Appendix 5

U.S. 69 Express Lanes Level 2 Traffic and Toll Revenue Study

US 69 Express Lanes

Level-2 Traffic and Toll Revenue Study

DRAFT | JUNE 2021

Prepared for

Kansas Department of Transportation

HNTB

Prepared by

CDM Smith

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Disclaimer

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Appendices

Appendix A Independent Demographic Review, by EBP
Appendix B Stated Preference Survey Report, by CDM Smith

Chapter 1
Introduction

CDM Smith was contracted by HNTB on behalf of the Kansas Department of Transportation (KDOT) to conduct a Level-2 Traffic and Toll Revenue Study for the proposed tolled express lanes along the US 69 corridor between 179th Street and 103rd Street located in the City of Overland Park in Johnson County, Kansas. The purpose of this study is to develop traffic and toll revenue forecasts for the proposed US 69 express lanes that will be used to analyze the financial feasibility of the project.

1.1 Objective and Scope of Study

The following report details the data, methodology, and results of the Level-2 Traffic and Toll Revenue Study for the proposed US 69 express lanes. The study included the consideration of multiple express lanes configurations, updated demographic data provided by independent demographer EBP, and an enhanced toll diversion/market share model based on the latest 2050 travel demand model developed by Mid-America Regional Council (MARC), the Metropolitan Planning Organization (MPO) for the greater Kansas City region.

As part of the study, traffic data was collected along the US 69 corridor and within the project study area to understand the historical and current traffic profiles and travel demand patterns. The data was used to calibrate a 2019 base year model and establish key parameters that will drive the future demand for the proposed tolled express lanes. The key tasks undertaken as part of the various comprehensive data collection efforts included:

- Traffic counts collected along US 69 and several screen lines in 2016 (as a part of the 2018 US 69 Study, conducted by HNTB) and in 2020 (by GH Associates), and speed and delay data obtained from INRIX for 2019. These data, along with counts from other data sources (KDOT, MoDOT, Replica, StreetLight Data) were used to establish 2019 baseline traffic patterns in the study area for the purpose of calibrating the base year travel demand model to the conditions that existed before the onset of the COVID-19 pandemic in March 2020.

- Origin-Destination (O-D) data obtained from StreetLight Data for the entire year of 2019 to capture the trip characteristics along the US 69 corridor for use in evaluating and enhancing the trip tables obtained from the MARC travel demand models.

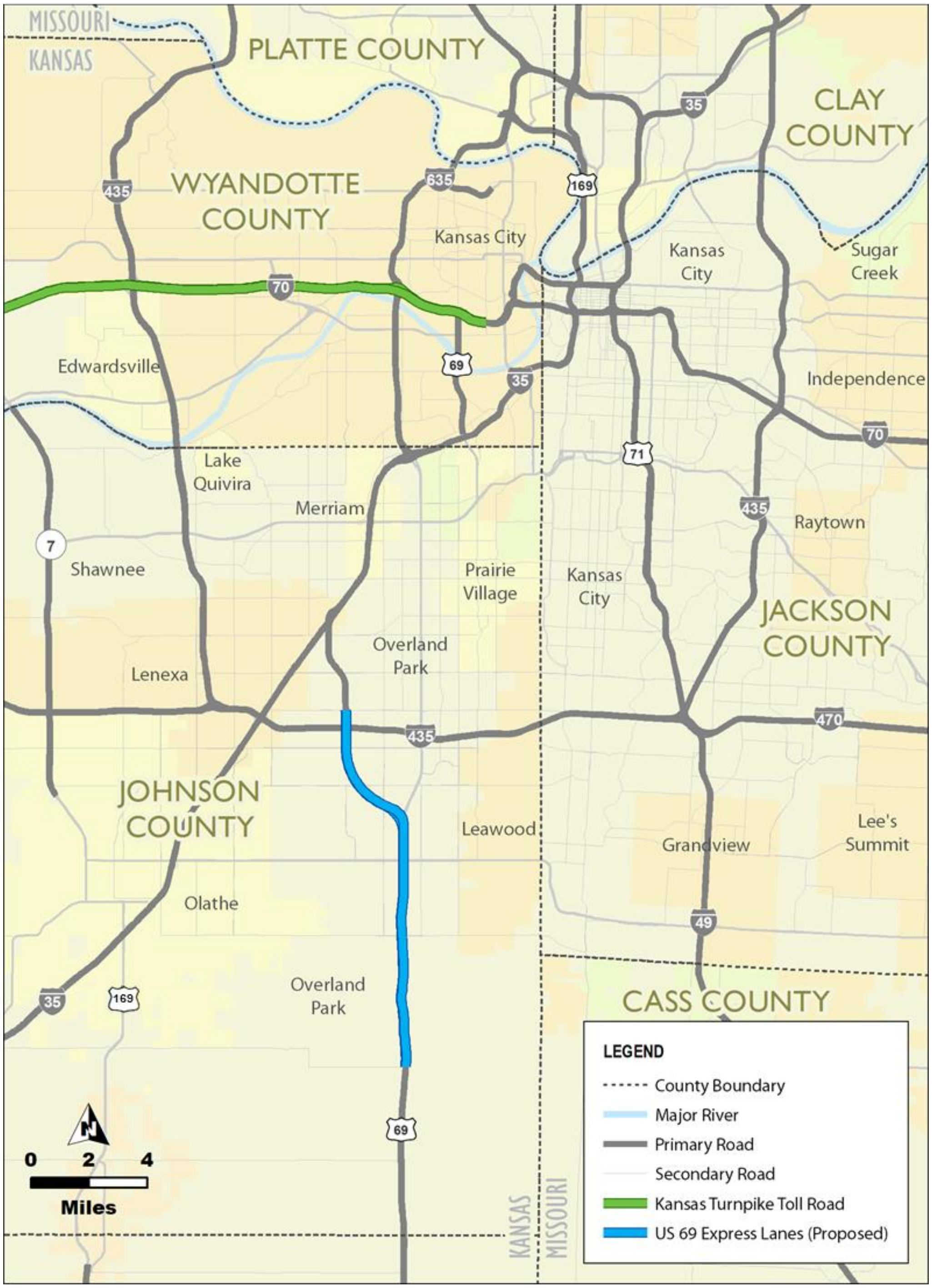
- Stated-preference (SP) surveys conducted in 2021 as a part of the study to investigate the willingness-to-pay characteristics of travelers in the study area and to capture other preferences affecting the use of the proposed express lanes. The survey asked travelers about information related to frequency of use of the US 69 corridor, demographic information, and stated preference tradeoff scenarios. This information was critical in developing and enhancing the toll diversion characteristics in the corridor. The resulting values-of-time (VOTs) and diversionary characteristics were reviewed and incorporated into the study.

The key tasks undertaken for the US 69 Level-2 Traffic and Toll Revenue Study also included a review of background material, an independent demographic analysis of regional growth, model development and calibration, and forecasting of the traffic and toll revenue for the proposed US 69 express lanes. In addition, a traffic and toll revenue sensitivity assessment was performed to evaluate the key parameters that may affect the future toll revenue potential of the proposed express lanes.

1.1.1 Existing Corridor Description

The US 69 study corridor shown in **Figure 1-1** is approximately 10.5 miles long and includes two general-purpose (GP) lanes in each direction. This section of US 69 falls entirely within Johnson County and runs parallel to US 169. It also tracks somewhat parallel to I-35, which runs diagonally across Johnson County from southwest to northeast, until they merge a few miles north of the US 69/I-435 interchange. No other interstate intersects the US 69 study corridor; however, the corridor is transected by several major arterials including 103rd Street, College Boulevard, 119th Street, Blue Valley Parkway, 135th Street, 151st Street, 159th Street, 167th Street and 179th Street, all of which have interchanges along US 69. Metcalf Avenue and Antioch Avenue are other major arterials running parallel to US 69 within a half-mile on either side of the corridor. Apart from residential development, the northern half of the corridor is also surrounded by corporate office parks, national chain restaurants, and businesses, making it one of the strongest employment centers in the Kansas City (KC) metro area. The entire corridor is surrounded by several residential neighborhoods primarily made up of subdivisions. The highest traffic volumes in the corridor are typically experienced during the peak AM and PM hours due to the thousands of individuals who live along the corridor and whose work destinations are scattered throughout the KC metro area.

Figure 1-1 US 69 Corridor Location



1.1.2 Proposed Express Lanes Configuration

The US 69 corridor proposed express lanes will include a single inside lane in both the northbound and the southbound direction. Under the Phase 1 Base Case, assumed to open in 2026, the express lanes will extend from north of 151st Street to just north of 103rd Street with an ingress/egress location just north of Blue Valley Parkway and a direct connection between the express lanes and

Blue Valley Parkway. There is also additional general-purpose lanes between 151st and Blue Valley Parkway as well as changes to the ramp configuration at 135th Street, including reconstruction to a diverging-diamond interchange. The configuration under Phase 2, set to open in 2040, will include the addition of an express lane extension at the southern end of the corridor from 151st Street to 179th Street. **Figure 1-2** through **1-5** show the proposed configuration of the US 69 express lanes for the Phase 1 Base Case and Phase 2, respectively.

Figure 1-2 US 69 Study Corridor – Express Lanes Phase 1 Base Case Configuration (103rd Street to Blue Valley Parkway)

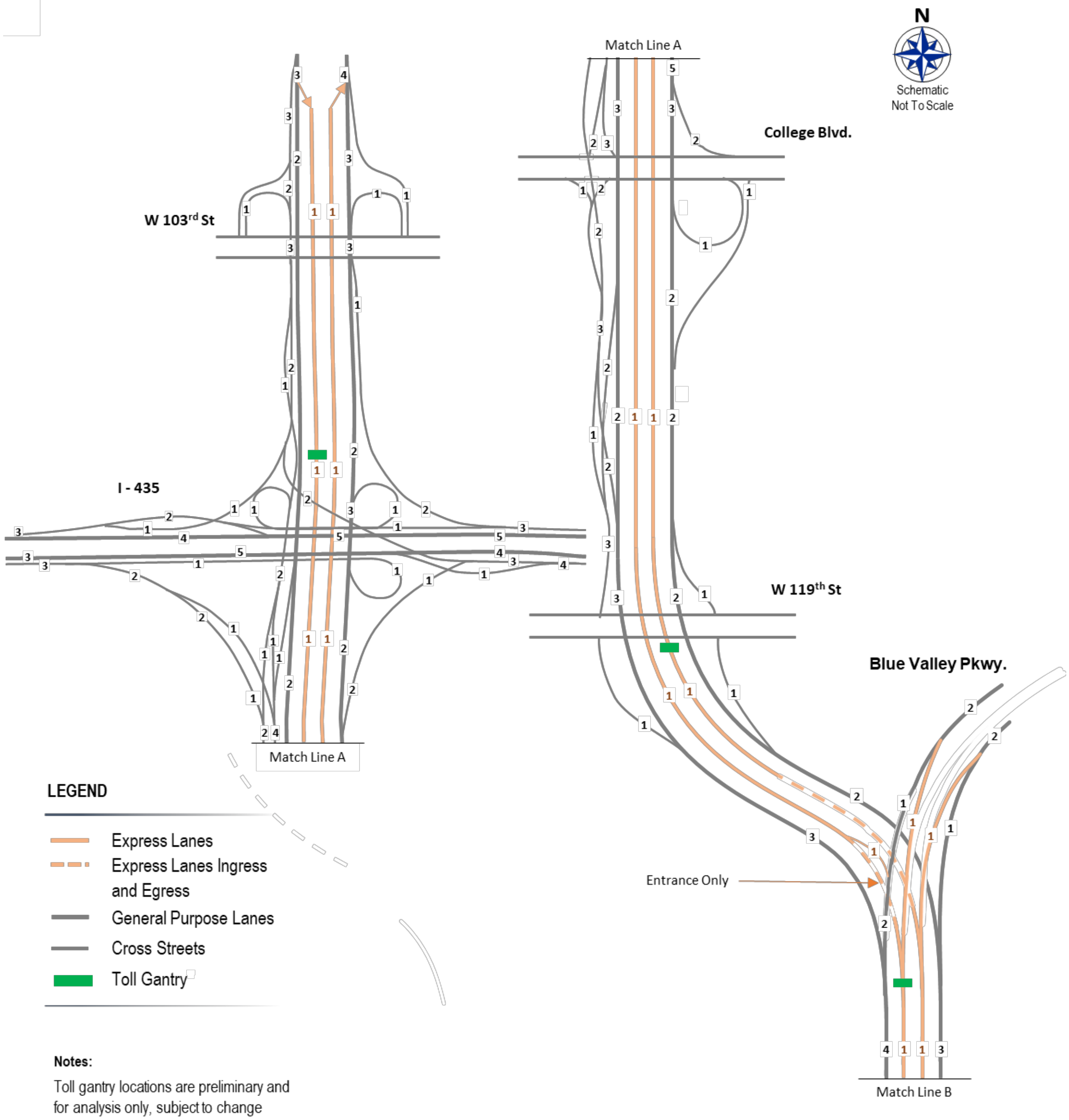


Figure 1-3 US 69 Study Corridor – Express Lanes Phase 1 Base Case Configuration (135th Street to 151st Street)

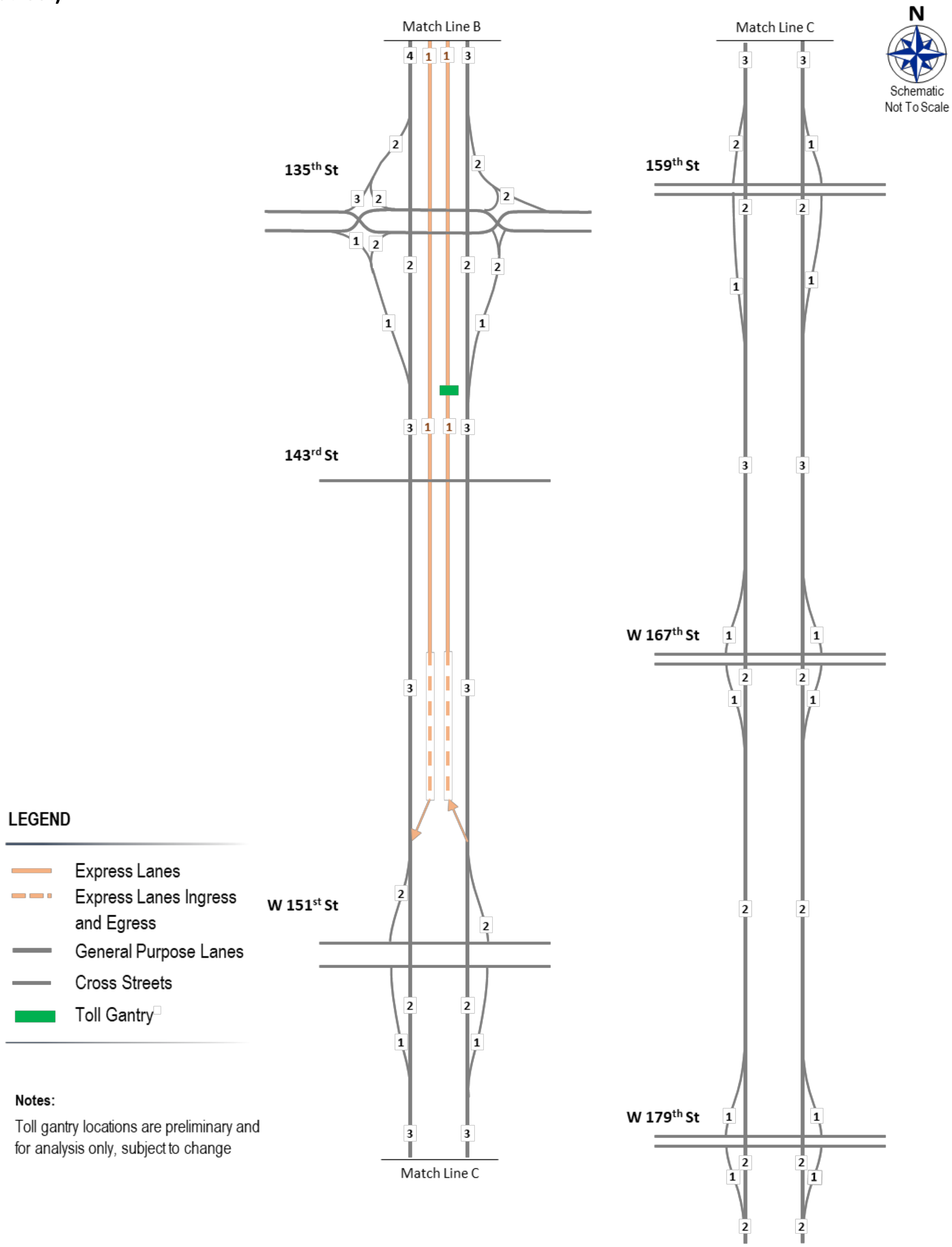


Figure 1-4 US 69 Study Corridor – Express Lanes Phase 2 Configuration (103rd Street to Blue Valley Parkway)

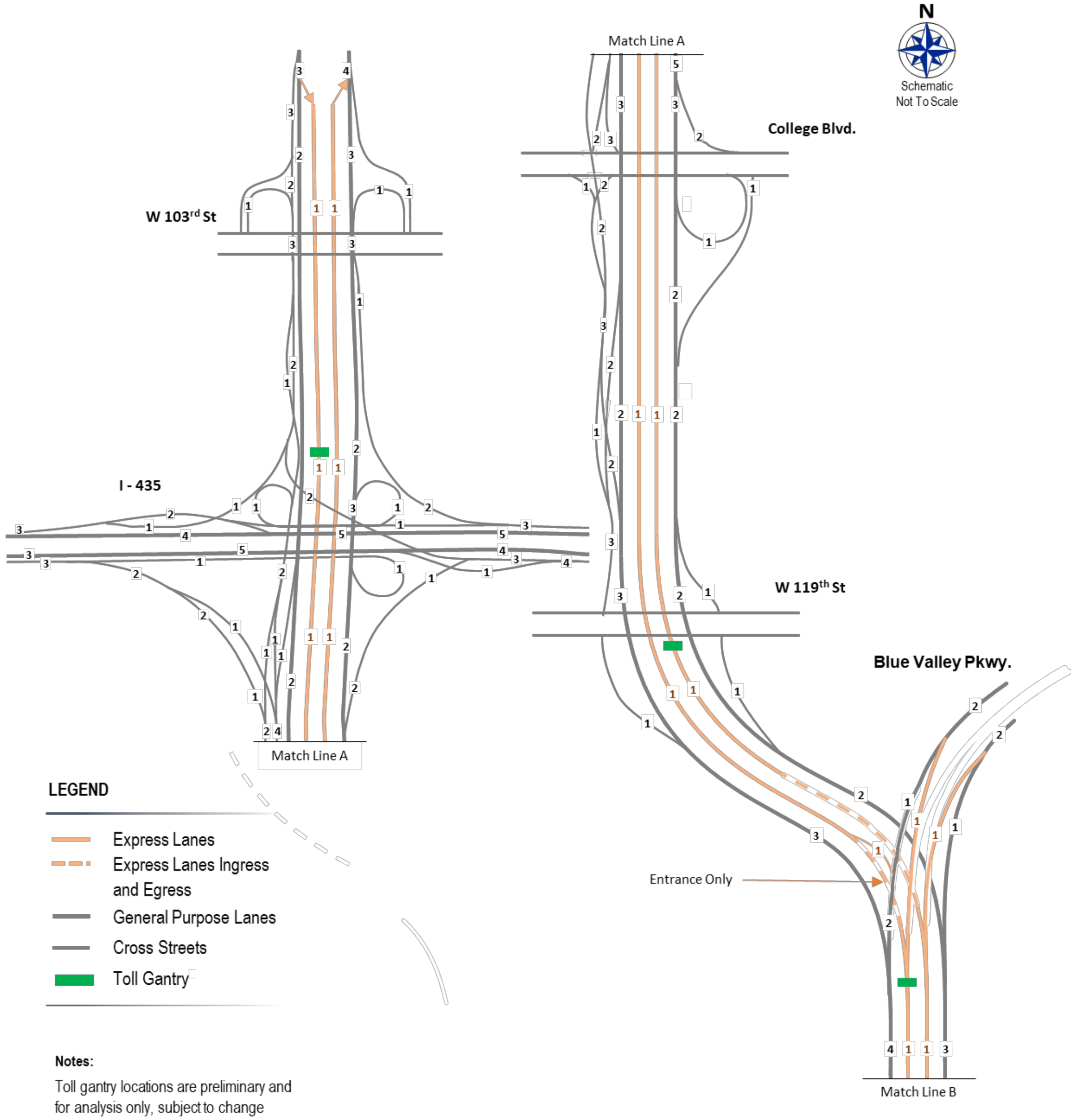


Figure 1-5 US 69 Study Corridor – Express Lanes Phase 2 Configuration (135th Street to 179th Street)

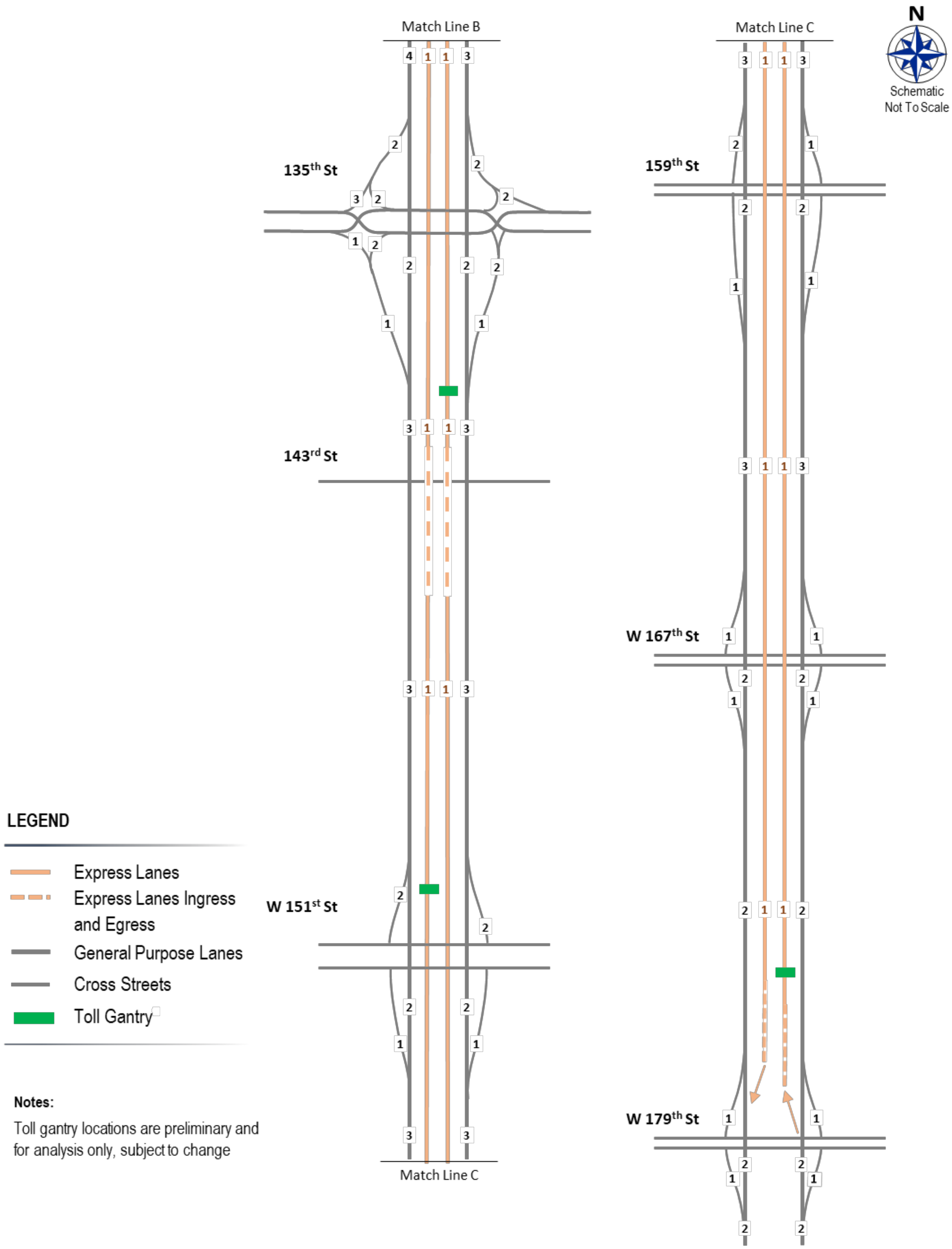
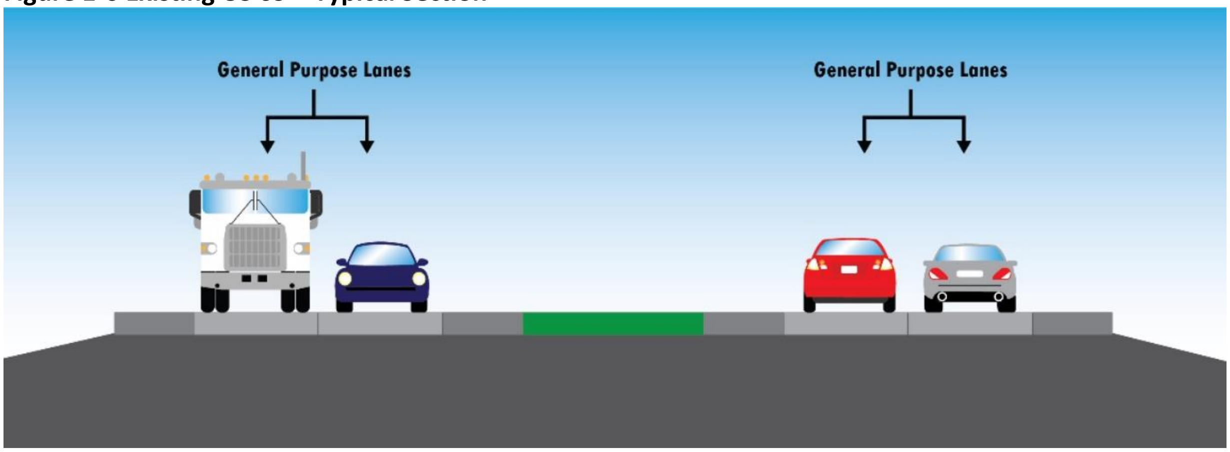


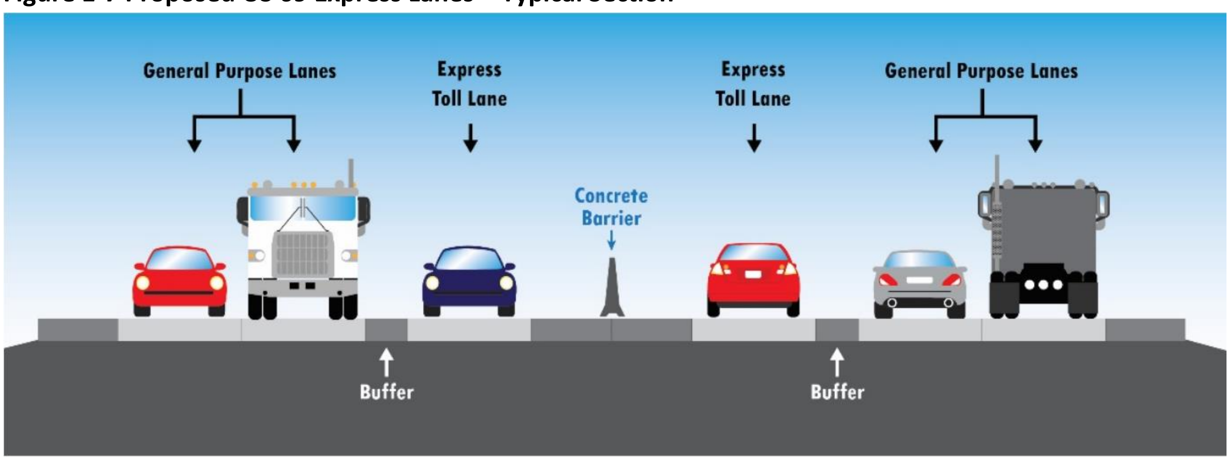
Figure 1-6 illustrates the existing US 69 typical cross section consisting of two general purpose lanes in each direction. **Figure 1-7** illustrates the typical cross section proposed under the Phase 1 Base Case and Phase 2 scenarios. An express lane will be added in each direction between the general-purpose lanes, separated by a buffer.

Figure 1-6 Existing US 69 – Typical Section



Source: HNTB

Figure 1-7 Proposed US 69 Express Lanes – Typical Section



Source: HNTB

1.1.3 Traffic and Toll Revenue Forecasts Description

Two scenarios were analyzed as part of this study for the US 69 express lanes. As previously described, the Phase 1 Base Case assumes the express lanes will extend from north of 151st Street to just north of 103rd Street from 2026 through the entire 40-year forecast horizon. Phase 2 assumes the Phase 1 Base Case configuration from 2026 until 2040, when the southern section of the express lanes from 179th Street to 151st Street is then added thereafter.

Additionally, the two scenarios were analyzed for two assumed strategies: (1) Using the official demographic data provided by MARC and (2) Using the MARC revised demographic data independently reviewed and adjusted by EBP.

1.1.4 Report Structure

In addition to this chapter, the report is divided into the following five chapters that refer to the major work elements undertaken as part of the study.

- **Chapter 2 – Existing Traffic Trends and Characteristics**: The extensive traffic data collected as part of this study is described and summarized in this chapter. Data collection efforts that were undertaken included a traffic count program and speed and delay/travel time data along US 69 and other nearby roadways. The origin-destination (O-D) data obtained from StreetLight Data is summarized, and a historical overview of traffic in the project area is summarized. The methodologies implemented for each of the data collection and analysis efforts and respective results are detailed and summarized herein.

- **Chapter 3 – Background Transportation Characteristics**: The planned highway projects and overall future transportation characteristics anticipated in the Kansas City region are briefly summarized in this chapter based on the MARC's Connected KC 2050 Plan, US 69 Corridor Study Phase 1 Report (HNTB, 2018), and the US 69 Pre-Planning Analysis (HNTB, 2020), with additional input from KDOT, the City of Overland Park and HNTB staff regarding assumptions for specific projects within the study corridor.

- **Chapter 4 – Demographics**: This chapter reviews the historical demographic growth trends in the Kansas City Metro region as defined by the MARC MPO boundary and expected future growth trends. This review is focused on an evaluation of the socioeconomic variables that are used as inputs to the travel demand models. EBP developed the most recent demographic forecasts for the study. The socioeconomic variables include population, households, employment, and major employment establishments, as well as other proposed developments which may have an impact on traffic demand. The assessment of the growth characteristics was also supported through an independent socioeconomic review of both the regionwide and county-level demographics and the individual traffic analysis zones (TAZs) surrounding the US 69 study corridor. The independent demographic review was commissioned to evaluate the MARC 2050 forecasts and provide modifications based on more recent trends, where applicable, to the future growth of population, households, and employment for each TAZ within the study area. The revised demographic forecasts provided by EBP were input into MARC's four-step travel demand forecasting model to generate modified trip tables.

- **Chapter 5 – Travel Demand Modeling**: This chapter describes the travel demand modeling process used to develop the traffic and toll revenue forecasts for the proposed US 69 express lanes. The calibration of the 2019 base year travel demand model is described along with other major elements undertaken as part of the modeling process which included regional demand projections and market share analysis.

- **Chapter 6 – Traffic and Toll Revenue Estimates:** The key assumptions and estimated annual traffic and toll revenue for a 40-year forecast horizon for the proposed US 69 express lanes are presented and summarized in this chapter for the Phase 1 Base Case and Phase 2 scenarios using both the MARC and EBP revised demographic data. This chapter also includes results from sensitivity tests which were conducted to evaluate the impact of potential changes to key input variables influencing the traffic and toll revenue estimates.

Two appendices are also provided, detailing updated work undertaken by the independent demographer (EBP) and the detailed results of the stated preference survey:

- **Appendix A:** Independent Demographic Review, by EBP
- **Appendix B:** Stated Preference Survey Report, by CDM Smith

Chapter 2

Existing Traffic Trends and Characteristics

This chapter provides a summary of the historical traffic trends and characteristics along the existing highway infrastructure in and around the United States Highway 69 (US 69) study corridor, located in Johnson County, Kansas. A summary of the historical traffic counts and growth trends along the study corridor, based on the Kansas Department of Transportation (KDOT) historical database, is also presented herein. A comprehensive traffic count program undertaken along the US 69 corridor with Automatic Traffic Recorder (ATR) counts collected along the major freeways and several arterials within the vicinity of the US 69 study corridor is described in detail in **Section 2.3**. Additionally, traffic counts were also collected along four selected screenlines during 2020. The efforts undertaken supported a complete reevaluation of the baseline condition in 2019 along the corridor, and the 2020 counts were adjusted to reflect the 2019 traffic conditions. This exercise of adjusting to 2019 counts was done with an objective to discount the COVID-19 pandemic related traffic impacts at the 2020 count locations, ensuring that the calibrated model reflected the more typical traffic patterns and travel conditions.

