OKLAHOMA TURNPIKE AUTHORITY

GILCREASE EXPRESSWAY

COMPREHENSIVE TRAFFIC & REVENUE STUDY

SUMMARY REPORT

June 2018

CDM Smith

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June 1, 2018

Wendy Smith
Director of Finance and Revenue
Oklahoma Turnpike Authority
PO Box 11357, 3500 North Martin Luther King Avenue
Oklahoma City, OK 73111-4295

Re: Gilcrease Expressway Comprehensive Traffic and Revenue Study

Dear Ms. Smith:

CDM Smith is pleased to submit this Comprehensive Traffic and Revenue Study report for the planned Gilcrease Expressway project in Tulsa. The report summarizes the data collection, analysis undertaken and the results of the study that includes the toll revenue projections over a forty-year period.

Our project team, including Michael Copeland, Justin Winn, Maneesh Mahlawat, Kunal Singh and others, gratefully acknowledge the assistance and cooperation received from OTA staff as well as others contacted over the course of the study. CDM Smith sincerely appreciates the opportunity to have participated in this important project.

Respectfully submitted,

Christopher Mwalwanda
Vice President
CDM Smith Inc.

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Disclaimer

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

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

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

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

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

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Section 1
Introduction

The following summarizes CDM Smith's current efforts to develop traffic and revenue estimates for the proposed Gilcrease Expressway toll project, which was announced as part of the Oklahoma Turnpike Authority (OTA) Driving Forward program. The work effort associated with this endeavor included the development of a detailed travel demand model for the Tulsa area which was then used to estimate the long-term revenue forecasts for the Gilcrease Expressway project.

Gilcrease Expressway

On October 29, 2015, Governor Mary Fallin and the OTA announced the Driving Forward program, which included a series of six major projects (including Gilcrease Expressway) designed to improve and expand OTA's system of turnpikes. Figure 1-1 shows the planned alignment of the Gilcrease Expressway in southwestern Tulsa. The proposed project extends from the intersection of I-44 and I-244 northward across the Arkansas River, terminating at Edison Street, just north of US 412. The expressway will provide a high-speed limited access facility to the western portion of the Tulsa area as an additional crossing over the Arkansas River to alleviate demand at the existing SH 97 and I-244 crossings. The segment of Gilcrease Expressway from W. Edison Street to L.L. Tisdale Parkway was not assumed to be constructed during the forecast period.

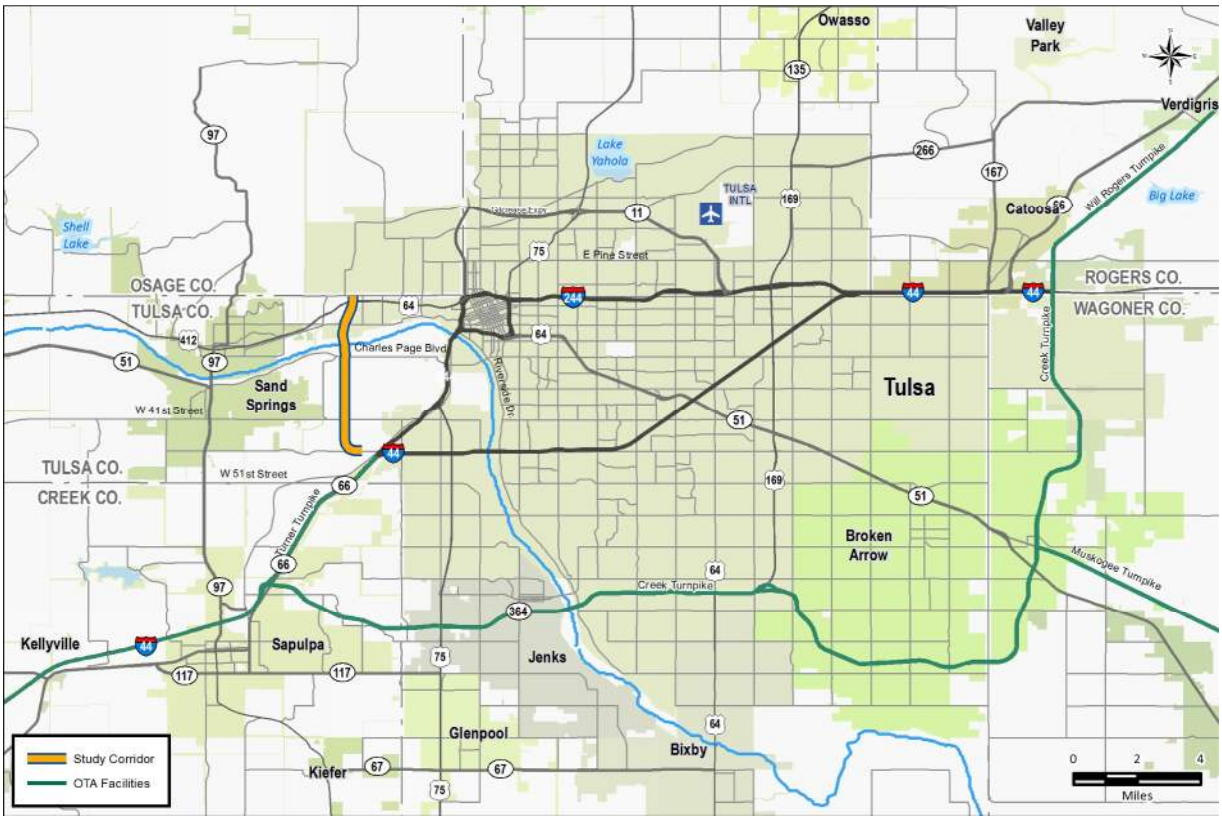

Figure 1-1. Proposed Gilcrease Expressway

Structure of Study and Report

The purpose of this study was to develop long-term revenue forecasts for the proposed Gilcrease Expressway project. The following outlines the general structure of the report:

Section 2 – Tulsa Area Transportation Demand Profile

This section describes the travel demand data collected in the Tulsa area to support the development of the revenue forecasts for the Gilcrease Expressway project. The collected data included traffic counts at specific locations around the project corridor and comprehensive travel speed information for the region. Origin-destination data was collected in the region to analyze trip patterns, and stated preference surveys were conducted to determine users' average values of travel time savings.

Section 3 – Socio-Economic Characteristics

This section provides a description of the historical and expected future demographic growth in the Tulsa area and from a statewide perspective. This included an analysis of population, employment, and several key economic indicators within the state. Research and Demographic Solutions (RDS) performed an independent review and update of the official Tulsa area demographic forecasts developed by the Indian Nations Council of Governments (INCOG) that were used to support the traffic and revenue forecasts.

Section 4 – Traffic Forecasting Methodology

This section describes the databases utilized as part of the analysis and highlights the methodologies implemented to develop the models used to project future year traffic along the Gilcrease Expressway project. INCOG's travel demand model for the Tulsa area was calibrated to current traffic conditions to ensure that it reflected the observed traffic characteristics captured along existing corridors within the study area.

Section 5 – Revenue Forecasts

This section provides the toll sensitivity analyses performed as part of the study, the key input assumptions used in the development of revenue forecasts, and the resulting traffic and toll revenue forecasts. Also presented are the planned/proposed tolling configurations and a series of sensitivity tests undertaken to reflect variance to several key influential factors such as demographic growth and values of time.

Section 2

Tulsa Area Traffic Characteristics

This section provides background information regarding the existing traffic conditions for the roadway infrastructure in and around the planned Gilcrease Expressway project. The information in this section provides a historical overview of traffic in the greater Tulsa area that was used as input to the traffic and revenue forecasting process. A comprehensive data collection effort was undertaken within the study area, which included traffic counts, travel time data analysis, origin-destination patterns and stated preference behavioral data.

Traffic Count Program

CDM Smith conducted a comprehensive traffic count program that included multiple screenlines throughout study corridor, as shown in Figures 2-1 and 2-2. The screenlines were developed to analyze the total corridor traffic trends and were used to ensure that the travel demand model outputs in the traffic forecasting process reflected current traffic characteristics within the study area. CDM Smith engaged GRAM Traffic NTX to perform a series of 48-hour traffic counts during March 2015. The 48-hour counts were collected only during interior weekdays (Tuesday, Wednesday and Thursday) to avoid the weekend-related traffic fluctuations on Mondays and Fridays and to generate data that was most representative of average weekday travel within the study area.

From the traffic counts collected, CDM Smith was able to determine the average traffic volumes near the Gilcrease Expressway corridor, and the AM peak, PM peak and midday period traffic profiles. This information was used to validate the travel demand model. Figures 2-3 through 2-8 show the daily traffic profiles for each screenline within the project area. As shown in the figures, traffic along all screenlines shows peaking characteristics in both directions during both the AM and PM peak periods. On Screenlines 1 and 2, demand is highest in the southbound direction during the AM peak and in the northbound direction during the PM peak. Conversely, along Screenlines 3, 4 and 5 demand is highest in the northbound direction during the AM peak and in the southbound direction during the PM peak. As expected, Screenline 6 has its highest demand in the eastbound direction (toward central Tulsa) in the AM peak period and in the westbound direction during the PM peak period.

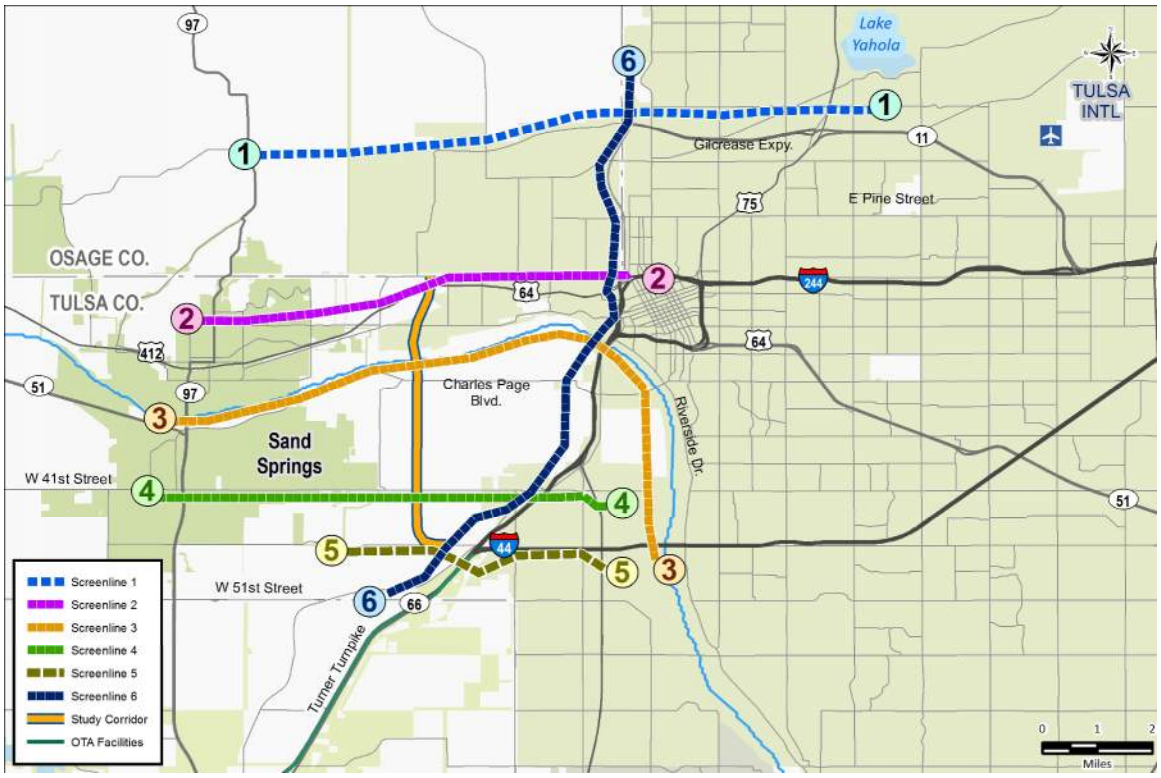

Figure 2-1. Traffic Count Screenlines

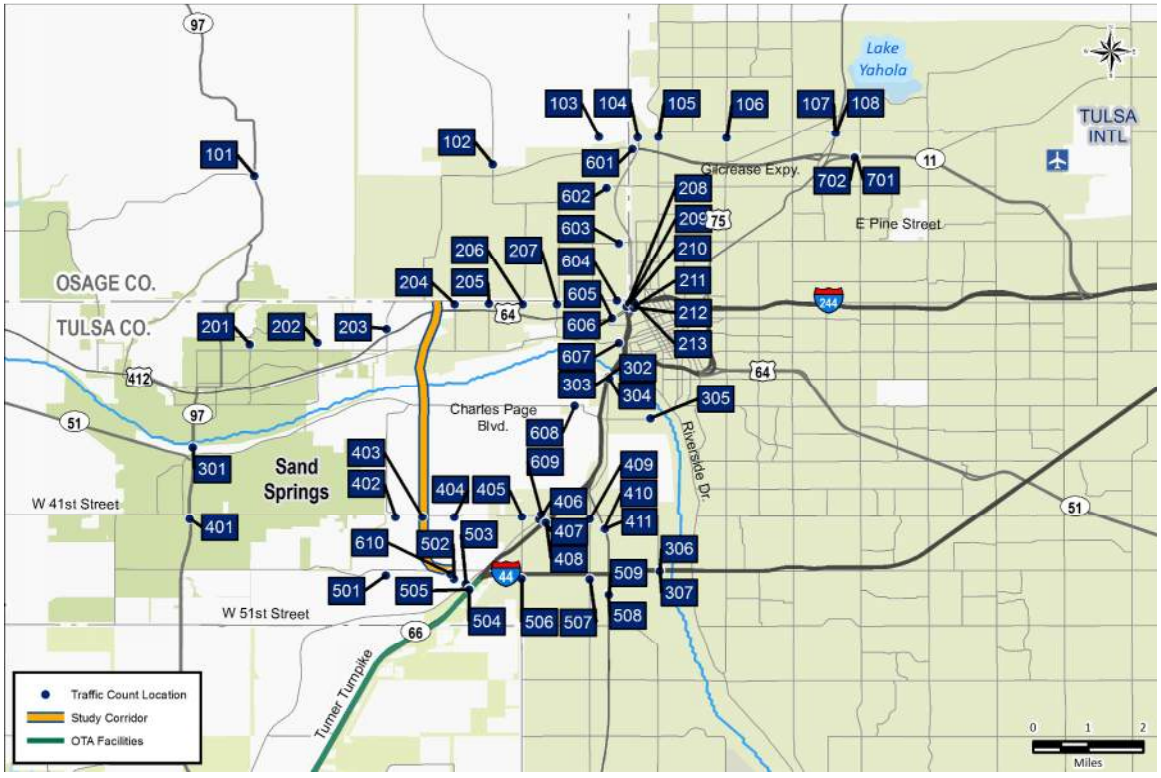

Figure 2-2. Traffic Count Locations

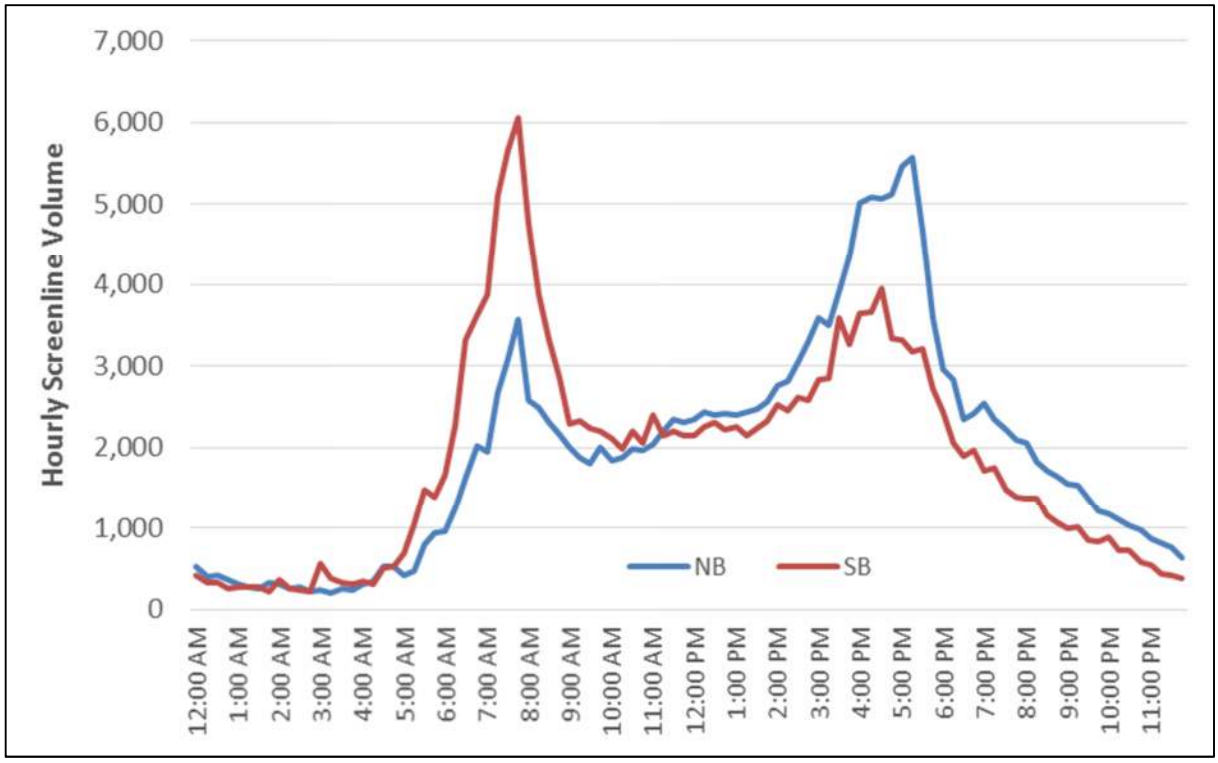

Figure 2-3. Daily Traffic Profile – Screenline 1

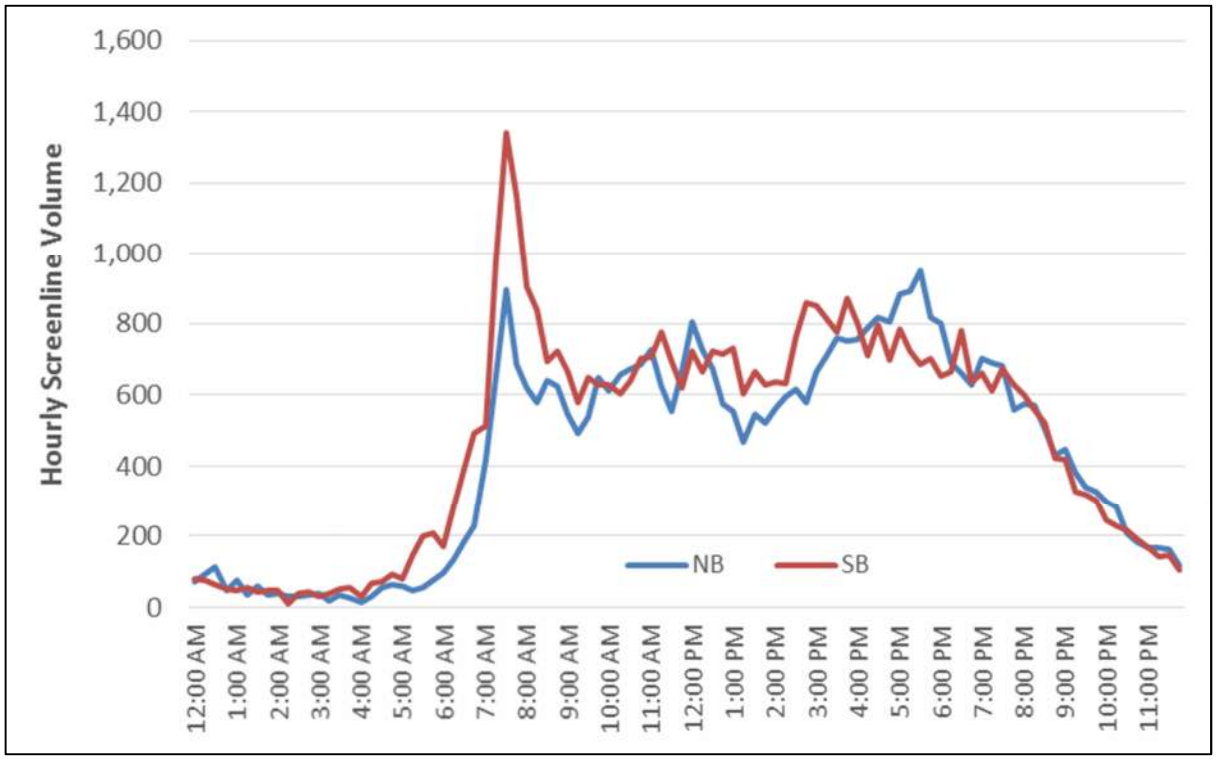

Figure 2-4. Daily Traffic Profile – Screenline 2

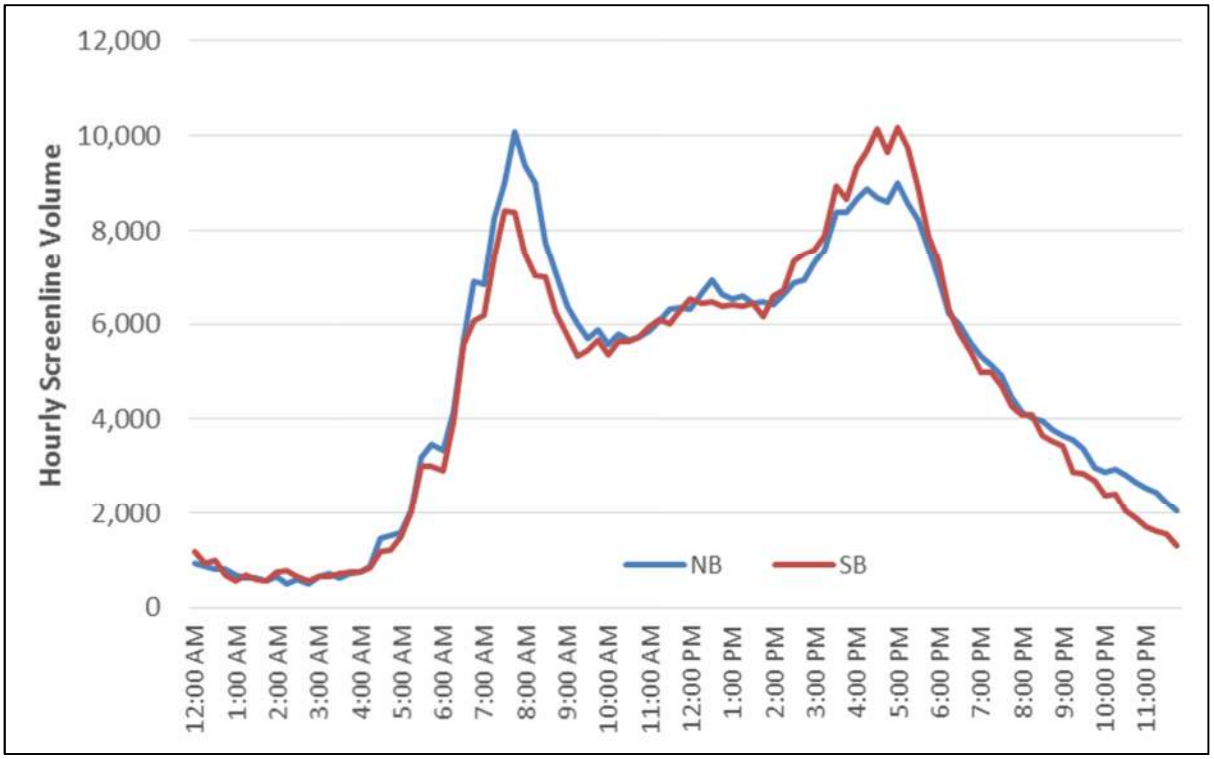

Figure 2-5. Daily Traffic Profile – Screenline 3

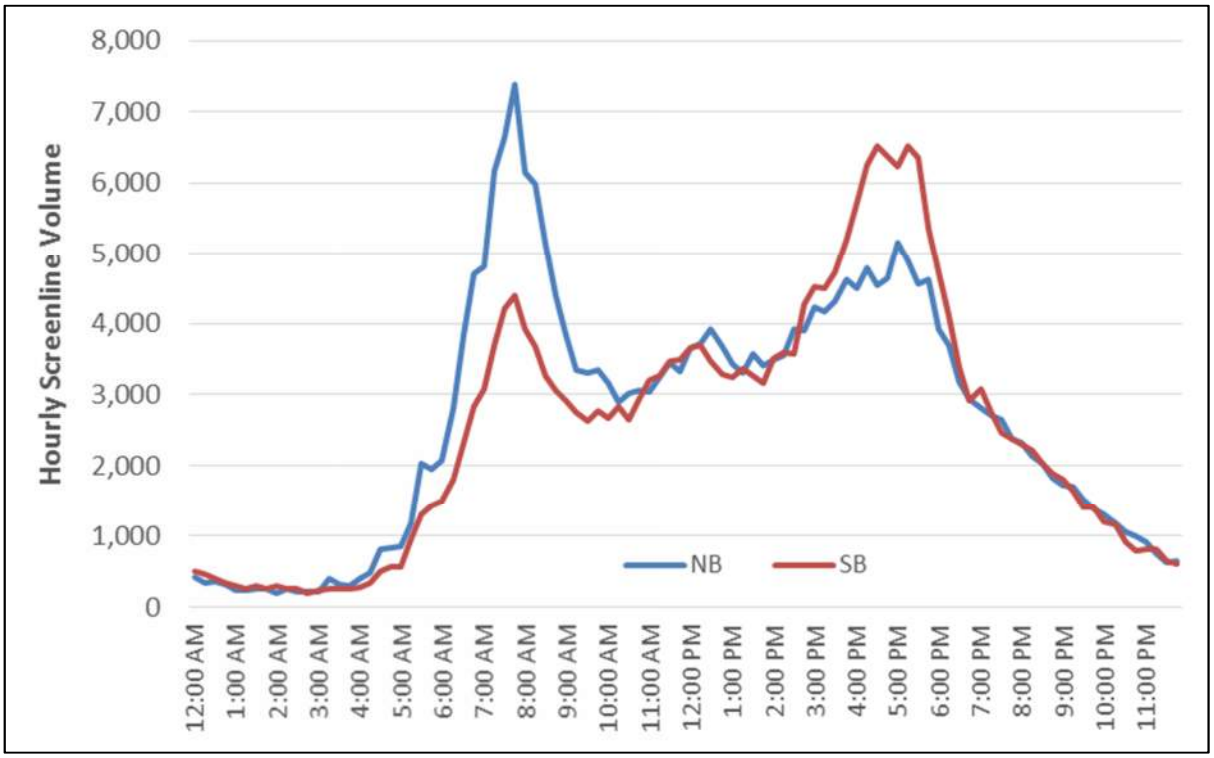

Figure 2-6. Daily Traffic Profile – Screenline 4

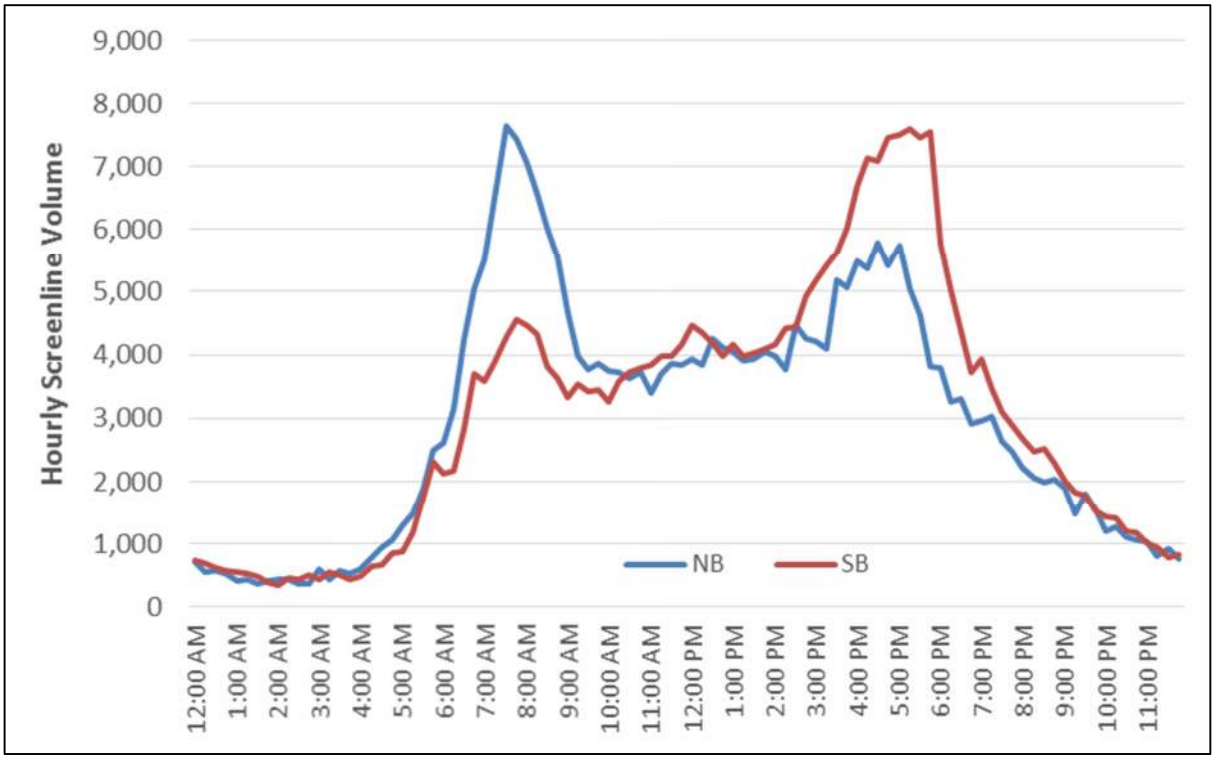

Figure 2-7. Daily Traffic Profile – Screenline 5

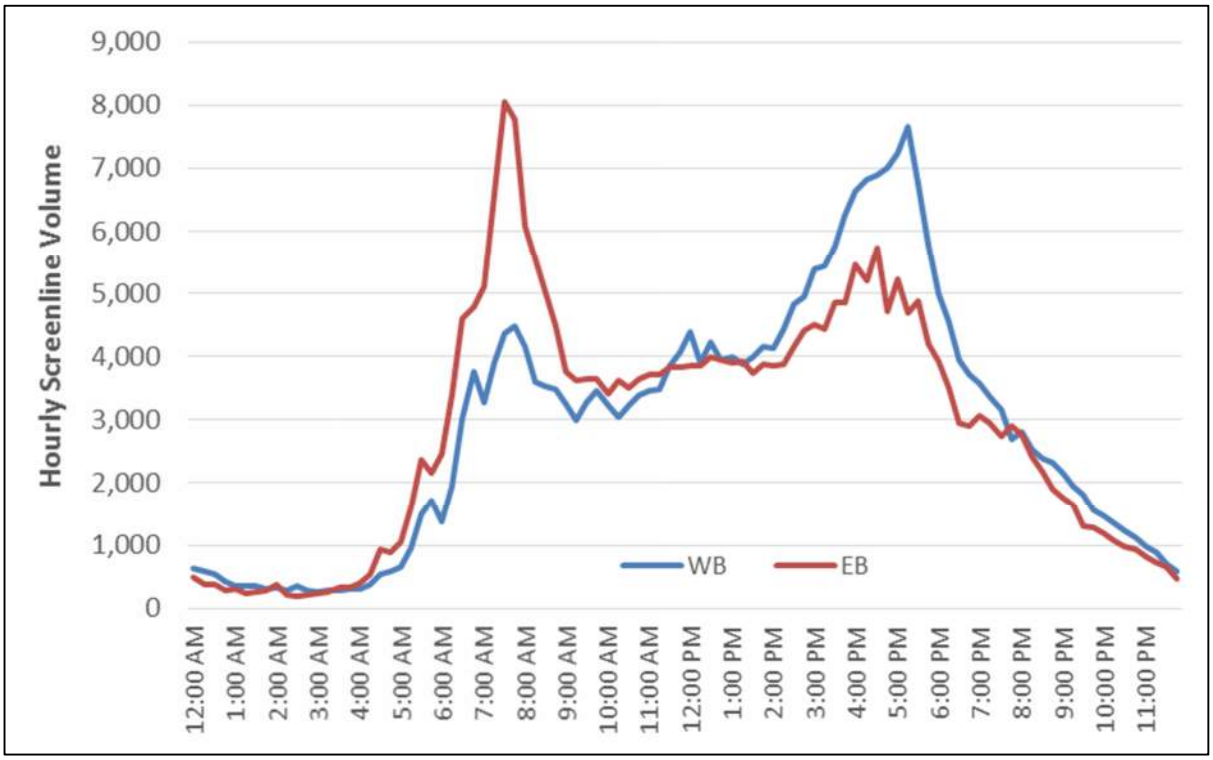

Figure 2-8. Daily Traffic Profile – Screenline 6

Historical Traffic Counts

The Oklahoma Department of Transportation (ODOT) records the Average Annual Daily Traffic (AADT) volumes at several locations across the statewide roadway network. CDM Smith obtained the AADT for several locations throughout the Tulsa region for a ten-year period between 2005 and 2015. The historical counts in Table 2-1 show the historical growth of traffic along major routes within the study area. As shown in the table, most of the locations in the study area experienced positive AADT growth over the ten-year period from 2005 to 2015, with some of the highest growth rates observed along SH 97 and I-44 near the proposed project corridor.

Table 2-1. Historical Traffic Counts – Tulsa Area

Facility	Location	2005	2010	2015	Annual Growth 2005-2015
SH 97	South of SH 51	13,443	13,800	14,668	0.9%
N Adams Rd	North of US 412	2,200	2,000	2,000	-0.9%
River Rd	East of Wilson Ave	30,400	30,800	34,400	1.2%
I-244	South of I-44	65,000	65,100	51,500	-2.3%
I-244	North of I-44	20,100	20,700	20,100	0.0%
I-244	North of US 75	62,800	64,000	66,800	0.6%
US 412	West of SH 97	25,700	24,100	23,600	-0.8%
US 412	West of I-244	48,700	57,200	55,400	1.3%
I-44	**East of I-244**	**46,500**	**47,300**	**51,900**	**1.1%**
I-44	East of US 169	51,235	54,042	51,453	0.0%
US 75	South of I-244	67,700	62,566	67,973	0.0%
US 75	South of SH 364	38,100	46,200	49,100	2.6%
US 75	North of I-244	34,000	34,000	36,200	0.6%
I-244	East of LL Tisdale Pkwy	62,500	66,900	74,700	1.8%
US 64	East of US 75	84,200	85,100	87,700	0.4%
US 64	West of US 75	45,700	45,500	49,000	0.7%
US 75	South of I-244	47,200	50,100	47,900	0.1%
US 75	North of US 64	41,000	46,000	49,700	1.9%
US 51	West of Creek Turnpike	84,200	94,200	86,300	0.2%
I-244	West of SH 11	67,700	71,600	66,100	-0.2%
I-44	**East of US 75**	**72,800**	**67,900**	**81,600**	**1.1%**
US 169	South of I-44	85,000	116,300	105,300	2.2%
SH 97	**North of Arkansas River**	**1,700**	**1,900**	**2,200**	**2.6%**
I-20	West of SH 11	13,700	16,300	16,300	1.8%

Speed and Travel Time

The evaluation of a toll facility's future traffic and revenue potential requires knowledge of the current travel time characteristics of the major roadways within the project area. For the current study, travel time data was collected by two methods. The primary source was historical travel data obtained from INRIX, Inc., a traffic data company based in Washington State that maintains an archive of travel speed data for thousands of roadways across the United States accumulated from global positioning system (GPS)-enabled devices along the highway network. INRIX is a Data as a Service (DaaS) company that monitors traffic flow along approximately 260,000 miles of major freeways, highways, urban and rural arterials, and side streets in the United States. This data provides historical and real-time traffic data seven days a week, 24 hours a day in as little as five-minute increments for all metro areas with a population of more than one million. They were engaged to provide a series of travel speed data for several roadways within the study area.

INRIX obtains its data via crowd sourcing and collects travel speed information from various probes, including anonymous cell phones/smartphones and vehicles equipped with GPS devices (trucks, delivery vans, transit vehicles, etc.). The collected data is then processed in real-time to create traffic speed information along the major roadways. The real-time travel speed data is normalized to account for parameters that affect traffic flow conditions such as weather forecasts, school schedules, special events, accidents, seasonal variation, and road construction. The procedure adopted by INRIX to obtain and distribute the crowd-sourced traffic data is illustrated in Figure 2-9.

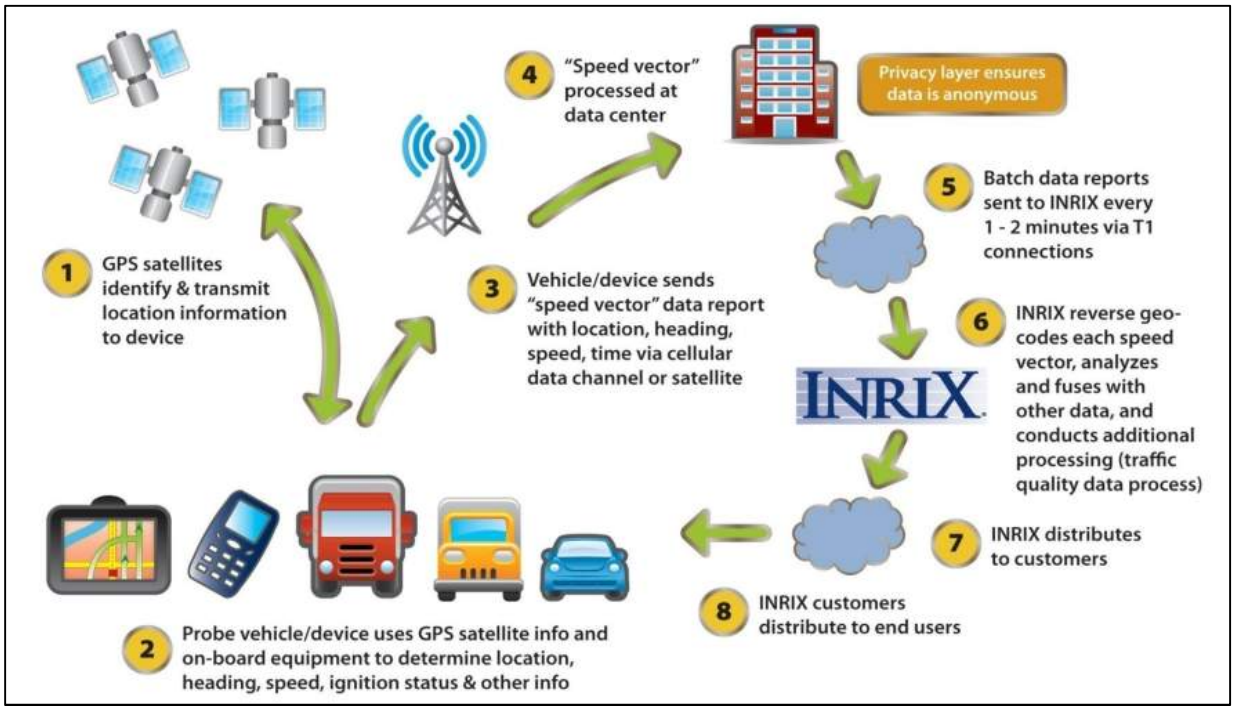

Figure 2-9. INRIX Traffic Data Collection and Distribution Process

Source: INRIX, Inc.

Figures 2-10 through 2-12 show the routes for which travel time data was obtained and the average speeds observed. Major routes throughout the corridor were selected for analysis to provide a profile of the fluctuation in operating speeds throughout the corridor and the relationship between demand and congestion levels. The data illustrated in Figures 2-10 through 2-12 represents the average travel speeds as measured by INRIX in the spring of 2015.

The figures illustrate the typical travel speeds in each direction along major routes for the AM peak, PM peak, and midday periods. As expected, the slowest travel speeds during the peak periods are observed near the downtown area, with the most congestion occurring in the inbound direction during the AM peak period and in the outbound direction during the PM peak period. Additionally, the data indicates that regular congestion occurs along other key travel routes into the greater Tulsa area.

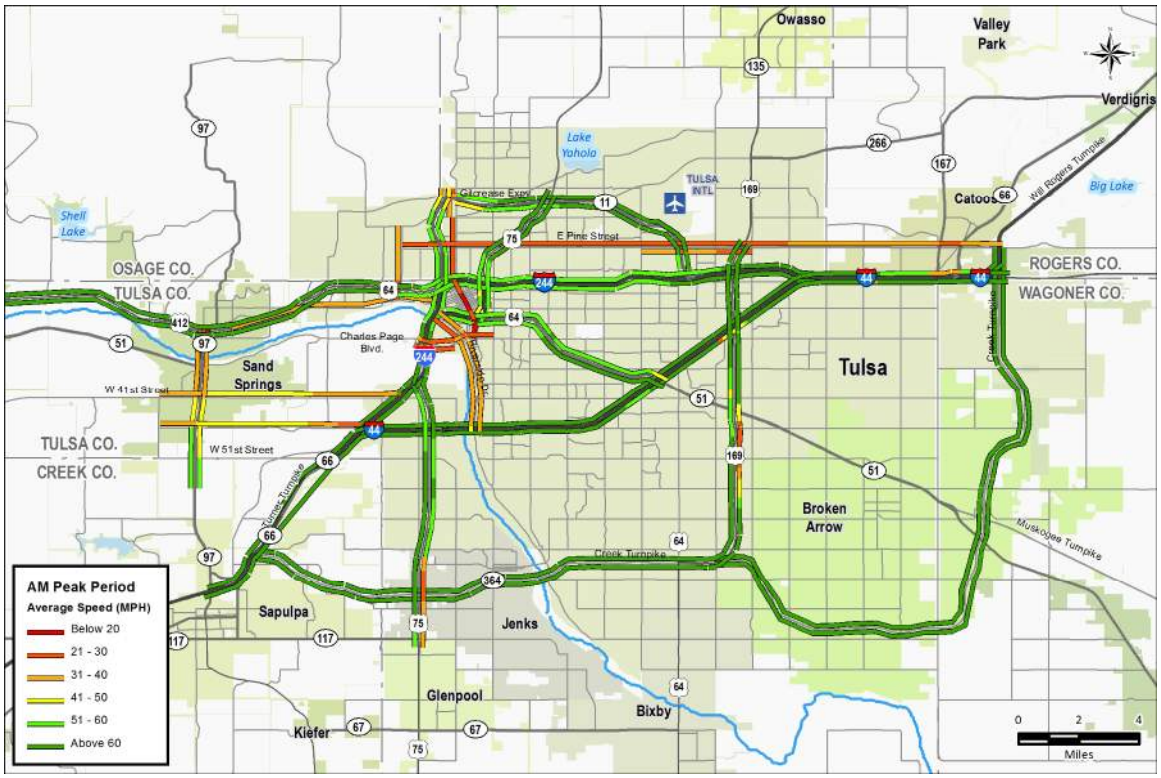

Figure 2-10. Average Travel Speeds – AM Peak Period

Source: INRIX, Inc.

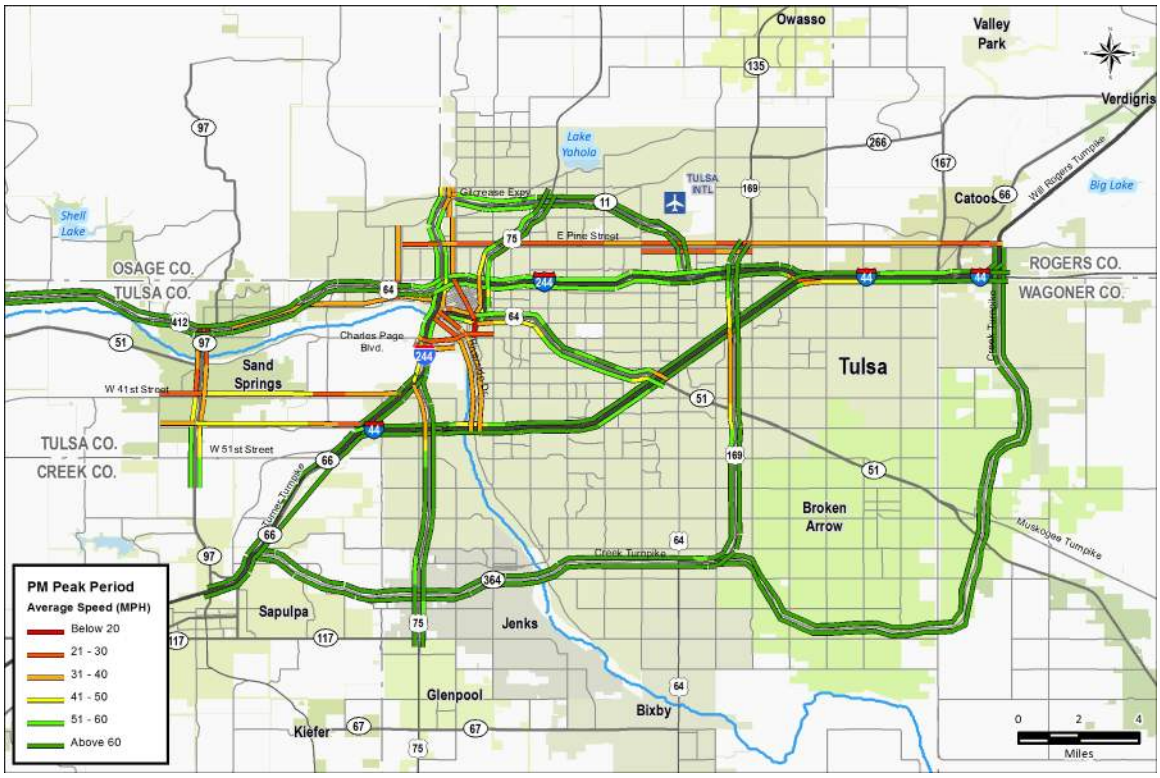

Figure 2-11. Average Travel Speeds – PM Peak Period

Source: INRIX, Inc.

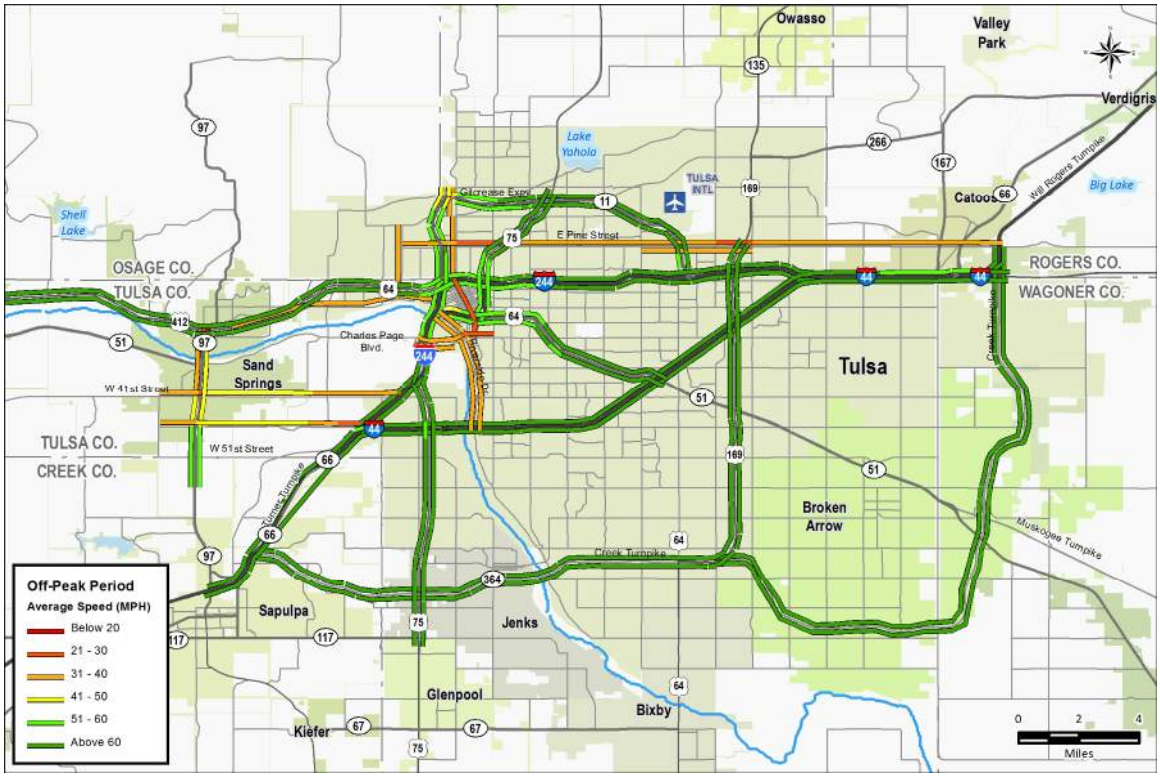

Figure 2-12. Average Travel Speeds – Midday Period

Source: INRIX, Inc.

Regional Trip Patterns

An analysis of the origin-destination (O/D) patterns in the Tulsa area was undertaken by CDM Smith to investigate the travel patterns of the potential future users of the Gilcrease Expressway project. To determine these patterns, CDM Smith engaged the services of All Traffic Data Services, Inc. to collect data at multiple locations using Bluetooth® readers. Readers were placed at each of the locations shown in Figure 2-13. Each Bluetooth® reader recorded the unique Bluetooth® device IDs that passed within the reader's range. The source of the Bluetooth® IDs was primarily smart phones, but other Bluetooth®-enabled devices such as laptops and music players may have also been picked up by the reader.

Figures 2-14 through 2-39 summarizes the results of the O/D data collection effort. For each reader location, the figure highlights the percent of that reader's identified Bluetooth® IDs that were also observed at each of the other reader locations. For example, as shown in Figure 2-14, 16 percent of the Bluetooth® IDs that were observed at Location 1 were also observed at Location 4 during the AM peak period.

Figure 2-13. Origin-Destination Analysis Locations

Figure 2-14. Location 1: LL Tisdale South of 36th - AM O/D Distribution

Figure 2-15. Location 1: LL Tisdale South of 36th - PM O/D Distribution

Figure 2-16. Location 2: Peoria Ave South of 36th - AM O/D Distribution

Figure 2-17. Location 2: Peoria Ave South of 36th - PM O/D Distribution

Figure 2-18. Location 3: US 75 South of 36th - AM O/D Distribution

Figure 2-19. Location 3: US 75 South of 36th - PM O/D Distribution

Figure 2-20. Location 4: LL Tisdale North of US 64 - AM O/D Distribution

Figure 2-21. Location 4: LL Tisdale North of US 64 - PM O/D Distribution

Figure 2-22. Location 5: SH 97 South of Arkansas River - AM O/D Distribution

Figure 2-23. Location 5: SH 97 South of Arkansas River - PM O/D Distribution

Figure 2-24. Location 6: I-244 South of Arkansas River - AM O/D Distribution

Figure 2-25. Location 6: I-244 South of Arkansas River - PM O/D Distribution

Figure 2-26. Location 7: I-44 West of Arkansas River - AM O/D Distribution

Figure 2-27. Location 7: I-44 West of Arkansas River - PM O/D Distribution

Figure 2-28. Location 8: Gilcrease Expressway South of 41st - AM O/D Distribution

Figure 2-29. Location 8: Gilcrease Expressway South of 41st - PM O/D Distribution

Figure 2-30. Location 9: I-44 South of I-244 - AM O/D Distribution

Figure 2-31. Location 9: I-44 South of I-244 - PM O/D Distribution

Figure 2-32. Location 10: US 75 South of I-44 - AM O/D Distribution

Figure 2-33. Location 10: US 75 South of I-44 - PM O/D Distribution

Figure 2-34. Location 11: US 64 East of 81st - AM O/D Distribution

Figure 2-35. Location 11: US 64 East of 81st - PM O/D Distribution

Figure 2-36. Location 12: W 21st West of Waco - AM O/D Distribution

Figure 2-37. Location 12: W 21st West of Waco - PM O/D Distribution

Figure 2-38. Location 13: Gilcrease Expressway East of US 75 - AM O/D Distribution

Figure 2-39. Location 13: Gilcrease Expressway East of US 75 - PM O/D Distribution

Stated Preference Survey

A stated preference survey was conducted by Resource Systems Group (RSG), a subconsultant to CDM Smith, to capture the potential willingness-to-pay for travelers currently making trips within the corridor. Full details of the survey, including questions asked, methodology and findings are provided in the RSG report included as Appendix A of this report.

An important element of this survey included the estimation of the potential willingness-to-pay of travelers within the area served by the Gilcrease Expressway. This behavioral characteristic provides a gauge to help determine likely market shares that will be captured by the Gilcrease Expressway corridor. The most common method used to quantify the willingness-to-pay of a potential user group is a stated preference survey. Survey results facilitate the development of toll sensitivity curves and value of time parameters estimated through trade-off variable testing. The survey focused on the Tulsa area and was conducted in mid-2016.

The stated preference survey was conducted using an internet-based self-interview technique. Postcards with links to the online survey were mailed to 20,000 residents within the study area. The distribution of the sent postcard invitations is shown in Figure 2-40. Additionally, email invitations to participate in the survey were sent to 20,000 PIKEPASS account holders within the study area. All survey invitees were provided with a unique anonymous password to access the web-based survey to prevent duplicate responses.

Based on the data collected by the survey, RSG was able to estimate values of time (VOTs) for key travelers within the study area. VOTs were estimated using a utility function that included household income and travel time savings as influential variables. Table 2-2 illustrates the mean VOTs for the work and non-work trips within the study area. VOTs along the corridor typically increase with income, and the work trips were shown to have a slightly higher travel time savings value than the non-work trips.

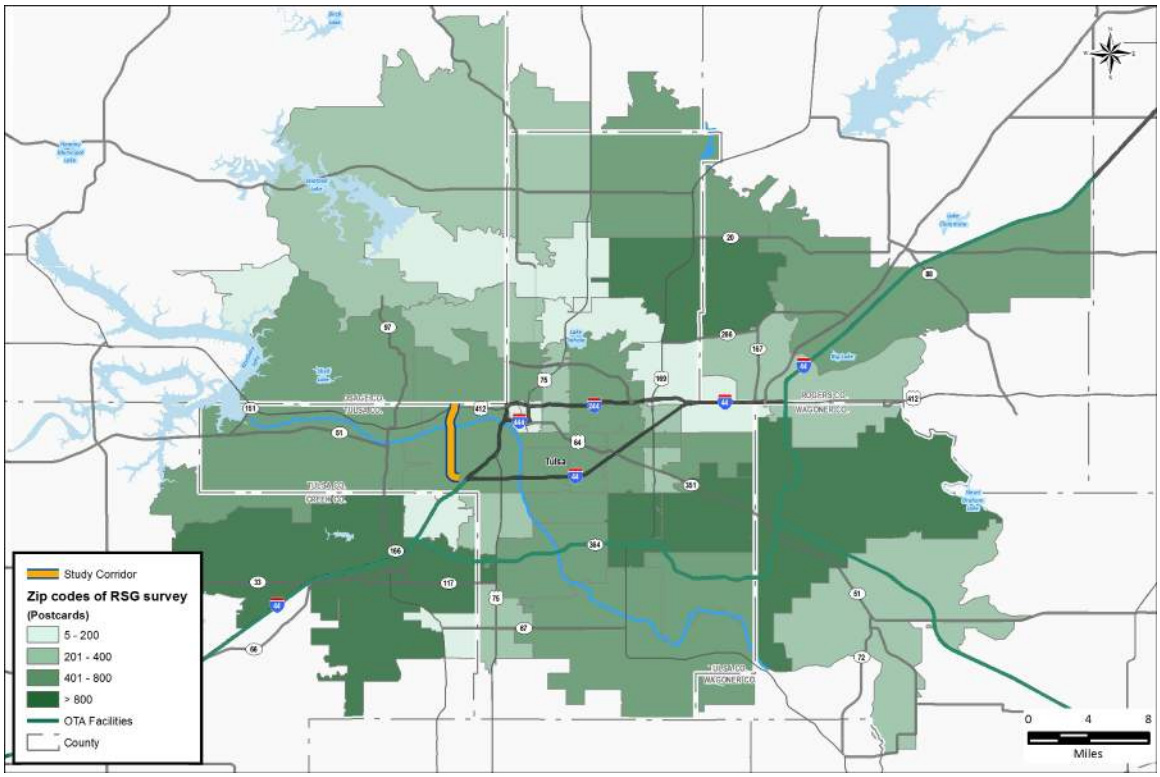

Figure 2-40. Distribution of Survey Postcards

Table 2-2. Stated Preference Survey Results (Values of Time in $/hr)

Household Income	Work Trips	Non-Work Trips
$10,000	$7.24	$6.50
$20,000	$8.33	$7.48
$30,000	$8.97	$8.05
$42,500	$9.52	$8.54
$62,500	$10.12	$9.08
$87,500	$10.65	$9.56
$112,500	$11.05	$9.91
$137,500	$11.36	$10.20
$175,000	$11.74	$10.54
$200,000	$11.95	$10.73

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Section 3

Socio-Economic Characteristics

The historical and projected statewide demographic characteristics along the Gilcrease Expressway study corridor and the greater Tulsa area were reviewed to support the traffic and revenue forecasting process. The following section provides a summary of the historical and projected future growth in the Tulsa metropolitan area and also discusses the independent demographic forecast update conducted by Research and Demographic Solutions (RDS) for the Gilcrease Expressway study area. The demographic information is used by the trip generation model to estimate total trips for the travel demand model and serves as the foundation to support the development of the potential toll demand for the planned Gilcrease Expressway project.

