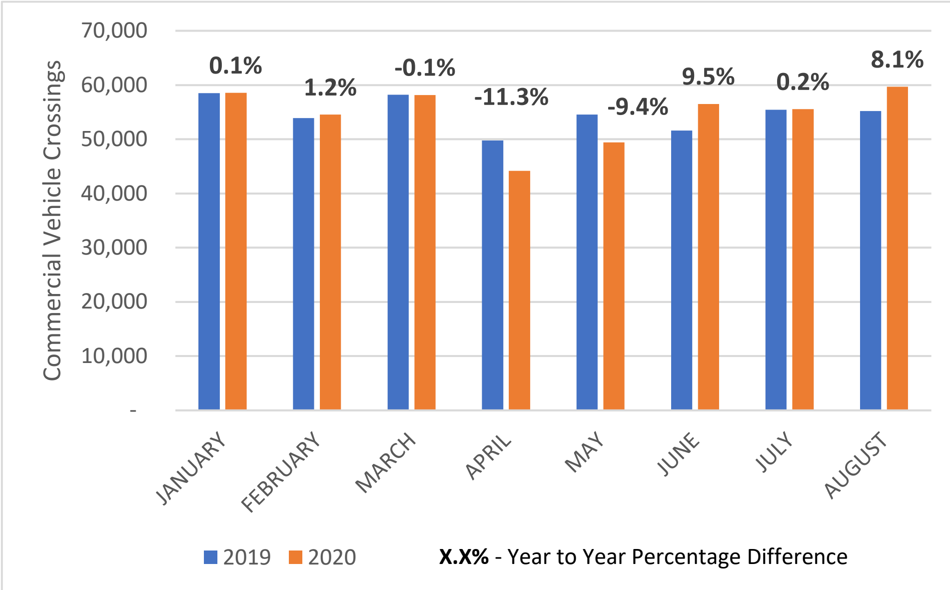
Figure 2-25. Hidalgo County VMT in 2020

Border crossings at the U.S/Mexico border in Hidalgo County decreased substantially due to an Executive Order restricting border-crossings to those who have essential business in the United States or in Mexico. As shown in Figure 2-26, passenger vehicle crossings in July 2020 were about 47 percent lower compared to the same month of the previous year. However, the impact on commercial vehicles crossings was much lower, exhibiting a decrease of only 11 percent in April and returning to positive growth by June 2020.



Source: USDOT, BTS[25]

Figure 2-26. Northbound Hidalgo County Passenger Vehicle Border Crossings



Source: Pharr-Reynosa International Bridge[26]

Figure 2-27. Northbound Pharr–Reynosa International Bridge Commercial Vehicle Border Crossings

In September 2020, a Hidalgo County Judge announced a new set of rules to protect Texans from the virus during the winter.[27] As of September 14, the following rules were implemented:

- Event organizers holding events indoors, other than a church ceremony, are limited to 50 percent of the total listed occupancy of the facility. All patrons must wear a face covering (over nose and mouth) wherever it is not feasible to maintain 6 feet of physical distancing from another individual not in the same household, and minimum standard health protocols should be followed.
- Hair/Nail salons: standard health protocols; at least 6 feet physical distancing; schedule appointments to limit amount of persons in facilities; sanitize surfaces and equipment between uses.
- Gyms: standard health protocols; at least 6 feet physical distancing; sanitize surfaces and equipment between uses; provide hand sanitizer, disinfecting wipes, soap, and water.
- Bowling Alleys/Bingo Halls: standard health protocols; at least 6 feet physical distancing; add dividers if social distancing isn't possible; sanitize surfaces and equipment between uses; provide hand sanitizer, disinfecting wipes, soap and water.
- Weddings/Wedding Venues: held indoors, other than a church ceremony, are limited to 50 percent of the total listed occupancy of the facility. All patrons must wear a face covering (over nose and mouth) wherever it is not feasible to maintain 6 feet of physical distancing from another individual not in the same household, and minimum standard health protocols should be followed. Sanitize surfaces and equipment between uses; provide hand sanitizer, disinfecting wipes, soap, and water.
- Movie Theaters: may operate at 50 percent of the total listed occupancy of the facility. All patrons must wear a face covering (over nose and mouth) wherever it is not feasible to maintain 6 feet of physical distancing from another individual not in the same household, and minimum standard health protocols should be followed. Maintain at least two seats (or 6 feet separation) between groups in any row (except that two or more members of the same household, or two individuals who are not members of the same household but who are attending together can sit adjacent to one another, with two seats empty on either side).

- Every person in the County of Hidalgo shall wear a face covering over the nose and mouth when inside a commercial entity or other building or space open to the public, or when in an outdoor public space; wherever it is not feasible to maintain 6 feet of physical distancing from another person not in the same household (see order for exemptions).
- ALL persons over the age of 65 are strongly encouraged to stay home as much as possible and maintain appropriate physical distance from any member of the household who has been out of the residence in the last 14 days.
- There will be a curfew for all persons aged 18 and over from 10:00 p.m. to 5:00 a.m. The only exceptions are for a medical emergency, to provide covered essential services, or any other purpose permitted under this order. All persons 17 and younger must be accompanied by a parent or guardian when participating in essential activities.
- To the greatest extent possible, all travel during the CURFEW, within the jurisdiction of Hidalgo County, should be limited to obtaining or performing essential covered services. Travel should be limited to no more than two persons per vehicle for persons obtaining essential services, and four persons per vehicle for essential healthcare or government functions.
- Any outdoor gathering of 10 or more people is prohibited unless the Mayor of the City in which the gathering is held or the Hidalgo County Judge in the case of a gathering in an unincorporated area, approves of the gathering. Outdoor areas or outdoor venues shall operate at no more than 50 percent as underlined in the order (see order for examples).
- All commercial covered entities operating within Hidalgo County shall remain at 50 percent of the total listed occupancy limit. It is highly encouraged and recommended that services be provided by curbside, drive-thru, or take-out.
- All bars and similar establishments that receive more than 51 percent of their gross receipts from the sale of alcoholic beverages MUST remain CLOSED, but may open for delivery and take-out, including alcoholic beverages.
- Bar areas within restaurant establishments must follow Minimum Standard Health Protocols relevant to operations of the business or entity services and must not permit customers to loiter at the bar or in common areas, only provide services to seated individuals in "bar" areas, discouraging activities that enable close physical contact in the "bar" areas.
- Commercial covered entities, including flea markets and farmers markets, must develop and implement "Health and Safety Practices" that require employees and customers to follow additional hygiene measures, including wearing facial coverings over mouth and nose.
- Employers of covered entities should follow Minimum Standard Health Protocols relevant to operations of the business or entity services such as training all employees on appropriate cleaning and disinfection, hand hygiene, and respiratory etiquette, not allow employees with known close contact to a positive for COVID-19 to return to work until the end of a 14-day self-isolation period, and/or conducting temperature checks or health screenings of employees.

If shelter-at-home orders are persistent in Hidalgo County, the traffic pattern will be significantly affected and will not return to previously observed traffic patterns in the near future. The long-term effects of the COVID-19 pandemic for Hidalgo County are discussed further in subsequent chapters, including assumptions post-Project opening.

[1] Texas Department of Transportation (n.d.). Transportation planning maps. Retrieved August 5, 2020 from http://www.txdot.gov/inside-txdot/division/transportation-planning/maps.html

[2] INRIX (n.d.). Traffic Scorecard. Retrieved August 28, 2020 from https://inrix.com/scorecard-city/?city=McAllen%2C%20TX&index=730

[3] Texas Department of Transportation (2020). Texas – Mexico Border Transportation Master Plan. Retrieved from https://ftp.txdot.gov/pub/txdot/move-texas-freight/resources/btmp/border-transportation-master-plan.pdf

[4] Secretaria de Comunicaciones y Transportes (2020, July 9). Road data. Retrieved from http://www.sct.gob.mx/carreteras/direccion-general-de-servicios-tecnicos/datos-viales

[5] Caminos y Puentes Federales (n.d.). Taridas Vigentes. Retrieved August 12, 2020 from http://pot.capufe.mx/gobmx/Transparencia/Tarifas.html

[6] Texas Department of Transportation (2020, July 6). *Texas-Mexico International Bridges and Border Crossings: Existing and Proposed 2015*. Retrieved from https://ftp.dot.state.tx.us/pub/txdot-info/iro/international-bridges.pdf

[7] U.S. Customs and Border Protection (CBP) (n.d.). CBP border wait times. Retrieved July 18, 2020 from https://apps.cbp.gov/bwt/mobile.asp?action=n&pn=2305

[8] Chalvire, P. (2020, May 6). CPB: Cost a sticking point for northbound trucks on Anzalduas Bridge. Retrieved from http://valleycentral.com/news/local/cbp-cost-a-sticking-point-for-northbound-trucks-on-anzalduas-bridge

[9] Pharr International Bridge (n.d.). Special Hours of Operation (Starting December 2nd until further notice). Retrieved January 27, 2020 from https://bridge.pharr-tx.gov/live-bridge-camera/

[10] Hinojosa, R., Sr., and Vela, F., Jr. (2020, June 22). Donna and Pharr border crossing projects gain approval through private-public partnership program. Retrieved from https://votesmart.org/public-statement/1106314/donna-and-pharr-border-crossing-projects-gain-approval-through-private-public-partnership-program#.WV6_bGdK3wo

[11] Bureau of Transportation Statistics, Office of the Assistant Secretary for Research and Technology (BTS, OST-R) (2020, September). Border crossing/Entry data. Retrieved from https://www.bts.gov/transborder

[12] CBP, Laredo Field Office (2020, July). [Monthly border crossing data]. Unpublished data.

[13] FHWA (2019). Texas monthly border crossings – 2018 [Database].

[14] The University of Arizona, Eller College of Management (n.d.). Arizona-Mexico Economic Indicators: Commodity Flows. Retrieved November 25, 2019 from https://azmex.eller.arizona.edu/commodity-flows-overview

[15] Martin, B. (2012, October 1). Texas produce shipments to loom larger in future. Retrieved from http://haulproduce.com/2012/texas-produce-shipments-to-loom-larger-in-future/

[16] Texas Department of Transportation (n.d.). Traffic Count Database System. Retrieved July 31, 2020 from https://txdot.ms2soft.com/tcds/tsearch.asp?loc=Txdot&mod=tcds&local_id=57CC441

[17] McAllen Chamber of Commerce (2020). McAllen economic scan. Retrieved from http://mcallen.org/wp-content/uploads/2014/10/market_profile.pdf

[18] International Community Publications, LLC (n.d.). Mexico industrial maps. Retrieved August 9, 2020 from http://www.mexicoindustrialmaps.com/

[19] Rio Grande Valley Metropolitan Planning Organization (n.d.). U.M.A.P. Retrieved August, 2020 from http://hcmpo.maps.arcgis.com/apps/webappviewer/index.html?id=a21dc22ec10c4ccb96923ab55170e530

[20] Martin, B. (2020, August 1). Texas produce shipments to loom larger in future. Retrieved from http://haulproduce.com/2012/texas-produce-shipments-to-loom-larger-in-future/

[21] Hidalgo County Regional Mobility Authority (2020, May 9). Specialized overweight permits: Permit information. Retrieved from https://texas.promiles.com/hidalgo/

[22] Hidalgo County Regional Mobility Authority, Oversize/Overweight Permit Database. [Public Information Request]

[23] Opportunity Insights (n.d.). Economic Tracker. Retrieved October 5, 2020 from https://opportunityinsights.org/

[24] StreetLight Data, Inc. (n.d.). COVID-19 VMT Monitor. Retrieved October 5, 2020 from https://www.streetlightdata.com/vmt-monitor-by-county/#emergency-map-response

[25] United States Department of Transportation, Bureau of Transportation Statistics (n.d.). Border Crossing Entry Data / Monthly Data. Retrieved October 5, 2020 from https://explore.dot.gov/views/BorderCrossingData/Monthly?:isGuestRedirectFromVizportal=y&:embed=y

[26] Pharr International Bridge (n.d.). Northbound Truck Crossings. Retrieved October 5, 2020 from https://bridge.pharr-tx.gov/northbound-truck-crossings/

[27] KRGV.com (2020, September 12). Hidalgo County judge lifts 'Shelter at Home' order. Retrieved from https://www.krgv.com/news/hidalgo-county-judge-lifts-shelter-at-home-order

Chapter 3: Field Data Analysis

Since 2008, C&M has been collecting field data in the study area specifically related to the Project. Based on these data, C&M not only developed a user profile but also gained a comprehensive understanding of traffic characteristics and travel patterns within the study area, all of which provided critical information for travel demand model development and calibration, as detailed in Chapter 5. Importantly, C&M was able to rely on its previously collected data in lieu of some field work efforts that could not be completed for the present study due to the COVID-19 pandemic. For example, C&M utilized its previously collected traffic counts, as current traffic counts would not provide an accurate depiction of typical traffic patterns. C&M also previously performed several in-person intercept surveys to obtain critical traffic information such as origin–destination (OD) patterns and travel characteristics of persons using the project corridor. Nevertheless, C&M's field work for the present study did include several online travel surveys, which could be carried out as proposed despite COVID-19.

This chapter first summarizes the field work performed by C&M for previous studies related to the Project. The remainder of this chapter presents the field work performed by C&M for the present study, which includes the following:

- *Cell phone and GPS OD data collection*
- *Online/Mail Hidalgo County Residents Stated Preference (SP) Survey*
- *Online Hidalgo County Visitor SP Survey*
- *Online/Phone International Trade Truck Company Survey*

3.1. Field Work from Previous Studies

The following sections summarize the field work conducted by C&M from 2008 to 2016 for T&R studies related to the Project.

3.1.1. Interviews

In addition to discussions with TxDOT, C&M has conducted formal interviews with the following stakeholders on both sides of the border in the study area:

- The Hidalgo County Metropolitan Planning Organization (HCMPO)[i]
- The B&P Bridge Company (Administrator of the Weslaco–Progreso International Bridge)
- The City of Pharr (Administrator of the Pharr–Reynosa International Bridge)
- The City of McAllen (Administrator of the McAllen–Hidalgo–Reynosa International Bridge and the Anzalduas International Bridge)
- The City of Donna (Administrator of the Donna–Rio Bravo International Bridge)
- The Reynosa Asociación de Maquiladoras y Manufactureras, A.C. (RAMMAC) – Mexico
- The Cámara Nacional del Autotransporte de Carga (CANACAR) – Mexico

The information received was used to determine counting locations and to validate parameters for willingness to pay and assumptions for commercial vehicle traffic in the area.

[i] Now part of the Rio Grande Valley Metropolitan Planning Organization (RGVMPO)

3.1.2. Field Observations and Reconnaissance

C&M performed a general inventory of the traffic network on both sides of the border (e.g., number of lanes, ramp locations) using commercially-available satellite imagery and aerial photography supported by field observations and reconnaissance. The field reconnaissance focused on I-2, US 281, industrial zones, the international bridges, and the major roads and maquiladora parks in Mexico. Multiple trips were made during the AM, PM, and off-peak hours by C&M staff. Field observations revealed that traffic across the study area is greatly influenced by the trailer trucks originating in and destined to the McAllen–Edinburg–Mission MSA. Commercial vehicle and passenger vehicle interactions and competition for space produce a less than preferable level of service (LOS) along the observed corridors. According to interviews with the HCMPO, accidents involving minor collision damage are common on US 281 and in the commercial vehicle corridor, causing disruptions to traffic flow.

The field reconnaissance corroborated that commercial vehicle traffic on international bridges and within industrial zones is tied to maquiladora activity and to border crossing waiting times, peaking during midday on Mondays and Fridays.

Additionally, C&M has continuously monitored construction at both the Anzalduas International Bridge and the Donna–Rio Bravo International Bridge to corroborate locations and the approaching roads and geometries on both sides of the border. Furthermore, in 2020 C&M performed traffic studies on both POEs. This information served as input for travel demand modeling.

3.1.3. Traffic Counts

C&M previously carried out a comprehensive traffic count program for the study area in June 2008. The program included counts from 48 locations along the major facilities within the study area, including I-2, US 281, Military Highway, and the Dicker Road/Jackson Road corridor. All traffic counts included vehicle classification (i.e., passenger vehicle or commercial vehicle).

The counts were analyzed by time of day. The AM peak period for total traffic was determined to occur between 8:00–9:00 a.m., and the PM peak period for total traffic corresponded to 5:00–6:00 p.m. A separate analysis of commercial vehicle traffic indicated an AM peak period of 11:00 a.m.–12:00 p.m. and a PM peak period of 3:00–4:00 p.m.

In 2010, automatic traffic recorder (ATR) counts—as well as vehicle class and direction data—were collected from over 60 locations on both sides of the U.S./Mexico border and used in conjunction with permanent count station data provided by TxDOT. The majority of counts were recorded over a three-day period, with additional efforts made on Fridays due to the corresponding high volume of commercial vehicle traffic. Overall, the traffic patterns observed were in line with TxDOT's AADT data and with patterns expected in urban areas of a similar size. However, weekend traffic was generally higher than weekday traffic due to the high volume of recreational/shopping travel in the area, particularly near the border and near shopping malls or other recreational areas. Overall, the percentage of commercial vehicles is relatively high in the study area due to the commercial vehicle traffic from the international bridges.

In May 2012, C&M collected ATR data at over 30 locations to determine weekday and weekend traffic volumes within the study area. The ATR data—which included direction, time of day, day of the week, 15-minute traffic counts, and 13 vehicle classifications—was collected during seven-day or three-day periods. The ADT for each station was used in conjunction with 2010 AADTs from TxDOT for TDM calibration and validation.

C&M added to its expanding ATR counts database in 2014 by collecting seven-day counts at 35 locations. These counts were used to determine ADT along major facilities within the study area and to determine the weekly traffic profiles of these facilities. The observed traffic was in line with C&M's observations from previous years. Similar traffic profiles were observed over weekdays and weekends, and weekend/weekday ratios ranged from 74 to 89 percent. The majority of locations exhibited high percentages of commercial vehicle traffic. I-2 exhibited more traffic in the eastbound direction, whereas US 281 exhibited similar trends in each direction, with lower traffic volumes during the weekends.

Starting on February 1, 2016, C&M collected traffic data at 15 count locations, as shown in Figure 3-1. The counts were collected during three weekdays along important corridors within the study area and for seven days on the international border crossings to determine traffic patterns and hourly/daily distributions for the international bridges.

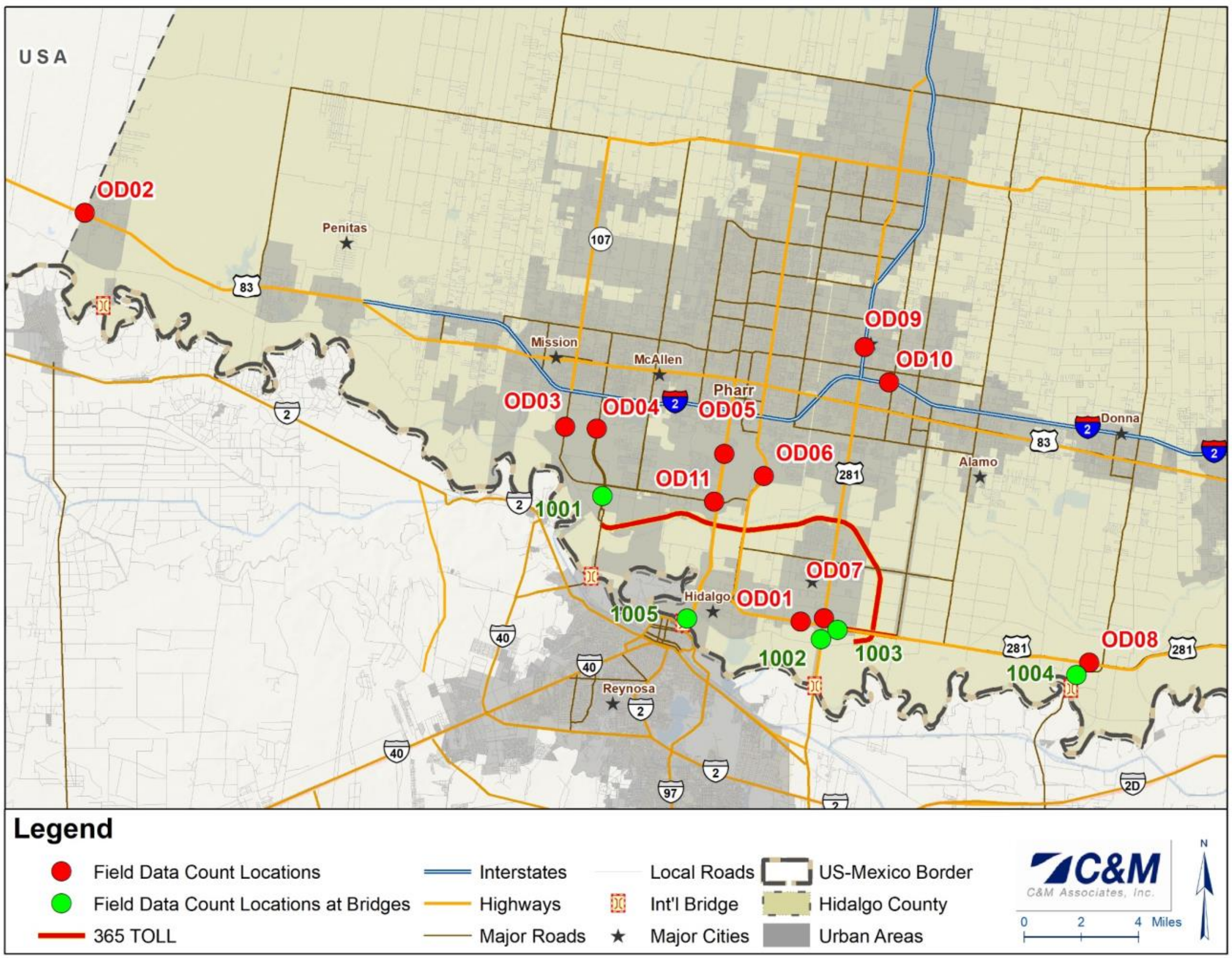


Figure 3-1. Field Data Collected in the Study Area – February 2016

Table 3-1 presents the traffic counts and commercial vehicle percentages (average weekday) from these selected locations. As shown, most locations have high commercial vehicle percentages, particularly along Military Highway. Table 3-2 presents the border crossing counts. The McAllen–Hidalgo–Reynosa International Bridge data are from previous field work.

Table 3-1. ADT Counts and Commercial Vehicle Percentages at Selected Locations – February 2016

Station ID	Description	Counts	Commercial Vehicle %
OD01	US 281 E of Jackson Rd	13,918	23%
OD02	I-2 E of Pipeline Rd	17,710	11%
OD03	FM 1016 S of U S83	6,648	7%
OD04	FM 396 S of I-2	7,971	11%
OD05	FM 115 S of I-2	23,757	10%
OD06	SH 336 S of I-2	18,331	8%
OD07	US 281 N of Military Hwy	8,479	20%
OD08	US 281 W of FM 493	4,234	18%
OD09	US 281 N of I-2 - FR	18,377	9%
OD09	US 281 N of US 83 - ML	116,815	7%
OD10	I-2 E of US 281 - FR	23,895	6%
OD10	I-2 E of US 281 - ML	134,438	5%
OD11	FM 1016 W of FM 115	23,161	23%

Note: FR = Frontage Road; ML = Mainlanes

Table 3-2. Traffic Counts and Commercial Vehicle Percentages at International Bridges – February 2016

ID	Description	Weekday		Weekend		Weekend/ Weekday Ratio
		Counts	Commercial Vehicle %	Counts	Commercial Vehicle %	
1001	Anzalduas Hwy, N of Anzalduas International Bridge	7,031	8%	5,960	5%	85%
1002	Pharr-Reynosa International Bridge, N of Capote Central	10,835	31%	6,150	18%	57%
1004	International Blvd, N of Donna-Rio Bravo International Bridge Facility	3,014	1%	3,587	1%	119%
1005	McAllen-Hidalgo-Reynosa International Bridge*	21,680	9%	19,724	5%	91%

Note: * Data obtained from earlier field work efforts.

Figure 3-2 illustrates the weekly traffic profiles at international bridges in 2016. These weekly profiles aided in verifying the revenue days used in estimating annual revenues for the present study. For the Pharr–Reynosa International Bridge, the two northbound bridge facilities for cars and commercial vehicles were surveyed separately (stations 1002 and 1003).

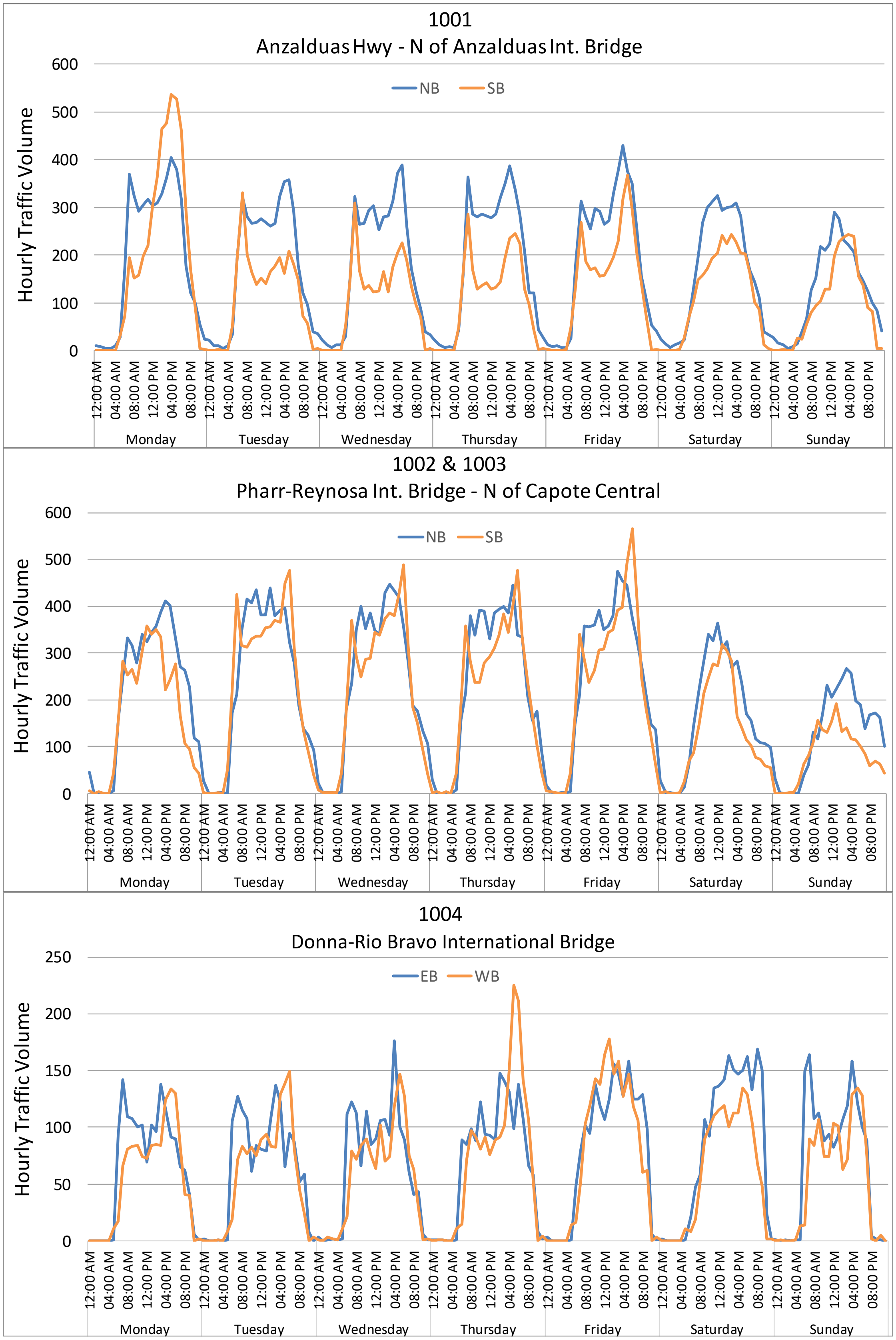
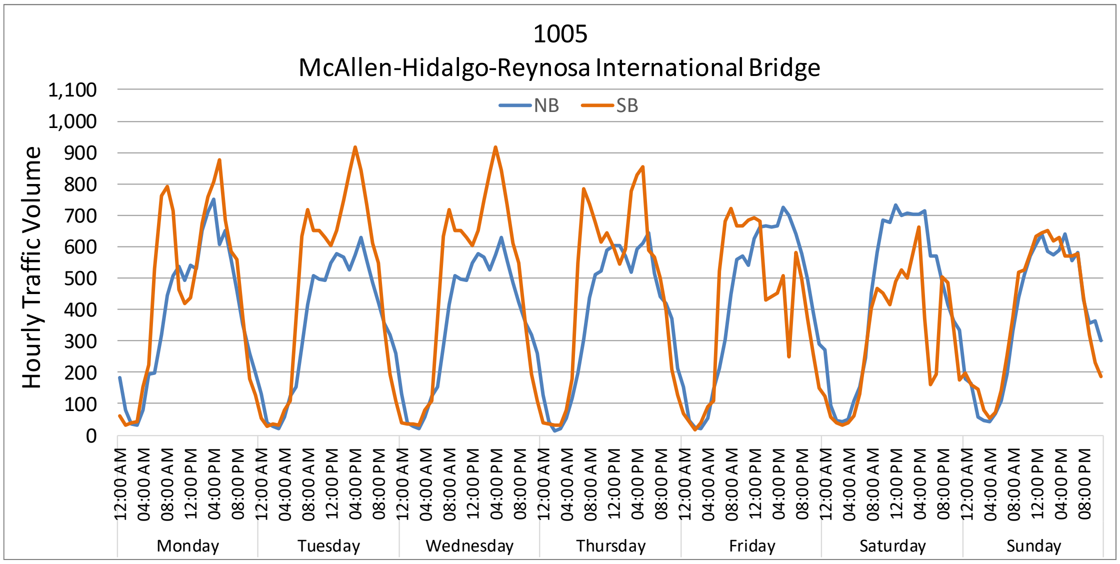


Figure 3-2. Weekly Traffic Profiles at International Bridges – February 2016



Note: McAllen–Hidalgo–Reynosa data were obtained from earlier field work efforts.

Figure 3-2. Weekly Traffic Profiles at International Bridges – February 2016 (Cont'd.)

3.1.4. Travel Time Studies

C&M previously conducted a travel time study to evaluate highway performance against the corresponding routes within the modeled transportation network. The travel time study was performed on June 11, 2008, between 6:00 a.m. and 6:00 p.m. Nine routes were selected, as presented in Table 3-3 along with the route lengths and average travel speeds.

Table 3-3. Travel Time Routes – 2008

Facility	From	To	Length (mi)	Avg. Traveled Speed (mph)
I-2/US 281	SH 336 (I-2)	Nolana Loop (US 281)	5.1	45.7
I-2/US 281	Nolana Loop (US 281)	SH 336 (I-2)	5.2	44.4
I-2/US 281	N Cesar Chavez Rd (I-2)	Nolana Loop (US 281)	4.7	46.1
I-2/US 281	Nolana Loop (US 281)	N Cesar Chavez Rd (I-2)	4.9	46.1
SH 336	Frontage Rd, I-2	Military Hwy	6.9	39.0
S. Stewart Rd	Frontage Rd, I-2	Military Hwy	7.8	41.2
S. Alamo Rd	Frontage Rd, I-2	Military Hwy	7.3	40.9
FM 1015	Frontage Rd, I-2	Military Hwy	5.1	36.7
Military Hwy	Jackson Road	FM 1015	16.6	54.2

A minimum of four travel runs per route were carried out simultaneously by different drivers. Average traffic speed was captured via the "floating car" survey method. GPS was used to store raw data, such as latitude and longitude, and to calculate time and speed. This information was then processed for each travel run to determine average speeds for the peak periods along the selected routes.

Additionally, C&M requested the raw data from travel runs performed by Jacobs Engineering for the HCMPO, providing average speeds for all major roads within the study area during the winter of 2008 and summer of 2009.[1] These data were incorporated into C&M's TDM and aided the validation process.

C&M also evaluated the quality of traffic movement along US 281, I-2, and several local roads by analyzing Google Maps data with its proprietary data streaming program, which was conducted over several months in 2014 and gathered road segment travel times every 5 minutes over full-day periods. For each segment, average speeds were calculated from selected 5-minute intervals for each time period. For example, Figure 3-3 and Figure 3-4 present heat maps of I-2 during AM and PM peak periods in the eastbound direction. Each heat map shows a color-coded representation of the average vehicle speed; green represents speeds greater than 55 mph, yellow represents speeds from 35 to 55 mph, and red represents speeds lower than 35 mph.

During the AM and PM peak periods, heavy congestion was observed on I-2 just before US 281/ I-69C. C&M used the raw data from the monitoring program and, after review and validation, incorporated the acquired speeds into its TDM.

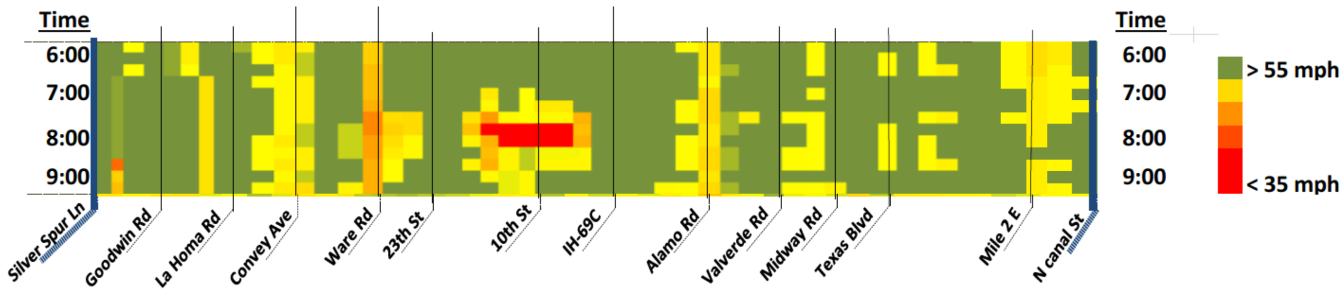


Figure 3-3. AM Speed Heat Map for I-2 Eastbound – 2014

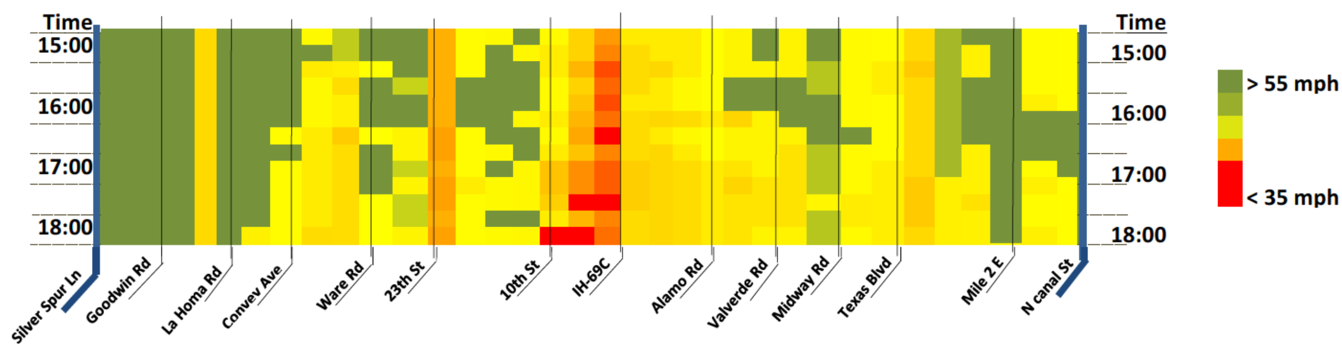


Figure 3-4. PM Speed Heat Map for I-2 Eastbound – 2014

3.1.5. Origin-Destination Studies

In April 2010, C&M performed a passenger car OD study conducted using a postcard return method. This study was used to determine the OD patterns of passenger car traffic within the study area and to validate OD data from the HCMPO and 2004 survey data from the Texas Transportation Institute (TTI). Validated data were included in C&M's TDM. The OD study revealed that the most common origin (30%) and destination (39%) locations were the cities of McAllen and Pharr, where the majority of jobs within the study area are located.

In 2014, C&M enlisted AirSage to perform a regional OD survey within the study area, utilizing its Wireless Signaling Extraction (WiSE) technology to compile data from select wireless carrier networks as generated by mobile devices. The results of the OD survey were used in model development and validation. This technology anonymizes the data and performs multiple stages of analysis to monitor the location and movement of mobile devices.

AirSage uses a modular, multi-step methodology to derive useful information and analytics from wireless signaling data provided by its wireless carrier partners. The core components of the data collection, processing, and delivery process include the following:

- Device Location Processing: Time-stamped locations (latitude/longitude) are generated for each mobile device (e.g., a cell phone), utilizing the network signaling data generated each time the mobile device interacts with the mobile network. This interaction occurs not only when devices are in use, but also when they are in idle mode.
- Activity Pattern Analysis: The data are run through a series of pattern recognition and statistical clustering algorithms to determine repeated and irregular trip patterns and primary activity locations for a device. This information can then be used to classify trip purpose.
- Activity Point Generation: Each device location is combined with other recent sightings and known activity locations to further refine the location, determine if the device is moving or stationary, and calculate additional attributes to create individual "Activity Points." These are then combined to create "Trip Legs," which eventually allow the creation of a network of travel behaviors.
- Population Synthesis: A full population is synthesized from the collected dataset by considering device quality and the penetration rates, which is the ratio of the number of residents observed by AirSage in a given geographical area to the 2010 Census population.
- Trip Analysis: Each trip is analyzed and classified into various categories such as the resident class of subscriber, trip purpose, time of day, and day of the week.
- Data Aggregation and Packaging: A unique study area is further subdivided into analysis zones, and the trip ends (Activity Points) are assigned to these zones. All the trip ends within these zones are also assigned a purpose and time of day during which they took place. The results are then packaged in the form of an OD Matrix.

The OD data were processed for 145 aggregated traffic analysis zones (TAZ) for Hidalgo and Cameron Counties from mid-October to mid-November, representing an average month of the study area in terms of traffic volumes. The sample comprised roughly 1.3 million trips.

In November and December 2015, CJ Hensch & Associates performed an OD survey within the study area on behalf of C&M. The survey utilized Bluetooth technology and was performed at 11 locations, as shown in Figure 3-5. The data were analyzed for weekday traffic and are summarized by time period in Table 3-4. The OD data were expanded and used in the calibration process of the TDM as described later in this report.

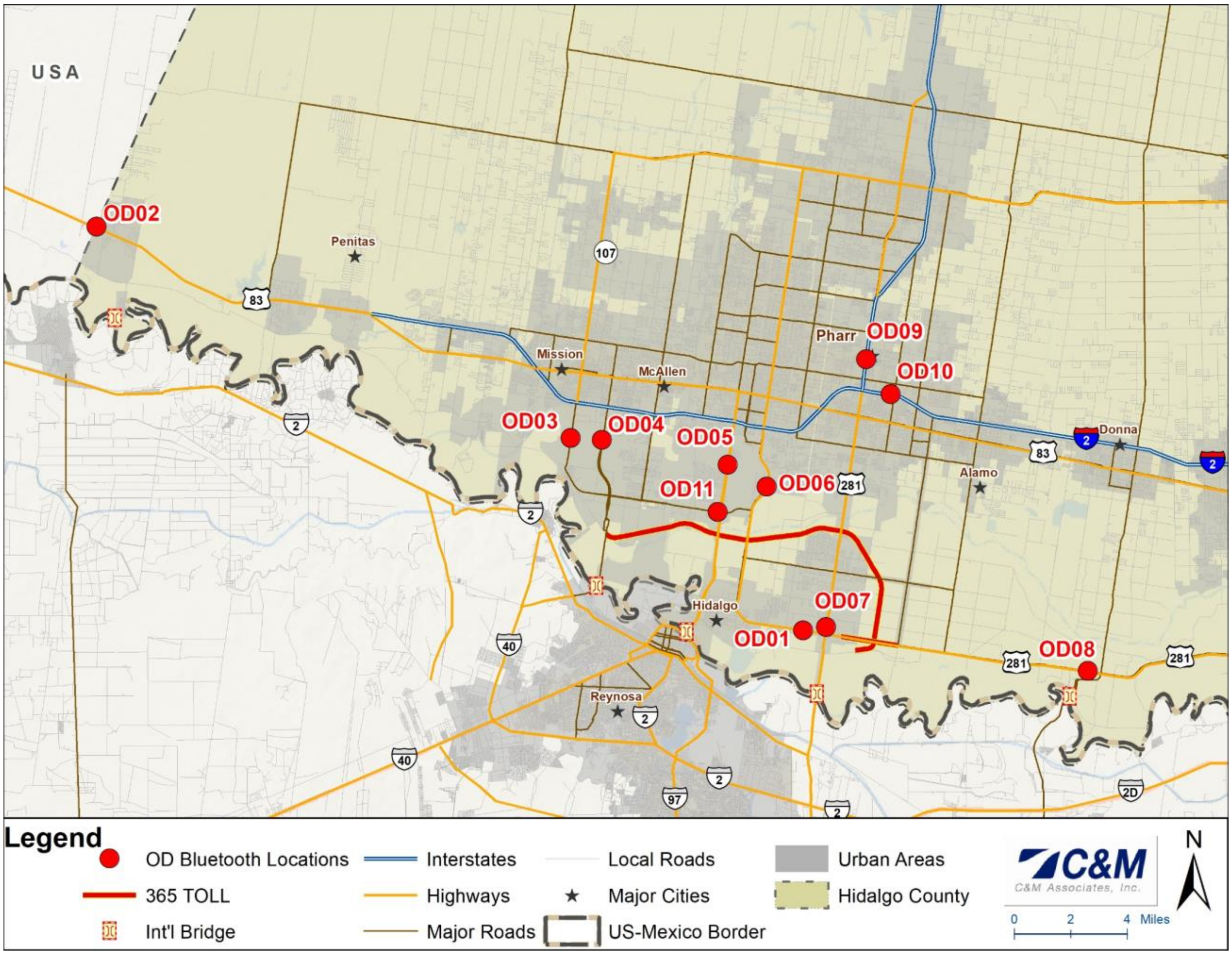


Figure 3-5. Bluetooth OD Locations

Table 3-4. Traffic Counts and Bluetooth Reads by Time Period – 2015

Time Period	Counts	Reads	Capture Rate
AM: 7AM - 9AM	56,842	5,038	8.9%
MD: 9AM – 4PM	179,383	17,892	10.0%
PM: 4PM – 7PM	92,677	8,306	9.0%
NT: 7PM – 7AM	88,832	9,594	10.8%

3.1.6. Stated Preference Surveys

In 2010, C&M tasked Resource Systems Group, Inc. (RSG) with performing an SP survey of passenger vehicle travelers within the southern Hidalgo County area to determine their likelihood of using the Hidalgo Loop Road (consisting of the IBTC and the Trade Corridor Connector) and, ultimately, their value of time (VOT). In the case of a toll facility, VOT represents the amount that a user would be willing to pay to save time, or the amount they would accept as compensation for lost time. The survey utilized a computer-assisted self-interview method and was administered from March 23 to April 7, 2010. Participants were recruited via in-person intercepts at various locations near the study corridor in the McAllen area (*n* = 407; 64%), online through a purchased email sample (*n* = 180; 29%), and online as a follow up to C&M's passenger car OD study (*n* = 45; 7%), for a total sample size of 632 (reduced from 802 after data checks and outlier analyses).

Respondents were first asked to describe their most recent trip of at least 10 minutes in length within the study area. To qualify for participation in the study, the trip had to occur within the last month. Qualifying participants were asked to think about a one-way portion of the trip and provide details regarding the day of the week the trip occurred, the start/end locations (and whether the trip crossed the U.S./Mexico border; and if so, which international bridge was used), the trip purpose, door-to-door travel time, delays due to congestion, vehicle occupancy, trip frequency, and their familiarity with electronic toll collection (ETC) transponders.

Each respondent's reference trip details were used to generate the SP questions in the next portion of the survey. After reviewing a description of the proposed toll facility and toll collection method, respondents were presented with eight hypothetical scenarios. For each scenario, respondents had to choose between their current route or the Hidalgo Loop Road (365 TOLL and the IBTC) to complete the trip they previously described. The scenarios varied in terms of the Hidalgo Loop Road's travel time savings and toll cost. Following the SP questions, respondents completed debriefing questions in which they were asked their opinion of the Hidalgo Loop Road and toll facilities in general and provided reasons for their responses to the SP exercise.

Finally, respondents completed a demographic questionnaire regarding residency, household size, vehicle ownership, gender, employment status, and annual household income. The sample included both residents of the United States (93.5%) and Mexico (6.5%) with a roughly even split of men (53%) and women (47%). The majority of respondents (52%) reported living in a house with four or more people, while 22 percent reported living in a two-person household and 20 percent reported living in a three-person household. Furthermore, 42 percent of respondents reported having two vehicles in their household, and 17 percent reported having one vehicle. The median annual household income of the entire sample fell within the $35,000-$49,999 category (15%), the midpoint of which was $42,500. The sample distribution of household income is presented in Table 3-5.

Table 3-5. Household Income Distribution – 2010 SP Survey

Income category	Count	Percent	
Less than $4,999	37	5.9%	|||||
$5,000-$9,999	41	6.5%	||||||
$10,000-$14,999	75	11.9%	||||||||||||
$15,000-$24,999	73	11.6%	||||||||||||
$25,000-$34,999	81	12.8%	|||||||||||||
$35,000-$49,999	95	15.0%	||||||||||||||||
$50,000-$74,999	94	14.9%	|||||||||||||||
$75,000-$100,000	71	11.1%	||||||||||||
More than $100,000	65	10.3%	|||||||||||
Total	632	100%	

Source: RSG

Regarding the reference trip details, the majority of reported trips were weekday non-work trips (47%), while the remainder of the sample was roughly split between weekday work trips (25%) and weekend trips (27%). There were 134 reported trips that involved crossing the U.S./Mexico border. Only 11 percent of weekday work trips crossed the international border, compared to 22 percent of weekday non-work trips and 29 percent of weekend trips. The McAllen-Hidalgo-Reynosa International Bridge was used most often for international trips, in the sample, as shown in Table 3-6.

Table 3-6. Bridge Used for International Trips – 2010 SP Survey

Bridge or crossing used	Count	Percent
McAllen - Hidalgo Reynosa International Bridge	45	33.6%
Progresso - Nuevo Progresso International Bridge	29	21.6%
Pharr - Reynosa International Bridge	28	20.9%
Anzalduas International Bridge	24	17.9%
Brownsville & Matamoros International Bridge	5	3.7%
Free Trade/Los Indio International Bridge	2	1.5%
Veterans International Bridge	1	0.8%
Total	134	100%

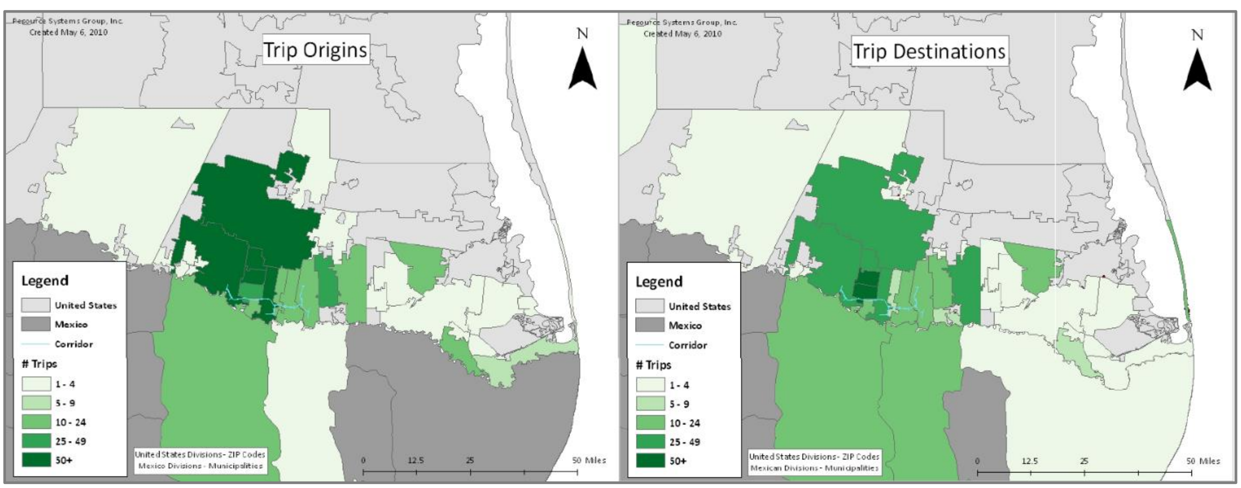
Source: RSG

The majority of sampled trips began at the respondents' homes (87%) and ended at a place other than home or work (75%). The OD pattern of reported trips is summarized in Table 3-7 and Figure 3-6. Regarding trip purpose, the most common trips were work/business related (30.3%), followed by shopping/mall trips (25.6%), as shown in Table 3-8.

Table 3-7. Origin–Destination Summary – 2010 SP Survey

		Destination		
		Home	Work	Another place
Origin	Home	1.3%	17.6%	67.7%
	Work	2.1%	0.5%	4.4%
	Another place	3.5%	0.5%	2.4%

Source: RSG



Source: RSG

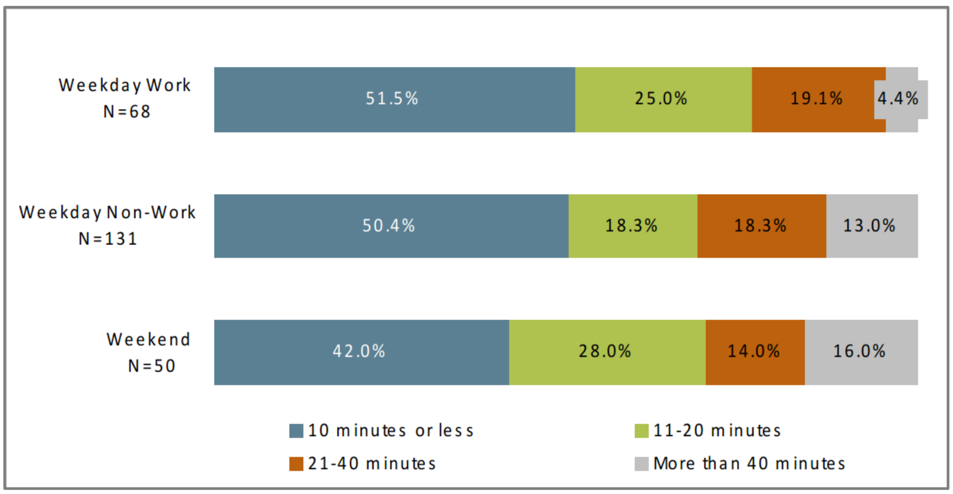
Figure 3-6. Origin–Destination Summary by Zip Code – 2010 SP Survey

Table 3-8. Trip Purpose – 2010 SP Survey

Trip purpose	Count	Percent
Shopping, Mall	162	25.6%
Go to/from work	140	22.2%
Go to/from school	75	11.9%
Other personal business	67	10.6%
Social event and/or visit	60	9.5%
Recreation	52	8.2%
Business related travel (going to a meeting, sales call, etc.)	51	8.1%
Go to South Padre Island	14	2.2%
Go to/from airport	9	1.4%
Go to the Foreign Trade Zone	2	0.3%
Total	632	100%

Source: RSG

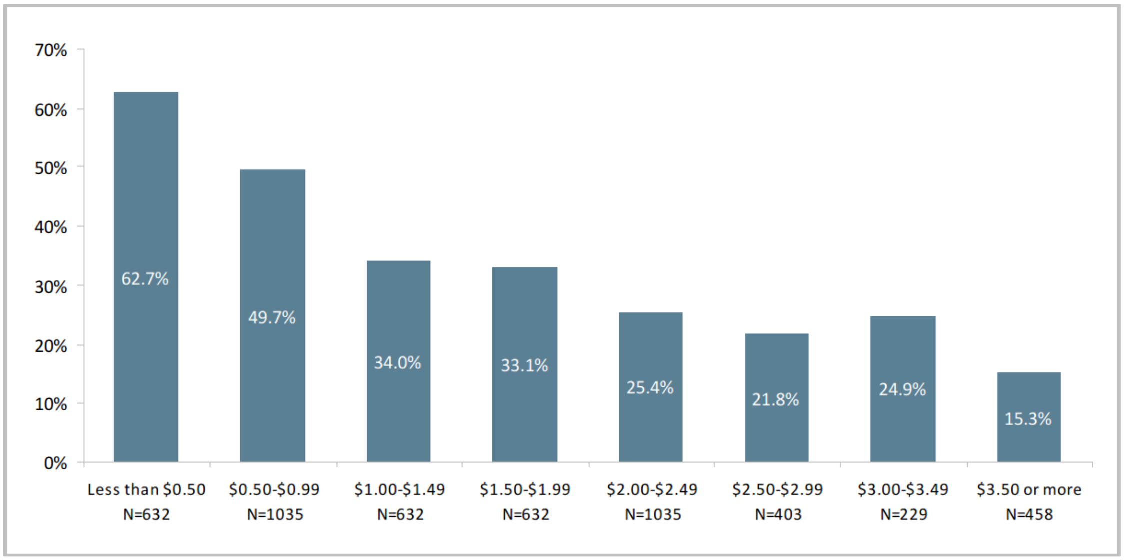
Delays due to congestion were reported by 40 percent of the sample, and roughly two-thirds of those crossing the international border reported delays of 10 minutes or more at the border. As shown in Figure 3-7, roughly 40–50 percent of all delayed trips were delayed by 10 minutes or less, while roughly 30 percent of delayed weekend trips and 24–31 percent of weekday trips exhibited delays over 20 minutes long.



Source: RSG

Figure 3-7. Length of Delays – 2010 SP Survey

Regarding the SP questions, there were a total of 5,056 responses since each participant responded to 8 scenarios. The majority of respondents (70%) selected the Hidalgo Loop Road at least once, whereas 30 percent of respondents never chose the toll road option. The likelihood of choosing the tolled option decreased as the price of the toll increased, as shown in Figure 3-8. Among those who never chose the tolled option, the most common reasoning offered was that the time savings were not worth the cost (31.3%), followed by a general opposition to paying tolls (28.1%) and the belief that their current route was more convenient (12.0%). Nevertheless, 55 percent of respondents were generally in favor of the Hidalgo Loop Road, while 24 percent were neutral and 21 percent reported a negative opinion about the project. The primary benefits of the Hidalgo Loop Road, according to those in favor of it, were less congestion (34.7%), shorter travel time (29.7%), and improved travel around McAllen by avoiding downtown (16.7%).



Source: RSG

Figure 3-8. Toll Road Selection Based on Toll Cost – 2010 SP Survey

The results of the SP survey served as the basis for multinomial logit model estimation for three market segments: weekday work, weekday non-work, and weekend travel. RSG's modeling efforts resulted in implied VOTs of $7.29/hr. (in 2010 dollars) for weekday work travelers, $6.19/hr. for weekday non-work travelers, and $5.20/hr. for weekend travelers.

C&M also conducted a limited SP survey for commercial vehicle drivers in October 2010 to determine their willingness to pay and VOT. Results for FAST-certified commercial vehicles and regular commercial vehicles were used to develop toll diversion models, which resulted in calculated VOTs of $18/hr. (in 2010 dollars) for regular commercial vehicles and $22/hr. for FAST commercial vehicles per axle.

In July 2012, C&M implemented a more inclusive commercial vehicle survey by contacting stakeholders across the wide commercial vehicle market, including U.S. trucking companies, maquiladoras, and custom brokers. The survey was conducted by the Data and Information Services Center at the University of Texas Pan-American (UTPA) via phone interviews. After consulting with RAMMAC and the McAllen FTZ, a list of 149 stakeholders was compiled, of which 71 were surveyed. The surveyed stakeholders comprised 54 U.S. trucking companies, 10 maquiladoras, and 7 custom brokers. The results of this SP survey were used in developing separate toll diversion models for commercial vehicles for use in the travel demand modeling process.

Respondents were first asked a series of control questions to ensure suitable individuals within the companies were participating (i.e., those involved in operations and routing decisions) and to determine the types of commodities shipped by the company. Respondents were then asked a series of questions about route choice.

Regarding congestion levels at the I-2/US 281 interchange, the majority of respondents (53%) described it as a "major problem," whereas 31 percent described it as a "minor problem" and 16 percent indicated "no problem." Furthermore, 77 percent of respondents indicated that they currently do not use tolled facilities.

For those who do use tolled facilities, 40 percent reported using a toll facility in Hidalgo and Cameron Counties, while the remaining 60 percent use toll facilities elsewhere. Also, 61 percent stated that the company pays for the tolls, whereas 14 percent indicated that the client pays.

As shown in Figure 3-9, respondents provided a range of responses regarding the conditions under which they would be willing to use a toll road, with 18 percent indicating that they will never use toll roads.

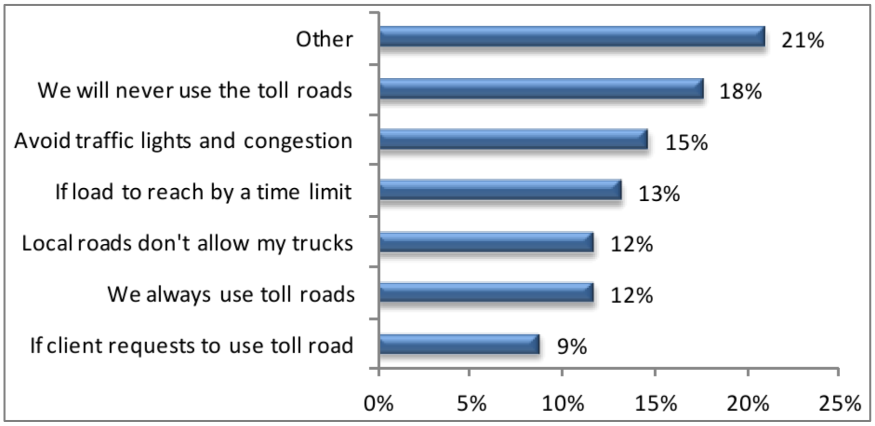


Figure 3-9. Conditions to Consider Using a Toll Road – 2012 SP Survey

Following the route choice questions, respondents answered six SP questions consisting of hypothetical scenarios in which they had to choose between using their current non-tolled route or the Hidalgo County Loop toll road (365 TOLL and the IBTC). Each scenario varied in terms of the travel time savings provided by the toll road option and the cost of the toll. The responses to these SP questions were used to determine VOT in 2012 dollars. In calculating VOT, C&M split the dataset into U.S. and border-crossing stakeholders, with a VOT of $34/hr. for U.S. stakeholders and $15/hr. for border-crossing stakeholders.

For those who never chose the tolled route in the SP exercise, the reasoning for doing so was equally split between the time savings not being worth the toll (23%) and the company having a no-toll policy (23%), while 8 percent indicated the current route is more convenient.

Finally, respondents were asked questions regarding their typical trips. Regarding trip frequency, 46 percent of respondents reported sending commercial vehicles into and out of Hidalgo County “several times each day,” compared to 24 percent reporting “several times a week,” 22 percent reporting “once a day,” and 8 percent reporting “less than once a day.” Regarding typical origins and destinations, the majority of respondents indicated places around McAllen as cargo trip starting points and northbound US 281, McAllen, and Brownsville as cargo trip end points, as illustrated in Figure 3-10.

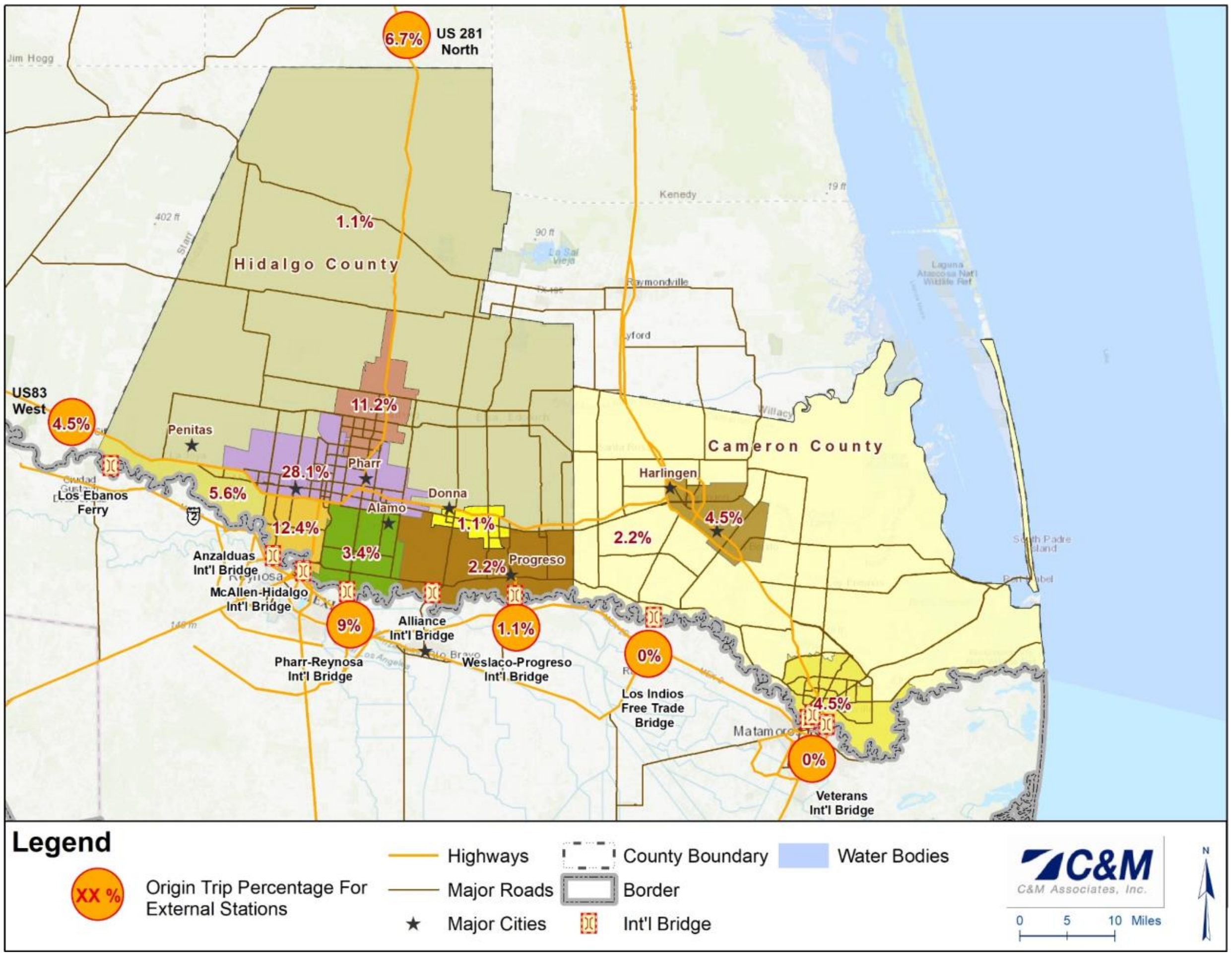


Figure 3-10. Major Cargo Trip Start Locations – 2012 SP Survey

Between April and May 2016, C&M employed two survey methods to gather SP data from two border-crossing focus groups: Mexican residents—specifically, frequent border crossers from Reynosa and Monterrey—and passenger vehicles intercepted while crossing the border.

The Mexican resident frequent border crossers' SP survey was conducted via pre-scheduled interviews by telephone. C&M identified potential participants based on a criteria profile for residents within the Reynosa and Monterrey areas (e.g., students, commuters, shoppers, etc.). Only residents that drive across the border at least three times weekly were considered eligible to complete the interviews. The recruiting process involved a combination of several outreach methods: flyers, local online announcements, personal and professional networks, and the personal contacts of the interviewed survey participants within a "snowball" system. The number of completed surveys totaled 129 for Reynosa residents and 109 for Monterrey residents.

For the border-crossing intercept SP survey, passenger vehicles were stopped after crossing the border from Mexico into the United States at the Pharr–Reynosa and Anzalduas International Bridge facilities. These locations were chosen because they are the most frequented locations where the intercept interviews could be performed within the United States and outside of the CBP areas. The collected sample sizes (i.e., completed interviews) totaled 625 for the Pharr–Reynosa International Bridge and 146 for the Anzalduas International Bridge. The survey was conducted from May 5 to May 12, 2016. Figure 3-11 presents photos from the C&M intercept survey on the Pharr–Reynosa International Bridge.

Figure 3-11. C&M 2016 Passenger Vehicle Intercept Survey

The two surveys followed a similar structure and question format. An initial set of questions determined whether the respondent was eligible to participate in the survey. The respondent was then asked to provide details regarding a typical cross-border trip. Based on their trip characteristics, the respondent was then presented with hypothetical SP scenarios. For each scenario, the respondent had to choose between a route that is similar to their described trip or a tolled option, including the 365 TOLL Project. The scenarios varied in terms of the travel time savings and the toll cost. Following the SP exercises, respondents were asked follow-up questions regarding their SP choices, their opinion of the Project, and additional demographic details.

The combined results of these surveys were used to calculate an average VOT for weekdays and weekends, as presented in Table 3-9. VOTs estimated from these surveys are in the range of previous observations and/or assumptions. However, the fact that the intercept survey was not executed within the waiting lines of the border crossing might influence the results, in the sense that only drivers who had spare time were willing to take the survey. This could influence the representativeness of the sample, especially in terms of commuters, which are likely to be underrepresented. The high percentage of shopping trips are not observed in this magnitude in other Hidalgo County visitor surveys. Therefore, these results should be weighted differently when compared to other survey formats.

Table 3-9. Average Value of Time, Passenger Vehicles (2016 Dollars)

Type	VOT ($/hr)
Passenger Vehicle - Weekday	$4.56
Passenger Vehicle - Weekend	$4.52

The Mexican resident survey focused on two types of frequent border-crossing residents: local residents in Reynosa and long-distance travelers from Monterrey. Monterrey City, or the Metropolitan area of Monterrey, is the next largest Mexican city in the region after Reynosa. MEX 40 and MEX 40D connect Monterrey to the U.S./Mexico border. Mexican residents who frequently cross the border play an important role for the Project, in the sense that they have already spent a relatively large amount to obtain a visa to cross the border, which suggests that their trip/time is important or special and that they potentially have a higher propensity to use a toll road.

Respondents were asked about their typical trips across the border, including how frequently they cross the border, trip purpose, day of travel (weekday, weekend), trip frequency, trip duration, trip start and end points, which international bridge they use, and vehicle occupancy. They were also asked questions regarding their opinions about the Project and their familiarity with border-crossing programs.

The most common trip purpose is shopping, as reported by 40 percent of Reynosa participants and 71 percent of Monterrey participants. Reynosa participants reported work or business trips more often than Monterrey participants (20% vs. 7%, respectively). This difference between Reynosa and Monterrey residents is further highlighted by the days of the week that typical trips take place, as Monterrey residents primarily cross the border on Fridays and Saturdays, while Reynosa residents report more weekday travel, indicative of commuting. The trip purpose distributions and typical trip days are presented in Figure 3-12 and Figure 3-13, respectively.

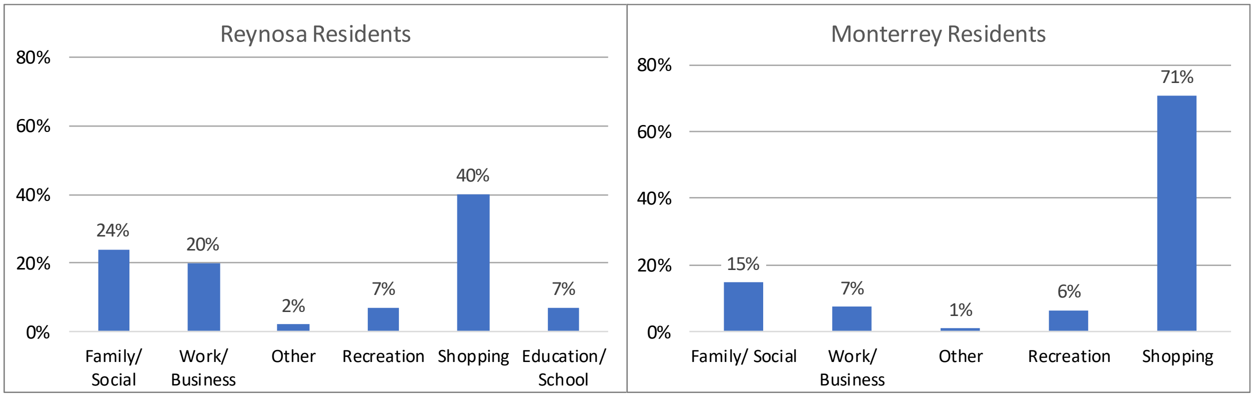


Figure 3-12. Trip Purposes – 2016 Mexican Resident Survey

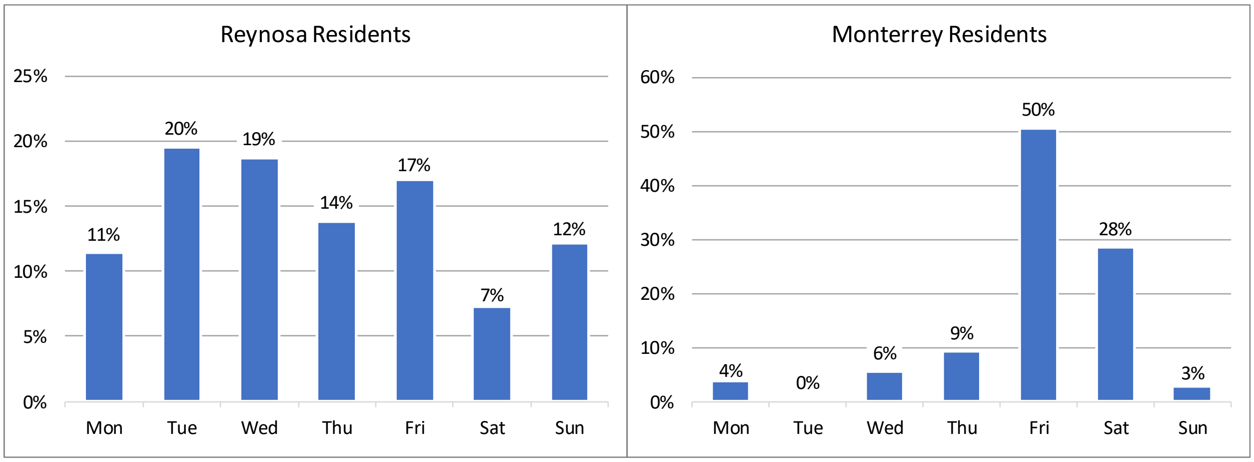


Figure 3-13. Trip Days – 2016 Mexican Resident Survey

Border-crossing frequency (in the northbound direction) is illustrated in Figure 3-14. For Reynosa respondents, 69 percent regularly travel at least 3 times per week. Monterrey respondents' trips across the border are far less frequent, with 61 percent reporting 1–4 border crossings per year.

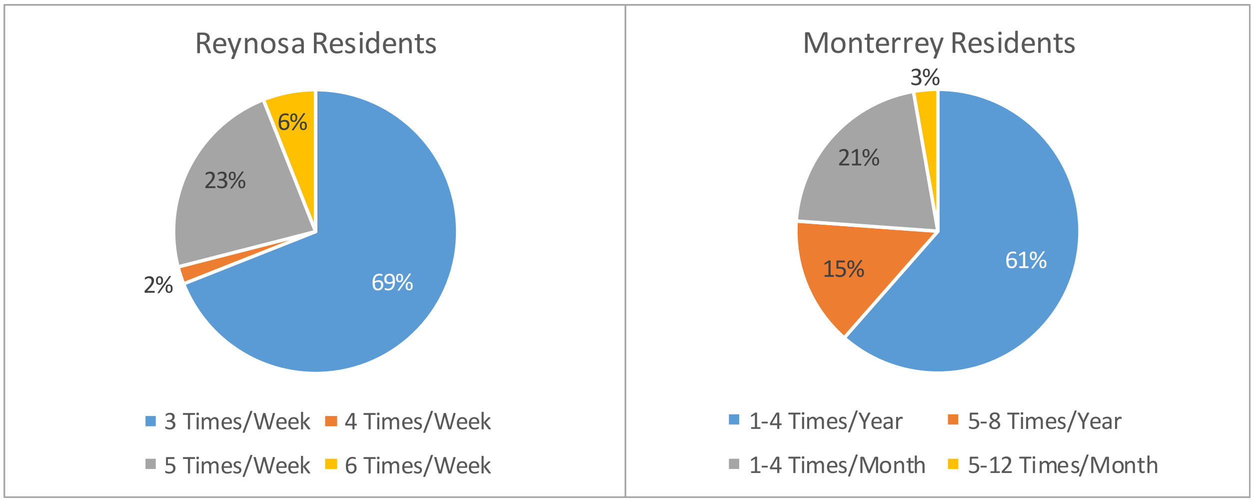


Figure 3-14. Northbound Border-Crossing Frequency – 2016 Mexican Resident Survey

As shown in Figure 3-15, 38 percent of reported trips by Reynosa residents used the Pharr–Reynosa International Bridge, followed by 37 percent using the McAllen–Hidalgo–Reynosa International Bridge. Regarding Monterrey residents, 52 percent of respondents reported using the Anzalduas International Bridge.

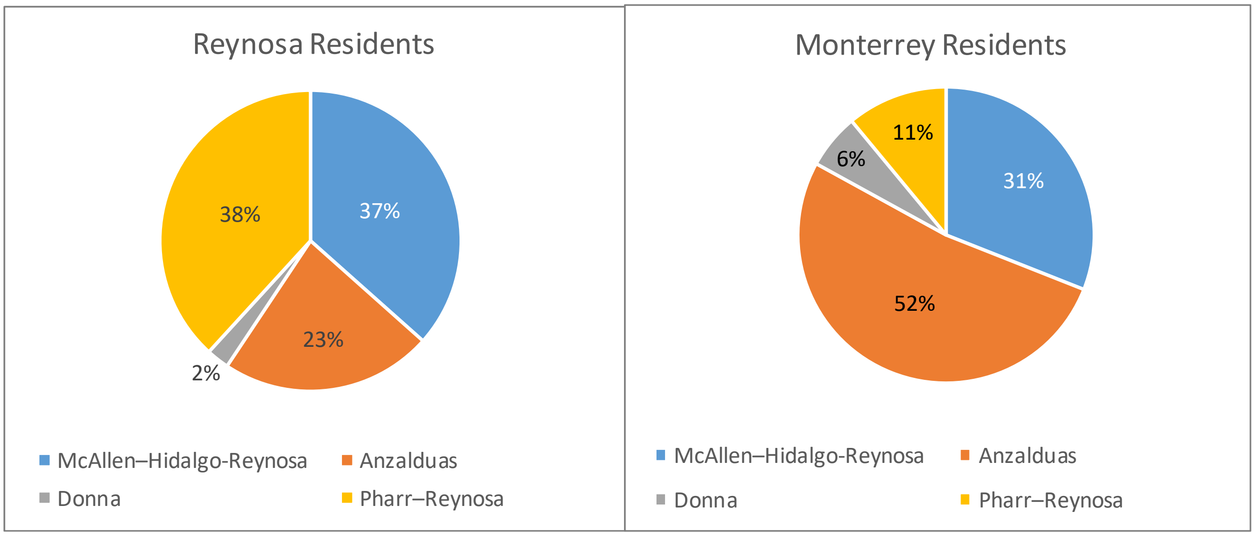


Figure 3-15. International Bridge Usage – 2016 Mexican Resident Survey

Figure 3-16 and Figure 3-17 present the origins and destinations of reported trips, respectively. As shown, 80 percent of Reynosa residents' trips and 89 percent of Monterrey residents' trips originated at home. Stores, businesses, and shopping malls account for more than half of the reported destinations for both groups of respondents.

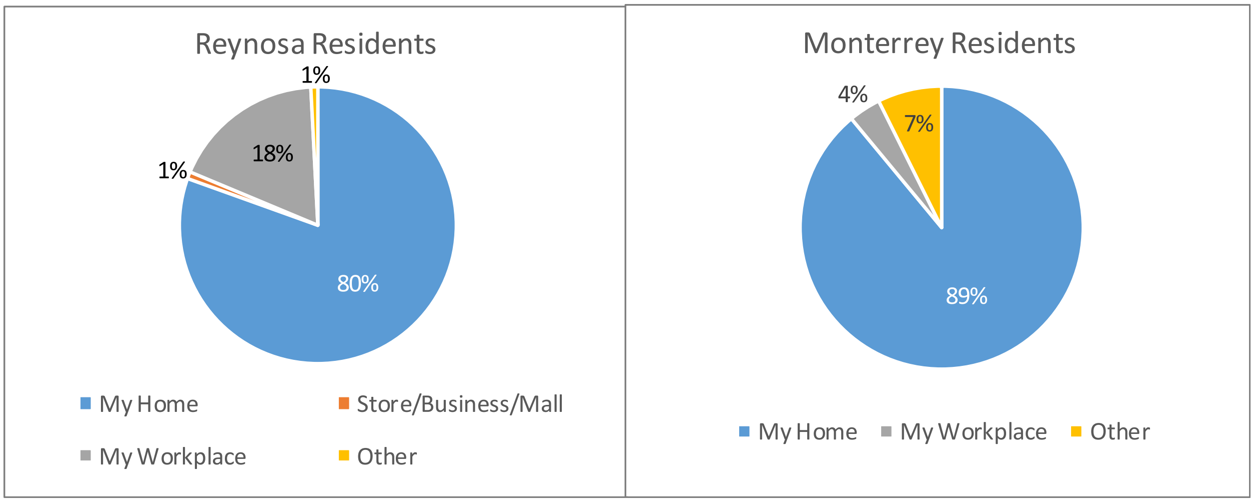


Figure 3-16. Trip Origins – 2016 Mexican Resident Survey

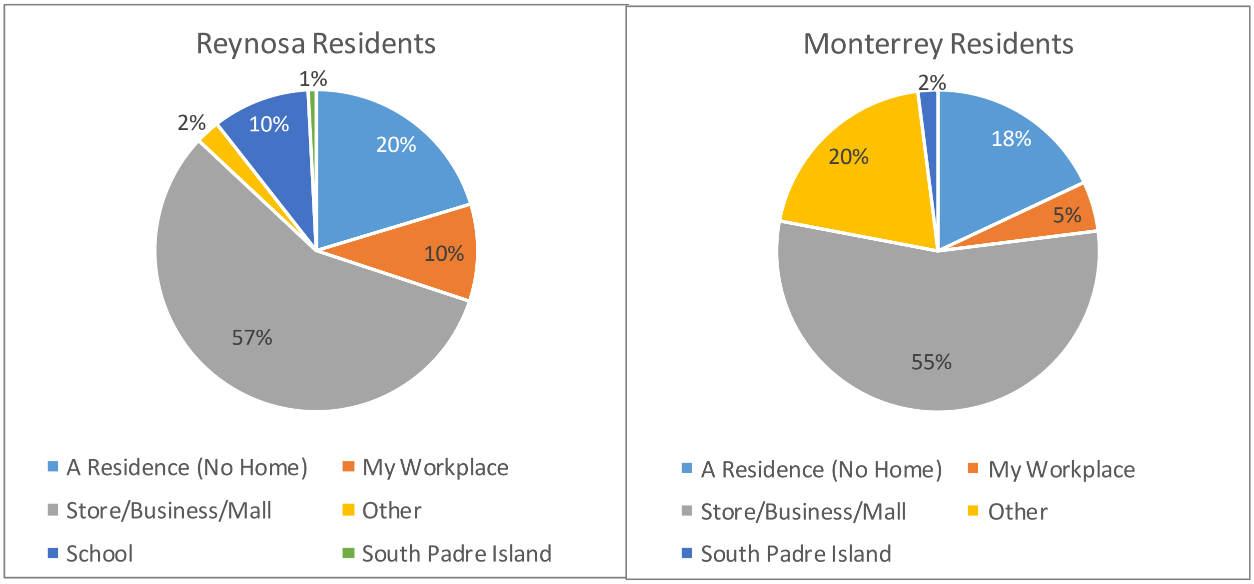


Figure 3-17. Trip Destinations – 2016 Mexican Resident Survey

During the survey, the respondents were asked about their opinions of the Project. As shown in Figure 3-18, opinions were generally positive, with 34 percent of Reynosa respondents and 39 percent of Monterrey residents indicating that they are strongly in favor of the Project, while fewer than 8 percent of respondents in each group are strongly opposed to it.

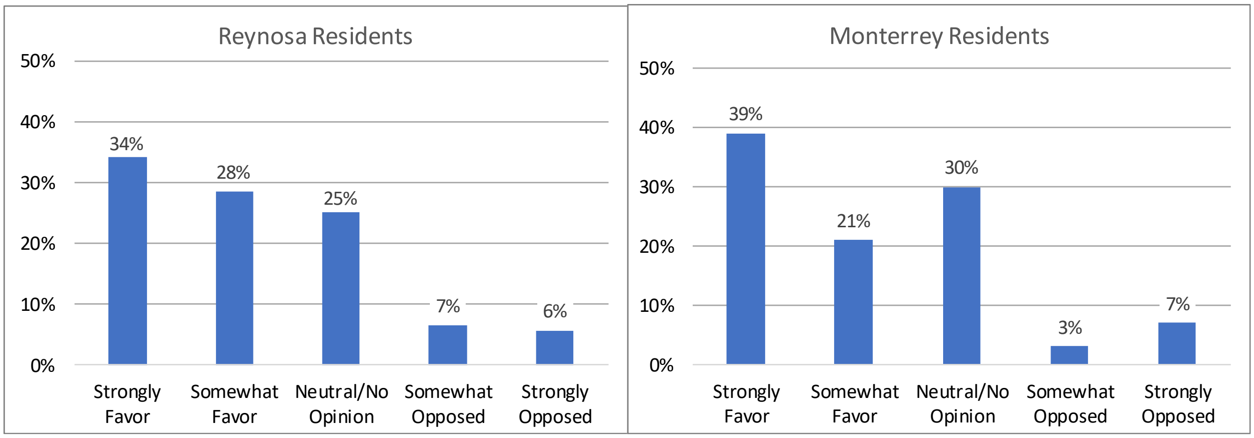


Figure 3-18. Interest in the Project – 2016 Mexican Resident Survey

3.1.7. Commercial Vehicle Surveys

In 2009, C&M surveyed commercial vehicles crossing the U.S./Mexico border in both directions to determine their likelihood of using a toll road. On the Mexican side of the border, the Pharr–Reynosa International Bridge was selected as the count location. A data collection team interviewed drivers of idling commercial vehicles at the border on October 16 and 19, resulting in a sample size of roughly 490 commercial vehicle drivers. The OD data from this snapshot of commercial traffic crossing the Pharr–Reynosa International Bridge are summarized in Table 3-10.

Table 3-10. Commercial Traffic Destinations from the Pharr–Reynosa Bridge – 2009 Survey

Destination	Percent
McAllen/Pharr South of I-2 (Industrial Area)	70%
Other in Hidalgo County, South of I-2	10%
McAllen/Pharr, Edinburgh, North of I-2	5%
Other in Hidalgo County, North of I-2	10%
Other	5%

As part of the commercial vehicle survey, C&M included questions to determine, among other things, who pays the tolls, the most common type of commercial vehicle, FAST program enrollment status, and trip frequency. Results indicated that almost all trucking companies pay the tolls as part of the truckers' expenses. Commercial vehicles with five axles were the most common. The majority of commercial vehicles (65% of respondents from the Pharr–Reynosa Bridge commercial vehicle survey, 82% of respondents from the Hidalgo County commercial vehicle survey) were not enrolled in the FAST program.

Additionally, C&M had the opportunity to contact several Mexican trucking companies that transfer cargo into the United States. This survey was used along with the OD data to determine diversion rates of commercial traffic to the new international bridges and the likelihood of using the Hidalgo County Loop. Specifically, with assistance from RAMMAC and the McAllen FTZ, C&M identified 40 maquiladora companies that sent the most commercial vehicles from Mexico into the United States. C&M was able to interview 27 of these 40 companies, representing approximately 20 percent of total commercial vehicle traffic crossing the Pharr–Reynosa International Bridge. The results of these interviews revealed that the companies were all enrolled in the FAST program and placed a premium on the efficiency of their operations, which included analyzing commercial vehicle routes and consistently choosing toll roads to optimize travel times. Roughly 27 percent of the companies interviewed regularly sent commercial vehicles out on Saturdays, in addition to the typical Monday–Friday schedule, and even sent commercial vehicles out on Sundays during particularly busy periods (e.g., prior to holidays). At the time of this study, FAST-enrolled commercial vehicles could cross the border in approximately 2 hours on average, depending on their trip origin and destination, with travel times of about 20 minutes after crossing the border.

In May 2014, over a period of one week, C&M conducted a survey of commercial vehicles traveling from Mexico to the United States over the two commercial-vehicle-carrying bridges in Hidalgo County: the Pharr–Reynosa International Bridge and the Weslaco–Progreso International Bridge. The month of May was chosen as most representative of annual commercial vehicle traffic based on existing information C&M reviewed. C&M surveyed 615 commercial vehicle drivers on the Pharr–Reynosa International Bridge, representing 33 percent of commercial vehicle traffic on this bridge, and 140 commercial vehicle drivers on the Weslaco–Progreso International Bridge, representing 80 percent of commercial vehicle traffic. Based on the timing of the survey and the response rate achieved, these samples were considered representative of commercial vehicle traffic across these bridges. However, due to the project schedule, there was no possibility to survey commercial vehicles based on specific load types, as the types of goods imported to the United States vary throughout the year.

Truckers were surveyed by C&M staff via a paper-and-pencil questionnaire on the Mexican side of the border while queued to enter the United States. The primary purpose of the survey was to gather OD data, but the survey also included questions regarding trip frequency, trip duration, cargo type, and general information regarding the truckers' companies and logistics. Figure 3-19 presents example images of the surveying process.

Figure 3-19. 2014 Survey Images

Consistent with previous surveys and interviews, the majority of respondents indicated that each route is predetermined by the driver's company; if there are tolls, the drivers are expected to pay and are later reimbursed. Also, most commercial vehicles on both bridges are five axle trucks. The five-axle trailer truck is the most common used commercial vehicle to cross the U.S./Mexico border, mainly because of drayage activity. Multi-trailer trucks are not allowed to cross the U.S./Mexico border. One of the few exceptions is the Weslaco-Progreso International Bridge, which is privately owned and does not have a Texas Department of Public Safety (TxDPS) inspection facility. Therefore, oversize/overweight and multi-trailer trucks can cross from Mexico to the United States but must unload their cargo within assigned areas at the edge of the bridge facility. The trucks that cross the Weslaco–Progreso International Bridge are not allowed to enter the public U.S. road network without passing a TxDPS inspection.

As shown in Figure 3-20, respondents on both bridges indicate similar trip durations. Most trips take between 1 and 3 hours, though it is worth noting that 15–20 percent of trips were reported as taking 12 or more hours.

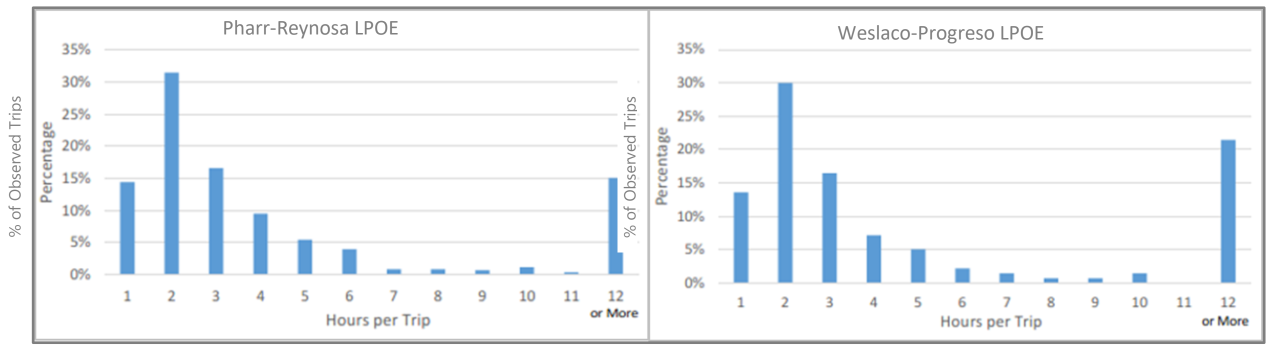
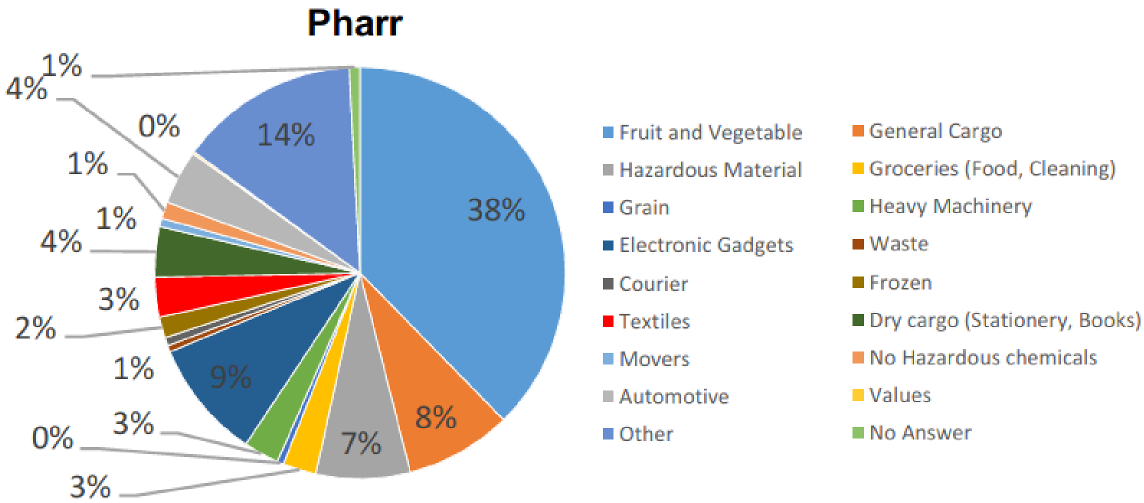


Figure 3-20. Bridge Trip Durations – 2014 Survey

Figure 3-21 shows the types of freight that commercial vehicles carry on both bridges. Fruits and vegetables were the major imported products on both bridges, and a greater variety of freight is carried over the Pharr–Reynosa International Bridge. However, as noted earlier, the types of freight imported are subject to change throughout the year.



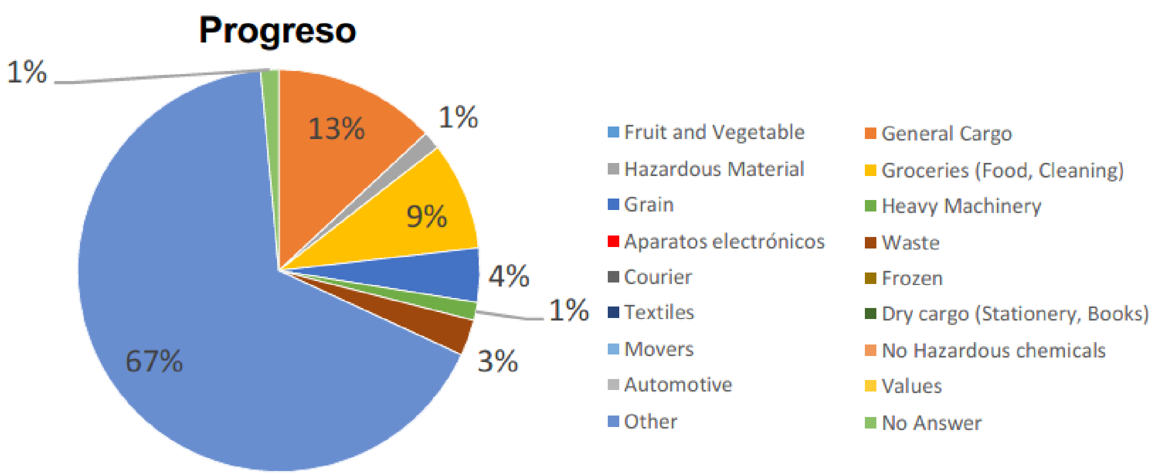


Figure 3-21. Commercial Vehicle Load Distribution by Bridge – 2014 Survey

Table 3-11 presents the OD results of the survey for northbound travel. Origin locations are presented in terms of both states and cities, limited to the top 10 cities that were reported. Destinations are only presented in terms of cities, as all reported destinations were within the state of Texas. As can be seen, the most commonly reported origin state was Tamaulipas (77.2%), and the most common origin city was Reynosa (61.4%). The most commonly reported destination cities were McAllen (41.8%), Pharr (15.6%), and Hidalgo (10.5%).

Table 3-11. Commercial Vehicle Origins and Destinations, Northbound – 2014 Survey

Origin State	Share
Tamaulipas	77.2%
Guanajuato	6.3%
Michoacan	4.9%
Nuevo Leon	4.0%
Coahuila	1.6%
Puebla	1.1%
Veracruz	1.1%
Sinaloa	0.8%
Jalisco	0.7%
Colima	0.5%
Queretaro	0.5%
San Luis Potosi	0.5%
Aguascalientes	0.4%
Durango	0.3%

Origin City	Share
Reynosa	61.4%
Rio Bravo	7.1%
Matamoros	4.2%
Irapuato	2.6%
Monterrey	1.9%
Valle De Santiago	1.6%
Valle Hermoso	1.4%
Zamora	1.4%
Montemorelos	1.0%
Nuevo Progreso	1.0%

Destination City	Share
McAllen	41.8%
Pharr	15.6%
Hidalgo	10.5%
Progreso	7.5%
Edinburg	7.2%
Brownsville	2.6%
Delmita	2.6%
Harlingen	2.4%
Donna	2.3%
Weslaco	2.3%
Mission	1.6%
Alamo	1.4%
San Juan	1.3%
Los Indios	0.7%
Houston	0.1%
Laredo	0.1%

Other relevant results from the survey are summarized in Table 3-12.

Table 3-12. Additional Key Results – 2014 Survey

Description	Pharr	Progreso
Percentage of drivers that perform this trip on a weekly basis	34%	49%
Percentage of drivers that did not come from a maquiladora or an industrial park	52%	89%
Percentage of commercial vehicles that were owned by a Company or an Association	74%	53%
Percentage of commercial vehicles that were not enrolled in the FAST program	45%	55%
Percentage of drivers that do not encounter traffic congestion after crossing the border	44%	64%

In 2016, C&M developed and administered a commercial vehicle company SP survey as part of its investment grade T&R study for the Project. For the commercial vehicle company SP survey, the HCRMA provided a list of commercial vehicle companies that frequently cross the border in Hidalgo County. This database is based on Hidalgo County's overweight permit program. The identified companies were then called by phone to arrange an appointment for the survey. The survey effort included 21 companies: 15 from Reynosa, 3 from Rio Bravo, 1 from Michoacán, 1 from Queretaro, and 1 from Veracruz. These companies are among the top 60 companies sending commercial vehicles across Hidalgo County's international bridges. The commercial vehicle company SP survey process took approximately 3 months, including survey design, scheduling appointments with company decision makers, executing the interviews, QA/QC of the results, addressing additional questions for the decision makers, and database management.

C&M focused on the following factors: trip frequency, trip duration, actual toll road use, cargo types, fleet sizes, the number of axles, reasons to use a toll road, and preferred methods of payment. Not all of these factors were directly used as inputs in the present study, but provided supplemental information used in gauging certain post-processing parameters as well as our overall understanding of the market.

Regarding trip frequency, 46 percent of the companies reported 7 or more trips per week, while the next most common category reported was 2–3 trips per week (24%). In other words, more than three-quarters of the companies reported making 4 or more trips per week with almost half making 7 or more trips per week. The trip frequency distribution is summarized in Figure 3-22.

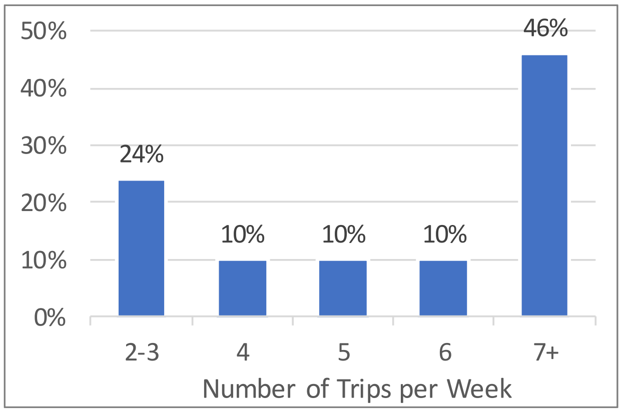


Figure 3-22. Trip Frequency Distribution – 2016 Commercial Vehicle Survey

Total trip durations (from origin to destination) for a typical trip are summarized in Figure 3-23. As shown, nearly half of the trips take 2–4 hours to reach their destination, and nearly a quarter of the trips take over 15 hours.

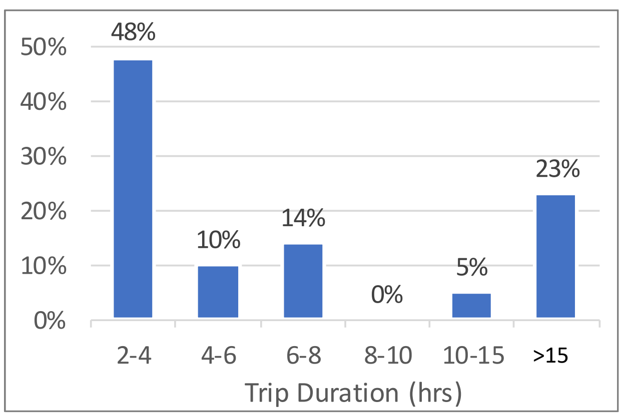


Figure 3-23. Trip Duration – 2016 Commercial Vehicle Survey

Approximately 10 percent of the companies that dispatch border crossing shipments on a regular basis are paying tolls after crossing into the United States. This number is low because there are no toll roads in Hidalgo County; besides the international bridges, the closest toll roads are in Austin or Houston. Regarding the preferred method of payments at toll booths, 57 percent of those who use toll roads reported a preference to pay with cash, while 43 percent prefer prepaid cards such as FasTrak or Express Card.

Figure 3-24 illustrates the types of cargo that the surveyed companies transport most frequently across the border. Fresh produce accounts for the majority (67%) of the transports, which is expected given that the commercial vehicle company contacts came mainly from the HCRMA OS/OW permits database.

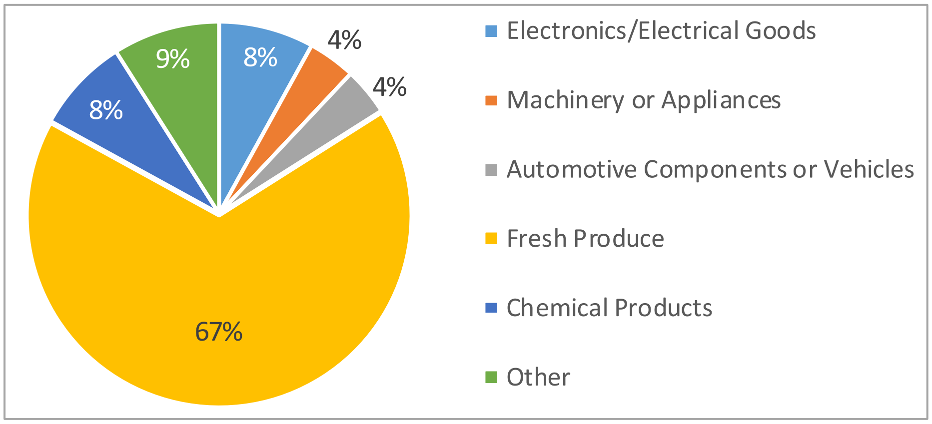


Figure 3-24. Cargo Types – 2016 Commercial Vehicle Survey

The commercial vehicle companies were also asked about their fleet sizes; this information was then used to weight the SP results and calculate a more representative VOT for this sample. The number of commercial vehicles owned by each surveyed company was grouped into three categories. The majority of companies reported a relatively small fleet of 2–9 commercial vehicles (62%), followed by 25 or more commercial vehicles (24%) and 10–24 commercial vehicles (14%). Additionally, 95 percent of participants reported their commercial vehicles having three to five axles, whereas the remaining 5 percent reported six axles.

Respondents were presented with eight SP scenarios, in which they had to imagine a typical trip and choose between their currently-preferred route and the Project, based on varying travel time savings and toll costs. All the respondents selected the Project (toll road scenario) at least once. Figure 3-25 presents the reported reasons for choosing the Project, with 36 percent of respondents stating that using toll roads is beneficial primarily because of the time savings.

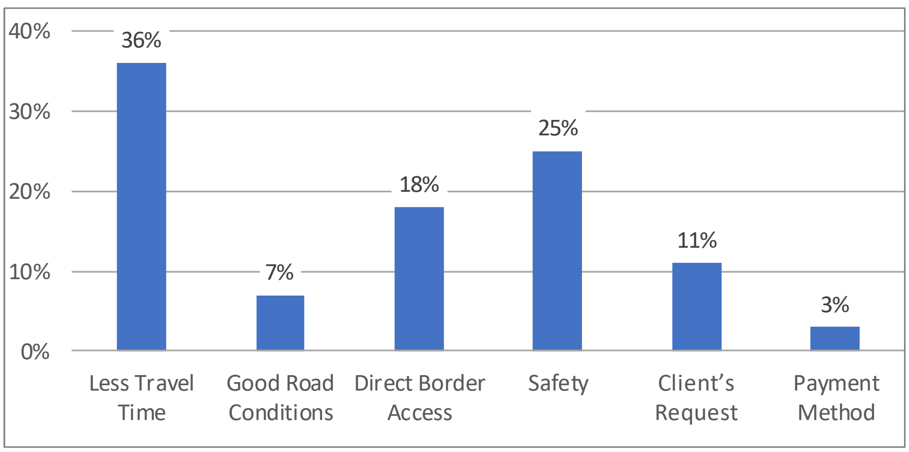


Figure 3-25. Reasons for Using Toll Roads – 2016 Commercial Vehicle Survey

The survey analysis ultimately resulted in a VOT estimate of $22.26 (in 2016 dollars) for commercial vehicles traveling on weekdays.

3.2. Field Reconnaissance and Monitoring

Using publicly-available satellite imagery and aerial photography, as well as data gathered through field observations and reconnaissance, C&M determined the general geometric inventory of the traffic network on both sides of the border, including information such as number of lanes and ramp locations. This information was used to develop the base year road network for the present study.

3.3. Cell phone and GPS Origin and Destination Data

To update the study area traffic data to recent pre-pandemic travel patterns, C&M purchased OD data from StreetLight Data, Inc. The data provided by StreetLight are derived from two types of locational "Big Data" sources: navigation-GPS data and Location-Based Services (LBS) data. StreetLight has incorporated and evaluated several other types of mobile data supply in the past, including cellular tower and ad-network derived data. StreetLight aims to achieve a 33 percent trip penetration rate for all StreetLight InSight® analyses. Trip penetration rates for individual analyses can range from as low as 1 percent to as high as 35 percent, based on the data period, geography, mode, and other factors. StreetLight calibrates their data to the U.S. Census and 10,000+ permanent counters to normalize the sample and accurately represent the full population.[2]

C&M compared the Streetlight OD data of the study area with the OD data obtained from the present study's TDM. StreetLight's OD data provides TAZ-to-TAZ (polygon) traffic flows within the study area and segment-to-segment flows into and out of the study area. The StreetLight OD datasets were configured as below:

- Vehicle type: passenger vehicles and commercial vehicles (trucks)
- Year: 2018 (aggregated into yearly weekday average)

As presented in Figure 3-26 and Table 3-13, C&M identified 16 significant super zones (i.e., aggregated TAZs) surrounding the Project. Table 3-14 and Table 3-15 present the OD patterns of 2018 annual average weekday traffic (AAWDT) for passenger and commercial vehicles, respectively. Only the traffic originating from the 16 super zones are included and to be considered as an essential part in the process of TDM calibration. Each number represents the percentage of trips for the OD pair out of all trips originating from the origin super zone. As only the significant super zones are included in the analysis, each row and column total is less than 100% and represents the traffic that moves within the study area.

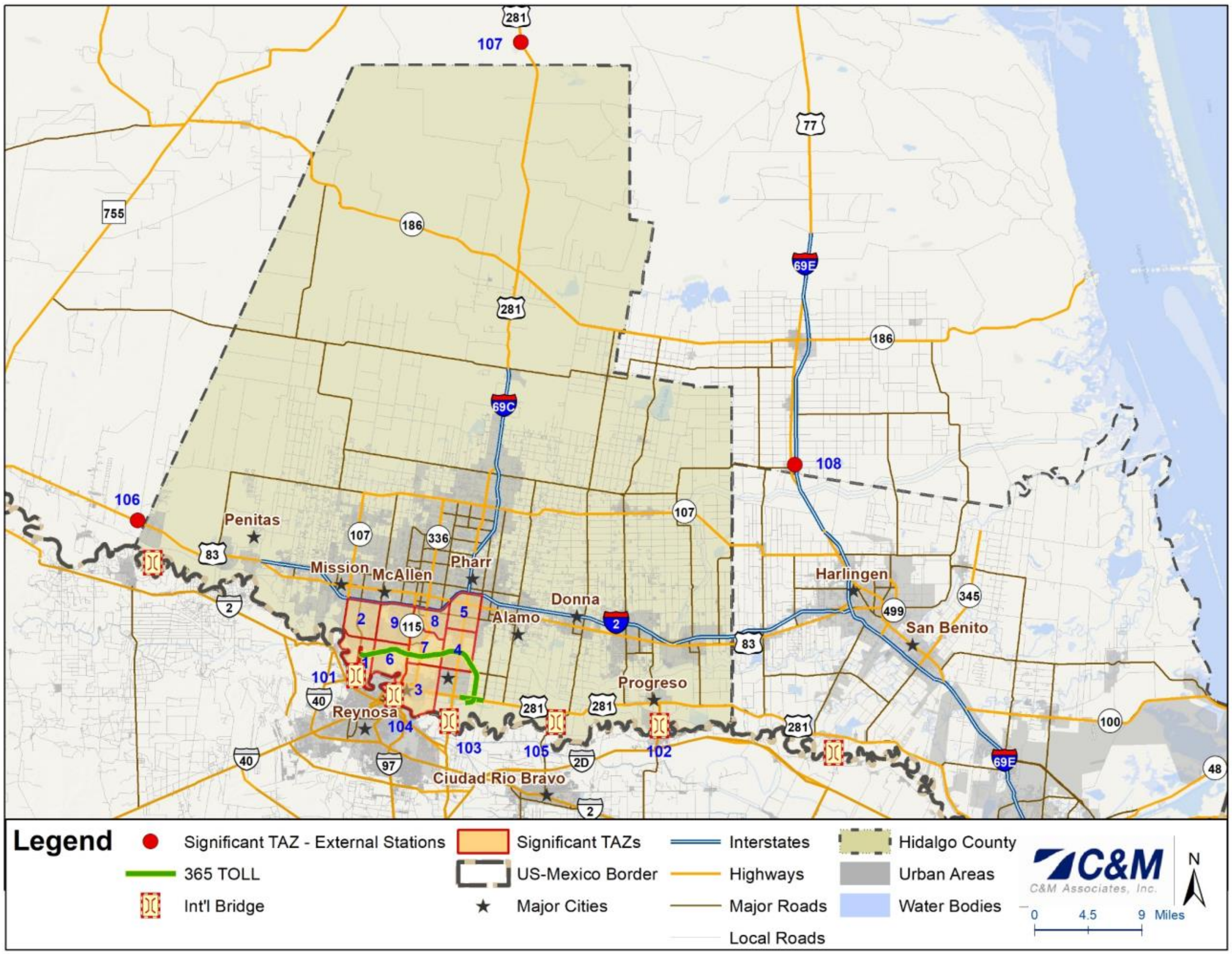


Figure 3-26. Significant TAZ Locations

Table 3-13. Significant TAZs

TAZ ID	Location	Shape
1	South of US 83 & West of US 281	Polygon
2	South of US 83 & West of US 281	Polygon
3	South of US 83 & West of US 281	Polygon
4	South of US 83 & West of US 281	Polygon
5	South of US 83 & West of US 281	Polygon
6	South of US 83 & West of US 281	Polygon
7	South of US 83 & West of US 281	Polygon
8	South of US 83 & West of US 281	Polygon
9	South of US 83 & West of US 281	Polygon
101	Anzalduas International Bridge	Pass-through Zone
102	Progreso International Bridge	Pass-through Zone
103	Pharr International Bridge	Pass-through Zone
104	Hidalgo International Bridge	Pass-through Zone
105	Donna International Bridge	Pass-through Zone
106	US 83 West of Model Area	Pass-through Zone
107	US 281 North of Model Area	Pass-through Zone
108	Interstate 69E North of Model Area	Pass-through Zone

Table 3-14. StreetLight AAWDT Pattern for Passenger Vehicles – 2018

Origin \ Destination	1	2	3	4	5	6	7	8	9	101	102	103	104	105	106	107	108
1	5.6%	9.8%	3.2%	1.0%	3.4%	0.8%	0.5%	3.7%	5.0%	3.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
2	0.2%	9.0%	1.9%	0.4%	1.3%	2.1%	0.4%	4.9%	4.9%	0.5%	0.0%	1.6%	0.0%	0.0%	0.7%	0.0%	0.0%
3	0.1%	1.5%	33.1%	10.5%	4.8%	2.6%	2.6%	7.6%	1.6%	0.1%	0.0%	0.8%	0.0%	0.1%	0.3%	0.0%	0.0%
4	0.0%	0.4%	10.4%	14.3%	15.5%	1.2%	1.4%	8.8%	1.9%	0.0%	0.0%	0.9%	0.0%	0.1%	0.1%	0.0%	0.0%
5	0.1%	0.4%	2.2%	7.1%	14.3%	0.3%	0.2%	7.9%	1.9%	0.0%	0.0%	0.2%	0.0%	0.0%	0.1%	0.0%	0.0%
6	0.3%	5.1%	8.1%	3.2%	2.6%	7.4%	2.5%	4.8%	8.7%	0.6%	0.0%	0.9%	0.0%	0.0%	1.1%	0.3%	0.0%
7	0.1%	4.6%	5.5%	3.6%	5.3%	1.8%	6.1%	11.0%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.1%	0.0%
8	0.0%	1.6%	3.6%	4.2%	8.8%	0.5%	0.5%	9.4%	5.6%	0.0%	0.0%	0.1%	0.0%	0.0%	0.8%	0.0%	0.0%
9	0.2%	5.4%	3.2%	1.1%	2.9%	3.3%	1.0%	7.8%	5.9%	0.7%	0.0%	0.4%	0.0%	0.0%	0.7%	0.1%	0.0%
101	2.5%	3.3%	5.0%	4.6%	6.6%	0.0%	0.0%	9.6%	6.6%	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
102	0.0%	0.1%	0.8%	0.7%	2.2%	0.0%	0.3%	2.3%	0.5%	0.0%	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
103	0.0%	4.4%	6.4%	3.2%	4.4%	2.9%	0.0%	9.8%	10.0%	0.0%	0.0%	-	0.0%	0.0%	0.0%	0.0%	0.0%
104	4.8%	0.0%	47.6%	11.9%	0.0%	4.8%	2.4%	0.0%	9.5%	0.0%	0.0%	0.0%	-	0.0%	0.0%	0.0%	0.0%
105	0.0%	1.2%	5.9%	7.6%	4.5%	0.9%	0.0%	5.6%	0.7%	0.0%	0.0%	0.0%	0.0%	-	2.2%	0.0%	0.0%
106	0.0%	4.0%	1.8%	0.3%	1.4%	2.4%	0.2%	4.9%	7.0%	0.4%	0.0%	0.0%	0.0%	0.0%	-	0.0%	0.0%
107	0.0%	1.0%	2.5%	0.8%	2.1%	2.3%	0.4%	2.5%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	-	2.0%
108	0.0%	0.0%	0.1%	0.0%	0.1%	0.1%	0.0%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	-

Table 3-15. StreetLight AAWDT Pattern for Commercial Vehicles – 2018

Origin \ Destination	1	2	3	4	5	6	7	8	9	101	102	103	104	105	106	107	108
1	3.9%	5.5%	3.4%	0.0%	0.7%	12.2%	0.2%	1.7%	7.3%	3.9%	0.0%	0.9%	0.0%	0.0%	1.5%	0.4%	0.0%
2	0.1%	5.4%	1.6%	0.2%	2.5%	5.2%	0.8%	2.2%	4.6%	0.3%	0.0%	0.1%	0.0%	0.0%	3.9%	0.7%	0.1%
3	0.1%	1.1%	4.2%	4.4%	3.8%	6.3%	6.2%	4.9%	3.7%	0.3%	0.0%	3.7%	0.3%	0.0%	2.2%	1.4%	0.1%
4	0.0%	0.5%	12.5%	7.6%	4.3%	2.4%	2.0%	3.7%	2.4%	0.1%	0.0%	0.7%	0.0%	0.0%	0.5%	0.4%	0.0%
5	0.0%	1.2%	2.5%	3.5%	8.3%	1.2%	0.7%	4.0%	1.8%	0.1%	0.0%	0.2%	0.0%	0.2%	3.1%	0.4%	0.0%
6	0.2%	7.9%	9.5%	0.5%	1.3%	11.1%	4.5%	3.2%	4.0%	0.2%	0.0%	1.7%	0.0%	0.0%	7.4%	3.0%	0.1%
7	0.0%	1.5%	2.8%	1.3%	2.8%	1.4%	3.9%	3.8%	4.2%	0.0%	0.0%	3.4%	0.6%	0.0%	1.6%	7.0%	0.0%
8	0.0%	1.7%	4.1%	1.9%	5.6%	3.6%	1.3%	5.4%	6.3%	0.1%	0.0%	0.1%	0.1%	0.0%	1.8%	0.5%	0.1%
9	0.6%	5.0%	2.9%	0.5%	1.8%	10.1%	3.1%	3.5%	2.3%	1.8%	0.0%	0.7%	0.1%	0.0%	5.4%	1.0%	0.1%
101	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
102	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
103	0.0%	1.9%	7.7%	0.0%	0.0%	6.7%	4.8%	0.0%	5.8%	3.2%	0.0%	-	0.0%	0.0%	0.2%	1.3%	0.0%
104	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	0.0%	0.0%	0.0%	0.0%
105	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	0.0%	0.0%	0.0%
106	0.0%	5.3%	2.9%	0.5%	5.8%	2.5%	2.2%	2.5%	1.2%	0.1%	0.0%	0.0%	0.0%	0.0%	-	0.1%	0.0%
107	0.0%	0.9%	3.3%	0.4%	1.6%	5.2%	1.3%	5.3%	2.7%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	-	3.6%
108	0.0%	0.1%	0.2%	0.1%	0.2%	0.3%	0.0%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	-

Table 3-16 and Table 3-17 show the percent difference between the base year 2018 TDM OD pattern and the observed StreetLight OD data pattern for the selected zones. As shown, the overall difference between the observed and modeled travel patterns in the study area are minor. In the case of the commercial vehicle ODs, some larger percentage differences are observed due to the small absolute numbers between these OD pairs. The TDM replicates the OD pairs and observed travel patterns for most of the study area.

Table 3-16. Passenger Vehicle 2018 OD Pattern – TDM vs. StreetLight

Origin \ Destination	1	2	3	4	5	6	7	8	9	101	102	103	104	105	106	107	108
1	2.0%	7.9%	6.1%	4.6%	1.5%	1.1%	1.5%	6.6%	11.1%	0.1%	0.0%	0.0%	8.1%	0.0%	0.0%	0.0%	0.0%
2	1.0%	5.5%	2.5%	1.6%	1.9%	0.3%	0.5%	5.6%	8.4%	0.1%	0.0%	0.0%	11.0%	0.0%	0.8%	0.1%	0.0%
3	0.5%	1.8%	20.6%	10.6%	1.6%	0.9%	2.0%	6.0%	9.6%	0.2%	0.0%	0.2%	9.1%	0.1%	0.3%	0.2%	0.0%
4	0.4%	1.3%	10.3%	20.9%	6.0%	0.6%	1.0%	8.5%	4.3%	0.6%	0.0%	0.1%	0.0%	0.2%	0.1%	0.1%	0.0%
5	0.1%	0.9%	1.4%	3.3%	13.4%	0.1%	0.2%	15.8%	3.0%	0.3%	0.0%	0.0%	0.0%	0.3%	0.2%	0.1%	0.0%
6	1.3%	3.1%	12.7%	7.9%	2.3%	0.6%	2.1%	6.7%	10.0%	0.2%	0.0%	0.0%	0.0%	0.1%	5.6%	2.6%	0.2%
7	0.3%	1.2%	4.7%	6.5%	9.6%	0.4%	0.3%	30.4%	4.1%	0.1%	0.0%	0.0%	2.1%	0.1%	0.1%	0.1%	0.0%
8	0.2%	1.8%	1.9%	3.0%	6.3%	0.1%	0.3%	7.3%	5.3%	0.0%	0.0%	0.2%	0.0%	0.0%	0.4%	0.0%	0.0%
9	0.7%	5.1%	6.1%	2.9%	3.1%	0.6%	0.8%	15.4%	10.6%	0.3%	0.0%	0.0%	0.0%	0.1%	0.9%	0.2%	0.0%
101	0.1%	1.5%	3.2%	7.3%	8.0%	0.2%	0.5%	2.1%	6.7%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	0.2%	0.0%
102	0.0%	0.5%	1.1%	0.6%	1.5%	0.1%	0.1%	0.2%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.3%	1.4%
103	0.0%	0.0%	3.0%	1.8%	1.1%	0.0%	0.0%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%
104	3.4%	43.3%	40.0%	0.0%	0.0%	0.0%	3.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
105	0.1%	1.0%	3.1%	3.3%	12.3%	0.2%	0.5%	1.1%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	6.4%	0.0%	2.7%
106	0.0%	2.9%	1.3%	0.3%	1.4%	1.7%	0.2%	6.0%	5.5%	0.5%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%
107	0.0%	0.6%	1.3%	0.5%	1.3%	1.6%	0.2%	1.5%	1.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
108	0.0%	0.0%	0.1%	0.0%	0.1%	0.1%	0.0%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 3-17. Commercial Vehicle 2018 OD Pattern – TDM vs. StreetLight

Origin \ Destination	1	2	3	4	5	6	7	8	9	101	102	103	104	105	106	107	108
1	0.7%	2.7%	3.6%	0.0%	1.6%	2.2%	0.0%	0.7%	5.8%	0.0%	0.0%	5.2%	0.0%	0.0%	0.3%	2.0%	0.0%
2	0.4%	1.8%	1.5%	1.0%	1.7%	1.0%	0.0%	4.4%	3.2%	0.9%	0.5%	13.8%	0.0%	0.0%	2.0%	2.3%	0.0%
3	0.3%	0.4%	5.6%	9.0%	0.8%	0.5%	0.2%	0.8%	0.1%	0.6%	0.2%	13.7%	0.0%	0.0%	0.7%	8.2%	0.1%
4	0.0%	0.2%	6.8%	4.0%	6.3%	0.0%	0.3%	7.5%	0.5%	0.1%	0.0%	1.0%	0.0%	0.0%	0.4%	1.4%	0.1%
5	0.0%	0.3%	0.8%	4.6%	3.2%	0.0%	0.0%	3.9%	0.6%	0.3%	0.2%	4.0%	0.0%	0.0%	0.8%	2.7%	0.4%
6	0.3%	1.1%	1.0%	0.0%	0.2%	0.6%	0.0%	0.0%	2.4%	3.9%	1.0%	56.1%	0.0%	0.0%	1.9%	9.5%	0.2%
7	0.0%	0.5%	0.8%	3.4%	6.8%	0.0%	0.2%	16.3%	1.4%	0.1%	0.0%	5.9%	0.0%	0.0%	0.3%	4.2%	0.0%
8	0.0%	1.3%	0.4%	3.3%	3.7%	0.0%	0.0%	6.5%	1.4%	0.0%	0.0%	0.2%	0.0%	0.0%	2.1%	4.2%	0.2%
9	0.3%	1.3%	0.1%	0.6%	1.1%	0.8%	0.1%	2.5%	2.0%	3.3%	1.1%	46.5%	0.0%	0.0%	1.2%	1.4%	0.1%
101	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
102	0.0%	2.2%	1.2%	0.3%	4.6%	3.8%	0.1%	0.2%	12.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%
103	0.2%	3.7%	5.5%	0.7%	4.7%	11.7%	0.7%	0.2%	30.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%
104	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
105	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
106	0.0%	1.1%	0.6%	0.5%	2.0%	0.8%	0.1%	4.3%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%
107	0.1%	0.6%	3.0%	1.0%	2.9%	1.8%	0.5%	3.9%	0.8%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	4.4%
108	0.0%	0.0%	0.1%	0.1%	1.0%	0.1%	0.0%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	11.5%	0.0%

3.4. Stated Preference Surveys – 2020

The following section presents a summary of the development, results, and findings of the SP surveys conducted in July and August 2020 for the purposes of the present study. For a full description of the survey methodology and results, please refer to Appendix A. The surveys themselves are presented in Appendix B.

3.4.1. Introduction

For the present study, C&M considered it necessary to update the choice modeling and VOTs last estimated from the 2016 survey data presented earlier in this chapter. Additionally, C&M conducted these surveys to determine the impact that the COVID-19 pandemic might have on travelers' willingness to pay tolls.

As presented earlier in this chapter, C&M has a thorough understanding of the Project region due to studies developed for multiple entities—including the HCRMA—since 2008. Based on this experience, C&M developed the experimental SP survey design for the present study. One important lesson learned from previous studies related specifically to the Project is that the relatively small size of the Project facility (about 12 miles long) limits the time savings the Project can offer to roughly 10–12 minutes at most. Therefore, C&M also considered travel time reliability and travelers' value of reliability (VOR) in its survey design. Travel time reliability represents the time-based uncertainty experienced by travelers due to traffic congestion. VOR is the amount a traveler (i.e., a user of the Project) would pay to experience a reliable travel time between their origin and destination. C&M tested whether the potential users of the Project are willing to pay a toll for more reliable travel through the study area.

Three SP surveys were developed and targeted at different user groups important to the Project: Hidalgo County residents, international visitors to Hidalgo County from Mexico, and commercial freight companies. The attributes included in the experimental survey design were time savings, toll cost, and travel time reliability. Time savings and toll costs were varied to create the VOT and VOR survey questions.

The three SP surveys were prepared such that respondents could participate without the need for in-person contact. The distribution of the surveys depended on the intended user group. For the Hidalgo County residents survey, invitations to participate were distributed via postcard. The survey was conducted on an online platform. The mailing list was obtained from the publicly-available GIS map of the Hidalgo County Appraisal District office, which includes the address all Hidalgo County residents that have a registered car.

For international visitors, shoppers, and commuters traveling from Mexico to Hidalgo County—with a focus on those traveling from Reynosa and Monterrey—C&M contracted an online survey provider to employ its subscriber base and invite them to the SP survey. Prior to sending invitations, the subscriber base of the online survey provider was filtered to only Reynosa and Monterrey residents that had previously traveled to Hidalgo County from Mexico.

For the commercial freight company SP survey, companies were contacted by C&M via e-mail and telephone based on a contact list provided by the HCRMA and the government of Mexico. The contact list included freight companies that transport goods across the U.S./Mexico border into Hidalgo County and companies in the international freight business located in the Reynosa MSA or Hidalgo County. The freight company surveys were conducted via phone or video conference.

In coordination with the HCRMA, C&M engaged in several public outreach efforts to create awareness of the surveys among the respective audiences and to explain the purpose of the surveys, including a survey website and a public appearance at the Pharr International Bridge's "Bridge Connect" event. The survey design included several mechanisms to ensure that respondents were eligible to participate (i.e., that they represented the targeted populations). Furthermore, the responses were reviewed by C&M staff as soon as a respondent finalized the survey to ensure accurate and reliable data pertaining to the Project.

The components of the SP surveys were as follows:

- **Control Questions** – to ensure that the respondent is from the target population, is an adult, has traveled within the Project study area, has an official survey code, etc.
- **Trip Related Questions** – to collect information about a recent trip the respondent made through the Project study area, including trip length, OD, trip frequency, trip purpose, etc.
- **VOT Questions** – to collect data about user preferences. Respondents were presented different hypothetical scenarios with varying toll fees and time savings. For each scenario, respondents were asked whether they would choose the proposed 365 TOLL and pay the toll shown, continue to use their current toll-free route, or if they had no preference between the two options.
- **Opinion Questions** – to collect respondents' opinions regarding the Project.
- **VOR Questions** – to obtain information regarding respondents' travel time reliability preferences. Respondents were asked about any delays in their trips as well as further details of those same trips. These details include the total length of the delays, the frequency of these delays, and the maximum delay they have experienced. As with the VOT questions, respondents were presented with various scenarios to choose from. Respondents could choose between 365 TOLL and their current toll-free route based on varying travel times and toll costs.
- **COVID-19 Pandemic Questions** – to obtain information regarding how the COVID-19 pandemic has affected the potential users of the Project and how it may affect their future travel.
- **User-Specific Questions** – to obtain relevant details about the survey respondents. Hidalgo County residents and visitors were asked about their household incomes. Commercial freight companies were asked about the load types they carry, how big their vehicle fleet is, etc.

The information from the SP surveys allowed C&M to estimate updated VOTs and develop VOR estimates for potential users of the Project. From these results, C&M developed its toll diversion model using utility functions and multinominal logit (MNL) models.

The following sections summarize the three surveys conducted in 2020, including descriptions of the sampling methods, results, and conclusions.

3.4.2. Hidalgo County Residents SP Survey

C&M conducted a survey for residents of Hidalgo County to further understand their travel patterns and to obtain feedback regarding the 365 TOLL Project. C&M mailed 6,400 survey invitations to selected households in the study area that will most likely benefit from the Project based on their location as well as their median household income (relative to the median household income of the surrounding area). C&M obtained from the Hidalgo County appraisal district the information and location of households that have a car and determined the median household income based on census tract data to obtain a representative sample size for the survey. C&M sent invitations in two waves of 3,200 invites each. In the second wave, 50 percent of those contacted were from the first wave (to obtain a better response rate from households that were underrepresented in the first wave). The overall return rate of the survey was 3.5 percent. From the 168 responses to this survey, C&M meticulously analyzed the responses and omitted incorrect or irrelevant information, resulting in a final sample size of 116 respondents.

C&M asked the interviewees to provide the details of a typical and recent trip they had taken within the study area. As shown in Figure 3-27, 90 percent reported beginning their trip from their homes. Reported destinations were more varied, with 32 percent of respondents indicating mall/store being the most popular destination.

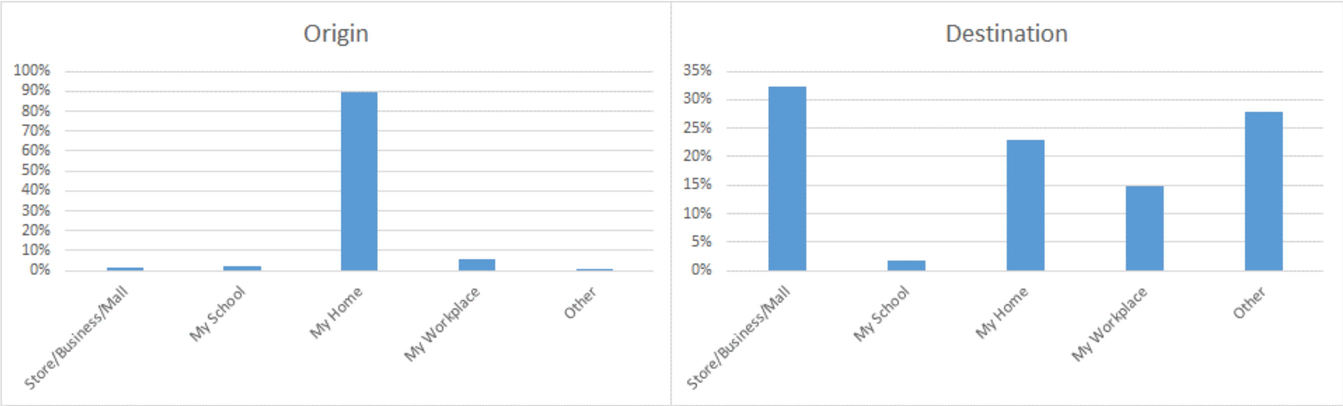


Figure 3-27. Trip Origins & Destination – Hidalgo County Residents Survey

Respondents were asked about the frequency of making this same trip. As shown in Figure 3-28, the answers varied and were somewhat evenly distributed. Once per month was the most frequent response, followed by 2-3 times a week. Reported trip duration is shown in Figure 3-29, with 28 percent of respondents' trips taking 21–30 minutes and 50 percent taking 11–30 minutes.

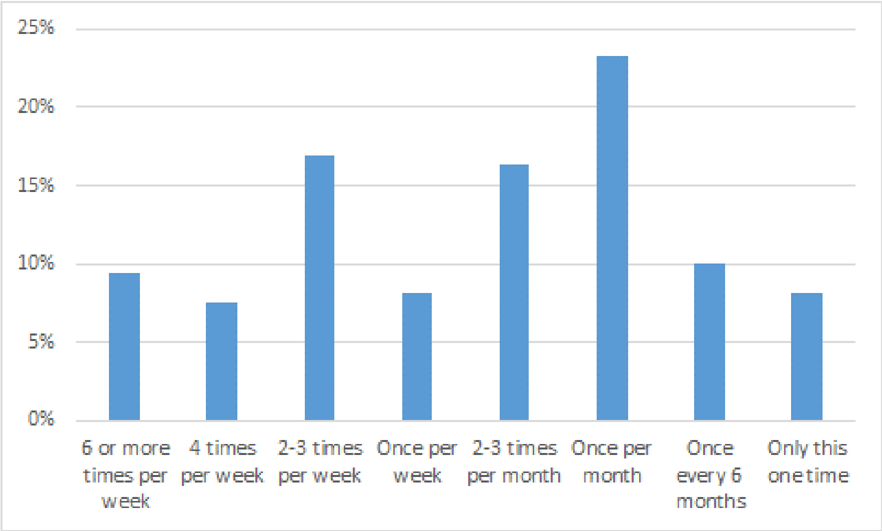


Figure 3-28. Trip Frequency – Hidalgo County Residents Survey

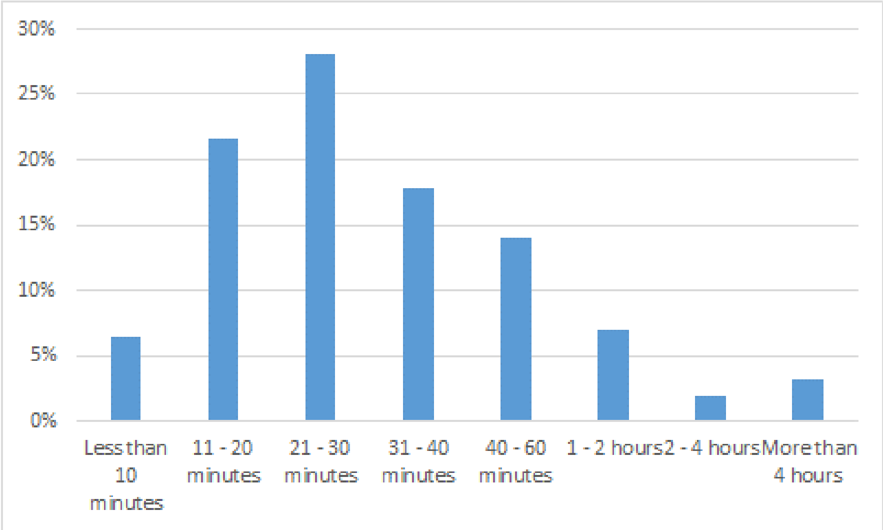


Figure 3-29. Trip Duration – Hidalgo County Residents Survey

The respondents were asked to provide the day of the week of their trip. As shown in Figure 3-30, Saturday was the most frequent response, but responses were spread across all days, indicating that C&M obtained a well-distributed sample of the possible users of the Project.

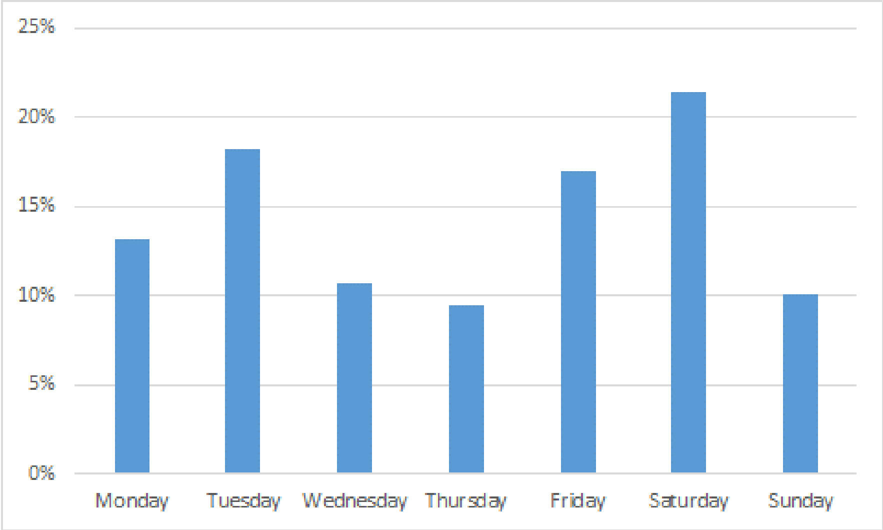


Figure 3-30. Trip Day – Hidalgo County Residents Survey

Figure 3-31 shows the distribution of bridges used by respondents who made an international trip across the U.S./Mexico border. Unsurprisingly, the McAllen–Hidalgo–Reynosa International Bridge was the bridge most frequently used.

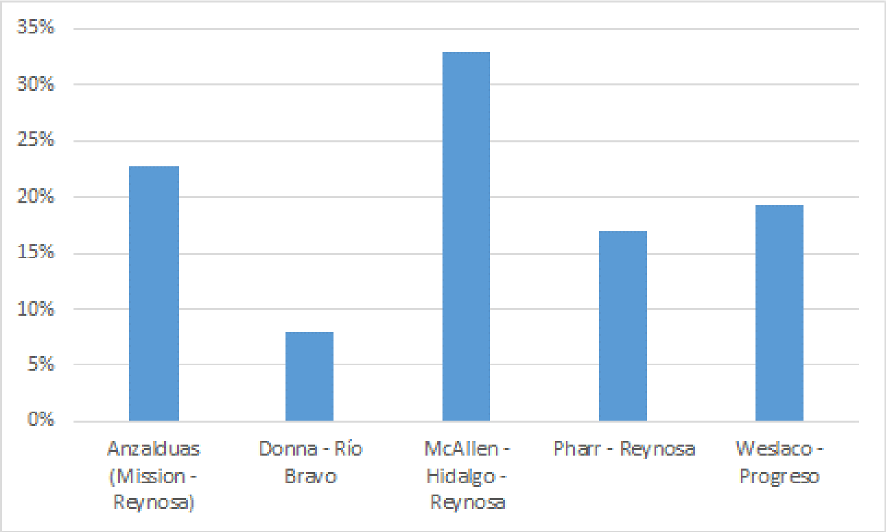


Figure 3-31. Bridge Usage – Hidalgo County Residents Survey

Respondents were asked to provide their household income. Of those who opted to respond, the highest share falls in the $50,000 – $74,999 category. The overall results are within the expected range for Hidalgo County residents, as the 2019 median household income in Hidalgo County was $40,014 (in 2019 Dollars).[3]

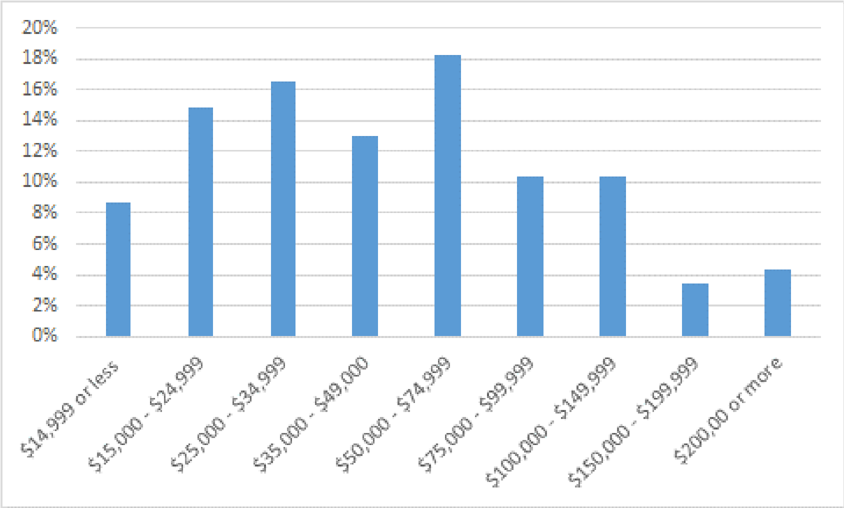


Figure 3-32. Annual Household Income – Hidalgo County Residents Survey

Respondents were asked for the reasons they use toll roads, with the following results:

- 41 percent use toll roads for time savings.
- 50 percent use toll roads in case of an emergency or when time is crucial.
- 64 percent stated that by using toll roads, they are certain that they will arrive at their destination on time.
- 71 percent use toll roads if the toll is reasonable.

C&M also surveyed the respondents regarding how the COVID-19 pandemic has affected them in ways that could affect their travel patterns. The majority of respondents (53%) indicated that they were full-time employees before March 15, but only 35 percent remained employed full-time after March 15. Out of the total, only 5 percent were unemployed, furloughed, or laid-off before COVID-19; this percentage rose to 20 percent after the pandemic began. Respondents were also asked of their opinion on their employment status once COVID-19 is controlled and restrictions are lifted. Though most stated that the employment rate would go up, the rate was still significantly lower than that prior to the pandemic. Most notably, the retirement rate prior to COVID-19 was 10 percent, whereas respondents estimated a 17 percent retirement rate in the future after COVID-19 is controlled.

Respondents were asked about their work-from-home status before and after COVID-19. The majority of respondents (54%) indicated never working from home prior to the pandemic; this number was reduced to 32 percent during the pandemic and estimated to be 35 percent in the future when COVID-19 is controlled. The share of respondents who used to work from home before the pandemic for a 5-day work week was 13 percent and increased substantially to 22 percent during the pandemic. Respondents estimated that even after the pandemic is under control, there would be more work-from-home opportunities than before.

Respondents were presented with various scenarios to determine their stated preferences. This allowed C&M to estimate VOT by analyzing the relationship between the willingness of respondents to pay a toll with respect to the time savings it would return. C&M determined VOTs for residents of Hidalgo County to be within the range of $10/hr. to $14/hr.

The VOR estimates were determined from the reliability time questions. Higher VOR indicates a higher willingness to pay for more reliable travel times. C&M determined that the VORs for residents of Hidalgo County are within the range of $13/hr. to $23/hr.

3.4.3. Online Hidalgo County International Visitor SP Survey

C&M worked with an online survey provider to reach this survey's target population, which comprises Mexican visitors, shoppers, and commuters from Reynosa and Monterrey that made an international trip to Hidalgo County. Out of 8,019 Reynosa and Monterrey residents in the subscriber base that were invited to the survey, only 1,622 visited Hidalgo County in the recent past. In total, 619 respondents completed the survey, which represents a return rate of 7.7 percent. The final sample size was reduced to 288 after checking for valid and accurate data.