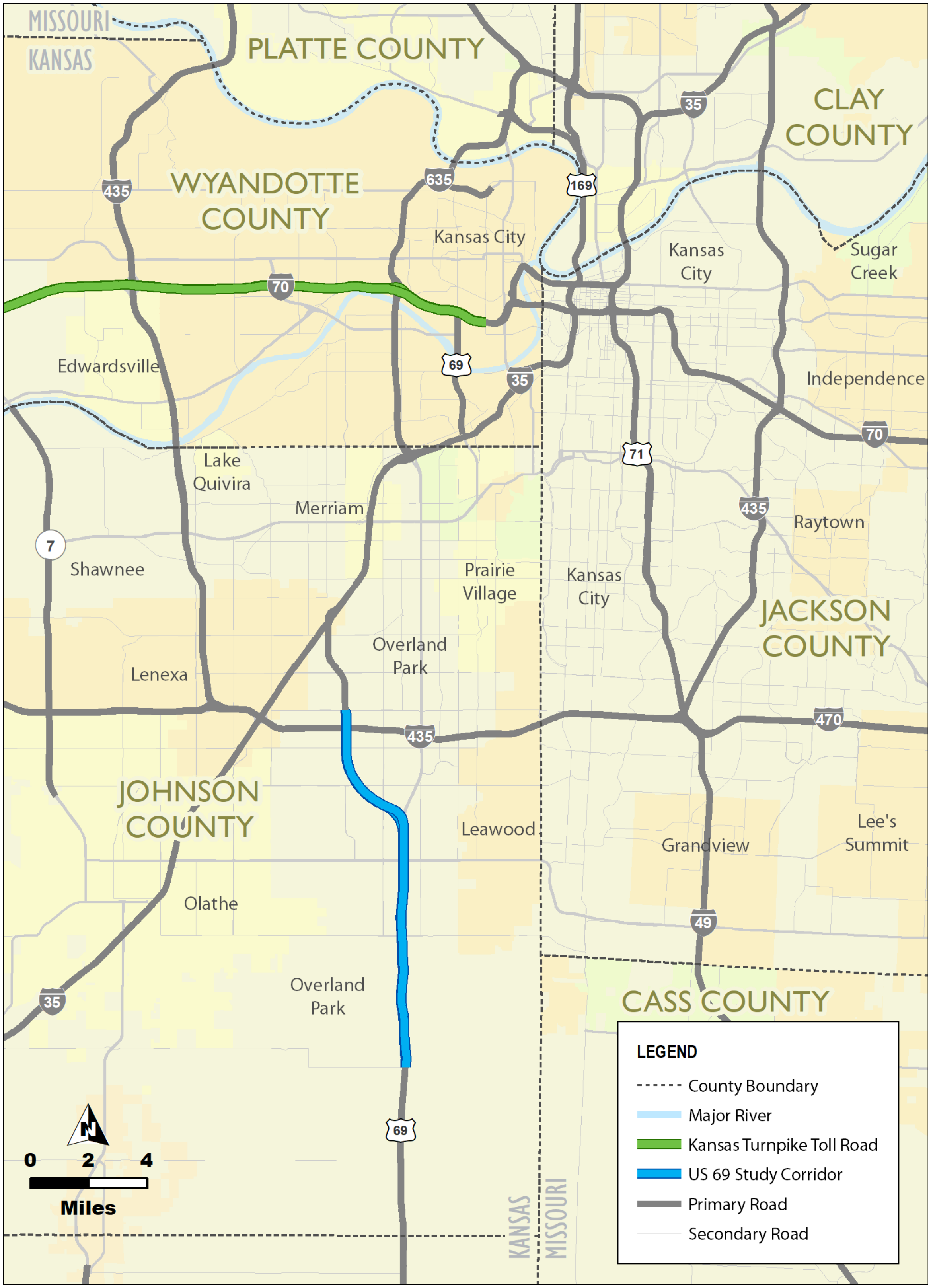
The data collection effort also included average travel speeds data O-D data. Both the speed data and the O-D data were acquired for the base year of 2019. The traffic count and operational data summarized in this chapter were used as input to the model calibration process (discussed in **Chapter 5**), resulting in an updated and enhanced travel demand model. This model was then used to develop traffic and toll revenue estimates for the proposed express lanes along the US 69 study corridor.

2.1 Description of Existing Corridor Facilities

US 69 is a vital component of the transportation network in the KC metro area and the City of Overland Park and is often referred as the backbone of Overland Park. US 69 extends through the city from the junction with I-35 to the southern city limit. It feeds many of the primary east-west arterial corridors in the city, providing connectivity to major employment centers and residential areas.

The section of US 69 under is approximately ten miles long and is a major north-south highway that runs from 179th Street north to 103rd Street. US 69 is one of the state's busiest highways, with significant congestion during peak hours and at other times. The entire study corridor, between 179th Street and 103rd Street, is located in Johnson County, as shown in **Figure 2-1**.

Figure 2-1 US 69 Study Corridor



2.1.1 Major Toll Roads, Freeways, and Arterials in the Region

As shown in **Figure 2-1**, Kansas City has only one toll facility, the Kansas Turnpike, which operates under fixed pricing. The proposed express lanes along US 69 will be the first express lane facility in Kansas that will operate under a dynamic pricing regime. There are several other key routes in the vicinity of US 69 that will have an impact on the overall demand for the proposed express lanes. The following are the major toll roads, freeways and arterials within the KC metro area:

- **Kansas Turnpike**: The 236-mile Kansas Turnpike is a four- to six-lane toll road between the Oklahoma border in Sumner County and US 69 in Wyandotte County. Currently, the turnpike accepts payment via toll tags and cash paid at toll booths. Within the Kansas City metropolitan boundary, the Kansas Turnpike runs in an east-west direction. The facility carries traffic from the western edge of Kansas City to the downtown area.

- **I-35 Freeway**: I-35 in the Kansas City metropolitan region facilitates travel between the southwestern corner of the region (Olathe) to downtown Kansas City. In Overland Park, the US 69 corridor merges into I-35, providing a direct route towards downtown Kansas City for traffic originating in southern Johnson County and Miami County.

- **I-435 Freeway**: I-435 is a circumferential freeway around Kansas City. The freeway intersects with the US 69 corridor in Overland Park, providing an additional route for the commuters making the north-south movement whilst circumventing the Kansas City downtown traffic.

- **I-49 Freeway**: I-49 is located in Missouri and runs parallel to US 69 approximately nine miles to the east. I-49 provides access to the downtown Kansas City area and serves as an alternative to US 69 for long-distance traffic.

- **Antioch Road:** Antioch Road is a 16-mile long four-lane arterial running north-south, approximately one-half mile to the west of the US 69 study corridor. It crosses the US 69 corridor to the north of 127th Street. Because of its proximity to the study corridor, Antioch Road is one of the main competing arterials that provides an alternate route for US 69.

- **Metcalf Avenue:** Metcalf Avenue is a 16-mile long four-to-six-lane arterial running north-south, about a half-mile to the east of US 69. Metcalf Avenue is another key competitive arterial that runs parallel to the entire stretch of the US 69 study corridor. The northern terminus of Metcalf Avenue, at the I-35 interchange, connects to the I-635 freeway.

- **Blue Valley Parkway:** Blue Valley Parkway is a mile-long roadway that connects US 69 to Metcalf Avenue. It provides access to US 69 southbound towards 135th Street and from US 69 northbound towards Metcalf Avenue.

2.2 Historical Traffic Growth Trends

The following sections provide a detailed description of the traffic data collection efforts that were undertaken as part of this study and summarizes the key observations and trends. The assessment includes a summary of KDOT's historical traffic counts and growth trends along the US 69 study corridor observed since 2000, and a summary of the seasonal variation in traffic observed from information compiled from KDOT's permanent count stations (also known as Automatic Traffic

Recorder or ATR locations). A detailed description of the current traffic exhibited along US 69 and the screenlines selected for this study is also provided herein.

2.2.1 Historical Traffic Growth

An overview of the historical traffic growth between 1999 and 2019 along the US 69 corridor in Johnson County is presented in **Table 2-1**. The historical count data was obtained from KDOT, which collects traffic counts statewide on an annual basis. US 69 to the south of 95th Street has the highest traffic volume along the entire study corridor and grew at an average annual rate of 4.2 percent between 2014 and 2019. US 69 south of 135th Street grew at an average annual rate of 2.5 percent over that same period. US 69 to the south of 167th Street has grown rapidly with a ten-year growth rate of 3.5 percent and five-year growth rate of 6.2 percent.

Table 2-1 Historical Trends in Annual Average Daily Traffic

Location	1999	2009	2014	2019	Last 20-year growth 1999-2019	Last 10-year growth 2009-2019	Last 5-year growth 2014-2019
US 69 at South of 95th St.	87,800	81,400	81,000	99,500	0.6%	2.0%	4.2%
US 69 at South of 135th St.	44,000	45,300	51,500	58,200	1.4%	2.5%	2.5%
US 69 at South of 167th St.	24,000	23,600	24,600	33,300	1.7%	3.5%	6.2%

2.3 Traffic Data Collection

A comprehensive traffic data collection program was conducted during October/November 2020 to collect a series of traffic counts along the study area screenlines. In addition to the screenline counts, 2019 AADT (Average Annual Daily Traffic) volumes were provided by HNTB for locations along the US 69 study corridor (both mainlanes and ramps), and 2019 traffic volumes along the major roadways in the region were obtained from KDOT and Missouri Department of Transportation (MoDOT) count databases. The data collection program for this study is summarized below and is further documented in the following sub-sections.

Gewalt Hamilton Associates, Inc (GHA), a local traffic data collection firm, was contracted by HNTB to collect traffic counts along four selected screenlines within the study area as part of the data collection effort for this study. The counts were collected for a continuous 48-hour period. In addition to the screenline counts, additional counts were collected at selected spot locations along the I-435 and I-35 mainlanes. Moreover, the counts along the US 69 study corridor were obtained from 2019 balanced daily traffic volume summaries developed by HNTB. Additionally, five ATR locations were identified from the KDOT traffic database to garner a better understanding of the daily traffic distribution profile. The ATR counts were summarized at 15-minute time periods to establish a disaggregated temporal distribution of the current corridor traffic demand and to facilitate the development of temporal segmentations within the travel demand model. Factors to convert 2019 AADTs to AWDTs (average weekday traffic) were computed using the five ATR locations. As the travel demand model represents an average weekday condition, an AADT to AWDT factor was then applied to the HNTB-developed 2019 AADTs and 2019 AADT volumes from KDOT that were used for model calibration. Traffic volumes obtained from MoDOT represent AWDT.

Figures 2-2 through **2-4** show the count locations for the screenline, ramp, and ATR counts. **Tables 2-2** and **2-3** provide the full list of screenline and spot traffic count locations. Additional data from permanent counters obtained from KDOT are also shown in **Table 2-4**. **Table 2-5** illustrates the ramp locations along the US 69 study corridor where traffic volumes were obtained from the HNTB-developed balanced traffic profile. For simplicity, the ramp IDs in **Tables 2-2 through 2-5** were kept the same as what was used to collect and summarize Streetlight OD data for the US 69 study corridor ramps. Each table provides a description of the count location and its respective unique identification number.

These counts were adjusted to reflect 2019 traffic conditions, as discussed in **Section 2.3.1**, and subsequently used to calibrate the travel demand models to reflect 2019 traffic conditions, i.e. normal travel patterns before the onset of the COVID-19 pandemic that resulted in significant impact on travel. Traffic counts collected along the major facilities within the corridor provided information regarding the current AWDT volumes and the morning peak, evening peak and off-peak period traffic. Counts collected were initially evaluated for consistency with historical trends, historical seasonal variations as described in **Section 2.3.2**, and overall reasonableness in the magnitude of the observed traffic demand. The final reviewed daily traffic volumes were then used to calibrate the base travel demand model that was used to evaluate the US 69 proposed express lane corridor's future demand potential.

Figure 2-2 Traffic Count Locations

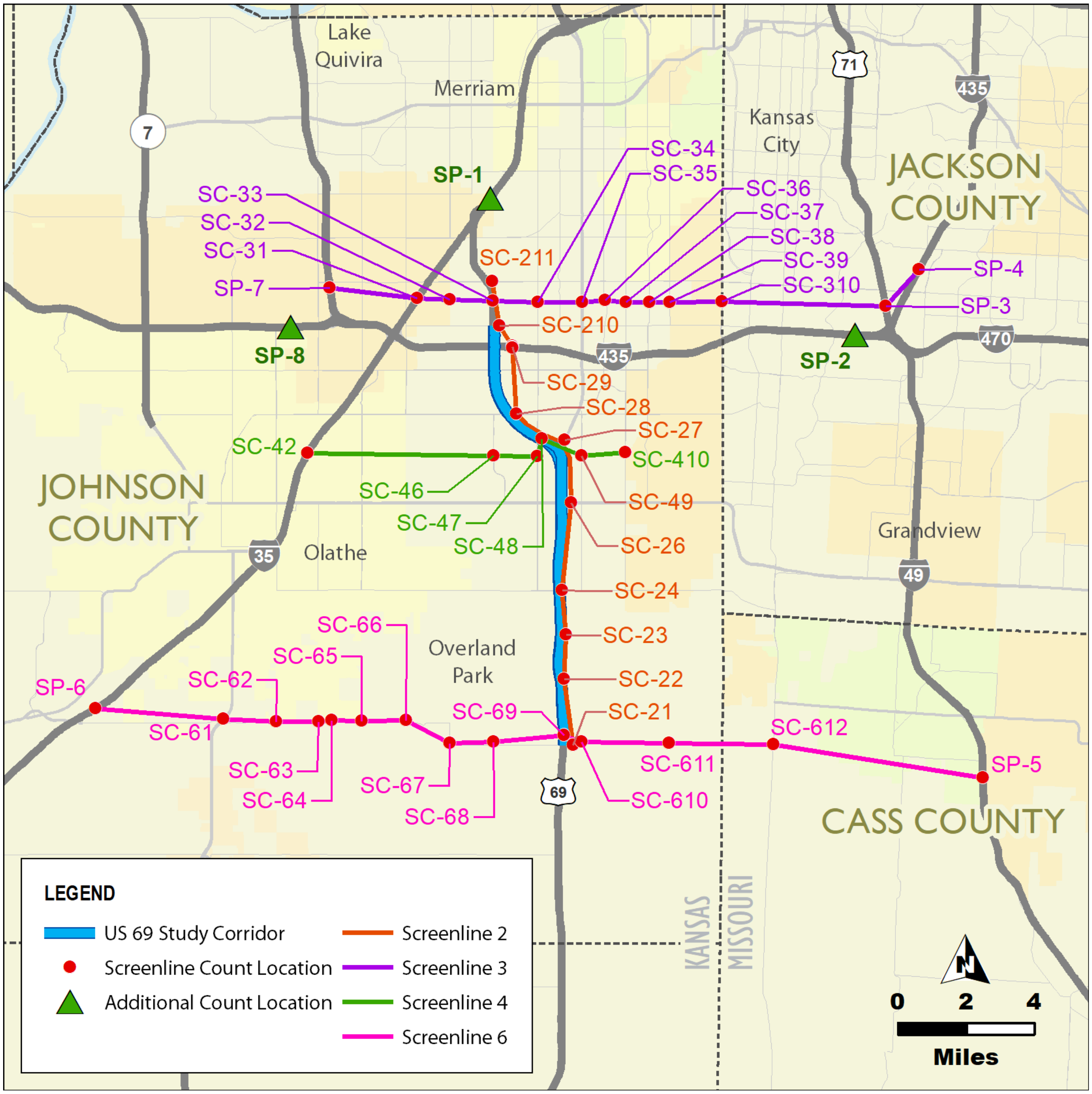


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Figure 2-3 Ramp Traffic Volume Locations

Figure 2-4 KDOT Permanent Count Locations

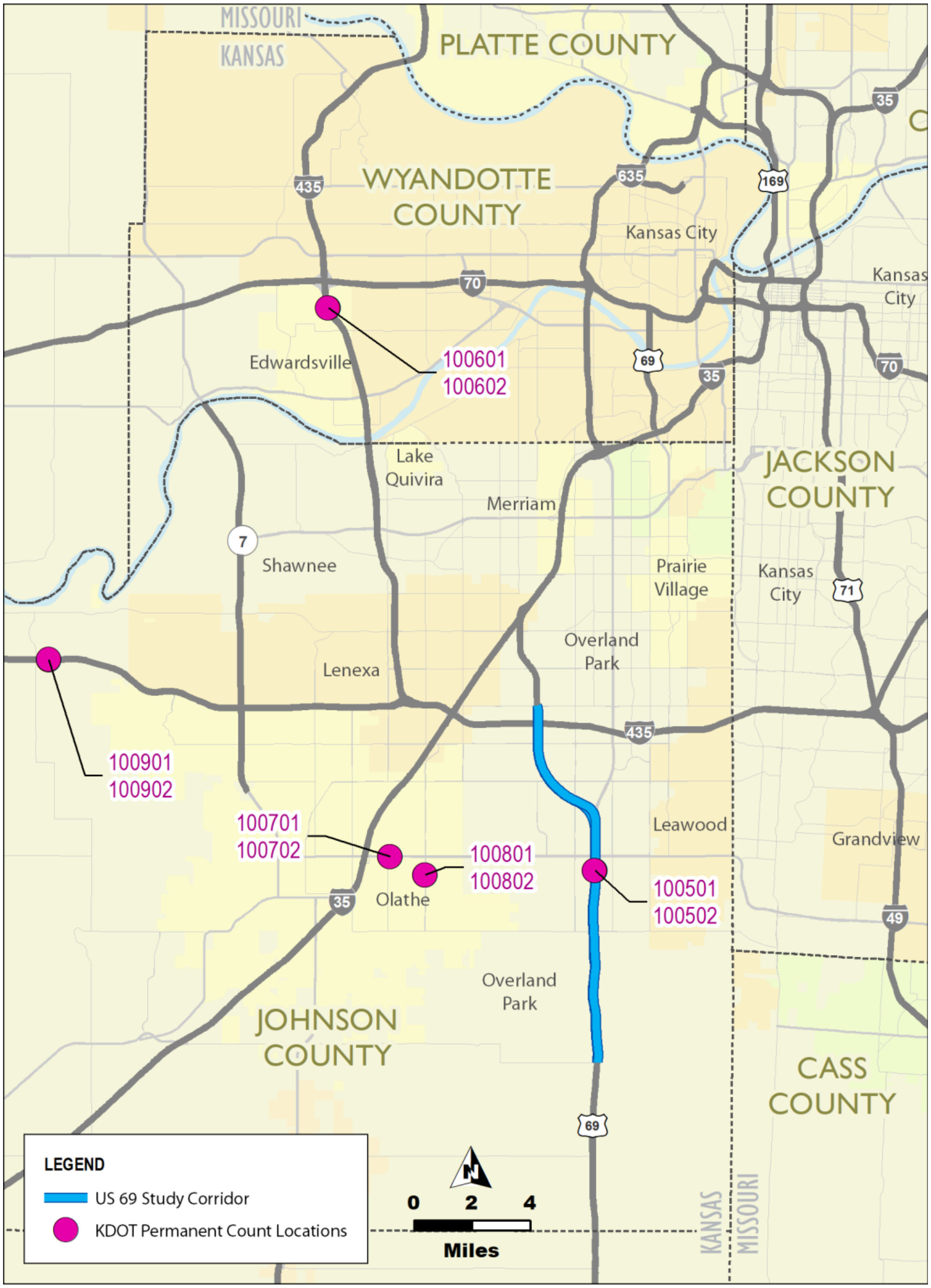


Table 2-2 Screenline Count Locations

ID	Location Description	Location Type	Source
Screenline 1 - East of US 69			
SC-21	179th Street east of US 69	Arterial	GHA Counts
SC-210	103rd Street east of US 69	Arterial	GHA Counts
SC-211	95th Street east of US 69	Arterial	GHA Counts
SC-22	167th Street east of US 69	Arterial	GHA Counts
SC-23	159th Street east of US 69	Arterial	GHA Counts
SC-24	151st Street east of US 69	Arterial	GHA Counts
SC-26	135th Street east of US 69	Arterial	GHA Counts
SC-27	Blue Valley Parkway north of US 69	Arterial	GHA Counts
SC-28	119th Street east of US 69	Arterial	GHA Counts
SC-29	**I-435 east of US 69**	**Mainlane**	**GHA Counts**
Screenline 2 - North of I-435			
SP-7	**I-435 north of SH 10**	**Mainlane**	**GHA Counts**
SC-31	**I-35 north of I-435**	**Mainlane**	**GHA Counts**
SC-310	State Line Road north of I-435	Arterial	GHA Counts
SC-32	Quivira Road north of 99th Street	Arterial	GHA Counts
SC-33	**US 69 north of 103rd Street**	**Mainlane**	**HNTB Daily Count Summary**
SC-34	Antioch Road north of I-435	Arterial	GHA Counts
SC-35	Metcalf Avenue north of 99th Street	Arterial	GHA Counts
SC-36	Lamar Avenue north of I-435	Arterial	GHA Counts
SC-38	Roe Avenue north of I-435	Arterial	GHA Counts
SP-3	**US 71 north of I-435**	**Mainlane**	**MoDOT Daily (AWDT)**
SP-4	**I-435 north of Bannister Road**	**Mainlane**	**MoDOT Daily (AWDT)**
Screenline 3: North of 127th Street			
SC-42	**I-35 north of 127th Street**	**Mainlane**	**GHA Counts**
SC-46	Switzer Road north of 127th Street	Arterial	GHA Counts
SC-47	Antioch Road north of 127th Street	Arterial	GHA Counts
SC-48	**US 69 north of Blue Valley Parkway**	**Mainlane**	**HNTB Daily Count Summary**
SC-49	Metcalf Avenue north of 127th Street	Arterial	GHA Counts
SC-410	Nail Avenue north of 127th Street	Arterial	GHA Counts
Screenline 4: North of 175th Street			
SP-6	**I-35 north of 175th Street**	**Mainlane**	**GHA Counts**
SC-61	**US 169 north of 175th Street**	**Mainlane**	**GHA Counts**
SC-610	Metcalf Avenue north of 175th Street	Arterial	GHA Counts
SC-611	Mission Road north of 175th Street	Arterial	GHA Counts
SC-612	Holmes Road north of 175th Street	Arterial	GHA Counts
SC-62	Ridgeview Road north of 175th Street	Arterial	GHA Counts
SC-63	Renner Road north of 175th Street	Arterial	GHA Counts
SC-64	Legler Road north of 175th Street	Arterial	GHA Counts
SC-65	Lackman Road north of 175th Street	Arterial	GHA Counts
SC-66	Pflumm Road north of 175th Street	Arterial	GHA Counts
SC-67	Quivira Road north of 175th Street	Arterial	GHA Counts
SC-68	Switzer Road north of 175th Street	Arterial	GHA Counts
SC-69	**US 69 north of 179th Street**	**Mainlane**	**HNTB Daily Count Summary**
SP-5	**I-49 north of Cass Parkway**	**Mainlane**	**GHA Counts**

Table 2-3 Spot Count Locations

ID	Location Description	Location Type	Source
SP-1	I-35 east of US 69	Mainlane	GHA Counts
SP-2	I-435 west of US 71	Mainlane	MoDOT Daily (AWDT)
SP-8	SH 10 east of Ridgeview Road	Mainlane	GHA Counts

Table 2-4 KDOT Permanent Count Locations

ID	Location Description	Location Type	Source
100901/902	K-10 east of Kill Creek Road	Freeway	ATR Counts
100601/602	I-435 south of I-70	Freeway	ATR Counts
100801/802	Black Bob Road south of 135th Street	Arterial	ATR Counts
100701/702	135th Street east of Mur-Len Road	Arterial	ATR Counts
100501/502	US 69 Mainlane south of 135th Street	Freeway	ATR Counts

Table 2-5 Ramp Counts along US 69 Study Corridor

ID	Location Description	Ramp Type	Source
102	NB Entrance Ramp from 179th Street	Entrance Ramp	HNTB Daily Traffic Profile
103	SB Exit Ramp to 179th Street	Exit Ramp	HNTB Daily Traffic Profile
202	NB Entrance Ramp from 167th Street	Entrance Ramp	HNTB Daily Traffic Profile
203	SB Exit Ramp to 167th Street	Exit Ramp	HNTB Daily Traffic Profile
301	NB Exit Ramp to 159th Street	Exit Ramp	HNTB Daily Traffic Profile
302	NB Entrance Ramp from 159th Street	Entrance Ramp	HNTB Daily Traffic Profile
303	SB Exit Ramp to 159th Street	Exit Ramp	HNTB Daily Traffic Profile
304	SB Entrance Ramp from 159th Street	Entrance Ramp	HNTB Daily Traffic Profile
401	NB Exit Ramp to 151st Street	Exit Ramp	HNTB Daily Traffic Profile
402	NB Entrance Ramp from 151st Street	Entrance Ramp	HNTB Daily Traffic Profile
403	SB Exit Ramp to 151st Street	Exit Ramp	HNTB Daily Traffic Profile
404	SB Entrance Ramp from 151st Street	Entrance Ramp	HNTB Daily Traffic Profile
501	NB Exit Ramp to 135th Street	Exit Ramp	HNTB Daily Traffic Profile
502	NB Entrance Ramp from 135th Street	Entrance Ramp	HNTB Daily Traffic Profile
503	SB Exit Ramp to 135th Street	Exit Ramp	HNTB Daily Traffic Profile
504	SB Entrance Ramp from 135th Street	Entrance Ramp	HNTB Daily Traffic Profile
505	NB Entrance Ramp from 135th Street	Entrance Ramp	HNTB Daily Traffic Profile
601	NB Exit Ramp to Blue Valley	Exit Ramp	HNTB Daily Traffic Profile
604	SB Entrance Ramp from Blue Valley	Entrance Ramp	HNTB Daily Traffic Profile
701	NB Exit Ramp to 119th Street	Exit Ramp	HNTB Daily Traffic Profile
702	NB Entrance Ramp from 119th Street	Entrance Ramp	HNTB Daily Traffic Profile
703	SB Exit Ramp to 119th Street	Exit Ramp	HNTB Daily Traffic Profile
704	SB Entrance Ramp from 119th Street	Entrance Ramp	HNTB Daily Traffic Profile
801	NB Exit Ramp to College Blvd	Exit Ramp	HNTB Daily Traffic Profile
802	NB Entrance Ramp from College Boulevard	Entrance Ramp	HNTB Daily Traffic Profile
803	SB Exit Ramp to College Boulevard	Exit Ramp	HNTB Daily Traffic Profile
804	SB Entrance Ramp from College Boulevard	Entrance Ramp	HNTB Daily Traffic Profile
805	NB Entrance Ramp from College Boulevard	Entrance Ramp	HNTB Daily Traffic Profile
901	NB Exit Ramp to I-435	Exit Ramp	HNTB Daily Traffic Profile
902	NB Entrance Ramp from I-435	Entrance Ramp	HNTB Daily Traffic Profile
903	NB Exit Ramp to I-435	Exit Ramp	HNTB Daily Traffic Profile
904	NB Entrance Ramp from I-435	Entrance Ramp	HNTB Daily Traffic Profile
1001	NB Exit Ramp to 103rd Street	Exit Ramp	HNTB Daily Traffic Profile
1002	NB Entrance Ramp from 103rd Street	Entrance Ramp	HNTB Daily Traffic Profile
1003	SB Exit Ramp to 103rd Street	Exit Ramp	HNTB Daily Traffic Profile
1101	NB Exit Ramp to 95th Street	Exit Ramp	HNTB Daily Traffic Profile
1102	NB Entrance Ramp from 95th Street	Entrance Ramp	HNTB Daily Traffic Profile
1103	SB Exit Ramp to 95th Street	Exit Ramp	HNTB Daily Traffic Profile
1104	SB Entrance Ramp from 95th Street	Entrance Ramp	HNTB Daily Traffic Profile

2.3.1 Adjusted Traffic Counts

Screenline counts are intended to showcase the traffic demand that flows through a specific unique section of the study area. Typically, they include major routes that carry the overall demand flowing along and/or across the study corridor. They are used to determine the corridor's share of overall demand and are used to highlight potential diversion of traffic into or out of the corridor. They also provide a measure of the overall travel demand estimated by calibrated travel demand model.

Four screenlines were selected to evaluate the existing traffic characteristics within the study area and to establish the base travel demand patterns that were used to calibrate the 2019 base year travel demand model. The four screenlines were:

- Screenline 1: East of US 69
- Screenline 2: North of I-435
- Screenline 3: North of 127th Street
- Screenline 4: North of 175th Street

The four screenline locations are illustrated in **Figure 2-7** and reflects a total of 42 count locations. The counts were obtained for a continuous 48-hour period along each major arterial and freeway as listed in **Tables 2-2** and **2-3.** Following the traffic data collection program, the raw data was processed and evaluated for consistency. Since the counts collected were after the onset of COVID-19, they naturally included traffic impacts due to the pandemic. However, these impacts were normalized back to the model 2019 base year by adjusting the counts using the historically observed trends at selected ATR count locations. For any given screenline count location, the closest ATR count location with similar facility type (arterial or freeway/expressway mainlane) was identified. Subsequently, the COVID-19 impact was assessed on the identified ATR count locations by comparing the November 2019 and 2020 traffic volumes at each period and daily level. The resulting impacts were applied at a period level to the 2020 screenline counts to derive the estimated normalized 2019 counts. **Figures 2-5** and **2-6** show the northbound and southbound count profiles before (November 2019) and after (November 2020) the onset of the COVID-19 pandemic at the US 69 ATR location south of 135th Street.

Table 2-6 provides a summary of the 2019 AWDT volumes and the percentage share of the US 69 corridor demand along the four screenlines shown in **Figure 2-7**. **Tables 2-7** through **2-9** provide the AWDTs for the spot count locations, ATR count locations, and ramps along US 69 corridor, respectively.

Figure 2-5 COVID-19 Trend Adjustment – US 69 ATR Count (South of 135th Street) Northbound

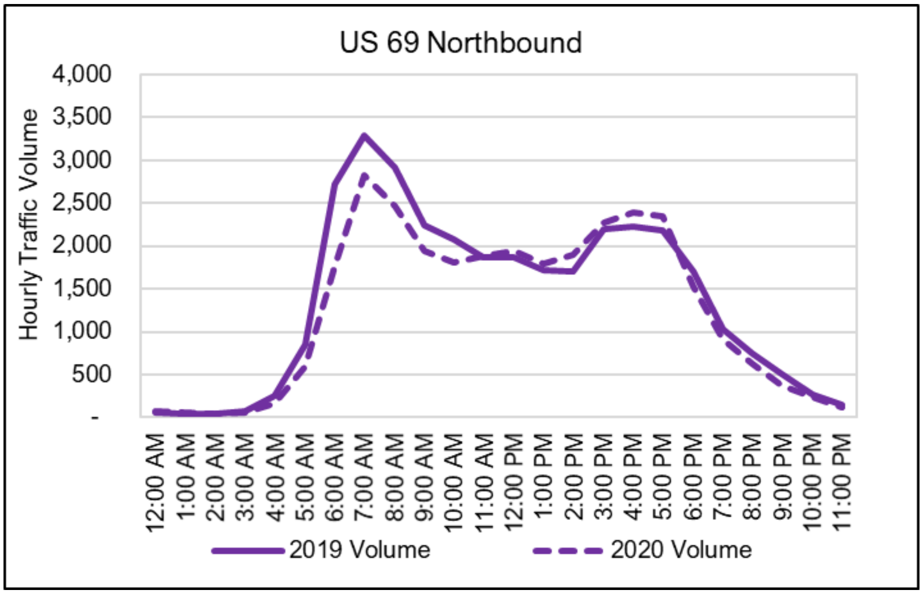
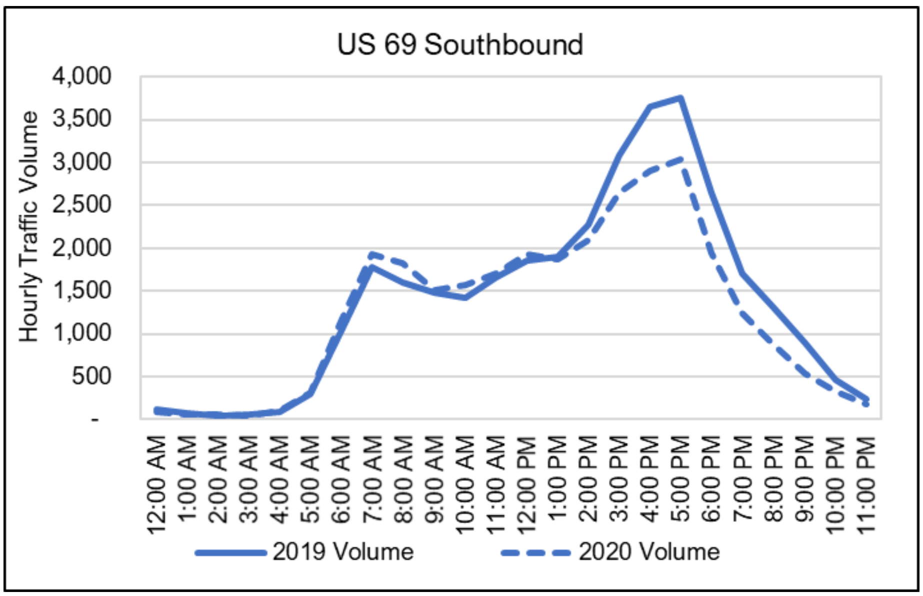


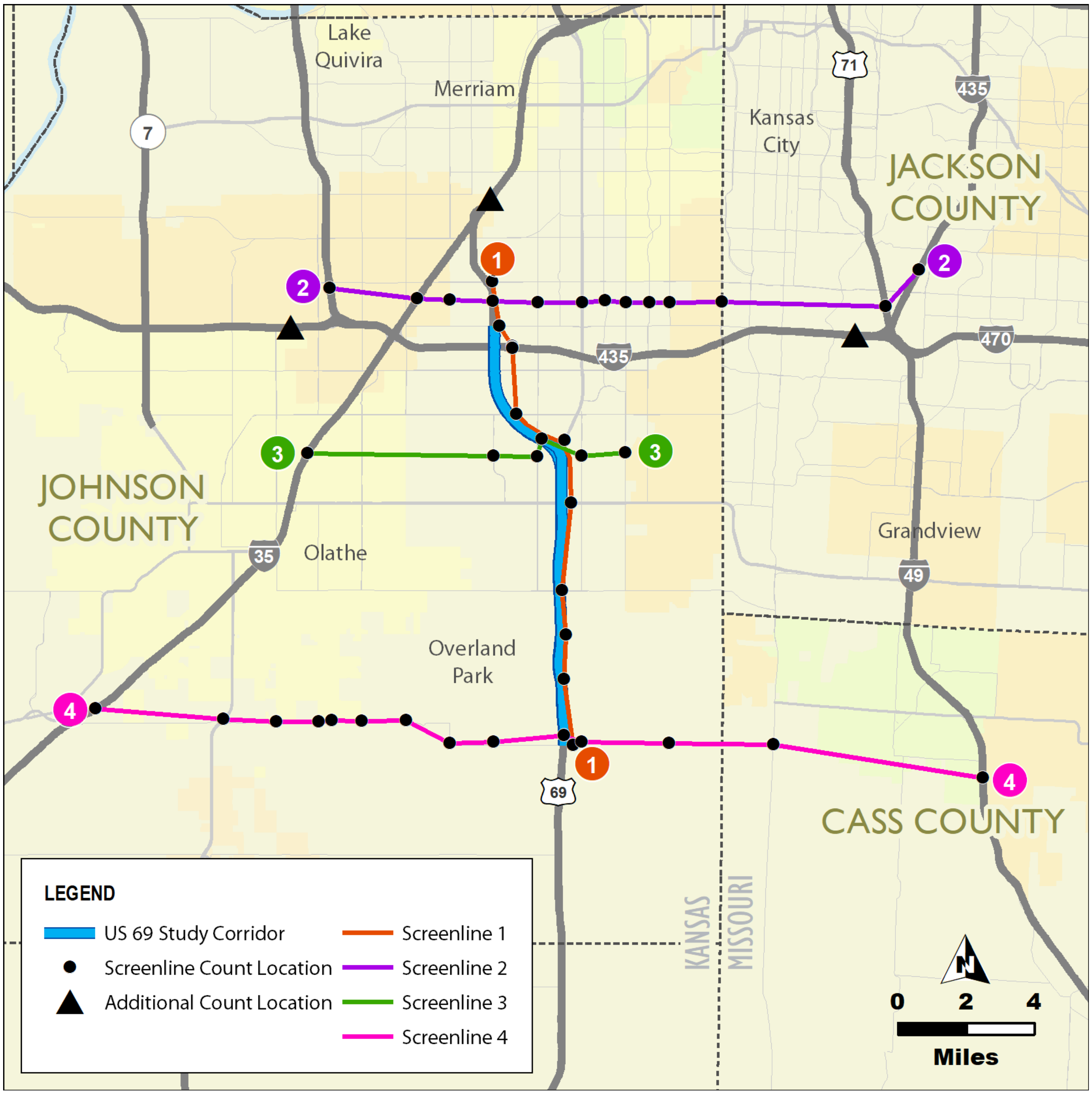
Figure 2-6 COVID-19 Trend Adjustment – US 69 ATR Count (South of 135th Street) Southbound



Screenline 1 – East of US 69 is comprised of 10 traffic count locations between 95th Street and 179th Street. This screenline was selected to capture traffic moving across the study corridor, including traffic entering and exiting the study corridor. As seen in **Table 2-6**, I-435 (including the collector distributor roads and mainlanes) serves most of the screenline traffic with a share of 43.3 percent of the overall screenline traffic. 135th Street is the major arterial along the screenline capturing 13.4 percent of the screenline traffic share.