Historical and Forecasted Population

Population growth is the largest factor influencing travel demand, particularly within metropolitan areas. Table 3-1 shows the historical population trends for the State of Oklahoma, the Tulsa MSA and several counties in the greater Tulsa area. The total statewide population increased at an average annual rate of 0.9 percent from 1990 to 2015, adding 759,000 more residents to the state. A similar growth trend was observed in the Tulsa region, which grew at an average annual rate of 0.9 percent and added 234,000 residents between 1990 and 2015.

Tulsa County is one of the largest counties in the state in terms of population with approximately 634,000 residents in 2015. However, some of the surrounding counties have seen higher average annual growth over the last twenty-five years. Rogers County and Wagoner County both grew at an average annual rate of over one percent between 1990 and 2015. The fastest growing county in the Tulsa area during the same time period was Rogers County, which grew at 2.0 percent annually.

Also included in Table 3-1 are population forecasts obtained from Woods & Poole Economics, Inc. as an independent source for 2020 and 2035. Based on these independent forecasts, the total population of the Tulsa metropolitan area is expected to increase from 1.15 million in 2015 to 1.20 million by 2020 and 1.34 million by 2035, corresponding to an average annual growth rate of 0.8 percent.

Table 3-1. Population Trends and Projections (thousands)

Location		1990	2000	2005	2010	2015	2020 (forecast)	2035 (forecast)	Average Growth 1990-2015	Average Growth 2015-2035
State of Oklahoma		3,149	3,454	3,549	3,759	3,908	4,076	4,586	0.9%	0.8%
Tulsa Area	Tulsa County	505	564	568	605	634	656	721	0.9%	0.6%
	Osage County	42	45	46	47	48	51	60	0.6%	1.1%
	Creek County	61	68	68	70	71	73	79	0.6%	0.5%
	Rogers County	55	71	80	87	91	99	125	2.0%	1.6%
	Wagoner County	48	58	64	73	77	81	96	1.9%	1.1%
Tulsa Metro Area		914	1,022	1,046	1,109	1,148	1,195	1,337	0.9%	0.8%

Source: Woods & Poole Economics, Inc.

Historical and Forecasted Employment

Employment statistics are typically used as relative indicators of trip attractions to a study area. The magnitude of employment growth influences the potential for an increase in the demand for transportation infrastructure within the region. The historical employment trends in Oklahoma and the Tulsa area are shown in Table 3-2. Between 1990 and 2015, total employment in the state increased at an average annual rate of 1.4 percent. The Tulsa area's employment grew at an average annual rate of 1.3 percent over that same period. Tulsa County was the largest employment generator within the region in 2015, with an employment total of 464,000. However, both Osage County and Rogers County experienced strong economic growth between 1990 and 2015, with average annual growth rates of 2.8 percent and 3.6 percent, respectively.

Figure 3-1 shows the historical unemployment rates in the Tulsa metropolitan statistical area (MSA), the State of Oklahoma and the United States. Since 1990, unemployment rates in Oklahoma have been consistently below the nationwide average. Although unemployment rose from 2008 to 2010 due to the economic recession, it has fallen to pre-recession levels in recent years. By 2015, unemployment rates had fallen below five percent in the Tulsa MSA and statewide.

Table 3-2 also shows the employment forecasts generated by Woods & Poole Economics, Inc. as an independent source for 2020 and 2035. The Tulsa MSA is expected to continue to be the largest employment center in the region and is forecasted to add an additional 171,000 jobs by 2035 at an average annual growth rate of 1.1 percent. The other four counties in the region, as well as the state as whole, are also expected to see annual average employment growths of over one percent through 2035.

Table 3-2. Employment Trends and Projections (thousands)

Location		1990	2000	2005	2010	2015	2020 (forecast)	2035 (forecast)	Average Growth 1990-2015	Average Growth 2015-2035
State of Oklahoma		1,655	1,994	2,041	2,133	2,316	2,476	2,894	1.4%	1.1%
Tulsa Area	Tulsa County	349	425	420	430	464	495	575	1.1%	1.1%
	Osage County	10	12	18	19	20	22	26	2.8%	1.2%
	Creek County	21	29	29	29	33	35	41	1.7%	1.1%
	Rogers County	20	33	38	41	48	53	66	3.6%	1.7%
	Wagoner County	11	14	13	13	15	16	18	1.2%	1.0%
Tulsa Metro Area		503	616	624	643	694	742	865	1.3%	1.1%

Source: Woods & Poole Economics, Inc.

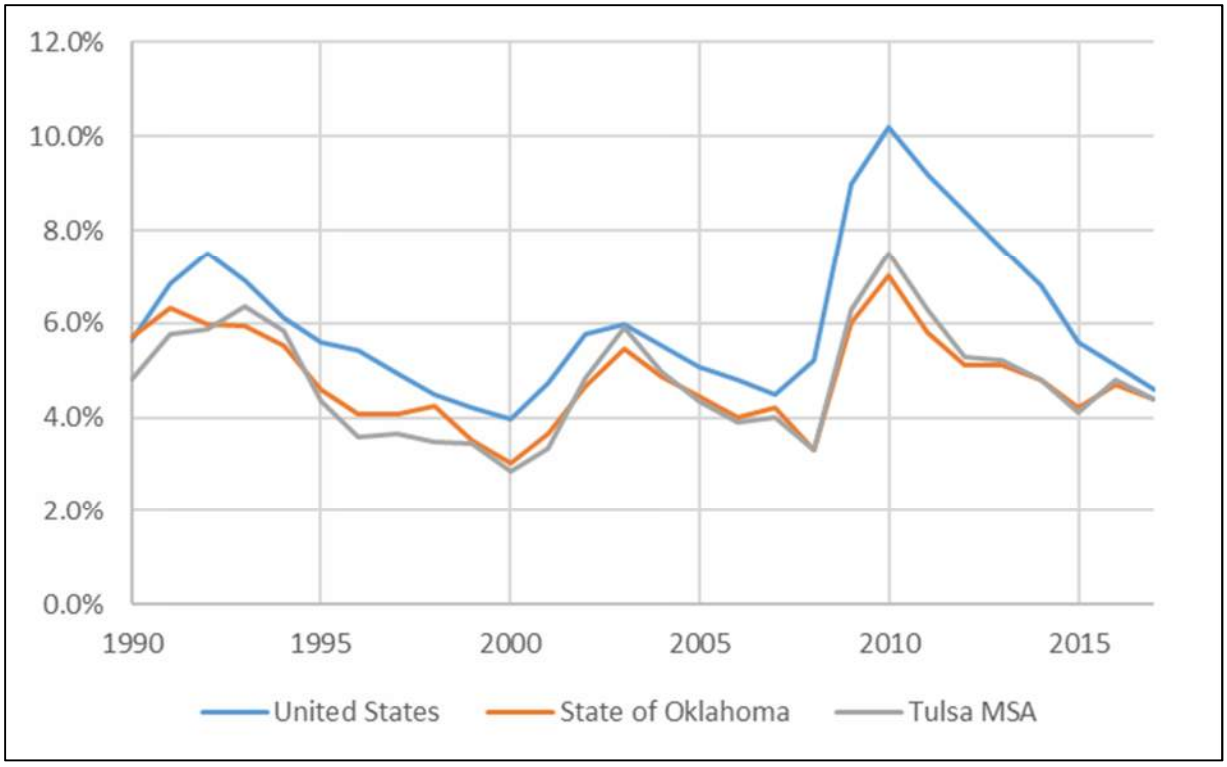

Figure 3-1. Historical Unemployment Rates
Source: U.S. Bureau of Labor Statistics

Additional Economic Factors

Consumer Price Index

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

Figure 3-2 illustrates the historical trends for CPI-U growth from 1990-2017 for Oklahoma and the United States. As shown in the graph, CPI-U growth in Oklahoma has closely mirrored nationwide trends. This indicates that the inflation rate in Oklahoma is consistent with the rate of inflation seen nationwide. In Oklahoma, CPI-U has grown at an average annual rate of less than three percent since 2011. Since 2015, annual CPI-U growth in Oklahoma has been slightly lower than the national average.

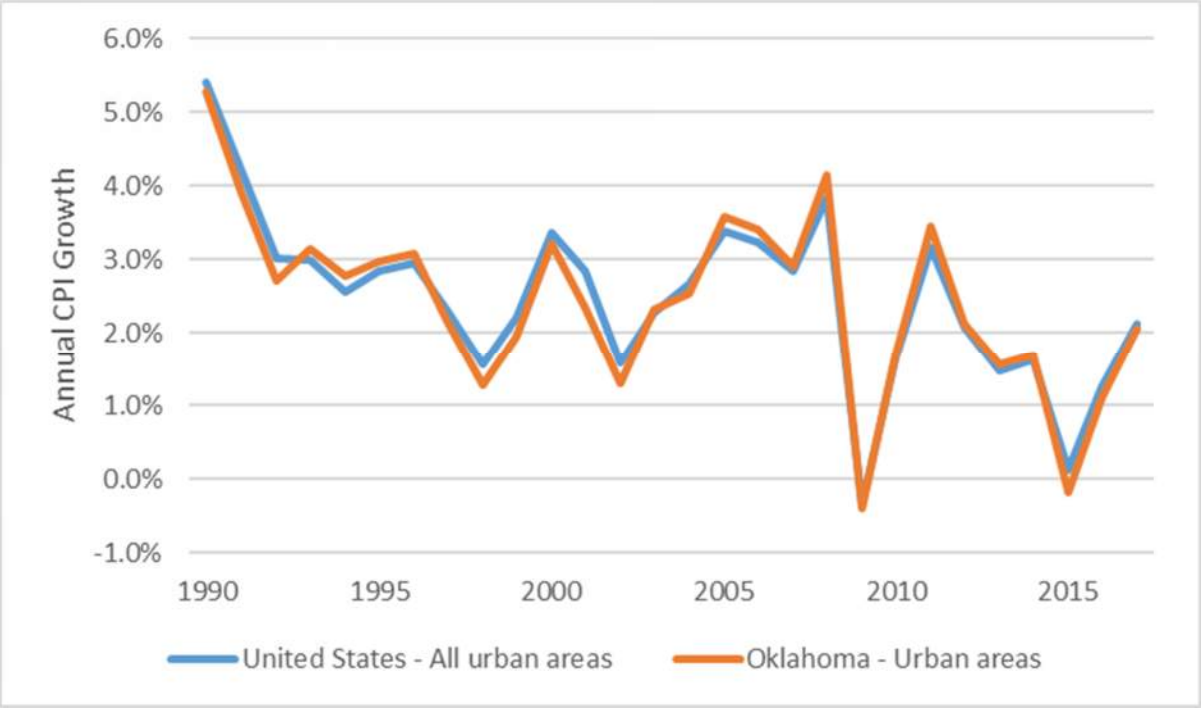

Figure 3-2. Consumer Price Index for All Urban Consumers

Source: U.S. Bureau of Labor Statistics

Household Income

Household income is another key factor used in determining a traveler's willingness-to-pay tolls to utilize a roadway. Table 3-3 summarizes the average historical household income at selected locations within the Tulsa area and the projected growth from the Woods & Poole data. As shown in the table, household income in the Tulsa area grew at an average annual rate of 2.0 percent between 1990 and 2015, and is anticipated to grow 1.4 percent per year through 2035. Similar trends and forecasts were also evident for the state as a whole.

Table 3-3. Historical and Forecasted Mean Household Income (thousands, 2009$)

Location		1990	2000	2005	2010	2015	2020	2035	Average Growth 1990-2015	Average Growth 2015-2035
State of Oklahoma		$61.1	$74.6	$82.2	$88.7	$99.4	$106.1	$132.1	2.0%	1.4%
Tulsa Area	Tulsa County	68.2	86.2	95.4	99.7	113.8	120.9	148.7	2.1%	1.4%
	Osage County	49.0	66.0	71.3	74.7	81.2	85.8	101.2	2.0%	1.1%
	Creek County	55.0	67.6	73.7	83.8	89.1	96.0	119.8	2.0%	1.5%
	Rogers County	63.6	81.1	79.7	92.3	100.9	107.5	130.2	1.9%	1.3%
	Wagoner County	59.9	70.3	73.9	79.9	83.2	87.8	102.5	1.3%	1.1%
Tulsa Metro Area		66.9	82.7	91.5	96.4	108.8	115.8	142.9	2.0%	1.4%

Source: Woods & Poole Economics, Inc.

Fuel Prices

Another factor that can potentially influence travel behavior is vehicle fuel price. Historically, some amount of correlation has been noted between the price of motor vehicle fuel and overall roadway demand trends. Figure 3-3 illustrates the historical trends in gasoline price in Oklahoma since 1992. After remaining fairly constant throughout the 1990s, prices began to rise steadily throughout the 2000s, eclipsing $4.00 per gallon by 2008. In recent years, however, gas prices have fallen and are currently below $2.75 per gallon in Oklahoma. It should also be noted the traffic along the Oklahoma's existing toll facilities has been largely inelastic to fluctuations in fuel price over the long term.

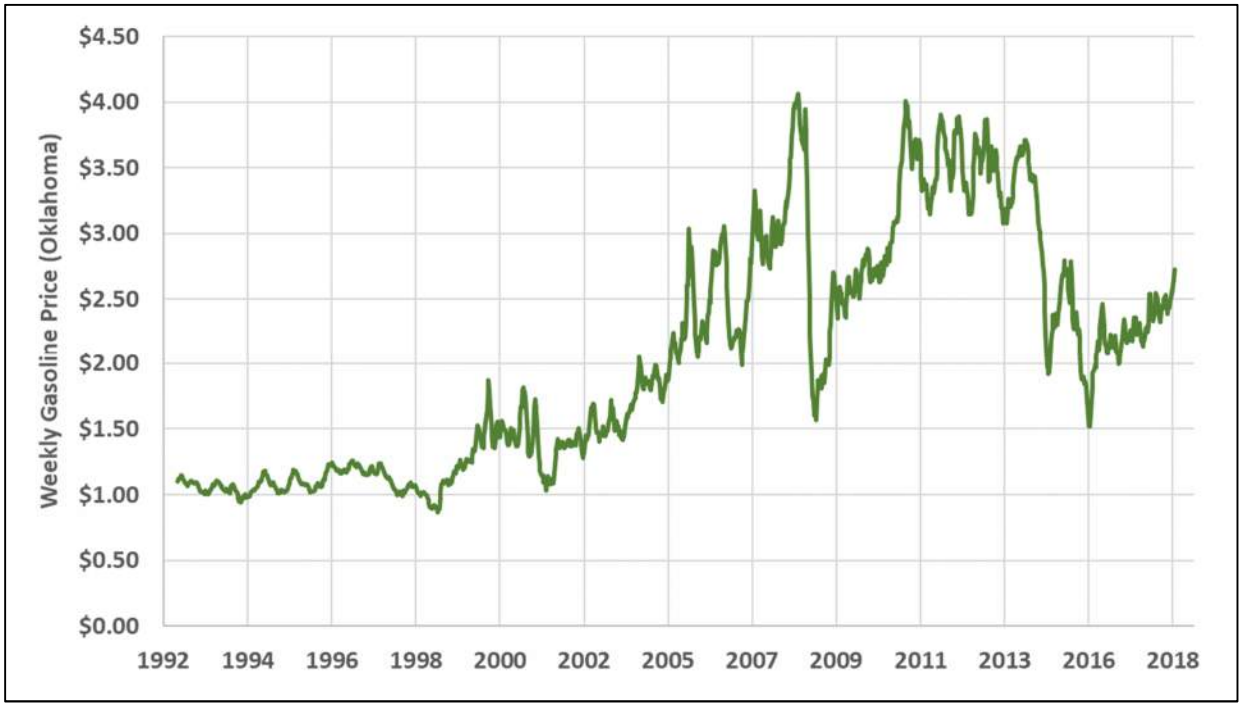

Figure 3-3. Historical Fuel Prices

Source: U.S. Energy Information Administration

Independent Demographic Review

The planned Gilcrease Expressway project lies within the greater Tulsa area, which is the second-largest metropolitan area in the state. Given the significant role that demographics play in the traffic and revenue forecasting process, an independent demographic review was undertaken to reflect a more detailed assessment of the demographics along the project corridor.

Base MPO Forecasts

The base demographic forecasts used in the independent demographic review were those developed by the Indian Nations Council of Governments (INCOG) as part of their Connections 2035 metropolitan transportation plan (MTP). INCOG serves as the metropolitan planning organization for the greater Tulsa region, which includes Creek, Osage, Rogers, Tulsa and Wagoner counties. As the region's current long-range MTP, "Connections 2035" details the current and forecast conditions for population, employment, planned roadway network improvements, and system performance over a 30-year period from 2005 to 2035. Based on its identified system needs, it provides a guide to the multimodal transportation system investments for the long-term, and guides the development of short-range implementation of projects through the regional Transportation Improvement Program (TIP).

Demographic Forecast Update

CDM Smith engaged Research and Demographic Solutions (RDS) in late 2015 to perform an independent demographic review and to update the demographic forecasts within the project area. The goal of the demographic review was to update the original 2035 forecasts in the area (from INCOG) at the traffic analysis zone (TAZ) level to create a more refined demographic profile within the surrounding areas near the proposed project. The TAZ locations that were reviewed and updated by RDS are shown in Figure 3-4.

The updated forecasted demographics reflect changes to the demographic trends that RDS suggests based on their detailed review of development activity within the project area. Table 3-4 summarizes the demographic forecast revisions recommended by RDS for the Gilcrease Expressway project area. Adjustments were made to the forecasts to account for current and planned developments in the study area and to align the base forecasts with the 2010 census data. For the forecast year of 2035, the RDS revised population is 8.1 percent higher than the base INCOG forecast for the Gilcrease Expressway study area. For employment, the 2035 forecast was increased by 2.8 percent in the study area compared to the INCOG base case.

For additional details regarding the independent demographic review performed by RDS and the respective rationale behind the population and employment adjustments highlighted below, please refer to Appendix B of this report.

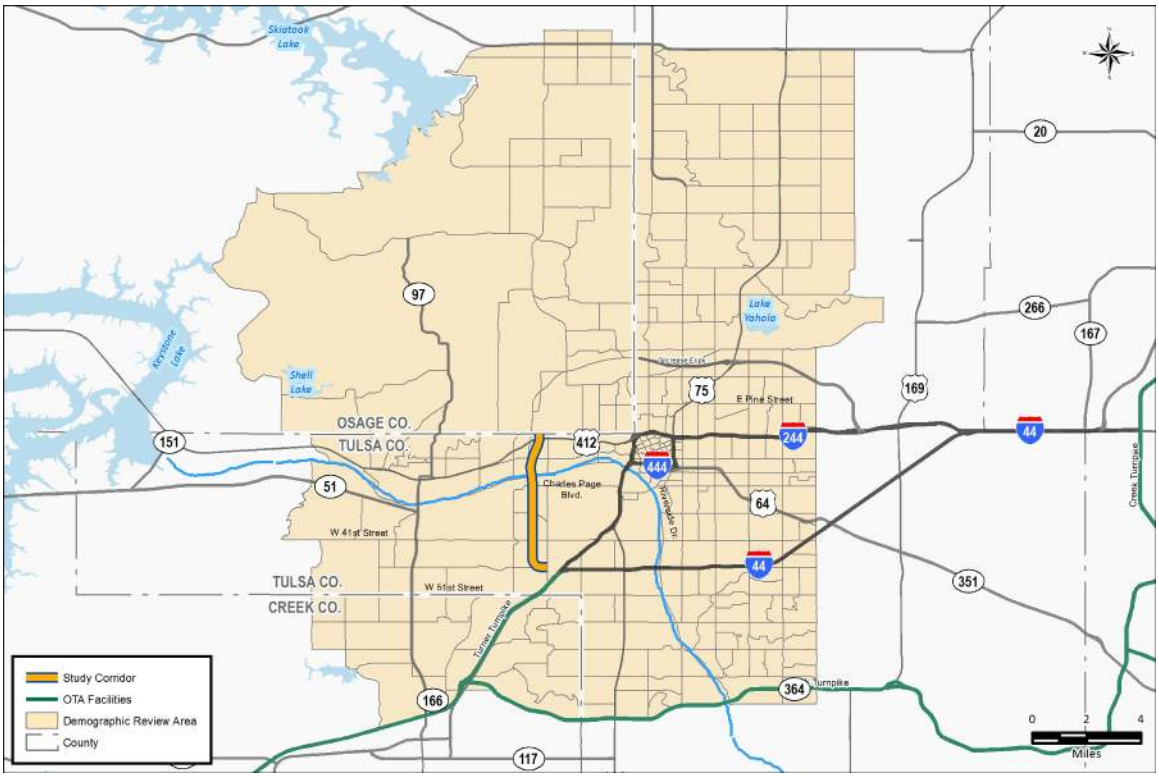

Figure 3-4. Gilcrease Expressway Demographic Review Area

Table 3-4. Revised Demographic Forecast – Gilcrease Expressway Project Area

Source	Population		Employment	
	2015	2035	2015	2035
Base (INCOG)	316,709	379,183	233,661	263,960
RDS Revised	348,886	409,849	236,300	271,334
Total Change	10.2%	8.1%	1.1%	2.8%

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Section 4
Traffic Forecasting Methodology

This section describes the travel demand estimation methodologies used to develop future year demand forecasts for the Gilcrease Expressway project. This effort included the development of a travel demand model, using the INCOG Connections 2035 model as a base, to evaluate future year demand along the Gilcrease Expressway corridor.

Future year revenue forecasts for the Gilcrease Expressway project were developed using an updated and validated travel demand model for the greater Tulsa area. The travel demand model validation process included database modifications and updates to the roadway network and socio-economic characteristics in the Gilcrease Expressway study area. Figure 4-1 illustrates the travel demand process used by CDM Smith to support the development of toll revenue forecasts for the Gilcrease Expressway project.

Roadway Network Update

The INCOG base model used for this analysis was the complete Tulsa regional travel demand model (including networks, demographic forecasts and trip tables) as provided in Cube format to CDM Smith. The base year network from the model was reviewed for consistency with existing conditions and validated based on the comprehensive data collected within the project areas as described in Section 2. The validated networks were then used to develop the forecasted traffic for the Gilcrease Expressway project.

Model Validation Process

CDM Smith used traffic counts collected in the spring of 2015 to validate the model and adjust the network characteristics where needed. The model validation process involved comparing the 2015 base year traffic assignment output volumes along each project corridor to the observed traffic count data. Additionally, output travel times and speeds from the travel demand model were compared to the actual travel speed information collected along corridors within the study area. Model volumes were also compared to average daily traffic (ADT) counts available from OTA to test the base year travel demand model's ability to replicate existing turnpike traffic. Finally, the origin-destination patterns from the base year model were analyzed to ensure that they accurately reflected the travel patterns observed from the origin-destination data obtained for the region.

Travel demand modeling practitioners in the United States use "NCHRP 255: Highway Traffic Data for Urbanized Area Project Planning and Design," published by the Transportation Research Board to check the reasonableness of model validation. As shown in Figure 4-2, the percentage difference between the model volumes and traffic is within acceptable ranges for each screenline.

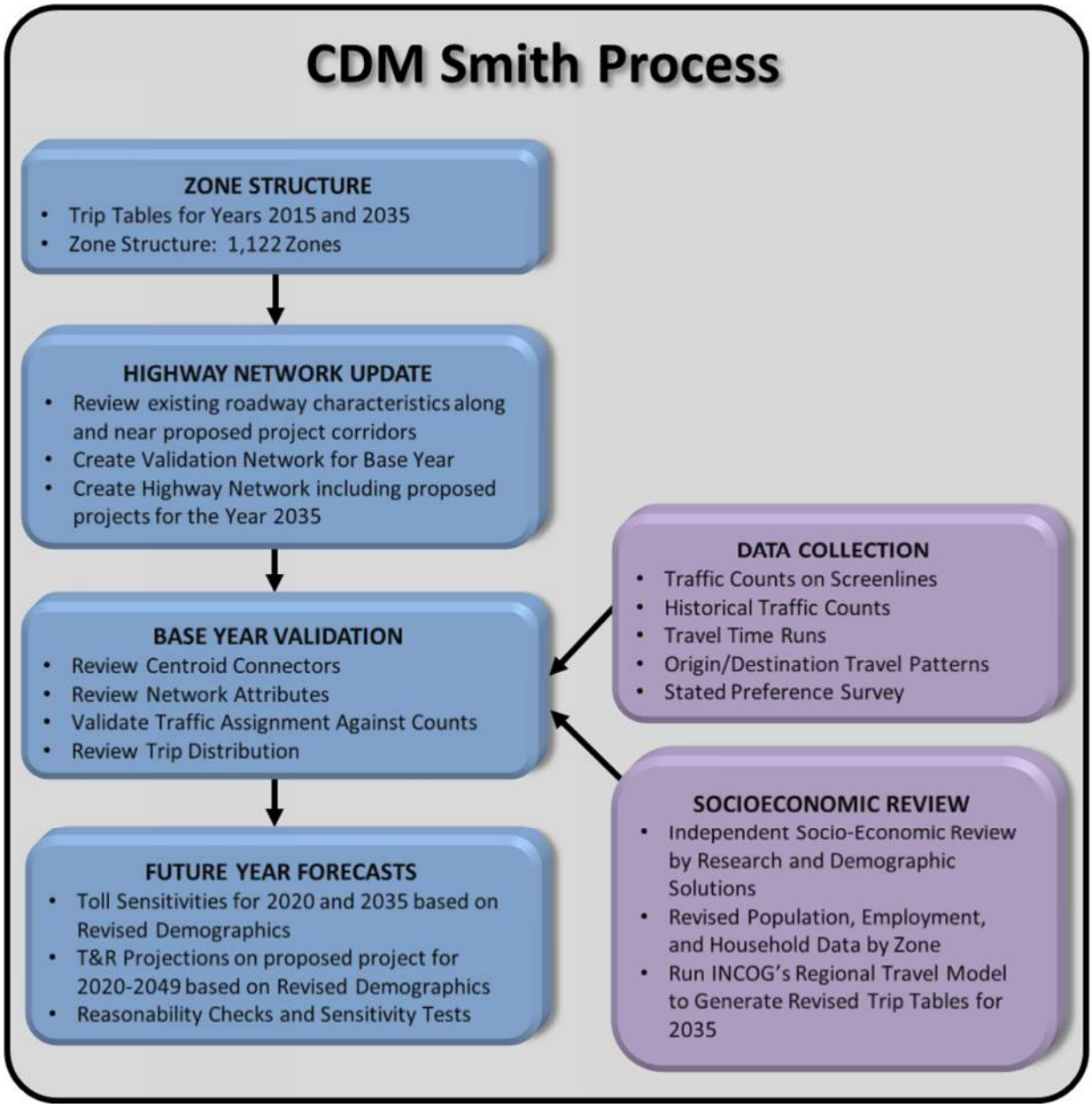

Figure 4-1. Travel Demand Modeling Process

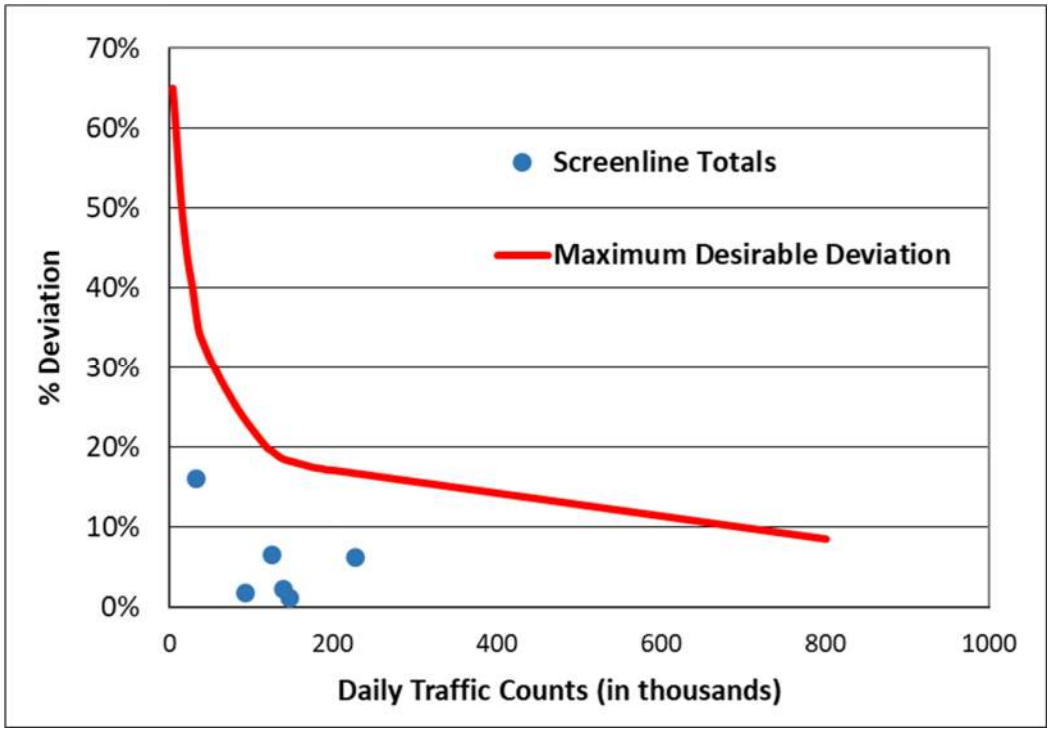

Figure 4-2. Screenline Validation Results

Modeling Methodology

Professional practices and procedures were used in the development of the revenue forecasts for Gilcrease Expressway. The CDM Smith market share diversion routines, designed specifically to emulate motorists' willingness to pay tolls at different toll levels and congestion conditions, were used to test the toll sensitivities within the corridor for the both the validation year and 2035 forecast year.

The toll diversion traffic assignments were run using an equilibrium diversion technique to evaluate the toll feasibility of the corridor. In the process, the travel model builds two paths between each pair of zones, one including the project mainlane links, and the other path excluding the project mainlane links. The travel cost associated with using both travel paths is computed, and the amount of trips using the toll facility is then estimated based on travel time savings between the two paths. This technique simulates the driver's decision to use a toll or toll free route, which depends largely on the marginal differences in time and cost between the defined routes.

Time Cost and Vehicle Operating Costs

In addition to tolls, two other end-user costs are considered when calculating the total cost of a trip along the Gilcrease Expressway, namely time cost and vehicle operating costs. The motorists' time cost is calculated using the value of time estimates that are integrated into the modeling process. How travelers value their time helps them determine which route to use for a specified trip. The value of time parameter provides a measure to convert travel time into an equivalent monetary cost for inclusion in the toll diversion process. Vehicle operating costs include a multitude of additional costs to travelers such as wear and tear, maintenance, tires, oil, fuel, and other variable costs.

Based on the results of the stated preference survey summarized in Section 2, average values of time (as a function of income) were used for the current study. Values of time were assumed to inflate at an average annual rate of two percent throughout the forecast period.

A vehicle operating cost of $0.21 per mile for passenger vehicles in 2015 was assumed based on estimates published by the American Automobile Association and inflated at the rate of two percent per year. This includes motor fuel and limited other perceived out-of-pocket costs that are well below the full cost of operation. These are generally not perceived by the drivers as variable costs that affect their route decision choices.

Demographics and Trip Tables

Revenue estimates along the Gilcrease Expressway corridor that are presented in Section 5 of this report are based updated demographic datasets developed by RDS as described in Section 3. The RDS datasets were used as an input to the INCOG travel demand model to generate an alternate set of trip tables and are referred to as the "revised" trip tables. These revised trip tables were used as the baseline for the revenue estimation and toll sensitivity evaluations completed for the Gilcrease Expressway project.

Section 5

Revenue Forecasts

This section presents forty-year revenue estimates for the proposed Gilcrease Expressway toll project. The long-term forecasts are based on the modeling methodologies and background assumptions described in Section 4 and other assumptions presented in this section. In addition, this section describes the toll sensitivity analyses that were performed to estimate the impacts of toll rate changes on revenue generation. The results of various sensitivity tests performed to assess impacts on revenue of the various key influential variables are also presented.

Input Assumptions

The forecasted traffic volumes and estimated toll revenues from this study are based on the following general assumptions, several of which were derived through coordination with OTA staff, that CDM Smith believes are reasonable for the purposes of this study:

- The Gilcrease Expressway will open to traffic on January 1, 2020
- Tolling configuration, alignment and access for the Gilcrease Expressway will be as depicted in Figure 5-1
- A combination PIKEPASS/PlatePay toll collection system will be used. The 2020 base toll rates for 2-axle vehicles will be $1.85 for PIKEPASS users traveling the full length of the facility in one direction. Tolls will be collected at three tolling locations, as shown in Figure 5-1
- The base toll rate for PlatePay users will be equal to the PIKEPASS rate plus a 100 percent surcharge
- Toll rates will be increased every two years at an annually compounded rate of 1.5 percent. All tolls will be rounded up to the nickel.
- Truck toll rates will be set as follows:
    - 3-axle vehicles: 1.5 times the 2-axle rate
    - 4-axle vehicles: 2.0 times the 2-axle rate
    - 5-axle vehicles: 3.5 times the 2-axle rate
    - 6-axle vehicles: 4.5 times the 2-axle rate
- The segment of Gilcrease Expressway from W. Edison Street to L.L. Tisdale Parkway is not assumed to be constructed during the forecast period.
- Economic growth along project corridors will follow the forecasts described in this report
- No additional competing limited-access highways will be constructed within the Gilcrease Expressway corridor at any time during the forecast period.

- The Gilcrease Expressway will be well-maintained, efficiently operated, and effectively signed to encourage maximum usage
- Growth in vehicle operating costs (which include fuel, maintenance, and tires) will not significantly deviate from the assumed inflation rate
- No local, regional, or national emergency will arise which would abnormally restrict the use of motor vehicles

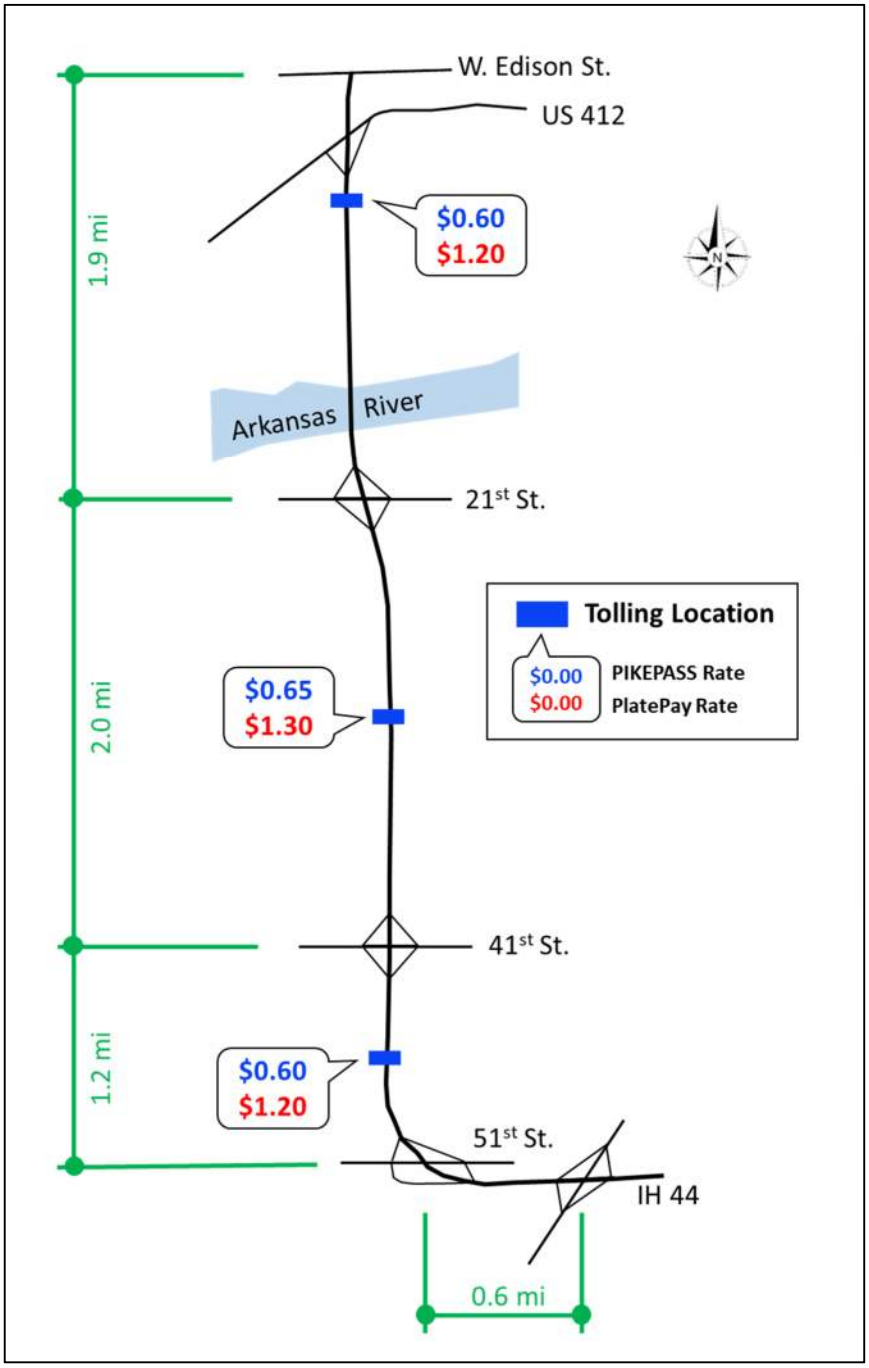

Figure 5-1. Gilcrease Expressway Tolling Configuration and Access

Toll Sensitivity Analysis

A toll sensitivity analysis was performed to test the impacts of changes to toll rates on the revenue generated by the Gilcrease Expressway. It is advisable that the planned toll rates on the facility be less than that required to maximize revenue as determined by the toll sensitivity analysis. Future flexibility should be maintained to increase tolls, if necessary, to generate additional revenue. Toll sensitivity curves are based on changes in traffic characteristics along the facility such as congestion levels, values of time and attractiveness of competing facilities. These curves are essential in estimating the viability of planned toll rate increases.

In general, the toll sensitivity curve suggests that when the toll rate increases, a portion of travelers will leave the toll facility and choose other routes. Therefore, as the toll rate increases, demand for the toll facility will decrease. However, as the toll rate increases, the toll revenue increases until it reaches the highest revenue point where an additional toll rate increment will reduce demand enough to result in less revenue.

Toll sensitivity analyses were conducted for the assumed opening year of 2020 and the forecast year of 2035, as shown in Figure 5-2. The curves were developed using average per mile toll rates from $0.00 to $0.80 per mile. Toll sensitivity results for the Gilcrease Expressway indicate that rates in both 2020 and 2035 could be increased approximately 10 percent before total revenues begin to fall below the revenue maximization point. These results indicate that the planned toll rates are only slightly below the revenue maximization points, demonstrating that, if needed, there is very limited potential for revenue enhancement through toll increases above those assumed for traffic and revenue forecasting purposes.

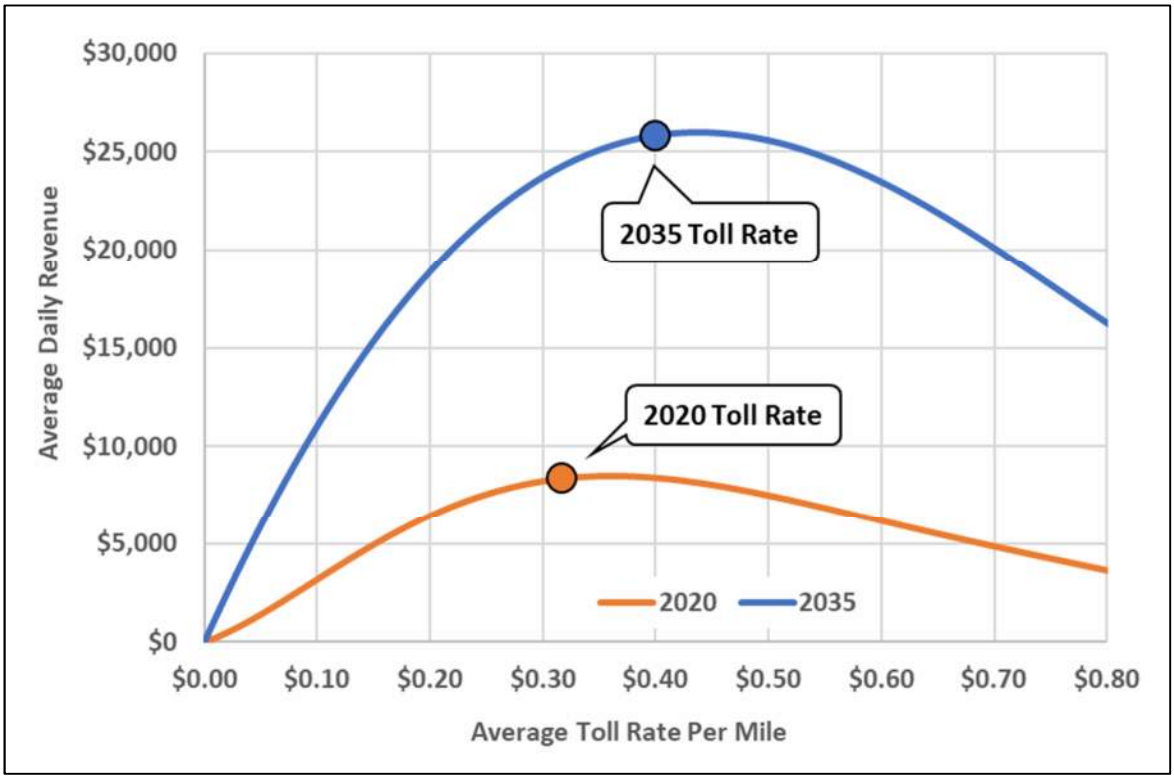

Figure 5-2. Toll Sensitivity Results

Corridor Share Analysis

As part of the analysis of the future traffic on the Gilcrease Expressway, the corridor share of each was analyzed across multiple screenlines in the study area. As shown in Figure 5-3, four screenlines were analyzed along each corridor to determine what percentage of the total demand is expected to use the new turnpike.

Table 5-1 shows the results of the corridor share analysis for the Gilcrease Expressway study area. For Screenline 2, the Gilcrease Expressway accounts for 3.3 percent of the corridor throughput in 2020 under a toll-free scenario and 0.3 percent under a tolled condition. By 2035, the Gilcrease Expressway accounts for a 12.4 percent corridor share without tolls and 2.2 percent with tolls. For Screenline 3, the facility attracts 9.9 percent of the corridor throughput in 2020 without tolls and 1.6 percent with tolls. In 2035, Gilcrease Expressway accounts for a 14.6 percent corridor share without tolls and 4.0 percent with tolls.

Along Screenline 4, the Gilcrease Expressway accounts for 10.9 percent of the 2020 traffic without tolls and 1.9 percent with tolls. In 2035, the facility holds a 12.7 percent share without tolls and 3.9 percent share with tolls. Along Screenline 6, the Gilcrease Expressway accounts for 14.3 percent of the corridor throughput in 2020 under a toll-free scenario. This drops to 3.1 percent with tolls added to the facility. By 2035, the facility accounts for a 14.5 percent corridor share without tolls and 4.8 percent with tolls.

Figure 5-3. Corridor Share Analysis Screenlines

Table 5-1. Corridor Share Analysis Results

	2020		2035	
Screenline 2	**Toll Free**	**Toll**	**Toll Free**	**Toll**
Total Screenline Volume	**73,000**	**71,000**	**96,000**	**90,000**
S 81st W Ave north of E 10th St/W 7th St	2.3%	2.4%	2.5%	2.9%
S 65th W Ave north of US 64	5.2%	6.3%	5.8%	8.0%
Gilcrease Expressway north of US 64	**3.3%**	**0.3%**	**12.4%**	**2.2%**
S 33rd W Ave south of W Edison St	13.5%	13.9%	11.8%	12.6%
LL Tisdale Parkway	75.7%	77.0%	67.5%	74.3%
Screenline 3	**Toll Free**	**Toll**	**Toll Free**	**Toll**
Total Screenline Volume	**187,000**	**169,000**	**260,000**	**223,000**
SH 51/SH 97 Wilson Ave south of Arkansas River	16.4%	19.7%	13.3%	17.5%
Gilcrease Expressway south of Arkansas River	**9.9%**	**1.6%**	**14.6%**	**4.0%**
IH 244 south of Arkansas River	3.9%	6.3%	7.8%	10.8%
Southwest Blvd/Route 66 south of Arkansas River	12.0%	14.0%	11.0%	13.7%
W 23rd St west of Arkansas River	45.6%	52.0%	35.0%	42.8%
IH 44 west of Arkansas River	12.3%	6.4%	18.3%	11.2%
Screenline 4	**Toll Free**	**Toll**	**Toll Free**	**Toll**
Total Screenline Volume	**166,000**	**152,000**	**244,000**	**214,000**
SH 97 south of W 41st St S	9.4%	12.2%	10.3%	12.5%
E 57th Pl south of W 41st St S	1.1%	1.0%	2.5%	2.6%
Gilcrease Expressway south of W 41st St S	**10.9%**	**1.9%**	**12.7%**	**3.9%**
S 49th W Ave south of W 41st St S	1.4%	2.0%	1.2%	1.5%
S 33rd W Ave south of W 41st St S	3.0%	3.5%	2.8%	3.5%
Southwest Blvd/Route 66 south of W 41st St S	21.4%	27.6%	20.8%	26.4%
IH 244 south of Southwest Blvd	6.3%	7.3%	7.8%	8.6%
S Union Ave south of W 41st St S	32.9%	37.5%	26.5%	31.1%
US 75 south of W 41st St S	13.5%	7.0%	15.6%	9.9%
Screenline 6	**Toll Free**	**Toll**	**Toll Free**	**Toll**
Total Screenline Volume	**177,000**	**169,000**	**242,000**	**233,000**
Gilcrease Expressway west of LL Tisdale Pkwy	2.9%	3.2%	5.2%	5.1%
W Apache St west of LL Tisdale Pkwy	3.6%	4.2%	5.8%	6.0%
W Pine St west of LL Tisdale Pkwy	7.6%	8.6%	7.4%	8.1%
W Edison St west of LL Tisdale Pkwy	3.6%	4.1%	4.9%	5.4%
US 64 west of IH 244	41.8%	47.2%	33.9%	37.3%
Charles Page Blvd west of IH 244	3.7%	4.7%	5.9%	7.4%
W 21st St west of S Waco Ave	8.2%	9.5%	9.0%	11.8%
W 41st St S west of Southwest Blvd/Route 66	6.7%	8.1%	5.7%	7.0%
W 51st west of IH 244/IH 44	7.5%	7.3%	7.8%	7.1%
Gilcrease Expressway west of IH 244/IH 44	**14.3%**	**3.1%**	**14.5%**	**4.8%**

Note: Corridor share analysis results do not account for ramp up and other post-processing adjustments.

Travel Time Savings Analysis

An important part of the decision to use a toll facility is the potential time savings that is offered to the traveler. This section illustrates the travel time savings associated with using the Gilcrease Expressway rather than alternative routes in the study area for the years 2020 and 2035. Three route options (one which included Gilcrease Expressway) were evaluated, as illustrated in Figure 5-4.

As shown in Figure 5-4, a trip from the southwestern portion of the Tulsa area to the northeastern portion was evaluated. Three alternative routes were considered: one that utilizes the Gilcrease Expressway, and two that use the existing roadway network (Alternate Routes 1 and 2). The routes were evaluated in future years 2020 and 2035, and the maximum observed travel time savings for each are summarized in Figure 5-4. In 2020, the Gilcrease Expressway offers time savings of just over a minute compared to Alternate Route 1 and a time savings of 3.5 minutes over Alternate Route 2. In 2035, the Gilcrease Expressway route is six minutes faster than Alternate Route 1 and over ten minutes faster than Alternate Route 2.

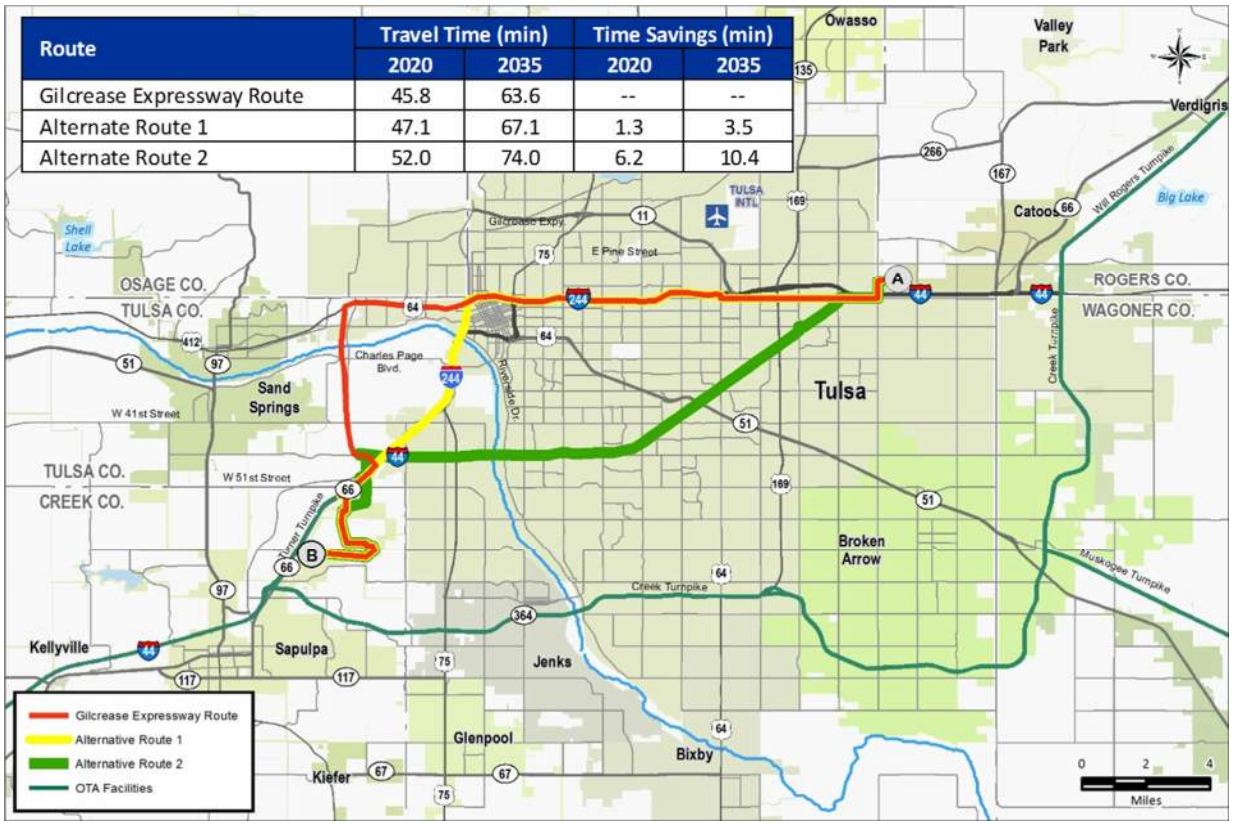

Figure 5-4. Travel Time Comparison

Estimated Annual Traffic and Revenue

An equilibrium diversion technique was used to carry out traffic assignment runs for the forecast years of 2020 and 2035. Traffic volumes were estimated by using the revised demographics trip tables, which were adjusted based on the base year model validation process, as described in Section 4. The proposed Gilcrease Expressway will utilize a PIKEPASS/PlatePay toll collection system, such that two separate traffic assignments, one with PIKEPASS toll charges and the other with PlatePay charges, were conducted for each model year. The traffic volumes obtained by each assignment were factored based on assumed transaction shares to get the final PIKEPASS and PlatePay traffic volumes. The sum of the two volumes provided the total traffic using the proposed facilities. In this manner, the volume totals along each facility were estimated for each model year. All other years were interpolated or extrapolated between or beyond the modeled years to obtain the yearly T&R estimates.

The traffic assignment results were reviewed for reasonableness and post-model adjustments were made as necessary. This included adjustments to reflect model validation results along each corridor. Based on forecasted traffic along the project, annual traffic and revenue forecasts were prepared through 2059. Estimates beyond year 2035 are based on nominal assumptions regarding future traffic growth. As shown in Table 5-2, the Gilcrease Expressway project is expected to generate $2.02 million in its first year of operation, increasing to $8.62 million by 2035 and $24.11 million by 2059. Table 5-3 summarizes the average daily traffic along the Gilcrease Expressway across all segments. As shown in Table 5-3, the Gilcrease Expressway project is expected to generate average daily traffic of 2,700 vehicles in its first year of operation, increasing to 9,200 per day by 2035 and 17,600 per day by the end of the forecast period.

Table 5-2. Gilcrease Expressway Revenue Forecast

Year	Annual Revenue	Year	Annual Revenue
2020	$2,023,000	2040	$11,229,000
2021	$2,533,000	2041	$11,553,000
2022	$3,350,000	2042	$11,886,000
2023	$3,832,000	2043	$12,230,000
2024	$4,137,000	2044	$12,826,000
2025	$4,442,000	2045	$13,196,000
2026	$5,103,000	2046	$14,088,000
2027	$5,431,000	2047	$14,495,000
2028	$5,759,000	2048	$15,186,000
2029	$6,086,000	2049	$15,625,000
2030	$6,565,000	2050	$16,937,000
2031	$6,900,000	2051	$17,427,000
2032	$7,563,000	2052	$18,537,000
2033	$7,914,000	2053	$19,072,000
2034	$8,265,000	2054	$19,946,000
2035	$8,616,000	2055	$20,522,000
2036	$9,442,000	2056	$21,795,000
2037	$9,715,000	2057	$22,425,000
2038	$9,995,000	2058	$23,435,000
2039	$10,284,000	2059	$24,112,000

Table 5-3. Gilcrease Expressway Traffic Forecast

Year	Average Daily Traffic	Year	Average Daily Traffic
2020	2,700	2040	10,500
2021	3,300	2041	10,800
2022	4,100	2042	11,100
2023	4,700	2043	11,400
2024	5,100	2044	11,700
2025	5,400	2045	12,000
2026	5,800	2046	12,400
2027	6,200	2047	12,700
2028	6,600	2048	13,100
2029	6,900	2049	13,400
2030	7,300	2050	13,800
2031	7,700	2051	14,200
2032	8,000	2052	14,600
2033	8,400	2053	15,000
2034	8,800	2054	15,400
2035	9,200	2055	15,800
2036	9,400	2056	16,200
2037	9,700	2057	16,700
2038	9,900	2058	17,100
2039	10,200	2059	17,600

Sensitivity Tests

The base case forecasts for the Gilcrease Expressway project shown above are based on several assumptions, as described previously. Any forecast of the future is subject to considerable uncertainty, thus most traffic and revenue forecasts to be used in support of project financing typically include sensitivity tests. In general, these are intended to provide a general measure of the potential impact on the revenue forecasts associated with hypothetical changes in certain basic assumptions. These sensitivity tests provide a comparison with the previously presented base case toll revenue forecasts. Each relevant sensitivity test is described in more detail below.

Demographic Growth

The base revenue forecasts were tested to determine the impacts of changes in demographic growth within the Gilcrease Expressway study area. Two demographic growth alternative scenarios were tested. In the first, the baseline revenue forecasts were tested with a 50 percent reduction in demographic growth assumed throughout the forecast period. The 2035 impact on the traffic and revenue estimates for the Gilcrease Expressway project is summarized in Table 5-4, resulting in a revenue decrease of 43 percent. The second test looked at the impacts on revenue if population and employment were to stay at opening year (2020) levels throughout the forecast period. The resulting 2035 revenue impacts under this condition were compared to the base revenues as shown in Table 5-4, resulting in a revenue decrease of 63 percent.

Table 5-4. Revenue Sensitivity to Demographic Growth

2035 Revenue Impact		
Base	50 Percent Growth	Zero Growth
1.00	0.57	0.37

Value of Time

The baseline values of time (VOT) assumed for the base revenue forecasts for the Gilcrease Expressway are provided in Table 2-2. Two alternative scenarios with low VOT and high VOT were created to test the sensitivity of the revenue forecasts to the baseline VOT assumptions. The alternative VOTs were created by assuming a twenty percent decrease and increase for the low and high VOT scenarios, respectively. The scenarios were tested for forecast year 2035, and the revenue impact comparison is shown in Table 5-5. The twenty percent increase in VOT resulted in an increase of approximately sixteen percent in in 2035. Conversely, a twenty percent reduction in VOT resulted in a revenue reduction of approximately sixteen percent.

Table 5-5. Revenue Sensitivity to Value of Time

2035 Revenue Impact		
Base	VOT +20%	VOT -20%
1.00	1.16	0.84

Connected 2045 Regional Transportation Plan

In November 2017, INCOG adopted Connected 2045, a new regional transportation plan for the greater Tulsa area. The new plan included updates to both the regional roadway improvement recommendations and the underlying demographic forecasts for the area. The potential impacts that this new plan will likely have on the Gilcrease Expressway traffic and revenue were evaluated for years 2020 and 2035. As shown in Table 5-6, the demographic updates included in the new plan would result in positive revenue impacts of seven percent and eleven percent in 2020 and 2035, respectively.

Table 5-6. Revenue Sensitivity to Connected 2045 Regional Transportation Plan

Revenue Impacts		
Year	Base	Connected 2045 Plan
2020	1.00	1.07
2035	1.00	1.11

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Appendix A

Stated Preference Survey

This appendix contains the documentation of the stated preference survey as provided by the subconsultant, Resource Systems Group. This report was provided to CDM Smith in September 2016.