Figure 3-33 illustrates the respondents' reasons for making a trip to Hidalgo County. As shown, 34 percent indicated that their main motive was shopping while 33 percent stated their main purpose was work.

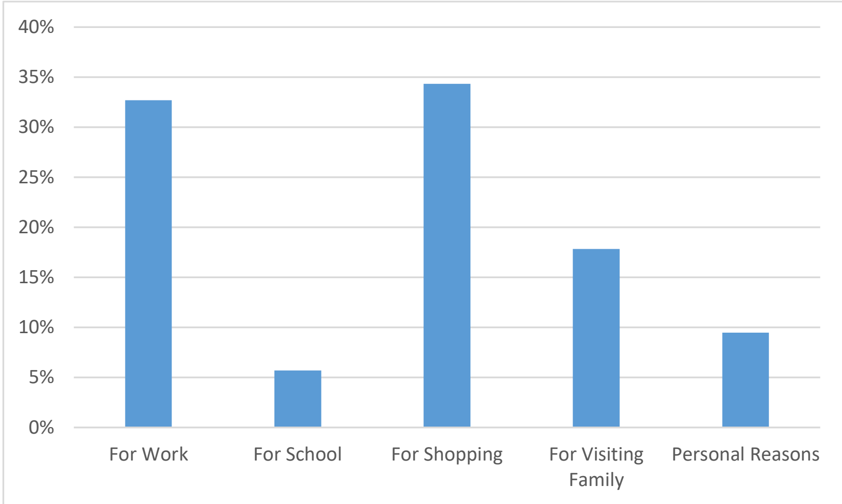


Figure 3-33. Trip Purpose – Hidalgo County Visitors Survey

Figure 3-34 shows the breakdown of bridge usage for visitors of Hidalgo County. Unsurprisingly, the McAllen–Hidalgo–Reynosa bridge was the most popular, having 37 percent of the share, more than double of the next two most popular bridges: Anzalduas and Pharr-Reynosa.

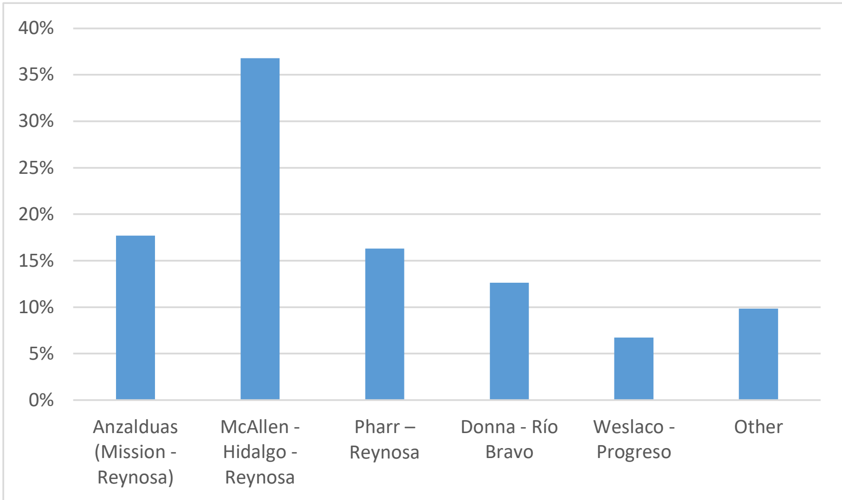


Figure 3-34. Trip Bridge Usage – Hidalgo County Visitors Survey

Table 3-18 shows the respondents' origins and destinations. As previously mentioned, most visitors traveled from cities and states closer to the border. Although Tamaulipas is right along the border, the state of Nuevo Leon sees the highest share due to having a higher population of 5 million (including the Metropolitan Area of Monterrey) in contrast to Tamaulipas's 3.4 million. Furthermore, most Nuevo Leon visitors originated from the Monterrey metropolitan area, representing over half of the respondents. McAllen and Hidalgo represented the most popular destination, as the former is popular for shopping and the latter for its employment of people from across the border.

Table 3-18. Trip Origins and Destinations – Hidalgo County Visitors Survey

Origin State	Share
Nuevo Leon	58%
Tamaulipas	27%
Mexico City	5%
Coahuila	3%
Chihuahua	1%
Jalisco	1%
San Luis Potosi	1%
Sinaloa	1%
Colima	1%
Hidalgo	1%
Sonora	1%
Tijuana	1%
Zacatecas	1%

Origin City	Share
Monterrey	53%
Reynosa	20%
Mexico City	5%
Saltillo	4%
Juarez	3%
Rio Bravo	2%
Cadereyta	2%
Zapopan	1%
Tampico	1%
McAllen	1%
Colima	1%
Allende	1%
Aquismon	1%
San Luis Potosi	1%
Alfredo V Bonfil	1%
Mochis	1%
Nuevo Progreso	1%
El Mante	1%
Atlamira	1%
Tecate	1%

Destination City	Share
McAllen	39%
Hidalgo	39%
Pharr	12%
San Juan	3%
San Antonio	3%
Alamo	3%

Figure 3-35 shows the reported trip frequencies. Previously, it was shown that shopping is the most frequent trip purpose (see Figure 3-33). This corresponds to the rather low frequency of trips being made, as 89 percent of respondents indicated that they make this type of trip once a month or less. The remaining 11 percent reporting higher trip frequencies are primarily those who are employed across the border and, thus, cross multiple times a week.

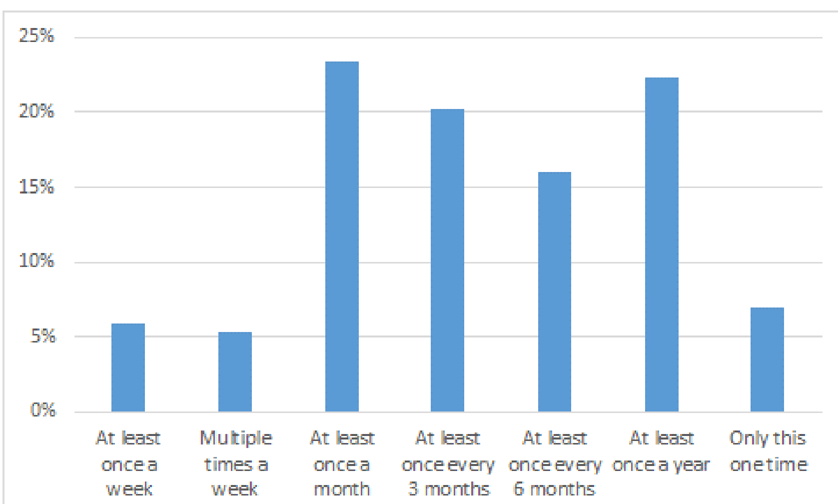


Figure 3-35. Trip Frequency – Hidalgo County Visitors Survey

Figure 3-36 illustrates the time lapsed for visitors to reach their destination after finishing the border crossing process. As shown, 19 percent of respondents stated that they reach their destination in 21 to 30 minutes. Including the lower end time periods, only 32 percent of respondents indicated 30 minutes or less to reach their destination. As shown previously in Table 3-18, the destinations of these visitors are relatively close to the border; therefore, it can be concluded that congestion issues on the U.S. side are having a major impact on travel times.

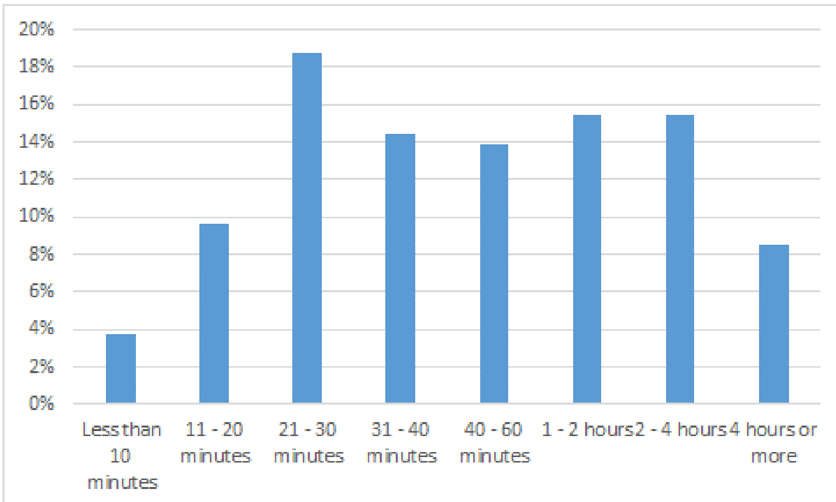


Figure 3-36. Trip Duration – Hidalgo County Visitors Survey

Respondents were asked their opinions on reasons to use toll roads, with the following results:

- 50 percent reported using toll roads due to superior road conditions.
- 43 percent reported that they use toll roads when the toll fee is shared with others.
- 72 percent reported that they use toll roads for the time savings provided.
- 47 percent reported that they would only use toll roads in case of an emergency or when time is crucial.
- 72 percent reported that they feel comfortable reaching their destination on time when using toll roads.
- 69 percent reported that they use toll roads when the toll fee is reasonable.

Respondents were given SP questions to determine VOT. In responding to the SP scenarios, 43.9 percent of the respondents chose 365 TOLL, 32.3 percent chose their current route, and 23.8 percent responded with indifference between the two. C&M determined VOT to be in the range of $13/hr. to $17/hr. It is important to note that VOR is only applicable to drivers who visit the study area frequently, which is less relevant to this sample.

3.4.4. Freight Company SP Survey

C&M conducted a survey for international trips made by commercial vehicles by interviewing freight companies. The survey sample included 28 interviews with decision makers from international trade companies that transport their goods across the U.S./Mexico border via the Pharr–Reynosa International Bridge in Hidalgo County. Based on the truck fleet sizes and trip frequency, these 28 companies represent about 22 percent of the total daily commercial vehicle crossings on the Pharr–Reynosa International Bridge.

Furthermore, based on available data, 16 out of these 28 companies represent 2,566 OS/OW permits out of the 33,780 OS/OW permits issued in 2019. As with the other SP surveys, C&M omitted incorrect and incomplete data given by respondents to present an accurate sample, resulting in 25 complete and verified responses.

Respondents were asked to keep in mind one recent trip they dispatched across the border when considering the survey questions.

Table 3-19 indicates the distribution of commercial vehicle origins and destinations. As expected, Tamaulipas, and more specifically Reynosa, have the greatest share of commercial vehicle origins. Similarly, Hidalgo has the greatest share of commercial vehicle destinations, meaning most international trips made by commercial vehicles begin and end not too far from the border.

Table 3-19. Freight Company Survey – Origins & Destinations

Origin State	Share
Tamaulipas	44%
Nuevo Leon	15%
Mexico City	10%
Puebla	8%
Jalisco	5%
Guanajuato	5%
Michoacan	5%
Hidalgo	3%
Texas	3%
Veracruz	3%

Origin City	Share
Reynosa	47%
Apodaca	6%
Iztapalapa	6%
Monterrey	6%
Acatzingo	3%
Cadereyta	3%
Huachinango	3%
Irapuato	3%
Jerecuaro	3%
Jesus Maria	3%
Jocotepec	3%
Martinez De La Torre	3%
McAllen	3%
Los Reyes	3%
San Juan Atenco	3%
Toluca	3%
Uruapan	3%

Destination City	Share
Hidalgo	35%
McAllen	35%
Pharr	12%
Reynosa	6%
Alamo	3%
Donna	3%
San Antonio	3%
San Juan	3%

Respondents were asked to provide the frequency of this type of trip, the day this trip was made, and the average duration of this trip. As shown in Figure 3-37, most of these international trips were made multiple times per day, which would coincide with the fact that most of the trips begin and end relatively close to the border. Most of the respondents stated that this type of trip is made at least once per week, if not more.

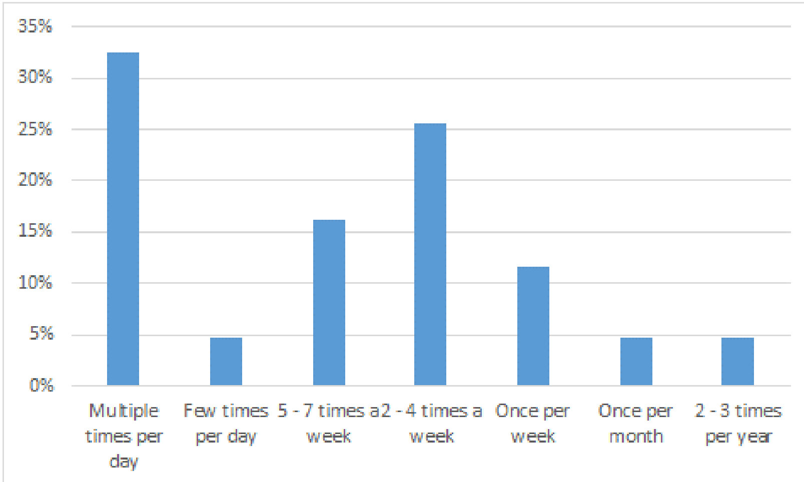


Figure 3-37. Trip Frequency – Freight Company Survey

As depicted above in Figure 3-38, the most popular days for these types of trips are early in the week. The share of trips made decreases as the week goes on, except for a small surge on Fridays.

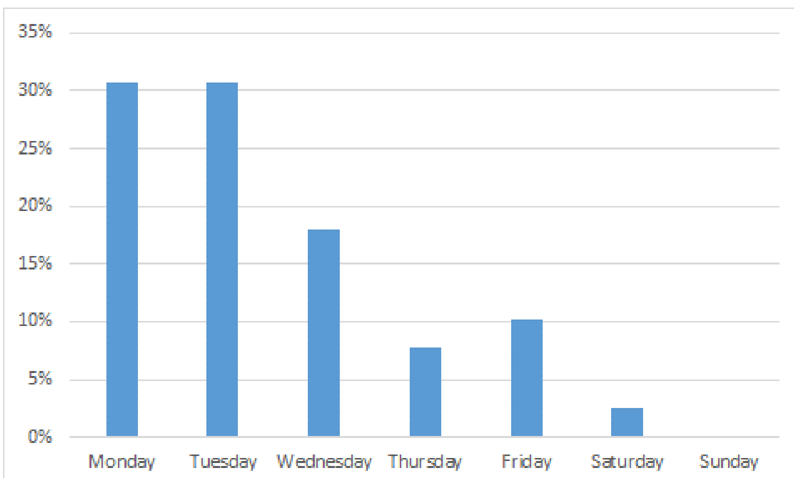


Figure 3-38. Trip Days – Freight Company Survey

As illustrated in Figure 3-39, about a third of the trips lasted more than 4 hours. This is to be expected, as historically any northbound trip takes more time than any southbound trip. The border crossing process easily adds at least 1 hour of time to the trip. Moreover, the further demand and increased traffic on existing routes has caused congestion to increase over the years. Therefore, it is unusual for any of these trips to last less than 1 hour.

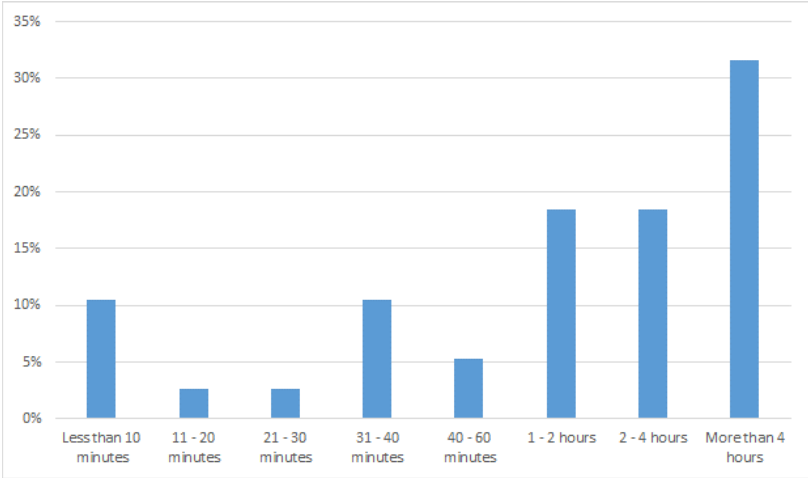


Figure 3-39. Trip Duration – Freight Company Survey

Figure 3-40 presents the breakdown of respondents' reasons for using toll roads. As shown, 31 percent claimed to use them for the sole reason of cargo being allowed while 18 percent reported that the client requested or even required them to use the toll road. Overall, the data indicate that toll roads still produce a margin of savings for companies despite having to pay a toll.

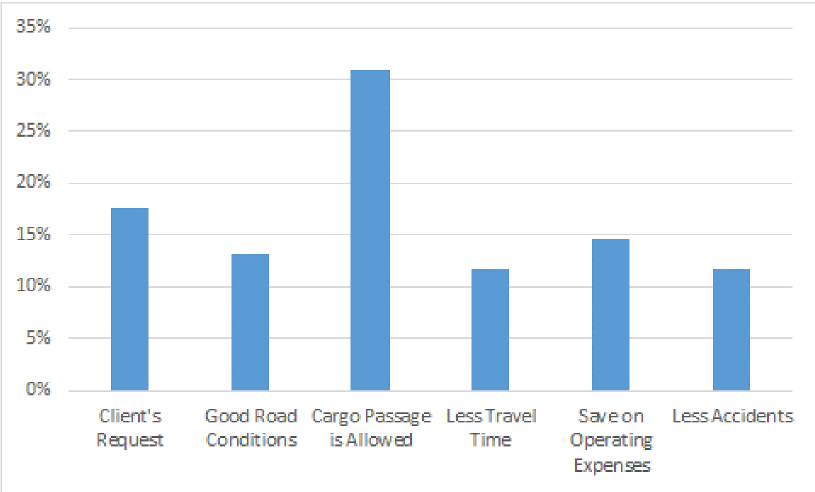


Figure 3-40. Reasons for Using Tolls – Freight Company Survey

Figure 3-41 shows the reported number of axles in the respondents' fleets. The most frequent response was five axles, far surpassing the rest with a 26 percent share.

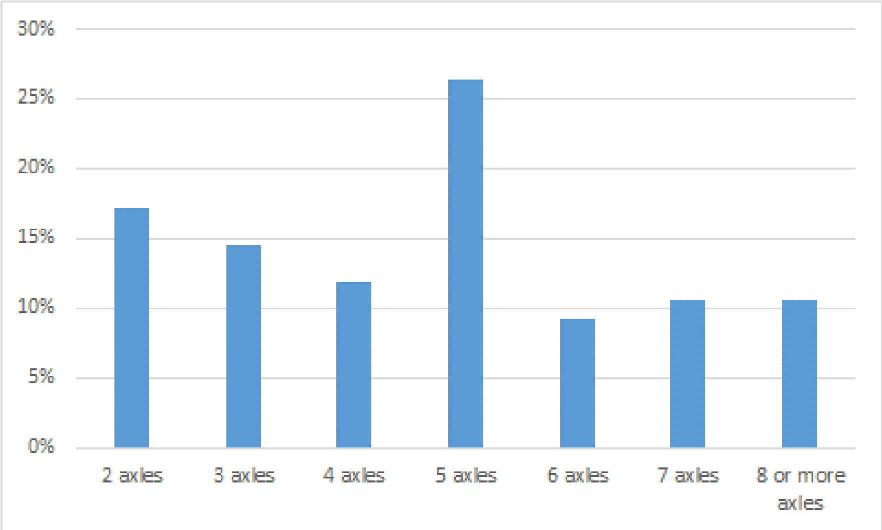


Figure 3-41. Commercial Vehicle Axles – Freight Company Survey

Figure 3-42 summarizes who oversees route decisions. As shown, 24 percent of respondents reported that the traffic manager in the distribution center makes route decisions. The second most common response was the logistics operator, as reported by 22 percent of respondents. The driver is the decision maker in only about 12 percent of cases.

Figure 3-42. Route Decision Making – Freight Company Survey

C&M asked company-specific questions to gather additional relevant information. Regarding fleet size, 54 percent of respondents reported a fleet of 2–9 commercial vehicles, 23 percent reported 10–24 commercial vehicles, and 23 percent reported a fleet size of 25 or more commercial vehicles. When asked if 365 TOLL would be useful for their typical trip, 35 percent responded with agreement, 19 percent responded with disagreement, and 46 percent responded with "possibly."

Table 3-20 below shows the distribution of cargo types reported. For this question, C&M asked respondents to answer whether the COVID-19 pandemic has or will have an impact on the type of cargo transported by reporting their cargo type under three cases: before, during, and after COVID-19. The "After COVID-19" case represents the respondents' best estimates of their cargo types once COVID-19 is under control. Across the three cases, fresh produce remains the most transported type of cargo. Naturally, vehicle parts and machinery cargo stayed relevant in respondents' estimates with a high percentage across all three cases. The most notable changes are the rise in percentage of fresh produce, increasing from 17 percent before COVID-19 to 23 percent during the pandemic. It is also important to note the 5 percent decrease in processed foods, meat, and dairy products; this is in part due to the furloughs and layoffs that decreased the workforce in the area.

Table 3-20. Cargo Type Amidst COVID-19 – Freight Company Survey

Cargo Type	Before COVID-19	During COVID-19	After COVID-19
Electronics / Electrical Goods	9%	11%	7%
Machinery or appliances	8%	8%	10%
Automotive components or new vehicles	11%	9%	8%
Fresh produce	17%	23%	20%
Plastic goods / Packaging	3%	5%	7%
Paper or printed products	9%	4%	7%
Processed foods, meat, or dairy products	10%	5%	7%
Grains, nuts, or flour products	6%	7%	7%
Furniture	6%	1%	8%
Rubber products	10%	8%	9%
Chemical products	6%	11%	6%
Wood products (non-furniture)	5%	8%	5%

Table 3-21 summarizes companies' responses to how often they transport goods. Before the pandemic, 33 percent of respondents reported transporting multiple times a day, which was the most frequent response. During the pandemic, however, the frequency of transporting goods decreased and the previous share of 33 percent was reduced to 16 percent. Respondents' estimates once COVID-19 is under control show that frequencies will rebound, albeit not to the exact amount they were prior to the pandemic.

Table 3-21. Cargo Frequency Amidst COVID-19 – Freight Company Survey

Cargo Frequency	Before COVID-19	During COVID-19	After COVID-19
Several times per day	33%	16%	29%
6 to 7 days per week	16%	12%	13%
5 days a week	10%	6%	13%
4 days a week	8%	8%	6%
2 to 3 days a week	10%	20%	15%
1 day per week	12%	10%	8%
1 to 3 days a month	0%	8%	4%
Less than once a month	4%	12%	4%
Rarely	4%	2%	6%
Never	4%	4%	2%

Table 3-22 presents the types of structural changes implemented by companies in response to the COVID-19 pandemic. In terms of resignations, prior to the pandemic, many employees of the surveyed companies only resigned by choice or perceived necessity. Multiple company changes had already begun prior to March 15, and many have prevailed throughout the pandemic. The respondents' estimates of structural changes for when COVID-19 is under control do not differ much from the situation during the pandemic.

Table 3-22. Structural Changes Amidst COVID-19 – Freight Company Survey

Structural Change	Before COVID-19	During COVID-19	After COVID-19
Reduce employees' work hours	11%	19%	18%
Lay-off employees	3%	8%	9%
Changed pay structure	8%	10%	16%
Employees resign by choice or necessity	27%	4%	11%
Furloughed employees with pay	14%	14%	4%
Furloughed employees without pay	14%	12%	9%
Change of work assignments to employees	11%	15%	16%
Stagger work schedules	14%	20%	18%

Like the two previous surveys, respondents were also presented with SP questions that would allow C&M to estimate VOT and VOR. Unlike passenger vehicle drivers, commercial vehicle respondents were more open to tolling even as toll costs increased in the hypothetical scenarios, resulting in a VOT range of $38/hr. to $45/hr. For VOR, C&M determined the range to be from $39/hr. to $56/hr.

3.4.5. Conclusion

C&M analyzed a total of 429 completed surveys. From the data gathered, it can be concluded that respondents consider the Project is in their best interests. In general, the observations from the presented surveys are in line with previous observations. In particular, the commercial vehicle and resident surveys are very consistent with commonly observed indicators of passenger vehicle and commercial vehicle traffic. The resulting VOT range for commercial vehicles based on the latest survey is higher than the VOT estimate from the 2016 survey. One possible reason for this change is the higher percentage of perishables transported in 2020 than in 2016, as VOT is generally higher when transporting perishables than for regular shipments. The share of perishables crossing Hidalgo County POEs via commercial vehicles is expected to continue growing in the future.

---

[1] Jacobs Engineering (2009). *Congestion management process – Final report*. McAllen, TX: Hidalgo County Metropolitan Planning Organization.

[2] StreetLight Data, Inc. (July 2020). Our Methodology and Data Sources. Retrieved from https://learn.streetlightdata.com/methodology-data-sources-white-paper

[3] United States Census Bureau, Quck Facts Hidalgo County. Retrieved on January 8, 2021 from: https://www.census.gov/quickfacts/hidalgocountytexas

Chapter 4: Socioeconomic Review and Border Demand Forecast

This chapter provides a review of historical and forecasted socioeconomic data for the RGVMPO region, including Hidalgo and Cameron Counties, which are part of the travel demand modeling area (see Chapter 5). Special emphasis was placed on factors that impact transportation activities and influence traffic demand, particularly population, employment, number of households, median household income, and gross regional product (GRP).

Additionally, this chapter describes the development of C&M's border demand forecast based through a socioeconomic regression model, which is related to the study area's socioeconomic projections.

4.1. Introduction

The purpose of this socioeconomic review is to evaluate and update the TDM's socioeconomic inputs for this investment grade T&R study. The socioeconomic forecasts utilized in this study are based on an independent analysis carried out by Economic & Planning Systems, Inc. (EPS), including an evaluation of the COVID-19 pandemic's effects (for the full report from EPS, please see Appendix C). EPS's areas of expertise are in real estate development, land use policy, and local government finance. EPS offers strong technical expertise and the ability to evaluate opportunities of urban development. Furthermore, EPS has had direct experience working in Texas with the North Central Texas Council of Governments (NCTCOG) and the City of Laredo.

The independent socioeconomic forecasts from EPS consider the current economic conditions, possible recovery scenarios from the COVID-19 pandemic and subsequent recession, and long-term structural economic patterns. As such, EPS's model is structured with dual components:

- **Short-Term Forecast (through 2025):** This model component forecasts current conditions through the end of 2025 on a monthly basis, providing a link between the base year (2018) and the initial year of the long-term forecast component. This forecast is built on two series of ordinary least squares (OLS) regressions: 1) sales taxes by county, and 2) employment by county and industry supersector. This two-stage regression model replicates the clear relationship that personal consumer spending has on the overall economy and, thus, employment levels. Moreover, the short-term model allows for a quantification of the impact of the COVID-19 pandemic on the employment market.
- **Long-Term Forecast (2025–2045):** This model component forecasts employment, population, and number of households with an employment-based population forecast methodology. It aggregates the short-term model employment outputs at an annual level and applies additional macroeconomic and demographic assumptions to arrive at longer-term forecasts of employment, population, and number of households. The layers of macroeconomic assumptions incorporate regional industry-level location quotients and national industry-level employment projections. Demographic assumptions include shifts related to in- and out-commuting patterns, unemployment, self-employed persons, group quarters, non-working populations, and shifts in average household size.

After an initial review of historical data and consideration of incorporating COVID-19 data into the modeling parameters, EPS identified three scenarios which contain separate but intertwined assumptions and profiles regarding the current downturn, recovery, and longer-term economic and demographic outlook, as explained below.

4.1.1. Short-Term Forecast

In the short-term model, scenario narratives are driven largely by three eventualities related to the remainder of the COVID-19 pandemic, which can be described as low, medium, and high forecast assumptions. In this narrative, assumptions regarding public health outcomes drive outcomes in consumer confidence, consumer spending, and employment levels. The assumptions are described as follows:

- **Low:** A vaccine is not widely available until late 2021, and recovery patterns in consumer confidence, consumer spending, and employment are slightly slower as a result of the length of the disruption caused by more lasting personal income impacts.
- **Medium:** A vaccine becomes available in early 2021, but immunization and the eradication of cases persist longer into 2021, such that recovery patterns in consumer confidence, consumer spending, and employment levels occur within the year.
- **High:** A vaccine becomes available in early 2021, and immunization and the eradication of cases occur relatively quickly, allowing quick recovery of consumer confidence, consumer spending, and employment levels, reflecting little deterioration in underlying consumer demand.

4.1.2. Long-Term Forecast

In the long-term model, scenario narratives are driven by 1) annual employment levels for 2025 from the short-term model and 2) the performance of each regional industry relative to the anticipated national structural growth by industry, as defined by the Bureau of Labor Statistics (BLS). Details of these assumptions are described as follows:

- **Low:** This scenario is characterized by slower than anticipated long-term growth rates following the recovery from the pandemic and over the subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment persists longer and commuting patterns reflect relatively lower local labor force participation rates over time.
- **Medium:** This scenario is characterized by anticipated long-term growth rates by industry, which materialize following the recovery from the COVID-19 pandemic and subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment persists longer and commuting patterns reflect slightly higher local labor force participation rates over time.
- **High:** This scenario is characterized by higher-than-anticipated rates of industry-level employment growth rates following the pandemic and subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment does not persist and commuting patterns reflect high labor force participation rates.

In addition to EPS's independent socioeconomic analysis, C&M's socioeconomic data update for the present study included the following steps:

1) Reviewed historical and forecasted socioeconomic data in the areas of interest.
2) Supervised the socioeconomic analysis carried out by EPS.
3) Prepared traffic analysis zone (TAZ) level socioeconomic data for all future model years of the TDM (see Chapter 5).
4) Developed the border demand forecast based on a socioeconomic regression model.

In preparing its socioeconomic update, C&M considered historical and forecasted data from the following sources, in addition to the EPS study:

- U.S. Census Bureau, American Community Survey (ACS)[1]
- BLS[2]

- McAllen Chamber of Commerce[3]
- Mexican National Population Council (Consejo Nacional de Poblacion [CONAPO][4]
- National Institute of Statistics and Geography (Instituto Nacional de Estadistica y Geografia [INEGI][5,6]
- Moody's Analytics (Moody's)[7]
- Woods & Poole Economics, Inc. (W&P)[8]
- Texas State Data Center (TSDC)[9]
- Texas Water Development Board (TWDB)[10]
- TxDOT's Lower Rio Grande Valley (LRGV) TDM[11]
- TxDOT's Texas Statewide Analysis Model (Texas SAM)[12]
- Bureau of Transportation Statistics (BTS)[13]

Among the sources analyzed, it is important to note that besides EPS, the projections developed by Moody's and W&P also consider the impacts of the COVID-19 pandemic in both the short term and long term. The remaining sources serve as a useful comparison point to highlight COVID-19's estimated impact.

4.2. Population

4.2.1. Historical Population Trends

Population is a key factor for transportation modeling and network simulation. C&M derived the baseline assessment of population from county and city data, including datasets on population and land use as gathered from local, state, and federal data sources.

The populations of Hidalgo and Cameron Counties have expanded rapidly in the last four decades, particularly in the 1990s following the implementation of NAFTA. As shown in Table 4-1, Hidalgo County has added 302,138 residents since 2000, which translates into a CAGR of approximately 2.4 percent from 2000 to 2018. In comparison, the state's overall CAGR is 1.8 percent for the same time period. The population in Hidalgo County is 865,939 in the TDM base year 2018.

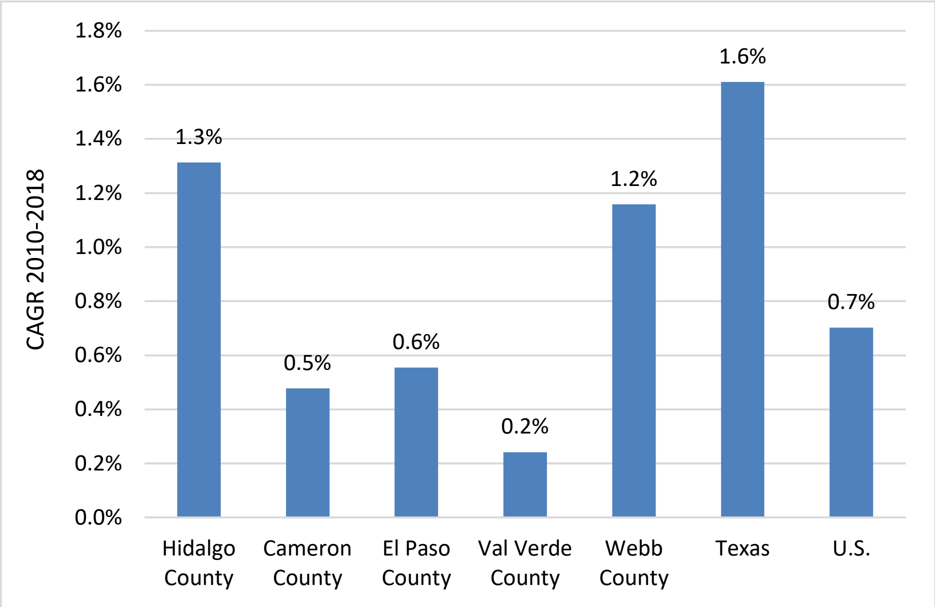
Table 4-1. Historical Population Trends and Growth Rates

Year	Population		CAGR	
	Hidalgo County	Cameron County	Hidalgo County	Cameron County
1970	181,535	140,368	-	-
1980	283,229	209,727	4.5%	4.1%
1990	383,545	260,120	3.1%	2.2%
2000	563,801	331,138	3.9%	2.4%
2010	780,087	408,054	3.3%	2.1%
2011	797,810	400,332	2.3%	-1.9%
2012	806,552	415,557	1.1%	3.8%
2013	815,996	417,276	1.2%	0.4%
2014	831,073	420,392	1.8%	0.7%
2015	842,304	422,156	1.4%	0.4%
2016	849,843	422,135	0.9%	0.0%
2017	860,661	423,725	1.3%	0.4%
2018	865,939	423,908	0.6%	0.0%
2019	868,707	423,163	0.3%	-0.2%

Source: 1970 – 2000 data from U.S. Decennial Census; 2010 to 2018 data from ACS 1-Year Estimates

Population growth in Hidalgo County has been influenced by two key demographic variables: birth-rate and domestic in-migration. The high birth rate within the area is most likely due to the county's relatively young population.[14] According to ACS 1-Year Estimates, the median age of 29.6 years is notably less than that of Texas (35.1) and the United States overall (38.5).[1]

As shown in Figure 4-1, from 2010 to 2018, Hidalgo County exhibited a population CAGR of 1.3 percent, which is substantially higher than other counties along the Texas/Mexico border and the nation as a whole (0.7%). Hidalgo County's growth is in sync with the growth of the state of Texas, which exhibited a CAGR of 1.6 percent from 2010 to 2018.



Source: ACS 1-Year Estimates; ACS 5-Year-Estimates (for Val Verde CAGR)

Figure 4-1. Regional Population Growth Rates (2010–2018 CAGR)

4.2.2. Population Projections

Based on EPS's research, there are substantial instances of COVID-19 directly impacting the socioeconomics of the study area. However, population growth has been minimally impacted.

C&M purchased and reviewed several sources of population projections and growth rates for Hidalgo and Cameron Counties, including W&P, Moody's, the TSDC, and the TWDB, as well as the LRGV TDM and the Texas SAM. Figure 4-2 presents the projections from these sources (excluding Moody's)[i] along with EPS's Medium population forecast and the forecast C&M employed in its previous investment grade study of the Project (C&M 2016). EPS's Medium forecast for population shows minor differences in the short-term (COVID-19 impact) and a conservative trend in the long-term compared to C&M 2016, the LRGV TDM, and the Texas SAM.

[i] The projections from Moody's considered in this study are limited to Hidalgo County. Therefore, Moody's projections have been excluded from figures displaying combined projections for Hidalgo and Cameron Counties.

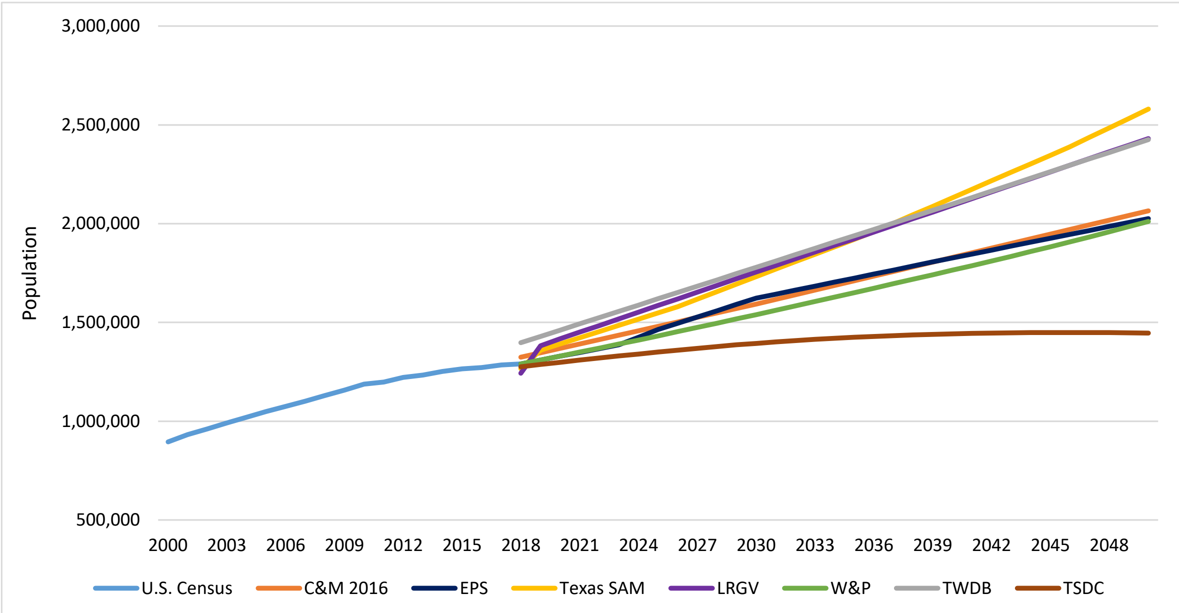
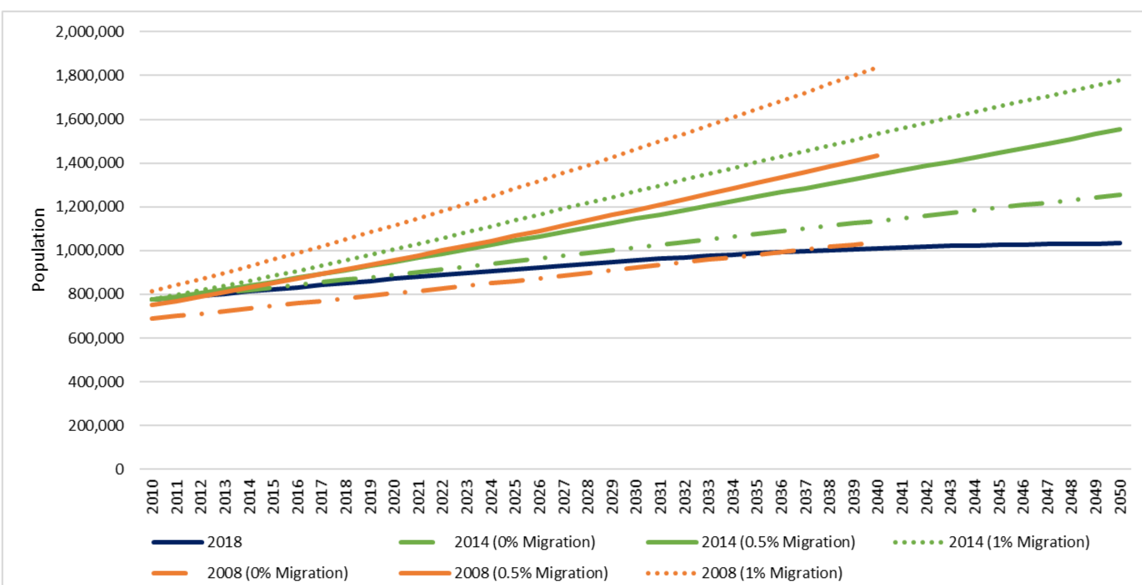


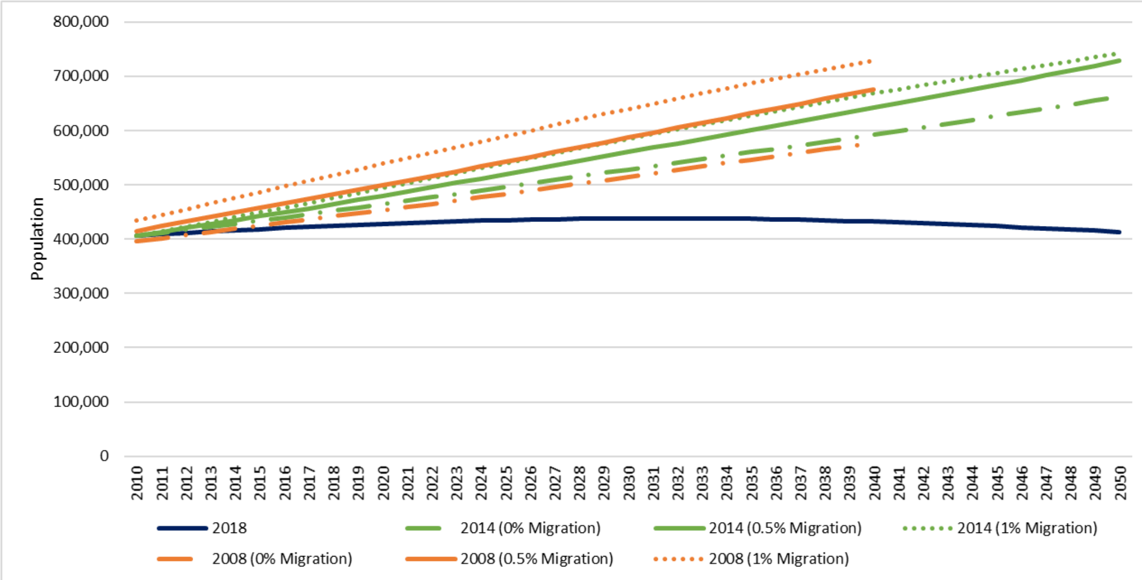
Figure 4-2. Hidalgo and Cameron Counties Population Trend and Projections

The TSDC provides county-level population projections for public and private institutions and has by far the lowest future population projections for the model area. The latest estimate from the TSDC was published in 2018 before the COVID-19 pandemic. C&M compared different estimates from the TSDC (2004, 2014, and 2018) in Figure 4-3 and Figure 4-4 for Hidalgo County and Cameron County, respectively. In the 2008 and 2014 estimates, the TSDC presents 1 percent, 0.5 percent, and 0 percent migration growth projections related to the total population growth scenarios. The 2018 estimates provided by the TSDC are in the range of the previous 0 percent migration scenario forecast. Moreover, in Hidalgo County, the 2018 estimates are close to the 0 percent migration scenario published in 2008, in contrast to Cameron County 2018 projections, which are the lowest projections of all the TSDC scenarios with negative population growth.



Source: TSDC

Figure 4-3. Hidalgo County Population Projections – TSDC



Source: TSDC

Figure 4-4. Cameron County Population Projections – TSDC

Table 4-2 presents the population CAGR projections by source along with C&M's forecast used in the previous T&R study ("C&M 2016") and C&M's updated forecast for the present study ("C&M Update") for each of the TDM years. EPS's Medium forecast was adopted for C&M's updated forecast.

The TWDB and the Texas SAM predict the largest population growth for Hidalgo County, reaching approximately 1.58 and 1.63 million by 2045, respectively, and translating into 2018–2045 CAGRs of 1.9 and 2.2 percent. EPS predicts 1.7 percent annual growth for Hidalgo County, arguing that one key factor behind their lower estimates is the lower population growth rates reported by the Census for 2013 and 2014. Indeed, whereas Hidalgo County's population CAGR between 2000 and 2010 was 3.3 percent, for 2013 and 2014 this growth rate dropped to 1.2 and 1.8 percent, respectively (see Table 4-1). Nevertheless, the TSDC still predicts the lowest growth for Hidalgo County, with a 2018–2045 CAGR of 0.7 percent reaching 1.02 million in 2045, as previously discussed.

C&M's updated population estimates for Hidalgo County are similar to the 2016 T&R study estimates. As for Cameron County, C&M's updated population CAGR of 1 percent is lower than C&M's 2016 estimate of 1.2 percent for the period of 2018 to 2040. In addition, C&M's update reaches a lower population in 2040 compared to C&M's 2016 estimate (528,894 and 576,019, respectively). The LRGV TDM and Texas SAM estimate the highest growth for Cameron County, with 2018–2045 CAGRs of 2.2 percent and 1.9 percent, respectively.

Table 4-2. Population Projections by Source

County	Source	Population					
		2018	2025	2030	2035	2040	2045
Hidalgo	C&M Update	865,933	1,013,350	1,146,387	1,221,848	1,297,309	1,371,095
	CAGR	-	2.3%	2.5%	1.3%	1.2%	1.1%
	C&M 2016	884,035	997,975	1,079,471	1,166,125	1,252,779	1,339,433
	CAGR	-	1.7%	1.6%	1.6%	1.4%	1.3%
	Moody's	862,298	937,395	1,014,409	1,092,147	1,163,303	1,232,277
	CAGR	-	1.2%	1.6%	1.5%	1.3%	1.2%
	W&P	865,939	975,953	1,060,106	1,148,123	1,239,379	1,335,658
	CAGR	-	1.7%	1.7%	1.6%	1.5%	1.5%
	EPS Low	865,933	1,001,990	1,131,273	1,201,348	1,271,422	1,332,141
	CAGR	-	2.1%	2.5%	1.2%	1.1%	0.9%
	EPS Medium	865,933	1,013,350	1,146,387	1,221,848	1,297,309	1,371,095
	CAGR	-	2.3%	2.5%	1.3%	1.2%	1.1%
	EPS High	865,933	1,028,015	1,166,611	1,248,515	1,330,418	1,414,424
	CAGR	-	2.5%	2.6%	1.4%	1.3%	1.2%
	TSDC	851,285	915,411	956,044	988,064	1,010,557	1,025,208
	CAGR	-	1.0%	0.9%	0.7%	0.5%	0.3%
	TWDB*	934,423	1,100,558	1,219,225	1,338,364	1,457,502	1,576,880
	CAGR	-	2.4%	2.1%	1.9%	1.7%	1.6%
	LRGV TDM	907,122	1,047,798	1,147,371	1,246,945	1,346,518	1,446,553
	CAGR	-	2.1%	1.8%	1.7%	1.5%	1.4%
	Texas SAM	906,945	1,059,259	1,191,371	1,323,483	1,475,189	1,626,894
	CAGR	-	2.2%	2.4%	2.1%	2.2%	2.0%
Cameron	C&M Update	423,906	450,629	476,517	502,706	528,894	554,808
	CAGR	-	0.9%	1.1%	1.1%	1.0%	1.0%
	C&M 2016	439,454	482,487	513,657	544,838	576,019	607,200
	CAGR	-	1.3%	1.3%	1.2%	1.1%	1.1%
	Moody's	422,140	456,440	489,040	523,650	557,860	592,970
	CAGR	-	1.1%	1.4%	1.4%	1.3%	1.2%
	W&P	429,128	467,196	494,195	522,448	549,489	576,713
	CAGR	-	1.2%	1.1%	1.1%	1.0%	1.0%
	EPS Low	423,906	447,718	467,189	490,312	513,435	542,848
	CAGR	-	0.8%	0.9%	1.0%	0.9%	1.1%
	EPS Medium	423,906	450,629	476,517	502,706	528,894	554,808
	CAGR	-	0.9%	1.1%	1.1%	1.0%	1.0%
	EPS High	423,906	454,588	487,500	519,666	551,832	582,305
	CAGR	-	1.0%	1.4%	1.3%	1.2%	1.1%
	TSDC	424,462	434,887	438,143	436,976	431,963	423,859
	CAGR	-	0.3%	0.1%	-0.1%	-0.2%	-0.4%
	TWDB*	462,850	519,284	559,593	600,485	641,376	685,419
	CAGR	-	1.7%	1.5%	1.4%	1.3%	1.3%
	LRGV TDM	474,944	571,870	641,147	710,423	779,700	848,971
	CAGR	-	2.7%	2.3%	2.1%	1.9%	1.7%
	Texas SAM	453,159	520,887	577,991	635,095	698,464	761,833
	CAGR	-	2.0%	2.1%	1.9%	1.9%	1.8%

Note: *Population data for 2018 and 2025 were calculated via linear interpolation from available data for 2020 and 2030.

4.2.3. Population at the TAZ Level

EPS developed population growth estimates at the TAZ level, which C&M revised with the latest Census tract data for the TDM base year 2018. The disaggregated TAZ-level population forecasts are the inputs to the TDM for each model year.

Figure 4-5 to Figure 4-8 illustrate population CAGRs for Hidalgo and Cameron Counties and the Project corridor for the years 2018–2025 and 2025–2045. As shown, the highest growth is more concentrated in the periphery of Hidalgo County's urban centers. Furthermore, high population increases can be observed in all years around the western end of the Project.

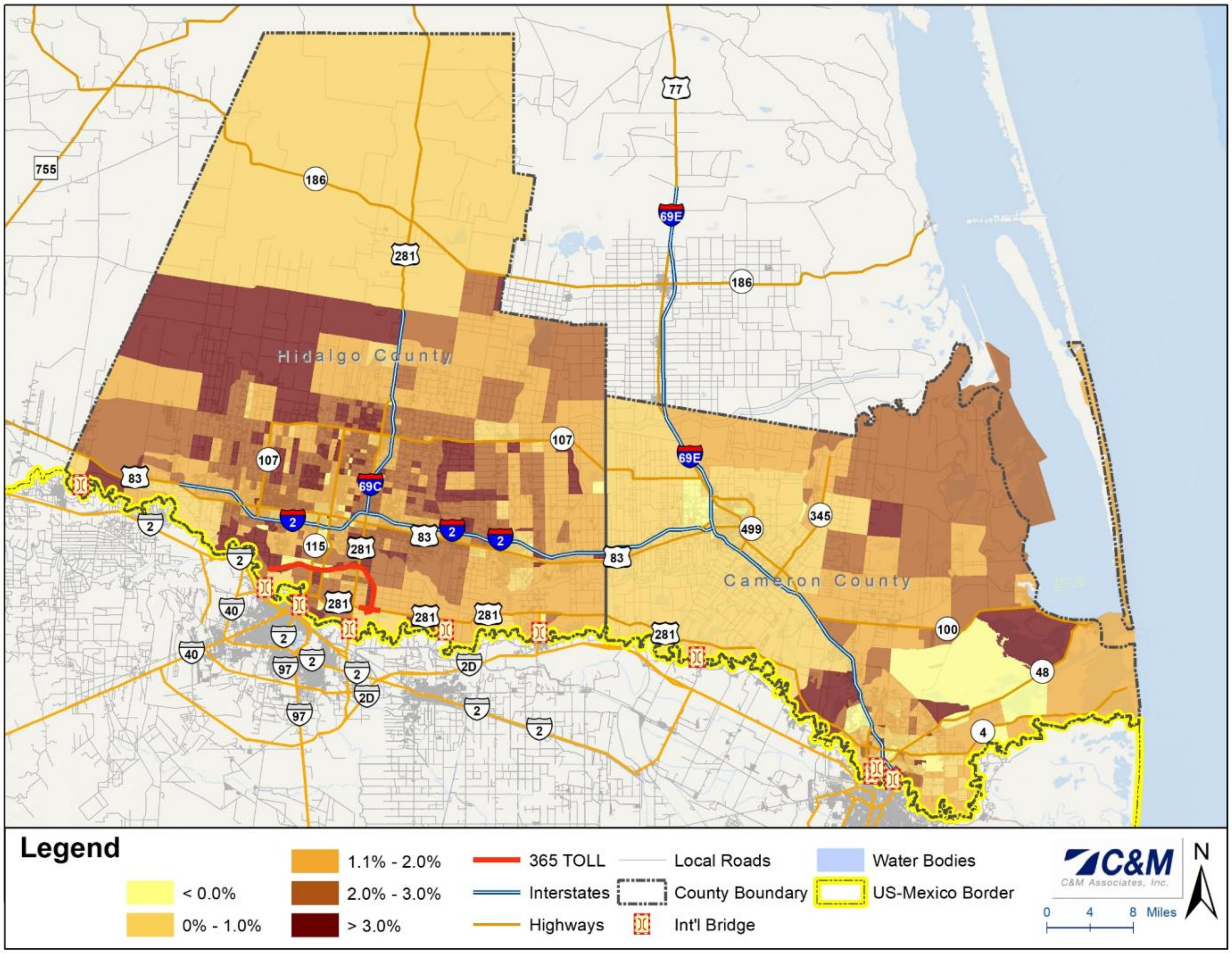


Figure 4-5. TAZ-Level Population Growth (2018–2025 CAGR)

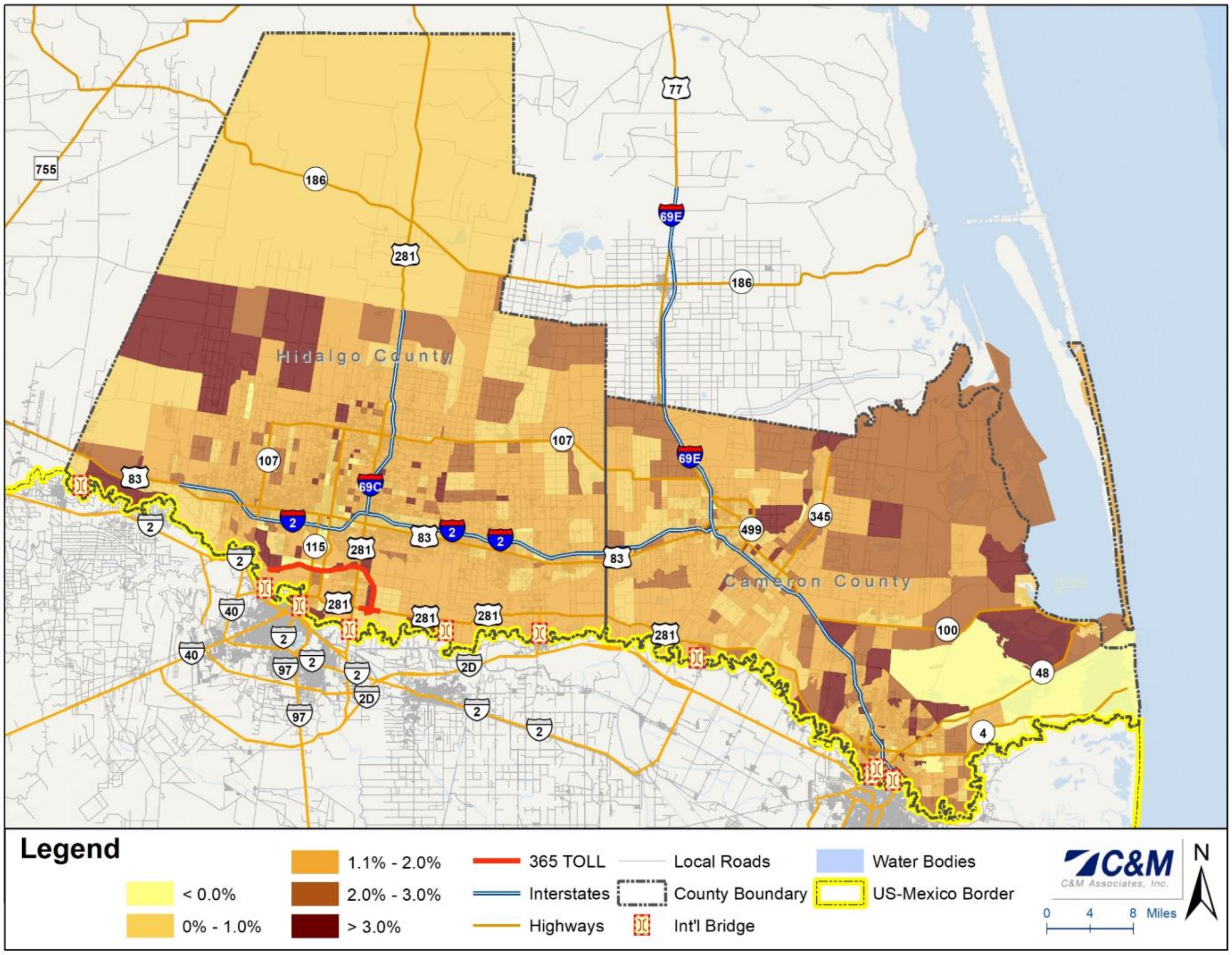


Figure 4-6. TAZ-Level Population Growth (2025–2045 CAGR)

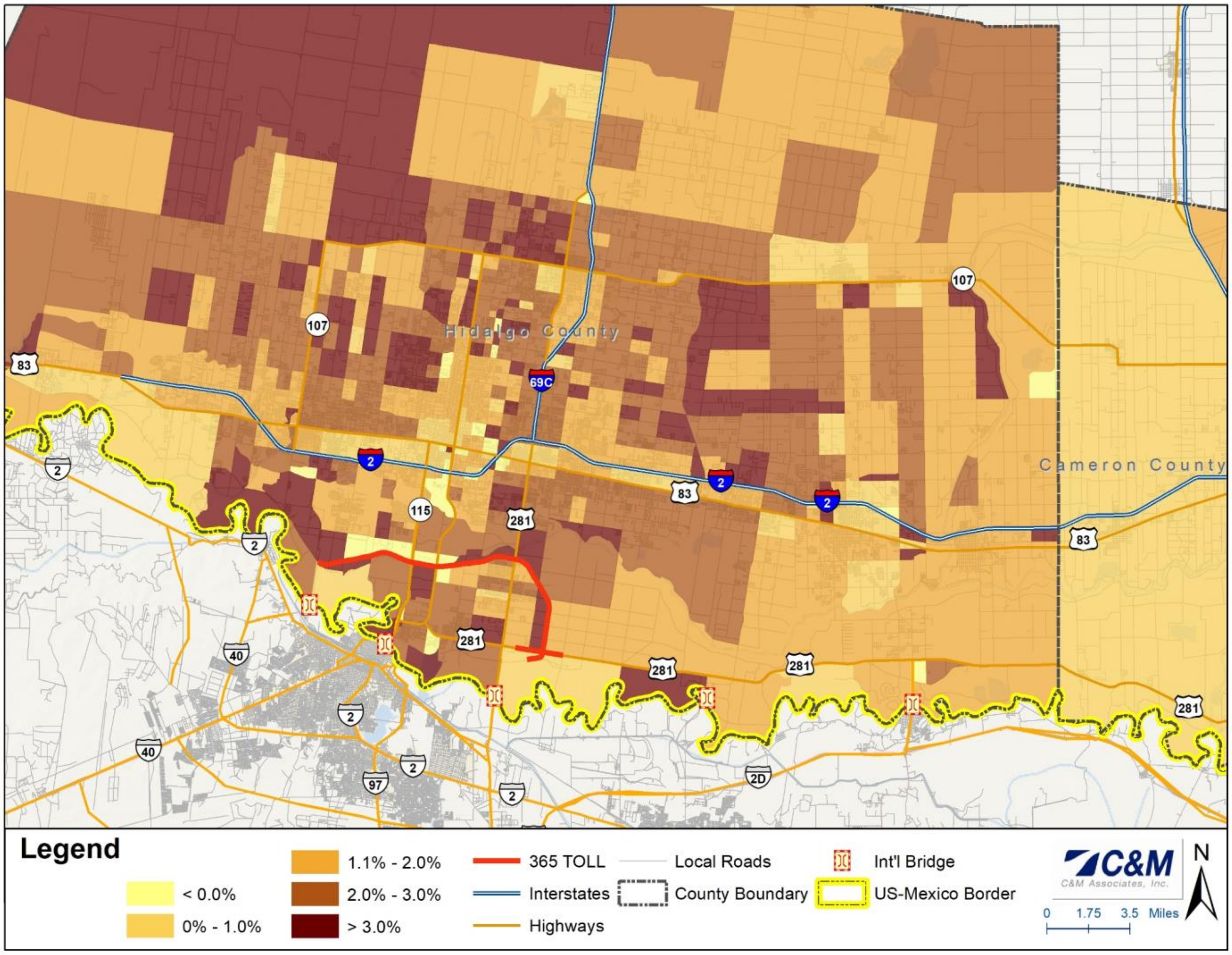


Figure 4-7. TAZ-Level Population Growth – Project Corridor (2018–2025 CAGR)

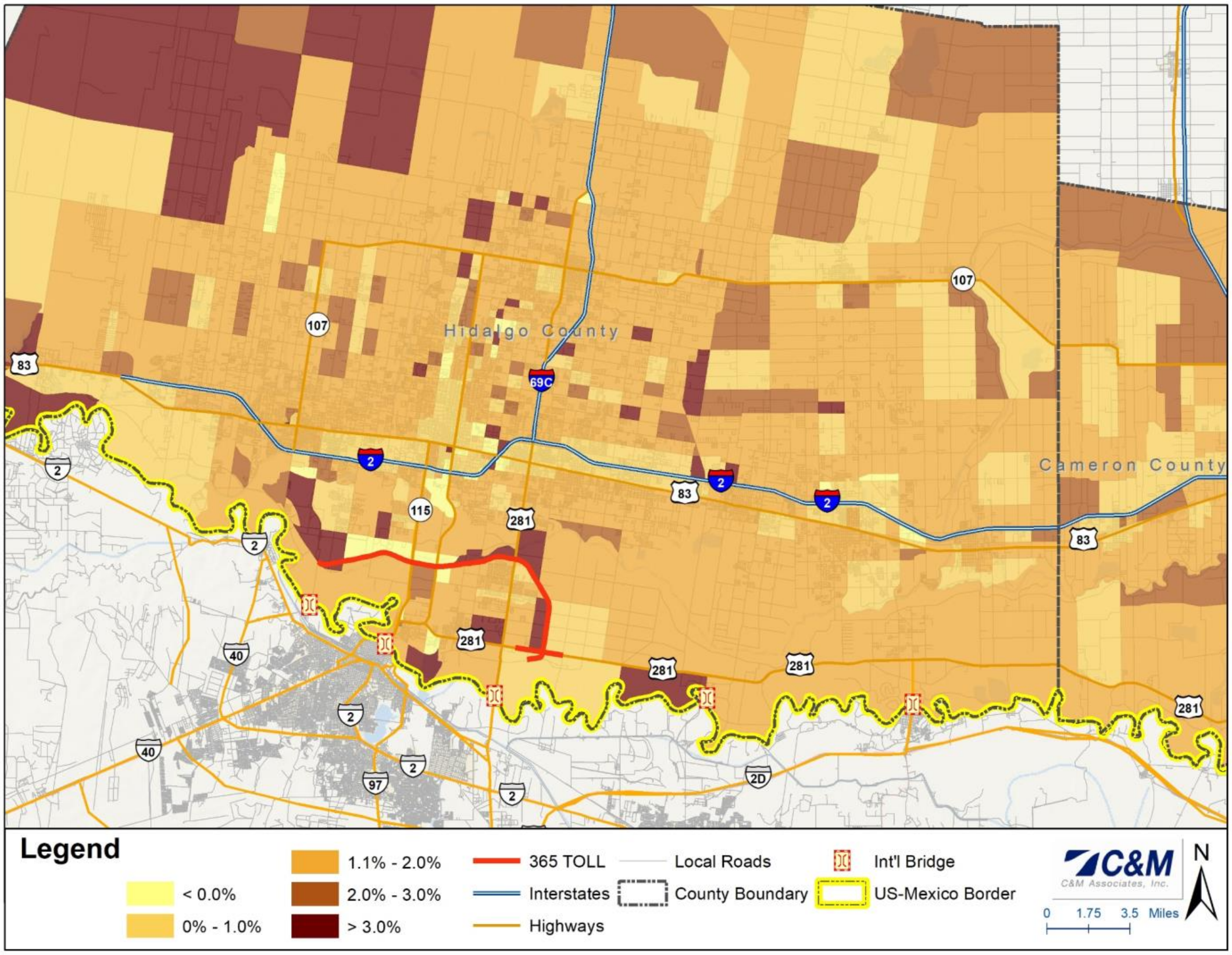


Figure 4-8. TAZ-Level Population Growth – Project Corridor (2025–2045 CAGR)

4.3. Employment

From a transportation planning perspective, workplace-based employment in a region provides a useful picture of trip destinations. C&M reviewed EPS's TAZ-level employment projections and evaluated Hidalgo and Cameron Counties' current job markets, the area's employment history, and available employment projections for each county. Based on that information, employment forecasts were developed for the greater Hidalgo County and Cameron County area, specifically for those census tracts within the modeling area. The final employment growth forecast also considered information obtained through interviews with Hidalgo County stakeholders, including the Hidalgo County Economic Development Agency (EDA) and important private land developers. These interviews not only provided valuable insights into the current trends within the area but also provided another local view of what might lie ahead in the coming years. The information from the Hidalgo County stakeholders was shared with EPS.

4.3.1. Historical Employment Trends

EPS collected and analyzed county and city data pertaining to employment and labor force size within Hidalgo and Cameron Counties. Additional employment information was then gathered from local, state, and federal sources.

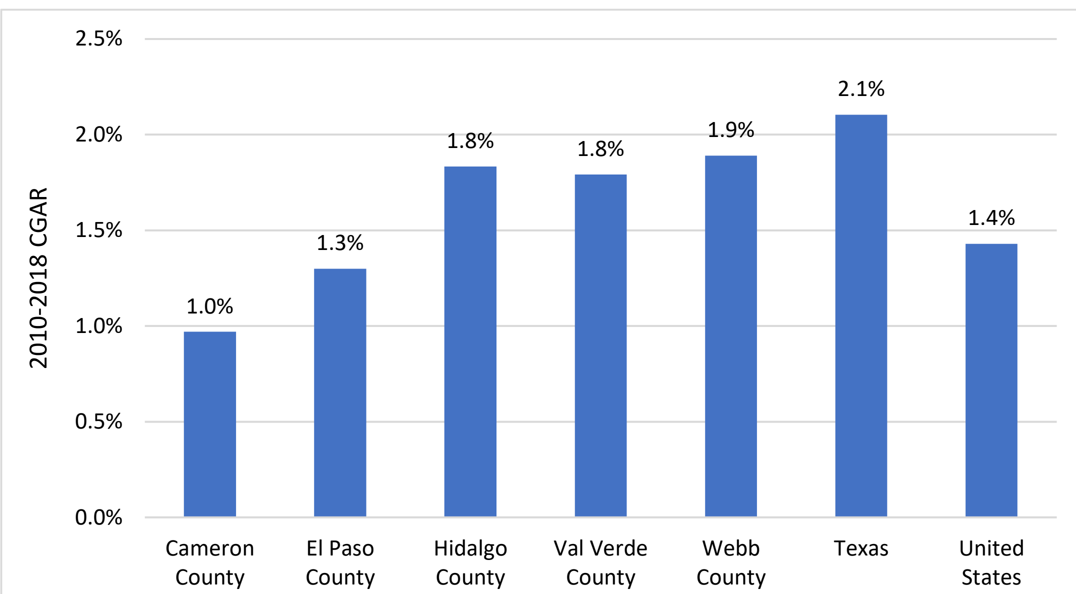
Table 4-3 depicts Hidalgo and Cameron Counties' employment growth patterns since 2000 based on BLS data. The findings indicate that the area has generally experienced positive employment growth. In fact, employment in Hidalgo County has grown at a faster rate than population since 2010.

Table 4-3. Historical Employment Trends and Growth Rates

Year	Employment		CAGR	
	Hidalgo County	Cameron County	Hidalgo County	Cameron County
2000	192,190	118,477	-	-
2010	280,884	144,171	3.9%	2.0%
2011	288,558	146,773	2.7%	1.8%
2012	293,300	149,171	1.6%	1.6%
2013	296,978	150,439	1.3%	0.9%
2014	303,296	152,683	2.1%	1.5%
2015	304,749	151,508	0.5%	-0.8%
2016	310,647	154,064	1.9%	1.7%
2017	317,398	154,709	2.2%	0.4%
2018	324,843	155,750	2.3%	0.7%
2019	330,817	157,675	1.8%	1.2%

Source: BLS

As illustrated in Figure 4-9, according to the BLS, Hidalgo County has been one of the fastest growing counties in the region in terms of employment, with a 2010–2018 CAGR of 1.8 percent. Likewise, Hidalgo County represents 34 percent of the total employment among the counties shown in Figure 4-9, trailing only El Paso County, which accounts for 39 percent of total employment but exhibits a lower CAGR of 1.3 percent. Employment growth in Hidalgo County has been close to that of the state and above the national average of 1.4 percent.



Source: BLS

Figure 4-9. Regional Employment Growth (2010–2018 CAGR)

4.3.2. Employment Projections

In contrast to population, the employment rate has been significantly impacted by the COVID-19 pandemic and is expected to continue being impacted through the recovery period, which EPS assumed would begin in the middle of 2020 Q3 and continue through 2021 Q2. Figure 4-10 highlights COVID-19's impact on employment projections in the initial forecast years compared to previously developed forecasts.

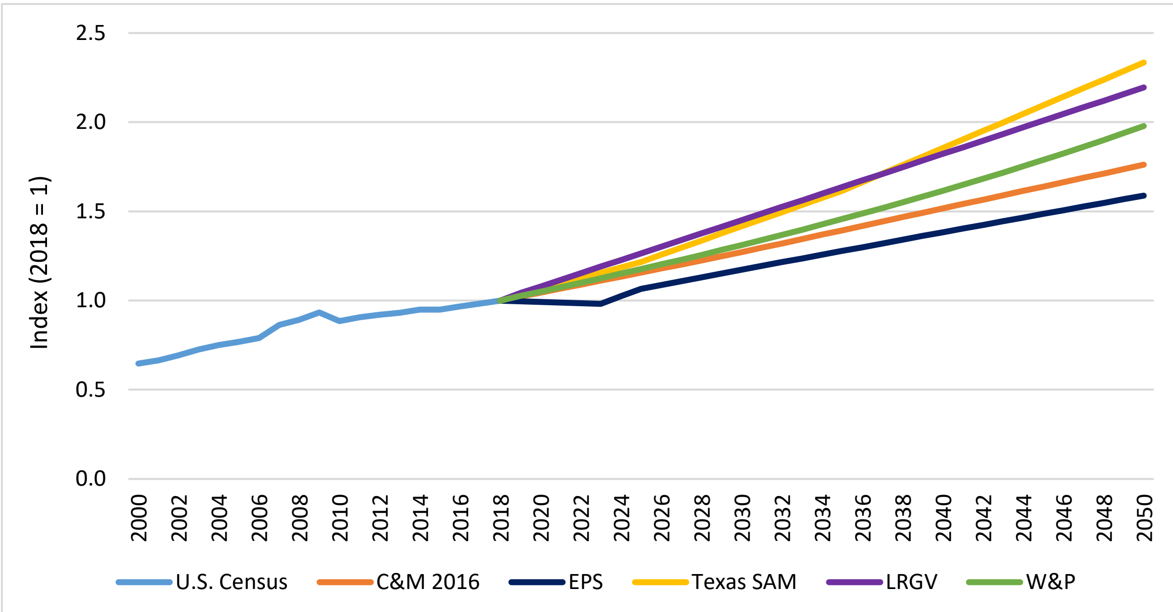


Figure 4-10. Hidalgo and Cameron Counties Employment Trend and Projections (Normalized to 2018)

C&M reviewed employment projections from W&P, Texas SAM, EPS, and other sources as shown in Table 4-4. EPS's Medium forecast was adopted for C&M's updated forecast (C&M Update).

For Hidalgo County, C&M's updated forecast estimates lower annual growth rates with respect to other projections with a CAGR of 1.6 percent from 2018 to 2045, which is lower than that considered in C&M's 2016 T&R study (1.9% CAGR). The LRGV TDM and the Texas SAM estimate the highest growth rates, with 2018–2045 CAGRs of 2.5 and 2.9 percent, respectively. However, these estimates do not account for the impact of COVID-19.

Similar to Hidalgo County, the projections by EPS and W&P for Cameron County present a more conservative outlook given the impact of COVID-19. The expected average annual growth is 1.2 percent, which is a decrease of 0.7 percent annually compared to C&M's 2016 T&R study. The LRGV TDM estimates the largest growth with a CAGR of 2.9 percent based on their pre-COVID estimates.

The forecasts by Texas SAM and W&P markedly differ from one another, not only in terms of their projected growth rates over time but in terms of their base year (2018) values. These differences are primarily due to the different definitions of employment used by each source, as they may exclude/include particular employment categories (e.g., seasonal employment, self-employment, etc.).

Table 4-4. Employment Projections by Source

County	Source	Employment					
		2018	2025	2030	2035	2040	2045
Hidalgo	C&M Update	261,197	281,387	312,535	343,371	374,207	402,697
	CAGR	-	1.1%	2.1%	1.9%	1.7%	1.5%
	C&M 2016	262,982	306,100	338,754	373,288	407,822	442,356
	CAGR	-	2.2%	2.0%	2.0%	1.8%	1.6%
	EPS Low	261,197	272,615	300,075	326,883	353,691	378,323
	CAGR	-	0.6%	1.9%	1.7%	1.6%	1.4%
	EPS Medium	261,197	281,387	312,535	343,371	374,207	402,697
	CAGR	-	1.1%	2.1%	1.9%	1.7%	1.5%
	EPS High	261,197	293,900	329,558	365,336	401,113	434,268
	CAGR	-	1.7%	2.3%	2.1%	1.9%	1.6%
	W&P	385,547	460,146	518,099	581,662	651,542	728,521
	CAGR		2.6%	2.4%	2.3%	2.3%	2.3%
	LRGV TDM	200,250	249,340	283,613	317,887	352,160	386,264
	CAGR	-	3.2%	2.6%	2.3%	2.1%	1.9%
	Texas SAM	271,140	332,982	390,677	448,372	519,304	590,236
	CAGR	-	3.0%	3.2%	2.8%	3.0%	2.6%
Cameron	C&M Update	139,146	145,429	157,146	168,287	179,427	192,099
	CAGR	-	0.6%	1.6%	1.4%	1.3%	1.4%
	C&M 2016	144,652	165,200	179,450	194,883	210,315	225,748
	CAGR	-	1.9%	1.7%	1.7%	1.5%	1.4%
	EPS Low	139,146	142,289	152,814	162,774	172,733	183,837
	CAGR	-	0.3%	1.4%	1.3%	1.2%	1.3%
	EPS Medium	139,146	145,429	157,146	168,287	179,427	192,099
	CAGR	-	0.6%	1.6%	1.4%	1.3%	1.4%
	EPS High	139,146	148,732	161,227	173,141	185,054	199,235
	CAGR	-	1.0%	1.6%	1.4%	1.3%	1.5%
	W&P	196,272	224,219	244,684	266,028	288,360	311,802
	CAGR		1.9%	1.8%	1.7%	1.6%	1.6%
	LRGV TDM	119,175	154,586	179,659	204,733	229,806	255,327
	CAGR	-	3.8%	3.1%	2.6%	2.3%	2.1%
	Texas SAM	146,174	174,536	200,237	225,937	254,918	283,898
	CAGR	-	2.6%	2.8%	2.4%	2.4%	2.2%

Note: *Employment data for EPS/C&M Update in 2035 were calculated based on linear interpolation between model years

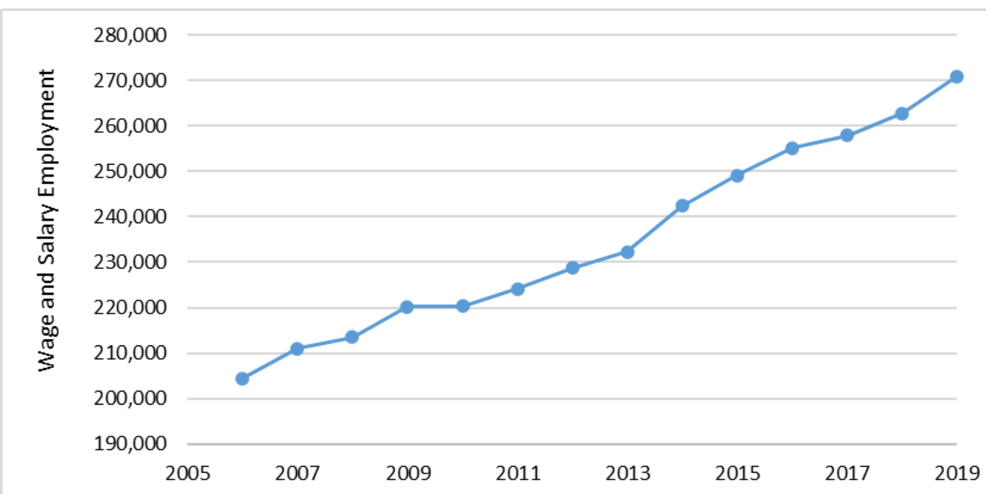
Although the impacts of COVID-19 are strongly reflected in employment in the short term, the recovery scenarios estimated by EPS assume a recovery starting in 2023 for the Medium case with relatively high annual growth rates. This assumption is based in part on international trends, as the area's proximity to northern Mexico's many manufacturing and export assembly plants (i.e., maquiladoras) and the produce shipping industry has led to a robust trade industry; as a result, the long-term forecast calls for Hidalgo County to remain an attractive location for residents and businesses alike.

The pre-pandemic positive employment trends are also supported by local sources, such as the McAllen wage and salary employment reported by the McAllen Chamber of Commerce. The McAllen area's wage and salary employment from 2006 to 2019 is presented in Table 4-5 and Figure 4-11. As shown, wage and salary employment has exhibited positive growth throughout this time period, even during the Great Recession. The 2006–2019 CAGR of 2.2 percent is within the range of Hidalgo County's forecasted employment growth of over 2 percent.

Table 4-5. McAllen Area Wage and Salary Employment

Year	Employment (YTD Avg.)	CAGR
2006	204,500	-
2007	211,000	3.2%
2008	213,500	1.2%
2009	220,200	3.1%
2010	220,382	0.1%
2011	224,108	1.7%
2012	228,750	2.1%
2013	232,260	1.5%
2014	242,442	4.4%
2015	249,100	2.7%
2016	255,140	2.4%
2017	257,885	1.1%
2018	262,750	1.9%
2019	270,925	3.1%

Source: McAllen Chamber of Commerce



Source: McAllen Chamber of Commerce

Figure 4-11. McAllen Area Wage and Salary Employment Trend

4.3.3. Employment at the TAZ Level

As with population, EPS provided C&M with disaggregated TAZ-level employment projections. Figure 4-12 to Figure 4-15 illustrate TAZ-level employment CAGRs for Hidalgo and Cameron Counties and the Project corridor for the years 2018–2025 and 2025–2045. In almost all years, employment growth around the Project is at the high end of the estimated growth rates. In Hidalgo County, the areas estimated to experience high population growth are also projected to have high employment growth.

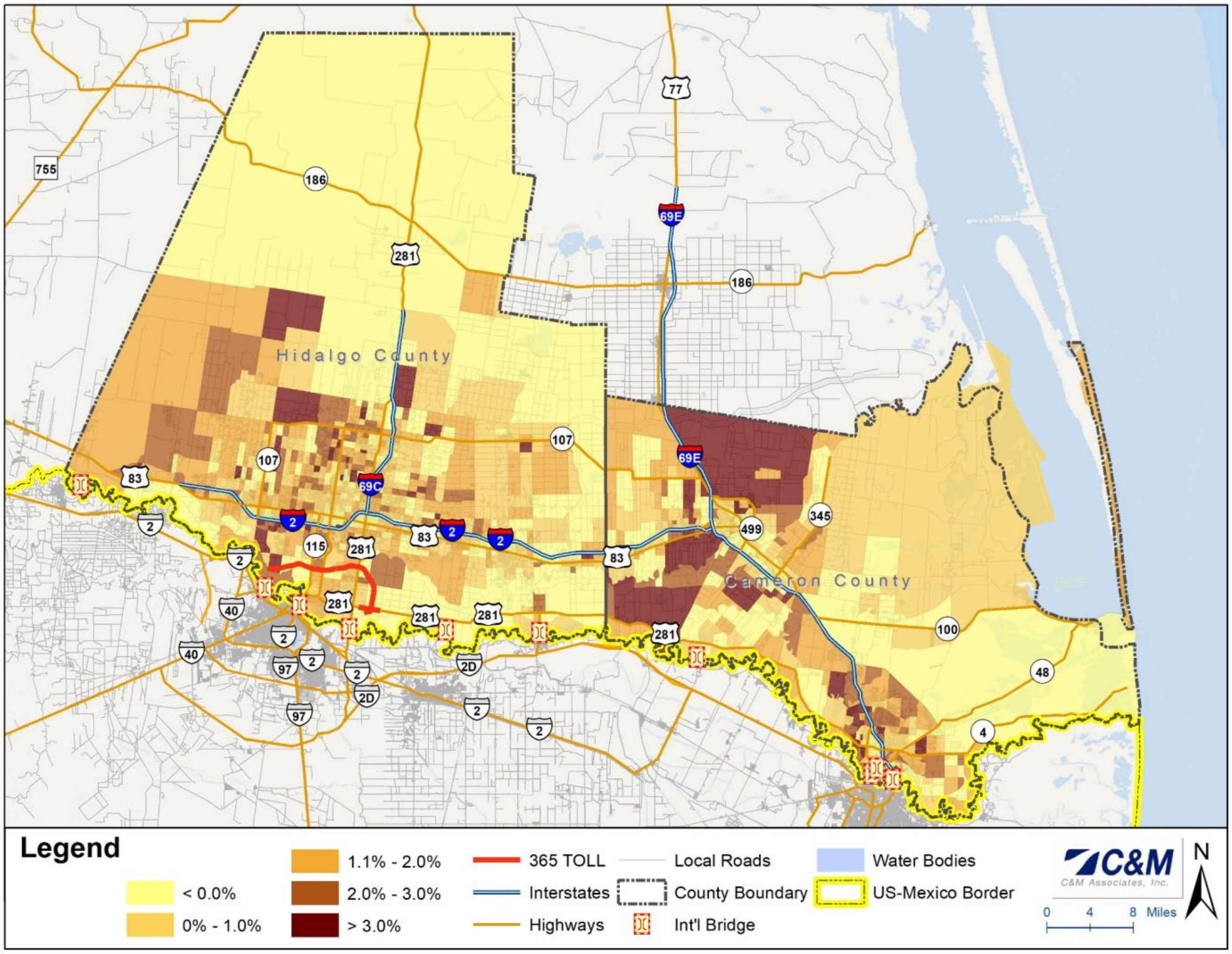


Figure 4-12. TAZ-Level Employment Growth (2018–2025 CAGR)

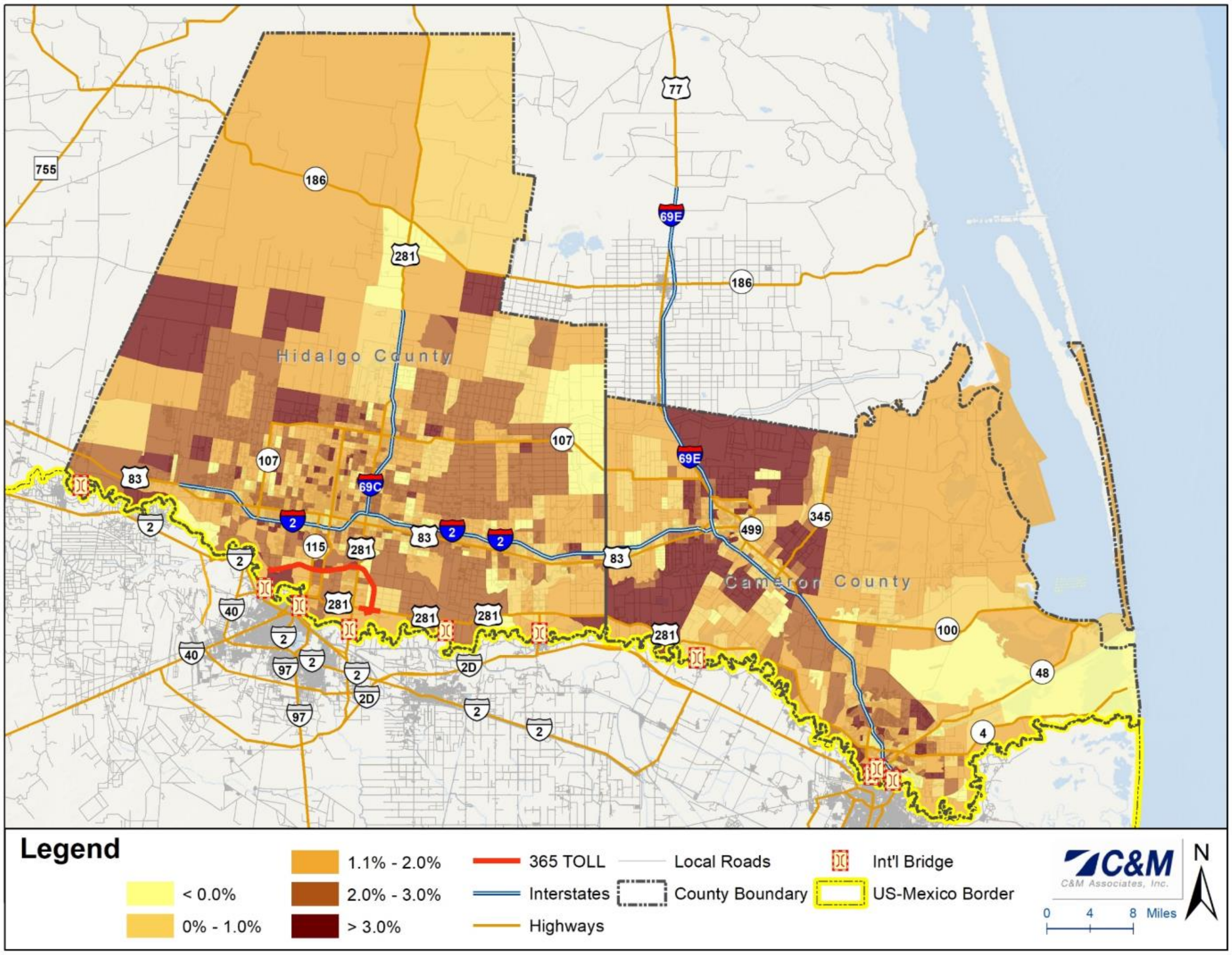


Figure 4-13. TAZ-Level Employment Growth (2025–2045 CAGR)

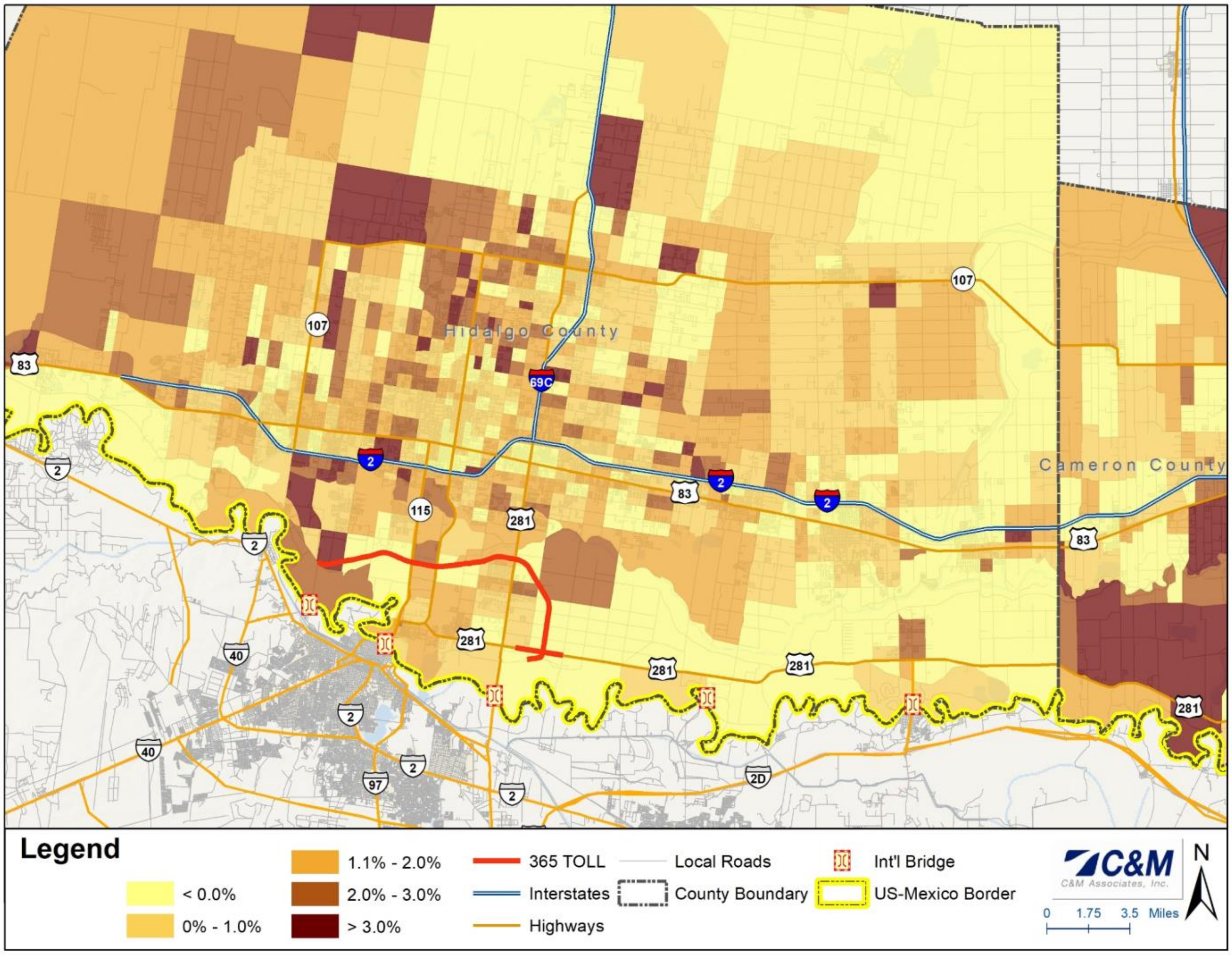


Figure 4-14. TAZ-Level Employment Growth – Project Corridor (2018–2025 CAGR)

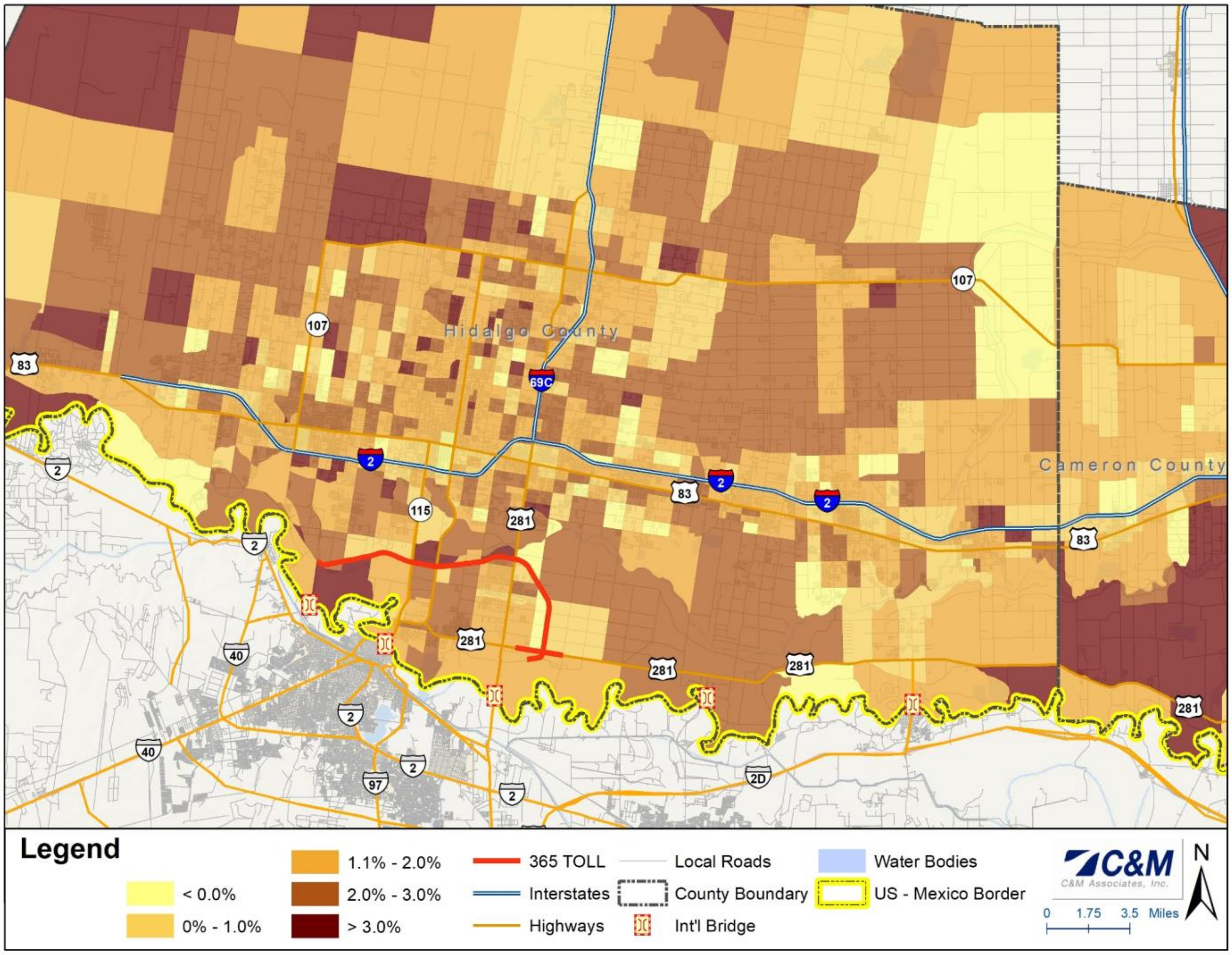


Figure 4-15. TAZ-Level Employment Growth – Project Corridor (2025–2045 CAGR)

4.4. Number of Households

As shown in Table 4-6, historical household growth was less consistent in Hidalgo County compared to Cameron County. Moreover, the total number of Households in Hidalgo County represent about 62 percent of the total households between both counties in 2018.

Table 4-6. Historical Household Trends and Growth Rates

Year	Number of Households		CAGR	
	Hidalgo County	Cameron County	Hidalgo County	Cameron County
2000	156,824	97,267	-	-
2010	212,743	115,579	3.1%	1.7%
2011	215,877	118,782	1.5%	2.8%
2012	222,849	121,179	3.2%	2.0%
2013	223,367	118,546	0.2%	-2.2%
2014	226,000	121,009	1.2%	2.1%
2015	225,692	122,468	-0.1%	1.2%
2016	234,716	120,499	4.0%	-1.6%
2017	239,825	123,024	2.2%	2.1%
2018	237,323	124,812	-1.0%	1.5%
2019	247,544	129,307	4.3%	3.6%

Source: ACS 1-Year Estimates

4.4.1. Households Projections

C&M reviewed different sources of household projections, such as the LRGV TDM, Texas SAM, and the C&M forecast used in the previous T&R study ("C&M 2016") to evaluate EPS's growth estimates. EPS's Medium forecast was adopted for C&M's updated forecast.

As presented in Table 4-7, the EPS Medium scenario's CAGR in Hidalgo County is 0.6 percent higher in the short-term forecast (2018–2025) compared to the previous C&M 2016 estimates. However, in the long term, EPS's Medium estimates have the lowest CAGR of all presented sources. As a result, C&M's updated model inputs represent the most conservative estimates in terms of total numbers and growth rate in the long term compared to the other sources.

The short-term CAGR for Cameron County is more conservative than Hidalgo County and becomes more aggressive in the long term. From 2018 to 2045, the LRGV TDM's CAGR is the highest with 2.5 percent growth, followed by Texas SAM with 1.9 percent growth during the same period. In addition, C&M's updated model inputs for the number of households presents the lowest estimates in terms of total household numbers.

Table 4-7. Household Projections by Source

County	Source	Household					
		2018	2025	2030	2035	2040	2045
Hidalgo	C&M Update	237,319	284,266	328,868	349,953	371,038	395,612
	CAGR	-	2.6%	3.0%	1.3%	1.2%	1.3%
	C&M 2016	257,386	294,728	324,197	348,386	372,574	396,763
	CAGR	-	2.0%	1.9%	1.4%	1.4%	1.3%
	EPS Low	237,319	281,076	324,524	344,088	363,652	384,426
	CAGR	-	2.4%	2.9%	1.2%	1.1%	1.1%
	EPS Medium	237,319	284,266	328,868	349,953	371,038	395,612
	CAGR	-	2.6%	3.0%	1.3%	1.2%	1.3%
	EPS High	237,319	288,370	334,651	357,574	380,497	408,094
	CAGR	-	2.8%	3.0%	1.3%	1.3%	1.4%
	W&P	262,291	305,152	332,135	357,474	382,565	410,236
	CAGR	-	2.2%	1.7%	1.5%	1.4%	1.4%
	LRGV TDM	265,024	319,042	357,362	395,681	434,001	472,476
	CAGR	-	2.7%	2.3%	2.1%	1.9%	1.7%
	Texas SAM	249,542	295,414	327,911	360,407	400,771	441,134
	CAGR	-	2.4%	2.1%	1.9%	2.1%	1.9%
Cameron	C&M Update	124,810	131,198	137,762	149,354	160,945	171,129
	CAGR	-	0.7%	1.0%	1.6%	1.5%	1.2%
	C&M 2016	127,879	140,550	147,073	160,349	173,625	186,901
	CAGR	-	1.4%	0.9%	1.7%	1.6%	1.5%
	EPS Low	124,810	130,346	135,067	145,656	156,244	167,439
	CAGR	-	0.6%	0.7%	1.5%	1.4%	1.4%
	EPS Medium	124,810	131,198	137,762	149,354	160,945	171,129
	CAGR	-	0.7%	1.0%	1.6%	1.5%	1.2%
	EPS High	124,810	132,349	140,939	154,432	167,925	179,613
	CAGR	-	0.8%	1.3%	1.8%	1.7%	1.4%
	W&P	141,965	157,463	165,647	172,319	178,249	184,759
	CAGR	-	1.5%	1.0%	0.8%	0.7%	0.7%
	LRGV TDM	141,356	175,553	199,986	224,420	248,854	273,237
	CAGR	-	3.1%	2.6%	2.3%	2.1%	1.9%
	Texas SAM	132,298	154,225	168,980	183,735	201,643	219,550
	CAGR	-	2.2%	1.8%	1.7%	1.9%	1.7%

Note: *Household data for EPS/C&M Updated in 2035 was calculated based on linear interpolation between model years

4.4.2. Households at the TAZ Level

Figure 4-16 to Figure 4-19 illustrate TAZ-level household CAGRs for Hidalgo and Cameron Counties and the Project corridor for the years 2018–2025 and 2025–2045. Similar to population projections, the higher household growth rates are concentrated more in the periphery of Hidalgo County's urban centers. Furthermore, high household growth can be observed in all years around the western end of the Project.

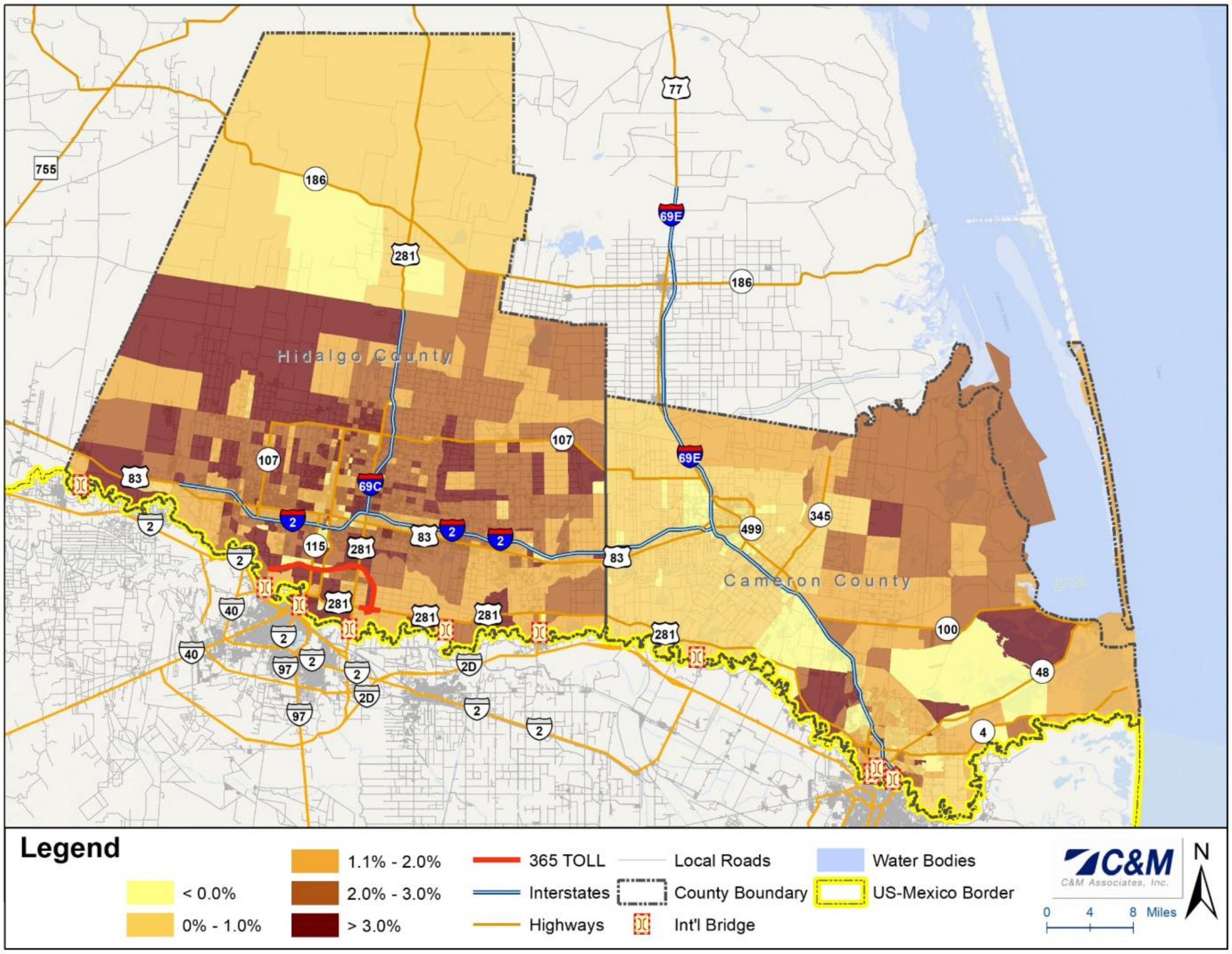


Figure 4-16. TAZ-Level Household Growth (2018–2025 CAGR)

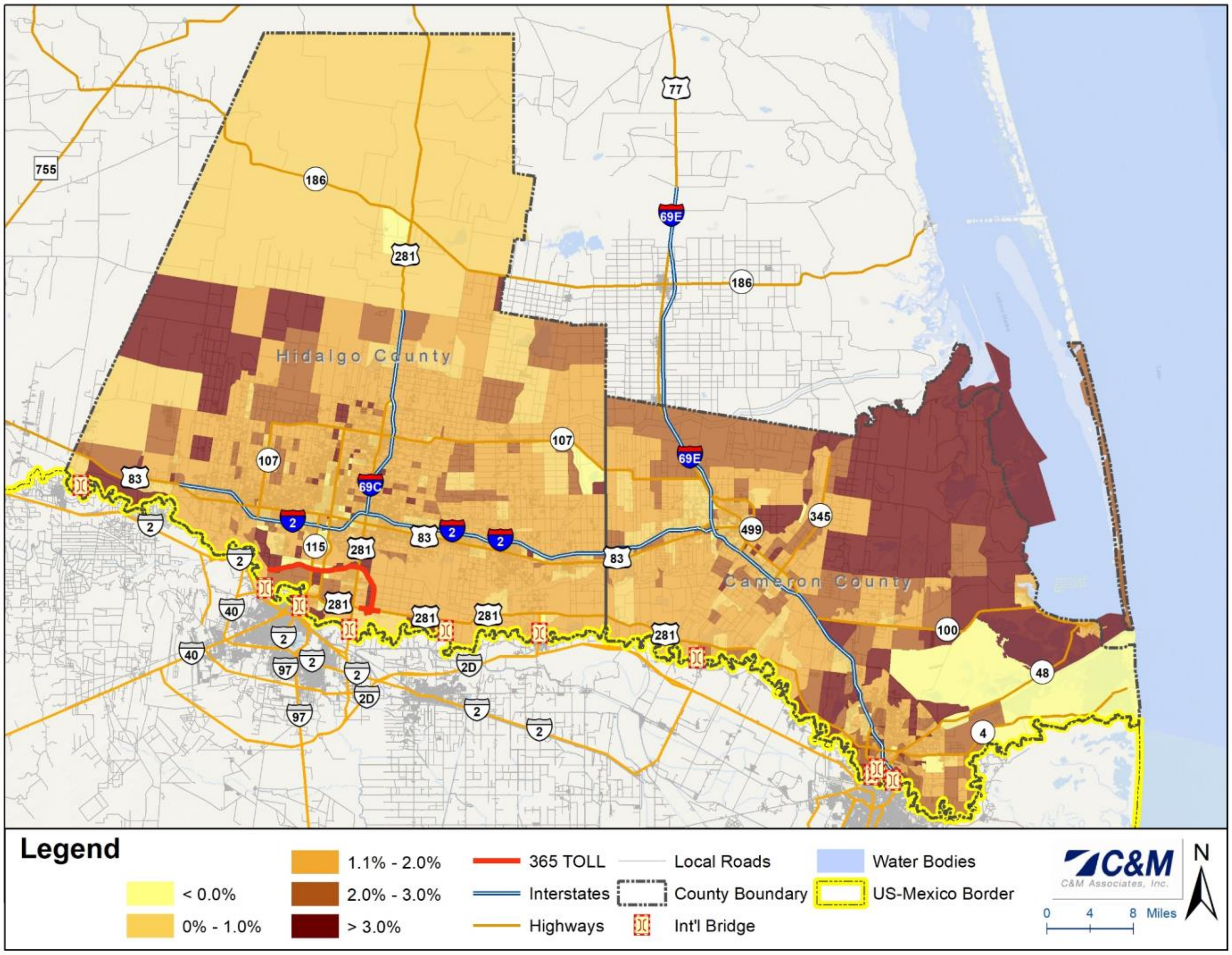


Figure 4-17. TAZ-Level Household Growth (2025–2045 CAGR)

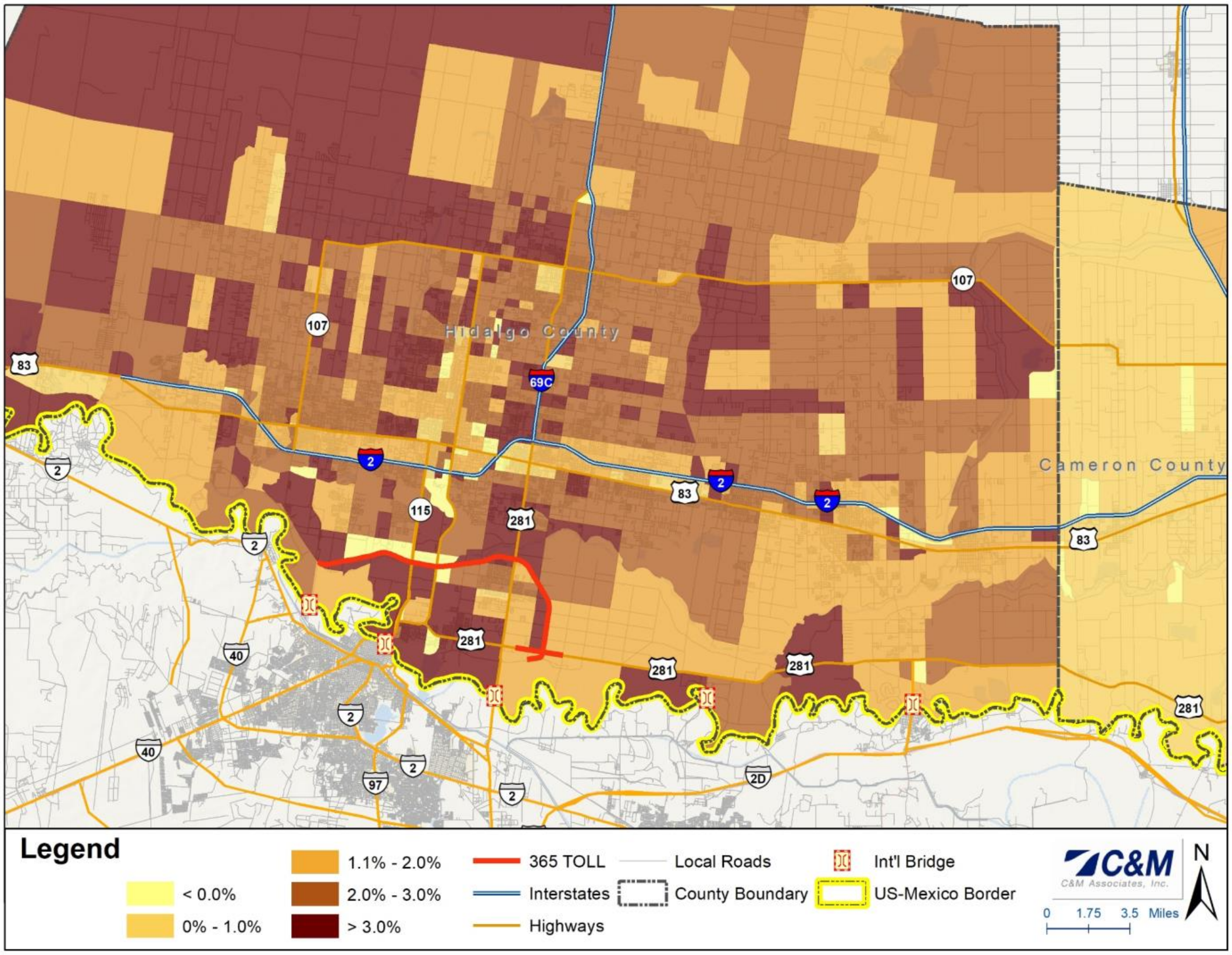


Figure 4-18. TAZ-Level Household Growth – Project Corridor (2018–2025 CAGR)

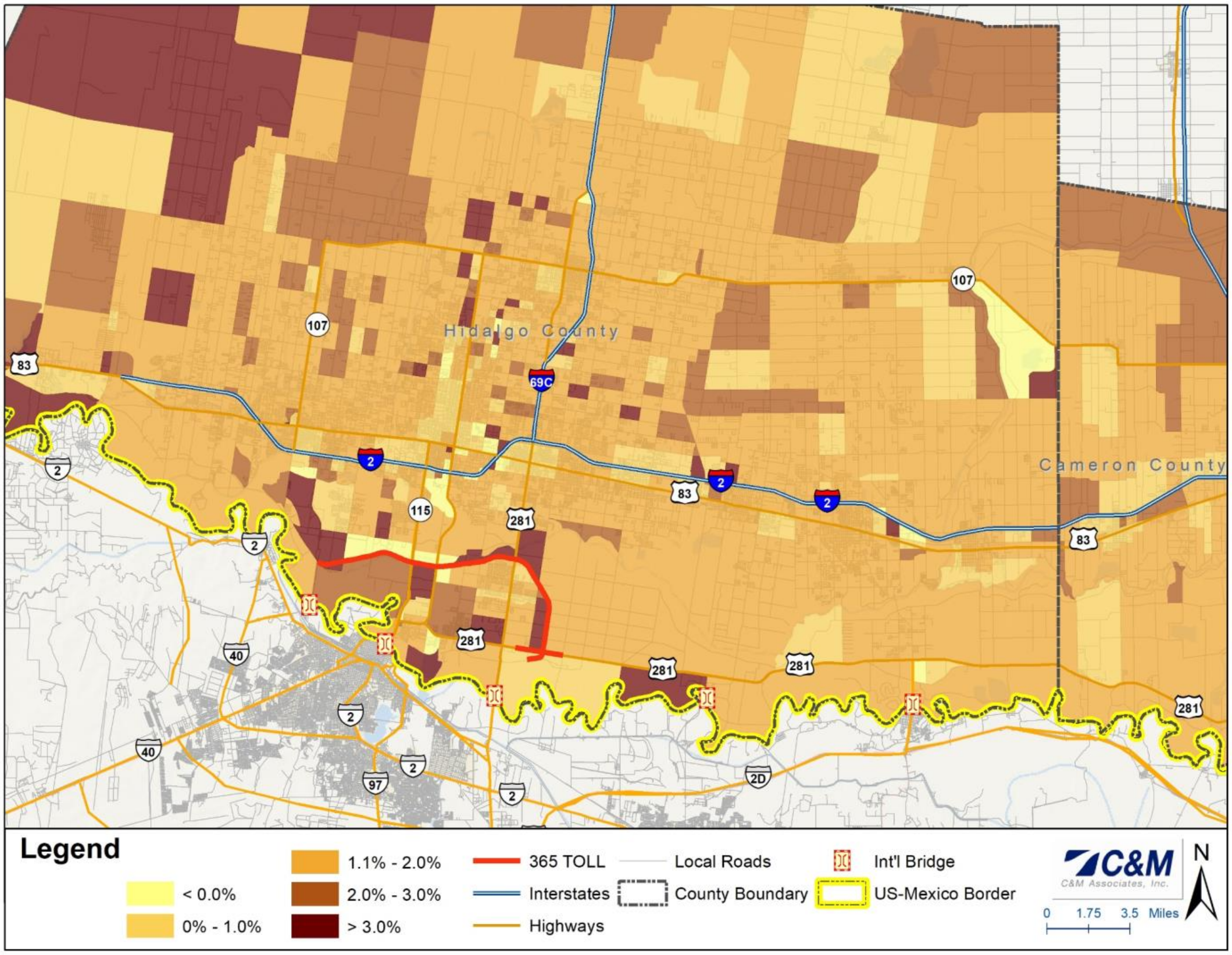


Figure 4-19. TAZ-Level Household Growth – Project Corridor (2025–2045 CAGR)

4.5. Median Household Income Trends and Projections

Median household income is another socioeconomic variable typically used as an input in travel demand modeling. Income plays an important role in travelers' decisions regarding toll facilities, as it influences their willingness to pay a toll. Hidalgo County median household income data were obtained from a variety of sources. Historical trends, current figures, and future projections were compared to ensure consistency. C&M uses median household income as input for trip generation and the toll diversion model (see Chapters 5 and 6).

Table 4-8 presents historical median household income (in nominal dollars) for Hidalgo and Cameron Counties based on ACS 1-Year Estimates.

Table 4-8. Median Household Income Trends and Growth Rates

Year	Median Household Income (Nominal Dollars)		CAGR	
	Hidalgo County	Cameron County	Hidalgo County	Cameron County
2010	$33,732	$31,736	-	-
2011	$31,077	$32,070	-7.9%	1.1%
2012	$33,761	$30,953	8.6%	-3.5%
2013	$35,098	$34,374	4.0%	11.1%
2014	$34,801	$32,093	-0.8%	-6.6%
2015	$35,730	$34,074	2.7%	6.2%
2016	$36,176	$37,061	1.2%	8.8%
2017	$37,106	$36,975	2.6%	-0.2%
2018	$39,165	$38,378	5.5%	3.8%
2019	$41,800	$41,123	6.7%	7.2%

Source: US Census data from ACS 1-Year Estimates

4.5.1. Median Household Income Projections

Table 4-9 shows the median household income projections (in nominal dollars) and CAGRs by source. Again, there are some definitional differences between sources that result in different absolute projections. Nevertheless, the general growth trend across sources is a higher CAGR in the short term and a lower CAGR in the long term. The only exception is the Texas SAM, where the long-term estimates indicate higher CAGRs in Hidalgo County for the final model years.

Table 4-9. Hidalgo County 2018 Median Household Income – Comparison by Source

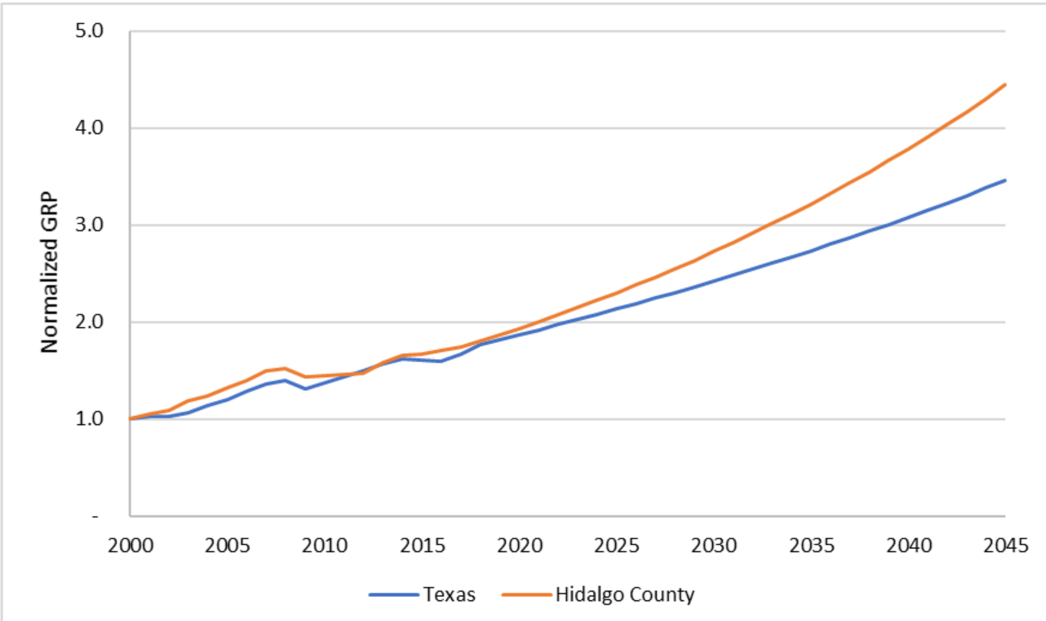
County	Source	Median Household Income					
		2018	2025	2030	2035	2040	2045
Hidalgo	C&M Update	$41,940	$50,337	$56,321	$61,838	$67,355	$73,015
	CAGR	-	2.6%	2.3%	1.9%	1.7%	1.6%
	EPS	$41,940	$50,337	$56,321	$61,838	$67,355	$73,015
	CAGR	-	2.6%	2.3%	1.9%	1.7%	1.6%
	LRGV TDM	$38,428	$47,122	$53,622	$60,121	$66,620	$75,507
	CAGR	-	3.0%	2.6%	2.3%	2.1%	2.5%
	Texas SAM	$36,677	$43,317	$49,871	$56,424	$64,772	$73,120
	CAGR	-	2.4%	2.9%	2.5%	2.8%	2.5%
Cameron	C&M Update	$40,744	$48,216	$53,535	$58,383	$63,231	$68,202
	CAGR	-	2.4%	2.1%	1.7%	1.6%	1.5%
	EPS	$31,596	$48,216	$53,535	$58,383	$63,231	$68,202
	CAGR	-	6.2%	2.1%	1.7%	1.6%	1.5%
	LRGV TDM	$31,596	$38,831	$44,211	$49,591	$54,972	$62,338
	CAGR	-	3.0%	2.6%	2.3%	2.1%	2.5%
	Texas SAM	$33,075	$38,166	$43,276	$48,387	$54,576	$60,766
	CAGR	-	2.1%	2.5%	2.3%	2.4%	2.2%

Note: *Median Income data for EPS/C&M Updated in 2035 were calculated based on linear interpolation between model years.

4.6. Gross Regional Product

Gross Domestic Product (GDP) and its regional equivalent, Gross Regional Product (GRP), are widely seen as the most comprehensive measures of economic activity. An industry's GRP, or its value added, is calculated as the sum of incomes earned by labor and capital and the costs incurred in the production of goods and services.

Figure 4-20 and Table 4-10 present data from W&P regarding historical and projected GRP trends for Hidalgo County—representative of the Project's study area—and the state of Texas. Consistent with its growing economy, Hidalgo County's GRP reached over $21.5 billion (in 2012 dollars) in 2018. The Great Recession did not impact Hidalgo County as strongly as it did the state of Texas as a whole. Indeed, Hidalgo County's GRP is growing faster than that of Texas, with 2018–2045 CAGRs of 3.4 and 2.5 percent, respectively.



Source: W&P

Figure 4-20. Historical and Projected GRP by Region (Normalized to 2000)

Table 4-10. Historical and Projected GRP by Region (in 2012 Dollars)

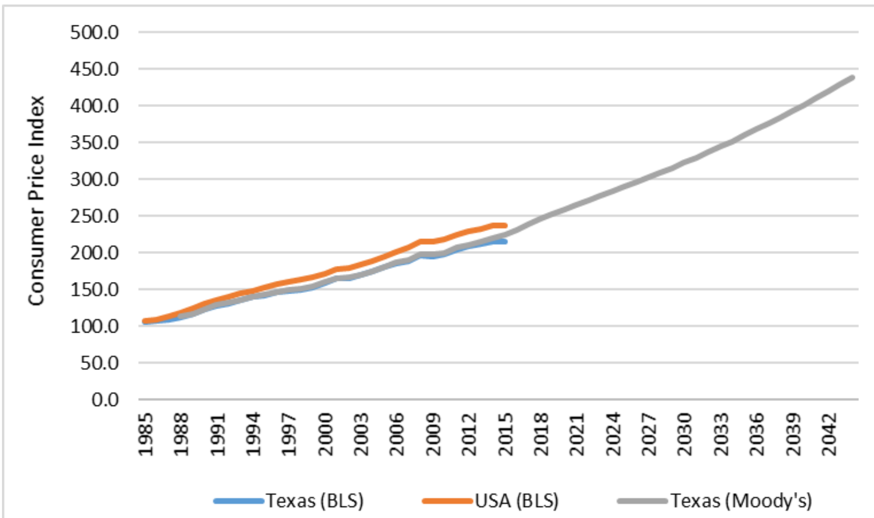
Region	Gross Regional Product (in millions of 2012 Dollars)							
	2000	2018	2020	2025	2030	2035	2040	2045
Texas	$944,425	$1,666,785	$1,763,050	$2,013,600	$2,284,197	$2,580,838	$2,907,834	$3,270,981
CAGR	-	3.2%	2.8%	2.7%	2.6%	2.5%	2.4%	2.4%
Hidalgo County	$11,996	$21,591	$23,198	$27,622	$32,695	$38,577	$45,396	$53,300
CAGR	-	3.3%	3.7%	3.6%	3.4%	3.4%	3.3%	3.3%

Source: W&P

4.7. Consumer Price Index

Consumer Price Index (CPI) measures the average price of a basket of consumer goods and services purchased by households, as well as the price change for a constant market quantity of goods and services from one period to the next within the same region. The annualized percent change in CPI is a means of estimating inflation. Economic indicators such as GDP are typically forecasted in nominal terms; CPI is used to deflate this forecast to the dollar value of a base year so that the real growth in such indicators can be better understood.

Figure 4-21 illustrates historical CPI for the state of Texas and the United States from the BLS and forecasted CPI for Texas by Moody's. C&M used percent changes in CPI projections provided by Moody's to obtain the real growth in per capita GDP and, in turn, real growth in toll rates for the Project throughout the forecast period.



Source: Moody's, BLS

Figure 4-21. Historical and Projected CPI in Texas and the U.S.

Comparing the historical growth pattern of CPI to Moody's future projections, Table 4-11 shows that Moody's long-term (2015–2045) forecasted CAGR of 2.1 percent in Texas is similar to the long-term (1985–2015) historical CAGR of 2.4 percent. Moody's short-term growth estimates are also similar to the corresponding short-term historical growth rates.

Table 4-11. CPI CAGR Comparisons

Year		Texas (BLS)	USA (BLS)	Texas (Moody's)
From	To			
1985	2015	2.4%	2.7%	-
1995	2015	2.1%	2.2%	-
2005	2015	1.8%	2.0%	-
2010	2015	1.7%	1.7%	-
2015	2020	-	-	1.5%
2015	2025	-	-	2.0%
2015	2035	-	-	2.1%
2015	2045	-	-	2.1%

Source: Moody's, BLS

4.8. McAllen Economic Indicators

The following section summarizes major economic indicators for the city of McAllen, as published by the McAllen Chamber of Commerce. Since McAllen is the largest city in Hidalgo County, these indicators largely represent the economic conditions of Hidalgo County; as such, these indicators were used by C&M within the modeling process.

4.8.1. Average Home Sales Price

Table 4-12 and Figure 4-22 present the average home sales price (in nominal dollars) for the McAllen area. After experiencing a decrease during the Great Recession, the average home sales price has grown since 2009, increasing from $119,352 in 2009 to $167,853 in 2019 with a CAGR of 3.5 percent. This variable was not used directly within the travel demand modeling process, but it serves as a further indicator of the economic growth in this area.

Table 4-12. McAllen Area Average Home Sales Price (in Nominal Dollars)

Year	Sales Price (YTD Avg.)	CAGR
2006	$127,972	-
2007	$128,872	0.7%
2008	$122,584	-4.9%
2009	$119,352	-2.6%
2010	$122,399	2.6%
2011	$125,714	2.7%
2012	$127,010	1.0%
2013	$133,362	5.0%
2014	$135,667	1.7%
2015	$140,842	3.8%
2016	$147,360	4.6%
2017	$153,640	4.3%
2018	$159,671	3.9%
2019	$167,853	5.1%

Source: McAllen Chamber of Commerce

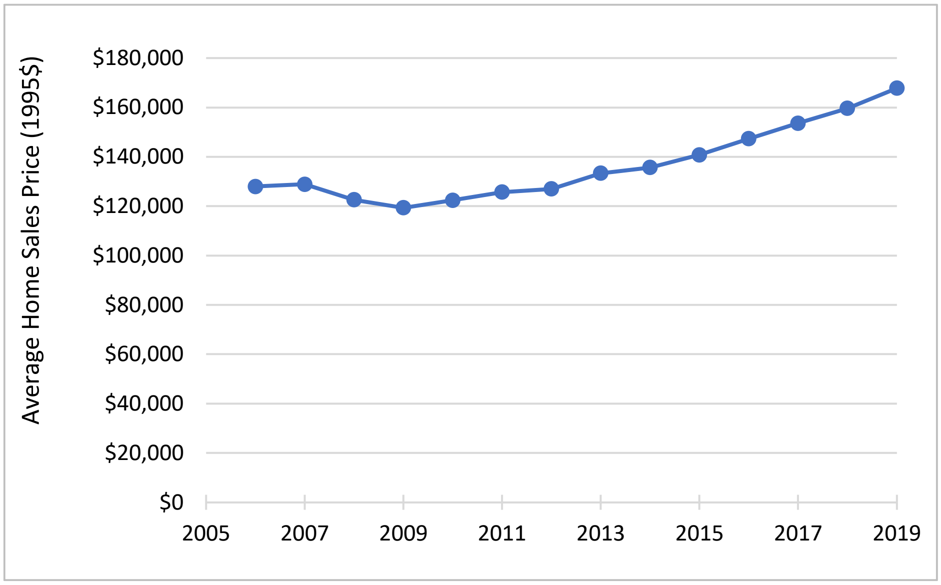


Figure 4-22. McAllen Area Average Home Sales Price Trends

4.8.2. Unemployment Rate

Table 4-13 and Figure 4-23 present the unemployment rate for the McAllen area from 2006 to 2019. Following several years of increasing unemployment, which reached a peak of 12.1 percent in 2011, the unemployment rate has since decreased every year, reaching 4.2 percent in 2019, which is the lowest unemployment rate observed during this time period.

As of September 2020, the seasonally unadjusted unemployment rate in the McAllen area reached a high of 12.8 percent due to the COVID-19 pandemic. In the leisure and hospitality industries, the number of jobs decreased 16.1 percent compared to 2019, despite the recent 2.1 percent gain from August to September.[15]

Table 4-13. McAllen Area Unemployment Rate

Year	Unemployment (YTD Avg.)
2006	7.1%
2007	6.5%
2008	7.3%
2009	10.6%
2010	11.8%
2011	12.1%
2012	11.0%
2013	10.8%
2014	9.1%
2015	4.8%
2016	4.8%
2017	5.3%
2018	4.7%
2019	4.2%

Source: McAllen Chamber of Commerce

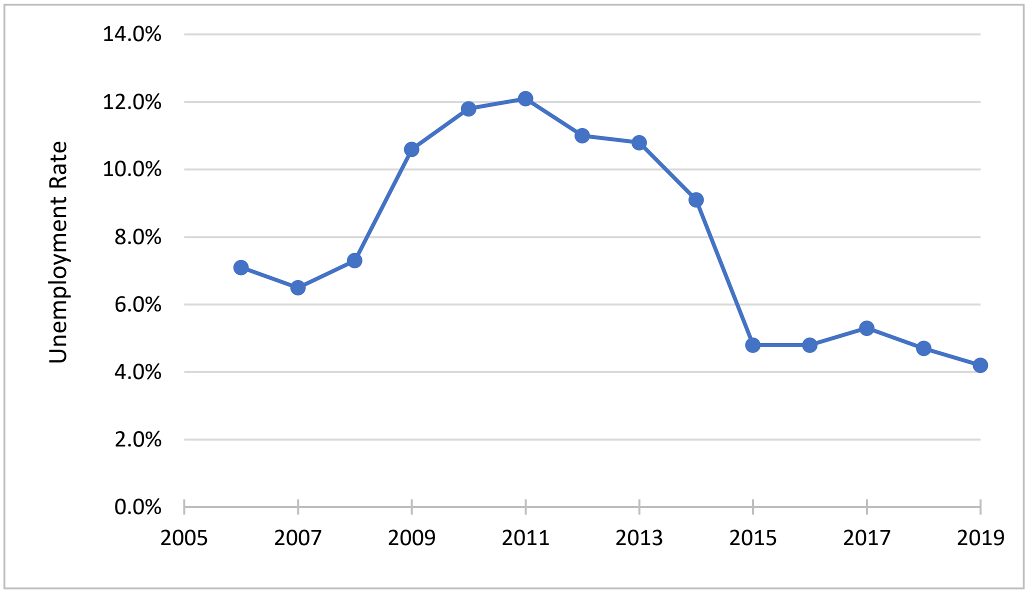


Figure 4-23. McAllen Area Unemployment Rate Trend

4.8.3. New Home Construction

The McAllen area's new home permits from 2006 to 2019 are presented in Table 4-14 and Figure 4-24. New home construction has decreased since the pre-Great Recession period, though it has exhibited some positive growth in recent years, increasing from 1,119 in 2013 to 1,329 in 2015 and later from 1,378 in 2017 to 1,492 in 2019. This parameter cannot be used directly within the travel demand modeling procedure, but it supports the overall picture of positive trends for economic indicators within this region.

Table 4-14. McAllen Area New Home Permits

Year	New Home Permits	CAGR
2006	3,285	-
2007	2,405	-26.8%
2008	1,270	-47.2%
2009	1,216	-4.3%
2010	1,536	26.3%
2011	1,295	-15.7%
2012	1,142	-11.8%
2013	1,119	-2.0%
2014	1,218	8.8%
2015	1,329	9.1%
2016	1,394	4.9%
2017	1,378	-1.1%
2018	1,411	2.4%
2019	1,492	5.7%

Source: McAllen Chamber of Commerce

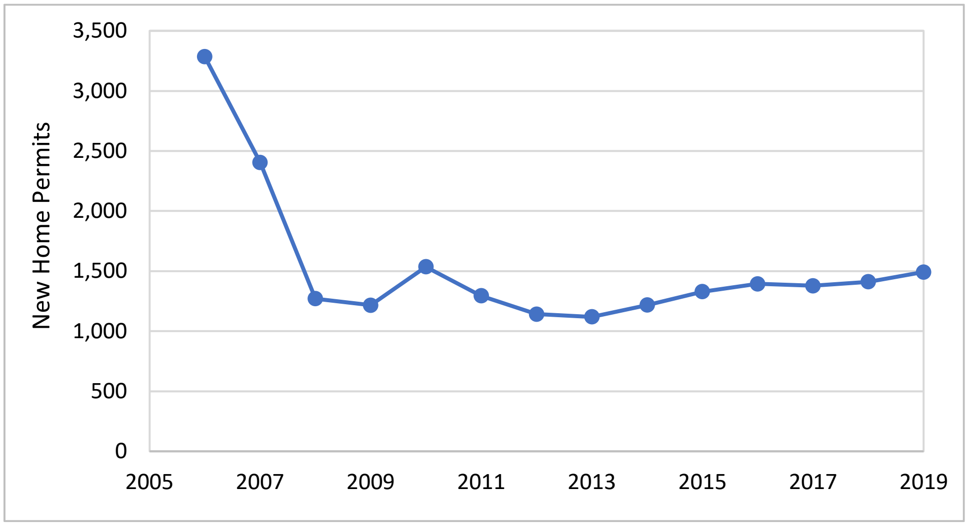
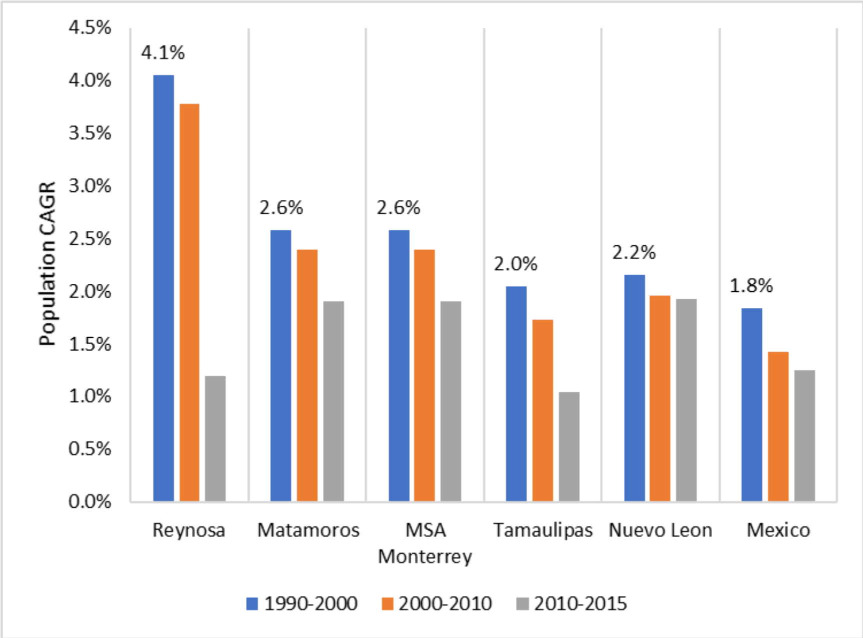


Figure 4-24. McAllen Area New Home Permit Trends

4.9. Cross-Border Economic Activity

Hidalgo County and northern Mexico represent a highly-integrated economic unit. Residents from both the United States and Mexico travel across the border every day in search of consumer goods as well as educational and employment opportunities. Businesses ship raw materials and unfinished products to manufacturing facilities throughout the region, where they await additional processing, final assembly, and eventual distribution. Therefore, socioeconomic trends in Mexico and the border region have a profound impact on activity within Hidalgo County, stimulated in large part by the fast-growing Mexican city of Reynosa just across the border.

Figure 4-25 compares Reynosa's recent population boom with the populations of other major urban areas in Mexico, as well as with the state of Tamaulipas and Mexico as a whole.[16] The population data for Reynosa shows persistent dynamic growth. Reynosa's population exhibited a CAGR of 4.1 percent from 1990 to 2000, 3.8 percent from 2000 to 2010, and 1.2 percent from 2010 to 2015.[5] Although a drop in growth is observed from 2010 to 2015, public entities estimate that growth could register an annual average increase of 1.4 percent in the municipality of Reynosa when final 2020 data are available.[4]

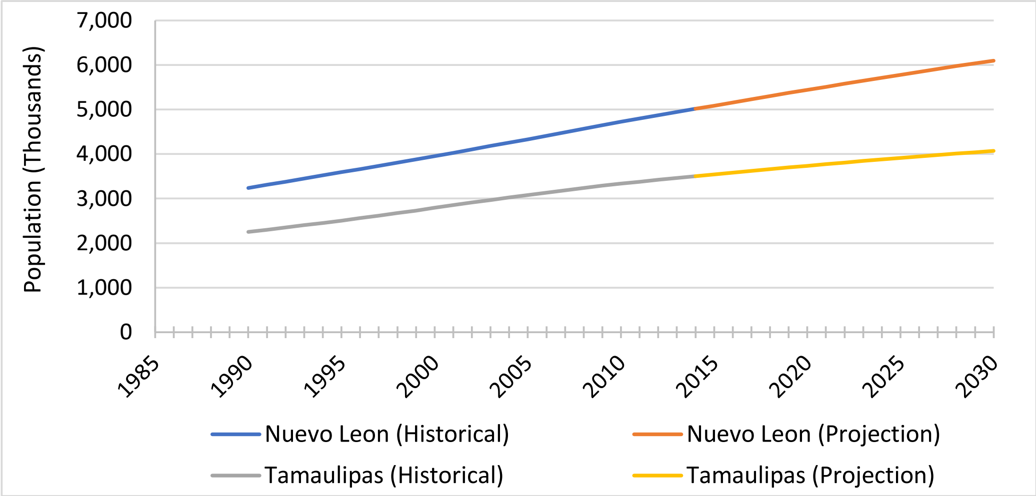


Source: INEGI, CONAPO

Figure 4-25. Population CAGR in Representative Mexican Regions (1990–2015)

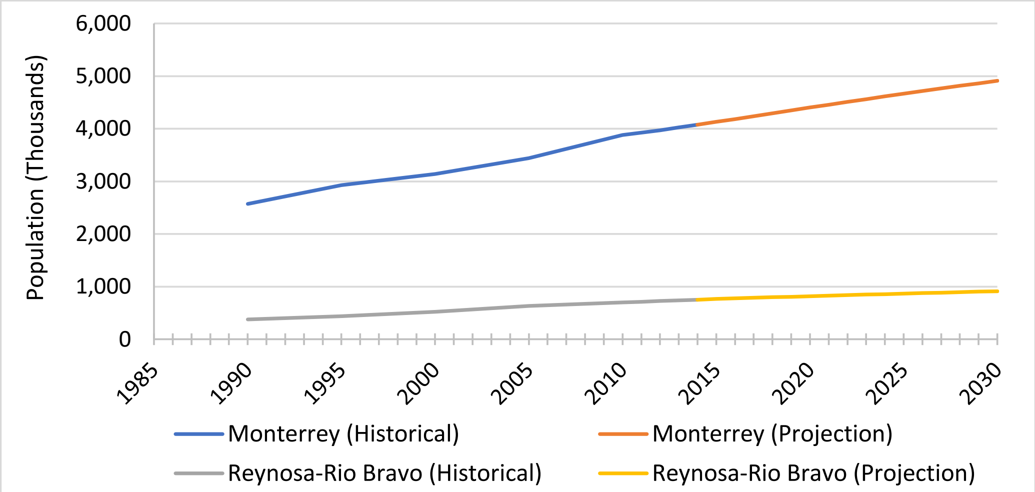
Figure 4-26 through Figure 4-28 represent historical and projected population data obtained from CONAPO and INEGI for selected Mexican states, metropolitan areas (MPA), and cities, respectively. In the state of Nuevo Leon, population is projected to grow at a CAGR of 1.2 percent from 2014 to 2030.[4] Similar growth rates are projected for Reynosa and the MPAs of Reynosa–Rio Bravo and Monterrey.

Given the economic interdependency of the Mexico/Texas border region, it can be safely assumed that the high and continuous population growth on the Mexican side of the border will translate into economic growth for Hidalgo County.