Screenline 2 – North of I-435 consists of 11 traffic count locations. This screenline captures north-south traffic movements, including all routes competing with US 69. As seen in **Table 2-6**, I-35 contributes to the largest share with 19.2 percent of the overall screenline traffic. The northern terminus of the study corridor (US 69 north of 103rd Street) has the second highest share of the screenline traffic with a share of 16.9 percent. The I-435 and US 71 freeways have shares of 14.4 and 16.2 percent, respectively. Metcalf Avenue is the highest volume arterial route and serves 6.2 percent of the screenline traffic.

Figure 2-7 Screenline Map



Screenline 3– North of 127th Street consists of six traffic count locations. This screenline captures north-south traffic movements, including several of the routes competing with US 69. As seen in **Table 2-6**, I-35 contributes most of the traffic with a share of 47.9 percent of the overall screenline

traffic. US 69 has the second highest share at 25.3 percent. Among the arterial routes, Nail Avenue has the highest traffic share at 8.3 percent.

Screenline 4 – North of 175th Street consists of 14 traffic count locations. This screenline captures north-south traffic movements and includes all routes competing with US 69. As seen in **Table 2-6**, I-35 again contributes a large share with 29.0 percent of the overall screenline traffic, followed by I-49 with 25.5 percent. US 69 has the third highest share of the screenline traffic with a share of 18.9 percent. Among arterial routes, US 169 has the highest traffic share at 14.0 percent.

Table 2-6 Screenline Traffic Volumes and Shares

ID	Location Description	2019 Average Weekday Traffic	Screenline Share
Screenline 1 - East of US 69			
SC-21	179th Street east of US 69	4,900	1.2%
SC-210	103rd Street east of US 69	17,500	4.3%
SC-211	95th Street east of US 69	28,700	7.1%
SC-22	167th Street east of US 69	2,800	0.7%
SC-23	159th Street east of US 69	26,300	6.5%
SC-24	151st Street east of US 69	33,200	8.2%
SC-26	135th Street east of US 69	53,900	13.4%
SC-27	Blue Valley Parkway north of US 69	33,500	8.3%
SC-28	119th Street east of US 69	27,500	6.8%
SC-29	**I-435 east of US 69**	**174,400**	**43.3%**
Screenline 1: Total		**402,700**	**100.0%**
Screenline 2 - North of I-435			
SP-7	**I-435 north of SH 10**	83,600	14.4%
SC-31	**I-35 north of I-435**	111,000	19.2%
SC-310	State Line Road north of I-435	25,400	4.4%
SC-32	Quivira Road north of 99th Street	18,700	3.2%
SC-33	**US 69 north of 103rd Street**	97,700	16.9%
SC-34	Antioch Road north of I-435	18,300	3.2%
SC-35	Metcalf Avenue north of 99th Street	36,100	6.2%
SC-36	Lamar Avenue north of I-435	2,700	0.5%
SC-38	Roe Avenue north of I-435	7,800	1.3%
SP-3	**US 71 north of I-435**	**84,100**	**14.5%**
SP-4	**I-435 north of Bannister Road**	**93,800**	**16.2%**
Screenline 2: Total		**579,200**	**100.0%**
Screenline 3: North of 127th Street			
SC-42	**I-35 north of 127th Street**	122,900	47.9%
SC-46	Switzer Road north of 127th Street	10,100	3.9%
SC-47	Antioch Road north of 127th Street	21,000	8.2%
SC-48	**US 69 north of Blue Valley Parkway**	64,900	25.3%
SC-49	Metcalf Avenue north of 127th Street	**16,700**	**6.5%**
SC-410	Nail Avenue north of 127th Street	**21,200**	**8.3%**
Screenline 3: Total		**256,800**	**100.0%**
Screenline 4: North of 175th Street			
SP-6	**I-35 north of 175th Street**	**55,900**	**29.0%**
SC-61	**US 169 north of 175th Street**	**27,000**	**14.0%**
SC-610	Metcalf Avenue north of 175th Street	4,100	2.1%
SC-611	Mission Road north of 175th Street	1,200	0.6%
SC-612	Holmes Road north of 175th Street	4,900	2.5%
SC-62	Ridgeview Road north of 175th Street	3,000	1.6%
SC-63	Renner Road north of 175th Street	2,100	1.1%
SC-64	Legler Road north of 175th Street	800	0.4%
SC-65	Lackman Road north of 175th Street	3,000	1.6%
SC-66	Pflumm Road north of 175th Street	2,300	1.2%
SC-67	Quivira Road north of 175th Street	1,100	0.6%
SC-68	Switzer Road north of 175th Street	1,900	1.0%
SC-69	**US 69 north of 179th Street**	36,500	18.9%
SP-5	**I-49 north of Cass Parkway**	**49,200**	**25.5%**
Screenline 4: Total		**193,000**	**100.0%**

Table 2-7 Spot Count Traffic Volumes

ID	Location Description	2019 Average Weekday Traffic
SP-1	I-35 east of US 69	158,000
SP-2	I-435 west of US 71	70,600
SP-8	SH 10 east of Ridgeview Road	89,500

Table 2-8 ATR Count Location Traffic Volumes

ID	Location Description	2019 Average Weekday Traffic
100901/902	K-10 east of Kill Creek Road	42,200
100601/602	I-435 south of I-70	79,100
100801/801	Black Bob Road south of 135th Street	23,000
100701/701	135th Street east of Mur-Len Road	35,900
100501/501	US 69 Mainlane south of 135th Street	66,200

Table 2-9 Ramp Traffic Volumes

ID	Location Description	2019 Average Weekday Traffic
102	NB Entrance Ramp from 179th Street	4,200
103	SB Exit Ramp to 179th Street	4,200
202	NB Entrance Ramp from 167th Street	1,600
203	SB Exit Ramp to 167th Street	1,600
301	NB Exit Ramp to 159th Street	3,600
302	NB Entrance Ramp from 159th Street	8,400
303	SB Exit Ramp to 159th Street	8,400
304	SB Entrance Ramp from 159th Street	3,600
401	NB Exit Ramp to 151st Street	5,600
402	NB Entrance Ramp from 151st Street	14,800
403	SB Exit Ramp to 151st Street	14,800
404	SB Entrance Ramp from 151st Street	5,600
501	NB Exit Ramp to 135th Street	7,400
502	NB Entrance Ramp from 135th Street	14,500
503	SB Exit Ramp to 135th Street	22,700
504	SB Entrance Ramp from 135th Street	7,400
505	NB Entrance Ramp from 135th Street	8,200
601	NB Exit Ramp to Blue Valley	16,800
604	SB Entrance Ramp from Blue Valley	16,800
701	NB Exit Ramp to 119th Street	2,700
702	NB Entrance Ramp from 119th Street	15,900
703	SB Exit Ramp to 119th Street	6,400
704	SB Entrance Ramp from 119th Street	2,700
801	NB Exit Ramp to College Blvd	4,400
802	NB Entrance Ramp from College Boulevard	5,500
803	SB Exit Ramp to College Boulevard	6,200
804	SB Entrance Ramp from College Boulevard	15,700
805	NB Entrance Ramp from College Boulevard	5,000
901	NB Exit Ramp to I-435	8,800
902	NB Entrance Ramp from I-435	3,800
903	NB Exit Ramp to I-435	14,900
904	NB Entrance Ramp from I-435	17,500
1001	NB Exit Ramp to 103rd Street	4,300
1002	NB Entrance Ramp from 103rd Street	3,800
1003	SB Exit Ramp to 103rd Street	22,200
1101	NB Exit Ramp to 95th Street	8,300
1102	NB Entrance Ramp from 95th Street	3,800
1103	SB Exit Ramp to 95th Street	3,800
1104	SB Entrance Ramp from 95th Street	8,300

2.3.2 Seasonal Variation Trends

KDOT has several permanent traffic counters along state highways and some arterials throughout Kansas that continuously record traffic volumes. The traffic data was obtained for permanent count stations along three freeways (US 69, I-435, and K-10) and two arterials (135th Street and S. Black Bob Road) to gauge the monthly/seasonal variation in traffic compared to the overall annual average. **Figure 2-8** shows the average monthly variations summarized as seasonal indices. The peak months are typically May, June, September, and October. These seasonal variations were taken into consideration as part of the model calibration to compare AWDT counts to those produced by the travel demand model.

Figure 2-8 Monthly/Seasonal Variation for Average Daily Traffic for US 69

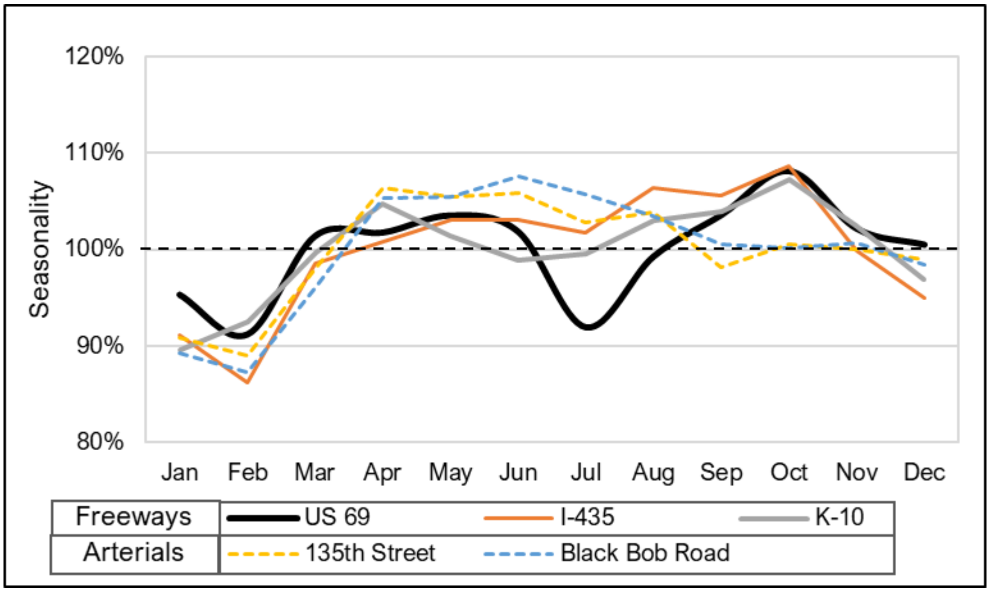
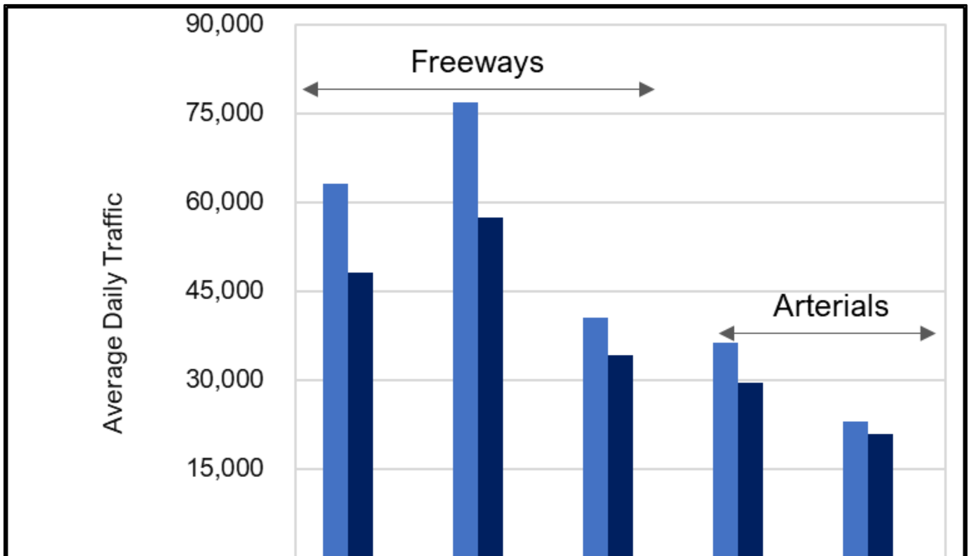


Figure 2-9 summarizes the yearly average weekday versus weekend factors for all the permanent count locations, including the US 69 corridor. The average weekend traffic is approximately 74 to 84 percent and 82 to 90 percent of the AWDT for freeways and arterials, respectively.

Figure 2-9 Average Weekday vs. Weekend Distribution



	US-69	I-435	K-10	135th Street	Black Bob
Avg. Weekday (2019)	63,200	76,800	40,600	36,300	23,100
Avg. Weekend (2019)	48,100	57,400	34,200	29,600	20,800
Weekend Share	76.1%	74.7%	84.2%	81.5%	90.0%

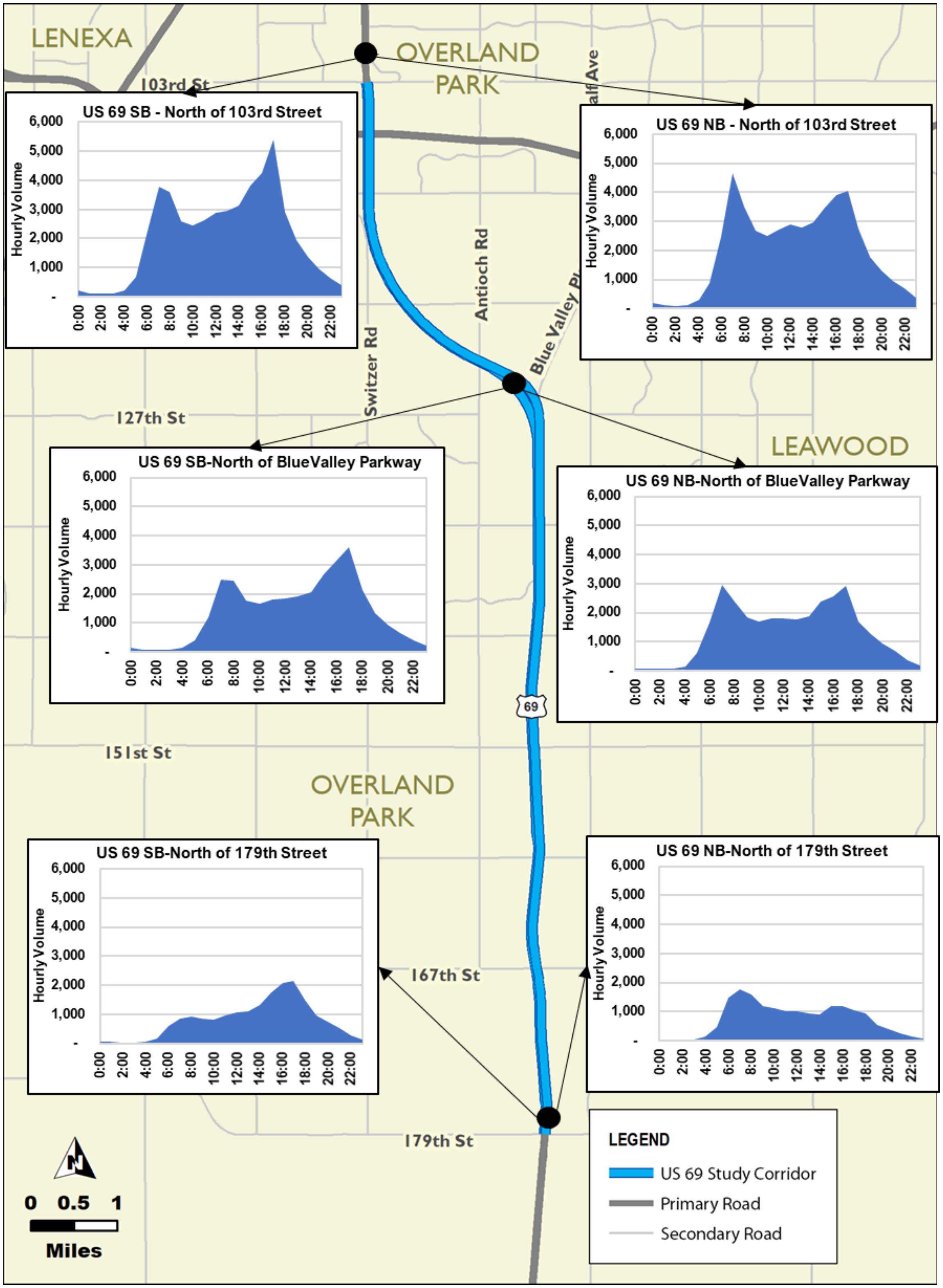
2.3.3 Time-of-Day Traffic Distribution

Comprehensive traffic volume profiles were summarized to show the average traffic demand along US 69 in both the northbound and the southbound directions, for the peak and off-peak periods. The peak periods were further divided into individual hours in the regional travel demand model. The comprehensive mainlane and ramp counts collected along US 69 were used to generate the overall traffic profile along the entire corridor for the four time periods listed below:

- AM Peak Period – 5:00 AM to 9:00 AM;
- Midday Period – 9:00 AM to 3:00 PM;
- PM Peak Period – 3:00 PM to 7:00 PM; and
- Night Period – 7:00 PM to 5:00 AM.

Figure 2-10 summarizes the temporal distribution of the US 69 main lane volumes at three locations along the US 69 study corridor. The 15-minute traffic counts are displayed as hourly volumes by adding the four 15-minute volumes in an hour for illustrative purposes to show the hour in which the highest traffic volume was observed. As shown in the figure, most of the locations displayed peak traffic in the northbound direction during the morning hours and in the southbound direction during the evening hours. The highest hourly equivalent traffic occurred in the southbound direction at 103rd Street with over 5,400 vehicles per hour (vph). The lowest hourly peak period traffic of 900 vph was observed at the southern terminus of the corridor, in the southbound direction.

Figure 2-10 Temporal Distribution of Traffic along US 69 – 2019



2.3.4 Corridor Peak Period Traffic

As described earlier, an analysis of the temporal distribution of the traffic was conducted by analyzing the AWDT volumes, which were obtained from the 15-minute counts taken in October 2020 and combined into the hours in each respective period. This data is summarized in **Figures 2-11** and **2-12** for the AM and PM peak period volumes by travel direction along US 69. The graphics again illustrate that the predominant direction of travel is the northbound direction in the AM peak period with the highest traffic volume north of 103rd Street. Between 103rd Street and 179th Street, the traffic volumes along the US 69 corridor gradually decrease to the minimum volume recorded at the southern terminus of the study corridor, at 179th Street. During the PM peak period, the predominant direction of travel is in the southbound direction, converse of the traffic profile for the northbound direction which exhibits higher traffic during the AM peak period.

Figure 2-11 AM Peak Period (5:00 AM – 9:00 AM) Traffic Volumes along the Study Corridor

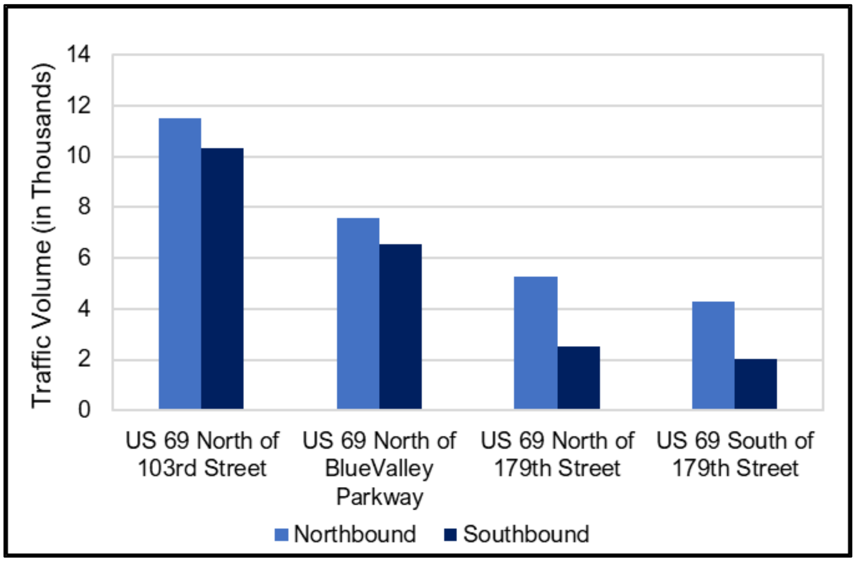
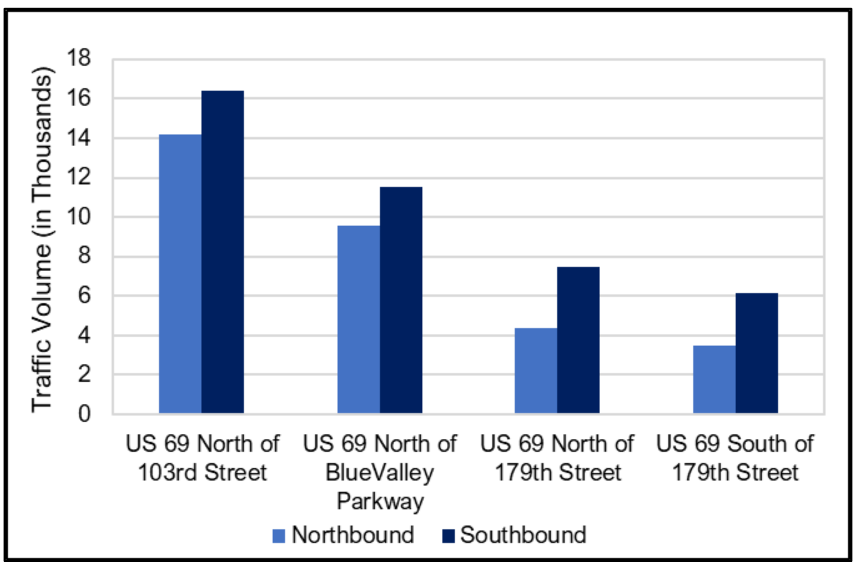


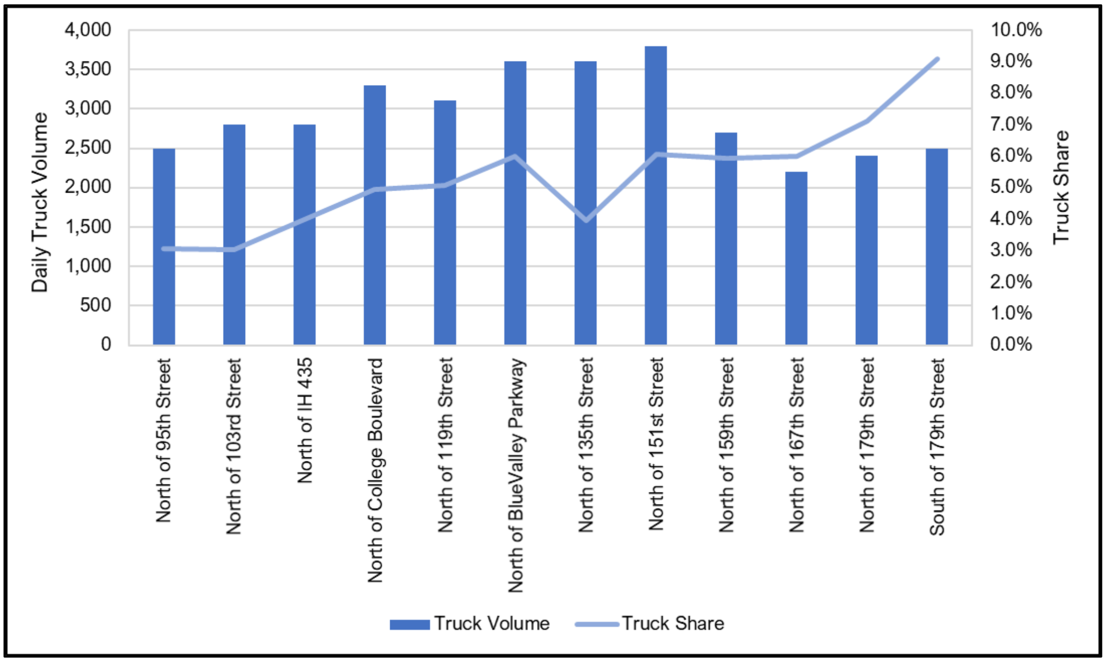
Figure 2-12 PM Peak Period (3:00 PM – 7:00 PM) Traffic Volumes along the Study Corridor



2.3.5 Corridor Daily Truck Share

Figure 2-13 illustrates the 2019 truck traffic volumes along the US 69 corridor, between 95th Street and 179th Street. These truck volumes were estimated from the HNTB-developed 2019 balanced daily traffic volumes summary. As seen in the figure, the US 69 mainlanes north of 151st Street have the highest volume of trucks in 2019 with around 3,800 daily trucks. Truck traffic was low at the southern terminus of the study corridor, near 179th Street and 167th Street. Despite low truck traffic, the highest truck share was observed towards the southern end of corridor (south of 179th Street) as the total traffic is lower compared to northern end of corridor. Truck share of six percent was observed north of 151st Street and Blue Valley Parkway. A four percent truck share was observed north of 135th Street and three percent at the northern end of the study corridor predominately due to the higher overall traffic observed at these locations.

Figure 2-13 2019 Truck Traffic Volumes and Percent Shares along the US 69 Study Corridor



2.4 Speed and Delay Information

One of the crucial inputs for an express lanes study is the current operating characteristics of the study corridor and any competing roadways. Travel time data was collected from two different sources for this study. The first source was historical travel time 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 by tracking vehicles with GPS-enabled devices. 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 as well as 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. INRIX was engaged to provide 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 travel speed information along most of the major roadways.

The second source was the *National Performance Management Research Data Set* (*NPMRDS*). The NPMRDS is a monthly archive of average travel times, reported every five minutes when data is available, on the National Highway System. The travel times are based on vehicle probe-based data. Separate average travel times are included for "all traffic", freight and passenger travel. FHWA provides access to the NPMRDS to the State DOT and MPO partners for their performance management activities.

2.4.1 Route Selection

Speed information was obtained from INRIX for selected arterial routes in Johnson County, Kansas, and Cass and Jackson counties in Missouri. The speed and delay data for the US 69 corridor and other major highways were extracted from the NPMRDS.

Several arterial routes were selected for analysis to provide a profile of the fluctuation in average travel speeds throughout the US 69 study area and the relationship between demand and congestion levels. INRIX data was collected for 2019 for arterials in the vicinity of the US 69 corridor. It should be noted that the data collected included travel speeds for Tuesday through Thursday. Hence, the data represent a typical weekday and exclude weekends and potentially atypical characteristics of traffic usually observed on Mondays and Fridays.

Similarly, data along the US 69 corridor, obtained from NPMRDS, was collected at the fifteen-minute level for typical weekdays (Tuesday through Thursday) from February through April 2019.

The subsequent section discusses the speed and delay data analyzed along nearby arterial routes within the study area and along the US 69 study corridor.

2.4.2 Speed Information

Figures 2-14 and **2-15** illustrate the speed data collected along key arterial routes within the US 69 study area. The data shows some slowdowns around major intersections and further north along 103rd Street and College Boulevard, however, many of the segments were shown to be operating at speeds of 30 mph or higher during the AM and the PM peak hours.

Figures 2-16 and **2-17** illustrate the average travel speeds along US 69 for the AM peak period (5:00 AM to 9:00 AM) and the PM peak period (3:00 PM to 7:00 PM), respectively. The speed data collected in concert with the traffic data collection effort were used to support the development of congestion characteristics and the ensuing volume profiles.

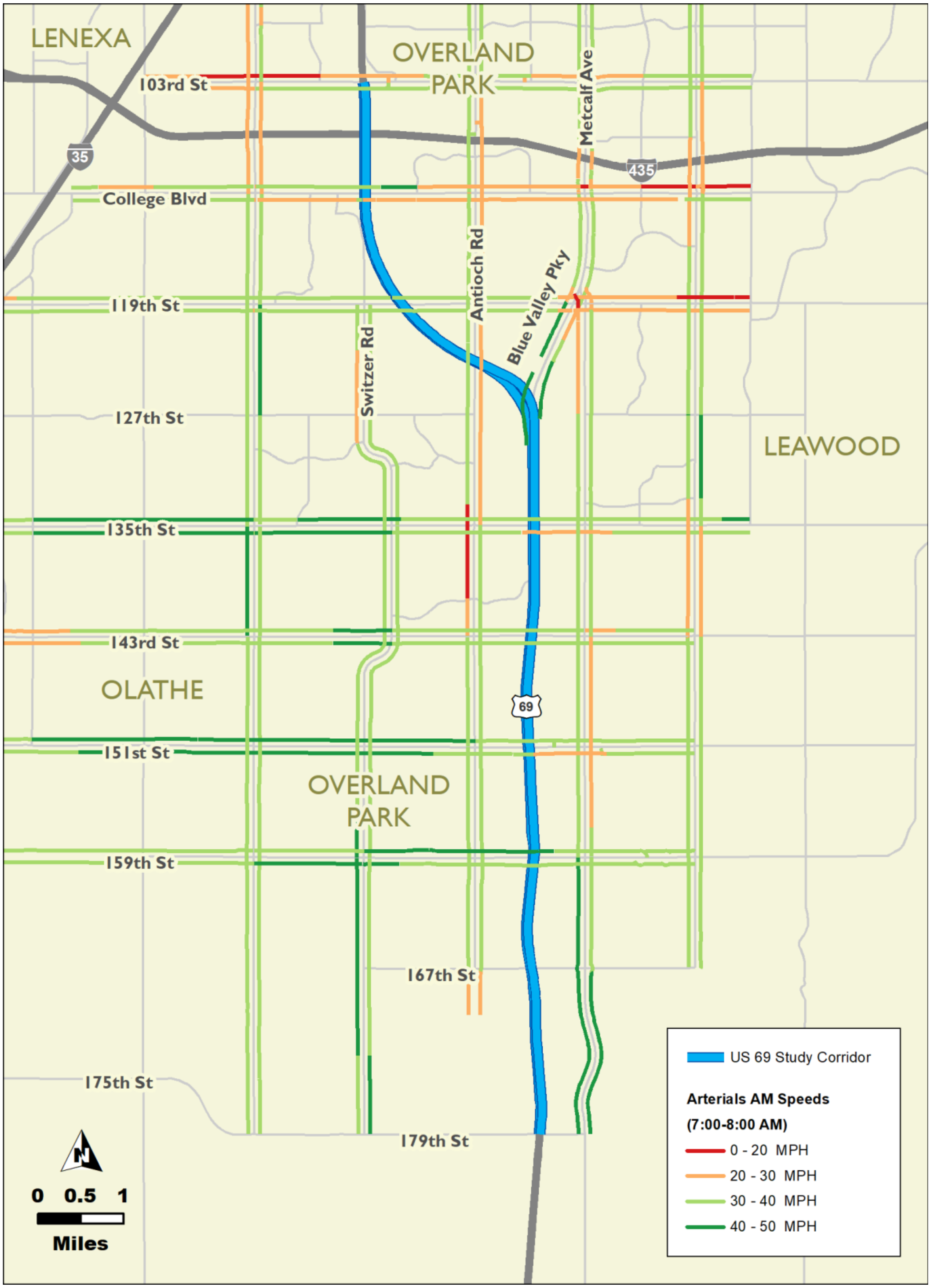
For the morning peak period, the peak direction of travel along US 69 corridor is in the northbound direction as commuters head north towards Kansas City. The corridor becomes congested between 151st Street and 135th Street, with speeds dropping to less than 25 mph. The decrease in speed for this section begins after 7:00 AM and continues through 9:00 AM and is likely due to the higher entrance volume during the morning period from 151st Street. However, the corridor speeds to the

CDM Smith

north of this section were shown to increase to over 60 mph for the remainder of the corridor length throughout the entire peak period.