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FINAL REPORT

TULSA STATED PREFERENCE SURVEY

RSG
the science of insight

9.14.2016

PREPARED FOR:
CDM SMITH

SUBMITTED BY:
RSG

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1.0 EXECUTIVE SUMMARY

CDM Smith, in collaboration with the Oklahoma Turnpike Authority (OTA), is preparing a traffic and revenue forecast for the proposed extension of the Gilcrease Expressway. The newly-constructed roadway would cross the Arkansas River west of downtown Tulsa and connect L.L. Tisdale to I-44, relieving congestion during peak periods and providing a more direct route to Tulsa's urban core. Figure 1-1 shows the approximate alignment of the Gilcrease Expressway extension. As part of this work, Resource Systems Group, Inc. (RSG) conducted a stated preference (SP) survey in the greater Tulsa area. RSG collaborated with CDM Smith to design and conduct the survey, the results of which will be used in CDM Smith's travel demand forecasting model for the region.

FIGURE 1-1: PROPOSED ALIGNMENT OF THE GILCREASE EXPRESSWAY

The primary purpose of the Tulsa Travel Study was to estimate the willingness to pay for travel time savings, or value of time (VOT), of passenger vehicle travelers who are candidates for using the proposed facility, or who make automobile trips on other highways in the greater Tulsa area. Based on respondents' answers in the SP experiments, these estimates of travelers' values of time will be used to support highway traffic and toll revenue projections. In preparation for the SP experiments, the questionnaire also collected data on respondents' current travel behaviors (known as "revealed preferences") and presented respondents with information about the proposed facility.

The web-based survey approach employed a computer-assisted self-interview (CASI) technique developed by RSG. The stated preference survey instrument was customized for each respondent by presenting questions and modifying language based on respondents' previous answers. These dynamic survey features provided an accurate and efficient means of data collection and allowed the presentation of realistic future conditions that

corresponded with the respondents' reported experiences. RSG's proprietary software was customized for online administration to targeted audiences in the study region.

Respondents from a selection of ZIP codes in or around the study corridor and the larger Tulsa region were contacted through the following methods:

- E-mail invitations sent to PIKEPASS transponder customers
- Postcard invitations mailed to 20,000 residents

A total of 1,143 surveys were collected in May and June of 2016. Stated preference data from the survey were analyzed using accepted statistical techniques to estimate the coefficients of a set of multinomial logit (MNL) models. The model coefficients provide estimates of travelers' sensitivities to varying travel times and toll costs and can be used to calculate values of time.

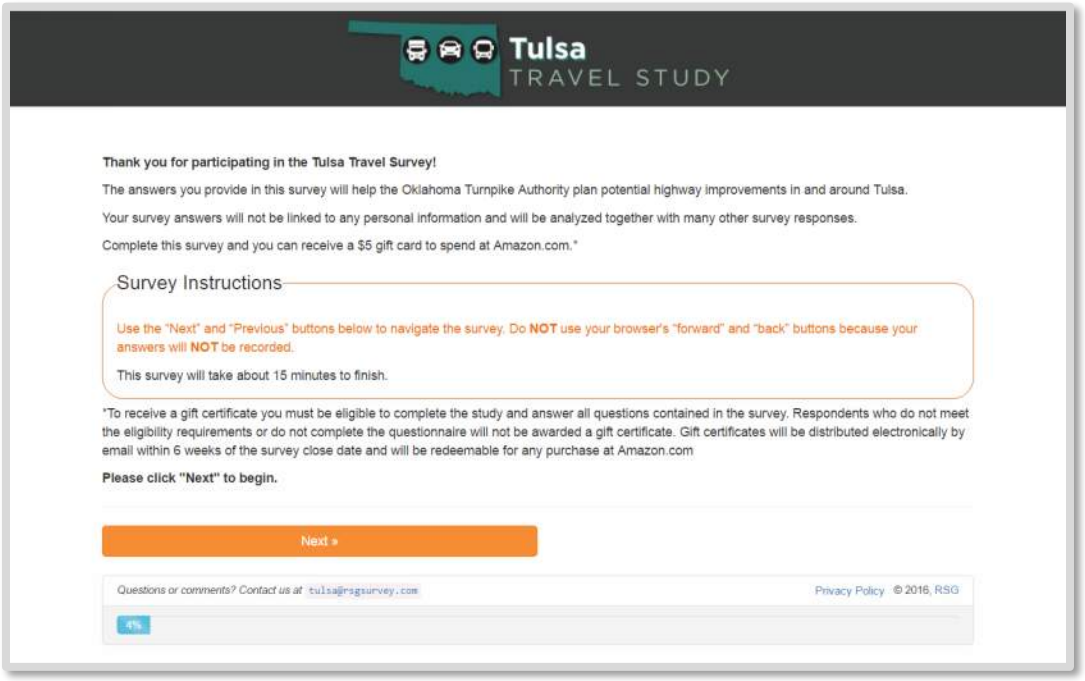
This report documents the development and administration of the survey questionnaire, presents survey results, and summarizes the discrete choice model estimation methodology and findings. The questions in survey screen captures and response tabulations are presented in the final sections of this report.

2.0 QUESTIONNAIRE

RSG worked closely with CDM Smith and the project team to develop a stated preference questionnaire to meet the objectives of the study. The questionnaire collected information necessary to estimate values of time for various traveler market segments who make trips within the proposed corridor or on other highways in the greater Tulsa area.

Respondents were presented with an introduction screen at the beginning of the survey that described the purpose of the survey, the time required to complete it, and instructions for navigating the online instrument (Figure 2-1). Respondents were also able to contact a member of the survey team with any technical questions via e-mail using the "Contact Us" option included at the bottom of all survey screens.

FIGURE 2-1: SAMPLE SURVEY SCREEN – INTRODUCTION AND INSTRUCTIONS



The survey was designed to collect information about a recent trip that a respondent made within, through, or into the proposed corridor of the Gilcrease Expressway or using other highways in the greater Tulsa area. Once data about a recent qualifying trip was collected, the survey then explored how drivers might alter their travel behavior given hypothetical future travel routes. Opinion and demographic information was also collected, with the survey instrument ultimately consisting of five main sections:

1. Qualification questions, which determined respondent eligibility
2. Trip detail questions, which collected details about a recent one-way trip made in the Gilcrease Expressway corridor or a trip that used other highways within the Tulsa area

3. Stated preference questions, which were designed to reveal respondents' sensitivities to travel time savings and toll costs
4. Debrief and opinion questions, which were designed to identify the reasons behind choices made in the SP questions and to understand respondents' attitudes toward tolling and possible transportation improvements in the area
5. Demographic questions, which sought to ensure that a diverse sample of the traveling population had been reached and also to facilitate comparisons between different demographic groups

The complete set of survey questions (as they appeared to respondents on-screen) is included in Section 7.0.

2.1 | QUALIFICATION QUESTIONS

Following the survey introduction, respondents were shown either one or two trip qualification questions to determine if they were eligible to participate in the survey. To be eligible, respondents needed to have made a trip that met the following conditions:

- The trip was made in the past month (30 days) – This timeframe was selected to include respondents who make less frequent trips while also ensuring trips were recent enough for respondents to accurately recall specific details.
- The trip took at least ten minutes – A ten-minute minimum helped ensure trips that could reasonably use highways and allowed meaningful travel time variations to be shown in the stated preference choice experiments.
- The trip was made on a weekday (Monday-Friday).
- The trip traveled through certain areas of (or used the highways around) Tulsa. The first screener question assessed whether the respondent's trip could have used the proposed Gilcrease Expressway (Figure 2-2). If a respondent did not travel in this area, then they were shown a second screener question (Figure 2-3). This more general screener question confirmed the respondent had made a trip that used a highway in the Tulsa area and met the other study criteria.

FIGURE 2-2: SAMPLE SURVEY SCREEN – TRIP QUALIFICATION (GILCREASE EXPRESSWAY STUDY AREA)

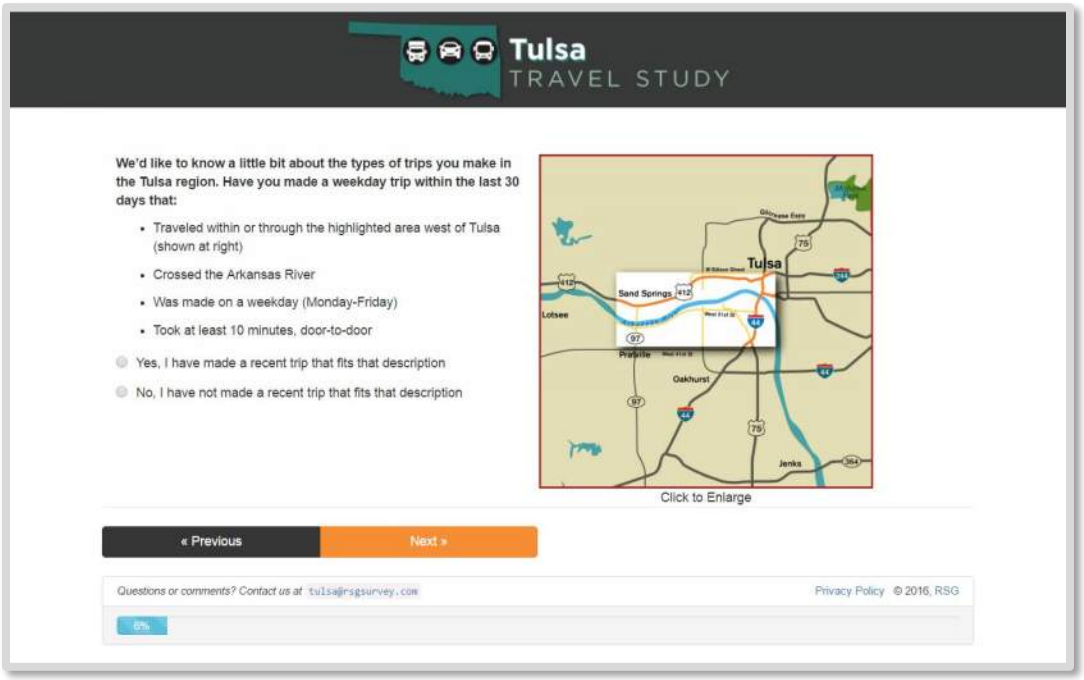
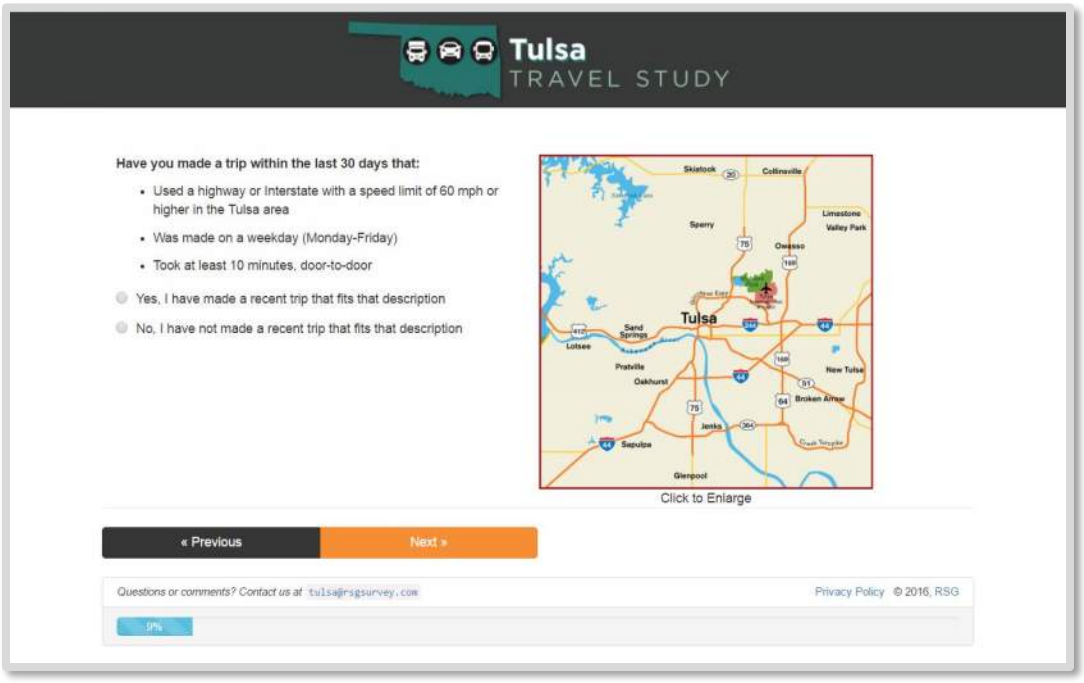


FIGURE 2-3: SAMPLE SURVEY SCREEN – TRIP QUALIFICATION (GENERAL STUDY AREA)



2.2 | TRIP DETAIL QUESTIONS

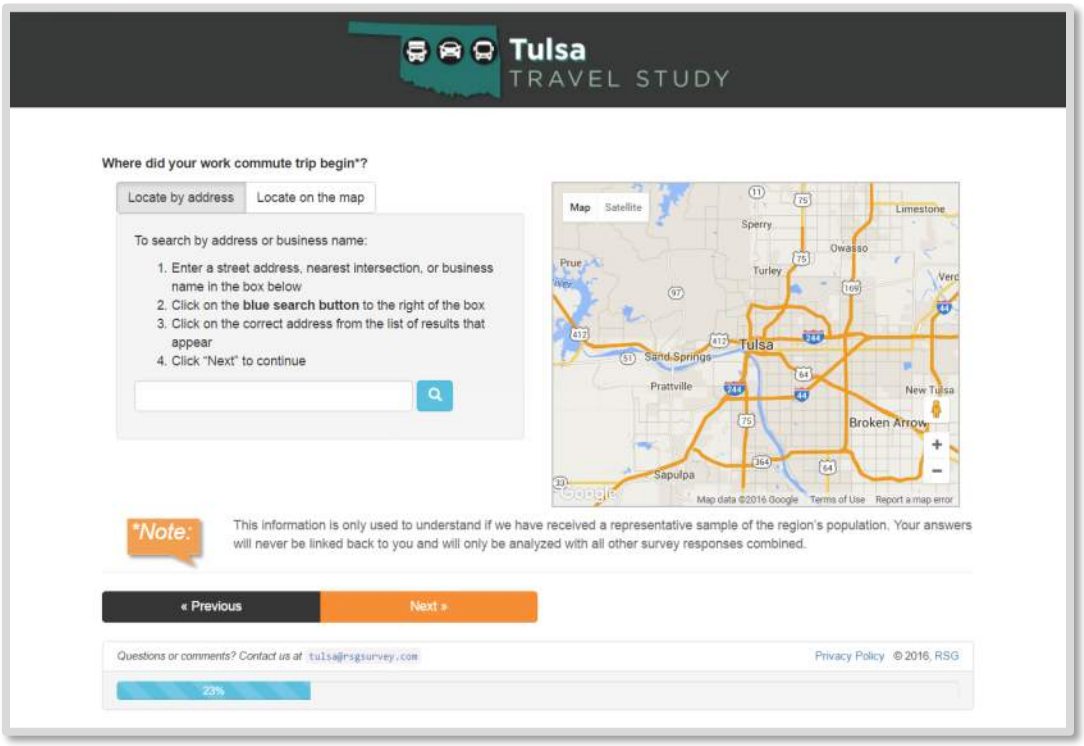
Qualifying respondents were asked to focus for the duration of the survey on their most recent trip that met the criteria outlined above. The survey specified their most recent trip (and not a typical or average trip that they might make) to obtain a representative sample of trip types made in the region. This most recent trip (referred to as the respondent's "reference trip") formed the basis for the trip detail questions. Focusing on their most recent trip also gave respondents a more concrete frame of reference when considering the stated preference scenarios later in the survey.

Respondents were instructed to think about a one-way trip (rather than an entire round trip) and were then asked a series of questions regarding the specific details of that reference trip including:

- Day of week traveled
- Trip purpose
- Beginning and ending location types (e.g., home, work, other)
- Trip origin and destination locations
- Trip departure time
- Door-to-door travel time
- Delays encountered (with duration, if any)
- Tolls paid (with amount, if any)
- Vehicle occupancy
- Trip frequency
- Transponder ownership (or reason for not owning)

Respondents used a Google Maps-based geocoder developed by RSG to identify the specific location of their trip's origin and destination. This tool allowed respondents to text-search for a business name, street intersection, or full address, or alternatively, to click on an interactive map (Figure 2-4). Origin and destination locations were geocoded using a Google Maps application-programming interface (API) to record latitude and longitude values for both the trip origin and destination. These coordinates were used to verify that the trip began and ended in two different locations (i.e. was not a round trip) and that the trip could have reasonably traveled through the relevant study area, as well as to measure the potential distance the respondent may have traveled on the proposed facilities. The geocoding application was also used to estimate travel time for comparison to respondents' reported travel times. If the locations of a trip's origin and destination suggested an invalid trip, respondents were reminded to describe a one-way portion of the trip and asked if they needed to change their beginning or ending location.

FIGURE 2-4: SAMPLE SURVEY SCREEN – ORIGIN ADDRESS AND MAP INTERFACE



2.3 | STATED PREFERENCE QUESTIONS

After respondents provided detailed information about their most recent trip, that information was used to construct stated preference exercises involving hypothetical variations based on that reference trip. Depending on their answers to the screener questions, respondents were provided with an introduction to either the proposed Gilcrease Expressway (Figure 2-5), or (if they indicated not having traveled through the study corridor, but having made a trip using other highways) a general introduction to possible new highways in the area that may be used for future trips (Figure 2-6).

FIGURE 2-5: SAMPLE SURVEY SCREEN – GILCREASE EXPRESSWAY SP INTRODUCTION

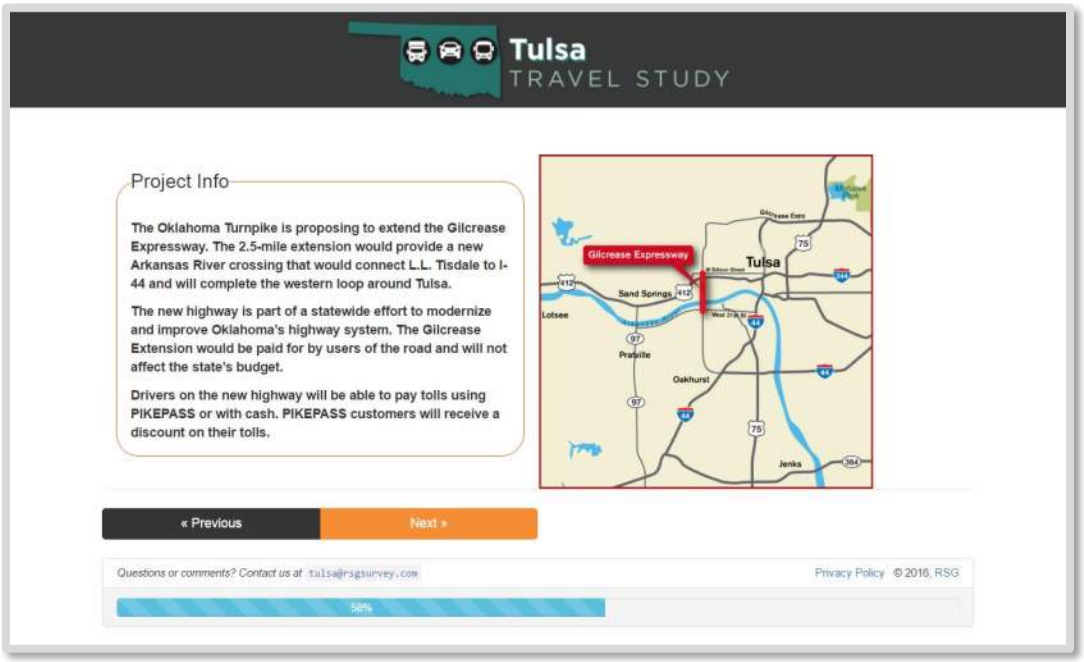
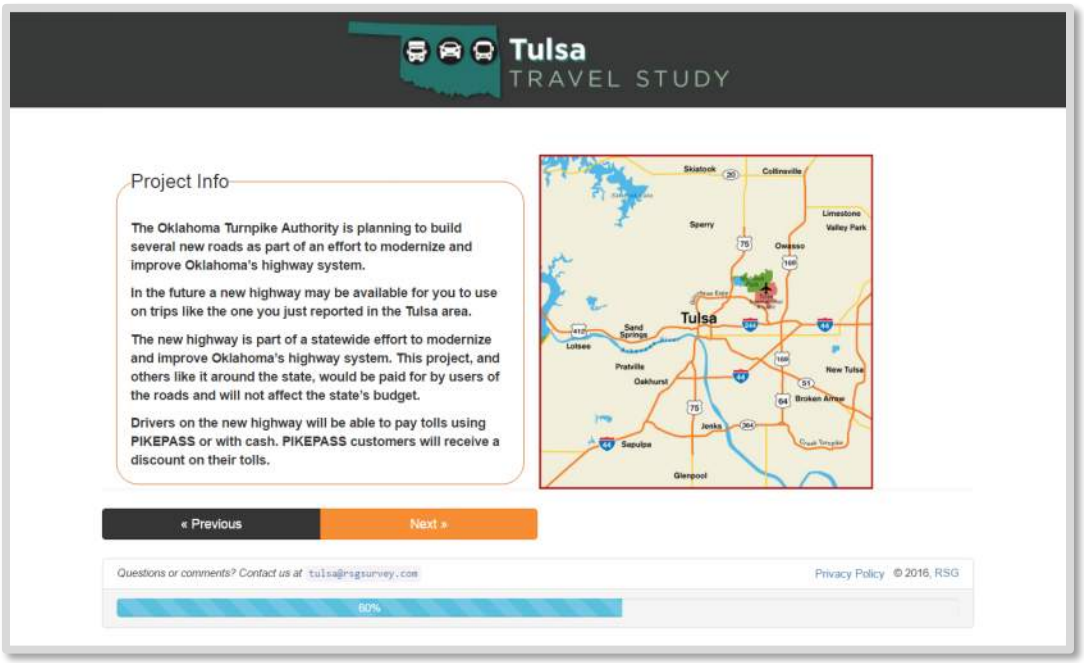
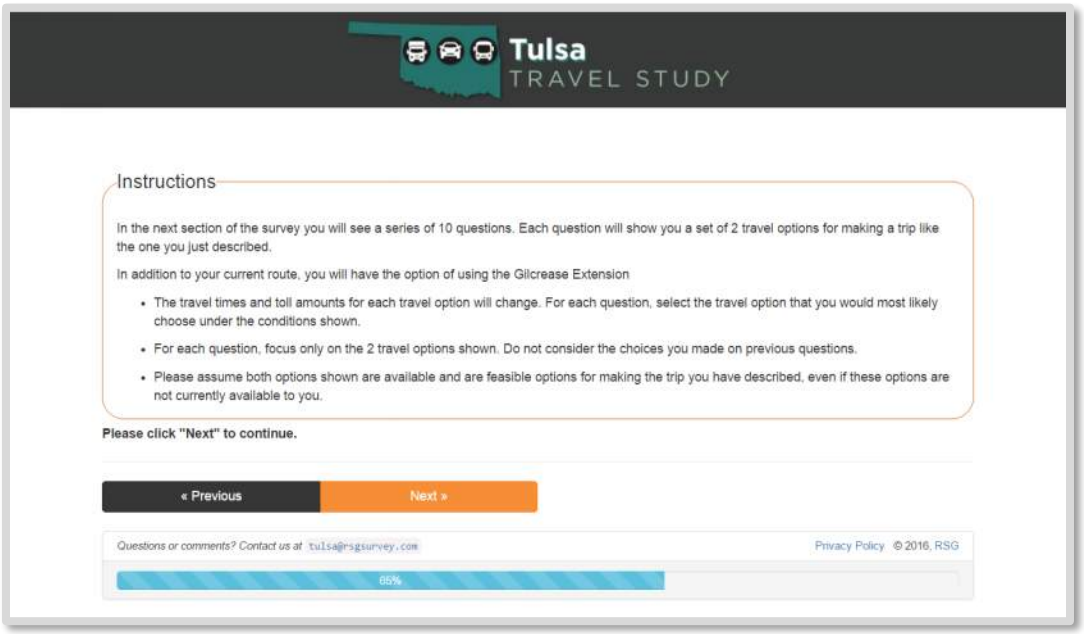


FIGURE 2-6: SAMPLE SURVEY SCREEN – GENERAL SP INTRODUCTION



Respondents were next shown instructions for navigating the stated preference experiments (Figure 2-7), which were followed immediately by the series of SP questions.

FIGURE 2-7: SAMPLE SURVEY SCREEN – SP INSTRUCTIONS

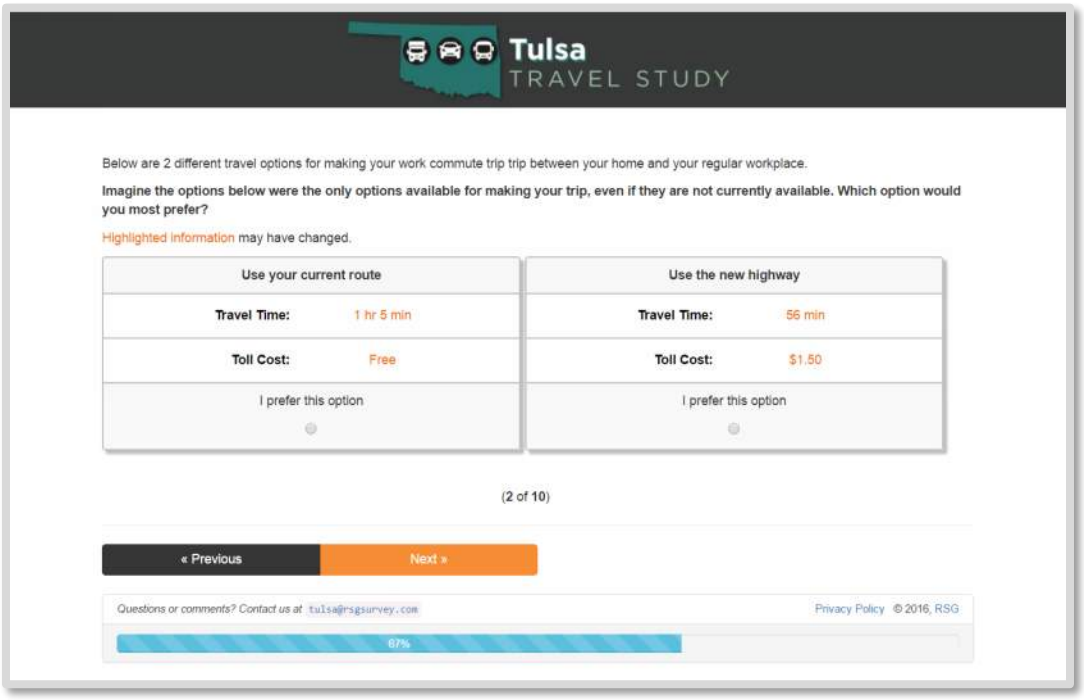


The objective of stated preference questions is to collect quantitative data that can be used to estimate respondents' travel preferences and behavioral responses under hypothetical future conditions. The details of each respondent's reference trip were used to build a set of ten stated preference scenarios, each of which included two travel alternatives for making their trip in the future. Travelers were presented with the following two alternatives:

1. Make the trip using their current route
2. Make the trip using the Gilcrease Expressway/using a new highway (the version of this alternative for all experiments was dictated by the study area to which a given respondent was assigned)

Each alternative was distinguished by two varying attributes: travel time and toll cost. The values of the attributes varied across the ten questions and respondents were asked to select the alternative they most preferred under the conditions presented. Figure 2-8 shows an example stated preference experiment. In order to avoid potential bias associated with the layout of the alternatives, the order of the two alternatives (current route vs. future tolled alternative) was randomized for each respondent. Additional examples of stated preference exercises (as they appeared to respondents on-screen) are presented in Section 7.0.

FIGURE 2-8: SAMPLE SURVEY SCREEN – SP EXPERIMENT



The attribute values presented in each scenario varied around a set of base values. Trip characteristics of each respondent's reference trip were used to pivot the base time and toll cost values to ensure that the scenarios were realistic. These pivoted base values were varied, according to an experimental design, to give a unique set of attribute values for each stated preference experiment.

The amount of variation for each attribute depended on the potential distance traveled on the Gilcrease Expressway, or for users who had not made a trip through the corridor, the calculated distance of their trip from start to finish. The distance traveled along the proposed corridor was estimated by calculating the closest projected entrance and exit interchanges to potential users' trip start and end locations. The calculated distance or overall distance traveled was used to generate a factor to multiply the specific base value shown in the experiments. Table 2-1 shows how the factors were calculated for each respondent's selected trip type. The distance factors were applied differently depending on the selected corridor or trip type to account for the relatively short length of the Gilcrease Expressway. Table 2-2 shows the base attribute levels that were multiplied by assigned factors and then used to generate the experiments.

TABLE 2-1: STATED PREFERENCE ATTRIBUTE FACTORS BY CORRIDOR

Distance	Gilcrease Expressway	New Highway
Less than 5 miles	1.5	
5 to 9 miles	2.5	1
10 to 19 miles	N/A	2
20 or more miles	N/A	3

TABLE 2-2: STATED PREFERENCE BASE ATTRIBUTE VALUES

Attribute	Level #	Alternative 1: Current Route		Alternative 2: Gilcrease Expressway/New Highway	
		Description	Level	Description	Level
Travel Time	1	Reported Travel Time + (Factor * Level)	0	Reported Travel Time - (Factor * Level)	5
	2		2		4
	3		3		3
	4		4		2
	5		5		1
Toll Cost	1			(Factor * Level) + Toll(s) Paid	$0.25
	2				$0.50
	3				$0.75
	4				$1.00
	5				$1.25
	6				$1.50
	7				$1.75
	8				$2.00
	9				$2.25
	10				$2.50

The specific levels used in each stated preference experiment were determined using an orthogonal experimental design. Orthogonal designs are commonly used for this type of research to ensure that the attribute values vary independently and to minimize correlation between attribute values. The experimental design used to generate the stated preference experiments in the survey included 100 total experiments divided into ten groups of ten. A respondent was randomly assigned to one of the ten blocks and then shown each of the ten experiments from that block in a random order.

By varying the travel time and cost of the new highways in each experiment, respondents were faced with different times savings for different costs, allowing them to demonstrate their travel preferences across a range of values of time.

2.4 | DEBRIEF AND OPINION QUESTIONS

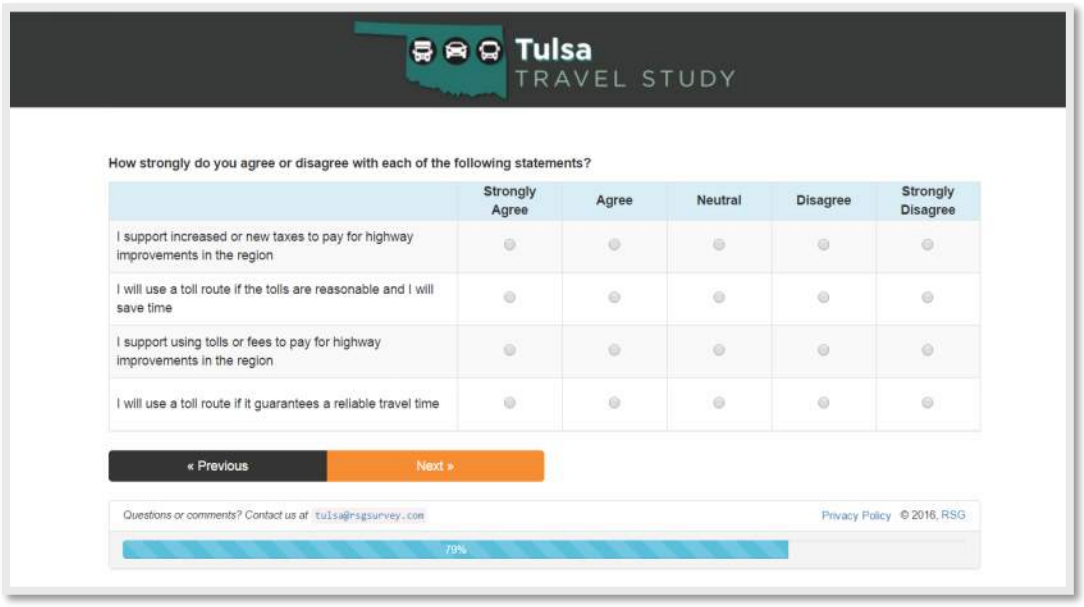
After completing the ten stated preference experiments, respondents answered a series of questions to assess the rationale underlying their choices and to identify any potential strategic bias in their responses.

Respondents who never selected the toll alternative were asked to choose a reason for always choosing their current route. Next, respondents were asked their opinion of the proposed project (or new highways in the Tulsa region in general) based on the information presented in the survey. A respondent's opinion of the project is an important indicator of the choices they might be expected to make in the stated preference experiments. Those

who indicated they were in favor of or opposed to the project (not neutral) were asked a follow up question to explain their reasoning.

Finally, all respondents were asked to indicate the extent to which they agree or disagree with a set of attitude statements about tolls as shown in Figure 2-9.

FIGURE 2-9: SAMPLE SURVEY SCREEN – TOLL ATTITUDE STATEMENTS



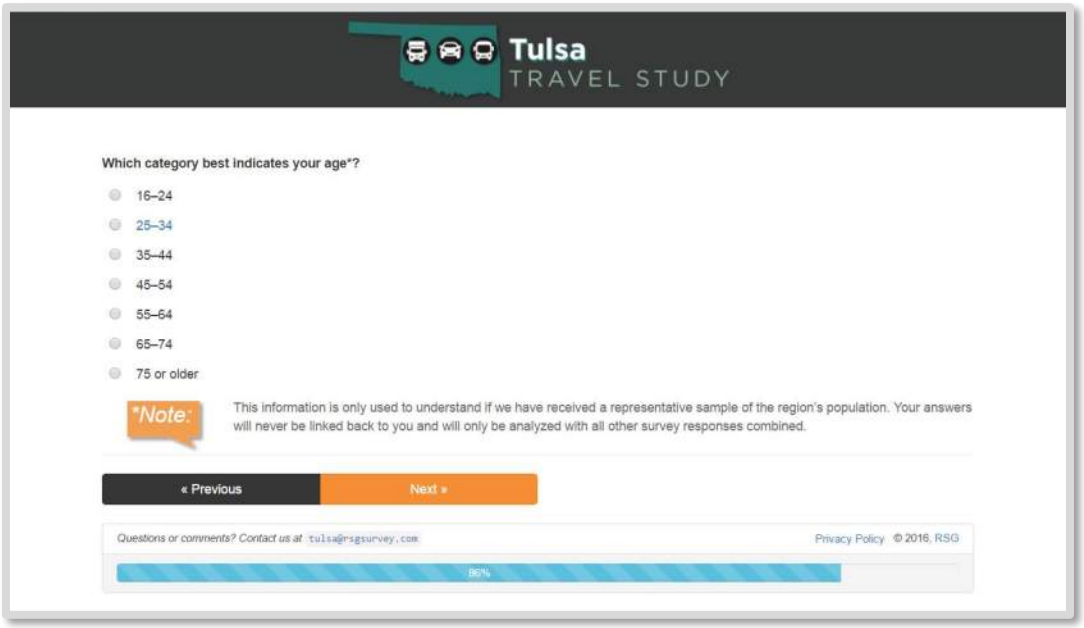
2.5 | DEMOGRAPHIC QUESTIONS

The final section of the survey included a series of demographic questions in which respondents were asked for the following information:

- ZIP Code
- Gender
- Age
- Employment status
- Household size
- Household number of vehicles
- 2015 household income, before taxes

These screens included a note that responses would be analyzed in aggregate, and not linked back to individuals (as shown in Figure 2-10).

FIGURE 2-10: SAMPLE SURVEY SCREEN – DEMOGRAPHIC QUESTION WITH NOTE ABOUT PERSONAL INFORMATION



Answers to the demographic questions were used to classify respondents, identify possible behavioral differences across demographics, and to confirm that the sample contained a diverse group of drivers that travel in the study region.

At the conclusion of the survey, participants recruited through the postcard administration were asked for their e-mail address if they were among the first 600 respondents (and thus eligible to receive a $5 Amazon.com gift card). Finally, all respondents were given the opportunity to leave comments about the project or the survey itself.

3.0 SURVEY ADMINISTRATION

RSG worked closely with the project team to design an administration plan to produce a generally representative sample of highway users in the Tulsa area. The sampling plan was designed to include a sufficient range of travelers and trip types to support the statistical estimation of coefficients of a discrete choice model. By collecting data from a range of traveler and trip types, it is possible to identify the ways in which different characteristics affect route choice behavior. These differences can then be reflected in the structure and coefficients of the resulting choice model. In general, stated preference survey samples do not need to be strictly population proportional as long as any demographic or other dimensions along which they are non-proportional either do not significantly affect the choice being modeled or are represented as variables in the model and the model equations are applied (in any forecasting or market simulations) to proper population proportions.

The targeted population for the survey sample included potential users of the proposed Gilcrease Expressway as well as other users of highways in the Tulsa region. Travelers were recruited to participate in the stated preference survey using two methods:

1. E-mail outreach to a random sample of 20,000 PIKEPASS customers in a targeted selection of ZIP codes in and around the study region
2. Postcard mailing to 20,000 random residential addresses in a targeted selection of ZIP codes in and around the study region

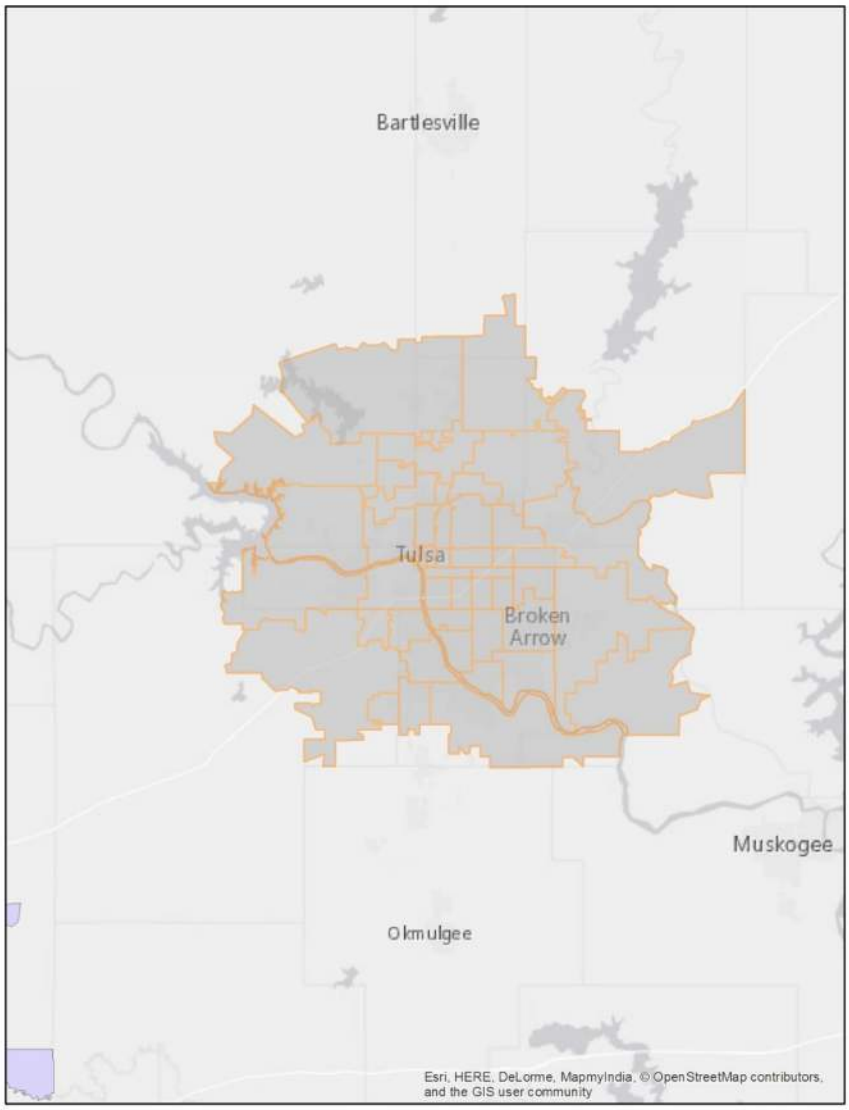
The survey was administered entirely online through RSG's proprietary online survey platform. The survey administration began on May 22, 2015 and concluded on June 27, 2015. The administration methods and number of completed surveys are presented in Table 3-1.

TABLE 3-1: SURVEY COMPLETION BY ADMINISTRATION METHOD

Data Source	Number of Completed Surveys	Percent of Total Sample	Completion Rate
PIKEPASS Customer E-mail Outreach	846	74%	4.2%
Postcard Mailing	297	26%	1.5%
Total	**1,143**	**100%**	**--**

With assistance from the project team, RSG coordinated an outreach to a random sample of residents who reside in specific ZIP codes in the Tulsa area. The ZIP codes from which respondents were recruited to participate are shown in Figure 3-1. Both the postcards and PIKEPASS e-mail outreach were administered proportionally to the number of households in each ZIP code.

FIGURE 3-1: SURVEYED ZIP CODES



3.1 | PIKEPASS CUSTOMER E-MAIL OUTREACH

The OTA provided the contact information of approximately 300,000 PIKEPASS transponder customers living within the surveyed ZIP codes (Figure 3-1) to recruit for participation in the study. From this list, RSG distributed e-mail invitations to 20,000 random customers, with each ZIP code sampled proportionally to its overall contribution to the study area's population. Each e-mail invitation contained information about the study and an open link to access the survey webpage. Eight hundred and forty-six (846) completed surveys were collected from PIKEPASS customers in the Tulsa region, resulting in a completion rate of approximately 4.2%.

3.2 | POSTCARD INVITATION TO HOUSEHOLDS

Customized postcards designed by RSG were mailed to approximately 20,000 home addresses in the same ZIP code areas, again distributed proportionally to the number of households in each ZIP code. The postcard (Figure 3-2 and Figure 3-3) contained information about the study as well as the $5 electronic gift card incentive that would be sent to the first 600 respondents who completed the survey. Each postcard contained a link to access the survey webpage and a personalized password to control access to the questionnaire and the survey incentive. Two hundred and ninety-seven (297) respondents completed the survey from this recruitment method, resulting in a completion rate of approximately 1.5%.

FIGURE 3-2: POSTCARD INVITATION – FRONT

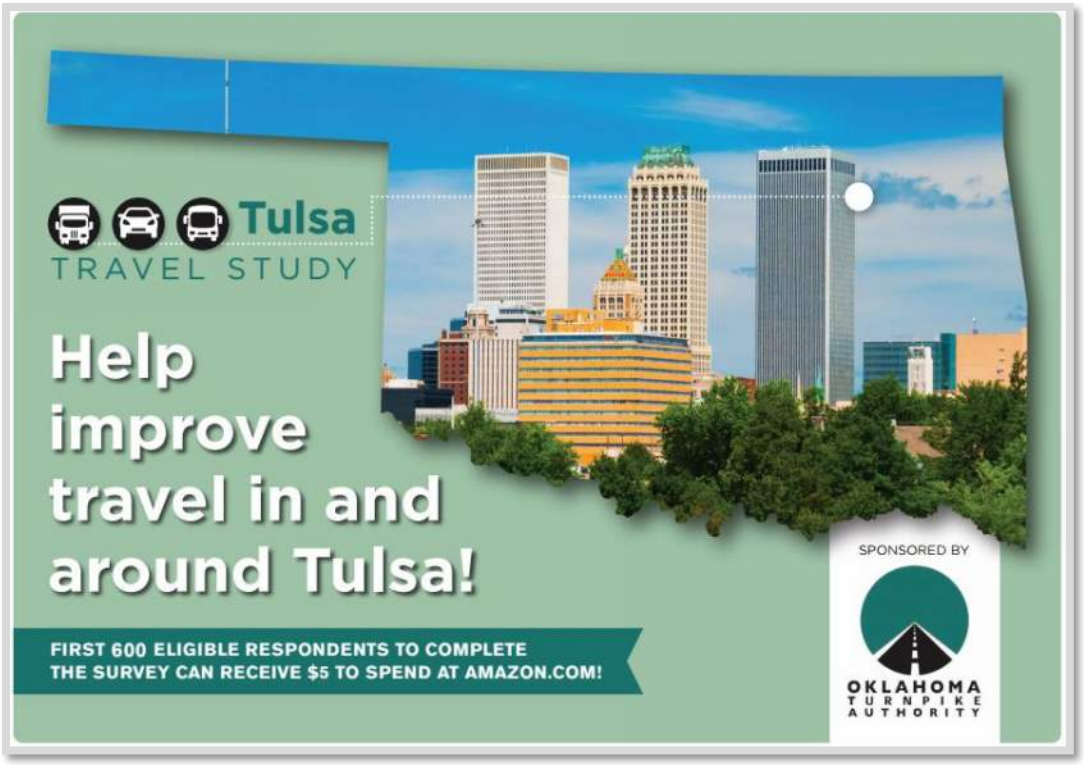
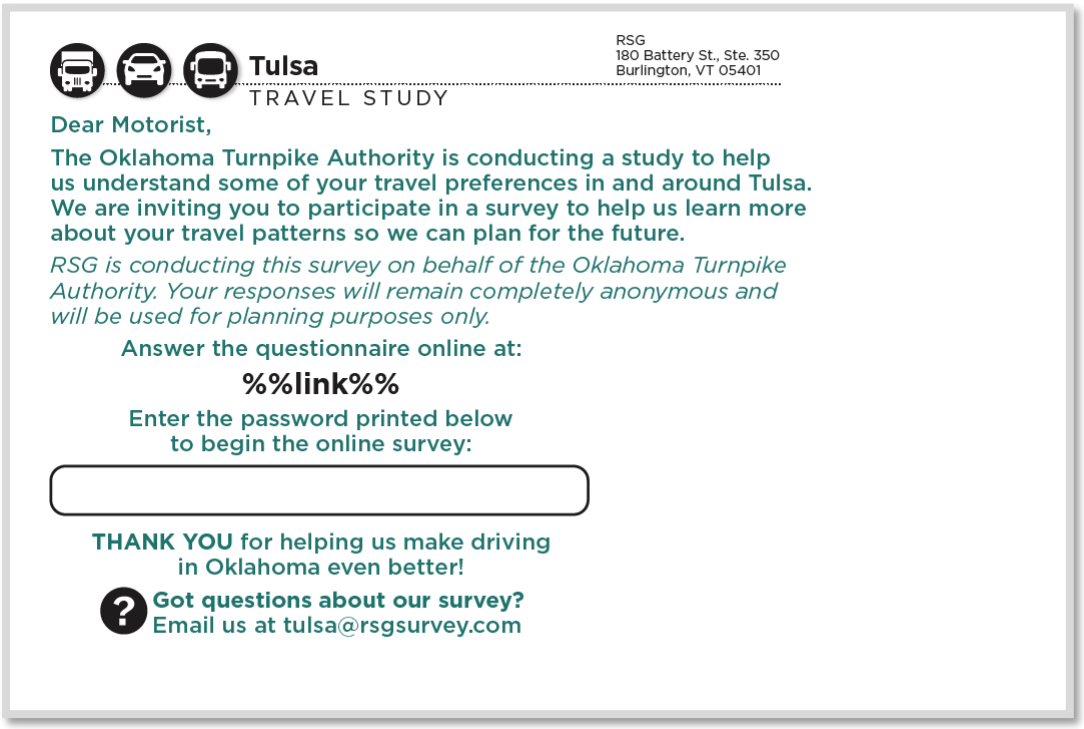


FIGURE 3-3: POSTCARD INVITATION – BACK



4.0 SURVEY ANALYSIS

Summary tabulations and statistics are presented in the following sections for select survey questions. A complete set of survey tabulations for each question can be found in Section 8.0. Before finalizing the dataset and beginning choice model estimation, the data were screened for outliers. This screening process is outlined below.

4.1 | IDENTIFICATION OF OUTLIERS

The survey data were screened to ensure that all observations included in the data analysis and model estimation represented realistic trips in the study area and reasonable tradeoffs in the stated preference exercises. Variables such as trip origin and destination, travel speed, and choice behavior were reviewed during the screening process.

During the data collection phase of the project, 1,143 respondents completed the stated preference survey. After viewing different variables and their impact on model results, it was determined that respondents who met the following conditions should be excluded from the final analysis. The categories listed below are not mutually exclusive; some respondents were excluded for more than one of the data checks listed:

- Respondents whose origin and destination coordinates implied their trip could not make reasonable use of the selected corridor for their reference trip (9 respondents)
- Respondents whose implied speed (60 * Google-calculated trip distance / reported travel time) for their trip was greater than 120 mph or less than 3 mph (18 respondents)
- Respondents whose trip distance was less than 3 miles or more than 400 miles (36 respondents)
- Respondents who completed the survey in less than 6 minutes (15 respondents)
- Respondents who indicated they paid more than $10 in tolls on their trip (7 respondents)
- Respondents demonstrating inconsistent or irrational choice behavior in the stated preference exercises. For example, respondents who established a certain dollar amount for willingness to pay for time savings and then rejected paying less money for equal or greater time savings (10 respondents)

Based on the analysis described above, 68 distinct records were removed and 1,075 respondents (10,750 choice observations) were included in the final dataset and used to estimate the models presented in this report.

4.2 | SURVEY RESULTS

The descriptive analysis of the survey data presented in this section of the report is based on the 1,075 valid responses and is provided in four sections: trip details, stated preference, debrief and opinion, and demographic questions.

Respondents who indicated that they had recently made a trip that crossed the Arkansas River west of Tulsa were asked to recount the details of their the most recent trip through the corridor (66% of respondents). The remaining 34% of respondents who had not traveled through the Gilcrease Expressway corridor, but had made a recent highway trip in the Tulsa area, were assigned to the General Trip segment (Table 4-1).

TABLE 4-1: CORRIDOR/TRIP TYPE

Corridor	Count	Percent
Gilcrease Expressway	705	66%
General Trip	370	34%
Total	**1,075**	**100%**

TRIP DETAILS

Figure 4-1 shows primary trip purposes for all respondents. The most commonly reported trip purpose was travel to or from work (27% of trips). Trips made for social or recreational purposes comprised 24% of all trips, while trips for other personal business (not for work, social, or recreational purposes) made up approximately 23% of all reported trip purposes. Respondents who made a General Trip were more likely to report a trip to or from work (42%), while 18% of respondents who made a trip in the Gilcrease Expressway corridor reported a work trip (see Section 8.0). Trips that were made for work-related business or commuting comprised 42% of all reported trip purposes across all respondents.

FIGURE 4-1: PRIMARY TRIP PURPOSE

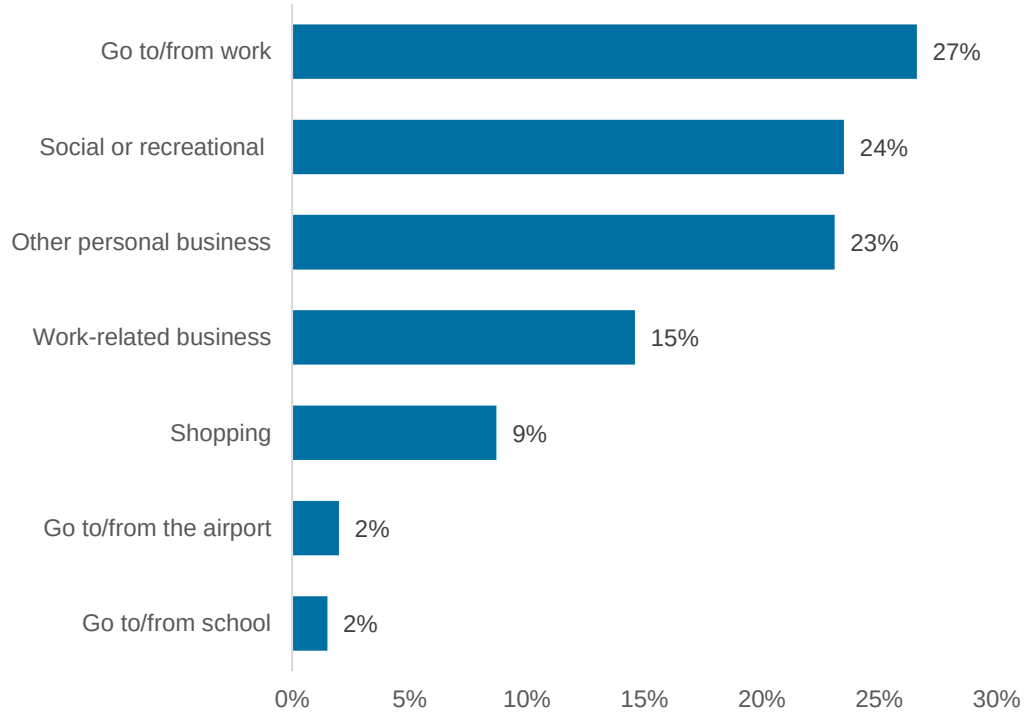


Table 4-2 summarizes the distribution of beginning and ending locations for all respondents. The majority of trips began at home and ended at a place other than home or work. Correspondingly, the single most commonly reported trip combination originated at home and ended at a place other than home or work (56%). Twenty-two percent of trips started at home and ended at a regular workplace.

TABLE 4-2: TRIP ORIGINS AND DESTINATIONS

Origin & Destinations		Destination			
		My home	My regular workplace	Another place	**Total**
Origin	My home	2%	22%	56%	**80%**
	My regular workplace	4%	0%	8%	**13%**
	Another place	4%	1%	3%	**7%**
	Total	**10%**	**23%**	**67%**	**100%**

Table 4-3 presents trip departure periods by corridor. The highest percentage of trips made in the Gilcrease Expressway corridor (42%) were made in the midday period (between morning and afternoon peak, or between 9:00 AM and 2:59 PM), while respondents who reported a General Trip within the region were most likely to report a trip that occurred in the morning peak period (42%). The morning peak period is defined as weekday mornings between 6:00 and 8:59 AM, and the afternoon peak period is defined as weekday afternoons between 3:00 and 6:59 PM.

TABLE 4-3: TRIP DEPARTURE TIME PERIOD BY CORRIDOR

Time Period	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Morning Peak (6:00-8:59 AM)	215	30%	154	42%	**369**	**34%**
Midday (9:00 AM-2:59 PM)	296	42%	129	35%	**425**	**40%**
Afternoon Peak (3:00-6:59 PM)	161	23%	61	16%	**222**	**21%**
Night (7:00 PM-5:59 AM)	33	5%	26	7%	**59**	**5%**
Total	**705**	**100%**	**370**	**100%**	**1,075**	**100%**

The latitude and longitude coordinates for each trip's origin-destination pair were used to estimate trip distances using a Google Maps route-planning algorithm. The average calculated distance traveled for all respondents was 32 miles and the median distance was 17 miles. The average reported travel time for all respondents was 43 minutes and the median travel time was 30 minutes. Respondents who reported a General Trip within the Tulsa region reported shorter trips by distance and duration than those who reported trips in the Gilcrease Expressway corridor. Table 4-4 shows calculated trip distances and reported travel times (mean and median) by corridor, as well as for all respondents together.

TABLE 4-4: MEAN AND MEDIAN TRIP DISTANCE AND TRAVEL TIME BY CORRIDOR

	Gilcrease Expressway		General Trip		Total	
	Mean	Median	Mean	Median	Mean	Median
Google Distance (miles)	36	18	23	15	**32**	**17**
Reported Time (minutes)	49	30	33	25	**43**	**30**

Figure 4-2 shows the cumulative distribution of Google-calculated trip distances for all respondents and Figure 4-3 shows the cumulative distribution of reported travel times for all respondents.

FIGURE 4-2: CUMULATIVE TRIP DISTANCES

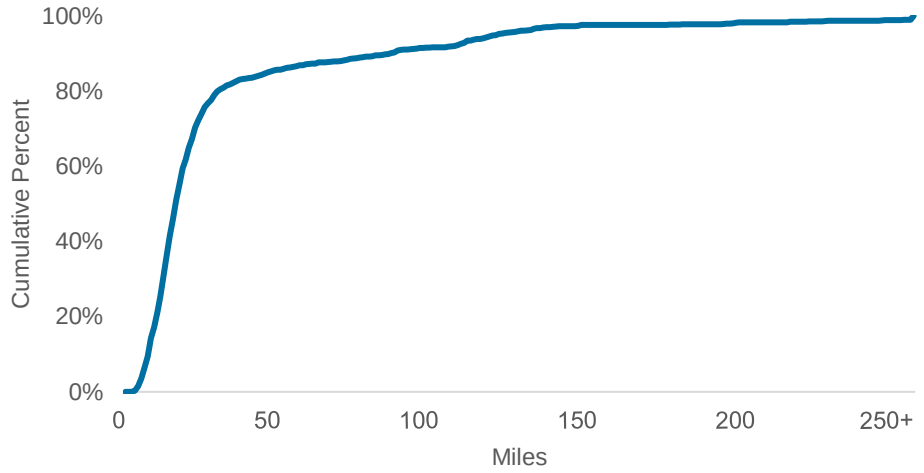
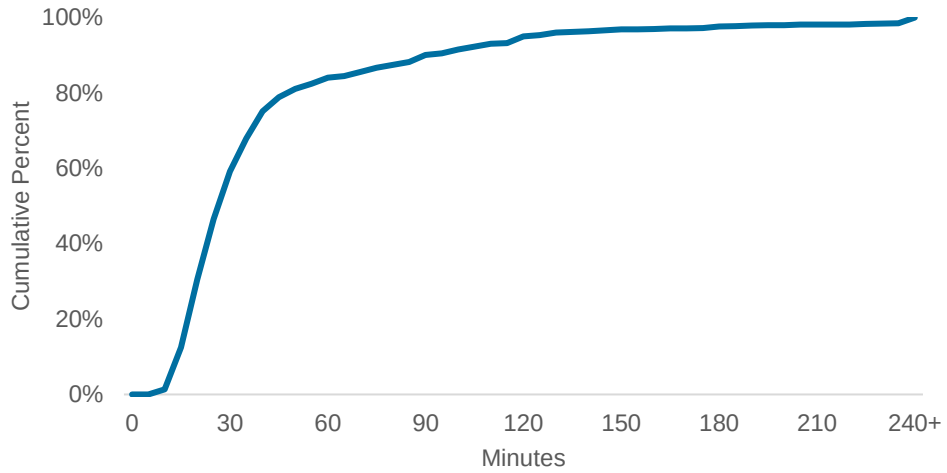


FIGURE 4-3: CUMULATIVE TRAVEL TIMES



Trip origins and destinations, stratified by corridor, are shown in Figure 4-4 and Figure 4-5. Figure 4-4 shows that trip origins are scattered throughout the Tulsa region, and Figure 4-5 shows that Gilcrease Expressway trip destinations tend to coalesce near the proposed Gilcrease corridor.