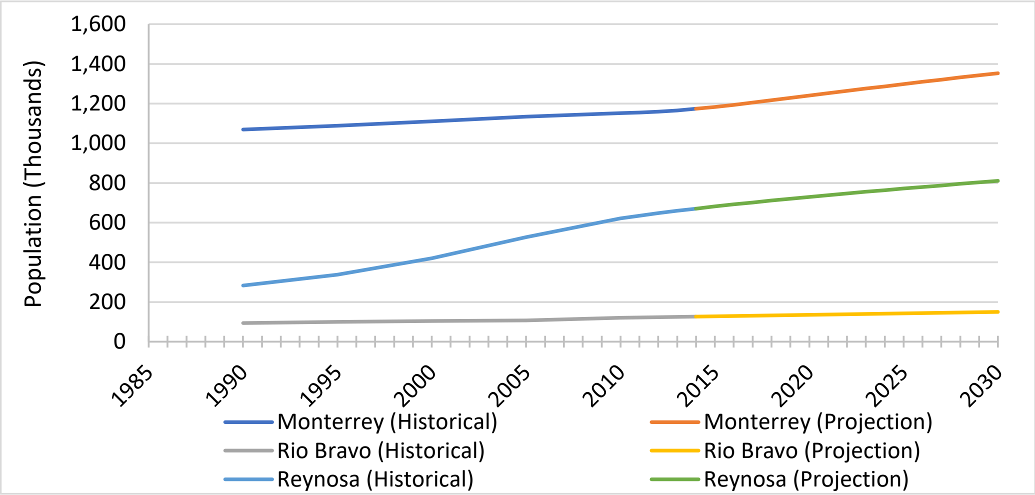
Source: CONAPO

Figure 4-26. Historical and Projected Population for Selected Mexican States



Source: CONAPO

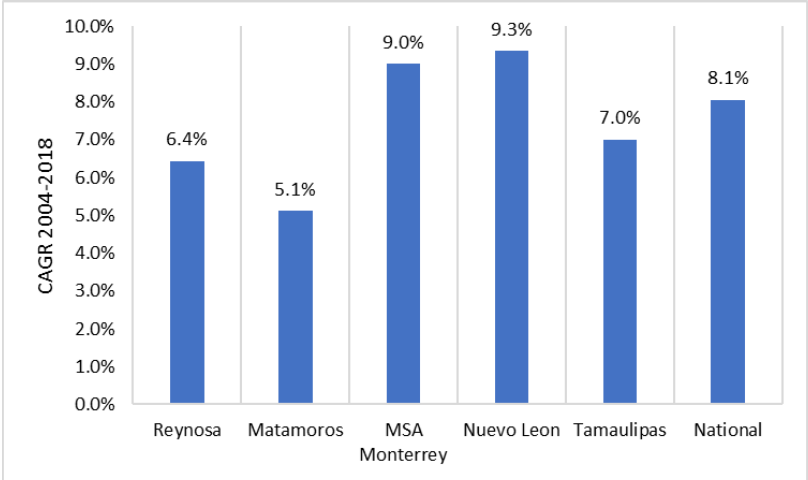
Figure 4-27. Historical and Projected Population for Selected Mexican MPAs



Source: CONAPO

Figure 4-28. Historical and Projected Population for Selected Mexican Cities

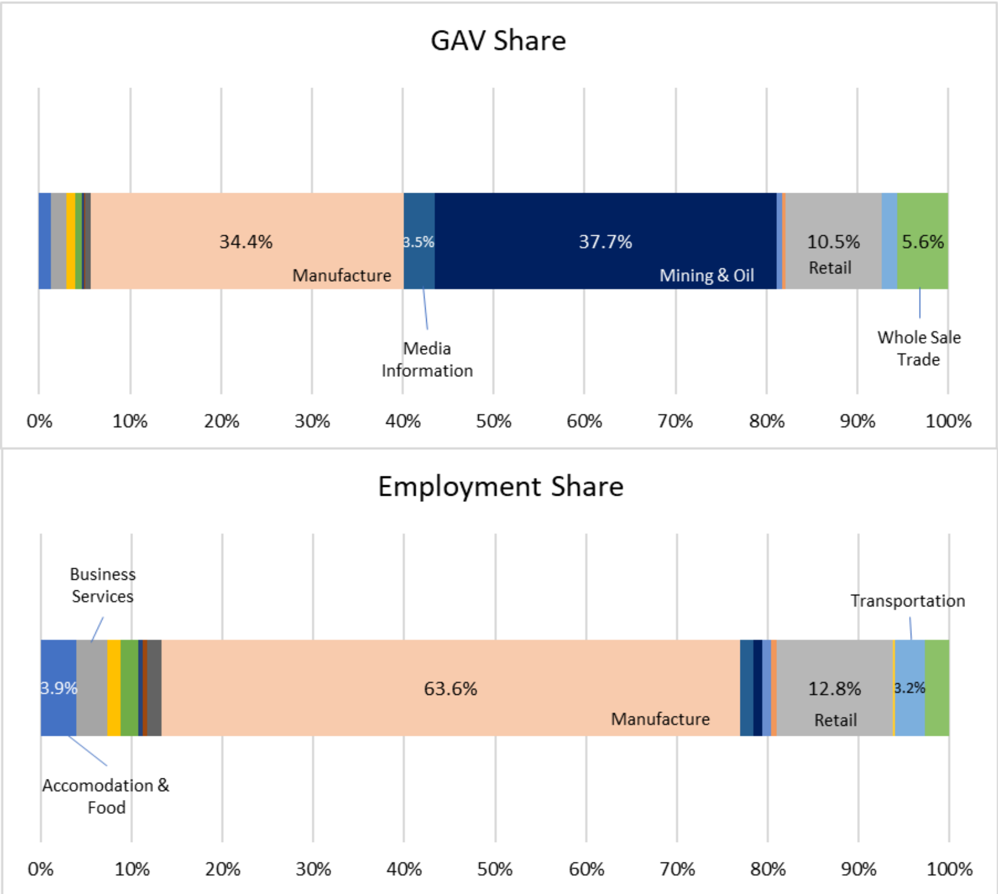
Gross Added Value (GAV) is a measure of the net value of the production of a region and, therefore, of its economy.[17] As shown in Figure 4-29, the growth of GAV in Reynosa has been lower than the state's growth, with Tamaulipas exhibiting a 2004–2018 CAGR of 6.4 percent. In contrast, the Nuevo León region's CAGR of 9.3 percent exceeds the national average of 8.1 percent.[6]



Source: INEGI Economic Census

Figure 4-29. Gross Added Value (GAV) CAGR in Representative Mexican Regions (2004–2018)

Figure 4-30 illustrates the main economic activities in Reynosa in relation to GAV and employment. In terms of value, the manufacturing activities and mining and petroleum together make up more than 70 percent of the GAV of the municipality. However, in terms of employment, the sectors with the highest shares are manufacturing and retail, with 63.6 percent and 12.8 percent, respectively.

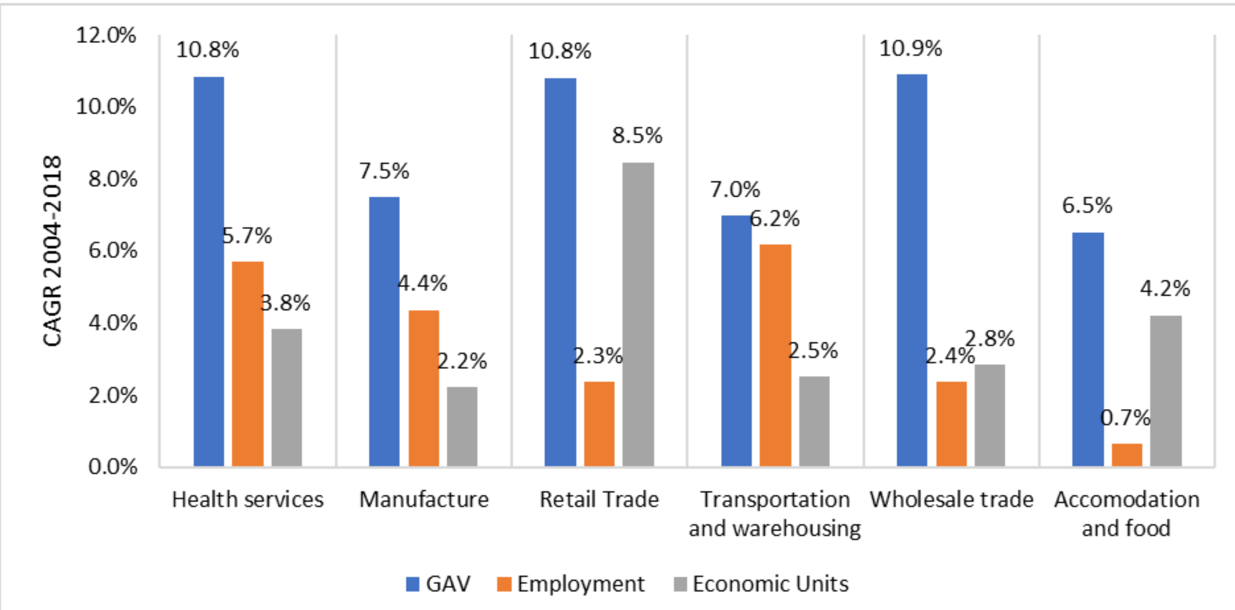


Source: INEGI Economic Census

Figure 4-30. Relevance of Economic Sectors in Reynosa (2018)

The growth dynamics of the key sectors of Reynosa's economy are illustrated in Figure 4-31. There is a greater supply of retail products on the Mexican side of the border; this is reflected in the growth of sales in the sector in recent years. Similarly, the accelerated growth of Health Services is explained by the so-called “medical tourism” that exists in border cities and attracts the demand for services at lower prices.

The average annual growth of GAV in the manufacturing sector from 2004 to 2018 was 7.5 percent. However, activities such as Retail Trade, Wholesale Trade, and Health Services grew in the same period by over 10 percent annually. Nevertheless, manufacturing has remained relevant in terms of growth. Although the acceleration is lesser, there is a constant development of the sector that is observed in the growth of employment from 2004 to 2018 (CAGR 4.4%) and of the economic units (CAGR 2.2%).[6] Furthermore, the Transportation and Warehousing sector has a close relationship with manufacturing and importing/exporting products across the border, resulting in an average annual growth of 7 percent in GAV (6.2% in employment and 2.5% in economic units). Finally, the Accommodation and Food industry has increased annually by 4.2 percent in economic units, having the second most growth on this measure and a GAV CAGR of 6.5 percent.



Source: INEGI Economic Census

Figure 4-31. CAGR of Reynosa Economic Sector Indicators

Although the economy of the border has exhibited continuous growth in recent years, the effects of COVID-19 have impacted the prospects for growth and development in the short term and long term. Consequently, the International Monetary Fund (IMF) estimates that the expected impact for Mexican GDP in 2020 is a nearly 9 percent drop. Moreover, the recovery in the following years is expected to be gradual, with an increase of 3.5 percent in 2021 and 2022 and 2.3 percent in 2023. Table 4-15 shows in detail the prospects estimated by the IMF for Mexico in the latest World Economic Outlook (WEO).[18]

Table 4-15. GDP Forecast for Mexico

Year	Date of Estimation			
	October 2018	April 2019	October 2019	October 2020
2018	2.2%	2.0%	2.0%	2.0%
2019	2.5%	1.6%	0.4%	-0.3%
2020	2.7%	1.9%	1.3%	-9.0%
2021	2.9%	2.4%	1.9%	3.5%
2022	3.0%	2.6%	2.1%	2.3%
2023	3.0%	2.7%	2.3%	2.2%
2024	-	2.7%	2.4%	2.1%
2025	-	-	-	2.1%

Source: IMF World Economic Outlook

The impact of the COVID Effect on the U.S. economy is expected to be less than that of Mexico. According to the IMF, in 2020 the effect will be a 4.3 percent decrease in GDP. However, the recovery is estimated to be rapid in 2021 and 2022 with growth rates of 3.1 and 2.9 percent, respectively.

Table 4-16. GDP Forecast for the United States

Year	Date of Estimation			
	October 2018	April 2019	October 2019	October 2020
2018	2.9%	2.9%	2.9%	3.0%
2019	2.5%	2.3%	2.4%	2.2%
2020	1.8%	1.9%	2.1%	-4.3%
2021	1.7%	1.8%	1.7%	3.1%
2022	1.5%	1.6%	1.6%	2.9%
2023	1.4%	1.6%	1.6%	2.3%
2024	-	1.6%	1.6%	1.9%
2025	-	-	-	1.8%

Source: IMF World Economic Outlook

The importance of the Hidalgo County international bridge system for border crossing in the state of Texas is such that it served 16.3 percent of total passenger vehicle crossings and 15.8 percent of total commercial vehicle crossings in 2019, as shown in Table 4-17. Regarding commercial vehicle crossings, Hidalgo County is behind only Webb County (52.9%) and El Paso (17.7%).[13] In addition, from 2010 to 2019, Hidalgo County incorporated an average of 3.9 percent annual growth in commercial vehicle crossings; this ranks it in second place in terms of growth among the major POE Systems (El Paso, Webb, Cameron County).

Table 4-17. Texas Border Crossings by Port of Entry

POE System	2010-2019 CAGR		2019 Share	
	PV	CV	PV	CV
Cameron County	-0.3%	3.7%	14.0%	6.4%
Val Verde County	3.0%	3.4%	5.0%	1.7%
Maverick County	1.7%	7.3%	8.9%	4.0%
El Paso County	0.7%	1.2%	34.1%	17.7%
Hidalgo County	-1.8%	3.9%	16.3%	15.8%
Webb County	0.5%	4.5%	15.9%	52.9%
Presidio County	0.0%	1.0%	2.1%	0.2%
Starr County	2.5%	7.5%	3.7%	1.2%

Note: PV = passenger vehicle; CV = commercial vehicle
Source: BTS

On March 21, 2020, due to COVID-19, travel policies were implemented for border crossings along the U.S./Mexico border. Per federal authorities, crossings were limited to essential trips for both passenger vehicle and commercial vehicle crossings. These restrictions generally affected cross-border traffic flow in the region. Table 4-18 shows a monthly percentage comparison between 2020 and 2019. The months exhibiting the greatest impact are April and May for both passenger vehicles and commercial vehicles. However, commercial vehicles have shown a faster recovery in the most recent months.

The Hidalgo County passenger vehicle border crossings for the year 2020 (between January and September) dropped by 35 percent due to the restriction of all but essential travel since March 2020. However, commercial vehicles have not been affected in the same way as passenger vehicles, even exhibiting growth of 0.4 percent compared to the same months of 2019.[13] Unlike the rest of the commercial border POEs, the Hidalgo POE is the only one with growth during 2020 despite the persisting pandemic.

Table 4-18. COVID-19 Restrictions Impact on PV & CV Northbound Border Crossings (BC)

Personal Vehicles Border Crossings: Monthly Covid-19 Effect (2020 vs 2019)											
POE System	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total (%)	Total (BC)
Cameron County	-2%	5%	-20%	-58%	-44%	-41%	-52%	-47%	-48%	-34%	-1,136,538
Val Verde County	-5%	-1%	-23%	-51%	-34%	-66%	-45%	-33%	-34%	-36%	-441,898
Maverick County	0%	5%	-25%	-56%	-51%	-44%	-47%	-46%	-51%	-35%	-745,142
El Paso County	-9%	-4%	-50%	-67%	-59%	-49%	-44%	-50%	-59%	-42%	-3,415,096
Hidalgo County	-13%	-10%	-33%	-59%	-41%	-39%	-48%	-39%	-42%	-35%	-1,360,205
Webb County	-9%	-3%	-28%	-58%	-42%	-38%	-46%	-45%	-52%	-36%	-1,369,455
Presidio County	-9%	-6%	-26%	-58%	-38%	-35%	-26%	-21%	-26%	-27%	-141,165
Starr County	-4%	-4%	-25%	-53%	-34%	-59%	-41%	-35%	-50%	-35%	-306,833
Commercial Vehicles Border Crossings: Monthly Covid-19 Effect (2020 vs 2019)											
POE System	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total (%)	Total (BC)
Cameron County	5%	7%	6%	-45%	-36%	-3%	-3%	-3%	13%	-7%	-16,139
Val Verde County	-6%	-7%	-12%	-42%	-41%	-9%	-4%	-5%	6%	-13%	-7,622
Maverick County	-3%	0%	0%	-25%	-32%	-1%	-6%	-5%	9%	-7%	-9,994
El Paso County	-5%	-5%	-80%	-81%	-85%	-78%	-77%	-78%	-76%	-62%	-372,056
Hidalgo County	1%	1%	0%	-12%	-10%	8%	-1%	6%	11%	0%	2,441
Webb County	-1%	2%	-1%	-23%	-32%	-3%	-1%	-1%	9%	-6%	-102,597
Presidio County	17%	13%	15%	-43%	-47%	-5%	-13%	-4%	-14%	-10%	-698
Starr County	26%	23%	26%	-9%	-8%	22%	17%	14%	41%	16%	6,376

Source: BTS

One of the key elements to understanding this outcome is observed in the border crossings of the Pharr–Reynosa International Bridge, where, despite the border restrictions, commercial vehicle crossings have been considerably higher in 2020 compared to 2019. The main products driving this growth are both produce industry imports (2018–2019 CAGR = 17%) and oil and gas exports that represent more than 50 percent of the bridge's exports. Overall, the growth from fiscal year 2019 to fiscal year 2020 (September to August) is 2 percent.

4.10. Border Demand Forecast

The Mexican border region has a direct impact on the Project in the form of border crossings. The following sections describe C&M's border crossing demand forecast methodology and results.

4.10.1. Existing Border Crossing Forecasts

Prior to updating C&M's existing border crossing demand forecast, C&M reviewed previous border crossing forecasts pertaining to the study area from public sources (i.e., federal and state governments) as well as private consultant studies. These estimates and their latest updates served as a reference point for the current study. The key findings of this review include the applied growth rates of the border crossing forecasts and comparisons of forecasted values to actual crossings, when possible.

Texas-Mexico Border Transportation Master Plan

TxDOT, in collaboration and partnership with the Border Trade Advisory Committee, is working with U.S. and Mexican agencies and stakeholders to develop the Border Transportation Master Plan (BTMP). C&M reviewed the estimates and projections expected for border crossings in the study region. The BTMP estimates approximately 112.4 million people crossing the Texas/Mexico border in 2050, an increase of 26.1 million (30%) from the 86.3 million people that crossed in 2019. The El Paso POE has the greatest number of forecasted passenger vehicle movements with 27.6 million in 2050. Three other POEs are forecast to accommodate more than 10 million people in passenger vehicles in 2050: Laredo, Brownsville, and Hidalgo. The Hidalgo POE's passenger vehicle CAGR is estimated to be 1.3 percent per year.[19]

Commercial vehicles are estimated to exhibit a CAGR of 3.4 percent from 2019 to 2050 on the Hidalgo POE. Part of the reason for this growth is the expected increase in trade in the LRGV area, where goods and services traded are expected to grow 4.7 percent annually from 2019 to 2050.[19]

LRGV Travel Demand Model

C&M received the full LRGV TDM and extracted the traffic volumes assigned to the POEs. The LRGV model is a planning tool for the RGVMPO 2020–2045 Metropolitan Transportation Plan (MTP). The model covers the geographies of Hidalgo County and Cameron County. The evaluated projects include new roadways; improvements to existing roadways; new transit services; improvements to safety, illumination, and intersections; pedestrian and bicycle enhancements; and POE efficiencies.

In the LRGV TDM, POEs are treated as external stations. Table 4-19 presents the LRGV TDM's volume forecasts by POE and vehicle type.

Table 4-19. RGVMPO Area Border Crossing Forecasts by POE – LRGV TDM

POE	PV			CV			Total		
	2019	2045	CAGR	2019	2045	CAGR	2019	2045	CAGR
Los Ebanos Ferry Border Crossing	221	275	0.8%				221	275	0.8%
Anzalduas Int'l. Bridge	6,917	10,187	1.5%	295	451	1.6%	7,212	10,638	1.5%
McAllen–Hidalgo–Reynosa Int'l. Bridge	13,219	16,493	0.9%	158	196	0.8%	13,377	16,689	0.9%
Pharr–Reynosa Int'l. Bridge	7,508	9,496	0.9%	2,919	3,513	0.7%	10,427	13,009	0.9%
Donna–Rio Bravo Int'l. Bridge	4,103	5,710	1.3%	0	353		4,103	6,063	1.5%
Weslaco–Progreso Int'l. Bridge	3,140	4,062	1.0%	251	169	-1.5%	3,391	4,231	0.9%
Los Indios Int'l. Bridge	2,556	3,189	0.9%	174	217	0.9%	2,730	3,406	0.9%
B&M Express Int'l. Bridge	8,904	11,108	0.9%				8,904	11,108	0.9%
Veterans Int'l. Bridge / Los Tomates	7,373	9,199	0.9%	1,216	1,925	1.8%	8,589	11,124	1.0%
Gateway Int'l. Bridge	7,139	8,908	0.9%				7,139	8,908	0.9%
Total	**61,080**	**78,629**	**1.0%**	**5,013**	**6,823**	**1.2%**	**66,093**	**85,452**	**1.0%**

Texas Freight Mobility Plan

TxDOT's 2018 Freight Mobility Plan identifies challenges, investment strategies, policies, and data needed to enhance freight safety and mobility across all modes, to provide efficient, reliable, and safe freight transportation, and to improve the state's economic competitiveness. TxDOT's 2016 Freight Mobility Plan was the first comprehensive multimodal transportation plan developed by TxDOT. The Texas Freight Mobility Plan 2018 enhanced and expanded on the 2016 and the 2017 freight plans. The 2018 Freight Mobility Plan reaffirms and enhances the framework for Texas's comprehensive freight planning program and decision-making.

According to the 2018 Freight Mobility Plan, the daily average inbound heavy truck volume at the Texas border is expected to increase from 10,900 to 25,000 by 2045—a 130 percent increase. Total inbound commercial vehicle tonnage at the Texas border is projected to increase from 34 million to 111 million tons per year. The Hidalgo County POEs and the Cameron County POEs had 1,600 and 600 inbound daily commercial vehicle crossings in 2016, respectively. By 2045, they are projected to handle 6,800 and 2,800 daily commercial vehicles, respectively. This translates to a CAGR of 3.1 percent for passenger vehicles and 3.3 percent for commercial vehicles.

4.10.2. Econometric Model Forecast

C&M tested several forecasting methods to separately estimate passenger and commercial vehicle traffic demand for existing POEs within the study area, including non-seasonal methods (single moving average, single exponential smoothing, double moving average, double exponential smoothing, damped trend) and seasonal methods (Holt-Winters' additive/multiplicative, damped trend additive/multiplicative, autoregressive integrated moving average). After testing these methods, C&M chose the multiple linear regression method, which produced the most statistically significant results in terms of root mean square error (RMSE).

The multiple linear regression methodology is based on estimating econometric models to develop a traffic forecast using socioeconomic variables. These models are extensions of the linear regression analysis based on ordinary least squares (OLS) estimation.

The analysis consists of forming traffic and socioeconomic databases and estimating traffic forecasts through an iterative process of regression analysis to identify the variables that best explain trip behavior by vehicle type. The econometric models are a function of the variables selected based on their statistical and contextual appropriateness.

C&M developed, validated, and implemented an econometric multiple linear regression model to forecast passenger and commercial vehicle traffic demand. The econometric model's independent variables, the details of the model, and the demand forecast results are presented below.

Independent Variables

C&M purchased and reviewed the latest (2019) data regarding the following socioeconomic indicators:

Hidalgo County, Cameron County, Texas, and USA:

- Total population
- Total employment
- Utilities employment
- Manufacturing employment
- Wholesale trade employment
- Retail trade employment
- Transportation and warehousing employment
- Other services, excluding public administration employment
- Federal government civilian employment
- Total earnings
- Manufacturing earnings
- Wholesale trade earnings
- Retail trade earnings
- Transportation and warehousing earnings
- Finance and insurance earnings
- Management of companies and enterprise earnings
- Total personal income
- Net earnings
- Total personal income per capita
- W&P wealth index
- Gross Regional Product (GRP)
- Total retail sales per household
- Mean household total personal income
- Total number of households
- Total retail sales, including eating and drinking establishment sales
- Gasoline stations retail sales
- Farm employment
- Forestry, fishing, related activities, and other employment
- Mining employment
- Construction employment
- Information employment
- Finance and insurance employment
- Real estate and rental and lease employment

- Professional and technical services employment
- Management of companies and enterprises employment
- Administrative and waste services employment
- Educational services employment
- Health care and social assistance employment
- Arts, entertainment, and recreation employment
- Accommodation and food services employment
- Total government employment
- Federal military employment
- State and local government employment
- Farm earnings
- Forestry, fishing, related activities, and other earnings
- Mining earnings
- Utilities earnings
- Construction earnings
- Information earnings
- Real estate and rental and lease earnings
- Professional and technical services earnings
- Administrative and waste services earnings
- Educational services earnings
- Health care and social assistance earnings
- Arts, entertainment, and recreation earnings
- Accommodation and food services earnings
- Other services, except public administration earnings
- Federal civilian government earnings
- Federal military earnings
- State and local government earnings
- Motor vehicles and parts dealers retail sales
- Furniture and home furnishing stores retail sales
- Electronics and appliance stores retail sales
- Building materials and garden equipment and supplies dealers retail sales
- Food and beverage stores retail sales
- Health and personal care retail sales
- Clothing and clothing accessories stores retail sales
- Sporting goods, hobby, book, and music stores retail sales
- General merchandise stores retail sales
- Miscellaneous stores retail sales
- Nonstore retailers retail sales

Hidalgo and Cameron County TAZ Variables:

- Population
- Households
- Basic Employment
- Retail Employment
- Education Employment
- Service Employment
- Total Employment
- Household Income

Reynosa/Rio Bravo/Progreso Metropolitan Area, Nuevo León, and México:

- Population
- Number of maquiladora factories
- Maquiladora employment
- Gross Domestic Product (GDP)
- Employment
- Oil production

Independent Variable Estimation

The updated (2019) variables listed above were tested to determine their explanatory power regarding the dependent variables: northbound commercial vehicle and passenger vehicle crossings. Although most sources provided historical data from 1996 onwards, some data were only available for later years.

Most of the datasets for independent variables considered in this study—and all the variables used by C&M in the final demand forecast—are provided by W&P, who develops regional models to produce their projections. The method used by W&P to generate the county-level projections proceeds in four stages:

1. Develop forecasts to 2050 of total United States personal income, earnings by industry, employment by industry, population, inflation, and other variables.
2. Divide the country into 179 Economic Areas (EA) as defined by the U.S. Department of Commerce Bureau of Economic Analysis (BEA). For each EA, a projection is made for employment using an "export-base" approach.[ii] In some cases, the "export-base" approach is modified using historical change in employment by sector to forecast employment. Employment projections are sometimes adjusted to reflect the results of individual EA models or exogenous information and assumptions about the EA economy. The employment projection for each EA is then used to estimate earnings in each EA. Employment and historical change are the principal explanatory variables used to estimate population and number of households in each EA.
3. Forecast population by age, sex, and race for each EA based on projected net migration rates. For Stages 2 and 3, the U.S. projection is the control total for the EA projections.

[ii] This approach requires dividing the industrial sector, at the regional level, into two classes: basic and non-basic products. The basic industries produce output that is not consumed locally but is "exported" from the region for national or international consumption. This assumption allows these sectors to be linked closely to the national economy and follow national trends in productivity and output growth. In contrast, the growth of the "non-basic" sectors depends largely on the growth of the "basic" sectors that form the basis of the region's economy.

4. The fourth stage replicates Stages 2 and 3, except that it is performed at the county level, using the EAs as the control total for the county projections. The projection for each county in the United States is done simultaneously so that changes in one county will affect growth or decline in other counties.

W&P's regional projection methods are revised annually to reflect new computational techniques and new sources of regional economic and demographic information. Each year, a new projection is produced based on an updated historical database and revised assumptions.

Most of the historical socioeconomic data in the W&P regional databases are obtained from the BEA. Historical data are subject to revision from time to time. Historical employment and income data from the BEA are revised on a regular basis.

4.10.3. Econometric Model Methodology

C&M used the latest available data to develop the econometric demand forecast. C&M tested all previously mentioned variables independently—as well as combinations of explanatory variables—to search for significant correlations. Since each tested variable measures a different quantity (people, dollars, jobs, etc.), all feature-scaled values were given a value between 0 and 1 before being used in the econometric model.

Due to the economic effects of COVID-19, as well as the border crossing restrictions on the U.S./Mexico border, the pandemic's effect on Hidalgo County border crossings was taken into consideration. C&M acquired economic variables that include estimates of the impact and recovery of the local and national economies.

4.10.4. Commercial Vehicle Border Crossings

The following explanatory variable was found to be statistically significant and was used to estimate northbound commercial vehicle traffic:

- United States – Gross Domestic Product (GDP)

The forecast series of U.S. GDP was developed by W&P in their 2019 *Texas State Profile - Regional Projections and Database* series.

The regression model is represented by the following equation:

DA_CVCrossings_t = Constant + βUS_GDP (US_TE_t) + βHO_D * (Dummy)*

Where:

DA_CVCrossings_t = Feature-scaled northbound Hidalgo County International Bridge system commercial vehicle crossings in time period *t*

US_TE_t = Feature-scaled U.S. Real GDP in time period *t*

HO_CE_t = Feature-scaled Dummy variable time period *t*

Table 4-20 presents the results of the analysis for northbound commercial vehicle crossings.

Table 4-20. Commercial Vehicle Econometric Model Coefficients

Variable	Coefficient
Constant	0.009
US GDP	1.100
Dummy	-0.112

Note: R^2 = 0.98; p < 0.01; Durbin-Watson statistic = 1.43

Demand Forecast Results

C&M used the econometric model described above to estimate the demand for northbound commercial vehicles at the existing Hidalgo County POEs beginning in 2020. To assess the model's accuracy in relation to historical Hidalgo County border crossings, Figure 4-32 compares observed and "backcasted" northbound commercial vehicle crossings from 1996 to 2019.

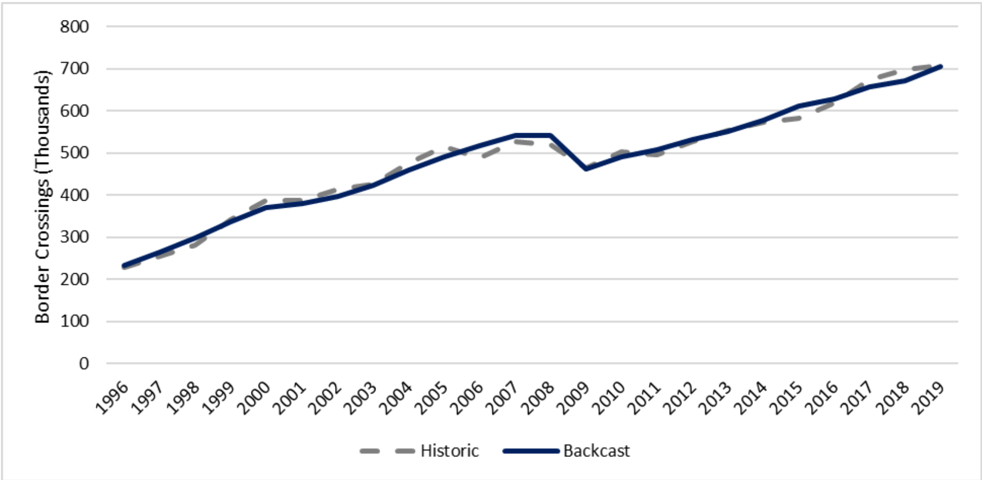


Figure 4-32. Hidalgo County POEs Northbound CV Border Crossings: Historical vs. Backcast

Figure 4-33 shows the estimated forecast for the Hidalgo County POEs' northbound commercial vehicle border crossings and the explanatory variable (indexed to 2019). The resulting model provides the coefficients that relate the commercial vehicle growth with the growth of U.S. GDP.

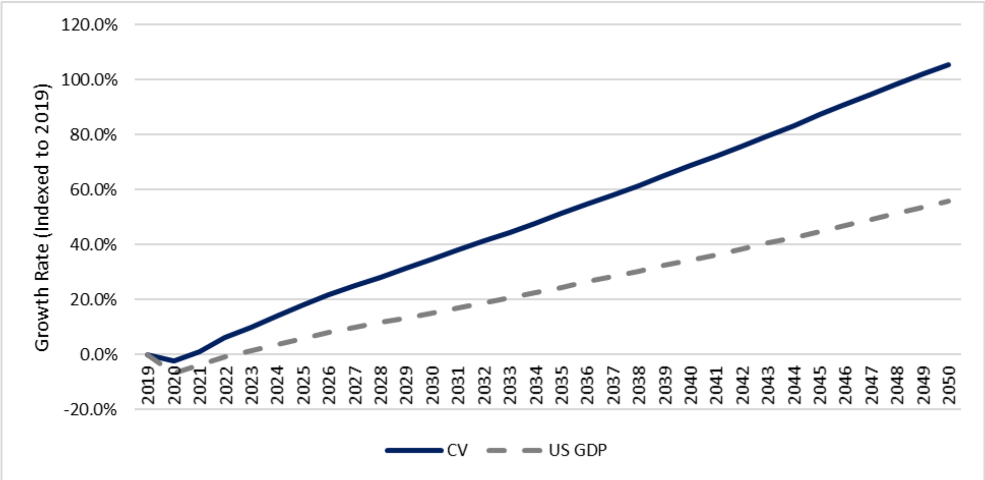


Figure 4-33. Hidalgo County POEs Northbound CV Border Crossings: Forecast vs. GDP

Figure 4-34 illustrates the complete series of actual (historical) and forecasted total commercial vehicle demand for Hidalgo County POEs. According to this model, northbound commercial vehicle crossings are expected to increase from over 713,800 in 2019 to about 1.61 million in 2050, with a CAGR of 2.7 percent.

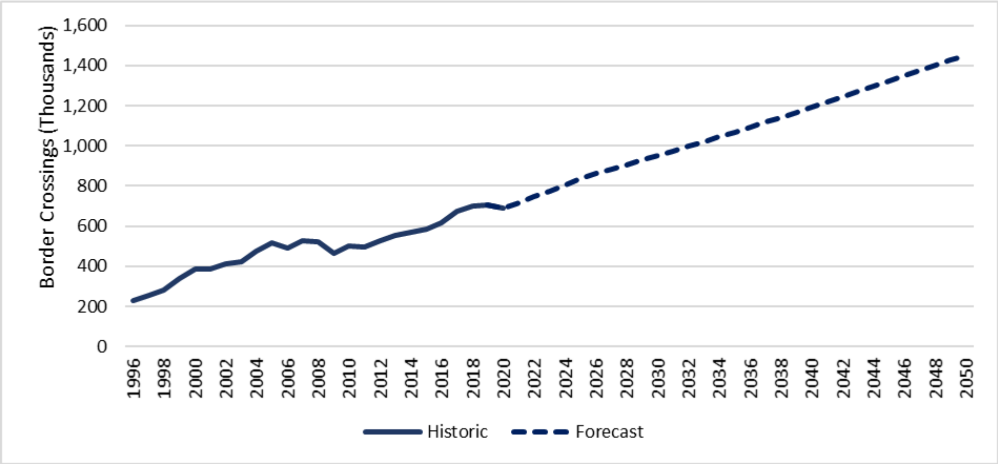


Figure 4-34. Hidalgo County POEs Northbound CV Border Crossings: Historical and Forecasted

4.10.5. Passenger Vehicle Border Crossings

The econometric models for passenger vehicles were not adequate for use in the present study due to the observed negative trend of passenger vehicle border crossings, which cannot be explained by the positive growth in the socioeconomic variables over the same time period, as this typically relates to positive traffic growth. Since 2000, passenger vehicle crossings have exhibited a negative trend (2000–2019 CAGR = -3.3%). The reasons for this significant decrease in passenger vehicles are based on the decrease of security in Mexico since 2006 with the introduction of the "war" on drug trafficking. Additionally, the availability and supply of products in Mexico has increased in recent years in relation to trade agreements, which has given Mexican households access to goods and services that were previously difficult to access or needed to be purchased in the United States. On the other hand, passenger vehicle crossings for work and study are still present. Employment and the production of goods also increased on the Mexican side of the border as part of the integration between border areas. After the COVID-19 recovery to 2019 border crossing levels by 2022, C&M assumes zero growth in passenger vehicle crossings for the remainder of the forecast period, which reflects the trend observed over the last 10 years.

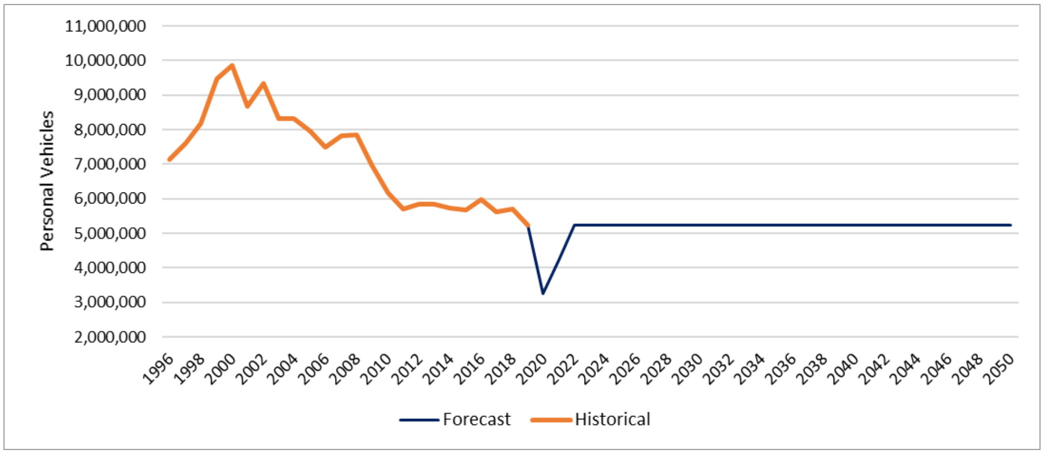


Figure 4-35. PV Historical Trend and Forecast

[1] U.S. Census Bureau (n.d.). American Community Survey, American Fact Finder 2015 ACS 1-Year Estimates. Retrieved June 8, 2020 from https://www.census.gov/

[2] U.S. Bureau of Labor Statistics, (n.d.). Retrieved June 7, 2020 from https://www.bls.gov/

[3] McAllen Chamber of Commerce (n.d.) Economic Pulse. Retrieved June 12, 2020 from https://mcallen.org/business-community/economicpulse

[4] Consejo Nacional de Población (n.d.). Proyecciones de la Población de los Municipios de México, 2015-2030. Retrieved July 20, 2020 from https://www.gob.mx/conapo/documentos/proyecciones-de-la-poblacion-de-los-municipios-de-mexico-2015-2030

[5] Instituto Nacional de Estadística y Geografía, Mexico (n.d.). Population data. Retrieved July 17, 2020 from http://en.www.inegi.org.mx/datos/

[6] Instituto Nacional de Información Estadística y Geografía, Mexico (n. d.). Economic census. Retrieved January 11, 2020 from https://www.inegi.org.mx/app/saic/

[7] Moody's Analytics (June 2020). [Purchased data]

[8] Woods & Poole Economics, Inc. (2020). Texas state profile - Regional projections and database series. [Purchased data].

[9] Texas Demographic Center (n.d.). Texas Population Estimates and Projections Program Overview. Retrieved June 12, 2020 from https://demographics.texas.gov/Data/TPEPP/

[10] Texas Water Development Board (n.d.). Retrieved June 12, 2020 from https://www.twdb.texas.gov/waterplanning/data/projections/index.asp

[11] Texas Department of Transportation (2020, July). Lower Rio Grande Valley Travel Demand Model. Provided by the Rio Grande Valley Metropolitan Planning Organization on July 16, 2020.

[12] Texas Department of Transportation (2019, February). Texas Statewide Analysis Model V4. Provided by the Texas Department of Transportation on July 16, 2020.

[13] Bureau of Transportation Statistics (n.d.). Border Crossing Entry Data / Annual Data. Retrieved January 11, 2020 from https://explore.dot.gov/views/BorderCrossingData/Annual?:isGuestRedirectFromVizportal=y&:embed=y

[14] Texas Department of State Health Services (n.d.). Births by county and city. Retrieved June 5, 2020 from https://www.dshs.texas.gov/chs/vstat/vs14/t09.aspx

[15] The Texas Tribune (2020, October 16). Texas unemployment rate rises to 8.3% in September, seven months into economic recession. Retrieved from https://www.texastribune.org/2020/10/16/texas-unemployment-rate-increase/

[16] City Population (n.d.). Mexico: Metropolitan areas. Retrieved July 20, 2020 from https://www.citypopulation.de/php/mexico-metro.php

[17] Instituto Nacional de Información Estadística y Geografía, Mexico (n. d.). Glossary. Retrieved January 11, 2020 from http://en.www.inegi.org.mx/app/glosario/default.html?p=csisflm

[18] International Monetary Fund (n.d.). World Economic Outlook Databases. Retrieved January 11, 2020 from https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases#sort=%40imfdate%20descending

[19] Texas Department of Transportation (2020). Texas-Mexico Border Transportation Master Plan. Retrieved from https://ftp.txdot.gov/pub/txdot/move-texas-freight/resources/btmp/border-transportation-master-plan.pdf

Chapter 5: Modeling Approach

This chapter outlines the steps undertaken by C&M to model the Project's travel demand. For this study, C&M adopted the existing TxDOT Lower Rio Grande Valley (LRGV) four-step travel demand model (TDM), which was developed in the TransCAD modeling software platform. C&M received the latest version of the LRGV TDM on July 16, 2020 from the Rio Grande Valley Metropolitan Planning Organization (RGVMPO). C&M reviewed, evaluated, and adopted all four steps of the LRGV TDM based on current transportation data, observed traffic patterns within the study area, and expected future road network improvements. C&M calibrated the adopted LRGV TDM to existing Project corridor traffic conditions (model base year 2018) within the study area and used the calibrated model to develop traffic forecasts for 2025, 2030, 2040, and 2045.

The latest LRGV TDM, which includes 1,565 traffic analysis zones (TAZ) and 26 external stations, has had some significant improvements to the previous TDMs available for this region. The LRGV TDM includes a time-of-day assignment of four time periods and an increase in the number of TAZs in Hidalgo County from 800 to 867. More details about the LRGV TDM are presented in Section 5.1.

Hidalgo and Cameron Counties have a high share of national (non-regional) commercial traffic origins and destinations, which required C&M to analyze traffic patterns extending beyond the Project region. Therefore, to further aid in revising and updating the LRGV TDM and its parameters for the current study, C&M requested and reviewed TxDOT's latest Texas Statewide Analysis Model (Texas SAM).

The following sections describe C&M's process of adopting the LRGV TDM and developing the future model years required for this study, including the model calibration and future year traffic assignments.

5.1. Adopting the Lower Rio Grande Valley TDM

The LRGV TDM was developed through a cooperative process between the RGVMPO, TxDOT's Pharr District, and TxDOT's Transportation Planning and Programming (TPP) Division. TxDOT–TPP is responsible for developing TDMs to support updates to regional long-range Metropolitan Transportation Plans (MTP) and associated long-range planning activities within 22 urban areas in Texas. In general, the TDM development process in Texas depends on cooperation between TxDOT–TPP, TxDOT districts, and the MPOs that TxDOT–TPP assists with their model development. TxDOT–TPP is ultimately responsible for developing and validating the MPO's TDM. The role of MPOs and districts in model development is to provide base year and future year demographic data and the regional roadway information.

The LRGV TDM supports the development of long-range plans in the region and is used to identify transportation system deficiencies and evaluate potential improvements. The LRGV TDM provides future design traffic for the model area to support locally developed Texas mobility plans, including the long-term 2045 MTP and the short-term Transportation Improvement Program (TIP). As part of the development process for the LRGV TDM, a household survey, an external travel survey, a commercial vehicle survey, and a workplace survey were conducted within Hidalgo and Cameron Counties.

The latest version of the LRGV TDM improves upon previous versions with the following technical features:[1]

- Generalized cost multi-class assignment technique that allows the assignment of commercial-vehicle-only and passenger-vehicle-only toll lanes, including the assignment of facility types such as High-Occupancy Vehicle (HOV) and High-Occupancy Toll (HOT) lanes.
- Time-of-day (TOD) model.
- Generation of person trips rather than direct generation of auto trips.

- Preservation of trips by income category.
- Stronger accounting of commercial vehicle/freight flows.
- Mode choice.

C&M received several model years from the RGVMPO—with different model inputs and results—based on the development phase of the LRGV TDM at that time. For the model years 2014, 2019, and 2040, the RGVMPO provided all inputs and results of the LRGV TDM, including the inputs and results of the trip generation, trip distribution, and traffic assignment steps. The following sections describe the details of how C&M adopted the LRGV TDM for the present study.

5.1.1. Road Network (Supply) Characteristics

The RGVMPO is responsible for the roadway inventory of the base year model network and provides the following network attributes:

- Number of lanes – The total number of lanes by direction.
- Posted speed limit – The facility's posted speed limit for every network link.
- Free-flow speed – The facility's average speed without congestion for every network link.
- Direction – The specification of whether a facility is a one-way or two-way facility.
- Median access type – Divided, undivided, or continuous left turn facility.
- Functional classification and facility types – Each network link is identified by a functional classification and facility type. TxDOT–TPP has 22 standard facility types that can be annotated to the network geography.

Base Year Network Development

As part of the LRGV TDM review process, C&M reviewed the existing base year 2014 network and future year 2019 network and compared them to arterial photos and the RGVMPO's MTP and TIP. Due to the traffic count data availability from TxDOT, C&M developed a 2018 base year network for model calibration. C&M ensured that the 2018 base year network matches the actual conditions of the Hidalgo County and Cameron County road networks.

Figure 5-1 illustrates the link functional classes and the external stations of C&M's 2018 base year network.

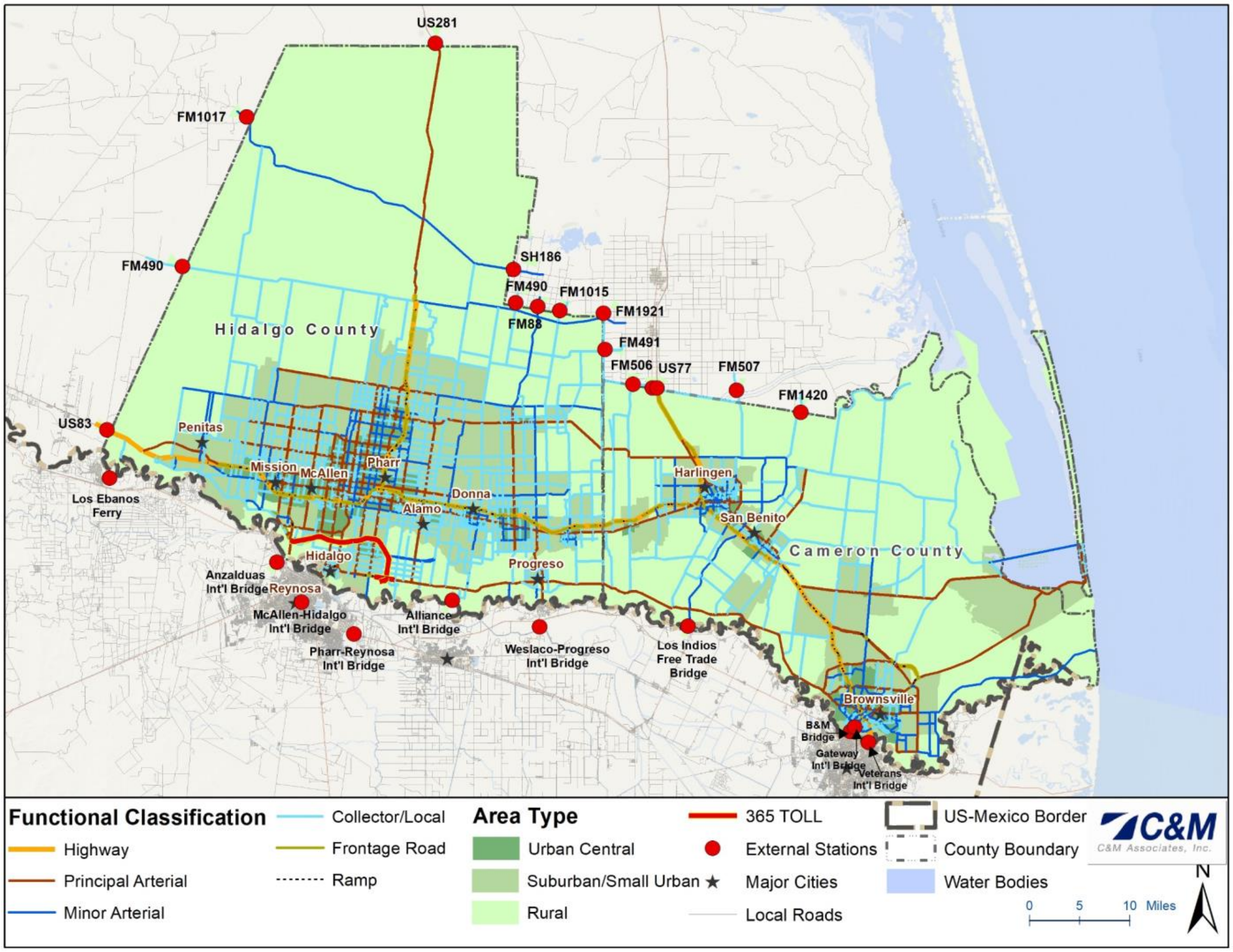


Figure 5-1. 2018 Base Model Year Road Network Structure and External Zones

To develop the base year network, C&M used the functional classification attributes from the LRGV TDM by area type. Every functional class has its own free-flow speed and hourly capacity per lane, depending on the area type in which the roadway link is located. Table 5-1 presents the speed and hourly capacity per lane for each functional class.

Table 5-1. Hourly Capacity and Speed of Roadway Links – LRGV TDM

Functional Class		# of Links	Length (mi)	Small Urban - Urban Central		Small Urban		Suburban		Rural	
ID	Description			Capacity (vphpl)	Speed (mph)	Capacity (vphpl)	Speed (mph)	Capacity (vphpl)	Speed (mph)	Capacity (vphpl)	Speed (mph)
1	Interstate Freeways	576	209	1,780	49	1,530	50	1,400	52	1,180	55
2	Other Highways	2	3	1,780	49	1,530	50	1,400	52	1,180	55
3	Principal Arterials	1,512	533	760	32	650	35	570	40	430	47
4	Minor Arterials	1,331	464	660	29	560	34	490	36	370	45
5	Collectors/Local St.	2,962	1,430	490	27	420	33	360	38	280	43
7	Frontage Roads	1,523	233	660	31	560	34	490	38	370	45
8	Ramps	396	72	1,590	25	1,690	28	1,590	28	1,140	30

Note: vphpl = vehicles per hour per lane

TxDOT employs a speed model for operational use that relies on posted speeds as one of the primary inputs to estimate speeds by facility type and area type. Therefore, the free-flow speeds used in the LRGV TDM are not the posted speed limits of the facility but rather a representation of observed regional congestion levels by functional class. The capacities coded into the LRGV TDM highway network are hourly directional capacities per lane.

A capacity look-up table is estimated by functional class and area type to specify the hourly capacities coded on the network links. C&M used the LRGV TDM's look-up table—at the functional class level—to estimate the TOD capacities and speeds for each of the model networks. The capacity factors used to estimate the TOD capacities for each of the model time periods are presented in Table 5-2.

Table 5-2. Time Period Capacity Factor

Time Period	Time of Day	Capacity Factor
Morning (AM)	7:00 AM - 9:00 AM (2 hrs)	1.4316
Midday (MD)	9:00 AM - 3:00 PM (6 hrs)	4.7421
Evening (PM)	3:00 PM - 6:00 PM (3 hrs)	2.4862
Nighttime (NT)	6:00 PM - 7:00 AM (13 hrs)	3.6693

The model's volume delay function (VDF) is a Bureau of Public Roads (BPR) function with an Alpha of 0.15 and a Beta of 4.0. The resulting differences between the posted speeds and model free-flow speeds (e.g., 50 mph posted speed on Freeways and model free-flow speeds of 49–55 mph) are a result of this calibration approach. The model's VDF by functional class is presented in Figure 5-2.

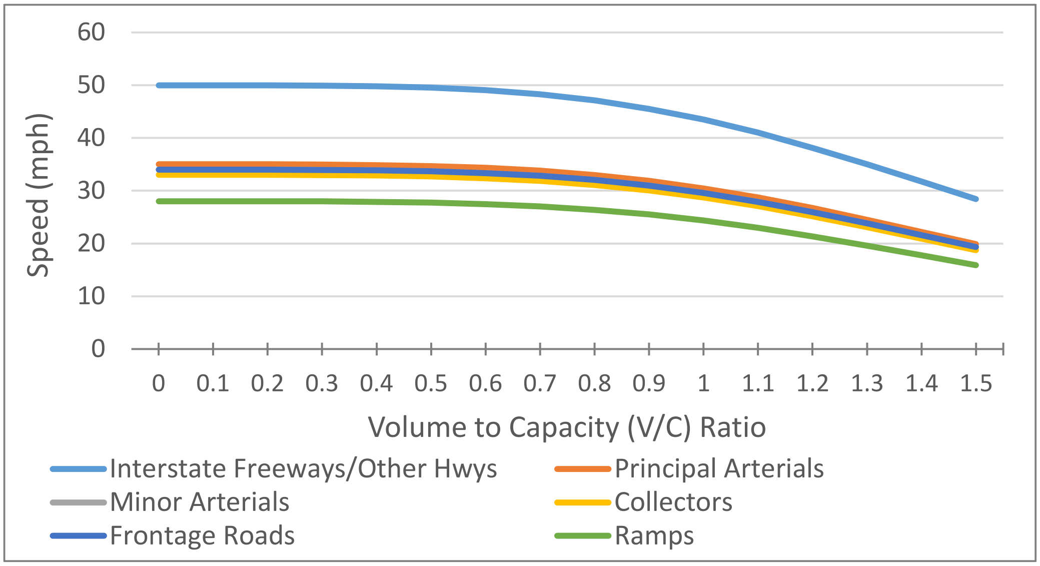


Figure 5-2. Model VDF by Functional Class

Future Year Network Development

C&M reviewed the RGVMPO MTP[2] and TIP[3] to develop future model years from the LRGV TDM's 2019, 2040, and 2045 future networks. C&M developed the 2025 model year as the Project's opening year and future model years 2030, 2040, and 2045.

Table 5-3 presents the future network lane mile comparison by functional class. Most of the lane mile increases occur on "Other Highway" facilities, which are planned for development within the two-county study area. This table also includes the two high-profile Hidalgo County projects: the IBTC and SH 68, to be built out as limited access facilities in 2035 and 2040, respectively. The year 2040 exhibits a slight decrease in the lane miles of minor arterials due to the opening of SH 68 and corresponding changes in the classification of some links to frontage roads.

Table 5-3. Future Network Lane Miles Comparison

Functional Class		Lane Miles					Percent Difference			
ID	Description	2018	2025	2030	2040	2045	2018-2025	2018-2030	2018-2040	2018-2045
1	Interstate Freeways	584.5	584.5	584.7	584.7	584.7	0.0%	0.0%	0.0%	0.0%
2	Others Highway	3.1	42.8	136.4	269.8	320.0	1267.6%	4261.3%	8524.7%	10130.4%
3	Principal Arterials	932.7	963.2	1,023.9	1,023.9	1,023.9	3.3%	9.8%	9.8%	9.8%
4	Minor Arterials	590.4	626.0	683.8	682.0	682.0	6.0%	15.8%	15.5%	15.5%
5	Collectors/ Local St.	1,519.3	1,561.0	1,660.3	1,631.8	1,667.2	2.7%	9.3%	7.4%	9.7%
7	Frontage Roads	541.1	553.4	625.5	730.6	730.6	2.3%	15.6%	35.0%	35.0%
8	Ramps	78.8	86.3	88.4	101.1	101.1	9.6%	12.2%	28.3%	28.3%
	Total	**4,249.9**	**4,417.2**	**4,802.9**	**5,023.9**	**5,109.5**	**3.9%**	**13.0%**	**18.2%**	**20.2%**

Figure 5-3 and Table 5-4 present the future road improvements considered within the LRGV TDM in this study.

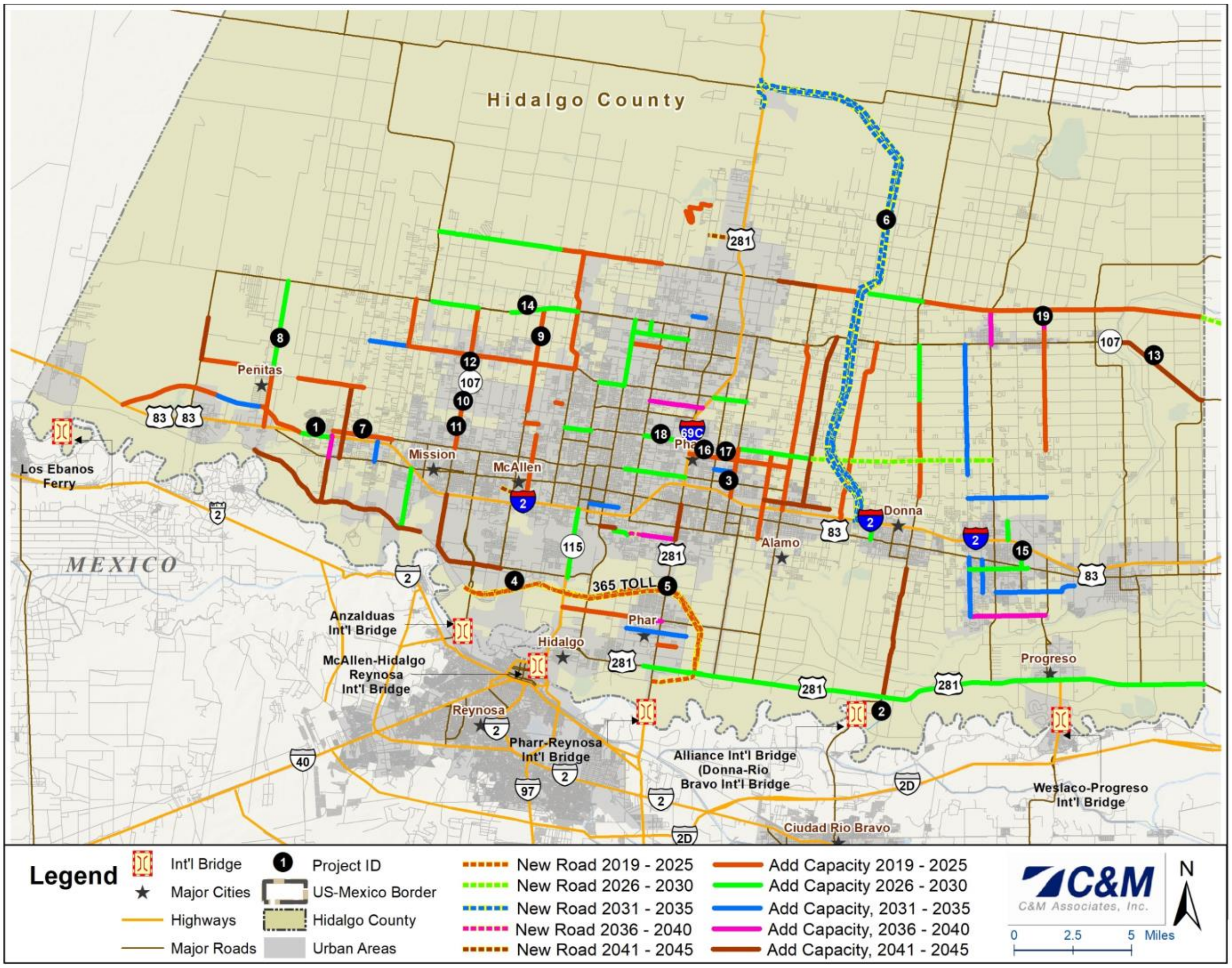


Figure 5-3. Future Network Improvements 2018–2045

Table 5-4. Network Improvements in Hidalgo County from 2018–2045

ID	Roadway	From	To	Number of Lanes by Year				
				2018	2025	2030	2040	2045
1	US 83	FM 1427	Bus 83	2	2	6	6	6
2	Donna Int'l Bridge Commercial Approach	Donna BSIF	Future IBTC / FM 493 intersection	0	2	2	2	2
3	FM 1426	Nolana Loop	I-2	2	3	3	3	3
4	365 TOLL	FM 396	FM 1016	0	4	4	4	4
5	365 TOLL	US 281	FM 1016	0	4	4	4	4
6	SH-68	US 83/I-2	US 281/I-69C	0	4	4	4	4
7	SH 495	SH 495	SH 364	1	2	2	2	2
8	SH 364	FM 2221	FM 676	1	2	2	2	2
9	SH 336	Trenton Rd	SH 107	2	2	3	3	3
10	SH 107	FM 1924 N	FM 676	2	3	3	3	3
11	SH 107	FM 495	FM 1924 N	2	3	3	3	3

ID	Roadway	From	To	Number of Lanes by Year				
				2018	2025	2030	2040	2045
12	SH 107	FM 676	FM 681/FM 2993	2	3	3	3	3
13	SH 107	FM 1425	West Levee	1	1	1	1	2
14	SH 107	FM 681	FM 2220	2	2	3	3	3
15	N Airport Dr	E Business 83	I-2	2	2	2	4	4
16	Eldora Rd	FM 3362	Veterans Blvd	1	4	4	4	4
17	East Eldora Rd	FM 907	I Rd	1	4	4	4	4
18	FM 3461	FM 2061	US 281	2	2	3	3	3
19	FM 1015	SH 107	FM 1925	1	1	1	2	2
Minor	Mile 3 N	Tom Gill Road	FM 2221	0	1	1	1	1
Minor	6th St	Westgate Drive	Bus 83	1	1	2	2	2
Minor	Abram Rd	Bus 83	US Expressway 83	1	1	1	2	2
Minor	Abram Rd	US 83	FM 2221	1	1	1	1	2
Minor	Alberta Rd	McColl Rd	US 281	1	1	1	2	2
Minor	Border Ave	S 18th St (Mile 6 N)	Bus 83	1	1	1	2	2
Minor	Cesar Chavez Rd	Business 83	Nolana Loop	1	2	2	2	2
Minor	CS Morrison Rd	FM 1847	FM 511	0	2	2	2	2
Minor	Dicker Road	International Blvd N	S Cage Blvd	1	2	2	2	2
Minor	Dove Ave	41st St	Bentsen Rd	1	2	2	2	2
Minor	E Yuma Ave	Jackson Rd	McColl Rd	0	0	0	2	2
Minor	E Yuma Ave	Jackson Rd	McColl Rd	1	1	1	1	1
Minor	FM 1016	US 83	Military Hwy	2	2	2	2	3
Minor	FM 1423	Minnesota Rd	IH-2	1	3	3	3	3
Minor	FM 1732	US 281	IH-69E	2	2	2	3	3
Minor	FM 1925	10th Street	McColl Rd	1	3	3	3	3
Minor	FM 1925	Wallace Rd	10th St	1	3	3	3	3
Minor	FM 1925	FM 681	Wallace Rd	1	1	2	2	2
Minor	FM 1925	FM 907	Sharp Rd	1	2	2	2	2
Minor	FM 1925	3rd Street	FM 493	1	1	2	2	2
Minor	FM 2062	US 83 S	Bus 83	1	1	1	2	2
Minor	FM 2812 W	Seminary Rd	US 281	1	1	1	1	2
Minor	FM 3072	S Cage Blvd	FM 907	1	2	2	2	2
Minor	FM 3248	IH-69E	FM 1847	1	2	2	2	2
Minor	FM 493	Mile 14 N Rd	Mile 10 N Rd	1	2	2	2	2
Minor	FM 493	SH 107	Mile 14 N Rd	1	1	2	2	2
Minor	FM 493	Champion St	Military Hwy	1	1	1	1	2
Minor	FM 494	FM 676	FM 1924	1	2	2	2	2
Minor	FM 676	Taylor Rd	FM 2220	1	2	2	2	2
Minor	FM 676	FM 492	SH 364	1	1	1	2	2

ID	Roadway	From	To	Number of Lanes by Year				
				2018	2025	2030	2040	2045
Minor	FM 676	SH 364 E	SH 107	1	2	2	2	2
Minor	FM 676	SH 107	Taylor Rd	1	2	2	2	2
Minor	FM 88	SH 107	FM 1925	1	1	1	2	2
Minor	FM 907	SH 107	Nolana	1	2	2	2	2
Minor	FM 907	Ridge Rd	Military Hwy	1	2	2	2	2
Minor	Freddy Gonzalez	SH 336	FM 2061	2	3	3	3	3
Minor	Goodwin Rd	Bus 83	FM 492	1	1	1	1	2
Minor	Goodwin Rd	US 83	FM 1924	1	1	1	1	2
Minor	Grove Park Rd	Calvazos-Olmito Rd	Rego Rd	1	1	1	1	2
Minor	Hutto Rd	US 83	Bus 83	1	1	2	2	2
Minor	Indiana Ave Realignment	On Indiana Ave	FM 1419	1	1	1	1	2
Minor	International Blvd. (SH 4)	US 83	Security Dr	2	3	3	3	3
Minor	Jackson Ave	S Bicentennial Ave	S 2nd St	1	1	1	2	2
Minor	Jara Chinas	FM 2221	US 83	1	1	1	1	2
Minor	Las Milpas Rd East	Cage Rd	I Rd	1	1	1	2	2
Minor	Liberty Blvd (Phase II)	Liberty Blvd, From Mile 3	US 83	1	2	2	2	2
Minor	Liberty Blvd/New Road	Mile 3 Rd	FM 2221	1	1	1	1	1
Minor	Main St	Zinnia Ave	US 83	1	1	1	1	1
Minor	MILE 10N	Mile 6	FM 1015	1	1	1	2	2
Minor	Mile 3 Rd	Mile 3N	FM 492	1	2	2	2	2
Minor	Mile 4 1/2 W Rd	US 83	Mile 9 N Rd	1	1	2	2	2
Minor	Mile 5 N	FM 1015	Westgate	1	1	1	2	2
Minor	Mile 6 N	FM 88	Mile 2 W	1	1	1	2	2
Minor	Mile 6 W Rd	Mile 14 1/2	Mile 11 N	1	1	1	2	2
Minor	Mile 6 W Rd	SH 107	Mile 14 1/2	1	1	1	2	2
Minor	Mile 7 Rd	Jara Chinas Rd	Iowa Rd	1	1	2	2	2
Minor	Mile 7 Rd	FM 2221	SH 107	1	3	3	3	3
Minor	Military Hwy	S Cage Blvd	Mile 3 E	1	1	2	2	2
Minor	Military Hwy	FM 494	FM 1427 (Abram)	1	1	1	1	2
Minor	Mon Mack Rd	Sprague Ave	SH 107	1	1	2	2	2
Minor	Moore Rd West	Jackson Rd	Cage Rd	1	1	1	2	2
Minor	N Bridge Ave	E Pike Blv	E 1oth street	1	1	2	2	2
Minor	N Shary Rd	SH 107	FM 676 (Mile 5)	1	2	2	2	2
Minor	Nebraska Ave (Alamo)	Cesar Chavez	Border Ave	1	1	1	1	2
Minor	New Road	Taylor Rd	Bentsen Rd.	0	0	0	0	1
Minor	New Road	US 83	W Loop 374	0	1	1	1	1
Minor	New Road	FM 490	Mile 13	0	1	1	1	1
Minor	New Road	FM 490	N Big Rd	0	1	1	1	1

ID	Roadway	From	To	Number of Lanes by Year				
				2018	2025	2030	2040	2045
Minor	New Road	FM 490	Calichera Rd	0	1	1	1	1
Minor	New Road	107	Trenton Rd	0	1	1	1	1
Minor	Nolana Loop	FM 2220 (Ware Rd)	FM 1926 (23rd st)	2	2	3	3	3
Minor	Nolana Loop	FM 494 (Shary Rd)	Taylor Rd	2	2	2	2	2
Minor	Nolana Loop (S1)	On Nolana Loop from FM 1426 (Raul Longoria)	FM 907	1	1	2	2	2
Minor	Nolana Loop (S2)	FM 907	FM 1423	1	1	2	2	2
Minor	Nolana Loop (S3)	FM 1423	FM 493	0	0	2	2	2
Minor	Nolana Loop (S4)	FM 493	FM 88	0	0	2	2	2
Minor	Old Alice Rd	SH 100	Sports Park Blvd	1	1	1	1	2
Minor	On Inspiration Rd	I-2	FM 1016	1	1	2	2	2
Minor	Outer Parkway	IH 69E	FM 106/General Brant Rd	0	0	2	2	2
Minor	Owasa Rd	Veterans Blvd	69C	1	2	2	2	2
Minor	S Jackson Rd	W Moore Rd	Bus 83	2	2	2	2	3
Minor	Schunior Ave	Sugar Rd	4th St	1	1	1	2	2
Minor	Seminary Rd	FM 1925	FM 2812	1	1	1	1	1
Minor	Sioux Rd	I Rd	FM 1426	1	1	1	2	2
Minor	SP 115 (S 23rd St)	US 83	FM 1016	2	2	3	3	3
Minor	Sprague Ave	Sugar Rd	SH 336	1	1	2	2	2
Minor	Tower Rd	US 83	SH 107	1	1	1	1	2
Minor	Trenton Rd	US 281	FM 1426	1	1	2	2	2
Minor	Treton Rd	FM 1926	SH 336	2	2	3	3	3
Minor	Tylor Rd	E Business 83	I-2 (US 83)	1	2	2	2	2
Minor	Tylor Rd	E Mile 2 Rd	E Business 83	1	2	2	2	2
Minor	W Anaya Rd	On Anaya Rd	Veterans Blvd	1	2	2	2	2
Minor	Ware Rd	Auburn Ave	Buddy Owens Blvd	1	2	2	2	2
Minor	Ware Rd (FM 2220)	SH 107	Mile 5 N	1	3	3	3	3
Minor	Ware Rd (FM 2220)	FM 1925	SH 107	1	3	3	3	3
Minor	Westgate	Business 83	Mile 5 N	1	1	1	2	2
Minor	Westgate Dr	Mile 1 N	Sugarcane Dr	1	2	2	2	2
Minor	Wichita Ave	SH 336 (S 10th St)	2nd St	1	1	1	1	4
Minor	US 77/83 South Parallel Corridor	FM 1479	FM 1577	1	1	1	1	2
Minor	FM 495	2nd St (McAllen)	US 281	2	2	3	3	3
Minor	FM 1015	Mile 12 N Rd	SH 107	1	2	2	2	2
Minor	SH 550	FM 1847	FM 3248	0	2	2	2	2
Minor	SH 48	SH 4	FM 511	2	2	2	3	3
Minor	FM 1847	FM 510	FM 2925	1	1	1	2	2
Minor	FM 1423	Roosevelt	SH 107	1	2	2	2	2

Build Networks

C&M coded the Project's alignment for the 2025, 2030, 2040, and 2045 future model roadway networks based on design drawings provided by the HCRMA. Roadway characteristics corresponding to the Highway functional class were assigned to the Project. Figure 5-4 through Figure 5-6 illustrate the 365 TOLL schematics based on the Project's ultimate design drawings.

Between the opening year 2025 and the future year 2030, the Project's number of mainlanes at the western end (between the exit to the Anzaldúas General Services Administration (GSA) Connector and the SP 115 exit) will change from one to two lanes per direction. The changes from 2030 to 2040 can be summarized as follows:

- Expanding all mainlanes from two to three lanes per direction.
- Adding two-lane frontage roads between Dicker Road and SH 336.
- Adding one additional lane per direction to the frontage road segment between US 281/Military Highway and Dicker Road.
- Adding exit and entrance ramps to SP 115.

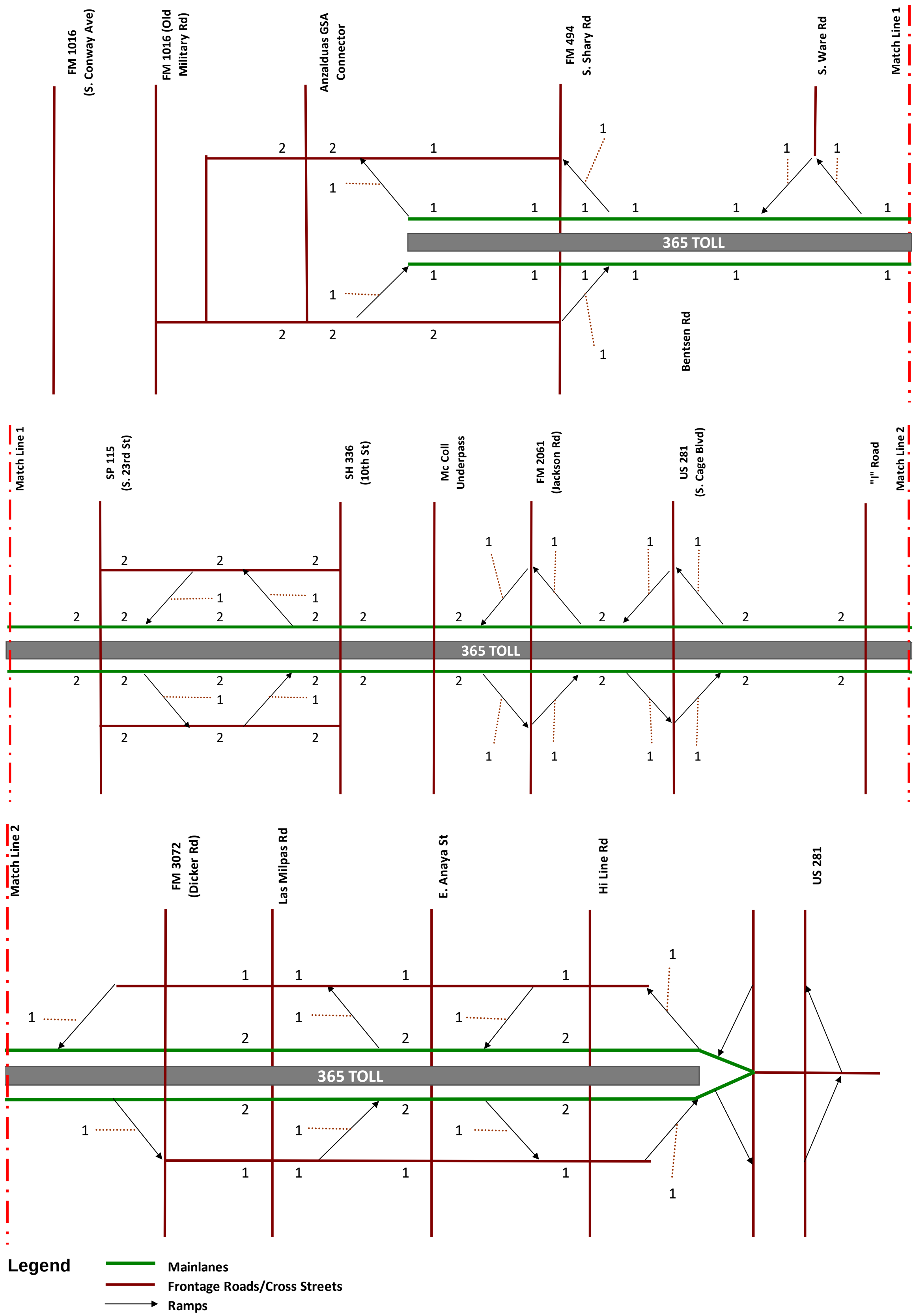


Figure 5-4. 365 TOLL Schematics – 2025

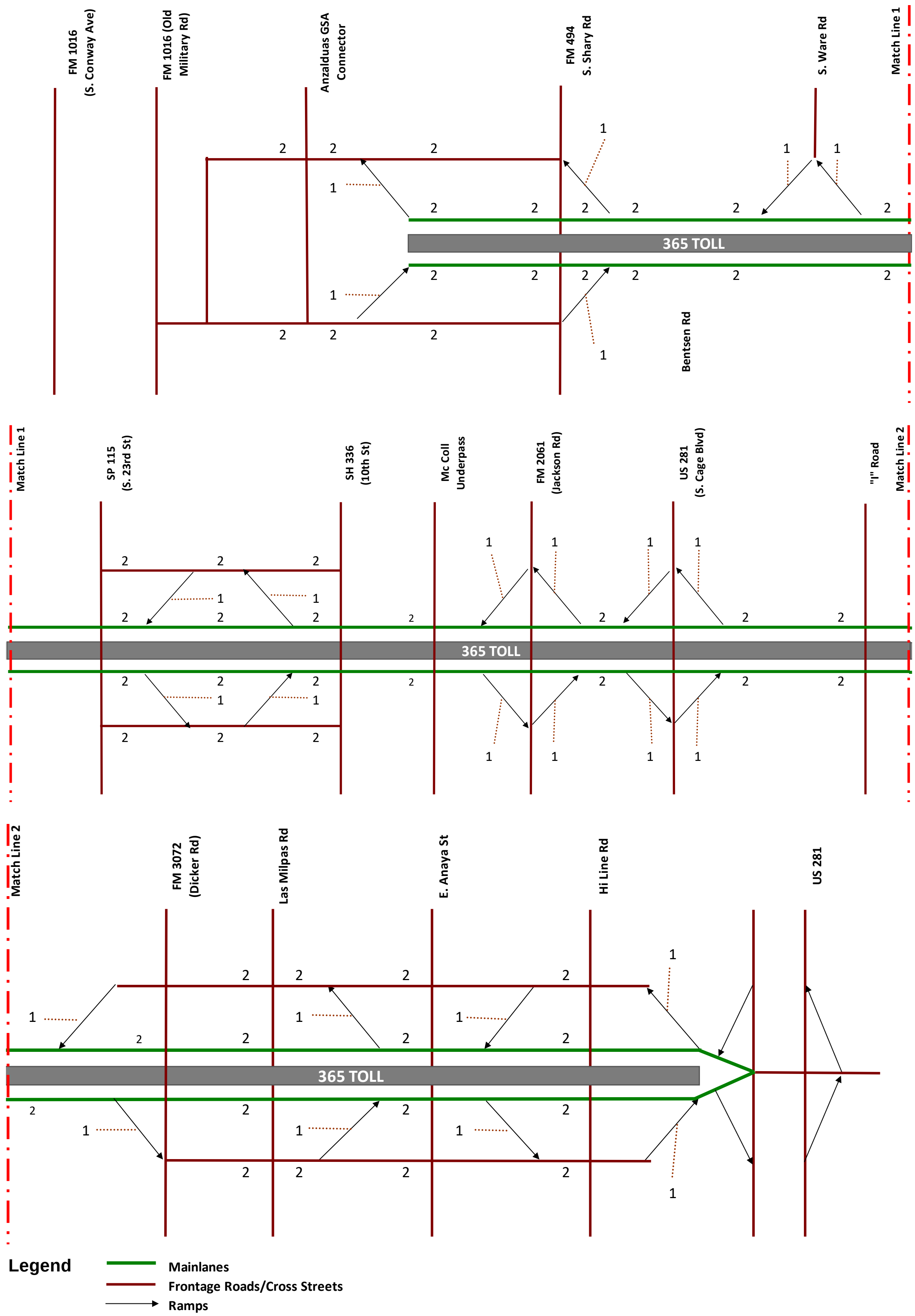


Figure 5-5. 365 TOLL Schematics – 2030

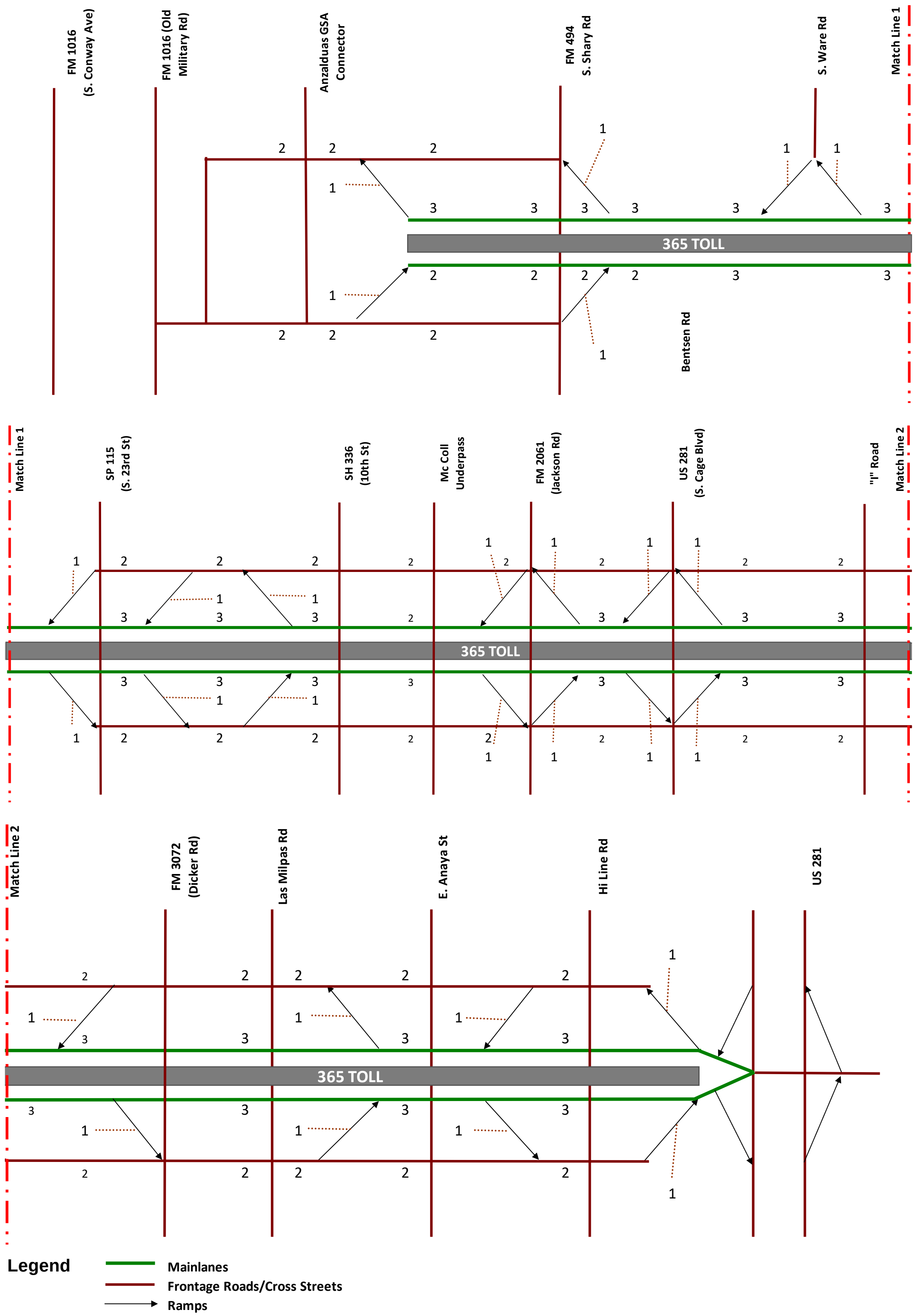


Figure 5-6. 365 TOLL Schematics – 2040 and 2045

5.1.2. Travel Demand Modeling

C&M revised, evaluated, replicated, and adopted the TxDOT LRGV TDM's inputs and results to model traffic within the study area. The LRGV TDM is a traditional "four-step" model, which includes trip generation, trip distribution, mode choice, and trip assignment, as described below.

Trip Generation

Trip generation is the first step in the traditional four-step travel demand modeling process. Trip generation predicts trip productions and attractions—i.e., the number of trips originating in or destined for a particular TAZ. For the trip generation model in the LRGV TDM, TripCAL5® software was used to develop the zonal trip generation estimates for the RGVMPO region, including Hidalgo and Cameron Counties. Two-way cross-classification production and attraction models are used in the LRGV TDM, employing production rates per household and expected average attractions per employee or household. The socioeconomic variables for the cross-classification production models are household size and income. The attraction model uses number of employees, which is scaled to match the production control totals by trip purpose.

The socioeconomic data variables for the attraction model are the following four employment categories:

- Basic employment
- Retail employment
- Service employment
- Education employment

In addition to the socioeconomic data inputs to the trip generation process, the TripCAL5 software allows the input of special generators. Figure 5-7 shows all TAZs in the study area that have special generators (e.g., airports, hospitals, stadiums, universities, etc.). Table 5-5 lists the zones and their special generators.

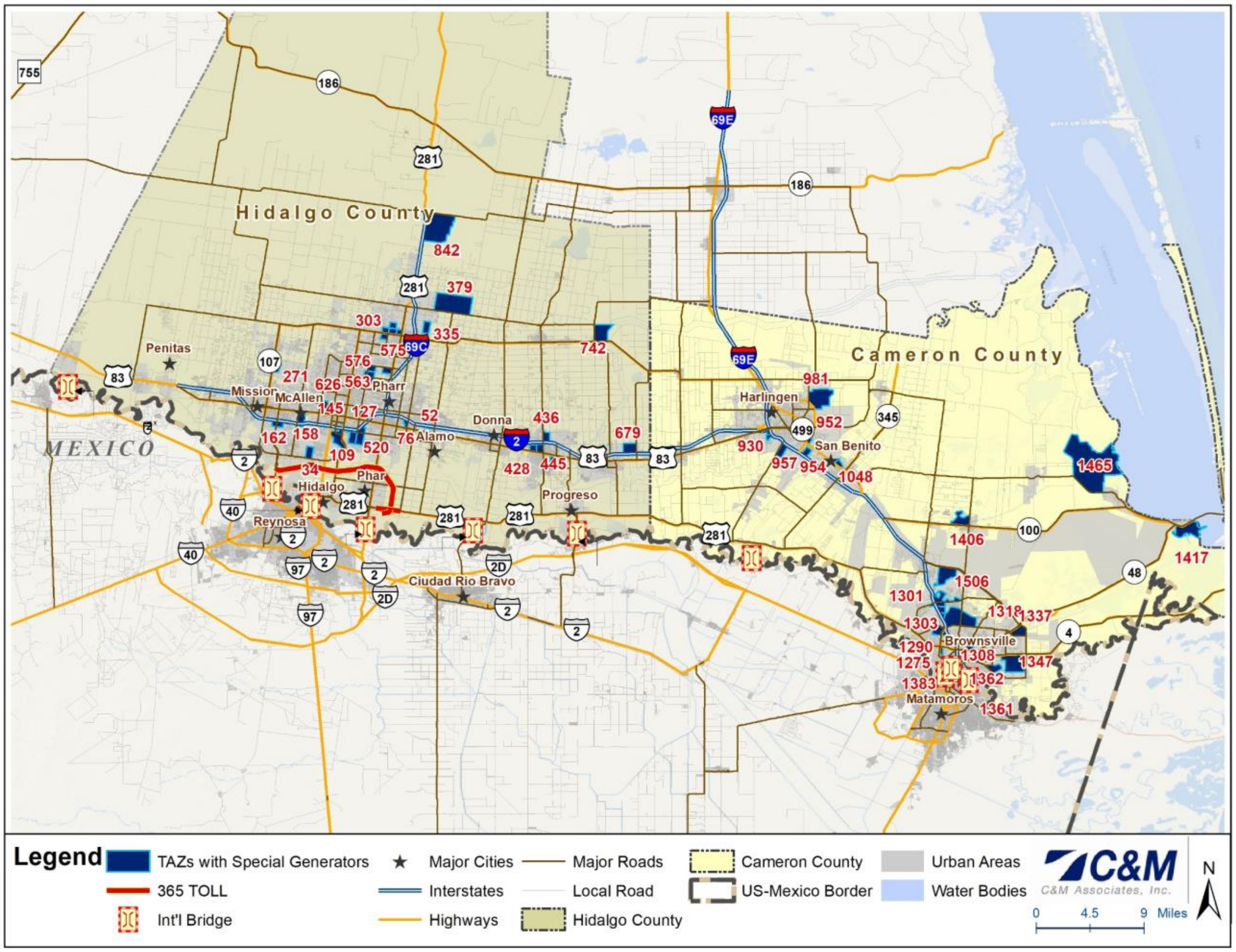


Figure 5-7. LRGV TDM TAZs with MPO Special Generators

Table 5-5. LRGV TDM TAZs with MPO Special Generators

TAZ	Description
34	South Texas College Technology College
47	Ratama Manor Nursing Center/McAllen
52	Walmart Supercenter
59	Mission Regional Medical Center
76	Basilica of Our Lady of San Juan del Valle-National Shrine
78	HEB Plus
105	Rio Grande Regional Hospital
106	McAllen Heart Hospital
109	McAllen Miller International Airport
116	La Plaza Shopping Mall
127	VA/New Hope Children's Shelter
145	South Texas College Pecan Plaza
154	South Texas College Main Campus

TAZ	Description
157	Walmart Supercenter
158	HEB Plus
162	Mission Nursing & Rehabilitation Center
206	South Texas College- Pecan Campus Cont.
256	The Women's Hospital at Renaissance
271	Walmart Supercenter
301	UTPA-3 Baseball Stadium, UTPA-Human Resources
303	The University of Texas Rio Grande Valley
304	UTPA-4 Marketing & Creative Services, Bookstore
335	Judge Mario E. Ramirez, Jr. Juvenile Justice Center
337	McAllen Medical Center
379	Evins Regional Juvenile Youth Commission
428	South Texas College Mid-Valley Campus
429	HEB Foods
436	Walmart Supercenter
445	Knapp Medical Center
519	Shopping Center
520	LifeCare Hospitals of South Texas - South McAllen
524	Biltmore Assisted Living
563	LifeCare Hospitals of South Texas - North McAllen
575	Edinburg Children's Hospital
576	Cornerstone Regional Hospital & Solara Hospital
603	Walmart Supercenter
605	UTPA-2 Unity Hall, Wellness & Rec Sports Complex
626	Walmart Supercenter
679	Rio Grande Premium Outlets
742	East Hidalgo Detention Center
768	Walmart Supercenter
770	Doctor's Hospital at Renaissance
842	Reynaldo V. Lopez State Jail, Manuel A. Segovia Unit, Hidalgo County Ja
906	Valle Vista Mall
930	Super Walmart
952	Valley Baptist Medical Center
954	Solara Hospital
957	Rio Grande State Center
981	Marine Military Academy
1048	Super Walmart
1263	Cameron County Adult Probation/Cameron County Old County Jail
1267	Gladys Porter Zoo
1275	Valley Baptist Medical Center

TAZ	Description
1289	Valley Grand Manor Nursing Home
1290	Valley International Country Club
1301	South Texas Rehabilitation Hospital
1303	Sunrise Mall
1308	BISD Administration Building
1318	Walmart
1337	Walmart Supercenter
1347	Brownsville/SPI Int'l Airport
1361	U.S. Border Patrol-Ft. Brown Station
1362	Walmart
1382	The University of Texas Rio Grande Valley - Brownsville
1383	OLIVEIRA ARNULFO MEMORIAL LIBR, Texas Southmost College
1400	Valley Regional Medical Center
1406	Walmart
1417	Walmart Supercenter
1454	Shopping Center/Healthcare Center
1455	Sunrise Common
1465	Port Isabel Detention Center
1475	Gateway International Bridge - U.S. Border Patrol
1480	Walmart Supercenter
1481	Shopping Center
1506	U.S. Border Patrol, Cameron County Ja
1509	Cameron County Corrections, Cameron County Detention Center

The latest version of TripCAL5 used in the LRGV TDM generates person trips, whereas previous versions directly generated vehicle trips. The following trip purposes are generated in the LRGV TDM, with specific trip rates for each:

- Home-Based Work (HBW)
- Home-Based Non-Work (HBNW):
    - Home-Based Non-Work Retail (HNW-RET)
    - Home-Based Non-Work Other (HNW-OTH)
    - Home-Based Non-Work School (HNW-EDU)
- Non-Home Based (NHB)
- Internal Commercial Vehicle and Taxi (TRTX)
- External–to–Internal Passenger Vehicle (EXLOA)
- External–to–Internal Commercial Vehicle (EXLOT)
- Non-Home-Based Non-Resident (NEXLO)

After reviewing the LRGV TDM's trip rates by trip purpose, C&M maintained the TDM's original trip generation process, including cross classification parameters. The only changes to the trip generation are the socioeconomic data inputs, as described in Chapter 4.

C&M prepared a series of benchmarks of trip generation outputs to evaluate the adopted TDM's outputs, as summarized in Table 5-6.[4] As shown, the TDM's trip generation results are mostly within the range of industry standards. However, some measures deviate from these benchmarks, such as regionwide population per household and person trips per household. These deviations can be attributed to the unique characteristics of the model area, as the area's average household size (3.58) is larger than the average household size of the United States (2.53).[5] This also explains the relatively low share of HBW trips in the Binational model; given the higher average household since, the amount of HBW trips is relatively low compared to HBNW trips.

Table 5-6. LRGV TDM Trip Generation – Comparison to Benchmarks

Statistic	Benchmarks		LRGV TDM				
	Low	High	2018	2025	2030	2040	2045
Regionwide Population/HH	2	3	3.6	3.5	3.5	3.4	3.4
HBW Person Trips/Employee	1.2	1.55	1.47	1.58	1.62	1.56	1.51
Person Trips/Person	3.3	4	4.06	4.10	4.14	4.21	4.80
Person Trips/HH	8	10	10.34	10.17	10.14	10.14	9.88
Percent Trips by Purpose - HBW	12%	24%	13%	13%	14%	13%	13%
Percent Trips by Purpose - HBNW	45%	60%	48%	48%	49%	48%	48%
Percent Trips by Purpose - NHB	20%	33%	33%	33%	33%	33%	33%

Note: HH = household
Source: Florida Department of Transportation[4]

Trip Distribution

Trip distribution is the second component of the four-step TDM. After estimating the total number of trip productions and attractions, the trip distribution step determines the number of trips between each pair of TAZs.

The LRGV TDM's trip distribution is performed using ATOM2® software. The inputs to the ATOM2's gravity model are the following:

- Shortest path matrix of the network travel times.
- Zonal radii values for each zone (surrogate for zone size).
- Productions and attractions by zone for each trip purpose.
- Trip length frequency distribution by minutes of separation.
- Calibrated friction factors for each trip purpose.

The shortest path matrix is created by skimming the minimum path from one zone to every other zone using the estimated 24-hour network travel times. The radii values help establish the spatial allocation between zone pairs. Rather than using a single theoretical point in the zone as the center of activity, the radii value is the driving factor of intrazonal trip generation. Intrazonal trips are trips that remain within one TAZ and do not enter the network to travel between two TAZs. As previously mentioned, productions and attractions by zone for each of the trip purposes are the result of the TDM's trip generation component. Trip length frequency distribution and friction factors are calibrated for each trip purpose.

C&M replicated the LRGV TDM's original trip generation and, as mentioned earlier, revised and evaluated each of the trip generation input parameters. C&M ultimately maintained all trip distribution parameters and processes of the LRGV TDM. Figure 5-8 presents the trip length distribution from the adopted TDM versus the trip lengths obtained from the original LRGV TDM.

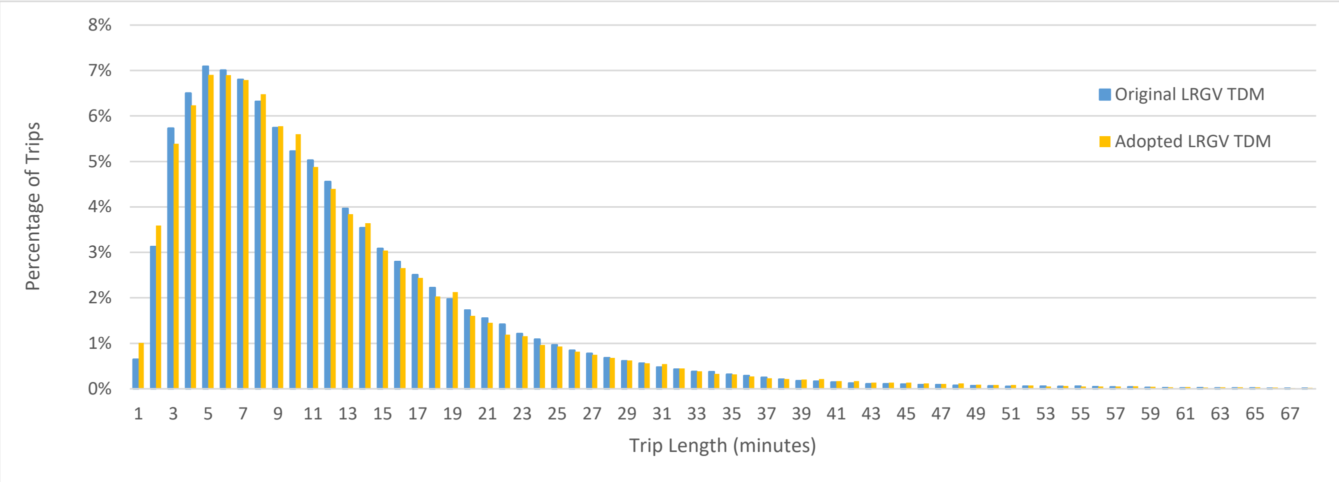


Figure 5-8. Trip Length Distribution – LRGV TDM (Original vs. Adopted)

Table 5-7 compares the adopted LRGV TDM's trip lengths by trip purpose to commonly used trip distribution benchmarks.[4] These benchmarks, along with the results illustrated in Figure 5-8, indicate that the adopted LRGV TDM replicates observed trip lengths and all model years are in line with commonly used benchmarks.

Table 5-7. Average Trip Length (Minutes) Benchmarks

Trip Purpose	Avg. Trip Length		LRGV TDM				
	Low	High	2018	2025	2030	2040	2045
HBW	12	35	14.90	15.52	15.96	17.05	17.19
HBO	8	20	9.73	10.10	10.36	11.16	11.29
NHB	6	19	11.19	11.40	11.74	12.79	13.04
IE	26	58	32.49	34.67	35.84	38.60	39.04

Note: HBO = Home-Based Other; IE = Internal-to-External
Source: Florida Department of Transportation[4]

Mode Choice

Mode choice is the third component of a four-step TDM. The mode choice component of the LRGV TDM consists of an HOV module. This module is available in the TxDOT Texas package and combines adaptations of three models: a travel time ratio model, a logic model, and a travel time savings model. In combination, these three models estimate the shift of person trips to HOV trips. Within the inputs to these models is the expected percent of transit ridership and the average auto occupancy of the region. Due to the lack of mass transportation infrastructure and the low share of public transport in the model area, the LRGV TDM incorporates a transit ridership percentage of 7.2 percent, including school bus trips for children.

C&M reviewed, evaluated, revised, and adopted the mode choice module inputs by mode based on the latest information available for the region. C&M integrated the trip tables that result from the LRGV TDM mode choice module in the traffic assignment process, which includes C&M's proprietary toll diversion model. In this process, C&M combined the Single Occupancy Vehicle (SOV) and HOV trips, as further described below.

Traffic Assignment

Traffic assignment is the final component of the four-step travel demand modeling process, and it determines the selection of routes between origins and destinations (OD) in the transportation network. For the purpose of travel forecasting, the traffic assignment step estimates which routes will be used by travelers within a variety of network paths. The assignment methodology iteratively defines the link impedance due to the capacity and the volume of each link. The "user equilibrium" is reached when each of the trips obtains their optimum route throughout the network.

C&M used its proprietary toll diversion assignment model for the LRGV TDM's trip assignment. The input for the assignment program includes the model networks previously described and the trip tables obtained from the mode choice step of the adopted TDM. All statistics and results of the trip assignment procedures shown below were obtained after C&M's model calibration, which is discussed later in this chapter.

C&M combined the LRGV TDM's mode choice trip tables in C&M's toll diversion assignment model. Table 5-8 presents the final trip table C&M used for its toll-diversion model and the respective vehicle trips that were generated from the LRGV TDM mode choice module.

Table 5-8. Combination of Trip Tables for Trip Assignment

C&M Trip Tables	Trip Purpose	LRGV Mode Choice Trip Tables
Internal Auto HBW	Home-Based Work	HBW - DA
		HBW - SR2
		HBW - SR3P
Internal Auto NHB	Non-Home-Based	NHB - DA
		NHB - SR2
		NHB - SR3P
	Non-Home-Based Non Resident	NEXLO - DA
		NEXLO - SR2
		NEXLO - SR3P
Internal Auto HNW	Home-Based Non-Work Retail	HNW-RET - DA
		HNW-RET - SR2
		HNW-RET - SR3P
	Home-Based Non-Work School	HNW-EDU - DA
		HNW-EDU - SR2
		HNW-EDU - SR3P
	Home-Based Non-Work Other	HNW-OTH - DA
		HNW-OTH - SR2
		HNW-OTH - SR3P
Internal Truck	Commercial Vehicles	TRTX

Note: DA = Drive Alone, SR2 = Shared Ride 2 Persons, SR3P = Shared Ride 3 Persons Plus

To evaluate whether the final trip table follows common industry standards for the TOD assignment, C&M compared the final TOD model trip table shares for the base year to internal trips share benchmarks from the National Cooperative Highway Research Program (NCHRP).[6] Table 5-9 presents the NCHRP and model trip share percentages by trip purpose and by TOD. As shown, there are differences between the NCHRP and LRGV TDM in terms of trip purpose shares. However, the LRGV TDM shares reflect the traffic count volumes observed in the Project study area, as presented in Section 5.2.

Table 5-9. Percentage Share of Trip Purposes – NCHRP vs TDM

Source	Trip Purpose	AM	MD	PM	NT
NCHRP	HBW	31.7%	22.2%	29.1%	16.8%
	HNW	12.1%	43.4%	21.7%	20.7%
	NHB	4.6%	55.0%	25.0%	15.6%
LRGV TDM	HBW	21.6%	21.6%	24.9%	31.9%
	HNW	13.8%	35.5%	21.7%	29.0%
	NHB	11.6%	43.8%	26.1%	18.6%

To estimate external trips, C&M did not use the LRGV TDM methodology because the TDM synthetically generates external trips based on the gravity model of the trip generation software rather than estimating them based on observed counts or OD patterns. Due to the Project's proximity to the Hidalgo County international bridges, C&M opted to use observed traffic counts and OD data to estimate the volume and ODs of the external trips. As described in Chapter 2 and Chapter 3, C&M employed traffic counts and StreetLight OD data as key inputs to its estimates. The daily external trip tables were also split into TOD trip tables using factors from the hourly profiles at the external stations.

The TDM has 26 external stations, including the proposed Mission/Madero–Reynosa POE, which was added by C&M to the original 25 external stations of the LGRV TDM. The external trip volumes and their OD patterns for passenger vehicles and commercial vehicles are estimated based on a variety of current and historical data sources:

- TxDOT existing and historical traffic counts (STARS II)[7]
- Historical C&M classification counts
- C&M OD survey data
- AirSage OD data
- StreetLight OD data
- Border crossing data

The future growth rate of each external station was determined by applying several time series forecast methodologies, including the use of the following parameters:

- Historical traffic growth rate at each external station.
- Historical and projected growth rates of socioeconomic parameters such as population, employment, and maquiladora industry production from Texas, Hidalgo County, Cameron County, and Reynosa.
- Historical and projected growth of manufactured goods shipments.
- Historical and projected GDP and GRP growth.
- Projected external station traffic growth rate of the LRGV TDM.

The international border crossings of Hidalgo County are worth noting separately from other external stations. In the last 5 years, C&M conducted several studies focusing solely on the border crossings of Hidalgo County, including an investment grade T&R study.[8] Based on these studies, C&M developed a Binational TDM that includes the RGVMPO region and the Reynosa/Matamoros metropolitan area. Based on the model results, C&M developed the future forecast of the Hidalgo County international bridges, as shown in Table 5-10. The total Hidalgo County passenger and commercial vehicle border crossing forecast was developed based on the econometric model described in Chapter 4.

Table 5-10. Border Crossing Forecast – Northbound and Southbound

Bridge	Year	Annual Crossings			Average Weekday	
		Passenger Vehicles	Commercial Vehicles	Total	Passenger Vehicles	Commercial Vehicles
*Pharr-Reynosa	2018	1,610,000	1,251,250	2,861,250	4,600	4,550
	2025	0	1,138,500	1,138,500	0	4,140
	2030	0	1,298,000	1,298,000	0	4,720
	2040	0	1,625,250	1,625,250	0	5,910
	2045	0	1,630,750	1,630,750	0	5,930
Weslaco-Progresso	2018	1,130,500	99,000	1,229,500	3,230	360
	2025	1,004,500	101,750	1,106,250	2,870	370
	2030	1,004,500	115,500	1,120,000	2,870	420
	2040	1,004,500	143,000	1,147,500	2,870	520
	2045	924,000	137,500	1,061,500	2,640	500
McAllen-Hidalgo-Reynosa	2018	5,414,500	0	5,414,500	15,470	0
	2025	5,477,500	0	5,477,500	15,650	0
	2030	5,477,500	0	5,477,500	15,650	0
	2040	5,477,500	0	5,477,500	15,650	0
	2045	4,875,500	0	4,875,500	13,930	0
Donna-Rio Bravo	2018	1,085,000	0	1,085,000	3,100	0
	2025	1,242,500	167,750	1,410,250	3,550	610
	2030	1,242,500	189,750	1,432,250	3,550	690
	2040	1,242,500	239,250	1,481,750	3,550	870
	2045	1,337,000	280,500	1,617,500	3,820	1,020
Anzalduas	2018	1,932,000	41,250	1,973,250	5,520	150
	2025	2,544,500	233,750	2,778,250	7,270	850
	2030	2,544,500	266,750	2,811,250	7,270	970
	2040	2,544,500	335,500	2,880,000	7,270	1,220
	2045	2,443,000	354,750	2,797,750	6,980	1,290
Mission	2018	0	0	0	0	0
	2025	0	0	0	0	0
	2030	0	0	0	0	0
	2040	0	0	0	0	0
	2045	689,500	195,250	884,750	1,970	710
All Bridges	2018	11,172,000	1,391,500	12,563,500	31,920	5,060
	2025	10,269,000	1,641,750	11,910,750	29,340	5,970
	2030	10,269,000	1,870,000	12,139,000	29,340	6,800
	2040	10,269,000	2,343,000	12,612,000	29,340	8,520
	2045	10,269,000	2,598,750	12,867,750	29,340	9,450
2018-2045 CAGR		-0.3%	2.3%	0.1%	-0.3%	2.3%

Note: * The Pharr–Reynosa International Bridge is assumed to not carry passenger vehicles in the future.

The daily international bridge crossing trip tables were split into TOD trip tables using factors from the hourly profiles observed at the international bridges. The daily OD patterns for passenger vehicles and commercial vehicles in the LRGV TDM are illustrated in Figure 5-9 and Figure 5-10, respectively. These OD patterns match the previously observed OD patterns presented in Chapter 3.

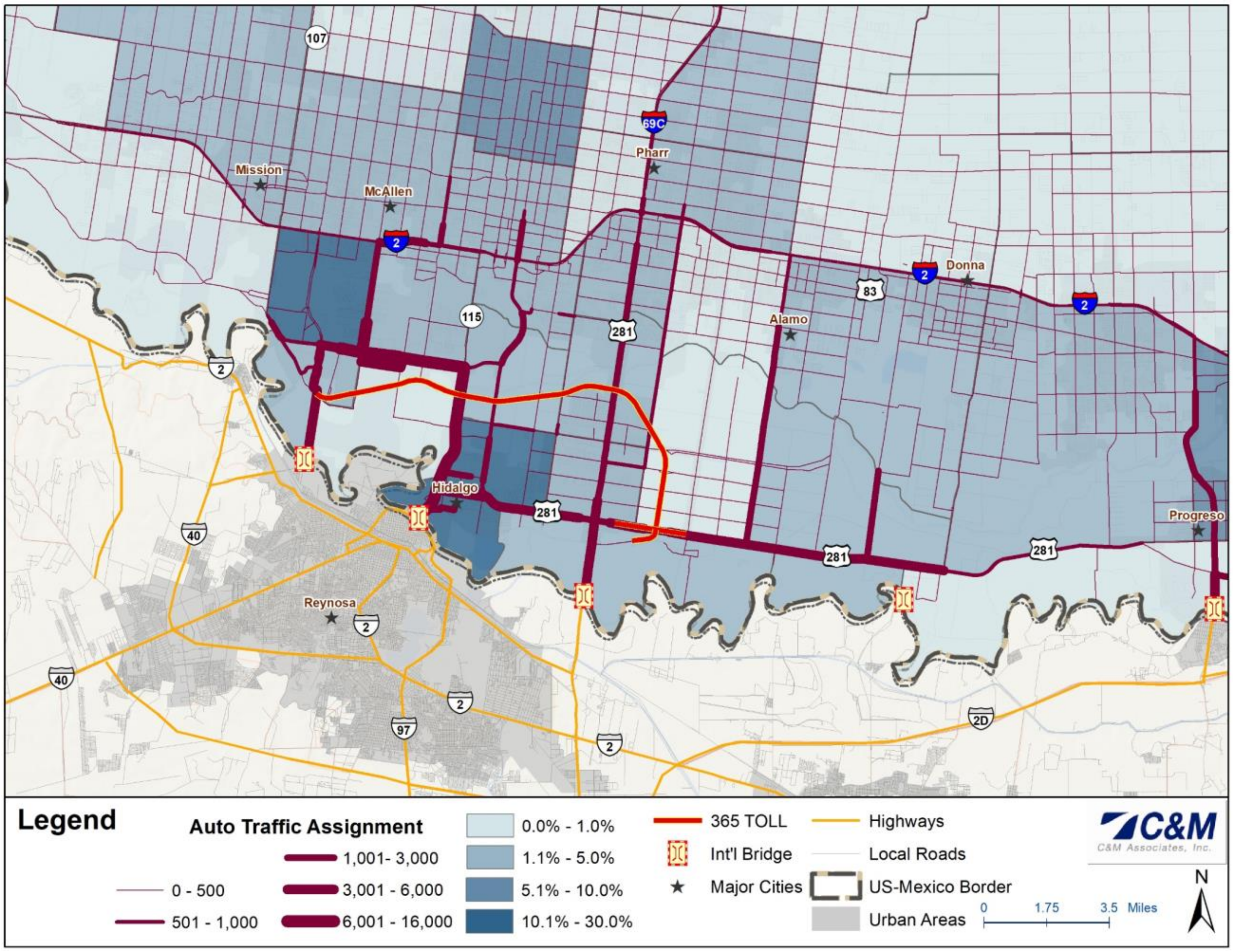


Figure 5-9. Border Passenger Vehicle Model ODs – Model Base Year 2018

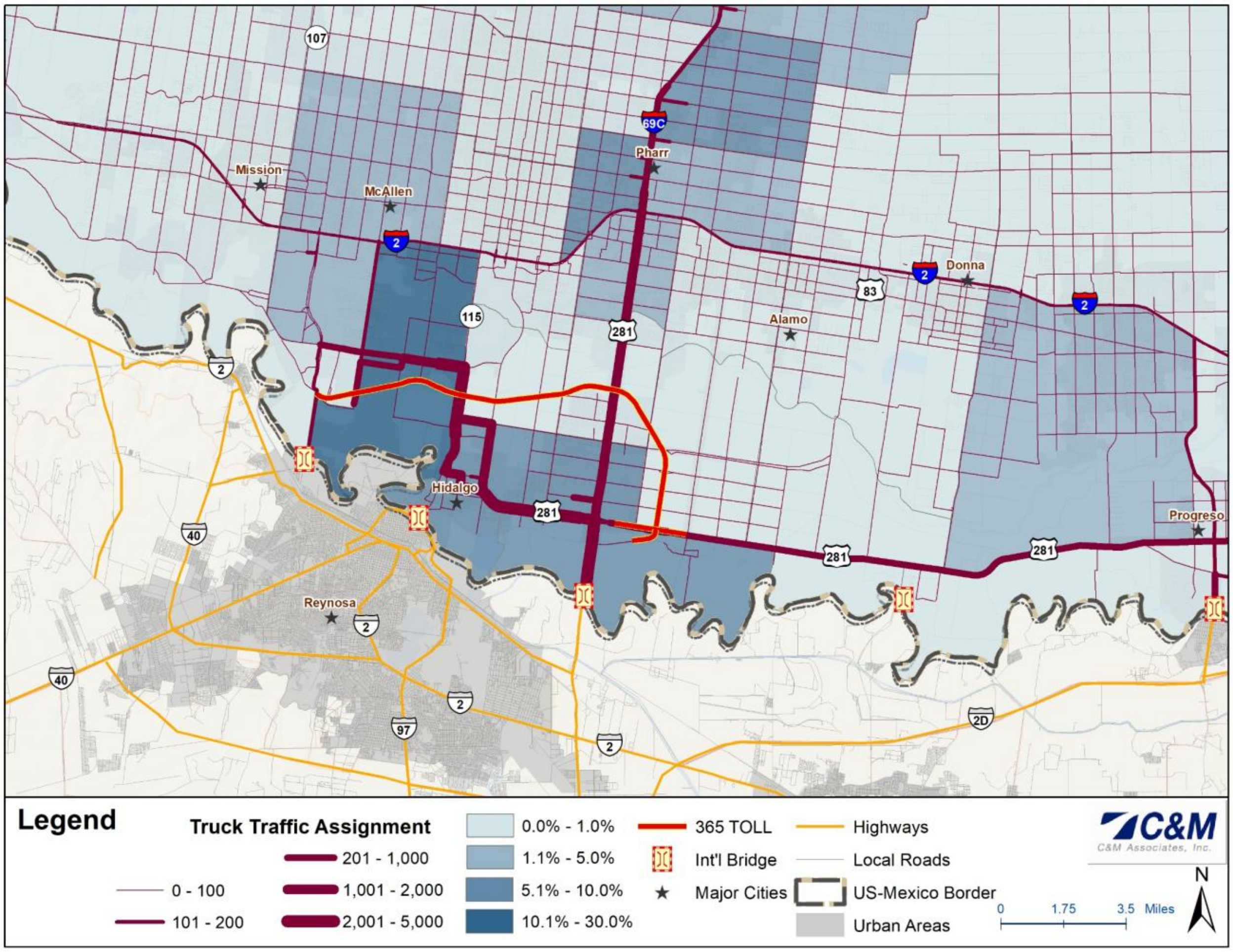


Figure 5-10. Border Commercial Vehicle Model ODs – Model Base Year 2018

To further evaluate the performance of the adopted LRGV TDM, C&M reviewed the growth pattern of VMT across the model years, as presented in Table 5-11. Results indicate that VMT continuously grows across future model years. The VMTs for each model year by functional class are presented in Table 5-12.

Table 5-11. LRGV TDM VMT – Future Year Comparison

Time Period	2025	2030	2040	2045
AM	4,347,282	4,872,333	5,615,315	5,848,885
MD	11,397,455	12,773,148	14,728,864	15,370,369
PM	7,242,663	8,114,230	9,381,749	9,751,406
NT	8,420,722	9,392,531	10,714,414	11,131,406
Total	**31,408,122**	**35,152,241**	**40,440,341**	**42,102,066**
CAGR	2025 - 2030	2030 - 2040	2040 - 2045	2025- 2045
AM	2.31%	1.43%	0.82%	1.32%
MD	2.31%	1.43%	0.86%	1.33%
PM	2.30%	1.46%	0.78%	1.32%
NT	2.21%	1.33%	0.77%	1.23%
Total	**2.28%**	**1.41%**	**0.81%**	**1.30%**

Table 5-12. LRGV TDM VMT and Growth Rate by Functional Class

Functional Class	2025	2030	2040	2045
Highways	6,490,853	7,122,403	8,061,812	8,340,077
Major Arterials	9,115,395	10,146,356	11,569,121	12,015,955
Minor Arterials	3,762,193	4,290,592	5,017,929	5,253,136
Collectors/Local Streets	6,390,623	7,276,904	8,462,232	8,826,803
Frontage Roads	1,318,654	1,486,254	1,757,539	1,835,241
Functional Class	CAGR			
	2025 - 2030	2030 - 2040	2040 - 2045	2025 - 2045
Highways	1.87%	1.25%	0.68%	1.10%
Major Arterials	2.17%	1.32%	0.76%	1.22%
Minor Arterials	2.66%	1.58%	0.92%	1.50%
Collectors/Local Streets	2.63%	1.52%	0.85%	1.43%
Frontage Roads	2.42%	1.69%	0.87%	1.49%

Following a common exercise in regional model functionality evaluation, C&M divided VMT by vehicle hours traveled (VHT) to determine the average congested speed by functional class. As presented in Table 5-13, the average congested speeds for all functional classes are similar across the model years. In 2040, when the Project's frontage roads between SH 336 and Dicker Road come into operation, an improvement in speed is observed for these segments and nearby roads due to the additional capacity.

Table 5-13. Congested Average Speed (mph) by Functional class – LRGV TDM

Functional Class	Average Speed (mph)			
	2025	2030	2040	2045
Highways	47.7	44.0	45.1	44.8
Major Arterials	32.6	30.5	28.8	28.2
Minor Arterials	31.4	28.4	29.0	28.3
Collectors/Local Streets	32.6	32.2	29.8	29.4
Frontage Roads	31.7	29.5	30.0	29.5
Functional Class	Percent Difference			
	2025 - 2030	2030 - 2040	2040 - 2045	2025 - 2045
Highways	-7.90%	2.63%	-0.61%	-6.05%
Major Arterials	-6.26%	-5.73%	-1.88%	-13.28%
Minor Arterials	-9.65%	2.03%	-2.37%	-10.00%
Collectors/Local Streets	-1.41%	-7.49%	-1.13%	-9.83%
Frontage Roads	-6.97%	1.69%	-1.49%	-6.80%

5.2. Model Calibration and Validation

The 2018 base year model was calibrated to replicate base year traffic conditions and match the modeled volumes with those observed at count locations within the study area. This was accomplished through a screenline analysis.

As mentioned earlier, C&M calibrated and validated the model using 2018 socioeconomic data from EPS, up-to-date roadway network data, and collected traffic data. C&M's 2014 and 2016 traffic counts, as well as TxDOT's existing and historical traffic counts (STARS II), were used for calibration purposes (for a description of C&M's traffic data collection efforts, see Chapter 3).

Based on C&M's initial analysis, 10 traffic screenlines were chosen for the study area: six capturing east–west travel and four capturing north–south travel. These screenlines are illustrated in Figure 5-11.

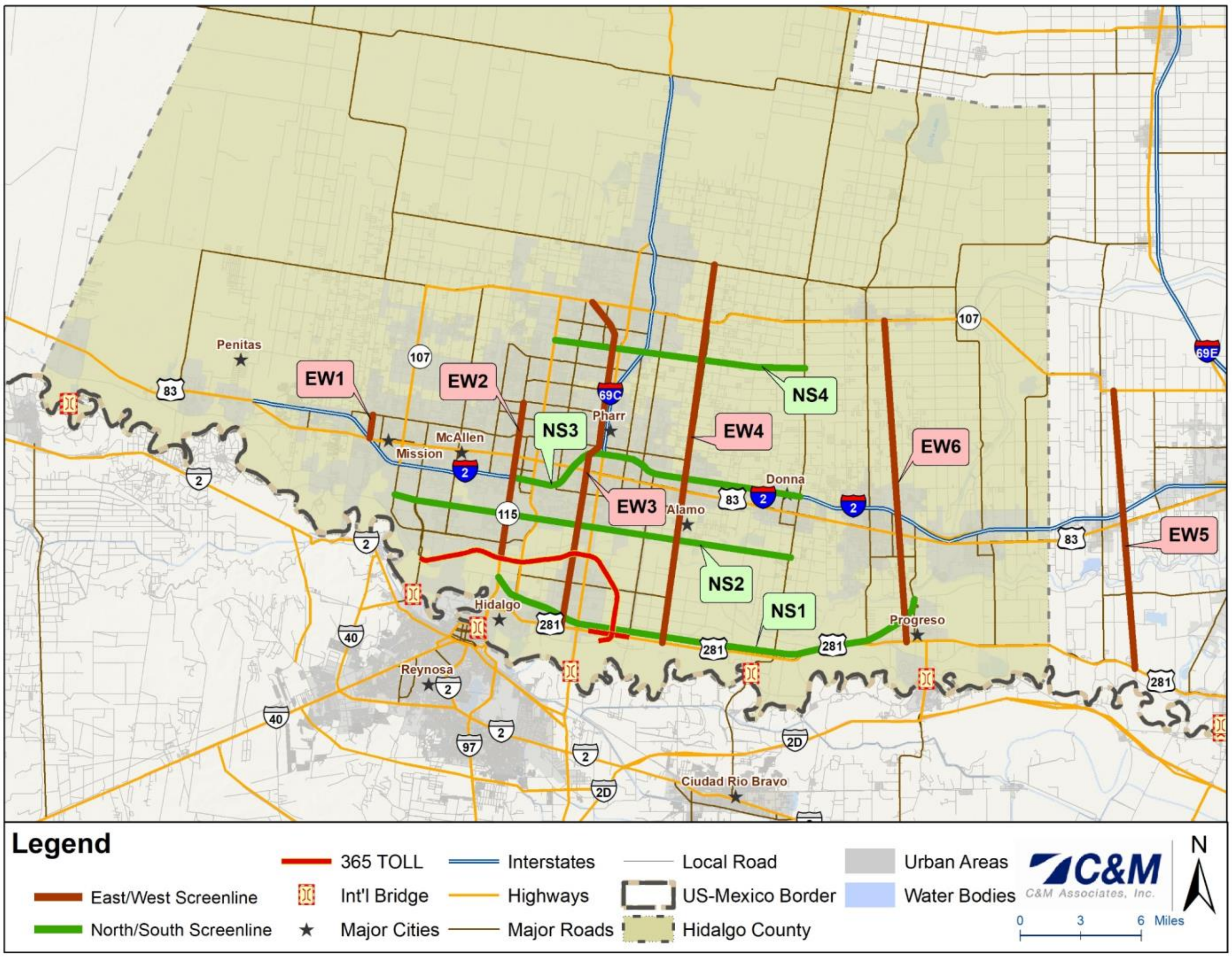


Figure 5-11. Screenline Locations for LRGV TDM Calibration

Following the TOD traffic assignment, link volumes on each screenline were determined and then used to validate the results of the traffic assignment step and the calibration process. Figure 5-12 illustrates the NCHRP criteria for screenline calibration; as shown, all screenline volumes fall well below the deviation thresholds recommended by the NCHRP.

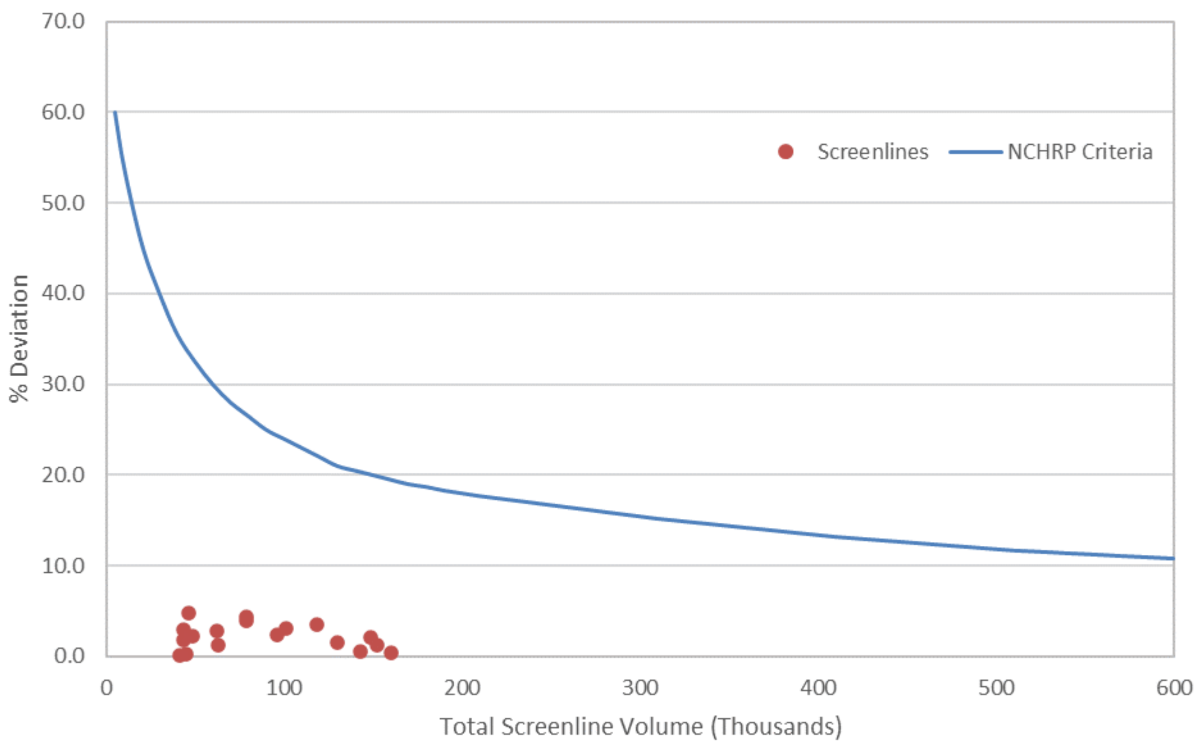


Figure 5-12. Comparison of Screenline Counts with Maximum Desirable Deviation by Direction

Table 5-14 and Table 5-15 compare the model volumes with observed traffic counts along each screenline daily and by time period, respectively. The daily differences between the screenline counts and model volumes fall within the acceptable range recommended by the Federal Highway Administration (FHWA).[9] The model volumes by TOD and direction are also within an acceptable range.

Table 5-14. Comparison of Daily Screenline Counts and Model Volumes

Screenline	Daily Traffic		
	Observed	Model	% Diff.
NS1	84,300	86,313	2.4%
NS2	127,565	124,991	-2.0%
NS3	311,153	308,677	-0.8%
NS4	164,049	157,249	-4.1%
EW1	97,823	94,375	-3.5%
EW2	253,799	247,417	-2.5%
EW3	295,837	294,667	-0.4%
EW4	201,855	196,375	-2.7%
EW5	85,460	85,613	0.2%
EW6	149,510	147,001	-1.7%

Table 5-15. Comparison of Observed Traffic Counts and Modeled Volumes by Time Period

Screenline	AM			MD			PM			NT		
	Counts	Model	Diff.	Counts	Model	Diff.	Counts	Model	Diff.	Counts	Model	Diff.
NS1	10,281	10,454	1.7%	32,064	32,493	1.3%	19,269	19,741	2.5%	22,686	23,625	4.1%
NS2	15,932	15,633	-1.9%	46,072	45,197	-1.9%	29,318	28,832	-1.7%	36,243	35,329	-2.5%
NS3	41,361	41,163	-0.5%	111,817	110,496	-1.2%	72,549	73,058	0.7%	85,425	83,960	-1.7%
NS4	23,274	22,728	-2.3%	60,198	57,458	-4.6%	37,079	35,253	-4.9%	43,498	41,810	-3.9%
EW1	12,973	12,549	-3.3%	35,628	34,203	-4.0%	22,011	21,351	-3.0%	27,212	26,272	-3.5%
EW2	33,877	33,204	-2.0%	94,478	91,489	-3.2%	56,490	54,882	-2.8%	68,954	67,842	-1.6%
EW3	39,120	39,129	0.0%	109,272	108,453	-0.7%	66,865	66,433	-0.6%	80,579	80,652	0.1%
EW4	29,340	29,160	-0.6%	75,422	73,193	-3.0%	47,258	45,811	-3.1%	49,835	48,211	-3.3%
EW5	12,148	12,161	0.1%	29,726	29,717	0.0%	20,135	20,176	0.2%	23,451	23,559	0.5%
EW6	21,118	20,834	-1.3%	54,321	53,308	-1.9%	35,463	35,016	-1.3%	38,608	37,843	-2.0%

Since commercial vehicles are important to the revenue forecast of 365 TOLL, C&M also compared the commercial vehicle model volumes with observed commercial vehicle traffic counts along each screenline daily and by time period, as presented in Table 5-16. Due to the very low counts for commercial vehicles, some of the screenlines show higher differences between the counts and model volumes than for total traffic (as presented in the previous table), but the observed differences are within an accpetable range.

Table 5-16. Comparison of Observed CV Traffic Counts and Modeled CV Volumes by Time Period

Screenline	AM			MD			PM			NT		
	Counts	Model	Diff.	Counts	Model	Diff.	Counts	Model	Diff.	Counts	Model	Diff.
NS1	560	649	16.0%	3,053	3,357	10.0%	1,604	1,829	14.0%	1,726	1,911	10.7%
NS2	977	946	-3.2%	2,426	2,476	2.0%	1,631	1,625	-0.3%	1,810	1,803	-0.4%
NS3	2,607	2,530	-3.0%	9,607	9,106	-5.2%	4,731	4,506	-4.8%	6,348	5,942	-6.4%
NS4	1,659	1,644	-0.9%	6,324	6,153	-2.7%	2,912	2,867	-1.5%	4,189	4,125	-1.5%
EW1	511	496	-3.0%	1,893	1,818	-3.9%	760	741	-2.4%	914	884	-3.3%
EW2	1,081	1,123	3.9%	4,084	4,282	4.9%	1,809	1,960	8.3%	2,096	2,369	13.0%
EW3	1,603	1,608	0.3%	5,257	5,458	3.8%	2,577	2,654	3.0%	2,861	3,169	10.8%
EW4	1,197	1,226	2.4%	4,026	4,086	1.5%	2,000	2,016	0.8%	2,148	2,215	3.1%
EW5	840	863	2.7%	3,157	3,280	3.9%	1,473	1,538	4.4%	1,654	1,800	8.8%
EW6	929	919	-1.0%	3,514	3,440	-2.1%	1,609	1,579	-1.8%	1,765	1,708	-3.2%

C&M not only compared the absolute difference of model results and observed counts by screenline but also by functional class. The model results by functional class are within the preferable range of deviation, as presented in Table 5-17.[4]

Table 5-17. Absolute Difference between Observed Traffic and Model Volumes by Functional class

Category	Absolute Difference Guidelines		LRGV TDM
	Acceptable	Preferable	
Freeway Volume-over Count	+/-7%	+/-6%	-5.7%
Divided Arterial Volume-over-Count	+/-15%	+/-10%	2.9%
Undivided Arterial Volume-over-Count	+/-15%	+/-10%	2.6%
Collectors Volume Over Count	+/-25%	+/-20%	2.5%
Freeway Peak Volume-over-Count	75% of links @ +/-20%	50% of links @ +/-10%	-3.7%
Major Arterial Peak Volume-over-Count	75% of links @ +/-30%	50% of links @ +/-15%	4.0%

Source: Florida Department of Transportation[4]

Another common measurement to evaluate calibration results besides the absolute difference is Root Mean Square Error (RMSE). RMSE is used to measure the differences between observed and predicted values, representing the standard deviation of the prediction errors.[4] Table 5-18 presents the acceptable and preferable standards of the RMSE parameters for different traffic volume links compared to the model assignment of each of the count locations used in the calibration.

Table 5-18. RMSE Between Observed Traffic and Model Volumes by Link Volume

Category	RMSE Guidelines		LRGV TDM RMSE
	Acceptable	Preferable	
< 5,000 AADT	100%	45%	20%
5,000-9,999 AADT	45%	35%	10%
10,000-14,999 AADT	35%	27%	16%
15,000-19,999 AADT	30%	25%	5%
20,000-29,999 AADT	27%	15%	28%
30,000-49,999 AADT	25%	15%	0%
50,000-59,999 AADT	20%	10%	0%
60,000+ AADT	19%	10%	0%
Areawide	45%	35%	2%

Source: Florida Department of Transportation[4]

It can be observed that almost all RMSE values of the LRGV TDM are well below the preferable thresholds, with only one value at the higher end of the acceptable threshold for AADTs between 20,000 and 29,999. These results indicate successful model calibration in terms of traffic volumes.

C&M also calibrated the TDM to actual speeds, comparing the most important ODs of the study area for commercial vehicles and passenger vehicles. Table 5-19 and Table 5-20 represent the TDM travel times between each of the selected OD pairs for AM and PM periods, respectively. The color scheme represents the absolute percent difference of the average travel times between the TDM and observed speeds from Google API, highlighting the OD pairs that have a lower and higher absolute percentage difference of 15 percent. As shown, the model reasonably replicates the travel times of the important ODs. The major reason for travel time differences is the delay times within the intersections, which are not directly considered in the TDM. It can be observed that at least 85 percent of all travel time ODs are within 15 percent of the observed data.

Table 5-19. TDM Travel Times and Differences Between Google API and TDM – AM Period

		TDM Travel Time (in Minutes)												
TAZ	Refference	Alamo Downtown	Pharr Downtown	La Plaza Mall	Mission Downtown	Donna	Weslaco Downtown	Payne Arena	Mc Allen Foreign	Mc Allen Downtown	Donna POE	Pharr POE	Hidalgo POE	Anzalduas POE
55	Alamo Downtown		8	14	22	8	14	22	19	15	17	18	24	26
82	Pharr Downtown	7		9	17	14	19	17	14	9	22	15	20	21
116	La Plaza Mall	15	9		11	21	26	8	6	5	26	15	12	14
180	Mission Downtown	26	20	13		33	38	20	14	14	38	27	22	10
398	Donna	8	15	21	29		7	29	26	22	12	24	31	33
428	Weslaco Downtown	14	20	26	34	7		33	31	27	14	28	35	38
491	Payne Arena	22	17	9	19	29	33		7	13	18	8	4	13
751	Mc Allen Foreign	21	15	7	14	27	32	7		11	24	14	8	8
759	Mc Allen Downtown	14	9	5	12	21	26	13	10		30	20	16	17
3301	Donna POE	17	22	26	36	12	15	18	24	30		14	20	31
5459	Pharr POE	18	15	16	27	24	28	8	14	20	14		10	21
5437	Hidalgo POE	24	20	12	20	30	34	4	8	16	20	9		14
7377	Anzalduas POE	28	23	15	10	35	40	14	8	18	31	21	15	
	Difference			< +/- 15%			> +/- 15%							

Table 5-20. TDM Travel Times and Difference Between Google API and TDM – PM Period

		TDM Travel Time (in Minutes)												
TAZ	Refference	Alamo Downtown	Pharr Downtown	La Plaza Mall	Mission Downtown	Donna	Weslaco Downtown	Payne Arena	Mc Allen Foreign	Mc Allen Downtown	Donna POE	Pharr POE	Hidalgo POE	Anzalduas POE
55	Alamo Downtown		7	13	23	8	13	21	19	14	17	18	24	26
82	Pharr Downtown	7		9	18	14	18	16	15	9	22	15	20	21
116	La Plaza Mall	13	8		12	20	24	9	7	5	26	16	12	14
180	Mission Downtown	23	17	11		29	34	20	14	12	37	27	21	10
398	Donna	8	14	20	29		6	28	26	21	12	24	30	33
428	Weslaco Downtown	14	19	25	34	6		33	31	26	14	28	34	38
491	Payne Arena	21	16	8	19	28	32		7	13	19	8	4	13
751	Mc Allen Foreign	19	14	7	14	26	30	7		11	25	14	8	8
759	Mc Allen Downtown	14	9	5	14	21	25	13	11		30	20	16	17
1542	Donna POE	17	22	26	37	12	14	18	24	30		14	20	31
1543	Pharr POE	18	15	15	26	24	28	8	14	20	14		10	20
1544	Hidalgo POE	24	19	12	21	30	34	4	8	16	20	10		14
1545	Anzalduas POE	25	20	14	10	32	36	13	8	17	31	21	14	

Difference: < +/- 15% ; > +/- 15%

[1] Texas Department of Transportation (2016, June). TEXPACK - Integrated Travel Demand Modeling Application, Texas Planning Conference. Retrieved from https://static.tti.tamu.edu/conferences/tpp16/presentations/breakout-12/hall.pdf

[2] Rio Grande Valley Metropolitan Planning Organization (2020, July 24). Metropolitan Transportation Plan (MTP) Amendment #2. Retrieved from https://www.rgvmpo.org/civicax/filebank/blobdload.aspx?blobid=24016

[3] Rio Grande Valley Metropolitan Planning Organization (2020, May). RGVMPO FY 2019-2022 TIP. Retrieved from https://www.rgvmpo.org/civicax/filebank/blobdload.aspx?blobid=24139

[4] Cambridge Systematics, Inc. (2008, October 2). FSUTMS-Cube Framework Phase II Model Calibration and Validation Standards, Prepared for: the Florida Department of Transportation Systems Planning Office. Retrieved from http://www.fsutmsonline.net/images/uploads/reports/FR2_FDOT_Model_CalVal_Standards_Final_Report_10.2.08.pdf

[5] U.S. Census (n.d.). Quick Facts: Hidalgo County, Texas; Hidalgo County, New Mexico; United States. Retrieved September 8, 2020 from https://www.census.gov/quickfacts/fact/table/hidalgocountytexas,hidalgocountynewmexico,US/PST045219

[6] Transportation Research Board (1982, December). National Cooperative Highway Research Program Report 255, Highway Traffic Data for Urbanized Area Project Planning and Design. Washington, D.C.

[7] Texas Department of Transportation (n.d.). Traffic Count Database System. Retrieved September 8, 2020 from https://txdot.ms2soft.com/tcds/tsearch.asp?loc=Txdot&mod=tcds&local_id=57CC441

[8] C&M Associates, Inc. (2020, March). Donna–Rio Bravo International Bridge Investment Grade Traffic and Revenue Study.

[9] Federal Highway Administration, U.S. Department of Transportation (1990). Calibration and adjustment of system planning models. Washington, DC: National Transportation Library. Retrieved from http://ntl.bts.gov/DOCS/377CAS.html

Chapter 6: TRAFFIC & REVENUE FORECAST

The following chapter presents the traffic and revenue (T&R) estimates for the Project over a forecast period of 40 years. C&M employed the adopted TxDOT LRGV TDM to model the Project's traffic for a typical working day and perform future scenario runs to forecast traffic for the years 2025, 2030, 2040, and 2045 (see Chapter 5 for details regarding the modeling effort). After the traffic forecast for a typical working day was developed, C&M estimated the toll rate and corresponding traffic through its toll diversion procedure and determined the T&R of the facility for each model year. C&M then incorporated this information into its post-processing model designed to estimate T&R on an annual basis. Traffic was interpolated between model years as well as extrapolated after the final model year 2045 to cover the entire forecast period of 2025 to 2064.

C&M also incorporated the results of its traffic data analysis and, based on experience with existing toll road facilities, utilized a series of assumptions regarding toll system implementation and enforcement. Furthermore, the T&R analysis was conducted with the assumption that exit ramps for the Project will be designed with proper geometric configuration and traffic control to ensure that traffic is not negatively affected. Other assumptions used in the development of the post-processing model, as well as assumptions pertaining to the toll collection system, are discussed in this chapter.

Finally, C&M modeled several T&R sensitivity scenarios to determine the forecasted revenue's sensitivity to changes in various factors—such as toll rate, VOT, VOR, and population growth, among others—and performed a risk analysis to quantify the uncertainty associated with the TDM key input variables and the impact that this uncertainty has on the confidence level of the T&R forecast. The methodology and results of the sensitivity analysis and risk analysis are presented at the end of this chapter.

6.1. Toll Collection System and Schedule

The Project is assumed to open to traffic on January 1, 2025. C&M's analysis also assumed that tolls will be collected by means of electronic toll collection (ETC) and video recognition systems only. The ETC system relies on transponders mounted inside vehicles, which—when detected by overhead gantries—electronically identify each vehicle, thus registering the appropriate toll and making it possible for travelers to proceed without stopping. In addition to their ETC function, these gantries are also expected to have video capability, allowing them to photograph the license plates of vehicles not equipped with transponders. Once these license plate images are processed, toll bills can be sent by mail to the registered vehicle owners. Toll gantry locations were chosen with the intent of capturing all travelers using the Project.