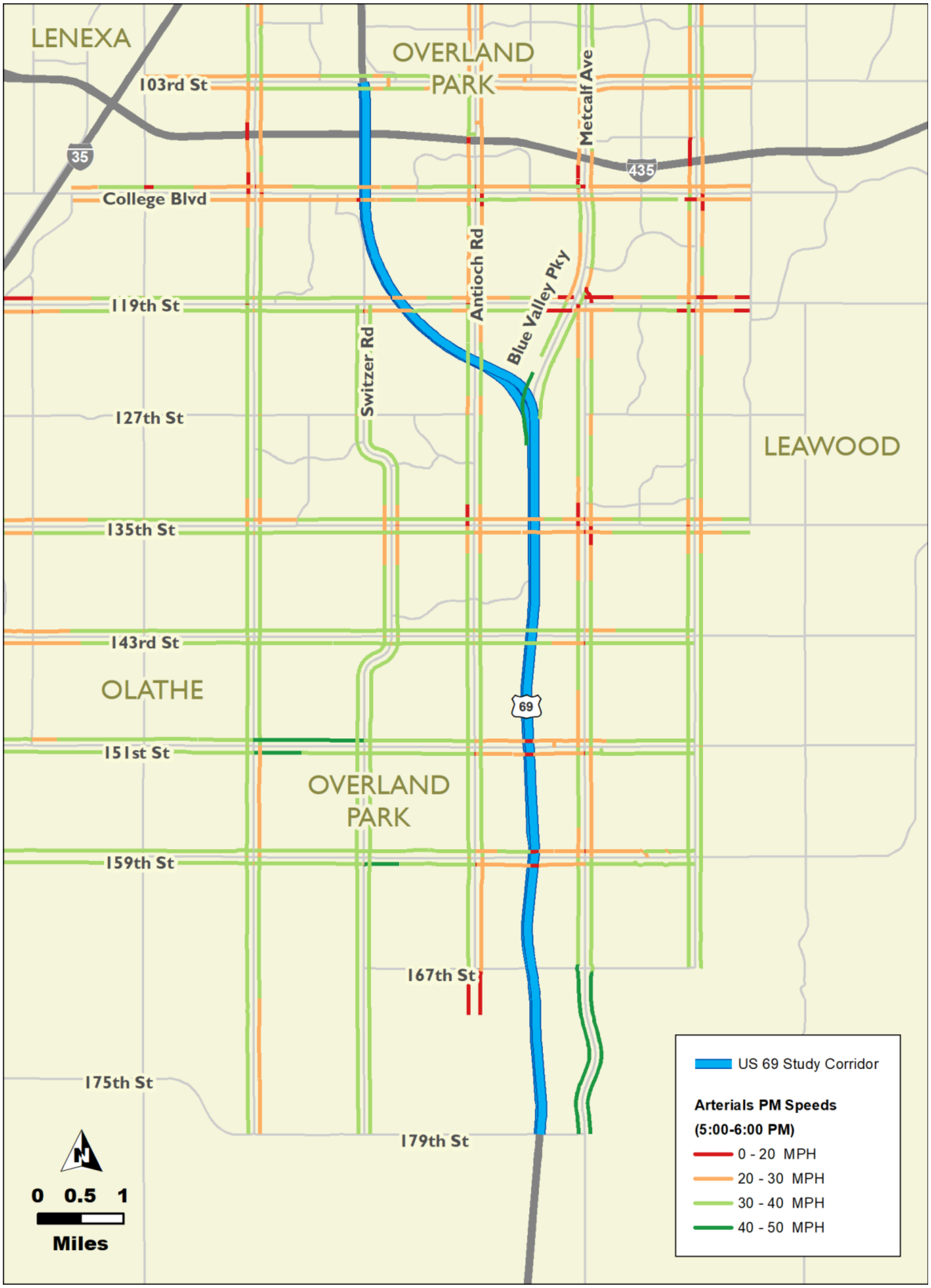
For the evening peak period, the peak direction of travel along US 69 corridor is in the southbound direction. The corridor becomes congested between College Boulevard and north of 151st Street, with speeds dropping to less than 45 mph in this section. At the 119th Street location, speeds drop to less than 25 mph, likely due to the higher southbound volume and the various merge points in this section. Aside from this section, observed speeds are approximately 60 mph and over for all other sections. During the evening peak period, the northbound traffic is also congested between 119th Street and I-435, and otherwise operates under free-flow speeds for the remaining sections and periods. For both the southbound and northbound directions, the lowest speeds are seen during the PM peak hour (5:00 PM to 6:00 PM).

Figure 2-14 2019 Average Weekday Speeds Along Arterials – AM Peak Hour (7:00 AM to 8:00 AM)



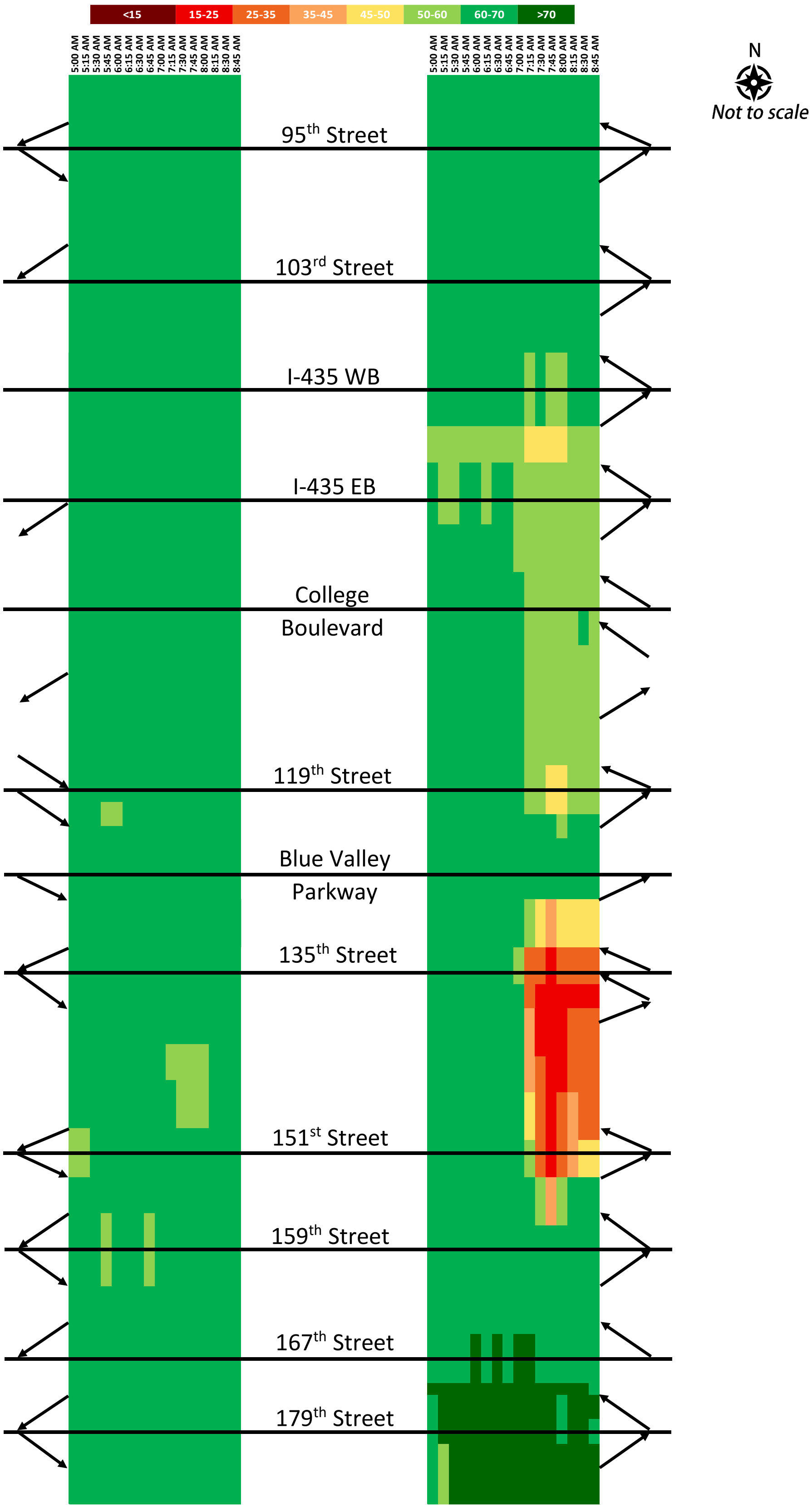
Source: INRIX

Figure 2-15 2019 Average Weekday Speeds Along Arterials – PM Peak Hour (5:00 PM to 6:00 PM)



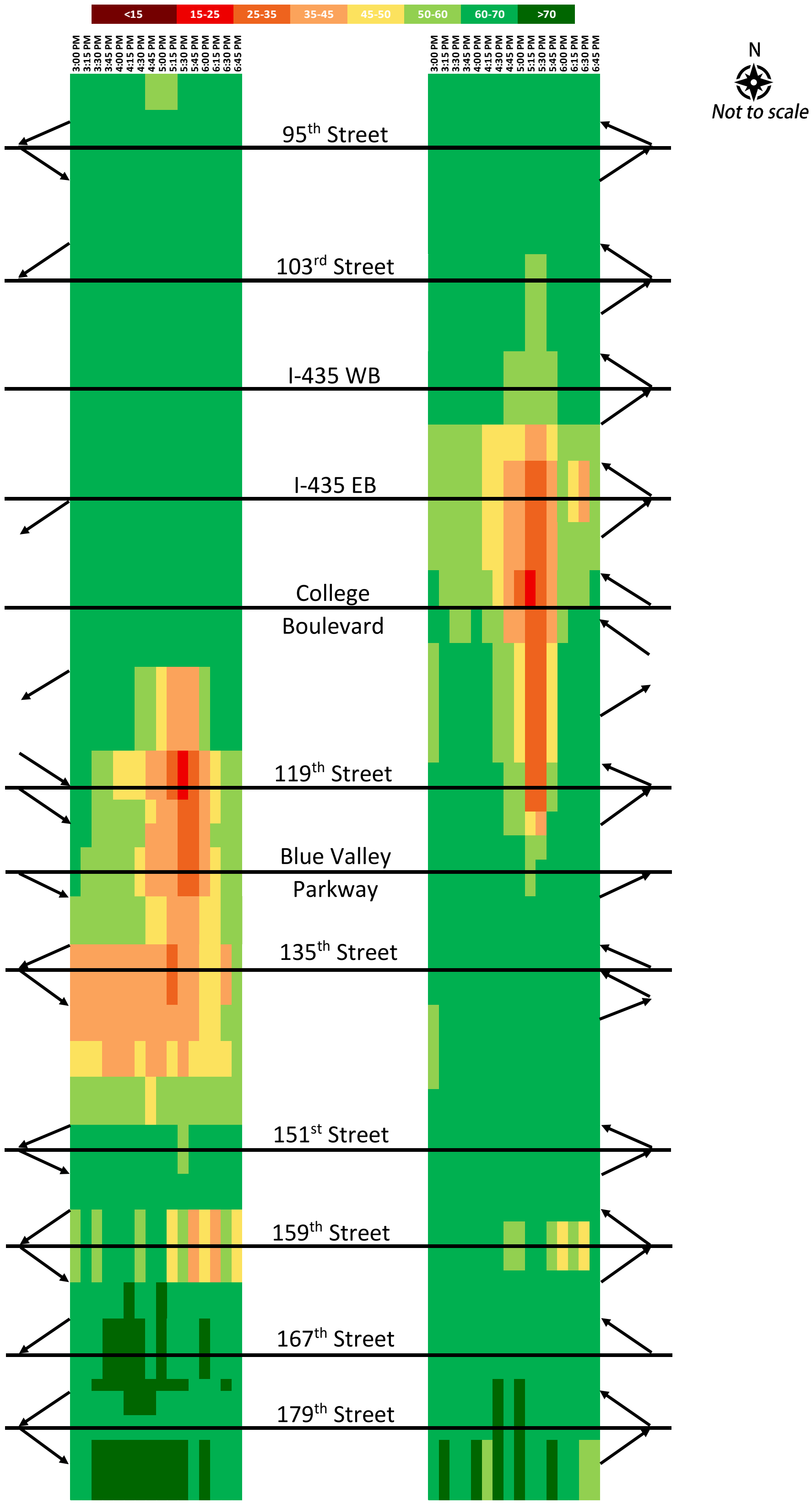
Source: INRIX

Figure 2-16 2019 Average Weekday Speed Profile Along US 69 – AM Peak Period (5:00 AM to 9:00 AM)



Source: NPMRDS

Figure 2-17 2019 Average Weekday Speed Profile Along US 69 – PM Peak Period (3:00 PM to 7:00 PM)



Source: NPMRDS

2.5 Origin-Destination Patterns

O-D data for the US 69 study corridor was obtained from StreetLight Data, a data analytics company based in San Francisco, California that compiles and analyzes the O-D patterns of traffic by tracking vehicles through GPS-enabled devices and mobile phones.

O-D data which represented the average weekday (Tuesday through Thursday) conditions for 2019 was obtained from StreetLight Data and the "location-based services with pass-through" metrics were analyzed to understand the travel pattern of the users passing through different sections of the US 69 study corridor. The data was summarized for an average weekday condition during both the AM Peak (5:00 AM – 9:00 AM) and the PM Peak (3:00 PM – 7:00 PM) periods. **Figure 2-18** illustrates the pass-through locations that were selected to collect the O-D data.

Figure 2-19 summarizes the average O-D patterns of traffic along southbound US 69 south of 87th Street during the AM and the PM peak periods. During the AM peak period, over half of this traffic exits to the intersecting arterials, primarily, 95th Street and 103rd Street and the collector-distributor from 103rd Street to I-435. The remaining half continues southbound along the US 69. Over 32 percent of the southbound traffic was observed to exit to the I-435 freeway. The remaining traffic continues further south with approximately only two percent of the traffic reaching the southern terminus of the study corridor, implying that the majority of traffic was destined to several cross-streets along the corridor. It should be noted that 135th Street exit carried 13.4 percent of the southbound US 69 traffic.

During the PM peak period, approximately 43 percent of traffic along southbound US 69 south of 87th Street exits to the adjacent arterials, primarily, 95th Street and 103rd Street and the collector-distributor from 103rd Street to I-435. As a result, only about 57 percent of the traffic continues southbound along US 69. Over 24 percent of the southbound traffic was observed to exit to I-435, with the remaining traffic continuing further south. Less than four percent of the traffic reaches the southern terminus of the study corridor, again suggesting that the majority of traffic is destined to one of the several cross-streets along the corridor. It should be noted that the 119th Street and 135th Street exits comprise 16.8 and 16.7 percent of the southbound US 69 traffic, respectively.

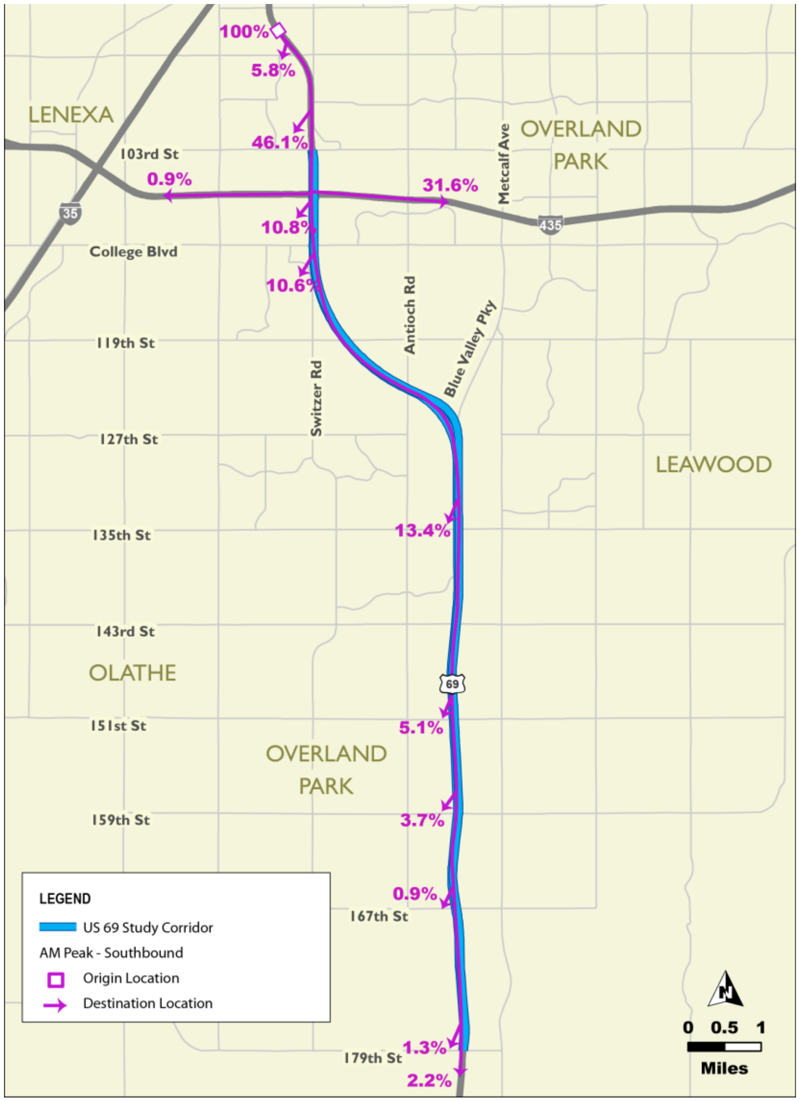
Figure 2-20 exhibits the average O-D pattern of traffic along northbound US 69 from south of 179th Street during the AM and the PM peak periods. During the AM peak period, over 20 percent of the northbound traffic exits to Blue Valley Parkway. Between 179th Street and Blue Valley Parkway, over half of the northbound traffic have destinations along the adjacent arterials. The remaining traffic continues further north, with over four percent of the overall traffic reaching the northern terminus of the study corridor, thus demonstrating that the majority of traffic is destined to the several cross-streets along the corridor.

During the PM peak period, the observed northbound US 69 O-D traffic patterns from south of 179th Street were similar to those observed during the AM peak period, with over two-thirds of the northbound traffic having destinations along the adjacent arterials. Over 16 percent of the northbound traffic was observed to exit at I-435, with the remaining traffic continuing further north. Less than four percent of the overall traffic reaches at the northern terminus of the study corridor.

Figure 2-18 StreetLight OD Locations

Figure 2-19 US 69 Southbound O-D Patterns of Traffic Observed South of 87th Street

AM Peak Period



PM Peak Period

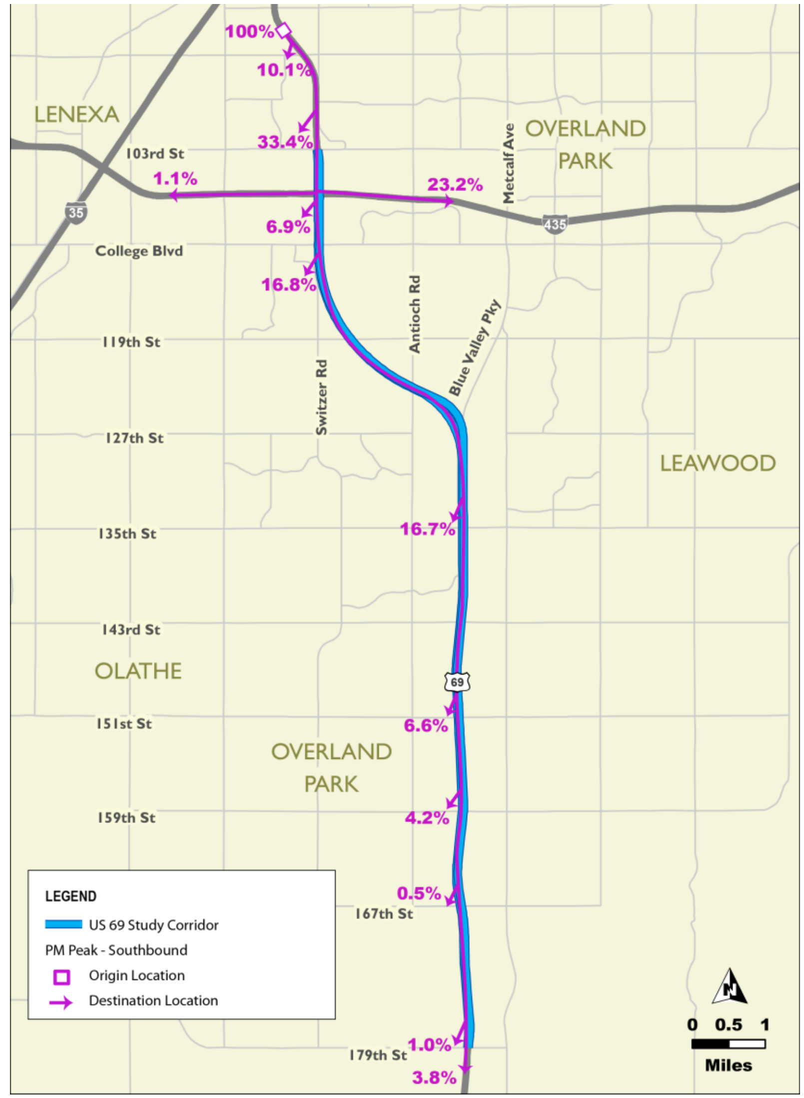
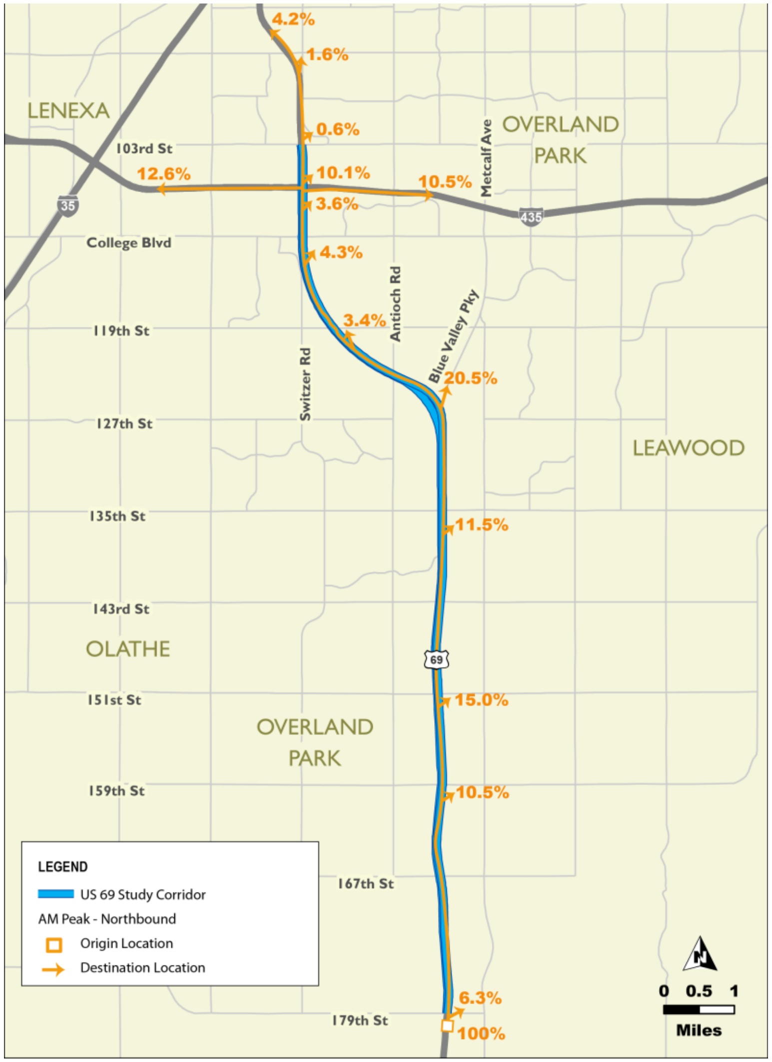
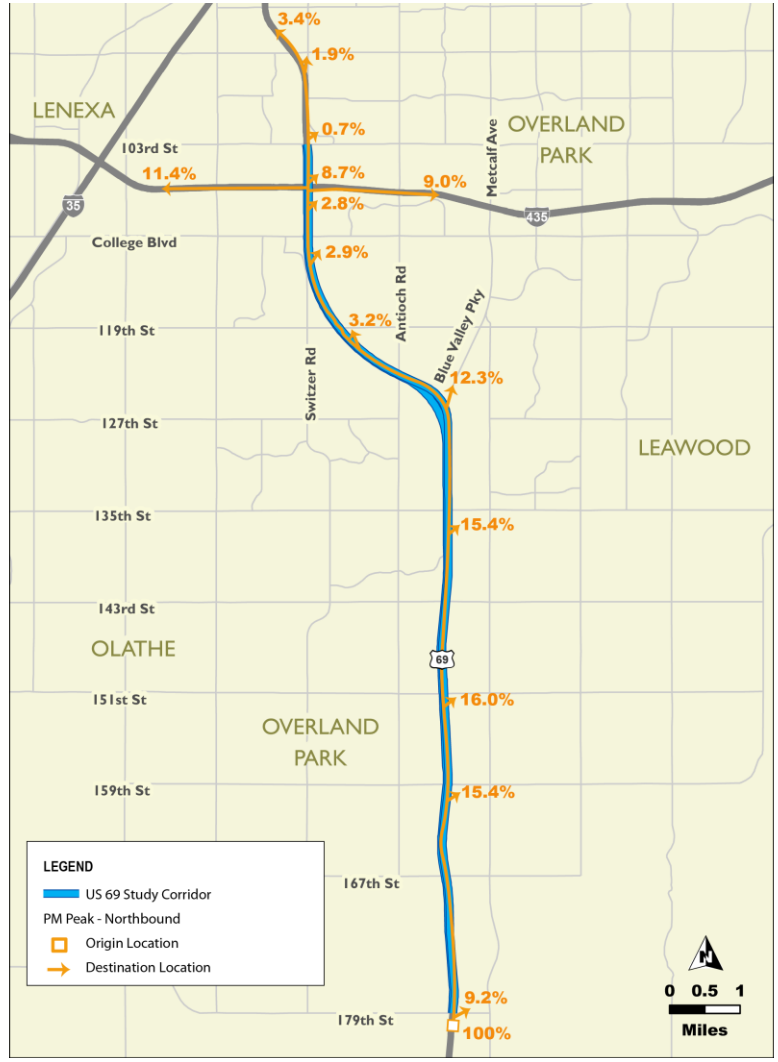


Figure 2-20 US 69 Northbound O-D Patterns of Traffic Observed South of 179th Street

AM Peak Period



PM Peak Period



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Chapter 3

Background Transportation Characteristics

This chapter provides information about existing and forecasted transportation characteristics within the US 69 study area. The information provided herein draws upon the Mid-America Regional Council (MARC) Connected KC 2050 plan, the Metropolitan Transportation Plan (MTP) for Kansas City (*Connected KC 2050*), adopted in June 2020 by MARC – the Metropolitan Planning Organization responsible for conducting multimodal, long-range, regional planning within Kansas City. *Connected KC 2050* is a comprehensive, multimodal transportation strategy developed by MARC to address the mobility needs of the Kansas City area. It serves as a guideline for the region's planned investments in transportation infrastructure and services over the next 30 years. This chapter also refers to the US 69 Phase 1 Report (June 2018) and the US 69 Pre-Planning Analysis (March 2020) both conducted by HNTB for the City of Overland Park, Kansas.

Connected KC 2050 outlines approximately $14.2 billion worth of expenditures through 2050 for transportation projects. This chapter focuses specifically on the highway and public transportation expenditures in order to determine their likely impact on the toll revenue generation potential of the proposed US 69 express lanes. A breakdown of planned transportation investments by type and sponsoring agencies is summarized in **Table 3-1**.

Table 3-1 Connected KC 2050 Plan Infrastructure Investment

Kansas			Missouri			Transit		
State	Number of projects	2019 dollars in millions	**State**	Number of projects	2019 dollars in millions	**State**	Number of projects	2019 dollars in millions
Constrained*	23	$2,292	Constrained	17	$882	Constrained	5	$158
Illustrative**	17	$1,131	Illustrative	36	$1,276	Illustrative	10	$1,213
Subtotal	40	$3,423	Subtotal	53	$2,158	Subtotal	15	$1,371
Local			**Local**					
Constrained	177	$2,815	Constrained	67	$1,123			
Illustrative	0	-	Illustrative	73	$3,321			
Subtotal	177	$2,815	Subtotal	140	$4,444			

** Projects above the median score (74.5) and above the median committee ranking (1.51) were included in the financially constrained project listing, if sufficient financial resources were projected to support them.*
*** Projects above both the median score and median committee ranking that could not be supported by projected financial resources were included in the high-priority illustrative list. The plan identifies potential new revenue sources that could be pursued to increase the region's financial capacity in the future.*

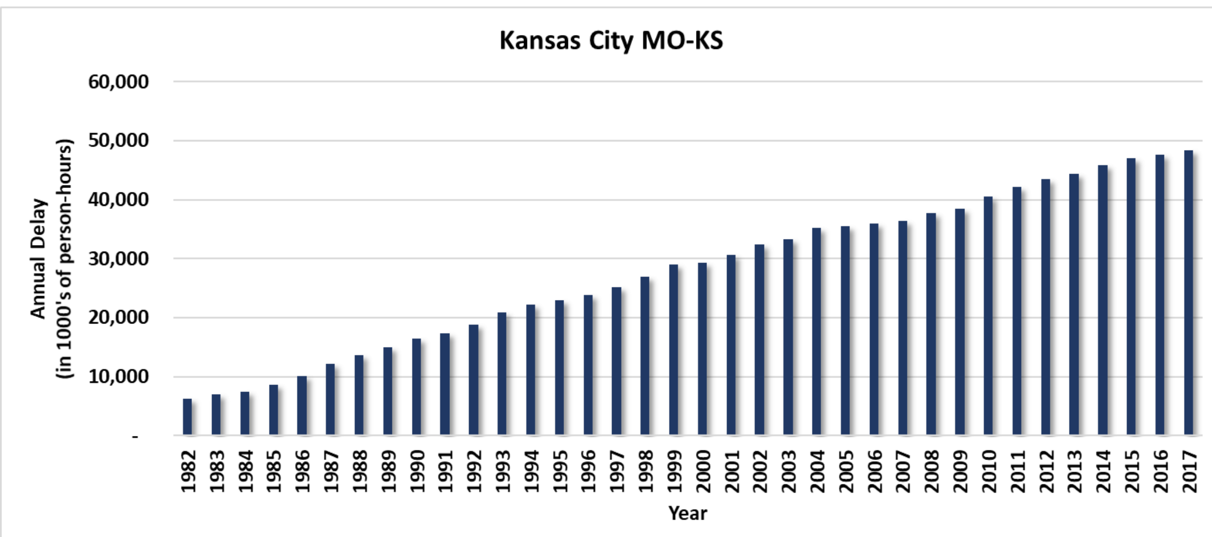
The transportation system defined in the *Connected KC 2050* and described herein was incorporated into the networks and the trip tables used to estimate the traffic and toll revenue for the proposed US 69 express lanes project. The trip tables and networks were obtained from MARC and reflect financially constrained planned transportation infrastructure development over the next 30 years.

Connected KC 2050 identifies US 69 as a part of the National Highway System and as a major freeway within the Kansas City region. The *Connected KC 2050* plan also describes the travel time reliability index as 'fair', and projects identified in the plan are identified to maintain and/or improve that rating. KDOT specifically identified a multi-phase project along US 69 from 103rd Street to 179th Street over the next few decades to implement needed improvements and to sustain the corridor's viability.