FIGURE 4-4: TRIP ORIGINS BY CORRIDOR

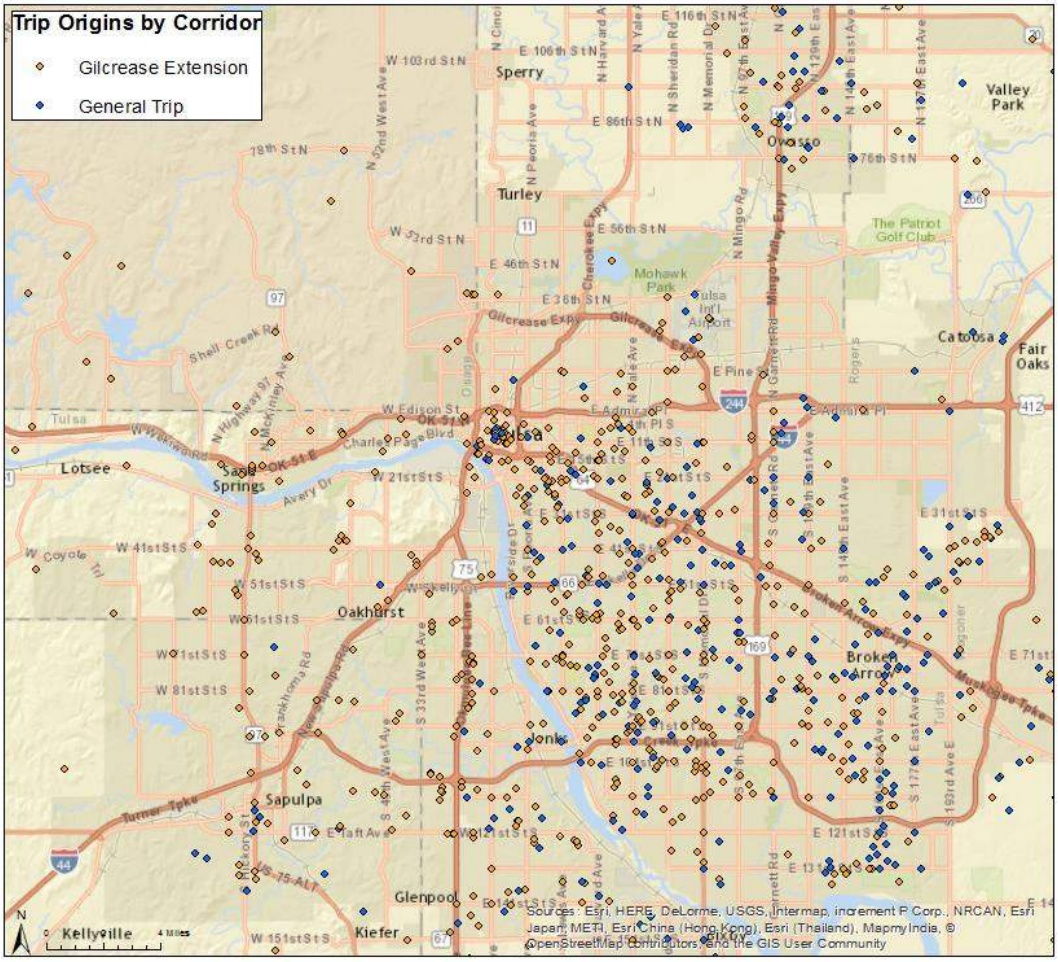


FIGURE 4-5: TRIP DESTINATIONS BY CORRIDOR

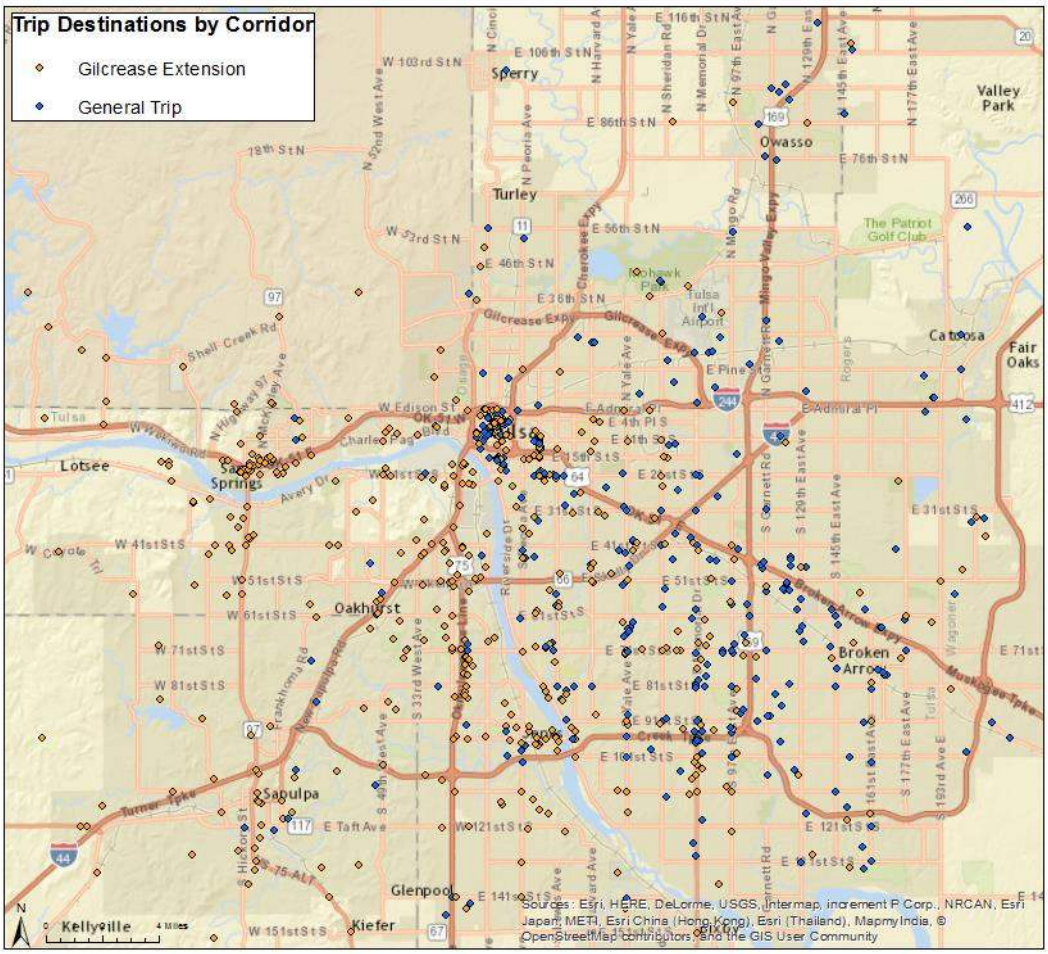
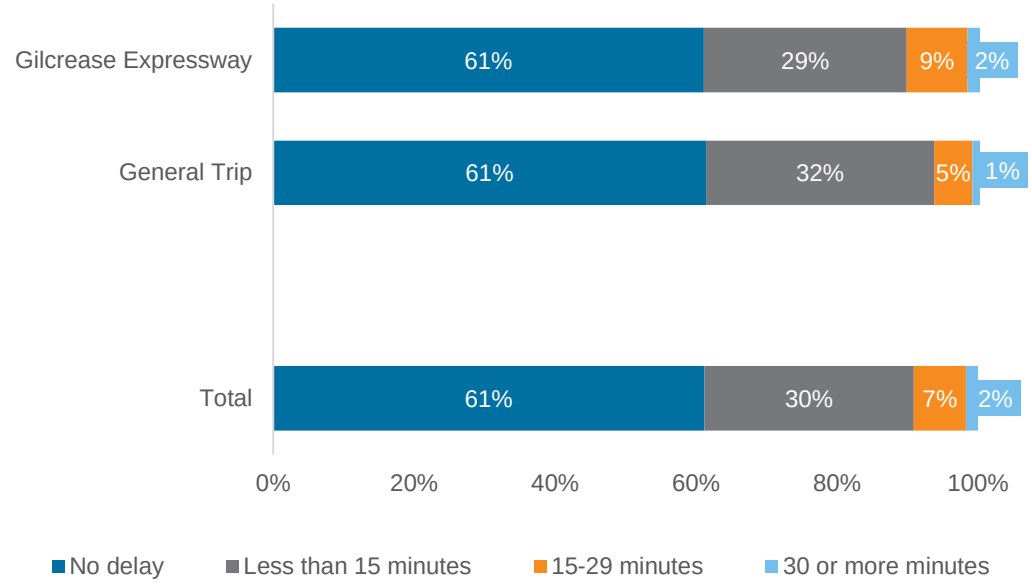


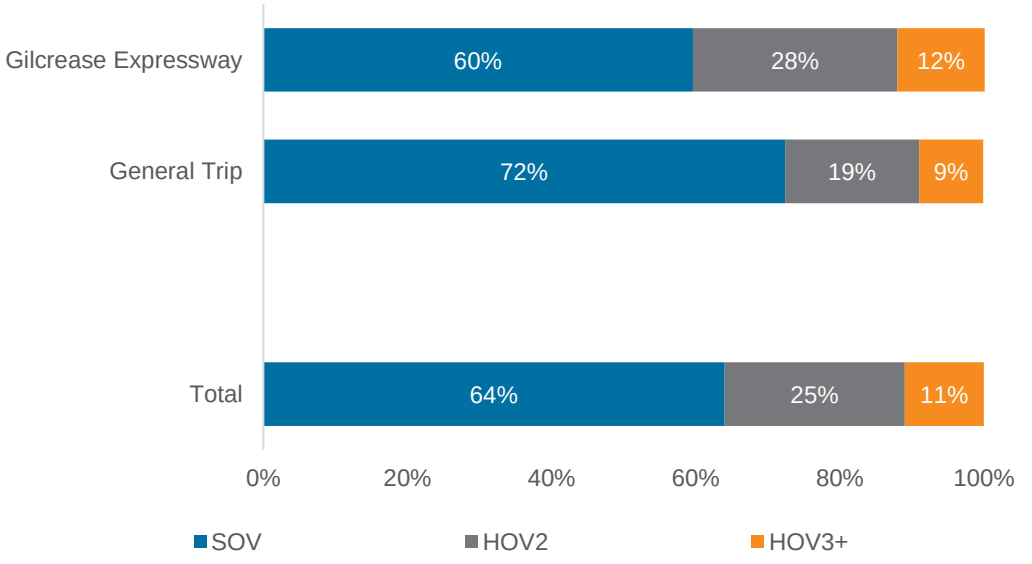
Figure 4-6 shows the categorized amount of delay experienced by respondents in each study area, as well as for all respondents. Approximately 39% of all respondents reported experiencing at least some delay on their trip. Thirty percent of all respondents experienced a delay of less than 15 minutes, with a smaller group experiencing longer delays. Reported amount of delay was similar between selected corridor or trip type, with respondents who made a trip through the Gilcrease Expressway corridor slightly more likely to report spending more time delayed by congestion.

FIGURE 4-6: AMOUNT OF DELAY BY CORRIDOR



Most respondents (64%) reported making their trip in a single occupant vehicle (SOV). Twenty-five percent of all trips were made in a vehicle with two occupants (HOV2), and 11% were made in a vehicle with three or more occupants (HOV3+). Respondents who reported a General Trip within the Tulsa region were somewhat less likely to have made a trip in a vehicle with additional occupants. Figure 4-7 shows vehicle occupancy by selected corridor and for all respondents.

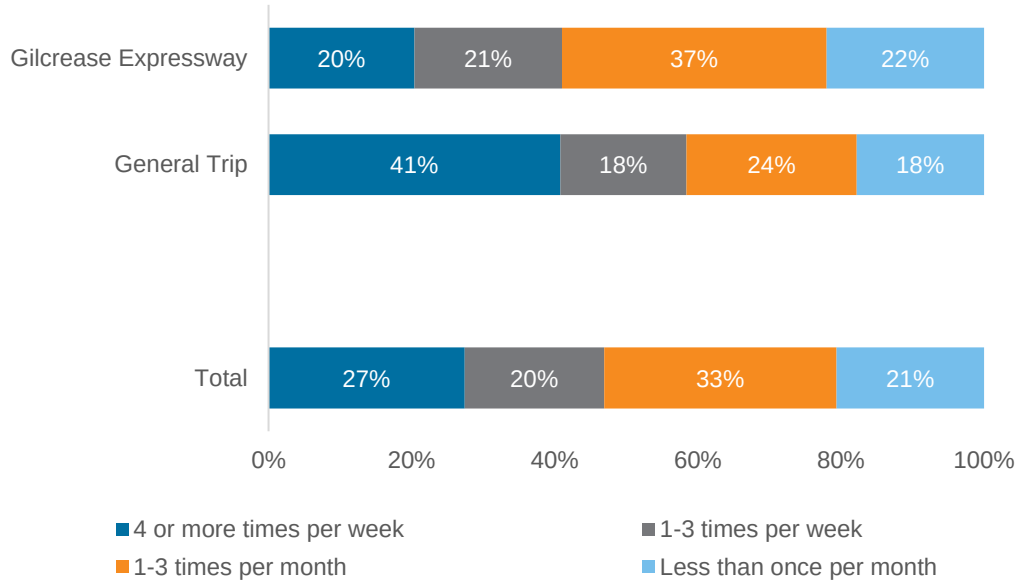
FIGURE 4-7: VEHICLE OCCUPANCY BY CORRIDOR



Twenty-seven percent of all trips were made four or more times per week, closely tracking the number of trips that were made to or from work (27% in Figure 4-1). General Trips

tended to show the highest frequency, with 41% of these respondents making their reference trip four or more times per week, while reference trips in the Gilcrease Expressway corridor were made this frequently by only 20% of respondents. Trip frequency by corridor and for all respondents is shown in Figure 4-8.

FIGURE 4-8: TRIP FREQUENCY BY CORRIDOR



Respondents were asked whether they owned a PIKEPASS or any other type of transponder for electronic toll collection. Nearly all respondents indicated that they owned a PIKEPASS transponder (95%). Table 4-5 shows transponder ownership by corridor and for all respondents.

TABLE 4-5: TRANSPONDER OWNERSHIP BY CORRIDOR (SELECT ALL THAT APPLY)

Transponder Ownership	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
PIKEPASS	669	95%	349	94%	**1,018**	**95%**
Other transponder	2	0%	4	1%	**6**	**1%**
None	36	5%	20	5%	**56**	**5%**
Total	**707**	**--**	**373**	**--**	1,080	**--**

STATED PREFERENCE QUESTIONS

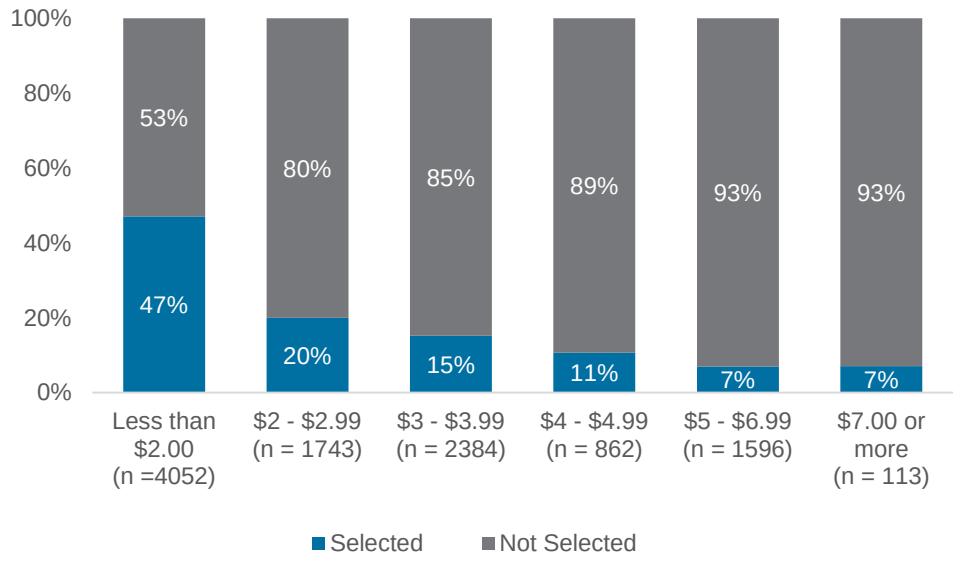
After completing the trip details portion of the survey, respondents answered a series of ten stated preference tradeoff exercises tailored to their reference trip. Survey respondents chose their current route in 74% of experiments and the alternative tolled option in 26% of experiments (Table 4-6).

TABLE 4-6: STATED PREFERENCE CHOICES

Alternative	Number of Experiments Shown	Number of Times Selected	Percent of All Choices
Use Current Route	10,750	7,921	74%
Use Alternate Tolled Route	10,750	2,829	26%

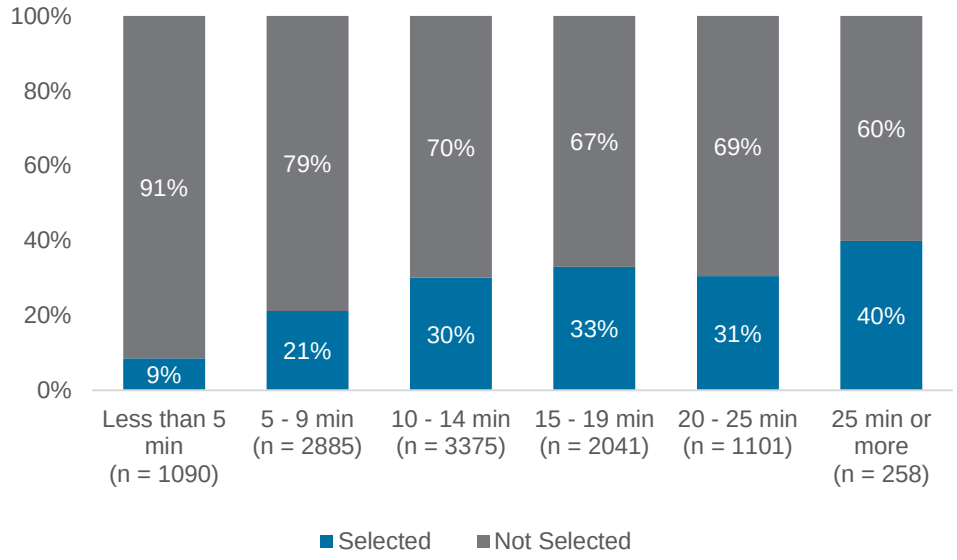
Respondents became less likely to choose the toll alternative tailored to their reference trip as the toll cost increased. Figure 4-9 shows the percentage of time the toll alternative was chosen in the stated preference experiments at different toll costs. The first bar on the left in Figure 4-9 shows that when the presented toll costs were less than $2.00, the toll option was selected 47% of the time, while the last bar on the right shows that when the presented toll costs were more than $7.00, the toll option was selected only 7% of the time. In general, Figure 4-9 shows that the likelihood of respondents choosing the toll option decreased considerably as the toll amount increased. Since each respondent was presented with ten questions, the total number of choice observations is 10,750.

FIGURE 4-9: SP TOLL OPTION SELECTION BY TOLL COST



Alternatively, respondents were generally more likely to choose the tolled option tailored to their reference trip as the travel time savings increased. Figure 4-10 shows the percentage of time the toll alternative was chosen in the stated preference experiments at different levels of travel time savings. The first bar on the left in Figure 4-10 shows that when the presented travel time savings was less than five minutes, the toll option was selected 9% of the time, while the last bar on the right shows that when the presented travel time savings was 25 minutes or more, the toll option was selected 40% of the time. In general, Figure 4-10 shows that the likelihood of respondents choosing the toll option increased considerably as the travel time savings increased.

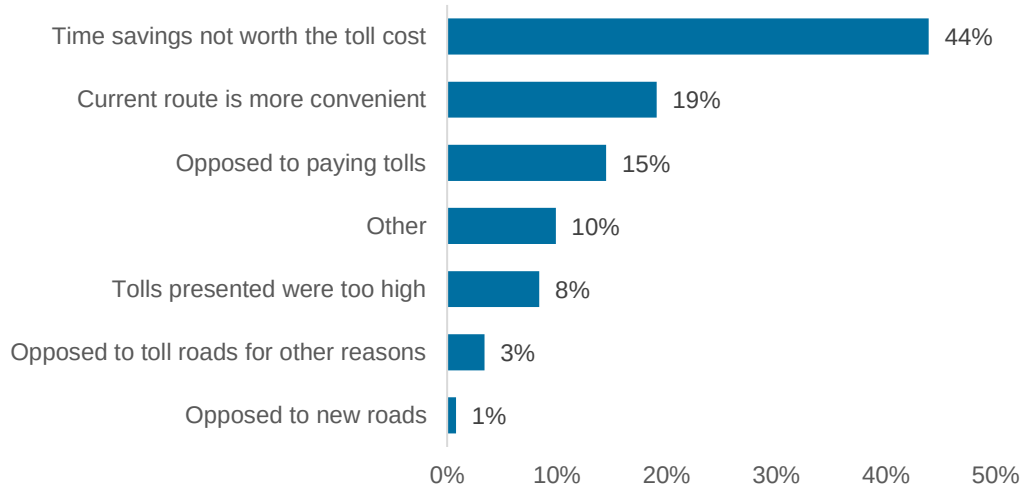
FIGURE 4-10: SP TOLL OPTION SELECTION BY TIME SAVINGS



DEBRIEF AND OPINION QUESTIONS

If a respondent never chose an option that had tolls during the stated preference section (24% of respondents), they were asked to indicate their primary reason for this. The reason most frequently cited (44% of all respondents who never selected the tolled alternative) was that the time savings presented in the experiments was not high enough to justify the toll cost (Figure 4-11).

FIGURE 4-11: PRIMARY REASON FOR NEVER SELECTING TOLLED OPTIONS



Approximately 37% of respondents were in favor of the project (11% strongly in favor and 26% somewhat in favor). Thirty-four percent of respondents were neutral in their project opinions, while approximately 28% were either strongly (11%) or somewhat (17%) opposed to the project. Table 4-7 shows project opinion by selected corridor and for all respondents.

It should be noted that General Trip respondents were asked for their opinion of toll facilities in the Tulsa region in general, not related to a specific corridor.

TABLE 4-7: PROJECT OPINION BY CORRIDOR

Project Opinion	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Strongly opposed	65	9%	55	15%	**120**	**11%**
Somewhat opposed	99	14%	87	24%	**186**	**17%**
Neutral	277	39%	91	25%	**368**	**34%**
Somewhat favor	176	25%	106	29%	**282**	**26%**
Strongly favor	88	12%	31	8%	**119**	**11%**
Total	**705**	**100%**	**370**	**100%**	**1,075**	**100%**

If a respondent reported a non-neutral opinion about the project, they were asked to indicate the main reason for that opinion. Table 4-8 and Table 4-9 show the main reasons for supporting or opposing the project by selected corridor. Of the 37% of respondents who supported the project, the most common reason was faster travel times, followed by a need for investment in infrastructure. Of the 28% of respondents who opposed the project, the most common reason was opposition to toll roads.

TABLE 4-8: PRIMARY REASON FOR PROJECT SUPPORT BY CORRIDOR

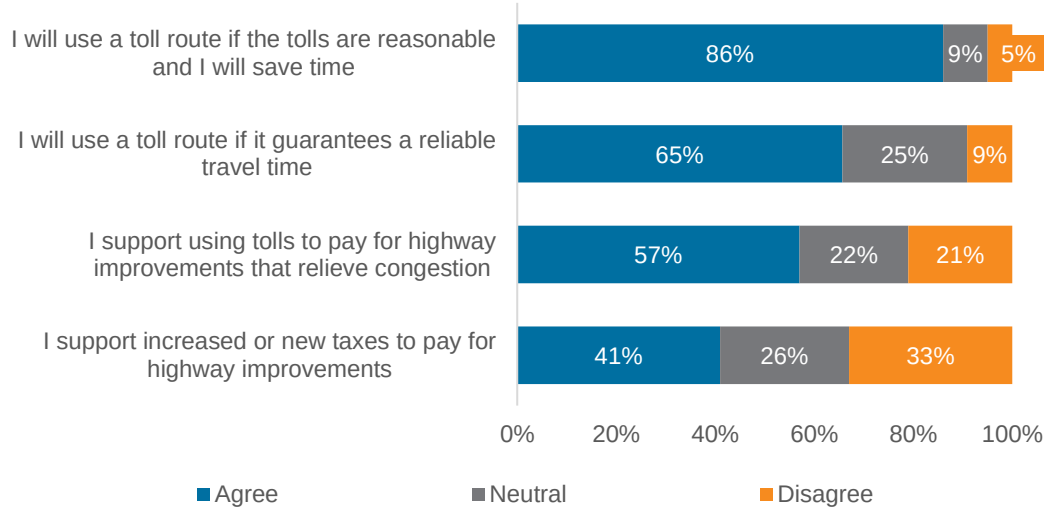
Reasons for Support	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Shorter travel times once completed	101	38%	77	56%	178	44%
Needed investment in infrastructure	86	33%	26	19%	112	28%
Safer road conditions	24	9%	26	19%	50	12%
More direct travel route	33	13%	0	0%	33	8%
Other reason	20	8%	8	6%	28	7%
Reduced emissions and improved air quality	0	0%	0	0%	0	0%
Total	**264**	**100%**	**137**	**100%**	**401**	**100%**

TABLE 4-9: PRIMARY REASON FOR PROJECT OPPOSITION BY CORRIDOR

Reasons for Opposition	Gilcrease Expressway		General Trips		Total	
	Count	Percent	Count	Percent	Count	Percent
Opposed to toll roads	71	43%	89	63%	160	52%
Other reason	41	25%	32	23%	73	24%
Rather see more investments in alternative transportation	24	15%	17	12%	41	13%
Opposed to where the highway would be built	20	12%	0	0%	20	7%
Opposed to spending money on road construction projects	7	4%	2	1%	9	3%
Opposed to new highways	1	1%	2	1%	3	1%
Total	**164**	**100%**	**142**	**100%**	**306**	**100%**

To gauge respondents' opinions about issues related to the proposed new road, levels of agreement were measured for a series of attitude statements (Figure 4-12). Of the statements presented, respondents were mostly likely to agree with the statement "I will use a toll route if the tolls are reasonable and I will save time" and least likely to agree with the statement "I support increased or new taxes to pay for highway improvements in the region."

FIGURE 4-12: TOLL ATTITUDE STATEMENTS



DEMOGRAPHIC QUESTIONS

To conclude the survey, respondents were asked a series of demographic questions. Fifty-six percent of respondents identified as male and 44% identified as female. The median age of the sample fell in the 45-54-year-old category. Forty-seven percent of respondents reported living in a two-person household and forty-eight percent of respondents reported living in a household with two vehicles. More than half (57%) of respondents indicated being employed full-time and 22% reported being retired.

When reporting income, respondents could select a 'Prefer not to answer' option, and approximately 20% of all respondents selected this option. The median annual household income of all respondents who chose to report their income was in the $75,000-$99,999 income category (Table 4-10).

TABLE 4-10: ANNUAL HOUSEHOLD INCOME BY CORRIDOR

Income Category	Gilcrease Expressway		General Trips		Total	
	Count	Percent	Count	Percent	Count	Percent
Less than $15,000	3	1%	5	2%	8	1%
$15,000-$24,999	21	4%	7	3%	28	3%
$25,000-$34,999	29	5%	8	3%	37	4%
$35,000-$49,999	68	12%	36	13%	104	12%
$50,000-$74,999	107	18%	63	22%	170	20%
$75,000-$99,999	111	19%	61	22%	172	20%
$100,000-$124,999	95	16%	42	15%	137	16%
$125,000-$149,999	55	9%	24	9%	79	9%
$150,000-$199,999	51	9%	20	7%	71	8%
$200,000 or more	43	7%	16	6%	59	7%
Total	**583**	**100%**	**282**	**100%**	**865**	**100%**

5.0 MODEL ESTIMATION

The primary purpose of the Tulsa Travel Study was to estimate the willingness to pay for travel time savings, or VOT, of passenger vehicle travelers who are candidates for using the Gilcrease Expressway or who make automobile trips on highways in the Tulsa area. These VOT estimates will support estimates of future traffic and revenue for the facility. The ten choice observations for each respondent were compiled into a dataset with 10,750 observations to support the estimations of VOT.

5.1 | METHODOLOGY

Statistical analysis and discrete choice model estimation were conducted using the stated preference survey data. The statistical estimation and specification testing were completed using a conventional maximum likelihood procedure that estimated coefficients for a set of MNL models. The MNL models were used to identify systematic differences in preference heterogeneity—for example, the difference in VOT by trip purpose, time of day, or income. The model coefficients provide information about the respondents' sensitivities to the attributes that were tested in the tradeoff scenarios and can be used to calculate VOT for travelers in the Gilcrease Expressway corridor and the larger Tulsa region. The model specification and results are discussed in more detail in the following sections.

5.2 | MULTINOMIAL LOGIT (MNL) MODEL SPECIFICATION

In each SP experiment, respondents were presented with two alternatives, with the label of the second alternative contingent on the corridor/trip type to which the respondent was assigned:

1. Make the trip using their current route
2. Make the trip using the Gilcrease Expressway/using a new toll highway

More information about the stated preference experimental design can be found in Section 2.3. The MNL model estimates a choice probability for each alternative presented in the stated preference tradeoff exercises. The alternatives are represented in the model by observed utility equations of the form described in Equation 1.

EQUATION 1: OBSERVED UTILITY EQUATION

$$\cup_1 = \boldsymbol{\beta}_1 \boldsymbol{X}_1 + \boldsymbol{\beta}_2 \boldsymbol{X}_2 \ldots + \boldsymbol{\beta}_n \boldsymbol{X}_n$$

In Equation 1, each X represents a variable specified by the researcher and each β is a coefficient estimated by the model that represents the sensitivity of the respondents in the sample to the corresponding variable.

Several utility equation structures were tested using different variables from the collected data. In addition to the travel times and toll costs presented in the stated preference experiments, tested variables included trip characteristic and demographic variables. These variables were introduced, one at a time, to test potential interactions with the toll cost and

travel time coefficients and to determine whether respondents' trip or personal characteristics significantly influenced their choices in the stated preference scenarios. Interaction variables include:

- Corridor/trip type
- Time of day
- Trip purpose
- Income
- Transponder ownership
- Trip distance
- Travel time
- Travel delay
- Project opinion

After reviewing the significance of each variable, the final model specification was chosen based on model fit, the intuitiveness and reasonableness of the model coefficients, and the expected application of the model results. The final specification included variables for travel time and travel cost applied to both alternatives. In addition to time and cost, dummy variables, or constants, were included on the toll alternative for those respondents who own a transponder and for those respondents who indicated they were strongly opposed to the Gilcrease Expressway or a new highway. Along with the alternative specific constant, these dummy variables capture the additional utility (or disutility) for the toll alternative that cannot be attributed to time and cost alone. Several different transformations of the cost coefficient by household income were tested in order to capture any systematic relationship between cost sensitivity and income. To capture the relationship between cost sensitivity and household income, the toll cost coefficient was divided by the natural log of household income in the utility equation as described in Equation 2.

EQUATION 2: TOLL COST INTERACTION WITH INCOME LEVEL

$$V_i = \cdots + \beta Cost * TC_i * \frac{1}{LN(\frac{income}{100})}$$

5.3 | MNL MODEL: COEFFICIENT ESTIMATES

The result of the final model specification is presented below and includes coefficients segmented by corridor and trip purpose. The model segmentation details are shown in Table 5-1.

TABLE 5-1: MODEL SEGMENTS BY CORRIDOR/TRIP PURPOSE

Segment	Count	Percent
Gilcrease - Work Trips	258	24%
Gilcrease - Non Work Trips	447	42%
General - Work Trips	185	17%
General - Non Work Trips	185	17%
Total	**1,075**	**100%**

Table 5-2 presents the variables included in the final model specification and the alternatives to which each variable applies.

TABLE 5-2: FINAL MODEL SPECIFICATION

Coefficient	Units	Alt 1: Current Route	Alt 2: Alternate Toll Route
Travel Time			
Gilcrease - Work Trips	Minutes	X	X
Gilcrease - Non Work Trips	Minutes	X	X
General - Work Trips	Minutes	X	X
General - Non Work Trips	Minutes	X	X
Travel Cost			
Gilcrease - Work Trips	$	X	X
Gilcrease - Non Work Trips	$	X	X
General - Work Trips	$	X	X
General - Non Work Trips	$	X	X
Dummy Variables			
Strongly Opposed to Project/New Facility	1,0		X
Possess a transponder	1,0		X
Alternative Specific Constant			
Alternative 2 - Toll Route	1,0		X

Table 5-3 contains coefficient values, robust standard errors, robust t-statistics, and general model statistics. The coefficient values are the values estimated by the choice model that represent the relative importance of each of the variables. It should be noted that these values are unit-specific and the units must be accounted for when comparing coefficients. The sign of the coefficient indicates a positive or negative relationship between utility and the associated variable. For example, a negative travel time coefficient implies that utility for a given travel alternative will decrease as the travel time associated with that alternative increases.

The standard error is a measure of error around the mean coefficient estimate. The t-statistic is the coefficient estimate divided by the standard error, which can be used to evaluate

statistical significance. A t-statistic greater/less than ±1.96 indicates whether the coefficient is statistically significantly different from 0 (unless otherwise reported) at the 95% level.

The model fit statistics presented below include the number of observations, the number of estimated parameters, the initial log-likelihood, the log-likelihood at convergence, rho-squared, and adjusted rho-squared. The log-likelihood is a model fit measure that indicates how well the model predicts the choices observed in the data. The null log-likelihood is the measure of the model fit with coefficient values of zero. The final log-likelihood is the measure of model fit with the final coefficient values at model convergence. A value closer to zero indicates better model fit. The log-likelihood cannot be evaluated independently, as it is a function of the number of observations, the number of alternatives, and the number of parameters in the choice model. The rho-square model fit measure accounts for this to some degree by evaluating the difference between the null log-likelihood and the final log-likelihood at convergence. The adjusted rho-square value takes into account the number of parameters estimated in the model.

TABLE 5-3: FINAL MNL MODEL COEFFICIENTS AND STATISTICS

Coefficient	Units	Value	Rob. Std. Error	Rob. T-stat
Travel Time				
Gilcrease - Work Trips	Minutes	-0.13	0.0114	-11.42
Gilcrease - Non Work Trips	Minutes	-0.135	0.00894	-15.13
General - Work Trips	Minutes	-0.185	0.0136	-13.56
General - Non Work Trips	Minutes	-0.185	0.0125	-14.78
Travel Cost*				
Gilcrease - Work Trips	$	-4.96	0.404	-12.29
Gilcrease - Non Work Trips	$	-5.74	0.339	-16.95
General - Work Trips	$	-7.27	0.596	-12.2
General - Non Work Trips	$	-6.34	0.501	-12.66
Dummy Variables				
Strongly Opposed to Project/New Facility	1,0	-2	0.22	-9.08
Possess a transponder	1,0	0.708	0.242	2.92
Alternative Specific Constant				
Alternative 2 - Use New Highway	1,0	-1.3	0.248	-5.25
Model Statistics				
Number of parameters				11
Number of observations				10750
Number of individuals				1075
Initial log-likelihood				-7451.332
Final log-likelihood				-4640.236
Rho-square				0.377
Adjusted rho-square				0.376

5.4 | MNL MODEL: WILLINGNESS TO PAY FOR TRAVEL TIME SAVINGS

One way to evaluate the sensitivities that are estimated in the MNL models is to calculate the marginal rates of substitution for different attributes of interest. In economic theory, the marginal rate of substitution is the amount of one good (e.g., money) that a person would exchange for a second good (e.g., travel time), while maintaining the same level of utility or satisfaction. In this analysis, the marginal rate of substitution of the travel time and toll cost coefficients provides the implied toll value that travelers would be willing to pay for a given amount of travel time savings offered by using the proposed facility or a new highway in the Tulsa area.

The willingness to pay for travel time savings, or VOT, can be calculated by dividing the travel time coefficient by the toll cost coefficient after accounting for the income transformation that was applied in the model specification. The resulting VOT is in units of dollars per minute; multiplying by 60 will convert this into the more commonly cited units of dollars per hour (Equation 3).

EQUATION 3: WILLINGNESS TO PAY FOR TRAVEL TIME SAVINGS

$$VOT = 60 \times \frac{\beta Time}{\left[\frac{\beta Cost}{LN(income/100)}\right]}$$

In Equation 3, βTime is the value of the travel time coefficient (with units of 1/min), βCost is the value of the toll cost coefficient (with units of 1/$), and the log transformation controls for nonlinear income effects.

TABLE 5-4: VALUE OF TIME BY CORRIDOR/TRIP TYPE AND PURPOSE

Household Income	Gilcrease - Work Trips	Gilcrease - Non Work Trips	General - Work Trips	General - Non Work Trips
$10,000	$7.24	$6.50	$7.03	$8.06
$20,000	$8.33	$7.48	$8.09	$9.28
$30,000	$8.97	$8.05	$8.71	$9.99
$42,500	$9.52	$8.54	$9.24	$10.60
$62,500	$10.12	$9.08	$9.83	$11.27
$87,500	$10.65	$9.56	$10.34	$11.86
$112,500	$11.05	$9.91	$10.73	$12.30
$137,500	$11.36	$10.20	$11.03	$12.65
$175,000	$11.74	$10.54	$11.40	$13.07
$200,000	$11.95	$10.73	$11.61	$13.31

6.0 CONCLUSION

RSG successfully developed and implemented a stated preference survey that gathered information from 1,143 automobile travelers in the Tulsa area. The purpose of the survey was to measure the VOT of travelers who could potentially use the proposed Gilcrease Expressway, as well as drivers who make general highway trips in the region. The questionnaire collected data on current travel behaviors, presented respondents with information about the proposed facilities, and engaged the travelers in a series of stated preference questions to measure their propensity to use tolled routes in the Tulsa area.

Multinomial logit choice models were developed to provide estimates of VOT for potential travelers on both of the proposed facilities and for travelers in the general region, both for work-related and non-work-related trips. The magnitude and signs of the sensitivity estimates are reasonable and intuitively correct, and the VOT for work trips and non-work trips at each segment's median income category ranged from $9.56 to $11.86 per hour. These values are within the range of other similar studies across the country and in Oklahoma.

These estimates of VOT will serve as inputs into the travel demand model used to forecast traffic and revenue for future highway construction in the Tulsa area.

7.0 SURVEY SCREEN CAPTURES

7.1 | INTRODUCTION AND QUALIFICATION QUESTIONS

FIGURE 7-1: SURVEY INTRODUCTION AND INSTRUCTIONS

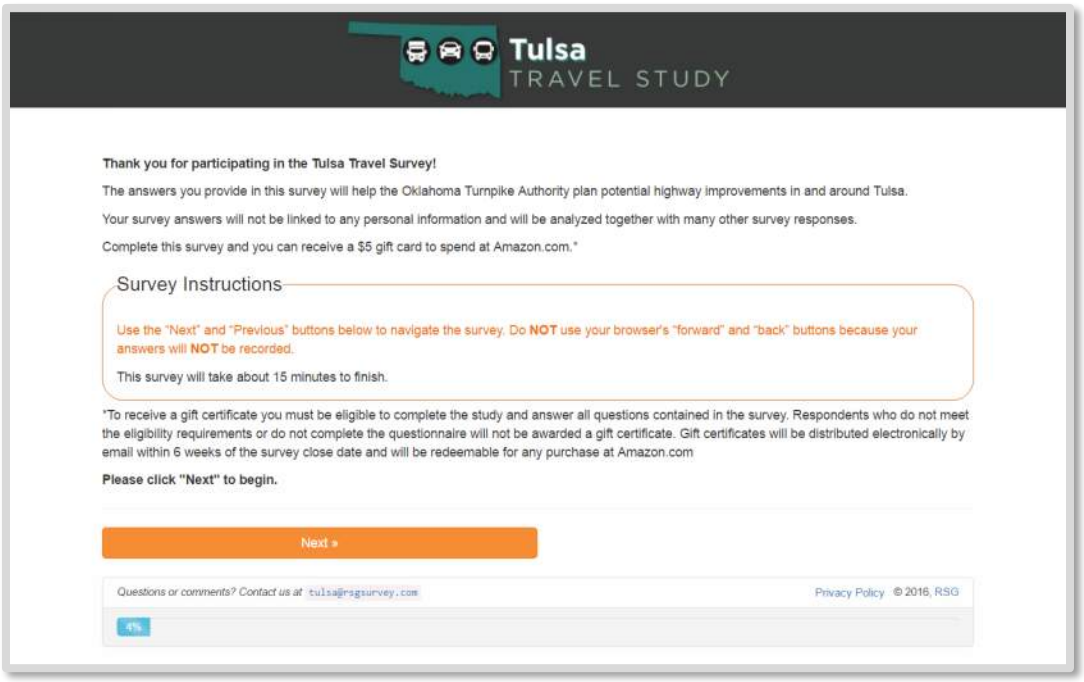


FIGURE 7-2: TRIP QUALIFICATION (GILCREASE EXPRESSWAY STUDY AREA)

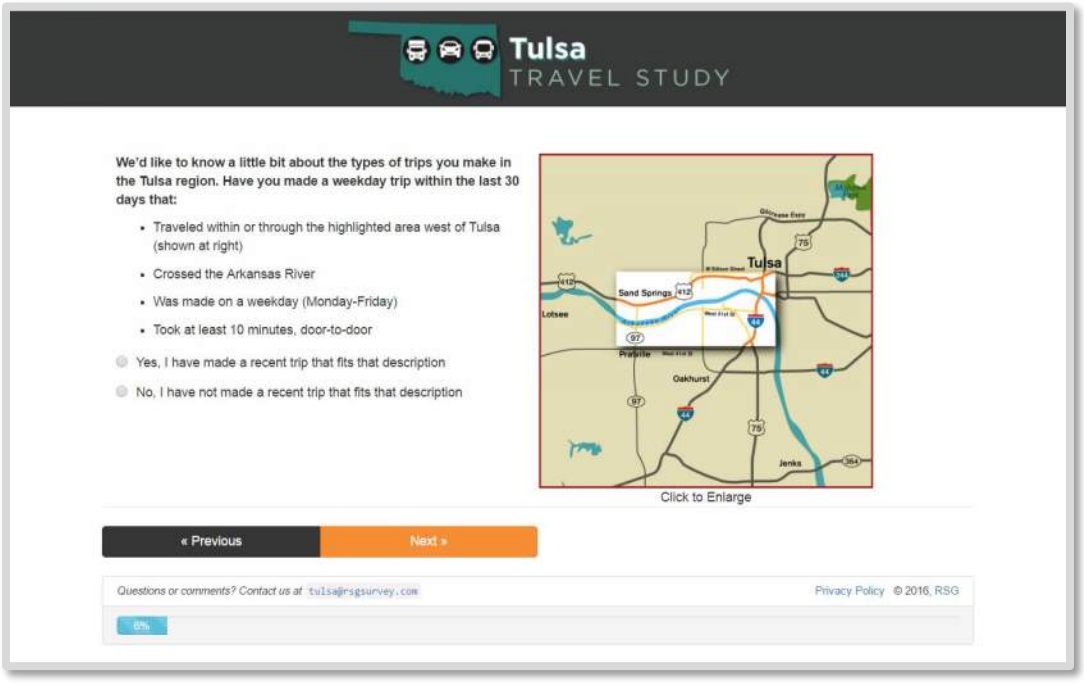


FIGURE 7-3: TRIP QUALIFICATION (GENERAL)

If respondent has not made a trip through the Gilcrease Expressway study area

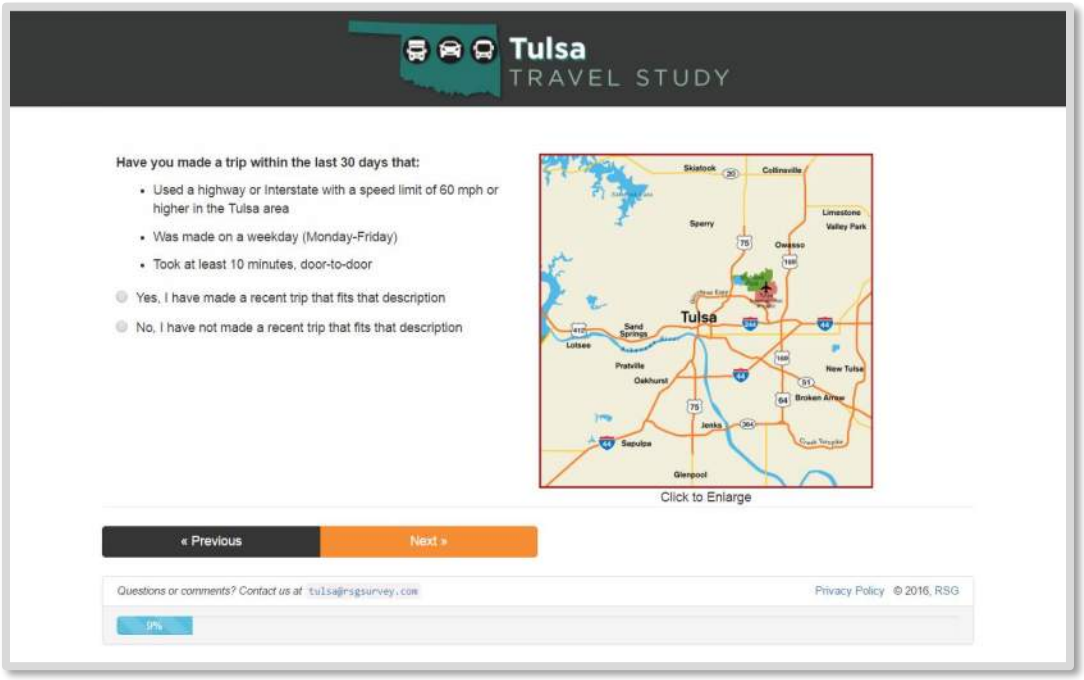
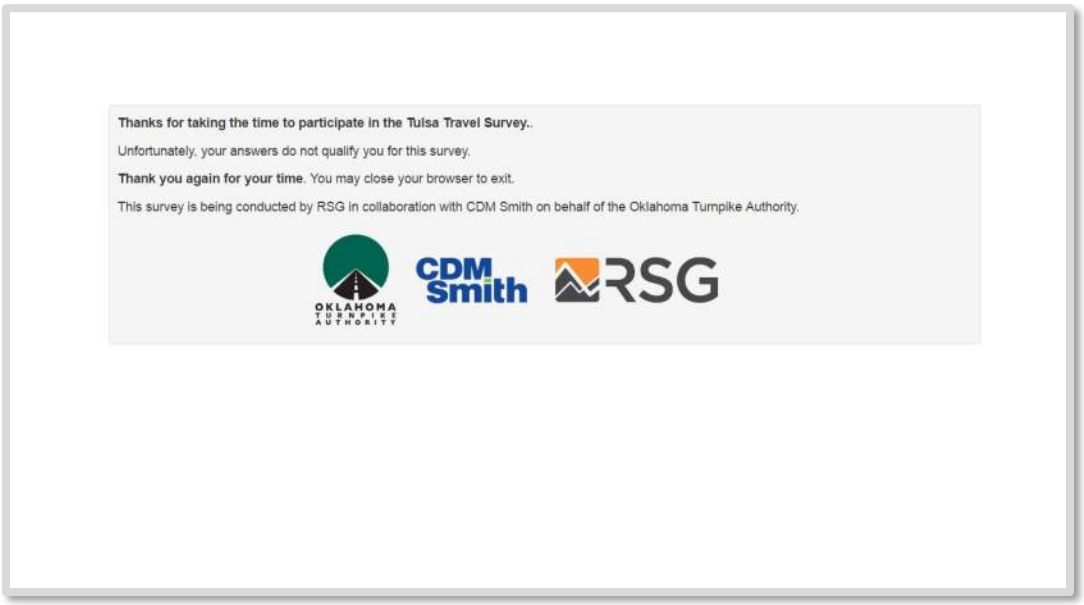