6.1.1. Toll Treatment

After analyzing several different toll systems, C&M developed the toll gantry configuration presented in Figure 6-1. Under this configuration, the entire length of the toll road comprises four toll segments, with one mainlane gantry (MLG) located on each segment. Five additional gantries were placed at selected entry and exit ramps to ensure that all possible vehicle movements are tolled.

Table 6-1 summarizes the definition of the toll segments and their corresponding lengths.

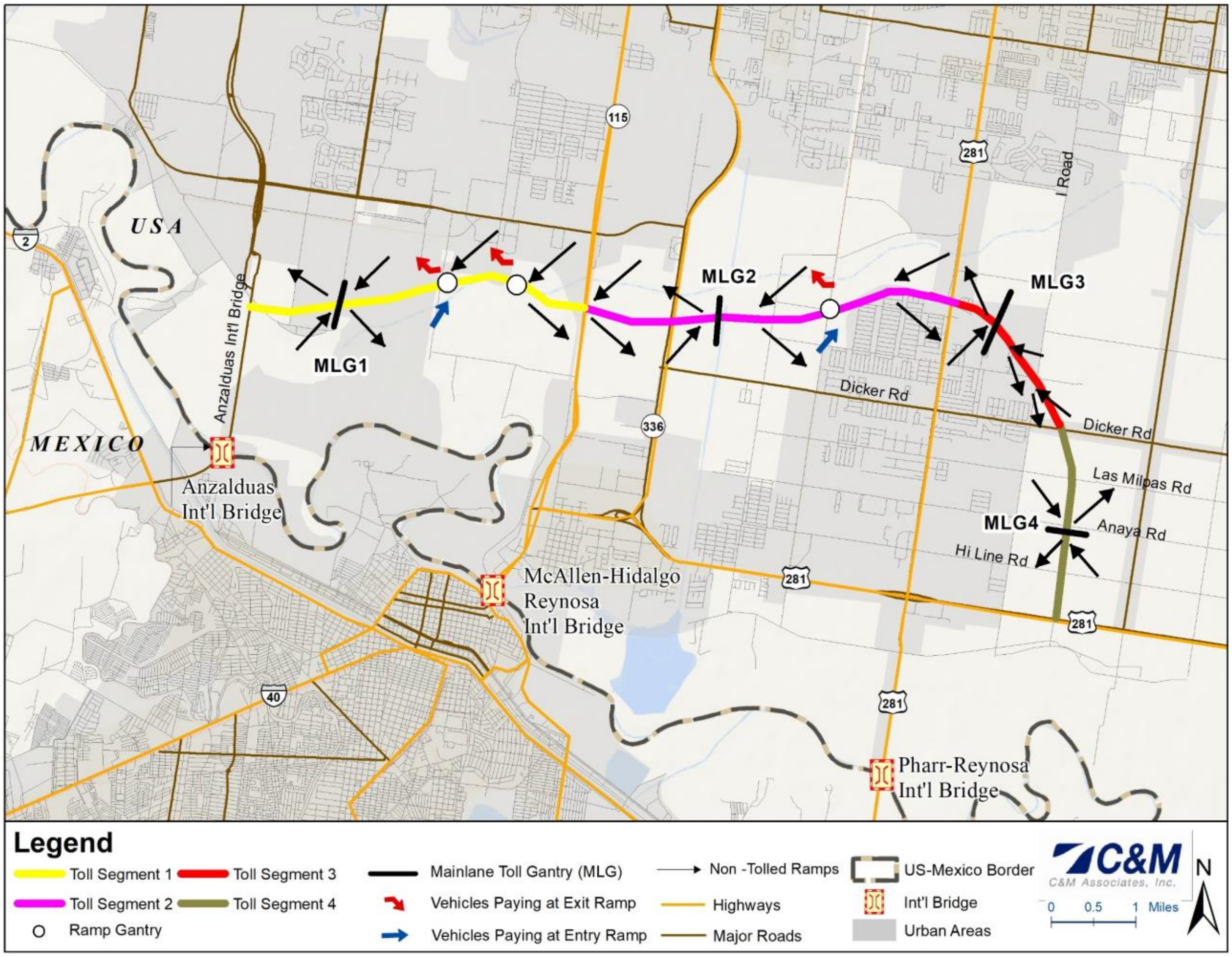


Figure 6-1. Final Toll Treatment

Table 6-1. Description of Toll Segments

ID	From	To	Length (mi)
1	Anzalduas GSA Connector	SH 115 (S. 23rd St)	4.3
2	SH 115 (S. 23rd St)	US 281 (S. Cage Blvd)	4.0
3	US 281 (S. Cage Blvd)	Dicker Road	2.0
4	Dicker Road	US 281 (Military Hwy)	1.8

6.1.2. Toll Rate

C&M defined the Project's toll rate per mile by striking a balance between revenue maximization and traffic throughput maximization to reduce congestion. C&M conducted a series of model runs to determine the optimum toll rate per mile, increasing the toll rate for all gantries simultaneously. This analysis was performed for model years 2025 and 2045. Figure 6-2 and Figure 6-3 illustrate the sensitivities of daily transactions and daily revenue to different toll rates per mile in 2025 and 2045, respectively. Toll rates and daily revenue are presented in 2020 dollars. As shown, daily revenue was maximized at approximately $0.22 per mile in 2025. This maximum point increases in future years, reaching $0.23 by 2045.

Based on the results of this sensitivity analysis, C&M chose an initial toll rate (i.e., the toll rate at the opening of the Project) of $0.20 per mile (in 2020 dollars). This toll rate is approximately 1 cent higher than the toll rate selected in C&M's 2016 Investment Grade T&R Study (in 2020 dollars). For comparison, the closest existing toll road to the Project is SH 550 in Cameron County, which as of January 2021 is charging $0.20 per mile.

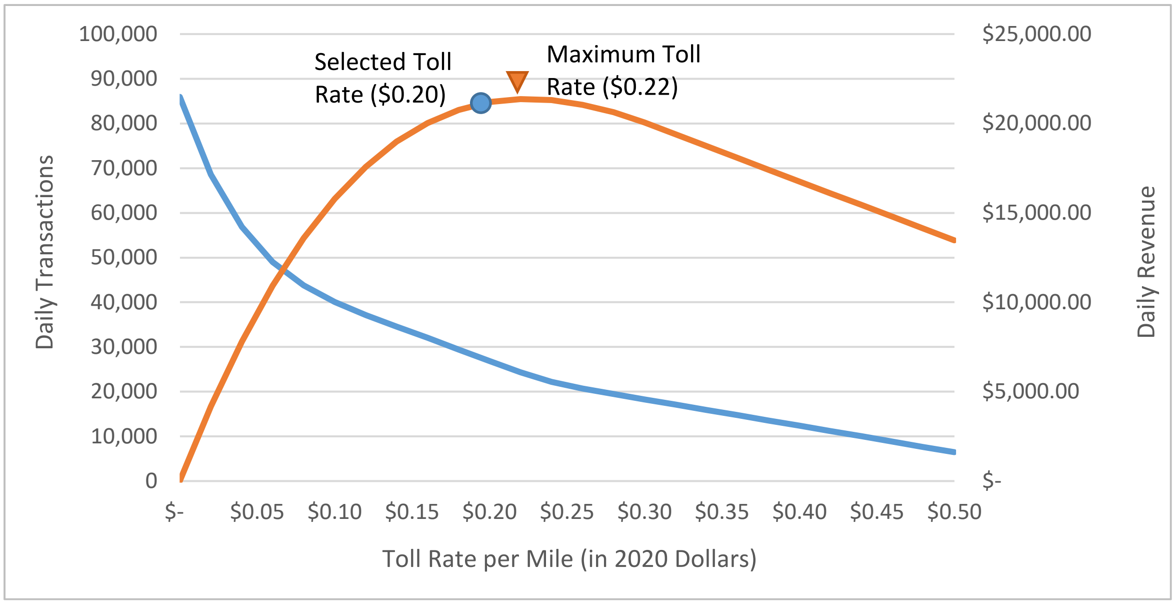


Figure 6-2. Daily T&R Sensitivity to Toll Rate – 2025

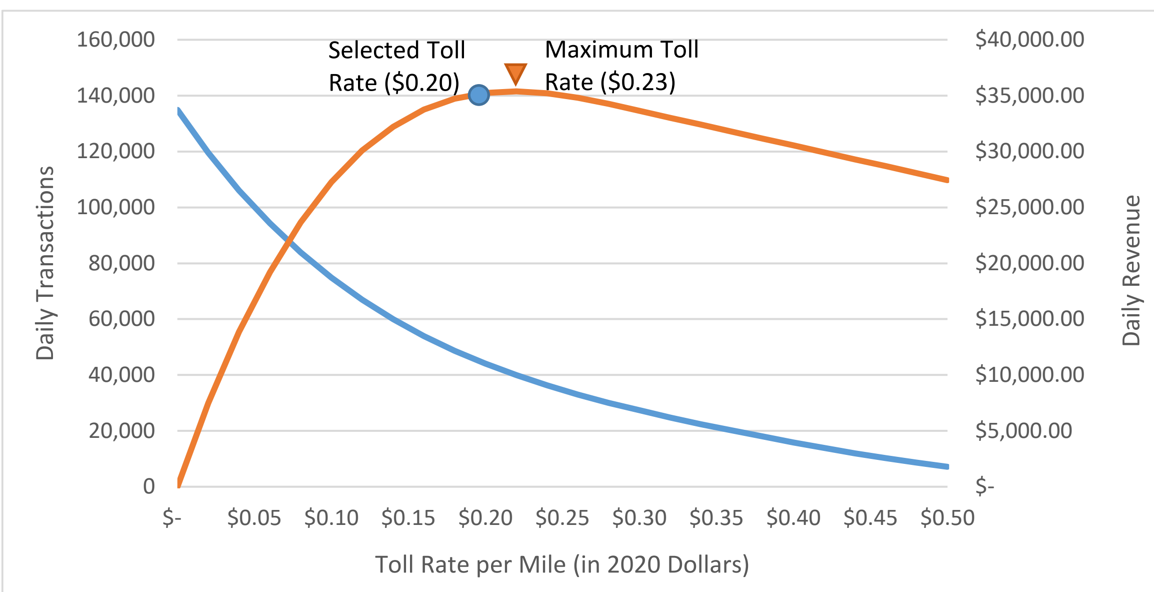


Figure 6-3. Daily T&R Sensitivity to Toll Rate – 2045

Following a common method in the industry, commercial vehicles are charged a higher toll rate than passenger vehicles, with each commercial vehicle paying the passenger vehicle rate multiplied by *N-1*, where *N* is the number of axles.

Figure 6-4 and Figure 6-5 present the toll rates (in nominal dollars) of all gantries for opening year 2025 and 2045, respectively. C&M's chosen initial toll rate of $0.20 is assumed to increase every year based on the consumer price index (CPI) of Texas. CPI is one of several price indices calculated by most national statistical agencies, measuring changes in the price level of consumer goods and services purchased by households. C&M used the average CPI forecast from Moody's for the cities of Houston, Sugar Land, Baytown, and the Dallas–Fort Worth–Arlington Metropolitan Area, which is commonly used to represent Texas CPI (see Chapter 4).

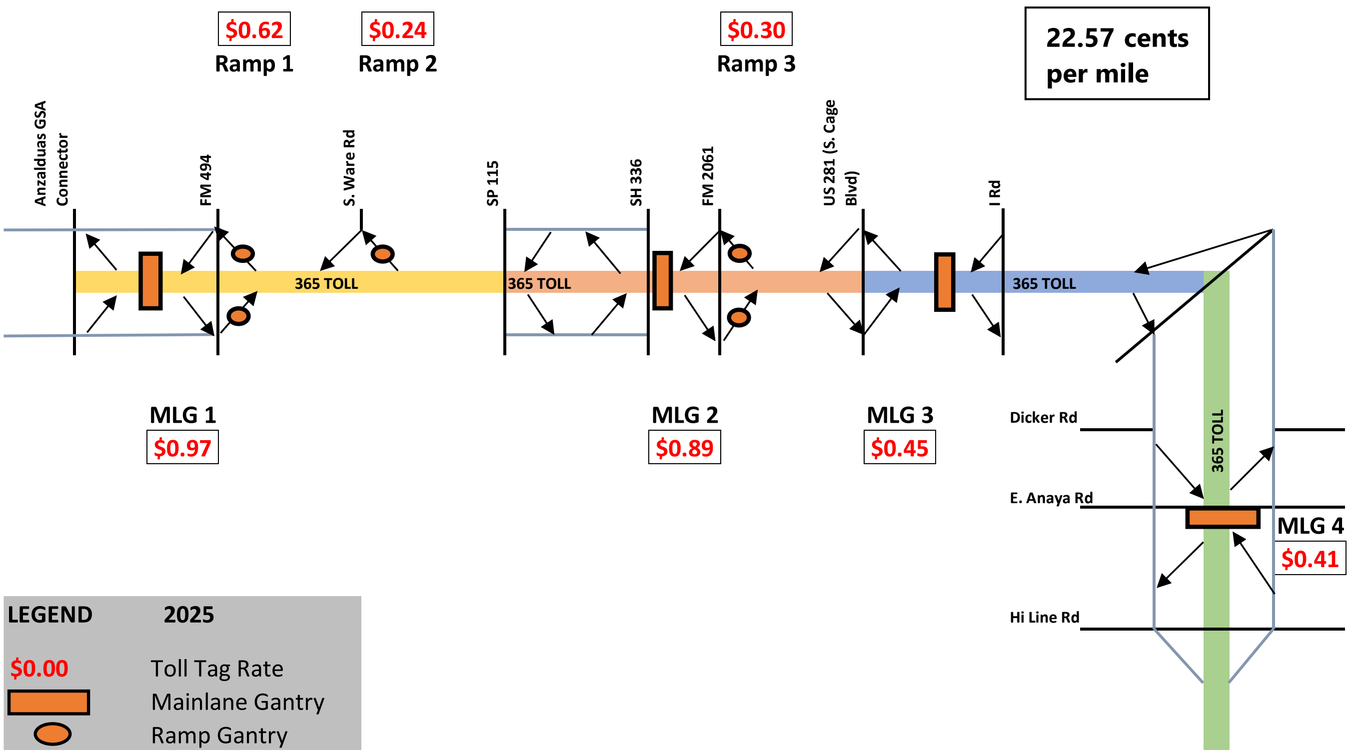


Figure 6-4. Toll Rates by Gantry in Opening Year 2025 (in Nominal Dollars)

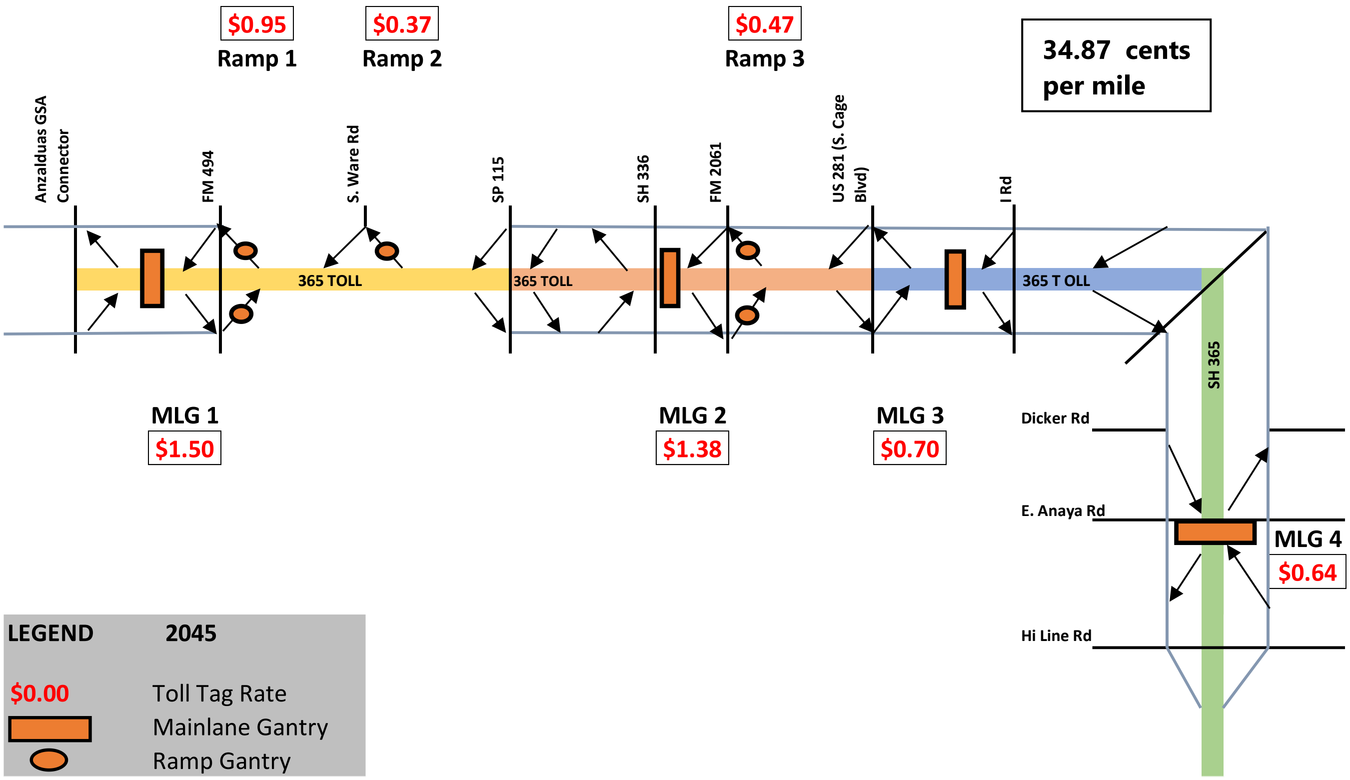


Figure 6-5. Toll Rates by Gantry in 2045 (in Nominal Dollars)

Based on 2020 prices, Figure 6-6 compares the average toll rate per mile used in this analysis to the ETC toll rates of various toll roads across the United States. While these findings indicate that the Project's proposed toll rate falls within the range of other toll roads, it is important to note that this comparison is intended only as a benchmark since it does not include all U.S. toll roads. It is also worth noting that the toll roads listed in Figure 6-6 differ significantly from one another in terms of their function (urban vs. inter-urban), length, land use, and regional socioeconomic trends. The toll rate per mile of 365 TOLL will increase over the years and will be different in the opening year of the Project, as well as the toll rate of other facilities that are shown here.

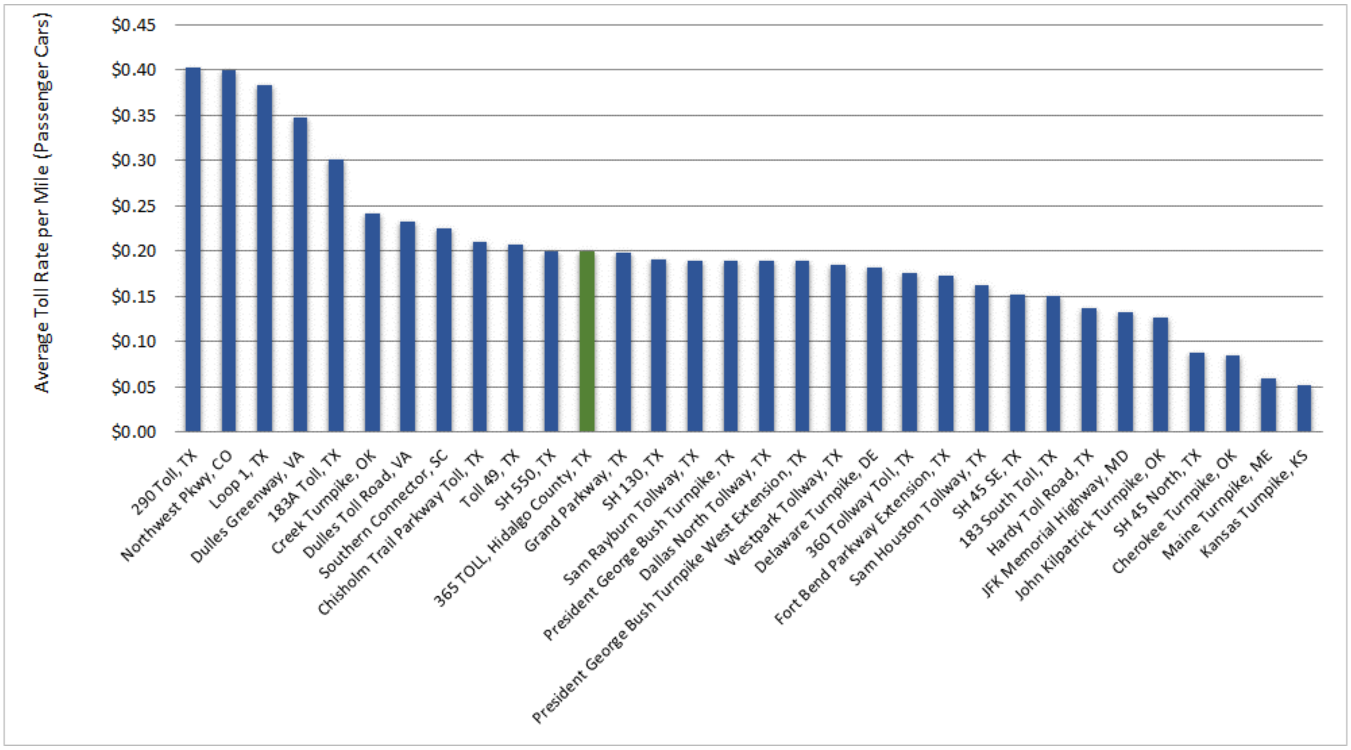


Figure 6-6. 2020 ETC Toll Rates among Various U.S. Toll Roads

6.2. Toll Diversion Model

Toll diversion models are used to estimate traffic demand for facilities such as toll roads, toll bridges, and managed lanes, simulating the driver's decision to use either a toll road and pay the related cost or the toll-free route to their destination. C&M's toll diversion models are structured as logit functions, dividing tolled and non-tolled trips on the basis of travel time savings and toll costs with respect to the socioeconomic characteristics of the individual traveler. The final calculation of the logit function estimates a probability that reflects the share of tolled and non-tolled trips between any given OD pair that may utilize the toll facility. The toll diversion model is run during the traffic assignment process in the TDM, creating two paths between each OD: one including the tolled Project and one that excludes the Project network links. The travel time savings and the toll cost (or lack of a toll) associated with each travel path are the inputs to the toll diversion model.

The following section provides a summary of C&M's methodology and implementation of its toll diversion model to estimate the Project's demand.

6.2.1. Toll Diversion Model Methodology

The final calculation of the logit function is a probability of the total number of trips using the tolled Project for each of the given OD pairs. C&M's logit function uses the following equation:

$$P_{ij}^{toll} = \frac{e^{U_{ij}^{toll}}}{e^{U_{ij}^{toll}} + e^{U_{ij}^{free}}}$$

Where:

P_{ij}^{toll} = Probability of selecting toll project origin TAZ i to destination TAZ j

e = Base of natural logarithm

$$U_{ij}^{toll} = \beta_0 + \beta_1 * Time_{ij}^{toll} + \beta_2 * SDTime_{ij} + \beta_3 * Toll_{ij} * (\frac{Income_i}{AverageIncome})^{\lambda}$$

$$U_{ij}^{free} = \beta_1 * Time_{ij}^{free} + \beta_2 * SDTime_{ij}$$

β_0 = Constant

β_1 = Coefficient of time

β_2 = Coefficient of standard deviation of travel time (reliability)

β_3 = Coefficient of toll

λ = Coefficient of Income multiplicator

$\mathrm{Time}_{ij}^{toll}$ = Time travel (in minutes) of the tolled route between the origin TAZ i and destination TAZ j

$\mathrm{Time}_{ij}^{free}$ = Time travel (in minutes) of the toll-free route between the origin TAZ i and destination TAZ j

$Toll_{ij}$ = Toll (in dollars) between the origin TAZ i and destination TAZ j

$SDTime_{ij}$= Observed standard deviation of the travel time between origin TAZ i and destination TAZ j

The toll diversion model discussed above was incorporated into the TDM's traffic assignment procedure using the TransCAD macro language (GISDK). This macro performs several iterations, distributing total trips into tolled trips and toll-free trips—to reflect changes in travel times as traffic levels change on the tolled and non-tolled routes—and then assigning them to the corresponding network configurations.

6.2.2. Toll Diversion Model Coefficients

To estimate the toll diversion model coefficients, C&M conducted stated preference and stated reliability surveys for passenger and commercial vehicles (see Chapter 3 and Appendix A). The results of the surveys were used to determine VOTs and VORs for the corresponding travel modes (trip tables) of the TDM traffic assignment. The resulting model coefficients and their related VOTs and VORs (in 2020 dollars) are presented in Table 6-2 for each of the model travel modes.

Table 6-2. Toll Diversion Model Coefficients

Type	Description	Code	Constant	Time Coefficient	SD Time Coefficient	Toll Coefficient	VOT ($/hr.)	VOR ($/hr.)
PVs	Home-Based-Work	HBW	0.196	-0.208	-0.366	-0.982	$12.74	$22.34
	Home-Based-Non-Work	HNW	0.196	-0.305	-0.366	-1.687	$10.85	$13.00
	None-Home-Based	NHB	0.178	-0.249	-0.333	-1.088	$13.72	$18.35
CVs	Internal Commercial Vehicles	ICV	0.059	-0.078	-0.095	-0.143	$32.78	$39.65
PVs	External Passenger Vehicles	EPV	0.000	-0.222	0.000	-1.000	$13.34	NA
	Hidalgo County International Bridges - Passenger Vehicles	HPV	0.000	-0.257	0.000	-0.927	$16.65	NA
CVs	External Commercial Vehicles	ECV	0.081	-0.104	-0.129	-0.141	$44.29	$55.05
	Hidalgo County International Bridges - Commercial Vehicles	HCV	0.058	-0.085	-0.092	-0.135	$38.12	$41.16
	Hidalgo County International Bridges - Overweight Commercial Vehicles	OWCV	0.053	-0.093	-0.086	-0.131	$42.51	$39.28

Note: PV = passenger vehicle; CV = commercial vehicle; NA = not applicable

It is worth mentioning that the VOR concept is only applicable to drivers who visit the study area frequently, which does not necessarily apply to the external passenger vehicles trip purpose. Toll diversion curves were scaled to reflect modeled travel times. Figure 6-7 illustrates the probability of each of the above trip types using the Project based on time savings, considering a toll of $1.30 (in 2020 dollars) to travel about half of the Project length as an example.

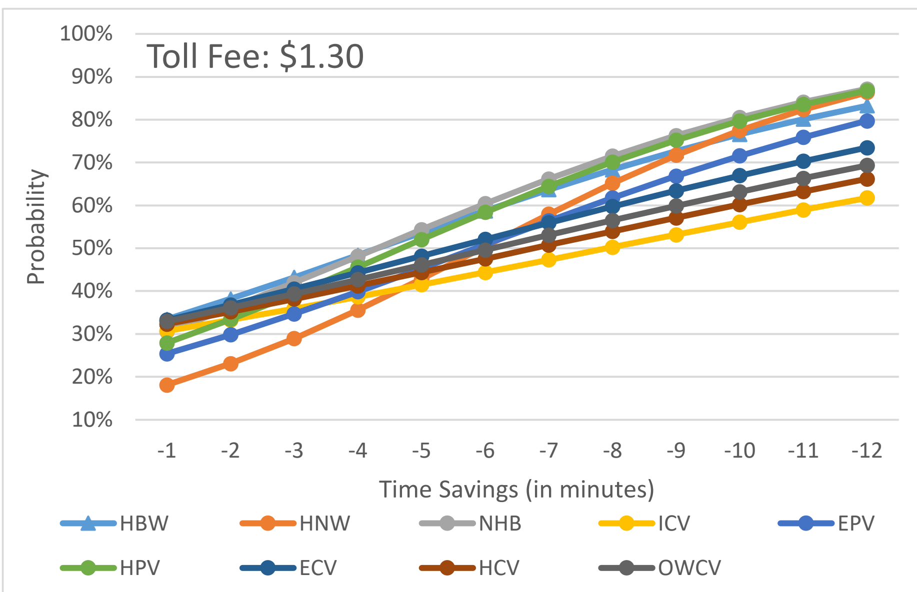


Figure 6-7. Probability of Using the Project by Trip Type and Time Savings

Figure 6-8 shows graphically the probability for each of the above presented toll diversion models based on different toll-rates, considering a consistent time savings of 6 minutes, which represents a common travel time of the Project (for example: from the Pharr International Bridge to the McAllen Free Trade Zone).

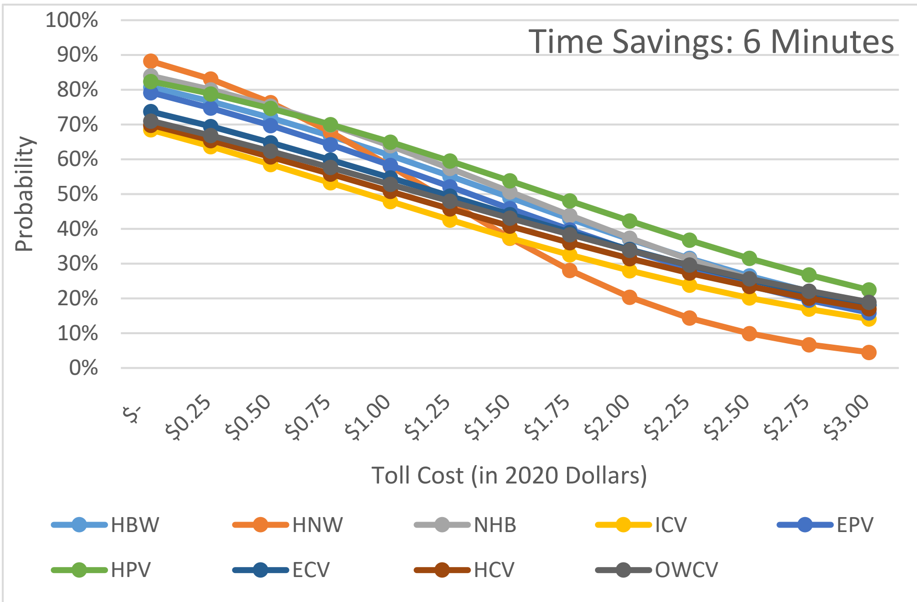


Figure 6-8. Probability of Using the Project by Trip Type varying Toll Cost

The last element of the toll diversion model logit function is the income multiplicator factor, which affects the toll utility component in such a way that trips originating in a TAZ with an above-average median household income (compared to the RGVMPO region) will increase the toll coefficient, resulting in a higher VOT for these trips. Similarly, if the origin TAZ has a below-average median household income, the toll coefficient will decrease along with VOT. The income factor comes from the ratio of the median household income (in 2020 dollars) of the origin (i) of the trip and the average income of the RGVMPO region (Hidalgo and Cameron County). The income multiplication factor is only applied to internal passenger vehicle trips.

6.2.3. Toll Diversion Model Results

The results from the toll diversion model can be observed on screenlines EW2, EW3, and NS1, which are the screenlines that cross the Project (see Chapter 5, Figure 5-13). Table 6-3 through Table 6-14 present the daily screenline shares for the tolled ($0.20, in 2020 dollars) and toll-free scenarios—as well as the volume retention rate from the Project—for model years 2025, 2030, 2040, and 2045.

Table 6-3. Daily Screenline Volumes and Toll Retention – NS1 (2025)

Road	Direction	Daily Volume			Comparison		
		No Build (NB)	Build				
			Free	Tolled ($0.2)	Free vs NB	Tolled vs NB	Tolled vs Free
		A	B	C	(B-A)/A	(C-A)/A	(C-B)/B
365TOLL	SB	0	3,160	1,080			-65.8%
365TOLL	NB	0	4,920	1,590			-67.7%
365TOLLFR	SB	0	0	0			
365TOLLFR	NB	0	0	10			
US281	SB	3,760	3,320	3,590	-11.7%	-4.5%	8.1%
US281	NB	3,270	2,470	2,850	-24.5%	-12.8%	15.4%
SP115	SB	13,380	14,550	14,980	8.7%	12.0%	3.0%
SP115	NB	13,460	16,140	15,620	19.9%	16.0%	-3.2%
10ST	SB	8,120	7,980	7,890	-1.7%	-2.8%	-1.1%
10ST	NB	10,090	8,320	9,240	-17.5%	-8.4%	11.1%
JACKRD	SB	6,550	5,670	6,080	-13.4%	-7.2%	7.2%
JACKRD	NB	5,840	5,490	5,560	-6.0%	-4.8%	1.3%
Total (without the project)		**64,470**	**63,940**	**65,820**			
Total (with the project)		**64,470**	**72,020**	**68,490**	**11.7%**	**6.2%**	
365TOLL Capture Percent			11%	4%			
365TOLL Retention Percent							33.1%
Total	Screenline	96,830	98,580	98,550	1.8%	1.8%	

Table 6-4. Daily Screenline Volumes and Toll Retention – NS1 (2030)

Road	Direction	Daily Volume			Comparison		
		No Build (NB)	Build				
			Free	Tolled ($0.2)	Free vs NB	Tolled vs NB	Tolled vs Free
		A	B	C	(B-A)/A	(C-A)/A	(C-B)/B
365TOLL	SB	0	3,690	1,310			-64.5%
365TOLL	NB	0	5,640	2,010			-64.4%
365TOLLFR	SB	0	0	0			
365TOLLFR	NB	0	0	0			
US281	SB	4,220	3,780	4,160	-10.4%	-1.4%	10.1%
US281	NB	3,510	2,900	3,260	-17.4%	-7.1%	12.4%
SP115	SB	14,350	15,990	16,490	11.4%	14.9%	3.1%
SP115	NB	14,400	17,730	17,040	23.1%	18.3%	-3.9%
10ST	SB	8,820	8,910	8,730	1.0%	-1.0%	-2.0%
10ST	NB	10,980	9,760	10,460	-11.1%	-4.7%	7.2%
JACKRD	SB	7,260	6,270	7,020	-13.6%	-3.3%	12.0%
JACKRD	NB	6,220	6,140	6,210	-1.3%	-0.2%	1.1%
Total (without the project)		**69,760**	**71,480**	**73,370**			
Total (with the project)		**69,760**	**80,810**	**76,690**	**15.8%**	**9.9%**	
365TOLL Capture Percent			12%	4%			
365TOLL Retention Percent							35.6%
Total	Screenline	105,640	113,250	112,010	7.2%	6.0%	

Table 6-5. Daily Screenline Volumes and Toll Retention – NS1 (2040)

Road	Direction	Daily Volume			Comparison		
		No Build (NB)	Build				
			Free	Tolled ($0.2)	Free vs NB	Tolled vs NB	Tolled vs Free
		A	B	C	(B-A)/A	(C-A)/A	(C-B)/B
365TOLL	SB	0	4,590	1,620			-64.7%
365TOLL	NB	0	7,860	2,740			-65.1%
365TOLLFR	SB	0	0	0			
365TOLLFR	NB	0	0	10			
US281	SB	4,710	4,850	4,590	3.0%	-2.5%	-5.4%
US281	NB	4,240	3,260	3,720	-23.1%	-12.3%	14.1%
SP115	SB	15,820	18,600	18,460	17.6%	16.7%	-0.8%
SP115	NB	16,190	20,640	19,300	27.5%	19.2%	-6.5%
10ST	SB	10,270	9,720	10,550	-5.4%	2.7%	8.5%
10ST	NB	12,610	10,520	12,160	-16.6%	-3.6%	15.6%
JACKRD	SB	8,300	6,550	7,200	-21.1%	-13.3%	9.9%
JACKRD	NB	7,650	6,770	6,700	-11.5%	-12.4%	-1.0%
Total (without the project)		**79,790**	**80,910**	**82,690**			
Total (with the project)		**79,790**	**93,360**	**87,050**	**17.0%**	**9.1%**	
365TOLL Capture Percent			13%	5%			
365TOLL Retention Percent							35.0%
Total	Screenline	121,100	130,010	128,010	7.4%	5.7%	

Table 6-6. Daily Screenline Volumes and Toll Retention – NS1 (2045)

Road	Direction	Daily Volume			Comparison		
		No Build (NB)	Build				
			Free	Tolled ($0.2)	Free vs NB	Tolled vs NB	Tolled vs Free
		A	B	C	(B-A)/A	(C-A)/A	(C-B)/B
365TOLL	SB	0	5,200	1,960			-62.3%
365TOLL	NB	0	8,400	3,240			-61.4%
365TOLLFR	SB	0	0	0			
365TOLLFR	NB	0	0	10			
US281	SB	4,770	4,800	4,560	0.6%	-4.4%	-5.0%
US281	NB	4,260	3,190	3,710	-25.1%	-12.9%	16.3%
SP115	SB	16,120	18,760	18,570	16.4%	15.2%	-1.0%
SP115	NB	16,380	20,680	19,270	26.3%	17.6%	-6.8%
10ST	SB	10,410	9,940	10,810	-4.5%	3.8%	8.8%
10ST	NB	12,860	10,710	12,400	-16.7%	-3.6%	15.8%
JACKRD	SB	8,450	6,710	7,430	-20.6%	-12.1%	10.7%
JACKRD	NB	7,950	6,980	6,970	-12.2%	-12.3%	-0.1%
Total (without the project)		**81,200**	**81,770**	**83,730**			
Total (with the project)		**81,200**	**95,370**	**88,930**	**17.5%**	**9.5%**	
365TOLL Capture Percent			14%	6%			
365TOLL Retention Percent							38.3%
Total	Screenline	123,370	133,610	130,670	8.3%	5.9%	

Table 6-7. Daily Screenline Volumes and Toll Retention – EW2 (2025)

Road	Direction	Daily Volume			Comparison		
			Build				
		No Build (NB)	Free	Tolled ($0.2)	Free vs NB	Tolled vs NB	Tolled vs Free
		A	B	C	(B-A)/A	(C-A)/A	(C-B)/B
365TOLL	WB	0	12,390	4,160			-66.4%
365TOLL	EB	0	13,330	4,560			-65.8%
MILHWY	WB	16,170	11,680	16,630	-27.8%	2.8%	42.4%
MILHWY	EB	15,350	12,820	16,520	-16.5%	7.6%	28.9%
I2	WB	63,260	58,090	60,410	-8.2%	-4.5%	4.0%
I2	EB	65,050	59,450	62,440	-8.6%	-4.0%	5.0%
I2FR	WB	19,450	19,420	19,380	-0.2%	-0.4%	-0.2%
I2FR	EB	10,450	9,460	9,480	-9.5%	-9.3%	0.2%
BS83	WB	13,690	12,780	13,020	-6.6%	-4.9%	1.9%
BS83	EB	12,860	12,220	12,390	-5.0%	-3.7%	1.4%
Total (without the project)		**216,280**	**195,920**	**210,270**			
Total (with the project)		**216,280**	**221,640**	**218,990**	**2.5%**	**1.3%**	
365TOLL Capture Percent			12%	4%			
365TOLL Retention Percent							33.9%
Total	Screenline	282,740	284,980	283,400	0.8%	0.2%	

Table 6-8. Daily Screenline Volumes and Toll Retention – EW2 (2030)

Road	Direction	Daily Volume			Comparison		
			Build				
		No Build (NB)	Free	Tolled ($0.2)	Free vs NB	Tolled vs NB	Tolled vs Free
		A	B	C	(B-A)/A	(C-A)/A	(C-B)/B
365TOLL	WB	0	14,360	4,710			-67.2%
365TOLL	EB	0	15,160	5,200			-65.7%
MILHWY	WB	16,440	12,940	18,210	-21.3%	10.8%	40.7%
MILHWY	EB	16,050	14,260	17,730	-11.2%	10.5%	24.3%
I2	WB	67,030	64,140	66,700	-4.3%	-0.5%	4.0%
I2	EB	67,750	64,790	67,450	-4.4%	-0.4%	4.1%
I2FR	WB	20,430	20,060	20,370	-1.8%	-0.3%	1.5%
I2FR	EB	11,840	10,950	11,800	-7.5%	-0.3%	7.8%
BS83	WB	14,810	14,310	14,710	-3.4%	-0.7%	2.8%
BS83	EB	13,490	13,170	13,440	-2.4%	-0.4%	2.1%
Total (without the project)		**227,840**	**214,620**	**230,410**			
Total (with the project)		**227,840**	**244,140**	**240,320**	**7.2%**	**5.5%**	
365TOLL Capture Percent			12%	4%			
365TOLL Retention Percent							33.6%
Total	Screenline	307,440	323,100	320,510	5.1%	4.3%	

Table 6-9. Daily Screenline Volumes and Toll Retention – EW2 (2040)

Road	Direction	Daily Volume			Comparison		
		No Build (NB)	Build				
			Free	Tolled ($0.2)	Free vs NB	Tolled vs NB	Tolled vs Free
		A	B	C	(B-A)/A	(C-A)/A	(C-B)/B
365TOLL	WB	0	24,090	6,530			-72.9%
365TOLL	EB	0	24,230	6,340			-73.8%
MILHWY	WB	18,160	8,910	19,040	-50.9%	4.8%	113.7%
MILHWY	EB	17,300	12,410	19,190	-28.3%	10.9%	54.6%
I2	WB	75,730	72,120	74,990	-4.8%	-1.0%	4.0%
I2	EB	76,180	71,640	75,480	-6.0%	-0.9%	5.4%
I2FR	WB	21,390	20,850	21,790	-2.5%	1.9%	4.5%
I2FR	EB	13,770	13,140	13,940	-4.6%	1.2%	6.1%
BS83	WB	16,640	15,960	16,450	-4.1%	-1.1%	3.1%
BS83	EB	15,540	15,140	15,560	-2.6%	0.1%	2.8%
Total (without the project)		**254,710**	**230,170**	**256,440**			
Total (with the project)		**254,710**	**278,490**	**269,310**	**9.3%**	**5.7%**	
365TOLL Capture Percent			17%	5%			
365TOLL Retention Percent							26.6%
Total	Screenline	343,730	365,000	358,580	6.2%	4.3%	

Table 6-10. Daily Screenline Volumes and Toll Retention – EW2 (2045)

Road	Direction	Daily Volume			Comparison		
		No Build (NB)	Build				
			Free	Tolled ($0.2)	Free vs NB	Tolled vs NB	Tolled vs Free
		A	B	C	(B-A)/A	(C-A)/A	(C-B)/B
365TOLL	WB	0	25,040	7,330			-70.7%
365TOLL	EB	0	25,120	7,290			-71.0%
MILHWY	WB	18,780	9,360	19,260	-50.2%	2.6%	105.8%
MILHWY	EB	17,920	12,920	19,810	-27.9%	10.5%	53.3%
I2	WB	77,210	73,690	76,620	-4.6%	-0.8%	4.0%
I2	EB	77,620	73,350	76,780	-5.5%	-1.1%	4.7%
I2FR	WB	21,900	21,020	21,620	-4.0%	-1.3%	2.9%
I2FR	EB	14,570	13,620	14,590	-6.5%	0.1%	7.1%
BS83	WB	16,890	16,120	16,720	-4.6%	-1.0%	3.7%
BS83	EB	15,710	15,440	15,730	-1.7%	0.1%	1.9%
Total (without the project)		**260,600**	**235,520**	**261,130**			
Total (with the project)		**260,600**	**285,680**	**275,750**	**9.6%**	**5.8%**	
365TOLL Capture Percent			18%	5%			
365TOLL Retention Percent							29.1%
Total	Screenline	351,200	373,580	366,350	6.4%	4.3%	

Table 6-11. Daily Screenline Volumes and Toll Retention – EW3 (2025)

Road	Direction	Daily Volume			Comparison		
		No Build (NB)	Build				
			Free	Tolled ($0.2)	Free vs NB	Tolled vs NB	Tolled vs Free
		A	B	C	(B-A)/A	(C-A)/A	(C-B)/B
365TOLL	WB	0	12,990	4,300			-66.9%
365TOLL	EB	0	11,100	3,760			-66.1%
365TOLLFR	WB	0	0	0			
365TOLLFR	EB	0	0	0			
MILHWY	WB	8,500	5,080	7,140	-40.2%	-16.0%	40.6%
MILHWY	EB	8,260	5,290	6,950	-36.0%	-15.9%	31.4%
DICKRD	WB	7,840	7,340	7,700	-6.4%	-1.8%	4.9%
DICKRD	EB	7,910	7,590	7,760	-4.0%	-1.9%	2.2%
I2	WB	54,880	51,430	52,420	-6.3%	-4.5%	1.9%
I2	EB	58,970	56,220	56,620	-4.7%	-4.0%	0.7%
I2FR	WB	16,690	16,670	16,690	-0.1%	0.0%	0.1%
I2FR	EB	18,250	17,860	18,040	-2.1%	-1.2%	1.0%
BS83	WB	11,240	9,300	9,960	-17.3%	-11.4%	7.1%
BS83	EB	10,750	9,480	9,940	-11.8%	-7.5%	4.9%
Total (without the project)		**203,290**	**186,260**	**193,220**			
Total (with the project)		**203,290**	**210,350**	**201,280**	**3.5%**	**-1.0%**	
365TOLL Capture Percent			11%	4%			
365TOLL Retention Percent							33.5%
Total	Screenline	344,230	346,420	337,790	0.6%	-1.9%	

Table 6-12. Daily Screenline Volumes and Toll Retention – EW3 (2030)

Road	Direction	Daily Volume			Comparison		
		No Build (NB)	Build				
			Free	Tolled ($0.2)	Free vs NB	Tolled vs NB	Tolled vs Free
		A	B	C	(B-A)/A	(C-A)/A	(C-B)/B
365TOLL	WB	0	14,750	5,100			-65.4%
365TOLL	EB	0	12,280	4,040			-67.1%
365TOLLFR	WB	0	0	0			
365TOLLFR	EB	0	0	0			
MILHWY	WB	9,310	6,090	8,210	-34.6%	-11.8%	34.8%
MILHWY	EB	8,770	6,310	7,940	-28.1%	-9.5%	25.8%
DICKRD	WB	10,300	9,280	10,040	-9.9%	-2.5%	8.2%
DICKRD	EB	12,150	11,080	11,880	-8.8%	-2.2%	7.2%
I2	WB	57,600	56,190	57,130	-2.4%	-0.8%	1.7%
I2	EB	60,430	59,450	60,360	-1.6%	-0.1%	1.5%
I2FR	WB	16,720	16,810	16,860	0.5%	0.8%	0.3%
I2FR	EB	18,200	18,320	17,920	0.7%	-1.5%	-2.2%
BS83	WB	11,810	10,930	11,530	-7.5%	-2.4%	5.5%
BS83	EB	11,210	10,170	10,840	-9.3%	-3.3%	6.6%
Total (without the project)		**216,500**	**204,630**	**212,710**			
Total (with the project)		**216,500**	**231,660**	**221,850**	**7.0%**	**2.5%**	
365TOLL Capture Percent			12%	4%			
365TOLL Retention Percent							33.8%
Total	Screenline	377,130	390,530	382,030	3.6%	1.3%	

Table 6-13. Daily Screenline Volumes and Toll Retention – NS1 (2040)

Road	Direction	Daily Volume			Comparison		
		No Build (NB)	Build				
			Free	Tolled ($0.2)	Free vs NB	Tolled vs NB	Tolled vs Free
		A	B	C	(B-A)/A	(C-A)/A	(C-B)/B
365TOLL	WB	0	18,070	6,170			-65.9%
365TOLL	EB	0	15,440	4,970			-67.8%
365TOLLFR	WB	0	2,430	7,520			209.5%
365TOLLFR	EB	0	1,230	3,520			186.2%
MILHWY	WB	10,880	6,840	8,810	-37.1%	-19.0%	28.8%
MILHWY	EB	10,630	7,390	8,890	-30.5%	-16.4%	20.3%
DICKRD	WB	10,790	9,450	9,830	-12.4%	-8.9%	4.0%
DICKRD	EB	12,900	11,430	11,960	-11.4%	-7.3%	4.6%
I2	WB	64,910	63,280	64,050	-2.5%	-1.3%	1.2%
I2	EB	67,420	66,250	66,810	-1.7%	-0.9%	0.8%
I2FR	WB	16,770	16,720	16,790	-0.3%	0.1%	0.4%
I2FR	EB	18,270	17,970	18,040	-1.6%	-1.3%	0.4%
BS83	WB	14,350	13,250	13,850	-7.7%	-3.5%	4.5%
BS83	EB	13,240	12,300	12,760	-7.1%	-3.6%	3.7%
Total (without the project)		**240,160**	**224,880**	**231,790**			
Total (with the project)		**240,160**	**262,050**	**253,970**	**9.1%**	**5.8%**	
365TOLL Capture Percent			13%	4%			
365TOLL Retention Percent							33.3%
Total	Screenline	420,550	440,700	434,110	4.8%	3.2%	

Table 6-14. Daily Screenline Volumes and Toll Retention – NS1 (2045)

Road	Direction	Daily Volume			Comparison		
		No Build (NB)	Build				
			Free	Tolled ($0.2)	Free vs NB	Tolled vs NB	Tolled vs Free
		A	B	C	(B-A)/A	(C-A)/A	(C-B)/B
365TOLL	WB	0	18,930	6,670			-64.8%
365TOLL	EB	0	16,110	5,430			-66.3%
365TOLLFR	WB	0	2,320	7,570			226.3%
365TOLLFR	EB	0	1,220	3,660			200.0%
MILHWY	WB	10,980	6,950	9,030	-36.7%	-17.8%	29.9%
MILHWY	EB	10,770	7,570	9,160	-29.7%	-14.9%	21.0%
DICKRD	WB	10,950	9,530	9,930	-13.0%	-9.3%	4.2%
DICKRD	EB	12,980	11,550	12,100	-11.0%	-6.8%	4.8%
I2	WB	66,350	64,560	65,380	-2.7%	-1.5%	1.3%
I2	EB	68,800	67,490	67,960	-1.9%	-1.2%	0.7%
I2FR	WB	16,640	16,690	16,790	0.3%	0.9%	0.6%
I2FR	EB	17,840	17,910	17,800	0.4%	-0.2%	-0.6%
BS83	WB	14,890	13,710	14,270	-7.9%	-4.2%	4.1%
BS83	EB	13,900	12,730	13,410	-8.4%	-3.5%	5.3%
Total (without the project)		**244,100**	**228,690**	**235,830**			
Total (with the project)		**244,100**	**267,270**	**259,160**	**9.5%**	**6.2%**	
365TOLL Capture Percent			13%	5%			
365TOLL Retention Percent							34.5%
Total	Screenline	427,700	449,830	442,510	5.2%	3.5%	

In summary, it can be observed that the Project is not a relief route for I-2 traffic, as only a small amount of traffic will deviate from I-2 to the Project. 365 TOLL traffic comes primarily from the local roads of the study area, which is reasonable. Internal passenger vehicles and the commercial vehicles from the international bridges are the main user groups of the Project. C&M estimates that 72 percent of passenger vehicle transactions in 2025 are internal passenger vehicles trips, with their ODs around the Project. The internal vehicle trip share of passenger vehicles is assumed to increase to 77 percent by 2045. As expected, most of the commercial vehicle transactions that use the Project are commercial vehicle trips with ODs related to Hidalgo County international bridges, representing roughly 65 percent of the Project's total commercial vehicle transactions. The Project's overall commercial vehicle transaction percentage grows from 12 percent in 2025 to 14 percent in 2045.

6.3. Travel Time and Safety Benefits from the Project

When the Project opens to traffic, it is expected to provide travel time savings as well as reliability and safety benefits for toll road users. Major competitors are Military Highway for east–west travel and US 281 and FM 493 for north–south travel. Travel time benefits may increase in future years when the Project features three lanes in each direction and, as a result, higher free-flow speeds. At the same time, growing congestion on competing roadways is expected to result in additional time savings for toll road users. It is also important to note that a driver using the existing toll-free route instead of the Project will have to cross 14 traffic lights on their route if traveling from Pharr to the Anzalduas International POE (see Figure 6-9).

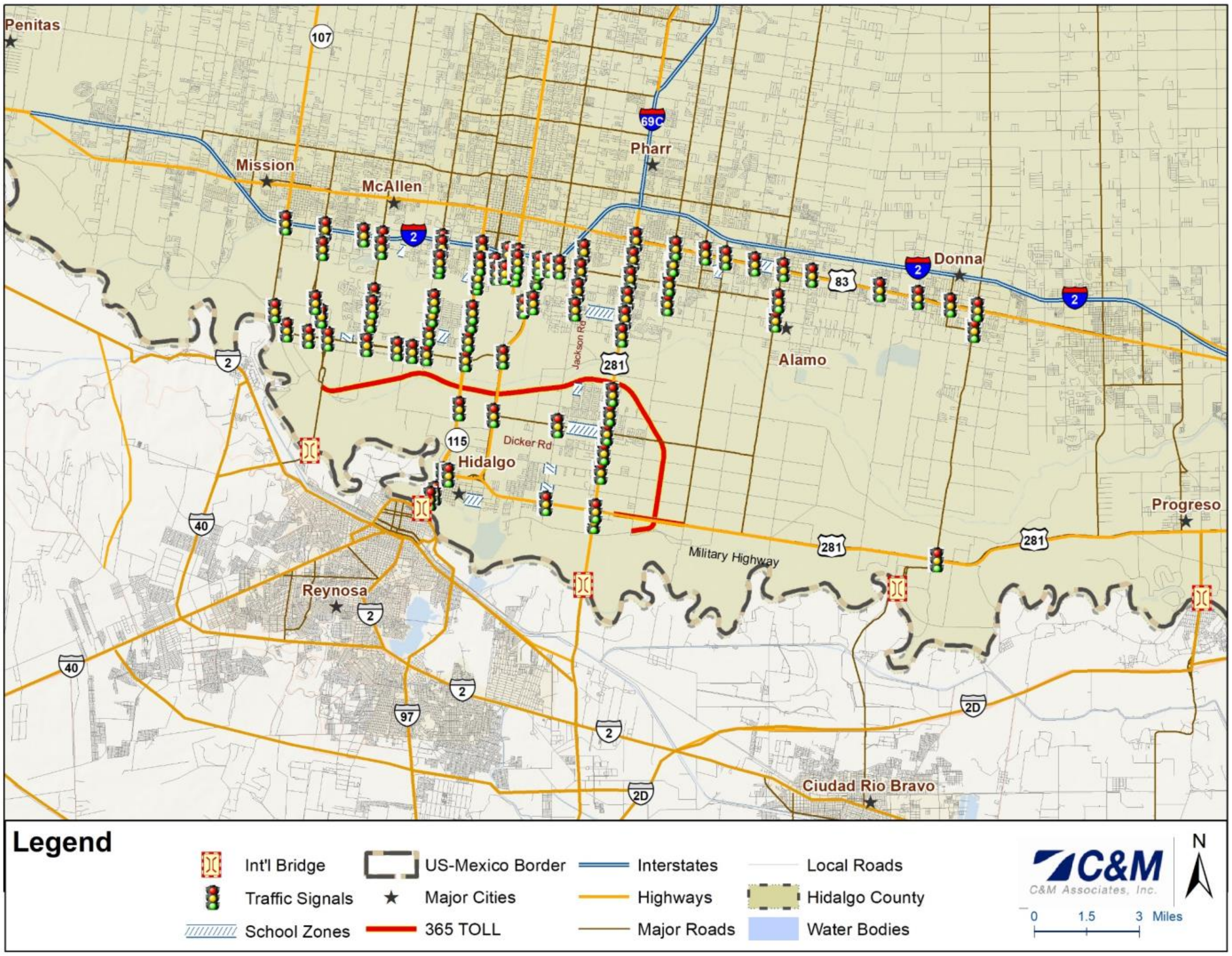


Figure 6-9. Intersections with Traffic Lights and School Zones around the Project

Figure 6-9 shows that the school zones within the study area on Dicker Road close to FM 1016 and Jackson Road are on key east–west and north–south road segments, adding delays particularly for commercial traffic flow through the area. The Project will provide more reliable travel times and a safer travel option through the study area. There are also clear safety benefits from alleviating traffic levels in the school zones.

Figure 6-10 and Figure 6-11 illustrate two OD pairs to compare travel times between the tolled route (the Project) and a toll-free alternative:

- Trip A: traveling from the Pharr–Reynosa International Bridge to FM 396 at Trinity Street.
- Trip B: traveling from the Pharr–Reynosa International Bridge to the McAllen FTZ.

Table 6-15 presents the estimated travel time savings of these trips using 365 TOLL during the AM and PM peak periods in the opening year and in the future model years.

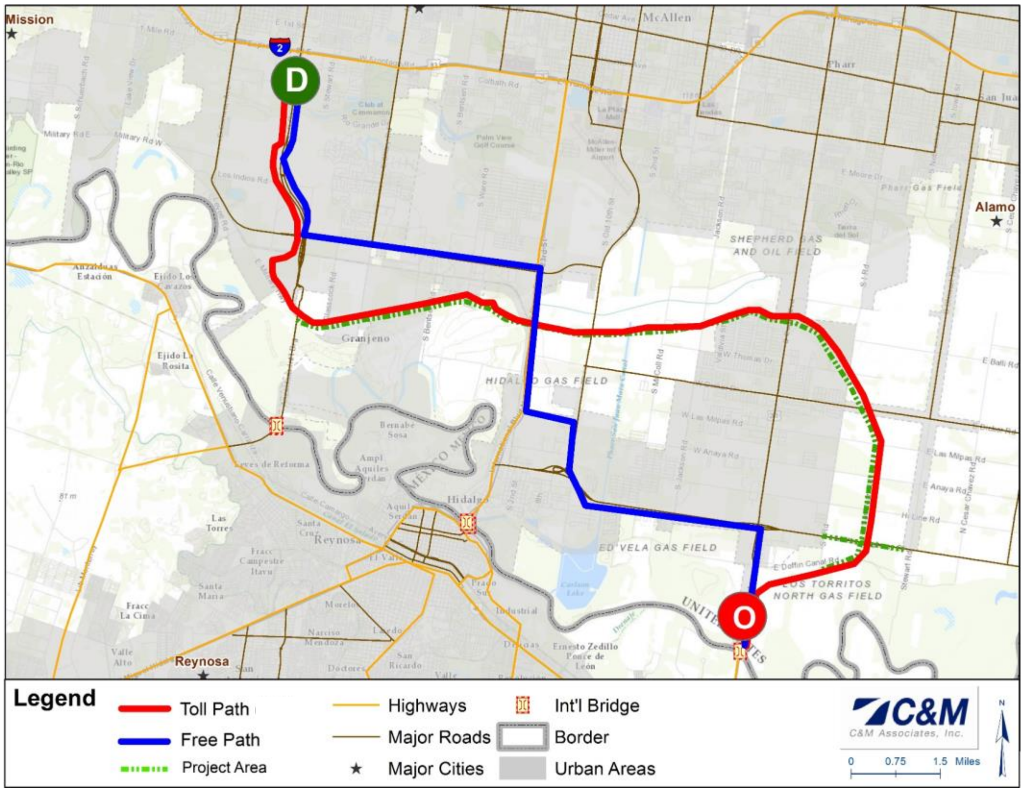


Figure 6-10. Travel Time Comparison – Tolled and Toll-Free Paths for Trip A

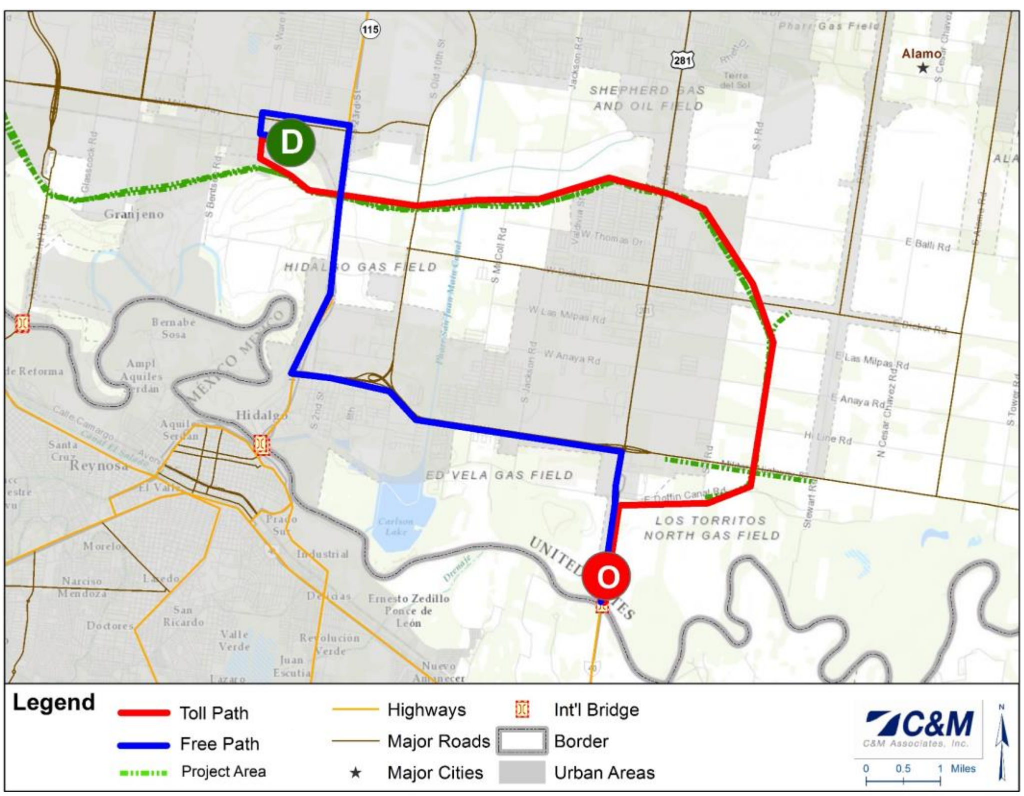


Figure 6-11. Travel Time Comparison – Tolled and Toll-Free Paths for Trip B

In 2025, traveling from the Pharr–Reynosa International Bridge to FM 396 at Trinity Street using 365 TOLL is predicted to provide time savings of 5.4 and 5.0 minutes during the AM and PM peak periods, respectively. The time savings 365 TOLL provides increase over time as network congestion increases; by 2045, the predicted time savings on 365 TOLL when traveling from the same origin to the McAllen FTZ is estimated to be 9.1 and 8.9 minutes during AM and PM peak periods, respectively.

Table 6-15. Travel Time Savings During AM/PM Peak Periods for Selected OD Pairs

From	To	Year	Time Period	Facility Type	Path	Length (mi)	Time (min)	Project Time Savings (min)
Pharr-Reynosa International Bridge **(Trip A)**	FM 396 at Trinity St. **(Trip A)**	2025	AM	Toll-Free	Military Hwy-SH336-FM1016-FM396	14.5	24.4	5.40
				Toll	365 TOLL	15.7	19.0	
			PM	Toll-Free	Military Hwy-SH336-FM1016-FM396	14.5	24.1	5.00
				Toll	365 TOLL	15.7	19.1	
		2030	AM	Toll-Free	Military Hwy-SH336-FM1016-FM396	14.5	24.9	5.80
				Toll	365 TOLL	15.7	19.1	
			PM	Toll-Free	Military Hwy-SH336-FM1016-FM396	14.5	24.7	5.60
				Toll	365 TOLL	15.7	19.1	
		2040	AM	Toll-Free	Military Hwy-SH336-FM1016-FM396	14.5	26.7	8.00
				Toll	365 TOLL	15.7	18.7	
			PM	Toll-Free	Military Hwy-SH336-FM1016-FM396	14.5	27.5	8.70
				Toll	365 TOLL	15.7	18.8	
		2045	AM	Toll-Free	Military Hwy-SH336-FM1016-FM396	14.5	27.3	9.10
				Toll	365 TOLL	15.7	18.2	
			PM	Toll-Free	Military Hwy-SH336-FM1016-FM396	14.5	27.2	8.90
				Toll	365 TOLL	15.7	18.3	
Pharr-Reynosa International Bridge **(Trip B)**	McAllen FTZ **(Trip B)**	2025	AM	Toll-Free	Military Hwy-SH336-FM1016-FM396	9.7	15.3	2.20
				Toll	365 TOLL	9.3	13.1	
			PM	Toll-Free	Military Hwy-SH336-FM1016-FM396	9.7	15.1	2.10
				Toll	365 TOLL	9.3	13.0	
		2030	AM	Toll-Free	Military Hwy-SH336-FM1016-FM396	9.7	15.9	2.60
				Toll	365 TOLL	9.3	13.3	
			PM	Toll-Free	Military Hwy-SH336-FM1016-FM396	9.7	15.7	2.70
				Toll	365 TOLL	9.3	13.0	
		2040	AM	Toll-Free	Military Hwy-SH336-FM1016-FM396	9.7	16.8	3.80
				Toll	365 TOLL	9.3	13.0	
			PM	Toll-Free	Military Hwy-SH336-FM1016-FM396	9.7	16.6	4.00
				Toll	365 TOLL	9.3	12.6	
		2045	AM	Toll-Free	Military Hwy-SH336-FM1016-FM396	9.7	17.4	4.20
				Toll	365 TOLL	9.3	13.2	
			PM	Toll-Free	Military Hwy-SH336-FM1016-FM396	9.7	16.9	4.20
				Toll	365 TOLL	9.3	12.7	

Given the different lengths of the two trips, the toll cost (in nominal dollars) for Trip A's tolled path is $2.73 in 2025 and $4.22 in 2045, whereas the cost for Trip B's tolled path is $2.00 in 2025 and $3.09 in 2045. Therefore, for Trip A, which travels the total Project length, all potential users with a VOT of at least $30/hr. (in nominal dollars) in 2025 and at least $28/hr. in 2045 would choose the tolled option over the toll-free option. For Trip B, all potential users with a VOT of at least $55/hr. (in nominal dollars) in the opening year and at least $44/hr. in 2045 would choose the tolled option.

6.4. Traffic and Revenue Assumptions

C&M's T&R forecast incorporates a set of post-processing assumptions (see Table 6-16), some of which differ depending upon whether the traveler remains exclusively within the United States or crosses the U.S./Mexico border. Of the Project's potential users, C&M estimated that 26 percent of passenger vehicle transactions in 2025 will have an origin or destination in Mexico, decreasing to 22 percent by 2045. As for commercial vehicles transactions, C&M estimated a constant share of 65 percent of the Project users will have origins or destination in Mexico. The oversize/overweight (OS/OW) commercial vehicle transactions are estimated to represent less than 1.5 percent of the Project's total commercial vehicle traffic volumes.

While several new toll roads are in the planning phase in the Rio Grande Valley of southern Texas, the fact remains that the region currently lacks toll roads comparable to the Project. The only existing tolled facilities are the international bridges and the SH 550 toll facility in Cameron County, which connects the Port of Brownsville with I-69 (US 77). Therefore, during the analysis, C&M was aware that many drivers in the area may be unfamiliar with the notion of road pricing and, consequently, reluctant to use new toll roads. This may result in an extended ramp-up period (i.e., the time it takes for traffic volumes to reach their full potential after the opening of a new toll facility). Different ramp-up rates were assumed for U.S. passenger vehicle and commercial vehicle drivers, with commercial vehicle drivers expected to start using the Project at a faster rate. The same initial ramp-up was assumed for both Mexican (border crossing) passenger vehicles and commercial vehicle drivers. Additionally, Mexican OS/OW commercial vehicles are expected to become familiar with the new toll road faster than other users because the Project connects almost all roads that are included in the HCRMA OS/OW corridor.

In the Project's opening year 2025, ETC penetration (i.e., the percentage of all toll transactions collected electronically) is assumed to be 50–60 percent for U.S. customers (passenger vehicles and commercial vehicles) and 40–65 percent for Mexican customers. These percentages ultimately reach 75–80 percent for U.S. customers and 65–85 percent for Mexican customers by 2030. Indeed, C&M's stated preference surveys have found that over 70 percent of passenger vehicle travelers reported they would likely use the ETC system. ETC penetration for commercial vehicles is assumed to be higher than that for passenger vehicles due to the operational characteristics of commercial vehicle traffic.

Additional key assumptions used in this study are summarized below:

- The Project is assumed to open to traffic on January 1, 2025.
- Commercial vehicles are assumed to have an average of 3.9 axles for internal trips and 4.9 for external trips, which results in commercial vehicle toll-rate factors of 2.9 and 3.9, respectively. This results in Project toll rates of $0.58 and $0.78 per mile (in 2020 dollars) for commercial vehicle internal and external trips, respectively
- Tolls will be collected by means of ETC or video recognition. The video toll rates are assumed to be 130 percent of the ETC rates to compensate for the additional costs associated with the video tolling recognition and billing method.

- The ETC leakage rate is assumed to be 1 percent, which accounts for uncollected revenue from ETC customers as a result of system deficiencies.
- A video violation rate was applied to account for revenue lost as a result of deficiencies in the video transaction system and potential toll evaders. An effective video toll factor of 21–36 percent was assumed for all customers in the opening year. In 2030 and thereafter, this percentage increases to 54–68 percent and remains the same for the rest of the forecast period. The effective video toll factor represents the percentage of revenue that will be recovered from the toll agency, including the video toll surcharge, the video revenue that could be invoiced, and the video revenue that could not be collected. For example, a video toll factor of 25 percent means that out of every $1.00 of possible video revenue, only $0.25 will be recovered.
- To obtain annual T&R figures, C&M estimated 340 revenue days for passenger vehicles and 280 for commercial vehicles based on the analysis of weekday and weekend traffic counts. Revenue days for border-crossing vehicles were estimated to be 350 for passenger vehicles and 275 for commercial vehicles.
- Only roadway improvements listed in the RGVMPO 2020–2045 MTP and TIP have been implemented within the model.
- The use of alternative modes of transportation in the Project's area of influence are assumed to remain unchanged during the forecast period.
- Gasoline availability and prices are assumed to remain at levels that will not significantly affect traffic.
- Federal and state fuel taxes are assumed to not change to a degree that would affect travel behavior.
- The Project is assumed to be efficiently maintained for the length of the forecast period.

Table 6-16. Traffic and Revenue Assumptions

Item	Assumptions
Opening Year	2025
Final Forecast Year	2064
Toll Collection Method	All Electronic Tolling and Video Tolling
Posted Speed	70 mph

Number of Mainlanes

2025	2030	2040	2045	After 2045
2	2	3	3	3

Ramp-Up

Year	U.S. Vehicles		Border-Crossing Vehicles		
	PV	CV	PV	CV	OS/OW CV
2025	50%	60%	50%	50%	60%
2026	60%	70%	60%	60%	70%
2027	70%	80%	70%	70%	80%
2028	80%	90%	80%	80%	90%
2029	90%	100%	90%	90%	100%
2030+	100%	100%	100%	100%	100%

ETC Penetration

Year	U.S. Vehicles		Border-Crossing Vehicles		
	PV	CV	PV	CV	OS/OW CV
2025	50%	60%	40%	60%	65%
2026	55%	65%	45%	65%	70%
2027	60%	70%	50%	70%	75%
2028	65%	75%	55%	75%	80%
2029	70%	80%	60%	80%	85%
2030+	75%	80%	65%	80%	85%

ETC Leakage: 1%

Video Revenue Reduction Factors

Item	2025	2026	2027	2028	2029	2030+
	U.S. Vehicles					
Total Video Revenue in Process	60%	65%	70%	75%	80%	80%
Invoiced Video Revenue Recovered	35%	40%	45%	50%	55%	60%
Video Revenue Toll Factor	1.3	1.3	1.3	1.3	1.3	1.3
Effective Video Toll Factor	0.27	0.34	0.41	0.49	0.57	0.62
Item	Border-Crossing Passenger Vehicles					
Total Video Revenue in Process	55%	60%	65%	70%	75%	75%
Invoiced Video Revenue Recovered	30%	35%	40%	45%	50%	55%
Video Revenue Toll Factor	1.3	1.3	1.3	1.3	1.3	1.3
Effective Video Toll Factor	0.21	0.27	0.34	0.41	0.49	0.54
Item	Border-Crossing Commercial Vehicles					
Total Video Revenue in Process	70%	75%	80%	80%	80%	80%
Invoiced Video Revenue Recovered	40%	45%	50%	55%	60%	65%
Video Revenue Toll Factor	1.3	1.3	1.3	1.3	1.3	1.3
Effective Video Toll Factor	0.36	0.44	0.52	0.57	0.62	0.68

Item	Category	
Revenue Days	Internal - PV	340
	Internal - CV	280
	External - PV	350
	External - CV	275
Commercial Vehicle Toll Factor	Internal - CV	2.9
	External - CV	3.9
Project Toll Rate (Cents per Mile, 2020$)	PV	$0.20
	Internal - CV	$0.58
	External - CV	$0.78

6.5. Traffic and Revenue Results

This section presents the results of C&M's T&R forecasting in terms of annual toll transactions and revenue. All revenues are presented in nominal dollars, while the corresponding table also presents revenue in 2020 dollars. The model forecast years from the TDM were interpolated and extrapolated as needed to obtain annual transactions and revenue figures by employing a post-processing model.

The Project's annual T&R forecast for the years 2025–2064 is presented in Table 6-17 and illustrated in Figure 6-12. For the opening year 2025, C&M forecasts that the Project will generate approximately $2.7 million in toll revenue as a result of 4.5 million toll transactions. The number of transactions is projected to increase to approximately 10.3 million by 2030, 13.0 million by 2040, and to 17.8 million by the final forecast year 2064. Annual revenue is projected to reach approximately $9.5 million by 2030, $15 million by 2040 and $35.2 million by 2064. The jump in T&R observed in 2040 is a result of the Project's expansion to three lanes per direction in 2035.

The Project's accumulated gross revenue (in 2020 dollars) is $399,370,000.

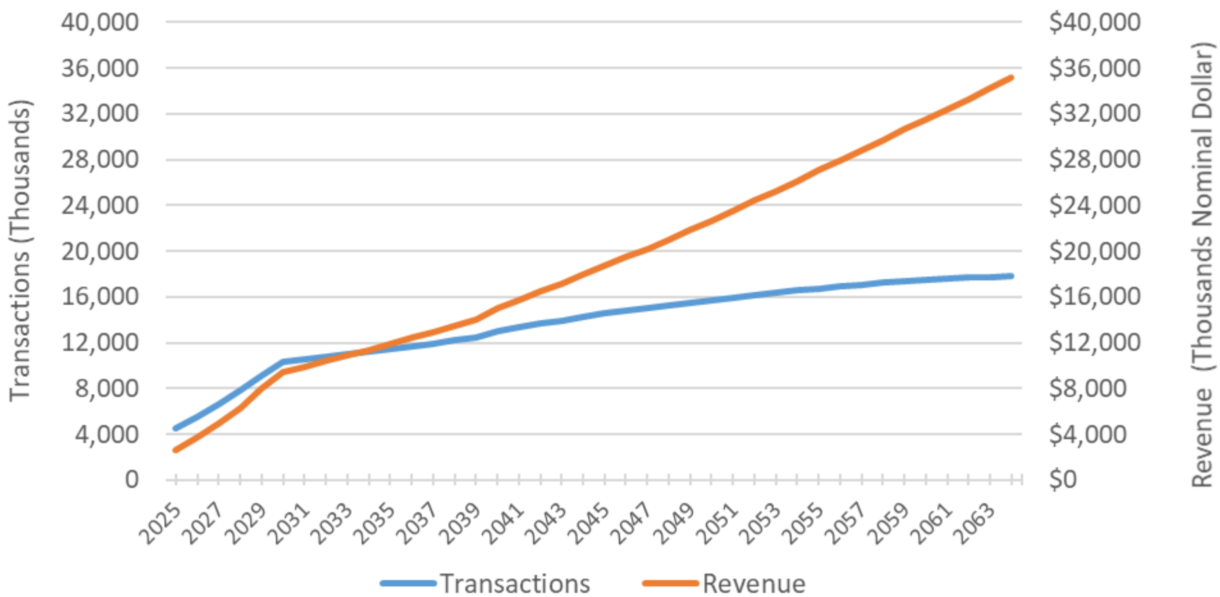


Figure 6-12. 365 TOLL Annual Transactions and Revenue

Table 6-17. 365 TOLL Annual Transactions and Revenue

Year	Transactions (in Thousands)			Revenue (in Thousands 2020 Dollars)			Revenue (in Thousands Nominal Dollars)		
	PV	CV	Total	PV	CV	Total	PV	CV	Total
2025	3,942	549	4,491	$1,590	$770	$2,360	$1,790	$870	$2,660
2026	4,873	682	5,555	$2,170	$1,030	$3,200	$2,500	$1,190	$3,690
2027	5,852	824	6,676	$2,840	$1,330	$4,170	$3,350	$1,570	$4,920
2028	6,878	975	7,853	$3,590	$1,660	$5,250	$4,340	$2,000	$6,340
2029	7,952	1,136	9,088	$4,420	$2,010	$6,430	$5,450	$2,480	$7,930
2030	9,073	1,261	10,334	$5,240	$2,270	$7,510	$6,620	$2,870	$9,490
2031	9,256	1,308	10,564	$5,340	$2,350	$7,690	$6,900	$3,040	$9,940
2032	9,440	1,356	10,796	$5,440	$2,440	$7,880	$7,180	$3,220	$10,400
2033	9,623	1,403	11,026	$5,540	$2,530	$8,070	$7,470	$3,410	$10,880
2034	9,807	1,451	11,258	$5,640	$2,610	$8,250	$7,770	$3,600	$11,370
2035	9,990	1,499	11,489	$5,730	$2,700	$8,430	$8,080	$3,800	$11,880
2036	10,174	1,546	11,720	$5,830	$2,790	$8,620	$8,400	$4,010	$12,410
2037	10,357	1,594	11,951	$5,930	$2,870	$8,800	$8,720	$4,230	$12,950
2038	10,540	1,642	12,182	$6,020	$2,960	$8,980	$9,050	$4,450	$13,500
2039	10,724	1,689	12,413	$6,120	$3,050	$9,170	$9,390	$4,680	$14,070
2040	11,249	1,783	13,032	$6,380	$3,230	$9,610	$10,000	$5,060	$15,060
2041	11,505	1,829	13,334	$6,530	$3,310	$9,840	$10,450	$5,300	$15,750
2042	11,761	1,876	13,637	$6,680	$3,390	$10,070	$10,920	$5,540	$16,460
2043	12,017	1,922	13,939	$6,820	$3,470	$10,290	$11,400	$5,790	$17,190
2044	12,273	1,969	14,242	$6,970	$3,550	$10,520	$11,900	$6,060	$17,960
2045	12,530	2,015	14,545	$7,120	$3,630	$10,750	$12,410	$6,330	$18,740
2046	12,734	2,052	14,786	$7,230	$3,690	$10,920	$12,890	$6,580	$19,470
2047	12,939	2,089	15,028	$7,350	$3,760	$11,110	$13,380	$6,850	$20,230
2048	13,144	2,127	15,271	$7,470	$3,830	$11,300	$13,880	$7,120	$21,000
2049	13,349	2,164	15,513	$7,580	$3,900	$11,480	$14,410	$7,400	$21,810
2050	13,554	2,201	15,755	$7,700	$3,960	$11,660	$14,950	$7,690	$22,640
2051	13,725	2,232	15,957	$7,800	$4,020	$11,820	$15,550	$8,020	$23,570
2052	13,895	2,263	16,158	$7,890	$4,070	$11,960	$16,100	$8,310	$24,410
2053	14,066	2,294	16,360	$7,990	$4,130	$12,120	$16,660	$8,610	$25,270
2054	14,237	2,325	16,562	$8,090	$4,190	$12,280	$17,230	$8,920	$26,150
2055	14,408	2,356	16,764	$8,180	$4,240	$12,420	$17,830	$9,240	$27,070
2056	14,536	2,379	16,915	$8,260	$4,280	$12,540	$18,390	$9,540	$27,930
2057	14,664	2,402	17,066	$8,330	$4,320	$12,650	$18,960	$9,840	$28,800
2058	14,792	2,425	17,217	$8,400	$4,370	$12,770	$19,550	$10,160	$29,710
2059	14,920	2,449	17,369	$8,480	$4,410	$12,890	$20,160	$10,490	$30,650
2060	15,005	2,464	17,469	$8,520	$4,440	$12,960	$20,730	$10,790	$31,520
2061	15,090	2,480	17,570	$8,570	$4,460	$13,030	$21,310	$11,100	$32,410
2062	15,176	2,495	17,671	$8,620	$4,490	$13,110	$21,910	$11,410	$33,320
2063	15,261	2,511	17,772	$8,670	$4,520	$13,190	$22,520	$11,740	$34,260
2064	15,347	2,526	17,873	$8,720	$4,550	$13,270	$23,150	$12,080	$35,230

Note: PV = Passenger Vehicle; CV = Commercial Vehicle

6.6. Sensitivity Analysis

C&M performed a sensitivity analysis to determine the forecasted revenue's sensitivity to adjusting the following variables: VOT, VOR, forecasted border-crossing demand growth, forecasted internal commercial vehicle demand growth, toll rate, socioeconomic growth, revenue days, ramp-up, and ETC penetration. As summarized in Table 6-18, each variable was adjusted to produce a High Case and Low Case (relative to the original value, or Base Case), resulting in High and Low accumulated gross revenues for the Project to compare to the Project's Base Case accumulated gross revenue. In most cases, the range is +/- 20 percent of the Base Case.

Table 6-18. The Project's Accumulated Gross Revenue (2020$) by Scenario

Variable	Base Case	High Case	Low Case	Accumulated Gross Revenue				
				Base	High Case	%Diff	Low Case	%Diff
VOT Internal Trips - PV	$12.44	$14.93	$9.95	$399,370	$416,100	4.2%	$382,700	-4.2%
VOT Internal Trips - CV	$32.78	$39.34	$26.22	$399,370	$400,900	0.4%	$397,900	-0.4%
VOT Boder Crossing - PV	$16.65	$19.98	$13.32	$399,370	$406,900	1.9%	$391,900	-1.9%
VOT Boder Crossing - CV	$40.32	$48.38	$32.26	$399,370	$403,200	1.0%	$395,400	-1.0%
VOR - PV	$17.90	$21.48	$14.32	$399,370	$405,300	1.5%	$393,300	-1.5%
VOR - CV	$39.65	$47.58	$31.72	$399,370	$400,700	0.3%	$398,000	-0.3%
Boder Crossing Growth - PV	0.0%	0.5%	-0.5%	$399,370	$401,500	0.5%	$390,100	-2.3%
Boder Crossing Growth - CV	2.3%	2.8%	1.8%	$399,370	$412,500	3.3%	$386,200	-3.3%
Growth Rate - Internal trips CV	2.0%	2.4%	1.6%	$399,370	$404,400	1.3%	$390,300	-2.3%
Toll Rate ($/mile) - PV	$0.20	$0.24	$0.16	$399,370	$392,000	-1.8%	$388,700	-2.7%
Toll Rate ($/mile) - CV	$0.58	$0.70	$0.46	$399,370	$406,700	1.8%	$386,300	-3.3%
Population Growth	1.2%	1.6%	0.8%	$399,370	$484,200	21.2%	$357,300	-10.5%
Employment Growth	1.7%	2.2%	1.2%	$399,370	$524,600	31.4%	$357,400	-10.5%
Revenue Days - Internal PV	340	370	310	$399,370	$420,940	5.4%	$377,790	-5.4%
Revenue Days - Internal CV	280	310	250	$399,370	$403,890	1.1%	$394,840	-1.1%
Revenue Days - External PV	350	380	320	$399,370	$405,390	1.5%	$393,290	-1.5%
Revenue Days - External CV	275	300	250	$399,370	$408,940	2.4%	$389,790	-2.4%
Ramp Up - PV	5 years	4 years	6 years	$399,370	$403,600	1.1%	$397,200	-0.5%
Ramp Up - CV	4 years	3 years	5 years	$399,370	$401,500	0.5%	$398,000	-0.3%
ETC Penetration - Internal PV	75%	85%	65%	$399,370	$408,800	2.4%	$389,900	-2.4%
ETC Penetration - Border Crossing PV	65%	75%	55%	$399,370	$403,000	0.9%	$395,700	-0.9%
ETC Penetration - CV	80%	90%	70%	$399,370	$402,900	0.9%	$395,700	-0.9%
Video Toll Surcharge	1.3	1.5	1.0	$399,370	$385,100	-3.6%	$384,800	-3.6%
Video Toll Recovery	60%	70%	50%	$399,370	$413,100	3.4%	$385,800	-3.4%

The following sections provide details regarding each variable and the sensitivity analysis results, with yearly comparisons presented in nominal dollars and accumulated gross revenue in 2020 dollars.

6.6.1. Value of Time and Reliability

As discussed earlier in this chapter, passenger vehicle and commercial vehicle VOTs and VORs were estimated based on route choice models derived from C&M's stated preference surveys. Therefore, C&M performed a sensitivity analysis by decreasing VOT/VOR to 80 percent of the Base value (Low Case) and increasing VOT/VOR to 120 percent of the Base value (High Case) for both passenger and commercial vehicles. In addition, the analysis considered internal trips and external Hidalgo County bridge crossing (HBC) trips separately to assess the unique impacts on these trips.

For the internal trips, results indicate that if internal passenger vehicle VOT is increased by 20 percent, the Project's accumulated gross revenue increases by 4.2 percent to $416,100. If internal commercial vehicle VOT is increased by 20 percent, the Project's accumulated gross revenue increases by 0.4 percent to $400,900. In contrast, if internal passenger vehicle VOT is decreased by 20 percent, the Project's accumulated gross revenue decreases by 4.2 percent to $382,700. If internal commercial vehicle VOT is decreased by 20 percent, the Project's accumulated gross revenue decreases by 0.4 percent to $397,900.

For the external HBC trips, results indicate that if HBC passenger vehicle VOT is increased by 20 percent, the Project's accumulated gross revenue increases by 1.9 percent to $406,900. If HBC commercial vehicle VOT is increased by 20 percent, the Project's accumulated gross revenue increases by 1 percent to $403,200. In contrast, if HBC passenger vehicle VOT is decreased by 20 percent, the Project's accumulated gross revenue decreases by 1.9 percent to $391,900. If HBC commercial vehicle VOT is decreased by 20 percent, the Project's accumulated gross revenue decreases by 1 percent to $395,400.

Regarding VOR, results indicate that if passenger vehicle VOR is increased by 20 percent, the Project's accumulated gross revenue increases by 1.5 percent to $405,300. If commercial vehicle VOR is increased by 20 percent, the Project's accumulated gross revenue increases by 0.3 percent to $400,700. In contrast, if passenger vehicle VOR is decreased by 20 percent, the Project's accumulated gross revenue decreases by 1.5 percent to $393,300. If commercial vehicle VOR is decreased by 20 percent, the Project's accumulated gross revenue decreases by 0.3 percent to $398,000.

6.6.2. Border Crossing Growth Rate

C&M conducted a sensitivity analysis of total border crossing demand growth, increasing and decreasing the growth rate for passenger and commercial vehicles in the High Case and Low Case, respectively. Results indicate that if the passenger vehicle growth rate is increased to 0.5 percent, the Project's accumulated gross revenue increases by 0.5 percent to $401,500. If the commercial vehicle growth rate is increased to 2.8 percent, the Project's accumulated gross revenue increases by 3.3 percent to $412,500.

In contrast, if the passenger vehicle growth rate is decreased to -0.5 percent, the Project's accumulated gross revenue decreases by 2.3 percent to $390,100. If the commercial vehicle growth rate is decreased to 1.8 percent, the Project's accumulated gross revenue decreases by 3.3 percent to $386,200.

6.6.3. Internal Truck Trips Growth Rate

C&M conducted a sensitivity analysis of total internal commercial vehicles trips generated on the Rio Grande Valley, increasing and decreasing the growth rate for the commercial vehicles by 20 percent in the High Case and Low Case, respectively, and compared the results to the Base Case (2.0%).

Results indicate that if the internal trips commercial vehicle growth rate is increased to 2.4 percent, the Project's accumulated gross revenue increases by 1.3 percent to $404,400 in the High Case. In contrast, if the growth rate is decreased to 1.6 percent, the Project's accumulated gross revenue decreases by 2.3 percent to $390,300 in the Low Case.

6.6.4. Toll Rate

For the passenger vehicle toll rate sensitivity analysis, C&M selected toll rates of $0.24 (High Case) and $0.16 (Low Case) and compared the results to the Base Case toll rate of $0.20. Results indicate that if the passenger vehicles toll rate is increased to $ 0.24, the Project's accumulated gross revenue decreases by 1.8 percent to $392,000. In contrast, if the passenger vehicles toll rate is decreased to $0.16, the Project's accumulated gross revenue decreases by 2.7 percent to $388,700.

For the commercial vehicle toll rate sensitivity analysis, C&M selected toll rates of $26.70 (High Case) and $17.80 (Low Case) and compared the results to the Base Case toll rate of $22.25. Results indicate that if the commercial vehicle toll rate is increased to $26.70, the Project's accumulated gross revenue increases by 1.8 percent to $406,700. In contrast, if the commercial vehicles toll rate is decreased to $17.80, the Project's accumulated gross revenue decreases by 3.3 percent to $386,300.

6.6.5. Socioeconomic Growth

The socioeconomic growth of the study area—including both the United States and México—is crucial to the Project's demand. For this sensitivity analysis, C&M increased and decreased the TDM's input variables of population and employment growth by 30 percent for the High Case and Low Case, respectively, and compared the results to the population and employment Base Case (1.2% and 1.7% growth, respectively).

For population, the results indicate that if the growth rate is increased to 1.6 percent, the Project's accumulated gross revenue increases by 21.2 percent to $484,200. In contrast, if the population growth rate is decreased to 0.8 percent, the Project's accumulated gross revenue decreases by 10.5 percent to $357,300.

For employment, the results indicate that if the growth rate is increased to 2.2 percent, the Project's accumulated gross revenue increases by 31.4 percent to $524,600. In contrast, if the employment growth rate is decreased to 1.2 percent, the Project's accumulated gross revenue decreases by 10.5 percent to $357,400.

6.6.6. Revenue Days

Revenue days are calculated as the equivalent number of "weekdays" during the year based on the ratio of weekend-to-weekday traffic. A lower weekend-to-weekday ratio translates into fewer revenue days and, consequently, lower annual revenue. For this sensitivity analysis, revenue days for passenger vehicles and commercial vehicles were simultaneously increased and decreased by 10 percent for the High Case and Low Case, respectively. Additionally, the analysis was separated by internal and external trips.

For internal passenger vehicles, the results indicate that if revenue days is increased to 370, the Project's accumulated gross revenue increases by 5.4 percent to $421,000. In contrast, if revenue days is decreased to 310, the Project's accumulated gross revenue decreases by 5.4 percent to $378,000.

For internal commercial vehicles, the results indicate that if revenue days is increased to 310, the Project's accumulated gross revenue increases by 1.1 percent to $404,000. In contrast, if revenue days is decreased to 250, the Project's accumulated gross revenue decreases by 1.1 percent to $395,000.

For external passenger vehicles, the results indicate that if revenue days is increased to 380, the Project's accumulated gross revenue increases by 1.5 percent to $405,000. In contrast, if revenue days is decreased to 320, the Project's accumulated gross revenue decreases by 1.5 percent to $393,000.

For external commercial vehicles, the results indicate that if revenue days is increased to 300, the Project's accumulated gross revenue increases by 2.4 percent to $409,000. In contrast, if revenue days is decreased to 250, the Project's accumulated gross revenue decreases by 2.4 percent to $390,000.

6.6.7. Ramp-Up

To verify the impact of ramp-up on total gross revenue from 2025 to 2031, C&M conducted a sensitivity analysis by defining High and Low Cases using the percentages shown in Table 6-19.

Table 6-19. Ramp-Up Sensitivity Analysis

Year	Passenger Vehicles			Commercial Vehicles		
	Base Case (5 years)	High Case (4 years)	Low Case (6 years)	Base Case (4 years)	High Case (3 years)	Low Case (5 years)
2025	50%	60%	40%	60%	75%	50%
2026	60%	70%	50%	70%	85%	60%
2027	70%	85%	60%	80%	95%	70%
2028	80%	95%	70%	90%	100%	80%
2029	90%	100%	80%	100%	100%	90%
2030	100%	100%	90%	100%	100%	100%
2031	100%	100%	100%	100%	100%	100%

For passenger vehicles, the results indicate that if the ramp-up period changes to 4 years, the Project's accumulated gross revenue increases by 1.1 percent to $403,600. In contrast, if the ramp-up period changes to 6 years, the Project's accumulated gross revenue decreases by 0.5 percent to $397,200.

For commercial vehicles, the results indicate that if the ramp-up period changes to 3 years, the Project's accumulated gross revenue increases by 0.5 percent to $401,500. In contrast, if the ramp-up period changes to 5 years, the Project's accumulated gross revenue decreases by 0.3 percent to $398,000.

6.6.8. ETC Penetration

For the internal passenger vehicles ETC penetration sensitivity analysis, C&M selected 85 percent (High Case) and 65 percent (Low Case) and compared the results to the Base Case of 75 percent. Results indicate that if the internal passenger vehicles ETC penetration rate is increased to 85 percent, the Project's accumulated gross revenue increases by 2.4 percent to $408,800 In contrast, if the ETC penetration rate is decreased to 65 percent, the Project's accumulated gross revenue decreases by 2.4 percent to $389,900.

For the border crossing passenger vehicles ETC penetration sensitivity analysis, C&M selected 75 percent (High Case) and 55 percent (Low Case) and compared the results to the Base Case of 65 percent. Results indicate that if border crossing passenger vehicles ETC penetration rate is increased to 75 percent, the Project's accumulated gross revenue increases by 0.9 percent to $403,000. In contrast, if the ETC penetration rate is decreased to 55 percent, the Project's accumulated gross revenue decreases by 0.9 percent to $395,700.

For the commercial vehicles ETC penetration sensitivity analysis, C&M selected 90 percent (High Case) and 70 percent (Low Case) and compared the results to the Base Case of 80 percent. Results indicate that if the commercial vehicles ETC penetration rate is increased to 90 percent, the Project's accumulated gross revenue increases by 0.9 percent to $402,900. In contrast, if the ETC penetration rate is decreased to 70 percent, the Project's accumulated gross revenue decreases by 0.9 percent to $395,700.

6.6.9. Video Toll Surcharge

For the video toll surcharge sensitivity analysis, C&M varied the video revenue toll factor and selected 1.5 (High Case) and 1.0 (Low Case) and compared the results to the Base Case of 1.3. Results indicate that if the video toll factor is increased to 1.5, the Project's accumulated gross revenue decreases by 3.6 percent to $385,100 in the High Case. If the video toll factor is decreased to 1.0, the Project's accumulated gross revenue again decreases by approximately 3.6 percent to $384,800 in the Low Case.

6.6.10. Video Toll Recovery

For the video toll recovery sensitivity analysis, C&M selected 70 percent (High Case) and 50 percent (Low Case) and compared the results to the Base Case of 60 percent. Results indicate that if video toll recovery is increased to 70 percent, the Project's accumulated gross revenue increases by 3.4 percent to $413,100 in the High Case. In contrast, if video toll recovery is decreased to 50 percent, the Project's accumulated gross revenue decreases by 3.4 percent to $385,800 in the Low Case.

6.7. Risk Analysis

Investments are associated with uncertainties, which ultimately lead to risk. In the case of T&R forecasts, results are typically driven by fundamental demographic and economic factors, such as the explanatory variables used in the present study to determine 365 TOLL's demand and serve as inputs to the TDM. These inputs carry varying levels of uncertainty. To assess an investment against a particular risk tolerance, a toll road investor requires not only a range of revenues but also a sense of the probability that revenues will reach those levels in specific years. Risk analysis attempts to evaluate the uncertainties in T&R forecasting via numerous simulations to determine the probability of a range of potential annual revenues.

In developing this study's T&R forecast, C&M accepted a set of socioeconomic projections and post-processing assumptions. However, due to the uncertainty associated with these key variables, the T&R forecast itself contains some level of uncertainty. In an effort to better understand the implications of these uncertainties in the assumed inputs, C&M conducted a risk analysis using a Monte Carlo simulation model to determine the likelihood of the Project's T&R reaching the forecasted values presented earlier in this chapter. The following sections elaborate on C&M's risk analysis methodology and results.

6.7.1. Risk Analysis Methodology

Identifying Key Input Variables

For this analysis, the key input variables influencing daily revenue are the VOT and VOR, forecasted border-crossing demand growth, forecasted internal truck demand growth, toll rate, socioeconomic growth, revenue days, ramp-up, ETC penetration rate, video toll recovery, and CPI. These key input variables were chosen based on the T&R sensitivity analysis, as they represent the variables that have the greatest impact on the Project's forecasted revenue.

Determining the Distribution of Identified Key Input Variables

To conduct the risk analysis, each factor must be quantified so that it can be treated as a continuous independent variable within the revenue model and represented as a distribution of values. The middle value often (but not always) has the greatest likelihood of occurring. The shape of the distribution can be normal, triangular, uniform, or another form, which determines the likelihood of different values under random sampling. Standard deviations were selected to cover all reasonable possibilities for the Project. For each risk factor, C&M developed a distribution based on the best available information and analysis for use in the Monte Carlo simulation. Factors with normal distributions were normalized to a mean value of 1.0. The distributions are summarized in Table 6-20.

Table 6-20. Risk Analysis Summary Statistics

Variable	Year	Year Distribution					Distribution Values		
		Type	Mu	Sigma	Min	Max	Most Likely	10%	90%
VOT Internal trips - Passenger Vehicles	2025	Normal	1	0.25	NA	NA	12.44	8.45	16.43
	2030	Normal	1	0.28	NA	NA		7.98	16.90
	2035	Normal	1	0.31	NA	NA		7.50	17.38
	2040	Normal	1	0.34	NA	NA		7.02	17.86
	2045	Normal	1	0.37	NA	NA		6.54	18.34
VOT Internal trips - Commercial Vehicles	2025	Normal	1	0.30	NA	NA	32.78	20.18	45.38
	2030	Normal	1	0.32	NA	NA		19.34	46.22
	2035	Normal	1	0.34	NA	NA		18.50	47.06
	2040	Normal	1	0.36	NA	NA		17.66	47.90
	2045	Normal	1	0.38	NA	NA		16.82	48.74
VOT Hidalgo Border Crossing - Passenger Vehicles	2025	Normal	1	0.25	NA	NA	16.65	11.32	21.98
	2030	Normal	1	0.28	NA	NA		10.68	22.62
	2035	Normal	1	0.31	NA	NA		10.04	23.26
	2040	Normal	1	0.34	NA	NA		9.40	23.90
	2045	Normal	1	0.37	NA	NA		8.76	24.54
VOT Hidalgo Border Crossing - Commercial Vehicles	2025	Normal	1	0.30	NA	NA	40.32	24.82	55.82
	2030	Normal	1	0.32	NA	NA		23.78	56.86
	2035	Normal	1	0.34	NA	NA		22.75	57.89
	2040	Normal	1	0.36	NA	NA		21.72	58.92
	2045	Normal	1	0.38	NA	NA		20.68	59.96
VOR - Passenger Vehicles	2025	Normal	1	0.25	NA	NA	17.9	12.17	23.63
	2030	Normal	1	0.28	NA	NA		11.48	24.32
	2035	Normal	1	0.31	NA	NA		10.79	25.01
	2040	Normal	1	0.34	NA	NA		10.10	25.70
	2045	Normal	1	0.37	NA	NA		9.41	26.39
VOR - Commercial Vehicles	2025	Normal	1	0.30	NA	NA	39.65	24.41	54.89
	2030	Normal	1	0.32	NA	NA		23.39	55.91
	2035	Normal	1	0.34	NA	NA		22.37	56.93
	2040	Normal	1	0.36	NA	NA		21.36	57.94
	2045	Normal	1	0.38	NA	NA		20.34	58.96
Border Crossing Passenger Vehicles Growth Rate	2025	Normal	1	0.75	NA	NA	0.0%	-1.0%	1.0%
	2030	Normal	1	0.90	NA	NA		-1.2%	1.2%
	2035	Normal	1	1.05	NA	NA		-1.3%	1.3%
	2040	Normal	1	1.05	NA	NA		-1.3%	1.3%
	2045	Normal	1	1.05	NA	NA		-1.3%	1.3%
Border Crossing Commercial Vehicles Growth Rate	2025	Normal	1	0.12	NA	NA	2.3%	2.0%	2.7%
	2030	Normal	1	0.15	NA	NA		1.9%	2.8%
	2035	Normal	1	0.18	NA	NA		1.8%	2.9%
	2040	Normal	1	0.21	NA	NA		1.7%	3.0%
	2045	Normal	1	0.24	NA	NA		1.6%	3.0%
Internal Commercial Vehicles Growth Rate	2025	Normal	1	0.12	NA	NA	2.0%	1.7%	2.3%
	2030	Normal	1	0.15	NA	NA		1.6%	2.4%
	2035	Normal	1	0.18	NA	NA		1.5%	2.5%
	2040	Normal	1	0.21	NA	NA		1.5%	2.5%
	2045	Normal	1	0.24	NA	NA		1.4%	2.6%

Variable	Year	Year Distribution					Distribution Values		
		Type	Mu	Sigma	Min	Max	Most Likely	10%	90%
Toll Rate Passenger Vehicles ($/mile)	2025	Normal	1	0.08	NA	NA	$ 0.20	$ 0.18	$ 0.22
	2030	Normal	1	0.11	NA	NA		$ 0.17	$ 0.23
	2035	Normal	1	0.14	NA	NA		$ 0.16	$ 0.24
	2040	Normal	1	0.17	NA	NA		$ 0.16	$ 0.24
	2045	Normal	1	0.20	NA	NA		$ 0.15	$ 0.25
Toll Rate Commercial Vehicles ($/mile)	2025	Normal	1	0.08	NA	NA	$ 0.58	$ 0.52	$ 0.64
	2030	Normal	1	0.11	NA	NA		$ 0.50	$ 0.66
	2035	Normal	1	0.14	NA	NA		$ 0.48	$ 0.68
	2040	Normal	1	0.17	NA	NA		$ 0.45	$ 0.71
	2045	Normal	1	0.20	NA	NA		$ 0.43	$ 0.73
Population Growth Rate	2025	Normal	1	0.15	NA	NA	1.2%	1.0%	1.4%
	2030	Normal	1	0.18	NA	NA		0.9%	1.5%
	2035	Normal	1	0.21	NA	NA		0.9%	1.5%
	2040	Normal	1	0.24	NA	NA		0.8%	1.6%
	2045	Normal	1	0.27	NA	NA		0.8%	1.6%
Employment Growth Rate	2025	Normal	1	0.08	NA	NA	1.7%	1.5%	1.8%
	2030	Normal	1	0.11	NA	NA		1.4%	1.9%
	2035	Normal	1	0.14	NA	NA		1.4%	2.0%
	2040	Normal	1	0.17	NA	NA		1.3%	2.0%
	2045	Normal	1	0.20	NA	NA		1.2%	2.1%
Revenue Days - Internal Passenger Vehicles	2025	Triangle	NA	NA	310	365	340	NA	NA
	2030	Triangle	NA	NA	315	375		NA	NA
	2035	Triangle	NA	NA	320	385		NA	NA
	2040	Triangle	NA	NA	325	395		NA	NA
	2045	Triangle	NA	NA	330	400		NA	NA
Revenue Days - Internal Commercial Vehicles	2025	Triangle	NA	NA	270	310	280	NA	NA
	2030	Triangle	NA	NA	270	315		NA	NA
	2035	Triangle	NA	NA	270	320		NA	NA
	2040	Triangle	NA	NA	270	325		NA	NA
	2045	Triangle	NA	NA	270	330		NA	NA
Revenue Days - External Passenger Vehicles	2025	Triangle	NA	NA	320	365	350	NA	NA
	2030	Triangle	NA	NA	325	375		NA	NA
	2035	Triangle	NA	NA	330	385		NA	NA
	2040	Triangle	NA	NA	335	395		NA	NA
	2045	Triangle	NA	NA	340	400		NA	NA
Revenue Days - External Commercial Vehicles	2025	Triangle	NA	NA	260	310	275	NA	NA
	2030	Triangle	NA	NA	260	315		NA	NA
	2035	Triangle	NA	NA	260	320		NA	NA
	2040	Triangle	NA	NA	260	325		NA	NA
	2045	Triangle	NA	NA	260	330		NA	NA
Ramp-Up - Passenger Vehicles	2025	Triangle	NA	NA	35%	65%	50%	NA	NA
	2026	Triangle	NA	NA	45%	75%	60%	NA	NA
	2027	Triangle	NA	NA	55%	85%	70%	NA	NA
	2028	Triangle	NA	NA	65%	95%	80%	NA	NA
	2029	Triangle	NA	NA	80%	100%	90%	NA	NA

Variable	Year	Year Distribution					Distribution Values		
		Type	Mu	Sigma	Min	Max	Most Likely	10%	90%
Ramp-Up - Commercial Vehicles	2025	Triangle	NA	NA	50%	70%	60%	NA	NA
	2026	Triangle	NA	NA	60%	80%	70%	NA	NA
	2027	Triangle	NA	NA	70%	90%	80%	NA	NA
	2028	Triangle	NA	NA	80%	100%	90%	NA	NA
	2029	Triangle	NA	NA	90%	100%	100%	NA	NA
ETC Penetration - Internal Passenger Vehicles	2025	Triangle	NA	NA	25%	60%	50%	NA	NA
	2026	Triangle	NA	NA	30%	70%	55%	NA	NA
	2027	Triangle	NA	NA	30%	80%	60%	NA	NA
	2028	Triangle	NA	NA	35%	90%	65%	NA	NA
	2029	Triangle	NA	NA	40%	95%	70%	NA	NA
ETC Penetration - Hidalgo Border Crossing Passenger Vehicles	2025	Triangle	NA	NA	20%	50%	40%	NA	NA
	2026	Triangle	NA	NA	25%	60%	45%	NA	NA
	2027	Triangle	NA	NA	25%	70%	50%	NA	NA
	2028	Triangle	NA	NA	30%	80%	55%	NA	NA
	2029	Triangle	NA	NA	35%	85%	60%	NA	NA
ETC Penetration - Commercial Vehicles	2025	Triangle	NA	NA	35%	70%	60%	NA	NA
	2026	Triangle	NA	NA	40%	80%	65%	NA	NA
	2027	Triangle	NA	NA	40%	90%	70%	NA	NA
	2028	Triangle	NA	NA	45%	95%	75%	NA	NA
	2029	Triangle	NA	NA	50%	100%	80%	NA	NA
Video Toll Surcharge	2025	Triangle	NA	NA	1.00	1.50	1.30	NA	NA
	2026	Triangle	NA	NA	1.00	1.50	1.30	NA	NA
	2027	Triangle	NA	NA	1.00	1.50	1.30	NA	NA
	2028	Triangle	NA	NA	1.00	1.50	1.30	NA	NA
	2029	Triangle	NA	NA	1.00	1.50	1.30	NA	NA
Video Toll Recovery	2025	Triangle	NA	NA	25%	45%	35%	NA	NA
	2026	Triangle	NA	NA	30%	50%	40%	NA	NA
	2027	Triangle	NA	NA	35%	55%	45%	NA	NA
	2028	Triangle	NA	NA	40%	60%	50%	NA	NA
	2029	Triangle	NA	NA	45%	65%	55%	NA	NA
Consumer Price Index	2025	Normal	1	0.12	NA	NA	2.0%	1.7%	2.3%
	2030	Normal	1	0.15	NA	NA		1.6%	2.4%
	2035	Normal	1	0.18	NA	NA		1.5%	2.5%
	2040	Normal	1	0.21	NA	NA		1.5%	2.5%
	2045	Normal	1	0.24	NA	NA		1.4%	2.6%

Implementing the Revenue Model

The previously described sensitivity analysis was used to determine the elasticity of the parameters. The following equation represents the revenue model—i.e., the model of revenue outcomes as they are influenced by the chosen variables, which have probabilistic distributions that are sampled repeatedly in a Monte Carlo simulation:

$$SRevenue(x) = BaseRevenue(x) * \left(\frac{SVOT(x)}{VOT(x)}\right)^{\beta} * \left(\frac{SVOR(x)}{VOR(x)}\right)^{\epsilon} * \left(\frac{SIntTripsGrowthRate(x)}{IntTripsGrowth\ Rate(x)}\right)^{\eta} * \left(\frac{SBCGrowthRate(x)}{BCGrowth\ Rate(x)}\right)^{\kappa} * \left(\frac{STollRate(x)}{TollRate(x)}\right)^{\lambda} * \left(\frac{SPopGrowthRate(x)}{PopGrowthRate(x)}\right)^{\pi} * \left(\frac{SEmpGrowthRate(x)}{EmpGrowthRate(x)}\right)^{\rho} * \left(\frac{SRevenueDays(x)}{RevenueDays(x)}\right)^{\sigma} * \left(\frac{SRampUp(x)}{RampUp(x)}\right)^{\varphi} * \left(\frac{SETC(x)}{ETC(x)}\right)^{\psi} * \left(\frac{SVideoToll(x)}{VideoToll(x)}\right)^{\Pi} * \left(\frac{SCPI(x)}{CPI(x)}\right)^{\mathrm{P}}$$

Where:

SRevenue(x) = the stochastic revenue for year *x*

BaseRevenue(x) = the Base forecast revenue for year *x*

SVOT(x) = the stochastic VOT for year *x*

SVOR(x) = the stochastic VOR for year *x*

SIntTripsGrowthRate(x) = the internal trips growth rate for year *x*

SBCGrowthRate(x) = the stochastic border crossings growth rate for year *x*

STollRate(x) = the stochastic toll rate per mile for year *x*

SPopGrowthRate(x) = the stochastic population growth rate for year *x*

SEmpGrowthRate(x) = the stochastic employment growth rate for year *x*

SRevenueDays(x) = the stochastic revenue days for year *x*

SRampUp(x) = the stochastic commercial vehicle ramp-up for year *x*

SETC(x) = the stochastic ETC Penetration for year *x*

SVideoToll(x) = the stochastic Video Toll Recovery for year *x*

SCPI(x) = the stochastic consumer price index for year *x*

β = the elasticity of revenue to VOT variation

ϵ = the elasticity of revenue to VOR variation

η = the elasticity of revenue to internal trips growth variation

κ = the elasticity of revenue to border crossings growth variation

λ = the elasticity of revenue to toll rate variation

π = the elasticity of revenue to population growth variation

ρ = the elasticity of revenue to employment growth variation

σ = the elasticity of revenue to revenue days variation

φ = the elasticity of revenue to ramp-up variation

ψ = the elasticity of revenue to ETC Penetration variation

Π = the elasticity of revenue to Video Toll Recovery variation

P = the elasticity of revenue to consumer price index variation

The equation is implemented for passenger and commercial vehicles separately and considering the difference between internal and HBC-external trips on some cases. The elasticities resulting from the sensitivity analysis are shown in Table 6-21.

Table 6-21. Elasticity of Different Key Parameters to Total Revenue

Variable	Parameter	2025	2030	2035	2040	2045
VOT Internal Trips - Passenger Vehicles	β +	0.34	0.34	0.34	0.34	0.34
	β -	0.34	0.34	0.34	0.34	0.34
VOT Internal Trips - Commercial Vehicles	ϒ +	0.05	0.06	0.06	0.06	0.07
	ϒ -	0.05	0.06	0.06	0.06	0.07
VOT Border Crossing - Passenger Vehicles	δ +	0.14	0.15	0.15	0.15	0.16
	δ -	0.14	0.15	0.15	0.15	0.16
VOT Border Crossing - Commercial Vehicles	ε +	0.12	0.13	0.13	0.14	0.14
	ε -	0.12	0.13	0.13	0.14	0.14
VOR - Passenger Vehicles	ϵ +	0.12	0.12	0.12	0.12	0.12
	ϵ -	0.12	0.12	0.12	0.12	0.12
VOR - Commercial Vehicles	ζ +	0.05	0.05	0.05	0.05	0.05
	ζ -	0.05	0.05	0.05	0.05	0.05
Border Crossing Growth - Passenger Vehicles	κ +	0.01	0.02	0.03	0.04	0.05
	κ -	0.07	0.11	0.14	0.17	0.20
Border Crossing Growth - Commercial Vehicles	θ +	0.08	0.14	0.23	0.38	0.62
	θ -	0.16	0.24	0.32	0.40	0.48
Growth Rate - Internal Trips Commercial Vehicles	η +	0.01	0.03	0.06	0.14	0.30
	η -	0.25	0.28	0.31	0.34	0.37
Toll Rate – Passenger Vehicles ($/mile)	λ +	-0.12	-0.12	-0.13	-0.13	-0.14
	λ -	0.15	0.16	0.18	0.20	0.21
Toll Rate – Commercial Vehicles ($/mile)	μ +	0.29	0.28	0.27	0.26	0.25
	μ -	0.61	0.57	0.54	0.51	0.48
Population Growth	π +	1.69	1.73	1.76	1.80	1.84
	π -	0.89	0.91	0.94	0.96	0.99
Employment Growth	ρ +	1.97	2.17	2.39	2.63	2.89
	ρ -	0.89	0.91	0.94	0.97	1.00
Revenue Days - Internal Passenger Vehicles	ς +	0.80	0.80	0.80	0.80	0.80
	ς -	0.80	0.80	0.80	0.80	0.80
Revenue Days - Internal Commercial Vehicles	σ +	0.32	0.32	0.32	0.32	0.32
	σ -	0.32	0.32	0.32	0.32	0.32
Revenue Days - External Passenger Vehicles	τ +	0.30	0.30	0.30	0.30	0.30
	τ -	0.30	0.30	0.30	0.30	0.30
Revenue Days - External Commercial Vehicles	υ +	0.70	0.70	0.70	0.70	0.70
	υ -	0.70	0.70	0.70	0.70	0.70
Ramp Up - Passenger Vehicles	ϕ +	1.60	0.00	0.00	0.00	0.00
	ϕ -	0.80	0.00	0.00	0.00	0.00
Ramp Up - Commercial Vehicles	χ +	0.80	0.00	0.00	0.00	0.00
	χ -	0.40	0.00	0.00	0.00	0.00
ETC Penetration - Internal Passenger Vehicles	ψ +	0.53	0.44	0.35	0.25	0.16
	ψ -	0.53	0.44	0.35	0.25	0.16
ETC Penetration - Hidalgo Border Crossing Passenger Vehicles	Ϗ +	0.20	0.16	0.13	0.09	0.06
	Ϗ -	0.20	0.16	0.13	0.09	0.06

Variable	Parameter	2025	2030	2035	2040	2045
ETC Penetration - Commercial Vehicles	Л +	0.34	0.30	0.24	0.18	0.12
	Л -	0.34	0.30	0.24	0.18	0.12
Video Toll Surcharge	П +	-0.37	-0.37	-0.36	-0.34	-0.33
	П -	0.43	0.43	0.37	0.33	0.29
Video Toll Recovery	μ +	0.17	0.17	0.17	0.17	0.17
	μ -	0.17	0.17	0.17	0.17	0.17
Consumer Price Index	P +	1.00	1.00	1.00	1.00	1.00
	P -	1.00	1.00	1.00	1.00	1.00

Monte Carlo Simulation

Crystal Ball add-on software for Excel provides the capability to run a randomized series of scenarios (i.e., Monte Carlo simulation). The scenarios were defined by varying the risk factor values based on their associated distributions. The revenue model was used to estimate the associated revenue for each scenario. Crystal Ball automated the simulation process by selecting combinations of input values for the risk factors, which were used to construct 100,000 individual scenarios. The risk—with respect to the impact of these variables on total revenue—was evaluated for the model years 2025, 2030, 2040, and 2045. No risk analysis was conducted for revenue years 2046 to 2061. For these years, C&M applied the Base forecast growth rate for revenue.

6.7.2. Risk Analysis Results

The results of the risk analysis are presented in Table 6-22 and illustrated in Figure 6-13 in the form of probabilities, indicating the likelihood that revenue will reach a given value (in nominal dollars). For example, results indicate that in 2030 there is a 90 percent probability that revenue will reach $6.41 million, a 50 percent probability that revenue will reach $9.14 million, and a 10 percent probability that revenue will reach $12.95 million. The Base forecast revenue is assumed to be around the 50th percentile (i.e., P50) throughout the forecast period.

Table 6-22. Risk Analysis Results – Revenue (Thousands Nominal $) Probabilities

Year	BASE	P5	P10	P20	P30	P40	P50	P60	P70	P80	P90	P95
2025	$2,660	$4,489	$3,967	$3,397	$3,052	$2,794	$2,579	$2,387	$2,207	$2,019	$1,787	$1,620
2026	$3,690	$5,532	$5,018	$4,463	$4,103	$3,825	$3,582	$3,358	$3,137	$2,898	$2,596	$2,364
2027	$4,920	$7,009	$6,416	$5,767	$5,339	$5,004	$4,711	$4,434	$4,155	$3,850	$3,461	$3,166
2028	$6,340	$8,920	$8,191	$7,393	$6,878	$6,463	$6,095	$5,752	$5,406	$5,025	$4,529	$4,159
2029	$7,930	$10,916	$10,044	$9,103	$8,486	$7,993	$7,553	$7,143	$6,730	$6,267	$5,672	$5,215
2030	$9,490	$14,265	$12,950	$11,484	$10,536	$9,783	$9,139	$8,535	$7,918	$7,254	$6,411	$5,762
2031	$9,940	$15,341	$13,848	$12,207	$11,150	$10,317	$9,604	$8,939	$8,263	$7,539	$6,619	$5,915
2032	$10,400	$16,417	$14,747	$12,930	$11,765	$10,852	$10,069	$9,342	$8,609	$7,823	$6,826	$6,068
2033	$10,880	$17,493	$15,645	$13,653	$12,379	$11,386	$10,535	$9,746	$8,955	$8,108	$7,034	$6,220
2034	$11,370	$18,569	$16,544	$14,376	$12,993	$11,920	$11,000	$10,150	$9,301	$8,392	$7,241	$6,373
2035	$11,880	$19,644	$17,442	$15,099	$13,608	$12,454	$11,465	$10,554	$9,647	$8,676	$7,449	$6,526
2036	$12,410	$20,928	$18,501	$15,924	$14,298	$13,047	$11,978	$10,997	$10,021	$8,975	$7,659	$6,670
2037	$12,950	$22,212	$19,559	$16,750	$14,988	$13,640	$12,491	$11,439	$10,394	$9,274	$7,869	$6,814
2038	$13,500	$23,495	$20,617	$17,576	$15,678	$14,233	$13,004	$11,882	$10,768	$9,573	$8,080	$6,958
2039	$14,070	$24,779	$21,676	$18,402	$16,368	$14,825	$13,517	$12,324	$11,142	$9,872	$8,290	$7,103
2040	$15,060	$27,726	$24,083	$20,282	$17,918	$16,128	$14,615	$13,244	$11,897	$10,465	$8,709	$7,395
2041	$15,750	$30,024	$25,876	$21,639	$18,998	$17,021	$15,353	$13,848	$12,382	$10,829	$8,937	$7,536
2042	$16,460	$32,321	$27,669	$22,995	$20,079	$17,913	$16,092	$14,453	$12,868	$11,194	$9,165	$7,677
2043	$17,190	$34,619	$29,462	$24,352	$21,159	$18,806	$16,830	$15,057	$13,354	$11,558	$9,393	$7,819
2044	$17,960	$36,916	$31,255	$25,709	$22,240	$19,699	$17,569	$15,661	$13,840	$11,923	$9,621	$7,960
2045	$18,740	$39,214	$33,047	$27,065	$23,320	$20,592	$18,307	$16,266	$14,325	$12,287	$9,849	$8,102
2046	$19,470	$41,568	$34,885	$28,456	$24,427	$21,507	$19,064	$16,885	$14,823	$12,661	$10,083	$8,247
2047	$20,230	$43,982	$36,769	$29,882	$25,563	$22,445	$19,840	$17,520	$15,333	$13,044	$10,323	$8,395
2048	$21,000	$46,456	$38,700	$31,343	$26,726	$23,406	$20,635	$18,171	$15,857	$13,436	$10,568	$8,548
2049	$21,810	$48,992	$40,679	$32,840	$27,919	$24,392	$21,450	$18,838	$16,393	$13,839	$10,820	$8,704
2050	$22,640	$51,592	$42,707	$34,375	$29,141	$25,402	$22,286	$19,522	$16,942	$14,251	$11,078	$8,864
2051	$23,570	$54,256	$44,786	$35,948	$30,394	$26,437	$23,142	$20,223	$17,506	$14,674	$11,343	$9,028
2052	$24,410	$56,937	$46,880	$37,533	$31,657	$27,481	$24,006	$20,930	$18,074	$15,101	$11,610	$9,194
2053	$25,270	$59,636	$48,988	$39,130	$32,929	$28,533	$24,877	$21,643	$18,647	$15,532	$11,880	$9,361
2054	$26,150	$62,352	$51,111	$40,738	$34,212	$29,594	$25,755	$22,363	$19,226	$15,967	$12,153	$9,531
2055	$27,070	$65,087	$53,249	$42,359	$35,505	$30,664	$26,641	$23,089	$19,811	$16,406	$12,428	$9,702
2056	$27,930	$67,840	$55,403	$43,992	$36,808	$31,743	$27,535	$23,822	$20,400	$16,850	$12,707	$9,875
2057	$28,800	$70,613	$57,573	$45,638	$38,123	$32,831	$28,437	$24,562	$20,996	$17,299	$12,988	$10,050
2058	$29,710	$73,405	$59,760	$47,298	$39,448	$33,929	$29,347	$25,309	$21,598	$17,752	$13,273	$10,227
2059	$30,650	$76,217	$61,964	$48,971	$40,786	$35,037	$30,265	$26,064	$22,205	$18,210	$13,561	$10,406
2060	$31,520	$79,050	$64,185	$50,658	$42,134	$36,155	$31,193	$26,826	$22,819	$18,673	$13,852	$10,587
2061	$32,410	$81,904	$66,423	$52,359	$43,495	$37,283	$32,129	$27,595	$23,439	$19,141	$14,146	$10,770
2062	$33,320	$84,779	$68,680	$54,074	$44,868	$38,422	$33,074	$28,372	$24,065	$19,614	$14,444	$10,955
2063	$34,260	$87,677	$70,956	$55,805	$46,254	$39,572	$34,028	$29,158	$24,698	$20,092	$14,745	$11,143
2064	$35,230	$90,598	$73,251	$57,551	$47,653	$40,733	$34,993	$29,951	$25,338	$20,576	$15,050	$11,333

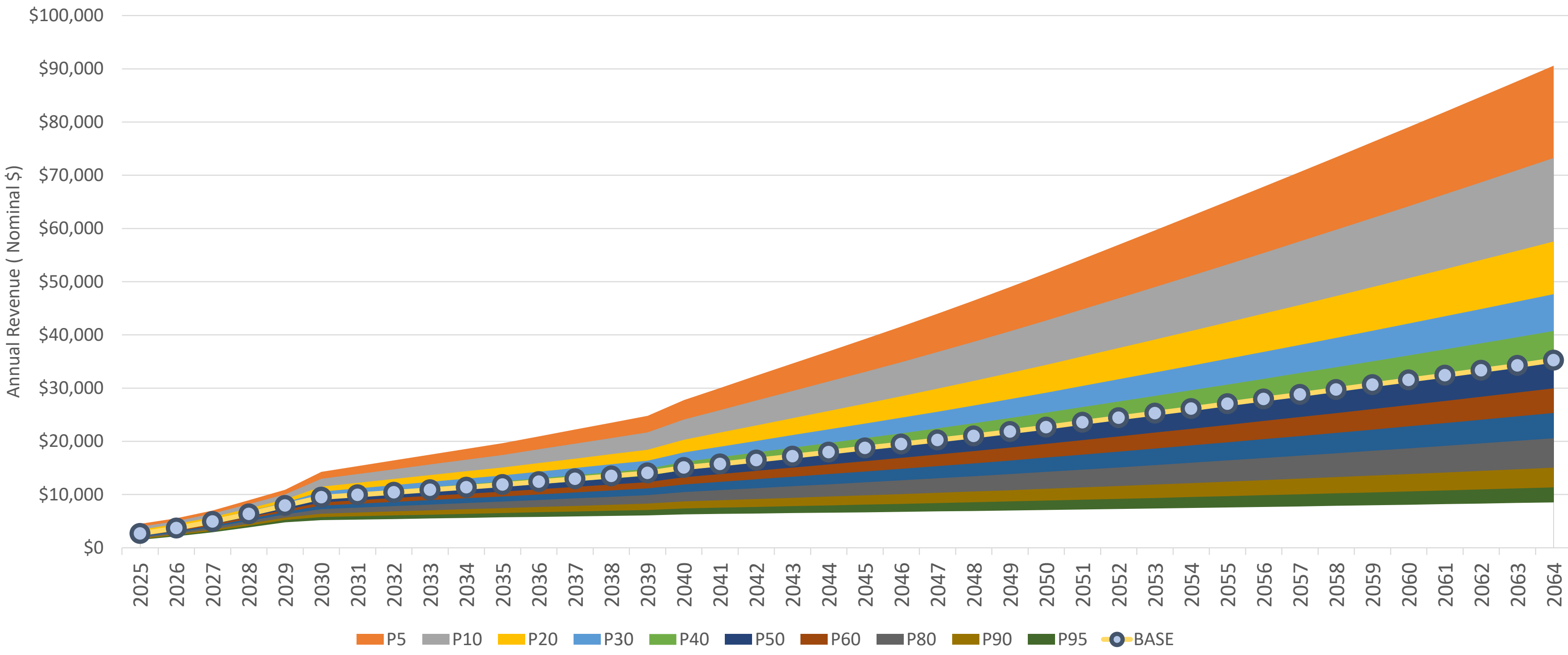


Figure 6-13. Risk Analysis Results – Revenue Probabilities

365 TOLL Stated Preference Study

C&M Associates, Inc.

December 2020

Table of Contents

List of Tables

List of Figures

1. Introduction

This report summarizes the stated preference (SP) surveys conducted by C&M Associates, Inc. (C&M) as part of the *365 TOLL Investment Grade Traffic and Revenue Study.* C&M conducted these surveys to update the choice modeling and value of time (VOT) estimates from its previous studies of the 365 TOLL project (the Project) and to determine the impact of the COVID-19 pandemic on travelers' willingness to pay tolls. Additionally, this new assessment estimates travelers' value of travel time reliability (VOR).

To develop the VOT and VOR estimates, C&M designed and administrated SP surveys to samples from three populations of the Project's potential users:

1) Passenger vehicle travelers who live in Hidalgo County (i.e., local users).
2) Passenger vehicle travelers who visit Hidalgo County (i.e., external users).
3) Decision makers of international trade companies that dispatch commercial vehicles across the U.S./Mexico border.

Due to the COVID-19 pandemic during the time of this study, the surveys were conducted online and supported by phone and video calls with trained staff.

This report summarizes the survey development, results, and model estimation for each population sample.

2. Project Description

The Project is a planned 14.9-mile tolled highway in Hidalgo County. This facility is intended to relieve traffic congestion, facilitate international trade shipments across the U.S./Mexico border, and benefit local travelers by providing a high-speed connection between the Pharr–Reynosa International Bridge, the Anzalduas International Bridge, the McAllen Foreign Trade Zone (FTZ), and industrial areas and warehouses in McAllen, Mission, and Pharr.

As shown in Figure 1, the Project comprises the following four segments:

- **Segment 1** – 5.8 miles extending from US 281/Military Highway to McColl Road, west of Jackson Road.
- **Segment 2** – 6.4 miles extending from McColl Road to FM 396/Anzalduas Highway, west of Jackson Road.
- **Segment 3** – 0.7 miles extending from US 281/Military Highway to FM 2557/Steward Road and the BSIF Connector. This segment is non-tolled.
- **Segment 4** – 2.7 miles extending from FM 396/Anzalduas Highway to FM 1016/Conway Avenue.

The Project is planned to have two construction phases. Phase 1, which was completed in 2018, includes the construction of Segment 3 as well as improvements to a 1.15-mile segment of US 281/Military Highway and the construction of a grade-separated interchange at the intersection of US 281 and the Project. Phase 2, which consists of Segments 1 and 2, is not yet under construction but is expected to be completed and open to traffic in 2025. Construction of Segment 4 is not yet scheduled.

The Project will initially be built with two mainlanes in each direction but will be expanded to three lanes per direction by 2035. Tolling along the facility is planned to begin in January 2025 and will comprise electronic and video toll gantry systems, meaning that vehicles will not need to stop at any time for tolling purposes. The Project will be operated and maintained by the Hidalgo County Regional Mobility Authority (HCRMA).

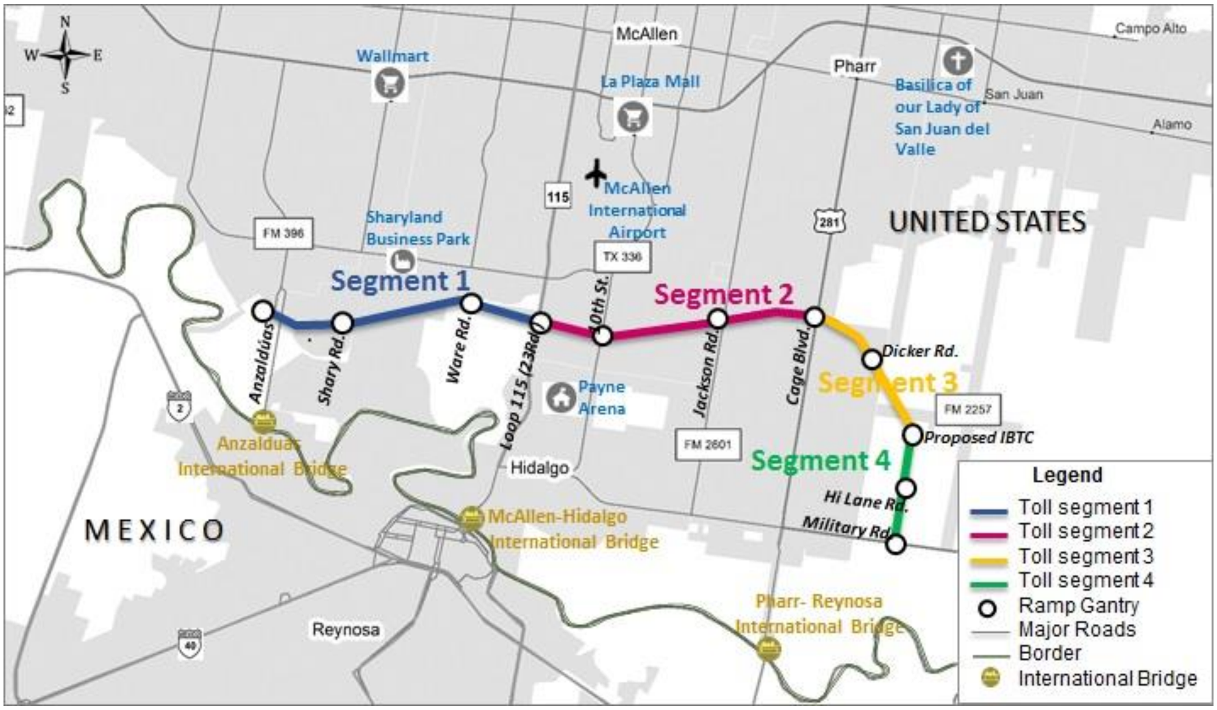


Figure 1. 365 TOLL Segments

3. Experimental Design

C&M has been analyzing the study area's travel patterns since 2008 through several studies conducted on behalf of the HCRMA. Through this experience, C&M determined the ranges and magnitudes of the key variables for each market segment impacting potential users' willingness to pay a toll for the Project. The following explanatory variables were considered in the survey's experimental design:

- Time savings
- Toll cost
- Travel time reliability

Since possible users might travel on either a portion of the Project or the entire Project length, C&M categorized trips as partial trips (i.e., traveling on a maximum of two consecutive segments of the Project) or complete trips (i.e., traveling on at least three consecutive segments of the Project).

C&M collected information to estimate the range and magnitude of each variable based on local and regional considerations. The following data relevant to the Project were obtained and analyzed:

- Travel times for each alternative route (365 TOLL vs. toll-free travel alternatives)
- Border crossing toll rates in the Hidalgo County region

To estimate the range of potential time savings when using the Project compared to existing toll-free alternative routes, travel times for those routes were obtained through web mapping platforms such as Google API and Waze by time period (AM peak, PM peak, and off-peak), date (before and after COVID-19 travel restrictions), and direction of traffic. These travel times were then compared to the Project's estimated free-flow travel times. 365 TOLL will permit free-flow speeds up to 75 mph, translating to an uninterrupted free-flow travel time of 12 minutes for the entire length of the Project. Similarly, a partial trip of 7.5 miles can be translated into a free-flow travel time of 6 minutes.

The Project's estimated time savings compared to alternative routes are presented in Table 1. The range of estimated time savings covers the lowest and highest data points of the observed travel time spectrum, thus providing the most representative estimate of the Project's possible time savings. Based on these estimated time savings, C&M determined the standard deviation (in minutes) for each of the alternative routes, as summarized in Table 2.

Table 1. Estimated Time Savings for 365 TOLL (in minutes)

Statistic	Complete Trip (14.9 miles)		Partial Trip (7.5 miles max.)	
	Passenger Vehicle	Commercial Vehicle	Passenger Vehicle	Commercial Vehicle
Minimum	8	10	5	5
Maximum	30	40	20	35
Average	18	26	11	19

Table 2. Estimated Standard Deviation of 365 TOLL Time Savings (in minutes)

Statistic	Complete trip (14.9 miles)		Partial Trip (7.5 miles max.)	
	Passenger Vehicle	Commercial Vehicle	Passenger Vehicle	Commercial Vehicle
Minimum	7.23	9.04	5.63	5.63
Maximum	19.56	26.08	9.33	16.32
Average	12.79	18.47	7.42	12.82

Regarding tolls in the Hidalgo County region, C&M reviewed the toll rates of international bridges in the Reynosa area, the operating highways in the state of Texas, and the estimated toll for the Project in C&M's 2016 T&R study. The ranges of toll rates considered in the experimental design by trip length (complete, partial) and vehicle type (passenger vehicle, commercial vehicle) are presented in Table 3.

Table 3. Estimated Toll Rates for 365 TOLL (in 2020 Dollars)

Statistic	Complete Trip (14.9 miles)		Partial Trip (7.5 miles max.)	
	Passenger Vehicle	Commercial Vehicle	Passenger Vehicle	Commercial Vehicle
Minimum	$2.00	$4.00	$0.75	$2.00
Maximun	$7.00	$22.00	$3.50	$10.00
Average	$4.00	$12.00	$2.00	$6.00

Using these ranges, two experimental designs were developed for the survey: one for determining respondents' value of time (VOT) and one for determining respondents' value of travel time reliability (VOR). Both consisted of a group of stated preference questions—i.e., hypothetical scenarios with varying toll rates and time savings associated with using the Project. For each question, respondents were given three choices presented in a random order: continue using their current route, use 365 TOLL, or no preference.

The VOT and VOR scenarios were developed with the help of specialized software for experimental designs (Ngene version 1.2.1). Several designs were evaluated to minimize correlations among the explanatory variables (e.g., the longer the travel time on the toll road is, the more expensive the fare is). Such a correlation would result in multicollinearity and unreliable model estimates. The goal of the selected experimental designs was to generate choice model parameters with the smallest possible standard errors.

As shown in Table 4, the design for the VOT experiment included a total of 96 scenarios. These scenarios were grouped into four blocks (with six scenarios in each block) for each of the following market segments:

- Passenger Vehicles – Partial trip
- Passenger Vehicles – Complete trip
- Commercial vehicles – Partial trip
- Commercial vehicles – Complete trip

Based on their reported trip type and vehicle type, each respondent was randomly presented with one of the blocks corresponding to the appropriate market segment. The six scenarios from that block were presented to the respondent in a randomized order.

Table 4. VOT Experimental Design

Market Segment	Card	Block A		Block B		Block C		Block D	
		Time Savings (minutes)	Project Toll Cost	Time Savings (minutes)	Project Toll Cost	Time Savings (minutes)	Project Toll Cost	Time Savings (minutes)	Project Toll Cost
Passenger Vehicles - Partial Trip	1	8	$2.00	15	$1.50	10	$2.75	8	$3.00
	2	20	$1.75	12	$0.75	5	$2.50	15	$1.75
	3	5	$2.75	5	$3.00	15	$0.75	10	$2.00
	4	12	$1.50	10	$1.75	12	$2.00	8	$3.50
	5	8	$2.50	20	$1.50	5	$1.00	12	$1.00
	6	15	$1.00	10	$3.50	20	$3.00	20	$0.75
Passenger Vehicles - Complete Trip	1	20	$2.50	30	$5.50	25	$3.50	8	$5.00
	2	8	$3.00	25	$2.00	15	$4.00	20	$3.50
	3	30	$2.00	10	$5.50	20	$2.00	30	$6.00
	4	10	$5.00	30	$7.00	8	$3.50	15	$5.50
	5	20	$3.00	8	$2.50	10	$6.00	25	$3.00
	6	15	$7.00	25	$4.00	15	$2.50	10	$2.50
Commercial Vehicles - Partial Trip	1	20	$5.00	10	$8.00	20	$10.00	10	$6.00
	2	5	$8.00	30	$2.00	10	$2.00	30	$3.00
	3	15	$7.00	5	$5.00	5	$7.00	15	$6.00
	4	35	$3.00	20	$7.00	35	$4.00	35	$8.00
	5	15	$10.00	35	$5.00	10	$7.00	5	$6.00
	6	30	$4.00	15	$4.00	20	$3.00	30	$10.00
Commercial Vehicles - Complete Trip	1	20	$12.00	35	$8.00	40	$15.00	30	$8.00
	2	10	$18.00	15	$10.00	15	$18.00	10	$20.00
	3	40	$6.00	40	$4.00	30	$4.00	35	$4.00
	4	15	$12.00	30	$15.00	15	$22.00	20	$15.00
	5	30	$6.00	10	$22.00	20	$6.00	35	$10.00
	6	35	$12.00	30	$10.00	35	$20.00	20	$8.00

As shown in Table 5, the design for the VOR experiment included a total of 40 scenarios grouped into two blocks (with five scenarios in each block) for each of the market segments.

As with the VOT experiment, respondents were randomly presented one of the blocks corresponding to the appropriate market segment, and the five scenarios from that block were presented to the respondent in a randomized order.