3.1 Traffic Congestion Trends

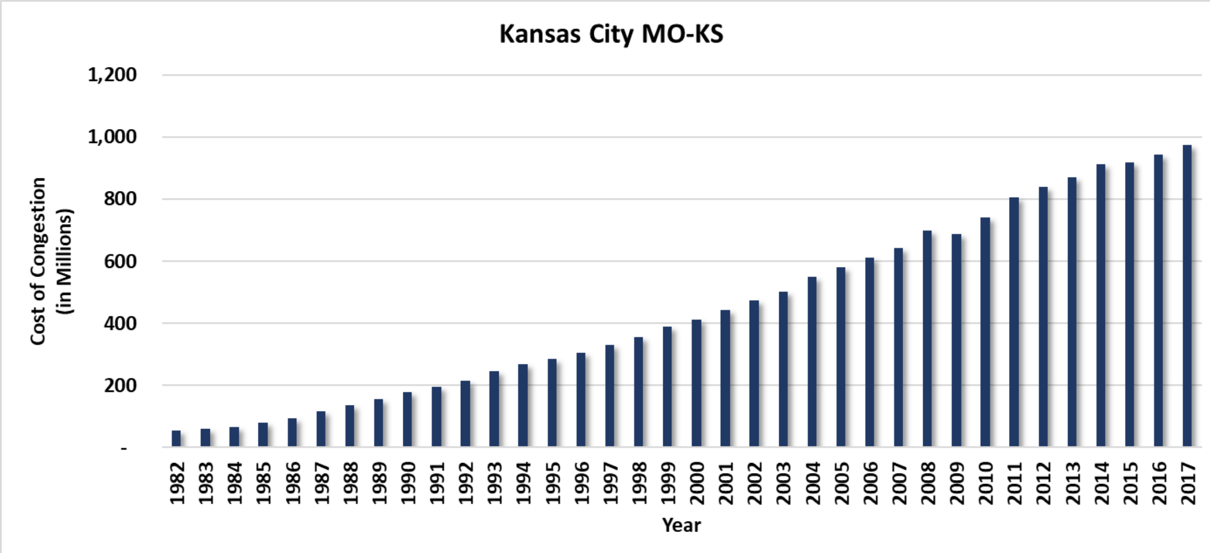
As illustrated in **Figures 3-1** and **3-2**, the Texas A&M Transportation Institute 2018 Urban Mobility Report estimated that the total cost of congestion for the Kansas City metropolitan region in 2017 was approximately $974 million and that total travel delay was approximately 48.3 million hours. The cost of congestion twenty years prior (in 1997), was approximately $329 million and the total travel delay was approximately 25.2 million hours. The costs of congestion and travel delay have therefore grown between 1997 and 2017 at average annual rates of 5.6 and 3.3 percent, respectively. The increases in regional congestion over the last twenty years, in part, is a result of transportation infrastructure construction not keeping up with the high population growth that has occurred within the region. The $14.2 billion in transportation infrastructure investment anticipated over the next 30 years (2020 through 2050) is expected to still lag behind anticipated demand such that total travel delay will likely continue to grow at a high rate for the foreseeable future.

Figure 3-1 Annual Delay Trend for Kansas City



Source: Texas A&M Transportation Institute's (TTI) 2018 Urban Mobility Scorecard

Figure 3-2 Cost of Congestion Trend for Kansas City



Source: Texas Transportation Institute's (TTI) 2018 Urban Mobility Scorecard

The 2019 Congestion Management Report, developed by MARC, shows traffic congestion and reliability data in terms of a variety of performance measures for the Kansas City metropolitan area for the year 2017. The main document of this report organizes and displays this data through ESRI Story Maps. The key findings of the report were:

- Congestion at the "severe" level is seen most prominently on highways leading into and out of downtown Kansas City, Missouri, and on the southern I-435/I-470 corridor. Exceptions include I-70 in Kansas and I-29 north of its merge with I-35. Morning congestion on major roadways is only significant around the University of Kansas Medical Center. Major roadways generally experience more congestion in the afternoon, but little of it rises to the "severe congestion" threshold.

- Reliability is worst on many of the same highway corridors that experience congestion during the peak periods. Unreliability along major roadways increases in the afternoon peak period.

- Historical Corridor Congestion Levels — Congestion generally improved from 2010 to 2012, however, the Travel Time Index for Missouri corridors increased during both the AM and the PM peak periods between 2012 and 2017. The degree of increase varied, up to 11 percent. In Kansas, two corridors had noticeable trends from 2010 to 2017: US 69 northbound improved in the morning, and I-35 southbound worsened in the afternoon.

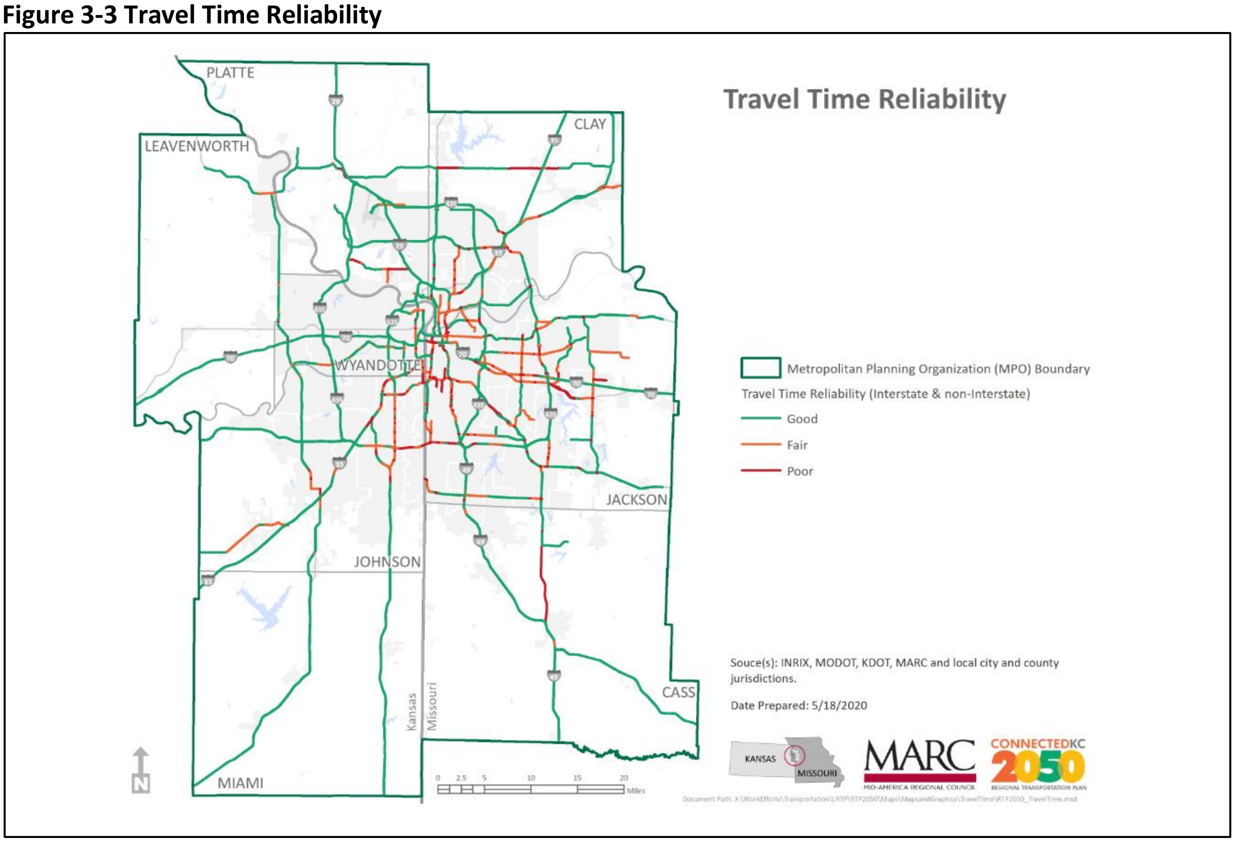
- NHS Level of Travel Time Reliability — This measure of reliability is calculated differently from the Planning Time Index and showed that many of the roads in the Kansas City region experience unreliable travel times, including some roads on the edges of the Kansas City metro area.

- Truck Travel Time Reliability Index — The federal reliability measure for trucks summarizes those interstate highways that experience high levels of unreliable travel times for commercial vehicle traffic. Little to no congestion or unreliability in other measures was indicated along I-70 or I-29 north of I-635 in Kansas, however, moderately unreliable travel times were shown along some segments of I-70.

- Peer Metro Comparisons — According to INRIX, the Kansas City urban area spent 40 hours in congestion per driver in 2017. This was the second lowest amount of time spent in congestion per driver for the 28 peer metros for which INRIX had rankings. The cost of congestion per driver for Kansas City residents was $560 in 2017.
- Average Incident Clearance Time — The MARC region's average incident clearance time for each month ranged from 24 to 33 minutes in 2017. This closely mirrored Missouri's average incident clearance times because there were more incidents logged for Missouri. Kansas's average incident clearance times was always higher than Missouri's and the MARC region's times.
- The continued population growth in the Kansas City metro area will impact travel times in the region due to increasing traffic congestion along many facilities within the region including US 69.

Figure 3-3 shows the travel time reliability for the MPO, which includes the counties of Cass, Clay, Jackson and Platte in Missouri, and Johnson, Leavenworth, Miami, and Wyandotte in Kansas. The US 69 study corridor includes segments classified as fair and poor near I-435 and Blue Valley Parkway.

Figure 3-3 Travel Time Reliability



Source: Connected KC 2050 Performance Measures

3.2 Planned Roadway System Improvements

A multitude of funded roadway recommendations are identified in the *Connected KC 2050* long-range plan to help improve overall system performance of the Kansas City area, including capacity improvements to existing freeways and arterials, as well as several new facilities. **Figures 3-4** and **3-5** highlight recommended arterial and freeway improvement projects, respectively, alongside and within the vicinity of US 69.

Several projects were reviewed and discussed regarding their suitability and timing for inclusion in the travel demand model. Confirmation of some of the project opening dates was received from the City of Overland Park and/or KDOT. Identification of these facilities is important for highlighting improvements that may materially impact T&R along the proposed US 69 express lanes. While some improvements may provide enhanced accessibility to the express lane corridor as feeders – resulting in positive impacts on the future toll revenue potential – others may compete with and dampen the express lanes' future toll revenue potential.

3.2.1 Arterial Projects

The planned improvement projects in the vicinity of the US 69 corridor, as shown in **Figure 3-4,** include capacity expansions along the following main corridors:

- Metcalf Avenue
- Antioch Road
- Quivira Road
- W 119th Street
- W 135th Street
- W 175th Street
- Pflumm Road
- W 167th Street
- Mission Road

A more comprehensive list of these projects is included in **Table 3-2** and key projects are described in more detail thereafter.

Figure 3-4 Proposed Connected KC 2050 Improvements around US 69 – Arterials

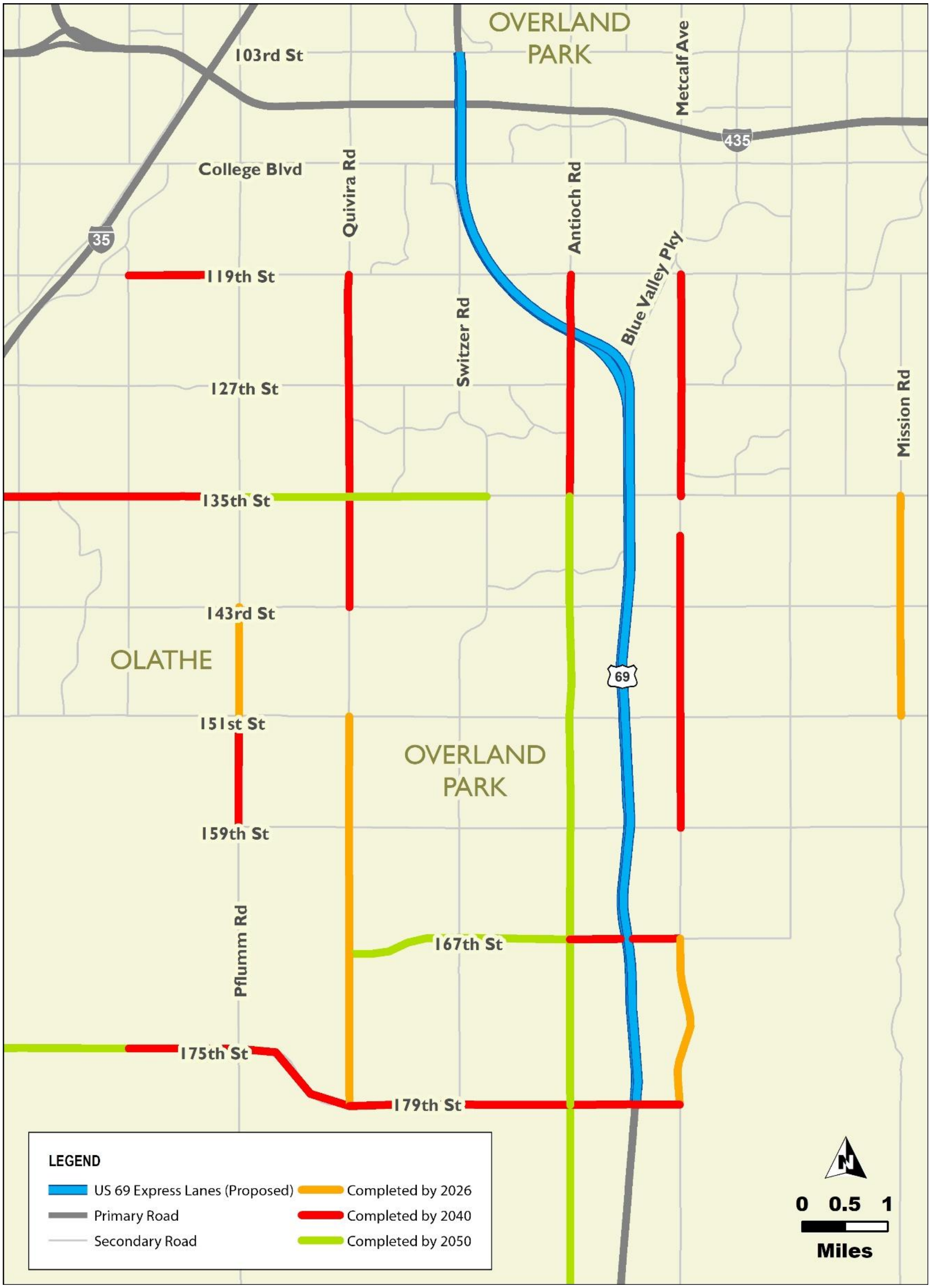


Table 3-2 Future Arterial Projects in the Vicinity of the Study Corridor

Future Roadway Project Improvements						
Source	**Roadway**	**Limits From**	**Limits to**	**Description**	**Opening Year**	**Model Year**
RTP	Antioch Road	W 119th Street	135th Street	Widen from 4 to 6 lanes	2030-2039	2040
RTP	Antioch Road	135th Street	W 167th Street	Widen from 4 to 6 lanes	2040-2049	2050
RTP	Antioch Road	W 167th Street	W 199th Street	Widen from 2 to 4 lanes	2040-2049	2050
RTP	Metcalf Avenue	W 119th Street	159th Street	Widen from 4 to 6 lanes	2030-2039	2040
RTP	Metcalf Avenue	167th Street	179th Street	Widen from 2 to 4 lanes	2020-2025	2026
RTP	W 167th Street	Quivira Road	Switzer Road	New 4 lanes	2040-2049	2050
RTP	W 167th Street	Switzer Road	Antioch Road	Widen from 2 to 4 lanes	2040-2049	2050
RTP	W 167th Street	Antioch Road	Metcalf Avenue	Widen from 2 to 4 lanes	2020-2029	2040
TIP	Mission Road	W 135th Street	W 151st Street	Widen from 2 to 4 lanes	2020-2025	2026
RTP	Quivira Road	W 119th Street	W 143rd Street	Widen from 4 to 6 lanes	2030-2039	2040
RTP	Quivira Road	151st Street	159th Street	Widen from 2 to 4 lanes	2040-2049	2050
TIP	Quivira Road	159th Street	W 179th Street	Widen from 2 to 4 lanes	2020-2025	2026
RTP	W 119th Street	S Black Bob Road	Pflumm Road	Widen from 4 to 6 lanes	2020-2029	2040
RTP	W 135th Street	N Ridgeview Road	Pflumm Road	Widen from 4 to 6 lanes	2020-2029	2040
RTP	W 135th Street	Pflumm Road	Switzer Road	Widen from 4 to 6 lanes	2040-2049	2050
RTP	W 175th Street	Hedge Ln	Lone Elm Road	Widen from 2 to 4 lanes	2020-2029	2040
RTP	W 175th Street	Lone Elm Road	K-7	Widen from 2 to 4 lanes	2030-2039	2040
RTP	W 175th Street	K-7	Ridgeview Road	Widen from 2 to 4 lanes	2020-2029	2040
RTP	W 175th Street	Ridgeview Road	Lackman Road	Widen from 2 to 4 lanes	2040-2049	2050
RTP	W 175th/179th Street	Lackman Road	Metcalf Avenue	Widen from 2 to 4 lanes	2030-2039	2040
TIP	Pflumm Road	W 143rd Street	151st Street	Widen from 2 to 4 lanes	2020-2025	2026
RTP	Pflumm Road	151st Street	W 159th Street	Widen from 2 to 4 lanes	2030-2039	2040

Notes: RTP – Regional Transportation Plan; TIP – Transportation Improvement Plan

The projects listed above could potentially have a significant impact in terms of volume, congestion, or toll revenue along the US 69 express lanes project corridor given their proximity to or direct connection with the corridor. Metcalf Avenue and Antioch Road, which run parallel to, and within a half-mile east and west of the study corridor, respectively, are anticipated to be widened from two to four lanes and four to six lanes by 2050. The widening will accommodate additional traffic that may prefer to use these toll-free alternate routes instead of the US 69 express lanes.

However, widening is also anticipated by 2050 along 167th Street and 179th Street which connect to US 69 near the southern terminus of the study corridor. These expansions could potentially bring more traffic to the US 69 express lanes.

3.2.2 Freeway Projects

In addition to the improvements along the arterials in the vicinity of the US 69 study corridor mentioned above, two other improvements are planned along freeways located in the US 69 study area as shown in **Figure 3-5**. Widening projects are planned east of the study corridor, along I-435 and I-49 as described in **Table 3-3**. I-49 is also a north-south corridor and has the potential to compete with US 69.

Table 3-3 Future Freeway Projects in the Vicinity of the Study Corridor

Source	Roadway	Limits From	Limits to	Description	Opening Year	Model Year
RTP	I-435	Holmes Road	I-49	Widen from 8 to 10 lanes	2040-2049	2050
TIP	I-49	155th Street	N Cass Parkway	Widen from 4 to 6 lanes	2020-2024	2026

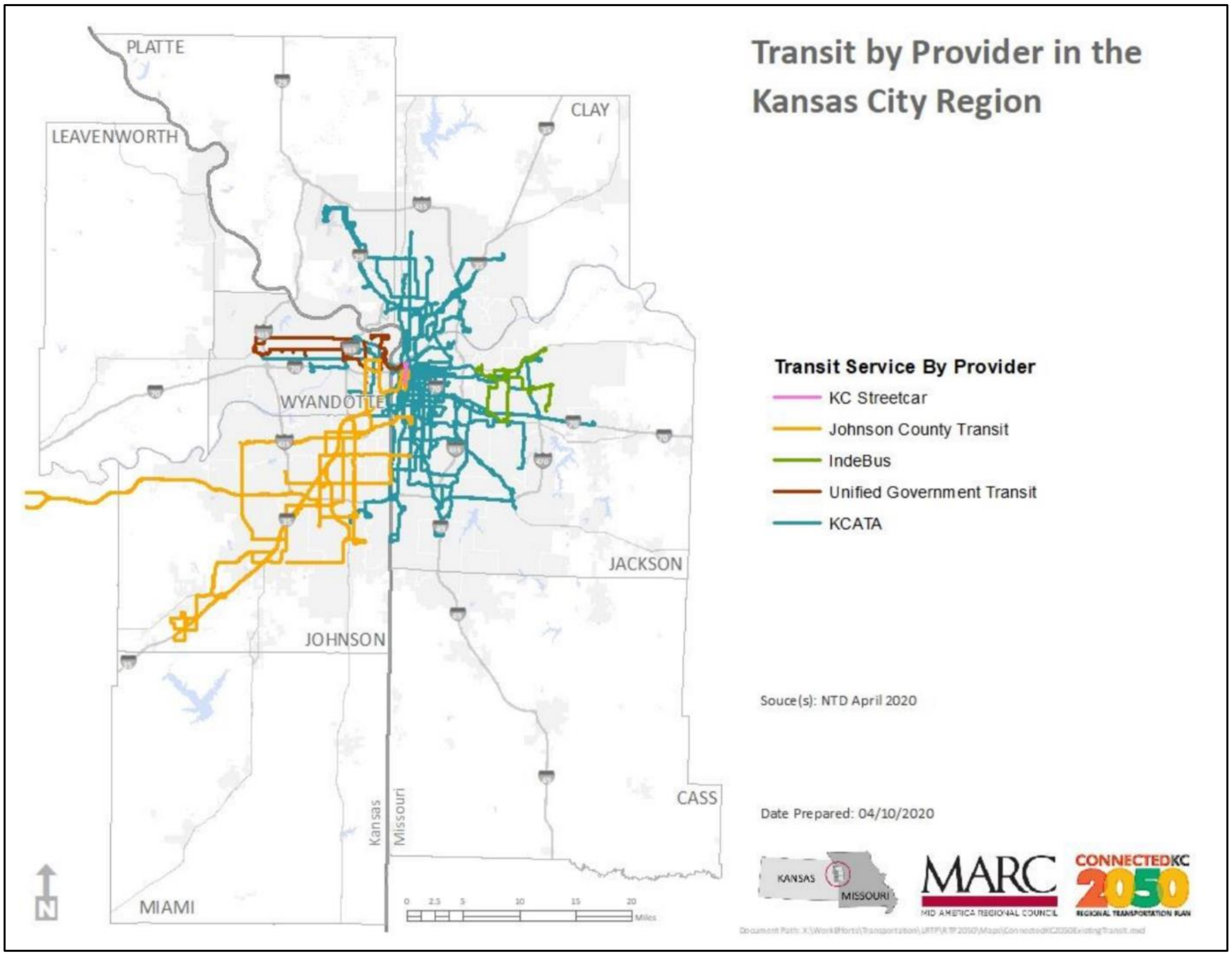
Notes: RTP – Regional Transportation Plan; TIP – Transportation Improvement Plan

Figure 3-5 Proposed Connected KC 2050 Improvements around US 69 – Freeways

3.3 Transit System

The Kansas City region's transit system is a network of services provided by five area transit agencies: the Kansas City Area Transportation Authority (KCATA), Johnson County Transit, Unified Government Transit, the City of Independence, and the Kansas City Streetcar Authority. These agencies operate transit vehicles along pre-determined routes that pick up and drop off people at specified stops. In 2015, the KCATA Board of Commissioners approved a unified branding for these agencies, called RideKC. **Figure 3-6** shows the current Transit providers in the Kansas City region.

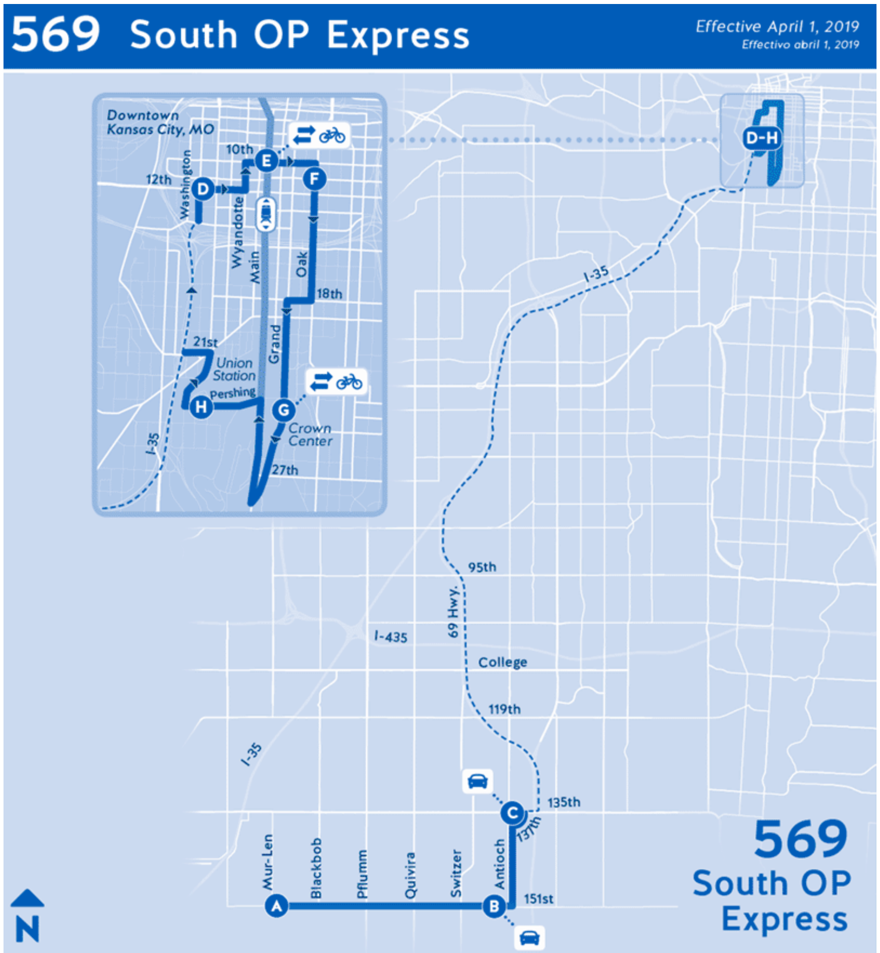
Figure 3-6 Transit Providers in the Kansas City Region



Source: MARC Connected KC Plan 2050

The KC Area Transit Authority (KCATA) operates as the main transit services provider in the Kansas City metro region. Currently US 69 is one of the main thoroughfares for the South Overland Park (OP) Express bus line, as shown in **Figure 3-7**. This is an express service that goes from 151st Street to downtown Kansas City, non-stop, as it travels along US 69 and I-35 and primarily serves as a commuter service. The South OP Express blue line operates from Monday through Friday, in the northbound direction during the morning peak period and in the southbound direction during the afternoon peak period. It is anticipated that this transit route will be able to access the proposed US 69 express lanes and will benefit from the increased reliability provided by the express lanes.

Figure 3-7 South Overland Park (OP) Express Service Route



Source: KCATA Bus Route Service Maps

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Chapter 4

Demographics

This chapter describes the major socioeconomic characteristics of the US 69 study area including both regional and corridor specific trends. The historical and projected demographic characteristics used by the MARC to develop the travel demand modeling trip tables were thoroughly reviewed along with other sources, such as the U.S. Census Bureau and the Bureau of Labor Statistics. These demographic projections are key variables that are utilized in the regional travel demand model to estimate future traffic demand. In June 2020, MARC's Executive Board adopted the new demographic datasets as part of *Connected KC 2050*, the MTP for the Kansas City region, superseding all previous forecasts. This forecast includes eight of the nine counties served by MARC, which are within the metropolitan planning boundary: Cass, Clay, Jackson and Platte in Missouri; Johnson, Leavenworth, Miami, and Wyandotte in Kansas. The demographics adopted by MARC are considered “official” demographics to support the metropolitan planning process and travel demand modeling within the region. To assist with an independent assessment of the future employment and population along the project corridor, an independent subconsultant, *EBP*, was engaged to perform a socioeconomic review and development update along the US 69 corridor. EBP provided an independent opinion of required updates and/or revisions to the underlying socioeconomic growth forecasts for the eight-county region as well as the US 69 study area and is included as **Appendix A**.

The first section of this chapter describes MARC’s forecasting process used to generate the official demographics. The next sections provide details of the regional historical and future growth patterns within the eight-county region. The historical and future growth trends in key municipalities within the study area are then described. The final section describes the independent socioeconomic review conducted and the updates made to the official MARC forecasts.

The demographic data included in this chapter ranges from the macroscopic-level (the region) to the corridor-level (surrounding the US 69 corridor). This demographic information was used as input to the trip generation model to estimate the total trips generated within the travel demand model and serves as the foundation for the forecasts of future demand within the study area.

4.1 MARC Demographic Forecasting Process

As required by federal legislation, MARC periodically develops future demographics based on county and regional control totals. The first step in the demographic forecasting process was the adoption of regional control totals of population and employment for 2020, 2030, 2040 and 2050. These regional forecasts were then disaggregated to the county level based on their historical shares of the region’s growth. The forecasted county totals are noted in **Table 4-1**. For the eight-county region, the population forecast from MARC is projecting an annual average growth rate of 0.7 percent from 2020 to 2050.

Table 4-1 Eight-County MARC Population Control Totals

8-County Region	2020	2030	2040	2050	Annual Average Growth Rate (2020-2050)
Total	2,067,600	2,241,600	2,400,300	2,546,900	0.7%

Source: Connected KC 2050

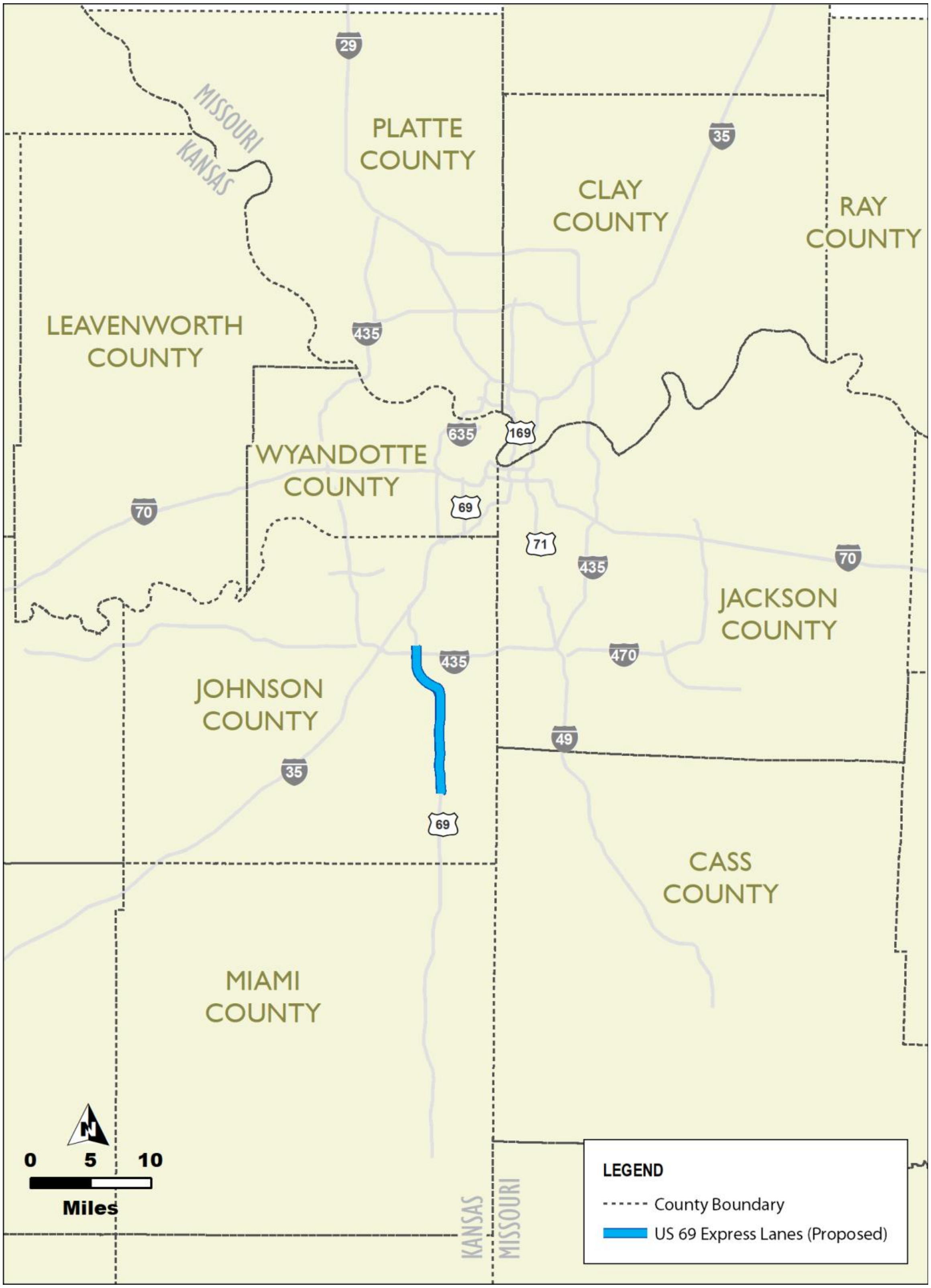
The county control totals were then used to allocate the region's population, household, and employment growth to Traffic Analysis Zones (TAZs) according to the development probabilities calculated from MARC's 'Paint the Town' land use change model. The TAZ-level forecasts derived by MARC serve as the basic geographical unit for generating traffic demand within the regional travel demand model and are used to analyze impacts of specific transportation policies and investments that might be undertaken in support of regional goals and objectives adopted by the MARC Board and stated in the MTP.

4.2 Historical and Future Regional Growth

The Kansas City metropolitan area, which includes 14 counties in Kansas and Missouri, represents 40 percent of Kansas' gross domestic product (GDP) and 23 percent of Missouri's. Manufacturing, trade, and transportation are considered the region's largest exports, and the metro area is home to four Fortune 500 companies.

The MARC Metropolitan Planning Organization (MPO) region, described in the *Connected KC 2050* plan, includes eight of the 14 counties within the Kansas MSA. The following sections summarize the historical and future population, employment, and household trends, as well as historical income levels for the eight-county region. **Figure 4-1** illustrates the spatial relationship of each county encompassed within the MARC MPO region and highlights the US 69 study corridor which traverses Johnson County.