FIGURE 7-4: TERMINATION

If respondent has not made a qualifying trip



7.2 | TRIP DETAIL QUESTIONS

FIGURE 7-5: DEFINITION OF QUALIFYING ONE-WAY TRIP

Figures 5-7 show Gilcrease Expressway version

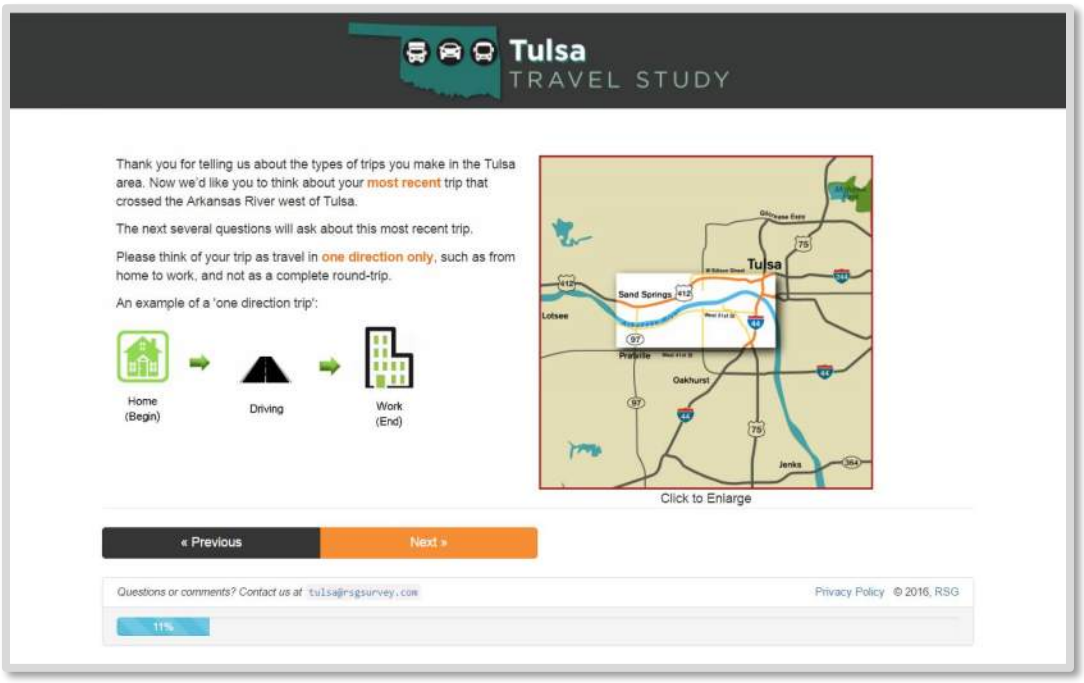


FIGURE 7-6: DAY OF WEEK

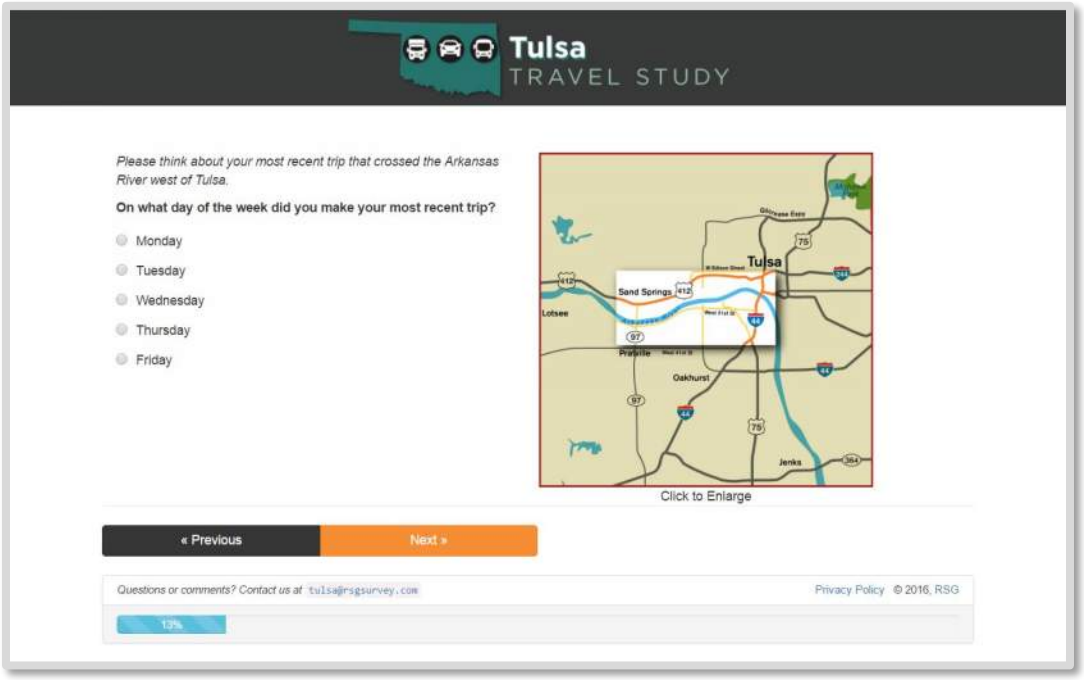


FIGURE 7-7: PURPOSE

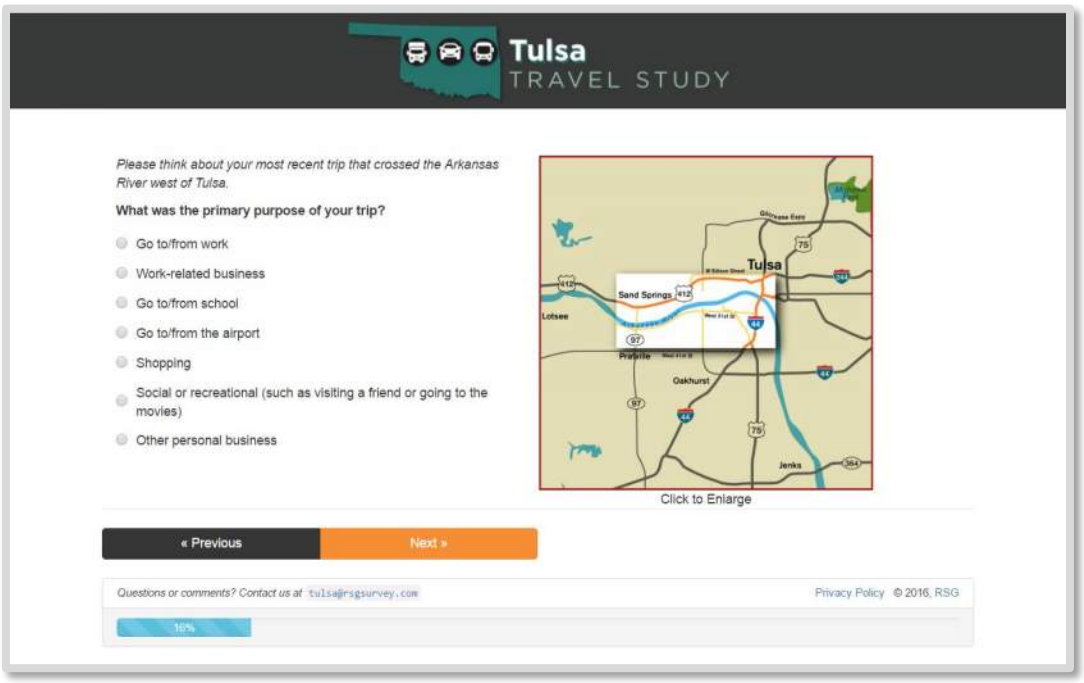


FIGURE 7-8: BEGINNING AND ENDING LOCATIONS

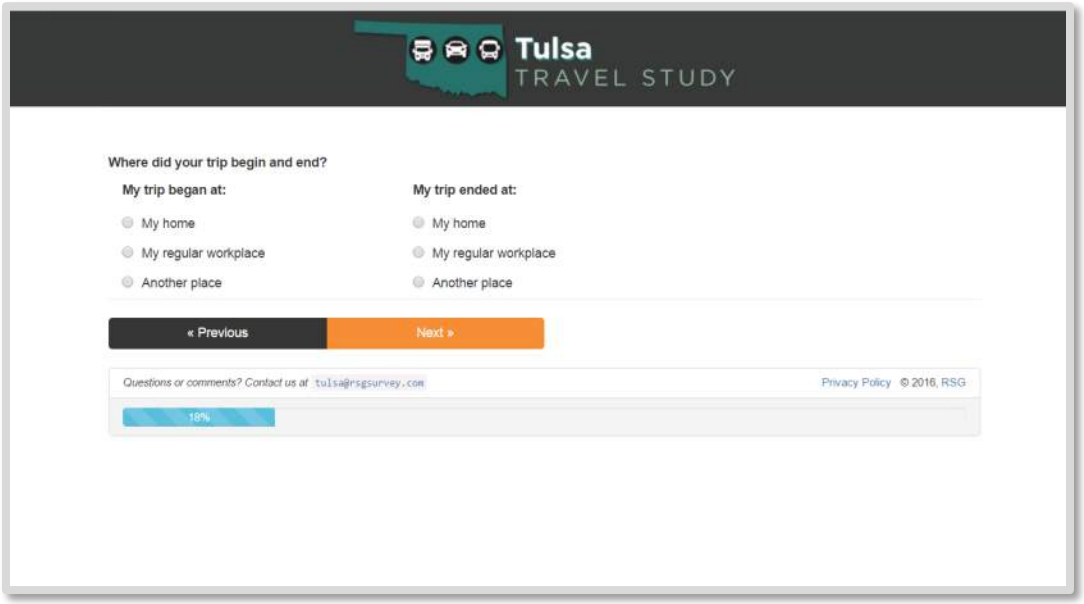


FIGURE 7-9: TRIP CONFIRMATION

If respondent's beginning and ending locations are both home or both work

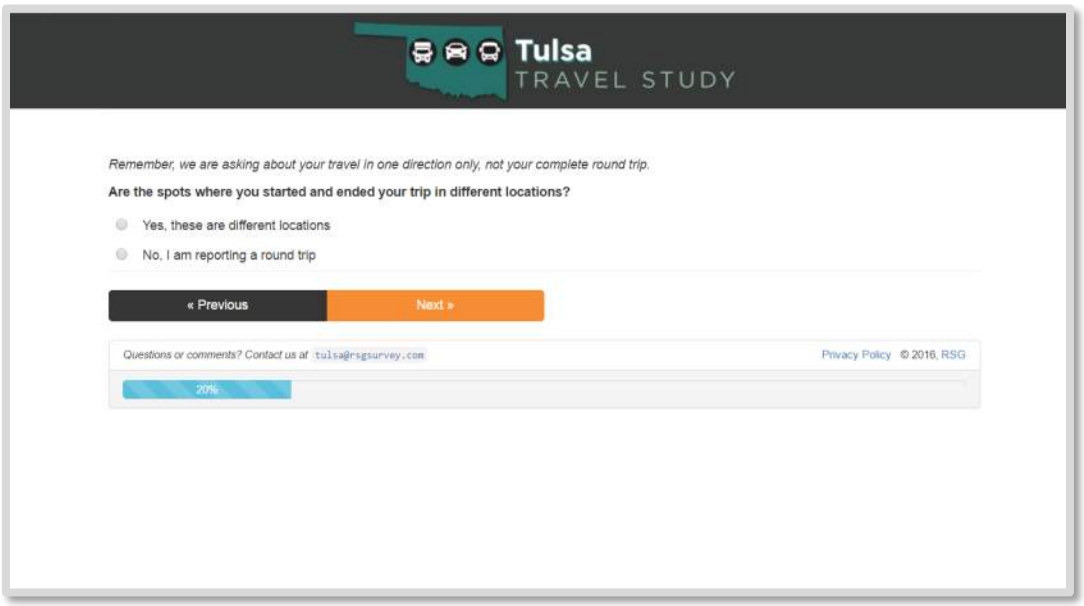


FIGURE 7-10: ORIGIN

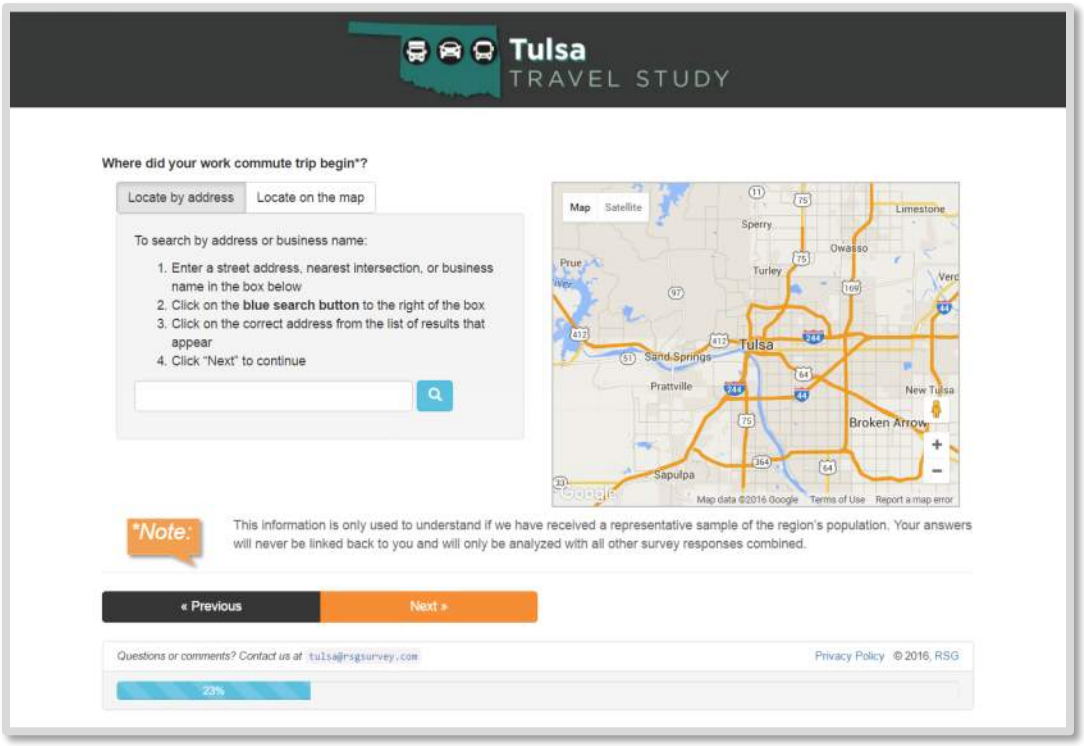


FIGURE 7-11: DESTINATION

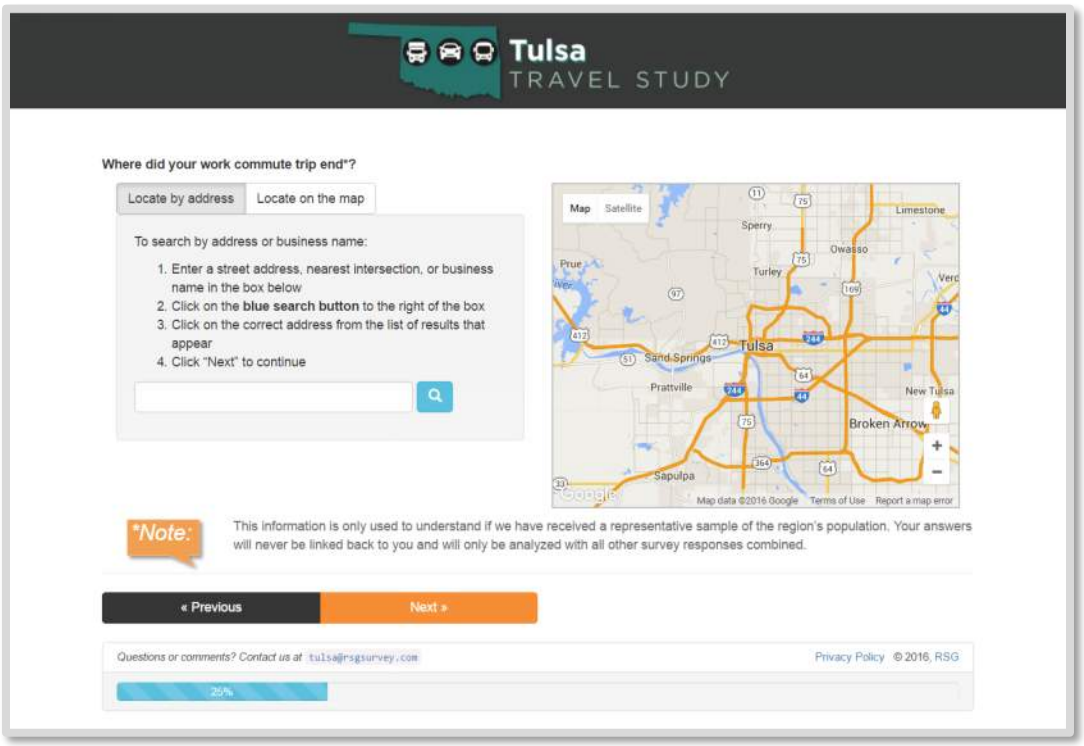


FIGURE 7-12: INVALID TRIP

If respondent's origin and destination indicate an invalid trip

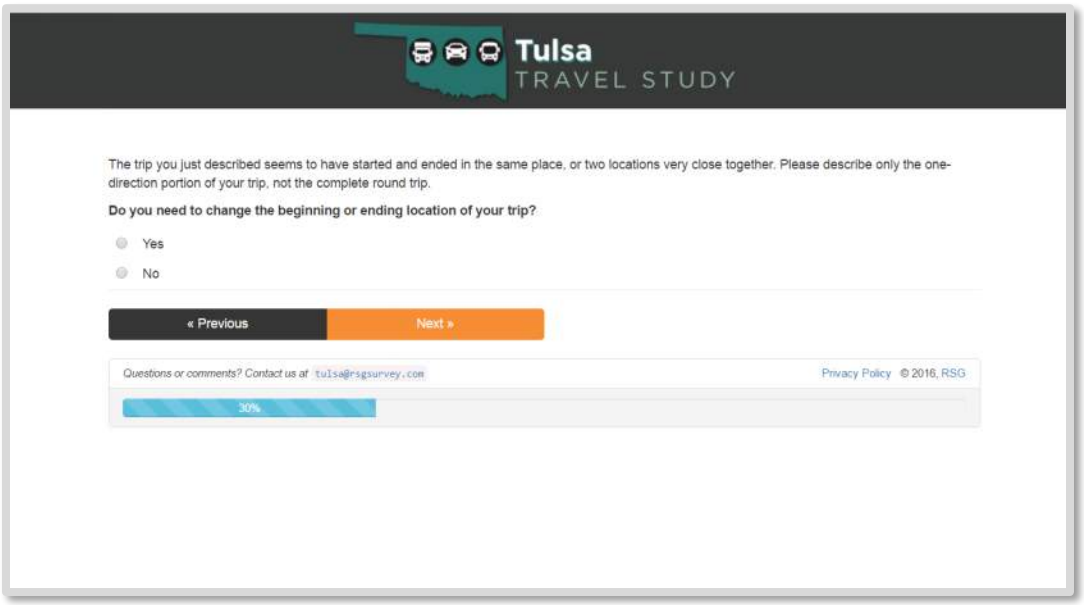


FIGURE 7-13: ORIGIN AND DESTINATION CONFIRMATION

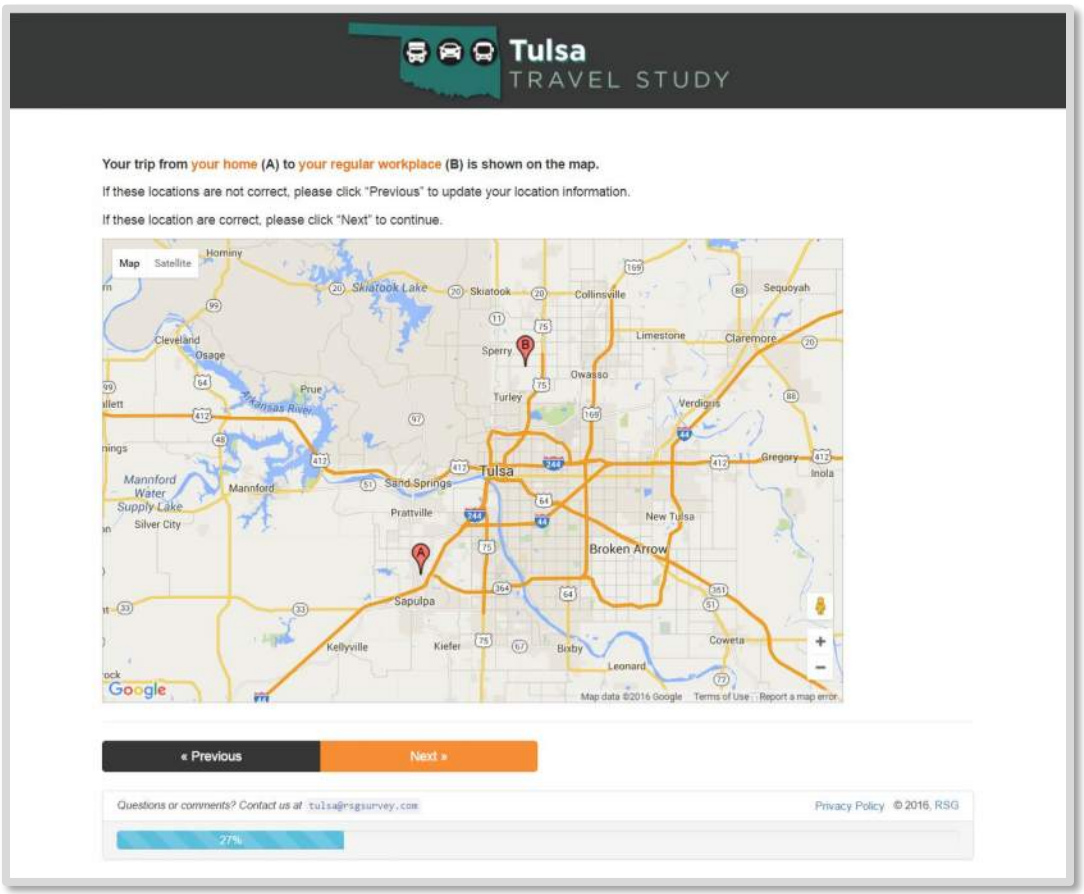


FIGURE 7-14: DEPARTURE TIME

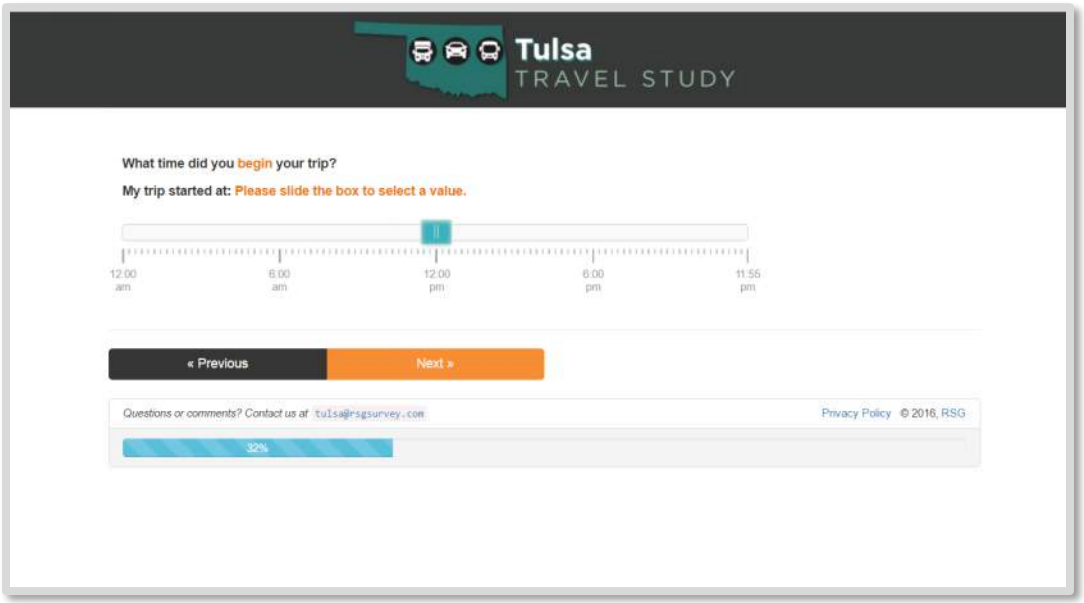


FIGURE 7-15: TRAVEL TIME

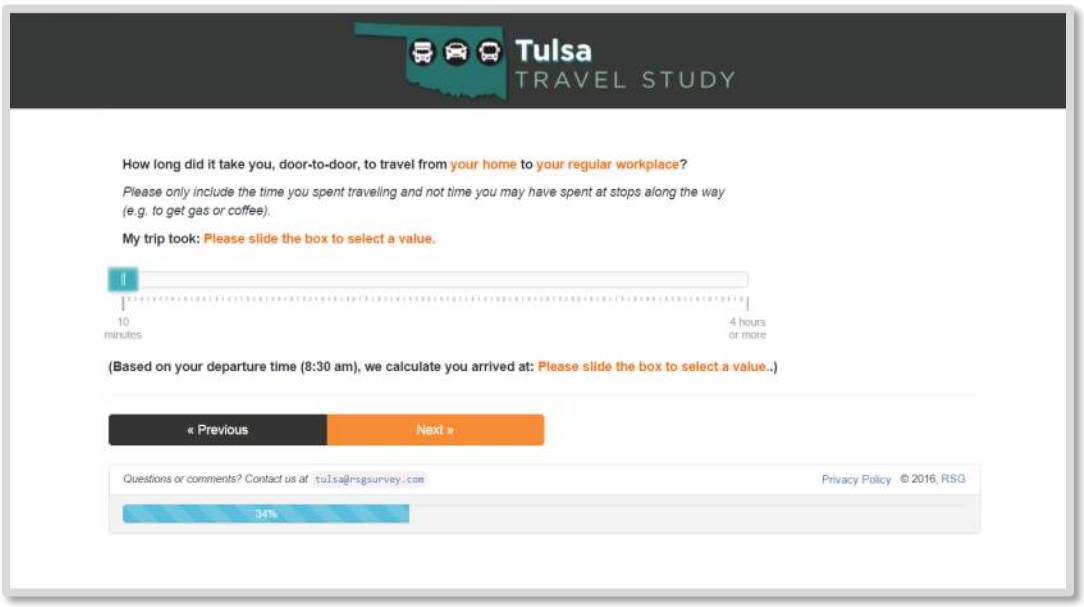


FIGURE 7-16: TRAVEL TIME CONFIRMATION

If stated travel time seems too short or too long

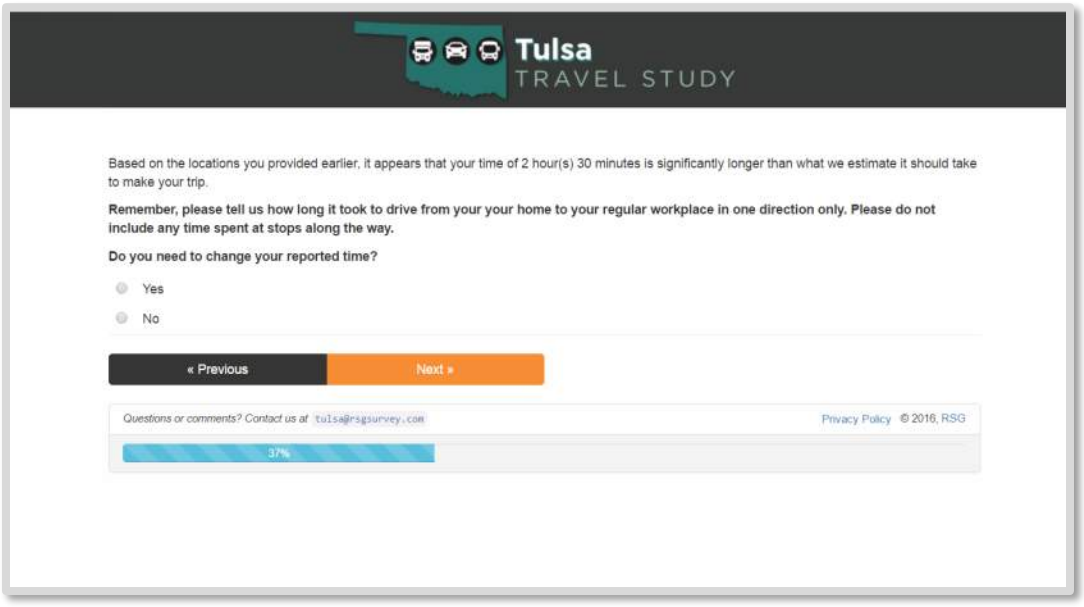


FIGURE 7-17: DELAY

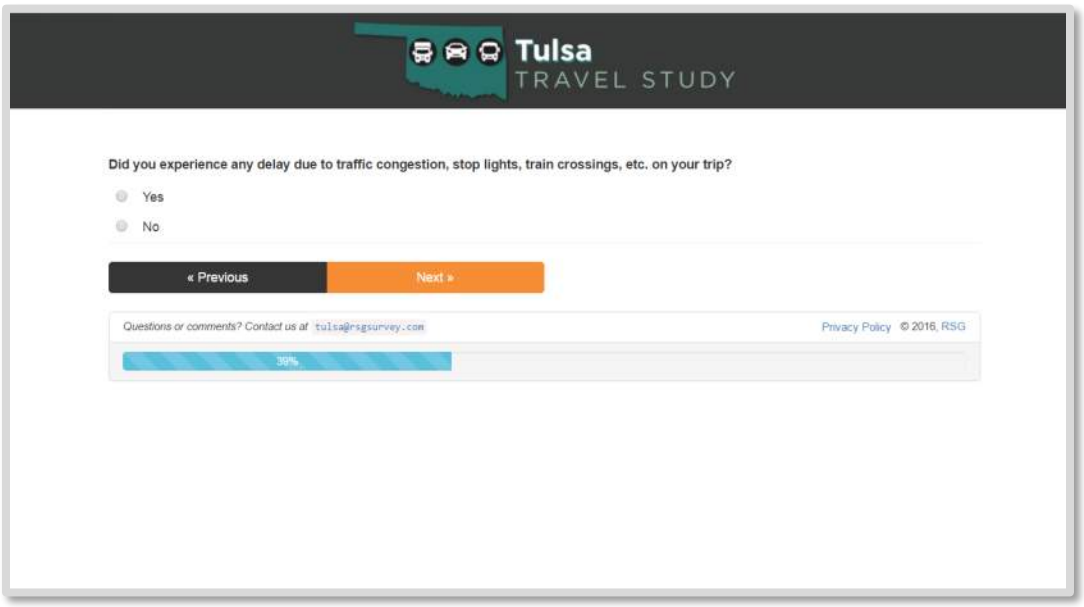


FIGURE 7-18: TRAVEL TIME WITHOUT DELAY
If respondent experienced delay due to traffic congestion

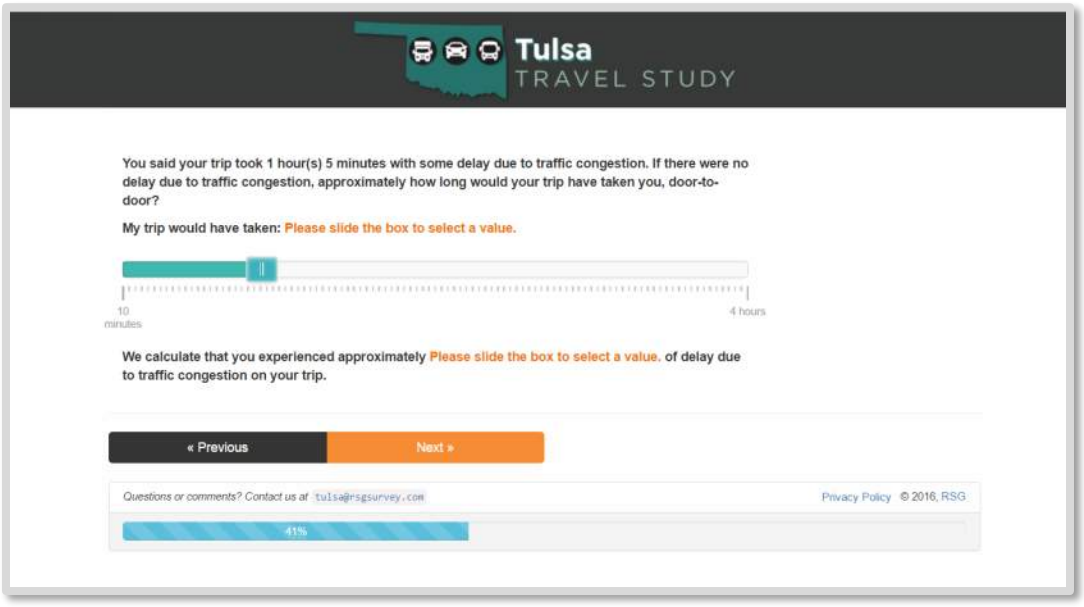


FIGURE 7-19: TOLL(S) PAID

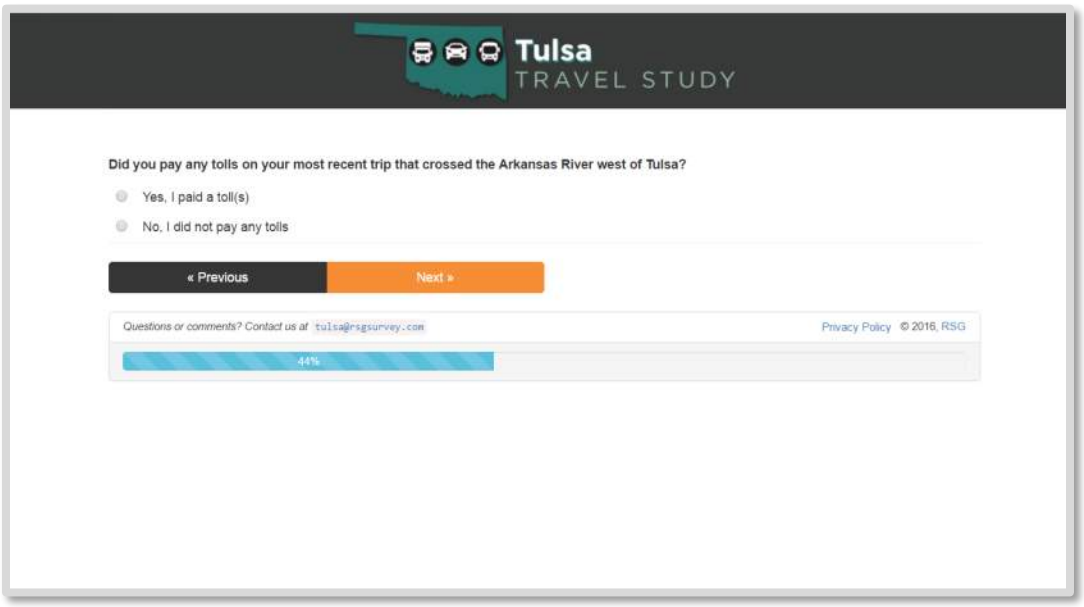


FIGURE 7-20: TOLL AMOUNT(S) PAID

If respondent paid toll(s)

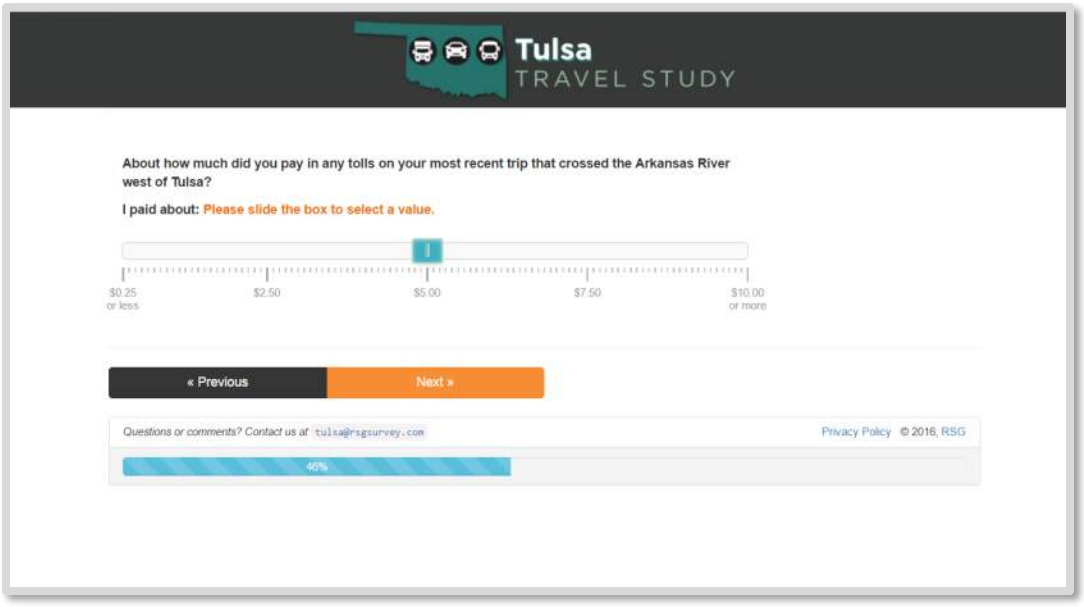


FIGURE 7-21: VEHICLE OCCUPANCY

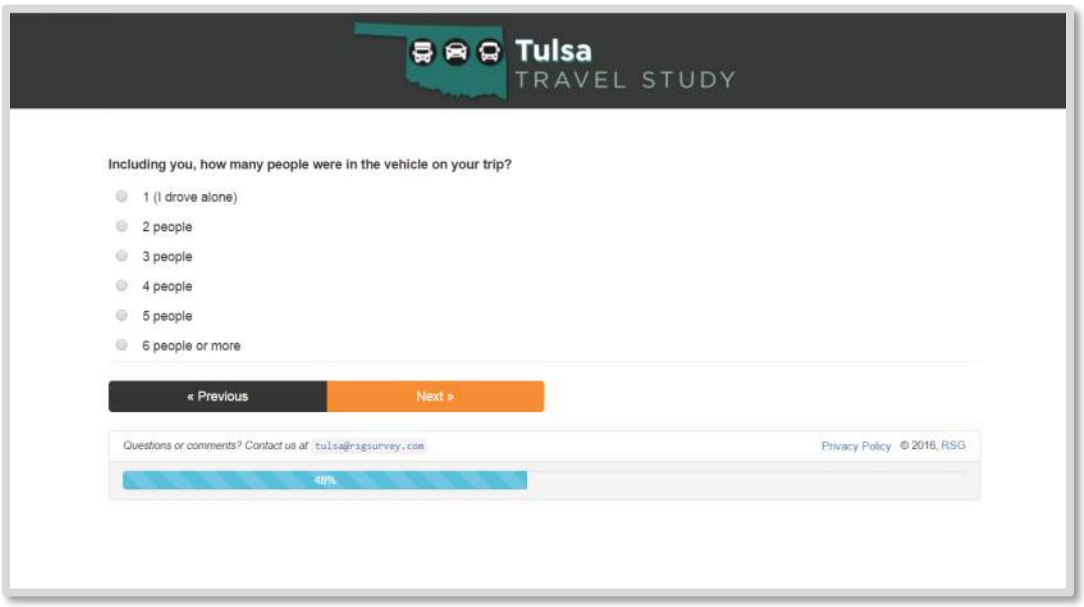


FIGURE 7-22: TRIP FREQUENCY

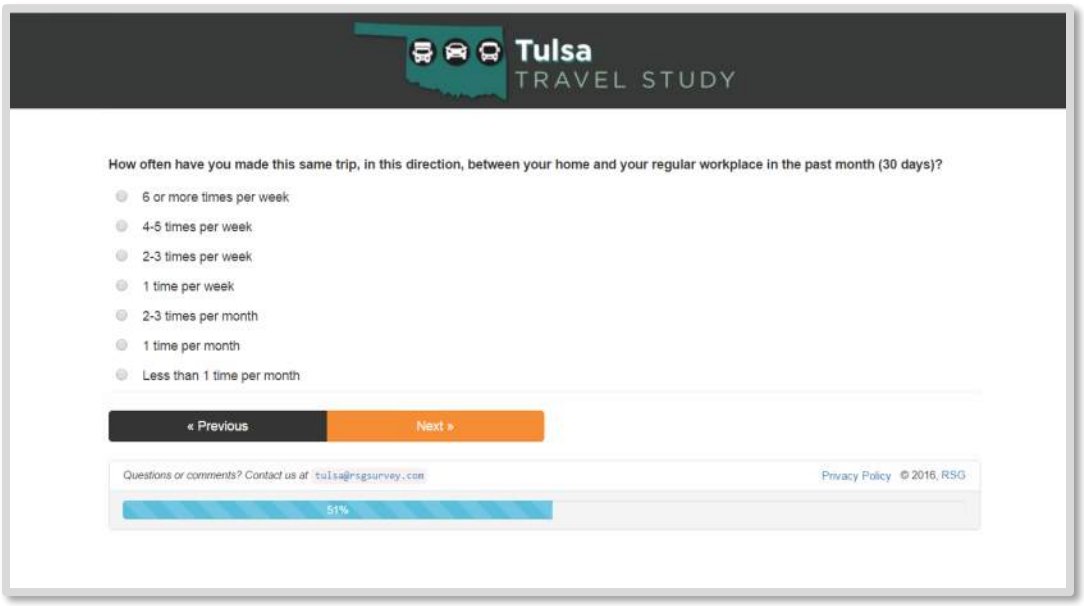


FIGURE 7-23: TRANSPONDER OWNERSHIP

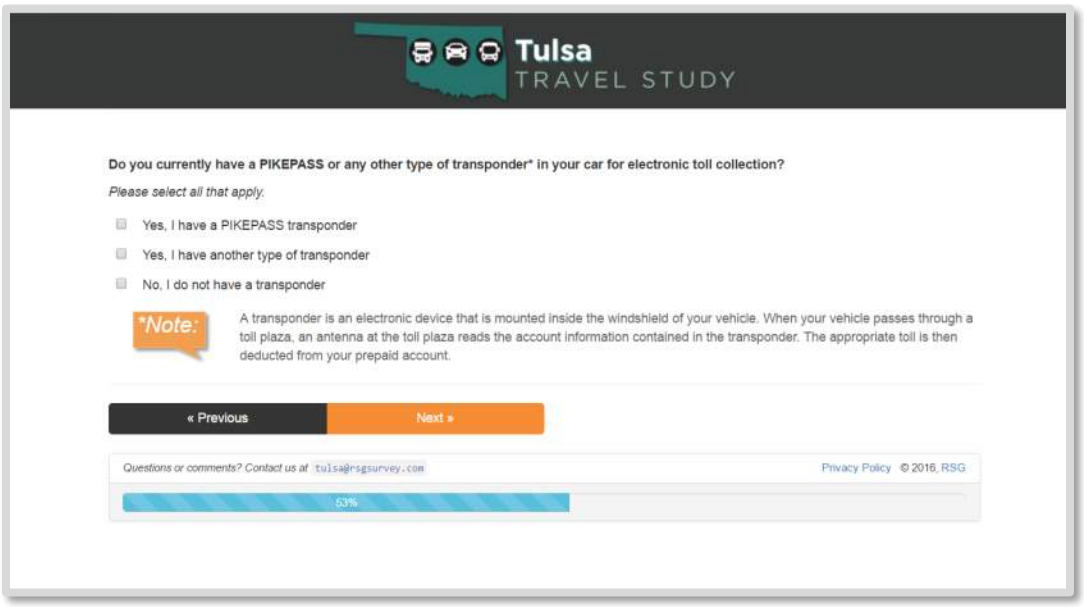
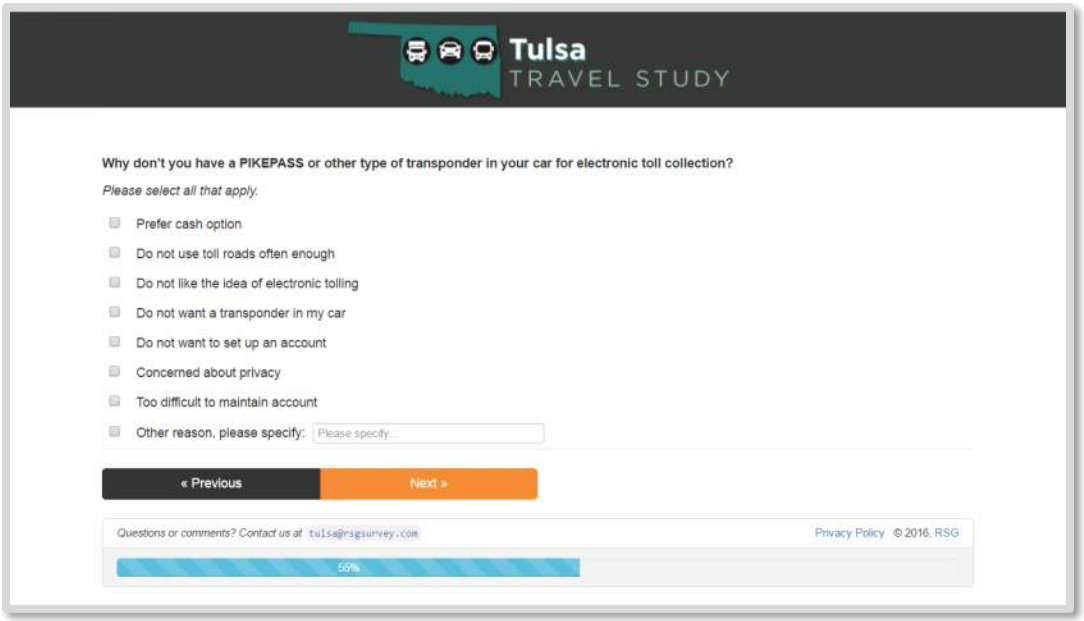


FIGURE 7-24: REASON(S) FOR NOT OWNING A TRANSPONDER
If respondent has no transponder



7.3 | STATED PREFERENCE QUESTIONS

FIGURE 7-25: PROJECT INTRODUCTION (GILCREASE EXPRESSWAY VERSION)

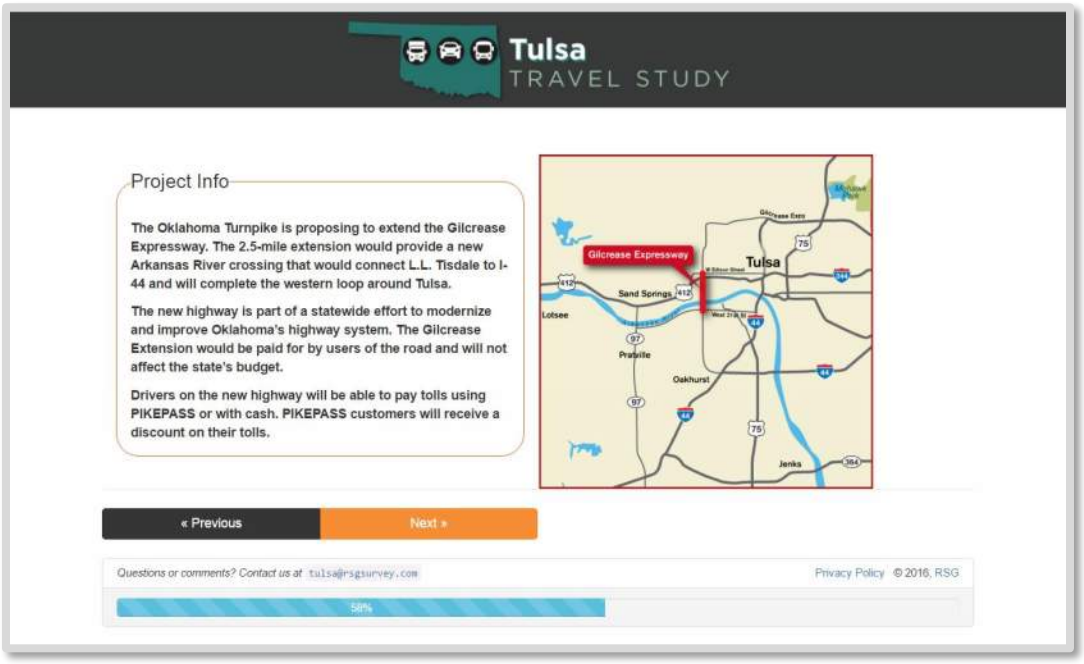


FIGURE 7-26: PROJECT INTRODUCTION (GENERAL VERSION)

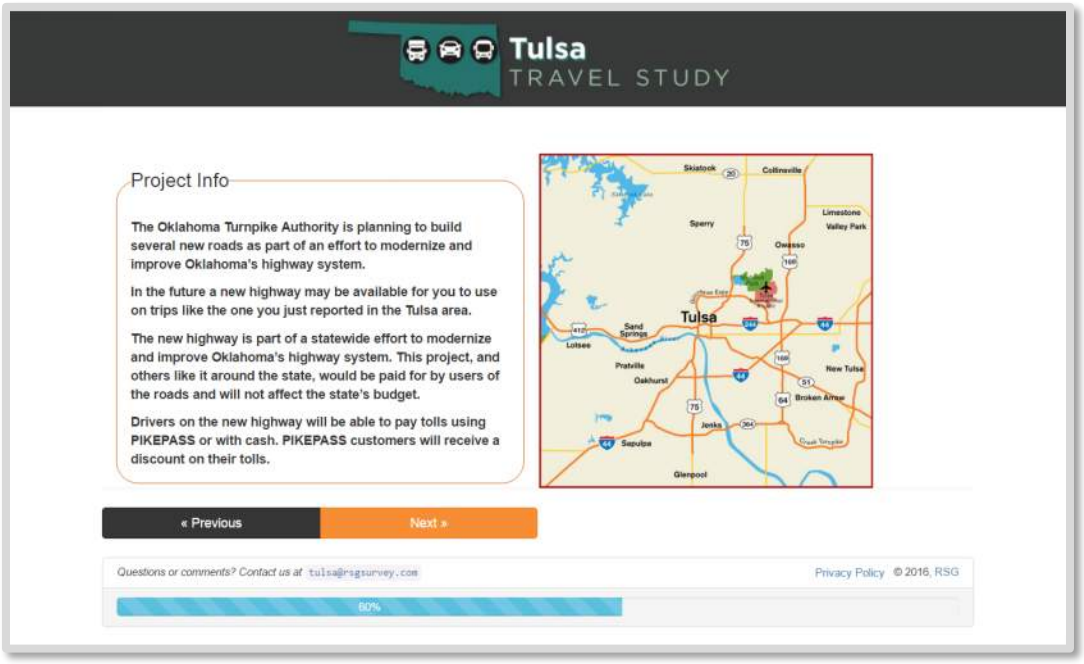


FIGURE 7-27: STATED PREFERENCE (SP) INSTRUCTIONS

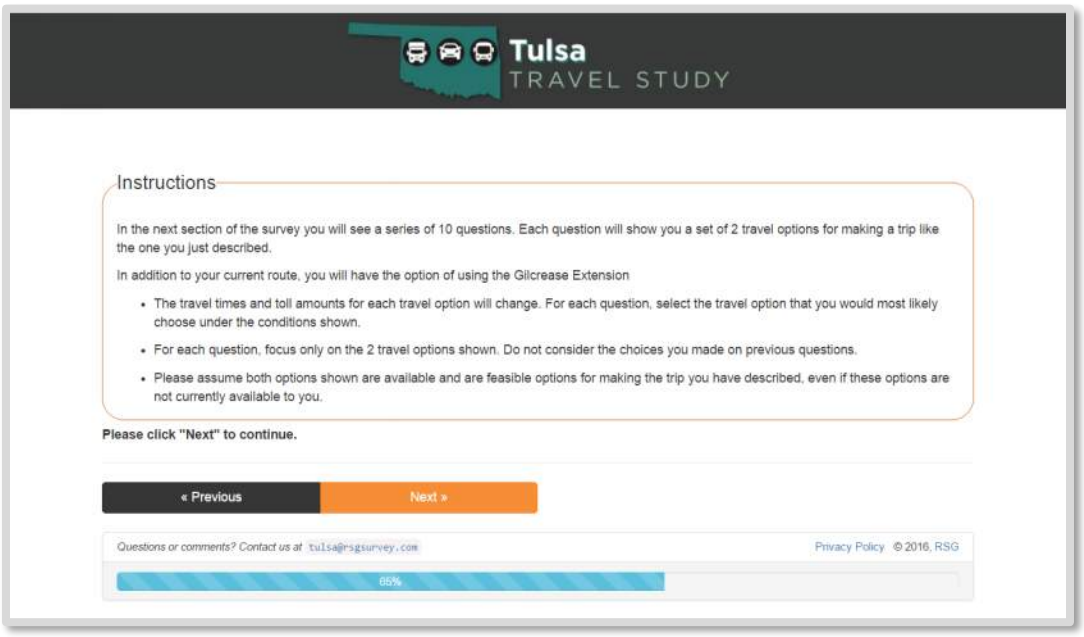


FIGURE 7-28: SP EXPERIMENT EXAMPLE #1 (GILCREASE EXPRESSWAY VERSION)

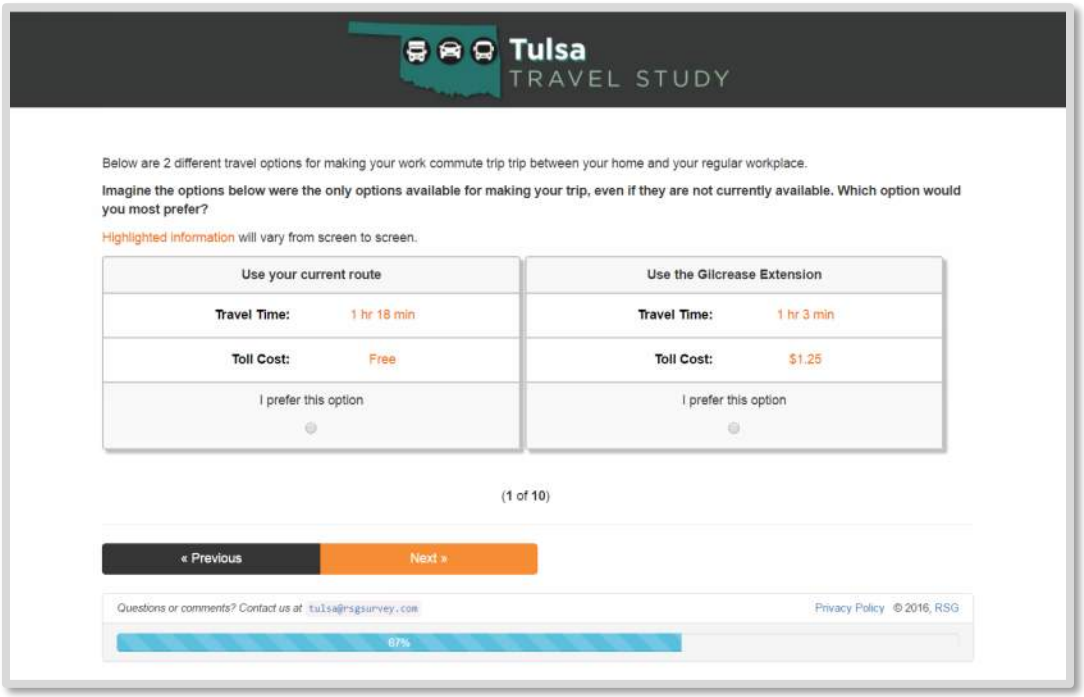


FIGURE 7-29: SP EXPERIMENT EXAMPLE #1 (GENERAL VERSION)