Table 5. VOR Experimental Design

Segment	Block	Card	Cost - Project	Travel Times - Project					Cost - Alternative	Travel Times - Alternative				
				T1	T2	T3	T4	T5		T1	T2	T3	T4	T5
Passenger Vehicles - Partial Trip	A	1	$3.00	7	5	10	8	8	$0.00	15	30	28	30	30
		2	$2.00	8	8	7	5	7	$0.00	17	9	20	30	22
		3	$1.00	7	7	5	6	6	$0.00	10	20	28	22	25
		4	$1.00	6	6	6	7	5	$0.00	10	22	25	20	28
		5	$2.00	5	12	8	15	5	$0.00	25	10	17	10	30
	B	1	$1.00	6	5	7	7	6	$0.00	10	28	20	20	28
		2	$3.00	8	10	8	8	5	$0.00	17	15	9	12	30
		3	$1.00	5	6	6	6	6	$0.00	12	25	22	25	25
		4	$3.00	5	8	5	10	8	$0.00	12	17	30	15	20
		5	$2.00	5	15	10	5	15	$0.00	25	10	28	30	12
Passenger Vehicles - Complete Trip	A	1	$2.00	14	15	12	15	12	$0.00	28	50	50	45	50
		2	$8.00	16	15	16	18	15	$0.00	20	55	30	21	30
		3	$8.00	10	20	16	18	14	$0.00	35	30	30	35	50
		4	$2.00	12	15	20	15	20	$0.00	30	60	15	45	15
		5	$5.00	15	18	15	20	12	$0.00	30	45	50	35	60
	B	1	$5.00	15	20	15	15	16	$0.00	25	30	45	50	30
		2	$8.00	16	20	10	20	15	$0.00	20	60	60	25	45
		3	$2.00	14	18	14	18	14	$0.00	28	45	45	40	35
		4	$5.00	10	18	14	20	16	$0.00	20	45	25	30	30
		5	$2.00	25	15	10	15	25	$0.00	20	60	45	50	20
Commercial Vehicles - Partial Trip	A	1	$3.00	12	7	12	5	10	$0.00	23	12	23	12	30
		2	$8.00	7	10	20	20	10	$0.00	20	12	12	15	12
		3	$5.00	7	5	15	10	12	$0.00	20	35	20	20	25
		4	$3.00	10	7	10	7	7	$0.00	12	15	15	35	35
		5	$5.00	7	10	7	10	15	$0.00	30	20	12	20	20
	B	1	$8.00	15	5	7	10	7	$0.00	20	30	12	12	8
		2	$5.00	15	10	7	5	12	$0.00	20	20	28	12	25
		3	$3.00	10	7	10	7	10	$0.00	20	30	28	20	35
		4	$8.00	12	5	12	5	15	$0.00	23	12	23	35	20
		5	$3.00	10	15	10	7	15	$0.00	20	12	20	35	12
Commercial Vehicles - Complete Trip	A	1	$15.00	16	14	13	13	13	$0.00	20	45	18	18	40
		2	$4.00	15	16	16	14	13	$0.00	23	30	28	45	45
		3	$15.00	13	13	13	15	13	$0.00	28	45	40	35	60
		4	$4.00	13	16	13	16	16	$0.00	30	30	45	30	28
		5	$25.00	14	16	20	13	14	$0.00	25	40	15	12	40
	B	1	$15.00	13	13	15	13	15	$0.00	30	60	30	60	30
		2	$4.00	16	13	16	16	16	$0.00	18	60	28	30	28
		3	$25.00	14	14	14	14	15	$0.00	25	40	35	40	35
		4	$4.00	14	15	15	13	15	$0.00	28	35	30	45	30
		5	$25.00	15	20	14	15	14	$0.00	24	12	12	35	35

4. Survey Questionnaires

C&M designed separate SP survey questionnaires (in both English and Spanish) for each target population: passenger vehicle residents in Hidalgo County, passenger vehicle visitors to Hidalgo County (i.e., external passenger vehicles), and decision-makers for border-crossing commercial vehicles. The questionnaire required approximately 10–40 minutes to complete depending on the type of survey: 30 minutes for residents, 10 minutes for visitors, and 40 minutes for commercial vehicle decision-makers.

The surveys were developed on the SurveyMonkey platform using a variety of response formats, including multiple choice, checkbox, dropdown menu, matrix, slider, and single and multiple text boxes. Table 6 presents the general structure of the survey for each market segment. The key differences between the surveys include several sections being excluded from the visitor survey (since visitors only travel to Hidalgo County occasionally) and a section in the commercial vehicle survey regarding permits to travel on Hidalgo County's oversize/overweight (OS/OW) corridors.

Table 6. Survey Structure per Market Segment

Sections		Visitors	Residents	Commercial Vehicles
i	Access to the survey	X	X	X
ii	Language (English or Spanish)	X	X	X
iii.	Introduction to the survey	X	X	X
iv.	Representative trip characteristics and international bridge use	X	X	X
v.	Context for the VOT experiment	X	X	X
vi.	Instructions for the VOT experiment	X	X	X
vii.	VOT experiment	X	X	X
viii.	Debrief for VOT experiment	X	X	X
ix.	Context for the VOR experiment		X	X
x.	Instructions for the VOR experiment		X	X
xi.	VOR experiment		X	X
xii.	COVID-19 pandemic's impact on travel patterns and income		X	X
xiii.	Opinions about the use of toll roadways and highways	X	X	X
xiv.	Paying for the permit for overweight or perishable cargo through overweight/oversize corridors			X
xv.	Demographic questions		X	X

It is important to note that all respondents were evaluated to ensure they were representative of the target populations (i.e., potential users of the Project). As explained in more detail below, this was accomplished through specific questions at the beginning of each survey and in the sections providing context for the VOT/VOR experiments.

4.1. Survey Sample Collection

4.1.1. External Passenger Vehicles

For the passenger vehicle visitors survey, C&M contracted the online survey provider PollFish to use its subscriber base and invite international visitors, shoppers, and commuters traveling from Mexico to Hidalgo County (with a focus on those traveling from Reynosa and Monterrey) to participate in the SP survey. PollFish utilizes an innovative survey methodology known as Random Device Engagement (RDE). Delivering the survey via popular mobile apps allows them to reach people who generally do not seek out participation in surveys. Prior to sending invitations, the subscriber base of the online survey provider was filtered to only Reynosa and Monterrey residents that had previously traveled to Hidalgo County from Mexico.

The survey first asked the following three questions to identify and eliminate anyone who is not a potential user of the Project:

1) "In the last year, have you made at least one trip (as the driver) that crossed the Mexico–US border to visit any of the towns in Hidalgo County: McAllen, Pharr, Edinburg, etc.?"
2) "Did you use any of these international bridges to make your trip? (Anzaldúas, Hidalgo-Reynosa, Pharr, Donna, Progreso, or other bridge)"
3) "When you crossed the border on that trip, what type of lane did you use? (SENTRI, Regular, Ready lane, or I crossed on foot)"

If those surveyed answered that they had not made any trips to the above cities, used another international bridge other than those located in Hidalgo County, or crossed on foot, they were not considered eligible to continue participating in the SP survey.

Moreover, the reported origin and destination (OD) of the respondent's trip also served as an evaluation question. All respondents who reported illogical trips (e.g., Tijuana to Los Angeles, Mexico City to Monterrey) were excluded from the final sample.

4.1.2. Local Passenger Vehicles

For residents of Hidalgo County, C&M obtained from the Hidalgo County Appraisal District the information and location of households that have a car and determined their median household income—based on census tract data—to obtain a representative sample for the survey. C&M mailed 6,400 survey invitations to selected households in the study area that would most likely benefit from the Project based on their location and their median household income (relative to the median household income of the surrounding area). C&M sent these out in two waves of 3,200 invitations each. The second wave included reaching out to 50 percent of those contacted in the first wave to obtain a better response rate from underrepresented households. To provide an incentive to participate, the invitation mentioned that respondents would receive a $10 gift card for participating (see Figure 2).

To ensure that respondents of the resident survey were limited to potential users of the Project, the survey asked respondents if they have traveled through the Project area within the past 6 months. Additionally, each invitation contained a unique 10-digit code that respondents were asked to enter when beginning the survey, ensuring that only individuals who had received an invitation were participating and confirming their residential address in Hidalgo County.

Figure 2. Survey Invitation Card for Hidalgo County Residents

4.1.3. Commercial Vehicles

For the commercial vehicle survey, C&M interviewed freight companies that dispatch border-crossing trips within the Project region via commercial vehicles. C&M relied on its existing database of hundreds of verified contacts from former projects in the region, including companies in Mexico and in the United States, all of whom were approached for the present survey. The survey was targeted at executives responsible for logistics—i.e., decisions about the commercial vehicle fleet and cross-border shipments. The executives had the option to answer the survey via three methods:

- Through a link sent by email.
- By video call, receiving the support of trained personnel from C&M.
- By clicking the link promoted by the Pharr International Bridge's website.

The most common method of participation was by video call.

The initial sample included 28 interviews with decision makers from international trade companies that transport their goods across the U.S./Mexico border via the Pharr–Reynosa International Bridge in Hidalgo County. Based on vehicle fleet size and trip frequency, these 28 companies represent about 22 percent of the total daily commercial vehicle crossings on the Pharr–Reynosa International Bridge. Furthermore, based on available data, 16 out of these 28 companies represent 2,566 out of the 33,780 OS/OW permits issued in 2019.

To ensure that commercial vehicle survey respondents represented commercial vehicles that would potentially use the Project, the survey asked the respondents to provide information about the most recent trip they dispatched across the Hidalgo County U.S./Mexico border. As with the other SP surveys, C&M omitted incorrect and incomplete data given by respondents to ensure an accurate and representative sample, resulting in a final sample size of 25 companies.

4.2. Reference Trip Characteristics

If participants were deemed eligible to participate in the SP surveys based on their responses to the eligibility questions, they were then asked to provide details about a recent trip. Respondents were later asked to consider this reference trip when responding to the VOT/VOR experiments.

The respondents had to answer several questions about the OD of their most recent trip, including providing the address of their destination as well as indicating the OD information on a coordinate grid. Additionally, the survey requested information regarding trip purpose, the time of day the trip took place, and trip frequency. These indicators were collected to assess the reasonableness of the respondents' answers and to group respondents in the appropriate market segments.

4.3. Value of Time Experiment

A key component of the SP surveys was the VOT experiment. The responses to the experiment questions were analyzed to obtain the parameters of the discrete choice model for each market segment.

To properly conduct this experiment, it was necessary to provide respondents with the proper context. As shown in Figure 3, they were first shown a map with the Project location and a description of the Project, including how potential users will pay the toll. Respondents were then asked: "Do you think the 365 TOLL project would be useful to you for taking the typical trip you just described?" Responses to this question aided model development by serving as an indicator of bias that could influence responses to the VOT/VOR experiments. Next, respondents were shown a second map with the segments and egress/access points of the Project, and they were asked to indicate which Project segments—or range of segments—they would most likely use. Lastly, respondents were asked about the travel time of their reported trip.

An appropriate experiment block was selected for respondents depending on their answer to these questions. If they selected several segments (two or more) of 365 TOLL and their trip travel time was over 31 minutes, a block of scenarios from the "complete trip" category was presented during the VOT experiment. If the respondent selected only one segment of 365 TOLL and the travel time was between 11 and 30 minutes, a block of scenarios from the "partial trips" category was presented. In cases where the trip travel time and the number of selected segments did not fall into the previous two categories, or if no segment was selected, the trip category was determined based on the reported travel time, with travel times over 30 minutes corresponding to "complete trips" and 11–30 minutes corresponding to "partial trips."

The VOT experiment presented six questions. For each question, respondents were given a hypothetical scenario in which they could use 365 TOLL for their representative trip based on varying toll rates and travel time savings. They then had to choose between three options: continue using their current route, use 365 TOLL, or no preference. These answers were randomly shuffled for each question to flag any respondents who may have answered randomly (e.g., always selecting the first option). Figure 4 shows an example of the VOT experiment questions.

Stated of Preference

"The Hidalgo County Regional Mobility Authority (HCRMA) is working to improve travel into southern Hidalgo County and is currently evaluating the proposed 365 TOLL project (highlighted in red in the map below). The project will initially be built with 2 main lanes in each direction, with an expansion to 3 lanes by 2030."

In order to fund the new road, the toll would be collected. You would NOT need to stop to pay your toll and would be able to continue to drive at highway speed and pay the toll in one of two different ways.

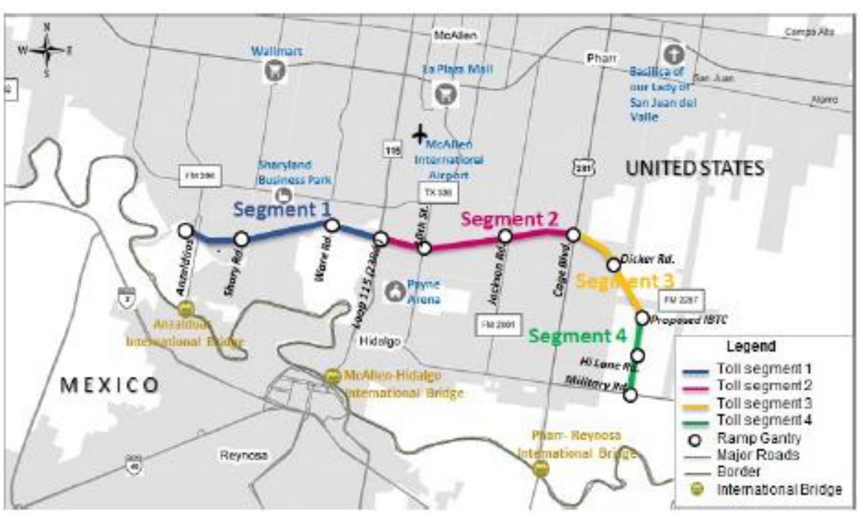
*** Prepay:** Paying the toll before using it by establishing a prepaid account. The tolls would be deducted from your account each time you use the road by reading a transponder (sticker or small electronic device mounted on the inside of your windshield), or by reading your license plates

*** Post pay:** Your vehicle's license plates would be read by a camera and a bill would be mailed to the registered owner. Additional processing fees could apply to a post-pay account.

*** 14. Do you think the 365 TOLL project would be useful to you for taking the typical trip you just described?**

◯ Yes ◯ Possibly ◯ No

Please look at the following map. The circles indicate the entrance or exit ramps of the 365 TOLL project. The colored lines indicate the segments.



*** 15. Please indicate the toll segments of 365 TOLL that you are most likely to use:**

- ( ) Only segment 1
- ( ) Only segment 2
- ( ) Only segment 3
- ( ) Only segment 4
- ( ) All four segments
- ( ) Segments 1 + 2 + 3
- ( ) Segments 1 + 2
- ( ) Segments 2 + 3
- ( ) Segments 2 + 3 +4
- ( ) Segments 3 + 4
- ( ) **Neither of them**

*** 16. Approximately how long did it take you, door-to-door, to drive from your trip began to where your trip ended? (Please include only the time you spent traveling a not time spent at any stops you may have done along the way (e.g., to get gas or coffee or the border crossing time)**

- ( ) Less than 10 minutes
- ( ) 11 - 20 minutes
- ( ) 21 - 30 minutes
- ( ) 31 - 40 minutes
- ( ) 40 - 60 minutes
- ( ) 1 - 2 hours
- ( ) 2 - 4 hours
- ( ) more than 4 hours and 1 minute

Figure 3. Context and Questions for VOT Experiment

Travel survey for Hidalgo County. Project: 365 Tollway

Stated Preference - Experiment 2C

Here are **SIX options** where the proposed **365 TOLL** could save you travel time in exchange for paying a toll. In terms of your regular trip, **please evaluate** if you would use the **365 TOLL PROJECT,** or you continue using your **CURRENT ROUTE or have NO PREFERENCE**. Remember that there are no right or wrong answers; we are only interested in your opinion.

*17. Which route would you use if the proposed 365 Toll offered a time saving of **25 minutes** with a toll of **USD 3.50**?

(_) 365 Toll Route (_) Current Route (_) I have no preference

*18. Which route would you use if the proposed 365 Toll offered a time saving of **15 minutes** with a toll of **USD 4.00**?

(_) I have no preference (_) 365 Toll Route (_) Current Route

*19. Which route would you use if the proposed 365 Toll offered a time saving of **20 minutes** with a toll of **USD 2.00**?

(_) Current Route (_) I have no preference (_) 365 Toll Route

Figure 4. VOT Experiment Example

At the end of the VOT experiment section, respondents were presented with three debriefing questions:

- A multiple-choice question: "Please explain the reasoning behind your responses to the previous scenarios."
- A slide question: "What is the maximum amount you would be willing to pay to use the 365 TOLL roadway? (Amount in USD)"
- A slide question: "How much time should this tollway save you to justify using it? (Quantity in minutes)"

The goal of these questions was to evaluate if the respondent's answers were consistent with their reported opinions, especially if they repeatedly chose the same option regardless of the varying toll rate and time savings values presented in each question.

4.4. Value of Travel Time Reliability Experiment

In addition to the VOT experiment, the SP survey included a VOR experiment to determine the willingness of potential users of the Project to pay a toll for travel time reliability. At the beginning of the VOR experiment, four questions were presented related to delays due to traffic, accidents, or situations beyond the respondent's control during their trip:

- "Did you experience any delays during this trip?"
- "How many minutes of delay did you experience during this trip?"
- "If you have made this same trip several times, either on different days or in different months, what has been the maximum delay that you have experienced on that trip for reasons beyond your control?"
- "How often do you experience delays on this same trip, on other occasions?"

These four questions determine the real travel delay and delay frequency that the potential 365 TOLL user has experienced within the study area. This information aided in evaluating and vetting the answers to the questions presented during the VOR experiment.

After answering these questions, respondents were shown the instructions for the VOR experiment. For the experiment, each respondent was presented with five scenarios. In each scenario, they were asked to choose between two travel options—a tolled route and a toll-free route—with different daily travel times shown. The toll rate for the tolled option varied depending on the block of scenarios presented (see Table 5). Figure 5 shows an example of a VOR experiment question.

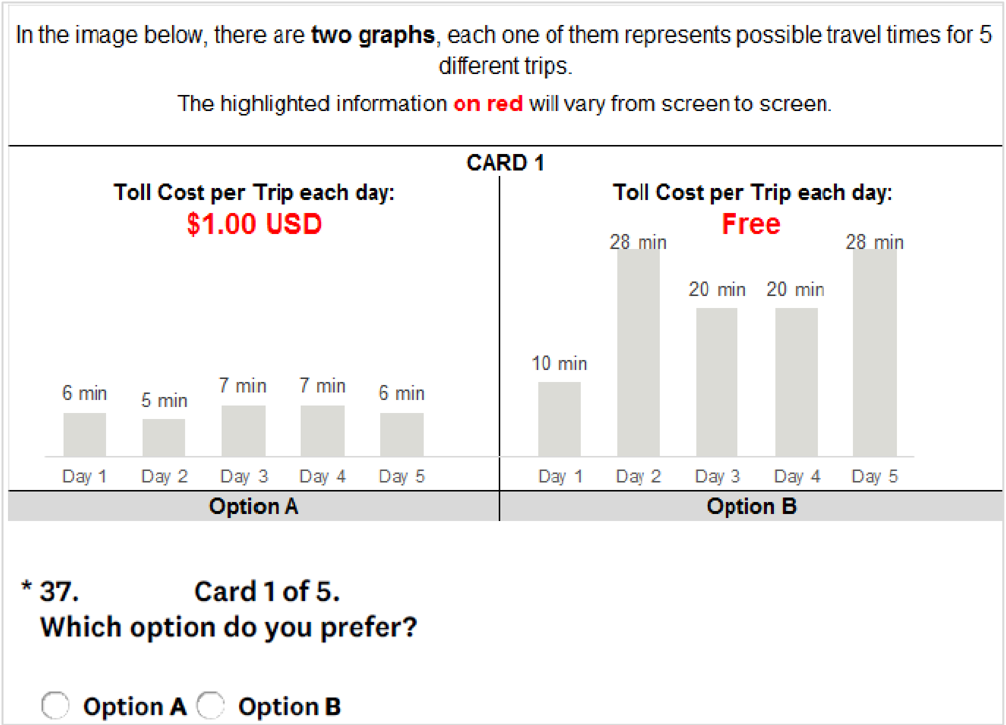


Figure 5. VOR Experiment Example

4.5. COVID-19 Pandemic Impact

The SP surveys included a series of questions regarding the COVID-19 pandemic's impact on potential users of the Project and how it may affect their future travel. Since the respondents could have been personally affected by the pandemic prior to participating in the survey, these questions were also meant to identify possible bias in responses to the VOT and VOR experiments due to the pandemic.

Respondents were asked about their job status prior to the pandemic and during the pandemic, as well as their thoughts on their expected job status once the pandemic is over. Respondents then answered questions about changes in travel behavior—comparing their current situation to pre-COVID conditions and to a future time after the pandemic—including questions about how often they work from home and how often they use carpool options or taxi services (e.g., Uber, Lyft, etc.).

4.6. Opinions Regarding the Use of Tolled Facilities

The next section of the SP survey obtained respondents' opinions regarding the 365 TOLL Project. The answers to these questions allowed C&M to filter respondents in the sample that were, for example, overly enthusiastic for (or strongly opposed to) the Project. Like other control questions, C&M aimed to identify biased responses to the VOT and/or VOR experiments.

4.7. Oversized/Overweight Permit Use

For the commercial vehicle survey, C&M included a unique section of questions for companies that purchase permits to use the Hidalgo County OS/OW corridor. Since the permits are paid for prior to crossing the U.S./Mexico border, this market segment of potential users of the Project has unique characteristics and possible toll products that might interest the HCRMA. Therefore, C&M paid special attention to this market segment.

4.8. Demographic Information

The demographic information gathered in the survey aided in disaggregating potential 365 TOLL users into different user groups, or market segments. Information regarding household size and medium household income served as important indicators and validation points for assessing the reasonableness of the VOT and VOR experiment responses. For the commercial vehicle survey, C&M obtained relevant details about the load types they carry, how big their vehicle fleet is, etc. to differentiate market segments within the commercial vehicle sample.

5. Survey Results

This section presents the results from the surveyed samples of potential users of 365 TOLL, including a summary of the reported trip characteristics, the results of the VOT and VOR experiments, debriefing responses, opinions regarding the Project and tolled facilities, and demographic information.

5.1. Sample Size

Table 7 shows the number of fully completed surveys and the number of VOT and VOR experiments completed for each market segment (local passenger vehicles, external passenger vehicles, commercial vehicles). All surveys were collected during the period of August 2020 to October 2020.

After conducting an outlier analysis on the survey responses received, a total of 399 respondents were excluded from the dataset. This analysis considered respondents whose reported ODs were not relevant to the Project (e.g., matching ODs or ODs representing cross-border travel that would be more reasonably completed via another international bridge). Furthermore, respondents who did not provide coherent answers to the experimental questions were considered outliers (e.g., a respondent willing to pay an expensive toll but unwilling to pay the cheapest toll). Each sample was analyzed under the same principle (i.e., as toll rate increases, willingness to pay should decrease).

As a result of removing outliers, 3,503 choice observations were included in the final discrete modeling choice analysis. The respondents who fully and validly completed the survey included 116 local passenger vehicle users, 288 external passenger vehicle users, and 25 commercial vehicle decision makers, totaling 429 completed surveys. The number of responses to the VOT and VOR experiments exceed the number of completed surveys because valid experiment responses were included in the analysis even if the respondent did not complete the entire survey.

Table 7. Survey Sample Sizes

Survey Type	VOT Responses	VOR Responses	Completed Surveys	Initial Date	Final Date
Passenger Vehicles – Local Users	139	125	116	Aug. 7, 2020	Oct. 1, 2020
Passenger Vehicles – External Users	293	N/A	288	Aug. 12, 2020	Oct. 1, 2020
Commercial Vehicles	26	26	25	Aug. 25, 2020	Oct. 5, 2020
Total # of Surveys	**458**	**151**	**429**		
Total # of Choice Observations	**2,748**	**755**			

According to Bradley and Kroes (1990) and Ortuzar and Willumsen (2001), a sample size of 75 to 100 is sufficient for conducting an SP survey. For the present study, the sample sizes obtained for residents and visitors both exceed this suggested range and are thus sufficient to develop discrete choice models.

For the commercial vehicle survey, a total of 28 surveys were administered to shippers and logistics managers from Hidalgo County; shippers were considered depending on the type of cargo, transport volumes, and the final destination of the cargo. Gathering a suitably sized sample from this population proved difficult, as respondents were skeptical of participating in the survey by video call or phone. Furthermore, the general tasks and workload of potential respondents—along with restrictions in place due to COVID-19—eliminated the possibility of in-person interviews.

Even though the commercial vehicle sample size would be considered small and insufficient for the purposes of conventional traffic modeling, it is necessary to understand that the population of interest is smaller than that of passenger vehicle travelers. C&M targeted the main players of the U.S./Mexico border trade in Hidalgo County. Based on the truck fleet sizes and trip frequency, the 28 companies that participated represent about 22 percent of the total daily commercial vehicle crossings on the Pharr–Reynosa International Bridge. Additionally, based on available data, 16 out of these 28 companies represent 2,566 OS/OW permits out of the 33,780 OS/OW permits issued in the year 2019. Furthermore, a study by Bliemer and Rose (2005) exploring the minimum sample size requirements for SP surveys recommends a minimum of 30 respondents be sampled for any discrete choice model, which is close to the commercial vehicle sample size for the present study. For these reasons, C&M considers its commercial vehicle sample to be suitable for the purposes of discrete choice modeling.

5.2. Passenger Vehicles – Local Users

This section summarizes the survey results for local passenger vehicle travelers (i.e., Hidalgo County residents), beginning with the reported characteristics of respondents' reference trips.

5.2.1. Reference Trip Characteristics

Local users were first asked if their reference trip involved crossing an international bridge. As shown in Figure 6, the majority of reported trips (54.8%) took place within Hidalgo County and did not involve an international bridge. When respondents did report using an international bridge, the Hidalgo–Reynosa International Bridge (13.3%) and the Anzalduas International Bridge (10.4%) were preferred over the Pharr–Reynosa (8.9%) and other bridges. For those who traveled across an international bridge, 52.4 percent reported wait times of less than 60 minutes when crossing the border and 25 percent reported wait times of 2 hours of more, as shown in Figure 7. Furthermore, 20 percent reported using a SENTRI card.

It is important to note that even though the survey asked for a reference trip within the last 6 months, 79 percent of respondents shared information from trips made in August or September 2020. As of December 2020, there are still restrictions on these types of trips as well as recommendations to stay home due to the COVID-19 pandemic. Due to this, local trips reported by respondents were predominantly low-frequency trips. As shown in Figure 8, the most common trip frequencies reported are once per month and 2-3 times per week, which together represent 42.5 percent of responses.

As shown in Figure 9, the most popular place to start the trip is at home, and the most popular destination is a shopping mall (38%). Trips related to work or school were less common in the sample due to these activities frequently being performed remotely during the pandemic.

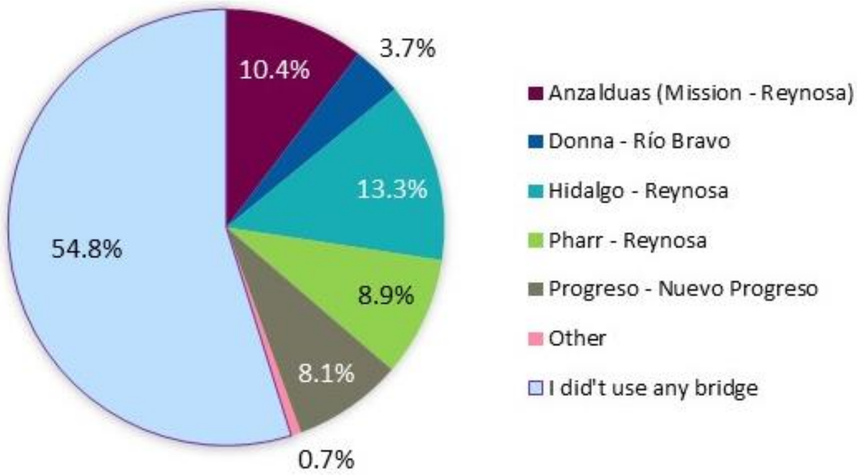


Figure 6. Local Users – International Bridge Used

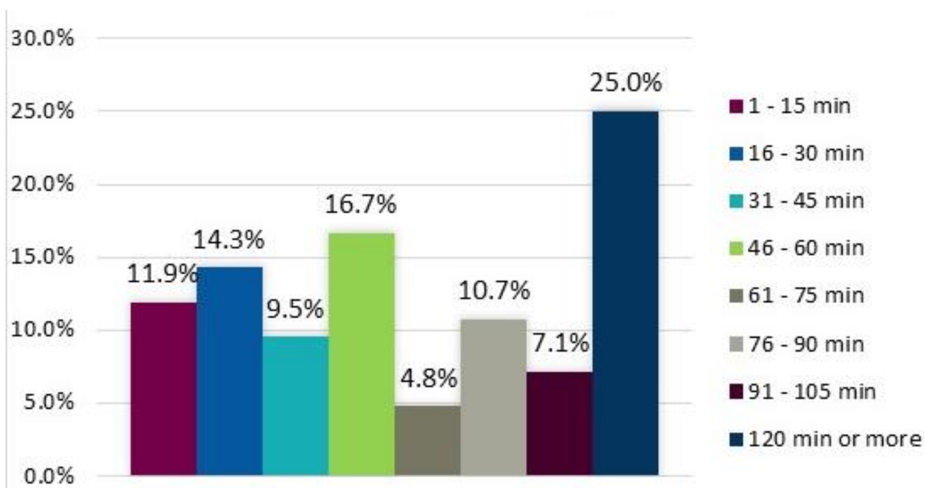


Figure 7. Local Users – Border Crossing Wait Time

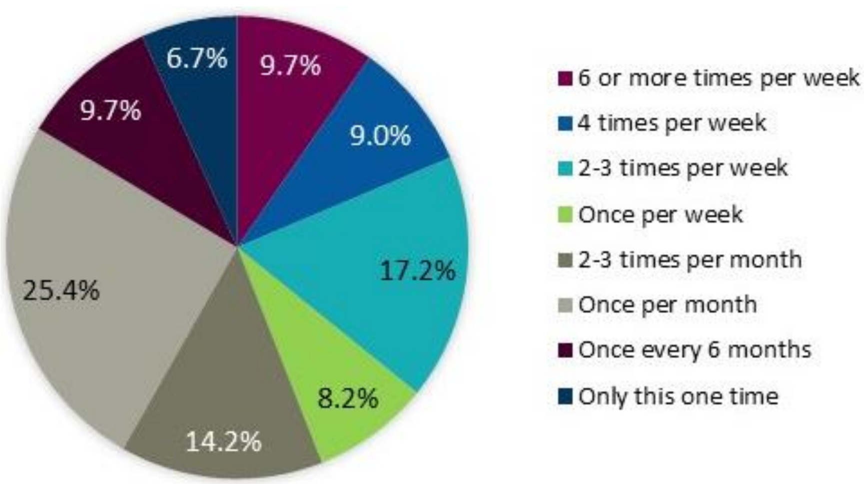


Figure 8. Local Users – Trip Frequency

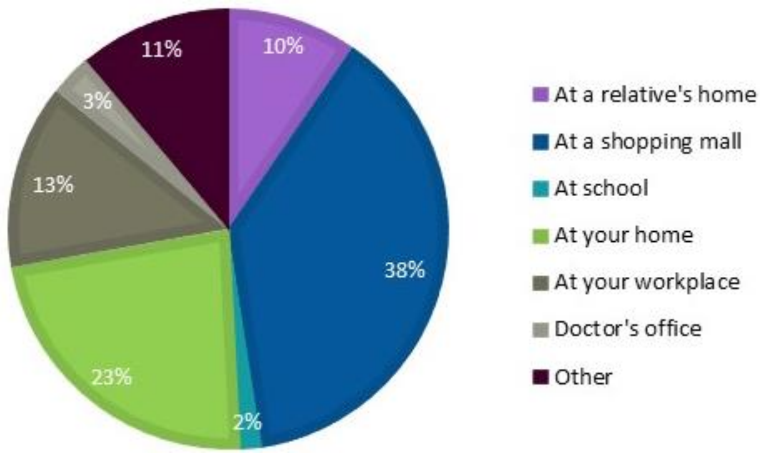


Figure 9. Local Users – Trip Destination

As shown in Table 8, the ODs of reported trips focus primarily on McAllen, Mission, and Pharr.

Table 8. Origins and Destinations for Local Users in Hidalgo County

	State	County	City	DESTINATION						
				USA						
				Minnesota	Texas					
				Renville	*	Hidalgo				%
				Renville		**	McAllen	Mission	Pharr	Origins
ORIGIN	Texas	Bexar	San Antonio	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.8%
		Cameron	Port Mansfield	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%
			South Padre	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.8%
		Hidalgo	Alamo	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.8%
			Donna	0.0%	0.0%	0.8%	0.8%	0.0%	0.0%	1.7%
			Edinburg	0.0%	0.0%	0.8%	0.8%	0.8%	0.0%	2.5%
			Hidalgo	0.0%	0.0%	3.4%	0.8%	0.0%	0.0%	4.2%
			McAllen	0.0%	2.5%	4.2%	12.6%	0.8%	1.7%	21.8%
			Mercedes	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.8%
			Mission	0.0%	0.0%	4.2%	10.1%	12.6%	0.0%	26.9%
			Penitas	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.8%
			Pharr	0.0%	1.7%	7.6%	7.6%	1.7%	11.8%	30.3%
			San Juan	0.0%	0.0%	1.7%	2.5%	0.0%	0.8%	5.0%
			Weslaco	0.8%	0.0%	0.8%	0.8%	0.0%	0.0%	2.5%
			% Destination	0.8%	4.2%	26.9%	36.1%	16.8%	15.1%	

Note: * Considers trips to Cameron and Live Oak County. ** Considers trips to Alamo, Donna, Edinburg, Hidalgo, La Joya, Mercedes, Muniz, Penitas, Progreso, San Juan, and Weslaco.

Regarding trip delays, Figure 10 illustrates that only 20.7 percent of respondents reported no delays in their trip whereas 43.7 percent reported a delay of 1 to 15 minutes. Therefore, it is possible that people who suffer a delay higher than 16 minutes (35.6%) are interested in an alternative that reduces delays during their trips, especially if these delays have a high rate of occurrence. Figure 11 displays the frequency of reported trip delays, with 19.3 percent reporting delays occurring two or more times per week.

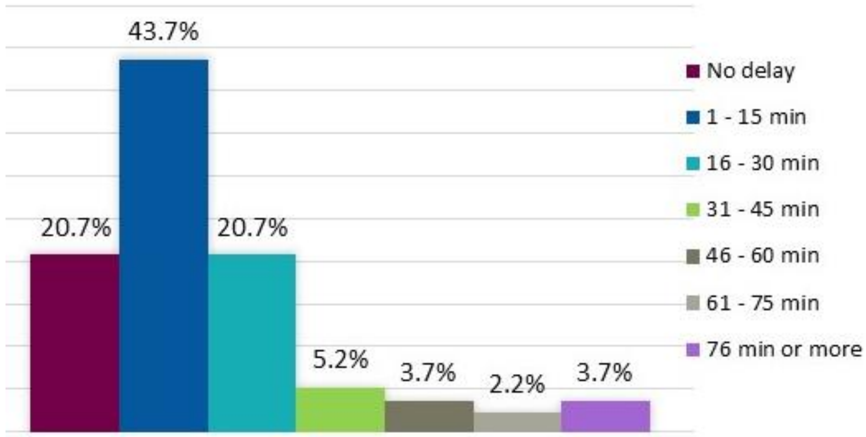


Figure 10. Local Users – Reported Delays During Trip

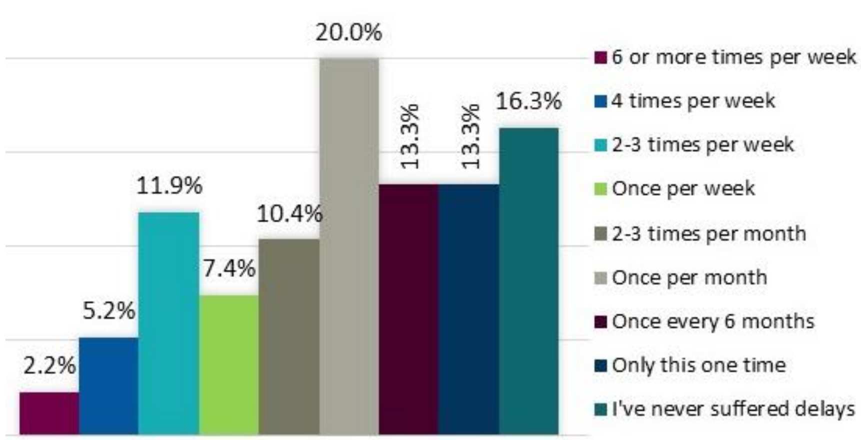


Figure 11. Local Users – Reference Trip Delay Frequency

5.2.2. COVID-19 Impact

This survey asked three questions about how the COVID-19 pandemic affected respondents' employment, working from home, and the use of taxis/carpools. Respondents were asked to provide responses to these questions for three periods of time: before the pandemic, during quarantine, and a future without restrictions.

Figure 12 shows how the percentage of people employed decreased during the pandemic while unemployment rose dramatically. Moreover, it can be observed that once all restrictions are lifted, the employment percentage will not necessarily be the same as before the pandemic. This is partly because the economic recovery is not going to be immediate, and several people are going to voluntarily change their employment status (e.g., retirement).

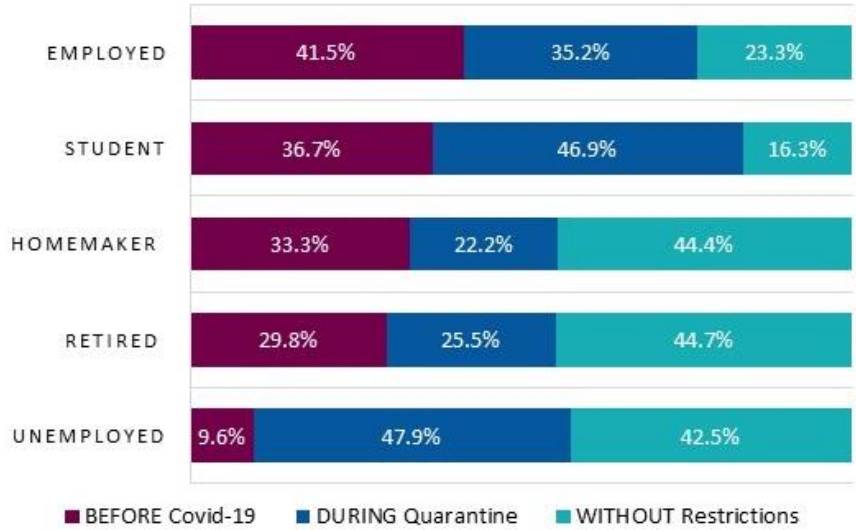


Figure 12. Local Users – Job Status

Regarding work from home status, Figure 13 shows that before the pandemic, 41 percent of respondents never worked from home and 24.6 percent worked from home more than four times per week. This percentage increased to 41.5 percent during the pandemic. This situation opened the door for more work from home opportunities in the partial form of 1 – 3 times per week or a few days per month, as reported by 86 percent of respondents.

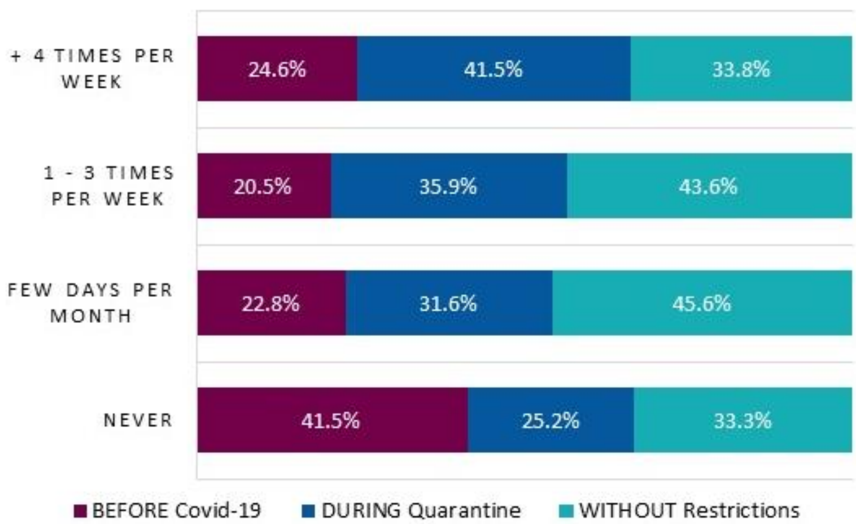


Figure 13. Local Users – Frequency of Working from Home

Regarding the use of taxis or any form or carpooling, Figure 14 shows that many respondents who use these services decreased their use during the pandemic. People who just used these services either occasionally or never prior to the pandemic maintained similar usage during the pandemic or only decreased slightly. Once all restrictions are lifted, frequent and occasional users hope to increase the use of these services by 53 percent.

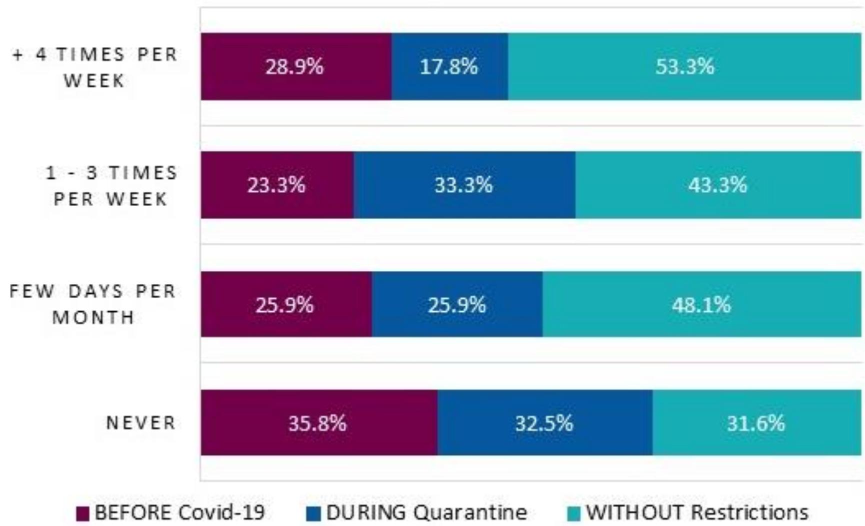


Figure 14. Local Users – Frequency of Taxi/Carpool Use

5.2.3. VOT Experiment

In the introductory portion of the VOT experiment, respondents were asked which segment(s) of 365 TOLL they would likely use. As shown in Figure 15, approximately 31 percent of respondents indicated their interest in using all four segments, whereas 69 percent of respondents indicated interest in partial trips, preferring Segments 1 and 2 above all other combinations.

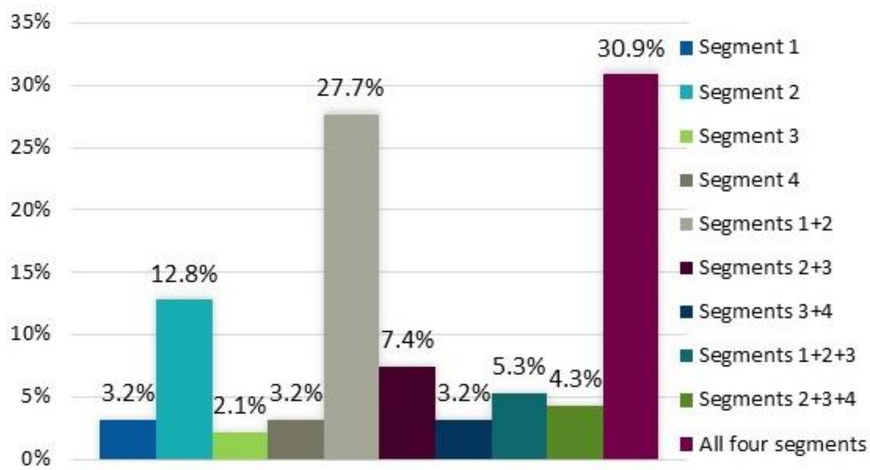


Figure 15. Local Users – 365 TOLL Segments of Interest

The sample size for the VOT experiment comprised 139 surveys with four blocks (A, B, C, and D), each with two possible options for a trip (partial or complete). Table 9 illustrates the results for each block and trip type. Out of the 834 responses, roughly 34 percent indicate a preference for using 365 TOLL, 46 percent prefer the current route, and 20 percent indicate no preference. The indifference was imputed with methods of missing values in the analysis.

Table 9. VOT Sample for Passenger Vehicles – Local Users

Experimental Design (Trip Type-Block)	# of Responses	Option Chosen				%
		365 TOLL	Current Route	No Preference	Total	
Complete-A	13	32	34	12	78	9%
Complete-B	17	30	45	27	102	12%
Complete-C	20	43	54	23	120	14%
Complete-D	10	23	23	14	60	7%
Partial-A	7	10	19	13	42	5%
Partial-B	25	51	80	19	150	18%
Partial-C	33	61	90	47	198	24%
Partial-D	14	35	38	11	84	10%
Total	**139**	**285**	**383**	**166**	**834**	100%
% Total	**100%**	**34%**	**46%**	**20%**	**100%**	-

Each choice experiment result indicates the relationship between toll rate and the willingness to pay with respect to the time savings each scenario offers. As shown in Figure 16, when the cost increases, the willingness to pay decreases. For example, whereas 70 percent of respondents

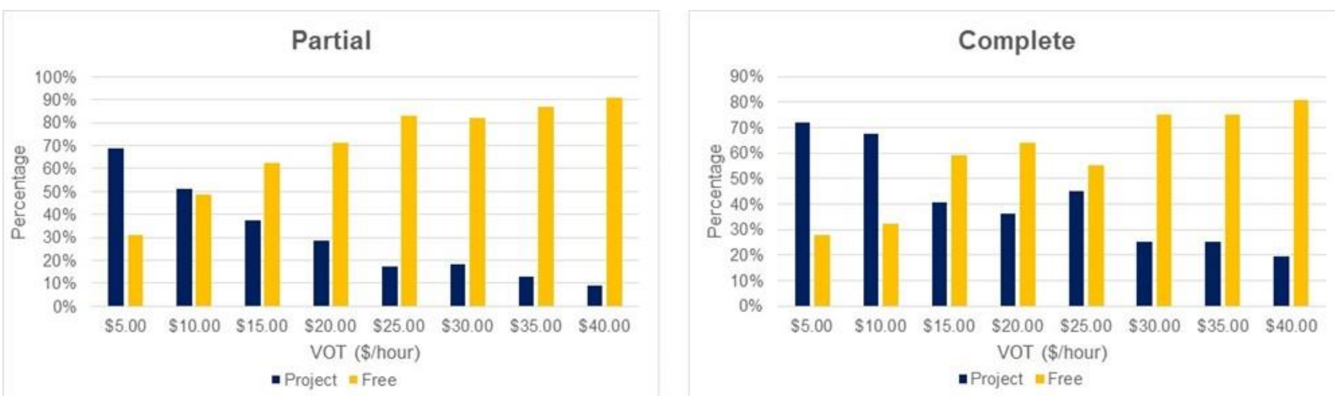


Figure 16. VOT Comparison – Passenger Vehicles

5.2.4. VOR Experiment

The sample collected for the VOR experiment comprised 125 surveys with two blocks (A/B) and two possible trips (complete, partial). In this case, the sample is adequate for developing the choice models, and there is an acceptable representation of each experiment block.

Table 10 displays the VOR experiment results for each block and trip type. Out of the 624 responses, 61.7 percent indicate a willingness to pay a toll for more reliable travel times.

Table 10. VOR Experiment for Passenger Vehicles – Local users

Experimental Design	# of Responses	Option Chosen		
		365 TOLL	Current Route	Total
Complete-A	35	97	78	175
Complete-B	26	83	47	130
Partial-A	26	79	50	129
Partial-B	38	126	64	190
Total	**125**	**385**	**239**	**624**
% Total	**-**	**62%**	**38%**	**100%**

Like the VOT experiment, Figure 17 illustrates that the proportion of responses choosing 365 TOLL decreases as VOR increases.

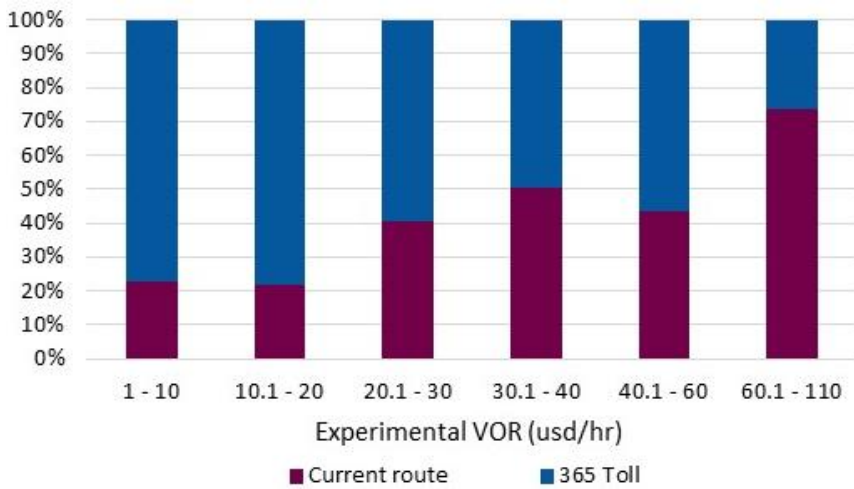


Figure 17. VOR Comparison – Passenger Vehicles

5.2.5. Debrief Questions

Even though 49.4 percent of responses reported some negative opinions about the Project, the sample also indicates positive attitudes from 47 percent of respondents. As shown in Table 11, the most frequent negative and positive opinions are that the time savings are not enough to pay a toll (19.4%) and that the new toll road will save the respondent time (19.8%).

It is important to point out that only 3.6 percent of respondents considered the VOT experiment scenarios to be unrealistic.

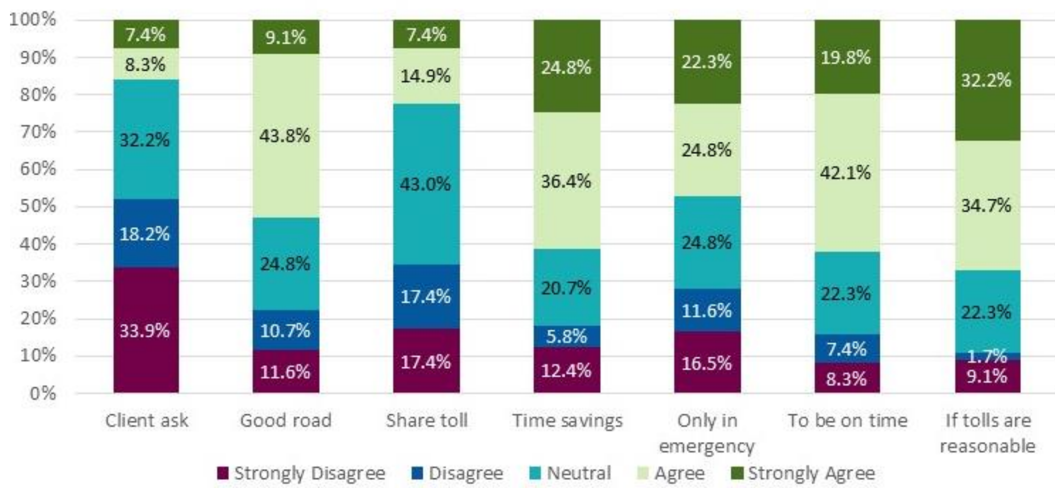
Table 11. VOT Experiment Debriefing Results

Statement	% Agree
I do not want to pay tolls in general.	13.4%
The toll cost is too expensive.	16.6%
The time savings are not enough to pay a toll.	19.4%
The scenarios were not realistic.	3.6%
I can't change my route.	3.6%
The toll cost seems affordable.	14.2%
I think the new toll road will be a safer route.	9.5%
I think the new toll road will save me time.	19.8%

5.2.6. Opinion and Demographic Questions

Figure 18 shows the opinion of 121 respondents who answered this question. The use of toll roads depends on reasonable prices for tolls, time savings, and their perception that using tolls will achieve their time goal to reach their destination.

Moreover, 52.1 percent of respondents do not consider it mandatory to use a tollway since clients do not ask them to do so; even in an emergency, 28.1 percent of respondents believe using a tollway is not justified.



Description	Client Ask	Good Road	Share Toll	Time Savings	Only in Emergency	To be on Time	If Tolls are Reasonable
Negative	52.1%	22.3%	34.7%	18.2%	28.1%	15.7%	10.7%
Neutral	32.2%	24.8%	43.0%	20.7%	24.8%	22.3%	22.3%
Positive	15.7%	52.9%	22.3%	61.2%	47.1%	62.0%	66.9%

Figure 18. Opinion about the Use of Toll Roads

Out of the total 125 respondents, 116 answered the survey until the last question. Figure 19 shows that the majority of respondents are female (59%) and in the range of 25 to 54 years old (the prime working stage of life).

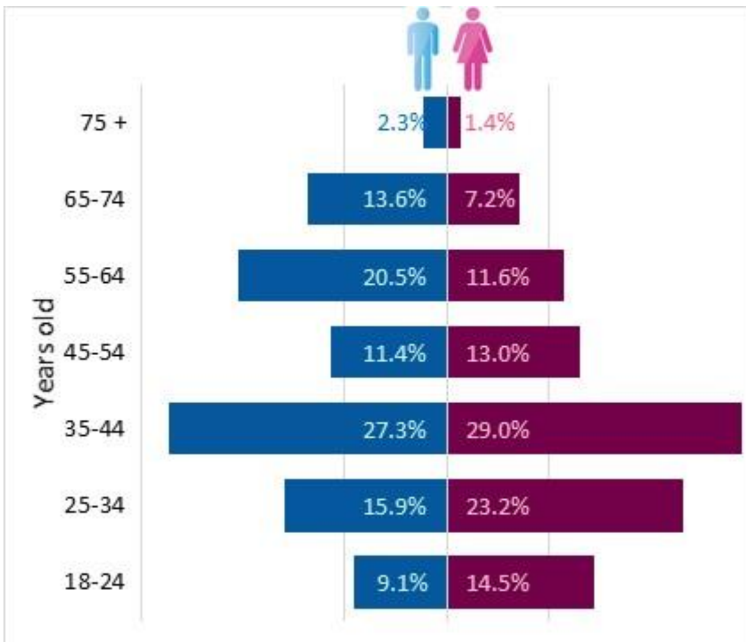


Figure 19. Sample by Age and Gender

Figure 20 shows that 16.4 percent of respondents reported an annual income in the range of $50,000–$74,999, while 38.8 percent reported an annual income in the range of $15,000–$49,999; Texas Demographics states that the median household income for Hidalgo County was $38,398 in 2018.[1]

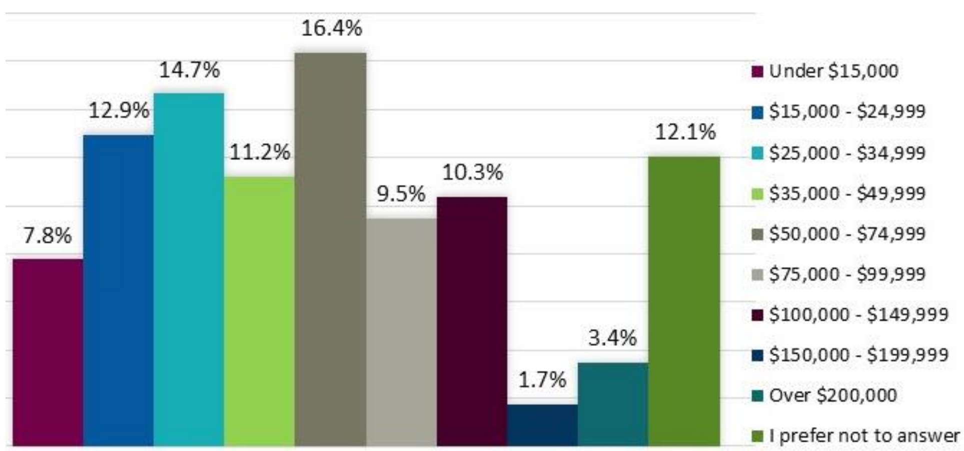


Figure 20. Household Annual Income

[1] https://www.texas-demographics.com/hidalgo-county-demographics#:~:text=Median%20Income,County%20residents%20live%20in%20poverty

Figure 21 indicates the 51.7 percent of respondents live in a household with four or more persons. Additionally, 90 percent of respondents reported that the vehicle used regularly for their trips is their own, and 92 percent reported that nobody helps them with the payment of gas or tolls.

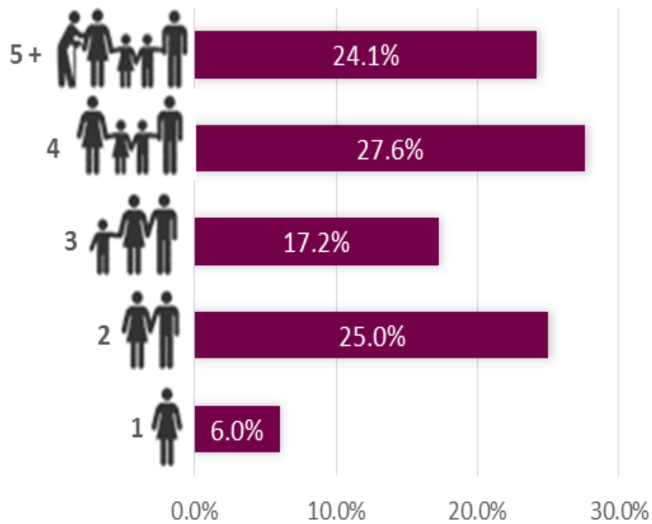


Figure 21. Household Size

5.3. External Passenger Vehicles

5.3.1. Trip Characteristic Questions

This survey was made specifically for users who travel to Hidalgo County from Mexico. The sample of 293 people focused primarily on the cities of Monterrey and Reynosa. Out of this sample, 40.6 percent of the respondents reported that Hidalgo–Reynosa is the main bridge they use to cross the border (as seen in Figure 22), followed by Anzalduas (20.5%) and Pharr–Reynosa (18.8%).

These trips are mostly low-frequency trips, as shown in Figure 23.; only 15 percent of them have a weekly frequency, which is similar to the 10.6 percent of respondents who belong to the SENTRI program, in contrast to the 89.4 percent who use Ready Lanes to cross the border.

As shown in Figure 24, 44.7 percent of reported trips are for shopping, followed by 28.7 percent of respondents who travel to Hidalgo County due to work and 15.4 percent who visit family in the United States.

Regarding travel time delays, Figure 25 shows that only 3.1 percent reported frequent delays while 22.5 percent reported delays once every six months and 18 percent reported no delays.

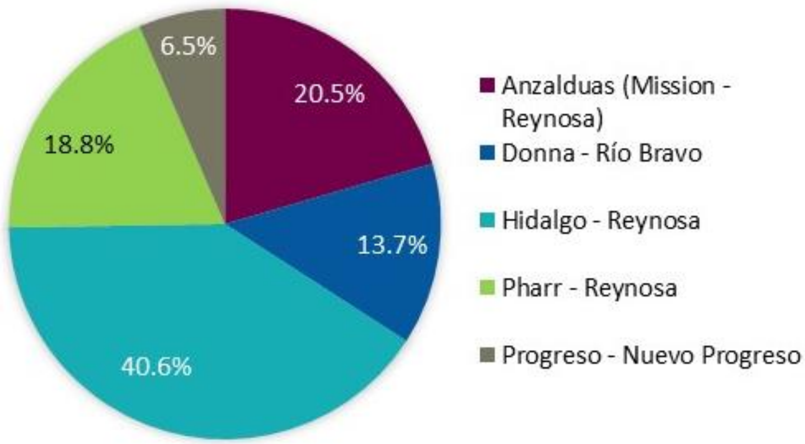


Figure 22. International Bridge Used

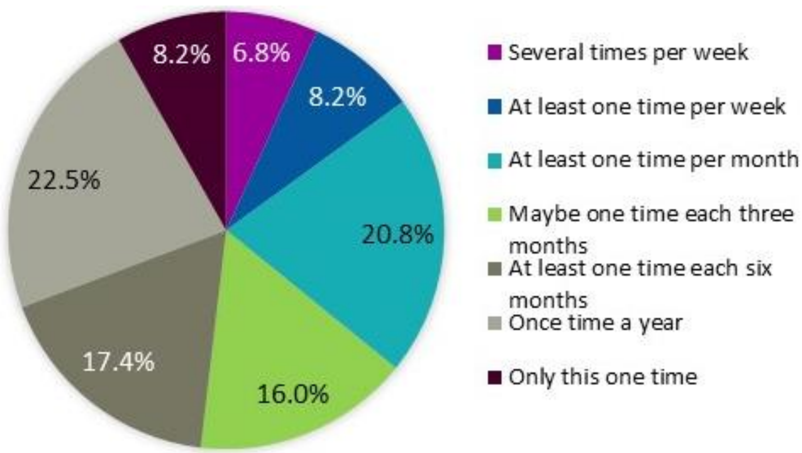


Figure 23. Trip Frequency

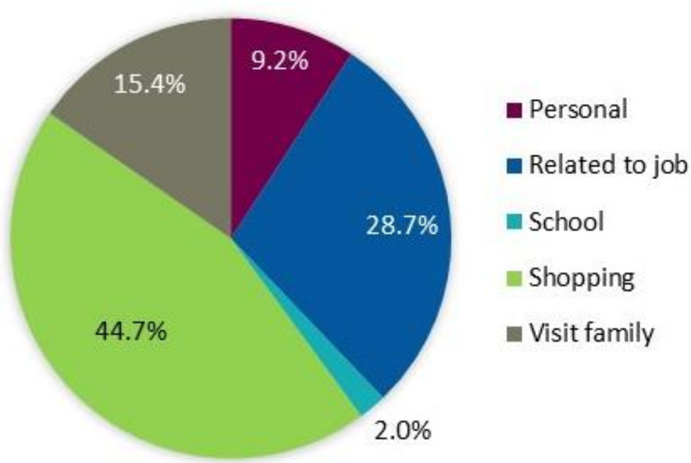


Figure 24. Trip Purpose

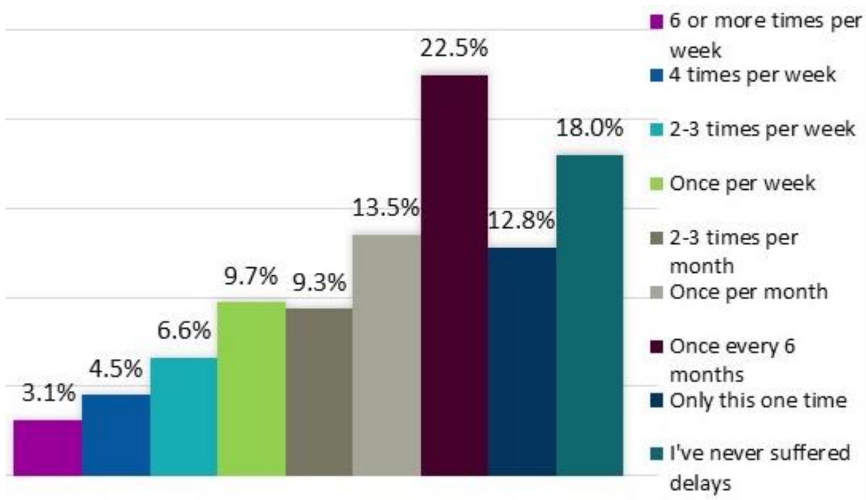


Figure 25. Delay Frequency

It can be observed in Figure 26 that 29.7 percent of the respondents estimated that they'll arrive at their destination in the United States around 11 to 30 minutes after crossing the border, whereas 27.3 percent estimated a range of 31 to 60 minutes, 14 percent estimated a range of 1 to 2 hours, and 25.9 percent estimated more than 2 hours of travel.

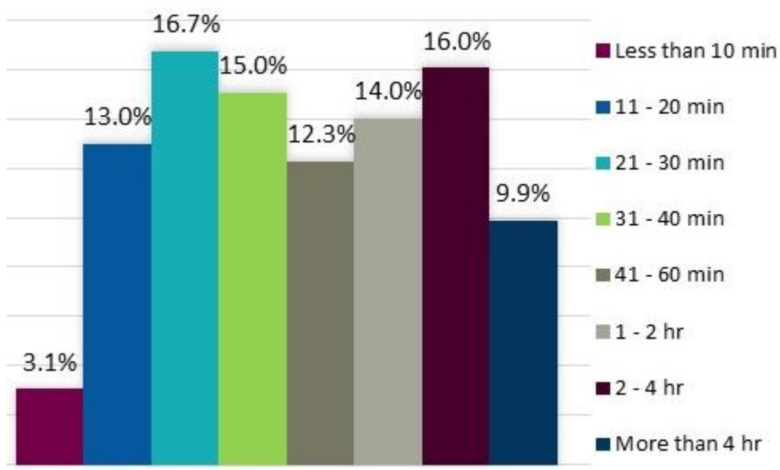


Figure 26. Travel Time in the U.S.

These travel times are consistent with the respondents' reported ODs, which include traveling to Dallas, Arkansas, Florida, Louisiana, and even New York. Nevertheless, 90.3 percent of the trips stay in Texas, and 73.5 percent of those trips stay in Hidalgo County, primarily in the cities of McAllen and Hidalgo (see Table 12).

Table 12. Destinations to Hidalgo County for Mexican Travelers

Region	%
West coast	4.6%
East coast	5.0%
Texas	90.3%
Total	100%

Texas County	%
Cameron	3.3%
Hidalgo	73.5%
Other	23.3%
Total	100%

Hidalgo City	%
Edinburg	1.9%
McAllen	63.3%
Mission	5.7%
Pharr	3.2%
Hidalgo	19.0%
Other*	7.0%
Total	100%

* Consider: Abigail, Alamo, Donna, Mercedes, Progreso, San Juan, and Weslaco

5.3.2. Value of Time Experiment

Similar to local passengers, the majority of external travelers reported a preference for using some segments of 365 TOLL rather than the entire corridor, with the most attractive segments being the combination of Segments 1 and 2 (19.8%) and Segments 1, 2, and 3 (19.5%). Nevertheless, 21.8 percent of respondents did report an interest in using the entire length of the Project. are interested in the entire project, as shown in Figure 27.

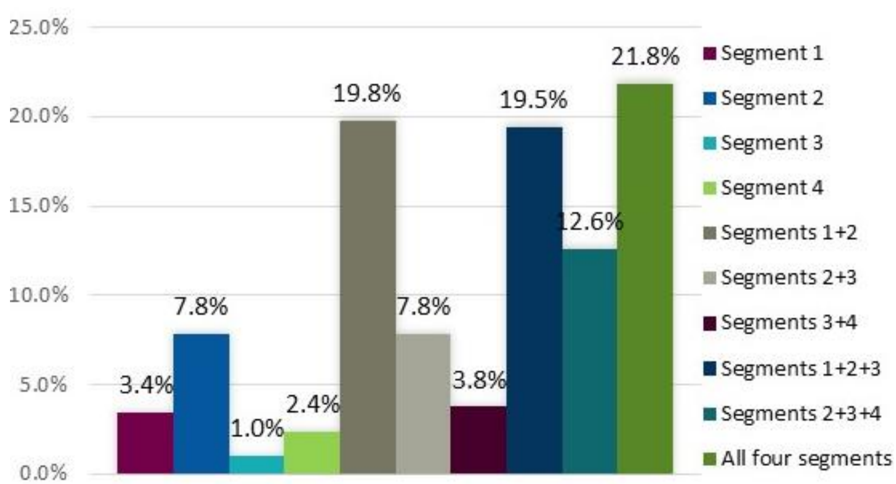


Figure 27. Segments of Interest for External Travelers

The VOT experiment applied to these external travelers was also the same experiment applied to local travelers. In this case, the sample size comprised 293 surveys composed of four blocks and two travel types, as presented in Table 13.

Table 13. VOT Sample for External Travelers

Experimental Design	# of Responses	Option Chosen				%
		365 TOLL	Current Route	No Preference	Total	
Complete-A	24	63	53	28	144	8.2%
Complete-B	22	50	38	44	132	7.5%
Complete-C	35	79	83	48	210	11.9%
Complete-D	15	46	26	18	90	5.1%
Partial-A	44	110	92	62	264	15.0%
Partial-B	48	139	93	56	288	16.4%
Partial-C	70	190	120	110	420	23.9%
Partial-D	35	95	62	53	210	11.9%
Total	293	772	567	419	1,758	100%
% Total	100%	43.9%	32.3%	23.8%	100.0%	

Of the 1,758 total responses to the VOT experiment questions 1,182 represent partial trips and 576 represent complete trips. This breakdown makes sense since 73.5 percent of trips stay in Hidalgo County once they have crossed the border. Additionally, 43.9 percent of the respondents prefer the 365 TOLL versus 32.3 percent who prefer their current route.

Figure 28 exhibits the change in preference to use 365 TOLL based on cost. As VOT increases, fewer people are willing to pay the required toll.

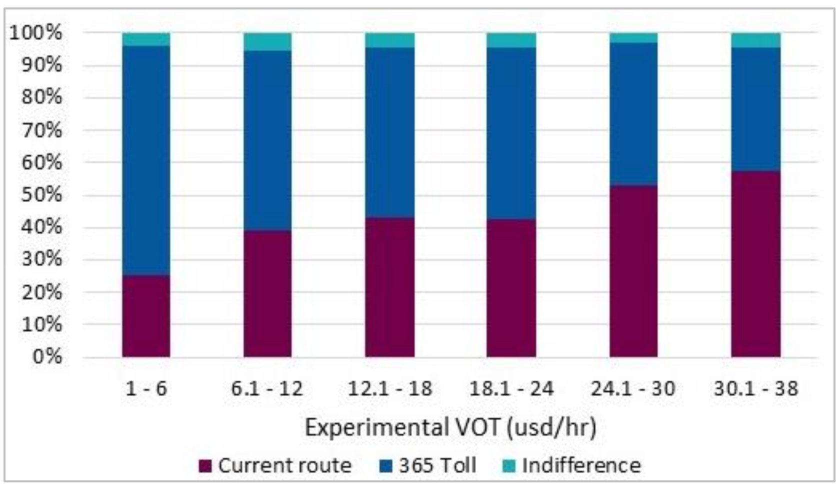


Figure 28. Experimental VOT Comparison for External Travelers

5.3.3. Debriefing Questions

External travelers also provided their opinions about the VOT experiments, as summarized in Table 14. In comparison to local users, external travelers have a higher willingness to pay a toll. They also have a positive opinion about time savings and the safety of toll roads. These answers are logical considering that these trips are made only a few times per year in contrast to weekly or monthly trips by local users. Lastly, only 1.9 percent of the respondents considered the VOT experiments unrealistic.

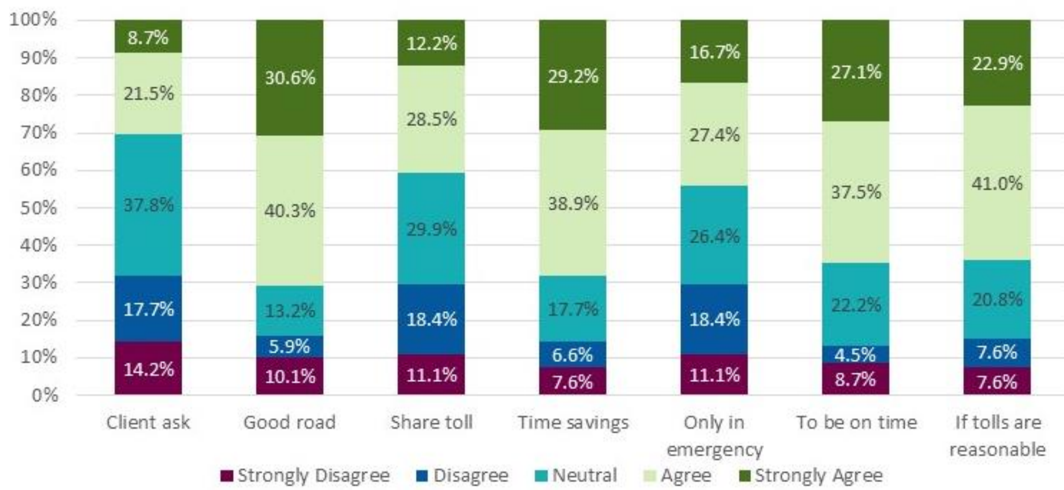
Table 14. VOT Experiment Opinions from External Travelers

Opinion	%
I do not want to pay toll in general.	4.4%
The toll cost is too expensive.	5.0%
The time savings are not enough to pay a toll.	11.1%
The scenarios were not realistic.	1.9%
I can't change my route.	3.6%
The toll cost seems affordable.	22.6%
I think the new toll road will be a safer route.	25.1%
I think the new toll road will save me time	26.1%

5.3.4. Opinion Questions

Figure 29 presents the opinions of 288 external travelers about the use of toll highways for their trips. They consider three main points to use a highway: the optimal conditions of the road, the time savings, and the reasonableness of the toll. Even though the opinions are similar to those of local users, external travelers focused on the conditions of the road first rather than cost.

Like the local users, the use of toll roads is not mandatory due to a client not requesting the use of it.



Description	Client Ask	Good Road	Share Toll	Time Savings	Only in Emergency	To be on Time	If Tolls are Reasonable
Negative	31.9%	16.0%	29.5%	14.2%	29.5%	13.2%	15.3%
Neutral	37.8%	13.2%	29.9%	17.7%	26.4%	22.2%	20.8%
Positive	30.2%	70.8%	40.6%	68.1%	44.1%	64.6%	63.9%

Figure 29. Opinions about the Use of Toll Roads for External Travelers

5.4. Commercial Vehicles

5.4.1. Trip Characteristic Questions

The trips reported by the commercial vehicle survey respondents primarily used the Progreso and Pharr–Reynosa International Bridges. Furthermore, 65.4 percent reported not transporting shipments beyond the 20-mile border commercial zone into the United States.

Figure 30 shows that 38.5 percent of respondents reported their commercial vehicles using the international bridges several times per day. More specifically, 15.4 percent reported daily trips and 38.5 percent reported using the bridge at least once per week. These users (57.7%) reported waiting in line for more than 91 minutes and 11.5 percent reported waiting times of 30 to 45 minutes (see Figure 31). The main problems at the border crossings reported by the respondents are the crossing times (40%), waiting times (26%), and customs (26%), as shown in Figure 32.

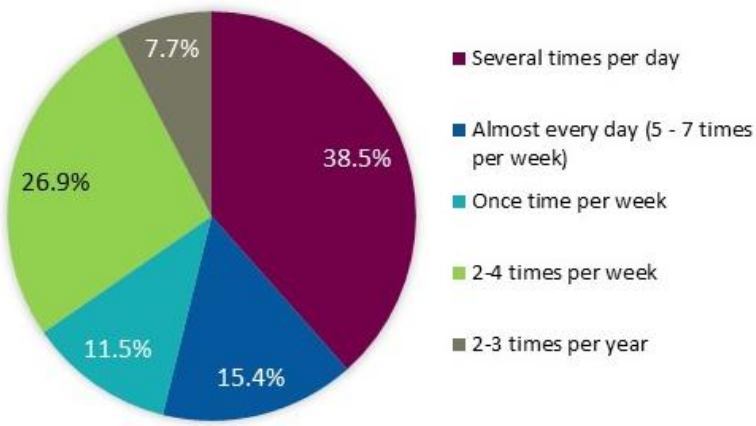


Figure 30. Frequency of Shipments Using International Bridges

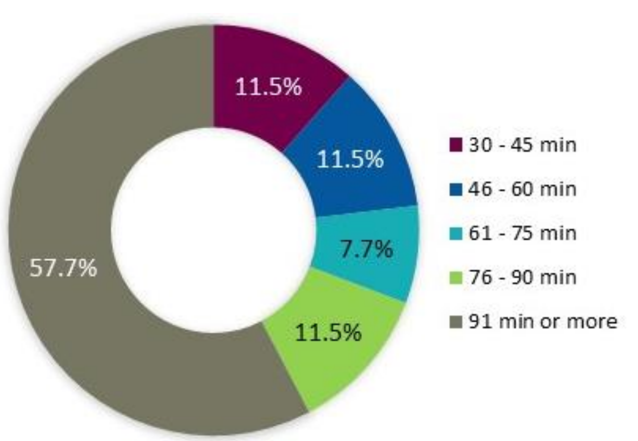


Figure 31. Time Spent in Line Waiting at the Border Crossing

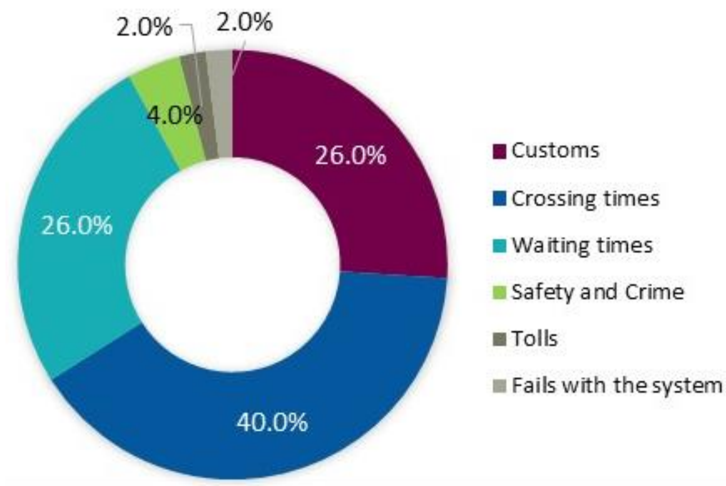


Figure 32. Reported Problems Crossings the Border

Figure 33 shows that 53.8 percent of users are currently not registered in the FAST program. For the near future, 14.3 percent do not consider it necessary, 35.7 percent are not sure, and 50 percent are already in the enrollment process.

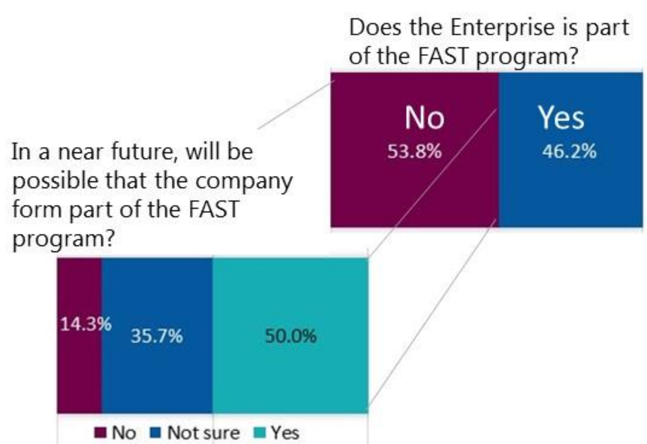


Figure 33. FAST Program Enrollment

Figure 34 shows that the FAST program may or may not be appropriate depending on the company's needs. Enterprises that cross the border several times per day (58.3%) benefit from the program, as opposed to those with lower border crossing frequencies. Users who are not enrolled in FAST show interest in the program but are unsure either because the cargo is not certified, they only have a few border crossings per month, or the clients do not require it. However, as mentioned earlier, 50 percent of the surveyed companies have already begun the enrollment procedure or are waiting for the results.

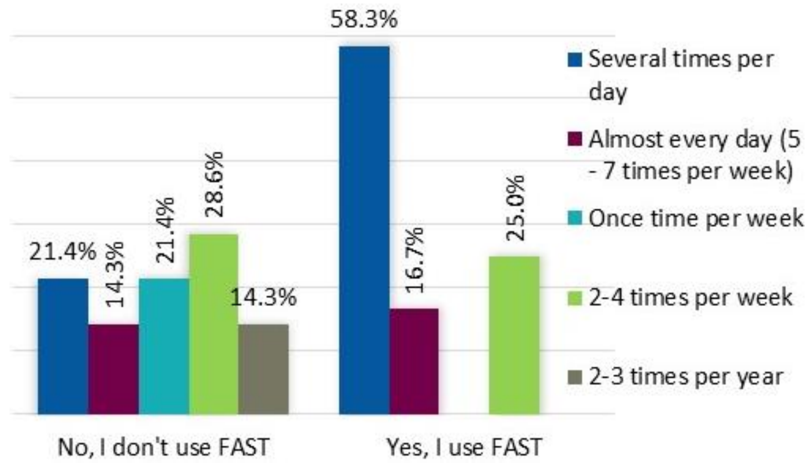


Figure 34. Merchandise Travel Frequency Using an International Bridge

Regarding door-to-door travel times, Figure 35 shows that 34.6 percent of respondents reported that their trips are longer than 4 hours. This is consistent with the waiting times at the border crossing and the ODs reported by the respondents. Furthermore, the sum of travel times lower than 60 minutes is 26.9 percent; meaning that 73.1 percent of respondents reported trips longer than 1 hour.

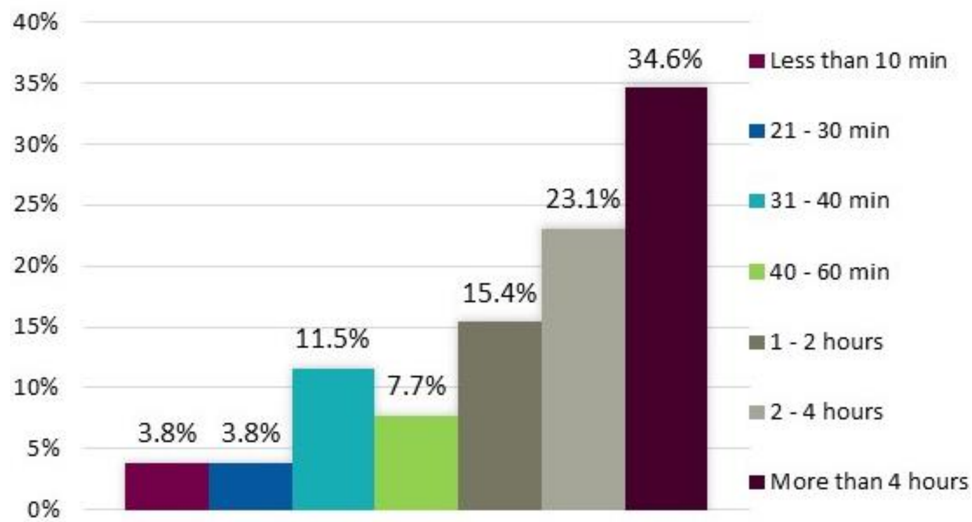


Figure 35. Door-to-Door Travel Time

The ODs for commercial vehicles depend on the location of warehouses, terminals, or the next step in the transport chain for the enterprise. Table 15 illustrates the states of Tamaulipas and Nuevo León as producer sites for this sample. It also shows the cities in Hidalgo County where the trips end, with McAllen representing 38.5 percent of respondents' destinations, followed by Pharr (23.1%), and Hidalgo (11.5%).

Table 15. ODs for Commercial Vehicle Companies

	Hidalgo County								Bexar County
State	Alamo	McAllen	Mission	Pharr	Edinburg	San Juan	Donna	Hidalgo	San Antonio
México City	0.0%	0.0%	0.0%	0.0%	3.8%	0.0%	0.0%	0.0%	0.0%
Guanajuato	0.0%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	3.8%	0.0%
Jalisco	0.0%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	3.8%	0.0%
Mexico	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Michoacan	0.0%	0.0%	0.0%	3.8%	0.0%	3.8%	0.0%	0.0%	0.0%
Nuevo León	0.0%	3.8%	3.8%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%
Puebla	0.0%	3.8%	0.0%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%
Tamaulipas	0.0%	19.2%	0.0%	11.5%	0.0%	3.8%	3.8%	3.8%	3.8%
Veracruz	0.0%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	3.8%	38.5%	3.8%	23.1%	3.8%	7.7%	3.8%	11.5%	3.8%

5.4.2. VOT Experiment

Similar to local and external users, the commercial vehicle VOT experiment opens with a question about which 365 TOLL segments are of interest to the respondent. Figure 36 shows that 35 percent of commercial vehicle respondents reported an interest in the entire Project length, followed by 20 percent interested in Segment 1 alone.

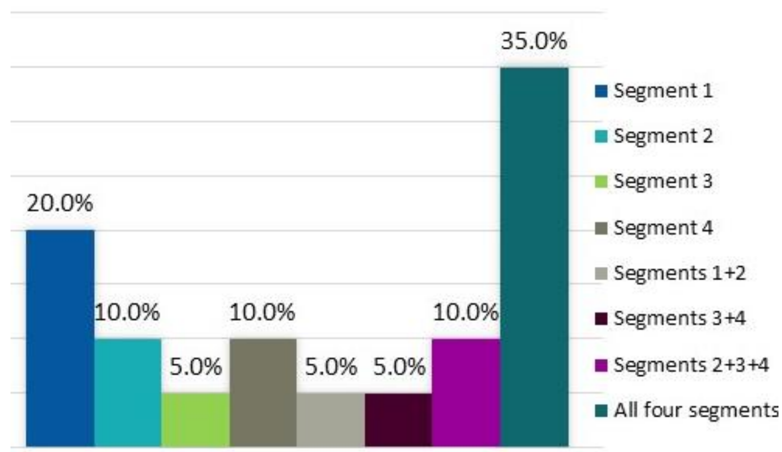


Figure 36. Segments of Interest – Commercial Vehicles

For the commercial vehicle VOT experiment, the sample size comprised 26 surveys divided into six blocks: two for partial trips and four for complete trips. A total of 156 responses were provided. Out of them, 51.3 percent of respondents chose 365 TOLL over their current route (see Table 16).

Table 16. VOT Experiment Sample – Commercial Vehicles

Experimental Design	# of Responses	365 TOLL	Current Route	Total	%
Partial-A	4	7	17	24	15.4%
Partial-D	2	4	8	12	7.7%
Complete-A	4	17	7	24	15.4%
Complete-B	6	14	22	36	23.1%
Complete-C	5	25	5	30	19.2%
Complete-D	5	13	17	30	19.2%
Total	26	80	76	156	
% Total	16.7%	51.3%	48.7%	100.0%	

Figure 37 presents the proportion of responses choosing the Project or the current route based on VOT. As with the passenger vehicle surveys, higher VOTs result in a smaller proportion of choices to pay the toll and use the Project.

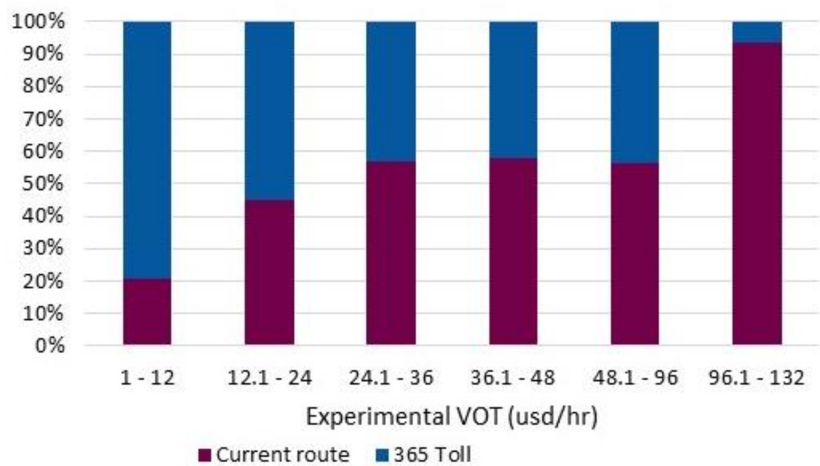


Figure 37. Experimental VOT Comparison – Commercial Vehicles

For the commercial vehicle VOR experiment, respondents were first asked about trip delays. In this case, only 19 percent of respondents reported experiencing delays of 61 minutes or more, while 46.2 percent claimed to have delays lower than 15 minutes or no delays at all (see Figure 38).

Figure 39 shows that 23.1 percent of respondents reported delays occurring two or three times per week, while 23.1 percent reported no delays on their trips. The most commonly reported (38.5%) maximum delay experienced was 61 minutes or more (see Figure 40).

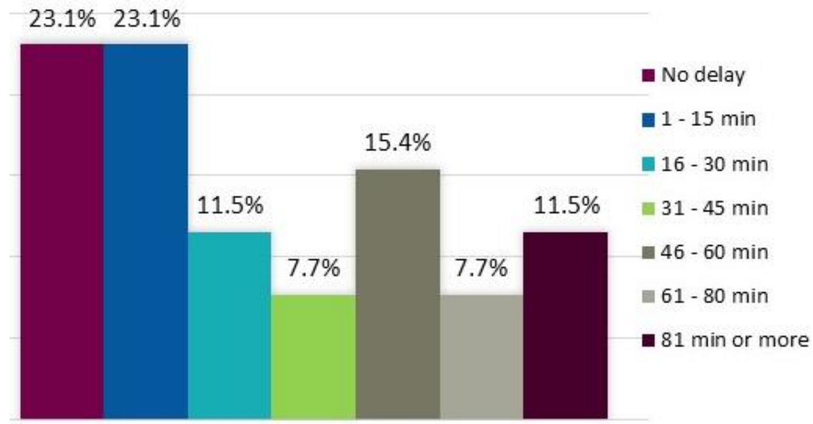


Figure 38. Regular Delays in Shipments

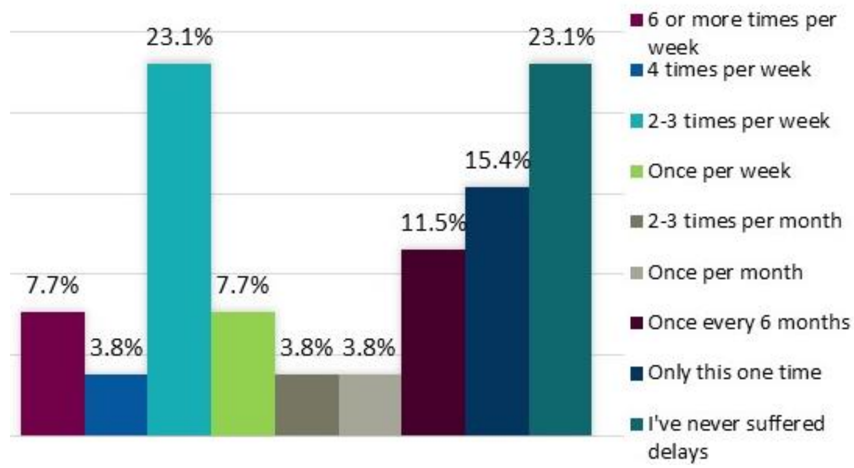


Figure 39. Delay Frequency – Commercial Vehicles

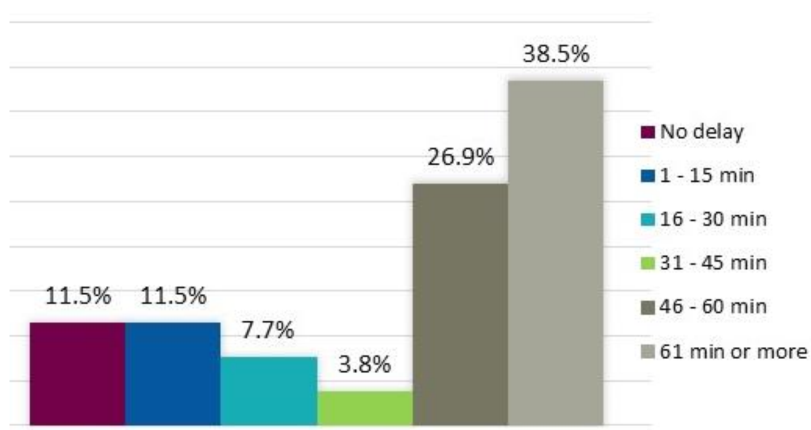


Figure 40. Maximum Delay Suffered

Similar to passenger vehicles, the commercial vehicle survey included a VOR experiment. The sample size for the commercial vehicle VOR experiment comprised 26 surveys and a total of 130 responses. The design considered two blocks and two trip types (partial, complete). In this case, all blocks exhibited an adequately representative number of responses. Overall, 46.2 percent of responses chose 365 TOLL over the current route. Some comments regarding this experiment by the respondents related to having to manage delivery schedules and optimizing the fleet at a reasonable cost as a part of daily variables in their field.

Table 17. VOR Experiment Sample – Commercial vehicles

Experimental Design	# of Responses	365 TOLL	Current Route	Total	%
Partial-A	3	10	5	15	11.5%
Partial-B	2	4	6	10	7.7%
Complete-A	10	22	28	50	38.5%
Complete-B	11	24	31	55	42.3%
Total	26	60	70	130	
% Total	100.0%	46.2%	53.8%	100.0%	

5.4.3. Debrief Questions

Respondents were then asked to give them opinions about the Proiect. Table 18 shows that 60.5 percent of respondents expressed positive opinions regarding using 365 TOLL, with the perception of time savings being the most important for users (30.2%). Additionally, respondents expressed that a toll highway will provide time savings for their trips, saving cost in fuel. They are not averse to paying the toll if it is affordable.

Overall, 7 percent of respondents claimed the scenarios were unrealistic. This is due to the respondents being unsure if the Project can be implemented for their regular trips.

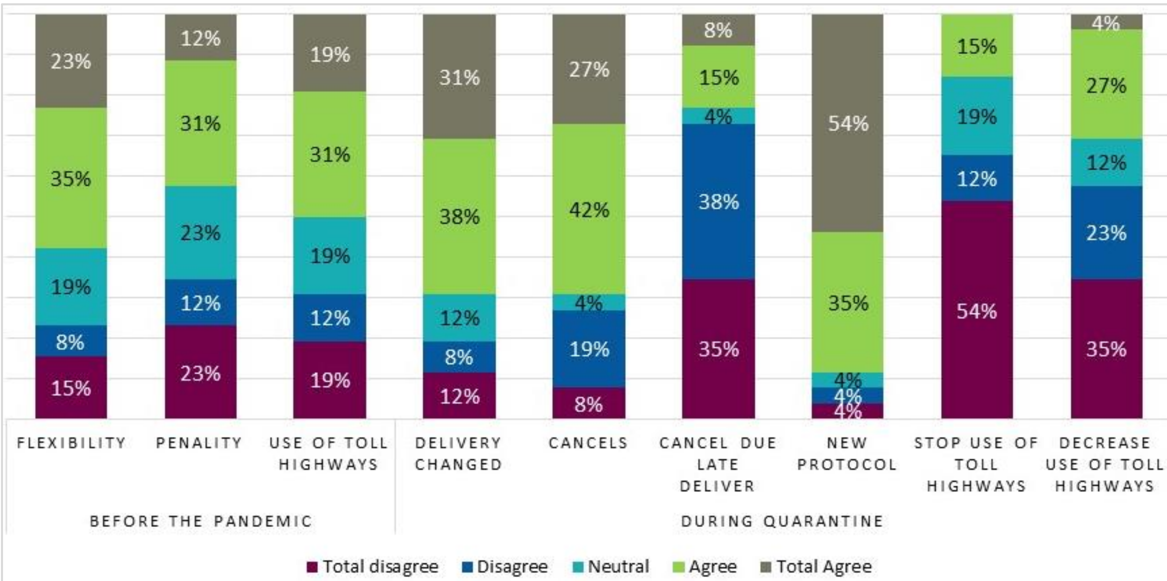
Table 18. VOT Experiment Opinions – Commercial Vehicles

Opinion Expressed	%	Sentiment
I do not want to pay toll in general.	9.3%	32.6%
The toll cost is too expensive.	11.6%	
The time savings are not enough to pay a toll.	11.6%	
The scenarios were not realistic.	7.0%	
I can't change my route.	11.6%	60.5%
The toll cost seems affordable.	14.0%	
I think the new toll road will be a safer route.	4.7%	
I think the new toll road will save me time	30.2%	

5.4.4. COVID-19 Questions

This part of the survey asked respondents to indicate how the COVID-19 pandemic has changed their company operations and dynamics for shipments and logistics management. The questions were related to these operative changes as well as shipments and the status of employees.

Figure 41 illustrates that before the pandemic, 58 percent of respondents had flexibility for the delivery of merchandise, 42 percent suffered penalties for late delivery, and half of them used toll highways. During the pandemic, 69 percent of respondents reported changes in days or frequency of deliveries. Furthermore, 69 percent suffered from canceled receipts and only 23 percent of them were due to late delivery. Of the total, 88 percent of the respondents acknowledged having a new protocol to deliver merchandise. Moreover, only 15 percent of the companies completely stopped the use of toll highways while 31 percent simply decreased their use.



Attitude	Before COVID-19			During COVID-19					
	Flexibility	Penalty	Use of Toll Highways	Delivery Changed	Cancels	Cancel due to Late Delivery	New Protocol	Stop Use of Toll Highways	Decrease Use of Toll Highways
Negative	23%	35%	31%	19%	27%	73%	8%	65%	58%
Neutral	19%	23%	19%	12%	4%	4%	4%	19%	12%
Positive	58%	42%	50%	69%	69%	23%	88%	15%	31%

Figure 41. Fleet Operation Before and During the Pandemic

As Figure 42 shows, during the pandemic, daily and weekly shipments decrease in percentage while the frequency of monthly increases significantly. Once all restrictions are lifted, the respondents hope to return to their daily deliveries at the same level as before the pandemic, increasing the possibility of weekly and monthly deliveries.

Moreover, companies have needed to invest in protective equipment for employees, vehicle and facility sanitation programs, and training employees on COVID-19 issues.

Regarding the status of employees, only 15.3 percent of respondents considered some form of work from home before COVID-19, 31.73 percent respondents worked from home during the pandemic, and 18.8 percent estimate that they will continue working from home when all restrictions are lifted. Moreover, managers reported that all employees in their respective companies suffered some change in their work status. Figure 43 exhibits 18.8 percent of respondents identify a reduction in employees' work hours while 26.7 percent commented about furloughing employees with/without payment, and more.

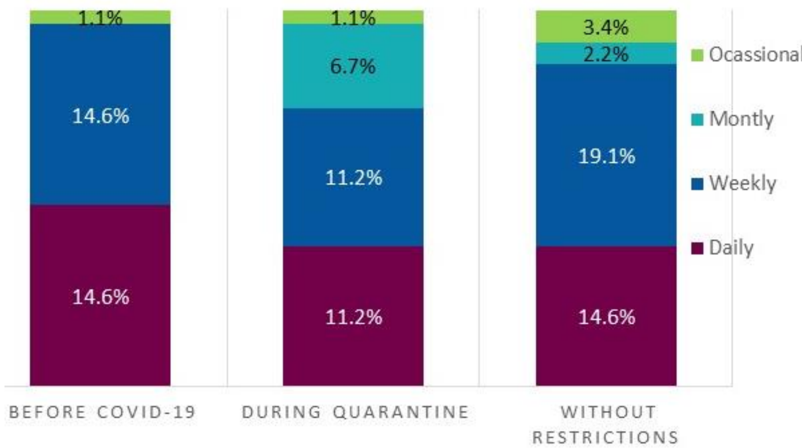


Figure 42. Frequency of Shipments

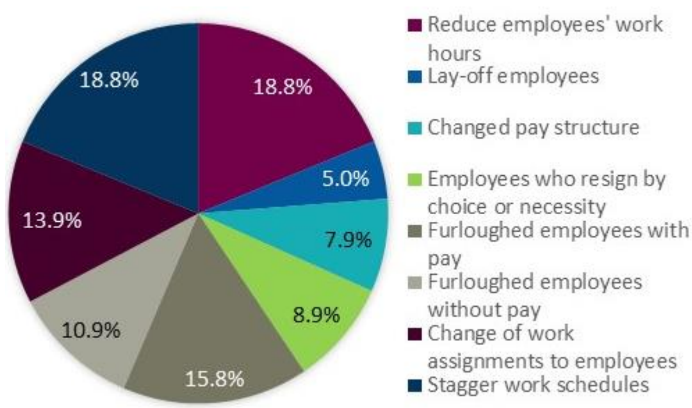


Figure 43. Status of Employees

5.4.5. Cargo and Permit Questions

Figure 44 shows the variety of cargo that respondents transport across international bridges. More than 40 percent of respondents transport perishable goods, followed by the machinery of appliances (10%), rubber products (9.3%), and automotive components (8.6%).

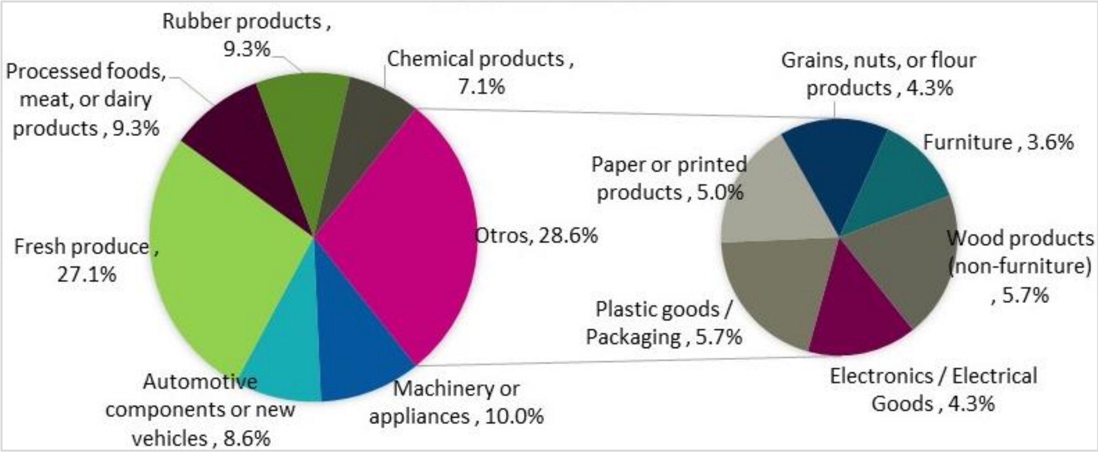


Figure 44. Type of Products Transported

Currently, the HCRMA allows oversized/overweight (OS/OW) shipments (no more than 125,000 pounds and maximum dimensions of 12' wide, 15'6" high, and 110' long) [2] by trucks with an OS/OW permit, which allows for travel on certain roads of Hidalgo County. The cost of the permit is $200.[3] Due to HCRMA evaluating an increase in permit price, the survey asked some questions about this topic.

Figure 45 shows that 33.4 percent of the respondents need the OS/OW permit, mainly for perishable products (29.2%).

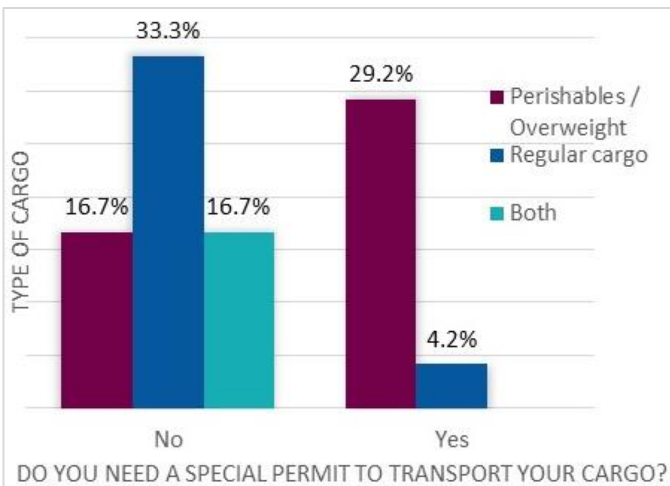
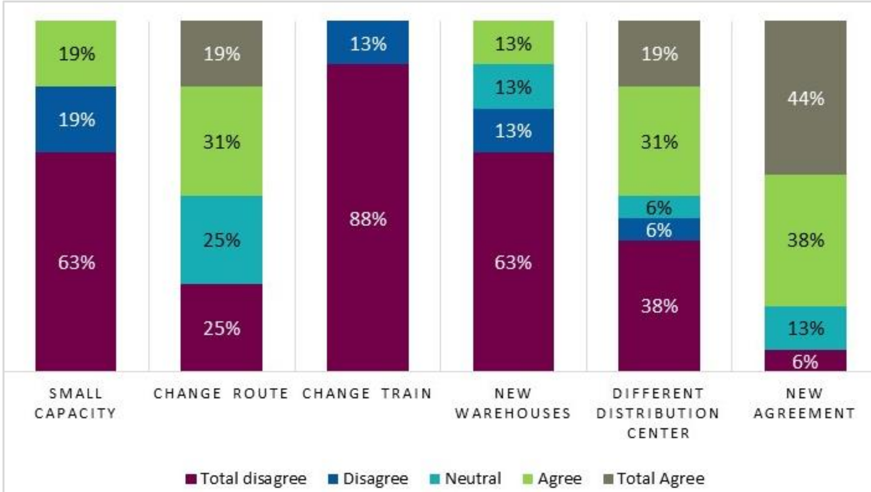


Figure 45. Type of Cargo and OS/OW Permit Status

The next two figures summarize what surveyed managers would do if the permit price becomes excessive. Figure 46 displays possible operation changes. Overall, 63 percent of respondents totally disagree with replacing their current vehicles with small capacity vehicles taking more frequent trips. Furthermore, 100 percent of respondents do not consider it possible to convert their usual truck transports to freight rail. However, 50 percent of respondents have a positive attitude about changing their route and look for a different distribution center. Furthermore, 81 percent of respondents considered reaching a new agreement with HCRMA.

2 https://texas.promiles.com/hidalgo/Default.aspx
3 https://www.hcrma.net/transparency.html



Attitude	Small Capacity	Change Route	Change Train	New Warehouses	Different Distribution Center	New Agreement
Negative	81%	25%	100%	75%	44%	6%
Neutral	0%	25%	0%	13%	6%	13%
Positive	19%	50%	0%	13%	50%	81%

Figure 46. Alternatives to Paying for a Permit

Figure 47 illustrates how an increment in the permit's price decreases the willingness to pay for it. The weighted average price amounts to $364. The current opinion regarding the price of $200 is shown in Figure 48. Respondents pay this price because it is obligatory to pay it, but also due to the good conditions of the road. Overall, 38 percent consider the permit to be affordable, and 44 percent claim to be able to transfer the payment to their clients.

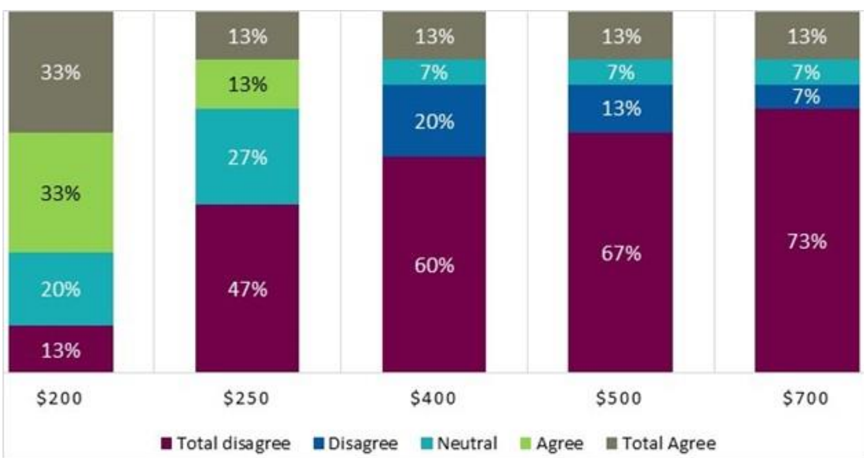
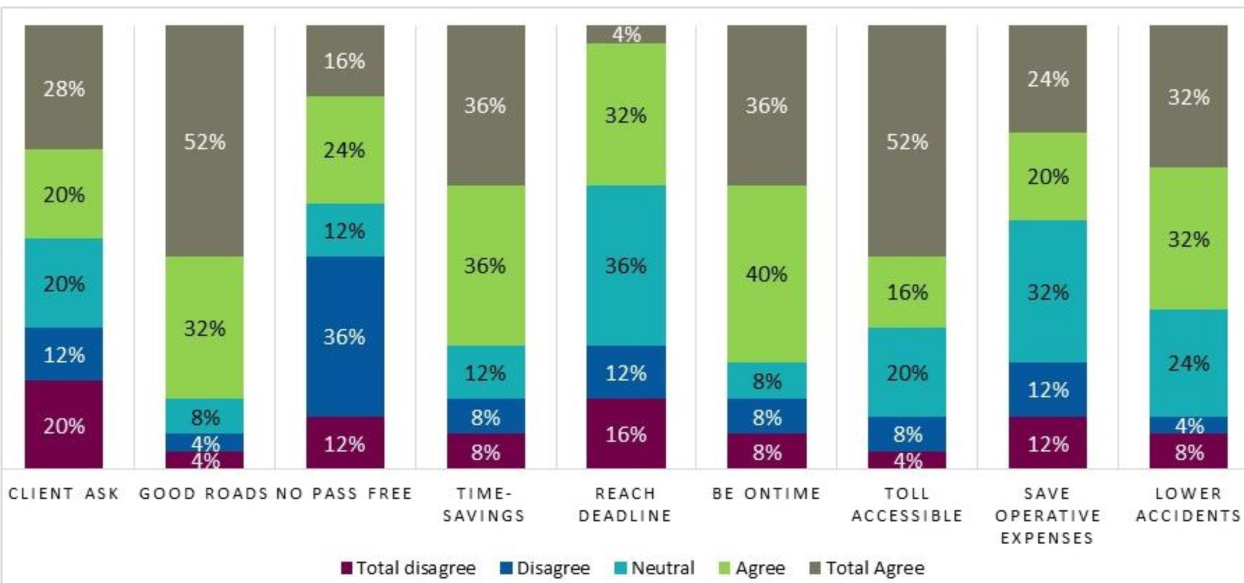


Figure 47. Willingness to Pay for Permit

Figure 48. Opinions about the Current Permit Price ($200)

5.4.6. Opinion Questions

Figure 49 shows respondents' opinions about the use of toll highways for commercial vehicles. Similar to local and external users, the commercial vehicle respondents consider a combination of variables to use the toll roads. These include good road conditions, reaching their destination on time, accessibility to pay the tolls, and a lower possibility of accidents.



Attitude	Client ask	Good Roads	No Pass Free	Time-Savings	Reach Deadline	Be OnTime	Toll Accessible	Save Operative Expenses	Lower Accidents
Negative	32%	8%	48%	16%	28%	16%	12%	24%	12%
Neutral	20%	8%	12%	12%	36%	8%	20%	32%	24%
Positive	48%	84%	40%	72%	36%	76%	68%	44%	64%

Figure 49. Reasons for Using Highways – Commercial Vehicles

5.4.7. General Characteristics of Commercial Vehicles

Regarding the characteristics of these users, 69 percent of respondents made their shipments with their fleet, and only 23 percent of them use containers for their shipments. The payment usually is by RFID (60%), or cash (36%), and credit card is only used by 4 percent of the respondents.

The typical vehicles in the fleet are trucks with two to four axles (45%), and trucks with five or six axles (42%). Only 13 percent of the respondents reported using vehicles with seven or more axles.

The breakdown of the person who selects the truck route is as follows: the logistics operator (27.6%), the driver (24%), the traffic manager in the distribution center (21%), the client (17%), and the company manager (10%).

6. Discrete Choice Model Estimation

The information offered by the SP surveys permitted the development of discrete choice models to estimate VOT and VOR for passenger vehicle travelers and commercial vehicles who are likely to use the Project. These estimates served as inputs for travel demand modeling and subsequent traffic and revenue (T&R) forecasting.

The estimation of VOT and VOR considered the six observations from each respondent collected as part of the willingness to pay a toll in exchange for time savings in their trips, as well the five observations for the willingness to pay for travel time reliability. There were analyses of diverse model estimations, but all estimations are based on evaluated methodologies of utility functions and user behavior through multinomial logistics models (MNL).

The MNL models are used to explain or predict a choice from a set of two or more distinct, separable, and mutually exclusive alternatives. These models operate within a framework of rational choice, where it is assumed that people choose the option of maximal benefit or utility. This utility function considers two main components:

- A deterministic part generated through attributes that can be observed and measurables such as travel time, cost, etc.
- A random error component that includes all unknown characteristics unknown or characteristics that cannot be enumerated such as comfort, safety, etc.

The general form of these MNL models is as follows:

$$P_{toll} = \frac{e^{Utoll}}{e^{Utoll} + e^{Ucurrent}}$$

Where:

P_{toll} = Probability of selecting the 365 Toll project

e = Base of the natural logarithm

$U_{toll} = \beta_o + \beta_1 * Time_{ij} + \beta_2 * Toll_{ij} + \beta_3 * SDTime_{ij}$

$U_{current} = \beta_1 * Time_{ij} + \beta_3 * SDTime_{ij}$

β_o = Constant

β_1 = Coefficient of travel time from an origin i to destination j

β_2 = Coefficient of toll

β_3 = Coefficient of standard deviation time (reliability)

$Time_{ij}$ = Time travel in minutes of the respective route from an origin i to destination j

$Toll_{ij}$ = Toll in dollars toll-route from an origin i to destination j

$SDTime_{ij}$ = Standard Deviation of the time from an origin i to destination j

To estimate these models, the travel demand model developed by C&M in 2016 was considered, which has the segmentation presented in Table 19.

Table 19. Model Segments

Type of vehicle	Segment	Specifications
Private vehicles (Automobiles)	Home – Based – Work	Business-related trips
	Home – Based – Non – Work	School trips, shopping trips, medical trips, etc.
	None – Home – Based	All those trips which are not related to home
	External Passenger Vehicles	Trips from/to Mexico to/from Hidalgo County
	External Passenger Vehicles – HBC	Trips from Mexico that used the Hidalgo International Bridge
Commercial vehicles (Trucks of 2 axles or more)	Internal Commercial Vehicles	Trips with origin-destination into the limit of 20 miles in Hidalgo County
	External Commercial Vehicles	Trips with origin-destination beyond the limit of 20 miles in Hidalgo County
	External Commercial Vehicles – PBC	Trips from/to Mexico which use the Pharr International Bridge
	External Overweight Commercial Vehicles	Commercial vehicles that transport overweight cargo or perishable cargo.

6.1. Model Specification

The databases were screened to ensure that all observations included in the model's estimations represented valid answers. To ensure this, the databases considered the analyses of sample sizes, general data, representation of OD trips, the income reported vs. income estimated for the area, the coherence of answers for the VOT and VOR experiments, lexicographical answers, and the imputation of missing data.

After several utility equation structures, the final specifications for the models considered the removal of bias from time and cost sensitivity. Each model is independent of the other to represent a specific demand segment as well as transformations of the toll cost variables. Additionally, dummy coefficients were estimated for the toll route affecting time, standard deviation, and the toll coefficient. All models were calculated with a 95% significance, using R, SPSS, and Stata software.

The parameters Time, Toll, and Standard Deviation have satisfactory significance for all models. Occasionally, the parameters show a significance near 90%, which does not negatively affect the results.

Next, the utility equations, coefficient values, standard errors, *t*-values, *p*-values, *z*, P>|z| statistics are presented for each model segment. The statistics included for each model are the number of observations, final log-likelihood, and more. Furthermore, a graph is presented for each model regarding the sensibility of the model for variations in time and toll coefficients.

Home - Based - Work / Home - Based - Non - Work

Model Specification

Y = (B1 + B6 * HNW.purpose) * Diff.Time.2 + B2 * Diff.SD.Time.2 + (Diff.Toll) * (B3 + B4 * COVID + B7 * HNW.purpose) * (Ratio)^B5

Parameters

Parameter	Units	Description	Value	SE	t-value	p-value
B1	1/min	Time	-0.0744	0.017	-4.478	0.000
B6	0,1	HNW Dummy Time	-0.0345	0.019	-1.856	0.064
B2	1/min	SD Time	-0.1305	0.029	-4.506	0.000
B3	1/USD	Toll	-0.3506	0.058	-6.080	0.000
B4	0,1	COVID Dummy	-0.3106	0.069	-4.526	0.000
B7	0,1	HNW Dummy SD Time	-0.2518	0.079	-3.185	0.001
B5	-	Income Lambda	-0.1490	0.052	-2.839	0.005

Model Statistics

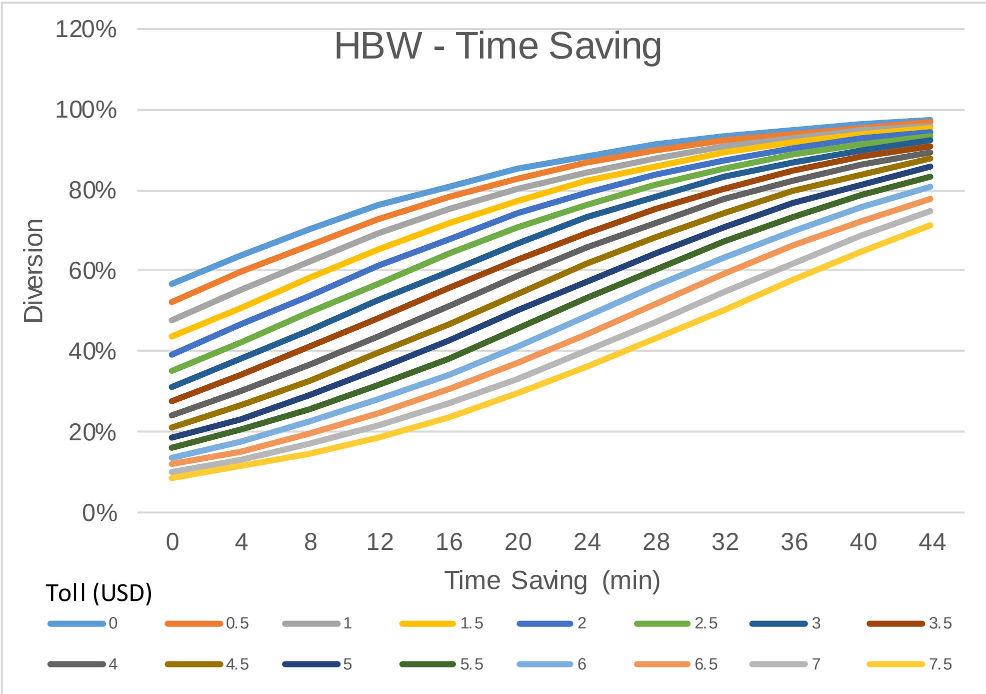
Number of estimated parameters:	7
Number of observations:	2918
Number of individuals:	133
Final log-likelihood:	554.835
Akaike Information Criterion (AIC):	561.835

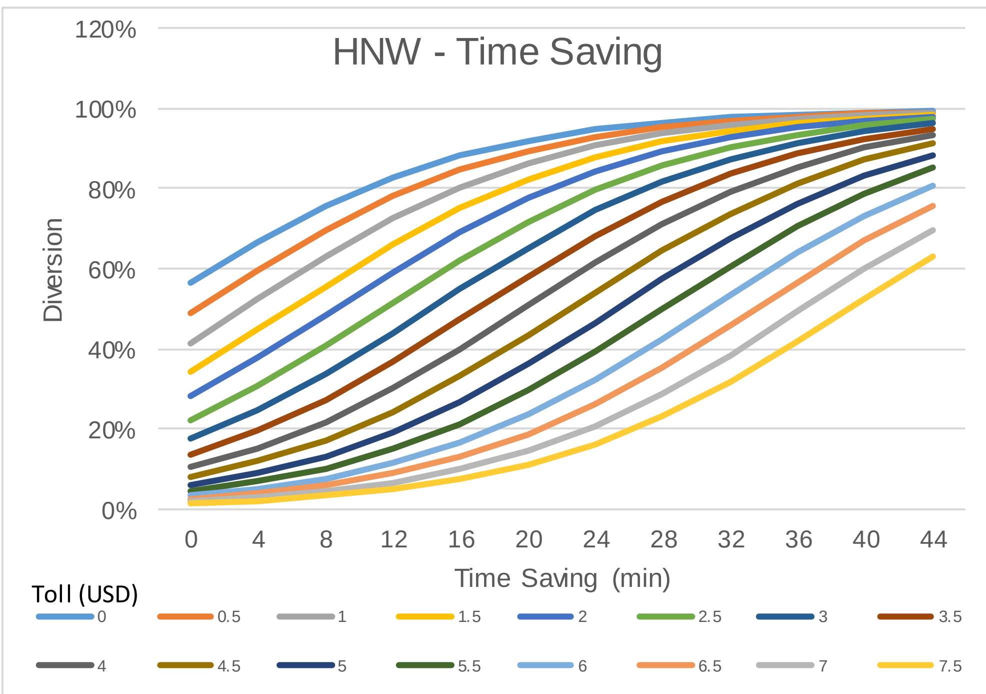
Results - HBW

Parameter	Units	Description	Value	VOT (USD/hr)	VOR (USD/hr)	VOR/VOT
β Time	1/min	Time	-0.0744	12.74	22.34	1.75
β SDTime	1/min	SD Time	-0.1305			
β Toll	1/USD	Toll	-0.3506			
λ Income	-	Income Lambda	-0.1490			

Results - HBNW

Parameter	Units	Description	Value	VOT (USD/hr)	VOR (USD/hr)	VOR/VOT
β Time	1/min	Time	-0.1090	10.85	13.00	1.20
β SDTime	1/min	SD Time	-0.1305			
β Toll	1/USD	Toll	-0.6024			
λ Income	-	Income Lambda	-0.1490			


HBW - Time Saving
120%
100%
80%
60%
40%
20%
0%
Diversion
0 4 8 12 16 20 24 28 32 36 40 44
Time Saving (min)
Toll (USD)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5


HNW - Time Saving
120%
100%
80%
60%
40%
20%
0%
Diversion
0 4 8 12 16 20 24 28 32 36 40 44
Time Saving (min)
Toll (USD)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5

None - Home - Based

Model Specification

Y = (B1) * Diff.Time.2 + (B2) * Diff.SD.Time.2 + (Diff.Toll) * (B3 + B7 * NHB.purpose) * (Ratio)^B5

Parameters

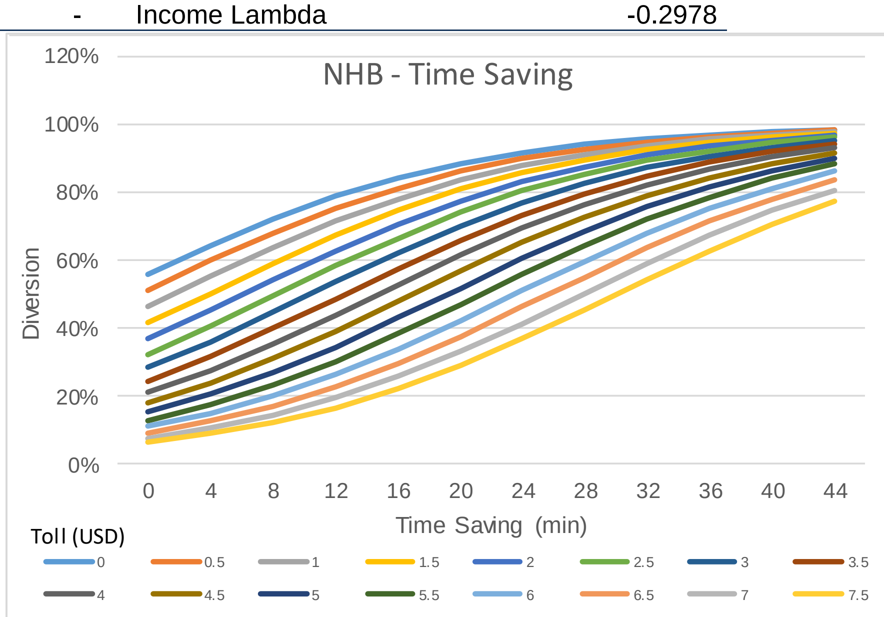
Parameter	Units	Description	Value	SE	t-value	p-value
B1	1/min	Time	-0.0889	0.0147	-6.0648	0.000
B2	1/min	SD Time	-0.1189	0.0324	-3.6674	0.000
B3	1/USD	Toll	-0.5080	0.0489	-10.3934	0.000
B7	0, 1	NHB Dummy	0.1194	0.1509	0.7913	0.043
B5	-	Income Lambda	-0.2978	0.0775	-3.8426	0.000

Model Statistics

Number of estimated parameters:	5
Number of observations:	2918
Number of individuals:	133
Final log-likelihood:	428.336
Akaike Information Criterion (AIC):	433.336

Results - NHB

Parameter	Units	Description	Value	VOT (USD/hr)	VOR (USD/hr)	VOR/VOT
β Time	1/min	Time	-0.0889	13.72	18.35	1.34
β SDTime	1/min	SD Time	-0.1189			
β Toll	1/USD	Toll	-0.3887			
λ Income	-	Income Lambda	-0.2978			



External Passenger Vehicles

Model Specification

Y = B1 * Diff_Time + B2 * Diff_Cost

Parameters

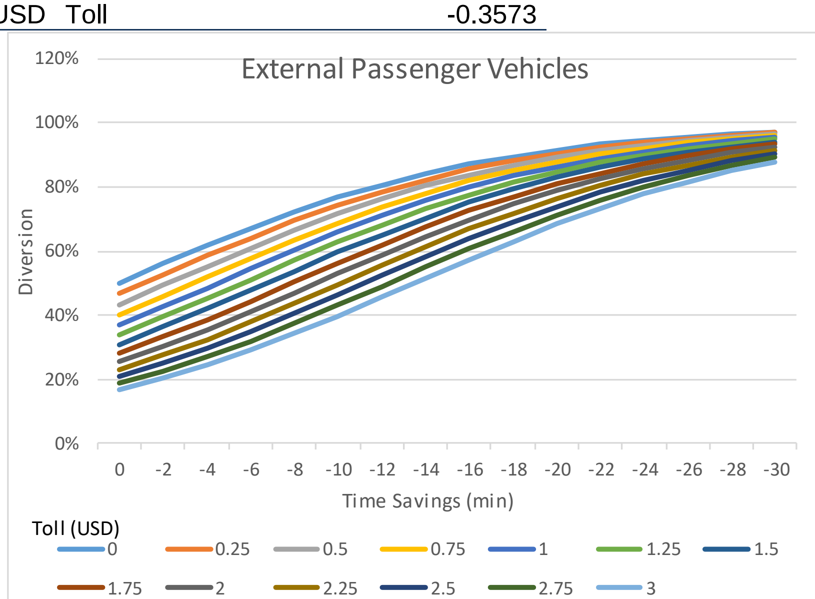
Parameter	Units	Description	Value	SE	Wald	p-value
B1	1/min	Time	-0.0795	0.0086	85.7462	0.000
B2	1/USD	Toll	-0.3573	0.0430	69.1037	0.000

Model Statistics

Number of estimated parameters:	2
Number of observations:	1121
Number of individuals:	187
Final log-likelihood:	1362.863
R squared of Cox y Snell:	0.133
R squared of Nagelkerke:	0.179

Results - External Passenger Vehicles

Parameter	Units	Description	Value	VOT (USD/hr)
β Time	1/min	Time	-0.0795	13.34
β Toll	1/USD	Toll	-0.3573	



External Passenger Vehicles - HBC

Model Specification

Y = B1 * Diff_Time + B2 * Diff_Cost

Parameters

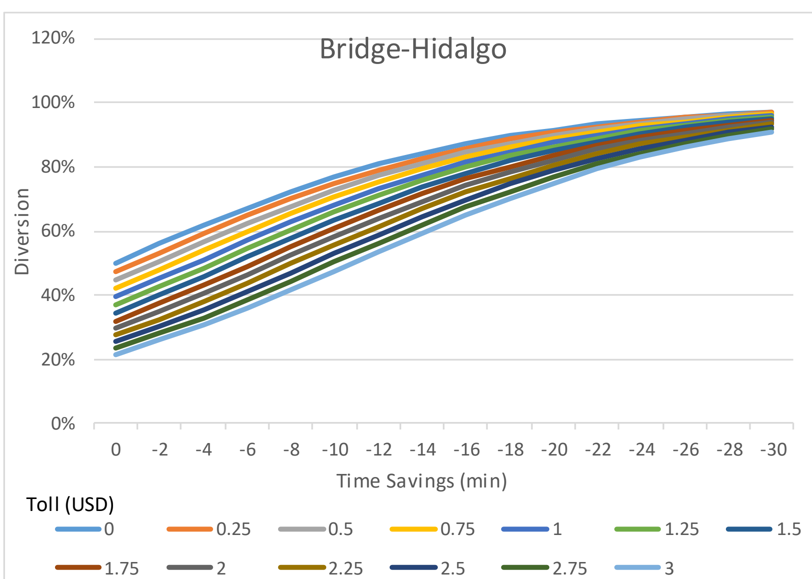
Parameter	Units	Description	Value	SE	Wald	p-value
B1	1/min	Time	-0.0919	0.0120	59.0251	0.000
B2	1/USD	Toll	-0.3312	0.0540	37.6749	0.000

Model Statistics

Number of estimated parameters:	2
Number of observations:	669
Number of individuals:	112
Final log-likelihood:	822.947
R squared of Cox y Snell:	0.126
R squared of Nagelkerke:	0.170

Results - External Passenger Vehicles - HBC

Parameter	Units	Description	Value	VOT (USD/hr)
β Time	1/min	Time	-0.0919	16.65
β Toll	1/USD	Toll	-0.3312	



Internal Commercial Vehicles

Model Specification

Y = B1 * Diff_Time + B2 * Diff_Cost + B3 * SDTime

Parameters

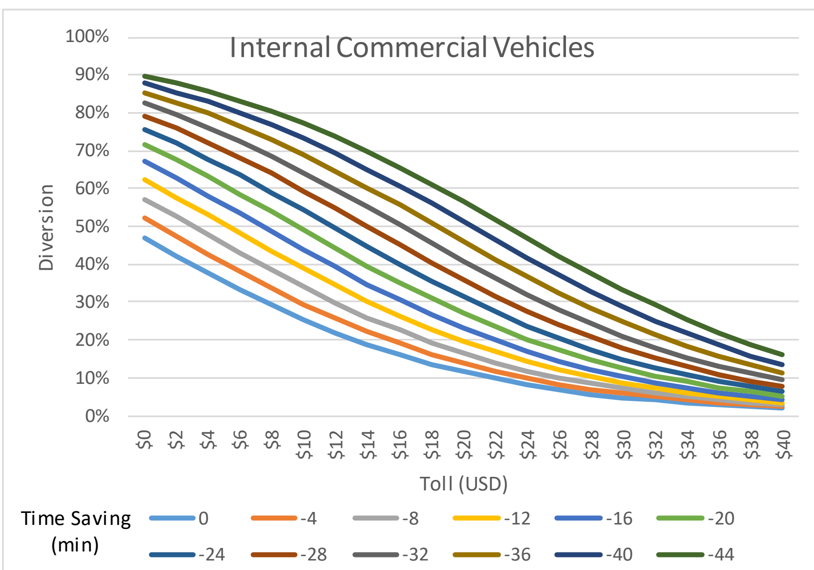
Parameter	Units	Description	Value	SE	z	P>|z|
B1	1/min	Time	-0.0435	0.0070	-6.2100	0.000
B2	1/USD	Toll	-0.0796	0.0111	-7.1700	0.000
B3	1/min	SD Time	-0.0526	0.0342	-1.5400	0.124

Model Statistics

Number of estimated parameters:	3
Number of observations:	825
Number of individuals:	26
Final log-likelihood:	514.482
Wald chi2(3):	91.540
Prob > chi2:	0.000

Results - Internal Commercial Vehicles

Parameter	Units	Description	Value	VOT (USD/hr)	VOR (USD/hr)	VOR/VOT
β Time	1/min	Time	-0.0435	32.78	39.65	1.21
β Toll	1/USD	Toll	-0.0796			
β SDTime	1/min	SD Time	-0.0526			



External Commercial Vehicles

Model Specification

Y = B1 * Diff_Time + B2 * Diff_Cost + B3 * SDTime

Parameters

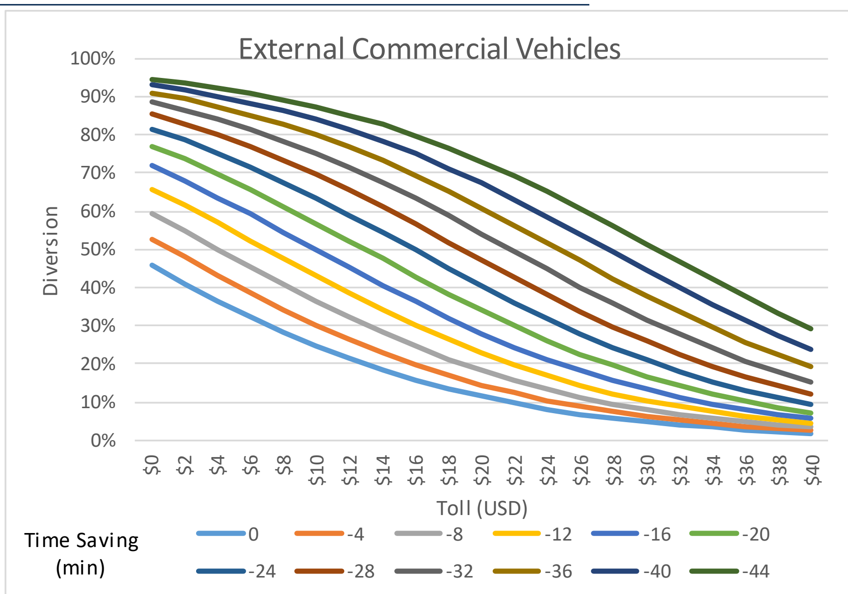
Parameter	Units	Description	Value	SE	z	P>|z|
B1	1/min	Time	-0.0578	0.0093	-6.2400	0.000
B2	1/USD	Toll	-0.0783	0.0133	-5.9000	0.000
B3	1/min	SD Time	-0.0718	0.0429	-1.6700	0.094

Model Statistics

Number of estimated parameters:	3
Number of observations:	550
Number of individuals:	18
Final log-likelihood:	337.203
Wald chi2(3):	70.92
Prob > chi2:	0

Results - External Commercial Vehicles

Parameter	Units	Description	Value	VOT (USD/hr)	VOR (USD/hr)	VOR/VOT
β Time	1/min	Time	-0.0578	44.29	55.05	1.24
β Toll	1/USD	Toll	-0.0783			
β SDTime	1/min	SD Time	-0.0718			



External Commercial Vehicles - HBC

Model Specification

Y = B1 * Diff_Time + B2 * Diff_Cost + B3 * SDTime

Parameters

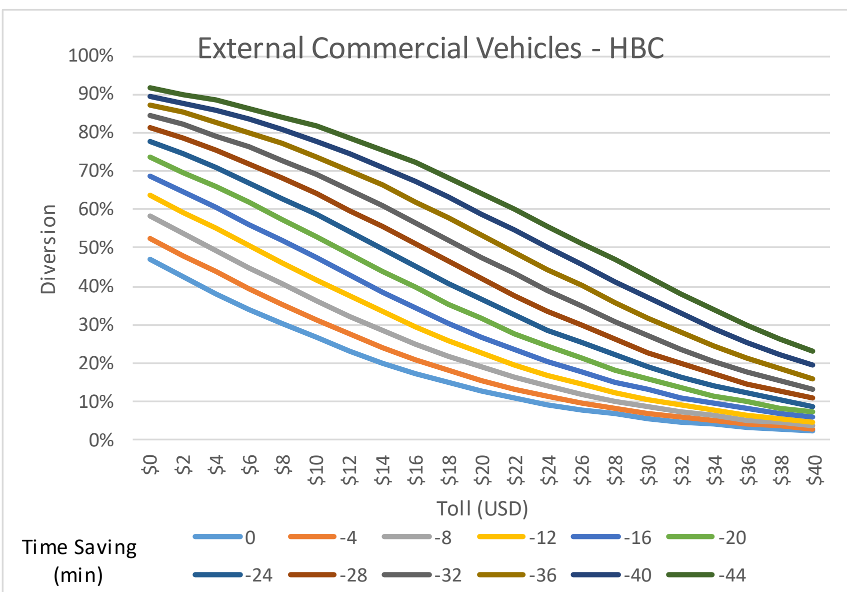
Parameter	Units	Description	Value	SE	z	P>|z|
B1	1/min	Time	-0.0475	0.0050	-9.4300	0.000
B2	1/USD	Toll	-0.0747	0.0073	-10.2700	0.000
B3	1/min	SD Time	-0.0513	0.0241	-2.1300	0.033

Model Statistics

Number of estimated parameters:	3
Number of observations:	1705
Number of individuals:	11
Final log-likelihood:	1068.224
Wald chi2(3):	187.770
Prob > chi2:	0.000

Results - External Commercial Vehicles - HBC

Parameter	Units	Description	Value	VOT (USD/hr)	VOR (USD/hr)	VOR/VOT
β Time	1/min	Time	-0.0475	38.12	41.16	1.08
β Toll	1/USD	Toll	-0.0747			
β SDTime	1/min	SD Time	-0.0513			



External Overweight Commercial Vehicles

Model Specification

Y = B1 * Diff_Time + B2 * Diff_Cost + B3 * SDTime

Parameters

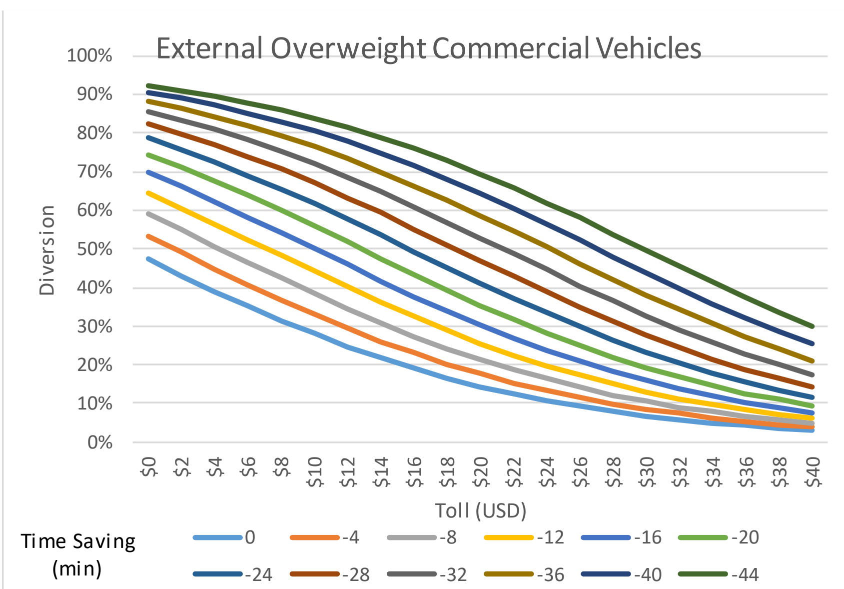
Parameter	Units	Description	Value	SE	z	P>|z|
B1	1/min	Time	-0.0514	0.0073	-7.0900	0.000
B2	1/USD	Toll	-0.0726	0.0097	-7.4600	0.000
B3	1/min	SD Time	-0.0475	0.0341	-1.3900	0.164

Model Statistics

Number of estimated parameters:	3
Number of observations:	880
Number of individuals:	29
Final log-likelihood:	550.008
Wald chi2(3):	101.11
Prob > chi2:	0

Results - External Overweight Commercial Vehicles

Parameter	Units	Description	Value	VOT (USD/hr)	VOR (USD/hr)	VOR/VOT
β Time	1/min	Time	-0.0514	42.51	39.28	0.92
β Toll	1/USD	Toll	-0.0726			
β SDTime	1/min	SD Time	-0.0475			



7. Conclusion

C&M successfully developed and implemented SP surveys to estimate the VOT and VOR of potential users of the proposed 365 TOLL highway in Hidalgo County.

The surveys gathered information from 139 residents of the region, 293 travelers, and 26 enterprises who make commercial trips to the United States in Hidalgo County. The questionnaires collected data on current travel behavior, presented respondents with information about the Project versus their current routes, and engaged the travelers in a series of experimental scenarios to determine their precise travel preferences, including sensitivity to toll costs for travel time savings and travel time reliability.

C&M developed MNL choice models using the survey data to produce estimates of VOT and VOR for each demand segment necessary for travel demand modeling. Table 20 shows the VOT and VOR results for each market segment. Values are within the expected range for the analyzed region based on the benchmarking analysis illustrated in Figure 50.