Figure 4-1 Eight-County MARC MPO Region



4.2.1 Historical and Future Regional Population Trends

Recent countywide population data from 2010 to 2020 is presented in **Table 4-2**. These values reflect the data from the U.S. Census Bureau's annual population estimates program. The eight-county population grew at an annual average growth rate of 0.8 percent between 2010 and 2020 according to U.S. Census Bureau. This growth rate was higher than the growth rate for the states of Kansas and Missouri for the same time period.

Most of the existing population in the eight-county region is concentrated within two counties, Johnson County, Kansas, and Jackson County, Missouri. Although Jackson County had the highest population the last ten years, it is evident that population growth in Jackson County has slowed down in recent years, predominately a result of the greater maturation of the county and as more people have moved into the surrounding counties.

Johnson County has the second largest population among the eight counties. The population of Johnson County increased at an average annual rate of 1.1 percent between 2010 and 2020, adding more than 61,000 new residents which resulted in 607,200 residents in 2020. The rate of population growth experienced in Johnson County between 2010 and 2020 was the third highest among the eight counties and was higher than the population growth seen in the combined eight-county region during the same period.

Table 4-2 Historical Short-Term Population Trends

Region	2010	2011	2012	2013	2014	2015	2016
Cass	99,800	100,000	100,500	100,700	100,900	101,400	102,600
Clay	222,600	225,300	227,600	230,400	233,100	235,300	238,800
Jackson	674,900	675,600	677,600	680,100	683,300	687,200	692,800
Johnson	**545,700**	**553,000**	**559,600**	**566,700**	**573,300**	**580,200**	**586,600**
Leavenworth	76,500	77,100	77,700	78,200	78,700	79,300	80,400
Miami	32,900	32,700	32,700	32,900	32,900	32,800	33,000
Platte	89,700	90,900	92,200	93,400	94,900	96,600	98,800
Wyandotte	157,600	158,000	159,400	161,000	162,300	163,800	164,900
Total	**1,899,700**	**1,912,600**	**1,927,300**	**1,943,400**	**1,959,400**	**1,976,600**	**1,997,900**
Kansas	**2,858,300**	**2,869,700**	**2,886,000**	**2,894,300**	**2,901,900**	**2,910,700**	**2,913,000**
Missouri	**5,996,100**	**6,011,200**	**6,026,000**	**6,043,000**	**6,059,100**	**6,075,400**	**6,091,400**

Table 4-2 Historical Short-Term Population Trends (Continued)

Region	2017	2018	2019	2020	Average Annual Growth (2010-2020)
Cass	103,500	104,800	105,700	106,800	0.7%
Clay	242,800	246,800	250,500	253,500	1.3%
Jackson	698,800	701,800	704,400	705,900	0.5%
Johnson	**592,100**	**599,000**	**602,900**	**607,200**	**1.1%**
Leavenworth	81,300	81,700	81,900	82,200	0.7%
Miami	33,500	33,700	34,200	34,300	0.4%
Platte	101,300	103,000	104,700	106,500	1.7%
Wyandotte	165,300	165,800	166,000	165,300	0.5%
Total	**2,018,600**	**2,036,600**	**2,050,300**	**2,061,700**	**0.8%**
Kansas	**2,910,900**	**2,912,700**	**2,912,600**	**2,913,800**	**0.2%**
Missouri	**6,111,400**	**6,126,000**	**6,140,500**	**6,151,500**	**0.3%**

Source: U.S. Census Bureau, Population Estimates Program

Table 4-3 shows the MARC forecasted population trends from 2020 to 2050 for each county within the eight-county region. Population in the eight-county region is expected to increase from 2.1 million in 2020 to 2.5 million by 2050, corresponding to an annual growth rate of 0.7 percent.

Based on MARC estimates, Johnson and Jackson counties were estimated to account for approximately 64 percent of the total population within the eight-county region in 2020, as shown in **Table 4-3**. As indicated, Jackson and Johnson counties will continue to comprise the largest population centers in the eight-county area, and Johnson County is expected to become the most populous of the eight counties by 2050.

The continued population growth in the MARC MPO region will affect travel times by increasing traffic congestion along many facilities within the region, including US 69. The MARC MPO region currently (2019) experiences congested traffic conditions during both the AM and the PM peak periods. According to the *Connected KC 2050* plan, population growth will likely result in significant impact on travel demand along the US 69 corridor.

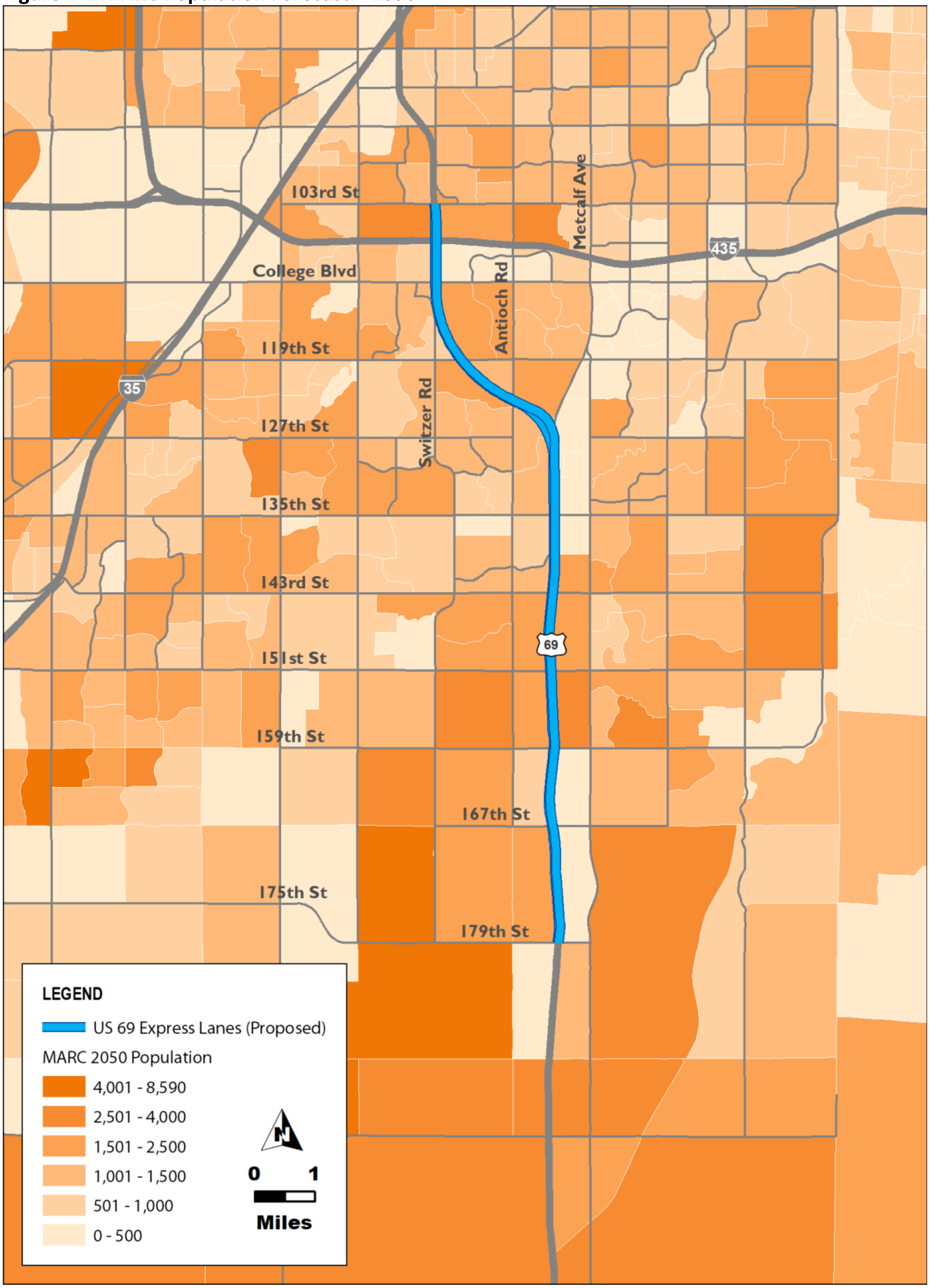
Figure 4-1 shows the projected population and its relative distribution within the eight-county region based on MARC 2050 population forecasts.

Table 4-3 Future Long-Term Population Trends from MARC

County	2020	2030	2040	2050	Average Annual Growth (2020-2050)	Population Distribution by County	
						2020	2050
Cass	107,000	117,000	126,200	134,600	0.8%	5.2%	5.3%
Clay	250,500	280,500	307,900	333,200	1.0%	12.1%	13.1%
Jackson	710,000	739,500	766,300	791,100	0.4%	34.3%	31.1%
Johnson	**612,200**	**684,600**	**749,700**	**808,900**	**0.9%**	**29.6%**	**31.8%**
Leavenworth	82,500	88,800	94,600	100,000	0.6%	4.0%	3.9%
Miami	34,400	36,700	39,800	43,500	0.8%	1.7%	1.7%
Platte	105,000	119,900	133,500	146,100	1.1%	5.1%	5.7%
Wyandotte	166,000	174,600	182,300	189,500	0.4%	8.0%	7.4%
Total	**2,067,600**	**2,241,600**	**2,400,300**	**2,546,900**	**0.7%**	**100.0%**	**100.0%**

Source: Connected KC 2050

Figure 4-1 MARC Population Forecast – 2050



4.2.2 Historical and Future Regional Employment Trends

Employment statistics are another indicator of the relative trip attractions to the study area. Strong employment growth in an area generally indicates potential increased demand for transportation infrastructure, especially if the level of employment is high relative to levels of population in the same area. The countywide historical employment trends from 2010 through 2020 for the eight-county region are shown in **Table 4-4**. These trends are based on the data from the Bureau of Labor Statistics (BLS).

From the employment trough in 2010 to its peak in 2019, the eight-county region added over 130,000 jobs at a rate of 1.5 percent per year, and the MSA's unemployment rate fell to levels not seen in 50 years. This tight labor market was the result not only of the demand for workers by employers, but also a slowing of growth in labor supply as the post-WWII Baby Boomers started turning 65 in increasing numbers this decade. However, employment decreased by 5.2 percent in the eight-county region between 2019 and 2020 due to the COVID-19 pandemic dropping to levels similar to 2015.

Johnson County has the second largest number of jobs among the eight counties. Employment in Johnson County increased at an average annual rate of 2.0 percent between 2010 and 2019, adding more than 57,000 new jobs which resulted in more than 353,000 jobs in 2019. Between 2019 and 2020, employment in Johnson County decreased by 4.9 percent because of the COVID-19 pandemic.

Table 4-4 Historical Short-Term Employment Trends

Region	2010	2011	2012	2013	2014	2015	2016
Cass	22,500	22,400	22,900	23,300	24,100	25,200	25,600
Clay	89,400	88,500	86,200	88,900	93,200	97,600	102,600
Jackson	339,600	340,100	347,700	348,000	350,300	358,300	363,100
Johnson	**296,400**	**302,300**	**310,200**	**320,000**	**328,000**	**334,700**	**337,900**
Leavenworth	21,300	21,100	20,900	20,700	20,400	20,600	20,900
Miami	7,800	7,500	7,600	7,700	8,000	8,000	8,400
Platte	38,800	39,300	39,400	39,800	40,800	41,500	44,400
Wyandotte	79,700	81,200	84,100	82,900	86,400	88,300	90,500
Total	**895,500**	**902,400**	**919,000**	**931,300**	**951,200**	**974,200**	**993,400**

Table 4-4 Historical Short-Term Employment Trends (Continued)

Region	2017	2018	2019	2020	Average Annual Growth (2010-2019)	Average Annual Growth (2019-2020)
Cass	25,900	26,900	27,000	25,900	2.0%	-4.1%
Clay	104,900	104,300	104,600	100,200	1.8%	-4.2%
Jackson	367,700	370,800	374,700	352,900	1.1%	-5.8%
Johnson	**342,400**	**349,300**	**353,500**	**336,200**	**2.0%**	**-4.9%**
Leavenworth	21,100	21,100	20,900	20,100	-0.2%	-3.8%
Miami	8,400	8,500	8,600	8,200	1.1%	-4.7%
Platte	45,600	47,300	48,200	43,800	2.4%	-9.1%
Wyandotte	91,000	90,500	90,500	86,800	1.4%	-4.1%
Total	**1,007,000**	**1,018,700**	**1,028,000**	**974,100**	**1.5%**	**-5.2%**

Source: Bureau of Labor Statistics
Note: 2020 average estimates are based on data through September 2020

Table 4-5 shows the MARC forecasted employment trends from 2020 to 2050 for each county within the eight-county region. The *Connected KC 2050* specifically emphasizes that the 2020 to 2050 forecasts were developed before the COVID-19 pandemic, however, a modest recession in the early 2020's was expected and included in those forecasts.

Although employment grew at moderate levels between 2010 and 2019, this trough-to-peak rate of employment expansion is not consistent with long-term trends. The model used to generate future estimates, from Regional Economic Models, Inc. (REMI), anticipates that nationwide labor force growth will continue to slow significantly in the 2020s and beyond as most of the Baby Boomers leave the labor force entirely, immigration trends downward and birth rates decline. Slow growth in the available workers will constrain future employment growth.

As a result, the eight-county study area is expected to add a net of 63,000 jobs between 2020 and 2030 as the economy absorbs the impact of another recession and a slower growth in labor supply. After 2020, employment growth is projected to accelerate slightly to a little over 74,000 between 2030 to 2040 and 89,000 between 2040 and 2050.

As shown in **Table 4-5**, Jackson and Johnson counties continue to be the major employment centers in the region, with employment in 2020 comprising approximately 36 percent and 35 percent of the eight-county area's total employment, respectively. However, in 2050, Johnson County is forecasted to be the county with the highest employment in the region. The change in employment distribution is the result of slower employment growth in Jackson County as compared to the relatively rapid growth in the surrounding counties during the last several years.

Johnson County employment is projected to grow at an average annual rate of 0.8 percent between 2020 and 2050. The growth will bring 103,000 new jobs to the county. Between 2020 and 2050, almost 226,000 additional jobs are expected to be added in the eight-county region, at an average annual growth rate of 0.6 percent.

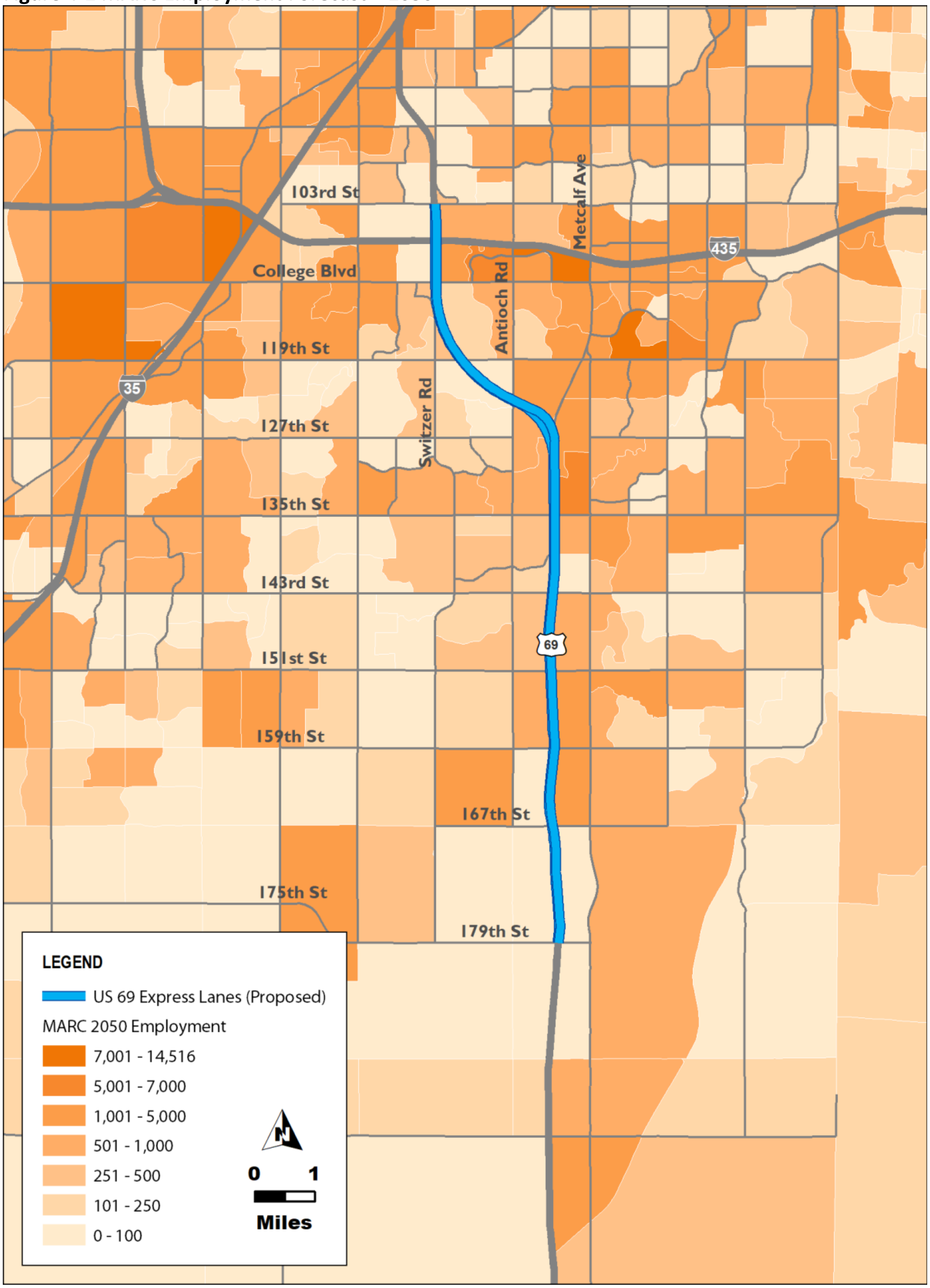
Figure 4-2 shows the projected employment and its relative distribution within the eight-county region based on MARC 2050 employment forecasts.

Table 4-5 Future Long-Term Employment Trends from MARC

County	2020	2030	2040	2050	Average Annual Growth (2020-2050)	Employment Distribution by County	
						2020	2050
Cass	29,800	32,200	35,100	38,600	0.9%	2.8%	3.0%
Clay	108,300	115,300	123,400	133,200	0.7%	10.0%	10.2%
Jackson	386,000	397,700	411,400	427,900	0.3%	35.7%	32.7%
Johnson	**372,700**	**401,500**	**435,400**	**476,100**	**0.8%**	**34.5%**	**36.4%**
Leavenworth	24,100	24,700	25,500	26,300	0.3%	2.2%	2.0%
Miami	9,500	10,100	10,900	11,800	0.7%	0.9%	0.9%
Platte	52,400	57,400	63,400	70,500	1.0%	4.8%	5.4%
Wyandotte	98,000	104,800	112,700	122,300	0.7%	9.1%	9.4%
Total	**1,080,800**	**1,143,700**	**1,217,800**	**1,306,700**	**0.6%**	**100.0%**	**100.0%**

Source: Connected KC 2050

Figure 4-2 MARC Employment Forecast – 2050



Source: Connected KC 2050

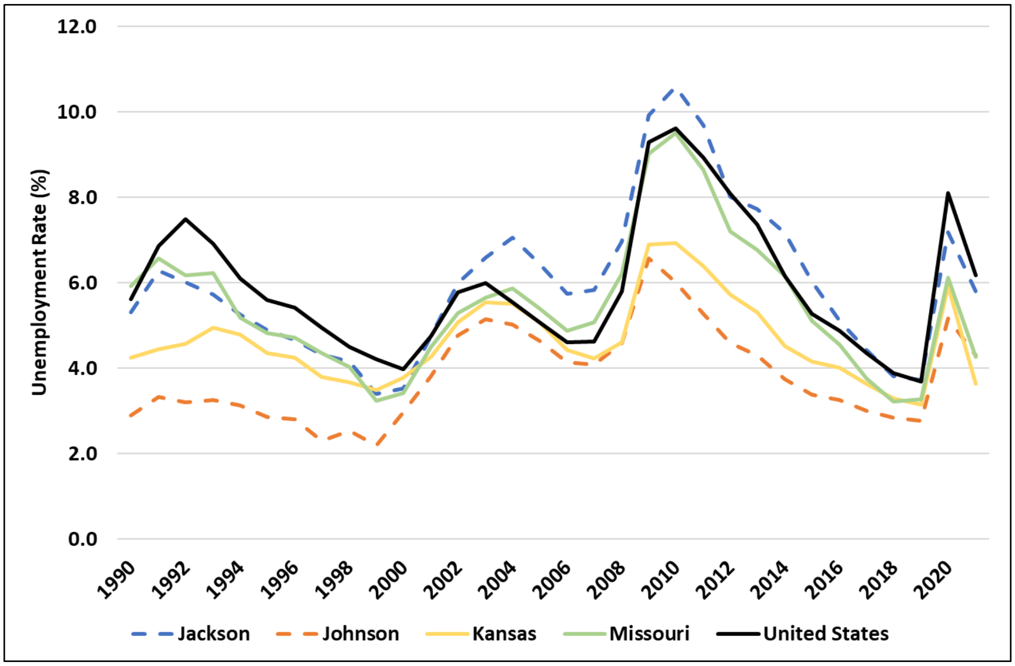
The unemployment rates between 1990 and 2021 for Jackson County, Johnson County, the states of Kansas and Missouri, and the United States are shown in **Table 4-6** and illustrated in **Figure 4-3**. The unemployment rate for Jackson County continually remained in line with the Missouri statewide unemployment rate prior to 2000. However, following 2000, the Jackson County unemployment rate has trended higher than the Missouri statewide rate and the national unemployment rate. Between 2008 and 2009, the unemployment rates spiked in both Jackson and Johnson counties because of the national economic recession. In 2010, unemployment rates peaked for both Jackson and Johnson counties as well as for the states of Kansas and Missouri and the United States. There was another spike in unemployment rates in 2020 due to the economic slowdown resulting from the COVID-19 pandemic, which increased the unemployment rates for Jackson and Johnson counties to 7.2 and 5.2 percent, respectively.

Table 4-6 Historical Unemployment Rate Trends

Year	Unemployment Rate				
	Jackson, MO	Johnson, KS	Kansas	Missouri	United States
1990	5.3	2.9	4.3	5.9	5.6
1991	6.3	3.3	4.5	6.6	6.9
1992	6.0	3.2	4.6	6.2	7.5
1993	5.7	3.3	4.9	6.2	6.9
1994	5.3	3.1	4.8	5.2	6.1
1995	4.9	2.9	4.4	4.8	5.6
1996	4.7	2.8	4.3	4.7	5.4
1997	4.3	2.3	3.8	4.4	4.9
1998	4.2	2.5	3.7	4.0	4.5
1999	3.4	2.2	3.5	3.2	4.2
2000	3.5	3.0	3.8	3.4	4.0
2001	4.8	3.8	4.3	4.5	4.7
2002	6.0	4.8	5.1	5.3	5.8
2003	6.6	5.2	5.6	5.7	6.0
2004	7.1	5.0	5.5	5.9	5.5
2005	6.4	4.6	5.1	5.4	5.1
2006	5.7	4.1	4.4	4.9	4.6
2007	5.8	4.1	4.2	5.1	4.6
2008	7.0	4.6	4.6	6.2	5.8
2009	9.9	6.6	6.9	9.0	9.3
2010	10.6	6.0	6.9	9.5	9.6
2011	9.7	5.3	6.4	8.6	8.9
2012	8.0	4.6	5.7	7.2	8.1
2013	7.7	4.3	5.3	6.8	7.4
2014	7.2	3.8	4.5	6.2	6.2
2015	6.0	3.4	4.2	5.1	5.3
2016	5.1	3.3	4.0	4.6	4.9
2017	4.4	3.0	3.6	3.8	4.4
2018	3.8	2.8	3.3	3.2	3.9
2019	3.7	2.8	3.1	3.3	3.7
2020	7.2	5.2	5.9	6.1	8.1
2021*	5.8	4.3	3.6	4.3	6.2

Source: Bureau of Labor Statistics (BLS)
**Data shown is through March 2021*

Figure 4-3 Historical Unemployment Rate Trends



Source: Bureau of Labor Statistics (BLS)
Note: Data shown is through March 2021

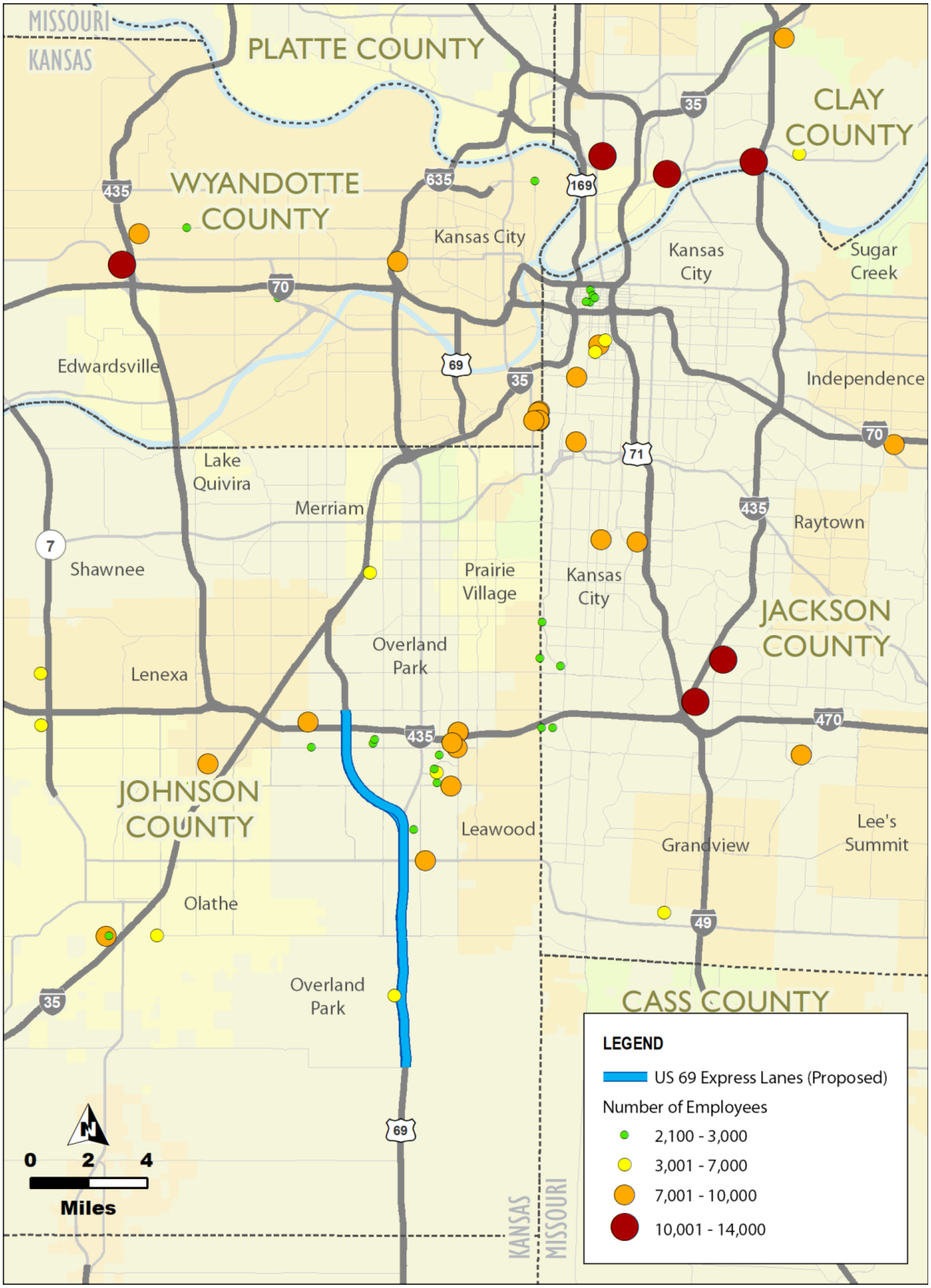
4.2.3 Study Area Employment

Much of the analysis of future development potential is based on the identification of major employment establishments located within the study corridor.

The major employment establishments were reviewed to better understand key economic generators along the corridor that are likely to affect the existing and future traffic demand. **Figure 4-4** illustrates the companies sourced from the CBRE GIS database for top employers in the Kansas City metropolitan area (updated in 2019).

Two of the ten highest ranked employers, Overland Park Regional Medical Center and Menorah Medical Center, are located approximately 1 mile and 2 miles respectively to the northern limit of the study corridor. There are several other key employers located in the region that the project corridor serves, including the Children's Mercy Blue Valley and Advent Health.

Figure 4-4 Largest Public and Private Companies in the Vicinity of the Study Corridor



Source: CBRE Kansas City Metropolitan Area Top Employers (2019)

4.2.4 Historical and Future Regional Household Trends

The number of households is a socioeconomic measure that is closely correlated to population. Households are also the preferred method for estimating travel demand in the trip generation step of travel demand modeling since the number of vehicle trips is more strongly correlated with the number of household units, rather than purely the number of persons.

Recent countywide household data from 2010 to 2019 is presented in **Table 4-7**. Household units grew at a rate of 0.6 percent per year for this period for the eight-county region.

Table 4-7 Historical Short-Term Household Trends

Region	2010	2011	2012	2013	2014	2015	2016
Cass	39,300	39,700	40,000	40,100	40,300	40,400	40,500
Clay	91,700	93,000	93,400	93,800	94,300	94,500	95,100
Jackson	311,400	311,900	312,200	312,300	313,100	314,000	315,500
Johnson	**222,200**	**224,900**	**226,300**	**227,600**	**229,300**	**231,000**	**233,100**
Leavenworth	28,300	28,500	28,700	28,800	28,900	29,000	29,100
Miami	13,000	13,100	13,200	13,200	13,200	13,300	13,300
Platte	38,300	38,900	39,100	39,400	39,600	39,900	40,200
Wyandotte	66,800	66,800	66,800	66,800	66,900	67,100	67,300
Total	**811,000**	**816,800**	**819,700**	**822,000**	**825,600**	**829,200**	**834,100**

Table 4-7 Historical Short-Term Household Trends (Continued)

Region	2017	2018	2019	Average Annual Growth (2010-2019)
Cass	41,000	41,400	41,800	0.7%
Clay	96,100	96,900	97,900	0.7%
Jackson	318,200	320,500	323,200	0.4%
Johnson	**235,800**	**238,700**	**241,800**	**0.9%**
Leavenworth	29,400	29,600	29,800	0.6%
Miami	13,500	13,600	13,700	0.6%
Platte	40,700	41,300	41,800	1.0%
Wyandotte	67,700	68,000	68,100	0.2%
Total	**842,400**	**850,000**	**858,100**	**0.6%**

Source: U.S. Census Bureau, American Community Survey 5-Year Estimates

Table 4-8 shows the MARC forecasted household trends from 2020 to 2050 for each county within the eight-county region. It is estimated that nearly 230,000 households will be added in the eight-county region between 2020 to 2050, at an average annual growth rate of 0.8 percent.

Historically, Jackson County had the highest number of households among the eight counties and is estimated to continue having the highest number in future years. Johnson County is estimated to add over 95,000 households between 2020 and 2050 at an average annual growth rate of 1.1 percent.

Table 4-8 Future Long-Term Household Trends

County	2020	2030	2040	2050	Average Annual Growth (2020-2050)	Household Distribution by County	
						2020	2050
Cass	41,000	46,000	50,700	55,300	1.0%	5.1%	5.3%
Clay	93,400	103,700	113,500	122,900	0.9%	11.6%	11.9%
Jackson	292,800	311,300	328,900	345,800	0.6%	36.3%	33.4%
Johnson	**236,900**	**270,500**	**302,100**	**332,200**	**1.1%**	**29.4%**	**32.1%**
Leavenworth	27,100	28,700	30,300	31,800	0.5%	3.4%	3.1%
Miami	13,000	14,300	16,000	17,900	1.1%	1.6%	1.7%
Platte	40,900	47,300	53,400	59,200	1.2%	5.1%	5.7%
Wyandotte	61,000	64,300	67,500	70,600	0.5%	7.6%	6.8%
Total	**806,100**	**886,100**	**962,400**	**1,035,700**	**0.8%**	**100.0%**	**100.0%**

Source: Connected KC 2050

4.2.5 Regional Median Household Income Trends

Travel demand, and more specifically demand for tolled facilities, is sensitive to the amount of disposable income available within a household. A reliable indicator of a household's propensity for trip-making, or a motorist's willingness to pay a toll, is the median household income. Generally, households with higher incomes tend to make more trips than those with lower incomes due to their higher disposable incomes. The value-of-time (VOT) is a key factor that defines motorists' willingness to pay tolls, and it also tends to be higher for households with higher incomes.

The most recent median household income data from the U.S. Census Bureau for all eight counties in the region is provided in **Table 4-9.** The median household income data presented in the table indicates that when reported in 2019 real dollars, median household income in the region grew considerably between 2000 and 2008 but had a decline after the global recession. Median household income for most of the counties was back to the 2008 levels by 2014 or 2015 as shown in the table. The median household incomes of Johnson (Kansas) and Platte (Missouri) counties have been consistently higher than rest of the counties in the region.