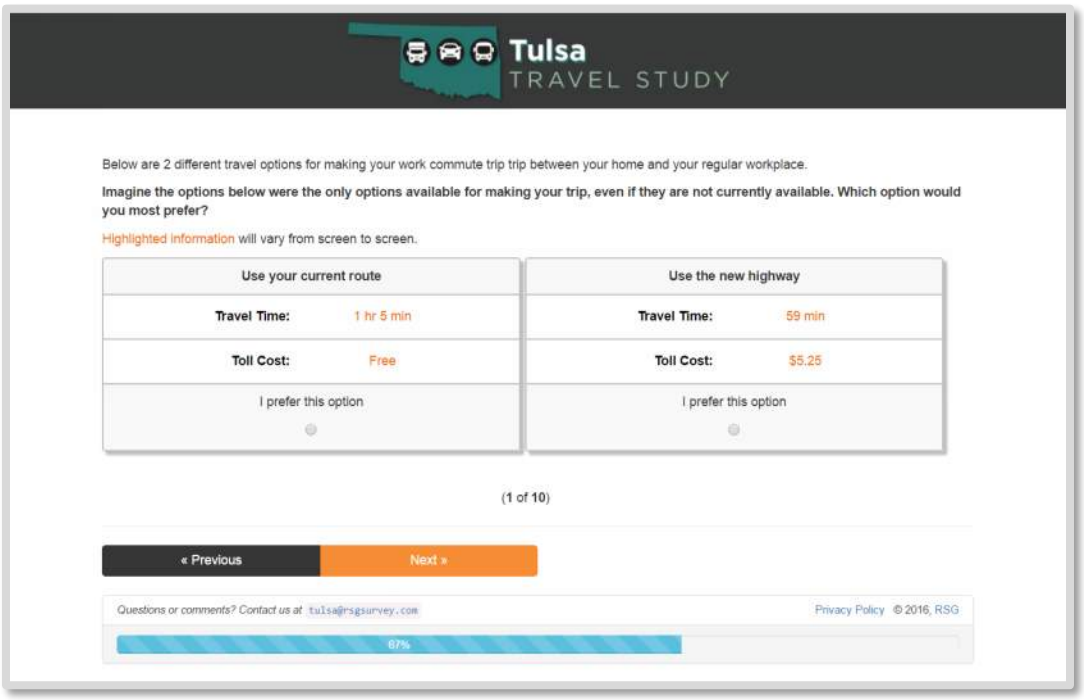


FIGURE 7-30: SP EXPERIMENT EXAMPLE #2

Examples #2-10 show the general version

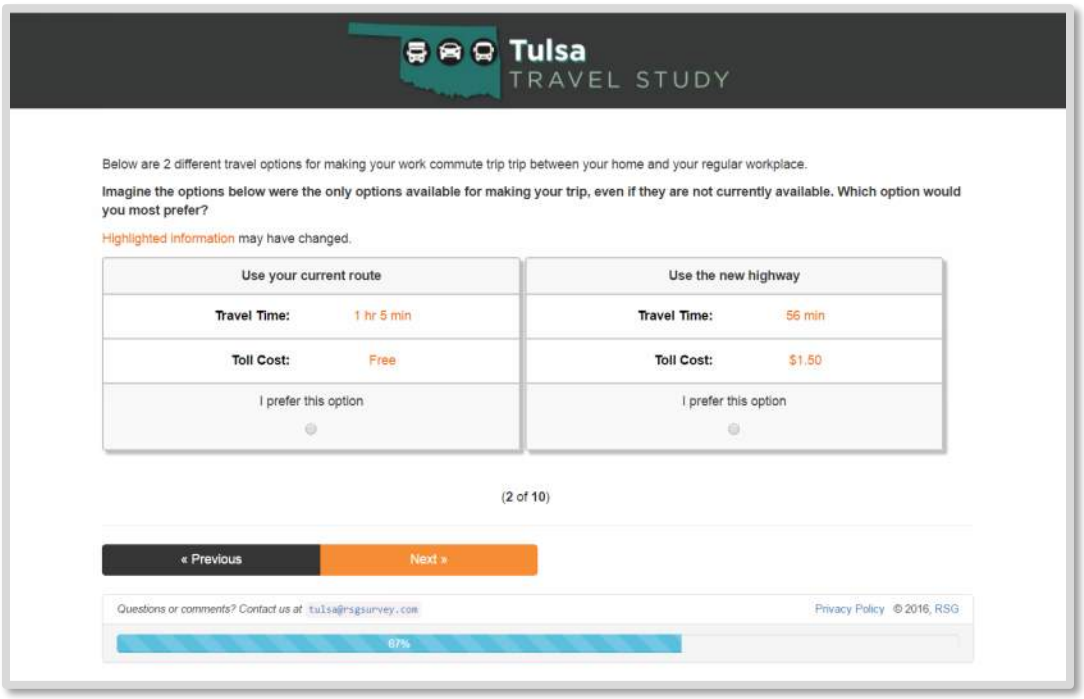


FIGURE 7-31: SP EXPERIMENT EXAMPLE #3

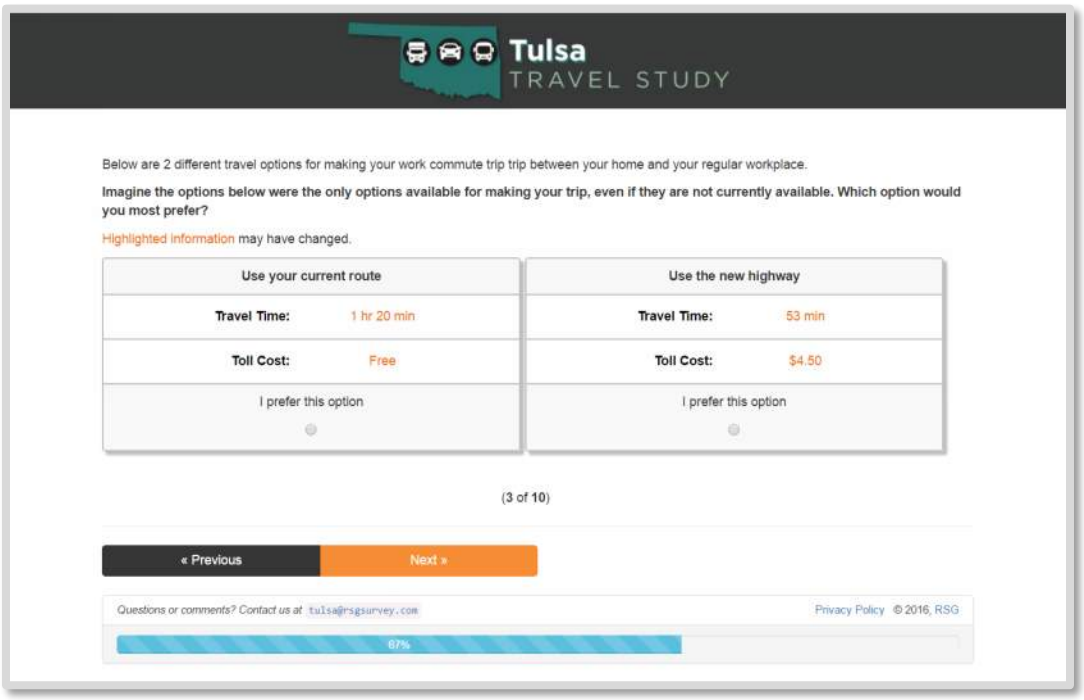


FIGURE 7-32: SP EXPERIMENT EXAMPLE #4

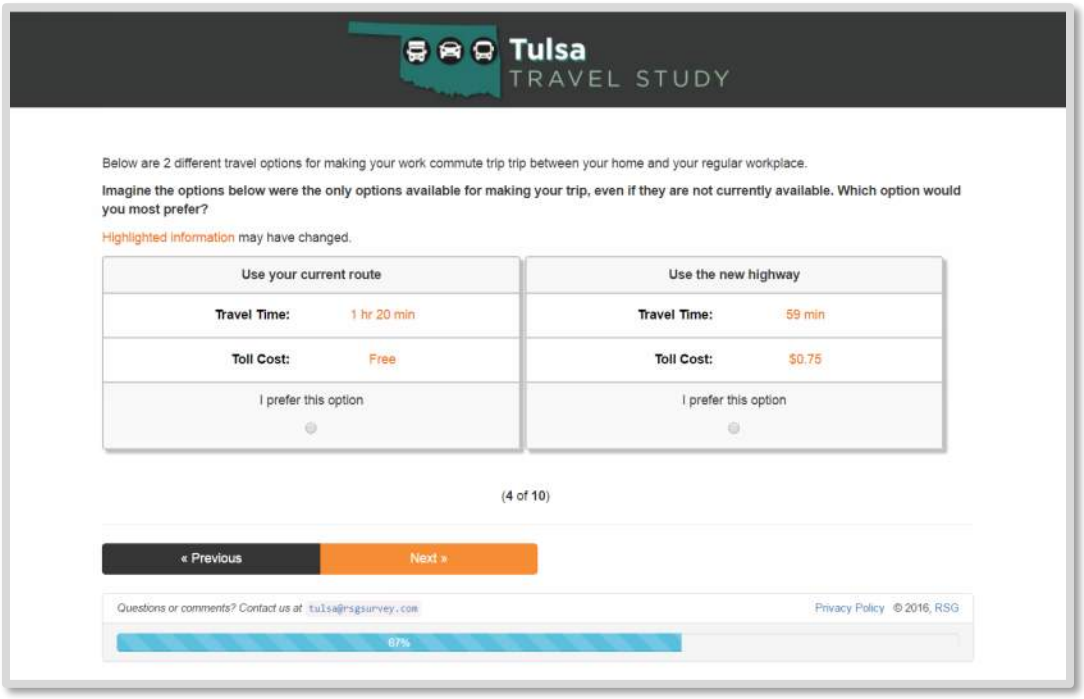


FIGURE 7-33: SP EXPERIMENT EXAMPLE #5

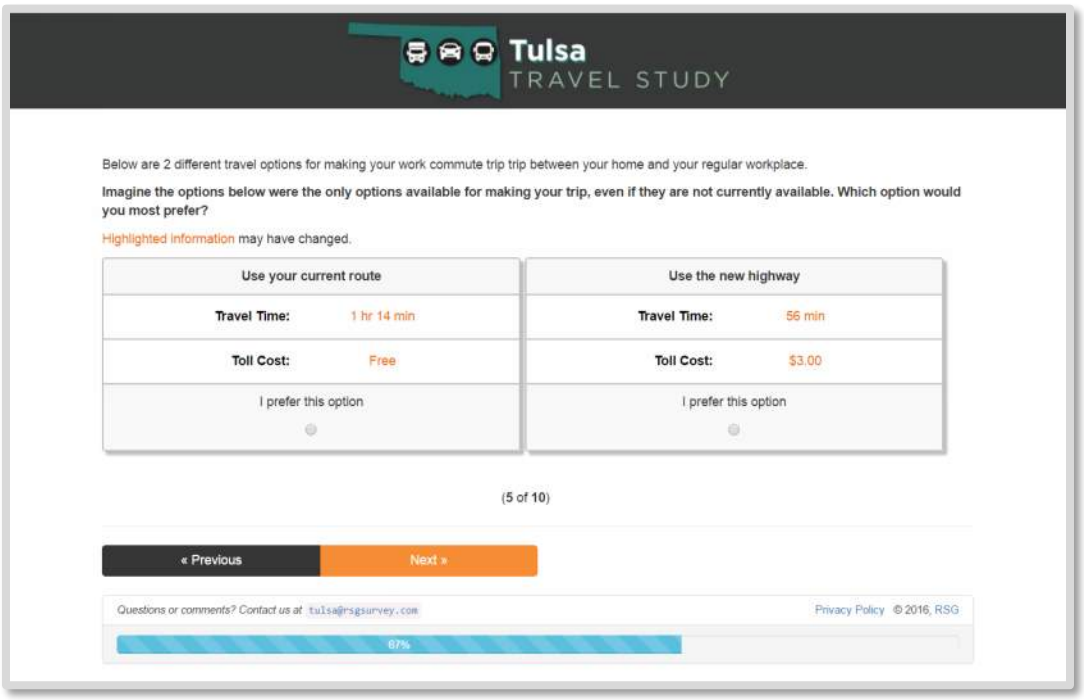


FIGURE 7-34: SP EXPERIMENT EXAMPLE #6

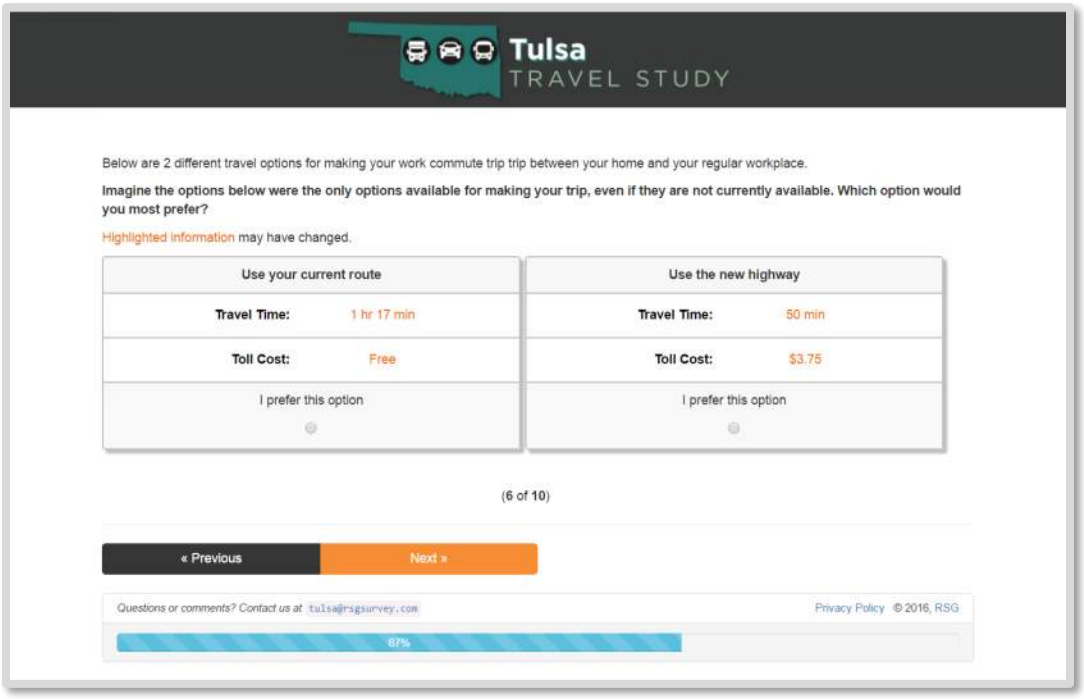


FIGURE 7-35: SP EXPERIMENT EXAMPLE #7

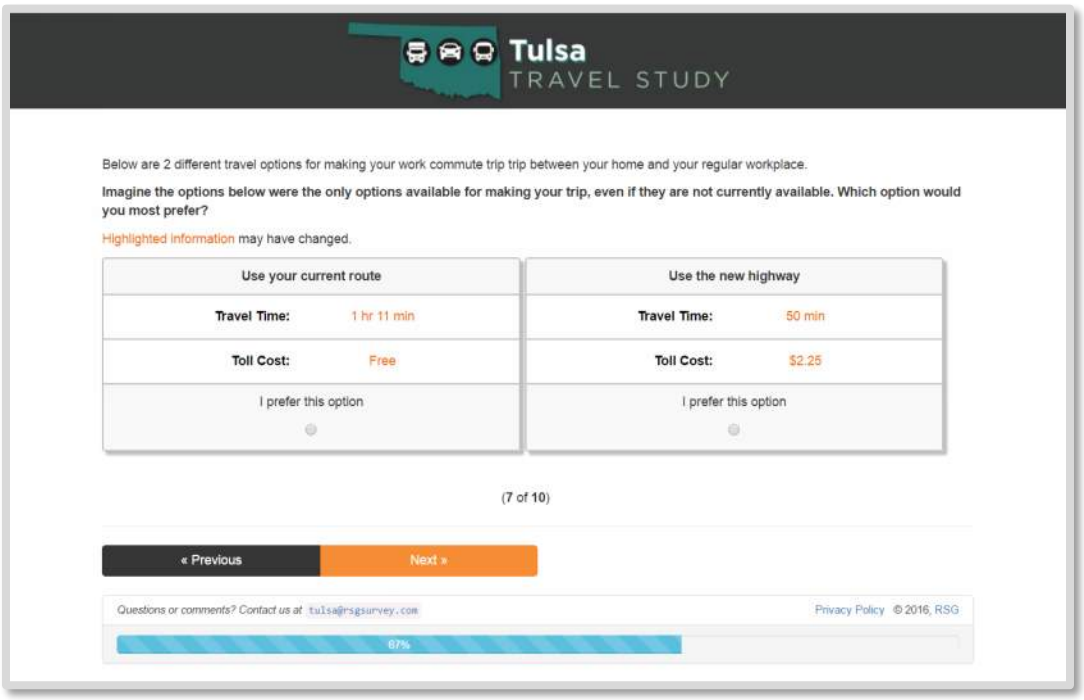


FIGURE 7-36: SP EXPERIMENT EXAMPLE #8

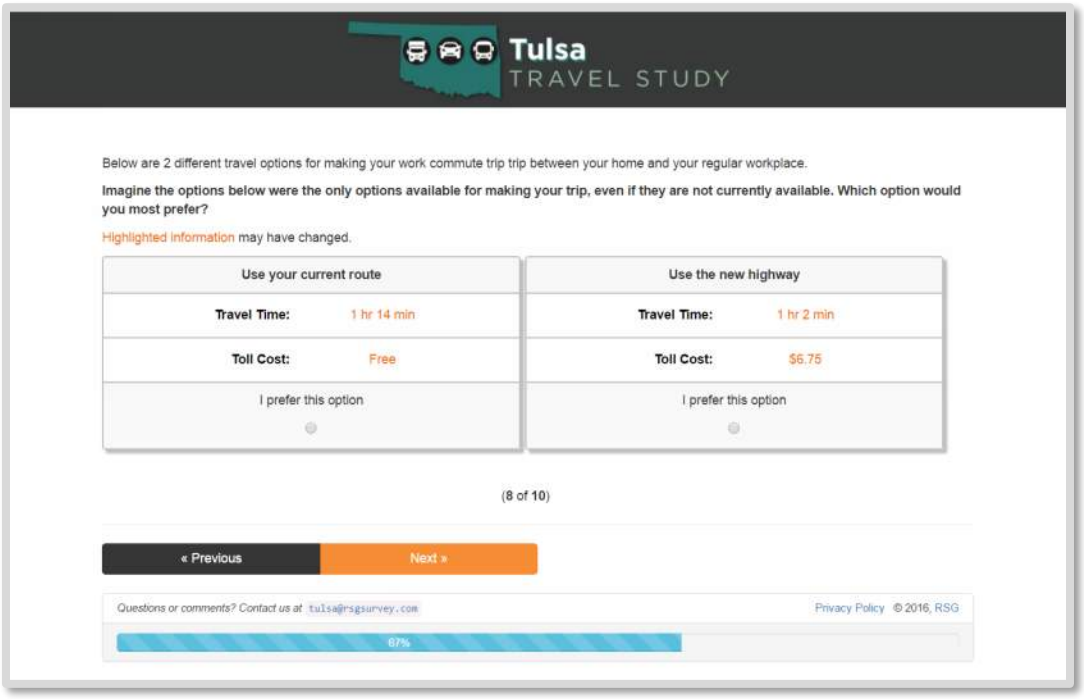


FIGURE 7-37: SP EXPERIMENT EXAMPLE #9

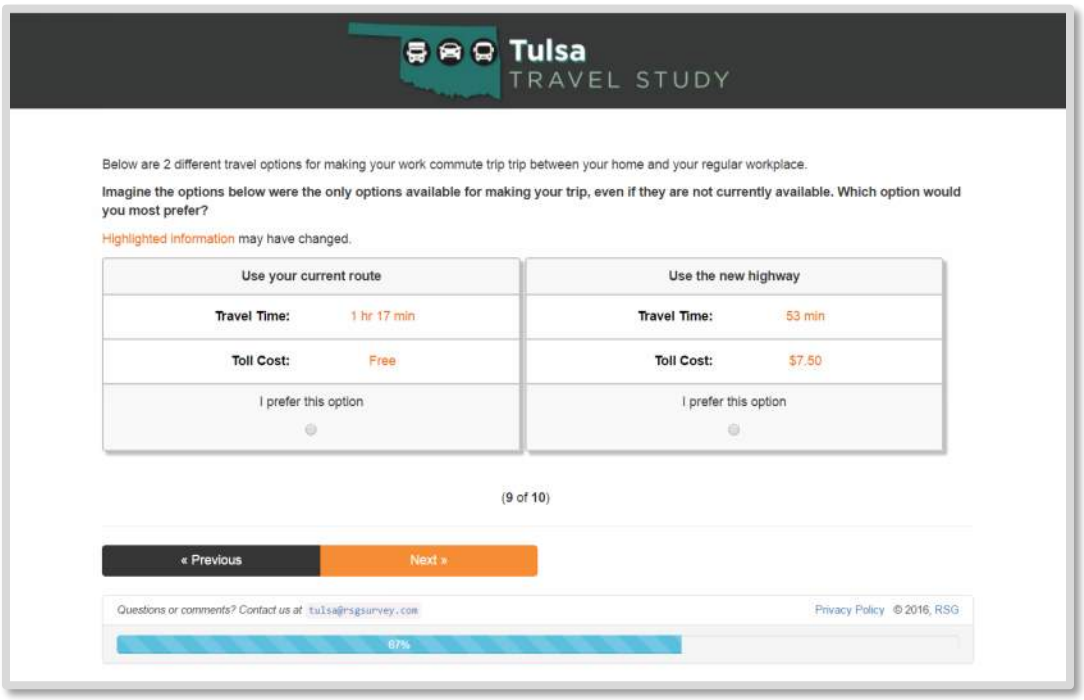
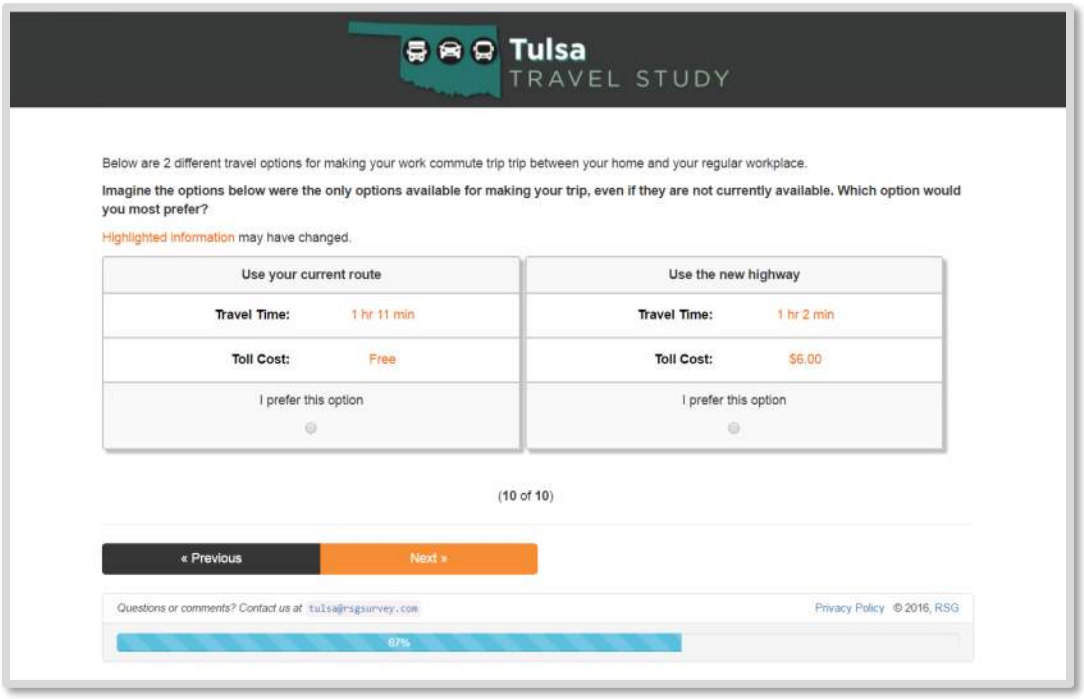


FIGURE 7-38: SP EXPERIMENT EXAMPLE #10



7.4 | DEBRIEF AND OPINION QUESTIONS

FIGURE 7-39: REASON FOR NOT SELECTING TOLLED OPTION

If never selected a tolled option in the stated preference section

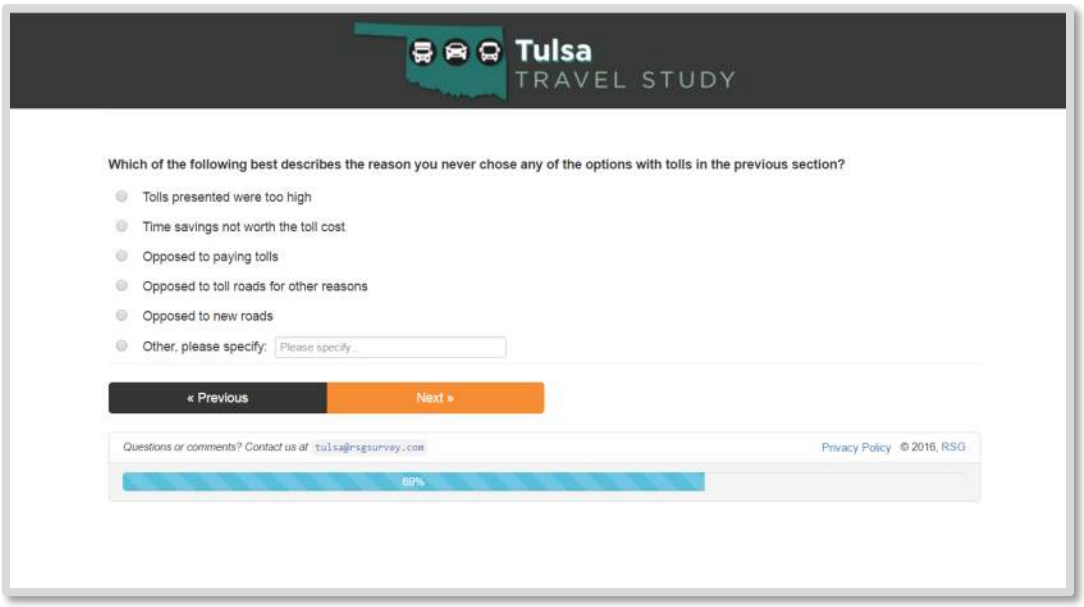


FIGURE 7-40: PROJECT OPINION

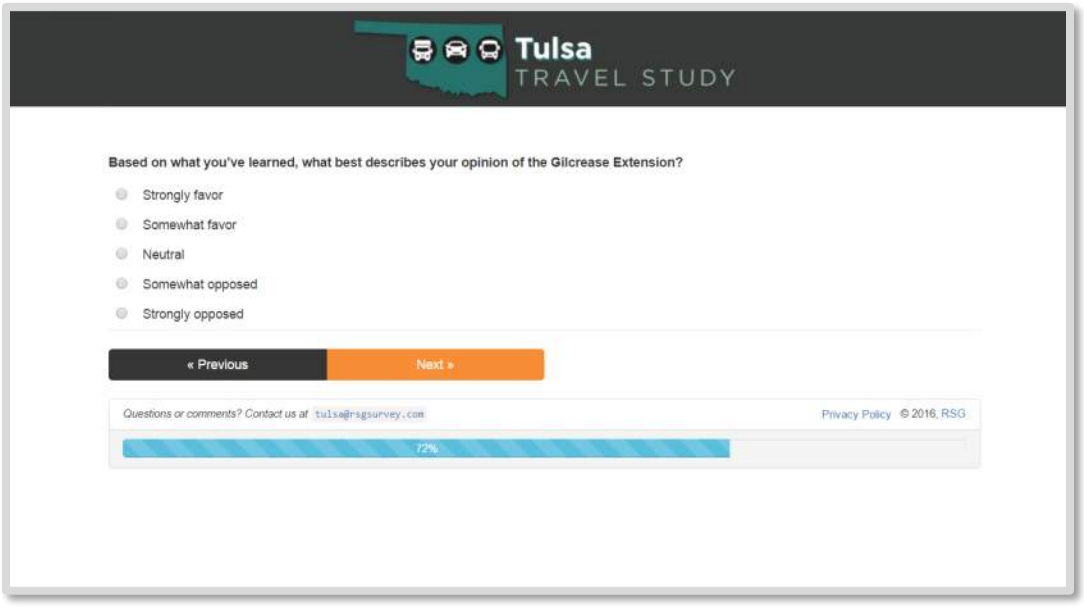


FIGURE 7-41: REASON FOR OPPOSING THE PROJECT
If somewhat or strongly opposes the project

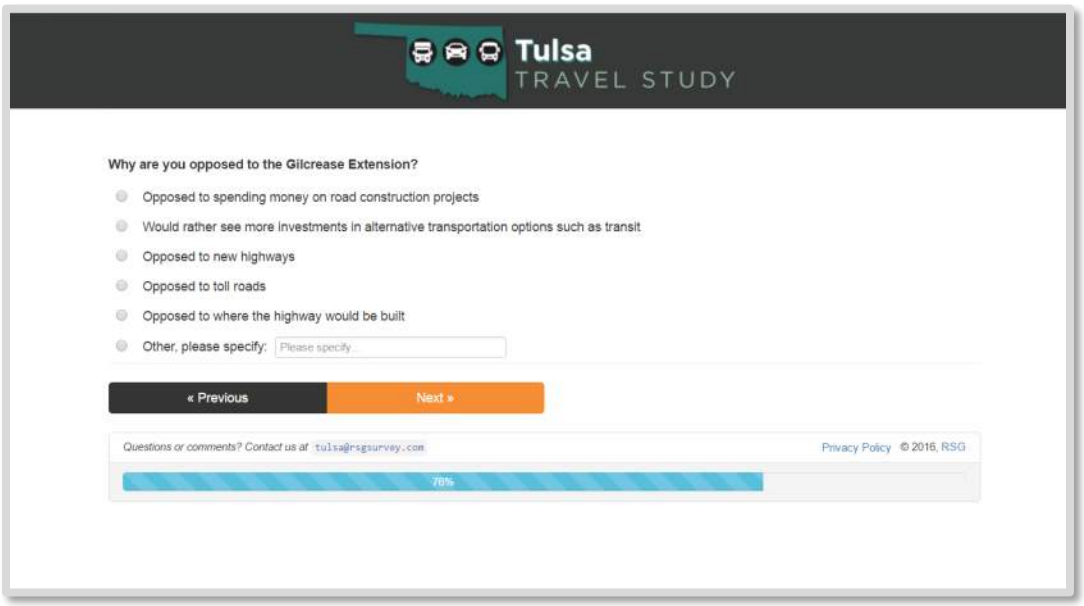


FIGURE 7-42: REASON FOR SUPPORTING THE PROJECT
If somewhat or strongly favors the project

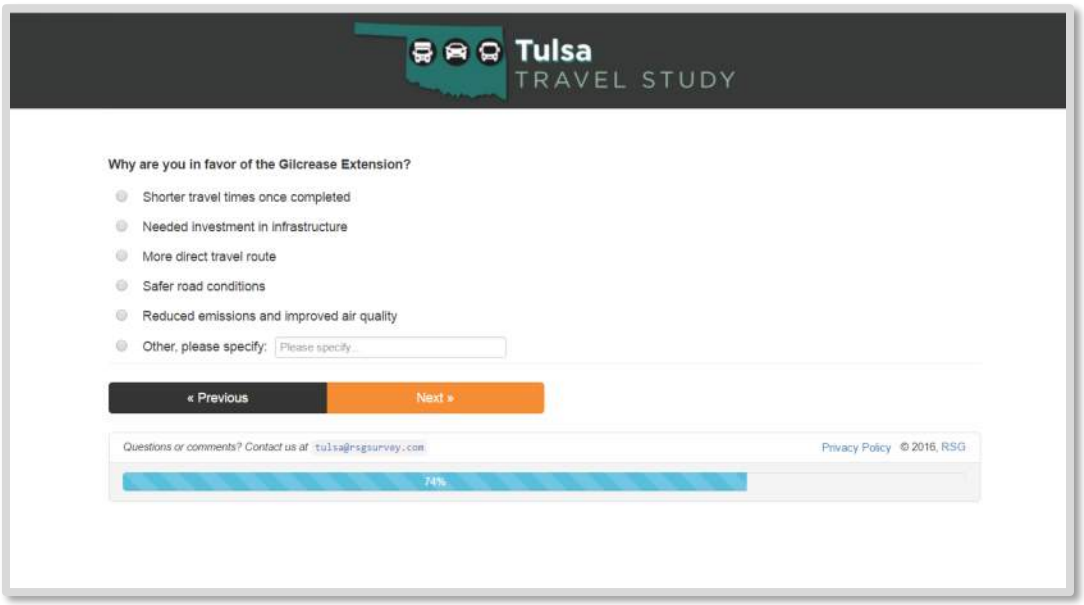
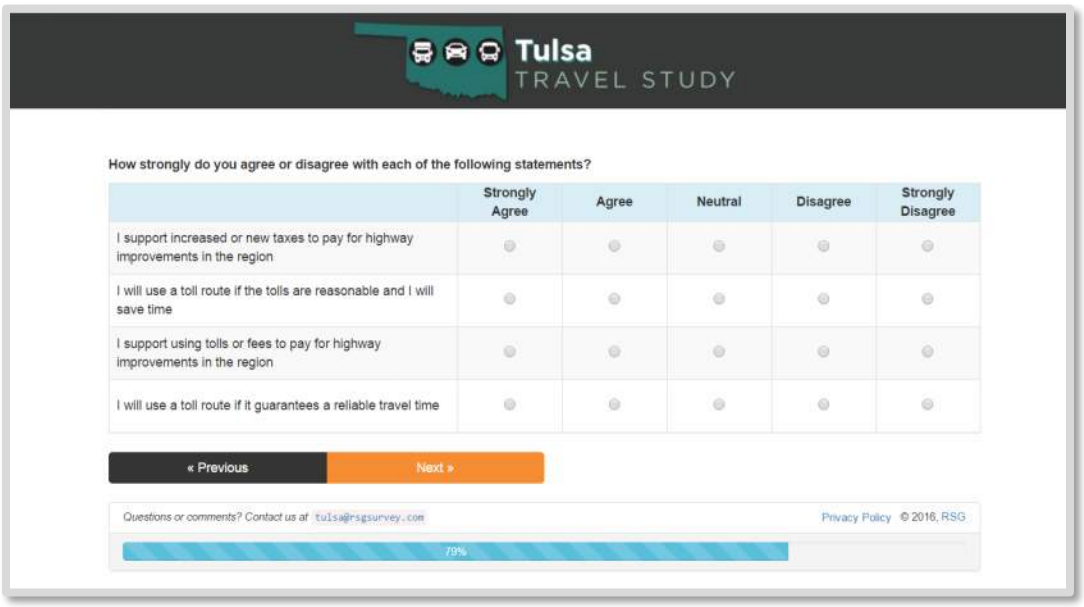


FIGURE 7-43: TOLL ATTITUDE STATEMENTS



7.5 | DEMOGRAPHIC QUESTIONS

FIGURE 7-44: ZIP CODE

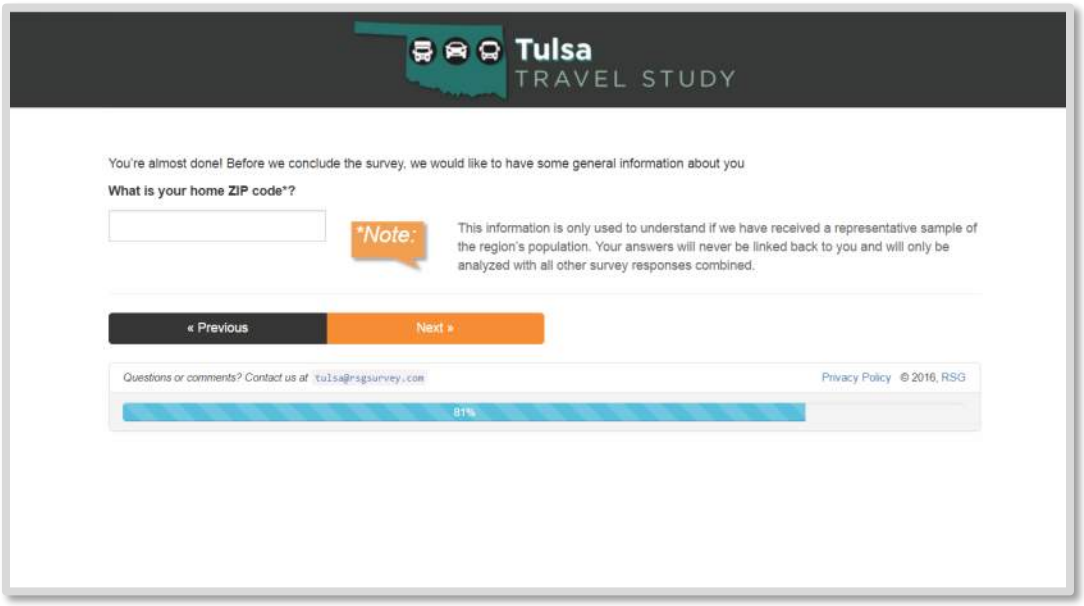


FIGURE 7-45: GENDER

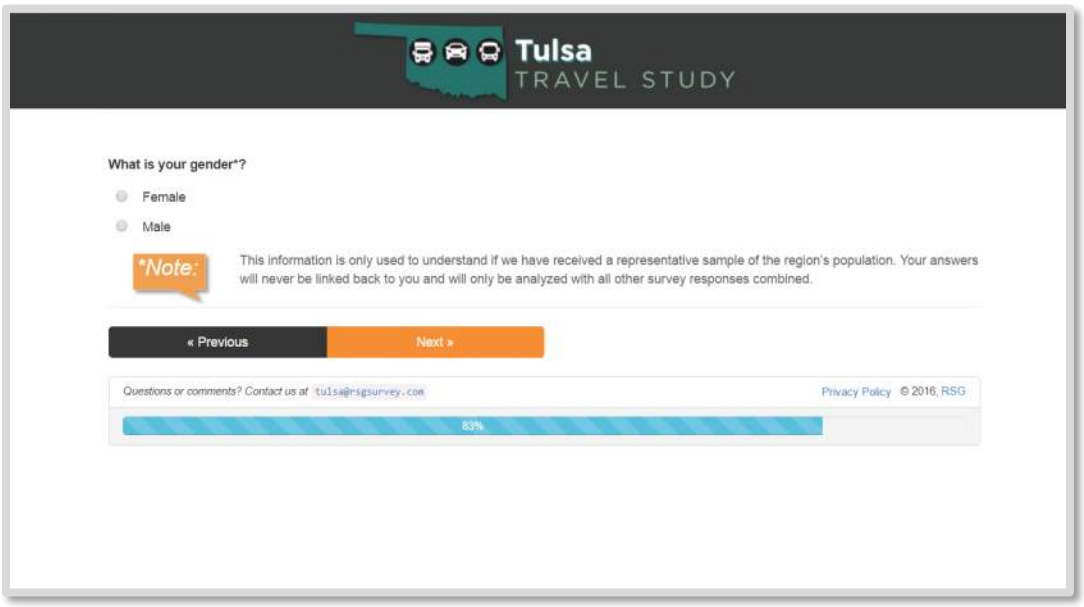


FIGURE 7-46: AGE

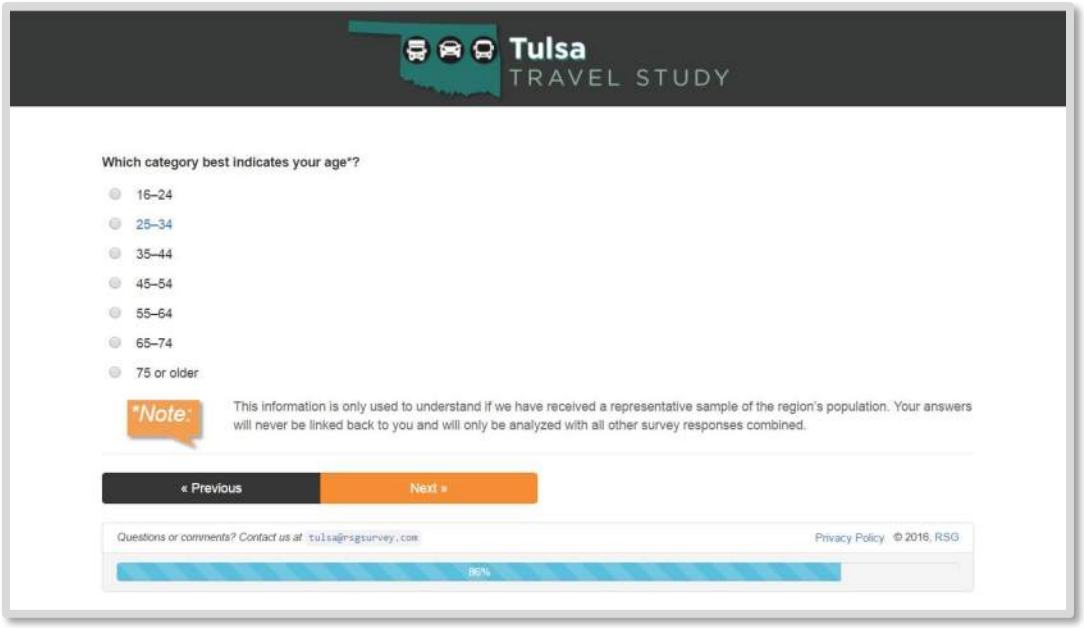


FIGURE 7-47: EMPLOYMENT STATUS

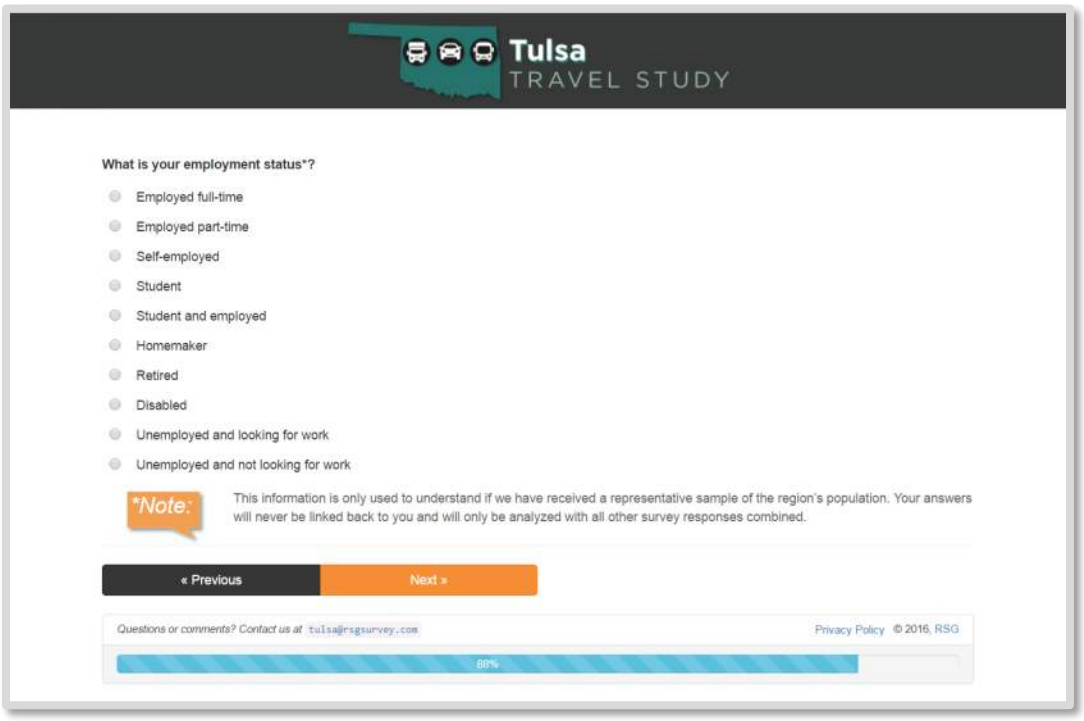


FIGURE 7-48: HOUSEHOLD SIZE

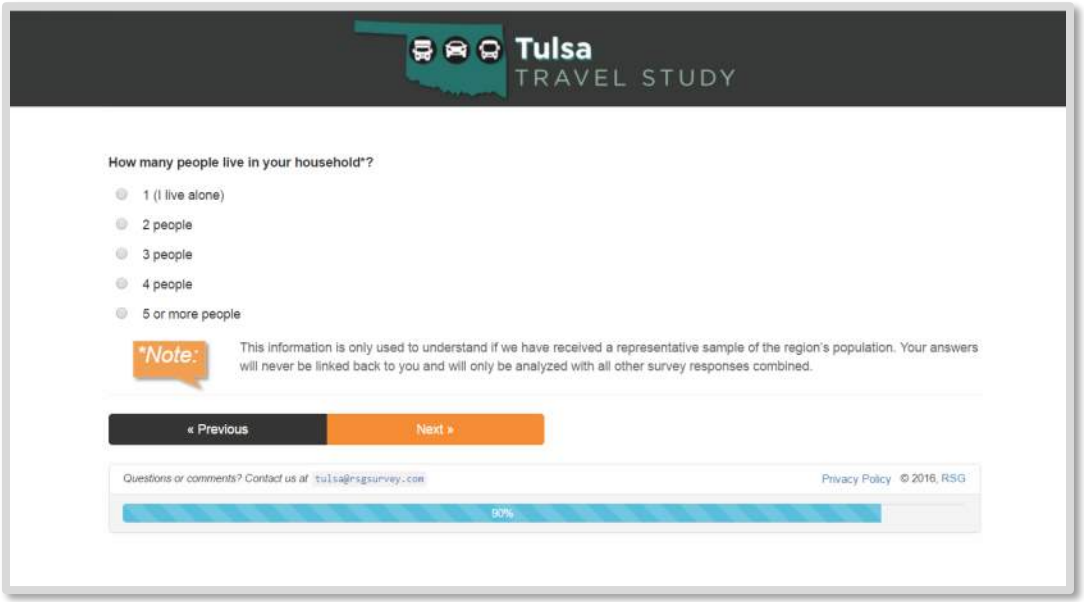


FIGURE 7-49: HOUSEHOLD VEHICLES

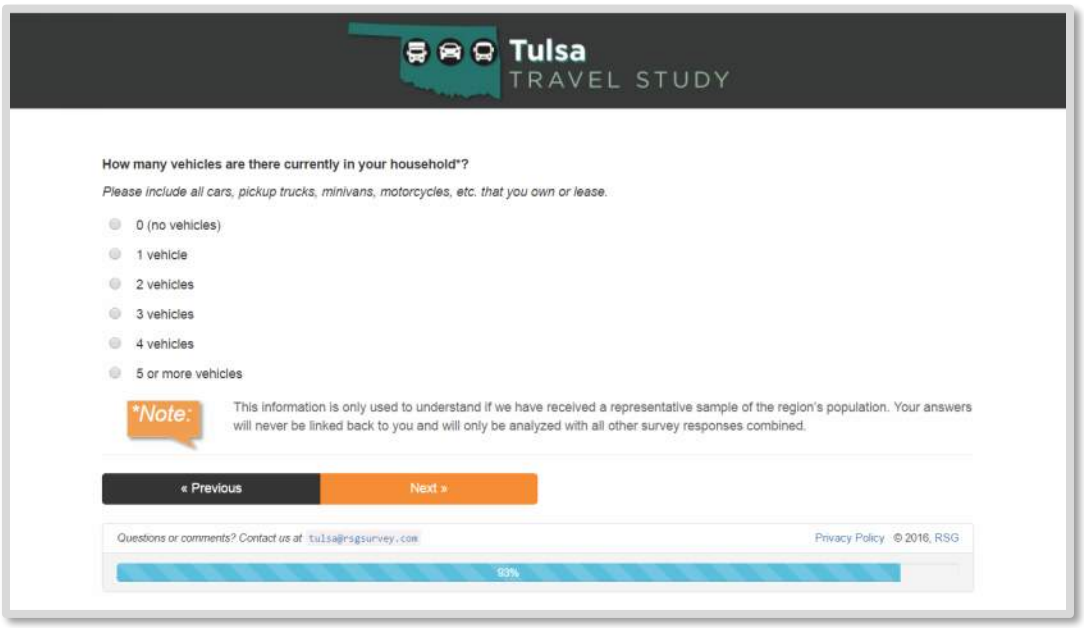


FIGURE 7-50: ANNUAL HOUSEHOLD INCOME

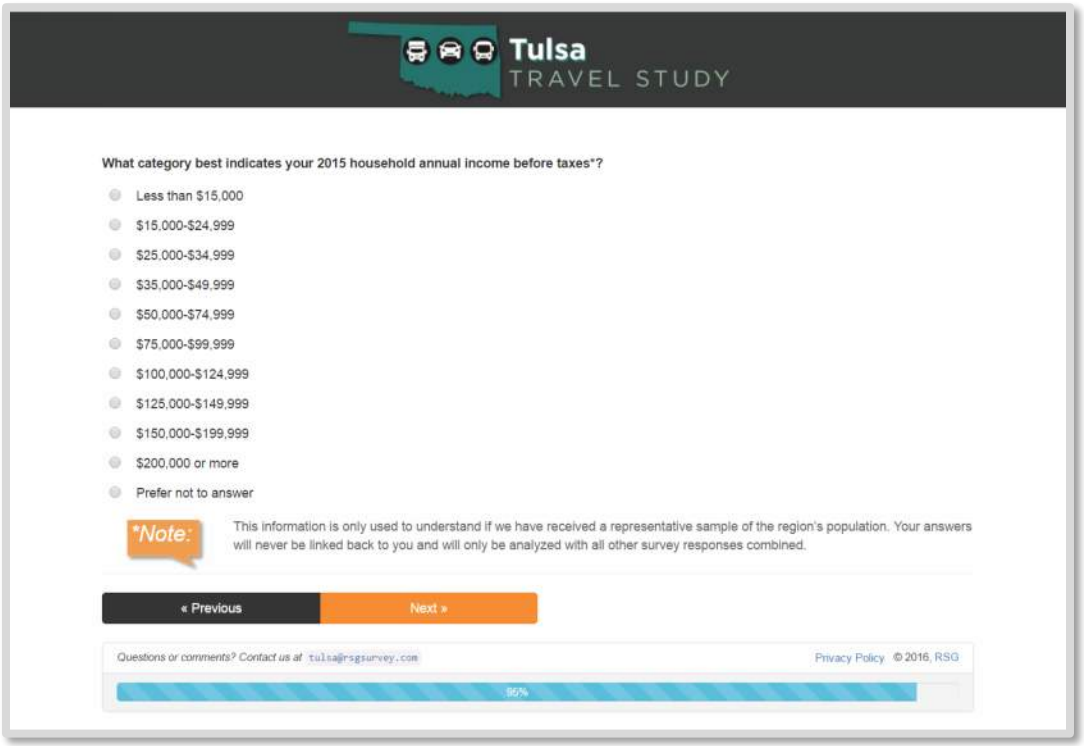


FIGURE 7-51: EMAIL ADDRESS AND SURVEY COMMENTS

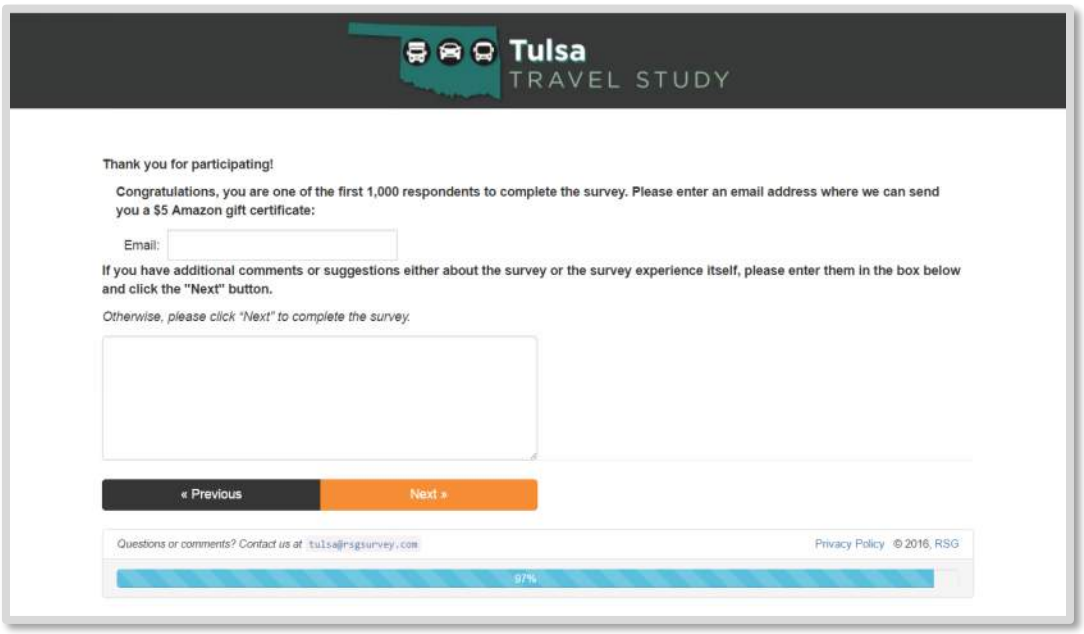
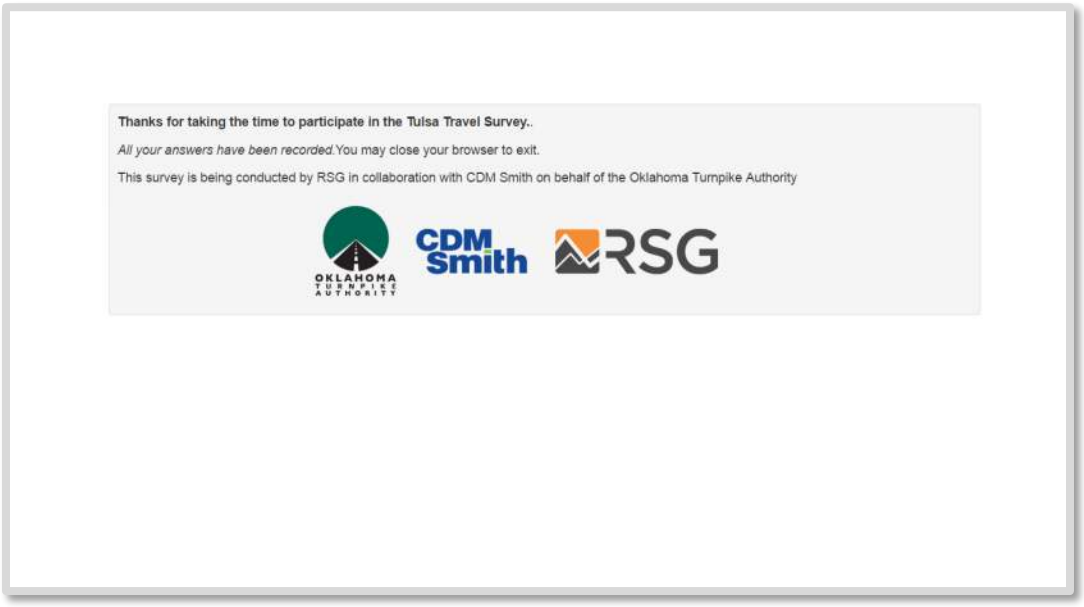


FIGURE 7-52: SURVEY END



8.0 SURVEY TABULATIONS

8.1 | TRIP DETAIL QUESTIONS

TABLE 8-1: RECRUITMENT METHOD

Recruitment Method

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Postcard respondent	194	27.5%	85	23.0%	279	26.0%
Email respondent	511	72.5%	285	77.0%	796	74.0%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-2: GILCREASE EXPRESSWAY CORRIDOR

Selected Gilcrease Expressway

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Yes, I have made a recent trip that fits that description	705	100.0%	0	0.0%	705	65.6%
No, I have not made a recent trip that fits that description	0	0.0%	370	100.0%	370	34.4%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-3: GENERAL TRIP

Selected General Trip

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Yes, I have made a recent trip that fits that description	0	0.0%	370	100.0%	370	100.0%
No, I have not made a recent trip that fits that description	0	0.0%	0	0.0%	0	0.0%
Total	0	0.0%	370	100.0%	370	100.0%

If did not make a recent Gilcrease Expressway trip

TABLE 8-4: DAY OF WEEK

On what day of the week did you make your most recent trip?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Monday	123	17.4%	83	22.4%	206	19.2%
Tuesday	104	14.8%	63	17.0%	167	15.5%
Wednesday	119	16.9%	48	13.0%	167	15.5%
Thursday	161	22.8%	89	24.1%	250	23.3%
Friday	198	28.1%	87	23.5%	285	26.5%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-5: TRIP PURPOSE

What was the primary purpose of your trip?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Go to/from work	129	18.3%	157	42.4%	286	26.6%
Work-related business	129	18.3%	28	7.6%	157	14.6%
Go to/from school	13	1.8%	3	0.8%	16	1.5%
Go to/from the airport	13	1.8%	8	2.2%	21	2.0%
Shopping	78	11.1%	16	4.3%	94	8.7%
Social or recreational (such as visiting a friend or going to the movies)	191	27.1%	62	16.8%	253	23.5%
Other personal business	152	21.6%	96	25.9%	248	23.1%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-6: BEGIN LOCATION

Where did your trip begin?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
My home	551	78.2%	310	83.8%	861	80.1%
My regular workplace	95	13.5%	43	11.6%	138	12.8%
Another place	59	8.4%	17	4.6%	76	7.1%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-7: END LOCATION

Where did your trip end?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
My home	71	10.1%	39	10.5%	110	10.2%
My regular workplace	116	16.5%	131	35.4%	247	23.0%
Another place	518	73.5%	200	54.1%	718	66.8%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-8: TRIP START TIME

What time did you start your trip?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
12AM - 12:59AM	2	0.3%	0	0.0%	2	0.2%
1AM - 1:59AM	0	0.0%	1	0.3%	1	0.1%
2AM - 2:59AM	0	0.0%	0	0.0%	0	0.0%
3AM - 3:59AM	1	0.1%	0	0.0%	1	0.1%
4AM - 4:59AM	2	0.3%	4	1.1%	6	0.6%
5AM - 5:59AM	4	0.6%	10	2.7%	14	1.3%
6AM - 6:59AM	46	6.5%	40	10.8%	86	8.0%
7AM - 7:59AM	92	13.0%	66	17.8%	158	14.7%
8AM - 8:59AM	77	10.9%	48	13.0%	125	11.6%
9AM - 9:59AM	67	9.5%	29	7.8%	96	8.9%
10AM - 10:59AM	63	8.9%	24	6.5%	87	8.1%
11AM - 11:59AM	40	5.7%	23	6.2%	63	5.9%
12PM - 12:59PM	41	5.8%	14	3.8%	55	5.1%
1PM - 1:59PM	49	7.0%	22	5.9%	71	6.6%
2PM - 2:59PM	36	5.1%	17	4.6%	53	4.9%
3PM - 3:59PM	27	3.8%	16	4.3%	43	4.0%
4PM - 4:59PM	40	5.7%	14	3.8%	54	5.0%
5PM - 5:59PM	57	8.1%	22	5.9%	79	7.3%
6PM - 6:59PM	37	5.2%	9	2.4%	46	4.3%
7PM - 7:59PM	12	1.7%	6	1.6%	18	1.7%
8PM - 8:59PM	6	0.9%	1	0.3%	7	0.7%
9PM - 9:59PM	4	0.6%	1	0.3%	5	0.5%
10PM - 10:59PM	2	0.3%	3	0.8%	5	0.5%
11PM - 11:59PM	0	0.0%	0	0.0%	0	0.0%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-9: TRAVEL TIME

Approximately how long did it take you, door-to-door, to drive from where your trip started to where it ended?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Less than 30 minutes	281	39.9%	219	59.2%	500	46.5%
30 to 44 minutes	200	28.4%	108	29.2%	308	28.7%
45 to 59 minutes	62	8.8%	16	4.3%	78	7.3%
60 to 74 minutes	29	4.1%	5	1.4%	34	3.2%
75 to 89 minutes	23	3.3%	5	1.4%	28	2.6%
90 to 119 minutes	46	6.5%	8	2.2%	54	5.0%
Two hours or more	64	9.1%	9	2.4%	73	6.8%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-10: DELAY

Did you experience any delay due to traffic congestion, stop lights, train crossings, etc. on your trip?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Yes	277	39.3%	144	38.9%	421	39.2%
No	428	60.7%	226	61.1%	654	60.8%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-11: AMOUNT OF DELAY

Amount of delay experienced due to traffic congestion

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
No delay	428	60.7%	226	61.1%	654	60.8%
Less than 15 minutes	203	28.8%	120	32.4%	323	30.0%
15-29 minutes	60	8.5%	20	5.4%	80	7.4%
30 or more minutes	14	2.0%	4	1.1%	18	1.7%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-12: TOLLS

Did you pay any tolls on your most recent trip?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Yes	293	41.6%	135	36.5%	428	39.8%
No	412	58.4%	235	63.5%	647	60.2%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-13: TOLL AMOUNT

Toll Amount Categories

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
$0.25 - $1.00	101	34.5%	76	56.3%	177	41.4%
$1.01 - $2.00	71	24.2%	31	23.0%	102	23.8%
$2.01 - $3.00	46	15.7%	13	9.6%	59	13.8%
$3.01 - $4.00	25	8.5%	9	6.7%	34	7.9%
$4.01 - $5.00	29	9.9%	4	3.0%	33	7.7%
Greater than $5.00	21	7.2%	2	1.5%	23	5.4%
Total	293	100.0%	135	100.0%	428	100.0%

If respondent paid a toll on most recent trip

TABLE 8-14: OCCUPANCY

Including you, how many people were in the vehicle on your trip?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
1 (I drove alone)	420	59.6%	268	72.4%	688	64.0%
2 people	200	28.4%	69	18.6%	269	25.0%
3 people	48	6.8%	21	5.7%	69	6.4%
4 people	28	4.0%	5	1.4%	33	3.1%
5 people	3	0.4%	5	1.4%	8	0.7%
6 people or more	6	0.9%	2	0.5%	8	0.7%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-15: TRIP FREQUENCY

How often have you made this same trip, in this direction, in the past month (30 days)?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
6 or more times per week	30	4.3%	30	8.1%	60	5.6%
4-5 times per week	114	16.2%	121	32.7%	235	21.9%
2-3 times per week	84	11.9%	39	10.5%	123	11.4%
1 time per week	61	8.7%	26	7.0%	87	8.1%
2-3 times per month	143	20.3%	60	16.2%	203	18.9%
1 time per month	118	16.7%	28	7.6%	146	13.6%
Less than 1 time per month	155	22.0%	66	17.8%	221	20.6%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-16: TRANSPONDER OWNERSHIP

Do you currently have a transponder?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Yes, I have a PIKEPASS transponder	669	94.9%	349	94.3%	1018	94.7%
Yes, I have another type of transponder	2	0.3%	4	1.1%	6	0.6%
No, I do not have a transponder	36	5.1%	20	5.4%	56	5.2%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-17: REASON(S) FOR NOT OWNING A TRANSPONDER

Why don't you have a transponder?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Prefer cash option	8	22.2%	4	20.0%	12	21.4%
Do not use toll roads often enough	18	50.0%	15	75.0%	33	58.9%
Do not like the idea of electronic tolling	4	11.1%	1	5.0%	5	8.9%
Do not want a transponder in my car	4	11.1%	0	0.0%	4	7.1%
Do not want to set up an account	9	25.0%	2	10.0%	11	19.6%
Concerned about privacy	6	16.7%	1	5.0%	7	12.5%
Too difficult to maintain account	5	13.9%	3	15.0%	8	14.3%
Other reason, please specify:	10	27.8%	3	15.0%	13	23.2%
Total	36	100.0%	20	100.0%	56	100.0%

If respondent does not own a transponder

8.2 | DEBRIEF AND OPINION QUESTIONS

TABLE 8-18: REASON FOR NOT SELECTING TOLLED OPTION

Which of the following best describes the reason you never chose any of the options with tolls in the previous section?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Tolls presented were too high	16	8.0%	6	9.7%	22	8.4%
Time savings not worth the toll cost	76	38.0%	39	62.9%	115	43.9%
Opposed to paying tolls	28	14.0%	10	16.1%	38	14.5%
Opposed to toll roads for other reasons	6	3.0%	3	4.8%	9	3.4%
Current route is more convenient	50	25.0%	0	0.0%	50	19.1%
Opposed to new roads	2	1.0%	0	0.0%	2	0.8%
Other, please specify:	22	11.0%	4	6.5%	26	9.9%
Total	200	100.0%	62	100.0%	262	100.0%

If respondent never selected a toll alternative in stated preference experiments

TABLE 8-19: PROJECT OPINION

Based on what you've learned, what best describes your opinion of the toll road?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Strongly opposed	65	9.2%	55	14.9%	120	11.2%
Somewhat opposed	99	14.0%	87	23.5%	186	17.3%
Neutral	277	39.3%	91	24.6%	368	34.2%
Somewhat favor	176	25.0%	106	28.6%	282	26.2%
Strongly favor	88	12.5%	31	8.4%	119	11.1%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-20: REASON FOR SUPPORTING THE PROJECT

Why are you in favor of the new road?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Shorter travel times once completed	101	38.3%	77	56.2%	178	44.4%
Needed investment in infrastructure	86	32.6%	26	19.0%	112	27.9%
More direct travel route	33	12.5%	0	0.0%	33	8.2%
Safer road conditions	24	9.1%	26	19.0%	50	12.5%
Reduced emissions and improved air quality	0	0.0%	0	0.0%	0	0.0%
Other, please specify:	20	7.6%	8	5.8%	28	7.0%
Total	264	100.0%	137	100.0%	401	100.0%

If respondent "strongly" or "somewhat" favors project

TABLE 8-21: REASON FOR OPPOSING THE PROJECT

Why are you opposed to the new road?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Opposed to spending money on road construction projects	7	4.3%	2	1.4%	9	2.9%
Would rather see more investments in alternative transportation options such as transit	24	14.6%	17	12.0%	41	13.4%
Opposed to new highways	1	0.6%	2	1.4%	3	1.0%
Opposed to toll roads	71	43.3%	89	62.7%	160	52.3%
Opposed to where the highway would be built	20	12.2%	0	0.0%	20	6.5%
Other, please specify:	41	25.0%	32	22.5%	73	23.9%
Total	164	100.0%	142	100.0%	306	100.0%

If respondent "strongly" or "somewhat" opposes project

TABLE 8-22: TOLL ATTITUDE STATEMENT 1

I will use a toll route if the tolls are reasonable and I will save time

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Strongly Disagree	20	2.8%	5	1.4%	25	2.3%
Disagree	16	2.3%	12	3.2%	28	2.6%
Neutral	61	8.7%	34	9.2%	95	8.8%
Agree	302	42.8%	180	48.6%	482	44.8%
Strongly Agree	306	43.4%	139	37.6%	445	41.4%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-23: TOLL ATTITUDE STATEMENT 2

I will use a toll route if it guarantees a reliable travel time

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Strongly Disagree	28	4.0%	12	3.2%	40	3.7%
Disagree	37	5.2%	23	6.2%	60	5.6%
Neutral	162	23.0%	109	29.5%	271	25.2%
Agree	300	42.6%	159	43.0%	459	42.7%
Strongly Agree	178	25.2%	67	18.1%	245	22.8%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-24: TOLL ATTITUDE STATEMENT 3

I support using tolls or fees to pay for highway improvements in the region

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Strongly Disagree	52	7.4%	32	8.6%	84	7.8%
Disagree	92	13.0%	52	14.1%	144	13.4%
Neutral	149	21.1%	88	23.8%	237	22.0%
Agree	282	40.0%	143	38.6%	425	39.5%
Strongly Agree	130	18.4%	55	14.9%	185	17.2%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-25: TOLL ATTITUDE STATEMENT 4

I support increased or new taxes to pay for highway improvements in the region

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Strongly Disagree	101	14.3%	36	9.7%	137	12.7%
Disagree	154	21.8%	63	17.0%	217	20.2%
Neutral	170	24.1%	107	28.9%	277	25.8%
Agree	189	26.8%	118	31.9%	307	28.6%
Strongly Agree	91	12.9%	46	12.4%	137	12.7%
Total	705	100.0%	370	100.0%	1075	100.0%

8.3 | DEMOGRAPHIC QUESTIONS

TABLE 8-26: GENDER

What is your gender*?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Female	288	40.9%	180	48.6%	468	43.5%
Male	417	59.1%	190	51.4%	607	56.5%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-27: AGE

Which category best indicates your age*?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
16–24	8	1.1%	6	1.6%	14	1.3%
25–34	115	16.3%	38	10.3%	153	14.2%
35–44	90	12.8%	59	15.9%	149	13.9%
45–54	163	23.1%	77	20.8%	240	22.3%
55–64	172	24.4%	98	26.5%	270	25.1%
65–74	132	18.7%	72	19.5%	204	19.0%
75 or older	25	3.5%	20	5.4%	45	4.2%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-28: EMPLOYMENT STATUS

What is your employment status*?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Employed full-time	404	57.3%	210	56.8%	614	57.1%
Employed part-time	33	4.7%	16	4.3%	49	4.6%
Self-employed	68	9.6%	22	5.9%	90	8.4%
Student	1	0.1%	3	0.8%	4	0.4%
Student and employed	7	1.0%	4	1.1%	11	1.0%
Homemaker	25	3.5%	16	4.3%	41	3.8%
Retired	147	20.9%	90	24.3%	237	22.0%
Disabled	12	1.7%	4	1.1%	16	1.5%
Unemployed and looking for work	6	0.9%	5	1.4%	11	1.0%
Unemployed and not looking for work	2	0.3%	0	0.0%	2	0.2%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-29: HOUSEHOLD SIZE

How many people live in your household*?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
1 (I live alone)	105	14.9%	54	14.6%	159	14.8%
2 people	326	46.2%	181	48.9%	507	47.2%
3 people	134	19.0%	60	16.2%	194	18.0%
4 people	87	12.3%	50	13.5%	137	12.7%
5 or more people	53	7.5%	25	6.8%	78	7.3%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-30: NUMBER OF VEHICLES

How many vehicles are there currently in your household*?