Table 20. VOT and VOR Results by Market Segment

Segment	VOT (USD/hr)	VOR (USD/hr)
Home Based Work	$12.74	$22.34
Home Based Non-Work	$10.85	$13.00
None Home Based	$13.72	$18.35
External Passenger Vehicles	$13.34	-
External Passenger Vehicles - HBC	$16.65	-
Internal Commercial Vehicles	$32.78	$39.65
External Commercial Vehicles	$44.29	$55.05
External Commercial Vehicles - HBC	$38.12	$41.16
External Overweight Commercial Vehicles	$42.51	$39.28

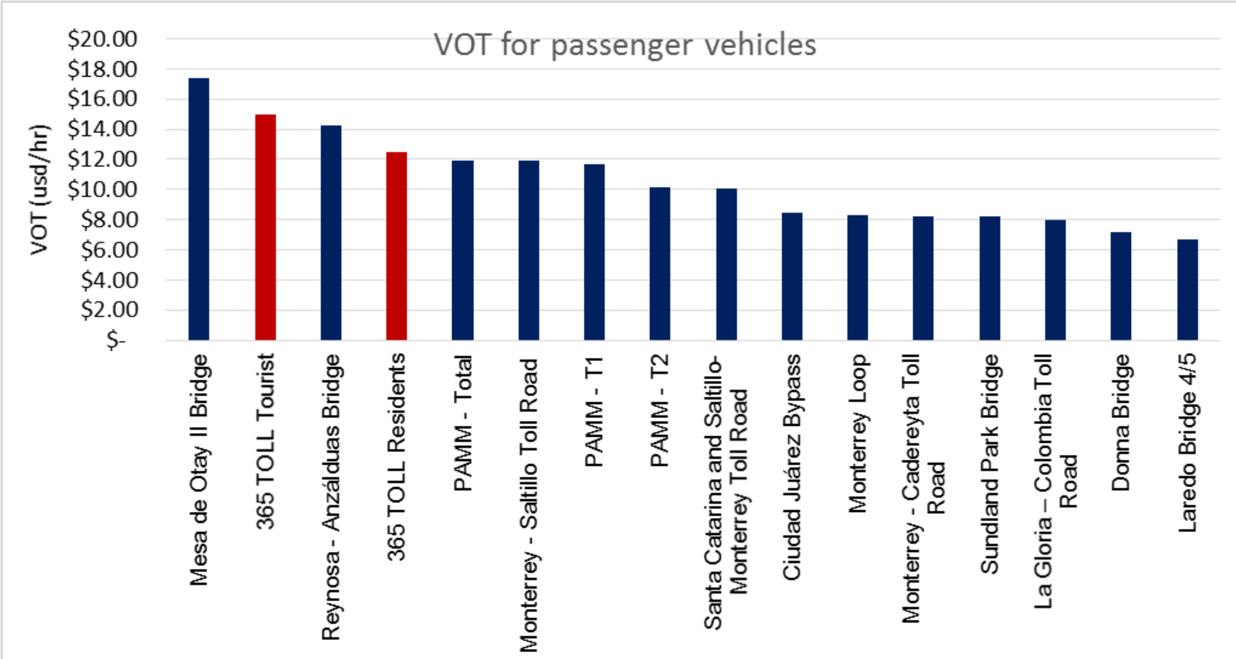


Figure 50. Benchmarking Analysis of VOTs in the Project Region

8. References

Bliemer, M., & Rose, J. (2005). Efficiency and sample size requirements for stated choice studies. *Institute of Transport and Logistics Studies*(Working paper ITLS-WP-05-08).

Bradley, M., & Kroes, E. (September de 1990). Simultaneous Analysis of Stated Preference and Revealed Preference Information. *Presented at the PTRC 18th Summer Annual Meeting*.

Bradley, M., & Kroes, E. P. (January de 1990). Forecasting Issues in Stated Preference Survey Research. *Presented to 3rd International Conference on Survey Methods in Transportation*.

Ortúzar, J., & Willumsen, L. G. (2001). *Modelling Transport* (Third ed.). John Willey & Sons, LTD.

Rose, J., & Bliemer, M. (01 de February de 2013). Sample size requirements for stated choice experiments. *Transportation, 40*, 1021-1041. doi:https://doi.org/10.1007/s11116-013-9451-z

365 TOLL Stated Preference Survey Questionnaires

C&M Associates, Inc.

December 2020

Travel surveys for Hidalgo County. Project: 365 TOLL

Questionnaire for Private Vehicles – Local Users

English survey

Dec 2020

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Travel survey for Hidalgo County. Project: 365 TOLL

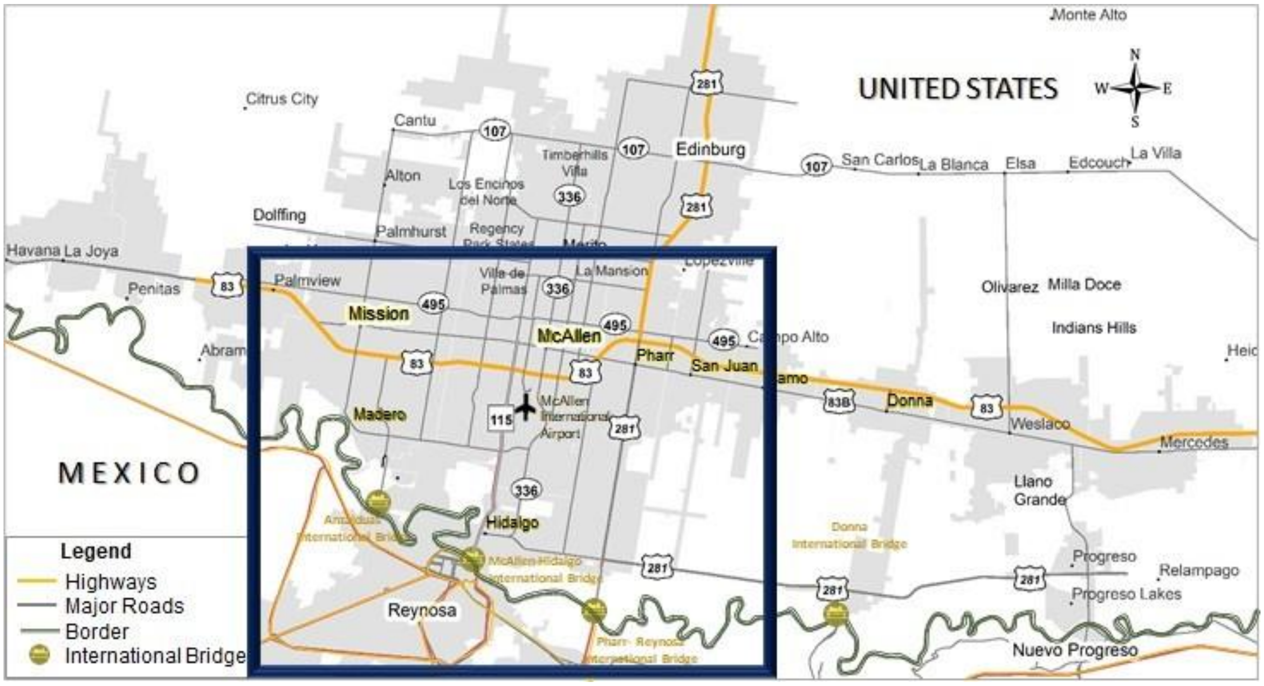
Introduction

"The Hidalgo County Regional Mobility Authority (HCRMA) has proposed the 365 TOLL highway to provide its customers with a rapid and reliable alternative for the safe and efficient movement of people, goods, and services. The proposed alignment of 365 TOLL is a 14.9-mile tolled highway in Hidalgo County, Texas extending from US 281/Military Highway in the City of Pharr to FM 1016/Conway Avenue in the City of Mission. The facility is intended to relieve traffic congestion, facilitate international trade shipments across the U.S./Mexican border, and benefit local travelers by providing a high-speed connection between the Pharr- Reynosa International Bridge, the Anzalduas International Bridge, the McAllen Foreign Trade Zone (MCFTZ), and industrial areas and warehouses in McAllen, Mission, and Pharr.

On behalf of the HCRMA, C&M Associates, Inc. is conducting a travel survey for Hidalgo County to determine the travel patterns and preferences of frequent travelers to support the 365 Toll Highway. Your responses will only be used for the purpose of this study. The survey will take less than 30 minutes of your time. All your personal information is confidential. Thank you in advance for your participation. "

In order to fill out this survey, you have to 18 years (or older) and had recently made a trip through the south of Hidalgo County. The goal is to collect details regarding your most recent trip, including travel time, trip duration, and trip purpose.

For the following questions, please consider a trip you made in the last six (6) months of this year that took at least 10 minutes and involved traveling within or through the area shown below in the blue square.



* 1. Please type the 10-digit survey access code from the left bottom corner of your invitation card or e-mail

Travel survey for Hidalgo County. Project: 365 TOLL OD survey

* 2. Have you made a trip within the past six months where you traveled within or through southern Hidalgo County? Please include trips that crossed the US-Mexico border.

- ☐ Yes
- ◯ No

* 3. On this trip, did you cross the US-Mexico border?

◯ Yes ◯ No

HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Travel survey for Hidalgo County. Project: 365 TOLL Cross Border

4. What bridge or port of entry did you use on your trip?

- Anzalduas (Mission - Reynosa)
- Donna - Río Bravo
- Hidalgo - Reynosa
- Progreso - Nuevo Progreso
- Pharr - Reynosa
- Other (please specify)

* 5. If on your trip you needed to cross the border, how much time did you spend waiting in line at the border crossing?
Slide the button to indicate the minutes

0 minutes | 60 minutes | 120 or more minutes

6. Did you use a SENTRI Card when you crossed the border?

- Yes
- No

HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Travel survey for Hidalgo County. Project: 365 TOLL

* 7. We'd like you to think about the one-way portion of your trip and not the entire round trip. For instance, if you went from home to a shopping center, we'd like you to describe the trip from your home to the shopping center.

Where did you start your trip?

- At your home
- At school
- At your workplace
- At a shopping mall
- Other (please specify)

* 8. Please provide some details regarding the trip's start locations.

Country

State

Municipality/County

Point of interest

ZIP code

* 9. Where did you finish your trip?

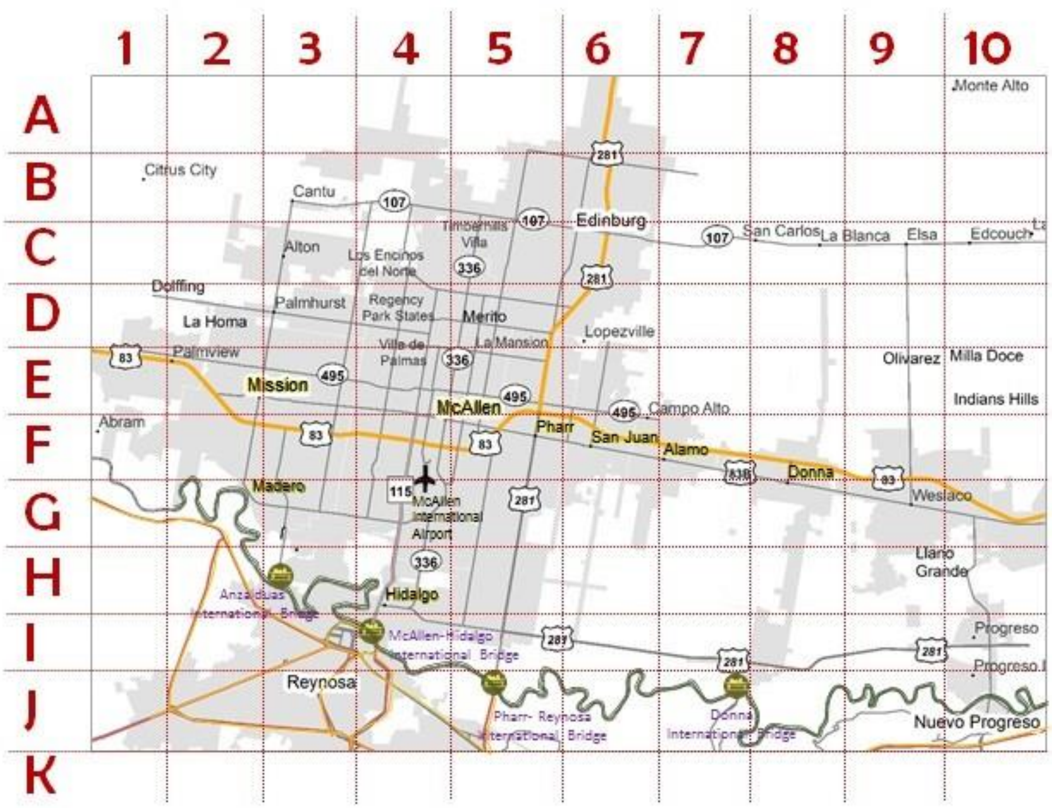
- At your home
- At school
- At your workplace
- At a shopping mall
- Other (please specify)

* 10. Please provide some details regarding the trip's finish locations.

Country	
State	
Municipality/County	
Point of interest	
ZIP code	

* 11. Just to be sure; on the map shown below, please indicate the area closest to your trip's origin and destination

	Row Label	Column Label
Origin		
Destination		



Travel survey for Hidalgo County. Project: 365 TOLL

* 12. What date and time of the day did you start your trip?
If you don't remember the exact date or time, please give us your best guess.

Date / Time

Date	Time		AM/PM
MM/DD/YYYY	hh	mm	-

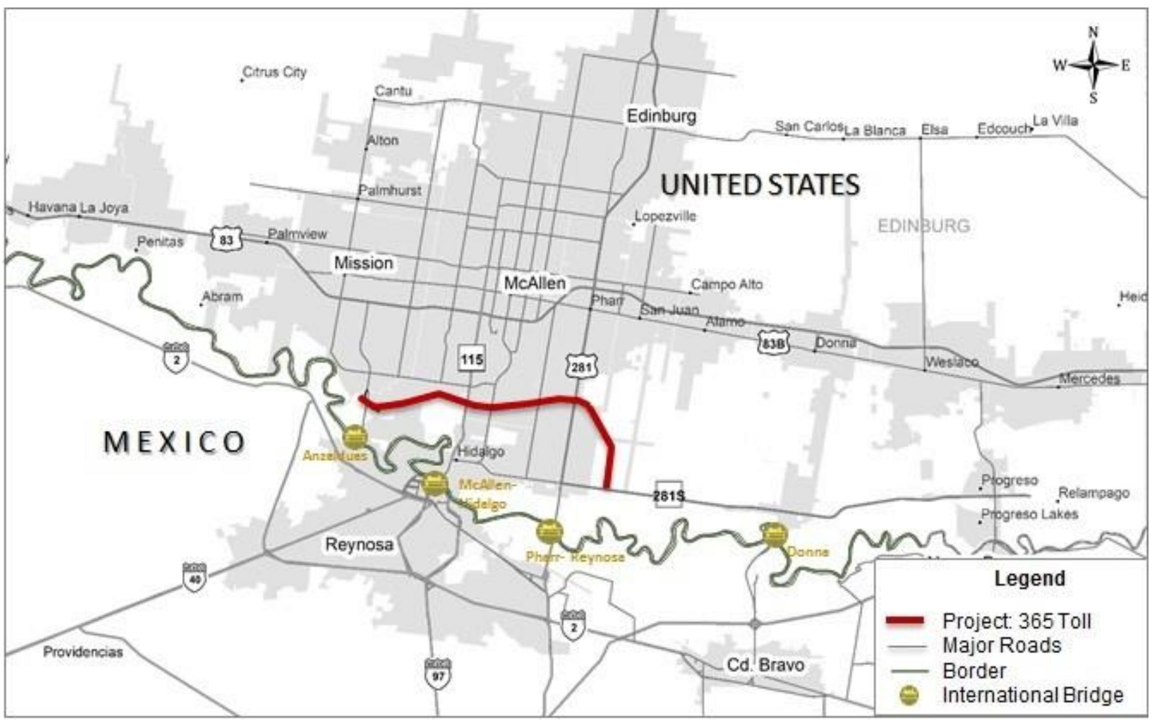
* 13. How often do you make this same trip? (One-way direction)

- 6 or more times per week
- 4 times per week
- 2-3 times per week
- Once per week
- 2-3 times per month
- Once per month
- Once every 6 months
- Only this one time

Travel survey for Hidalgo County. Project: 365 TOLL

Stated Preference

"The Hidalgo County Regional Mobility Authority (HCRMA) is working to improve travel into southern Hidalgo County and is currently evaluating the proposed 365 TOLL project (highlighted in red in the map below). The project will initially be built with 2 main lanes in each direction, with an expansion to 3 lanes by 2030."



In order to fund the new road, the toll would be collected. You would NOT need to stop to pay your toll and would be able to continue to drive at highway speed and pay the toll in one of two different ways.

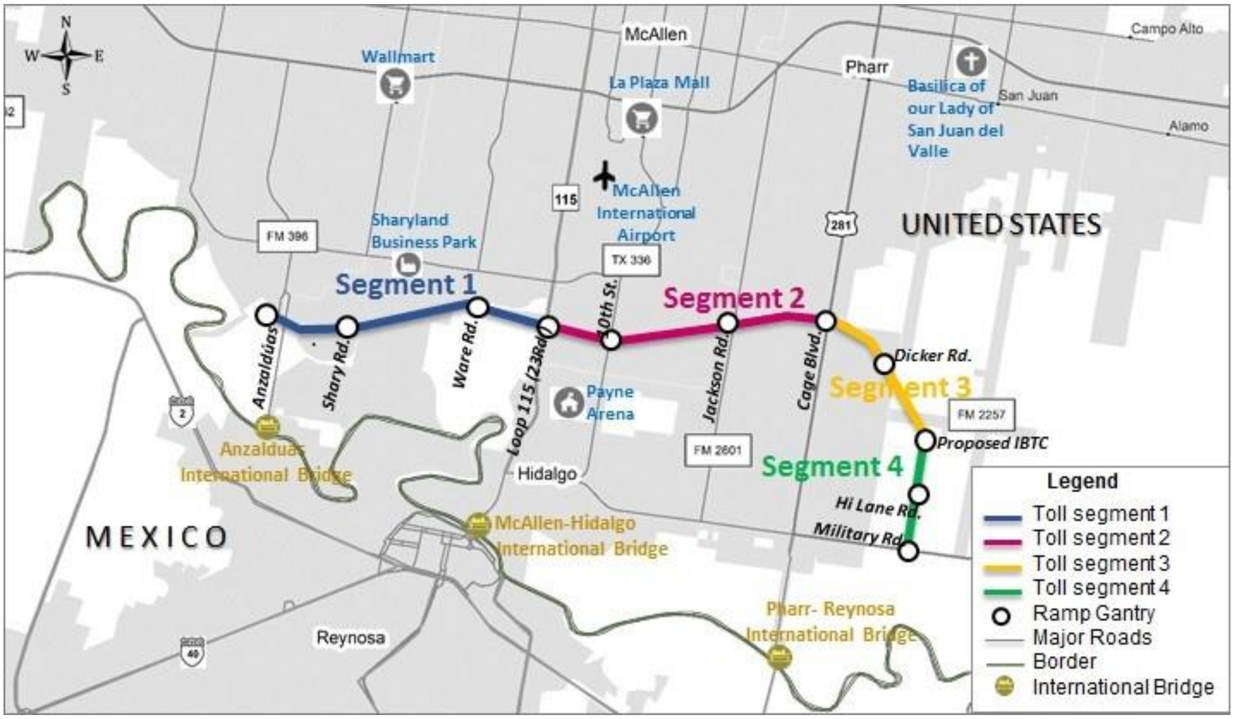
* Prepay: Paying the toll before using it by establishing a prepaid account. The tolls would be deducted from your account each time you use the road by reading a transponder (sticker or small electronic device mounted on the inside of your windshield), or by reading your license plates

* Post pay: Your vehicle’s license plates would be read by a camera and a bill would be mailed to the registered owner. Additional processing fees could apply to a post-pay account.

* 14. Do you think the 365 TOLL project would be useful to you for taking the typical trip you just described?

- [ ] Yes
- [ ] Possibly
- [ ] No

Please look at the following map. The circles indicate the entrance or exit ramps of the 365 TOLL project. The colored lines indicate the segments.



* 15. Please indicate the toll segments of 365 TOLL that you are most likely to use:

- [ ] Only segment 1
- [ ] Only segment 2
- [ ] Only segment 3
- [ ] Only segment 4
- [ ] All four segments
- [ ] Segments 1 + 2 + 3
- [ ] Segments 1 + 2
- [ ] Segments 2 + 3
- [ ] Segments 2 + 3 +4
- [ ] Segments 3 + 4
- [ ] Neither of them

* 16. Approximately how long did it take you, door-to-door, to drive from your trip began to where your trip ended? (Please include only the time you spent traveling a not time spent at any stops you may have done along the way (e.g., to get gas or coffee).

- Less than 10 minutes
- 11 - 20 minutes
- 21 - 30 minutes
- 31 - 40 minutes
- 40 - 60 minutes
- 1 - 2 hours
- 2 - 4 hours
- More than 4 hours and 1 minute

Travel survey for Hidalgo County. Project: 365 TOLL

Stated Preference - Experiment 1A

Here are SIX options where the proposed 365 TOLL HIGHWAY could save you travel time in exchange for paying a toll. In terms of your regular trip, please evaluate if you would use the 365 TOLL PROJECT, or you continue using your CURRENT ROUTE or have NO PREFERENCE. Remember that there are no right or wrong answers; we are only interested in your opinion.

* 17. Which route would you use if the proposed 365 Toll offered a time saving of8 minutes with a toll of $2.00 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 18. Which route would you use if the proposed 365 Toll offered a time saving of 20 minutes with a toll of $1.75 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 19. Which route would you use if the proposed 365 Toll offered a time saving of5 minutes with a toll of $2.75 USD?

☐ 365 Toll Route ☐ Current Route ☐ I have no preference

* 20. Which route would you use if the proposed 365 Toll offered a time saving of12 minutes with a toll of $1.50 USD?

☐ 365 Toll Route ☐ Current Route ☐ I have no preference

* 21. Which route would you use if the proposed 365 Toll offered a time saving of8 minutes with a toll of $2.50 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 22. Which route would you use if the proposed 365 Toll offered a time saving of15 minutes with a toll of $1.00 USD?

☐ 365 Toll Route ☐ Current Route ☐ I have no preference

Travel survey for Hidalgo County. Project: 365 TOLL
Stated Preference - Experiment 2A

Here are SIX options where the proposed 365 TOLL HIGHWAY could save you travel time in exchange for paying a toll. In terms of your regular trip, please evaluate if you would use the 365 TOLL PROJECT, or you continue using your CURRENT ROUTE or have NO PREFERENCE. Remember that there are no right or wrong answers; we are only interested in your opinion.

* 23. Which route would you use if the proposed 365 Toll offered a time saving of20 minutes with a toll of $2.50 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 24. Which route would you use if the proposed 365 Toll offered a time saving of8 minutes with a toll of $3.00 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 25. Which route would you use if the proposed 365 Toll offered a time saving of30 minutes with a toll of $2.00 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 26. Which route would you use if the proposed 365 Toll offered a time saving of10 minutes with a toll of $5.00 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 27. Which route would you use if the proposed 365 Toll offered a time saving of20 minutes with a toll of $3.00 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 28. Which route would you use if the proposed 365 Toll offered a time saving of15 minutes with a toll of $7.00 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Travel survey for Hidalgo County. Project: 365 TOLL Stated Preference - Debrief

* 29. Please explain the reasoning behind your responses to the previous scenarios. (Select all that apply)

- [ ] I do not want to pay toll in general.
- [ ] I can't change my route.
- [ ] The toll cost is too expensive.
- [ ] The toll cost seems affordable.
- [ ] The time savings are not enough to pay a Toll.
- [ ] I think the new toll road will be a safer route.
- [ ] The scenarios were not realistic.
- [ ] I think the new toll road will save me time
- [ ] Other (please specify)

30. What is the maximum amount (in USD) you would be willing to pay to use the 365 TOLL roadway?

0 50 100

* 31. How much time should this toll way save you to justify using it?
Slide the button to indicate the minutes

2 minutes 20 minutes 40 minutes

Travel survey for Hidalgo County. Project: 365 TOLL Reliability

* 32. Did you experience any delays due to traffic, accidents or situations beyond your control during this trip?
(Do not take into account the border crossing time)

◯ Yes ◯ No

* 33. How many minutes of delay did you experience during that trip?
(Do not take into account the border crossing time)
Slide the button to indicate the minutes

0 minutes 60 minutes 120 or more minutes

* 34. If you have made this same trip several times, either on different days or in different months, what has been the maximum delay that you have experienced on that trip for reasons beyond your control?
(Do not take into account the crossing time at border)
Slide the button to indicate the minutes

0 minutes 60 minutes 120 minutes or more

* 35. How often do you experience delays on this same trip, in other occasions?

- 6 or more times per week
- 4 times per week
- 2-3 times per week
- once per week
- 2-3 times per month
- Once per month
- Once every 6 months
- Only this one time
- I've never suffered delays

Travel survey for Hidalgo County. Project: 365 TOLL

Instructions - Reliability

The next set of questions will help us understand how important predictable travel times are to you. For the next five questions, you will be asked to choose between two different options for making the trip you just described.

* For each question, please look closely at the options and tell us which one you most prefer.
* For each question, focus only on the two travel options shown. Do not consider the choices you made on previous questions.
* Please remember there is no right or wrong answer, we only want your opinion.

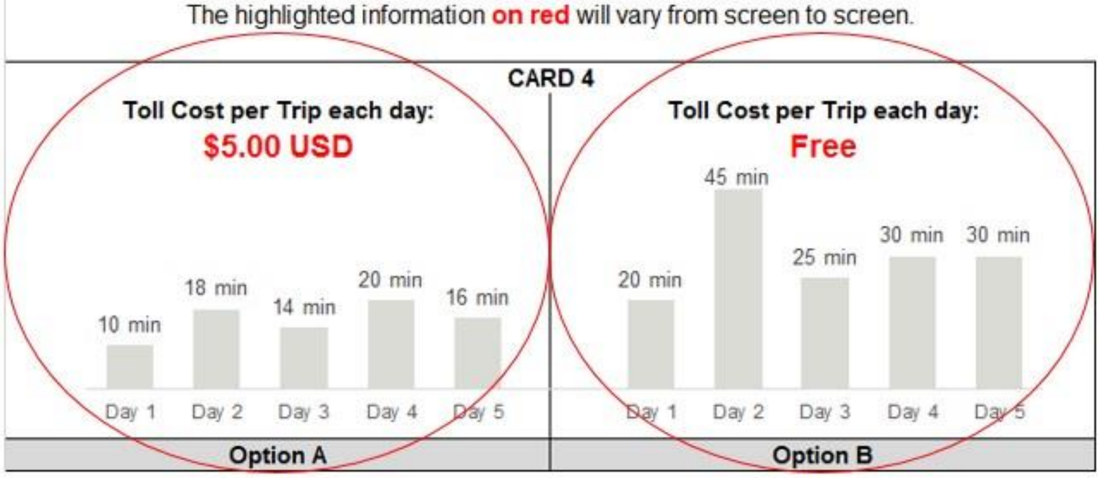
Instructions

Please read the instructions carefully.

Imagine you make your trip starting and ending at the same locations your previously listed on 5 separate occasions, with each trip starting at the same time of the day and the same day of the week. However, for reasons which cannot always be anticipated (e.g., traffic), these trips can take different amounts of time.

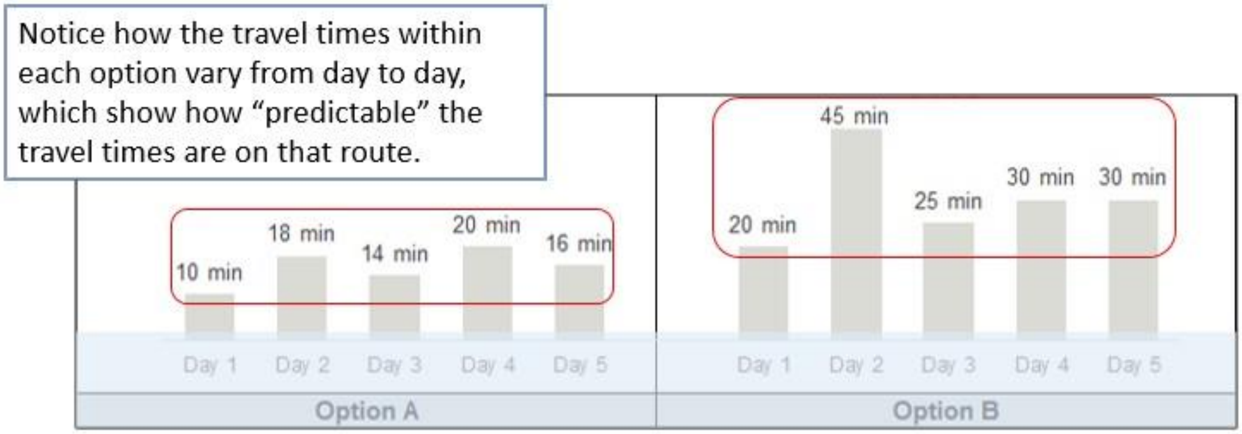
In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.



Each bar represents the time that will be spent making **ONE** of your 5 future trips using this option.

Note that in this example, the bars in Option A are on average shorter than in Option B. This means that, on average, Option A takes less time.



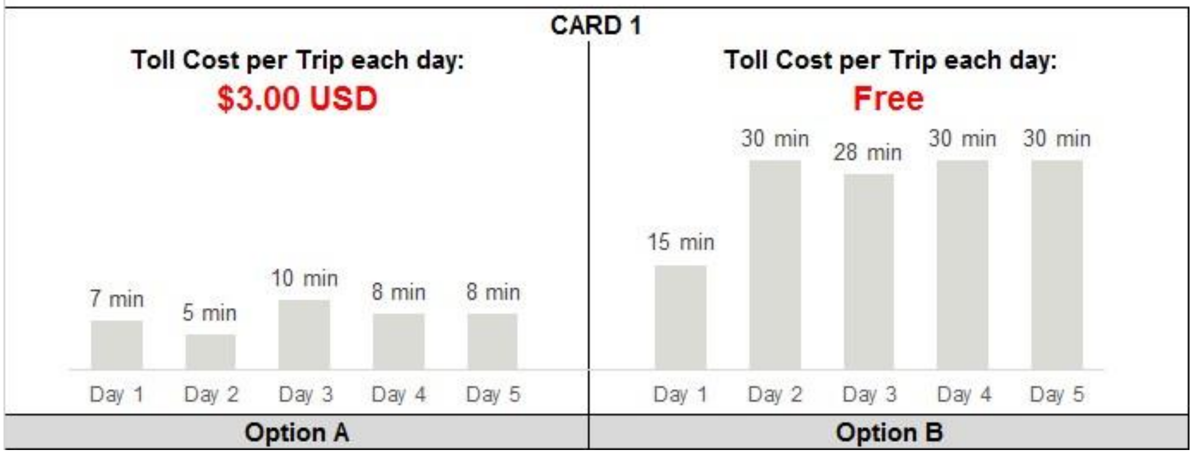
* 36. Just to remember. How long was your trip door-to-door?

- Less than 30 minutes
- 31 or more minutes

Travel survey for Hidalgo County. Project: 365 TOLL
Reliability - Experiment RAu1A

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.



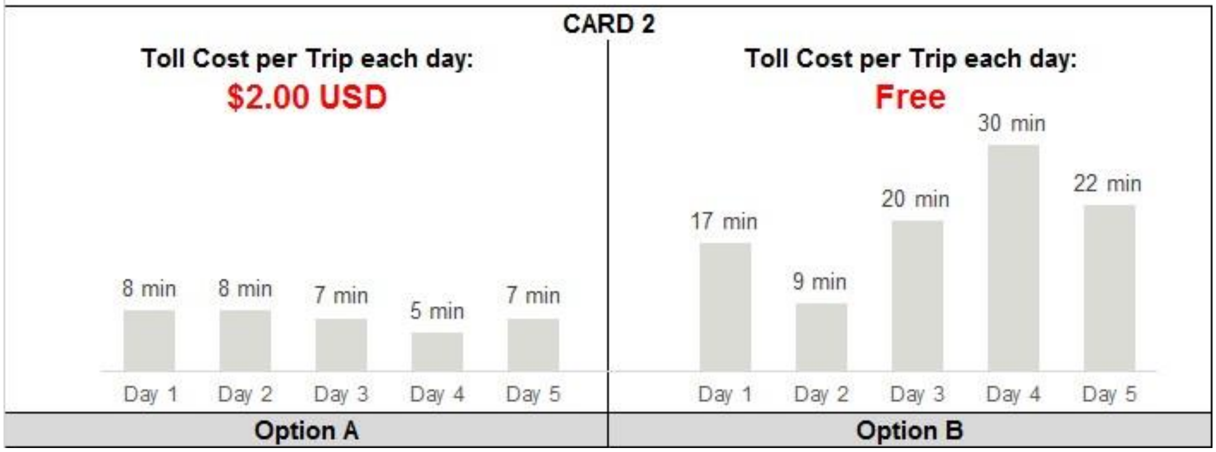
* 37. Card 1 of 5.
Which option do you prefer?

- ◯ Option A
- ◯ Option B

Travel survey for Hidalgo County. Project: 365 TOLL

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.



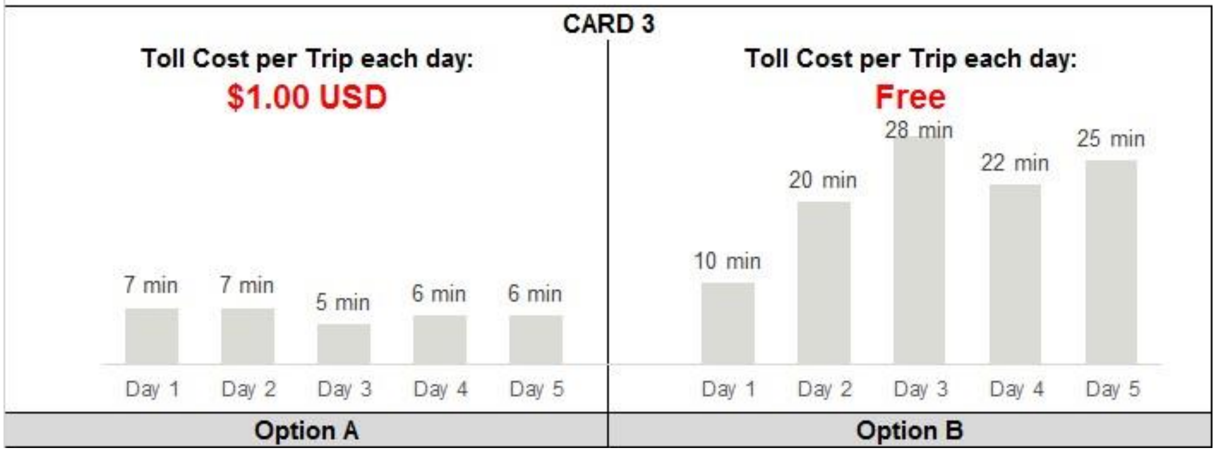
* 38. Card 2 of 5.
Which option do you prefer?

◯ Option A ◯ Option B

Travel survey for Hidalgo County. Project: 365 TOLL

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.



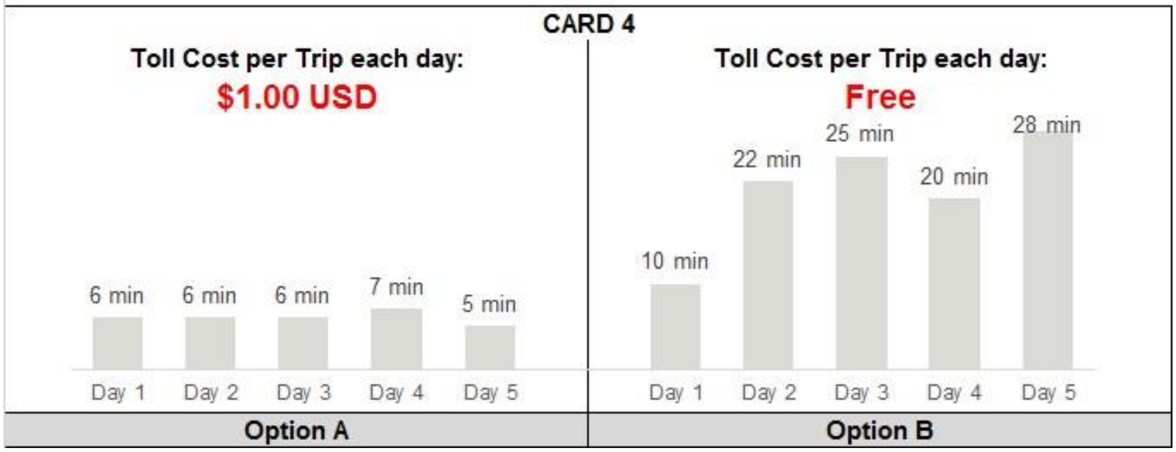
* 39. Card 3 of 5.
Which option do you prefer?

◯ Option A ◯ Option B

Travel survey for Hidalgo County. Project: 365 TOLL

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

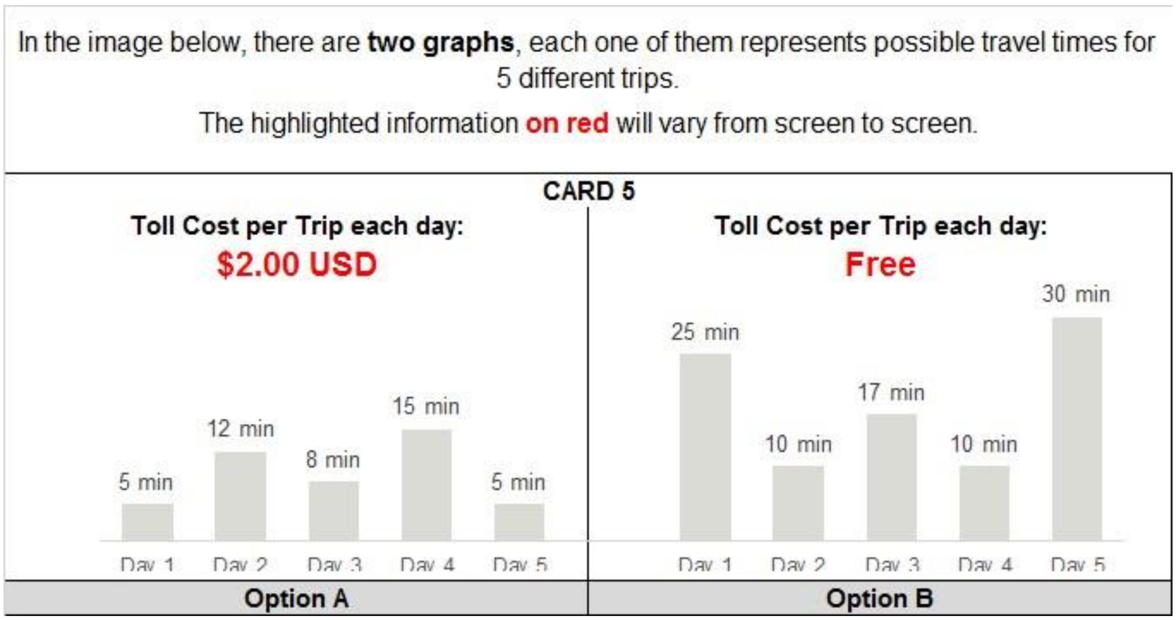
The highlighted information **on red** will vary from screen to screen.



* 40. Card 4 of 5.
Which option do you prefer?

◯ Option A ◯ Option B

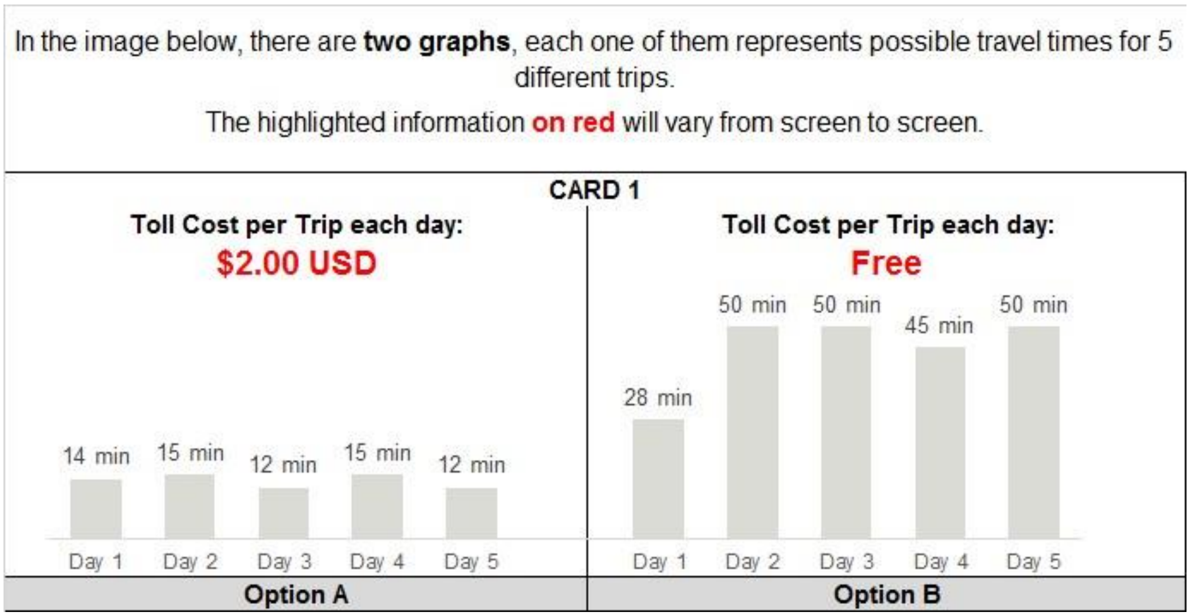
Travel survey for Hidalgo County. Project: 365 TOLL



* 41. Card 5 of 5.
Which option do you prefer?

◯ Option A ◯ Option B

Travel survey for Hidalgo County. Project: 365 TOLL Reliability - Experiment RAu2A



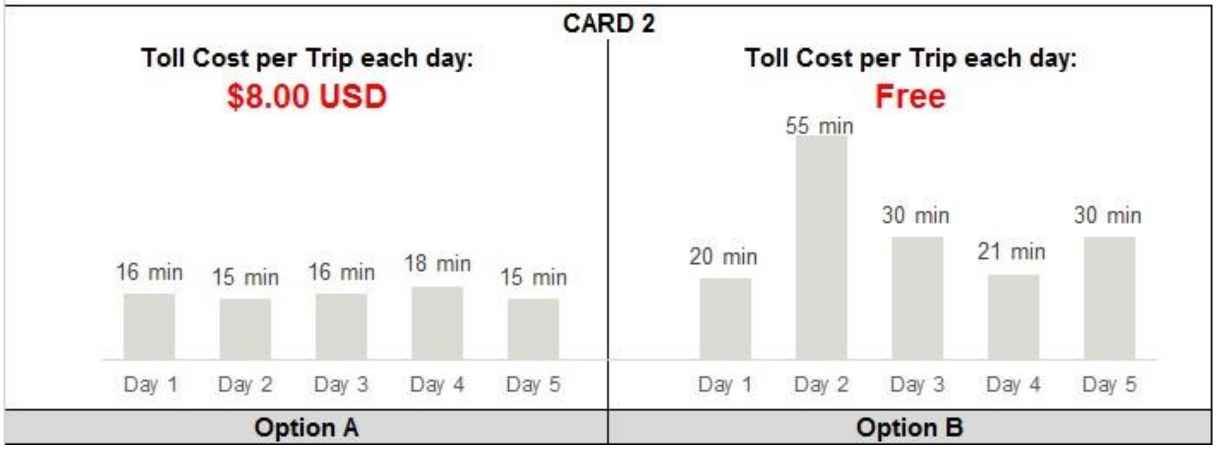
* 42. Card 1 of 5.
Which option do you prefer?

◯ Option A ◯ Option B

Travel survey for Hidalgo County. Project: 365 TOLL

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

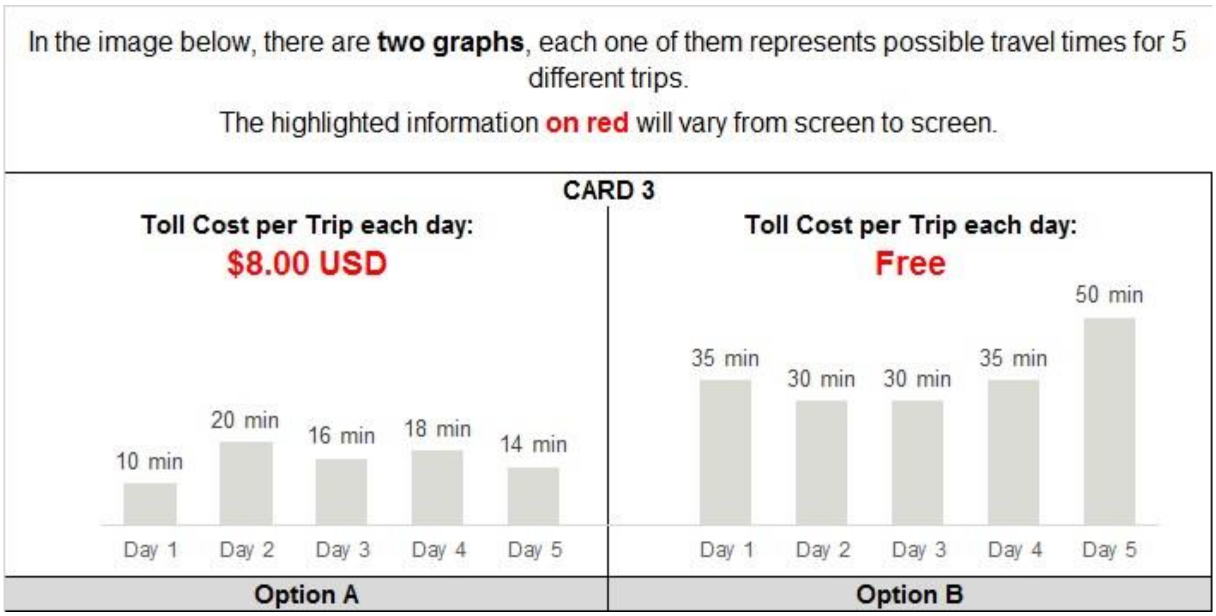
The highlighted information **on red** will vary from screen to screen.



* 43. Card 2 of 5.
Which option do you prefer?

○ Option A ○ Option B

Travel survey for Hidalgo County. Project: 365 TOLL



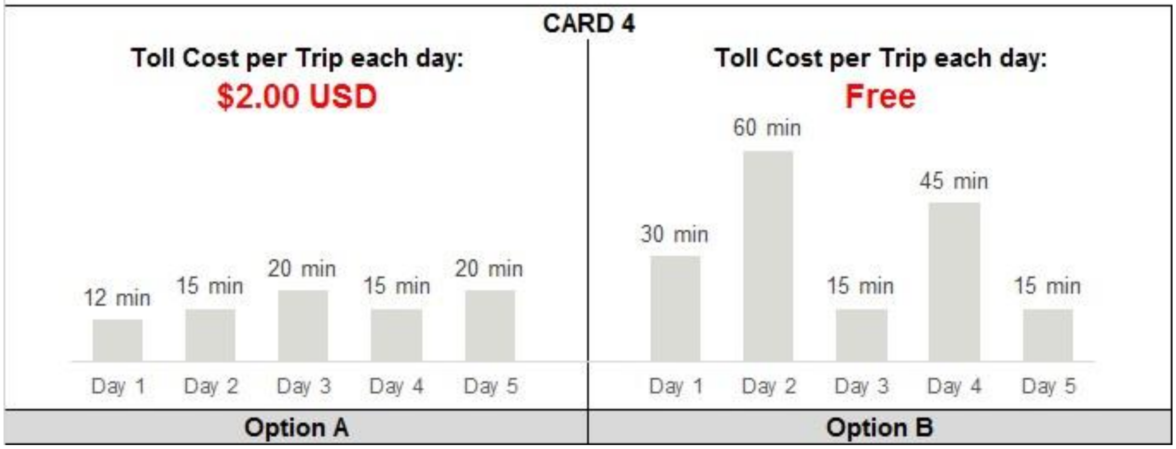
* 44. Card 3 of 5.
Which option do you prefer?

- ◯ Option A
- ◯ Option B

Travel survey for Hidalgo County. Project: 365 TOLL

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.



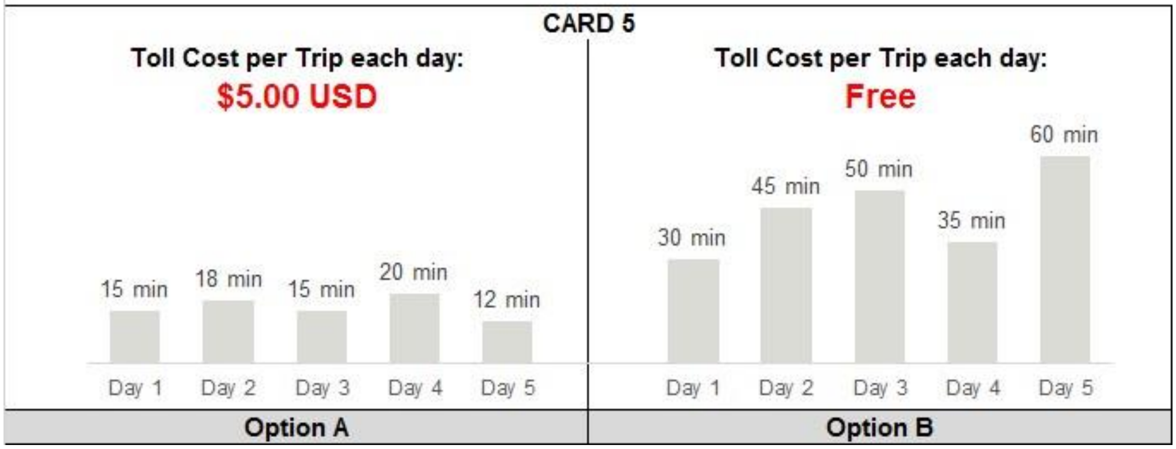
* 45. Card 4 of 5.
Which option do you prefer?

○ Option A ○ Option B

Travel survey for Hidalgo County. Project: 365 TOLL

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.



* 46. Card 5 of 5.
Which option do you prefer?

- [ ] Option A
- [ ] Option B

Travel survey for Hidalgo County. Project: 365 TOLL

COVID-19 Questions

"We are aware of the impact the recent COVID-19 pandemic has had on living and work conditions. For the following questions, we ask that you consider your situation BEFORE COVID-19, DURING QUARANTINE ORDERS, and in the FUTURE when all travel restrictions and stay-at-home orders have been lifted."

Please select all options that apply in each situation.

* 47. What was/will be the status of your job?

Please select all options that apply in each situation.

	BEFORE Covid-19	DURING Quarantine	WITHOUT Restrictions
Full-time worker	☐	☐	☐
Part-time worker	☐	☐	☐
Self-employed	☐	☐	☐
Student	☐	☐	☐
Student and employed	☐	☐	☐
Homemaker	☐	☐	☐
Retired	☐	☐	☐
Unemployed and Looking for a job	☐	☐	☐
Furloughed with pay	☐	☐	☐
Furloughed without pay	☐	☐	☐
I left my employment by choice or necessity	☐	☐	☐
Laid-off	☐	☐	☐

Other (please specify)

* 48. How often did you work from home?

	BEFORE Covid-19	DURING Quarantine	WITHOUT Restrictions
6 to 7 days per week	☐	☐	☐
5 days a week	☐	☐	☐
4 days a week	☐	☐	☐
2 - 3 days a week	☐	☐	☐
1 day per week	☐	☐	☐
1 - 3 days a month	☐	☐	☐
Less than once per month	☐	☐	☐
Once due to an unusual Situation (family emergency, etc.)	☐	☐	☐
Never	☐	☐	☐

* 49. How often did you carpool with one or more people or use taxi services (Uber, Lyft, etc.)?

	BEFORE Covid-19	DURING Quarantine	WITHOUT Restrictions
6 to 7 days per week	☐	☐	☐
5 days a week	☐	☐	☐
4 days a week	☐	☐	☐
2 - 3 days a week	☐	☐	☐
1 day per week	☐	☐	☐
1 - 3 days a month	☐	☐	☐
Less than once per month	☐	☐	☐
Once due to an unusual Situation (family emergency, etc.)	☐	☐	☐
Never	☐	☐	☐

HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Travel survey for Hidalgo County. Project: 365 TOLL

Opinion questions

* 50. Could you give us your opinion about how much do you agree or disagree with the following statements related to the use of toll roads and highways?

I use a toll road if the tolls are reasonable.

My employer or client requires the use of toll highways.	○	○	○	○	○
I use a toll road because the road conditions are good.	○	○	○	○	○
I use toll roads when I share the toll cost with others.	○	○	○	○	○
I use a toll road due to the time savings that it offers me compared to other routes.	○	○	○	○	○
I only use toll roads in case of an emergency or when arriving on time is crucial.	○	○	○	○	○
By using toll roads, I am pretty certain I will get to my destination on time.	○	○	○	○	○
	○	○	○	○	○

Strongly disagree
Disagree
Neutral Agree
Strongly agree

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Travel survey for Hidalgo County. Project: 365 TOLL
User's characteristics

* 51. What is your gender?

- Female
- Male
- Other
- I prefer not to answer

* 52. What is your age?

- Under 18
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75 or older

* 53. How many people live in your household?

- 1 (I live alone)
- 2 persons
- 3 persons
- 4 persons
- 5 or more persons

* 54. Including yourself, how many people were in the vehicle during your trip?

- 1 (Alone)
- 2 persons
- 3 persons
- 4 persons
- 5 or more persons

* 55. The vehicle that you drove on this trip is:

- My own
- Family's / friend's
- Company's
- Rented

* 56. Does anyone help you with paying tolls, gas, or parking?

- No, I pay.
- My employer pays.
- A family member or a friend pays.

57. What category best indicates your household annual income before taxes?
Note: This information is only used to ensure that we have assembled a representative sample of the population.
(Amount in USD)

- Under $15,000
- Between $15,000 and $24,999
- Between $25,000 and $34,999
- Between $35,000 and $49,999
- Between $50,000 and $74,999
- Between $75,000 and $99,999
- Between $100,000 and $149,999
- Between $150,000 and $199,999
- Over $200,000
- I prefer not to answer

* 58. For a chance to win a prize, please enter your contact information below. Your personal data will remain anonymous and confidential.

Name:

Address:

Address 2:

City Town:

State/Province:

ZIP code:

Phone number:

Email:

* 59. Thank you very much for your support by answering our survey. If you have any comments, please write them below.

Travel surveys for Hidalgo County. Project: 365 TOLL

Private Vehicles – Local Users

Spanish survey

Dec 2020

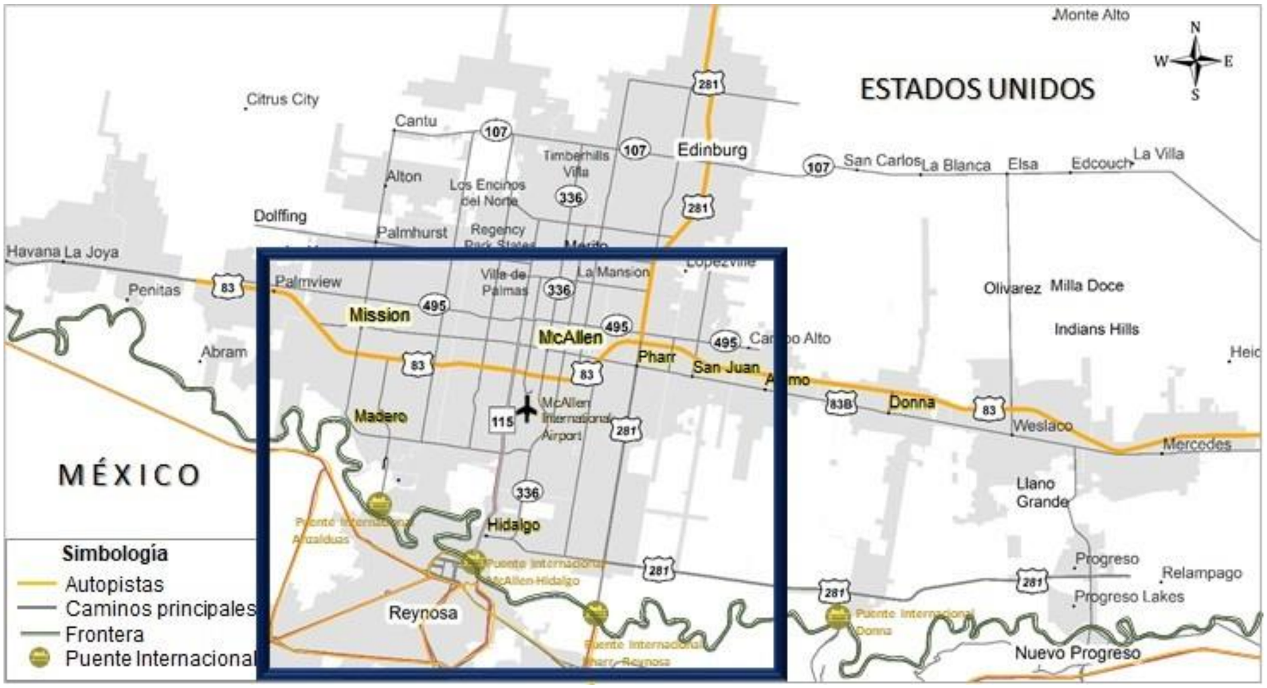
Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

Introducción

"La Autoridad de Movilidad Regional del Condado de Hidalgo (HCRMA) ha propuesto la autopista 365 TOLL para proporcionar a sus clientes una alternativa rápida y confiable para el movimiento seguro y eficiente de personas, bienes y servicios. La alineación propuesta de 365 TOLL es una autopista con peaje de 14.9 millas en el Condado de Hidalgo en el Estado de Texas que se extiende desde la US 281 / Military Highway en la Ciudad de Pharr hasta FM 1016 / Conway Avenue en la Ciudad de Mission. El objetivo de la instalación es aliviar la congestión del tráfico, facilitar los envíos de comercio internacional a través de la frontera entre Estados Unidos y México para beneficiar a los viajeros locales al proporcionar una conexión de alta velocidad entre el Puente Internacional Pharr-Reynosa, el Puente Internacional Anzalduas, la Zona de Comercio Exterior de McAllen (MCFTZ), y áreas industriales y almacenes en McAllen, Mission y Pharr"

Esta encuesta está dirigida a personas mayores de 18 años que han realizado un viaje reciente en la región. El objetivo es recopilar detalles sobre el viaje más reciente realizado, incluido el tiempo de viaje, la duración del viaje y el propósito del viaje.

Para las siguientes preguntas, por favor considere un viaje que haya realizado en los últimos seis (6) meses de este año, que tardó al menos 10 minutos y que implicó viajar dentro o por el área que se muestra a continuación en el cuadro azul.



* 1. Por favor, escriba el código de acceso a la encuesta de 10 dígitos que se encuentra en la esquina inferior izquierda de su tarjeta de invitación o en el correo electrónico.

HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

Encuesta OD

*2. ¿Usted ha realizado un viaje en los últimos seis meses donde viajó dentro o cruzó el Condado de Hidalgo? Incluya los viajes que cruzaron la frontera entre Estados Unidos y México

- Sí
- No

*3. En este viaje, ¿cruzó la frontera entre Estados Unidos y México?

- Sí
- No

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 Tollway

Cruce Fronterizo

* 4. ¿Utilizó alguno de estos puentes para realizar su viaje?

- Anzalduas (Mission - Reynosa)
- Donna - Río Bravo
- Hidalgo - Reynosa
- Progreso - Nuevo Progreso
- Pharr - Reynosa
- Otro (especifique)

* 5. Si en su viaje tuvo que cruzar la frontera, ¿Cuánto tiempo pasó esperando en la fila? Deslice el botón para indicar el tiempo

0 minutos | 60 minutos | 120 o más minutos

* 6. ¿Utilizó una credencial SENTRI para cruzar la frontera?

Si No

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 Tollway

* 7. Piense en un viaje en UNA dirección y no en el viaje ida y vuelta. Por ejemplo, si fue de su casa al centro comercial nos gustaría que describiera solo el viaje de su casa al centro comercial.

¿En dónde comenzó su viaje?

- ☐ En su casa
- ☐ En su escuela
- ☐ En su trabajo
- ☐ En el centro comercial
- ☐ Otro (especifique)

* 8. Por favor, proporcione algunos detalles sobre el lugar donde inició su viaje.

País

Estado

Municipio/Condado

Punto de interés

Código postal

* 9. ¿En dónde terminó su viaje?

- ☐ En casa
- ☐ En la escuela
- ☐ En el trabajo
- ☐ En el centro comercial
- ☐ Otro (especifique)

* 10. Por favor, proporcione algunos detalles sobre el lugar donde terminó su viaje.

País

Estado

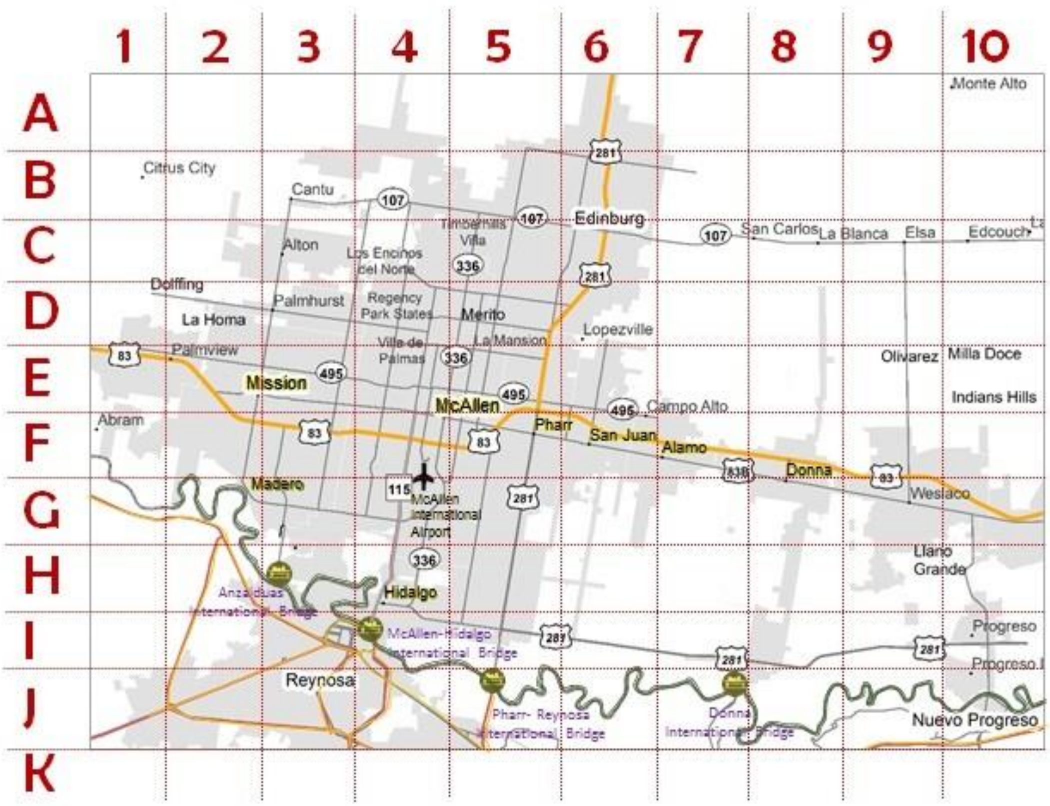
Municipio /Condado

Punto de interés

Código Postal

* 11. Sólo para confirmar; en el mapa que se encuentra debajo, por favor indique el área más cercana al inicio y fin del viaje.

	Etiqueta de fila	Etiqueta de columna
Inicio		
Fin		



HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

* 12. ¿En qué fecha y hora del día realizó el viaje?
Sí no recuerda el día u hora exacta, por favor elija la que más se acerque.

Fecha / Hora

Date	Time		AM/PM
MM/DD/YYYY	hh	mm	-

* 13. ¿Con qué frecuencia haces este mismo viaje? (en UNA dirección)

- ◯ 6 veces por semana
- ◯ 4 veces por semana
- ◯ 2-3 veces por semana
- ◯ 1 vez por semana
- ◯ 2-3 veces al mes
- ◯ Una vez al mes
- ◯ Cada 6 meses
- ◯ Sólo en esta ocasión

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

Preferencia Declarada

"La Autoridad de Movilidad Regional del Condado de Hidalgo (HCRMA) está trabajando para mejorar los viajes al sur del Condado de Hidalgo y actualmente está evaluando el proyecto 365 TOLL (resaltado en rojo en el mapa a continuación). El proyecto inicialmente se construirá con 2 carriles principales en cada uno dirección, con una expansión a 3 carriles para el 2030".

Para financiar la nueva carretera, se cobrará peaje. NO necesitaría detenerse para pagar su peaje y podría continuar conduciendo a la velocidad de la autopista y pagar el peaje de dos maneras diferentes.

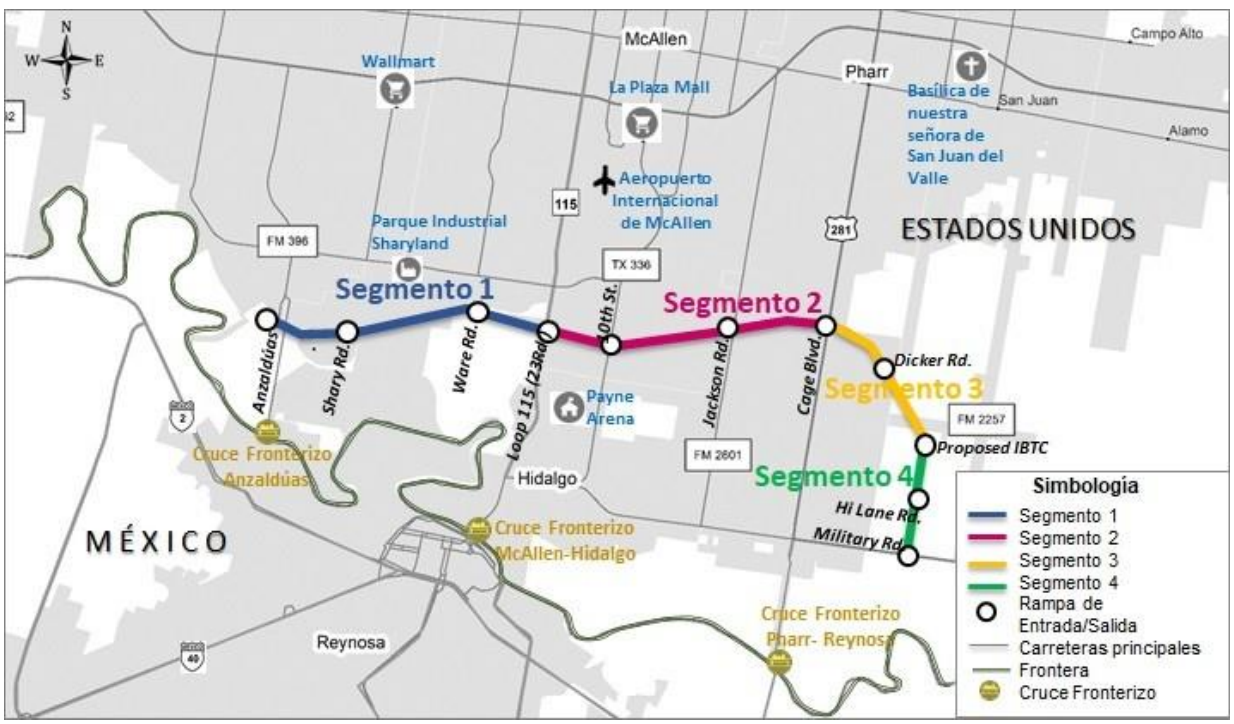
* Prepago: Pagando el peaje antes de usarlo estableciendo una cuenta prepago. Los peajes se deducirán de su cuenta cada vez que use la carretera leyendo un transponder (calcomanía o pequeño dispositivo electrónico montado en el interior de su parabrisas), o leyendo sus placas de matrícula

* Pago posterior: las placas de su vehículo se leerían con una cámara y se enviaría una factura al propietario registrado. Se podrían aplicar tarifas de procesamiento adicionales a una cuenta de pos pago.

*14. ¿Cree que el proyecto 365 TOLL te sería útil para realizar el viaje típico que acaba de describir?

◯ Sí ◯ Posiblemente ◯ No

Por favor, observa el siguiente mapa. Los círculos indican las rampas de entrada o salida del proyecto 365 TOLL. Las líneas coloreadas indican los segmentos.



* 15. Indique los segmentos del 365 TOLL que es más probable que use:

- Sólo segmento 1
- Segmentos 1+2
- Sólo segmento 2
- Segmentos 2+3
- Sólo segmento 3
- Segmentos 2+3+4
- Sólo segmento 4
- Segmentos 3+4
- Todos los segmentos
- Ninguno de los anteriores
- Segmentos 1+2+3

* 16. ¿Aproximadamente cuánto tiempo le tomó, puerta a puerta, conducir desde el comienzo de su viaje hasta el lugar donde terminó? (Incluya solo el tiempo que pasó viajando, no el tiempo que pasó en las paradas que haya hecho en el camino por ejemplo, para obtener gasolina o café).

- Menos de 10 minutos
- 40 - 60 minutos
- 11 - 20 minutos
- 1 - 2 horas
- 21 - 30 minutos
- 2 - 4 horas
- 31 - 40 minutos
- Más de 4 horas y 1 minutos

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

Preferencia Declarada - Experimento 1A

Se presentarán SEIS opciones donde el 365 TOLL propuesto podría ahorrarle tiempo de viaje a cambio de pagar un peaje. En términos de su viaje regular, evalúe si usaría el PROYECTO 365 TOLL, o si continúa usando su RUTA ACTUAL o NO TIENE PREFERENCIA. Recuerde que no hay respuestas correctas o incorrectas; solo nos interesa tu opinión.

* 17. ¿Qué ruta usaría si el 365 Toll propuesto ofreciera un ahorro de tiempo de8 minutos con un peaje de $ 2.00 dólares?

◯ Ruta 365 TOLL ◯ Ruta actual ◯ No tengo preferencia

* 18. ¿Qué ruta usaría si el peaje 365 propuesto ofreciera un ahorro de tiempo de20 minutos con un peaje de $ 1.75 dólares?

◯ Ruta 365 TOLL ◯ Ruta actual ◯ No tengo preferencia

* 19. ¿Qué ruta usaría si el peaje 365 propuesto ofreciera un ahorro de tiempo de5 minutos con un peaje de $ 2.75 dólares?

◯ Ruta 365 toll ◯ Ruta actual ◯ No tengo preferencia

* 20. ¿Qué ruta usaría si el 365 Toll propuesto ofreciera un ahorro de tiempo de12 minutos con un peaje de $ 1.50 dólares?

◯ Ruta 365 toll ◯ Ruta actual ◯ No tengo preferencia

* 21. ¿Qué ruta usaría si el peaje 365 propuesto ofreciera un ahorro de tiempo de8 minutos con un peaje de $ 2.50 dólares?

◯ Ruta 365 toll ◯ Ruta actual ◯ No tengo preferencia

* 22. ¿Qué ruta usaría si el 365 Toll propuesto ofreciera un ahorro de tiempo de15 minutos con un peaje de $ 1.00 dólares?

◯ Ruta 365 toll ◯ Ruta actual ◯ No tengo preferencia

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

Preferencia Declarada - Experimento 2A

Aquí hay SEIS opciones donde el365 TOLL propuesto podría ahorrarle tiempo de viaje a cambio de pagar un peaje. En términos de su viaje regular, evalúe si usaría el PROYECTO 365 TOLL, o si continúa usando su RUTA ACTUAL o NO TIENE PREFERENCIA. Recuerde que no hay respuestas correctas o incorrectas; solo nos interesa tu opinión.

* 23. ¿Qué ruta usaría si el peaje 365 propuesto ofreciera un ahorro de tiempo de20 minutos con un peaje de $ 2.50 dólares?

- ◯ Ruta 365 toll
- ◯ Ruta actual
- ◯ No tengo preferencia

* 24. ¿Qué ruta usaría si el 365 Toll propuesto ofreciera un ahorro de tiempo de8 minutos con un peaje de $ 3.00 dólares?

- ◯ Ruta 365 toll
- ◯ Ruta actual
- ◯ No tengo preferencia

* 25. ¿Qué ruta usaría si el peaje 365 propuesto ofreciera un ahorro de tiempo de30 minutos con un peaje de $ 2.00 dólares?

- ◯ Ruta 365 toll
- ◯ Ruta actual
- ◯ No tengo preferencia

* 26. ¿Qué ruta usaría si el 365 Toll propuesto le ofreciera un ahorro de tiempo de10 minutos con un peaje de $ 5.00 dólares?

- ◯ Ruta 365 toll
- ◯ Ruta actual
- ◯ No tengo preferencia

* 27. ¿Qué ruta usaría si el peaje 365 propuesto ofreciera un ahorro de tiempo de20 minutos con un peaje de $ 3.00 dólares?

- ◯ Ruta 365 toll
- ◯ Ruta actual
- ◯ No tengo preferencia

* 28. ¿Qué ruta usaría si el peaje 365 propuesto ofreciera un ahorro de tiempo de15 minutos con un peaje de $ 7.00 dólares?

- ◯ Ruta 365 toll
- ◯ Ruta actual
- ◯ No tengo preferencia

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 Tollway

Sondeo de Preferencia Declarada

* 29. Explique el razonamiento detrás de sus respuestas a los escenarios anteriores. (Seleccione todas las que correspondan)

- [ ] No quiero pagar peaje en general.
- [ ] El costo del peaje es demasiado caro.
- [ ] El ahorro de tiempo no es suficiente para pagar un peaje.
- [ ] Los escenarios no eran realistas.
- [ ] Otro (especifique)
- [ ] No puedo cambiar mi ruta.
- [ ] El costo del peaje parece accesible.
- [ ] Creo que la nueva carretera de peaje será una ruta más segura.
- [ ] Creo que la nueva autopista me ahorrará tiempo

* 30. ¿Cuál es la cantidad máxima que estaría dispuesto a pagar por usar la carretera 365 TOLL? Deslice el botón para indicar

$0 dólares | $50 dólares | $100 dólares

* 31. ¿Cuánto tiempo debería ahorrarle esta autopista para justificar su uso? Deslice el botón para indicar los minutos

2 minutos | 20 minutos | 40 minutos

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

Confiabilidad

* 32. ¿Experimentó algún retraso debido al tráfico, accidentes o situaciones fuera de su control durante este viaje?
(No tenga en cuenta el tiempo de cruce de la frontera)

☐ Sí ☐ No

* 33. ¿Cuántos minutos de retraso experimentaste durante ese viaje?
(No tenga en cuenta el tiempo de cruce de la frontera) Deslice el botón para indicar los minutos

0 minutos | 60 minutos | 120 ó más minutos

* 34. Si ha realizado este mismo viaje varias veces, ya sea en diferentes días o en diferentes meses, ¿cuál ha sido el máximo retraso que ha experimentado en ese viaje por motivos ajenos a su voluntad?
(No tenga en cuenta el tiempo de cruce en la frontera) Deslice el botón para indicar los minutos

0 minutos | 60 minutos | 120 minutos o más

* 35. ¿Con qué frecuencia experimenta retrasos en este mismo viaje, en otras ocasiones?

- 6 o más veces por semana
- 4 veces por semana
- 2-3 veces por semana
- Una vez por semana
- 2-3 veces por mes
- Una vez por mes
- Una vez cada 6 meses
- Sólo en esta ocasión
- Nunca he sufrido demoras

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

Instrucciones - Confiabilidad

El siguiente conjunto de preguntas nos ayudará a comprender lo importante que son para usted los tiempos de viaje predecibles. Para las siguientes cinco preguntas, se le pedirá que elija entre dos opciones diferentes para realizar el viaje que acaba de describir.

* Para cada pregunta, observe detenidamente las opciones y díganos cuál prefiere.
* Para cada pregunta, enfóquese solo en las dos opciones de viaje que se muestran. No considere las elecciones que hizo en preguntas anteriores.
* Recuerde que no hay una respuesta correcta o incorrecta, solo queremos su opinión.

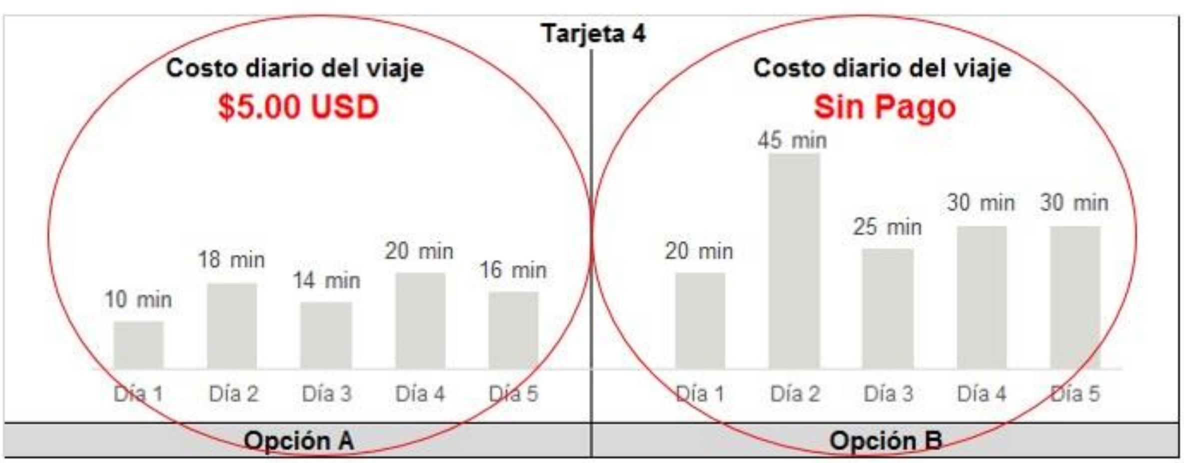
Instrucciones

Por favor lea las instrucciones cuidadosamente.

Imagine que usted realiza este mismo viaje que mencionó en la encuesta empezando y terminando en los mismos sitios, pero en 5 ocasiones distintas, empezando a la misma hora y el mismo día de la semana. Sin embargo, por razones que no pueden anticiparse (como ejemplo, el tráfico), estos viajes tienen diferentes cantidades de tiempo.

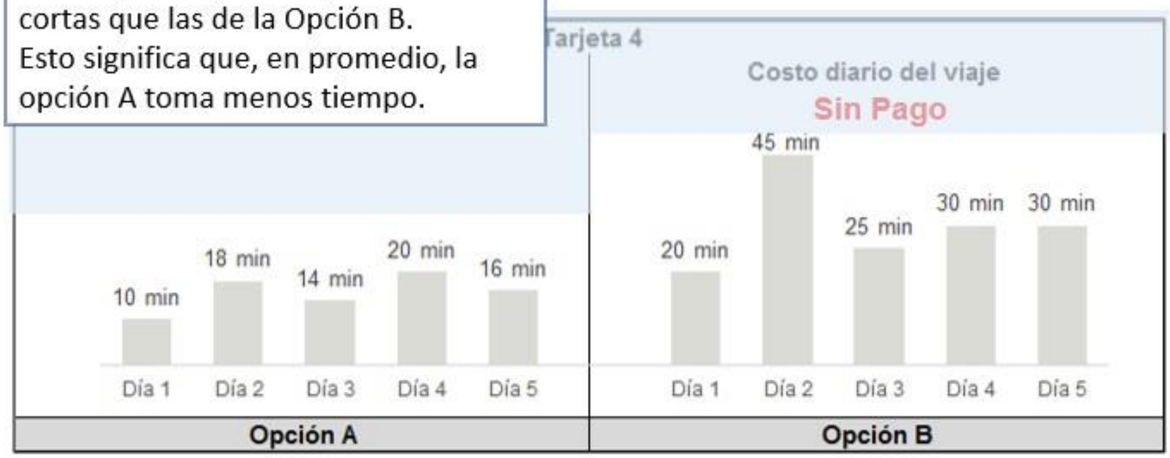
En la imagen se muestran **dos gráficas,** cada una de ellas representa los posibles tiempos de viaje para esas 5 ocasiones.

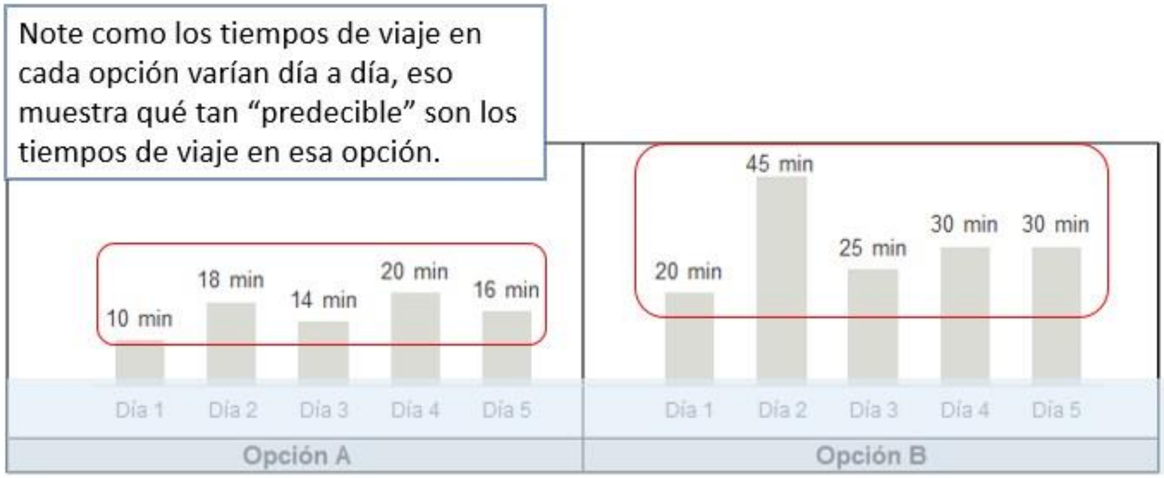
La información en **ROJO** variará de pantalla en pantalla.



Cada barra representa el tiempo que realizará en **CADA UNO** de los futuros 5 viajes usando esta opción.

Note que en este ejemplo, las barras en la Opción A, son en promedio más cortas que las de la Opción B.
Esto significa que, en promedio, la opción A toma menos tiempo.





* 36. Solo para recordar. ¿Cuánto duró su viaje de puerta en puerta?

- Menos de 30 minutos
- 31 minutos o más

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

Confiabilidad – Experimento RAu1A

En la imagen se muestran **dos gráficas,** cada una de ellas representa los posibles tiempos de viaje para esas 5 ocasiones.

La información en **ROJO** variará de pantalla en pantalla.

* 37. Tarjeta 1 de 5

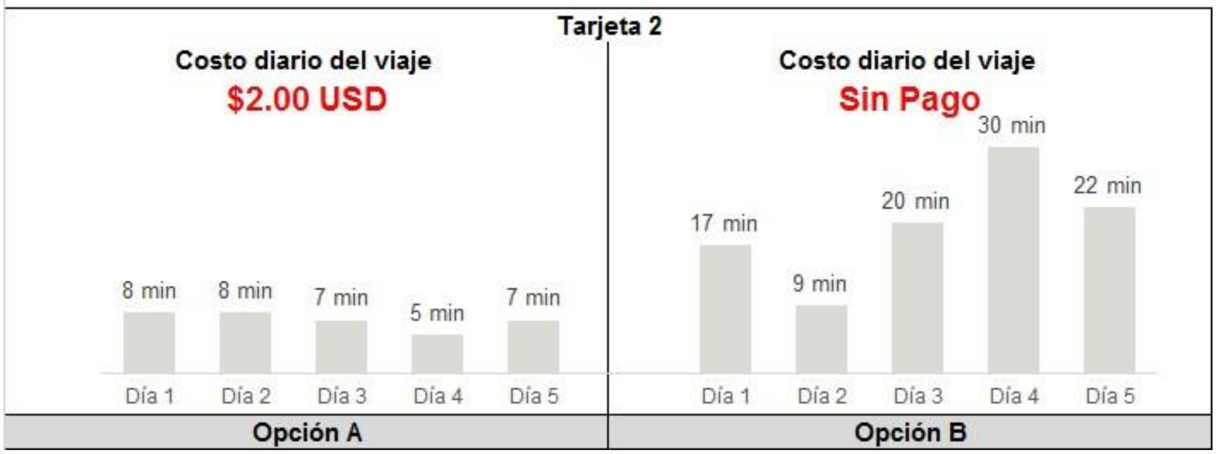
¿Qué opción prefiere?

☐ Opción A ☐ Opción B

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

En la imagen se muestran **dos gráficas,** cada una de ellas representa los posibles tiempos de viaje para esas 5 ocasiones.

La información en **ROJO** variará de pantalla en pantalla.



* 38. Tarjeta 2 de 5
Qué opción prefiere?

◯ Opción A ◯ Opción B

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

En la imagen se muestran **dos gráficas,** cada una de ellas representa los posibles tiempos de viaje para esas 5 ocasiones.

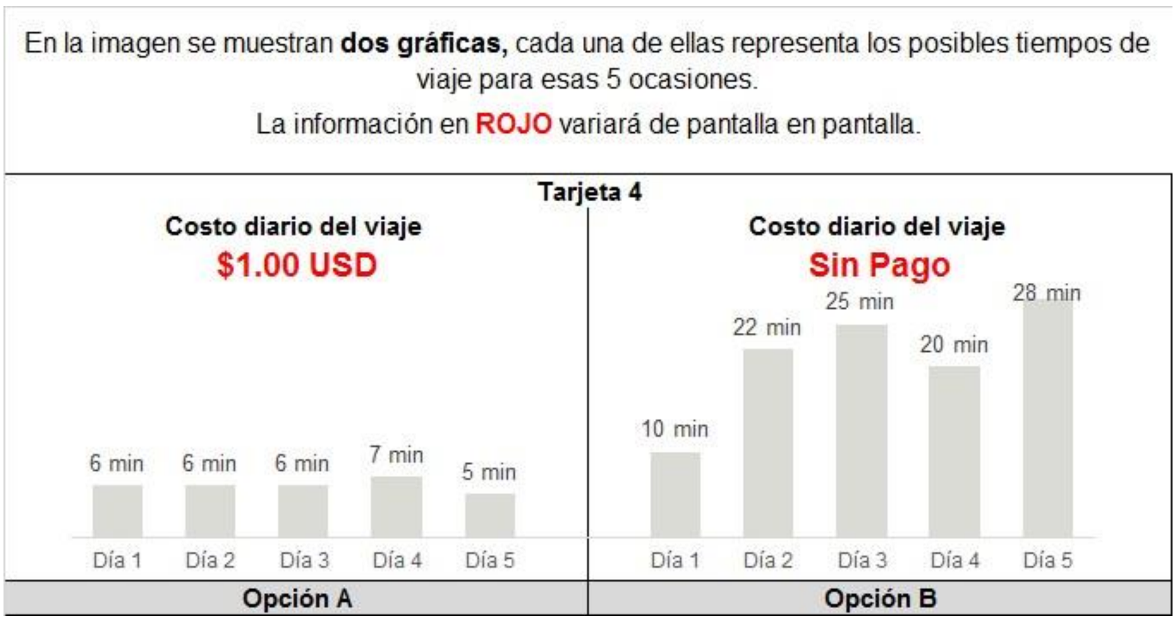
La información en **ROJO** variará de pantalla en pantalla.

* 39. Tarjeta 3 de 5

¿Qué opción prefieres?

◯ Opción A ◯ Opción B

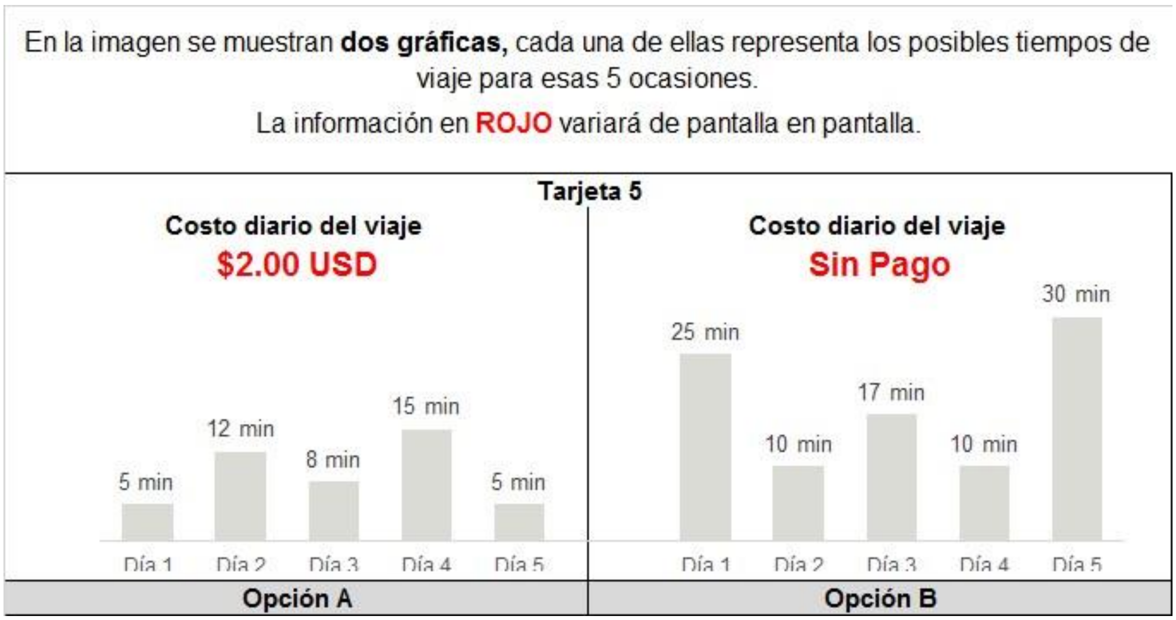
Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL



* 40. Tarjeta 4 de 5
¿Qué opción prefieres?

○ Opción A ○ Opción B

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

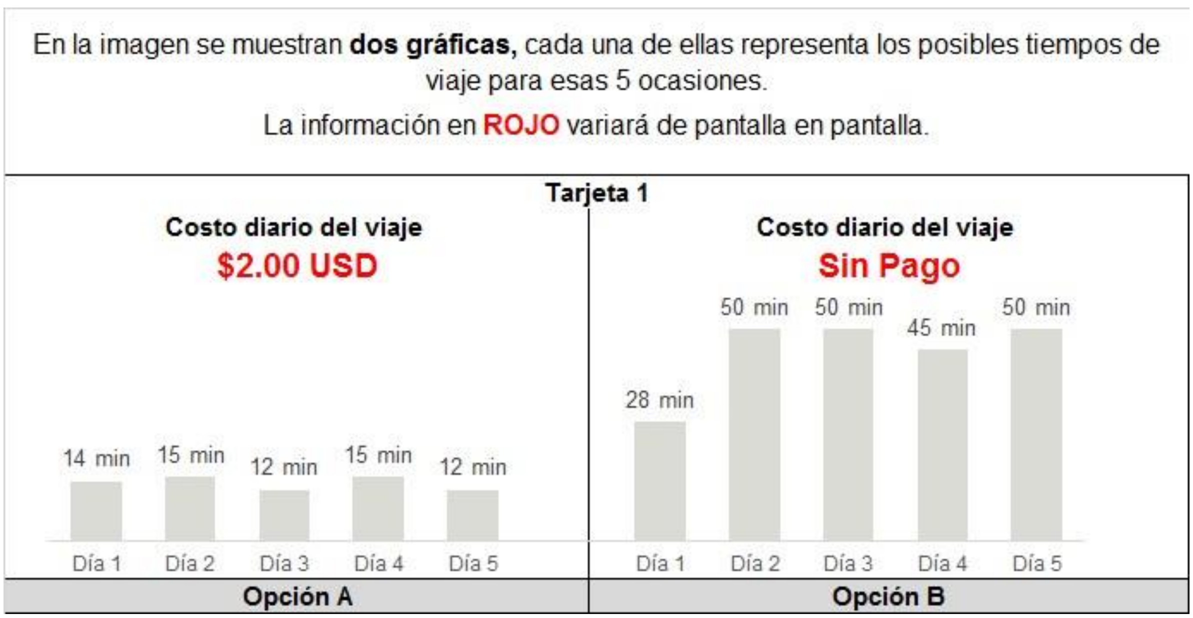


* 41. Tarjeta 5 de 5
¿Qué opción prefieres?

○ Opción A ○ Opción B

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

Confiabilidad – Experimento RAu2A



* 42. Tarjeta 1 de 5

¿Qué opción prefiere?

◯ Opción A ◯ Opción B

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

En la imagen se muestran **dos gráficas,** cada una de ellas representa los posibles tiempos de viaje para esas 5 ocasiones.

La información en **ROJO** variará de pantalla en pantalla.

* 43. Tarjeta 2 de 5
¿Qué opción prefiere?

◯ Opción A ◯ Opción B

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

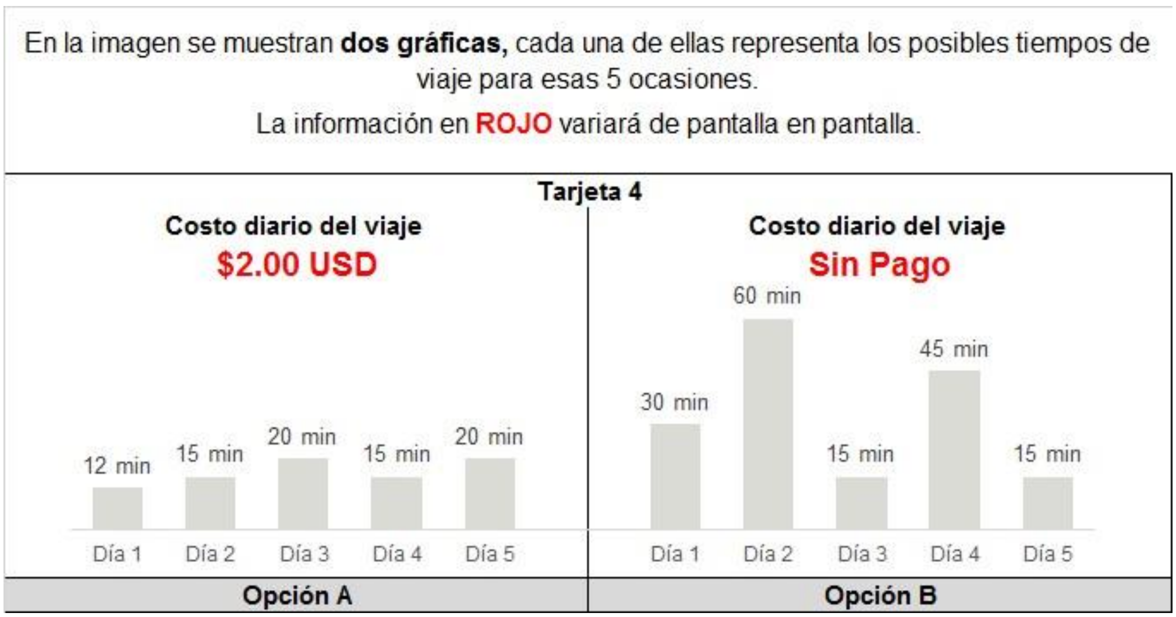
En la imagen se muestran **dos gráficas,** cada una de ellas representa los posibles tiempos de viaje para esas 5 ocasiones.

La información en **ROJO** variará de pantalla en pantalla.

* 44. Tarjeta 3 de 5
¿Qué opción prefiere?

◯ Opción A ◯ Opción B

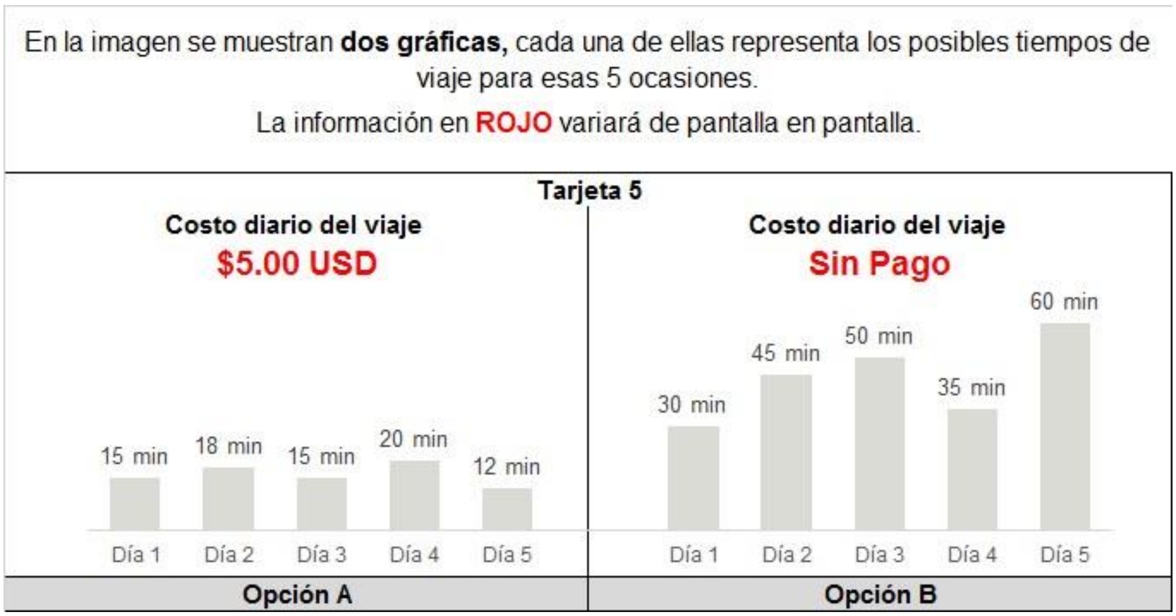
Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL



* 45. Tarjeta 4 de 5
¿Qué opción prefiere?

◯ Opción A ◯ Opción B

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL



* 46. Tarjeta 5 de 5
¿Qué opción prefiere?

◯ Opción A ◯ Opción B

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

COVID-19 – Preguntas

"Somos conscientes del impacto que la reciente pandemia de COVID-19 ha tenido en las condiciones de vida y de trabajo. Para las siguientes preguntas, le pedimos que considere su situación ANTES DE COVID-19, DURANTE LOS PERIODOS DE CUARENTENA, y en el FUTURO cuando todas las restricciones de viaje y las órdenes de quedarse en casa se han levantado".

Seleccione todas las opciones que se apliquen en cada situación.

* 47. ¿Cuál fue / será el estado de su empleo?

Seleccione todas las opciones que se apliquen a cada situación.

	ANTES de Covid-19	DURANTE la cuarentena	SIN restricciones
Trabajador tiempo completo	☐	☐	☐
Trabajador tiempo parcial	☐	☐	☐
Auto-empleado	☐	☐	☐
Estudiante	☐	☐	☐
Estudiante y trabajador	☐	☐	☐
Ama de casa	☐	☐	☐
Retirado	☐	☐	☐
Dsempleado buscando empleo	☐	☐	☐
Permiso con sueldo	☐	☐	☐
Permiso sin sueldo	☐	☐	☐
Dejé mi empleo por decisión o necesidad	☐	☐	☐
Despedido	☐	☐	☐

Otro (especifique)

* 48. ¿Con qué frecuencia trabajaba desde casa?

	ANTES Covid-19	DURANTE cuarentena	SIN restricciones
6 a 7 días por semana	☐	☐	☐
5 días por semana	☐	☐	☐
4 días por semana	☐	☐	☐
2 - 3 días por semana	☐	☐	☐
1 día por semana	☐	☐	☐
1 - 3 al mes	☐	☐	☐
Menos de una vez al mes	☐	☐	☐
Una vez debido a una situación inusual (emergencia familiar, etc.)	☐	☐	☐
Nunca	☐	☐	☐

* 49. ¿Con qué frecuencia compartió el automóvil con una o más personas o utilizó los servicios de taxi (Uber, Lyft, etc.)?

	ANTES Covid-19	DURANTE cuarentena	SIN restricciones
6 a 7 días por semana	☐	☐	☐
5 días por semana	☐	☐	☐
4 días por semana	☐	☐	☐
2 - 3 días por semana	☐	☐	☐
1 día por semana	☐	☐	☐
1 - 3 días por mes	☐	☐	☐
Menos de una vez por mes	☐	☐	☐
Una vez debido a una situación inusual (emergencia familiar, etc.)	☐	☐	☐
Nunca	☐	☐	☐

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 TOLL

Preguntas de Opinión

* 50. ¿Podría darnos su opinión sobre cuánto está de acuerdo o en desacuerdo con las siguientes declaraciones relacionadas con el uso de autopistas de cuota?

	Muy en desacuerdo	En desacuerdo	Neutral	De acuerdo	Muy de acuerdo
En la empresa o el cliente requiere el uso de autopistas de peaje.					
Utilizo una carretera de peaje porque las condiciones de la carretera son buenas.					
Utilizo carreteras de peaje cuando comparto el costo del peaje con otros.					
Utilizo una autopista de peaje por el ahorro de tiempo que me ofrece en comparación con otras rutas.					

	Muy en desacuerdo	En desacuerdo	Neutral	De acuerdo	Muy de acuerdo
Solo uso carreteras de peaje en caso de emergencia o cuando llegar a tiempo es crucial.					
Al usar carreteras de peaje, estoy bastante seguro de que llegaré a mi destino a tiempo.					
Utilizo una carretera de peaje si los peajes son razonables.					

Encuesta de transporte en el condado de Hidalgo- Proyecto: 365 Tollway

Características del usuario

* 51. ¿Cuál es su género?

- Mujer
- Hombre
- Otro
- Prefiero no contestar

* 52. ¿Cuál es su edad?

- Menos de 18
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75 o más

* 53. ¿Cuántas personas viven en su casa?

- 1 (vivo solo)
- 2 personas
- 3 personas
- 4 personas
- 5 o más

* 54. Incluyéndose usted mismo, ¿cuántas personas había en el vehículo durante su viaje?

- 1 (Viajé solo)
- 2 personas
- 3 personas
- 4 personas
- 5 o más

* 55. El vehículo que condujo en este viaje es:

- De mi propiedad
- De un familiar o amigo
- De la empresa
- Rentado

* 56. ¿Alguien le ayuda con el pago de peajes, gasolina o estacionamiento?

- No, yo pago
- La empresa paga
- Un miembro de la familia o un amigo

57. ¿Qué categoría indica mejor los ingresos anuales de su hogar antes de impuestos?
Nota: Esta información solo se utiliza para garantizar que hemos reunido una muestra representativa de la población. (Montos en dólares)

- Menos de $15,000
- De $75,000 a $99,999
- De $15,000 a $24,999
- De $100,000 a $149,999
- De $25,000 a $34,999
- De $150,000 a $199,999
- De $35,000 a $49,999
- Más de $200,000
- De $50,000 a $74,999
- Prefiero no responder

*58. Para tener la oportunidad de ganar un premio, ingrese su información de contacto a continuación. Su información personal permanecerá anónima y confidencial.

Nombre	
Dirección	
Dirección 2	
Ciudad	
Estado/Provincia	
Código Postal:	
Número telefónico:	
Email:	

59. Muchas gracias por su apoyo al responder nuestra encuesta. Si tiene algún comentario, escríbalo a continuación.

Travel surveys for Hidalgo County. Project: 365 TOLL

Questionnaire for Private Vehicles – External Users

English survey

Dec 2020

Survey for Mexican citizens visiting Hidalgo County in Texas, U.S.A.

Introduction

"The Hidalgo County Regional Mobility Authority (HCRMA) has proposed the 365 TOLL highway to provide its customers with a rapid and reliable alternative for the safe and efficient movement of people, goods, and services. The proposed alignment of 365 TOLL is a 14.9-mile tolled highway in Hidalgo County extending from US 281/Military Highway in the city of Pharr to FM 1016/Conway Avenue in the city of Mission. The facility is intended to relieve traffic congestion, facilitate international trade shipments across the U.S./Mexican border, and benefit local travelers by providing a high-speed connection between the Pharr-Reynosa International Bridge, the Anzalduas International Bridge, the McAllen Foreign Trade Zone (MCFTZ), and industrial areas and warehouses in McAllen, Mission, and Pharr.

On behalf of the HCRMA, C&M Associates, Inc. is conducting a travel survey for Hidalgo County to determine the travel patterns and preferences of frequent travelers to support the 365 Toll Highway. Your responses will be only be used for the purpose of this study. The survey will take less than 10 minutes of your time. All your personal information are confidential. Thank you in advance for your participation. "

To fill out this survey, you have to be older than 18 years and be residence of the cities of Reynosa and Monterrey who have recently made a trip through the south of Hidalgo County. This exercise is intended to help HCRMA better understand visitors travel preferences and improve Hidalgo County mobility plans.

"Respondents participating in this survey may be invited to participate in a separate Stated Preference (SP) survey."

* 1. In the last year, have you made at least one trip (as a driver) that crossed the Mexico-U.S. border to visit any of the towns in Hidalgo County: McAllen, Pharr, Edinburg, Pharr, etc.?

- Yes - For work
- Yes - For familiar visit
- Yes - For study
- Yes - For personal reasons
- Yes - For shopping
- I have not made any trips to those cities

Survey for Mexican citizens visiting Hidalgo County in Texas, U.S.A.

* 2. Did you use any of these bridges to make your trip?

- Anzaldúas (Mission - Reynosa)
- Donna - Río Bravo
- Hidalgo - Reynosa
- Progreso - Nuevo Progreso
- Pharr – Reynosa
- Other bridge

* 3. When did you cross the border on that trip, what type of lane did you use?

- SENTRI
- Regular/General
- Ready Lane
- I crossed walking

Survey for Mexican citizens visiting Hidalgo County in Texas, U.S.A.
O-D

* 4. Where did your trip begin?

Country	
State	
Municipality /County	
ZIP code	
Point of interest	

* 5. Where did your journey end?

Country	
State	
Municipality/County	
ZIP code	
Point of interest	

Survey for Mexican citizens visiting Hidalgo County in Texas, U.S.A.

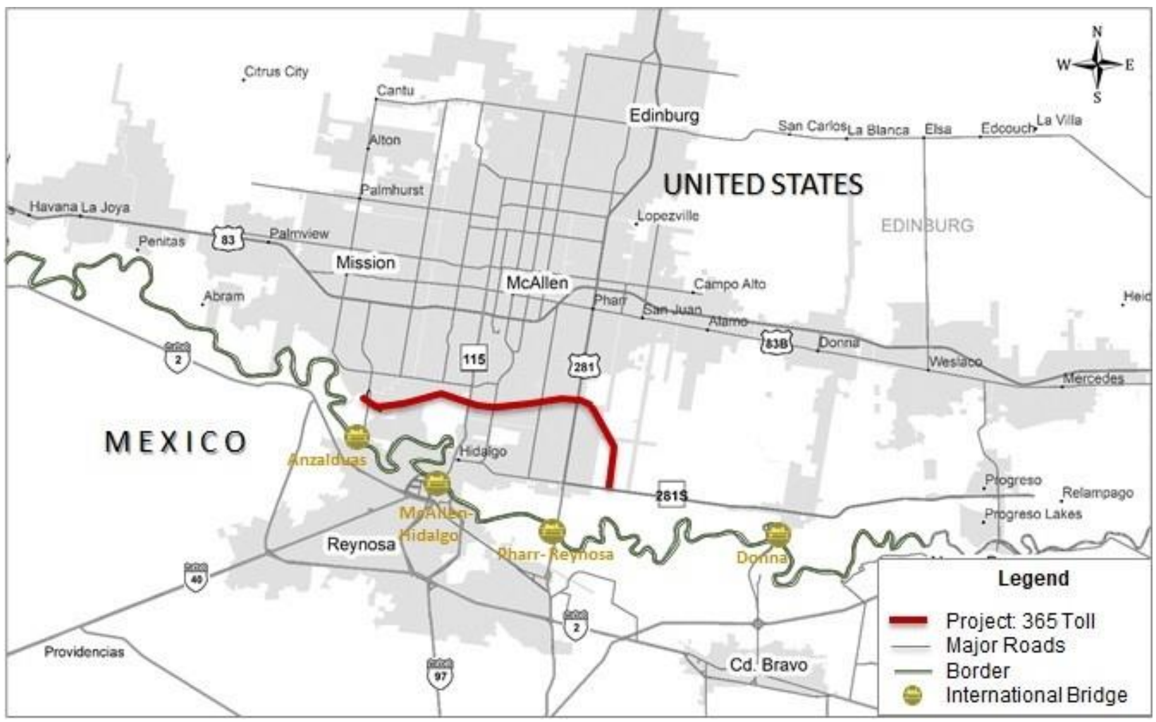
*6. How often do you make this trip?

- Monday to Friday
- At least once a week
- At least once a month
- Once every three months
- At least once every six months
- Once a year
- Just once

Survey for Mexican citizens visiting Hidalgo County in Texas, U.S.A.

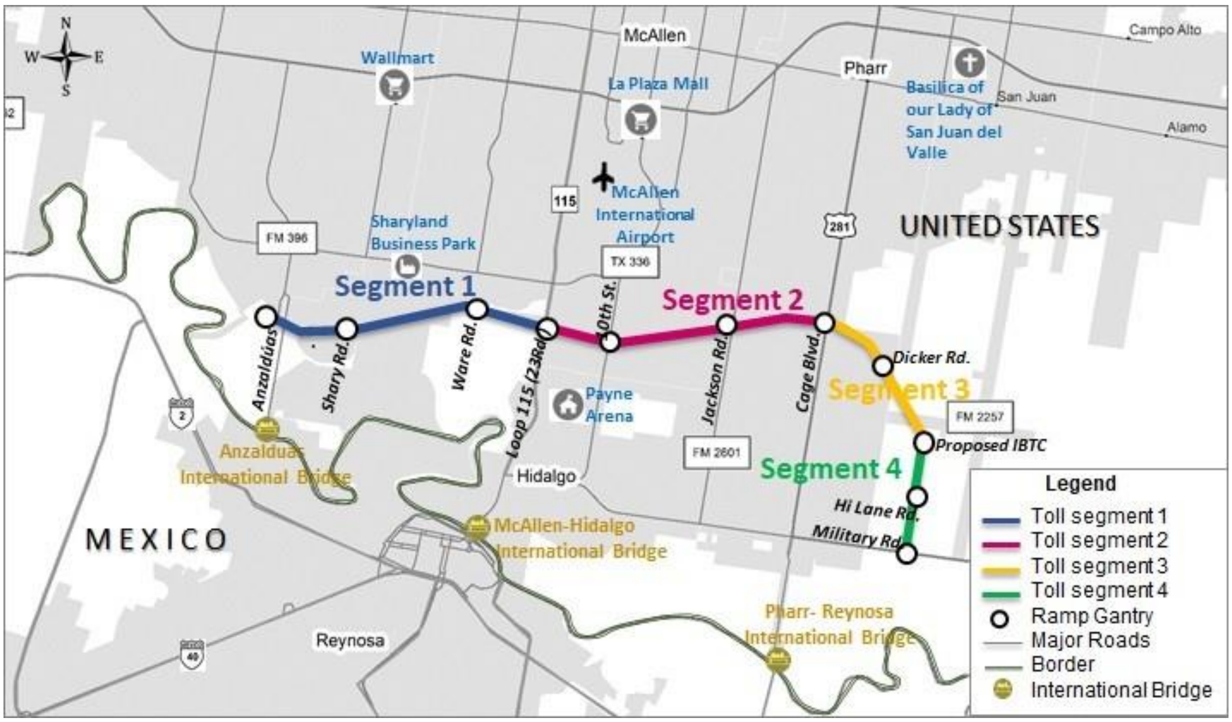
State of Preference

The Hidalgo County Regional Mobility Authority (HCRMA) is working to improve travel in South County. HCRMA is currently evaluating a toll road called 365 Toll (Indicated in red on the map). The project initially considers 2 main lanes in each direction, with an expansion to 3 lanes by 2030.



Survey for Mexican citizens visiting Hidalgo County in Texas, U.S.A.

Please watch the following map, the circles symbolize the entrance or exit ramps of the project. The colored lines indicate the segments.



*7. Please, indicate the interest segments that you could use.

- ☐ All segments
- ☐ Segments 1 + 2 + 3
- ☐ Segments 1 + 2
- ☐ Segments 2 + 3
- ☐ Segments 2 +3 + 4
- ○ Segments 3 + 4
- ☐ Segment 1
- ☐ Segment 2
- ☐ Segment 3
- ☐ Segment 4
- ☐ None of them

*8. On that trip, what was the time it took to get to your destination in the US once you crossed the border with Mexico?

- Less than 10 minutes
- 11 - 20 minutes
- 21 - 30 minutes
- 31 - 40 minutes
- 40 - 60 minutes
- 1 - 2 hours
- 2 - 4 hours
- 4 hours and 1 minute

Survey for Mexican citizens visiting Hidalgo County in Texas, U.S.A.

Experiment 2A

Here are some options where the NEW 365 TOLL HIGHWAY could save you travel time in exchange for an affordable rate. I ask you to evaluate if you would DO use the NEW PROJECT, prefer THE CURRENT ROUTE or HAVE NO PREFERENCE any option. Please pay attention and remember that there are no good or bad answers, we are only interested in your opinion.

* 9. Scenario 1: Which way would you use if the highway offered you a time saving of 20 minutes at a cost of $ 2.50 USD?

◯ 365 toll route ◯ Current route ◯ Have no preference

* 10. Scenario 2: Which way would you use if the highway offered you a time saving of 8 min at a cost of $ 3.00 USD?

◯ 365 toll route ◯ Current route ◯ Have no preference

* 11. Scenario 3: Which way would you use if the highway offered you a time saving of 30 minutes at a cost of $ 2.00 USD?

◯ 365 toll route ◯ Current route ◯ Have no preference

* 12. Scenario 4: Which way would you use if the highway offered you a time saving of 10 minutes at a cost of $ 5.00 USD?

◯ 365 toll route ◯ Current route ◯ Have no preference

* 13. Scenario 5: Which way would you use if the highway offered you a time saving of 20 minutes at a cost of $ 3.00 USD?

☐ 365 toll route ☐ Current route ☐ Have no preference

* 14. Scenario 6: Which way would you use if the highway offered you a time saving of 15 minutes at a cost of $ 7.00?

☐ 365 toll route ☐ Current route ☐ Have no preference

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Survey for Mexican citizens visiting Hidalgo County in Texas, U.S.A.

Experiment 1A

Here are some options where the NEW 365 TOLL HIGHWAY could save you travel time in exchange for an affordable rate. I ask you to evaluate if you would DO use the NEW PROJECT, prefer THE CURRENT ROUTE or HAVE NO PREFERENCE any option. Please pay attention and remember that there are no good or bad answers, we are only interested in your opinion.

* 15. Scenario 1: Which way would you use if the highway offered you a time saving of 8 minutes at a cost of $ 2.00 USD?

◯ 365 Toll route ◯ Current route ◯ Have no preference

* 16. Scenario 2: Which way would you use if the highway offered you a time saving of 20 minutes at a cost of $ 1.75 USD?

◯ 365 Toll route ◯ Current route ◯ Have no preference

* 17. Scenario 3: Which way would you use if the highway offered you a time saving of 5 minutes at a cost of $ 2.75 USD?

◯ 365 Toll route ◯ Current route ◯ Have no preference

* 18. Scenario 4: Which way would you use if the highway offered you a 12 minutes time savings at a cost of $ 1.50 USD?

☐ 365 Toll route ☐ Current route ☐ Have no preference

* 19. Scenario 5: Which way would you use if the highway offered you a time saving of 8 minutes at a cost of $ 2.50 USD?

365 Toll route   Current route   Have no preference

* 20. Scenario 6: Which way would you use if the highway offered you a time saving of 15 minutes at a cost of $ 1.00 USD?

365 Toll route   Current route   Have no preference

Survey for Mexican citizens visiting Hidalgo County in Texas, U.S.A.

* 21. Please explain the reasons behind your responses to the previous scenarios. (Select all that apply)

- [ ] I do not want to pay toll in general
- [ ] I can't change my route
- [ ] The toll cost is too expensive
- [ ] The toll cost seems affordable
- [ ] The time savings are not enough to pay a toll
- [ ] I think the new toll road will be a safer route
- [ ] The scenarios were not realistic
- [ ] I think the new toll road will save me time
- [ ] Other

Survey for Mexican citizens visiting Hidalgo County in Texas, U.S.A.

Reliability

* 22. In your experience, how often have you suffered from delays on this trip or on other occasions?

- 6 + times per week
- 4 times per week
- 2-3 times per week
- 1 time per week
- 2-3 times per month
- 1 time per month
- 1 time per 6 months
- Just this occasion
- Never

Survey for Mexican citizens visiting Hidalgo County in Texas, U.S.A.

Qualitative variables

* 23. Could you give me your opinion regarding the use of toll roads?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agre
The customer / company / requires the use of toll highways.	◯	◯	◯	◯	◯
I use toll roads because they offer me better travel conditions.	◯	◯	◯	◯	◯
I use toll roads when I share the cost with another person.	◯	◯	◯	◯	◯
I use toll roads for the time savings they offer.	◯	◯	◯	◯	◯
I only use toll roads in an emergency or to get to a meeting on time.	◯	◯	◯	◯	◯
When I use toll roads I can expect to reach my destination on time.	◯	◯	◯	◯	◯
I use the highways if the toll is accessible.	◯	◯	◯	◯	◯

Travel surveys for Hidalgo County. Project: 365 TOLL

Questionnaire for Private Vehicles – External Users

Spanish survey

Dec 2020

Encuesta para ciudadanos Mexicanos que visitan el condado de Hidalgo en Texas E.U.A.

Introducción

"La Autoridad de Movilidad Regional del Condado de Hidalgo (HCRMA) ha propuesto la autopista 365 TOLL para proporcionar a sus clientes una alternativa rápida y confiable para el movimiento seguro y eficiente de personas, bienes y servicios. La alineación propuesta de 365 TOLL es una autopista de peaje de 14.9 millas en el Condado de Hidalgo que se extiende desde la US 281 / Military Highway en la población de Pharr hasta FM 1016 / Conway Avenue en la población de Mission. La autopista está destinada a aliviar la congestión del tráfico, facilitar los envíos de comercio internacional a través de la frontera entre Estados Unidos y México y beneficiar a los viajeros locales al proporcionar una conexión de alta velocidad entre el Puente Internacional Pharr-Reynosa, el Puente Internacional Anzalduas, la Zona de Comercio Exterior de McAllen (MCFTZ), y áreas industriales y almacenes en McAllen, Mission y Pharr.

En nombre de la HCRMA, C&M Associates, Inc. está realizando una encuesta de viajes para el condado de Hidalgo para determinar los patrones de viaje y las preferencias de los viajeros frecuentes para apoyar la autopista de peaje 365. Sus respuestas solo se utilizarán para el propósito de este estudio. La encuesta tomará menos de 10 minutos de su tiempo. Toda su información personal es confidencial. Gracias de antemano por tu participación. "

Esta encuesta está dirigida a residentes (mayores de 18 años) de las ciudades de Reynosa y Monterrey que han viajado al menos una vez en el último año a las ciudades de McAllen, Pharr, Edinburg o Mission en los Estados Unidos. Este ejercicio tiene como objetivo ayudar a HCRMA a comprender mejor las preferencias de viaje de sus visitantes y mejorar los planes de movilidad del Condado de Hidalgo.

"Los encuestados que participan en esta encuesta pueden ser invitados a participar en una encuesta de Preferencias declaradas (SP) por separado".

* 1. En el último año usted, ¿ha realizado al menos un viaje en automóvil (como conductor) y que cruzara la frontera con E.U.A. para visitar alguna de las poblaciones del condado de Hidalgo; como McAllen, Pharr, Edinburg, Pharr, etc.?

- Sí - por trabajo
- Sí - por estudio
- Sí - por compras
- Sí - por visita familiar
- Sí - por motivos personales
- No he realizado ningún viaje a esas ciudades

Encuesta para ciudadanos Mexicanos que visitan el condado de Hidalgo en Texas E.U.A.

* 2. ¿Qué puente utilizó para su más reciente viaje de México a E.U.A?

- Anzaldúas (Mission - Reynosa)
- Donna - Río Bravo
- Hidalgo - Reynosa
- Progreso - Nuevo Progreso
- Pharr – Reynosa
- Otro puente internacional

* 3. ¿Cuándo cruzó la frontera en ese viaje, que tipo de carril utilizó?

- SENTRI
- Regular/General
- Ready Lane
- Crucé caminando

Encuesta para ciudadanos Mexicanos que visitan el condado de Hidalgo en Texas E.U.A.
O-D

* 4. ¿Dónde inició su viaje?

¿En qué país?	
¿En qué estado?	
¿En qué municipio?	
Proporcione el Código Postal:	
Alguna colonia o referencia:	

* 5. ¿Dónde terminó su viaje?

¿En qué país?	
¿En qué estado?	
¿En qué municipio?	
Proporcione el Código Postal:	
Alguna colonia o referencia:	

Encuesta para ciudadanos Mexicanos que visitan el condado de Hidalgo en Texas E.U.A.

* 6. ¿Con qué frecuencia realiza este mismo viaje?

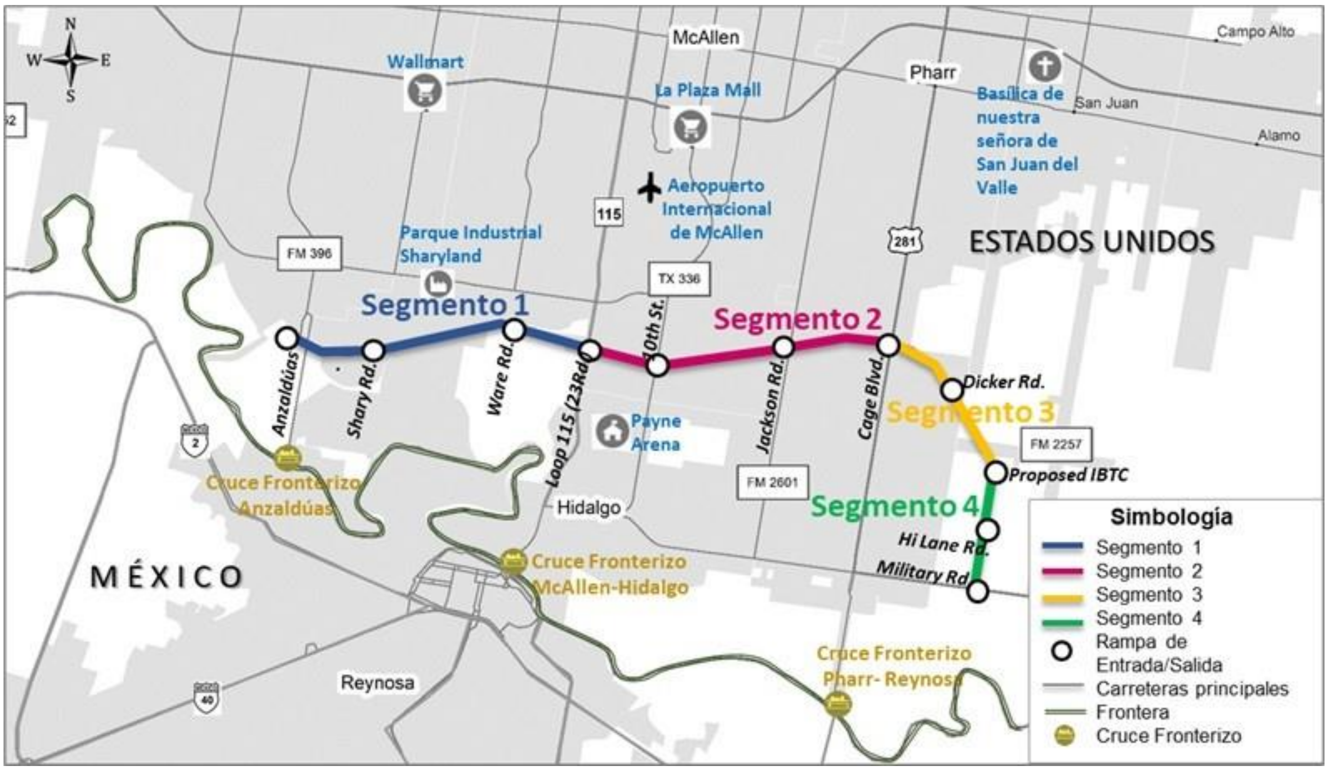
- Varias veces a la semana
- Por lo menos una vez a la semana
- Por lo menos una vez al mes
- Por lo menos una vez cada tres meses
- Por lo menos una vez cada seis meses
- Por lo menos una vez al año
- Solo en esa ocasión

Encuesta para ciudadanos Mexicanos que visitan el condado de Hidalgo en Texas E.U.A.
Preferencia declarada

La Autoridad de Movilidad Regional del Condado de Hidalgo (HCRMA) está trabajando para mejorar los viajes en el sur del Condado. La HCRMA está evaluando actualmente una autopista de cuota llamada 365 Toll (Indicada en color rojo en el mapa). El proyecto considera inicialmente 2 carriles principales en cada dirección, con una expansión a 3 carriles para 2030.

Encuesta para ciudadanos Mexicanos que visitan el condado de Hidalgo en Texas E.U.A.

Observe por favor el siguiente mapa, los círculos simbolizan las rampas de entrada o salida del proyecto. Las líneas de color indican los segmentos



* 7. Por favor, indique los segmentos de interés que usted podría utilizar.

- Todos los segmentos
- Segmentos 1 + 2 + 3
- Segmentos 1 + 2
- Segmentos 2 + 3
- Segmentos 2 +3 + 4
- Segmentos 3 + 4
- Segmento 1
- Segmento 2
- Segmento 3
- Segmento 4
- Ninguno de ellos

* 8. En ese viaje, ¿Cuál fue el tiempo que realizó para llegar a su destino en E.U.A una vez que cruzó la frontera con México?

- Menos de 10 minutos
- 11 - 20 minutos
- 21 - 30 minutos
- 31 - 40 minutos
- 40 - 60 minutos
- 1 - 2 horas
- 2 - 4 horas
- 4 horas y 1 minutos

Encuesta para ciudadanos Mexicanos que visitan el condado de Hidalgo en Texas E.U.A.

Experimento 2A

A continuación le voy a dar algunas opciones donde la NUEVA AUTOPISTA 365 TOLL podría ahorrarle tiempo de viaje a cambio de pagar una tarifa accesible. Le pido que evalúe si usted SÍ utilizaría el NUEVO PROYECTO, prefiere LA RUTA ACTUAL o LE DA IGUAL cualquier opción. Por favor, ponga atención y recuerde que no hay respuestas buenas ni malas, solo nos interesa su opinión.

* 9. Escenario 1: ¿Qué vía utilizaría si la autopista le ofreciera un ahorro en tiempo de 20 min con un costo de $2.50 dólares?

○ Proyecto ○ Actual ○ Igual

* 10. Escenario 2: ¿Qué vía utilizaría si la autopista le ofreciera un ahorro en tiempo de 8 min con un costo de $3.00 dólares?

○ Proyecto ○ Actual ○ Igual

* 11. Escenario 3: ¿Qué vía utilizaría si la autopista le ofreciera un ahorro en tiempo de 30 min con un costo de $2.00 dólares?

○ Proyecto ○ Actual ○ Igual

* 12. Escenario 4: ¿Qué vía utilizaría si la autopista le ofreciera un ahorro en tiempo de 10 min con un costo de $5.00 dólares?

○ Proyecto ○ Actual ○ Igual

*13. Escenario 5: ¿Qué vía utilizaría si la autopista le ofreciera un ahorro en tiempo de 20 min con un costo de $3.00 dólares?

○ Proyecto ○ Actual ○ Igual

* 14. Escenario 6: ¿Qué vía utilizaría si la autopista le ofreciera un ahorro en tiempo de 15 min con un costo de $7.00 dólares?

○ Proyecto ○ Actual ○ Igual

Encuesta para ciudadanos Mexicanos que visitan el condado de Hidalgo en Texas E.U.A.

Experimento 1A

A continuación le voy a dar algunas opciones donde laNUEVA AUTOPISTA 365 TOLL podría ahorrarle tiempo de viaje a cambio de pagar una tarifa accesible. Le pido que evalúe si usted SÍ utilizaría el NUEVO PROYECTO, prefiere LA RUTA ACTUAL o LE DA IGUAL cualquier opción. Por favor, ponga atención y recuerde que no hay respuestas buenas ni malas, solo nos interesa su opinión.

* 15. Escenario 1: ¿Qué vía utilizaría si la autopista le ofreciera un ahorro en tiempo de 8 min con un costo de $2.00 dólares?

◯ Proyecto ◯ Actual ◯ Igual

* 16. Escenario 2: ¿Qué vía utilizaría si la autopista le ofreciera un ahorro en tiempo de 20 min con un costo de $1.75 dólares?

◯ Proyecto ◯ Actual ◯ Igual

* 17. Escenario 3: ¿Qué vía utilizaría si la autopista le ofreciera un ahorro en tiempo de 5 min con un costo de $2.75 dólares?

◯ Proyecto ◯ Actual ◯ Igual

* 18. Escenario 4: ¿Qué vía utilizaría si la autopista le ofreciera un ahorro en tiempo de 12 min con un costo de $1.50 dólares?

☐ Proyecto ☐ Actual ☐ Igual

19. Escenario 5: ¿Qué vía utilizaría si la autopista le ofreciera unahorro en tiempo de 8 min con un costo de $2.50 dólares?

☐ Proyecto ☐ Actual ☐ Igual

* 20. Escenario 6: ¿Qué vía utilizaría si la autopista le ofreciera unahorro en tiempo de 15 min con un costo de $1.00 dólares?

☐ Proyecto ☐ Actual ☐ Igual

Encuesta para ciudadanos Mexicanos que visitan el condado de Hidalgo en Texas E.U.A.

* 21. ¿Qué opina de las opciones de ahorro de tiempo y tarifa que acaba de contestar? (seleccione todas las que apliquen)

- ☐ No me gusta pagar autopistas de cuota
- ☐ Está muy caro
- ☐ El ahorro de tiempo no es suficiente para pagar una cuota
- ☐ No es real lo que preguntan
- ☐ Otra (especifique)
- ☐ No puedo cambiar mi ruta
- ☐ Las tarifas parecen accesibles
- ☐ Sí la pagaría por seguridad
- ☐ Creo que la autopista si me va a ahorrar tiempo

Encuesta para ciudadanos Mexicanos que visitan el condado de Hidalgo en Texas E.U.A.

Confiabilidad

* 22. Si en otras ocasiones ya sea de horario o día que realiza el viaje que acaba de describir (mismo origen y mismo destino), ¿con qué frecuencia llega a tener retrasos en este tipo de viajes?

- Más de 6 veces por semana
- 4 veces por semana
- 2-3 veces por semana
- 1 vez por semana
- 2-3 veces al mes
- Menos 1 vez al mes
- 1 vez cada seis meses
- Sólo en esta ocasión
- Nunca he tenido retrasos

Encuesta para ciudadanos Mexicanos que visitan el condado de Hidalgo en Texas E.U.A.

Variables cualitativas

* 23. Podría darme su opinión de.. ¿Qué tan de acuerdo o en desacuerdo está respecto a los siguientes enunciados relacionados con el uso de autopistas de cuota?

	Total desacuerdo	En desacuerdo	Ni acuerdo Ni desacuerdo	De acuerdo	Totalmente acuerdo
El cliente o la empresa exigen el uso de las autopistas de cuota.	○	○	○	○	○
Utilizo las autopistas por las buenas condiciones del camino.	○	○	○	○	○
Utilizo las autopistas cuando alguien me ayuda con el pago de la cuota.	○	○	○	○	○
Utilizo las autopistas por el ahorro de tiempo que ofrecen respecto a otras rutas.	○	○	○	○	○

Solo utilizo las autopistas en caso de emergencia o tiempo límite para llegar.	○	○	○	○	○
Al usar las autopistas estoy casi seguro de llegar a tiempo a mi destino.	○	○			
Utilizo las autopistas si el peaje es accesible.	○	○	○	○	○

Travel surveys for Hidalgo County. Project: 365 TOLL

Questionnaire for Commercial Vehicles

English survey

Dec 2020

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

Introduction

"The Hidalgo County Regional Mobility Authority (HCRMA) has proposed the 365 TOLL Highway to provide its customers with a rapid and reliable alternative for the safe and efficient movement of people, goods, and services. The proposed alignment of 365 TOLL is a 14.9-mile tolled highway in Hidalgo County extending from US 281/Military Highway in the city of Pharr to FM 1016/Conway Avenue in the city of Mission. The facility is intended to relieve traffic congestion, facilitate international trade shipments across the U.S./Mexican border, and benefit local travelers by providing a high-speed connection between the Pharr-Reynosa International Bridge, the Anzalduas International Bridge, the McAllen Foreign Trade Zone (MCFTZ), and industrial areas and warehouses in McAllen, Mission, and Pharr.

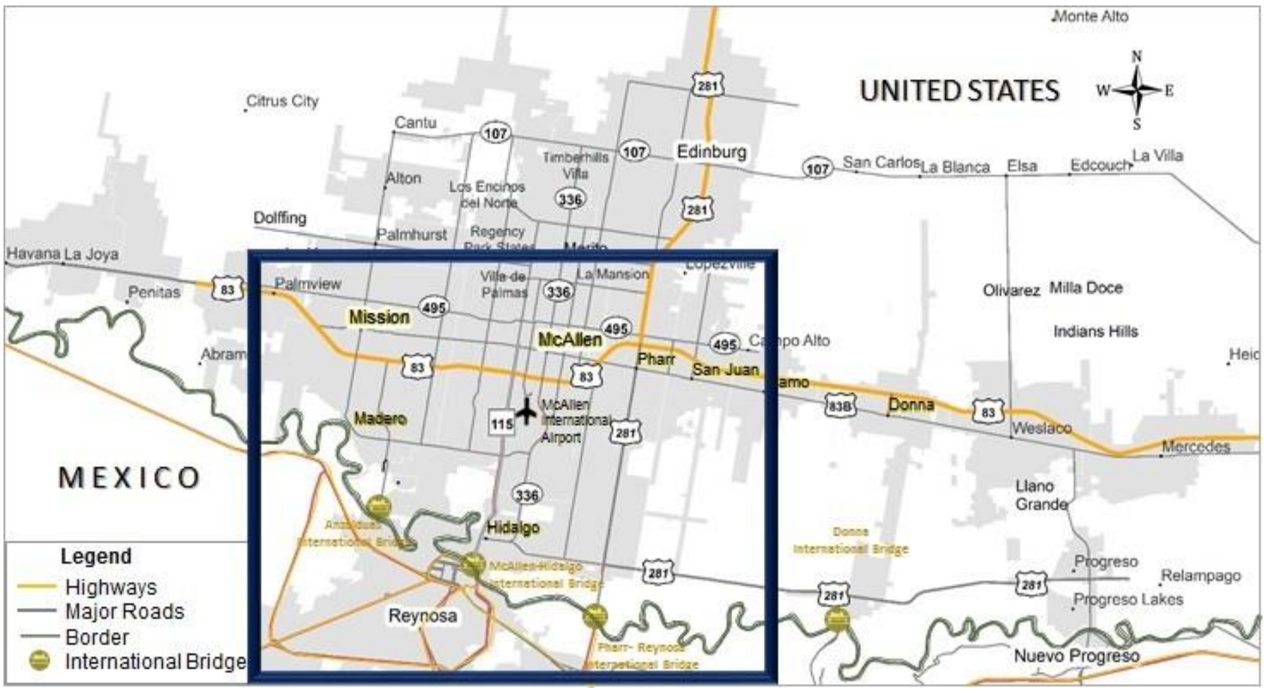
On behalf of the HCRMA, C&M Associates, Inc. is conducting a survey of the trucking industry and we would like to ask you some questions that will take less than 30 minutes of your time.

This survey is aimed at companies whose trucks have taken a recent trip that could use the proposed 365 TOLL highway in Hidalgo County. The objective is to collect data on the most recent trip taken within the region in terms of routes, perception of travel times, and other characteristics; with your help we are going to improve transportation in Hidalgo County.

"Respondents participating in this survey may be invited to participate in a separate Stated Preference (SP) survey."

For the following questions, please keep in mind a recent trip you made in the last six (6) months of this year that took at least 10 minutes and involved traveling within or through the area shown below in the blue square.

Please consider ANY trips where you crossed the border.



Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

OD survey

* 1. Does your company transport products to/from the United States?

◯ Yes ◯ No

2. Does your company use the Pharr and/or the Progreso International Bridge to transport the shipment to/from the United States?

☐ Yes ☐ Yes, sometimes ☐ No

☐ I use another bridge (please specify)

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

Cross Border

*3. Do your trucks transport shipments beyond the 20-mile border commercial zone into the United States?

- ◯ Yes
- ◯ No

*4. What is the most notable problem you've experienced when crossing the Pharr and/or Progreso International Bridge? (Select all options that apply to you)

- ☐ Customs
- ☐ Crossing times
- ☐ Waiting times
- ☐ Safety and Crime
- ☐ Tolls
- ☐ Other (please provide details)

*5. How often do you ship merchandise across the Pharr and/or the Progreso Port of Entry?

- ◯ A few times a day
- ◯ Almost every day (5 - 7 times per week)
- ◯ A few times a week (2, 3, or 4)
- ◯ About once a week
- ◯ A few times a month (2 or 3)
- ◯ Once a month
- ◯ 2-3 times per year

* 6. Usually, how much time do you spend waiting in line at the border crossing? Slide the button to indicate the minutes

0 minutes 60 minutes 120 or more minutes

* 7. Is your fleet part of the "FAST" program?

◯ Yes ◯ No

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

* 8. Do you believe in the near future that your fleet will need to be part of the "FAST" program?

☐ Yes ☐ No ☐ I do not know

* 9. What is the reason your company is not part of the "FAST" program?

HCRMA

HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

For the following questions, please think about a typical or regularly repeated trip made by your company's trucks to/from the United States using the International Pharr Bridge.

* 10. Where did you start your trip? (Please provide some details regarding the trip's start locations).

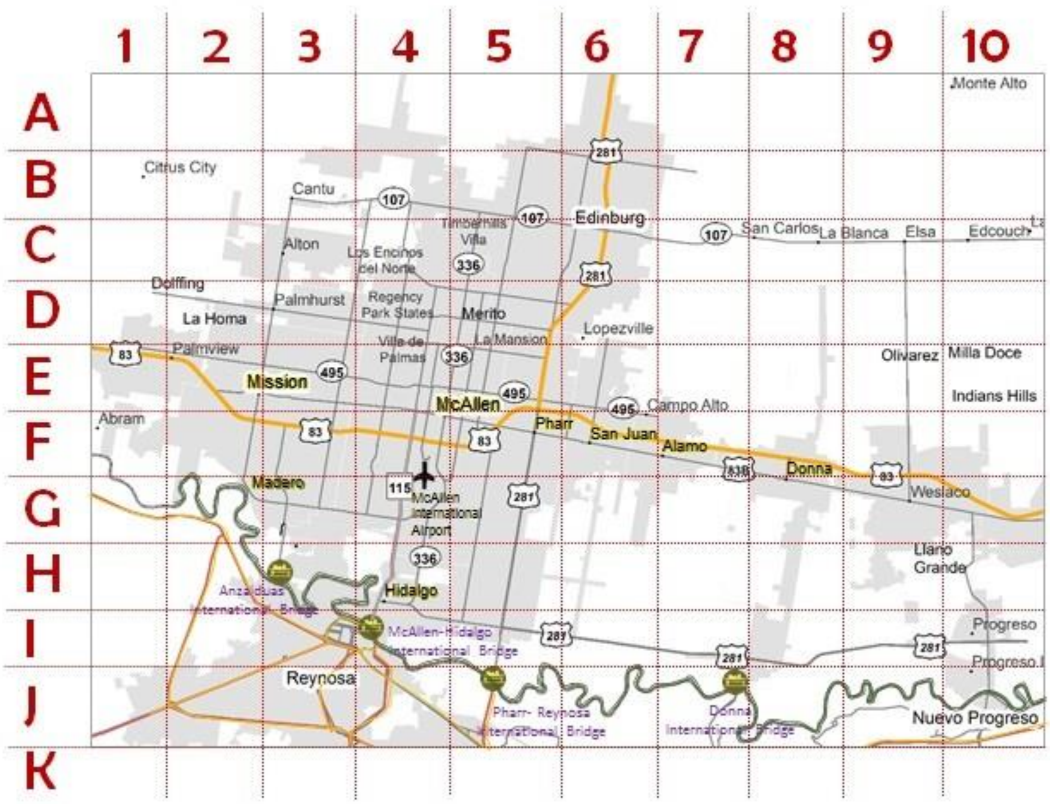
Country	
State	
Municipality/County	
Point of interest	
ZIP code	

* 11. Where did you finish your trip? (Please provide some details regarding the trip's finish locations).