Table 4-9 Median Household Income Trends

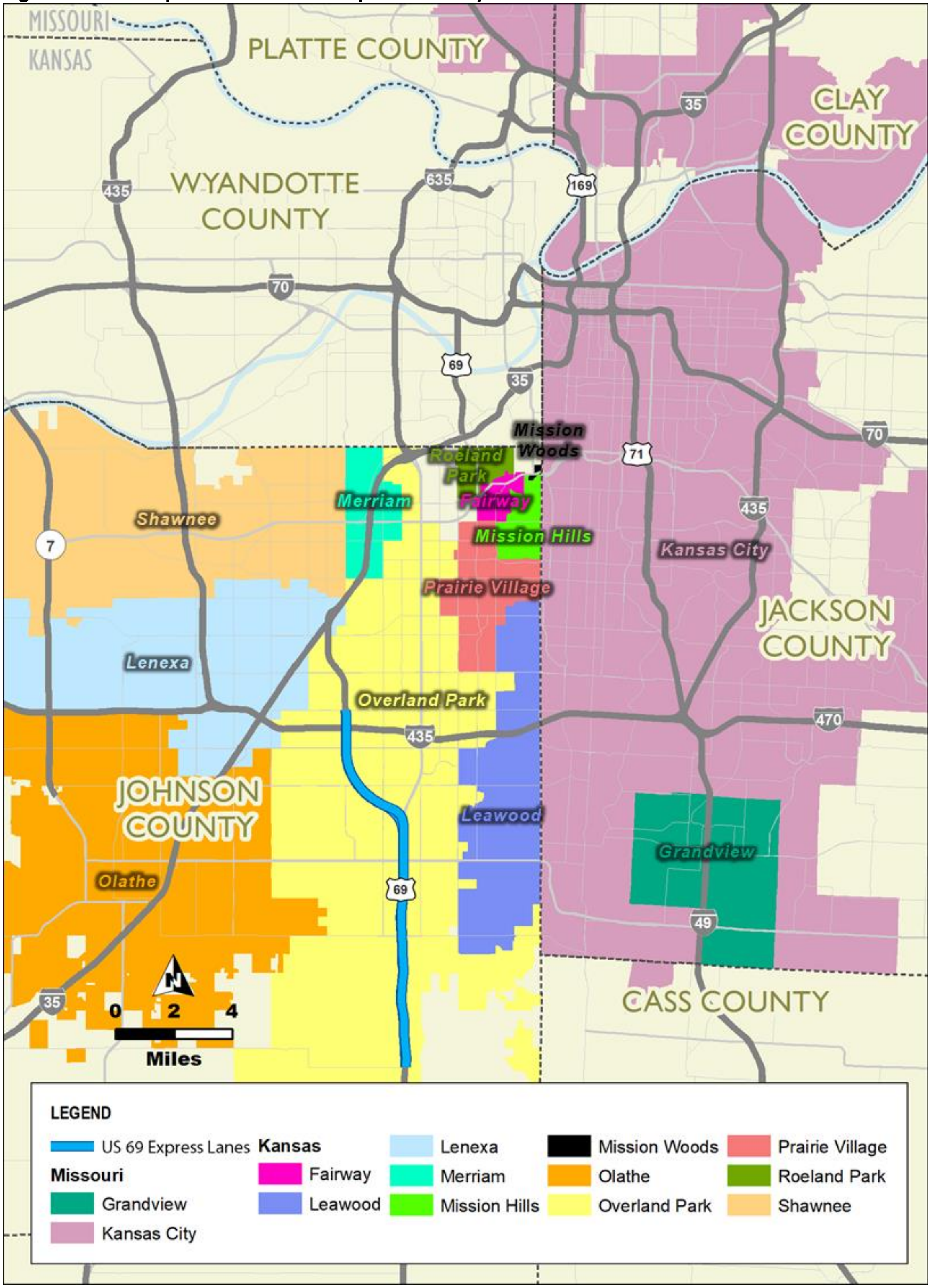
Year	Kansas				Missouri			
	Johnson	Leavenworth	Miami	Wyandotte	Cass	Clay	Jackson	Platte
2000	$66,800	$48,500	$45,300	$33,100	$50,700	$50,600	$42,100	$59,200
2001	$66,700	$48,700	$45,500	$32,500	$50,100	$50,400	$41,100	$58,400
2002	$67,000	$50,100	$47,100	$32,500	$50,800	$52,200	$41,800	$59,100
2003	$66,800	$50,800	$49,000	$33,000	$51,700	$53,700	$42,200	$60,100
2004	$68,000	$51,500	$51,700	$33,300	$53,000	$54,000	$42,400	$61,000
2005	$66,900	$54,300	$53,700	$34,600	$55,400	$54,000	$43,300	$61,400
2006	$70,000	$55,100	$56,200	$36,900	$55,500	$54,000	$44,200	$63,200
2007	$72,000	$58,900	$59,200	$37,500	$61,000	$58,300	$44,400	$64,400
2008	$76,300	$60,200	$61,200	$39,200	$61,900	$58,800	$47,300	$67,100
2009	$72,000	$57,700	$57,700	$37,300	$59,200	$58,000	$45,800	$65,900
2010	$71,400	$60,800	$58,400	$37,800	$57,400	$55,800	$44,600	$67,800
2011	$70,700	$61,600	$57,600	$38,000	$55,000	$59,000	$44,500	$63,700
2012	$73,700	$59,700	$64,600	$37,800	$56,400	$58,200	$44,600	$67,300
2013	$74,100	$65,400	$59,700	$38,700	$63,000	$60,600	$46,800	$68,400
2014	$76,100	$65,500	$63,900	$37,100	$61,000	$61,600	$46,200	$70,900
2015	$83,000	$61,500	$62,400	$41,700	$63,000	$65,100	$48,400	$72,500
2016	$80,900	$67,600	$67,700	$43,400	$64,400	$66,000	$50,800	$77,900
2017	$83,500	$70,700	$69,300	$46,000	$65,800	$67,700	$52,600	$75,700
2018	$87,100	$70,800	$71,800	$47,100	$71,400	$68,900	$55,900	$82,600
2019	$91,900	$75,800	$74,400	$47,300	$73,900	$70,700	$57,900	$84,500
Average Annual Growth Rate 2000-2010	0.7%	2.3%	2.6%	1.3%	1.2%	1.0%	0.6%	1.4%
Average Annual Growth Rate 2010-2019	2.8%	2.5%	2.7%	2.5%	2.8%	2.7%	2.9%	2.5%

Source: U.S. Census Bureau (Release: Small Area Income and Poverty Estimates)
2019 Dollars, Not Seasonally Adjusted

4.3 Historical Municipal Growth

The historical demographic growth in the Johnson (Kansas) and Jackson (Missouri) counties is described in this section, with a focus on the underlying demographic characteristics of the municipalities that the facility serves. **Figure 4-5** shows a map of these municipalities.

Figure 4-5 Municipalities in the Vicinity of the Study Corridor



4.3.1 Historical Population Trends

The historical population trends for the municipalities in the study area are presented in **Table 4-10** using data from the U.S. Census Bureau. The average annual population growth in the past decade ranged from a low of -0.3 percent for the cities of Mission Hills to a high of 1.6 percent for the City of Lenexa. Most of the cities near the study corridor have shown moderate growth during the past decade.

The City of Overland Park, where the study corridor is located, is the most populous city in Johnson County. It experienced an average annual population growth rate of 1.3 percent between 2010 and 2019, adding approximately 22,000 new residents during this time. Kansas City, Missouri, is the most populous city to the east of the study corridor. Between 2010 and 2019, Kansas City, Missouri gained 35,000 residents which translates into an annual growth rate of 0.8 percent.

Table 4-10 Population for Cities in the Study Area

County	City	2010 Population	2019 Population	Annual Average Growth Rate (2010-2019)
Johnson County, Kansas	Olathe	125,900	140,600	1.2%
	Overland Park	**173,300**	**195,500**	**1.3%**
	Lenexa	48,200	55,600	1.6%
	Shawnee	62,200	65,800	0.6%
	Leawood	31,900	34,700	0.9%
	Prairie Village	21,500	22,300	0.4%
	Mission Hills	3,600	3,500	-0.3%
	Fairway	3,900	4,000	0.3%
	Roeland Park	6,700	6,700	0.0%
	Merriam	11,000	11,100	0.1%
	Mission Woods	9,300	9,900	0.7%
Jackson County, Missouri	Kansas City	459,900	495,300	0.8%
	Grandview	24,500	24,900	0.2%

Source: U.S. Census Bureau
Note: The above summary includes cities for which the 2010 population was greater than 1,000

4.3.2 Historical Municipal Median Household Income Trends

Table 4-11 shows the median household incomes (in 2019 dollars) for the major cities/towns near the US 69 corridor. Median household income ranged between $47,100 and $250,000. The municipalities with the lowest and highest median incomes were Grand View, Missouri and Mission Hills, Kansas, respectively. Overland Park, where the study corridor is located, has a median household income of $91,500.

Table 4-11 Median Household Income for Major Cities

County	City	Median Household Income
Johnson County, Kansas	Olathe	$94,300
	Overland Park	**$91,500**
	Lenexa	$87,100
	Shawnee	$84,900
	Leawood	$157,500
	Prairie Village	$91,100
	Mission Hills	$250,000
	Fairway	$112,000
	Roeland Park	$76,000
	Merriam	$63,800
	Mission Woods	$180,000
Jackson County, Missouri	Kansas City	$55,300
	Grandview	$47,100

Source: 2019 American Community Survey 5-Year Estimates
Note: The above summary includes cities for which the 2010 population was greater than 1,000

4.4 Independent Socioeconomic Review

An independent socioeconomic assessment was undertaken to evaluate the validity of the current and anticipated growth in population, employment, and households within the US 69 corridor study area. A summary of the results from the independent socioeconomic review (by *EBP*) and a comparison with the MARC forecasts is described in this section.

EBP was engaged to perform a socioeconomic review and development update along the US 69 corridor and provide an independent opinion of required updates and/or revisions to the underlying socioeconomic growth forecasts for the eight-county region. The independent socioeconomic review was commissioned to provide 2019 data for the base year model and provide updates based on more recent trends, where applicable, to the future growth in population, employment, and households for each TAZ within the US 69 study corridor area. Most of the reviewed TAZs are within the Jackson and Johnson County boundaries. These modified demographics were used as part of this study and were utilized as input into the four-step travel demand forecasting model to generate the model trip tables.

The current and potential future economic development and the distribution of population and employment within the US 69 study corridor area was investigated at a detailed TAZ level. This analysis was undertaken to gain a better understanding of the growth patterns that are expected within the corridor over the next 30 years. This included an examination of the demographic forecasts for the area immediately adjacent to the study corridor and within the broader study area.

Population and employment growth between 2019 and 2050 for the TAZs along the study corridor based on the revised forecasts are highlighted in **Figure 4-6** through **Figure 4-13**. These figures show that economic activity and urbanized areas are concentrated around major highway corridors.

4.4.1 Population Growth Estimates

Figures 4-6 and **4-7** show 2019 and 2050 population estimates, respectively, as provided by *EBP.* The majority of the TAZs in the vicinity of the corridor have a moderate range of population (1,000 to 3,000 per TAZ) with a higher population in the northern segments (north of 159th Street) of the study corridor, as compared with the southern segment. Population estimates for 2050 depict similar population distribution pattern in the northern segment of the study corridor.

Figure 4-8 shows the estimated short-term population growth between 2019 and 2025 by TAZ, as provided by *EBP*. A significant amount of population growth in the zones near the northern terminus of the study corridor is expected through 2025. Several zones south of 151st Street are expected to grow by over 150 residents per TAZ by 2025. This significant population growth in the area north of the study corridor will likely produce additional traffic demand along the US 69 corridor as these residents' commute towards the core business district of Kansas City for work. Conversely, along the study corridor itself, a decrease in population is expected in several zones between 151st Street and the I-435 corridor.

Figure 4-9 shows the estimated long-term population growth between 2025 and 2050 by TAZ, as provided by *EBP*. A significant amount of population growth in the zones near the northern terminus of the study corridor is expected through 2050. Overall, an increase in population is expected in several zones around the study corridor.

4.4.2 Employment Growth Estimates

Figures 4-10 and **Figure 4-11** show 2019 and 2050 employment estimates, respectively, as provided by *EBP.* High employment zones are in the northern segment (north of 135th Street) of the study corridor. Notably, a majority of the TAZs in the vicinity of I-435 and I-35 are high employment zones. Similarly, 2050 employment estimates depict similar employment distribution in the study area.

Figure 4-12 shows the estimated short-term employment growth between 2019 and 2025 by TAZ, as provided by *EBP*. A significant amount of employment growth in the zones near the northern terminus of the study corridor is expected through 2025. Several zones to the east of the northern terminus of the study corridor are expected to grow by over 100 jobs per TAZ by 2025. This significant job growth of TAZs in the vicinity of I-435 and I-35 will likely produce additional commuter traffic demand along the US 69 corridor.

Figure 4-13 shows the estimated long-term employment growth between 2025 and 2050 by TAZ, as provided by EBP. A significant amount of employment growth in the zones near the northern terminus of the study corridor is expected through 2050. This significant job growth in TAZs in the vicinity of I-435 and I-35 will likely produce additional commuter traffic demand along the US 69 corridor.

Reviewing the population and employment density graphs in general provides an indication of the imbalance in the future origin and destination patterns that can be expected within the study region as a result of current land-use policies. In the future, population will grow denser along the areas near the US 69 corridor from north of 159th Street to south of I-35. Meanwhile, the employment is expected to remain concentrated in several areas relatively close to the freeway corridors in the study region (I-35 and I-435). As a result of sprawling population growth patterns and the relative concentration of employment centers, it is expected that traffic demand along the major corridors accessing the employment zones in the northern segment of the study corridor will continue to grow.