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
0 (no vehicles)	0	0.0%	3	0.8%	3	0.3%
1 vehicle	117	16.6%	57	15.4%	174	16.2%
2 vehicles	331	47.0%	183	49.5%	514	47.8%
3 vehicles	155	22.0%	78	21.1%	233	21.7%
4 vehicles	61	8.7%	38	10.3%	99	9.2%
5 or more vehicles	41	5.8%	11	3.0%	52	4.8%
Total	705	100.0%	370	100.0%	1075	100.0%

TABLE 8-31: ANNUAL HOUSEHOLD INCOME

Annual household income before taxes

	Gilcrease Expressway		General Trip		Total	
	Count	Percent	Count	Percent	Count	Percent
Less than $15,000	3	0.5%	5	1.8%	8	0.9%
$15,000-$24,999	21	3.6%	7	2.5%	28	3.2%
$25,000-$34,999	29	5.0%	8	2.8%	37	4.3%
$35,000-$49,999	68	11.7%	36	12.8%	104	12.0%
$50,000-$74,999	107	18.4%	63	22.3%	170	19.7%
$75,000-$99,999	111	19.0%	61	21.6%	172	19.9%
$100,000-$124,999	95	16.3%	42	14.9%	137	15.8%
$125,000-$149,999	55	9.4%	24	8.5%	79	9.1%
$150,000-$199,999	51	8.7%	20	7.1%	71	8.2%
$200,000 or more	43	7.4%	16	5.7%	59	6.8%
Total	583	100.0%	282	100.0%	865	100.0%

Appendix B

Independent Demographic Review

This appendix contains the documentation of the independent demographic review for the Gilcrease Expressway study area as provided by the subconsultant, Research and Demographic Solutions. This report was provided to CDM Smith in January 2016.

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Gilcrease Expressway

Independent Socioeconomic Analysis

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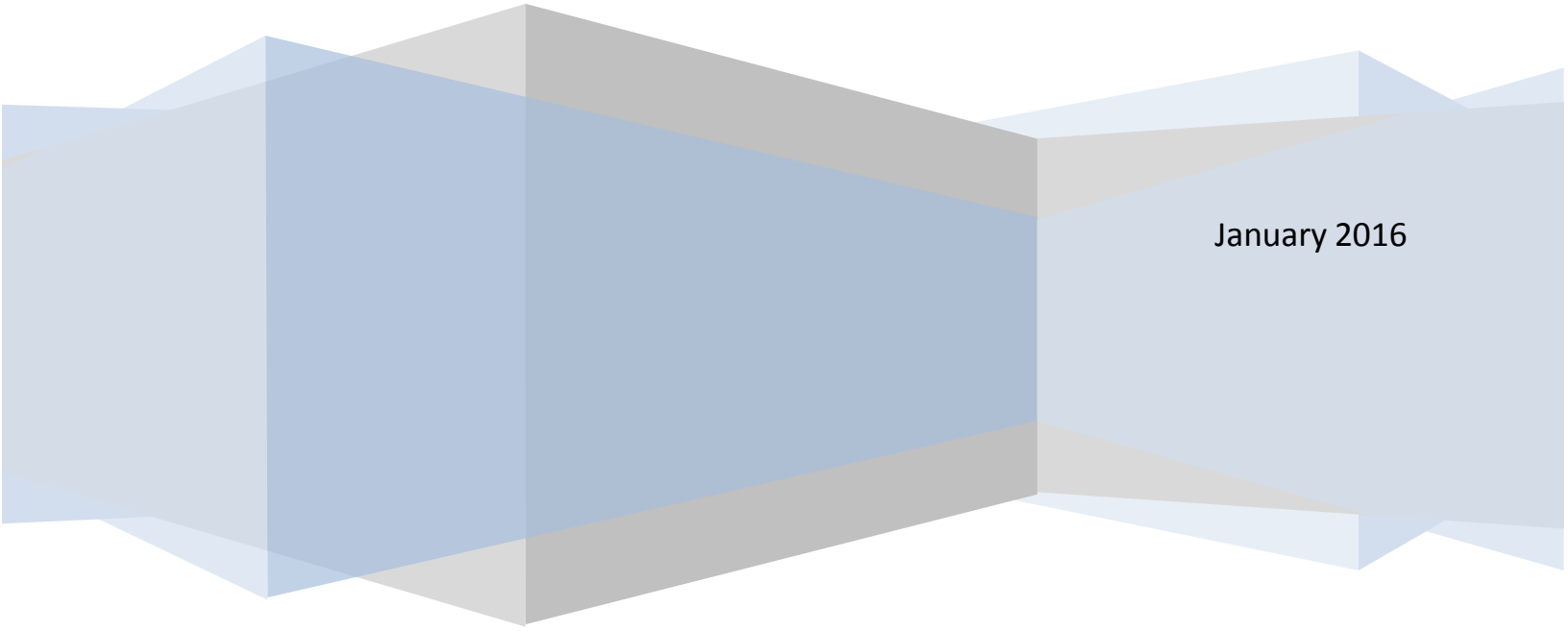

January 2016

Gilcrease Expressway
Independent Socioeconomic Analysis

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I. Introduction

Research and Demographic Solutions (**RDS**) was commissioned by CDM Smith to perform an independent socioeconomic analysis concerning households, household population, and employment forecasts for the Gilcrease Expressway Study Area as defined by CDM Smith. The Gilcrease Expressway Area of Interest (**AOI**) is composed 373 Traffic Analysis Zones (**TAZ**) within Tulsa, Creek and Osage Counties. This report provides RDS' independent socioeconomic analysis of the TAZ's in light of the demographic datasets provided to CDM Smith from the Indian Nations Council of Governments (**INCOG**).

RDS evaluated the latest INCOG socioeconomic forecasts for accuracy and reasonableness, detailed to the level of TAZ zones. The RDS evaluation was completed for the years of 2010 and 2035.

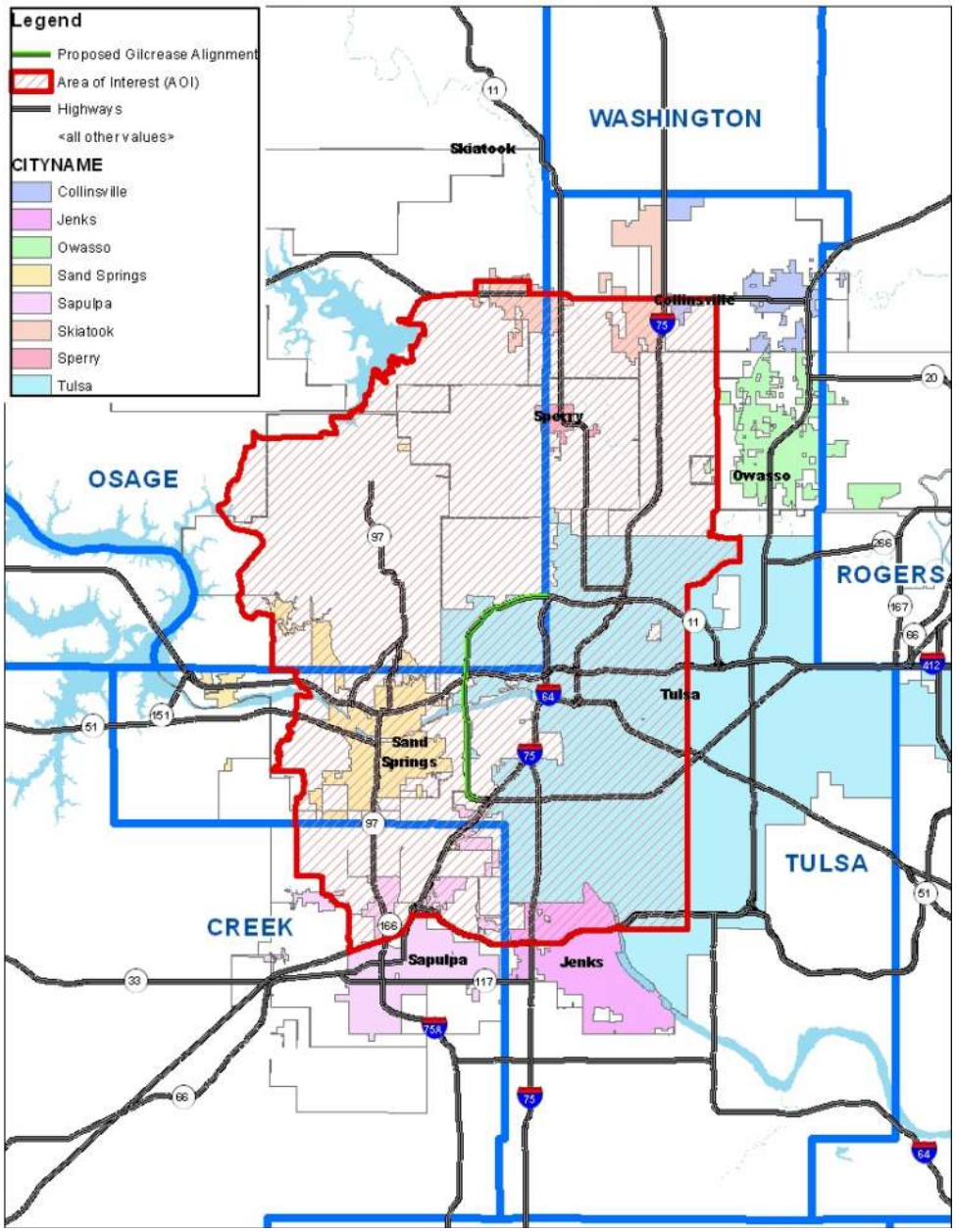
RDS also identified and calculated major emerging economic trends which directly impact the level and distribution of future socioeconomic growth in the Tulsa Metropolitan Area (**TMA**). In addition to Tulsa, Creek, and Osage Counties, the TMA includes Rogers and Wagoner Counties as well. Such trends include patterns in land use and major planned developments. RDS evaluated any factors that will likely change economic growth potential or the overall distribution of economic growth. Examples include, but are not limited to, infrastructure expansions and airport development.

Full citations are provided for methodologies, sources of development trends and projections, and narratives defining and detailing important issues affecting future socioeconomic growth in proximity to the Gilcrease Expressway AOI.

Gilcrease Expressway Area of Interest Map

The Area of Interest for this study includes almost all of Tulsa County, as well as portions of Creek and Osage Counties as shown in Figure 1. The City of Tulsa is the county seat of Tulsa County and other local municipalities in the AOI include Collinsville, Jenks, Owasso, Sand Springs, Sapulpa, Skiatook and Sperry. Unincorporated land also comprises a sizable portion of the AOI.

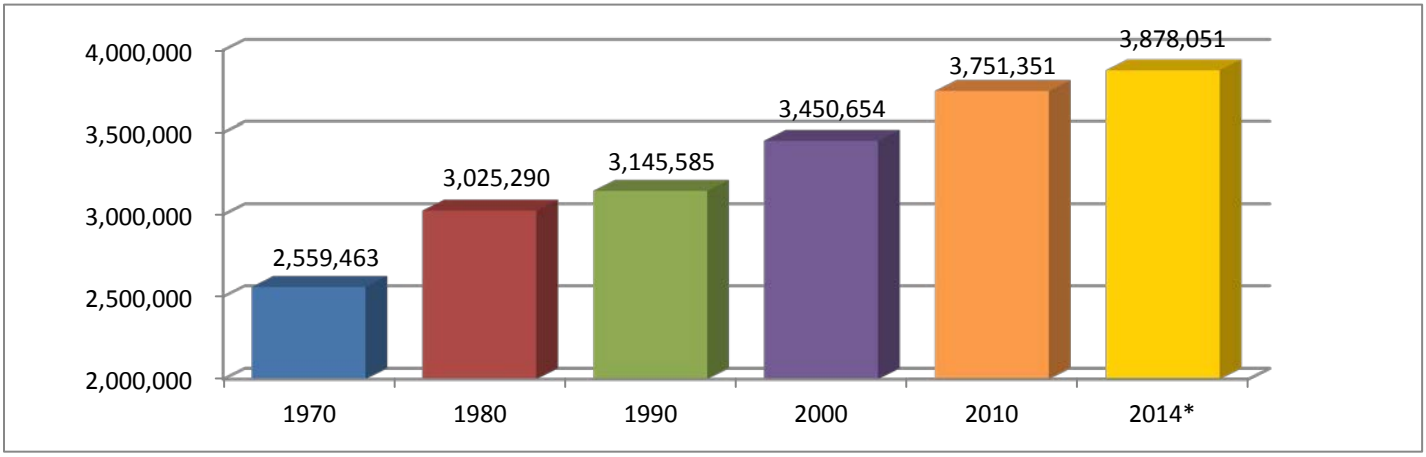
Figure 1: Area of Interest Map



II. State of Oklahoma Population Trends and Projections

Oklahoma has seen steady, modest population growth since 1970. Between 1970 and 2010, state growth has averaged just below 300,000 persons per decade. In line with this average, the Census Bureau reported that Oklahoma added just over 300,000 persons between 2000 and 2010, an 8.7 percent increase in total population. Since 2010, growth has continued on a similar trend line with the state adding 126,700 residents up to July 2014. Figure 2 illustrates the trends in Oklahoma population from 1970 through 2014.

Figure 2: State of Oklahoma Total Population
1970 - 2014



Source: US Census Bureau. *Census yearly population estimates are for a July 1 date while decennial figures are assumed to be for April 1 of that year.

Oklahoma's population growth will continue to remain modest going forward. The state economy's reliance on the oil and gas industry will cause migration uncertainties in the short-term, but likely will sort out over time. Depending on varying rates of migration as well as fertility and mortality rates, the Oklahoma Department of Commerce estimates that approximately 4.4 million people will live in the state by 2035, according to their most recent 2012 data, as shown in Table 1. In both of their 2015 releases, Woods and Poole, a proprietary demographic projections database, estimates 2035 population to be about 150,000 higher than the Department of Commerce figures while the Demographics Research Group estimates are 150,000 persons lower.

Table 1: State of Oklahoma Population Projections (in Millions)

Scenarios	2010	2035	2010-2035 Growth	Compound Annual Growth Rate 10-35
Oklahoma Dept. of Commerce	3.75	4.44	18%	0.68%
Woods & Poole	3.76	4.59	22%	0.80%
Demographics Research Group*	3.75	4.29	14%	0.54%

*2035 is extrapolated from DRG's 2030 and 2040 totals

III. City, County and Metro Area Tulsa Population Trends and Projections

According to the most recent 2014 Census Bureau population data, the City of Tulsa has added approximately 68,000 people since 1970. It is important to note that the growth rate has slowed to 0.12 percent since 2000. In comparison, Tulsa County has added almost 228,000 persons from 1970 to 2014. From 1970 to 2000, the County's CAGR was about twice the City's, but since 2000, the County CAGR has been more than 6 times the City's rate. The Tulsa Metro Area, which is comprised of Creek, Okmulgee, Osage, Pawnee, Rogers, Tulsa and Wagoner Counties, added 395,000 persons from 1970 to 2014. Overall, the Tulsa Metro growth rate has been in-line with Tulsa County since 1970.

Table 2: City of Tulsa and Tulsa Metropolitan Area Historic Population

	April 1, 1970	April 1, 1980	April 1, 1990	April 1, 2000	April 1, 2010	July 1, 2014	CAGR 1970-2000	CAGR 2000-2014
City of Tulsa	331,638	360,919	367,302	393,049	391,906	399,682	0.57%	0.12%
Tulsa County	401,663	470,593	503,341	563,299	603,403	629,598	1.13%	0.80%
Tulsa Metro Area	574,229	711,652	761,019	859,532	931,478	969,224	1.35%	0.86%

Source: US Census Bureau.

Residential growth had slowed down in the City, County and Metro Area of Tulsa between 2000 and 2010, but has picked back up in the County and Metro Area recently. All forecasting agencies including the Oklahoma Department of Commerce, INCOG and Woods & Poole, agree that looking forward to 2035, Tulsa County will continue to see household and population growth continuing at a pace much like it has experienced since 2000, as shown in Table 3. There are a myriad of attributes that contribute to the overall county projections. These include a

recent history of steady growth, affordable and available land with no limiting geographic boundaries such as an ocean or foreign border, the relatively low cost of doing business in the state and region, central geographic location in the U.S., favorable weather and amenities, etc.

Table 3: Tulsa County Population Projections 2010-2035

	2010	2035	Absolute Growth 2010-2035	CAGR 2010-2035
Oklahoma Department of Commerce	603,403	729,100	125,697	0.76%
Indian Nations Council of Governments	611,105	771,381	160,276	0.94%
Woods & Poole	605,127	717,804	112,677	0.69%

Sources: 2012 Demographic State of the State Report-Oklahoma Dept. of Commerce, INCOG 2035 Regional Transportation Plan (2009), 2015 Woods &Poole

INCOG does not produce projections for Okmulgee and Pawnee Counties; hence Table 4 compares the five most populous counties within the Tulsa Metro Area from 2010 to 2035. Overall, the three agencies forecast a similar growth trend.

Table 4: Creek, Osage, Rogers, Tulsa and Wagoner Counties Population Projections 2010-2035

	2010	2035	Absolute Growth 2010-2035	CAGR 2010-2035
Oklahoma Department of Commerce	880,832	1,090,406	209,574	0.86%
Indian Nations Council of Governments	785,951	1,030,471	244,520	1.09%
Woods & Poole	883,115	1,080,903	197,788	0.81%

Sources: 2012 Demographic State of the State Report-Oklahoma Dept. of Commerce, INCOG 2035 Regional Transportation Plan (2009), 2015 Woods &Poole

IV. State and Regional Employment Trends and Projections

Table 5 illustrates recent employment growth in Oklahoma, the Tulsa Metropolitan Area and Tulsa County. With the rebound in the economy beginning after the national recession of 2008-2009, all three geographies have seen steady employment gains through 2014. Job growth has been especially strong throughout the state and the Tulsa Metro gaining over 80,000 and 20,000 jobs

respectively, in just a four-year timeframe. While not growing quite as robustly as the state, Tulsa County employment grew by 2.7 percent during the same period.

Table 5: Oklahoma, Tulsa Metro Area and Tulsa County Employment Trends

	Sept 2011	Sept 2012	Sept 2013	Sept 2014	Sept 2015	Percent Change 2011-15	CAGR 2011-15
Oklahoma	1,675,884	1,710,977	1,706,722	1,705,165	1,756,414	4.8%	1.18%
Tulsa Metro Area	431,195	443,698	443,281	441,136	452,011	4.8%	1.19%
Tulsa County	286,487	293,361	295,514	293,925	294,131	2.7%	0.06%

Source: US Bureau of Labor Statistics, Local Area Unemployment Statistics

Looking into the future, the US Bureau of Labor Statistics **(BLS)** is expecting both Oklahoma and the Tulsa Workforce Investment Area[1] **(WIA)** to continue to grow at a rate similar to 2011 to 2015. Below, the BLS is expecting an almost 1 percent per year growth rate for both the state and the WIA. It is RDS' opinion that these projections are reasonable and should be viewed as an adequate scenario for long-term planning purposes.

Table 6: Projected 2022 Employment for Oklahoma and Tulsa WIA

State of Oklahoma	
2012 Total Employment	1,749,370
2022 Total Employment	1,924,440
Absolute Difference	175,070
Percentage Change 2012-2022	10.0%
Compound Annual Growth Rate	0.96%

Tulsa WIA	
2012 Total Employment	362,790
2022 Total Employment	399,920
Absolute Difference	51,560
Percentage Change 2012-2022	14.2%
Compound Annual Growth Rate	0.98%

[1] The Tulsa Workforce Investment Area is comprised of Creek, Osage, Pawnee and Tulsa Counties.

V. RDS Forecast Review Methodology

RDS was retained to review the latest socioeconomic forecasts for the Gilcrease Expressway Area of Interest for accuracy and reasonableness. For the purpose of this study, CDM Smith provided RDS with household, population, and employment data at the TAZ level from INCOG. This data was originally provided to RDS in two intervals, 2010 and 2035, for 373 TAZ's. RDS used this data to begin review on all TAZ's for these two iterations.

INCOG's 2035 Demographics Methodology

INCOG's Long Range Transportation Plan (LRTP) anticipates transportation needs for the TMA predicated on demographic and economic assumptions and forecasts for the entire region. Federal regulations require that the LRTP provide for a planning horizon of 20 years and must be updated not less than every five years. The most recent LRTP, 2032 Update, adopted in January of 2011, was prepared using 2005 base year data, pending the outcome of 2010 Census. In the spirit of maintaining a continuous planning process, Connections 2035 was developed using the now available 2010 Census data.[2]

INCOG 2035 Projection Methodologies

INCOG's first step in the process to determine and allocate population growth was to develop population projections for each of the geographies that encompass the Transportation Management Area **(TMA)**, namely Tulsa County and portions of Creek, Osage, Rogers and Wagoner Counties. Seven different population projections were developed before arriving at the recommended population projection. The seven projection methods included linear trends, other non-linear projection models, and outside sources, such as the Oklahoma Department of Commerce projections, and Woods and Poole projections. After reviewing the various alternatives, the Woods and Poole projection scenario was selected as the "low" growth trend.

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[2] INCOG, *Connections: 2035 Regional Transportation Plan*, http://www.incog.org/Transportation/connections2035/documents/Connections2035RegionalTransportationPlan(9).pdf 3-4.

The "high" growth trend was the maximum population growth that would be reached using the technique described in this document, with the assumption that all available land would be developed based on current zoning. The average of the high and low projections served as a middle of the road projection. The actual recommended projection used for the Long Range Plan was the average of all seven projections, with some slight modifications due to the allocation methodology used.[3]

For employment, six different projections were initially developed, which included private source data from Woods and Poole, publicly available data from the Bureau of Labor Statistics, as well as a ratio forecast that compared the employment per capita in 2005 and carried that forward to 2035. The actual projected employment that was allocated was a hybrid of the Bureau of Labor Statistics and Woods and Poole. Essentially, INCOG chose the BLS Constant Share projection for the total TMA employment number for 2035, but allocated employment by industry sector based on Woods and Poole's allocation (the total BLS number was distributed by industry sector based on the same proportion as Woods and Poole's projection by industry sector). The industry sectors are based on the North American Industry Classification System (NAICS) 2-digit sectors, which divide employment into the various sectors - retail, manufacturing, construction, health care, etc.[4]

From this point, both recommended 2035 population and employment totals were allocated to the TAZ-level by using GIS to analyze the effect of various weighting measures on potential future development. These attractiveness weights were based on several developmental factors and their influence on future residential or commercial TAZ growth. Some examples include previous development, future zoning, vacant developable land availability, highway and

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[3] INCOG, *Connections:2035 Regional Transportation Plan, Population Projections; The methodology for projecting and allocating, 2005 to 2035.* http://www.incog.org/transportation/connections2035/estimates/population/Projected_Development_Process_Summary%20.pdf, 2.

[4] INCOG, *Connections:2035 Regional Transportation Plan, Employment Projections; The methodology for projecting and allocating, 2005 to 2035.* http://www.incog.org/transportation/connections2035/estimates/employment/Projections/Project%20Development%20Process%20Summary.pdf, 2.

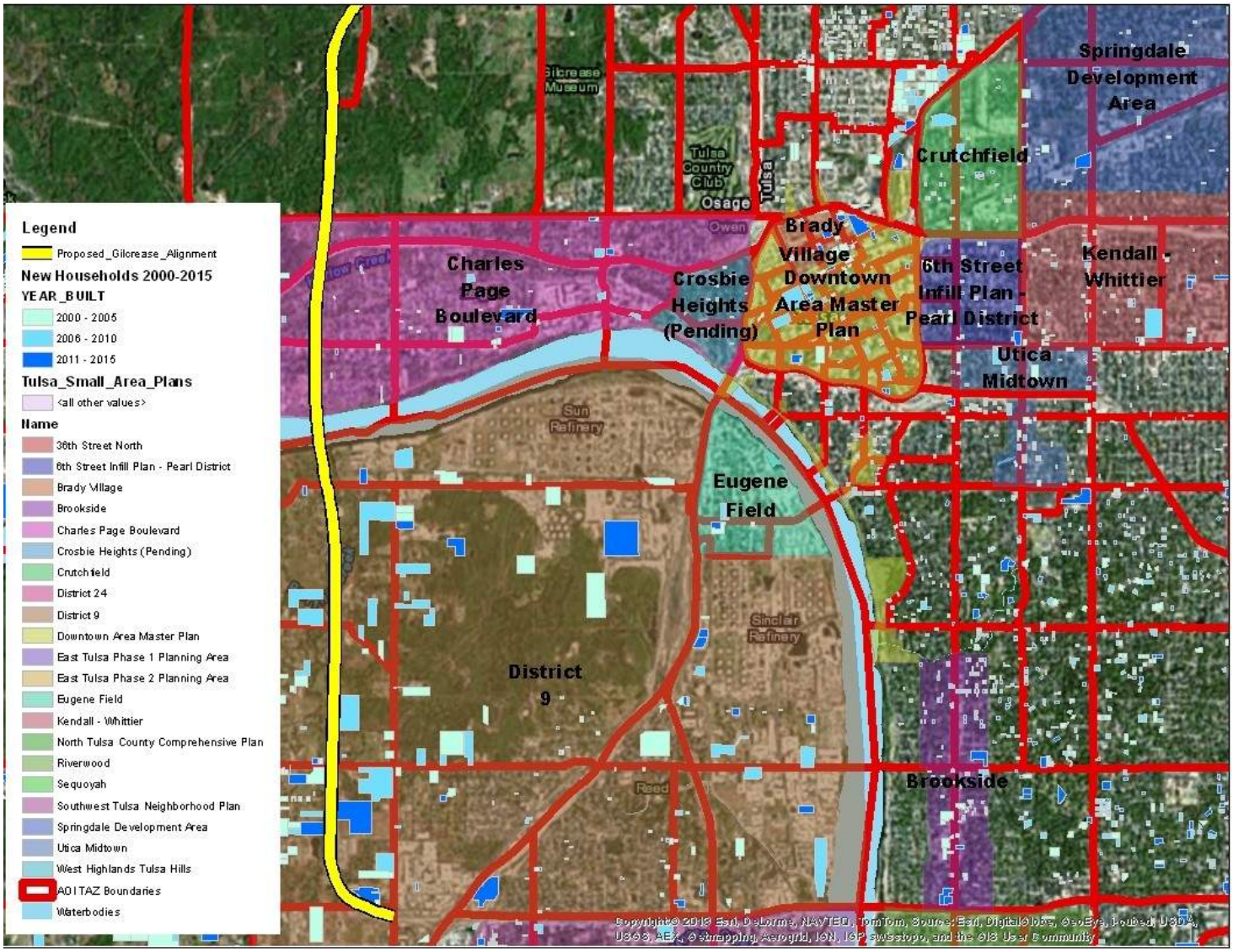
rail accessibility, proximity to public services, as well as geographic impedances to development such as water, floodplain, slope and improper soils.

After allocation was complete, INCOG presented its findings to two review bodies, the Transportation Technical and the Transportation Policy Committees. Findings were also shared with development professionals, whose knowledge of future projects assisted in identifying needed reallocations to other TAZ's within the county.

RDS GIS Review: As INCOG did during their allocation process, RDS took advantage of geographic information system (**GIS**) technology during the comprehensive review process. RDS gathered multiple years of aerial photography, zoning and future land use maps, parcel boundaries and Census block data summed to the TAZ-level for GIS analysis. (See Figure 3) Using GIS, RDS determined TAZ zones where new household and employment development would likely occur after 2010. Through the use of GIS, multiple datasets were displayed side-by-side. This allowed staff to review both model years of the project simultaneously.

Households/Population: After receiving the dataset, RDS reviewed the base year for accuracy. All 373 TAZ's were reviewed by RDS. Household population was derived by using the household sizes that were established in the original INCOG data for each TAZ. During this review, specific attention was given to areas that have seen recent significant household growth. Additionally, RDS reached out to planners and developers that work within the Gilcrease Expressway AOI. These experts were able to provide information on specific developments currently under construction or planned. RDS staff conducted thorough research through examination of local development announcements including news-related websites. RDS used a bottom-up approach using this local knowledge, development research and professional judgment to attempt to accurately account for new housing within the AOI.

Figure 3: Sample GIS Review



Employment: As with households, RDS first examined 2010 for accuracy. Discussions and feedback from local officials helped guide this review. Special attention was paid to special generator and major employer TAZ's, as well as TAZ's that intersected the Gilcrease Expressway itself. RDS used current and future land use and zoning GIS layers to determine if commercial development was feasible. If a commercial development's project use was known, consistent employees per square footage ratios were used to estimate a project's job potential (See Appendix D).

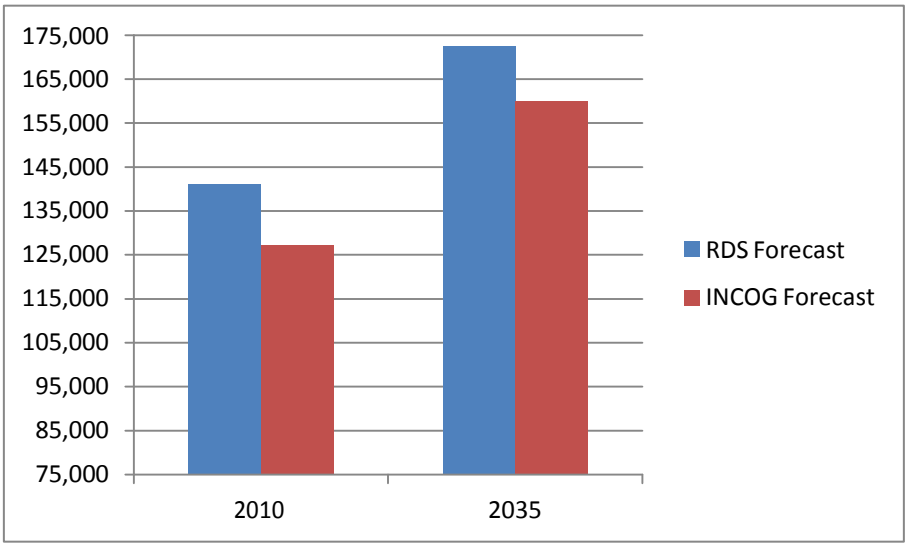
RDS 2010 Area of Interest Review: RDS began the review process by examining each TAZ's 2010 household and employment totals for accuracy. Based on RDS' staff review, the resultant 2010 AOI demographics added 13,939 households, 32,554 population and 1,455 jobs to the original INCOG data. Table 7 illustrates these comparisons for the 2010 demographic factors post-RDS review.

Table 7: 2010 Gilcrease Expressway Area of Interest Statistics

	2010		
	INCOG	RDS	Difference from INCOG
Households	127,106	141,045	13,939
Household Population	301,091	333,645	32,554
Employment	226,086	227,541	1,455

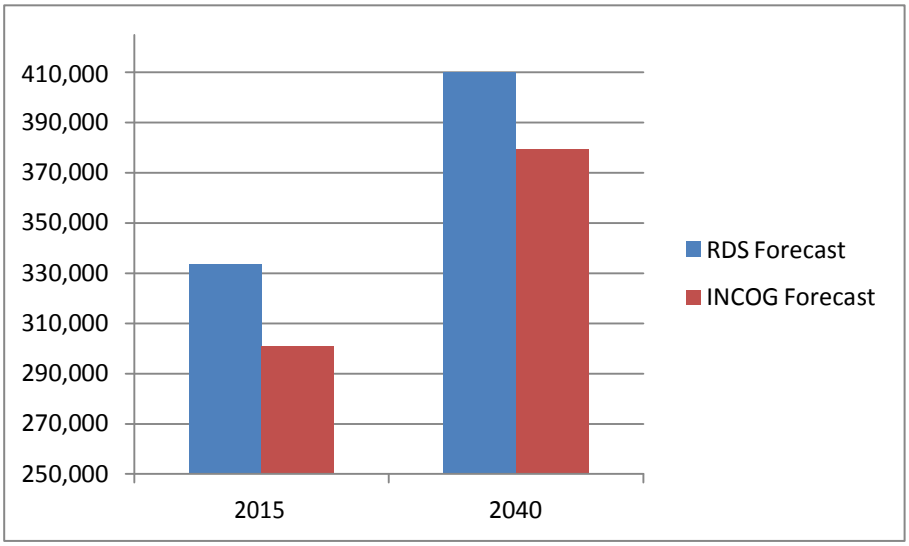
RDS 2010-2035 Review: After establishing new RDS 2010 demographics using staff review, new home reports, commercial development datasets and current year Appraisal District data for each individual TAZ, the 2035 future iteration was reviewed for growth and reasonableness. RDS staff established totals for each, noting the reason for each adjustment. Figures 4, 5, and 6 illustrate AOI growth from 2010-2035 and also compare them by the Compound Annual Growth Rate (CAGR) seen in RDS' and INCOG's forecasts.

Figure 4: RDS vs. INCOG AOI Forecast Households



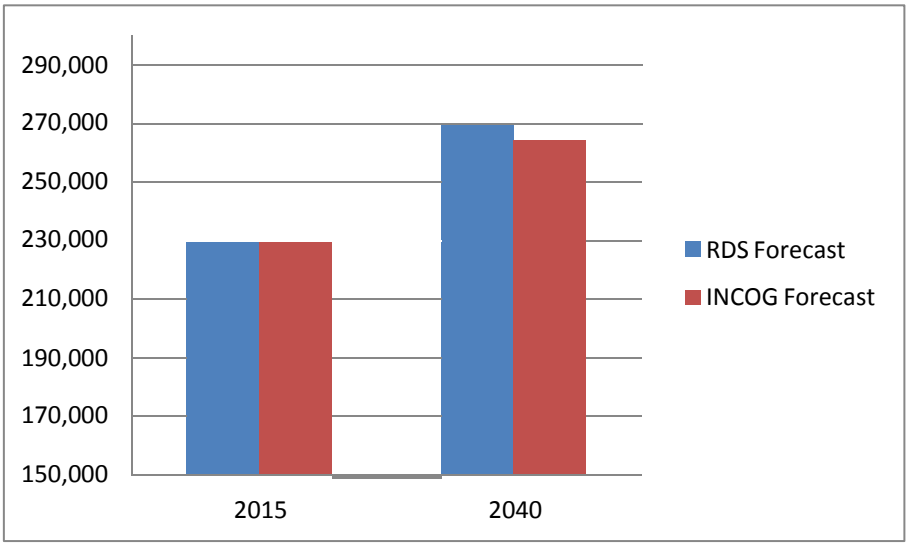
	10-35 GROWTH	10-35 CAGR
RDS	31,364	0.81%
INCOG	32,804	0.92%

Figure 5: RDS vs. INCOG AOI Forecast Household Population



	10-35 GROWTH	10-35 CAGR
RDS	76,204	0.83%
INCOG	78,092	0.93%

Figure 6: RDS vs. INCOG AOI Forecast Employment



	10-35 GROWTH	10-35 CAGR
RDS	43,793	1.11%
INCOG	37,874	0.83%

Table 8 displays RDS' post-review and INCOG's initial AOI totals for households, population and employment for the years 2010 and 2035.

Table 8: 2010-2035 RDS and INCOG Area of Interest Statistics

	2010			2035		
	HH	POP	EMP	HH	POP	EMP
Gilcrease Expwy - RDS	141,045	333,645	227,541	172,409	409,849	271,334
Gilcrease Expwy - INCOG	127,106	301,091	226,086	159,910	379,183	263,960
Absolute Difference (RDS-INCOG)	13,939	32,554	1,455	12,499	30,666	7,374
Percent Difference	11.0%	10.8%	0.6%	7.8%	8.1%	2.8%

VI. Household and Employment Comparison Maps

The following maps have been included to display RDS' future TAZ growth patterns for the entire 2010 to 2035 span of the project.

Figure 7: RDS Household TAZ Growth Map 2010 - 2035

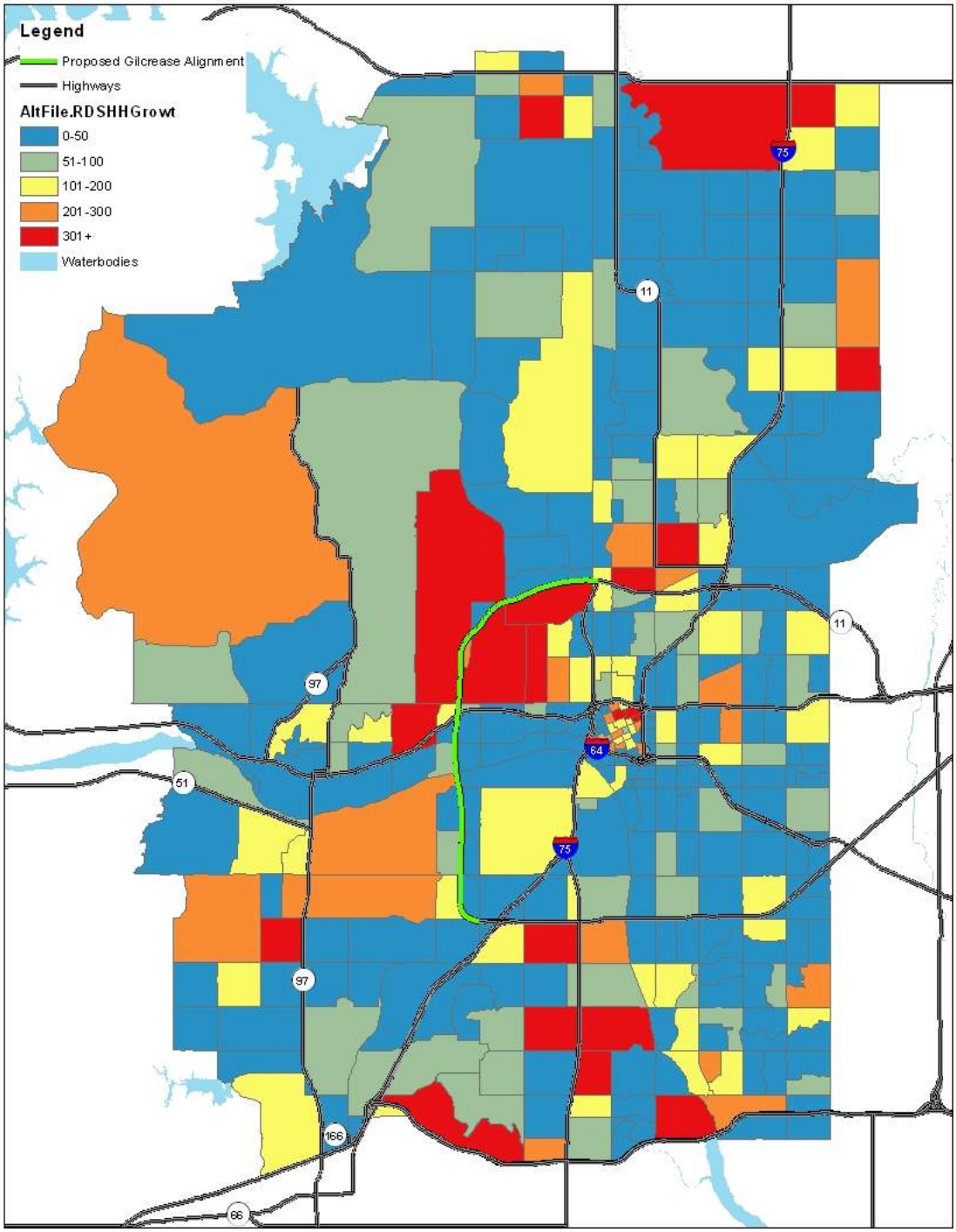
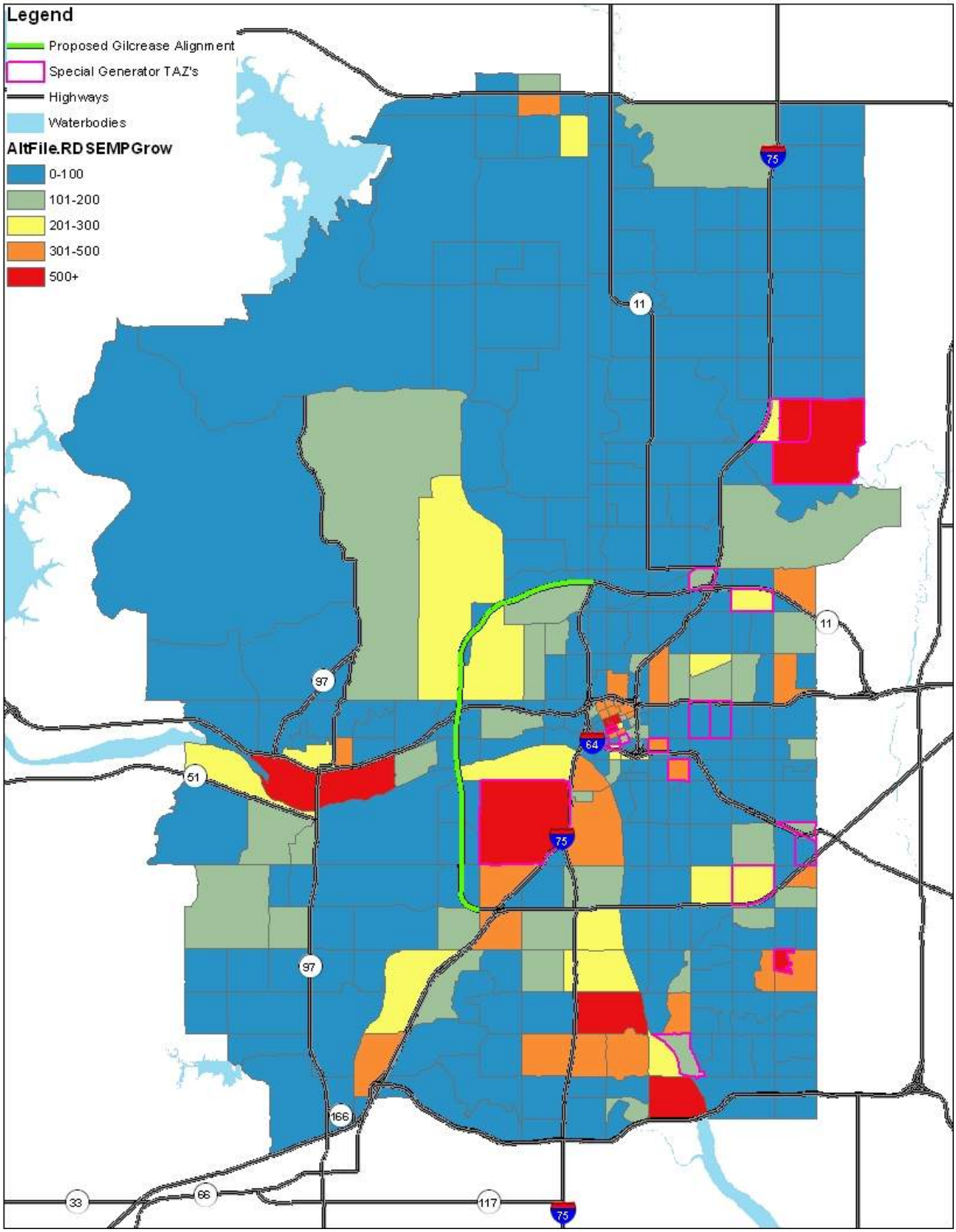


Figure 8: RDS Employment TAZ Growth Map 2010 – 2035



VII. Regional Economic Cycles – Alternative Scenarios

The conservative and optimistic scenarios were created by varying rates and magnitudes of growth due to positive or negative factors to residential or commercial development. Initial reviews of county population and employment data were performed utilizing several national and state agencies that specialize in the field. RDS used these reviews as a guide during its review, as examination of each was a valuable tool in establishing the alternative scenarios.

RDS estimated the household and employment growth impacts due to proximity to existing land uses and potential plans for new construction and redevelopment opportunity. Examples include major roads and highways, special zoning districts, and the Gilcrease Expressway Corridor itself. Using GIS as a tool, (see Figure 9 below) the conservative and optimistic scenarios (see Figures 10, 11 and 12) were created to reflect the potential success or lack thereof within each TAZ.

Figure 9: Subdivision, Major Road and Parcel Map

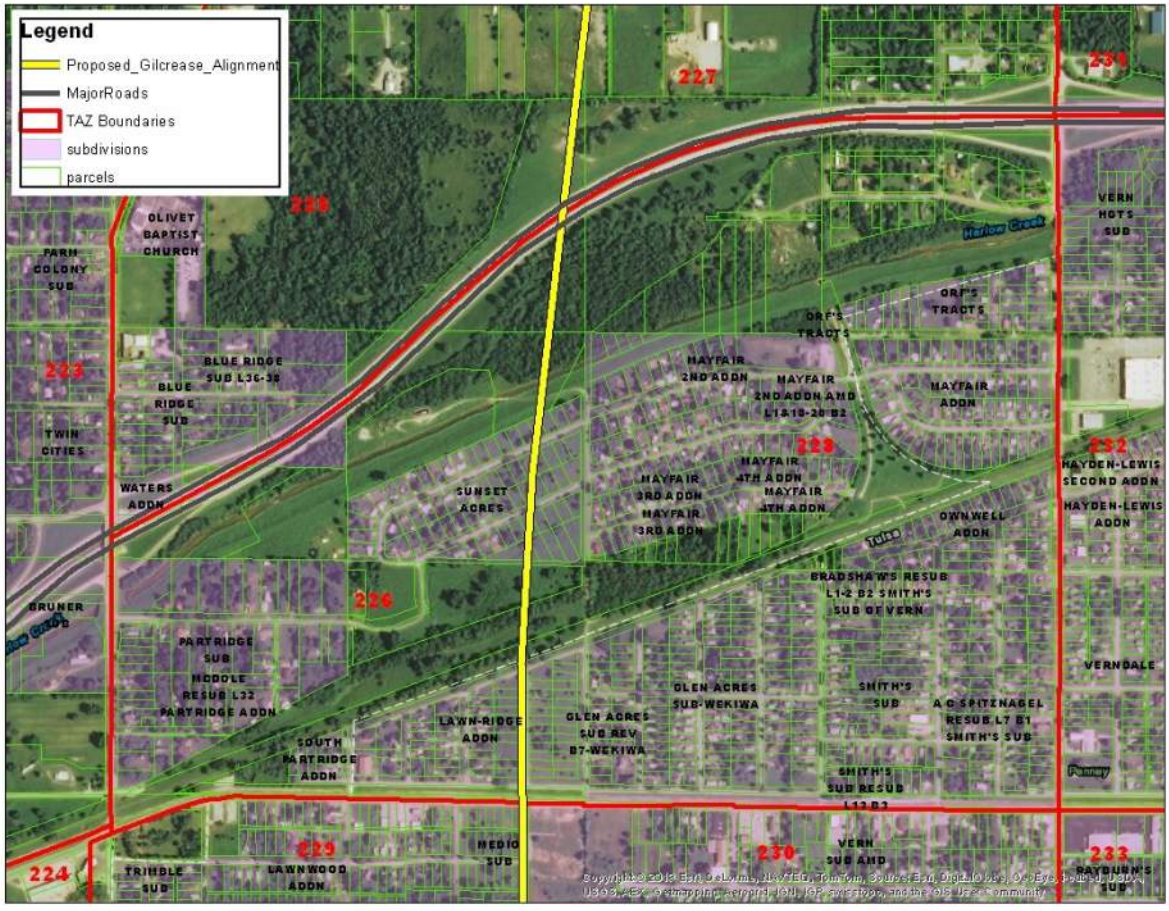
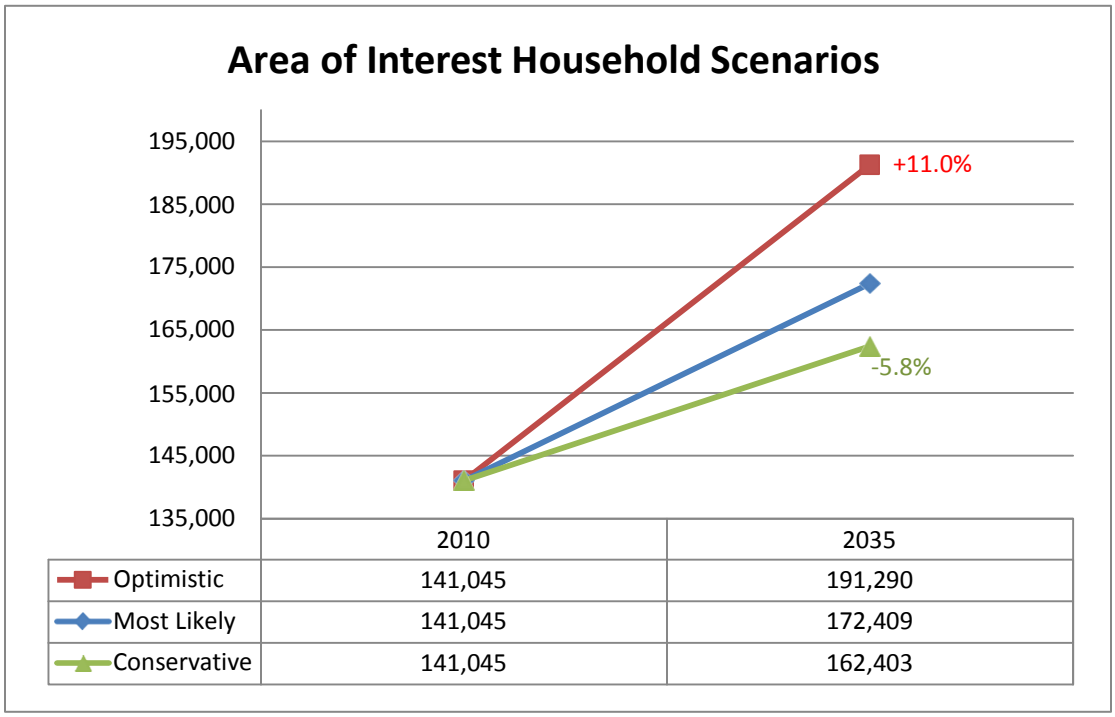
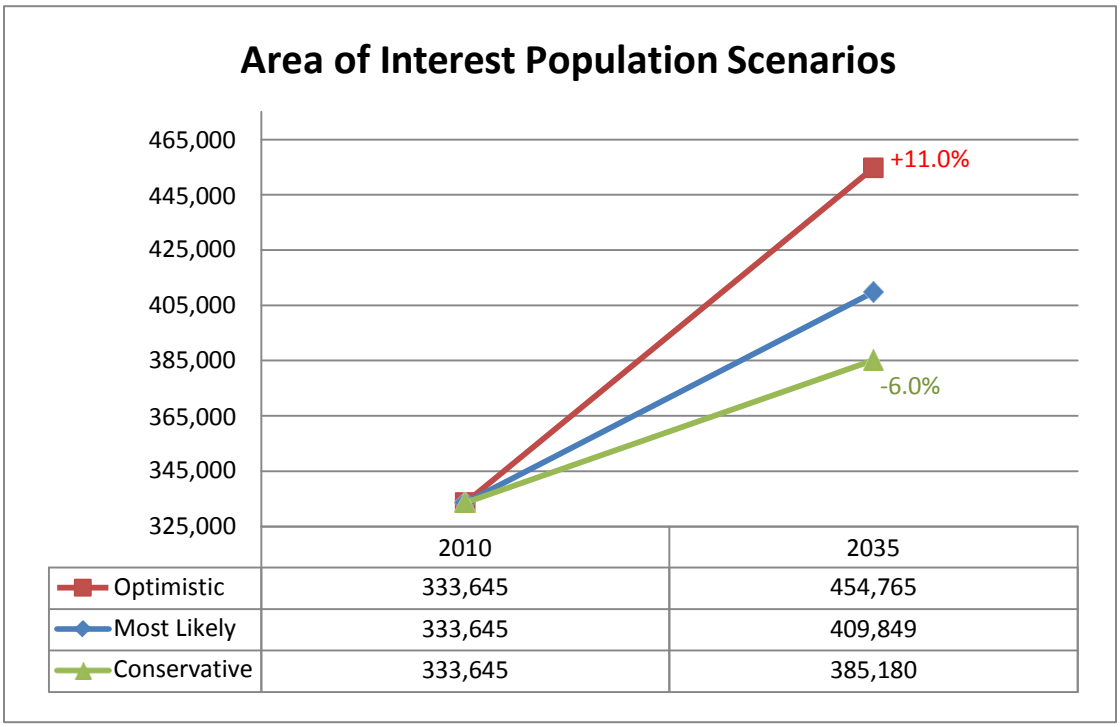


Figure 10: Gilcrease Expressway AOI Household Comparison by Scenario



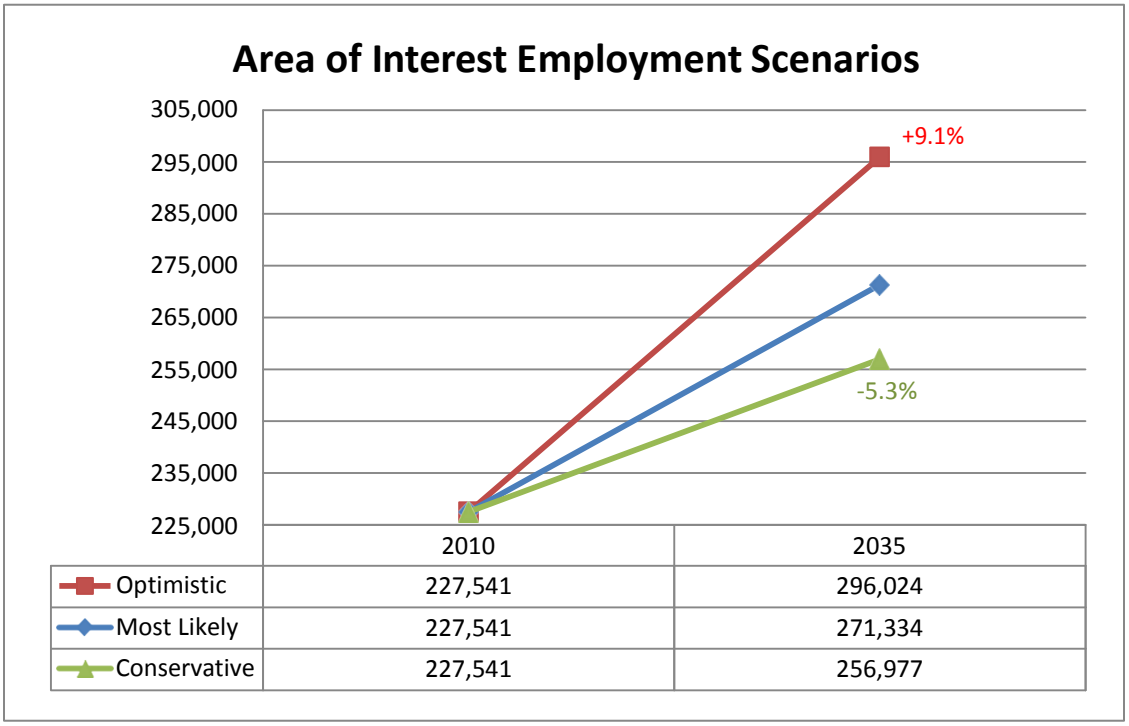
	2010	2035
Optimistic	141,045	191,290
Most Likely	141,045	172,409
Conservative	141,045	162,403

Figure 11: Gilcrease Expressway AOI Household Population Comparison by Scenario



	2010	2035
Optimistic	333,645	454,765
Most Likely	333,645	409,849
Conservative	333,645	385,180

Figure 12: Gilcrease Expressway AOI Employment Comparison by Scenario



	2010	2035
Optimistic	227,541	296,024
Most Likely	227,541	271,334
Conservative	227,541	256,977

Appendix

A. Special Generators – p. A-1

B. RDS Reviewed Household and Population Data - p. B-1 – B11

C. RDS Reviewed Employment Data – p. C-1 – C-12

D. Employee per Square Foot Ratios – p. D-1

A. Special Generators

Special generators are major employers with unique traffic patterns that generate high traffic volumes on a consistent or event-driven basis. Most of these special generators are universities, institutions and major employers. RDS examined each of these to ensure correct geographical location and then assigns each an accurate employment total. Here is a list of special generators located within the AOI. Each was taken into account when TAZ demographics were reviewed.