Country	
State	
Municipality/County	
Point of interest	
ZIP code	

* 12. Just to be sure; on the map shown below, please indicate the area closest to your trip's origin and destination

	Row Label	Column Label
Origin		
Destination		



HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

* 13. What date and time of the day did you start your trip?
If you don't remember the exact date or time, please give us your best guess.

Date / Time

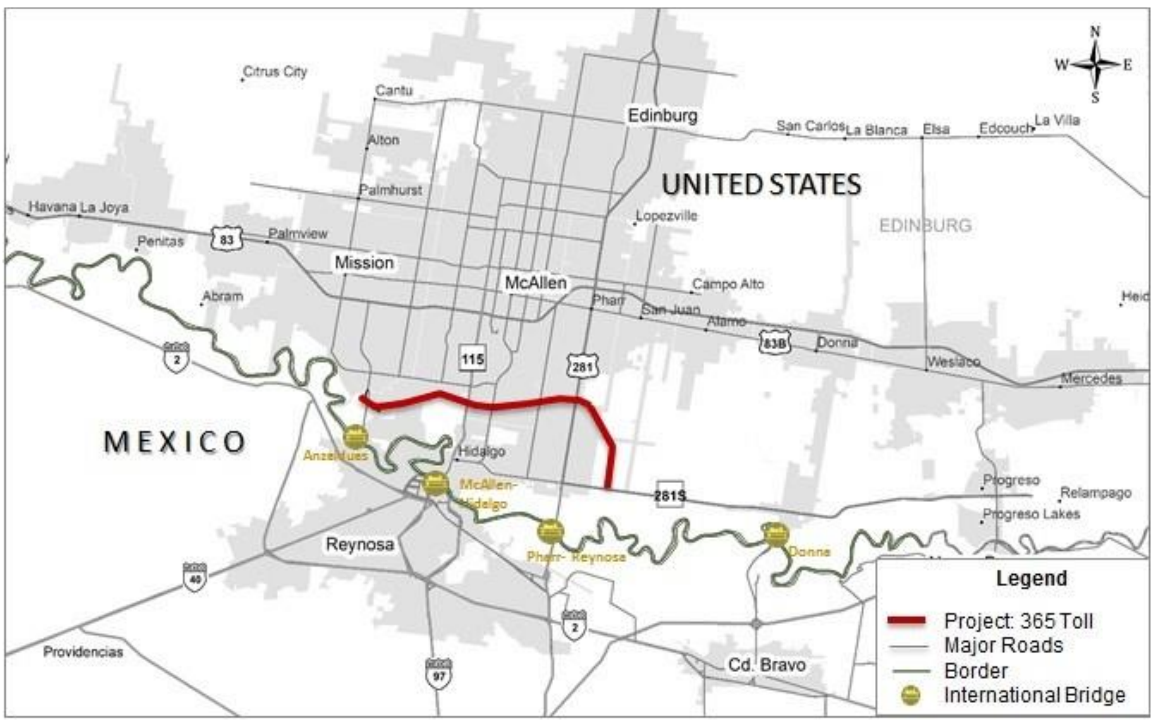
Date		Time		AM/PM
MM/DD/YYYY		hh	mm	-

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

Stated of Preference

"The Hidalgo County Regional Mobility Authority (HCRMA) is working to improve travel into southern Hidalgo County and is currently evaluating the proposed 365 TOLL project (highlighted in red in the map below). The project will initially be built with 2 main lanes in each direction, with an expansion to 3 lanes by 2030."



In order to fund the new road, the toll would be collected. You would NOT need to stop to pay your toll and would be able to continue to drive at highway speed and pay the toll in one of two different ways.

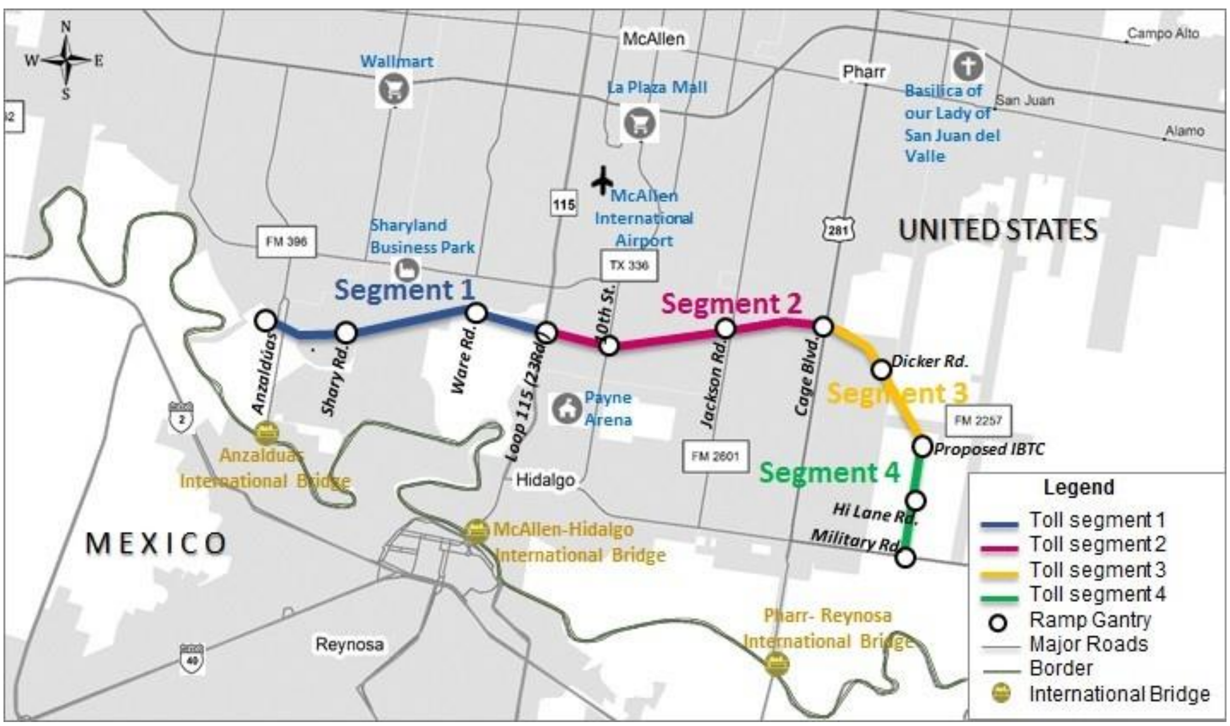
* Prepay: Paying the toll before using it by establishing a prepaid account. The tolls would be deducted from your account each time you use the road by reading a transponder (sticker or small electronic device mounted on the inside of your windshield), or by reading your license plates

* Post pay: Your vehicle's license plates would be read by a camera and a bill would be mailed to the registered owner. Additional processing fees could apply to a post-pay account.

* 14. Do you think the 365 TOLL project would be useful to you for taking the typical trip you just described?

◯ Yes ◯ Possibly ◯ No

Please look at the following map. The circles indicate the entrance or exit ramps of the 365 TOLL project. The colored lines indicate the segments.



* 15. Please indicate the toll segments of 365 TOLL that you are most likely to use:

- Only segment 1
- Only segment 2
- Only segment 3
- Only segment 4
- All four segments
- Segments 1 + 2 + 3
- Segments 1 + 2
- Segments 2 + 3
- Segments 2 + 3 +4
- Segments 3 + 4
- Neither of them

* 16. Approximately how long did it take you, door-to-door, to drive from your trip began to where your trip ended? (Please include only the time you spent traveling a not time spent at any stops you may have done along the way (e.g., to get gas or coffee or the border crossing time)

- Less than 10 minutes
- 11 - 20 minutes
- 21 - 30 minutes
- 31 - 40 minutes
- 40 - 60 minutes
- 1 - 2 hours
- 2 - 4 hours
- more than 4 hours and 1 minute

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

Stated Preference - Experiment 1A

Here are SIX options where the proposed 365 TOLL HIGHWAY could save you travel time in exchange for paying a toll. In terms of your regular trip, please evaluate if you would use the 365 TOLL PROJECT, or you continue using your CURRENT ROUTE or have NO PREFERENCE. Remember that there are no right or wrong answers; we are only interested in your opinion.

* 17. Which route would you use if the proposed 365 Toll offered a time saving of10 minutes with a toll of $6.00 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 18. Which route would you use if the proposed 365 Toll offered a time saving of30 minutes with a toll of $3.00 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 19. Which route would you use if the proposed 365 Toll offered a time saving of15 minutes with a toll of $6.00 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 20. Which route would you use if the proposed 365 Toll offered a time saving of35 minutes with a toll of $8.00 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 21. Which route would you use if the proposed 365 Toll offered a time saving of5 minutes with a toll of $6.00 USD?

- [ ] 365 Toll Route
- [ ] Current Route
- [ ] I have no preference

* 22. Which route would you use if the proposed 365 Toll offered a time saving of 30 minutes with a toll of $10.00 USD?

- [ ] 365 Toll Route
- [ ] Current Route
- [ ] I have no preference

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

Stated Preference - Experiment 2A

Here are SIX options where the proposed 365 TOLL HIGHWAY could save you travel time in exchange for paying a toll. In terms of your regular trip, please evaluate if you would use the 365 TOLL PROJECT, or you continue using your CURRENT ROUTE or have NO PREFERENCE. Remember that there are no right or wrong answers; we are only interested in your opinion.

* 23. Which route would you use if the proposed 365 Toll offered a time saving of30 minutes with a toll of $8.00 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 24. Which route would you use if the proposed 365 Toll offered a time saving of10 minutes with a toll of $20.00 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 25. Which route would you use if the proposed 365 Toll offered a time saving of35 minutes with a toll of $4.00 USD?

◯ 365 Toll Route ◯ Current Route ◯ I have no preference

* 26. Which route would you use if the proposed 365 Toll offered a time saving of20 minutes with a toll of $15.00 USD?

☐ 365 Toll Route ☐ Current Route ☐ I have no preference

* 27. Which route would you use if the proposed 365 Toll offered a time saving of35 minutes with a toll of $10.00 USD?

☐ 365 Toll Route ☐ Current Route ☐ I have no preference

* 28. Which route would you use if the proposed 365 Toll offered a time saving of20 minutes with a toll of $8.00 USD?

☐ 365 Toll Route ☐ Current Route ☐ I have no preference

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

Stated Preference Debrief

* 29. Please explain the reasoning behind your responses to the previous scenarios. (Select all that apply)

- [ ] I do not want to pay toll in general.
- [ ] I can't change my route.
- [ ] The toll cost is too expensive.
- [ ] The toll cost seems affordable.
- [ ] The time savings are not enough to pay a toll.
- [ ] I think the new toll road will be a safer route.
- [ ] The scenarios were not realistic.
- [ ] I think the new toll road will save me time
- [ ] Other (please specify)

* 30. What is the maximum amount you would be willing to pay to use the 365 TOLL roadway? (Amount in USD)

* 31. How much time should this tollway save you to justify using it? Slide the button to indicate the minutes

2 minutes — 20 minutes — 40 minutes

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

Reliability

* 32. Did you experience any delays due to traffic, accidents or situations beyond your control during this trip?
(Do not take into account the border crossing time)

◯ Yes ◯ No

* 33. How many minutes of delay did you experience during that trip?
(Do not take into account the border crossing time)
Slide the button to indicate the minutes

0 minutes | 60 minutes | 120 or more minutes

* 34. If you have made this same trip several times, either on different days or in different months, what has been the maximum delay that you have experienced on that trip for reasons beyond your control?
(Do not take into account the crossing time at border)
Slide the button to indicate the minutes

0 minutes | 60 minutes | 120 minutes or more

* 35. How often do you experience delays on this same trip, in other occasions?

- 6 or more times per week
- 4 times per week
- 2-3 times per week
- Once per week
- 2-3 times per month
- Once per month
- Once every 6 months
- Only this one time
- I've never suffered delays

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

Instructions - Reliability

The next set of questions will help us understand how important predictable travel times are to you. For the next five questions, you will be asked to choose between two different options for making the trip you just described.

* For each question, please look closely at the options and tell us which one you most prefer.

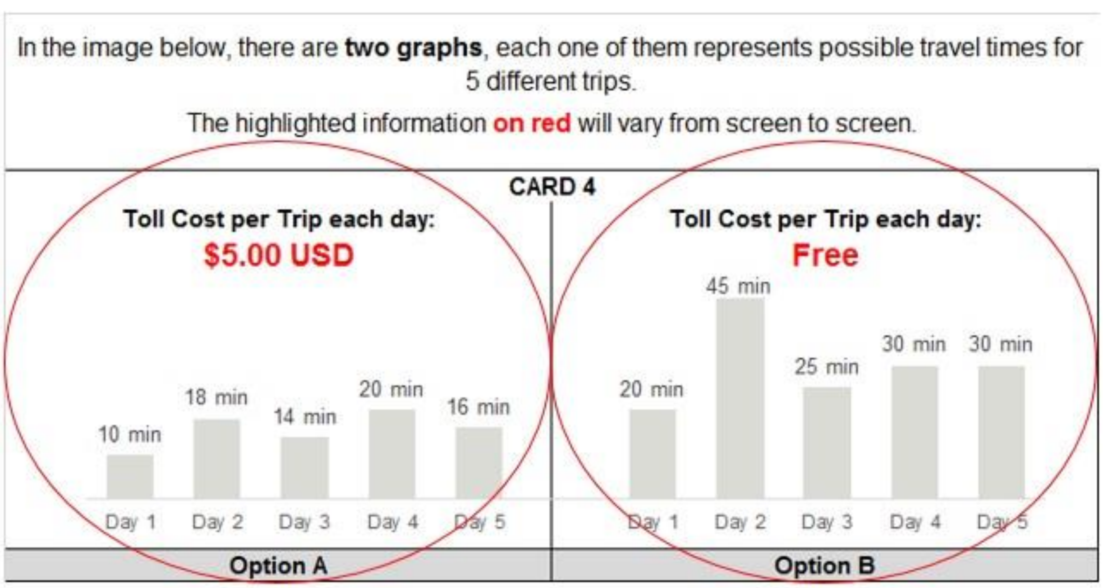
* For each question, focus only on the two travel options shown. Do not consider the choices you made on previous questions.

* Please remember there is no right or wrong answer, we only want your opinion.

Instructions

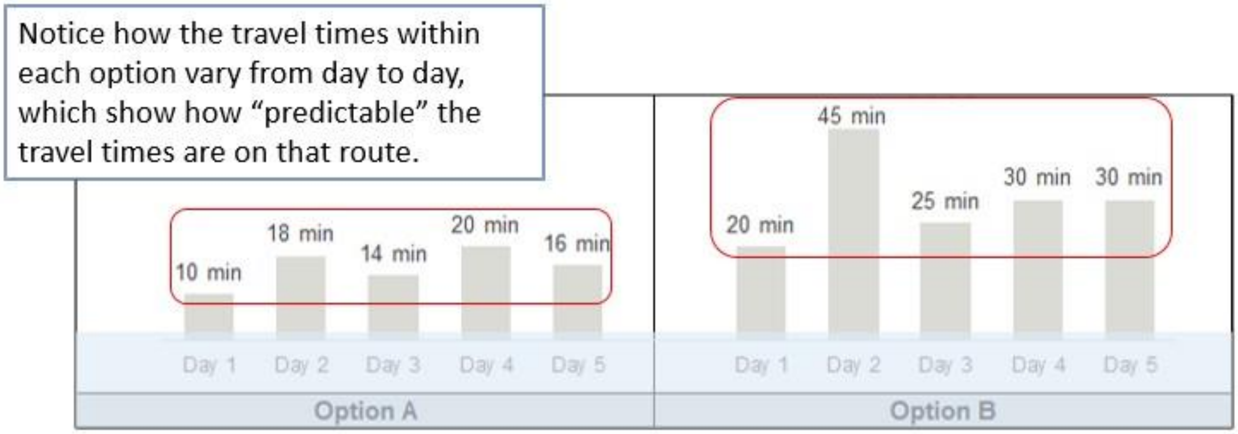
Please read the instructions carefully.

Imagine you make your trip starting and ending at the same locations your previously listed on 5 separate occasions, with each trip starting at the same time of the day and the same day of the week. However, for reasons which cannot always be anticipated (e.g., traffic), these trips can take different amounts of time.



Each bar represents the time that will be spent making **ONE** of your 5 future trips using this option.

Note that in this example, the bars in Option A are on average shorter than in Option B. This means that, on average, Option A takes less time.



* 36. Just to remember. How long was your trip door-to-door?

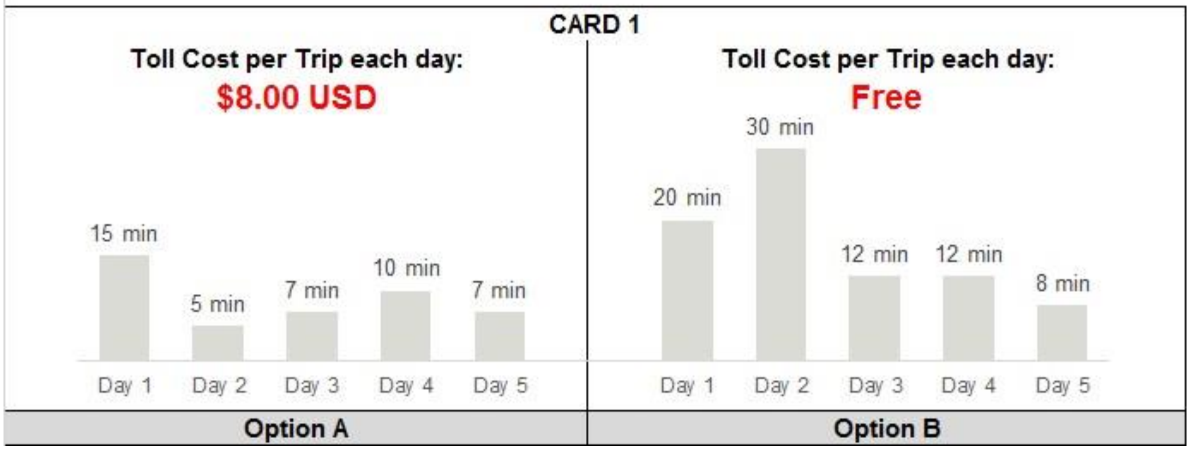
◯ Less than 40 minutes ◯ 41 or more minutes

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

Reliability - Experiment RT1A

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.



* 37. Card 1 of 5.

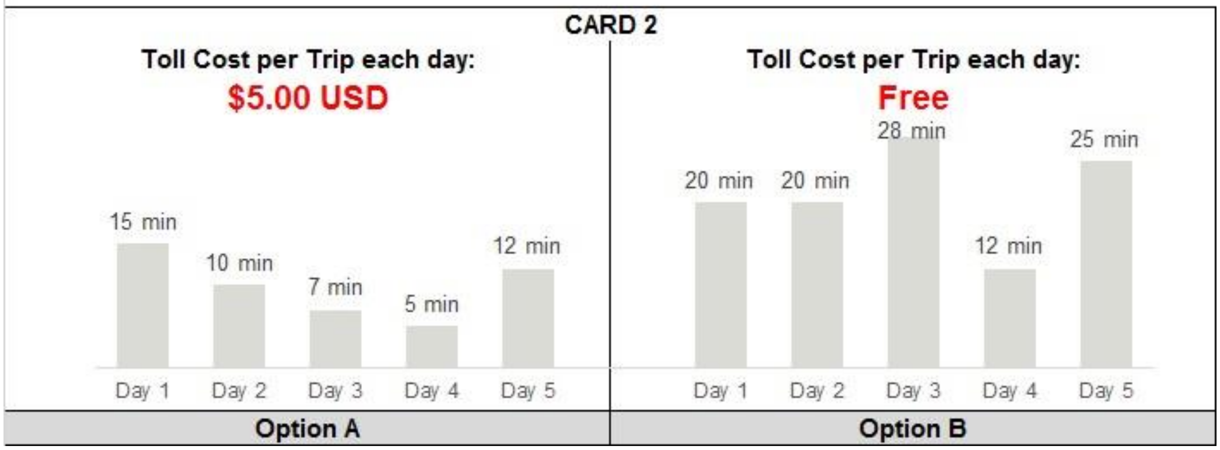
Which option do you prefer?

◯ Option A ◯ Option B

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.



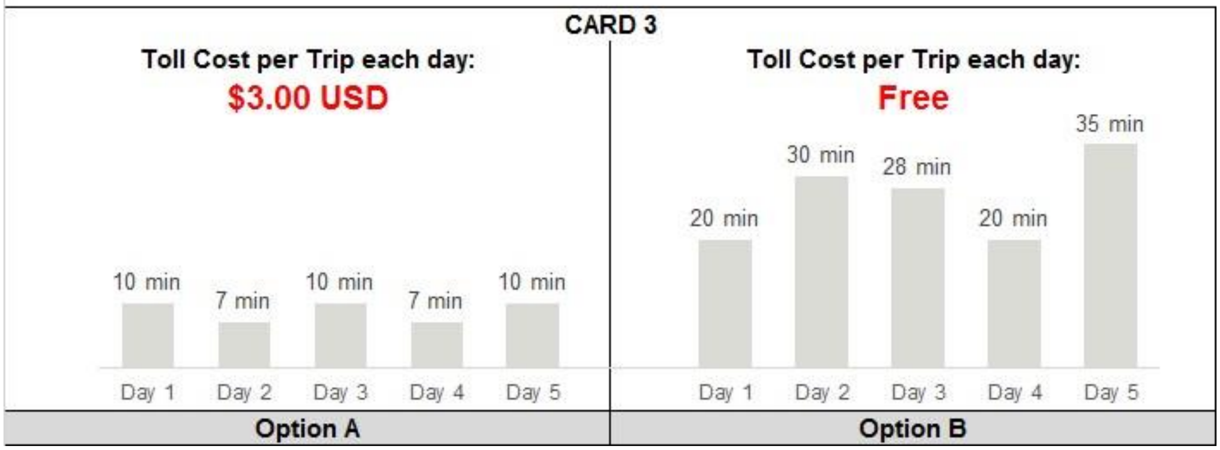
* 38. Card 2 of 5.
Which option do you prefer?

◯ Option A ◯ Option B

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.



* 39. Card 3 of 5.
Which option do you prefer?

◯ Option A ◯ Option B

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.

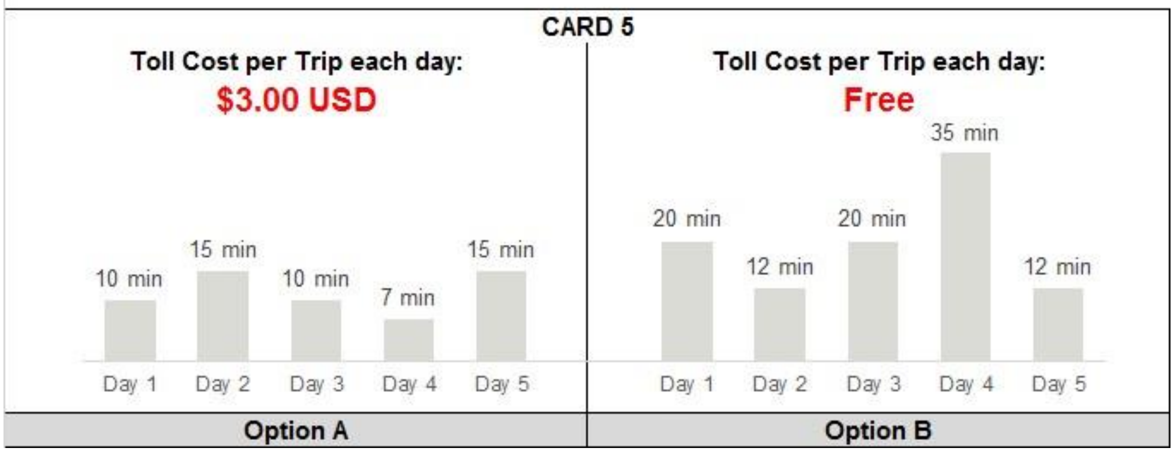
* 40. Card 4 of 5.
Which option do you prefer?

◯ Option A ◯ Option B

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.



* 41. Card 5 of 5.
Which option do you prefer?

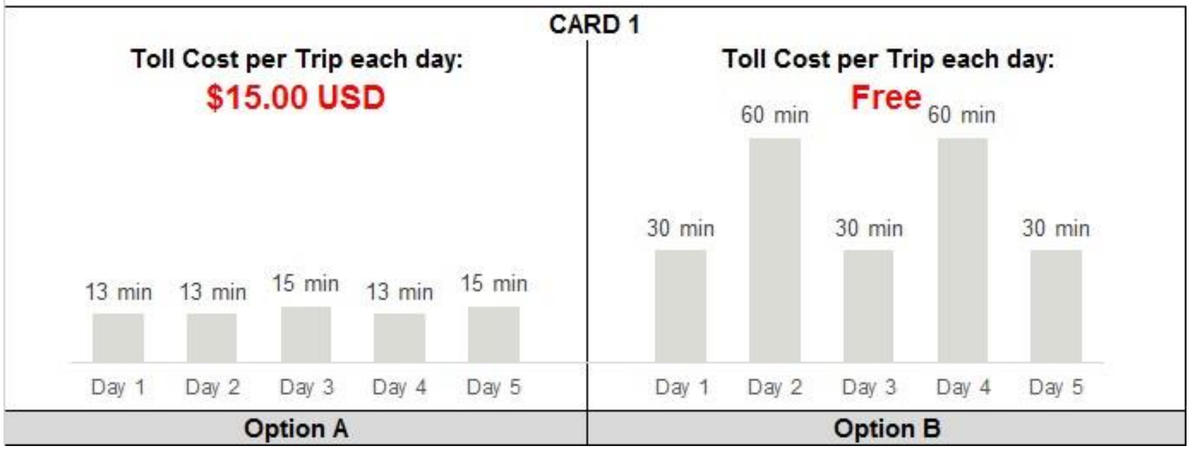
◯ Option A ◯ Option B

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

Reliability - Experiment RT2A

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.



* 42. Card 1 of 5.
Which option do you prefer?

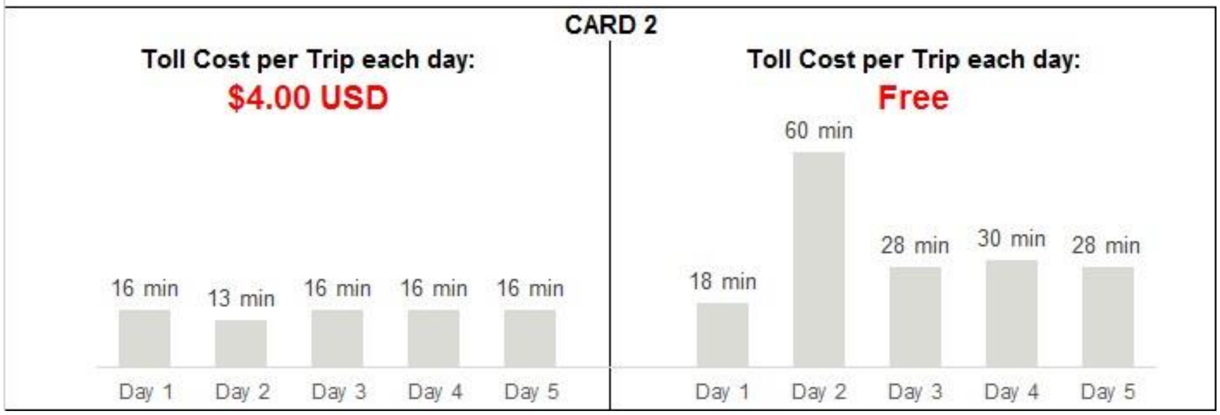
◯ Option A ◯ Option B

HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.



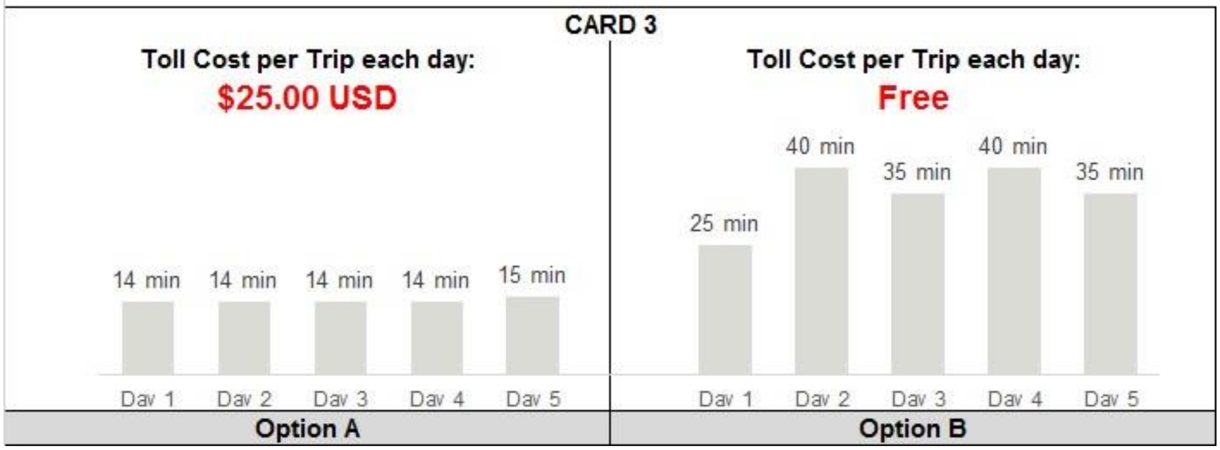
* 43. Card 2 of 5.
Which option do you prefer?

◯ Option A ◯ Option B

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

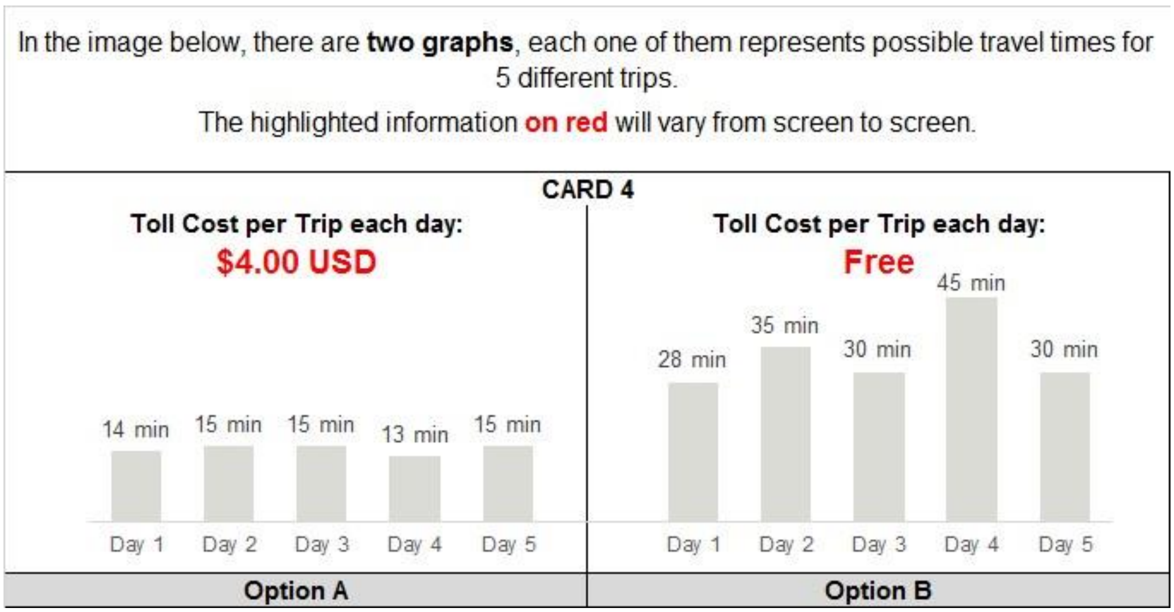
The highlighted information **on red** will vary from screen to screen.



*44. Card 3 of 5.
Which option do you prefer?

◯ Option A ◯ Option B

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll



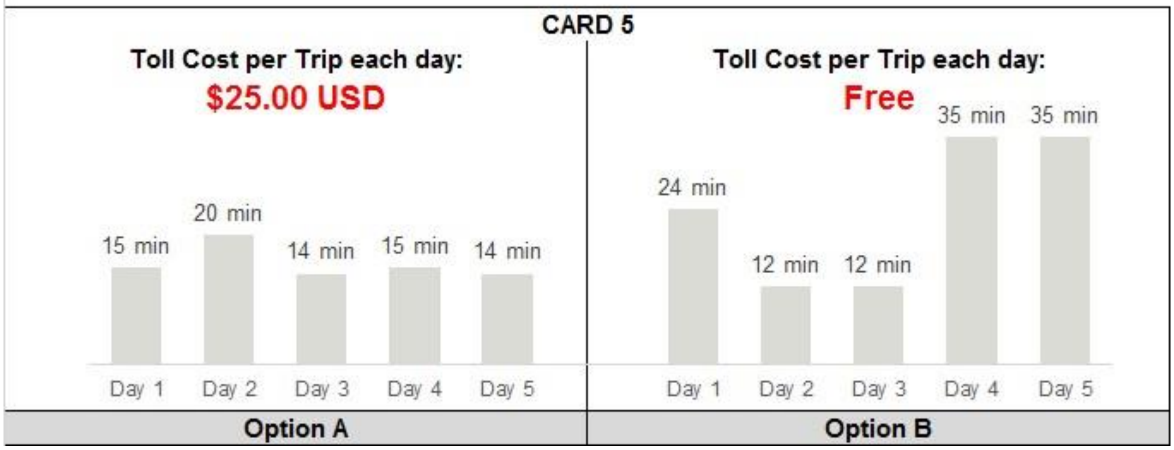
* 45. Card 4 of 5.
Which option do you prefer?

◯ Option A ◯ Option B

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

In the image below, there are **two graphs**, each one of them represents possible travel times for 5 different trips.

The highlighted information **on red** will vary from screen to screen.



* 46. Card 5 of 5.
Which option do you prefer?

◯ Option A ◯ Option B

HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

COVID-19 Questions

"We are aware of the impact the recent COVID-19 pandemic has had on living and work conditions. For the following questions, we ask that you consider your situation BEFORE COVID-19, DURING QUARANTINE ORDERS, and in the FUTURE when all travel restrictions and stay-at-home orders have been lifted."

Please select all options that apply in each situation.

* 47. Of all the employees that the company has, what percentage of them may carry out their work from home?

Before COVID-19 (%)	
Quarantine (%)	
Without Restrictions (%)	

* 48. How often did the company transport goods?

Please select all options that apply in each situation.

	BEFORE Covid-19	DURING Quarantine	WITHOUT Restrictions
Several times per day	☐	☐	☐
6 to 7 days per week	☐	☐	☐
5 days a week	☐	☐	☐
4 days a week	☐	☐	☐
2 to 3 days a week	☐	☐	☐
1 day per week	☐	☐	☐
1 to 3 days a month	☐	☐	☐
Less than once a month	☐	☐	☐
Rarerly	☐	☐	☐
Never	☐	☐	☐

Other (please specify)

* 49. What type(s) of cargo did the transport of your truck most frequently across the border into or from the US? Select all that apply.

	BEFORE Covid-19	DURING Quarantine	WITHOUT Restrictions
Electronics / Electrical Goods	☐	☐	☐
Machinery or appliances	☐	☐	☐
Automotive components or new vehicles	☐	☐	☐
Fresh produce	☐	☐	☐
Plastic goods / Packaging	☐	☐	☐
Paper or printed products	☐	☐	☐
Processed foods, meat, or dairy products	☐	☐	☐
Grains, nuts, or flour products	☐	☐	☐
Furniture	☐	☐	☐
Rubber products	☐	☐	☐
Chemical products	☐	☐	☐
Wood products (non-furniture)	☐	☐	☐

Other (please specify)

* 50. Has the company been forced to carry out actions such as:

	BEFORE Covid-19	DURING Quarantine	WITHOUT Restrictions
Reduce employees' work hours	☐	☐	☐
Lay-off employees	☐	☐	☐
Changed pay structure	☐	☐	☐
Employees who resign by choice or necessity	☐	☐	☐
Furloughed employees with pay	☐	☐	☐
Furloughed employees without pay	☐	☐	☐
Change of work assignments to employees	☐	☐	☐
Stagger work schedules	☐	☐	☐

Other (please specify)

* 51. Has the company had to invest in:

	NOW	WITHOUT Restrictions
Protective equipment (face mask, gloves, etc.)	☐	☐
Vehicle and facility sanitation programs	☐	☐
Training employees on COVID-19 issues	☐	☐
Adaptation of facilities or change of offices	☐	☐
Insurance or surety payments due to COVID-19	☐	☐

Other (please specify)

* 52. Please indicate your opinion on how much you agree or disagree with the following statements about the operation of your company.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
BEFORE the Pandemic, there was flexibility for the delivery of merchandise.	○	○	○	○	○
BEFORE the Pandemic, there were penalties for late delivery.	○	○	○	○	○

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
BEFORE the Pandemic, the company used to use toll highways.					
During the Pandemic, the delivery days and/or times have changed.					
During the Pandemic, customers have canceled the receipt of merchandise.					
During the Pandemic, customers have canceled late delivery penalties.					
During the Pandemic, customers demand new protocols for the delivery of goods.					
During the Pandemic, the company has stopped using toll highways.					
During the Pandemic, the company has decreased the use of toll highways.					

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

Opinion questions

* 53. Could you give us your opinion about how much do you agree or disagree with the following statements related to the use of toll roads and highways?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The customer, the insurance, or the type of merchandise requires using tolled highways.	○	○	○	○	○
I use a toll road because the road conditions are good.	○	○	○	○	○
I use toll roads because the free roads do not allow the passage of cargo.	○	○	○	○	○
I use a toll road due to the time savings that it offers me compared to other routes.	○	○	○	○	○
I only use toll roads in order to reach the delivery deadline.	○	○	○	○	○

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
By using toll roads, I am pretty certain to be on time for the delivery of merchandise.	◯	◯	◯	◯	◯
I use a toll road if the toll is accessible.	◯	◯	◯	◯	◯
I use toll roads because I save on operating expenses.	◯	◯	◯	◯	◯
I use toll roads because I have a lower chance of accidents.	◯	◯	◯	◯	◯

Other (please specify)

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

Overwheight or Perishable

54. Do you need a special permit provided by the HCRMA in order to transport your merchandise?

◯ Yes ◯ No

* 55. Just to remember. Do you transport overweight merchandise or merchandise related to perishable products such as fruits, vegetables, meats, dairy products, grains, nuts, flour, etc.?

◯ Yes ◯ No

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

* 56. Currently, the company has to apply for a permit to use certain routes that allow the passage of heavy vehicles or vehicles with perishable products. If the payment of the permit were excessive, what measures do you think the company would be willing to implement?

	Very Unlikely	Not Likely	Unsure	Likely	Very Likely
The company would switch to smaller capacity vehicles and have more trips.	○	○	○	○	○
The company would change route.	○	○	○	○	○
The company would change from trucks to freight trains.	○	○	○	○	○
The company would acquire or rent new warehouses.	○	○	○	○	○
The company would access to new or different distribution centers.	○	○	○	○	○
The company would try to get a new agreement with the county for the passage of the units.	○	○	○	○	○

Other (please specify)

57. What is your opinion of the $200 USD fee to pay the permit?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The payment seems fair.	○	○	○	○	○
I can afford the payment of the permit comfortably.	○	○	○	○	○
I pay it because it allows me to have good conditions on the road to transport the merchandise.	○	○	○	○	○
I must pay it, or I can not transport the merchandise.					
I pay it because I can pass the cost of the permit on the customer.	○	○	○	○	○

Other (please specify)

* 58. The quantity of... (read quantity) would be an excessive payment for the permit?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
$ 500 USD	○	○	○	○	○
$ 250 USD	☐	☐	☐	☐	☐
$ 400 USD	○	○	○	○	○
$ 200 USD	☐	☐	☐	☐	☐
$ 700 USD	○	○	○	○	○

(please specify)

Commercial Vehicles' survey in Hidalgo County. Project: 365 Toll

User's characteristics

* 59. Of all the trips that you regularly make in approximately one week. What percentage of transportation services do you contract versus using your own fleet?

I hire transportation services to cross the border (%)

My own fleet crosses the border and delivers the cargo to its final destination. (%)

* 60. Approximately how much do you pay (USD) for merchandise distribution? (Including contracting services for crossing the border with Mexico and long-distance services to reach your final destination)

* 61. The commercial vehicle that you drove on this trip is:

- My own
- Family's / friend's
- Company's
- Rented

* 62. About what percentage of your US-related shipments are in containers?

*63. Approximately, how many trucks does the company has?

- ◯ 2-9 trucks
- ◯ 10-24 trucks
- ◯ 25 or more

*64. What is the average age of the fleet?

Months

Years

*65. In general, how many axles do most of the company's trucks have? (Select all options that apply)

- ☐ 2 axles
- ☐ 3 axles
- ☐ 4 axles
- ☐ 5 axles
- ☐ 6 axles
- ☐ 7 axles
- ☐ 8 or more axles

*66. Who chooses the truck routes? (Select all that apply)

- ☐ The customer / client
- ☐ The company manager
- ☐ The customs broker
- ☐ The logistics operator
- ☐ The traffic manager in the distribution center.
- ☐ Driver
- ☐ Other (please specify)

*67. What is your preferred method of payment for the toll in highways and bridges? (Select all options that apply)

- ☐ Cash
- ☐ Credit card
- ☐ RFID (Prepaid)
- ☐ Other (please specify)

* 68. Please enter your contact information below. Your personal data will remain anonymous and confidential.

Name:	
Address:	
Address 2:	
City Town:	
State/Province:	
ZIP code:	
Phone number:	
Email:	

69. Thank you very much for your support by answering our survey. If you have any comments, please write them below.

Travel surveys for Hidalgo County. Project: 365 TOLL

Questionnaire for Commercial Vehicles

Spanish survey

Dec 2020

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Encuesta para vehículos comerciales en el condado de Hidalgo. Proyecto: 365 Tollway

Introducción

La Autoridad de Movilidad Regional del Condado de Hidalgo (HCRMA por sus siglas en inglés) ha propuesto la autpista 365 TOLL para proveer a sus clientes con una alternativa rápida y confiable para la seguridad y eficiente movimiento de personas, bienes y servicios. La vía propuesta 365 TOLL, es una autopista de cuota de 14.9 millas en el Condado de Hidalgo, extendiéndose desde la vía US 281/Military Highway en la ciudad de Pharr hasta la vía FM 1016/Conway Avenue en la ciudad de Mission. La intención de la vía es aliviar la congestión por tráfico, facilitar los embarques comerciales que cruzan la frontera E.U./México, y benericiar los viajes locales al proveer una conexión de alta velocidad entre los puentes Pharr-Reynosa, el Puente Internacional Anzaldúas, la Zona de Comercio Exterior de McAllen (MCFTZ por sus siglas en inglés), y las áreas industriales y almacenes en McAllen, Mission y Pharr.

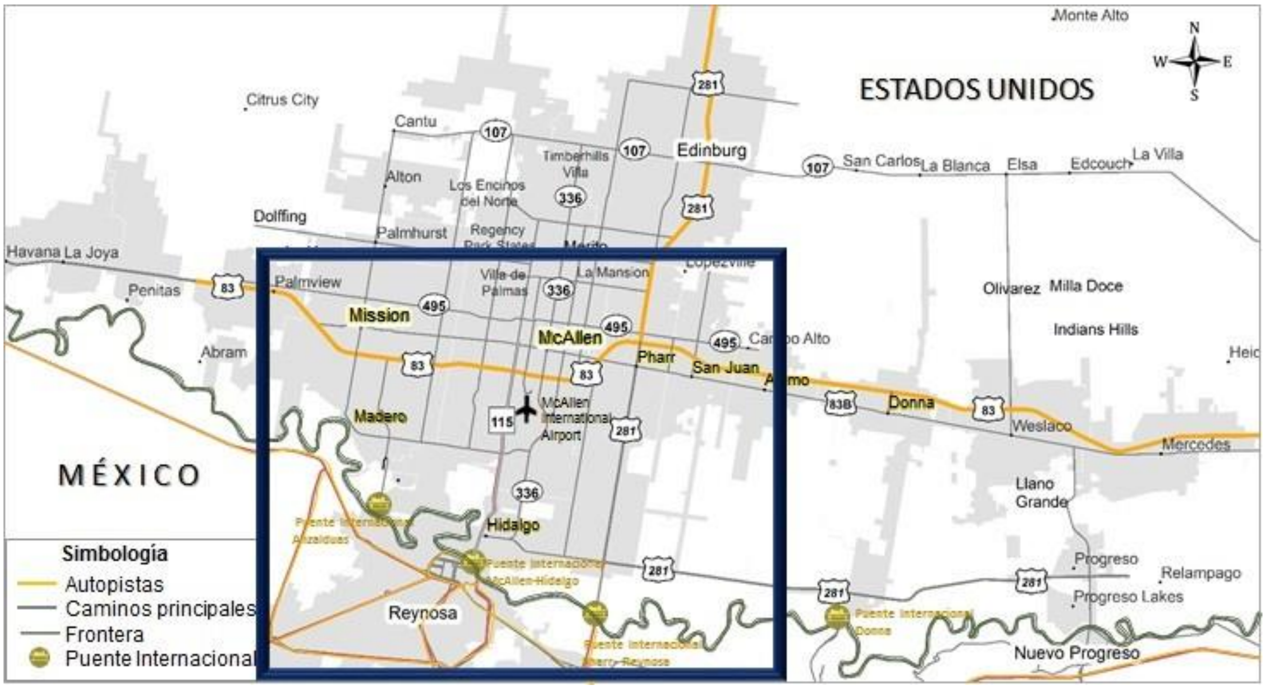
A nombre de la HCRMA, C&M Associates, Inc. está realizando una encuesta de la industria de carga y nos gustaría hacerle unas preguntas que le tomarán menos de 30 minutos de su tiempo.

Esta encuesta se dirige a empresas cuyos camiones han realizado un viaje reciente que podría usar la autopista propuesta 365 en el condado de Hidalgo. El objetivo es recolectar datos en términos de rutas, percepción de tiempos de viaje, y otras características. Con su ayuda mejoraremos el transporte de carga en el condado de Hidalgo.

"Los encuestados de esta encuesta pueden ser invitados a participar en una encuesta adicional de preferencia declarada (PD)".

Para las siguientes preguntas, por favor tenga en cuenta un viaje reciente que haya realizado en los últimos 6 meses de este año y que tomó al menos 10 minutos e involucró viajar dentro o a través del área marcada en el cuadro azul del siguiente mapa.

Por favor, considere CUALQUIER viaje donde el vehículo de carga cruzó la frontera.



Encuesta para vehículos comerciales en el condado de Hidalgo.
Proyecto: 365 Tollway
Encuesta OD

1. ¿La compañía transporta productos desde/hacia los Estados Unidos?

   ☐ Sí ☐ No

2. ¿La empresa usa el el puente internacional Pharr y/o Progreso para transportar mercancías de/hacia Estados Unidos?

   ☐ Sí ☐ Sí, algunas veces ☐ No

   ☐ Uso otro puente (Por favor especifique)

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Encuesta para vehículos comerciales en el condado de Hidalgo.
Proyecto: 365 Tollway
Cruce Fronterizo

* 3. ¿Los camiones transportan mercancía más allá de la zona comercial fronteriza de 20 millas dentro de los Estado Unidos?

◯ Sí ◯ No

* 4. ¿Cuál es el problema más notable que ha experimentado cuando cruza el Puente Internacional Pharr? (Seleccione todas las opciones que apliquen a la empresa que usted representa)

☐ Aduanas
☐ Tiempos de cruce
☐ Tiempos de espera
☐ Otro (Por favor especifique)
☐ Seguridad y crimen
☐ Cuotas en autopistas y puentes

* 5. ¿Con qué frecuencia cruza mercancía por los puentes internacionales Pharr y/o Progreso?

◯ Varias veces al día
◯ Casi todos los días (5 - 7 veces a la semana)
◯ Varias veces a la semana (2, 3, o 4)
◯ Una vez a la semana
◯ (2 o 3) Veces al mes
◯ Una vez al mes
◯ 2-3 veces al año

*6. Usualmente, ¿Cuánto tiempo espera en la fila para cruzar la frontera?
(Deslice el botón para indicar los minutos)

0 minutos 60 minutos 120 o más minutos

*7. ¿La flota es parte del programa "FAST"?

Sí No

*8. ¿Usted cree que en el futuro cercano, la flota necesitará ser parte del programa "FAST"?

Sí No Lo desconozco

*9. ¿Por qué razón la empresa no es parte del programa "FAST"?

Encuesta para vehículos comerciales en el condado de Hidalgo. Proyecto: 365 Tollway

Para las siguientes preguntas, por favor piense en un viaje típico o que realicen varias veces los camiones de la empresa de/hacia Estados Unidospor el Puente Internacional Pharr o Progreso.

* 10. ¿Dónde comenzó el viaje? (Por favor, proporcione algunos detalles respecto a la localización de este lugar de inicio)

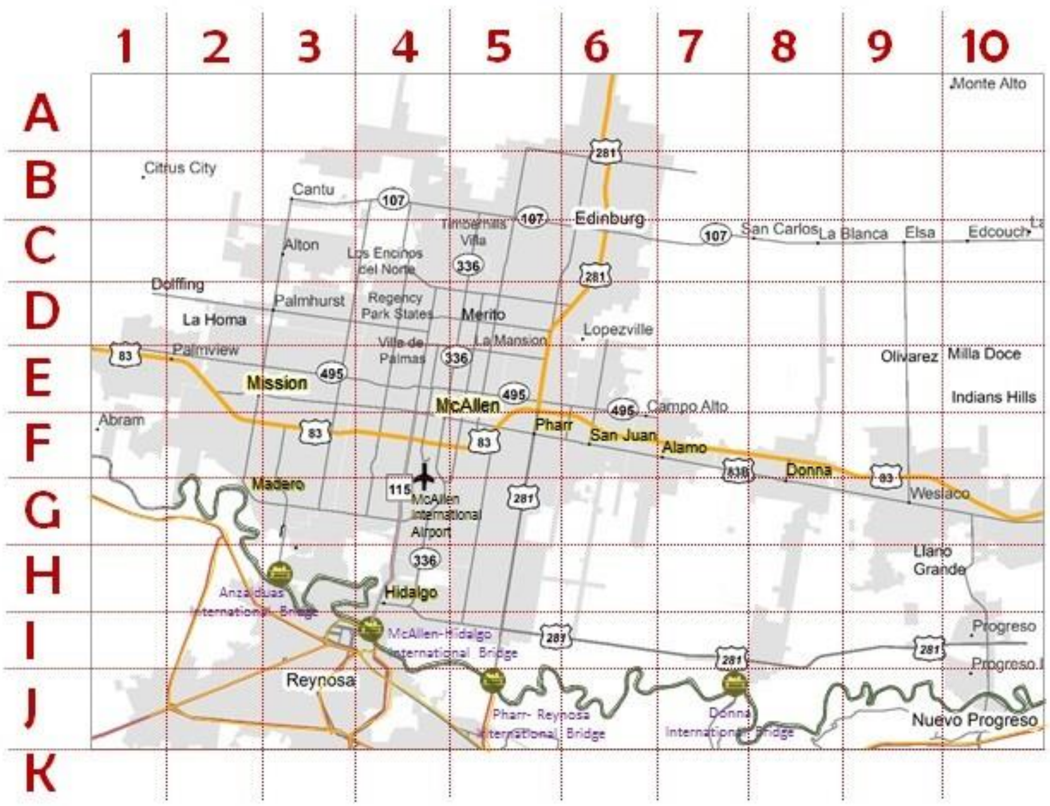
País	
Estado	
Municipio/Condado	
Punto de Interés	
Código Postal	

* 11. ¿Dónde terminó el viaje? (Por favor, proporcione algunos detalles respecto a la localización donde terminó el viaje)

País	
Estado	
Municipio/Condado	
Punto de Interés	
Código Postal	

* 12. Solo para estar seguro; en el mapa que se muestra abajo, por favor indique el área más cercana a su origen y destino del viaje.

	Renglón	Columna
Origen		
Destino		



Encuesta para vehículos comerciales en el condado de Hidalgo. Proyecto: 365 Tollway

*13. ¿En qué fecha y hora del día comenzó el viaje?
Si usted no recuerda la fecha u hora exacta, por favor de los datos de forma aproximada.

Fecha / Hora

Date		Time		AM/PM
MM/DD/YYYY		hh	mm	-

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Encuesta para vehículos comerciales en el condado de Hidalgo.
Proyecto: 365 Tollway

Preferencia Declarada

"La Autoridad de Movilidad Regional del Condado de Hidalgo (HCRMA por sus siglas en inglés) está trabajando para mejorar los viajes al sur del condado de Hidalgo, y actualmente está evaluando el proyecto de la autopista 365 TOLL project (resaltada en rojo en el mapa inferior). El proyecto será construido inicialmente con 2 carriles principales en cada dirección, con una expansión a 3 carriles para el año 2030".

Para financiar el nuevo camino, será un proyecto de cuota donde usted NO necesitará parar para pagar el peaje y será capaz de continuar conduciendo en la autopista a velocidad. La cuota se recolectará mediante dos formas.

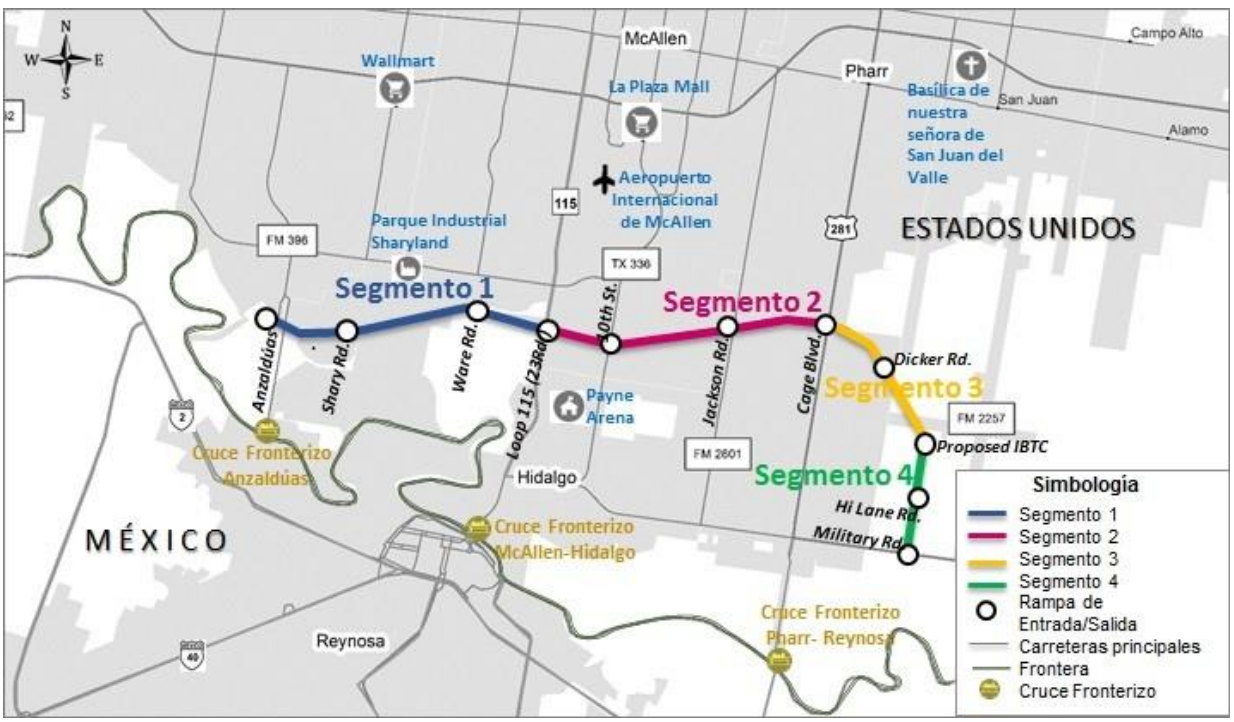
* Prepago: Pagando la cuota antes de usarla estableciendo una cuenta de prepago. Las cuotas serán deducidas de su cuenta cada vez que utilice la vía al leer un transponder (calcomanía o pequeño aparato electrónico montado dentro del vehículo en el parabrisas), o al leer las placas del vehículo.

* Post pago: Las placas del vehículo serán grabadas por una cámara y la cuenta será enviada por correo al propietario registrado. Una cuota adicional será aplicada por ser una cuenta post-pago.

*14. ¿Usted cree que el proyecto 365 TOLL le será de utilidad en el viaje que acaba de describir?

◯ Sí ◯ Posiblemente ◯ No

Por favor, observe el siguiente mapa. Los círculos indican la entrada o salida de las rampas del proyecto 365 TOLL. Las líneas de color indican los segmentos de la vía.



*15. Por favor, indique los segmentos del proyecto 365 TOLL que son más probables que usted utilice en el viaje que describió:

- Solo segmento 1
- Segmentos 1 + 2
- Solo segmento 2
- Segmentos 2 + 3
- Solo segmento 3
- Segmentos 2 + 3 +4
- Solo segmento 4
- Segmentos 3 + 4
- Todos los segmentos
- Ninguno de ellos
- Segmentos 1 + 2 + 3

*16. Aproximadamente, ¿Cuánto tiempo duró el viaje puerta-puerta desde que comenzó hasta que terminó el viaje? (Por favor, incluya solo el tiempo que pasó viajando y no el tiempo que pasó en alguna parada que pudo haber realizado en el camino (ejm. para cargar combustible o café o en los tiempos de cruce en la frontera)

- Menos de 10 minutos
- 40 - 60 minutos
- 11 - 20 minutos
- 1 - 2 horas
- 21 - 30 minutos
- 2 - 4 horas
- 31 - 40 minutos
- Más de 4 horas y 1 minuto

Encuesta para vehículos comerciales en el condado de Hidalgo. Proyecto: 365 Tollway

Preferencia Declarada - Experimento 1A

A continuación usted verá SEIS opciones donde la autopista propuesta 365 TOLL podría ahorrarle tiempo de viaje a cambio del pago de una cuota. De acuerdo al viaje que describió, por favor evalúe si usted preferiría el proyecto 365 Toll, la RUTA ACTUAL o NO TIENE PREFERENCIA por ninguna de las dos rutas. Recuerde que no hay respuestas correctas o equivocadas; solo nos interesa su opinión.

* 17. ¿Qué ruta usaría si la vía propuesta 365 Toll le ofreciera un ahorro de tiempo de 20 minutos con una cuota de $5.00 dólares?

◯ 365 Toll ◯ Ruta Actual ◯ No tengo preferencia

* 18. ¿Qué ruta usaría si la vía propuesta 365 Toll le ofreciera un ahorro de tiempo de 5 minutos con una cuota de $8.00 dólares?

◯ 365 Toll ◯ Ruta actual ◯ No tengo preferencia

* 19. ¿Qué ruta usaría si la vía propuesta 365 Toll le ofreciera un ahorro de tiempo de 15 minutos con una cuota de $7.00 dólares?

◯ 365 Toll ◯ Ruta Actual ◯ No tengo preferencia

* 20. ¿Qué ruta usaría si la vía propuesta 365 Toll le ofreciera un ahorro de tiempo de 35 minutos con una cuota de $3.00 dólares?

◯ 365 Toll ◯ Ruta Actual ◯ No tengo preferencia

* 21. ¿Qué ruta usaría si la vía propuesta 365 Toll le ofreciera un ahorro de tiempo de 15 minutos con una cuota de $10.00 dólares?

- [ ] 365 Toll
- [ ] Ruta Actual
- [ ] No tengo preferencia

* 22. ¿Qué ruta usaría si la vía propuesta 365 Toll le ofreciera un ahorro de tiempo de 30 minutos con una cuota de $4.00 dólares?

- [ ] 365 Toll
- [ ] Ruta Actual
- [ ] No tengo preferencia

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Encuesta para vehículos comerciales en el condado de Hidalgo. Proyecto: 365 Tollway

Preferencia Declarada - Experimento 2A

A continuación usted verá SEIS opciones donde la autopista propuesta 365 TOLL podría ahorrarle tiempo de viaje a cambio del pago de una cuota. De acuerdo al viaje que describió, por favor evalúe si usted preferiría el proyecto 365 Toll, la RUTA ACTUAL o NO TIENE PREFERENCIA por ninguna de las dos rutas. Recuerde que no hay respuestas correctas o equivocadas; solo nos interesa su opinión.

* 23. ¿Qué ruta usaría si la vía propuesta 365 Toll le ofreciera un ahorro de tiempo de 20 minutos con una cuota de $12.00 dólares?

◯ 365 Toll ◯ Ruta Actual ◯ No tengo preferencia

* 24. ¿Qué ruta usaría si la vía propuesta 365 Toll le ofreciera un ahorro de tiempo de 10 minutos con una cuota de $18.00 dólares?

◯ 365 Toll ◯ Ruta Actual ◯ No tengo preferencia

* 25. ¿Qué ruta usaría si la vía propuesta 365 Toll le ofreciera un ahorro de tiempo de 40 minutos con una cuota de $6.00 dólares?

◯ 365 Toll ◯ Ruta Actual ◯ No tengo preferencia

* 26. ¿Qué ruta usaría si la vía propuesta 365 Toll le ofreciera un ahorro de tiempo de 15 minutos con una cuota de $12.00 dólares?

◯ 365 Toll ◯ Ruta Actual ◯ No tengo preferencia

* 27. ¿Qué ruta usaría si la vía propuesta 365 Toll le ofreciera un ahorro de tiempo de 30 minutos con una cuota de $6.00 dólares?

☐ 365 Toll ☐ Ruta Actual ☐ No tengo preferencia

* 28. ¿Qué ruta usaría si la vía propuesta 365 Toll le ofreciera un ahorro de tiempo de 35 minutos con una cuota de $12.00 dólares?

☐ 365 Toll ☐ Ruta Actual ☐ No tengo preferencia

Encuesta para vehículos comerciales en el condado de Hidalgo.
Proyecto: 365 Tollway
Opinión de Preferencia Declarada

* 29. Por favor explique su opinión respecto a las respuestas que proporcionó en los escenarios previos. (Seleccione todas las que apliquen)

- [ ] En general, no quiero pagar cuotas de peaje.
- [ ] El costo de la cuota es muy caro.
- [ ] Los ahorros de tiempo no son suficientes para pagar una cuota.
- [ ] Los escenarios no son realistas.
- [ ] No puedo cambiar mi ruta.
- [ ] Las tarifas me parecen accesibles.
- [ ] Creo que la nueva autopista será una ruta más segura.
- [ ] Creo que la nueva autopista me ahorrará tiempo.
- [ ] Otro (por favor especifique)

* 30. ¿Cuál es la máxima cantidad que usted estaría dispuesto a pagar por usar la autopista 365 TOLL? (Cantidad en dólares)

* 31. ¿Cuánto ahorro de tiempo debe tener esta nueva vía para que se justifique el usarla?
Deslice el botón para indicar los minutos de ahorro.

2 minutos 20 minutos 40 minutos

Encuesta para vehículos comerciales en el condado de Hidalgo.
Proyecto: 365 Tollway
Confiabilidad

* 32. Durante este viaje, ¿tuvo alguna demora por tráfico, accidente o situación más allá de su control?
(No tome en cuenta el tiempo de cruce fronterizo)

◯ Sí ◯ No

* 33. ¿Cuántos minutos de demora sufrió en este viaje?
(No tome en cuenta el tiempo de cruce fronterizo)
Deslice el botón para indicar los minutos.

0 minutos 60 minutos 120 o más minutos

* 34. Si usted ha realizado este mismo viaje en otras ocasiones, ya sea en diferentes días u horarios. ¿Cuál es la demora máxima que ha experimentado en sus viajes por razones más allá de su control? (ejm. tráfico, accidentes, etc.)
(No tome en cuenta el cruce fronterizo)
Deslice el botón para indicar los minutos.

0 minutos 60 minutos 120 minutos or more

* 35. ¿Con qué frecuencia experimenta demoras en este tipo de viaje en otras ocasiones

- 6 o más veces por semana
- 4 veces por semana
- 2-3 veces por semana
- Una vez por semana
- 2-3 veces por mes
- Una vez por mes
- Una vez cada 6 meses
- Solo en esa ocasión
- Nunca sufro demoras

Encuesta para vehículos comerciales en el condado de Hidalgo.

Proyecto: 365 Tollway

Instrucciones - Confiabilidad

Las siguientes preguntas nos ayudarán a entender qué tan importante es el tener tiempos de viaje predecibles. Para las siguientes cinco preguntas, le pediré que escoja entre dos diferentes opciones para hacer el viaje que usted acaba de describir.

* Para cada pregunta, por favor preste atención a las opciones y díganos cuál prefiere más.
* En cada pregunta, enfóquese solo en las dos opciones de viaje mostradas. No considere otras elecciones que usted haya realizado en preguntas anteriores.
* Por favor recuerde que no hay respuestas correctas ni equivocadas, solo queremos conocer su opinión.

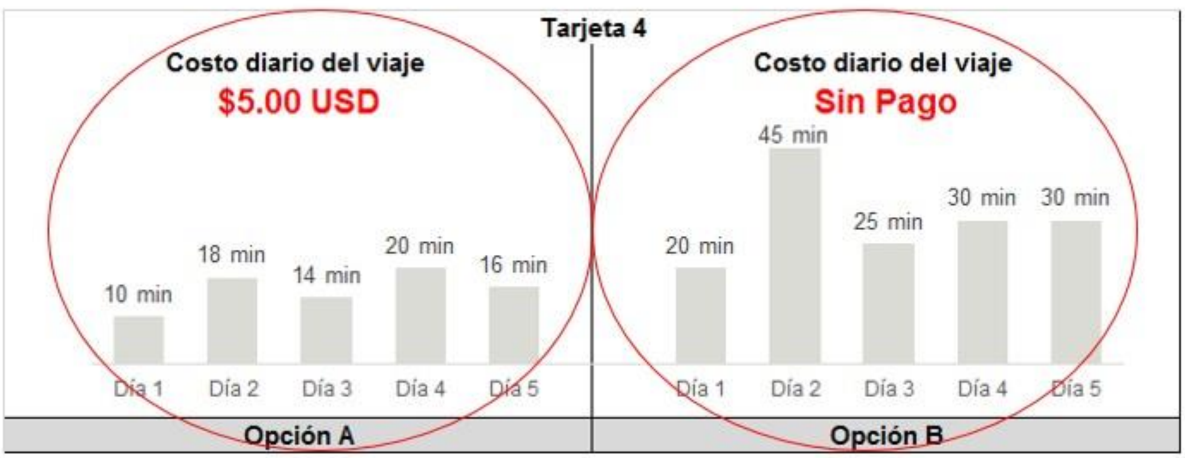
Instrucciones

Por favor lea las instrucciones cuidadosamente.

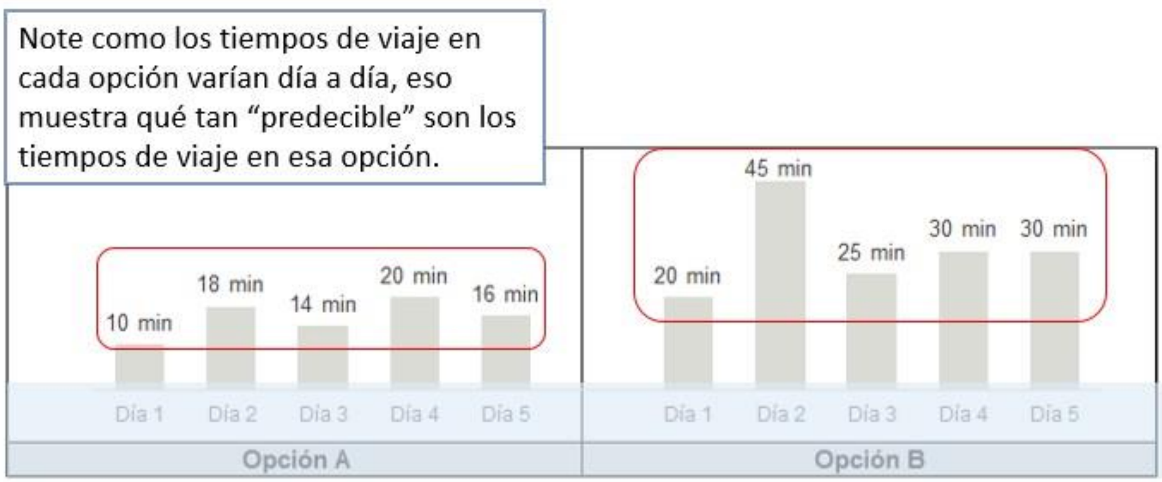
Imagine que usted realiza este mismo viaje que mencionó en la encuesta empezando y terminando en los mismos sitios, pero en 5 ocasiones distintas, empezando a la misma hora y el mismo día de la semana. Sin embargo, por razones que no pueden anticiparse (como ejemplo, el tráfico), estos viajes tienen diferentes cantidades de tiempo.

En la imagen se muestran **dos gráficas**, cada una de ellas representa los posibles tiempos de viaje para esas 5 ocasiones.

La información en **ROJO** variará de pantalla en pantalla.



Cada barra representa el tiempo que realizará en **CADA UNO** de los futuros 5 viajes usando esta opción.

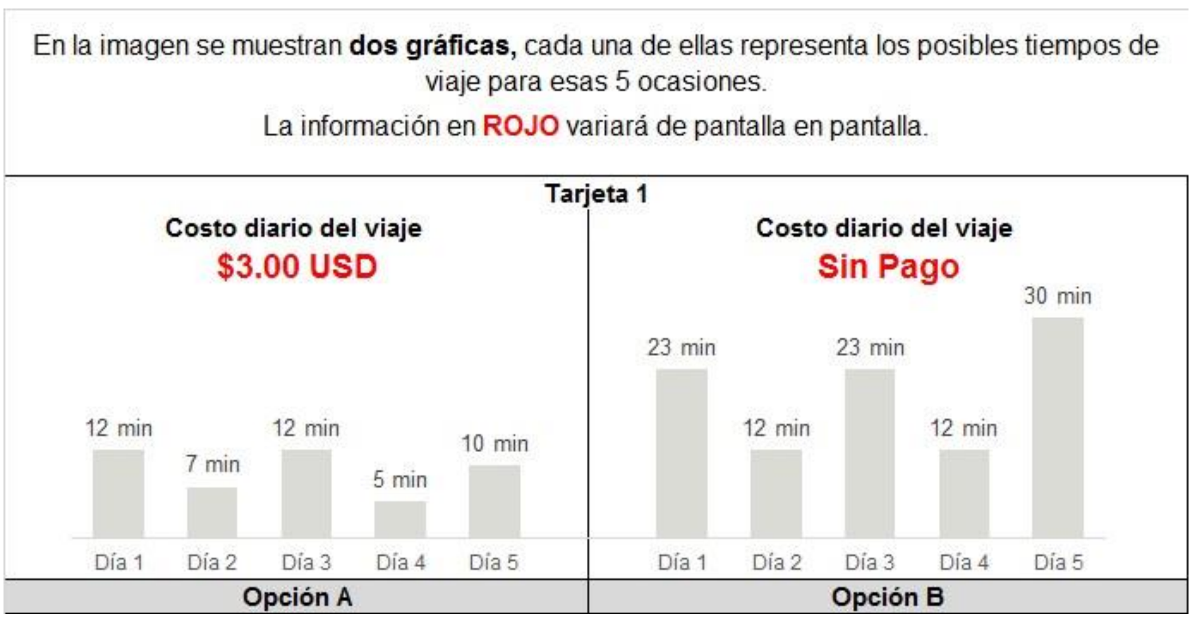


* 36. Solo para recordar. ¿Cuánto tiempo duró el viaje puerta a puerta?

◯ Menos de 40 minutos ◯ 41 o más minutos

HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Encuesta para vehículos comerciales en el condado de Hidalgo.
Proyecto: 365 Tollway
Confiabilidad - Experimento RT1A



* 37. Tarjeta 1 de 5.
¿Qué opción prefiere?

◯ Opción A ◯ Opción B

Encuesta para vehículos comerciales en el condado de Hidalgo. Proyecto: 365 Tollway

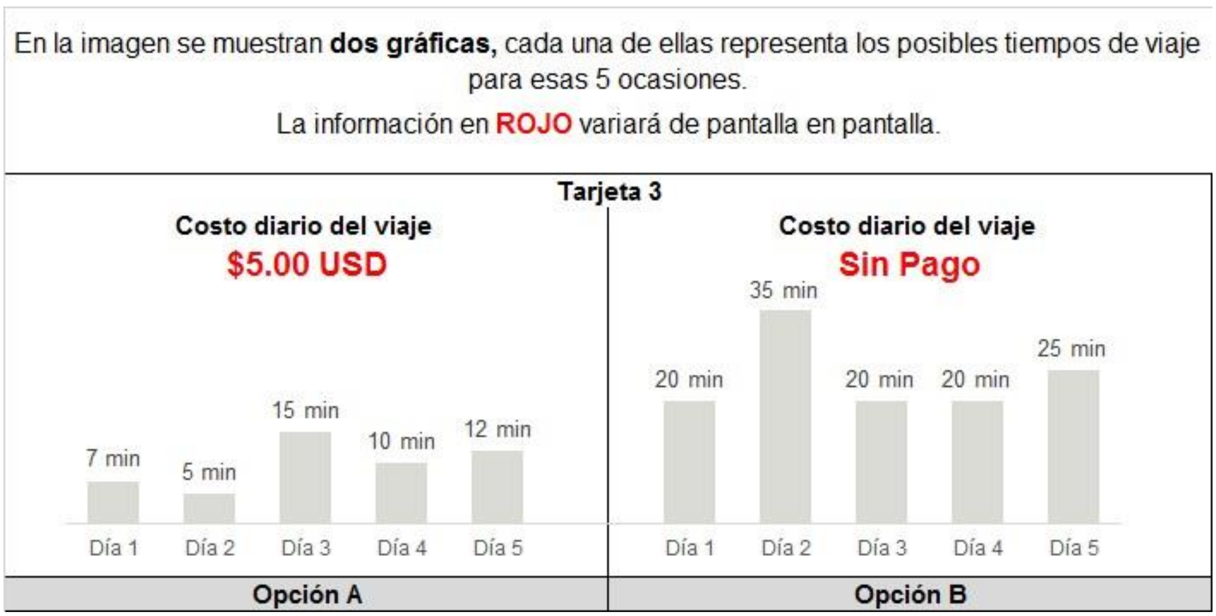
En la imagen se muestran **dos gráficas,** cada una de ellas representa los posibles tiempos de viaje para esas 5 ocasiones.

La información en **ROJO** variará de pantalla en pantalla.

* 38. Tarjeta 2 de 5.
¿Qué opción prefiere?

◯ Opción A ◯ Opción B

Encuesta para vehículos comerciales en el condado de Hidalgo. Proyecto: 365 Tollway



* 39. Tarjeta 3 de 5.
¿Qué opción prefiere?

◯ Opción A ◯ Opción B

Encuesta para vehículos comerciales en el condado de Hidalgo.
Proyecto: 365 Tollway

En la imagen se muestran **dos gráficas**, cada una de ellas representa los posibles tiempos de viaje para esas 5 ocasiones.

La información en **ROJO** variará de pantalla en pantalla.

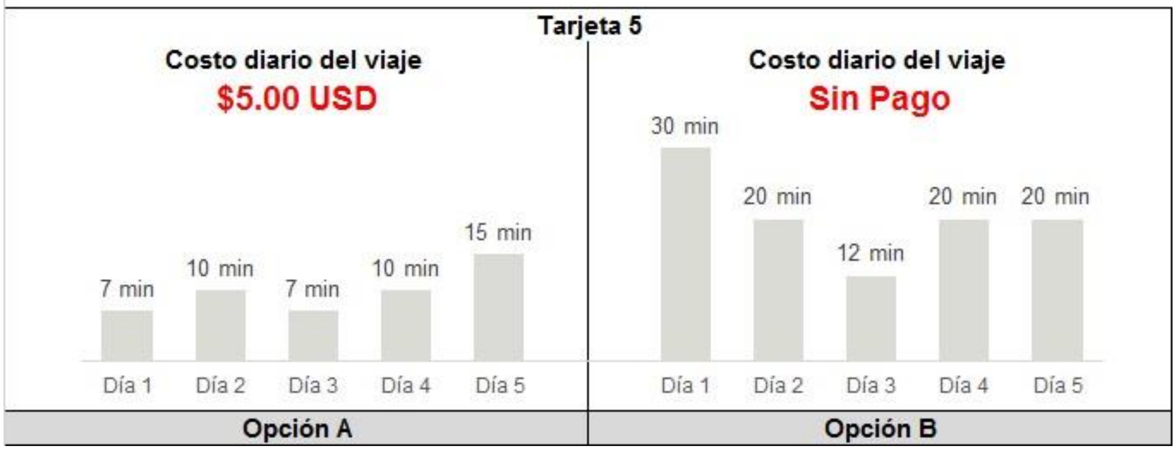
*40. Tarjeta 4 de 5.
¿Qué opción prefiere?

○ Opción A ○ Opción B

Encuesta para vehículos comerciales en el condado de Hidalgo.
Proyecto: 365 Tollway

En la imagen se muestran **dos gráficas**, cada una de ellas representa los posibles tiempos de viaje para esas 5 ocasiones.

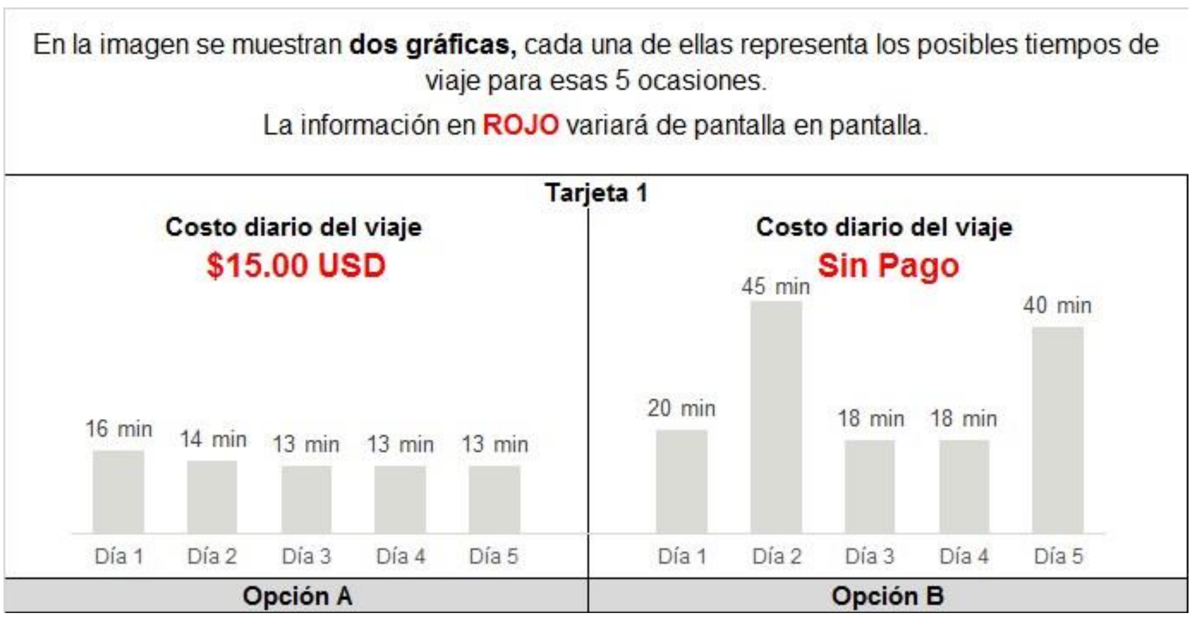
La información en **ROJO** variará de pantalla en pantalla.



* 41. Tarjeta 5 de 5.
¿Qué opción prefiere?

◯ Opción A ◯ Opción B

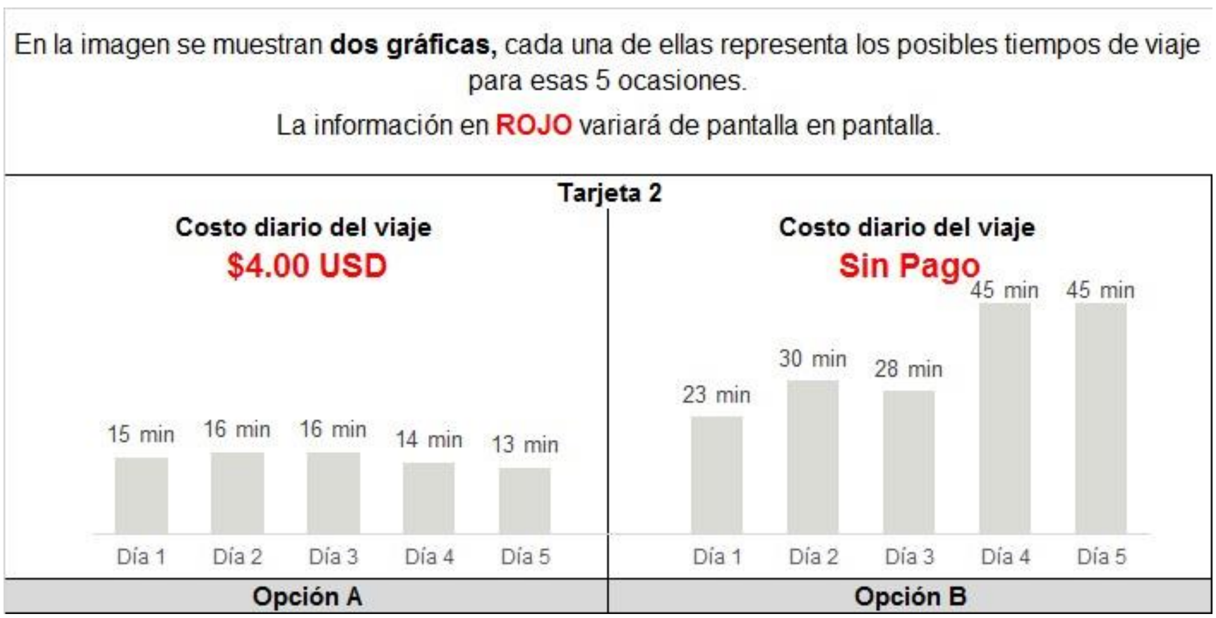
Encuesta para vehículos comerciales en el condado de Hidalgo.
Proyecto: 365 Tollway
Confiabilidad - Experimento RT2A



* 42. Tarjeta 1 de 5.
¿Qué opción prefiere?

◯ Opción A ◯ Opción B

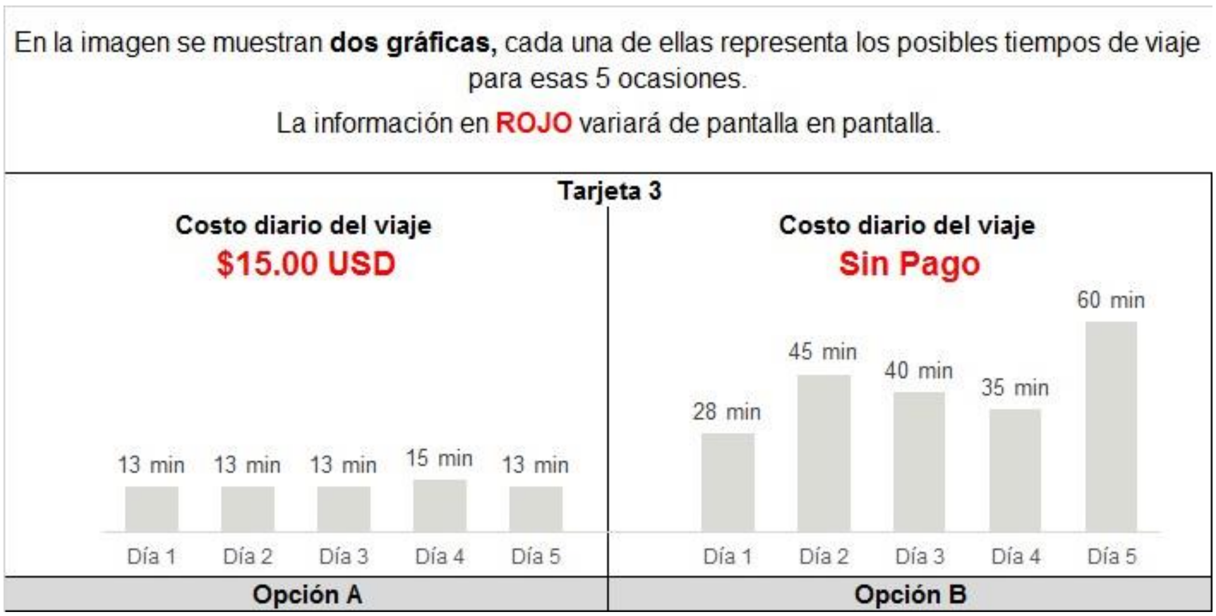
Encuesta para vehículos comerciales en el condado de Hidalgo.
Proyecto: 365 Tollway



* 43. Tarjeta 2 de 5.
¿Qué opción prefiere?

○ Opción A ○ Opción B

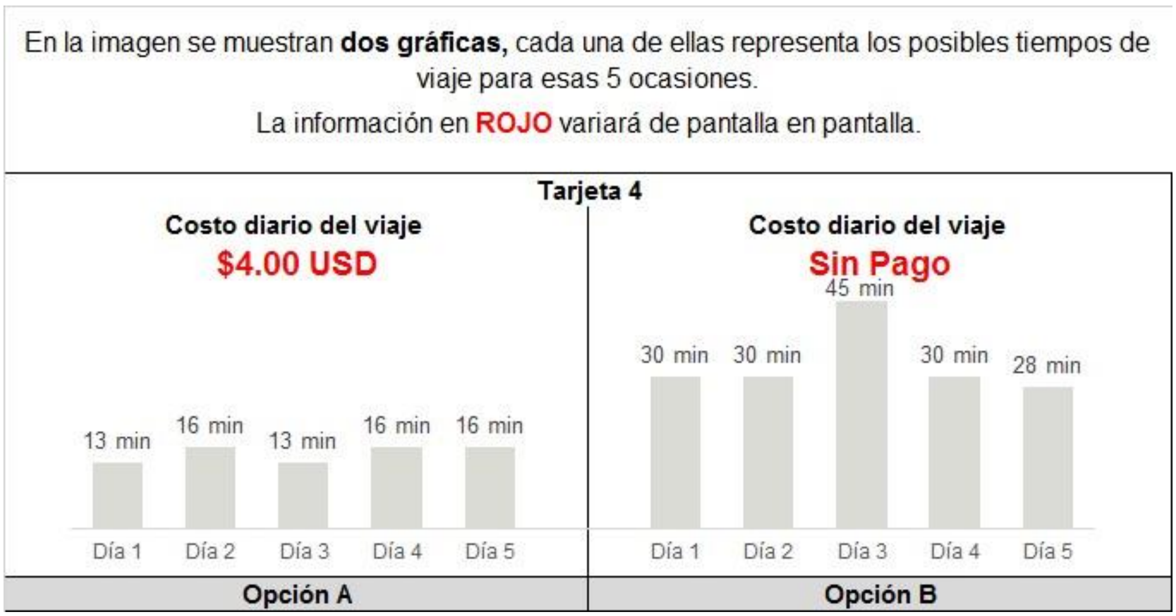
Encuesta para vehículos comerciales en el condado de Hidalgo. Proyecto: 365 Tollway



* 44. Tarjeta 3 de 5.
¿Qué opción prefiere?

- ◯ Opción A
- ◯ Opción B

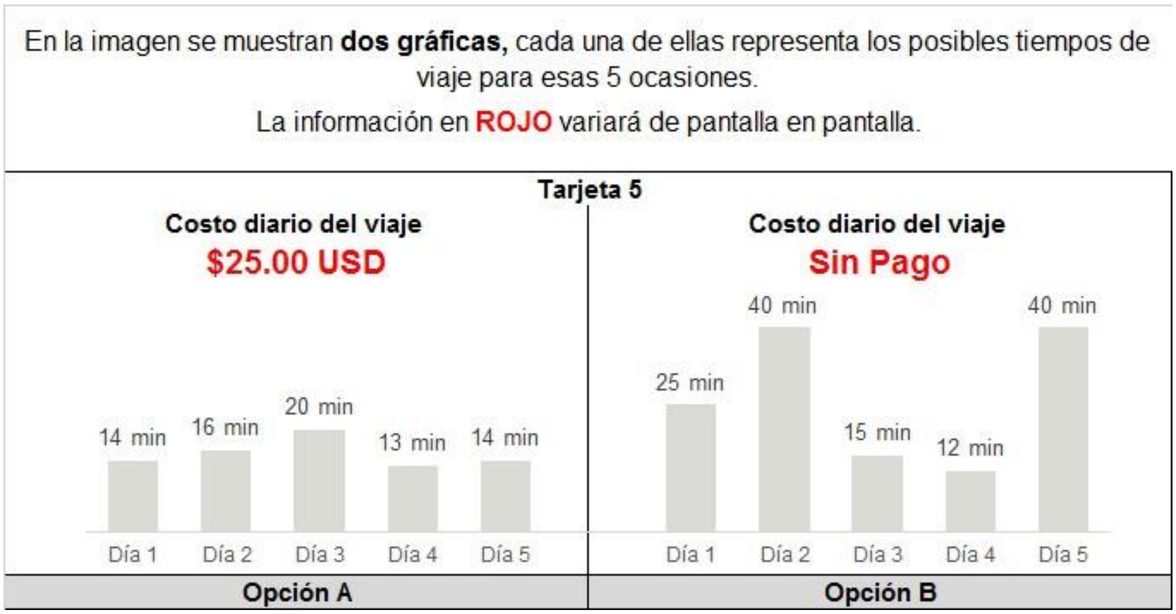
Encuesta para vehículos comerciales en el condado de Hidalgo.
Proyecto: 365 Tollway



* 45. Tarjeta 4 de 5.
¿Qué opción prefiere?

◯ Opción A ◯ Opción B

Encuesta para vehículos comerciales en el condado de Hidalgo. Proyecto: 365 Tollway



* 46. Tarjeta 5 de 5.
¿Qué opción prefiere?

◯ Opción A ◯ Opción B

Encuesta para vehículos comerciales en el condado de Hidalgo. Proyecto: 365 Tollway

COVID-19 - preguntas

"Estamos al tanto del impacto que la reciente pandemia COVID-19 ha tenido en las condiciones de vida y trabajo. Para las siguientes preguntas, le pediremos que considere la situación de la empresa ANTES del COVID-19, DURANTE el periodo de CUARENTENA, y en el FUTURO cuando todas las restricciones de quedarse en casa hayan sido eliminadas".

Por favor, seleccione todas las opciones que apliquen en cada situación.

* 47. De todos los empleados que tiene la empresa, ¿Qué porcentaje de ellos pueden realizar su trabajo desde casa?

Antes COVID-19 (%)	
Cuarentena (%)	
Sin Restricciones (%)	

* 48. ¿Con qué frecuencia la companía transporta mercancía?
Por favor, seleccione todas las opciones que aplican en cada situación.

	ANTES Covid-19	DURANTE Cuarentena	SIN Restricciones
Varias veces al día	☐	☐	☐
6 a 7 días a la semana	☐	☐	☐
5 días a la semana	☐	☐	☐
4 días a la semana	☐	☐	☐
2 a 3 días a la semana	☐	☐	☐
1 día a la semana	☐	☐	☐
1 a 3 días al mes	☐	☐	☐
Menos de una vez al mes	☐	☐	☐
Rara vez	☐	☐	☐
Nunca	☐	☐	☐

Otro (por favor especifique)

* 49. ¿Qué tipo(s) de carga la empresa transporta con mayor frecuencia a través de la frontera con EU/México o desde EU?
(Seleccione todas las que apliquen en cada situación)

	ANTES Covid-19	DURANTE Cuarentena	SIN Restricciones
Productos eléctricos / electrónicos	☐	☐	☐
Maquinaria y accesorios	☐	☐	☐
Componentes automotrices y/o vehículos nuevos	☐	☐	☐

	ANTES Covid-19	DURANTE Cuarentena	SIN Restricciones
Productos frescos	☐	☐	☐
Paquetería	☐	☐	☐
Papel o productos impresos	☐	☐	☐
Comida procesada, carne o productos lácteos	☐	☐	☐
Granos, nueces, o productos con harina	☐	☐	☐
Muebles	☐	☐	☐
Productos de derivado plástico	☐	☐	☐
Productos químicos	☐	☐	☐
Productos de madera (No muebles)	☐	☐	☐

Otros (por favor especifique)

* 50. ¿La empresa se ha visto obligada a realizar alguna(s) de las siguientes acciones? (Seleccione aquellas que apliquen en cada situación)

	ANTES Covid-19	DURANTE Cuarentena	SIN Restricciones
Reducir las horas de trabajo de los empleados	☐	☐	☐
Despedir personal	☐	☐	☐
Cambiar la estructura de pagos o prestaciones	☐	☐	☐
Empleados que renuncian por elección o necesidad	☐	☐	☐
Empleados en permiso CON paga	☐	☐	☐
Empleados en permiso SIN paga	☐	☐	☐
Cambio de actividades realizadas por los empleados	☐	☐	☐
Escalamiento de horarios de trabajo	☐	☐	☐

Otros (por favor especifique)

* 51. ¿La compañía ha tenido que invertir en...?

	AHORA	SIN Restricciones
Equipo de protección (Caretas, cubre-bocas, guantes, etc)	☐	☐
Programas de sanitización a vehículos e instalaciones	☐	☐
Capacitación a empleados en temas de COVID-19	☐	☐
Adaptación de instalaciones o cambio de oficinas	☐	☐
Pagos de seguros o fianzas debido al COVID-19	☐	☐

Otros (por favor especifique)

* 52. Por favor indique su opinión de qué tanto está de acuerdo o en desacuerdo con los siguientes enunciados acerca de la operación de la empresa.

	Total desacuerdo	En desacuerdo	Ni acuerdo Ni desacuerdo	De acuerdo	Total acuerdo
ANTES de la Pandemia, había flexibilidad para la entrega de mercancías.	◯	◯	◯	◯	◯
ANTES de la Pandemia, había penalización por ¿entregas tardías.	◯	◯	◯	◯	◯

	Total desacuerdo	En desacuerdo	Ni acuerdo Ni desacuerdo	De acuerdo	Total acuerdo
ANTES de la Pandemia, la empresa solía pagar el peaje de autopistas de cuota.					
DURANTE la Pandemia, los días de entrega y/o horarios de entrega han cambiado.					
DURANTE la Pandemia, los clientes han cancelado la recepción de mercancía.					
DURANTE la Pandemia, los clientes han cancelado la mercancía por entrega tardía.					
DURANTE la Pandemia, los clientes demandan nuevos protocolos para la entrega de mercancía.					
DURANTE la Pandemia, la empresa ha dejado de pagar autopistas de cuota.					

	Total desacuerdo	En desacuerdo	Ni acuerdo Ni desacuerdo	De acuerdo	Total acuerdo
DURANTE la Pandemia, la empresa ha disminuido el pago autopistas de cuota.	○	○	○	○	○

Encuesta para vehículos comerciales en el condado de Hidalgo.
Proyecto: 365 Tollway
Preguntas de opinión

* 53. ¿Podría darnos su opinión acerca de qué tan de acuerdo o en desacuerdo se encuentra con los siguientes enunciados aplicados a la empresa, en cuanto al uso de caminos de cuota y autopistas?

	Total desacuerdo	En desacuerdo	Ni acuerdo Ni desacuerdo	Acuerdo	Total acuerdo
El cliente / el seguro / el tipo de mercancía exigen el uso de las autopistas de cuota.	○	○	○	○	○
Utilizo las autopistas por las buenas condiciones del camino.	○	○	○	○	○
Utilizo las autopistas porque los caminos sin cuota no permiten el paso a carga.	○	○	○	○	○
Utilizo las autopistas por el ahorro de tiempo que ofrecen respecto a otras rutas.	○	○	○	○	○

	Total desacuerdo	En desacuerdo	Ni acuerdo Ni desacuerdo	Acuerdo	Total acuerdo
Solo utilizo las autopistas para alcanzar el tiempo límite en la entrega.	○	○	○	○	○
Al usar las autopistas estoy casi seguro de llegar a tiempo para la entrega de mercancía.	○	○	○	○	○
Utilizo las autopistas si las cuotas son accesibles.	○	○	○	○	○
Utilizo las autopistas porque ahorro gastos operativos.	○	○	○	○	○
Utilizo las autopistas porque tengo menos posibilidades de accidentes.	○	○	○	○	○

Otros (por favor especifique)

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Encuesta para vehículos comerciales en el condado de Hidalgo. Proyecto: 365 Tollway

Sobrepeso o Perecederos

54. ¿La empresa necesita un permiso especial proporcionado por la HCRMA para poder transportar la mercancía?

◯ Sí ◯ No

* 55. Solo para recordar. ¿La empresa transporta mercancía con sobrepeso o productos perecederos como frutas, verduras, carnes, productos lácteos, granos, nueces, harinas, etc.?

◯ Sí ◯ No

HCRMA
HIDALGO COUNTY REGIONAL MOBILITY AUTHORITY

Encuesta para vehículos comerciales en el condado de Hidalgo. Proyecto: 365 Tollway

* 56. Actualmente la empresa tiene que solicitar un permiso para usar determinadas rutas que permitan el paso de vehículos pesados o vehículos con productos perecederos. Si el pago del permiso fuera excesivo, como empresa ¿qué medidas cree que la empresa estaría dispuesta a implementar?

	Nada probable	No es probable	No estoy seguro	Es probable	Muy probable
La empresa cambiaría a vehículos de menor capacidad y realizaría más viajes.	○	○	○	○	○
La empresa cambiaría la ruta.	○	○	○	○	○
La empresa cambiaría de camiones a tren de carga.	○	○	○	○	○
La empresa adquiriría o rentaría nuevos almacenes o bodegas.	○	○	○	○	○
La empresa buscaría acceder a nuevos u otros centros de distribución.	○	○	○	○	○
La empresa buscaría un nuevo acuerdo con el condado para el paso de las unidades.	○	○	○	○	○

Otros (por favor especifique)

* 57. ¿Cuál es su opinión de la tarifa de $200 por el pago del permiso? (Seleccione qué tan de acuerdo o en desacuerdo es su opinión)

	Total desacuerdo	En desacuerdo	Ni acuerdo Ni desacuerdo	De acuerdo	Total acuerdo
El pago parece justo.	○	○	○	○	○
Puedo realizar el pago del permiso cómodamente.	○	○	○	○	○
Lo pago porque me permite tener buenas condiciones del camino para transportar la mercancía.	○	○	○	○	○
Debo pagarlo o no puedo transportar la mercancía.	○	○	○	○	○
Lo pago porque puedo pasar ese costo al cliente.	○	○	○	○	○

Otros (por favor especifique)

* 58. La cantidad de... (lea la cantidad) lo consideraría un pago excesivo por el permiso?

	Total desacuerdo	En desacuerdo	Ni acuerdo Ni desacuerdo	De acuerdo	Total acuerdo
$ 500 USD	○	○	○	○	○
$ 250 USD	○	○	○	○	○
$ 400 USD	○	○	○	○	○
$ 200 USD	○	○	○	○	○
$ 700 USD	○	○	○	○	○

Otros (por favor especifique)

Encuesta para vehículos comerciales en el condado de Hidalgo.
Proyecto: 365 Tollway
Características del usuario

* 59. De todos los viajes que regularmente hace la empresa en aproximadamente una semana. ¿Qué porcentaje de servicios de transportación contrata VS usar la propia flota de la empresa?

Se contratan servicios de transporte para cruzar la frontera (%)

La flota de la empresa cruza la frontera y entrega la carga al destino final (%)

* 60. Aproximadamente, ¿cuánto paga (USD) para distribuir la mercancía? (Incluyendo el contratar servicios para cruzar la frontera con México y servicios de larga distancia para llegar al destino final de la carga)

* 61. El vehículo comercial que realizó el viaje que describió anteriormente, ¿De quién es propiedad?

- De mi propiedad
- De la familia / De un amigo
- De la empresa
- Rentado

* 62. ¿Qué porcentaje de los embarques de/hacia E.U. son realizados en contenedores?

* 63. Aproximadamente, ¿Cuántos camiones tiene la empresa?

- ◯ 2-9 camiones
- ◯ 10-24 camiones
- ◯ 25 o más

* 64. ¿Cuál es la edad promedio de la flota?

Meses

Años

* 65. En general, ¿De cuántos ejes son los camiones de la empresa?

- ☐ 2 Ejes
- ☐ 3 Ejes
- ☐ 4 Ejes
- ☐ 5 Ejes
- ☐ 6 Ejes
- ☐ 7 Ejes
- ☐ 8 o más ejes

* 66. ¿Quién escoge la ruta del camión? (Seleccione todas las que apliquen)

- ☐ El cliente
- ☐ El gerente de la empresa
- ☐ El agente aduanal
- ☐ El operador logístico
- ☐ El gerente de tráfico en el centro de distribución
- ☐ El conductor
- ☐ Otro (por favor especifique)

* 67. ¿Cuál es su método preferido de pago para el pago de autopistas de cuota y puentes? (Seleccione todas las opciones que apliquen)

☐ Efectivo ☐ RFID (Prepago) ☐ Tarjeta de crédito

☐ Otros (por favor especifique)

* 68. Por favor, proporcione sus datos de contacto en los cuadros a continuación. Su información personal permanecerá anónima y confidencial.

Nombre:

Dirección:

Dirección 2:

Ciudad:

Estado/Provincia:

Código postal:

Número Telefónico:

Email:

69. Muchas gracias por su apoyo al contestar nuestra encuesta. Si usted tiene algún comentario, por favor escríbalo a continuación.

Investment Grade Socioeconomic Projections

Economic & Planning Systems, Inc.

November 30, 2021

Final Report

Investment Grade Socioeconomic Projections for Hidalgo County Regional Mobility Authority Toll 365 Project

The Economics of Land Use

Prepared for:
C&M Associates
HCRMA

Prepared by:
Economic & Planning Systems, Inc.

EPS #183146

November 30, 2021

Economic & Planning Systems, Inc.
730 17th Street, Suite 630
Denver, CO 80202-3511
303 623 3557 tel
303 623 9049 fax

Denver
Los Angeles
Oakland
Sacramento

www.epsys.com

Table of Contents

List of Tables

List of Figures

1. Executive Summary

Organization of Content

This report is organized with the following chapters.

- Executive Summary. a brief overview of EPS's three scenarios of independent forecasts, a comparison of these forecasts to third-party documentation, and an overview of methodologies used in their preparation.
- Trends. a historical analysis of economic and demographic variables used in the development of the short- and long-term independent forecasts and the selection of dependent and independent variables in the short-term econometric model.
- Major Development Plans. an analysis of conceptual, planned, or proposed land use projects (i.e. special generators) within Hidalgo and Cameron counties that may not have been integrated into the HCRMA's 2016 calibration of baseline TAZ forecast data.
- Independent Forecasts. provides details of EPS's methodology, assumptions, and model specifications for the short- and long-term model components. It also details the assumptions and parameters used to define the three (3) scenario profiles.
- Appendix. [*currently a placeholder for additional information that may need to be incorporated for documentation.*]

The content of the report is structured to answer questions related to the development of EPS's independent socioeconomic forecasts:

- Which data sources and trends were used to establish underlying factors and assumptions used in the forecasting models?
- What methodologies were used to develop the independent forecasts?
- How were different scenarios defined?
- What assumptions were used in defining the scenarios and why were they chosen?
- How do the resulting forecasts differ from previous or contemporary 3rd-party forecasts?

Summary of Projections

Employment

Independent Forecasts. **Table 1** illustrate EPS's three scenarios of employment between 2020 and 2045.

- Low: this scenario reflects average annual growth of approximately 7,200 jobs. The compounded annual average rate of growth is 1.6 percent.
- Mid: this scenario reflects average annual growth of approximately 8,500 jobs. The compounded annual average rate of growth is 1.9 percent.
- High: this scenario reflects average annual growth of approximately 10,200 jobs. The compounded annual average rate of growth is 2.2 percent.

Table 1 Summary of Employment Projections

	2020	2023	2025	2030	2035	2040	2045	2020-2045 Total	2020-2045 Ann. #	2020-2045 Ann. %
Scenarios										
Low Scenario	382,876	383,498	414,922	452,895	490,015	526,427	562,164	179,288	7,172	1.55%
Mid Scenario	382,876	392,698	426,805	469,693	511,927	553,634	594,819	211,942	8,478	1.78%
High Scenario	382,876	407,019	442,590	490,781	538,614	586,192	633,487	250,611	10,024	2.03%

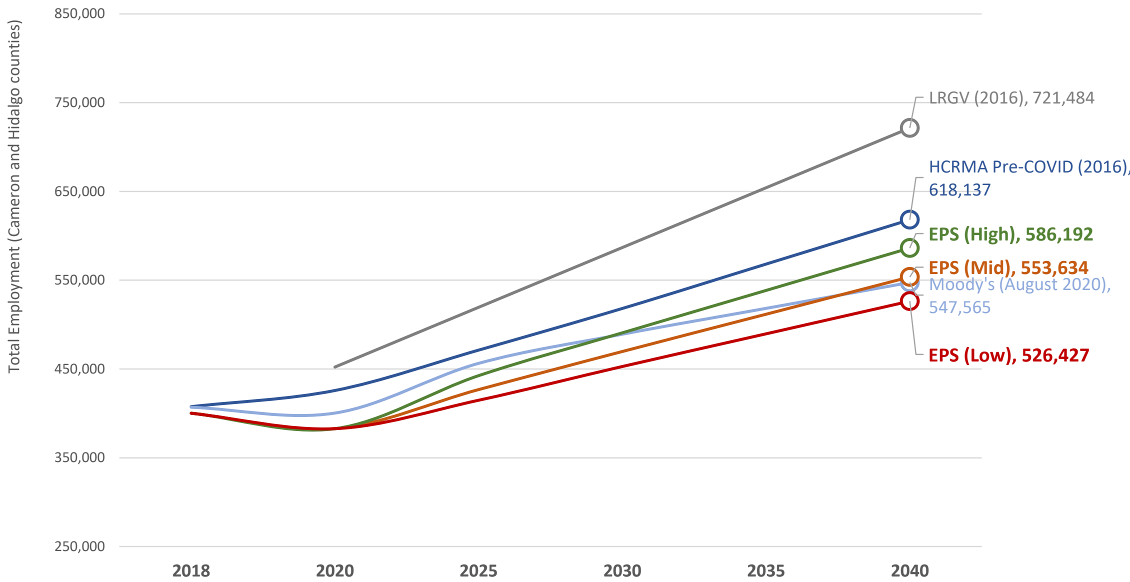
Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]Z.2 - Employment

Comparisons. **Figure 1** illustrates EPS's three employment forecast scenarios (shown here only through 2040 because 2045 horizon years were not consistently an output of the collected third-party forecasts) in the context of the LRGV forecast from 2016, HCRMA's pre-COVID forecast from 2016, and Moody's forecast prepared in August 2020.

- Low: this scenario is approximately 15 percent below HCRMA's 2016 forecast, 27 percent below LRGV's 2016 forecast, and 4 percent below Moody's 2020 forecast.
- Mid: this scenario is approximately 10 percent below HCRMA's 2016 forecast, 23 percent below LRGV's 2016 forecast, and 1 percent above Moody's 2020 forecast.
- High this scenario is approximately 5 percent below HCRMA's 2016 forecast, 19 percent below LRGV's 2016 forecast, and 7 percent above Moody's 2020 forecast.

Figure 1 Comparison of Employment Forecasts



Source: LRGV; HCRMA; Moody's; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Forecast Comparisons.xlsx]T1 - Summary

Population

Independent Forecasts. **Table 1** illustrate EPS's three scenarios of population between 2020 and 2045.

- Low: this scenario reflects average annual growth of approximately 21,400 persons. The compounded annual average rate of growth is 1.4 percent.
- Mid: this scenario reflects average annual growth of approximately 23,400 persons. The compounded annual average rate of growth is 1.5 percent.
- High: this scenario reflects average annual growth of approximately 26,200 persons. The compounded annual average rate of growth is 1.6 percent.

Table 2 Summary of Population Projections

								2020-2045		
	2020	2023	2025	2030	2035	2040	2045	Total	Ann. #	Ann. %
Scenarios										
Low Scenario	1,341,032	1,379,716	1,449,723	1,598,465	1,692,213	1,784,864	1,875,001	533,968	21,359	1.35%
Mid Scenario	1,340,942	1,387,162	1,463,988	1,622,910	1,724,348	1,826,195	1,925,917	584,975	23,399	1.46%
High Scenario	1,341,747	1,396,659	1,482,600	1,654,116	1,767,173	1,882,242	1,996,729	654,982	26,199	1.60%

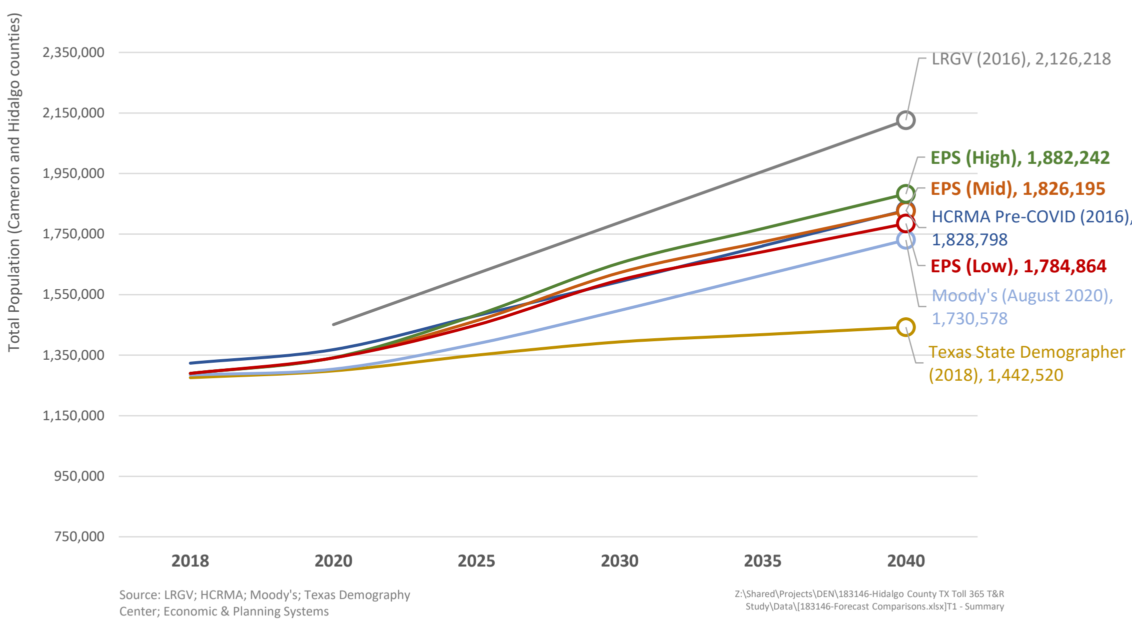
Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]Z.3 - Population

Comparisons. **Figure 43** illustrates EPS's three scenarios of population for the combined Cameron and Hidalgo counties in the context of the LRGV forecast from 2016, HCRMA's pre-COVID forecast from 2016, Moody's forecast prepared in August 2020, as well as the Texas State Demographer's forecast.

- Low: this scenario is approximately 2 percent below HCRMA's 2016 forecast, 16 percent below LRGV's 2016 forecast, 3 percent above Moody's 2020 forecast, and approximately 24 percent above the Texas Demographer.
- Mid: this scenario is 0.1 percent below HCRMA's 2016 forecast, 14 percent below LRGV's 2016 forecast, 6 percent above Moody's 2020 forecast, and approximately 27 percent above the Texas Demographer.
- High: this scenario is approximately 3 percent above HCRMA's 2016 forecast, 12 percent below LRGV's 2016 forecast, 9 percent above Moody's 2020 forecast, and approximately 31 percent above the Texas Demographer.

Figure 2 Comparison of Population Forecasts



Methodology Overview

Forecast Model Structure

The independent forecast is structured to accommodate inputs about the current economic situation, possible recovery scenarios from the COVID-19 pandemic and subsequent recession, as well as longer-term structural economic patterns. As such, EPS's model is structured with dual components:

- Short-Term Forecast (through 2025): This model component forecasts current conditions through the end of 2025 on a monthly basis, creating a linkage between the base year (2018) and the initial year of the long-term forecast component. This forecast is built on two series of ordinary least squares (OLS) regressions: 1) sales taxes by county, and 2) employment by county by industry supersector. This two-stage regression model replicates the clear relationship that personal consumer spending has on the overall economy and thus employment levels. Moreover, the short-term model allows for a quantification of the relationship between the COVID-19 pandemic and impacts to the employment market.
- Long-Term Forecast (2025-2045): This model component forecasts employment, population, and households with an employment-based population forecast methodology. It aggregates the short-term model employment outputs at an annual level and applies additional macroeconomic and demographic assumptions to arrive at longer-term forecasts of employment, population, and households. The layers of macroeconomic assumptions incorporate regional industry-level location quotients and national level industry-level employment projections. Demographic assumptions include shifts related to in- and out-commuting patterns, unemployment, self-employed persons, group quarters, non-working populations, as well as shifts in average household size.

Scenarios

After initial review of historical data and consideration for the incorporation of COVID-19 data into the modeling parameters, EPS identified three (3) scenarios, which contain separate but intertwined assumptions and profiles regarding the current downturn, recovery, and longer-term economic and demographic outlook.

Short-Term Forecast. In the short-term model, scenario narratives are driven largely by three eventualities related to the remainder of the COVID-19 pandemic. In this narrative, assumptions regarding public health outcomes drive outcomes in consumer confidence, consumer spending, and employment levels. Assumptions for each of these variables are described in greater detail in the following sections.

- Low. A vaccine is not widely available until late 2021, and recovery patterns in consumer confidence, consumer spending, and employment are slightly slower as a result of the length of the disruption caused by more lasting personal income impacts.
- Mid. A vaccine becomes available in early 2021, but immunization and the eradication of cases persist longer into 2021, such that recovery patterns in consumer confidence, consumer spending, and employment levels occur within the year.
- High. A vaccine becomes available in early 2021, and immunization and the eradication of cases occur relatively quickly, allowing quick recovery of consumer confidence, consumer spending, and employment levels, reflecting little deterioration of underlying consumer demand.

Table 3 Short-Term Model Scenarios

	Low	Mid	High
Public Health			
Peaks in confirmed COVID-19 cases	Peaks occur at 7-month intervals through 4th quarter 2021	Peaks occur at 7-month intervals through 2nd quarter 2021	Peaks occur at 7-month intervals through 2nd quarter 2021
Availability of COVID-19 vaccine	4th quarter 2021	1st quarter 2021	1st quarter 2021
Sufficient immunization reached to accommodate "business as usual"	1st quarter 2022	4th quarter 2021	3rd quarter 2021
Spending and Prices			
Consumer confidence (low point)	Middle of 3rd quarter 2021	End of 2nd quarter 2021	1st quarter 2021
Consumer prices	Rises at historic rates	Rises at historic rates	Rises at historic rates
Employment			
Low point	Middle of 2nd quarter 2021	Middle of 3rd quarter 2021	Middle of 4th quarter 2021
Recovery of 2019 levels	Approx. 1st quarter 2025	Approx. 2nd quarter 2024	Approx. 3rd quarter 2023

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\[183146-Model Scenarios.xlsx]Short Term

Long-Term Forecast. In the long-term model, scenario narratives are driven by: 1) annual employment levels for 2025 from the short-term model; and 2) the performance of each regional industry relative to the anticipated national structural growth by industry, as defined by the Bureau of Labor Statistics (BLS). Details of these assumptions are provided in the following sections.

- Low. This scenario is characterized by slower than anticipated long-term growth rates following the recovery from the pandemic and over the subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment persists longer and commuting patterns reflect relatively lower local labor force participation rates over time.
- Mid. This scenario is characterized by anticipated long-term growth rates by industry, which materialize following the recovery from the COVID-19

pandemic and subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment persists longer and commuting patterns reflect slightly higher local lower labor force participation rates over time.

- High. This scenario is characterized by higher-than-anticipated rates of industry-level employment growth rates following the pandemic and subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment does not persist and commuting patterns reflect high labor force participation rates.

Table 4 Long-Term Model Scenarios

	Low	Mid	High
Employment			
Long-term growth relative to national structural growth	Lower than anticipated regional-to-national industry-level outcomes	Anticipated regional-to-national industry-level outcomes	Higher than anticipated regional-to-national industry-level outcomes
Unemployment	Relatively high rates persist through 2023	Relatively high rates persist through 2023	Relatively high rates persist through 2021
Demographics			
In-commuting	Moderate increase of in-commuting patterns	Moderate increase of in-commuting patterns	Relatively high increase of in-commuting patterns
Out-commuting	Relatively low increase of out-commuting	Moderate increase of out-commuting	Relatively high increase of out-commuting
Self-employed	Moderate increase of self-employed persons	Moderate increase of self-employed persons	Moderate increase of self-employed persons
Non-working population (<16 years)	Lower than historic rate of cohort growth	Lower than historic rate of cohort growth	Lower than historic rate of cohort growth
Non-working population (over 65)	Slightly higher than historic rate of cohort growth	Slightly higher than historic rate of cohort growth	Slightly higher than historic rate of cohort growth

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\[183146-Model Scenarios.xlsx]Long Term

2. Trends

This chapter presents an analysis of historical trends in economic and demographic variables used in the calibration of dependent and independent variables within the short-term econometric model, as well as the long-term employment-based population forecasting model.

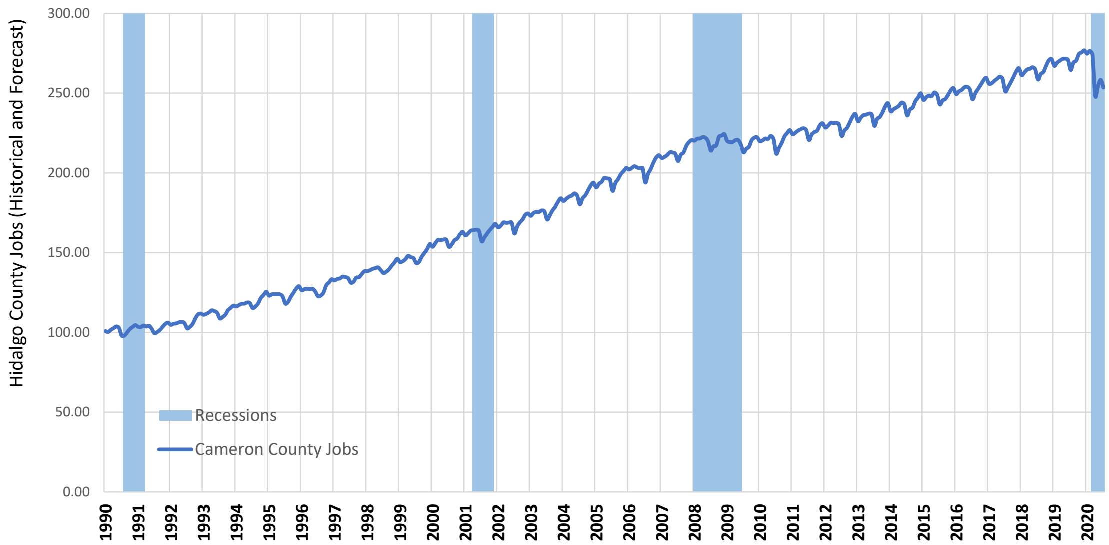
Employment and Commuting

This section details historical trends in Wage & Salary employment as well as commuting patterns. Wage & Salary employment data are sourced from the Bureau of Labor Statistics (BLS) and Texas Workforce Commission (TWC), and commuting data are sourced from the U.S. Census Longitudinal Employer Household Dynamics (LEHD). The methodology for the short-term independent forecast incorporates employment as one of the primary dependent variables (explained in greater detail in **Table 9** and **Table 11** on pages 28 and 30).

Hidalgo County. Shown in **Figure 3** are trends in Hidalgo County employment (jobs are shown in thousands) and recession indicators. Using historic information, including economic cycles preceding this timeframe, the following are rates of recovery during subsequent (recovery) time periods:

- 1991-2001: jobs rose at 4.5 percent per year, increasing 5,700 jobs per year
- 2001-2007: jobs rose at 4.7 percent per year, increasing 8,800 jobs per year
- 2009-2020: jobs rose at 2.0 percent per year, increasing 4,900 jobs per year

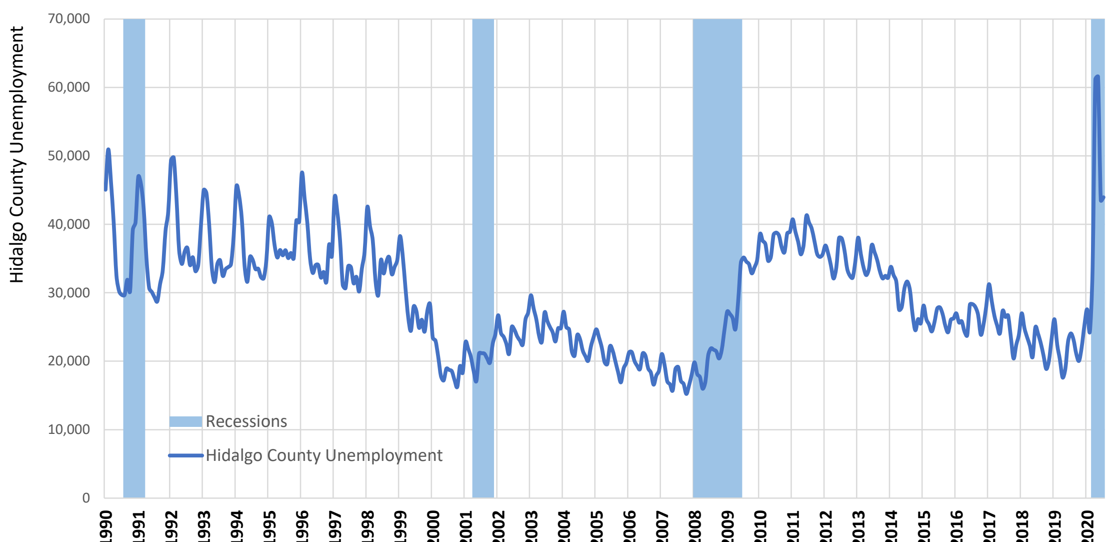
Figure 3 Historic Hidalgo County Jobs



Source: Bureau of Labor Statistics; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\Statistical Modeling\[183146-Monthly Model Calibration-090920.xlsx]H.10 - Sales Tax Forecast DATA

Figure 4 Hidalgo County Unemployment Trends



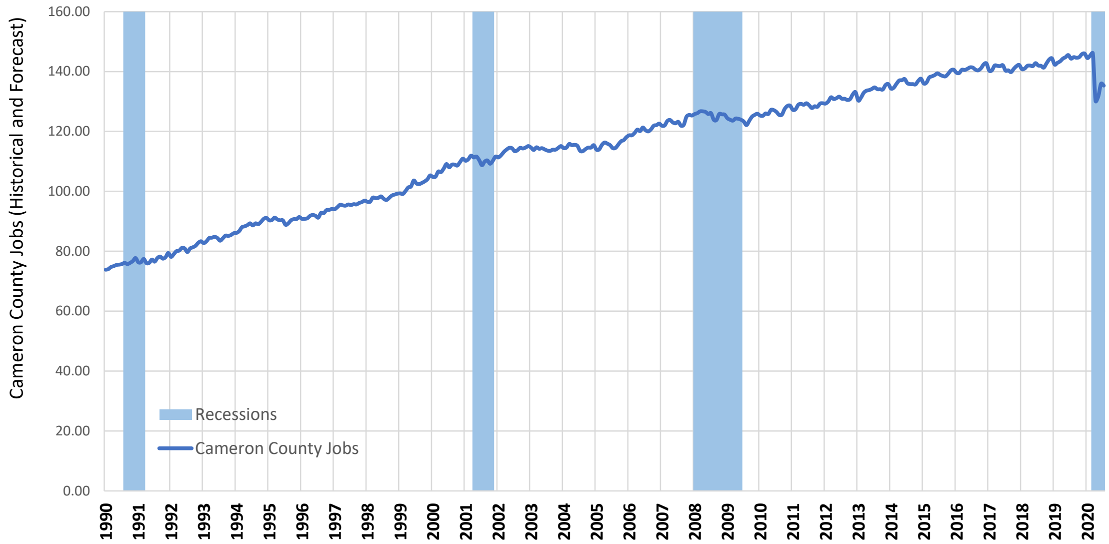
Source: Bureau of Labor Statistics; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\Statistical Modeling\[183146-Monthly Model Calibration-090920.xlsx]H.10 - Sales Tax Forecast DATA

Cameron County. Shown in **Figure 5** are trends in Cameron County employment (jobs are shown in thousands) and recession indicators. Using historic information, including economic cycles preceding this timeframe, the following are rates of recovery during subsequent (recovery) time periods:

- 1991-2001: jobs rose at 3.7 percent per year, increasing 3,400 jobs per year
- 2001-2007: jobs rose at 2.3 percent per year, increasing 2,600 jobs per year
- 2009-2020: jobs rose at 1.4 percent per year, increasing 1,800 jobs per year

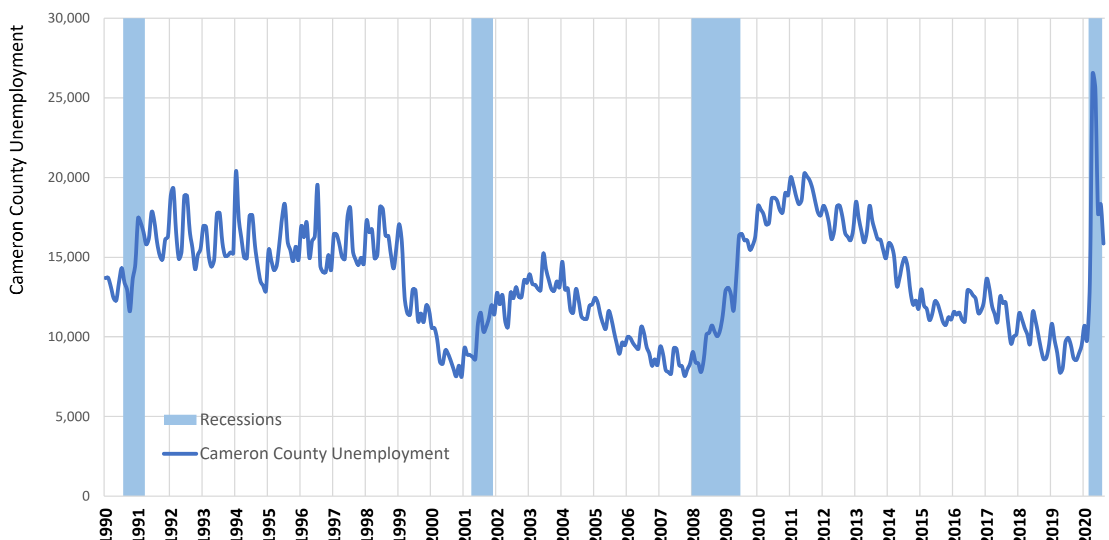
Figure 5 Historic Cameron County Jobs



Source: Bureau of Labor Statistics; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\[183146-Monthly Model Calibration-090920.xlsx]Sales Tax Forecast

Figure 6 Historic Cameron County Unemployment

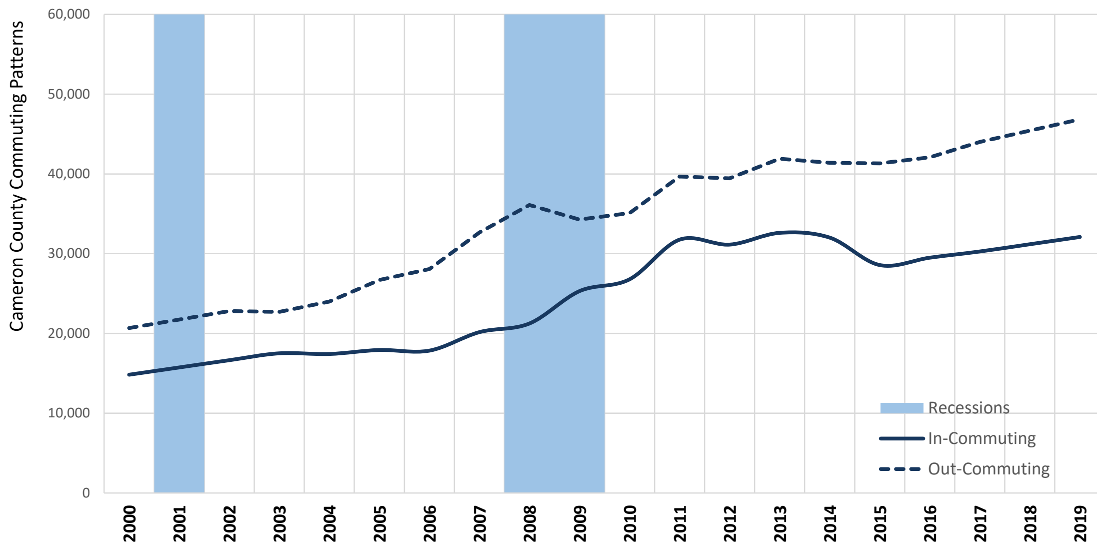


Source: Bureau of Labor Statistics; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\Statistical Modeling\[183146-Monthly Model Calibration-090920.xlsx]H.10 - Sales Tax Forecast DATA

Commuting Patterns. Shown in **Figure 7** and **Figure 8** are historical commuting patterns both counties. In Cameron County, the scale of both in- and out-commuting has doubled, moving in relative parallel to the growth of over employment. In Hidalgo County, the scale of in- and out-commuting have historically been similar, although in recent years in-commuting has declined.

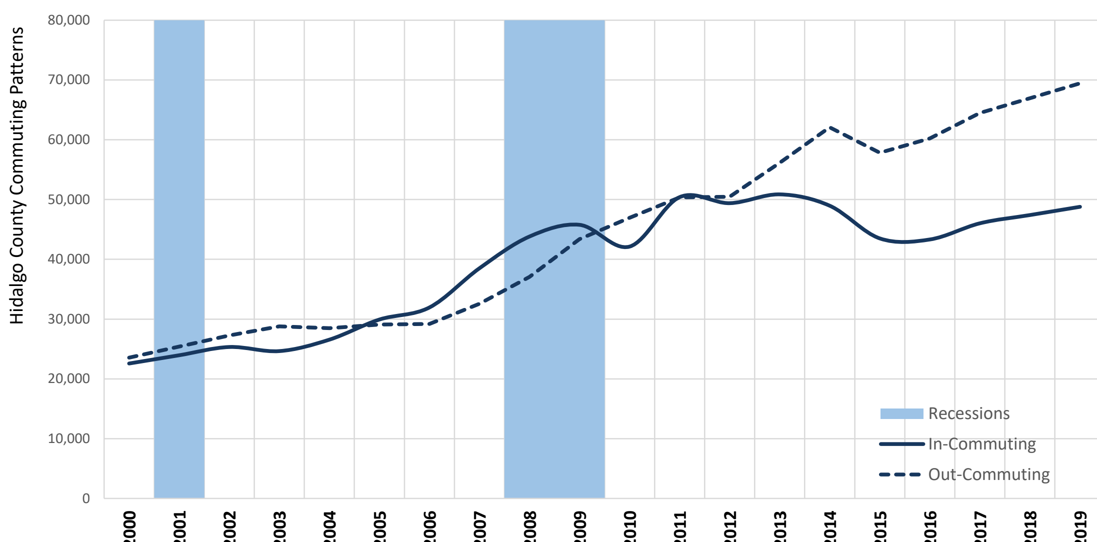
Figure 7 Cameron County Commuting Patterns



Source: U.S. Census LEHD; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Commuting.xlsx]TABLE iv - commuting

Figure 8 Hidalgo County Commuting Patterns

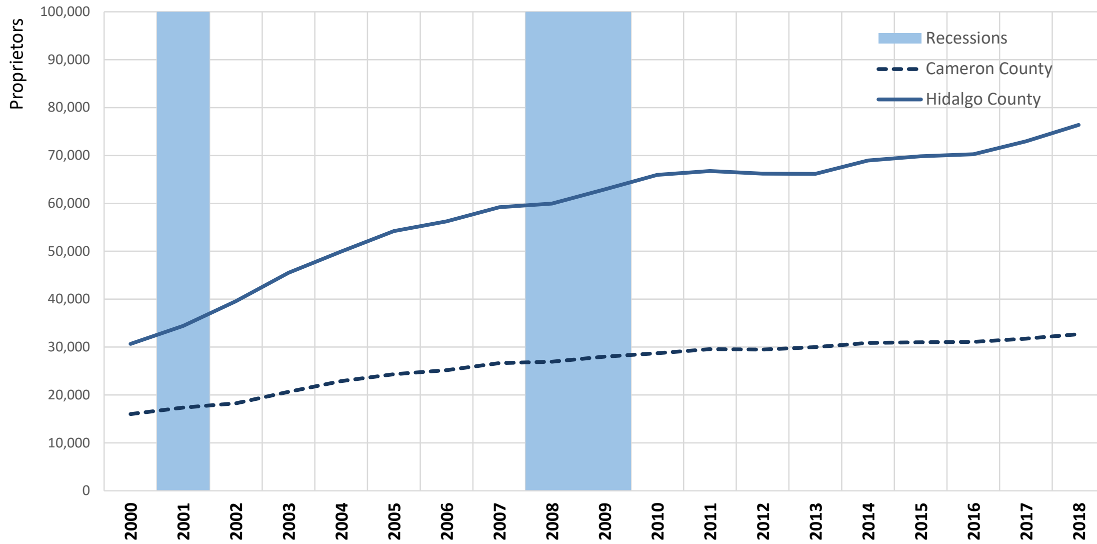


Source: U.S. Census LEHD; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Commuting.xlsx]TABLE iv - commuting

Proprietors. Historical trends in self-employed persons are shown for both counties in **Figure 9**. Over nearly 20 years, the scale of self-employed persons in both counties has doubled: from approximately 16,000 to 32,000 in Cameron County; and from approximately 31,000 to more than 76,000 in Hidalgo County. For Cameron County, this trend reflects a 4.0 percent compounded annual rate of growth, and for Hidalgo County, the trend represents a 5.2 percent rate of growth.

Figure 9 Historic Proprietor Employment



Source: U.S. Census; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Nonemployer Data.xlsx]TABLE 1 - Census

Demographics

The following section provides historical context to the demographic variables. Data are sourced from the U.S. Census American Community Survey (ACS) as well as the Texas State Demographer.

Group Quarters. A small component of the overall population is contained in Group Quarters, defined as populations in correctional institutions, nursing homes, or other institutions. **Table 5** illustrates the magnitude of group quarters in Cameron County has declined slightly since 2000, and that the size of the group quarters in Hidalgo County population has nearly doubled.

Table 5 Historic Group Quarters Population

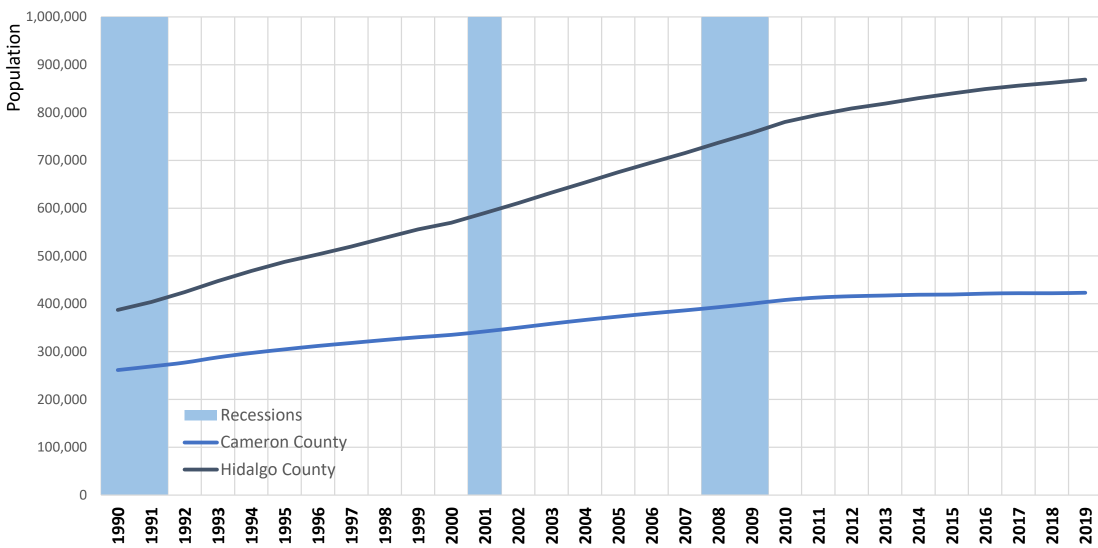
						2000-2019		
	2000	2005	2010	2015	2019	Total	Ann. #	Ann. %
Cameron	4,089	3,910	3,730	3,392	3,122	-967	-51	-1.41%
Hidalgo	5,662	6,322	6,982	8,756	10,175	4,513	238	3.13%

Source: U.S. Census; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Group Quarters.xlsx]TABLE ii.b - group qtrs

Population. Since 1990, the combined population of both counties has grown from less than 700,000 to approximately 1.3 million, an average annual increase of 22,200 persons per year. Shown in **Figure 10**, Hidalgo County's population has more than doubled from 400,000 to approximately 870,000 at an annual average rate of 2.8 percent, while Cameron County's population has grown from 270,000 to 420,000 at an annual average rate of 1.7 percent.

Figure 10 Historic Population Trends



Source: U.S. Census; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Intercensal Population-091520.xlsx]A.1 - Historic Pop Summary

Population by Age. Historical trends are broken down to show children (under 16), the traditional workforce ages (16 to 64 years), and retirees (65 and over). **Figure 11** and **Figure 12** illustrate that the elderly population in both counties has been rising steadily, as have the working age populations, but the scale of children under 16 has grown slower in the past 10 years.