Special Generators within AOI

TAZ	Name	Type
18	OneOK	Major Employer
30	Blue Cross/Blue Shield	Major Employer
25, 26	Oklahoma State University Medical Center	Hospital
28,161,344	Tulsa Community College	University/College
111, 112	NORDAM Group	Major Employer
112	Whirpool	Major Employer
112	Honeywell	Major Employer
128	Macy's Fulfillment Center	Major Employer
185	Oklahoma State - Tulsa	University/College
156	Warehouse Market	Major Employer
222	Baker Hughes	Major Employer
244,245,371	University of Tulsa	University/College
270	Hillcrest Medical Center	Hospital
275	St. John's Medical Center	Hospital
313	Aaon	Major Employer
343	Dollar Thrifty Automotive	Major Employer
426	St. Francis Hospital	Hospital
426	Warren Clinic	Hospital
472	River Spirit Casino	Major Employer

B. RDS Reviewed Household and Population Data

TAZ	RDSHH10	RDSHH35	RDSPOP10	RDSPOP35	NOTES
1	1	1	2036	2036	OK. Moss Correction Center - GQ.
2	1	5	120	612	OK. Zoned Industrial and CBD. Possible GQ from Mission.
3	4	208	9	469	OK. Brady Arts & Greenwood, Universal Ford and Fox Hotel - 31 du U/C, Davenport Lofts - 24 du announced, Robinson Packer Lofts - 12 du. More potential.
4	1	141	2	282	OK. Brady Arts/Greenwood incl. OneOK Field. Detroit Lofts - 16 du, Bedcheck Bldg Lofts - 13 du. More development imminent.
5	0	0	0	0	OK. All industrial.
6	0	225	0	316	OK.
7	30	492	40	656	OK. Many redevelopment projects since 2010. Metro@Brady - 71 du, Brady District Flats - 40 du, Tribune Lofts - 35 du. Flats on Archer - 61 du. Potential for more.
8	0	450	0	633	Brady Arts/Blue Dome area. Redevelopment strong. Greenarch - 70 du, 1st Lofts - 23 du, The View - 200 du. Adjust 2035.
9	0	0	0	0	Hwy and underpass.
10	0	0	0	0	OK. All commercial.
11	1	5	2	6	BOK Center and US post Office.
12	0	130	0	183	OK. Convention/Arena Area. Palace Bldg Reno - 53 du.
13	0	165	0	232	OK. 100 Boulder Lofts - 18 du, more redevelopment likely.
14	0	189	0	266	OK. CBD TAZ.
15	11	459	16	668	OK. Significant redevelopment since 2010 and into future in East Village District. Edge@East Village - 161 du, Urban 8 - 8 du's.
16	149	157	157	165	OK. Hewgley Terrace Apts - 150 units.
17	0	85	0	113	YMCA Lofts planned - 82 du.
18	62	336	85	460	OK. Redevelopment post-2010. Mayo Lofts - 70 du, Vandever Lofts - 40 du, Former Adams Hotel - 60 du, 111 W. 5th - 60 du.
19	16	80	144	721	OK. Philtower Lofts - 25 du. First Baptist Church of Tulsa may explain household size, possible mission.
20	33	193	61	356	OK. East Village district. East End Village planned - 83 du, Coliseum Apts reno - 36 du.
21	0	243	0	342	OK. Redevelopment potential.
22	33	60	41	74	OK. The Blair - 40 du.
23	0	167	0	234	OK. Redevelopment projects include Robinson Packer Lofts - 12 du
24	0	189	0	265	OK. CBD TAZ.
25	0	0	0	0	OK. OSU Medical Center.

TAZ	RDSHH10	RDSHH35	RDSPOP10	RDSPOP35	NOTES
26	487	750	676	1041	2035 is high. Currently, Renaissance - 159 du, Riverbend Garden - 41 du, Plaza Arms and Diana Apts.
27	22	256	31	361	OK, Deco District. Harrington Bldg reno - 24 du. More redevelopment potential.
28	0	151	0	212	OK. TAZ contains Tulsa JC campus.
29	0	0	0	0	No residential.
30	94	116	109	134	OK.
31	11	13	63	73	OK. HH Size due to Bryce House, homeless veterans in recovery program.
32	10	11	13	14	OK.
33	77	290	131	494	OK. Redevelopment potential.
34	0	0	0	0	Boston Ave. Methodist Church and parking lot.
42	620	700	1631	1841	2010 is low. Skiatook.
43	123	148	285	344	OK.
44	8	25	25	81	Could see small-scale SF development.
45	127	450	376	1335	Rural TAZ that has seen 63 homes built after 2010 - Prairie Ridge & Lantana Ranch. Development should continue.
46	110	450	333	1361	Collinsville, east of Hwy75. SF growth post-2010 in Cooper Crossing and Hollow Creek. Vacant land available for more SF residential.
47	8	150	17	312	22 homes built since 2010, will see more SF development.
48	52	250	141	680	Copper Mill Estates has developed 44 homes recently. More SF likely.
49	42	57	109	148	OK. Large, rural TAZ.
60	26	75	77	225	Cedar Crest GC, could see small-scale SF development.
61	12	21	38	65	OK. Rural TAZ.
62	30	35	77	89	OK.
63	26	34	79	102	OK.
64	21	34	53	87	OK.
65	12	14	39	46	OK.
66	13	50	43	169	TAZ has seen a little recent SF development, more likely.
67	17	53	42	131	OK.
68	15	49	38	123	OK. Mainly vacant, rural TAZ.
69	54	109	130	263	OK. Large, rural TAZ that has seen recent SF development.
70	18	53	51	151	OK.
83	315	373	810	959	OK.
84	90	103	220	251	OK.
85	83	122	217	319	OK.
86	70	83	179	212	OK.
87	101	120	258	307	OK.
88	145	173	409	487	OK.
89	19	40	45	94	Could see small-scale SF development.

TAZ	RDSHH10	RDSHH35	RDSPOP10	RDSPOP35	NOTES
90	35	73	113	237	OK.
91	76	131	191	329	OK. Large, rural TAZ.
92	45	250	113	626	TAZ has seen 21 homes built since 2010 in Sheridan Crossing. Growth should continue.
103	400	438	1201	1315	2010 is low, growth ok.
104	50	56	124	141	2010 is low, growth ok.
105	83	98	206	243	OK. Large, rural TAZ.
106	160	195	602	732	2010 is low, growth ok.
107	375	436	902	1049	2010 is low. Growth ok.
108	41	75	88	161	TAZ seen little SF development since 2010.
109	28	200	87	621	Large portion in SEC of TAZ is zoned SF.
110	16	150	50	472	24 homes built since 2010 in Westgate Subdivision. More SF likely.
111	2	42	4	83	OK.
112	0	0	0	0	All large scale industrial.
113	135	650	464	2236	Land available for more dense SF development. Carrington Pointe & Crossing@86th have seen significant post-2010 growth.
122	33	50	87	132	District 24. Large lot SF. Little room for future growth.
123	450	521	1274	1475	2010 is low. Growth ok.
124	575	689	1545	1849	2010 is low, growth ok. SF zoned land available.
125	80	200	194	483	Potential SF growth in District 24.
126	0	0	0	0	Floodplain, no residential.
127	9	48	20	106	OK.
128	10	49	27	133	OK.
132	575	679	1638	1935	2010 is low. Agricultural land may develop SF.
133	100	150	267	401	OK. Platted lots available for development.
134	1,400	1,500	3864	4139	2010 is low per Census, but growth to 2035 is high. Vacant land does not support growth. Mainly older SF.
135	575	600	1632	1704	2010 is low, growth is high. McLain HS.
136	275	351	738	941	2010 is low, growth ok.
137	158	210	371	493	OK.
138	80	99	231	287	2010 is low, growth ok.
139	1,100	1,394	3080	3903	2010 is low. Growth OK.
140	258	600	727	1690	Land use plan and zoning indicated large parcels designated for SF development. TAZ mainly vacant.
141	475	577	1549	1881	2010 is low, growth ok.
142	79	91	184	212	Tulsa Zoo, Mohawk GC and Park, Oxley Nature Center. Little growth.
143	1	1	1	1	Agricultural.
149	160	300	379	711	Northern terminus of Gilcrease Expwy. Residential development probable.
150	725	1,080	1638	2440	2010 is low. Growth ok.
151	310	381	764	940	2011 is low. Growth ok.
152	100	122	249	303	2010 is low, growth ok.

TAZ	RDSHH10	RDSHH35	RDSPOP10	RDSPOP35	NOTES
153	39	250	121	774	36th St. North District. Large portion zoned SF.
154	117	266	324	737	OK.
155	250	400	660	1055	2010 is low. Vacant parcel zoned residential on frontage could develop.
156	72	122	193	327	OK. Lots platted.
157	72	104	159	229	OK.
158	24	75	62	194	Older, large lot SF. Little chance for significant growth.
159	58	103	182	323	OK.
160	24	50	51	108	Platted lots available for development.
161	15	18	32	39	OK.
162	185	198	452	483	2010 is low, could see SF growth. TAZ abuts Tulsa Airport.
163	2	2	3	3	All industrial.
171	700	750	1611	1726	2010 is low per Census, TAZ built-out.
172	850	900	2082	2204	2010 is low. TAZ almost built-out.
173	725	825	1821	2072	2010 is low per Census, but growth to 2035 is high. Vacant land does not support growth. Mainly older SF.
174	1,075	1,150	2744	2936	Little residential land available for development. 2010 low, 2035 high.
175	235	291	662	819	2010 is low. Growth ok.
176	1,650	1,800	4800	5236	2010 is low per Census, but growth to 2035 is high. Vacant land does not support growth. Mainly older SF.
177	975	1,050	2846	3065	2010 is low per Census, but growth to 2035 is high. Vacant land does not support growth. Mainly older SF.
178	525	550	1584	1661	Vacant land zoned industrial. 2010 is low, 2035 adjusted.
179	800	925	2130	2463	Large vacant parcels designated SF. 2010 is low.
182	400	502	1003	1260	2010 is low. Far east portion of TAZ has SF platted vacant lots.
183	300	375	724	903	2010 is low, growth ok.
184	400	521	922	1200	2010 is low. Carver MS, vacant land university-owned.
185	364	492	630	852	OK. OSU-Tulsa. Vacant parcel owned by Oklahoma State could be MF development.
186	1	4	2	8	OK. Most of TAZ is zoned industrial.
187	0	0	0	0	No residential.
188	200	220	551	607	2010 is low and TAZ is built-out.
189	575	600	1802	1882	Crutchfield District - vacant land not zoned for residential growth. 2010 is low.
190	725	819	2205	2491	2010 is low. 2035 is accurate, but growth unrealistic.
191	550	575	1791	1873	2010 is low, TAZ is built-out.

TAZ	RDSHH10	RDSHH35	RDSPOP10	RDSPOP35	NOTES
192	1,750	2,000	4780	5464	2010 is low per Census, but growth to 2035 is high. Vacant land does not support growth. Mainly older SF.
193	1,075	1,125	2703	2830	2010 is low per Census, but growth to 2035 is high. Vacant land does not support growth. Mainly older SF.
194	800	850	2082	2213	2010 is low. Only vacant land is Rose Hill Memorial Park.
195	1,200	1,283	3112	3328	2010 is low.
196	950	975	2751	2824	2010 is low. TAZ is built-out.
212	76	93	174	214	OK.
213	39	50	107	137	OK.
214	425	600	1010	1426	2010 is low. Large TAZ east of Hwy 64. SF growth probable.
215	325	345	826	877	2010 is low. TAZ built-out.
216	950	975	2360	2422	2010 is low, TAZ is built-out.
217	175	190	356	386	Unprobable residential development. Sheffield Steel Co. and other industrial.
218	318	393	795	983	OK. Shadow Creek Subdivision still growing, 35 VDL as of 6/15.
219	334	388	703	816	2010 is low. TAZ built-out. Charles Page HS.
220	226	375	631	1046	Large parcels zoned SF available for further development in Sand Springs.
221	500	525	1431	1501	Only vacant land is Sand Springs Child's Home. Little future development.
222	17	17	24	24	OK. Mainly industrial.
223	670	1,000	1539	2298	2010 is low. Will likely see significant SF development in vacant portion of TAZ.
224	235	250	602	640	2010 is low. No land for further residential development.
225	43	150	98	344	Eastern boundary of TAZ is Gilcrease Expwy. SF growth potential.
226	101	123	258	313	OK. Eastern edge of TAZ is Gilcrease Expwy. Growth is low.
227	27	83	65	199	OK. Charles Page district.
228	520	550	1343	1419	2010 is low. SEC Gilcrease Expwy/ Sand Springs Expwy. Little growth due to possible demolitions.
229	360	428	1062	1264	2010 is low, growth ok. Charles Page district, Intersects Gilcrease Expwy.
230	209	249	547	651	OK. Western edge of TAZ is Gilcrease Expwy.
231	121	135	280	312	TAZ is built-out.
232	856	895	2179	2279	2010 is low and TAZ is built-out.
233	125	140	305	341	2010 is low. TAZ is built-out.
234	210	263	543	681	2010 is low. TAZ is built-out.
235	525	550	1222	1281	2010 is low. TAZ is built-out.
236	74	112	455	689	OK. Charles Page district. Vacant SF lots. HH Size likely due to Tulsa County Juvenile Bureau.

TAZ	RDSHH10	RDSHH35	RDSPOP10	RDSPOP35	NOTES
237	415	450	1104	1196	2010 is low, TAZ built-out.
238	155	175	397	448	Charles Page/Crosbie Heights. 2010 is low, TAZ built-out.
239	0	0	0	0	OK. Mainly industrial.
240	80	100	207	260	6th St./Pearl district. 2010 is low, possible redevelopment opportunity.
241	50	90	88	158	Little growth from Village@Central Park but vacant land is Centennial Park and Oaklawn Cemetery.
242	525	665	1240	1570	2010 is low. 6th St/Pearl District. Growth ok. City attempting redevelopment/revitalization.
243	925	975	2228	2347	Kendall-Whittier. 2010 is low. TAZ is built-out.
244	1,400	1,450	3239	3354	2010 is low. Kendall-Whittier. TAZ is built-out.
245	1,007	1,221	2766	3354	OK. University of Tulsa.
246	875	900	1905	1960	2010 is low. TAZ is built-out. Will Rogers HS.
247	970	1,000	2037	2099	2011 is low. TAZ is built-out.
248	1,325	1,482	2866	3206	2010 is low, growth ok.
259	154	190	261	322	OK.
260	330	350	549	582	2010 is low, TAZ is built-out.
261	82	85	124	129	2010 is low. TAZ is built-out.
262	440	479	611	665	2010 is low, growth ok.
263	1,075	1,200	1434	1601	2010 is low, growth ok. TAZ along river.
264	17	18	32	34	OK.
265	180	196	241	262	Redevelopment opportunity.
266	35	40	58	66	2010 is low. Majority of TAZ is Veterans Park.
267	85	92	191	206	2010 is low, growth ok.
268	300	320	686	731	2011 is low. TAZ is built-out.
269	210	225	528	565	2010 is low, TAZ is built-out.
270	600	658	1135	1245	2010 is low. Utica Midtown district.
271	370	401	705	764	2010 is low. Utica Midtown-Northern Section. Maybe small scale redevelopment.
272	325	400	469	578	Significant multi-family redevelopment 2000-2010. Possibly more in future. 2010 is low.
273	91	98	168	180	OK. Almost built-out.
274	750	780	1385	1440	Eastern portion of TAZ in Utica Midtown district. 2010 is low, TAZ built-out.
275	450	475	891	940	2010 is low and TAZ is built-out. St. John Medical Center.
276	1,225	1,357	2260	2503	2010 is low, growth ok. Almost built-out TAZ just south of University of Tulsa.
277	380	400	706	744	2010 is low and TAZ is built-out.
278	775	800	1509	1559	2011 is low. TAZ is built-out.
279	1,150	1,214	2275	2403	2010 is low. Increased occupancy could reach 2035 totals.
280	286	321	548	615	OK. Tulsa State Fairgrounds.
281	420	445	832	881	2010 is low, TAZ is built-out.
282	85	89	169	175	2010 is low, growth ok.
283	99	113	212	241	OK.

TAZ	RDSHH10	RDSHH35	RDSPOP10	RDSPOP35	NOTES
284	370	390	870	917	2010 is low. TAZ is built-out.
303	327	387	971	1150	OK. Sand Springs.
304	60	71	177	210	OK.
305	862	1,039	2578	3108	OK. 57 homes built post-2010. Timberling Hollow has 32 VDL, Prattwood Estates IV has 10 as of 6/15 per city.
306	563	668	1405	1666	OK. Land platted for SF development.
307	968	1,174	2534	3072	OK. Sand Springs, most land zoned agricultural per INCOG.
308	164	203	418	517	OK. Eastern edge of TAZ is Gilcrease Expwy. Growth is low.
309	90	109	242	295	2010 is low, growth ok.
310	250	310	630	780	OK. District 9. Gilcrease Expwy is eastern boundary.
311	45	62	130	180	OK.
312	0	0	0	0	OK. Mainly industrial.
313	435	553	1093	1389	2010 is low, growth ok. District 9.
314	1,425	1,600	2593	2910	OK. 2010 is low, but 2035 high. Little vacant land for development. Westport on the River.
315	264	327	766	948	Older, built-out TAZ along Hwy 75. Little chance for growth.
316	185	220	488	580	2010 is low, growth ok. Sinclair Refinery.
317	525	550	912	956	2010 is low. Only vacant land is Gathering Place for Tulsa parkland.
318	820	850	1871	1938	2010 is low. TAZ is built-out.
319	550	570	1362	1411	2010 is low. TAZ built-out.
320	0	0	0	0	All commercial. Utica Square SC.
321	450	475	1064	1124	2011 is low. TAZ is built-out. Cascia Hall Prep.
322	1,041	1,100	2350	2484	TAZ entirely built-out, almost all older SF.
323	276	290	501	526	TAZ is built-out.
324	1,700	1,750	3417	3516	2010 is low. TAZ built-out.
325	575	600	1100	1148	2010 is low, TAZ built-out. Tulsa School Board Bldg.
326	2,175	2,250	4857	5025	TAZ built-out. 2010 is low per Census, 2035 is high.
337	1,900	1,950	3136	3218	2010 is low. TAZ built-out.
338	1,050	1,150	1965	2151	2010 is low. Portion in Brockside District. TAZ mainly older SF, built-out but 43 homes since 2010.
339	596	625	1464	1535	TAZ is built-out. Teardowns possible.
340	1,000	1,025	2429	2489	2010 is low. TAZ entirely built-out, almost all older SF.
341	2,375	2,425	4764	4864	TAZ built-out. 2010 is low.
342	515	535	1208	1256	Southroads Mall. 2010 is low, TAZ built-out.
343	450	475	866	914	2011 is low, TAZ built-out.
344	525	550	1252	1310	2010 is low. Low growth TAZ. Bishop Kelley HS.
356	278	550	614	1214	OK. Sand Springs. 68 homes built post-2010. Angus Valley Farms has 26 VDL as of 6/15.

TAZ	RDSHH10	RDSHH35	RDSPOP10	RDSPOP35	NOTES
357	925	950	2336	2399	Sand Springs. 2010 is low. TAZ almost built-out. Largest vacant parcels are church/charity-owned.
358	417	650	1108	1727	Large vacant parcels zoned SF, will see growth.
359	252	550	702	1530	Large western portion of Sand Springs TAZ zoned SF. The Glens & Ridge @ Whispering Creek - 62 VDL as of 6/15.
360	136	250	363	666	Eastern edge of TAZ is Gilcrease Expwy. Growth is low.
361	5	17	13	43	OK. TAZ mainly zoned industrial.
362	700	750	1727	1850	2010 is low. Southern terminus of Gilcrease Expwy. District 9. Most vacant land zoned industrial.
363	1,650	1,670	4142	4192	2010 is low, growth ok.
364	175	200	443	506	2010 is low. Southwest Tulsa district. Only vacant land zoned industrial.
365	155	191	368	453	2010 is low, growth ok.
366	103	211	261	534	OK.
367	635	693	1511	1649	2010 is low. Growth ok.
368	1,125	1,175	2221	2320	2010 is low. TAZ almost built-out.
369	2,100	2,175	4259	4411	2010 is low. TAZ built-out.
370	840	890	1991	2110	2010 is low. Some redevelopment, 22 SF probably teardowns.
371	1,063	1,195	2390	2687	OK. Amost built-out TAZ along Hwy 66. OU-Tulsa.
372	317	335	482	510	Most existing vacant land is zoned commercial.
373	146	158	341	370	OK.
374	198	227	464	533	OK. Little vacant land for new residential.
375	1,900	1,950	4113	4222	2010 is low. TAZ built-out.
390	475	950	1290	2580	2010 is low, significant SF growth post-2010 in TAZ. Stone Creek Estates III - 58 lots VDL as of 6/15.
391	135	152	341	383	2010 is low, growth ok.
392	235	263	582	651	2010 is low, growth ok.
393	90	113	226	284	OK. Vacant land zoned industrial.
394	510	635	1352	1683	2010 is low. Platted SF lots available for construction.
395	693	1,200	1963	3398	Significant SF zoned land available for development.
396	3	250	7	583	Southwest Tulsa. Could see some small scale development per neighborhood plan.
397	1,475	1,525	3463	3580	2010 is low. TSZ is built-out. Only vacant land is Johnson Park.
398	1,450	1,500	3189	3298	2010 is low. TAZ built-out.
399	1,550	1,600	3024	3122	2010 is low. TAZ built-out.
400	1,250	1,300	2197	2284	2010 is low. TAZ built-out, mainly SF.
401	500	520	1044	1086	TAZ built-out. Grimes Elementary and Nimitz JH.
402	1,300	1,449	2377	2649	2010 is low, growth ok.

TAZ	RDSHH10	RDSHH35	RDSPOP10	RDSPOP35	NOTES
403	975	1,000	2112	2165	2010 is low. TSZ is built-out.
404	0	0	0	0	OK. LaFortune Park GC and park.
405	682	715	1586	1663	TAZ is built-out.
417	1,179	1,222	2931	3060	OK.
418	61	150	158	422	Land use plan calls for new neighborhood close to water tower.
419	1,525	1,696	2905	3230	2010 is low. Growth ok.
420	1,925	2,106	4212	4609	Riverwood District. 2010 is low, growth ok.
421	730	809	1464	1623	Riverwood District. 2010 is low, growth ok.
422	24	27	53	59	OK. Southern Hills CC.
423	675	700	1539	1596	2010 is low. Wealthy TAZ just south of Southern Hills CC. Built-out.
424	790	815	1803	1861	TAZ is built-out.
425	825	907	1504	1653	2010 is low.
426	60	60	142	142	TAZ is built-out. St. Francis Hospital.
427	1,000	1,250	2143	2680	2010 is low. Large vacant portion of TAZ zoned SF.
441	475	959	968	1977	2010 is low. Vacant land along Okmulgee Expwy.
442	188	570	605	1856	OK. Significant SF growth behind Tulsa Hills SC since 2010.
443	915	925	1905	1927	2010 is low. Little chance for future development, vacant land is designated park/open space.
444	2,300	2,500	4840	5262	2010 is low. Could see MF development.
445	42	46	1905	2091	OK. Oral Roberts University.
446	669	745	1529	1703	OK. Oral Roberts University and SF.
447	620	650	1443	1514	2010 is low. TAZ is built-out.
448	565	600	1190	1264	2010 is low. TAZ built-out.
449	1,540	1,701	2862	3161	2010 is low. Growth ok.
450	1,275	1,300	2794	2849	2010 is low, 2035 adjusted. TAZ is built-out.
468	94	141	231	368	OK. West Highlands/Tulsa Hills.
469	42	400	130	1370	Hyde Park at Tulsa Hills - 165 homes. Potential large SF developments. Jenks.
470	4	4	12	34	OK. Jones Airport.
471	165	185	433	507	OK. Most vacant land zoned industrial.
472	392	550	853	1197	River Spirit Casino. Possible MF complex.
473	525	750	1081	1544	2010 is low, apts built in 2011 could be more. Citiplex Towers.
474	1,525	1,675	3356	3687	2010 is low. Growth ok.
475	598	640	1592	1704	TAZ is built-out. Jenks East Elementary.
476	750	775	1708	1766	2010 is low. TAZ is built-out.
477	750	775	1437	1485	2010 is low. TAZ is built-out.
478	597	680	1533	1747	OK.
493	56	90	153	268	OK.
494	125	400	271	917	2010 is low. Southern Reserve subdivision has seen 161 new SF since 2010.

TAZ	RDSHH10	RDSHH35	RDSPOP10	RDSPOP35	NOTES
495	375	500	1076	1448	2035 is high. Vacant land does not support growth.
496	112	177	296	490	OK.
497	437	475	1123	1238	TAZ built-out. Includes South Lakes GC.
498	0	0	0	0	OK.
499	2	2	5	27	OK. Parkland and Commercial.
500	875	1,254	2275	3283	2010 is low. Riverwalk Apts built post-2010. TAZ includes Jenks HS.
501	1,550	1,850	2680	3199	2010 is low, land available for likely MF development.
502	329	350	924	983	TAZ is built-out. Jenks Middle School.
503	434	465	1196	1281	TAZ is built-out.
504	538	575	1406	1504	TAZ is built-out.
624	399	518	1216	1578	OK.
625	125	162	301	389	OK.
630	21	28	51	68	OK.
631	199	278	572	800	OK. Large, mainly vacant TAZ on SEC of Skiatook Lake.
632	64	117	193	352	OK. Lots platted in Summer Hill Estates.
633	287	550	694	1331	Large, vacant parcel zoned SF.
634	400	425	1007	1071	Little chance for development. Older SF, trailer park.
635	18	23	48	62	OK. Osage Reservation.
636	274	750	697	1907	Skiatook. TAZ could see considerable SF growth.
637	274	417	749	1141	OK. Few large parcels could be developed SF.
638	113	140	315	390	OK. Large, rural TAZ.
639	25	30	64	77	OK. Rural TAZ.
640	29	37	80	103	OK.
641	81	98	245	297	OK.
643	80	125	218	341	Large, rural parcel just south of Skiatook Lake.
644	63	95	175	263	OK. Rural TAZ.
645	128	184	358	516	OK. Large, rural TAZ.
646	20	24	50	61	OK. Rural TAZ.
647	227	400	612	1079	Large, rural TAZ , should see further SF development by 2035.
649	875	1,100	2263	2843	2010 is low. Should see more SF development before 2035.
650	653	750	1765	2028	Large TAZ that will see more residential development before 2035.
651	21	23	38	41	OK. Rural TAZ.
652	19	35	52	96	OK. Large, rural TAZ.
653	35	44	89	112	OK.
654	81	500	217	1338	Land use plan indicates possible large-scale SF development after Gilcrease Expwy is built.
655	89	103	210	242	OK.
656	43	60	101	141	2010 is low. Southern boundary is Gilcrease Expwy. Could see small-scale SF development.
657	0	0	0	0	Industrial along Gilcrease Expwy.

TAZ	RDSHH10	RDSHH35	RDSPOP10	RDSPOP35	NOTES
658	53	500	145	1369	Large, mainly vacant TAZ along Osage Expwy. Should see significant SF growth by 2035.
659	0	0	0	0	No residential.
661	95	150	245	389	Sand Springs Airport. Very large TAZ might see some growth before 2035. 2010 is low.
662	195	209	471	505	2010 is low, growth ok.
663	32	75	81	191	OK. The Ridge Subdivision - 30 VDL as of 6/15.
664	0	33	0	50	OK. Southeast boundary is Gilcrease Expwy.
665	0	250	0	596	Western boundary is Gilcrease Expwy. Could develop by 2035.
666	89	500	133	746	Large vacant TAZ east of Gilcrease Expwy.
667	185	500	505	1366	Significant vacant land in northern portion of TAZ for SF development.
668	306	409	768	1027	OK.
669	806	1,087	1869	2521	OK.
670	298	315	813	860	TAZ entirely built-out.
671	0	0	0	0	OK. ROW
672	775	900	1951	2264	2010 is low, 2035 is high. TAZ includes Tulsa CC. One developable parcel on far west portion. Almost built-out.
734	208	257	568	703	OK.
735	60	104	187	324	OK.
737	3	150	11	536	Rural TAZ surrounded by recent SF development.
738	80	100	207	258	OK.
739	196	239	469	572	OK.
740	137	171	342	428	OK. NEC of Sahoma Lake.
741	369	518	976	1370	OK. Large TAZ in Sapulpa.
742	131	163	365	453	OK.
743	52	62	127	151	OK.
744	268	333	741	920	OK. Sapulpa.
745	55	73	146	193	OK.
746	47	55	120	140	OK. TAZ mostly industrial.
747	350	395	946	1067	2010 is low. Growth OK.
748	114	178	609	949	OK. Most development is industrial, but could see small residential development, possibly mobile homes.
749	44	47	117	126	OK.
750	108	139	265	342	OK. Too much industrial to attract significant SF growth.
751	77	106	234	321	OK. Oaks CC.
752	400	425	1078	1145	2010 is low. TAZ is almost built-out.
753	155	240	579	897	OK.
754	392	488	1021	1271	OK.
755	350	424	951	1152	OK.
756	292	628	696	1498	OK. Large, Mainly vacant TAZ in Sapulpa.
757	86	150	231	402	Future SF development likely.
765	3	200	7	450	US75@Creek Turnpike. SF development close by.

C. RDS Employment Data

TAZ	RDSEMP10	RDSEMP35	NOTES
1	404	509	OK. Moss Correctional Center.
2	399	725	OK. Redevelopment potential in Brady Village.
3	208	534	OK. KOTV/Channel 6 building, Universal Ford & Fox Hotel redevelopment - restaurants and small office.
4	181	502	Greenwood District - OneOK Field.
5	108	129	OK. Wrecker yard and Avalon Correction Center, State offices.
6	162	488	OK. CBD revitalization.
7	205	524	OK. Brady Arts & Greenwood revitalization-Mathews Warehouse, OKPOP Museum. Future Holiday Inn Express.
8	633	1028	OK. Hogan Assessment HQ announced 200 emp.
9	16	21	OK. Mainly RR and hwy ROW.
10	50	51	2010 and 2035 are low. Industrial/Warehouses in CBD.
11	239	239	OK. BOK Center and Post Office. TAZ is built-out.
12	2429	3565	OK. One Place - 320K SF Office, 19K Retail, Tulsa World, Westin Hotel, District Court Bldg. Hilton Garden Inn & Hampton Inn announced 259 rms total.
13	14384	15489	OK. Williams Towers I & II - 770K SF Office, BOK Tower - 1.3M SF, One Technology Center - 627K SF Office, 320 S. Boston - 397K SF Office. Hyatt Regency, Tulsa City Hall, etc.
14	512	635	OK. CBD revitalization.
15	164	494	OK. Redevelopment - The Boxyard, several empty blocks ready for commercial dev.
16	853	875	TAZ is built-out. Human Services Bldg.
17	2875	2875	OK. Cox Business Center, Tulsa Ballroom, Tulsa PD, Courthouse, Library, Aloft Hotel - 200 rms.
18	4895	5569	OK. One OK Plaza, First Place Tower, Mayo Hotel, Bank of America Center, Park Centre, restaurants and retail.
19	3000	3250	2010 and 2035 are low. Mid-Continent Tower - 420K SF Office, Philtower Bldg - 119K SF Office, Philcade Bldg - 272K SF Office, 520 S. Cincinnati - 126K SF Office, Courtyard Tulsa.
20	127	223	OK. AT&T Building.
21	0	200	Small retail, possible revitalization.
22	311	375	OK.
23	4358	4858	2010 to 2035 growth appears high, TAZ almost built-out. 110 W. 7th St - 522K SF Office, 218 W. 6th, Main Plaza - 52K SF Office, 601 S. Boulder, Holiday Inn Tulsa City Center.
24	1600	1958	OK. 8:18 Bldg. - 80K SF Office, 624 S. Boston - 75K Office, Chamber of Commerce - 84K SF Office, American Electric Power, downtown retail and restaurants.
25	870	1082	OK. OSU Medical Center will likely grow.
26	503	503	OK. Doubletree and Best Western Hotels, OSU Obstetrics Program, restaurants and retail.

TAZ	RDSEMP10	RDSEMP35	NOTES
27	271	352	OK. Harrington Bldg reno, Cathedral District.
28	480	637	OK. Tulsa Community College.
29	1200	1400	2010 and 2035 are low. Home Depot, The Sun Bldg -250K SF Office, Bovaird Bldg - 70K SF Office, vacant commercial parcels available.
30	1465	1753	OK. 1215 S Boulder W - 120K SF Office, vacant parcels available in Cathedral district.
31	27	27	OK. FUMC Tulsa
32	21	21	OK. Small commercial along Detroit Ave.
33	156	156	OK. Gunboat District.
34	46	62	2010 and 2035 are high. Boston Avenue Methodist Church, rest of TAZ is ROW.
42	191	290	OK.
43	85	148	OK.
44	8	14	OK.
45	146	249	OK. Large, rural TAZ.
46	1	50	New Quiktrip and will have other ancillary business.
47	7	9	OK.
48	0	0	OK.
49	7	9	OK.
60	25	25	2010 and 2035 are low. Cedar Crest GC.
61	0	0	OK.
62	4	4	OK.
63	0	0	OK.
64	0	0	OK.
65	0	25	TAZ will see some ancillary development at US75 @ 116th.
66	13	17	OK. Storage warehouses.
67	8	10	OK. Rural off of US75.
68	15	23	OK. Large, rural TAZ.
69	3	5	OK.
70	2	2	OK.
83	313	378	OK. Sperry HS. Small retail and office.
84	66	77	OK.
85	76	97	OK. Rural TAZ.
86	18	23	OK. Large, rural TAZ.
87	20	23	OK.
88	14	16	OK.
89	68	150	Large, rural TAZ along US75 will see some employment growth.
90	6	10	OK.
91	5	8	OK.
92	5	8	OK. Large lot residential.
103	40	47	OK. Tulsa Lighthouse Charter School.
104	3	4	OK.
105	20	27	OK.
106	200	240	OK. Tuley Correction Center, Warehouse Market, Dollar General.

TAZ	RDSEMP10	RDSEMP35	NOTES
107	20	27	OK.
108	0	75	TAZ will see commercial development along US75 between 66th and 76th.
109	0	25	Ancillary development along US75.
110	31	125	2035 is low. Mainly undeveloped TAZ in unincorporated area along US75. Cornerstone Christian Academy,
111	375	608	OK. NORDAM. Vacant land zoned industrial.
112	2175	3044	OK. Whirlpool, Honeywell, Bama Foods, NORDAM.
113	69	117	OK. Barnes Elementary School.
122	16	20	OK.
123	46	55	OK. Tulsa Health Dept office.
124	232	272	OK. Center portion of TAZ is zoned industrial and has some vacant parcels.
125	21	25	OK.
126	41	70	OK.
127	10	16	OK.
128	2250	6000	2010 is high, 2035 low. Macy's fulfillment center will employ 2.5K FT workers, Verizon, Ryerson, American Alloy Steel. Significant land availble for future development.
132	96	104	OK. Gilcrease Elementary School.
133	32	41	OK.
134	262	313	OK.
135	173	206	McLain HS, Northridge SC, small retail and restaurants.
136	138	161	OK. Monroe Demonstration School, Penn Elementary.
137	1	25	Ancillary development along US75.
138	130	210	Large SEC portion of TAZ zoned commercial. Adjusted 2035.
139	676	773	OK. Tulsa Tech, Elementary School, small retail.
140	23	50	Walgreens, Family Dollar and a few other areas zoned commercial.
141	182	211	OK. Salvage yard, Traice Academy, autoshops.
142	329	500	Large rural TAZ, Tulsa Zoo, Mohawk Park GC, Water Treatment Plant. Should develop further.
143	5	10	TAZ is completely zoned agricultural.
149	11	50	TAZ is terminus of Gilcrease Expwy currently. Frost Pre-k, gas station and likely more commercial.
150	210	250	OK. Two schools, salvage yard, other small retail.
151	26	31	OK.
152	92	111	OK, 135K Light Industrial.
153	12	16	OK.
154	56	66	OK.
155	187	228	Anderson Elementary, Bunche School, Dollar General, 10 churches.
156	332	500	Commercial land available for future development per land use plan.
157	27	35	OK. Small commercial section in SWC of TAZ.
158	0	0	OK.

TAZ	RDSEMP10	RDSEMP35	NOTES
159	467	551	Large manufacuring/warehouse/distribution centers incl Anheuser Busch, Webco, John Crane, Okla Landscape and Irrigation, First Process Steel, Kloeckner Metals. Vacant parcels available.
160	218	264	OK. Eastern portion of TAZ should develop per land use.
161	637	900	Tulsa Community College, vacant industrial land available.
162	1089	1479	OK. TAZ west of Tulsa Airport, ancillary businesses, Gilcrease Expwy Industrial Park.
163	79	125	Gilcrease Expwy Industrial Park. Vacant land available.
171	89	105	OK.
172	342	375	2035 is high. Not enough vacant land to support growth.
173	150	188	OK.
174	328	369	OK. Booker T. Washington HS, Kipp Tulsa Academy.
175	207	247	OK. Sims Metal, Interstate Steel & Metals, Springdale SC - 94KSF.
176	500	525	2010 and 2035 are low. Resource One, Clinton Elementary, AutoZone, Dollar General, Ok Machine Works, Export Packing Company.
177	290	363	OK. Estes Moving Co., UPS.
178	193	227	OK. Acme Brick, Auto Salvage, Jackson Elementary School.
179	653	840	OK. Commercial Land available in SWC of TAZ.
182	16	18	OK. TAZ is built-out. Mainly residential.
183	271	335	OK. Emerson Elementary, Salvation Army, Tulsa Election Board.
184	107	123	OK. Carver Middle School, churches.
185	636	1100	OSU-Tulsa, vacant land availble for expansion.
186	977	1145	OK. Mix of retail, small office/medical, warehouse/manufacturing.
187	88	88	OK.
188	290	337	OK.
189	926	1400	Entire TAZ zoned commercial/industrial, land available. Frito-Lay Distribution. CRC Evans Pipeline, NORDAM Repair, 3 hotels, etc.
190	1243	1441	OK. Borg Compressed Steel, Ventaire, Tulsa Power, etc.
191	755	1000	2035 is low. Manufacturing/Warehouse w/ vacant property.
192	708	819	OK.
193	1161	1351	2010 and 2035 are high per LEHD. American Trim & Upholstery and other small industrial, small retail. Growth ok.
194	180	187	OK. Owen Elementary, commercial in far southern sector of TAZ.
195	1157	1489	OK. Remaining vacant land is zoned industrial.
196	123	140	TAZ is built-out.
212	21	36	OK. Rural TAZ.
213	3	4	OK.
214	21	75	Large, rural TAZ. Small commercial portion in SWC.

TAZ	RDSEMP10	RDSEMP35	NOTES
215	6	9	OK. All residential.
216	1506	1750	2035 is high, little room for future commercial development.
217	1527	2138	OK. Sheffield Steel, Walmart Supercenter, Warehouse Market, Timber Business Park.
218	42	64	OK. TAZ mainly residential.
219	2065	2500	2035 is high, TAZ is built-out. Charles Page HS, Sand Springs Village Square and other small and strip retail.
220	146	208	OK.
221	53	80	OK. Only vacant land is Sand Springs Child's Home. Little future development.
222	2683	3538	Alliance Business Park, Baker Hughes, Custofab, River West Development will bring Holiday Inn Express (existing), restaurants and retail.
223	135	202	OK.
224	417	586	OK. Sand Springs TAZ. Lkq Apex, Yaffe Metals, small retail.
225	41	75	Eastern boundary will be Gilcrease Expwy. May develop further.
226	1	50	Eastern boundary will be Gilcrease Expwy. May develop further, especially at Hwy 51 and GE.
227	4	4	OK.
228	9	50	Western boundary will be Gilcrease Expwy. May develop further.
229	47	59	OK. Eastern border will be Gilcrease Expwy. Mainly residential.
230	37	75	Eastern boundary will be Gilcrease Expwy. May develop further.
231	18	20	OK. TAZ is built-out.
232	724	844	OK. Port City Metal manufacturing, Madison JH, other warehouse/manuf.
233	231	261	Most available land is zoned parkland/agricultural.
234	41	51	OK, mainly residential.
235	75	99	2010 and 2035 are high. Teach for America and Museum. Growth ok.
236	293	372	OK. Tulsa Fire Dept, Prothro MD Pharmacy, Tulsa County Juvenile Center.
237	116	150	Crosbie Heights district. Redevelopment and renovation projects.
238	47	52	OK. Water Works Art Studio.
239	260	269	OK. Commercial and Industrial, TAZ is built-out.
240	475	537	OK. Pearl District. Revitalization efforts in TAZ could increase overall employment.
241	616	750	Commercial land available for future development per land use plan.
242	2206	2278	OK.
243	1034	1102	OK. Significant office space, TAZ is almost built-out.
244	818	874	OK. Kendall-Whittier District. University of Tulsa Properties. TAZ almost built-out.

TAZ	RDSEMP10	RDSEMP35	NOTES
245	1267	1353	OK. University of Tulsa
246	270	291	Will Rogers HS, retail and small office on southern TAZ border.
247	103	116	OK. TAZ is built-out.
248	1109	1150	TAZ is built-out.
259	1	1	OK.
260	185	206	OK.
261	3087	3354	OK. Boulder Towers - 522K SF Office, 1307 Boulder - 40K SF Office, International Plaza - 115K SF Office. Other sizable office, small retail.
262	133	151	OK.
263	1050	1161	OK. Mainly office. Mapco Plaza - 141K SF Office.
264	1979	2192	OK.
265	929	1020	OK. Main Square Towers - 60K SF Office, Boston Place - 45K SF Office, large amount of small retail and office.
266	500	550	2010 and 2035 low. 137K SF SpiritBank Tower.
267	57	62	OK. TAZ is built-out.
268	141	157	OK.
269	65	66	OK. The Lee School. Western Financial Center - 76K SF Office.
270	5881	6380	OK. Hillcrest Hospital and Medical Center, Columbia Bldg - 33K SF Office.
271	1179	1276	OK. One large commercial parcel available.
272	386	475	Large, undeveloped parcel zoned office in portion of Utica Midtown district.
273	1010	1050	TAZ is built-out. Small office.
274	1105	1164	OK. Eastern portion of TAZ in Utica Midtown District. Redevelopment could create jobs.
275	3781	4235	OK. St. Johns Medical Center, Arvest Building - 20K SF Office.
276	786	827	OK. Many restaurants and small retail stores around periphery of TAZ. Wilson MS, Reasor's Market.
277	1075	1125	TAZ is built-out. Midway Office Bldg - 47K SF.
278	240	263	OK. TAZ is built-out.
279	891	925	TSZ is built-out.
280	709	756	OK. Tulsa State Fair, hotel and Flea Market.
281	120	133	OK. TAZ is built-out.
282	1119	1227	OK. TAZ is almost completely commercial.
283	300	350	2010 and 2035 are high. Furniture Row retail, Office Depot, small retail. TAZ is almost built-out.
284	250	303	2010 and 2035 are high. Small TAZ with little commercial development. Growth ok.
303	369	624	OK.
304	29	65	OK. Large, rural TAZ.
305	332	499	OK. Large TAZ with available land. Tulsa Boys Home, Middle School, small retail.
306	490	627	OK. Prattville SC.

TAZ	RDSEMP10	RDSEMP35	NOTES
307	604	625	2010 and 2035 are high. Rural TAZ, NEC borders Gilcrease Expwy. Will see some employment growth.
308	118	200	OK. Eastern border will be Gilcrease Expwy. Mainly residential, but might see commercial development later.
309	18	50	Western boundary will be Gilcrease Expwy. May develop further.
310	80	175	Eastern border will be Gilcrease Expwy. Mainly residential.
311	34	100	Western boundary will be Gilcrease Expwy. May develop further.
312	1176	1430	OK. Holly Refinery.
313	2293	3000	OK. Flint Engineering & Construction, AAON, Copart. Significant vacant land for further industrial/warehouse development.
314	700	1006	2010 and 2035 are high. Change ok. Concrete Plant, Elementary School, small commercial and warehouse on far western strip.
315	416	535	OK. Vacant land is designated mixed-use per land use plan. Osteopathic Hospital.
316	2403	2895	OK. Sinclair Oil Refinery.
317	60	79	2010 and 2035 are high. Mainly residential. Growth OK.
318	50	62	TAZ is completely residential and built-out, some home-based jobs.
319	356	380	OK. Utica Plaza - 50K SF Office.
320	1420	1509	OK. Utica Square SC. TAZ is built-out.
321	651	734	2010 and 2035 are high. Two schools, art museum.
322	1582	1625	OK. TAZ is built-out. 2021 Lewis Center - 87K SF Office, 21 Centre Park - 42K SF Office, Parkland Plaza - 52K SF Office, Harvard Center -46K SF Office.
323	100	125	2010 and 2035 are high. Growth ok.
324	790	879	OK. Walmart, Tulsa Center for Bevioral Health. TAZ is built-out.
325	1111	1160	OK. Staples, Tulsa ISD Enrollment center, other small retail around periphery of TAZ
326	843	898	OK.
337	702	771	OK. Retail along eastern of TAZ.
338	1294	1350	TAZ is built-out.
339	88	93	OK.
340	197	213	OK, per LEHD.
341	1976	2106	OK.
342	1176	1227	OK, Southroads SC - 448K SF Retail.
343	3176	3366	OK. 5310 E. 31st Dollar/Thrifty - 129K SF Office, 5330 E. 31st Dollar/Thrifty - 117K SF Office, 5350 E. 31st - 31K SF Office, Mini-Mall 31.
344	1642	1738	OK. Bishop Kelley HS, Tulsa Community College, Platt College, City National Bank Office Bldg - 94K SF, Dept. of Human Services.
356	114	247	OK. Large, rural Sand Springs TAZ.

TAZ	RDSEMP10	RDSEMP35	NOTES
357	89	132	OK. TAZ is almost built-out.
358	152	205	OK, Sand Springs. Frontage along Hwy 97 is zoned commercial.
359	55	150	Some vacant parcels zoned commericial, will see additional employment growth.
360	43	100	Western boundary will be Gilcrease Expwy. May develop further.
361	81	150	Western boundary will be Gilcrease Expwy. Gilcrease Research Center, will develop commercially.
362	1249	1600	2035 is low. Manufacturing/Warehouse w/ vacant property.
363	568	665	OK. TAZ almost built-out.
364	53	100	TAZ has a few parcels available for commercial growth.
365	158	183	OK. Daniel Webster HS, small retail and restaurant.
366	449	557	OK.
367	1451	1650	Northern portion of TAZ is zoned industrial and has considerable vacant land available.
368	602	634	OK. Wright Elementary School, Walmart, Ace Hardware, car and Harley dealership.
369	1635	1726	OK.
370	3325	3600	OK. Edison Prep School, All Office - 2600 Center - 45K SF, 2700 Center - 13K SF, 2800 Center - 30K SF, 2900 Center - 18K SF, 3000 Center - 58K SF, 3100 Center - 49K SF. Other retail and office around the periphery of the TAZ.
371	2373	2578	OK. University of Tulsa - Oklahoma will likely grow. Harvard Tower - 77K SF Office. Other small retail also.
372	1278	1336	OK. Richmond Plaza - 166K SF Office, Significant commercial development in far eastern portion of TAZ over last 10 years. A few parcels left to develop.
373	2131	2225	OK. Tulsa Promenade Mall. Southland Tower - 115K SF Office.
374	2400	2800	2035 is low. Sam's, Academy, Bed, Bath & Beyond, Best Buy, La Quinta, Community Care College, Okla Tech College, Corporate Place - 117K SF Office, Remington Tower - 90K SF Office.
375	2156	2257	OK. Meridian Tower - 206K SF Office, 5151 E. 51st - 56K SF Office, Fountain Plaza 73K SF Office. Fulton 46 - 24K SF Office.
390	289	409	OK. Large TAZ with available commercial land in southern portion of TAZ.
391	14	19	OK.
392	38	58	OK.
393	344	500	Over half of TAZ is zoned industrial, significant land available.
394	1290	1700	2035 is low. Significant retail in SWC of TAZ. Vacant commercial land available.
395	544	648	OK. Considerable land available.

TAZ	RDSEMP10	RDSEMP35	NOTES
396	1000	1250	2010 and 2035 are low per LEHD. Tulsa Bottling Plant, City Wastewater Facility, Other large warehouse/distribution center, hotel. Most vacant land is dedicated parkland, but some developable land available.
397	344	372	OK. Marshall Elementary, small retail on outer edges of TAZ. TAZ is built-out.
398	472	500	Riverwood District. TAZ is built-out.
399	1010	1050	OK. Southern Hills Tower - 152K SF Office. TAZ is built-out.
400	2469	2563	OK. Woodland Village SC, Hobby Lobby, Villages @ Southern Hills retail, BOK Place @ Southern Hills - 124K SF Office, Elmcrest - 43K SF Office.
401	641	698	OK. Grimes Elementary School, Eisenhower Intnl School, Southern Hills Tower - 152K SF Office.
402	2265	2407	OK. Woodland Village and other retail in Northern portion of TAZ, 51 Yale - 70K SF Office, Park Towers - 107K SF Office, Fox Plaza - 81K SF Office, Interntnl Tower - 40K SF.
403	553	600	OK.
404	224	244	Memorial HS, LaFortune GC and Park.
405	665	700	Viewpoint SC, Key Elementary, Post Office, other retail. TAZ is built-out.
417	180	289	OK. Page Belcher GC. Land available in SEC of TAZ.
418	159	450	Tulsa Spine Hospital, medical offices, hotel. Additional US75 frontage available for commercial land use.
419	245	283	OK.
420	1230	1314	OK. Metro Christian Academy, Warehouse Market, McClure School. Riverbridge Office Park - 68K SF. 1515 Bldg - 30K SF Office. Retail, restaurant and office space in SWC of TAZ.
421	4000	4105	2010 and 2035 are low per LEHD. Willbros Office - 110K SF, Bridgeport I, II, III - 75K SF Office, Southern Ridge - 66K SF Office, Lewis Square Office Park - 28K SF, Southern Hills Office - 25K, Yorktown Place - 51K Office South Lewis Plaza - 42K SF retail, post office.
422	273	290	OK. Southern Hills CC.
423	268	279	OK. Madrona on Lewis - 50K SF Office.
424	40	50	2010 and 2035 are high. All residential, except Kirk of the Hills church.
425	5340	5713	OK. Warren Center Office - 960K SF, Copper Oaks - 251K SF Office, 7050 Bldg - 46K SF Office, Doubletree Hotel, Energy One CU, ATM Office, Apache Corp.
426	10081	10910	OK. St. Francis Hospital, Warren Professional Center and Research Center.

TAZ	RDSEMP10	RDSEMP35	NOTES
427	3719	4092	OK. Shadow Mtn Hospital, Autumn Oaks - 117K SF Office, Oak Cliff Terrace I & II - 36K SF, Thermafil Bldg. - 50K SF Office, Oxford Place - 82K SF Office, significant retail and office in SWC. Commercial available in SEC of TAZ.
441	9	9	2010 and 2035 are low. Belcher GC, small retail along eastside of TAZ.
442	879	2254	OK. Tulsa Hills SC and portion of TAZ closest to river is dedicated to employment per land use layer.
443	730	800	OK. Riverside District. River Oaks Office Park - 55K SF
444	2994	3313	OK. Victory Church and Christian School, Marriott Tulsa Hotel, IBC Tower - 63K SF Office, Walmart Supercenter, Crowne Plaza Southern Hills.
445	1090	1161	OK. Oral Roberts University.
446	578	578	OK. Atlanta South - 81K SF Office, Southern Oaks - 55K SF Office.
447	1426	1500	Executive Center I & II - 186K SF Office. TAZ is built-out.
448	337	375	OK. Retail in SEC, medical offices.
449	856	930	OK. Reasor's Market, Lighthouse SC, etc.
450	375	418	OK. TAZ is almost built-out.
468	147	519	OK. US75 frontage available for commercial growth.
469	107	503	OK. SEC of TAZ will see airport development per zoning. Site Solutions.
470	1177	1505	OK. Jones Airport and ancillary aviation businesses and warehousing, Tulsa Tech.
471	320	572	US64 @ 51. Tulsa Bone and Joint Clinic, At Home store, Okla Oncology.
472	1534	1669	OK. River Spirit Casino.
473	2214	2298	OK. 2.2M SF CityPlex Towers
474	838	932	OK. Home Depot, retail & restaurants.
475	444	461	OK. Jenks East Elementary and Middle School. TAZ is built-out.
476	967	1057	OK. Okla. National Bank Bldg - 52K SF.
477	258	273	OK. Holland Hall HS and Primary, small retail.
478	438	464	OK. Geophysical Resource Center - 102K SF Office. TAZ is built-out.
493	103	179	OK. Large, rural TAZ.
494	13	21	OK. Southern Reserve subdivision.
495	270	342	OK. Jenks West Elementary School.
496	33	100	Storage tank facility and gym, will develop further.
497	240	300	2035 is high, TAZ is built-out. South Lakes GC, Jenks Municipal Park, small retail.
498	0	0	OK.
499	345	539	OK. Far western portion of TAZ may develop.
500	2063	2995	OK. Jenks Original Town , Riverwalk Crossing I & II - 160K SF retail and restaurants, entertainment complex imminent as of 1/15 per Tulsa World.
501	1262	1334	OK. Whole Foods SC, Walmart Neighborhood Mkt, Kohl's Petco, other retail.

TAZ	RDSEMP10	RDSEMP35	NOTES
502	109	109	OK. Jenks MS, River Creek Village small retail.
503	311	338	OK. USPS Office, Bradford Place - 30K SF Office, significant retail in NEC and NWC of TAZ.
504	325	350	2010 and 2035 are high. Two small retail strips and little other employment. TAZ is built-out.
624	38	83	OK. Few commercial parcels available.
625	155	325	OK. Skiatook.
630	23	54	OK. Large, rural TAZ.
631	32	70	OK. Large, rural TAZ east of Skiatook Lake.
632	69	136	OK. Large, rural TAZ.
633	372	705	OK. Skiatook HS, Intermediate, MS.
634	261	350	Skiatook TAZ is mainly residential with little vacant land available to commercial development. 2035 is high.
635	2	5	OK.
636	200	300	2010 and 2035 are low. Skiatook Intermediate Elem., Newman Middle School, TAZ will add future commercial development.
637	212	437	OK. Skiatook Municipal Airport.
638	26	60	OK. Large, rural TAZ.
639	0	0	OK.
640	4	9	OK. Large, rural TAZ.
641	3	7	OK. Large, rural TAZ.
643	0	0	OK. Rural TAZ.
644	2	5	OK.
645	4	6	OK.
646	0	0	OK. Rural TAZ.
647	40	91	OK. Large, rural TAZ.
649	50	75	2010 is low per LEHD.
650	204	330	OK. Large, rural unincorporated TAZ.
651	15	15	Fruit Farm.
652	0	0	OK.
653	12	31	OK. Large, rural TAZ.
654	39	300	Far Southern boundary of mainly vacant TAZ is Gilcrease Expwy, could see development post-2020.
655	27	27	OK.
656	4	100	Southern border of TAZ is Gilcrease Expwy, likely to develop employment, portion zoned commercial.
657	62	158	OK. Warehouses, salvage yard.
658	0	125	Northern border of TAZ is Gilcrease Expwy, likely to develop. Commercial, industrial and office zoning.
659	0	0	OK.
661	50	100	2010 and 2035 are low. Pogue Municipal Airport in Sand Springs. Also vacant commercial parcels available.
662	12	40	Large TAZ will develop some jobs by 2035
663	0	0	OK.
664	3	25	Southern border of TAZ is Gilcrease Expwy, likely to develop some employment, portion zoned commercial.

TAZ	RDSEMP10	RDSEMP35	NOTES
665	0	0	Southern border of TAZ is Gilcrease Expwy, likely to develop, portion zoned commercial.
666	81	300	Large, rural TAZ that includes Gilcrease Expwy.
667	227	400	2035 is high. TAZ development will be mainly residential per land use plan.
668	84	186	OK.
669	113	150	2035 is high, TAZ is built-out.
670	17	44	OK. Large, rural TAZ.
671	0	0	OK.
672	121	200	2035 is high. Tulsa Country Club and alternative school. Rest is residential.
734	25	25	OK.
735	8	8	OK.
737	0	0	OK.
738	11	11	OK.
739	22	22	OK.
740	8	9	OK.
741	114	200	Large, rural TAZ will see future commercial development.
742	25	41	2010 and 2035 are high. Rural TAZ almost entirely residential.
743	3	3	OK.
744	22	50	Large, rural TAZ in Sapulpa, should see some small commercial growth.
745	506	600	Industrial/Warehouse along eastern edge of TAZ - Bennett and J&G Steel, Fabsco etc. Land available.
746	146	200	Likely to develop commercially, railroad tracks on eastside.
747	883	1100	Significant hwy frontage, commercial growth likely.
748	1183	1500	2035 is low. Sapulpa, vacant land zoned industrial.
749	39	44	OK.
750	1421	1527	OK. Selzer
751	181	205	OK.
752	491	535	OK.
753	207	235	OK.
754	236	257	Chevrolet Dealer, Pipeline Equipment, Madison, Salvage yard.
755	72	80	OK. TAZ is built-out.
756	89	150	Large, rural TAZ. Clary Fields GC, should see some ancillary commercial growth.
757	45	47	OK. Rural TAZ.
765	0	25	2035 is low. US75 @ Creek Turnpike.

D. Square Feet per Employee Estimations

The following chart represents employee coefficients that were used as a guide when reviewing and estimating commercial development employment.

Land Use Category	Estimated Square Feet per Employee
Office	275
Retail	300
Hotel/Motel	.75 Emp per Room
Institutional	800
Industrial	1250

Source: Urban Land Institute, North Central Texas Council of Governments

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