Figure 11 Cameron County Historic Population by Age

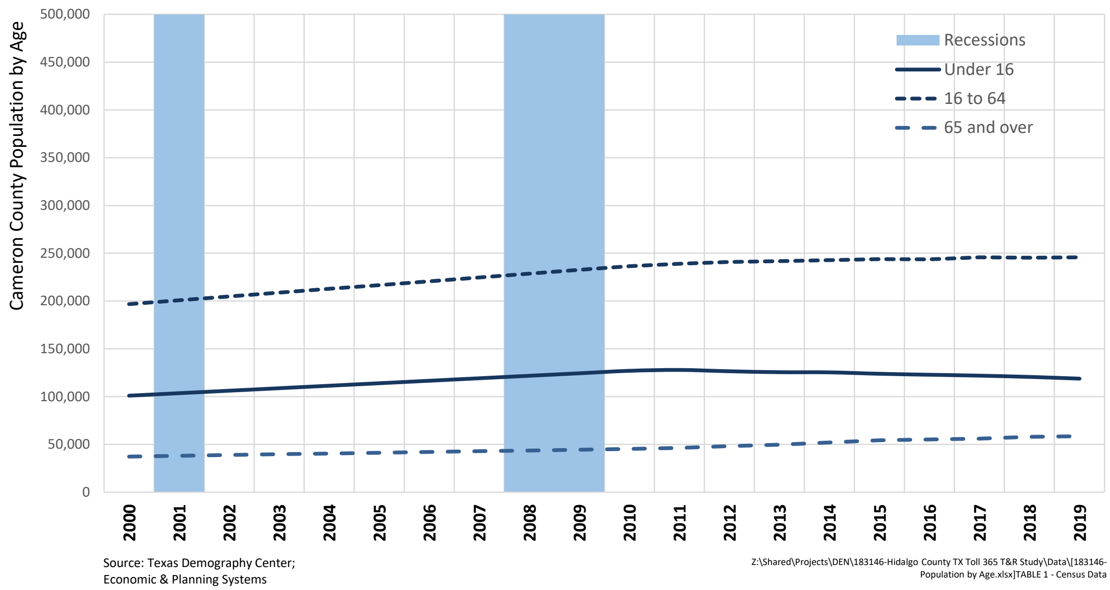
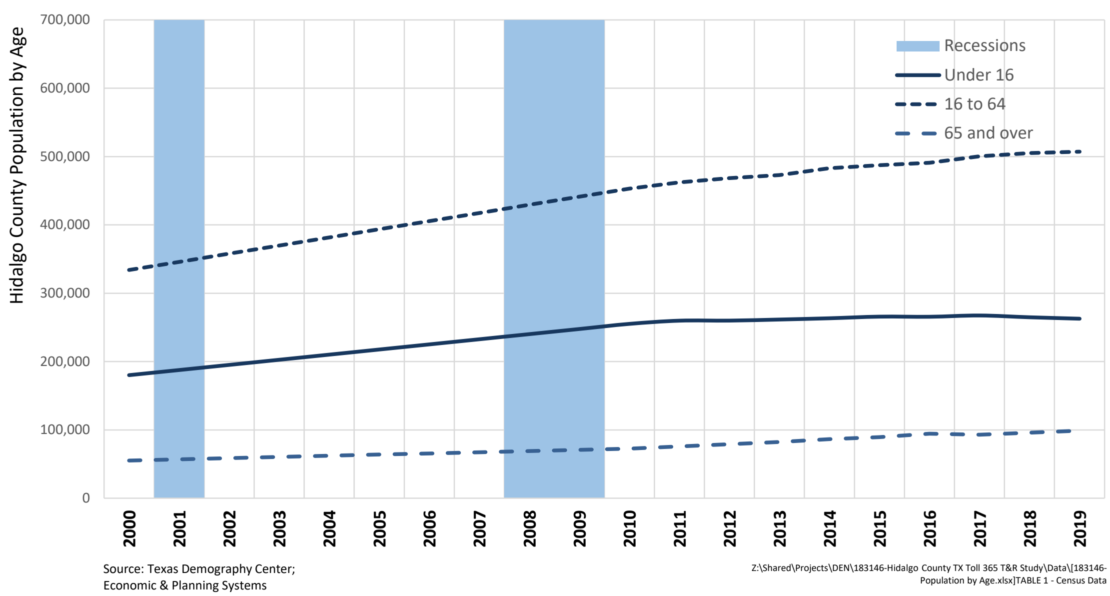


Figure 12 Hidalgo County Historic Population by Age



Consumer Spending

A second dependent variable in the short-term forecast is consumer spending, represented by sales tax allocations. Historical data were collected from the Texas Comptroller's website. Shown in **Figure 13** and **Figure 14** and are actual and "backcast" trends in sales tax allocations for both counties.

Figure 13 Historic Hidalgo County Sales Tax Allocations

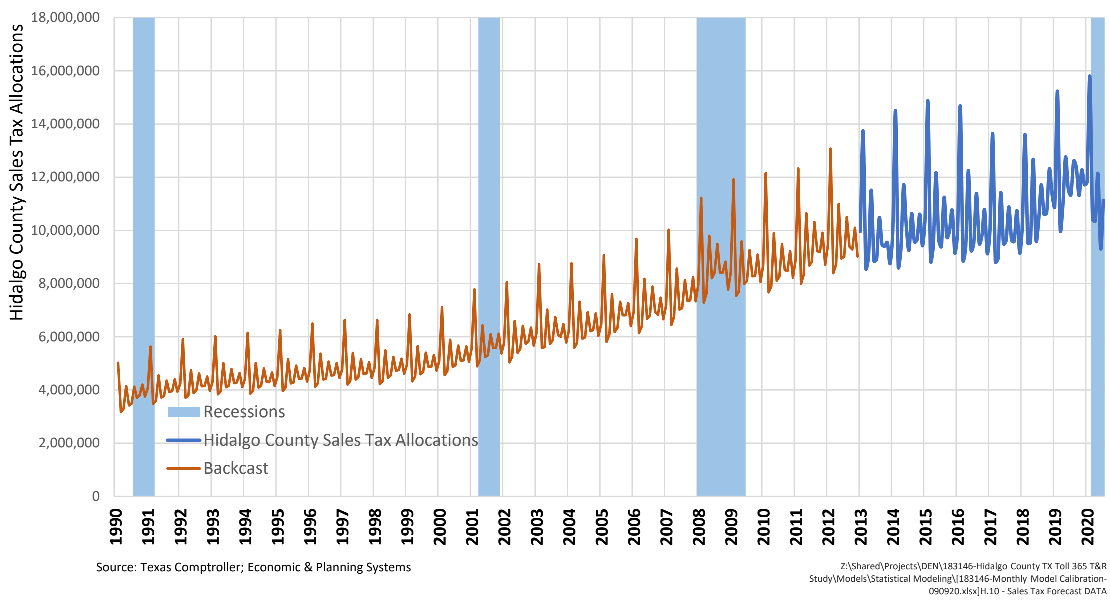
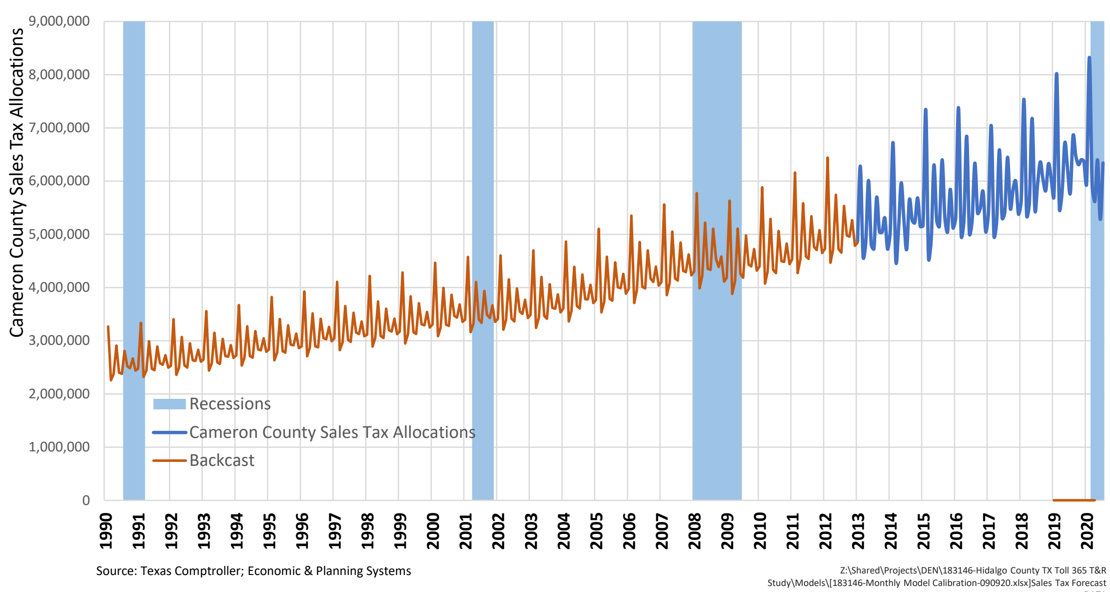


Figure 14 Historic Cameron County Sales Tax Allocations



Public Health

Data on new COVID-19 cases are sourced from the Texas Department of Health and Human Services (THHS). **Figure 15** and **Figure 16** illustrate the number of daily confirmed cases in each county, data were integrated into the short-term forecasting model as described in the following Independent Forecast chapter.

Figure 15 New Daily Cases of COVID-19 in Hidalgo County

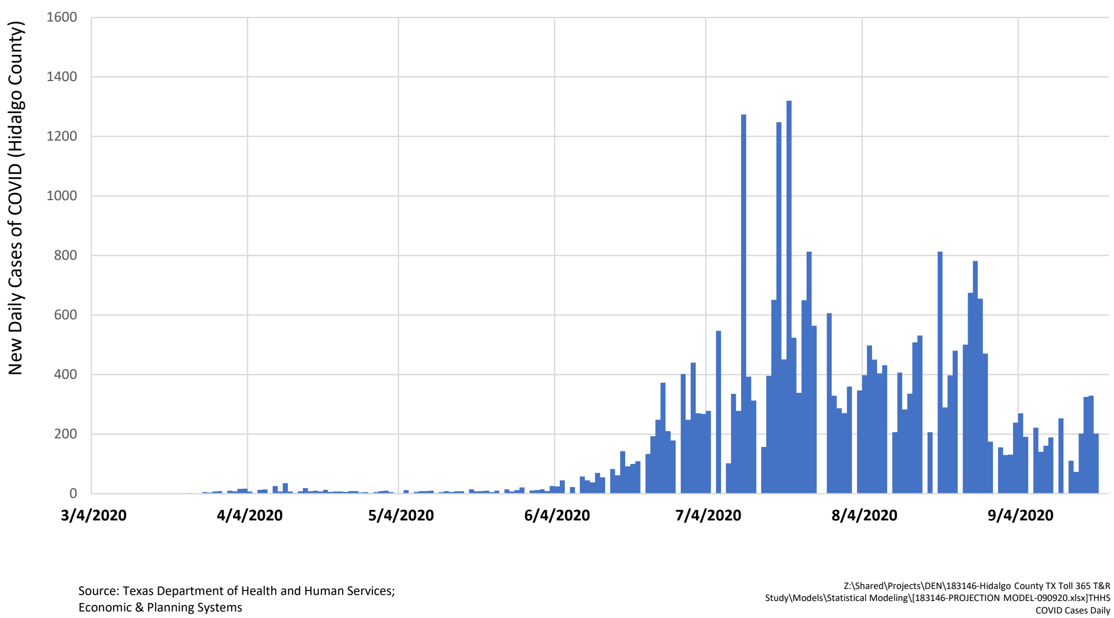
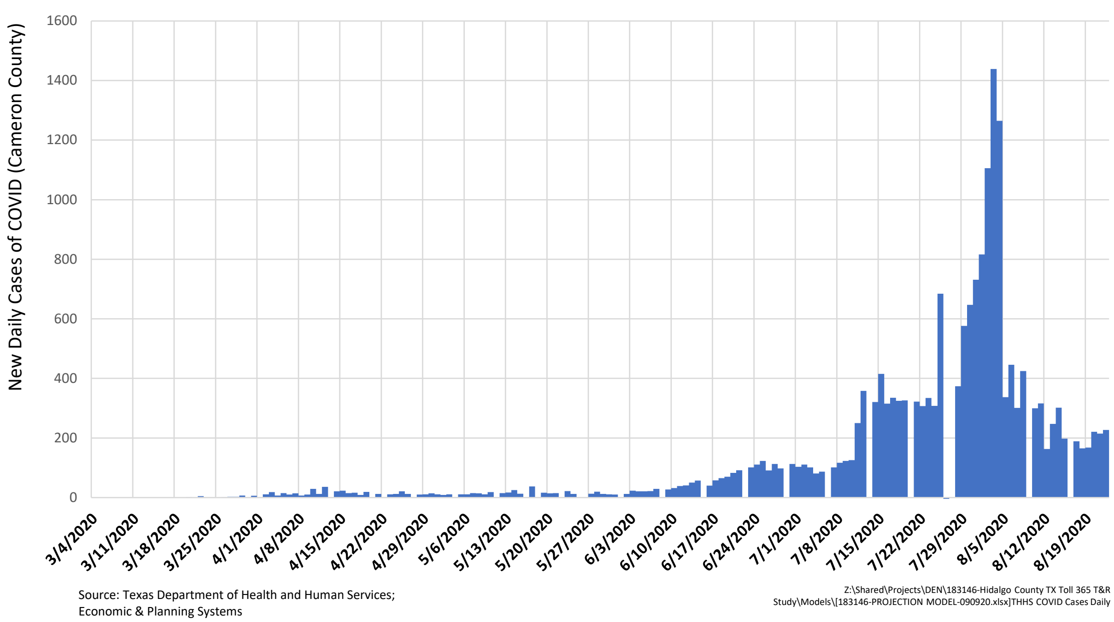


Figure 16 New Daily Cases of COVID-19 in Cameron County

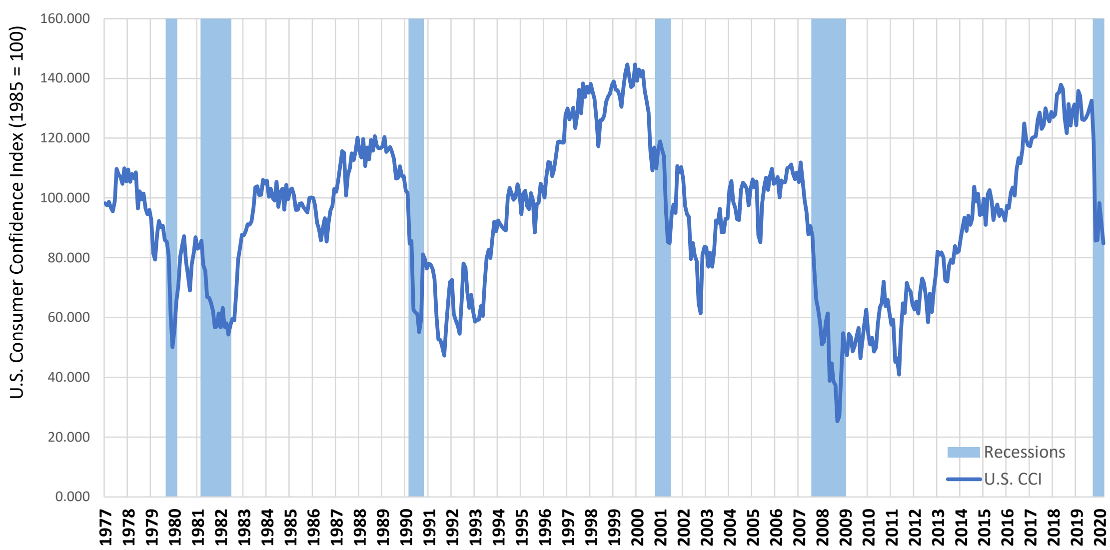


Consumer Confidence

In the absence of monthly or even quarterly data, the Conference Board's Consumer Confidence Index (CCI) is used as proxy for consumer spending and/or consumer sentiment regarding personal expenditure. Historic monthly data were obtained as shown back to 1977. The index is calibrated to 1985 as equaling 100. Recessions, as designated by the National Bureau of Economic Research, are highlighted as well. The trend reveals steep declines in the CCI during recessions with relatively similar rates of recovery between. Specifically, the rates of recovery were noted for the following economic cycles:

- 1982-1990: during the recession, the index declined at a rate of 2.4 points per month; during recovery, it increased by 0.5 points per month.
- 1991-2001: during the recession, the index declined at a rate of 3.9 points per month; during recovery, it increased by 0.5 points per month.
- 2001-2007: during the recession, the index declined at a rate of 2.5 points per month; during recovery, it increased by 0.1 points per month.
- 2009-2020: during the recession, the index declined at a rate of 2.3 points per month; during recovery, it increased by 0.7 points per month.

Figure 17 Consumer Confidence Index



Source: The Conference Board; Federal Reserve of Dallas; Economic & Planning Systems

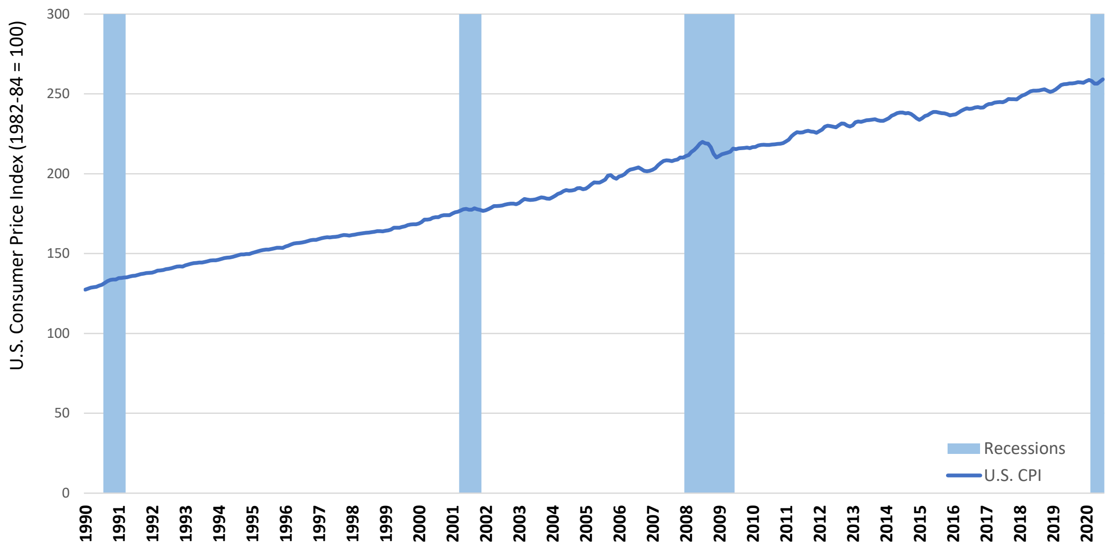
Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\[183146-PROJECTION MODEL-090920.xlsx]CEIC - CCI Monthly

Consumer Prices

The Consumer Price Index (CPI) from the Bureau of Labor Statistics was integrated as a standard component of model specifications for consumer spending. Historic data, which are shown below, back to 1990 reveal trends during a few of the previous economic cycles as well. Apart from slight increases in the rate of CPI escalation (noted visually in the chart below), data show the following patterns during the past three economic cycles:

- 1991-2001: index rose at 2.7 percent per year, increasing 4.1 points per year
- 2001-2007: index rose at 2.7 percent per year, increasing 5.2 point per year
- 2009-2020: index rose at 1.7 percent per year, increasing 4.1 points per year

Figure 18 Consumer Price Index



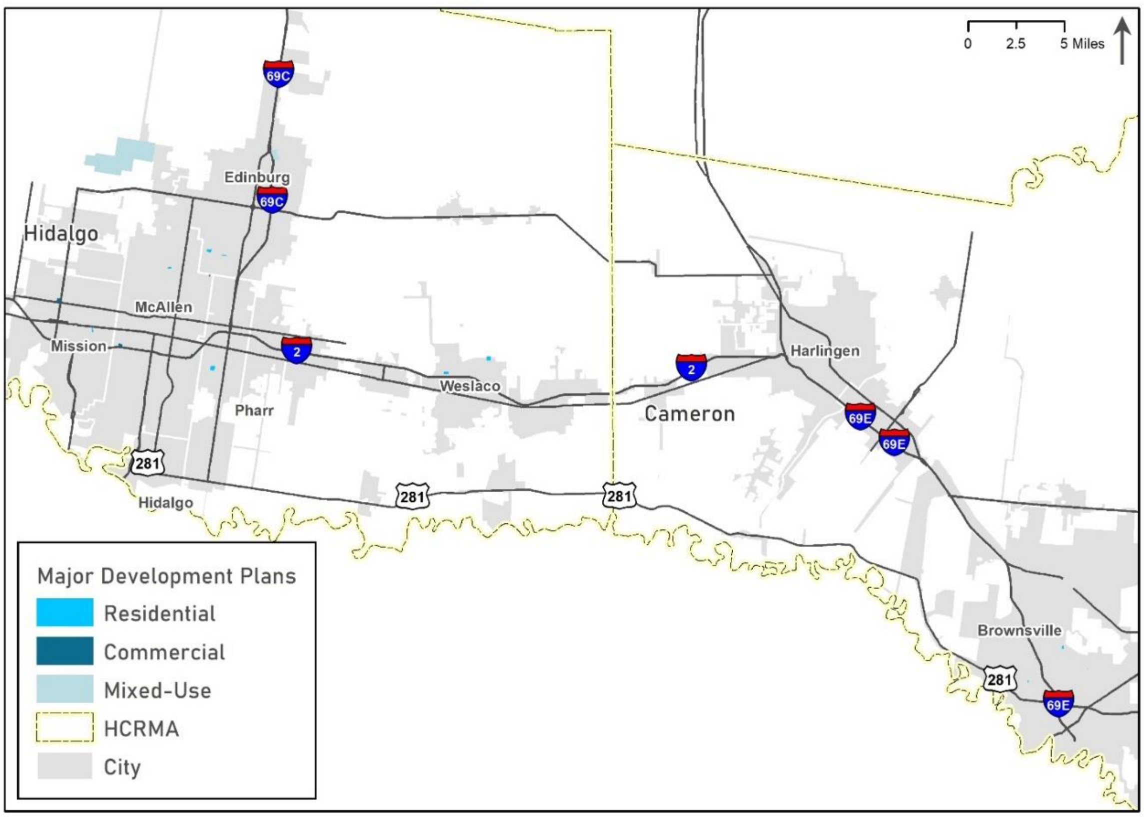
Source: Bureau of Labor Statistics; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\[183146-PROJECTION MODEL-090920.xlsx]CEIC - CCI Monthly

3. Major Development Plans

EPS researched and evaluated the growth potentials of 18 projects whose site plan boundaries are illustrated in **Figure 19**. Planners and city staff from each jurisdiction were interviewed to identify all projects in the area that are under construction, permitted, platted, planned, or conceptual. For each project, EPS made determinations based on market research and discussions with city staff as to the scale, timing, and likelihood of completion.

Figure 19. Major Development Plans



Application of Data

It is generally understood that an analysis of projections at a subarea or TAZ level produces results with a generally high degree of specificity and uncertainty. Moreover, HCRMA has often cautioned users against placing great reliance on TAZ level totals, as forecasting growth in such small geographic areas is difficult. As such, EPS' approach to making adjustments at the TAZ level is to do so only when market information and research provides a clear basis for such adjustments. In general, however, EPS adjusted TAZ-level data when the difference between what was likely to materialize in terms of land use developments and what was reported at the TAZ level were significantly different from each other (e.g., more than a 10 percent difference in magnitude). The following factors concerning market information and research were used to make these decisions with a clear basis.

- Development Plans
- Entitlement Process and Municipal Growth Policies
- Physical Area Attributes
- Existing Market Studies
- Development Pressure
- Proximity to Transportation Facilities
- Proximity to Employment Clusters
- Capital Improvements
- Ownership Patterns

As a result, when upward adjustments to TAZ-level data are made, which is generally the case for population and household data, population and household counts in TAZs in the respective municipality are reduced proportionally to ensure that control totals remain fixed. On the other hand, when downward adjustments to TAZ-level data are made, which is frequently the case for employment data in the Influence Area, employment counts in TAZs in the respective municipality are reduced proportionally to ensure that control totals remain fixed.

Land Use Development Research

The following are descriptions of each major development project evaluated and the conclusions drawn from our research and interviews regarding the scale, timing, and probability of development during the 2023 to 2045 timeframe.

Brownsville

- Huntington and Catalon at Paseo de la Resaca: Two recently completed multifamily developments with a total of 260 units. No adjustments were made.
- Las Palmas Retail Center: A shopping center currently under construction located at 3777 North Expressway. The center will include a total of 10,670 square feet of retail space. No adjustments were made.
- Wild Rose Villas: A recently completed multifamily development with 60 units located at 205 Wild Road Lane. No adjustments were made.
- Villas Turqueza Luxury Townhomes: A recently completed residential development with 16 townhome units. No adjustments were made.

Edinburg

- 3832 S. McColl Rd (Midtown Edinburg): A proposed residential development that plans to include 250 units. EPS adjusted HCRMA's household projections up by 228 households to reflect the development.
- 4122 Rhonda St (Devon Place Apartments): A recently completed multifamily development with 120 units. EPS adjusted HCRMA's household projections down by 5 households to reflect this development within a built-out area.
- US Highway 281 & Monte Crisco: A mixed use development currently under construction that will include 198 residential units and approximately 500,000 square feet of retail space. EPS adjusted HCRMA's employment projection up by 936 jobs to reflect the buildout of this development. No household adjustments were made.

McAllen

- 701 E Expressway 83: A recently completed office development with nearly 115,000 square feet of space. EPS adjusted HCRMA's employment projections up by 376 jobs to reflect the completion of this development.
- 1900 Dove Ave (Las Palomas Village): A recently completed multifamily development with 122 units. EPS adjusted HCRMA's household projections up by 90 households to reflect this development.
- 4800 W Expressway 83: A proposed commercial development that will include approximately 150,000 square feet of retail and office space. EPS adjusted HCRMA's employment projections up by 363 jobs to reflect the buildout of the development.
- Tres Lagos MPC: A master planned community located at 4350 Tres Lagos Boulevard currently under construction. When complete, the project will include 5,000 residential units and approximately 1,500,000 square feet of

retail and office space. The development is anticipated to develop over the next 20 years. EPS adjusted HCRMA's household projections up by 4,985 households and employment projections up by 5,355 jobs to reflect the buildout of the development.

- UT Texas Medical School (Biomedical Research): Recently completed medical office located at 5300 North L Street. The development includes approximately 86,000 square feet of office space. EPS adjusted HCRMA's employment project up by 279 jobs in the near term.

Mission

- 1804 E 83 Highway (Twin Oaks Apartments): Recently completed multifamily development with 104 units. No adjustments were made.
- NWC FM 495 & Conway: A proposed commercial development with approximately 152,000 square feet of retail space. No adjustments were made.

Pharr

- 1004 W Garrison Dr (Carmel Estates): A residential development currently under construction that will have 296 multifamily units. EPS adjusted HCRMA's household projections up by 144 households to reflect the development's completion.

Weslaco

- 1501 N Border Ave (Midtown Weslaco): A recently completed multifamily development with 160 units. EPS adjusted HCRMA's household projections up by 118 households to reflect the development's completion.
- 2411 E Sugarcane: A residential development currently under construction. The project will include 242 multifamily units when complete. EPS adjusted HCRMA's household projections up by 238 households to reflect the buildout of this development.

4. Independent Forecast

This chapter details the methodology, assumptions, and results of EPS's independent forecasts. The entirety of EPS's underlying assumptions and outputs are detailed in this chapter, but some of the more granular aspects are presented in the Appendix.

Methodology Overview

This section outlines the component structures and scenarios used to define the independent forecast.

Forecast Model Structure

The forecast model is structured for inputs and assumptions regarding both the current economic situation, possible recovery scenarios, and outcomes, as well as longer-term structural economic patterns. This dual modeling approach accommodates and merges granular specificity, i.e. monthly metrics and rates, in the short-term with macroeconomic and demographic shifts occurring over the long-term, i.e. annual metrics and rates.

- Short-Term Forecast (through 2025): This model component forecasts current conditions through the end of 2025 on a monthly basis, creating a linkage between the base year (2018) and the initial year of the long-term forecast component. This forecast is built on two series of ordinary least squares (OLS) regressions: 1) sales taxes by county, and 2) employment by county by industry supersector. The reasoning for this two-stage regression model is to replicate the clear relationship that personal consumer spending has on the overall economy and thus employment levels. Moreover, the short-term model responds to an interest in quantifying the relationship between the COVIDF-19 pandemic and subsequent recession. The model parameters are also calibrated to meet specific criteria in which outputs are statistically significant.
- Long-Term Forecast (2025-2045): This model component forecasts employment, population, and households with an employment-based population forecast methodology. It aggregates the short-term model employment outputs at an annual level and applies additional macroeconomic and demographic assumptions to arrive at longer-term forecasts of employment, population, and households. The layers of macroeconomic assumptions incorporate regional industry-level location quotients and national level industry-level employment projections. Demographic assumptions include shifts related to in- and out-commuting patterns, unemployment, self-employed persons, group quarters, non-working populations, as well as shifts in average household size.

Scenarios

Overall, the short- and long-term model components integrate a series of high-level narrative assumptions that define EPS's three (3) scenarios.

Short-Term Forecast. In the short-term model, scenario narratives are driven largely by three eventualities related to the remainder of the COVID-19 pandemic. In this narrative, assumptions regarding public health outcomes drive outcomes in consumer confidence, consumer spending, and employment levels. Assumptions for each of these variables are described in greater detail in the following sections.

- Low. A vaccine is not widely available until late 2021, and recovery patterns in consumer confidence, consumer spending, and employment are slightly slower as a result of the length of the disruption caused by more lasting personal income impacts.
- Mid. A vaccine becomes available in early 2021, but immunization and the eradication of cases persist longer into 2021, such that recovery patterns in consumer confidence, consumer spending, and employment levels occur within the year.
- High. A vaccine becomes available in early 2021, and immunization and the eradication of cases occur relatively quickly, allowing quick recovery of consumer confidence, consumer spending, and employment levels, reflecting little deterioration of underlying consumer demand.

Table 6 Short-Term Model Scenarios

	Low	Mid	High
Public Health			
Peaks in confirmed COVID-19 cases	Peaks occur at 7-month intervals through 4th quarter 2021	Peaks occur at 7-month intervals through 2nd quarter 2021	Peaks occur at 7-month intervals through 2nd quarter 2021
Availability of COVID-19 vaccine	4th quarter 2021	1st quarter 2021	1st quarter 2021
Sufficient immunization reached to accommodate "business as usual"	1st quarter 2022	4th quarter 2021	3rd quarter 2021
Spending and Prices			
Consumer confidence (low point)	Middle of 3rd quarter 2021	End of 2nd quarter 2021	1st quarter 2021
Consumer prices	Rises at historic rates	Rises at historic rates	Rises at historic rates
Employment			
Low point	Middle of 2nd quarter 2021	Middle of 3rd quarter 2021	Middle of 4th quarter 2021
Recovery of 2019 levels	Approx. 1st quarter 2025	Approx. 2nd quarter 2024	Approx. 3rd quarter 2023

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\[183146-Model Scenarios.xlsx]Short Term

Long-Term Forecast. In the long-term model, scenario narratives are driven by: 1) annual employment levels for 2025 from the short-term model; and 2) the performance of each regional industry relative to the anticipated national structural growth by industry, as defined by the Bureau of Labor Statistics (BLS). Details of these assumptions are provided in the following sections.

- Low. This scenario is characterized by slower than anticipated long-term growth rates following the recovery from the pandemic and over the subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment persists longer and commuting patterns reflect relatively lower local labor force participation rates over time.
- Mid. This scenario is characterized by anticipated long-term growth rates by industry, which materialize following the recovery from the COVID-19 pandemic and subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment persists longer and commuting patterns reflect slightly higher local lower labor force participation rates over time.
- High. This scenario is characterized by higher-than-anticipated rates of industry-level employment growth rates following the pandemic and subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment does not persist and commuting patterns reflect high labor force participation rates.

Table 7 Long-Term Model Scenarios

	Low	Mid	High
Employment			
Long-term growth relative to national structural growth	Lower than anticipated regional-to-national industry-level outcomes	Anticipated regional-to-national industry-level outcomes	Higher than anticipated regional-to-national industry-level outcomes
Unemployment	Relatively high rates persist through 2023	Relatively high rates persist through 2023	Relatively high rates persist through 2021
Demographics			
In-commuting	Moderate increase of in-commuting patterns	Moderate increase of in-commuting patterns	Relatively high increase of in-commuting patterns
Out-commuting	Relatively low increase of out-commuting	Moderate increase of out-commuting	Relatively high increase of out-commuting
Self-employed	Moderate increase of self-employed persons	Moderate increase of self-employed persons	Moderate increase of self-employed persons
Non-working population (<16 years)	Lower than historic rate of cohort growth	Lower than historic rate of cohort growth	Lower than historic rate of cohort growth
Non-working population (over 65)	Slightly higher than historic rate of cohort growth	Slightly higher than historic rate of cohort growth	Slightly higher than historic rate of cohort growth

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\[183146-Model Scenarios.xlsx]Long Term

Short-Term Model

This section provides detailed descriptions of the model parameters and assumptions used in the short-term model component.

Model Parameters

The short-term model includes two regression models that sequentially project the following dependent variables: 1) sales tax allocations by county; and 2) employment by county. The predictive relationships between each independent variable and the dependent variable are discussed.

Hidalgo County Parameter Estimates. Numerous iterations of the sales tax allocation model were made before arriving on an optimal structure, as shown below. The model parameters were established to: a) maximize the adjusted R-squared; b) optimize the Durbin-Watson statistics, i.e. minimize the collinearity of variables; and c) identify the most statistically significant coefficients, i.e. minimize the p-values at the 99 percent or at least 95 percent confidence levels. In brief, the independent variables selected were as follows:

- COVID-19 cases: monthly cases were modeled as a forward-lagged variable, replicating the impact that knowledge of increasing cases has on consumer spending – i.e. it was theorized (and confirmed through iterations of modeling) that coefficients for this variable in the month in which cases are at their maximum were neither statistically significant nor predictive of the adverse impact of spending in the current or following months. The (very small) coefficient is negative, as theorized, and it is significant at the 99 percent confidence level.
- CPI: inflation serves two purposes: 1) as a counter-proxy to the Consumer Confidence Index, which fluctuates much more considerably; and 2) as a proxy for the general escalation of personal income. The coefficient is positive, as theorized, and it is significant at the 99 percent confidence level.
- Month: consumer spending is seasonal; the inclusion of this variable controls for seasonality. The coefficients are a mix of positive and negative, as theorized, and they are all significant at the 99 percent confidence level.
- Consumer Confidence Index: as noted in the presentation of historical data, consumer confidence rises during improving economic conditions, and falls with declines in the market. The overlay of recession periods confirms that it is useful as a proxy for market (i.e. consumer) spending behavior. The (very small) coefficient is significant at the 95 percent confidence level but is negative. EPS believes that the pattern of international spending is having a counter-intuitive impact here.

Table 8 Hidalgo County Sales Tax Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	6.0979670	0.1102920	55.29	<.0001
Lag[HDLG_COVID, -1]	-0.0000046	0.0000016	-2.95	0.0042
CPI	0.0040024	0.0005310	7.54	<.0001
MONTH[1]	-0.0002440	0.0070040	-0.03	0.9723
MONTH[2]	0.1410245	0.0070000	20.15	<.0001
MONTH[3]	-0.0595540	0.0069930	-8.52	<.0001
MONTH[4]	-0.0464600	0.0071510	-6.5	<.0001
MONTH[5]	0.0535739	0.0071090	7.54	<.0001
MONTH[6]	-0.0357740	0.0071930	-4.97	<.0001
MONTH[7]	-0.0293530	0.0071120	-4.13	<.0001
MONTH[8]	0.0301807	0.0074640	4.04	0.0001
MONTH[9]	-0.0195580	0.0074330	-2.63	0.0103
MONTH[10]	-0.0219280	0.0074320	-2.95	0.0042
MONTH[11]	0.0185977	0.0074430	2.5	0.0146
US_CCI	-0.0004720	0.0002130	-2.22	0.0296
	Estimate	**Number of Obs.**	**AutoCorrelation**	**Prob<DW**
Durbin-Watson	1.1615356	91	0.401	<.0001

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\Statistical Modeling\[183146-Monthly Model Calibration-090920.xlsx]H.12 - Sales Tax Model Specs

Numerous iterations of the employment model were also made before arriving on an optimal structure, as shown below. As with the model described above, the model parameters were established to achieve desired statistical results. The independent variables selected were as follows:

- Consumer Confidence Index: in this model, the CCI is used also to calibrate the model for behavioral spending inclinations, as well as to counteract the more subtle (resulting) shifts in sales tax allocations because of actual spending. The (very small) coefficient is positive, as theorized, and it is significant at the 99 percent confidence level.
- Sales Tax Allocations: a one-month lag of sales tax allocations is used in the model to replicate the delayed impact that fluctuations in spending have on business hiring and layoff decisions. The coefficient is very small, but positive, and is significant at the 95 percent confidence level. (Note: The variable is modeling in quadratic form for the purpose of improving the model's specifications and significance.)
- COVID-19 Cases: monthly cases were modeled again as a forward-lagged variable, replicating the impact that knowledge of increasing cases has on consumer spending. The (very small) coefficient is significant at the 99 percent confidence level but is positive. EPS believes that the observation that spending patterns have maintained and recovered despite COVID cases may be impacting the variable.

Table 9 Hidalgo County Jobs Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	2.3022549	0.0050170	458.88	<.0001
US_CCI	0.0008875	0.0000454	19.54	<.0001
Square(Lag[HDLG_SALES_TAX])	0.0000000	0.0000000	2.98	0.0037
Lag[HDLG_COVID, -1]	0.0000013	0.0000005	2.54	0.0129
	Estimate	**Number of Obs.**	**AutoCorrelation**	**Prob<DW**
Durbin-Watson	0.8343427	90	0.5828	<.0001

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\Statistical Modeling\[183146-Monthly Model Calibration-090920.xlsx]H.13 - Jobs Model Specs

Cameron County Parameter Estimates. Numerous iterations of the sales tax allocation model were made before arriving on an optimal structure, as shown below. The model parameters were established to: a) maximize the adjusted R-squared; b) optimize the Durbin-Watson statistics, i.e. minimize the collinearity of variables; and c) identify the most statistically significant coefficients, i.e. minimize the p-values at the 99 percent or at least 95 percent confidence levels. In brief, the independent variables selected were as follows:

- COVID-19 cases: monthly cases were modeled as a forward-lagged variable, replicating the impact that knowledge of increasing cases has on consumer spending – i.e. it was theorized (and confirmed through iterations of modeling) that coefficients for this variable in the month in which cases are at their maximum were neither statistically significant nor predictive of the adverse impact of spending in the current or following months. The (very small) coefficient is negative, as theorized, and it is significant at the 99 percent confidence level.
- CPI: inflation serves two purposes: 1) as a counter-proxy to the Consumer Confidence Index, which fluctuates much more considerably; and 2) as a proxy for the general escalation of personal income. The coefficient is positive, as theorized, and it is significant at the 99 percent confidence level.
- Month: consumer spending (and employment) is seasonal; the inclusion of this variable controls for seasonality. The coefficients are a mix of positive and negative, as theorized, and they are all significant at the 99 percent confidence level.
- Consumer Confidence Index: as noted in the presentation of historical data, consumer confidence rises during improving economic conditions, and falls with declines in the market. The overlay of recession periods confirms that it is useful as a proxy for market (i.e. consumer) spending behavior. The (very small) coefficient is positive, as theorized, but is significant at the 85 percent confidence level.

Table 10 Cameron County Sales Tax Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	5.9887794	0.0865220	69.22	<.0001
Lag[CMRN_COVID, -1]	-0.0000064	0.0000024	-2.67	0.0092
CPI	0.0030423	0.0004170	7.3	<.0001
MONTH[1]	-0.0186890	0.0054610	-3.42	0.001
MONTH[2]	0.1100132	0.0054570	20.16	<.0001
MONTH[3]	-0.0537890	0.0054500	-9.87	<.0001
MONTH[4]	-0.0324270	0.0055700	-5.82	<.0001
MONTH[5]	0.0555333	0.0055590	9.99	<.0001
MONTH[6]	-0.0284690	0.0057580	-4.94	<.0001
MONTH[7]	-0.0339830	0.0057900	-5.87	<.0001
MONTH[8]	0.0382982	0.0058190	6.58	<.0001
MONTH[9]	-0.0124860	0.0057950	-2.15	0.0344
MONTH[10]	-0.0152540	0.0057940	-2.63	0.0103
MONTH[11]	0.0150605	0.0058030	2.6	0.0114
US_CCI	0.0002444	0.0001670	1.47	0.1469
	Estimate	**Number of Obs.**	**AutoCorrelation**	**Prob<DW**
Durbin-Watson	2.2412932	90	-0.1214	0.8144

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\[183146-Monthly Model Calibration.xlsx]Model Specs

Numerous iterations of the employment model were also made before arriving on an optimal structure, as shown below. As with the model described above, the model parameters were established to achieve desired statistical results. The independent variables selected were as follows:

- Consumer Confidence Index: in this model, the CCI is used also to calibrate the model for behavioral spending inclinations, as well as to counteract the more subtle (resulting) shifts in sales tax allocations because of actual spending. The (very small) coefficient is positive, as theorized, and it is significant at the 99 percent confidence level.
- Sales Tax Allocations: a one-month lag of sales tax allocations is used in the model to replicate the delayed impact that fluctuations in spending have on business hiring and layoff decisions. The coefficient is very small, but positive, and is significant at the 95 percent confidence level. (Note: The variable is modeling in quadratic form for the purpose of improving the model's specifications and significance.)
- COVID-19 Cases: monthly cases were modeled again as a forward-lagged variable, replicating the impact that knowledge of increasing cases has on consumer spending. The (very small) coefficient is negative, as theorized, and it is significant at the 95 percent confidence level.

Table 11 Cameron County Jobs Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	2.0899987	0.0033960	615.34	<.0001
US_CCI	0.0004743	0.0000334	14.19	<.0001
Square(Lag[CMRN_SALES_TAX])	0.0000000	0.0000000	2.03	0.0457
Lag[CMRN_COVID, -1]	-0.0000016	0.0000007	-2.14	0.0351
	Estimate	**Number of Obs.**	**AutoCorrelation**	**Prob<DW**
Durbin-Watson	0.8555818	89	0.5609	<.0001

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\[183146-Monthly Model Calibration-090920.xlsx]Jobs Model Specs

Model Assumptions

This section provides context and rationale for what assumptions were used in the short-term forecasting model, including two critical factors: public health and consumer confidence.

Projection of Public Health Conditions. The motivation for integrating public health metric in the model specifications is the impact that the number of cases, and subsequent business closures and layoffs, had on the economy and jobs market.[1]

Identifying reasonable forecast assumptions for the public health outlook required assembling various pieces of historical and project expert guidance and perspectives. In addition to the research and analysis of historical confirmed COVID-19 cases, EPS researched Institute of Health Metrics & Evaluation's (IHME) 4-month projection scenarios of COVID-19 cases, public health expert opinions regarding the timing and availability of a vaccine, and perspectives on timing for its distribution.[2]

Shown in **Figure 20** are the IHME's forecasts of COVID-19 cases in the entire state of Texas. It should be noted that these data reflect the IHME's calculation of "estimated" not confirmed cases, as well as scenarios to reflect different eventualities of public adoption of mask-wearing mandates.

- Historic cases: data show the pattern of cases peaking in August 2020, as previously shown for Hidalgo County.

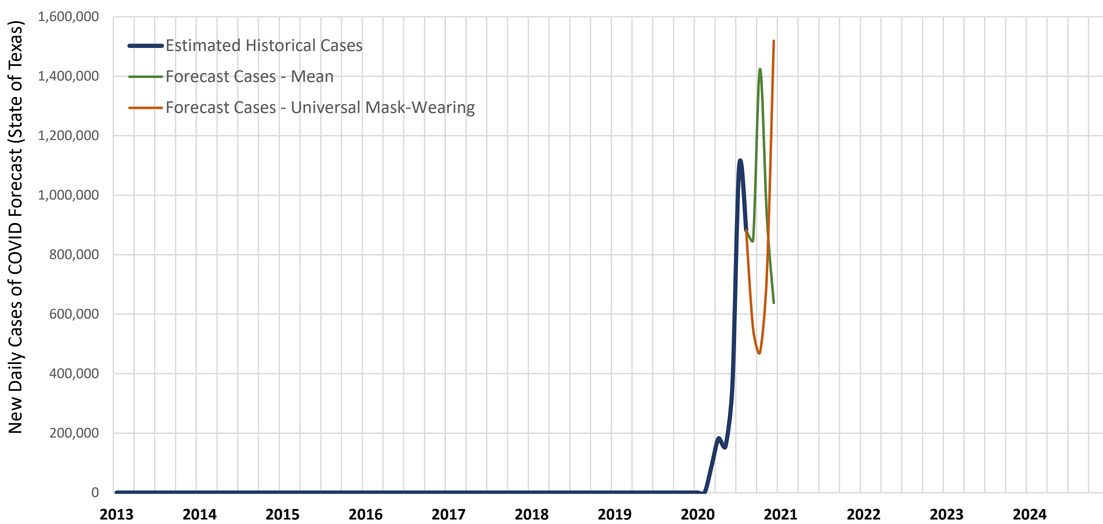
[1] Initial thinking on independent variables for the model specifications included dummy variables for beginning and end dates for lockdowns, specified industry business closures, etc. After a few months of observing trends in employment and spending, however, it was determined that those variables no longer carried predictive power for either consumer spending patterns or employment levels.

[2] EPS had not anticipated incorporating such a variable in its scoped work plan for producing independent socioeconomic forecasts; however, given the importance of integrating this element into the econometric modeling, EPS collected information on high-level public-facing documentation from public health experts on COVID-19 and its outlook. As such, this was neither a comprehensive review of the literature, nor a summary of a panel of all public health expert perspectives.

- Mean Forecast: the IHME estimates that cases will drop by approximately 23 percent from the July/August peak before increasing again. The next forecast peak is estimated to occur at the end of October 2020, just 3.2 months following the previous peak. It should be noted that a similar analysis at the U.S. level illustrates a peak-to-peak time frame of 7.4 months.
- Universal Mask Forecast: the IHME estimates that cases under this scenario will drop 57 percent through the beginning of November before increasing again. The next forecast peak is estimated to occur at the end of December 2020, 5.0 months following the previous peak. It should be noted that a similar analysis of this forecast scenario illustrates a peak-to-peak time frame of 8.7 months.

The critical take-aways from this analysis were the peak-to-peak periodicity of cases, which range from 3 to 5 months in the Texas forecast to 7 to 8 months in the U.S. forecast. Texas, however, did not peak at the end of March with the U.S. in general, but the IHME forecast assumes that Texas will peak with the U.S. in general in its four-month forecast.

Figure 20 IHME 4-Month Forecast of COVID-19 Cases in Texas



Source: Institute of Health Metrics & Evaluation; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-IHME Sept Projections.xlsx]Chart data

Modeled Public Health Assumptions

Reflecting the information discussed above, EPS identified the following as reasonable assumptions for projecting COVID-19 cases for integration with the short-term independent forecast.:

- Vaccine Availability and Delivery: expert opinions regarding these critical elements were relied upon. The "best case" assumptions were modeled with the convergence of current opinion (as of September 2020) from statements by: 1) Dr. Fauci, Director of the National Institute of Allergy and Infectious

Diseases; 2) Moncef Slaoui, Operation Warp Speed Chief Advisor; and 3) Stephane Bancel, Chief Executive Officer of Moderna. Respectively, these experts have made public statement that the vaccine will be available and delivered for large-scale immunization in the 3rd quarter 2021, 2nd quarter 2021, and 1st quarter 2021.

- Immunization Timing: expert opinion was also used to further calibrate the forecast assumption of the diminution of cases following the availability and delivery of an effective vaccine. That is, it is theorized that the delivery of a vaccine in the 2nd quarter of 2021, for example, would not imply that cases will immediately disappear; rather that any spike in cases would diminish over the next few months. Dr. Francis Collins, Director of the National Institute of Health (NIH) has stated publicly that distribution of a vaccine will take approximately three (3) months for 300 million doses.
- Third-Party Forecast of COVID-19 Cases and Periodicity Assumption: the Institute of Health Metrics and Evaluation (IHME) began producing state-level forecasts of new COVID-19 cases, deaths, rates of hospitalization, and hospital bed capacity in late March 2020. According to its website, the IHME uses a hybrid modeling approach, incorporating elements of statistical and disease transmission models. The IHME regularly updates its model to respond to new data and new information. The current 4-month forecast (September 4, 2020 version) was utilized for understanding the implied periodicity of new case peaks and magnitudes. These forecasts are described in greater detail below.

Projection of COVID-19 Cases. EPS has applied the general contours and timing of the periodicity and magnitude of the second wave (as estimated by the IHME) using both the U.S. and Texas-specific data.

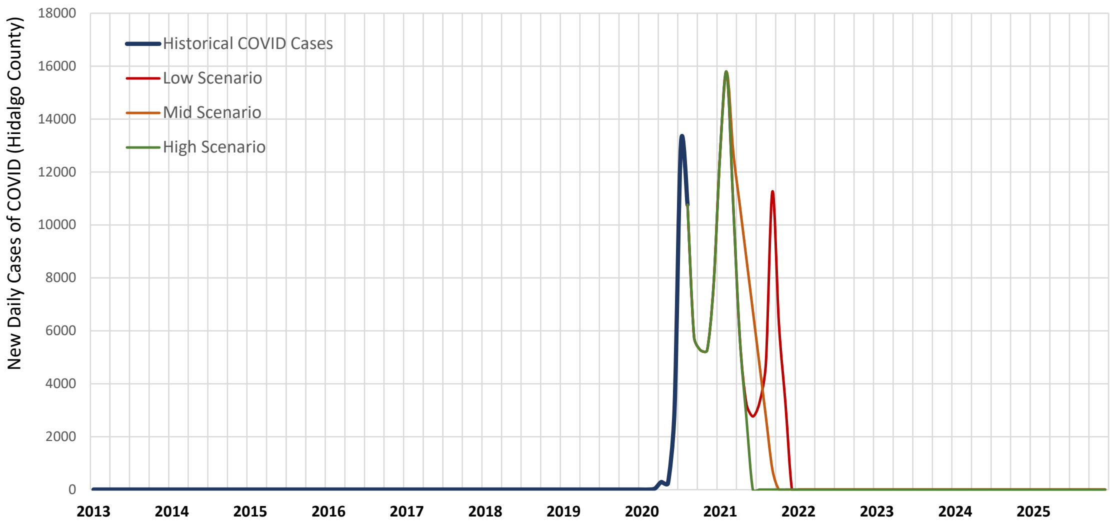
- Periodicity: EPS assumes that the peak-to-peak cases occur every 7 months, and, critically, that they occur every 7 months until a vaccine has been delivered. This is important. EPS's observation of previous iterations of forecasts is that models are consistently forecasting subsequent waves of cases following a decline. There is no evidence to suggest that cases will disappear following the next forecast peak in cases.
- Magnitude: EPS assumes that the magnitude of cases in the next (i.e. October to December time frame) wave of cases is larger than the first, as projected by both IHME scenarios. Subsequent waves, however, are assumed to be milder.

The calibration of this projection is shown in **Figure 21** and **Figure 22** for both counties. By scenario, these projections reflect the following additional assumptions:

- Low: this scenario assumes a delay in the availability, delivery, and immunization of a COVID-19 vaccine, implying that there are projected to be two (2) additional peaks of cases, not including the peak in August 2020.

- Mid: this scenario assumes a delay in the availability, delivery, and immunization of a COVID-19 vaccine, implying that there are projected to be one (1) additional peak of cases, not including the peak in August 2020, followed by a protracted decline in the number of cases through the second half of 2021.
- High: this scenario assumes one (1) additional peak of cases, not including the peak in August 2020, followed by a more optimistic decline in the number of cases, diminishing effectively by July 2021.

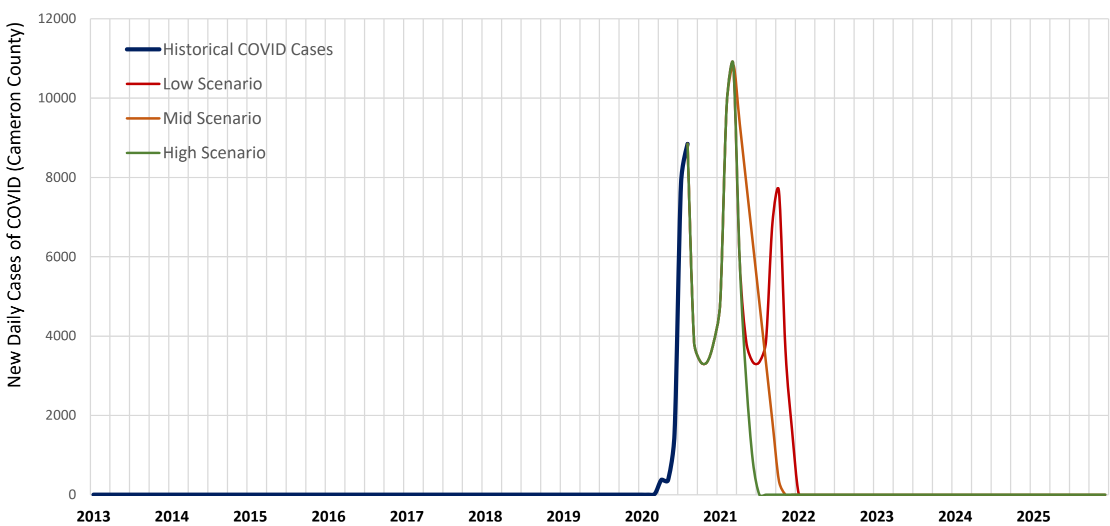
Figure 21 Applied Forecast of New COVID Cases in Hidalgo County



Source: Texas Department of Health and Human Services;
Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\[183146-PROJECTION MODEL-090920.xlsx]THHS COVID Cases Daily

Figure 22 Applied Forecast of New COVID Cases in Cameron County



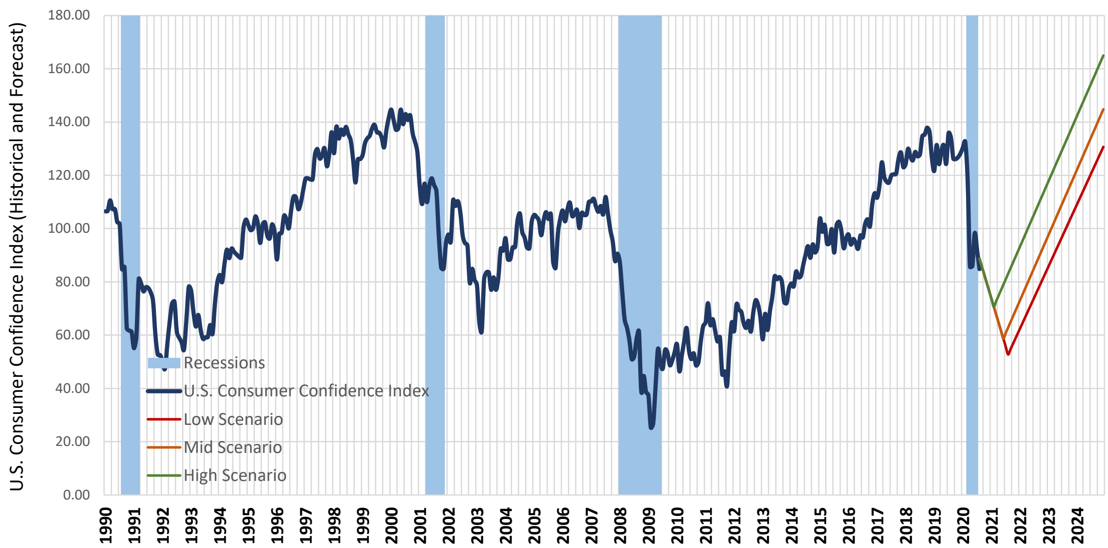
Source: Texas Department of Health and Human Services;
Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\[183146-PROJECTION MODEL-090920.xlsx]THHS COVID Cases Daily

Consumer Confidence. Using the preceding scenarios of COVID-19 cases, EPS assumes that consumer confidence will respond to the public health conditions, specifically to the confirmation of distribution of a vaccine. Each scenario is informed by historical patterns of downturn and recovery.

- Pre-Vaccine Delivery: each scenario assumes that the CCI drops by three (3) points per month until it is broadly announced that a vaccine will be delivered (assumed to be three months from elimination of cases).
- Recovery: for the Mid and High scenarios, EPS assumes that consumer confidence rebounds at a recovery pace of two (2) points per month, whereas the Low scenario recovers at slightly less than two (2) points per month.

Figure 23 Forecast Assumptions of Consumer Confidence Index



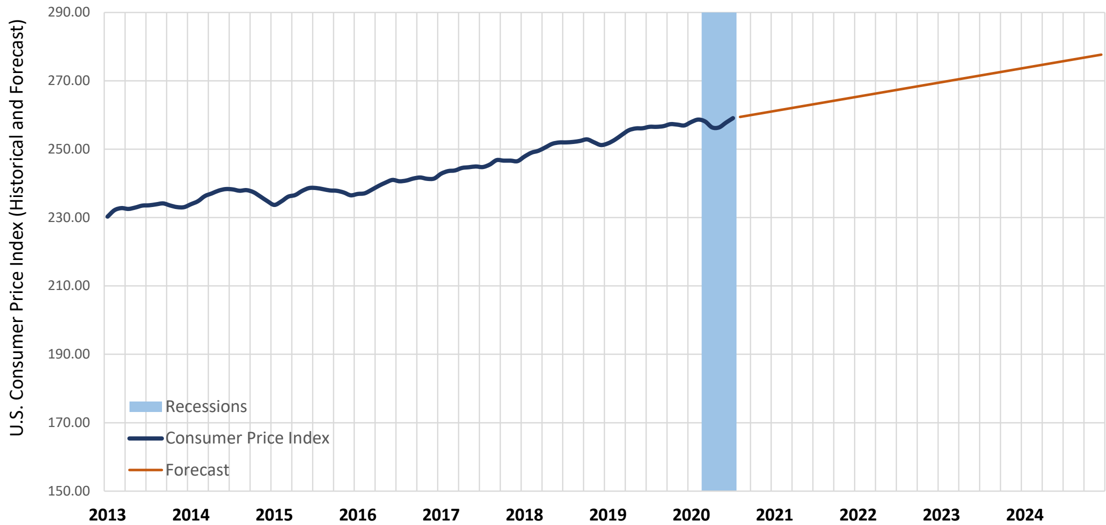
Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\Statistical Modeling\[183146-Monthly Model Calibration-090920.xlsx]H.7 - Sales Tax Forecast DATA

Consumer Prices

EPS assumes that inflation, which has increased steadily and without much fluctuation for the last few decades, will continue to increase at a constant rate of 4.2 points per year.

Figure 24 Forecast Assumption of Consumer Price Index



Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\[183146-Monthly Model Calibration-090920.xlsx]Sales Tax Forecast DATA

Other Critical Supporting Factors

Third-party sources that provide economic outlooks and forecasts in the near and long term for COVID-19 impacts and recovery in the U.S. were reviewed by EPS. These sources were used to determine and support the short- and long-term forecast assumptions and scenarios in EPS's independent forecasts.

Moody's Analytics. Moody's Analytics provided a presentation in March 2020, "COVID-19: Gauging the Pandemic" as well as an updated presentation in June 2020, "Handicapping the Paths for the Pandemic Economy." Both presentations provided a baseline scenario and multiple additional scenarios to forecast the economic recovery in the United States each with an estimated probability rate. Real GDP was the tracking factor to predict when the economy would recover. Each scenario included epidemiological assumptions of the total number of infections, when peak infections would occur, fatality rate, and when infections would abate. The June presentation included the forecasted shape of recovery of Real GDP from the start of recession with various scenarios all in the shape of a swoosh recovery with varying slopes.

McKinsey & Company. In March 2020, McKinsey published an article, "Safeguarding our lives and our livelihoods: The imperative of our time," that analyzed the uncertainty of the pandemic, impacts of lockdown on consumption and economic activity, and forecasted possible scenarios of recovery. McKinsey created a matrix to predict different scenarios of the shape of GDP recovery with public-health response on the y-axis and economic policies on the x-axis resulting in nine scenarios. In April and May, McKinsey surveyed over 2,000 global executives of what scenario within the matrix they believed was most likely to occur. The results of the survey were published in McKinsey's May article, "Crushing coronavirus uncertainty: The big 'unlock' for our economies" and updated with new survey results in a June article. Each scenario and shape of GDP recovery was determined by when the virus spread will be contained (or failure of containment), the depth of GDP decline, pace of GDP recovery, and unemployment rate. The most likely scenario, according to the global executives surveyed, was a u-shaped GDP recovery with virus recurrence, slow long-term growth, and muted world recovery. This is one of the more optimistic scenarios in which public health and economic policy interventions are partially effective, and the return to precrisis levels of GDP, income, and corporate earnings will take time. The scenarios with the highest probabilities of occurring by the global executives were used to influence EPS's independent forecast scenarios.

Deloitte. Deloitte publishes quarterly US economic forecasts with insights from Deloitte economists on trends and events shaping the economy. The second quarter 2020 US Economic Forecast and the August update were especially valuable in determining forecast assumptions and building scenarios to reflect the impacts of COVID-19. Deloitte provided a detailed forecast of three scenarios (baseline, optimistic, and pessimistic) for 2020 through 2025. Each scenario includes forecasts for GDP and components, consumer price index, labor markets, income and wealth, housing, foreign trade, federal funds, and federal budget balance. The baseline scenario with a 70 percent probability by Deloitte has a u-shaped recovery. In this scenario, a second decline in GDP occurs in the fourth quarter of 2020 followed by slow growth in the first and second quarter of 2021. Deloitte forecasts GDP growth to return to the pre-COVID level by the end of 2023, with the economy reaching full employment by the first quarter of 2025.

Long-Term Model

This section provides detailed descriptions of the model parameters and assumptions used in the long-term model component.

Parameters

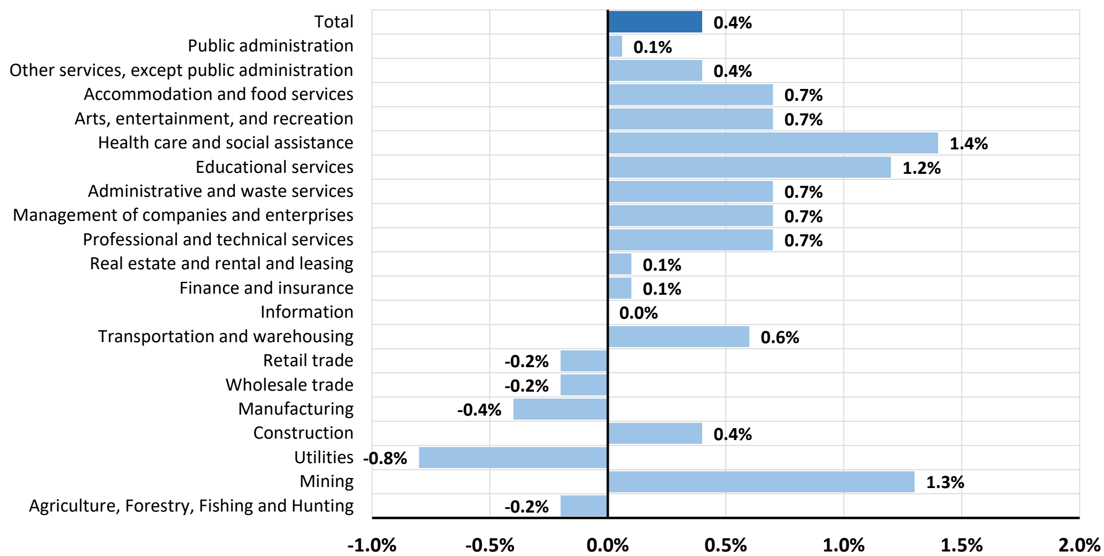
National Economic Growth. The Bureau of Labor Statistics publishes projections every two years of the U.S. labor force, industry employment, and occupational employment. The most recently published projections, available from their website and in the journal *Monthly Labor Review*, cover the 10-year period 2019 through 2029. These projections are made with a few key assumptions about the characteristics of the economy, such as:

- Labor market equilibrium where labor supply meets labor demand
- Projections focus on long-term structural change as opposed to market cycles, e.g., recessions[3]

The percentages shown in **Figure 25** are the BLS's projection of industry growth rates for 2019 through 2029. Overall, the BLS forecasts U.S. employment to grow an average of 0.6 percent annually over the next ten years. Industries projected to expand at above-average rates include: Accommodations and Food Service; Arts, Entertainment, and Recreation; Health Care and Social Assistance; Educational Services; Administrative Services; Management; Professional and Technical Services; and Construction. Some industries are projected to lose jobs, including: Retail Trade; Wholesale Trade; Manufacturing; and Utilities. Other industries are projected to neither expand nor contract, including: Public Administration; Information; and Agriculture.

[3] The 2019–29 projections do not include impacts of the COVID-19 pandemic and response efforts. The BLS Employment Projections are developed using models based on historical data, which in this set of projections cover the time period through 2019; all input data therefore precede the pandemic. In addition, the 2019–29 projections were finalized in the spring of 2020 when there was still significant uncertainty about the duration and impacts of the pandemic. The BLS Employment Projections are long-term projections intended to capture structural change in the economy, not cyclical fluctuations. As such, they are not intended to capture the impacts of the recession that began in February 2020. However, besides the immediate recessionary impacts, the pandemic may cause new structural changes to the economy. BLS releases new employment projections annually, and subsequent projections will incorporate new information on economic structural changes as it becomes available. In order to provide more information about potential impacts before the release of the 2020–30 projections, BLS is developing alternate scenarios for the 2019–29 projection period that encompass possible impacts from the pandemic. Comparison of these alternate scenarios with the baseline projections released here will demonstrate how changes in consumer behavior caused by the pandemic may alter the projections for detailed occupations and industries. An analysis of these scenarios will be released in a Monthly Labor Review article later in 2020.

Figure 25 Bureau of Labor Statistics 10-Year Employment Projection



Source: BLS; Economic & Planning Systems Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]AB.5

National-to-Regional Economic Relationships. Using the BLS national forecasts as a benchmark for underlying trajectories of employment by industry, the long-term methodology is calibrated by analyzing and projecting the national to regional economic relationships, i.e. location quotients, against the national forecasts over 10 years, and extrapolating continuing trends through the final projection year, as described below:

- Development of historical relationships: Using historical national and regional data by industry by year since 1990, shifts in the quantitative relationships between regional and national employment distributions were identified and applied over time to the regional forecasts by industry. For example, Cameron County's employment level (as a percent of national jobs) has increased from approximately 0.07 percent to 0.10 percent between 1990 and 2020. Hidalgo County's employment level has increased from approximately 0.10 to 0.18 percent over time, as well.
- Application to the national forecast: Applying these regional-to-national relationships to the national employment forecast results in overall regional employment captures of 0.10 percent of national employment for Cameron County and 0.21 percent of national employment for Hidalgo County. This set of calculations establishes a baseline set of underlying growth trends and rates through 2029, which are further calibrated (up or down) to align with the short-term modeling outputs.

- Horizon year (2045) growth constraints: Historical analysis also shows that as an employment base grows, the year-over-year (or periodic) percent rates of growth by industry bear logarithmic, not linear relationships to one another. As such, long-term growth rates are calibrated to a logarithmic relationship between a given year and its previous rate of growth. Although this type of a growth pattern yields similar annual growth magnitudes year over year, EPS is estimating that external economic factors, such as increases in productivity, will increasingly cause employment growth to taper in actual numbers, not just in growth rates.

Demographic Relationship Factors. As illustrated below (**Table 12** for Cameron County and **Table 13** for Hidalgo County), this methodology provides a platform to apply a methodology commonly used by demographers to examine the relationships between wage and salary employment, un-/under-employment, group quarters, population by age, households, and housing inventory. It also provides points at which population and household counts may be vetted against observed data points for the purpose of calibrating appropriate shifts over time.

Each step is described in the tables and charts that follow (**Figure 26** through **Figure 35**). Although EPS does not apply the findings of the housing inventory section of the following methodology, it is shown for the sake of completeness. Each component and their sources are as follows:

- Wage & salary employment: employment by industry is sourced from the Bureau of Labor Statistics[4], as well as from the Texas Workforce Commission[5].
- Commuting patterns: commuting patterns have been sourced from the U.S. Census Longitudinal Employer-Household Dynamics data series.[6]
- Unemployment: unemployment data are sourced from the BLS Local Area Unemployment Statistics U-3 "total unemployed" series[7], which nets those employed or "actively seeking employment".
- Proprietors: data are sourced from the U.S. Census Nonemployer Statistics data series.[8]
- Group quarters and "underemployed persons", age 16 to 65: this nets the total population of non-institutionalized persons aged 16 to 65, adding institutionalized persons 16 to 65 and those ages 16 to 65 that would be considered in the U-4, U-5, and U-6 measures of labor utilization[9],
- Persons aged under 16 and over 65: this adds the total population under 16 and over 65, including group quarters, resulting in total population.

[4] https://www.bls.gov/cew/datatoc.htm
[5] https://texaslmi.com/LMIbyCategory/QCEW
[6] https://onthemap.ces.census.gov/
[7] https://www.bls.gov/lau/
[8] https://www.census.gov/econ/nonemployer/
[9] https://www.bls.gov/lau/stalt.htm

The following few steps trace population to households and housing inventory:

- Group quarters: this addition results in population in households.
- Average household size: using the weighted average household size from U.S. Census data for the geography, total households are derived.
- Vacancy rate: using occupancy and vacancy status data from the U.S. Census, total inventory of housing is determined.

Table 12 Long-Term Forecasting Cameron County Demographic Calibration Factors

		Factors / Assumptions			Totals		
		2000	2019	2040	2000	2019	2040
Jobs to Population							
Step 1							
Wage & Salary Jobs	*Row A*				109,053	141,392	179,419
Step 2							
Less: In-Commuting [1]	*Row B*	16%	29%	37%	14,830	32,094	48,375
Subtotal (W & S Jobs Residing in Geo.)	*Row C*				**94,224**	**109,298**	**131,044**
Step 3							
Plus: Out-Commuting [1]	*Row D*	18%	30%	31%	20,692	46,840	58,456
Subtotal (W & S Jobs Held by Residents)	*Row E*				**114,915**	**156,137**	**189,500**
Step 4							
Plus: Unemployment	*Row F*	7%	6%	8%	8,791	9,186	16,229
Subtotal (Laborforce)	*Row G*				**123,706**	**165,323**	**205,729**
Step 5							
Plus: Proprietors [2]	*Row H*	11%	17%	22%	16,031	33,618	58,792
Subtotal (Non-Institutionalized Job Holders)	*Row I*				**139,737**	**198,941**	**264,521**
Step 6							
Plus: Group Quarters Age 16-65 / Underemployed Persons 16-65	*Row J*	29%	19%	9%	57,136	46,737	27,580
Subtotal (All Persons, Age 16-65)	*Row K*				**196,874**	**245,678**	**292,101**
Step 7							
Plus: Persons <16 and >65	*Row L*	41%	42%	46%	138,353	177,485	253,008
Subtotal (Total Population)	*Row M*				**335,227**	**423,163**	**555,764**
as %	*Row N*				100%	100%	*n/a*
Row O should be equal to this number from the U.S. Census.	*Row O*				*335,227*	*423,163*	*n/a*
Population to Housing							
Step 8							
Less: Total Group Quarters	*Row P*	1.2%	0.7%	0.7%	4,089	3,122	8,463
Total Population in Households	*Row Q*				**331,138**	**420,041**	**547,300**
Step 9							
Total Households	*Row R*	3.40	3.50	2.53	97,394	120,012	216,172
Plus: Vacant Housing	*Row S*	19%	16%	n/a	22,416	22,938	n/a
Total Housing Units	*Row T*				**119,810**	**142,950**	**n/a**
Row T should be equal to this number from the U.S. Census.	*Row U*				*119,654*	*154,022*	*n/a*

[1] Factors are extrapolated from trends for in- and out-commuting available between 2002 and 2017.

[2] Adds known proprietors using U.S. Census Nonemployer Statistics

Source: BLS; BEA; TWC; US Census; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]Cameron

Table 13 Long-Term Forecasting Hidalgo County Demographic Calibration Factors

		Factors / Assumptions			Totals		
		2000	2019	2040	2000	2019	2040
Jobs to Population							
Step 1							
Wage & Salary Jobs	*Row A*				163,139	266,137	374,215
Step 2							
Less: In-Commuting [1]	*Row B*	16%	22%	44%	22,578	48,799	114,249
Subtotal (W & S Jobs Residing in Geo.)	*Row C*				**140,561**	**217,338**	**259,966**
Step 3							
Plus: Out-Commuting [1]	*Row D*	14%	24%	26%	23,543	69,431	90,546
Subtotal (W & S Jobs Held by Residents)	*Row E*				**164,104**	**286,768**	**350,512**
Step 4							
Plus: Unemployment	*Row F*	10%	7%	9%	19,130	21,998	35,397
Subtotal (Laborforce)	*Row G*				**183,234**	**308,766**	**385,909**
Step 5							
Plus: Proprietors [2]	*Row H*	14%	20%	27%	30,683	78,896	145,948
Subtotal (Non-Institutionalized Job Holders)	*Row I*				**213,917**	**387,662**	**531,857**
Step 6							
Plus: Group Quarters Age 16-65 / Underemployed Persons 16-65	*Row J*	36%	24%	35%	120,116	119,617	286,405
Subtotal (All Persons, Age 16-65)	*Row K*				**334,034**	**507,279**	**818,262**
Step 7							
Plus: Persons <16 and >65	*Row L*	41%	42%	38%	235,429	361,428	521,361
Subtotal (Total Population)	*Row M*				**569,463**	**868,707**	**1,370,153**
as %	*Row N*				100%	100%	*n/a*
Row O should be equal to this number from the U.S. Census.	*Row O*				*569,463*	*868,707*	*n/a*
Population to Housing							
Step 8							
Less: Total Group Quarters	*Row P*	1.0%	1.2%	1.2%	5,662	10,175	20,865
Total Population in Households	*Row Q*				**563,801**	**858,532**	**1,349,288**
Step 9							
Total Households	*Row R*	3.60	3.64	2.53	156,611	235,860	532,940
Plus: Vacant Housing	*Row S*	19%	13%	n/a	35,785	36,637	n/a
Total Housing Units	*Row T*				**192,397**	**272,498**	**n/a**
Row T should be equal to this number from the U.S. Census.	*Row U*				*192,658*	*285,996*	*n/a*

[1] Factors are extrapolated from trends for in- and out-commuting available between 2002 and 2017.

[2] Adds known proprietors using U.S. Census Nonemployer Statistics

Source: BLS; BEA; TWC; US Census; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]Hidalgo

Forecast Assumptions

Downturn and Recovery Rates

The rates reported in the following two table are the outputs, not inputs or assumptions, of the short- and long-term econometric modeling. The rates are displayed as annual averages for EPS's Low, Mid, and High scenarios in context with historic rates (reflecting quarterly data from 1990 through 1st quarter 2020).

Short-Term Modeling. The rates shown in **Table 14** reflect the short-term model employment outputs for the period 2020 through 2025. Underlying these outputs are the inputs and assumptions outlined and described in the previous methodology section (e.g. COVID-19 cases, vaccine availability, consumer confidence, and spending).

The results as shown reflect the various degrees to which each supersector industry recovers from the pandemic and recession. Specifically, the rates reflect inputs of downturn and recovery rates by industry by county, based in an analysis of recession and recovery patterns since 1990. Most notable in the outputs is the relatively quick recover of retail jobs in the Mid and High scenarios.

Table 14 Annual Average Downturn and Recovery Rates for 2020 through 2025

		Annual Employment Change, 2020-2025		
	Historic	High	Mid	Low
Cameron County				
Basic Jobs	-137	175	147	94
Service Jobs	1,546	2,095	1,710	1,369
Retail Jobs	495	932	875	777
Education Jobs	292	304	156	43
Hidalgo County				
Basic Jobs	156	687	209	-101
Service Jobs	3,247	4,713	3,339	2,406
Retail Jobs	1,149	2,798	2,605	2,375
Education Jobs	848	1,522	1,198	949

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]B.1a

Long-Term Modeling. The rates shown in **Table 15** reflect the long-term model employment outputs for the period 2020 through 2045. Underlying these outputs are the inputs and assumptions outlined and described in the previous methodology section (e.g. national-to-regional 2-digit NAICS sector industry performance and shifts in underlying commuting and demographic patterns, described in greater detail in the following section).

In general, the results of the long-term modeling reflect somewhat lower annual industry-level growth. In most industry supersectors, the rates of growth in EPS's Mid scenario are more similar to the historic averages (though this is not intentional).

Table 15 Annual Average Long-Term Employment Rates by Industry

		Annual Employment Change, 2020-2045		
	Historic	High	Mid	Low
Cameron County				
Basic Jobs	-137	99	86	55
Service Jobs	1,546	1,752	1,599	1,433
Retail Jobs	495	421	394	321
Education Jobs	292	283	219	175
Hidalgo County				
Basic Jobs	156	459	293	164
Service Jobs	3,247	4,623	3,808	3,188
Retail Jobs	1,149	1,256	1,128	994
Education Jobs	848	1,131	951	841

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]B.1b

Demographic Patterns

This section details the underlying commuting and demographic shifts, which are used to construct the population and household forecasts. As noted before, the long-term model component is rooted in an employment-based population methodology, which provides a clear series of relationships between the variables. These series are reported with trend lines for each scenario, when relevant.

In-Commuting. In-commuting patterns are projected for Cameron County in **Figure 26** and for Hidalgo County in **Figure 27**.

Figure 26 Cameron County Projection of In-Commuting

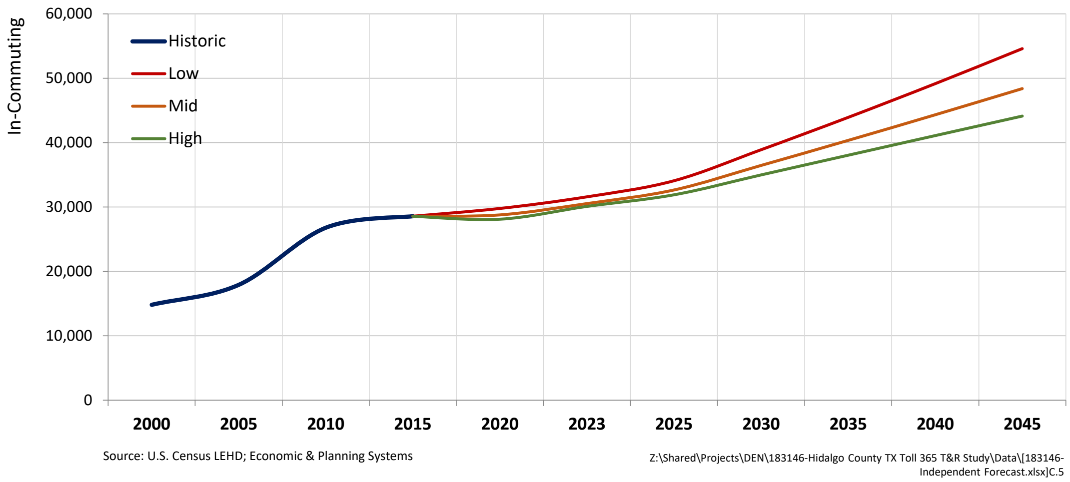
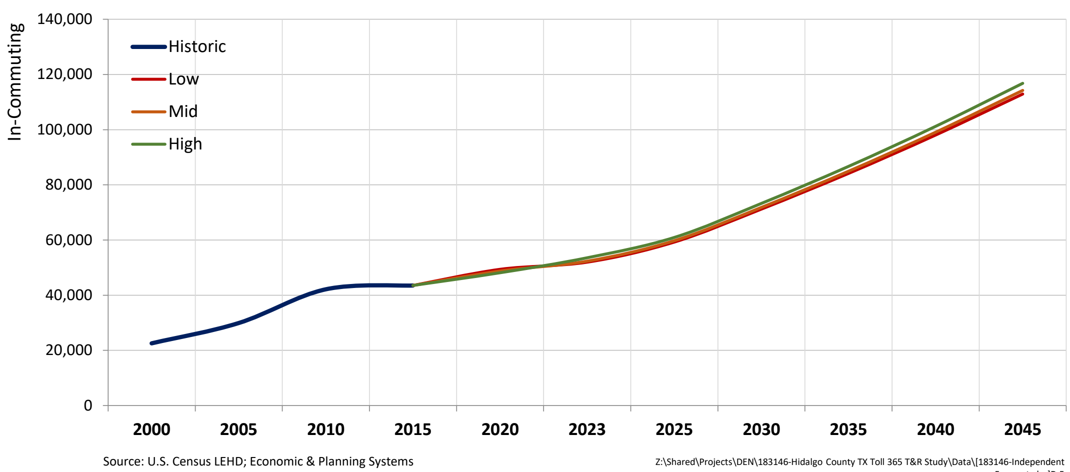
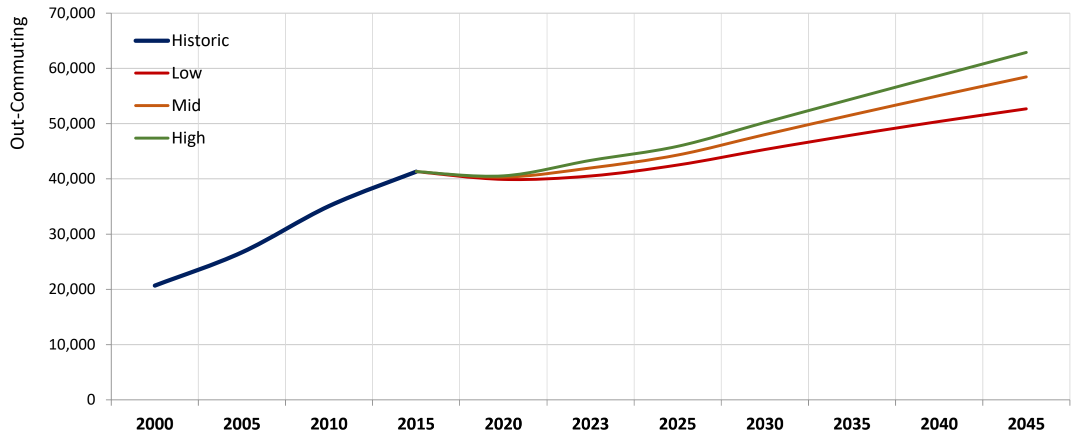


Figure 27 Hidalgo County Projection of In-Commuting



Out-Commuting. Out-commuting patterns are projected for Cameron County in **Figure 28** and for Hidalgo County in **Figure 29**. In general, the assumptions reflect a pattern where lower out-commuting rates are present when local employment options are lower.

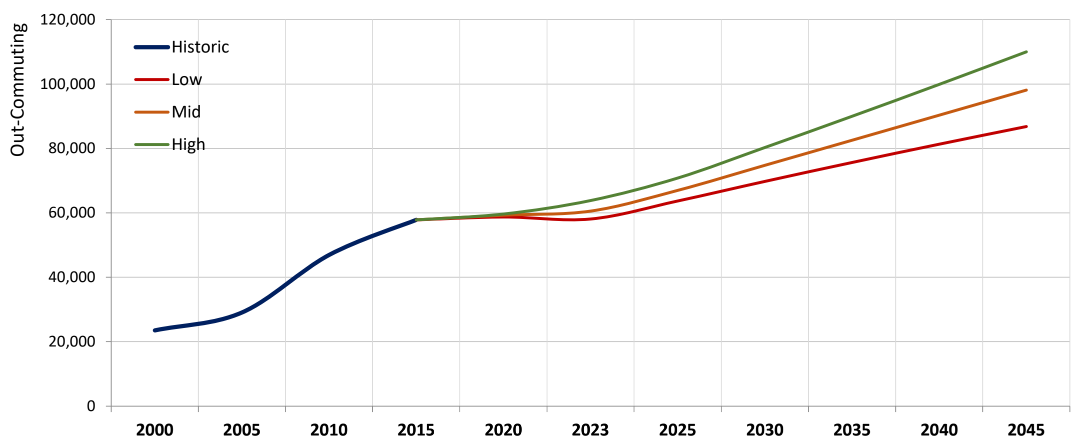
Figure 28 Cameron County Projection of Out-Commuting



Source: U.S. Census LEHD; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]C.5

Figure 29 Hidalgo County Projection of Out-Commuting

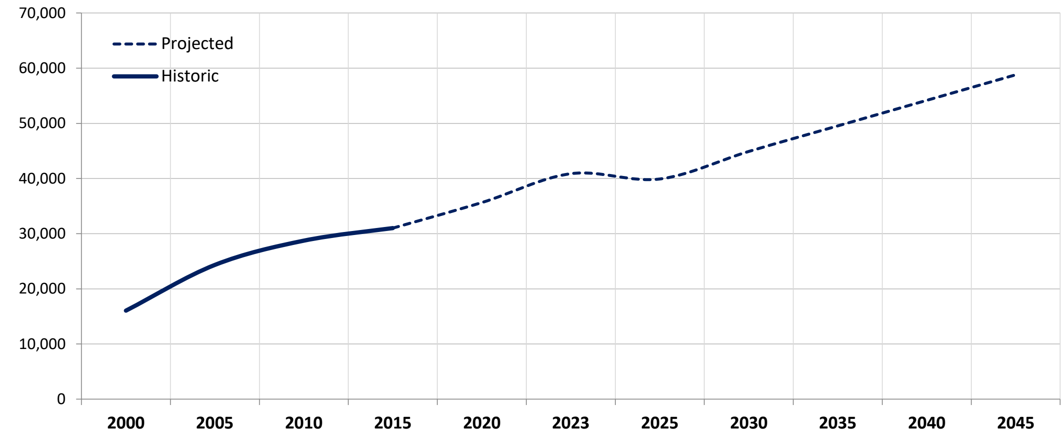


Source: U.S. Census LEHD; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]D.5

Self-Employed. The forecast of proprietors is shown in **Figure 30** for Cameron County and **Figure 31** for Hidalgo County. For both counties, the projection of self-employed persons is assumed to be consistent across EPS's three scenarios, escalated at generally historic rates.

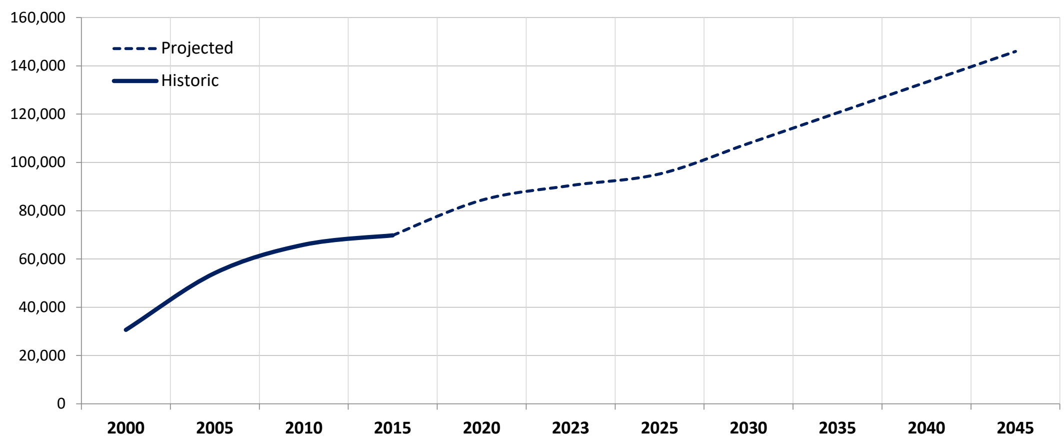
Figure 30 Cameron County Projection of Self-Employment



Source: U.S. Census; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]C.8

Figure 31 Hidalgo County Projection of Self-Employment



Source: U.S. Census; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]D.8

Unemployment. The projected unemployment rates for Cameron County are shown in **Figure 32** and for Hidalgo County in **Figure 33**. In general, these trends reflect more persistent, longer-term structural unemployment in the lower growth scenarios (specifically the Low scenario). Even under this assumption, the Low scenario converges on each county's respective long-term historic unemployment rates.

Figure 32 Cameron County Projection of Unemployment

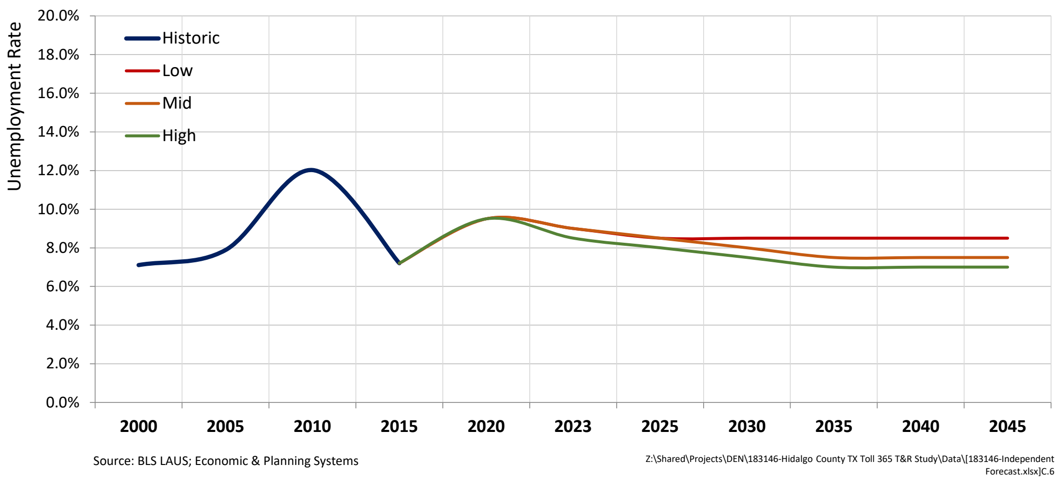
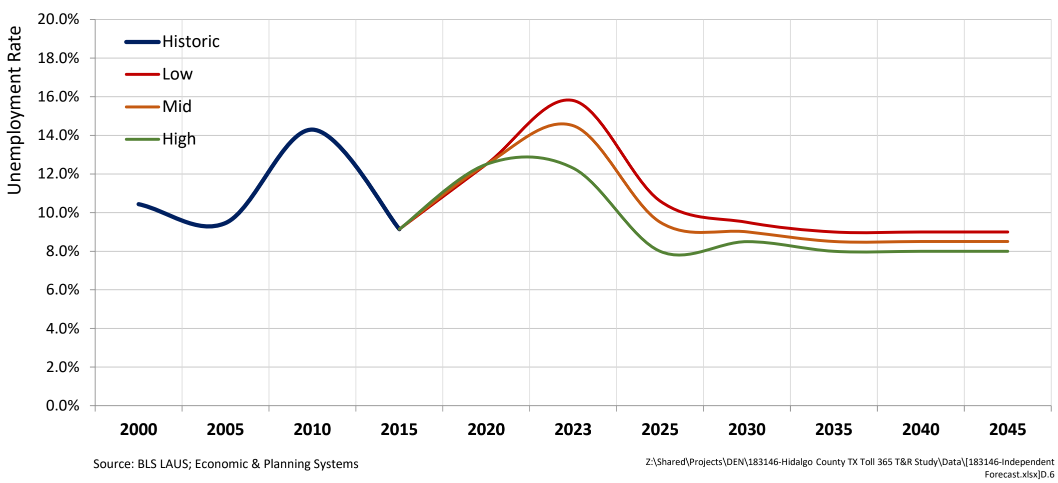


Figure 33 Hidalgo County Projection of Unemployment



Non-Working Population. Additional to group quarters populations for both counties, non-working populations include those persons under 16 years of age and those over 65 years of age. These projections have been calibrated to blend long-term historic averages with the Texas Demography Center's projections of county projections by age.

Figure 34 Cameron County Projection of Non-Working Population

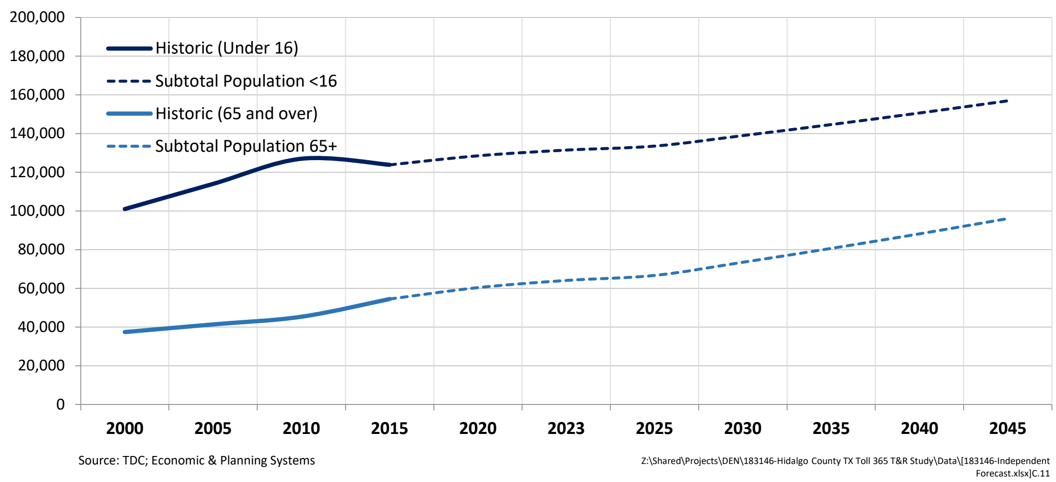
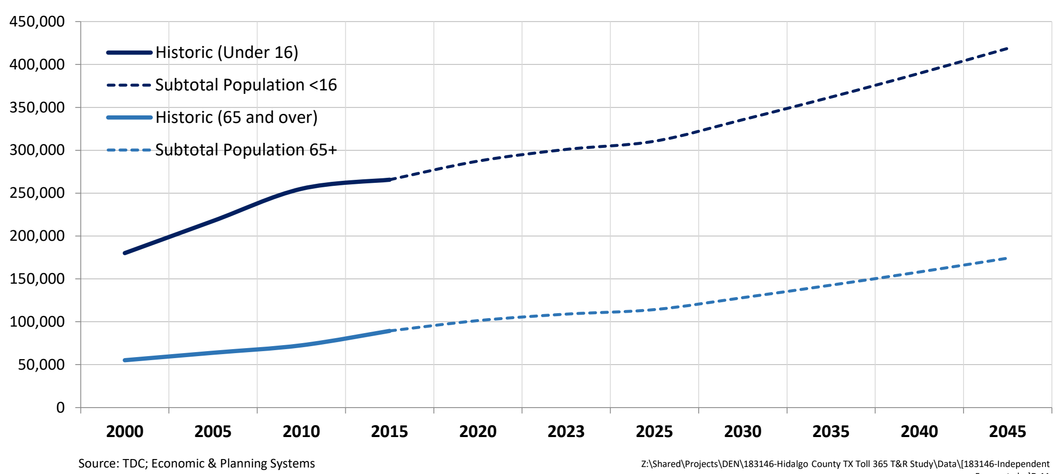


Figure 35 Hidalgo County Projection of Non-Working Population



Other. It should be noted that this blend of short- and long-term modeling methodology was developed in the context of the COVID-19 pandemic, in which it became necessary to identify critical current variables that have had an observable and significant impact on employment levels. Other variables were discussed through early phases of this study but were not ultimately incorporated into the econometric model.

- Paycheck Protection Program (PPP): The PPP was a loan program originating from the Coronavirus Aid, Relief, and Economic Security (CARES) Act in March 2020. Administered by the Small Business Administration (SBA), the program allocated more than $500 billion to more than 5 million businesses for the purpose of helping business maintain then-current employment levels through what was foreseen as a temporary disruption of demand. Consideration was made for including this in the econometric model parameters, but ultimately dismissed because data were not available to quantify the extent to which businesses in either county had benefitted from the PPP.
- Federal Unemployment Benefits: The Families First Coronavirus Response Act (FFCRA) was authorized in March 2020, which provided additional flexibility for state unemployment insurance agencies and additional administrative funding to respond to the COVID-19 pandemic. In conjunction with the CARES Act, it expanded states' ability to provide unemployment insurance for many workers impacted by the pandemic, including for workers who are not ordinarily eligible for unemployment benefits.[10] Consideration was given for incorporating this as a set of dichotomous (dummy) variables but ultimately dismissed because some research demonstrated only fleeting impact on personal consumer expenditure and demand.[11]
- Mexican GDP: It is understood that the regional economy is tethered not only to the U.S. economy, but also Mexico's. Consumer demand emanating from with the region on the U.S. and Mexican side are, as a result, clear drivers of spending and employment levels in Cameron and Hidalgo counties. EPS obtained and analyzed GDP and consumer spending data for Mexico and the state of Nuevo Leon. Ultimately, neither the correct periodicity of data was available (i.e. monthly), nor were data available through 2nd quarter 2020. Utilization of these data that satisfied both conditions would have allowed for the econometric model to replicate relationships between the pandemic and consumer demand from Mexico.

---

[10] https://www.dol.gov/coronavirus/unemployment-insurance
[11] https://opportunityinsights.org/wp-content/uploads/2020/05/tracker_paper.pdf

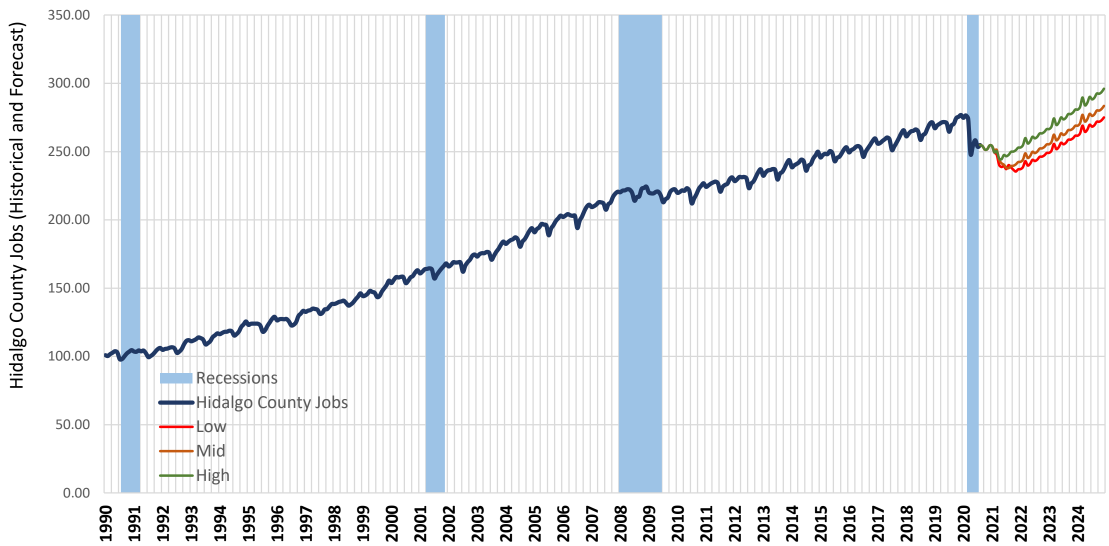
Independent Forecasts

This section contains detailed outputs of the short- and long-term employment and population projections. The projections of combined employment and population are also compared to third-party providers for context.

Short-Term Employment

Hidalgo County. The outcome of applying the preceding assumptions to both levels of the forecast model specifications is illustrate below in graphic and tabular form.

Figure 36 Hidalgo County Short-Term Jobs Forecast



Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\Statistical Modeling\[183146-Monthly Model Calibration-090920.xlsx]H.7 - Sales Tax Forecast DATA

Summarized and aggregated to the annual level, **Table 16** illustrates how the forecasts differ among each other, and by comparison to the peak-to-trough and recovery of jobs following the Great Recession. By comparison, each of the forecast scenarios shows a swifter decline in jobs, characteristic of observed impacts of the pandemic to observed employment data.

- Low: this scenario results in a similarly protracted recovery of jobs by comparison to the Great Recession, where by 2024, employment levels first recover and surpass the 2019 levels by 0.7 percent (compared to 4 percent below pre-peak levels following the Great Recession's initial downturn).
- Mid: this scenario reflects a baseline scenario in which pre-pandemic employment levels are reached and surpassed by 3.6 percent in 2024.
- High: this scenario reflects the underlying assumptions regarding vaccine availability, immunization, and the quick return of consumer confidence, where pre-pandemic employment levels are reached and surpassed by 2.6 percent in 2023.

Table 16 Hidalgo County Short-Term Jobs Forecast

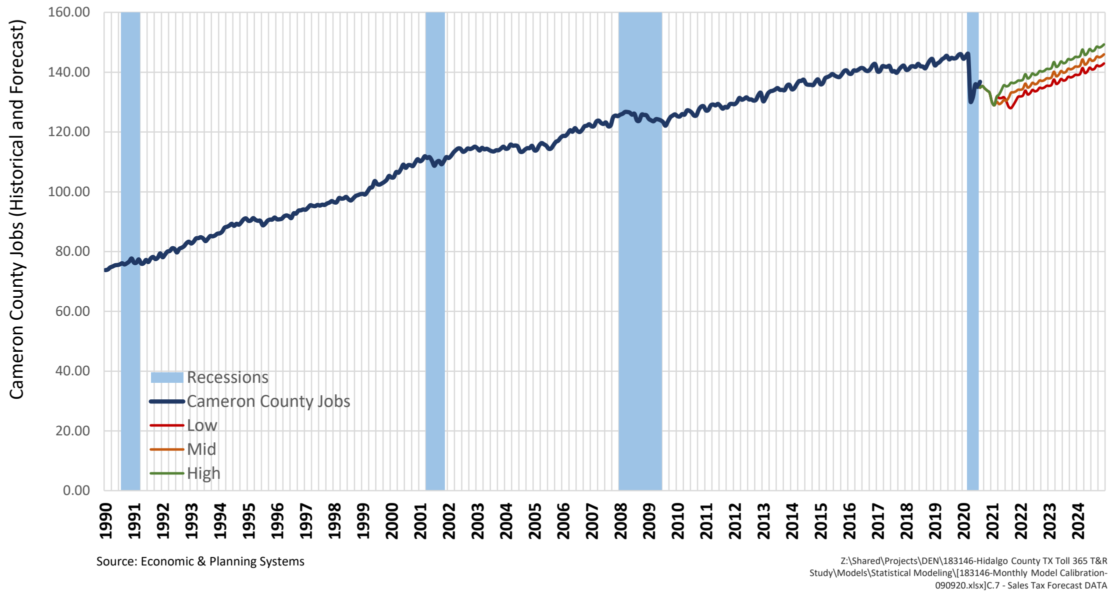
	2019	2020	2021	2022	2023	2024	2025
Jobs							
High	266,922	255,451	249,042	259,978	273,947	288,734	304,395
Mid	266,922	255,451	243,323	249,080	262,419	276,530	291,469
Low	266,922	255,451	241,172	243,274	255,629	268,659	282,409
as % of 2019							
High	0.0%	-4.3%	-6.7%	-2.6%	2.6%	8.2%	14.0%
Mid	0.0%	-4.3%	-8.8%	-6.7%	-1.7%	3.6%	9.2%
Low	0.0%	-4.3%	-9.6%	-8.9%	-4.2%	0.7%	5.8%
Peak-to-Trough and Recovery of Jobs (as % of Peak)							
Great Recession	0.0%	-1.0%	-5.0%	-7.0%	-6.0%	-4.0%	-3.0%

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\Statistical Modeling\[183146-Monthly Model Calibration-090920.xlsx]H.8 - Jobs Forecast Table

Cameron County. The outcome of applying the preceding assumptions to both levels of the forecast model specifications is illustrate below in graphic and tabular form.

Figure 37 Cameron County Short-Term Jobs Forecast



- Low: Pre-pandemic employment levels are reached and surpassed by 2.5 percent in 2025.
- Mid: Pre-pandemic employment levels are reached and surpassed by 1.9 percent in 2024.
- High: Pre-pandemic employment levels are reached and surpassed by 1.3 percent in 2023.

Table 17 Cameron County Short-Term Jobs Forecast

	2019	2020	2021	2022	2023	2024	2025
Jobs							
High	143,426	137,698	136,156	141,240	145,261	149,411	153,695
Mid	143,426	137,698	133,178	138,112	142,040	146,094	150,279
Low	143,426	137,698	132,153	135,685	139,355	143,138	147,037
as % of 2019							
High	0.0%	-4.0%	-5.1%	-1.5%	1.3%	4.2%	7.2%
Mid	0.0%	-4.0%	-7.1%	-3.7%	-1.0%	1.9%	4.8%
Low	0.0%	-4.0%	-7.9%	-5.4%	-2.8%	-0.2%	2.5%
Peak-to-Trough and Recovery of Jobs (as % of Peak)							
Great Recession	0.0%	-1.0%	-5.0%	-7.0%	-6.0%	-4.0%	-3.0%

Source: Economic & Planning Systems

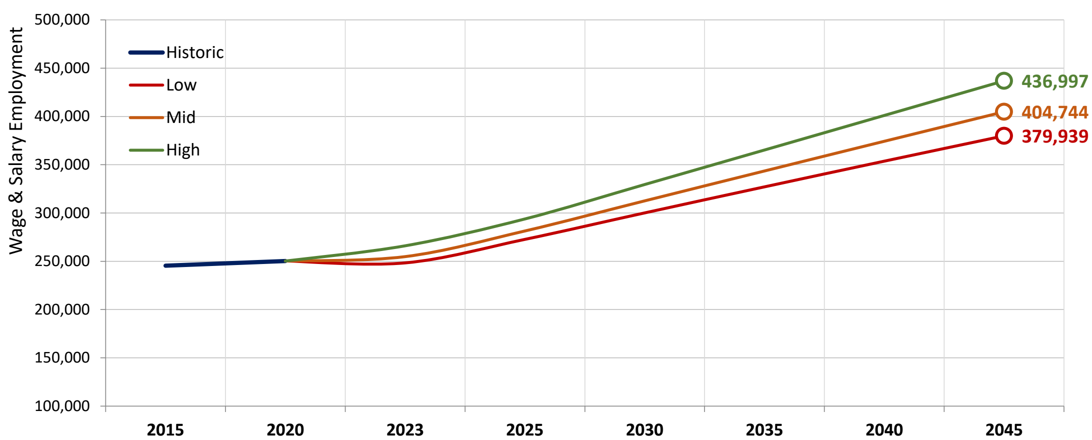
Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Models\Statistical Modeling\[183146-Monthly Model Calibration-090920.xlsx]C.8 - Jobs Forecast Table

Long-Term Employment

Hidalgo County. It should be noted that the following employment projection represents only Wage & Salary employment for Hidalgo County and does not include self-employed persons.

- Low: Employment is projected to grow by approximately 5,200 jobs per year between 2020 and 2045. The compounded annual average growth rate is approximately 1.7 percent per year over this period.
- Mid: Employment is projected to grow by approximately 6,200 jobs per year between 2020 and 2045. The compounded annual average growth rate is approximately 1.9 percent per year over this period.
- High: Employment is projected to grow by approximately 7,500 jobs per year between 2020 and 2045. The compounded annual average growth rate is approximately 2.3 percent per year over this period.

Figure 38 Hidalgo County Long-Term Jobs Forecast



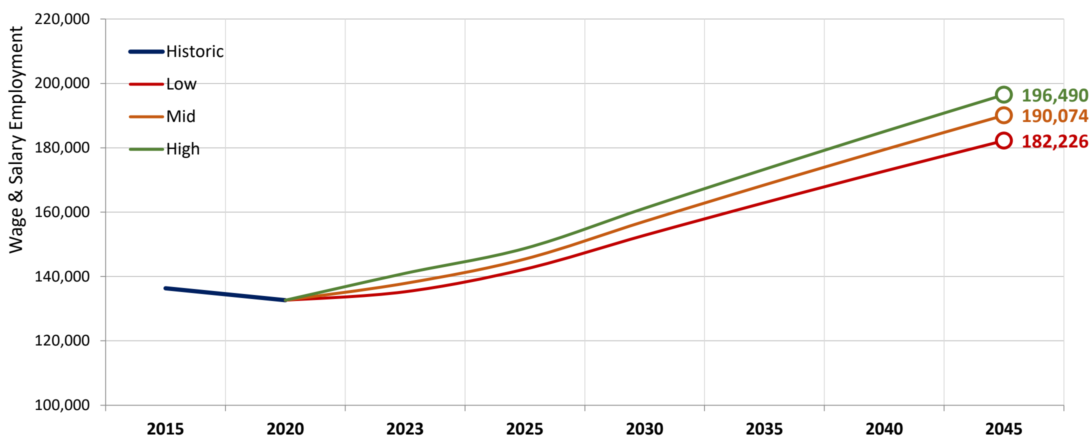
Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]C.8

Cameron County. The following **Figure 39** also represents only Wage & Salary employment for Cameron County and does not include self-employed persons.

- Low: Employment is projected to grow by approximately 2,000 jobs per year between 2020 and 2045. The compounded annual average growth rate is approximately 1.3 percent per year over this period.
- Mid: Employment is projected to grow by approximately 2,300 jobs per year between 2020 and 2045. The compounded annual average growth rate is approximately 1.5 percent per year over this period.
- High: Employment is projected to grow by approximately 2,600 jobs per year between 2020 and 2045. The compounded annual average growth rate is approximately 1.6 percent per year over this period.

Figure 39 Cameron County Long-Term Jobs Forecast



Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]C.8

Forecasts by Industry. **Table 18** provides a summary of Wage & Salary employment forecasts by scenario by supersector (see **Table 22** on page 61 for a crosswalk between NAICS codes and industry supersector).

Generally, each scenario reflects the proportional predominance of the service sector industries in the regional economy. They also reflect a structural economic outlook in which the region's service sector industries grow considerably more over time than the other sectors.

Basic jobs (e.g. agriculture, utilities, construction, manufacturing, wholesale trade, and information jobs) comprise a smaller portion of regional jobs and are also projected to grow only slightly over time. Education jobs, on the other hand, currently represent a similar portion of regional jobs, but are projected to grow more steadily over time in each scenario.

Table 18 Summary of Long-Term Employment Forecasts by Industry

								2020-2045		
	2020	2023	2025	2030	2035	2040	2045	Total	Ann. #	Ann. %
Low Scenario										
Basic	56,185	52,632	55,138	56,973	58,655	60,212	61,660	5,475	219	0.37%
Service	180,144	178,090	195,157	220,459	245,639	270,720	295,665	115,521	4,621	2.00%
Retail	87,852	94,739	102,121	107,270	112,051	116,526	120,735	32,883	1,315	1.28%
Education	58,695	58,037	62,507	68,192	73,669	78,969	84,104	25,409	1,016	1.45%
Total	**382,876**	**383,498**	**414,922**	**452,895**	**490,015**	**526,427**	**562,164**	**179,288**	**7,172**	**1.55%**
Mid Scenario										
Basic	56,185	54,121	57,004	59,416	61,643	63,720	65,665	9,480	379	0.63%
Service	180,144	183,364	201,713	229,941	258,295	286,774	315,314	135,170	5,407	2.26%
Retail	87,852	95,741	103,732	109,806	115,484	120,833	125,890	38,038	1,522	1.45%
Education	58,695	59,472	64,355	70,530	76,505	82,308	87,949	29,254	1,170	1.63%
Total	**382,876**	**392,698**	**426,805**	**469,693**	**511,927**	**553,634**	**594,819**	**211,942**	**8,478**	**1.78%**
High Scenario										
Basic	56,185	56,536	59,677	62,565	65,249	67,765	70,135	13,949	558	0.89%
Service	180,144	191,953	211,039	242,565	274,516	306,866	339,525	159,381	6,375	2.57%
Retail	87,852	96,786	105,024	111,759	118,090	124,083	129,774	41,922	1,677	1.57%
Education	58,695	61,744	66,851	73,891	80,759	87,478	94,053	35,358	1,414	1.90%
Total	**382,876**	**407,019**	**442,590**	**490,781**	**538,614**	**586,192**	**633,487**	**250,611**	**10,024**	**2.03%**

Source: Economic & Planning Systems

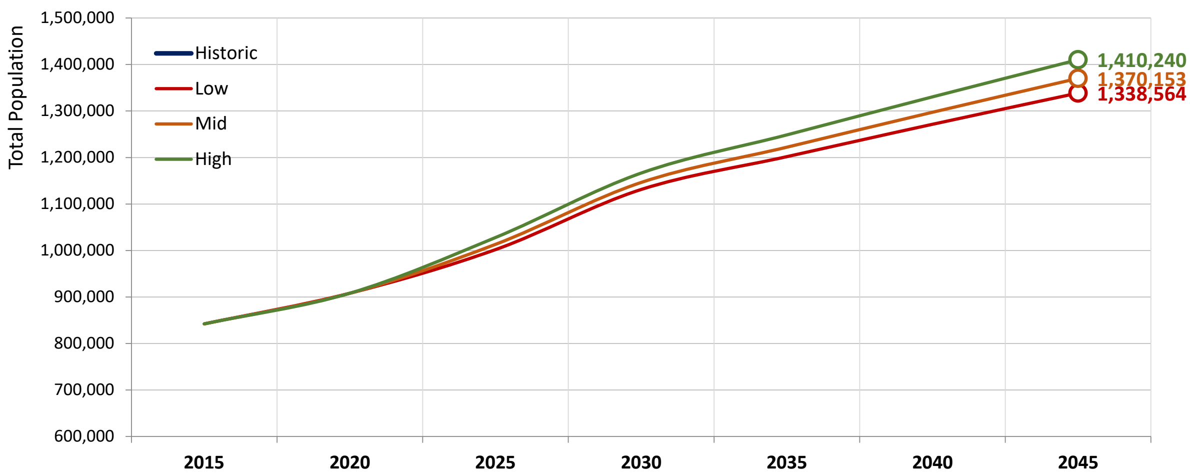
Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]Z.2 - Employment

Long-Term Population

Hidalgo County. **Figure 40** presents the total population outputs of the long-term forecasting model.

- Low: Population is projected to grow by approximately 17,200 persons per year between 2020 and 2045. The compounded annual average growth rate is approximately 1.5 percent per year over this period.
- Mid: Population is projected to grow by approximately 18,500 persons per year between 2020 and 2045. The compounded annual average growth rate is approximately 1.7 percent per year over this period.
- High: Population is projected to grow by approximately 20,100 persons per year between 2020 and 2045. The compounded annual average growth rate is approximately 1.8 percent per year over this period.

Figure 40 Hidalgo County Projection of Population



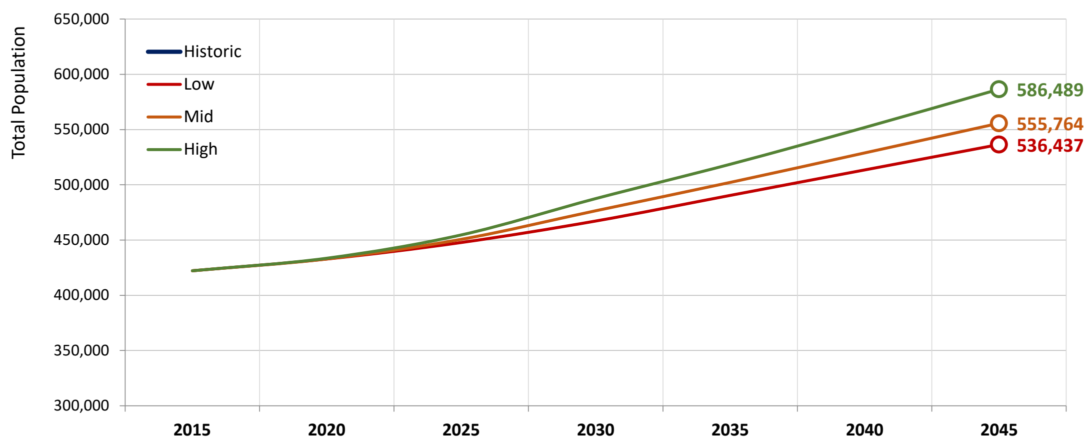
Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]D.8

Cameron County. **Figure 41** presents the total population outputs of the long-term forecasting model.

- Low: Population is projected to grow by approximately 4,100 persons per year between 2020 and 2045. The compounded annual average growth rate is approximately 0.9 percent per year over this period.
- Mid: Population is projected to grow by approximately 4,900 persons per year between 2020 and 2045. The compounded annual average growth rate is approximately 1.0 percent per year over this period.
- High: Population is projected to grow by approximately 6,100 persons per year between 2020 and 2045. The compounded annual average growth rate is approximately 1.2 percent per year over this period.

Figure 41 Cameron County Projection of Population



Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]C.8

Forecasts by Demographic Layer. **Table 19** provides details of each demographic layer projected, which form connection points between employment and overall population. As identified earlier (refer to **Table 12** and **Table 13** on pages 40 and 41), each layer in this methodology are initially calibrated to actual, observed data from national and state sources, historical shifts in each variable are identified, and projections are calibrated to reflect initial conditions, trajectories, and the profile of each scenario.

Table 19 Summary of Long-Term Forecasts by Layer

								2020-2045		
	2020	2023	2025	2030	2035	2040	2045	Total	Ann. #	Ann. %
Low Scenario										
Wage & Salary Jobs	382,876	383,498	414,922	452,895	490,015	526,427	562,164	179,288	7,172	1.55%
In-Commuting	79,143	83,534	93,315	110,094	128,061	147,214	167,524	88,380	3,535	3.04%
Out-Commuting	98,272	98,049	105,402	113,725	121,566	128,952	135,879	37,607	1,504	1.30%
Unemployed	52,021	61,889	46,760	46,000	46,818	49,213	51,386	-635	-25	-0.05%
Proprietors	120,049	132,633	136,910	152,794	170,109	187,425	204,740	84,692	3,388	2.16%
Group Quarters, Underemployed	192,714	188,034	223,071	284,527	294,346	304,166	313,985	121,271	4,851	1.97%
Population under 16	411,672	425,101	434,153	457,040	474,068	489,682	504,150	92,478	3,699	0.81%
Population 65 and over	162,572	174,046	181,819	201,578	223,351	246,214	270,219	107,647	4,306	2.05%
Total Population	**1,341,032**	**1,379,716**	**1,449,723**	**1,598,465**	**1,692,213**	**1,784,864**	**1,875,001**	**533,968**	**21,359**	**1.35%**
Mid Scenario										
Wage & Salary Jobs	382,876	392,698	426,805	469,693	511,927	553,634	594,819	211,942	8,478	1.78%
In-Commuting	77,523	82,849	92,379	108,274	125,278	143,400	162,624	85,101	3,404	3.01%
Out-Commuting	98,840	101,303	109,628	119,959	129,956	139,640	149,002	50,162	2,006	1.66%
Unemployed	52,281	59,175	44,717	45,594	45,868	48,834	51,626	-655	-26	-0.05%
Proprietors	120,049	131,333	135,172	152,794	170,109	187,425	204,740	84,692	3,388	2.16%
Group Quarters, Underemployed	190,175	186,354	224,073	284,527	294,346	304,166	313,985	123,810	4,952	2.03%
Population under 16	411,672	425,101	434,153	457,040	474,068	489,682	504,150	92,478	3,699	0.81%
Population 65 and over	162,572	174,046	181,819	201,578	223,351	246,214	270,219	107,647	4,306	2.05%
Total Population	**1,340,942**	**1,387,162**	**1,463,988**	**1,622,910**	**1,724,348**	**1,826,195**	**1,925,917**	**584,975**	**23,399**	**1.46%**
High Scenario										
Wage & Salary Jobs	382,876	407,019	442,590	490,781	538,614	586,192	633,487	250,611	10,024	2.03%
In-Commuting	76,234	83,647	92,813	108,239	124,720	142,280	160,911	84,677	3,387	3.03%
Out-Commuting	99,279	105,614	114,550	126,822	138,928	150,882	162,665	63,386	2,535	1.99%
Unemployed	52,493	52,862	40,376	45,233	45,854	49,353	52,723	230	9	0.02%
Proprietors	119,249	128,687	133,559	152,794	170,109	187,425	204,740	85,491	3,420	2.19%
Group Quarters, Underemployed	189,559	186,193	226,992	284,527	294,346	304,166	313,985	124,426	4,977	2.04%
Population under 16	411,672	425,242	434,495	458,195	476,388	493,568	510,058	98,386	3,935	0.86%
Population 65 and over	162,852	174,689	182,851	204,004	227,653	252,937	279,981	117,129	4,685	2.19%
Total Population	**1,341,747**	**1,396,659**	**1,482,600**	**1,654,116**	**1,767,173**	**1,882,242**	**1,996,729**	**654,982**	**26,199**	**1.60%**

[**Note 1**] Total population equals the sum of all series less In-Commuting.

Source: Economic & Planning Systems

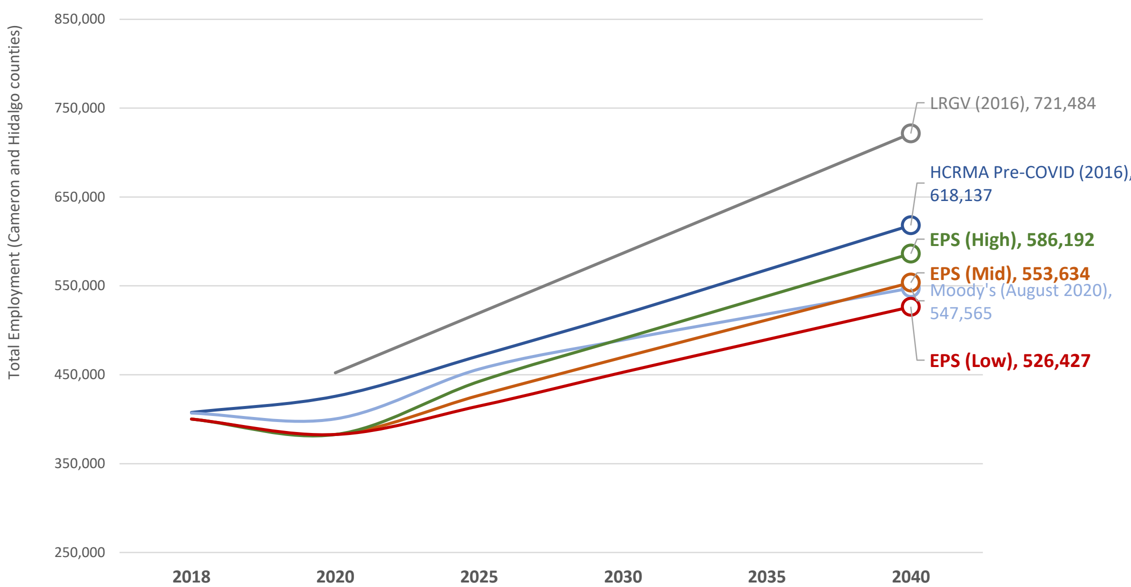
Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]Z.4 - Layers

Forecast Comparisons

Employment. **Figure 42** and **Table 20** illustrate EPS's three scenarios of employment for the combined Cameron and Hidalgo counties in the context of the LRGV forecast from 2016, HCRMA's pre-COVID forecast from 2016, and Moody's forecast prepared in August 2020.

- Low: this scenario reflects average annual growth of approximately 7,200 jobs. The compounded annual average rate of growth is 1.6 percent.
- Mid: this scenario reflects average annual growth of approximately 8,500 jobs. The compounded annual average rate of growth is 1.9 percent.
- High: this scenario reflects average annual growth of approximately 10,200 jobs. The compounded annual average rate of growth is 2.2 percent.

Figure 42 Comparison of Employment Forecasts



Source: LRGV; HCRMA; Moody's; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Forecast Comparisons.xlsx]T1 - Summary

Table 20 Comparison of Employment Forecasts, 2020-2040

	2020	2023	2025	2030	2035	2040	2020-2040 Total	2020-2040 Ann. #	2020-2040 Ann. %
EPS Scenarios									
Low Scenario	382,876	383,498	414,922	452,895	490,015	526,427	143,550	7,178	1.60%
Mid Scenario	382,876	392,698	426,805	469,693	511,927	553,634	170,757	8,538	1.86%
High Scenario	382,876	407,019	442,590	490,781	538,614	586,192	203,315	10,166	2.15%
Other Sources									
HCRMA (2016)	425,828	n/a	471,300	518,204	568,171	618,137	192,309	9,615	1.88%
LRGV (2016)	452,186	n/a	519,510	586,835	654,159	721,484	269,298	13,465	2.36%
Moody's (2020)	400,458	n/a	456,497	489,309	518,437	547,565	147,107	7,355	1.58%

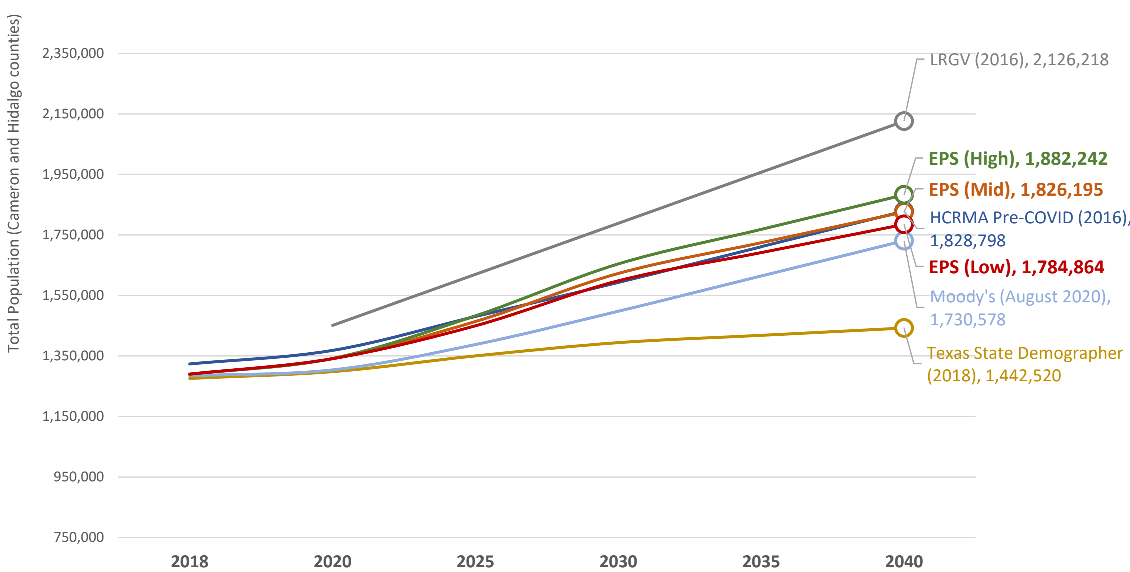
Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Forecast Comparisons.xlsx]T2 - Employment

Population. **Figure 43** illustrates EPS's three scenarios of population for the combined Cameron and Hidalgo counties in the context of the LRGV forecast from 2016, HCRMA's pre-COVID forecast from 2016, Moody's forecast prepared in August 2020, as well as the Texas State Demographer's forecast.

- Low: this scenario reflects average annual growth of approximately 19,300 persons. The compounded annual average rate of growth is 1.2 percent.
- Mid: this scenario reflects average annual growth of approximately 21,300 persons. The compounded annual average rate of growth is 1.3 percent.
- High: this scenario reflects average annual growth of approximately 24,000 persons. The compounded annual average rate of growth is 1.5 percent.

Figure 43 Comparison of Population Forecasts



Source: LRGV; HCRMA; Moody's; Texas Demography Center; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Forecast Comparisons.xlsx]T1 - Summary

Table 21 Comparison of Population Forecasts, 2020-2040

						2020-2040		
	2020	2025	2030	2035	2040	Total	Ann. #	Ann. %
EPS Scenarios								
Low Scenario	1,341,032	1,449,723	1,598,465	1,692,213	1,784,864	443,832	22,192	1.44%
Mid Scenario	1,340,942	1,463,988	1,622,910	1,724,348	1,826,195	485,253	24,263	1.56%
High Scenario	1,341,747	1,482,600	1,654,116	1,767,173	1,882,242	540,495	27,025	1.71%
Other Sources								
HCRMA (2016)	1,368,325	1,480,462	1,593,128	1,710,963	1,828,798	460,473	23,024	1.46%
LRGV (2016)	1,450,818	1,619,668	1,788,518	1,957,368	2,126,218	675,400	33,770	1.93%
Texas Demographer (2018)	1,298,247	1,350,298	1,394,187	1,418,354	1,442,520	144,273	7,214	0.53%
Moody's (2020)	1,303,865	1,387,621	1,497,725	1,614,151	1,730,578	426,713	21,336	1.43%

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Forecast Comparisons.xlsx]T3 - Population

5. Appendix

Employment Sector Assumptions

In the historical trends analysis, and for the purpose of projecting growth by employment sector, the following (**Table 22**) supersector definitions were used. EPS proceeded with this understanding given that HCRMA applies Texas Department of Transportation cross relationships between supersector category and underlying 2-digit NAICS code industry classifications.

Table 22 Industry Supersector Definitions

	NAICS Code
Basic	
Agriculture, Forestry, Fishing and Hunting	11
Mining	21
Utilities	22
Construction	23
Manufacturing	31-33
Wholesale Trade	42
Transportation and Warehousing	48-49
Information	51
Education	
Education	61
Retail	
Retail Trade	44-45
Accommodation and Food Services	72
Service	
Finance and Insurance	52
Real Estate and Rental and Leasing	53
Professional and technical services	54
Management of companies and enterprises	55
Administrative and waste services	56
Health Care and Social Assistance	62
Arts, entertainment, and recreation	71
Other services, except public administration	99
Public Administration	92

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]Z.1- Crosswalk

Self-Employment Trends Detail

In the analysis of self-employment trends using the U.S. Census Non-Employer Statistics (NES), and for the purpose of calibrating the forecasted rate of growth in proprietors, the following (**Table 23**) illustrates the profile of historical proprietor growth for each county.

- Cameron County: the average rate of self-employment growth has been 926 proprietors per year since 2000. Approximately one quarter of this annual increase has been in the broad sector of "Administrative and support services". Proprietors in Construction have accounted for 13 percent, proprietors in Transportation have accounted for 11 percent, and proprietors in Health Care have accounted for 11 percent.
- Hidalgo County: the average rate of self-employment growth has been 2,538 proprietors per year since 2000. The profile of growth has been similar to Cameron County. More than 20 percent has been in "Administrative and support services". Proprietors in Construction have accounted for 12 percent, proprietors in Transportation have accounted for 13 percent, and proprietors in Health Care have accounted for 9 percent.

Table 23 Historical Rate of Self-Employment Growth, 2000-2019

	Cameron County (2000-2019)		Hidalgo County (2000-2019)	
	Ann. #	as %	Ann. #	as %
Industry				
Agriculture, forestry, fishing and hunting	-27	-3%	20	1%
Mining, quarrying, and oil and gas extraction	2	0%	8	0%
Utilities	1	0%	2	0%
Construction	120	13%	307	12%
Manufacturing	11	1%	40	2%
Wholesale trade	9	1%	40	2%
Retail trade	74	8%	230	9%
Transportation and warehousing(037)	103	11%	325	13%
Information	6	1%	19	1%
Finance and insurance	18	2%	52	2%
Real estate and rental and leasing	41	4%	122	5%
Professional, scientific, and technical services	62	7%	178	7%
Administrative and support and waste management and remediation services	227	24%	539	21%
Educational services	28	3%	72	3%
Health care and social assistance	104	11%	227	9%
Arts, entertainment, and recreation	26	3%	63	2%
Accommodation and food services	46	5%	102	4%
Other services (except public administration)	75	8%	191	8%
Total	**926**	**100%**	**2,538**	**100%**

Source: US Census NES; Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Nonemployer Data.xlsx]TABLE 2 - Rates

Probability Details

The following tables are organized by topic: statistics for 1) the short-term econometric model through 2025; 2) the long-term model demographic assumptions through 2045; and 3) the long-term model employment assumptions by supersector through 2045. Each table presents: 1) modeled assumptions by scenario; 2) statistics from the historical trends analysis; and 3) probabilities associated with each assumption and each scenario.

Short-Term Model Assumptions and Probabilities. **Table 24** illustrates assumptions for: 1) monthly change in the Consumer Confidence Index (CCI); and 2) monthly change in the Consumer Price Index (CPI). The third series, monthly change in county-level sales tax allocations, is the output of the first level econometric model, which projects sales tax allocations to each county. Values shown in this table are average monthly for all months between 2020 and the end of 2025; as such, they are an average of: a) downturn rates through the duration of the COVID-19 pandemic and b) recovery rates through the end of 2025.

- CCI: compared to the long-term monthly average of negative 0.02 points change, EPS's modeled assumptions for downturn and recovery through the end of 2025 range between 1.02 and 1.58 points per month with associated probabilities ranging between 0.57 and 0.60.
- CPI: compared to the long-term monthly average change of 0.36 points, EPS's modeled assumption through the end of 2025 is 0.30 points, reflecting the assumption that inflation will maintain a relatively stable escalation over time. The underlying probability is 0.46.
- Sales Tax: compared to the long-term average increase of approximately $30,000 and $35,000 in monthly sales tax allocations for Cameron and Hidalgo county, respectively, the outputs of the first level model project monthly changes of approximately 28 percent in the Low scenario to 37 percent in the High scenario historic rates. The underlying probability is 0.49 for Cameron County and 0.50 for Hidalgo County.

Table 24 Short-Term Model Assumptions and Probabilities

	Model Assumptions			Historical Statistics				Probabilities		
	High	Mid	Low	Min	Max	Avg.	n =	High	Mid	Low
Monthly CCI Change	1.5766	1.2609	1.0219	-33.1000	21.7000	-0.0259	519	0.60	0.58	0.57
Monthly CPI Change	0.3000	0.3000	0.3000	-4.1480	2.4000	0.3611	367	0.46	0.46	0.46
Monthly Sales Tax Change										
Cameron	$10,967	$9,695	$8,440	($2.8) M	$2.4 M	$29,927	91	0.49	0.49	0.49
Hidalgo	$14,348	$6,707	$1,135	($6.0) M	$4.7 M	$35,869	91	0.50	0.50	0.49

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]B.1(2)

Long-Term Model Demographic Assumptions and Probabilities. **Table 25** illustrates assumptions for each demographic series used in the conversion of employment projections to population estimates. Values shown in this table are average annual changes for all years between 2020 and 2045; as such, they reflect blended averages of: a) downturn and recovery rates through the end of 2025; and b) long-term structural rates through 2045.

- In-Commuting: compared to historical trends, in-commuting is projected to be a more prevalent labor force response in Hidalgo County than in Cameron County. Probabilities for projected rates of in-commuting growth range between 0.44 and 0.52 for Cameron County and 0.63 and 0.65 for Hidalgo County.
- Out-Commuting: compared to historical trends, out-commuting is projected to be a less prevalent in the local labor force for both counties, where probabilities for projected rates of out-commuting growth range between 0.31 and 0.39 for Cameron County and 0.30 and 0.38 for Hidalgo County.
- Unemployment: unemployment is projected to stabilize over time in each of the scenarios, resulting in nearly identical long-term shifts and probabilities of approximately 0.47 across each scenario for both counties.
- Proprietors: the modeled assumptions across each scenario for both counties is 0.50.
- Persons Under 16: compared to long-term historical averages, probabilities for the projected rate of growth for the population under 16 years of age ranges between 0.54 and 0.58 for Cameron County, and 0.31 across each scenario for Hidalgo County.
- Persons 65 and Over: compared to long-term historical averages, probabilities for the projected rate of growth for the population 65 years of age and older ranges between 0.68 and 0.85 for Cameron County, and 0.66 across each scenario for Hidalgo County.
- Total Population: as an output to the modeling, total population growth rates are slightly lower than long-term historical averages in EPS's "Mid" scenario. Probabilities associated with these resulting rates range between 0.31 and 0.58 for Cameron County and between 0.55 and 0.75 for Hidalgo County.

Table 25 Long-Term Model Demographic Assumptions and Probabilities

	Model Assumptions			Historical Statistics				Probabilities		
	High	Mid	Low	Min	Max	Average	n =	High	Mid	Low
In-Commuting										
Cameron	992	784	640	-3,440	4,972	909	15	0.52	0.47	0.44
Hidalgo	2,747	2,620	2,543	-5,467	8,275	1,380	15	0.65	0.64	0.63
Out-Commuting										
Cameron	892	726	510	-1,827	4,597	1,413	15	0.39	0.35	0.31
Hidalgo	1,643	1,280	994	-4,250	6,304	2,480	15	0.38	0.33	0.30
Unemployment										
Cameron	39	44	71	-25,266	10,936	180	367	0.47	0.47	0.48
Hidalgo	-30	-70	-96	-49,339	19,228	531	367	0.45	0.44	0.44
Proprietors										
Cameron	926	926	926	-81	2,397	926	18	0.50	0.50	0.50
Hidalgo	2,494	2,462	2,462	-550	5,975	2,538	18	0.49	0.48	0.48
Laborforce										
Cameron	237	190	131	-12,326	6,258	149	363	0.52	0.51	0.50
Hidalgo	528	397	295	-10,117	13,393	521	363	0.50	0.49	0.47
Persons <16										
Cameron	1,372	1,136	1,136	-1,809	2,601	937	19	0.59	0.54	0.54
Hidalgo	2,563	2,563	2,563	-2,607	7,493	4,342	19	0.31	0.31	0.31
Persons 65+										
Cameron	1,808	1,428	1,428	692	2,473	1,122	19	0.89	0.71	0.71
Hidalgo	2,878	2,878	2,878	-1,491	5,048	2,290	19	0.67	0.67	0.67
Total Population										
Cameron	6,120	4,916	4,146	-88	10,975	5,567	29	0.58	0.41	0.31
Hidalgo	20,079	18,483	17,212	6,049	23,196	16,604	29	0.75	0.64	0.55

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]B.1(3)

Long-Term Model Employment Assumptions and Probabilities. **Table 26** illustrates assumptions for each employment supersector. Values shown in this table are average annual changes: 1) for all years between 2020 and 2025; and 2) for all years between 2020 and 2045.

- Basic: across both projection timeframes, the probabilities associated with projected rates for each county range generally between 0.50 and 0.65, reflecting the overall trajectory of the industries that comprise this supersector. In the short-term (i.e. through 2025) Hidalgo County projection, for example, the shift in Basic jobs is negative, accounting for the economic impacts associated with a longer duration pandemic.
- Service: probabilities associated with Service sector (e.g. finance, real estate, health care, arts, entertainment, and recreation) job growth rates range widely, given their dependence on the resumption of fuller consumer spending activity, e.g. uninhibited by social distancing and customer-facing activities. Long-term probabilities range between 0.45 on the low side and 0.83 on the high side.
- Retail: probabilities associated with Retail sector job growth rates also range widely, given their high dependence on the resumption of consumer spending activity. In the case of this supersector, it is projected that this sector will recover relatively quickly once other sectors respond in the broader economic recovery. Long-term probabilities range between 0.38 on the low side and 0.55 on the high side.
- Education: probabilities associated with Education sector job growth reflect the general contour of probability ranges of total population growth by scenario. Long-term probabilities range between 0.37 on the low side and 0.72 on the high side.

Table 26 Long-Term Model Employment Assumptions and Probabilities

	Model Assumptions			Historical Statistics				Probabilities		
	High	Mid	Low	Min	Max	Average	n =	High	Mid	Low
Rates through 2025										
Cameron										
Basic Jobs	175	147	94	-1,982	2,084	-137	29	0.63	0.62	0.60
Service Jobs	2,095	1,710	1,369	380	3,795	1,546	29	0.74	0.58	0.42
Retail Jobs	932	875	777	-848	1,405	495	29	0.77	0.74	0.68
Education Jobs	304	156	43	-378	836	292	29	0.51	0.35	0.24
Hidalgo										
Basic Jobs	687	209	-101	-3,383	2,481	156	29	0.65	0.52	0.43
Service Jobs	4,713	3,339	2,406	315	6,400	3,247	29	0.85	0.53	0.28
Retail Jobs	2,798	2,605	2,375	-911	3,082	1,149	29	0.97	0.95	0.92
Education Jobs	1,522	1,198	949	-203	1,796	848	29	0.92	0.77	0.58
Rates through 2045										
Cameron										
Basic Jobs	99	86	55	-1,982	2,084	-137	29	0.60	0.60	0.58
Service Jobs	1,752	1,599	1,433	380	3,795	1,546	29	0.60	0.53	0.45
Retail Jobs	421	394	321	-848	1,405	495	29	0.45	0.43	0.38
Education Jobs	283	219	175	-378	836	292	29	0.49	0.42	0.37
Hidalgo										
Basic Jobs	459	293	164	-3,383	2,481	156	29	0.59	0.54	0.50
Service Jobs	4,623	3,808	3,188	315	6,400	3,247	29	0.83	0.65	0.48
Retail Jobs	1,256	1,128	994	-911	3,082	1,149	29	0.55	0.49	0.43
Education Jobs	1,131	951	841	-203	1,796	848	29	0.72	0.58	0.49

Source: Economic & Planning Systems

Z:\Shared\Projects\DEN\183146-Hidalgo County TX Toll 365 T&R Study\Data\[183146-Independent Forecast.xlsx]B.1(4)