Figure 4-6 *EBP* Population Estimate – 2019

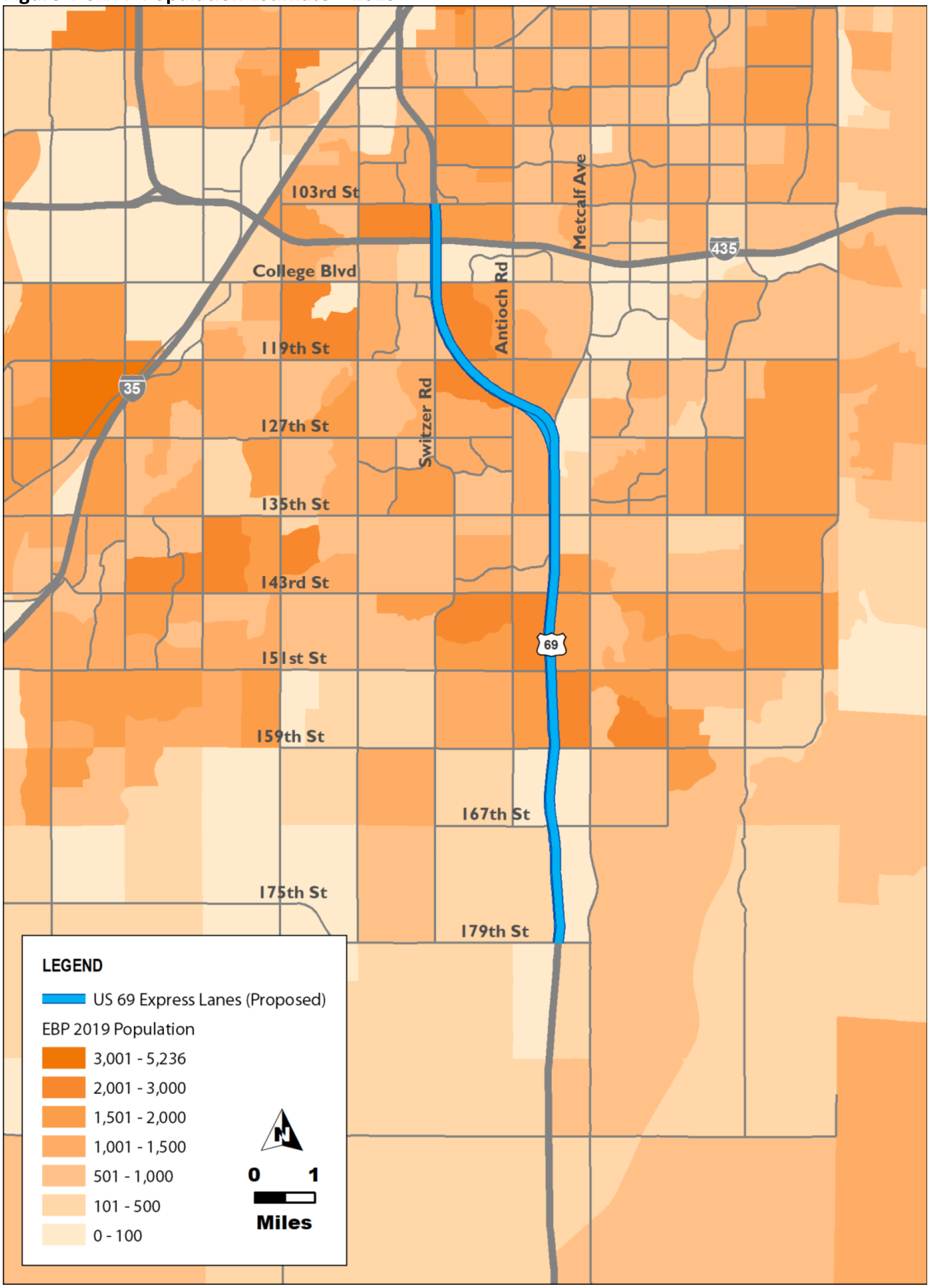


Figure 4-7 *EBP* Population Forecast – 2050

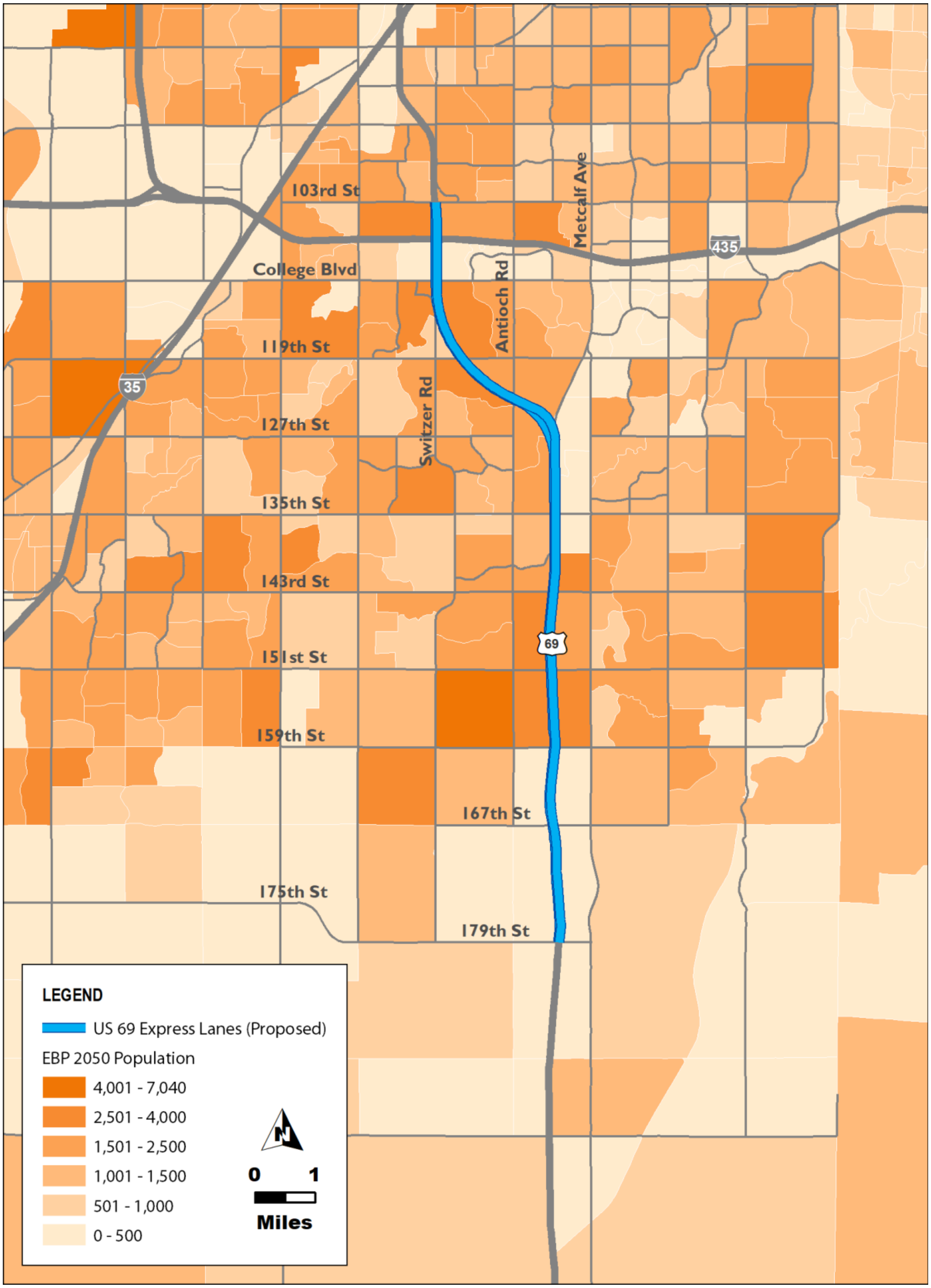


Figure 4-8 2025 vs 2019 Population Difference – *EBP* Forecast

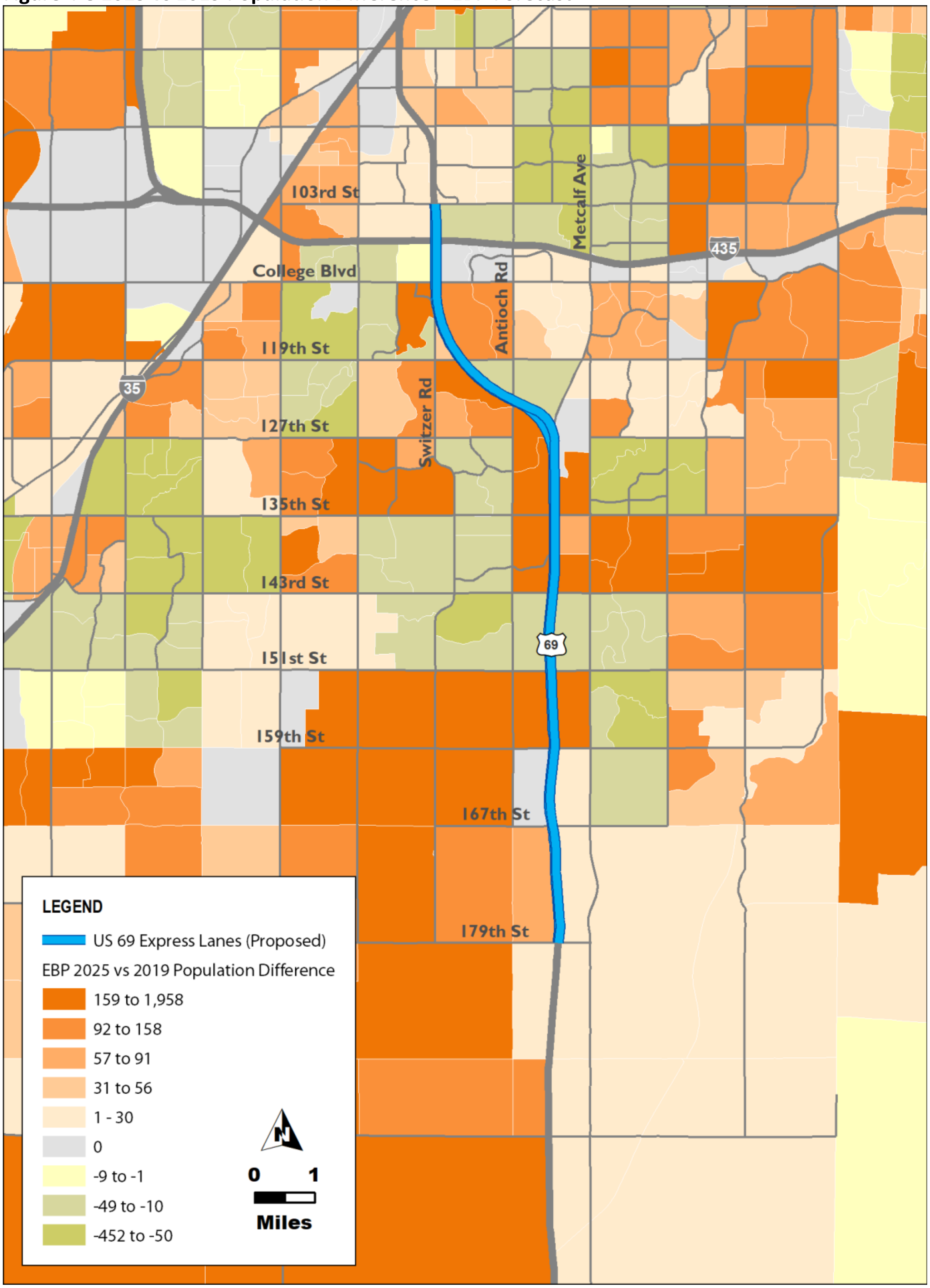


Figure 4-9 2050 vs 2025 Population Difference – *EBP* Forecast

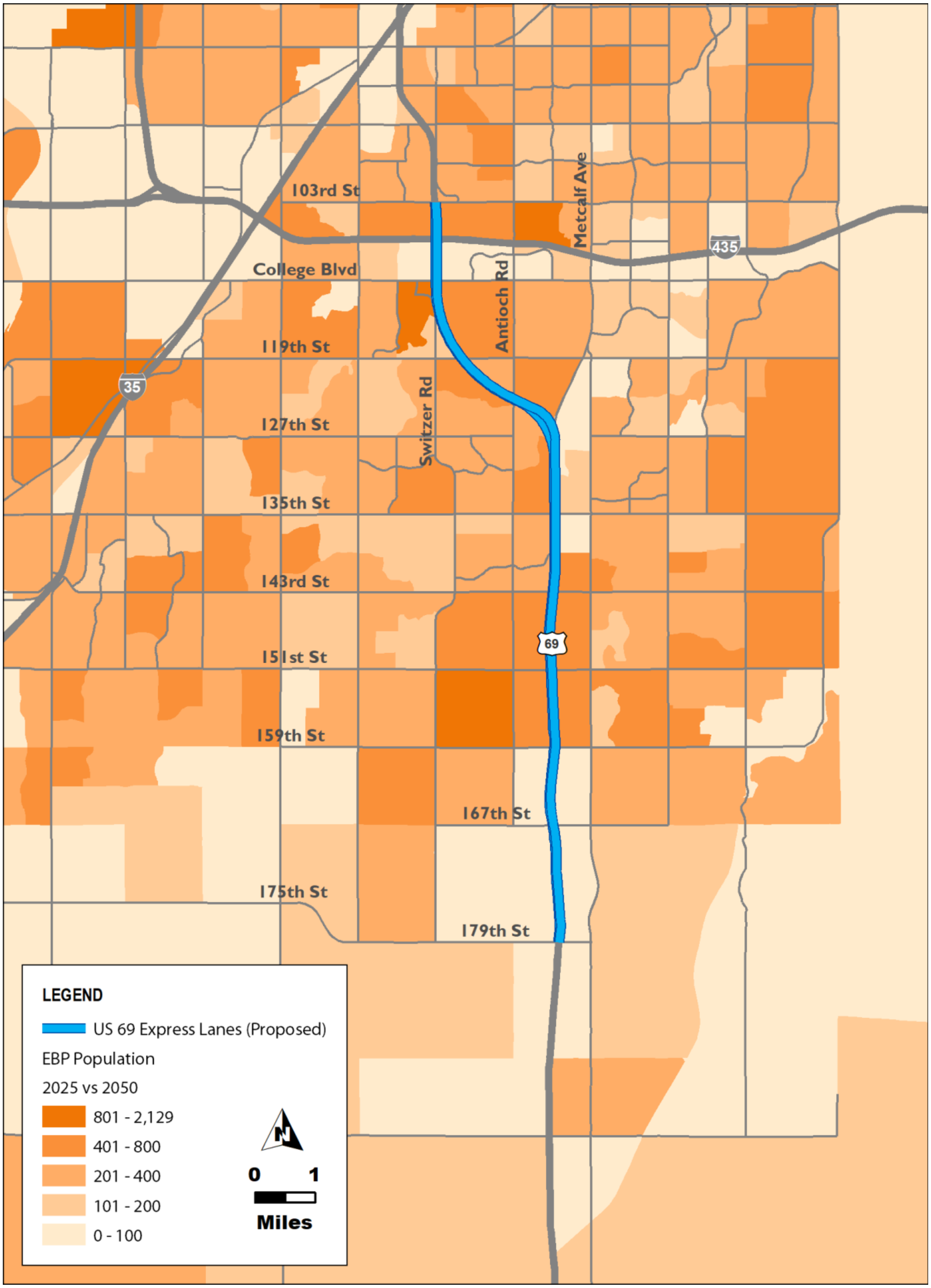


Figure 4-10 *EBP* Employment Estimate – 2019

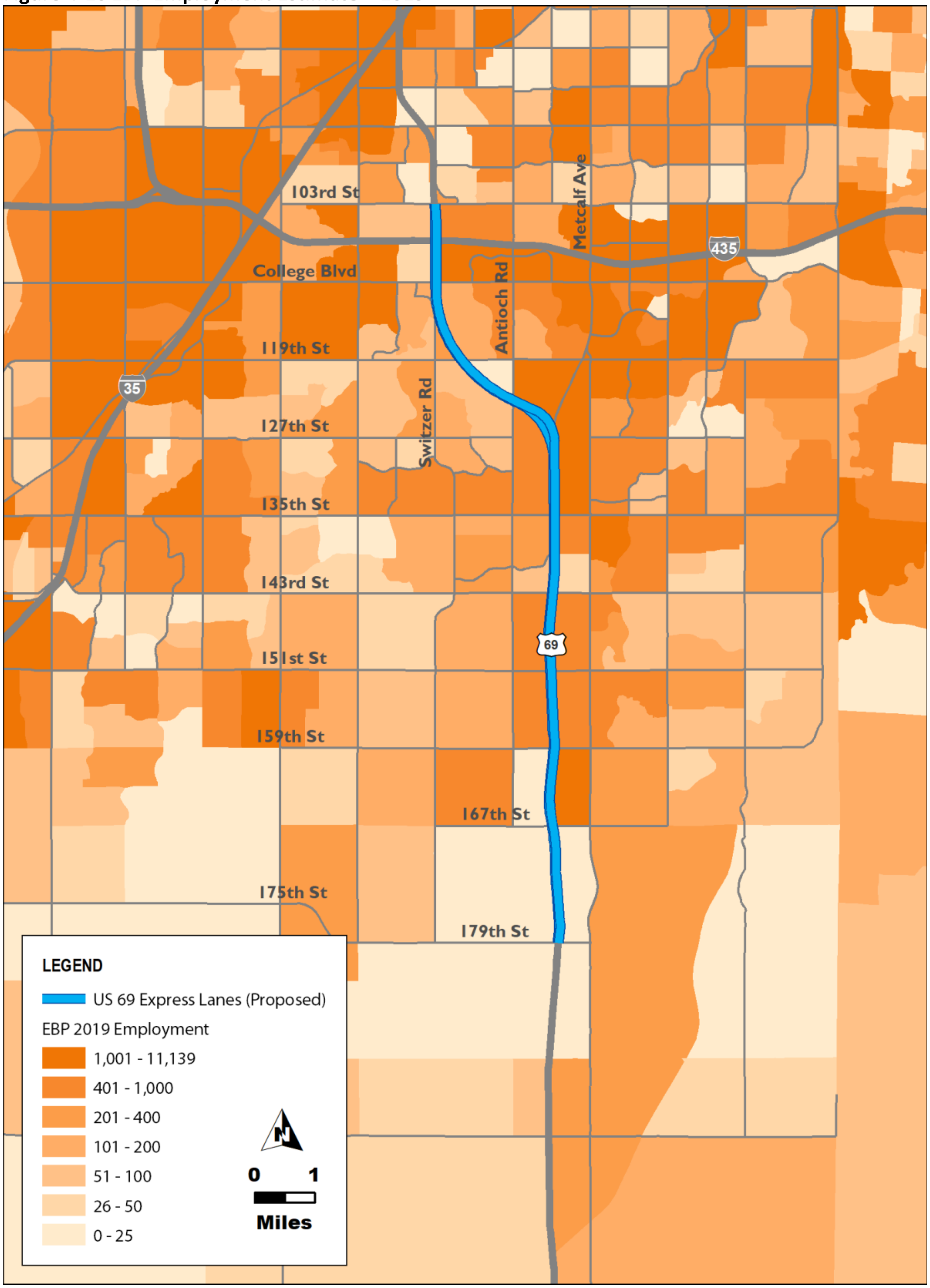


Figure 4-11 *EBP* Employment Forecast – 2050

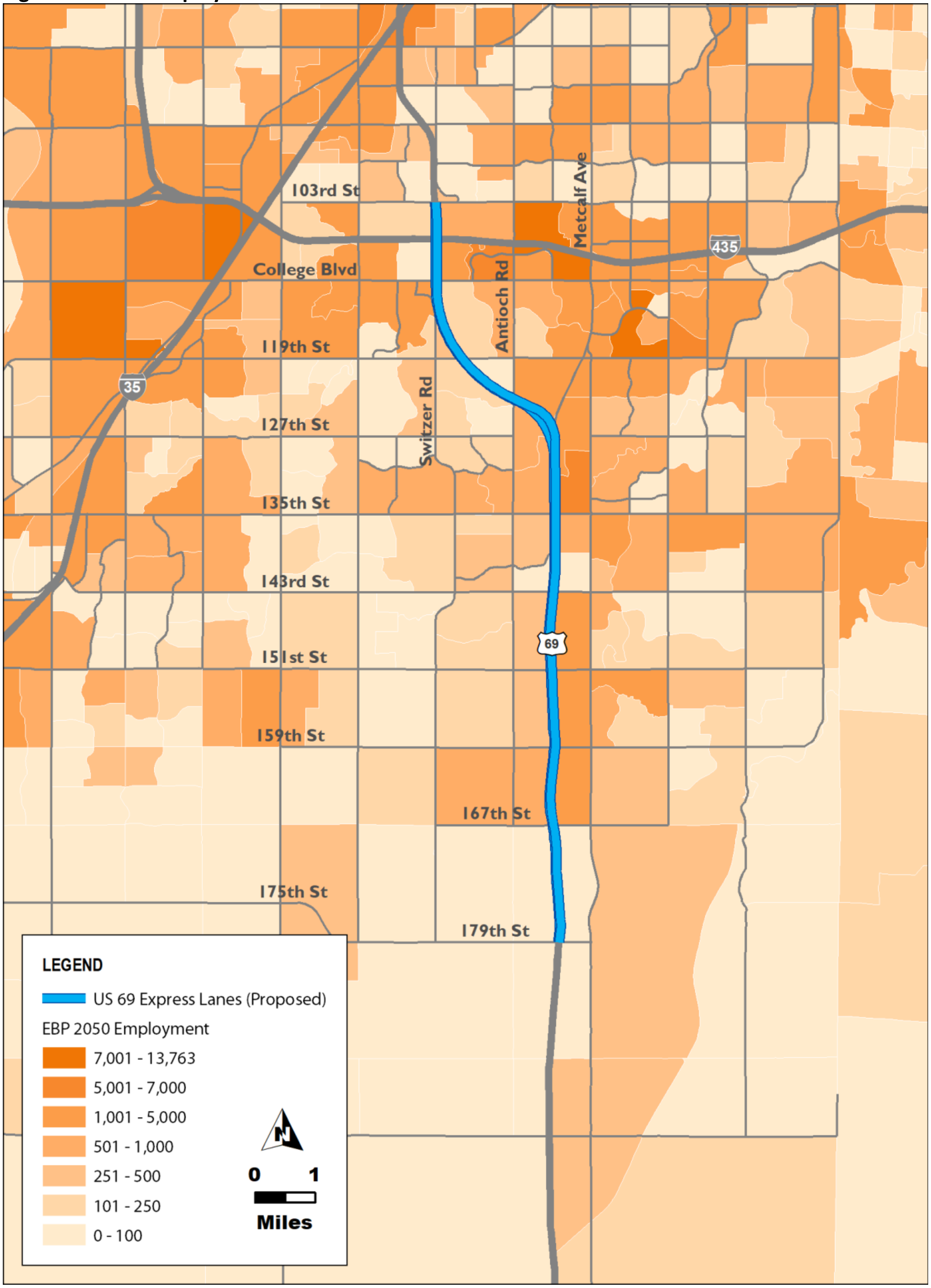


Figure 4-12 2025 vs 2019 Employment Difference – *EBP* Forecast

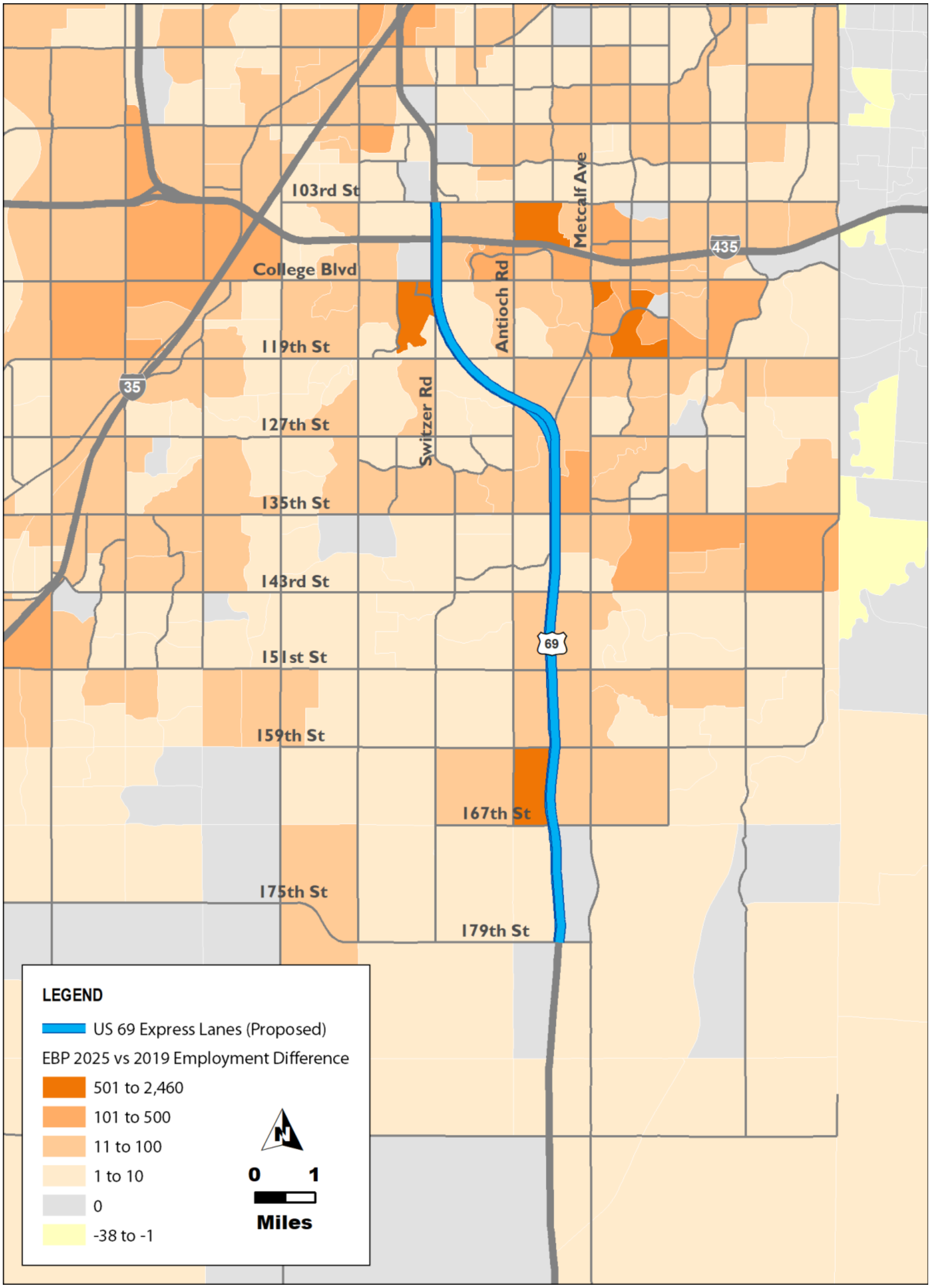
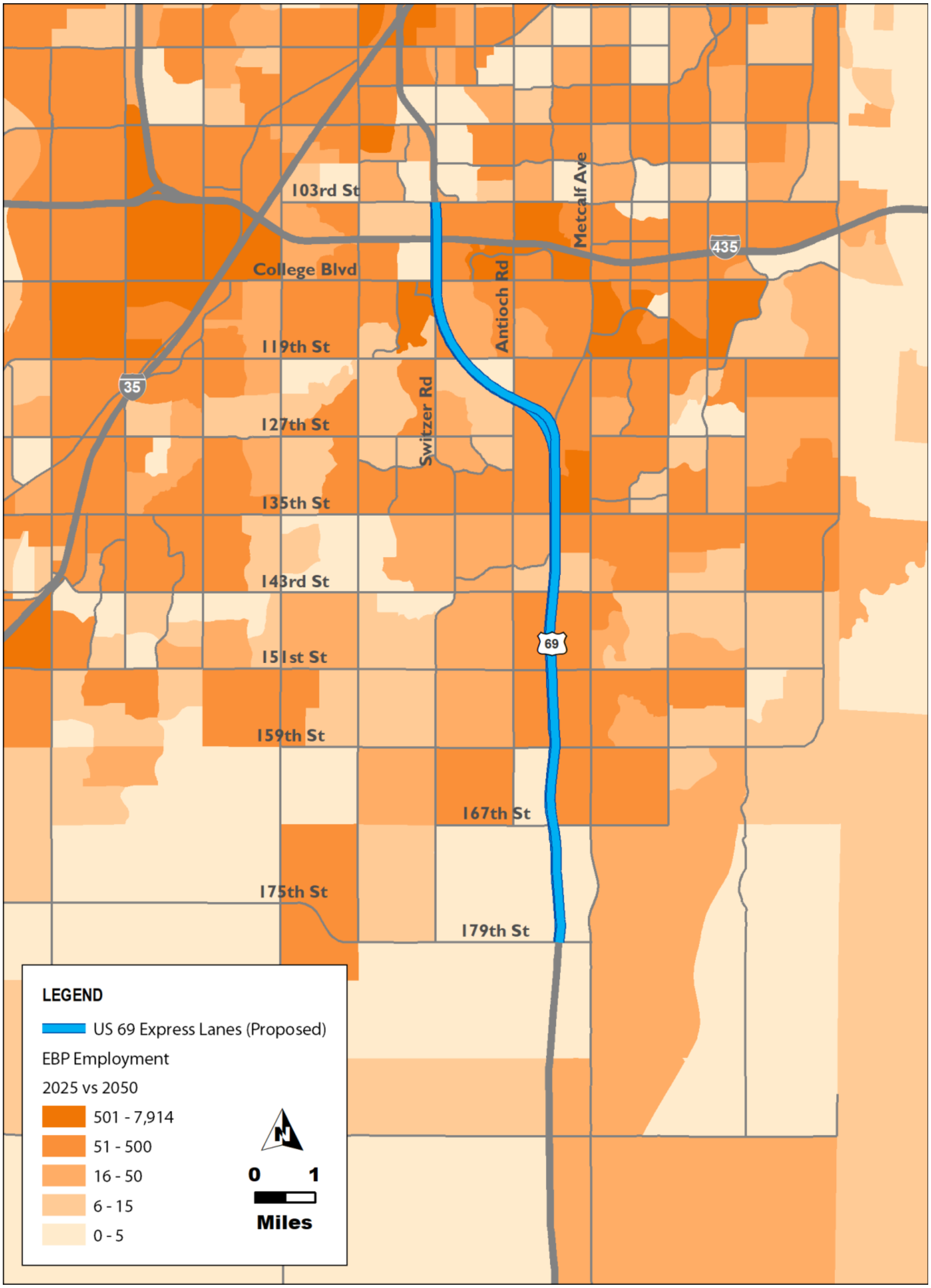


Figure 4-13 2050 vs 2025 Employment Difference – *EBP* Forecast



4.4.3 Comparison with Official MARC Forecasts

A comparison was made between the official MARC socioeconomic forecasts and the revised forecast developed by *EBP* to understand how the two forecasts differ from each other at the county level, corridor level and at the individual TAZ level in the vicinity of the US 69 study corridor.

The qualifier "official" refers to the MARC demographics datasets. Adjustments made to the population and employment forecasts by *EBP* to update the MARC official demographics datasets along the US 69 corridor, as well as the eight-county MARC MPO region, are referred to as the "revised" demographic datasets. The revised demographics datasets reflect changes to the socioeconomic trends that have occurred or have been announced since the development of the official demographics datasets. One set of T&R estimates for the US 69 corridor included in this report were developed using official MARC demographics and another set was developed using the revised demographics datasets prepared by *EBP*.

Table 4-12 shows a comparison of the official and revised population projections for Johnson County (Kansas) and Jackson County (Missouri), and the eight-county region for the years 2020, 2030, 2040, and 2050. The revised population forecast for the eight-county region is less than the official MARC forecast for the years 2020 through 2050. The 10-year (2020 to 2030) and 30-year (2020 to 2050) growth rates for population in the eight-county region are also lower for the revised population estimates provided by *EBP*. The 10-year and 30-year growth rates for the Johnson County revised population estimates decreased slightly as compared with the official population estimates. For Jackson County, population estimates also decreased as compared with the official population estimates.

Table 4-12 Comparison of Population Forecasts

Year	Johnson County, KS		Jackson County, MO		Eight-County Region	
	Official	Revised	Official	Revised	Official	Revised
2020	612,200	599,100	710,000	708,000	2,067,500	2,050,200
2030	684,600	673,500	739,500	736,600	2,241,600	2,208,200
2040	749,700	738,300	766,300	745,200	2,400,400	2,309,800
2050	808,900	797,900	791,100	753,900	2,546,900	2,395,700
CAGR 2020-2030	1.1%	1.2%	0.4%	0.4%	0.8%	0.7%
CAGR 2020-2050	0.9%	1.0%	0.4%	0.2%	0.7%	0.5%

Source: Mid-American Regional Council (MARC); EBP

Table 4-13 shows a comparison of the official and revised employment projections for Johnson County (Kansas) and Jackson County (Missouri), and the eight-county region for the years 2020, 2030, 2040 and 2050. Like the population forecasts, the revised employment forecasts for the eight-county region are less than official MARC forecasts for the years 2020 through 2050, with the exception of 2030, for which it is higher by over 7,000. However, the 10-year (2020 to 2030) growth rates for employment are higher for the revised employment estimates provided by *EBP*. The 30-year (2020 to 2050) growth rates are similar to the official demographics' growth rates.

Table 4-13 Comparison of Employment Forecasts

Year	Johnson County, KS		Jackson County, MO		Eight-County Region	
	Official	Revised	Official	Revised	Official	Revised
2020	372,700	364,800	386,000	374,100	1,080,800	1,052,800
2030	401,500	414,100	397,700	392,500	1,143,800	1,150,900
2040	435,400	443,200	411,400	394,800	1,217,900	1,199,500
2050	476,100	470,500	427,900	395,100	1,306,800	1,242,500
CAGR 2020-2030	0.7%	1.3%	0.3%	0.5%	0.6%	0.9%
CAGR 2020-2050	0.8%	0.9%	0.3%	0.2%	0.6%	0.6%

Source: Mid-American Regional Council (MARC); EBP

Zonal-level comparisons for population and employment between the revised, and the official MARC forecasts for 2020 and 2050 are illustrated in **Figures 4-14** through **4-17** and highlight the demographic revisions that were implemented for several zones within the study area based on a thorough review of zonal characteristics and future development patterns for each zone.

Figure 4-14 *EBP* vs MARC Population Delta – 2019

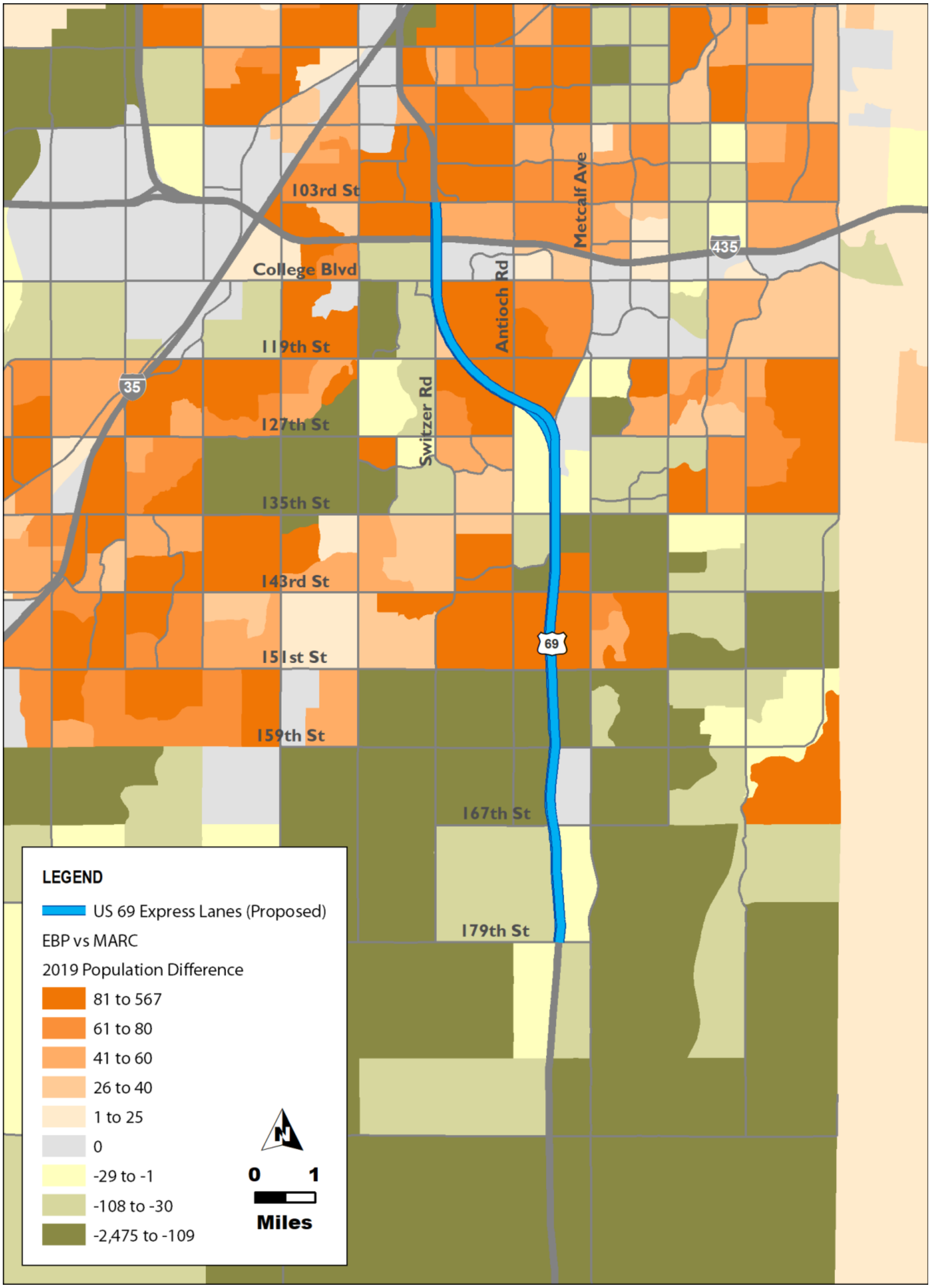


Figure 4-15 *EBP* vs MARC Employment Delta – 2019

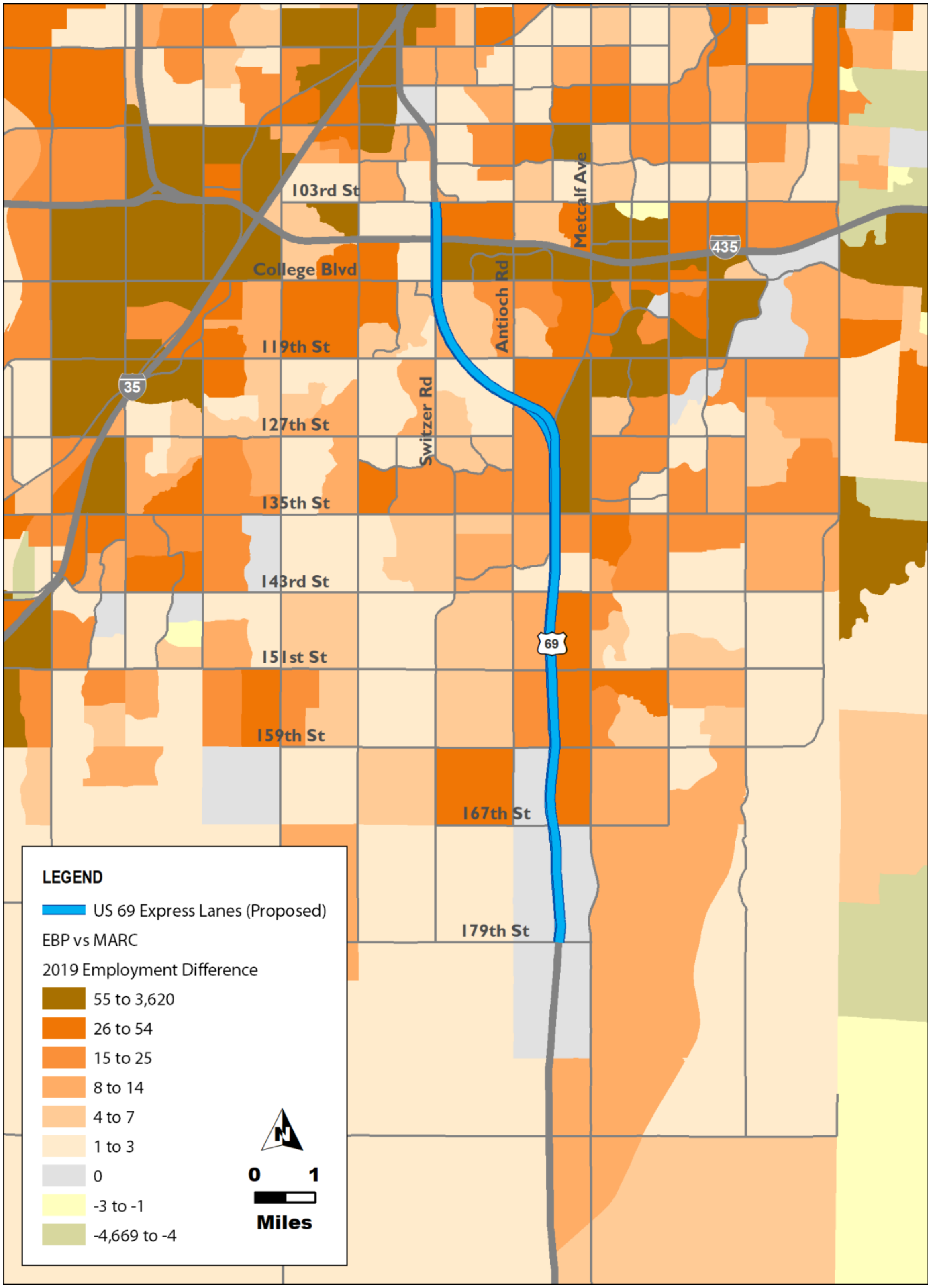


Figure 4-16 *EBP* vs MARC Population Delta – 2050

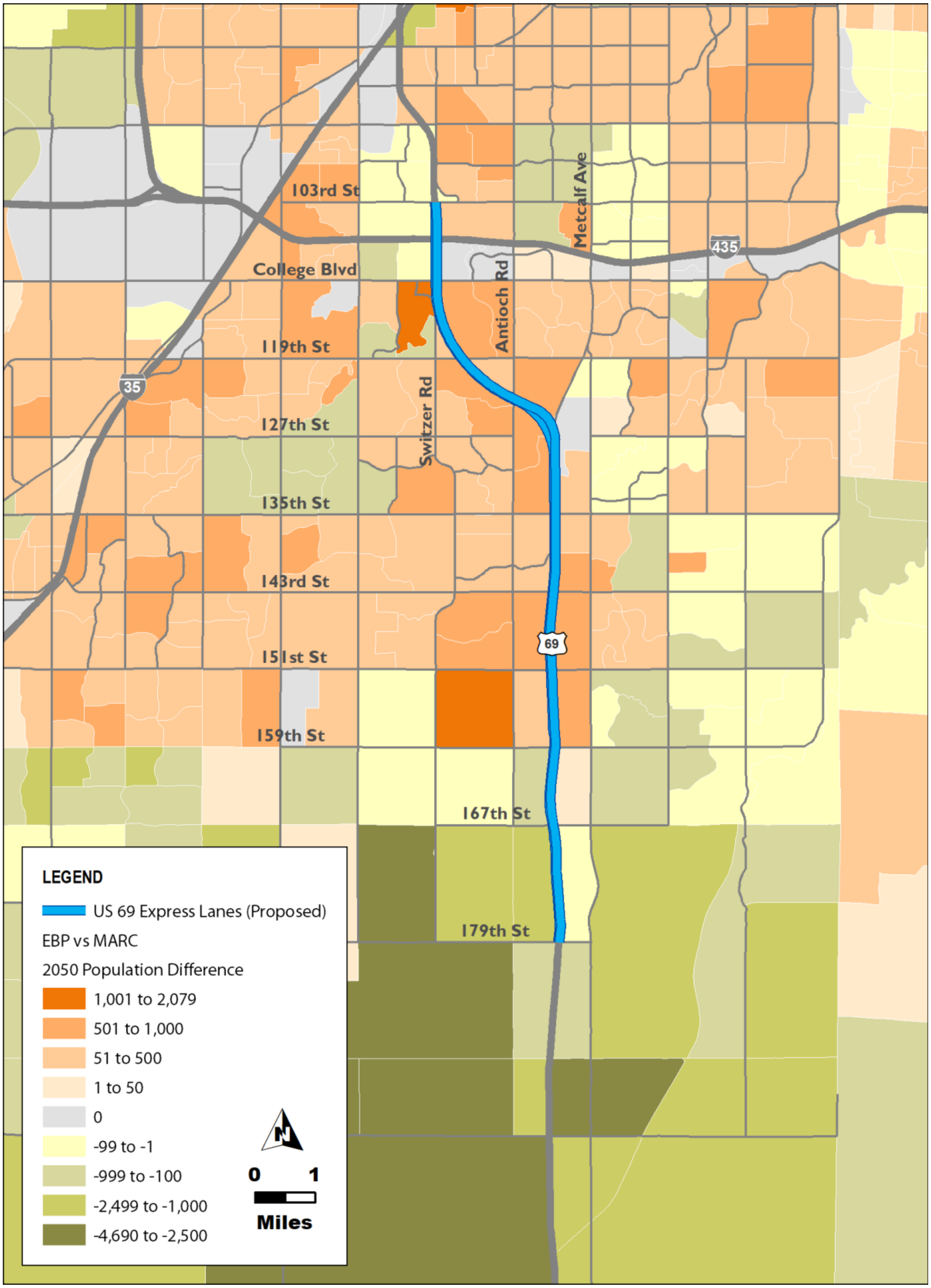
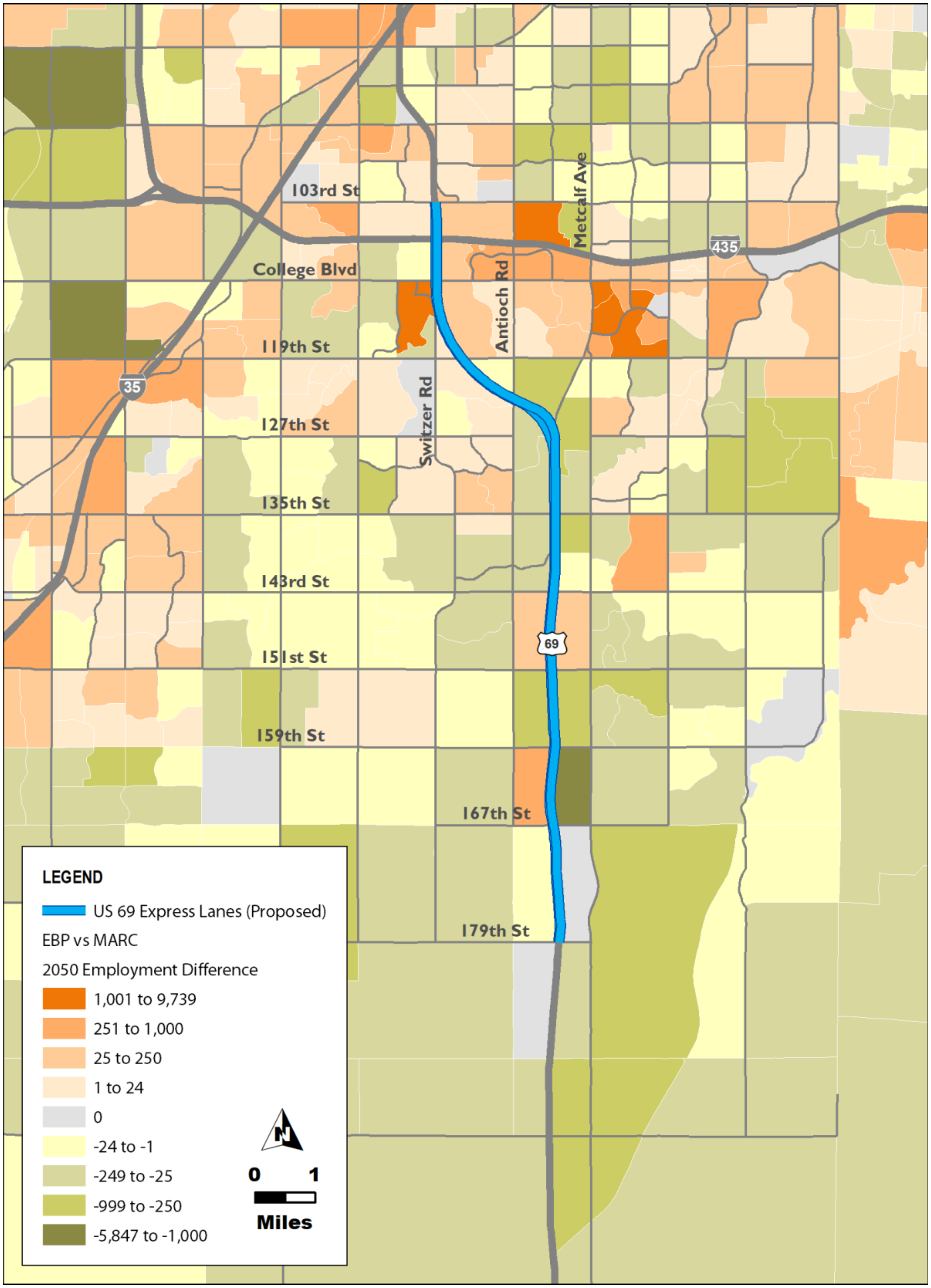


Figure 4-17 *EBP* vs MARC Employment Delta – 2050



4.5 Other Socioeconomic Indicators

4.5.1 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 done by calculating the average going price of each item in the market basket. Food, clothing, housing, transportation (including tolls) and entertainment are all included in the basket. Income taxes and investment items such as stocks and bonds are not included. The Bureau of Labor Statistics of the U.S. Department of Labor calculates the CPI-U every month.

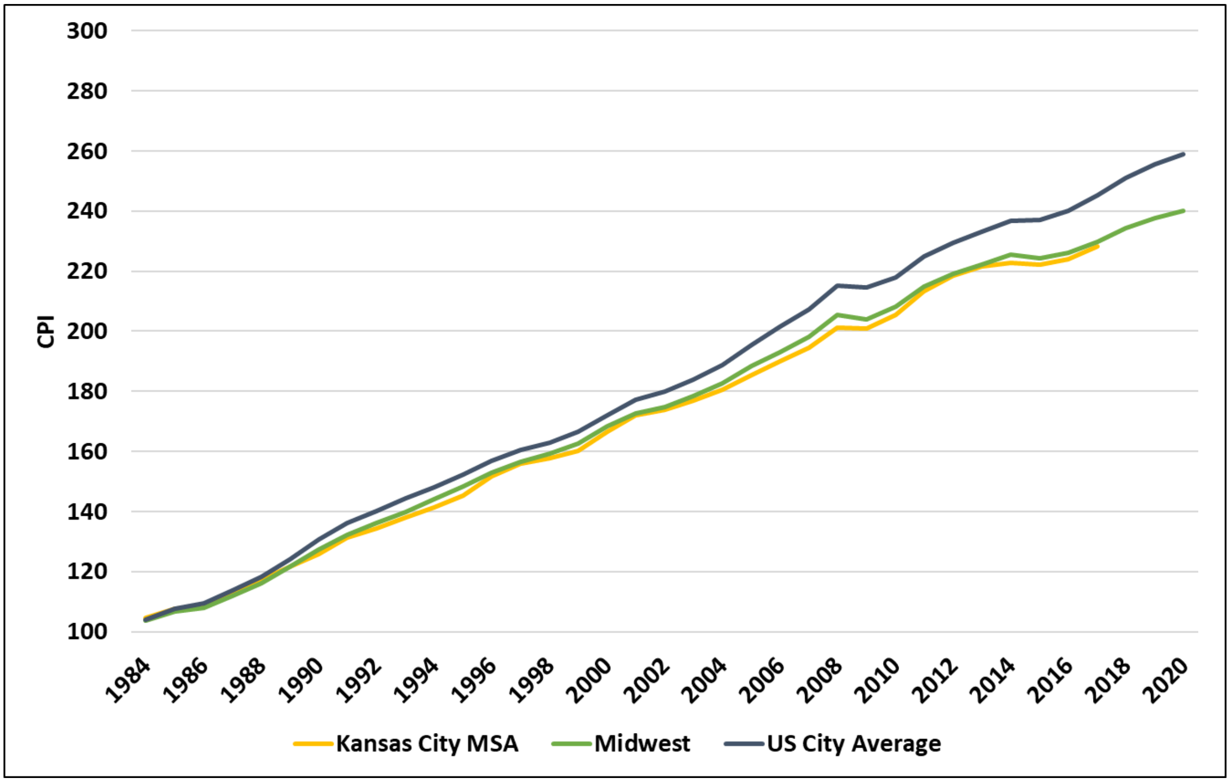
The consumer price index for the base timeframe (1982-1984) is 100. Inflation is determined by finding the percentage change in the CPI-U from one year to the next. **Table 4-14** and **Figure 4-18** give the historical trends for CPI-U from 1984 to 2017 for the Kansas City MSA, and from 1984 to 2020 for the Midwest region (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin) and the United States. As indicated in **Figure 4-18**, the CPI-U for the Kansas City MSA has continually increased at a rate similar to the CPI-U for both the Midwest Region and the United States. This indicates that the inflation rate in Kansas City is consistent with the rate of inflation seen nationwide. In Kansas City, the CPI-U has grown at an average annual rate of 2.7 percent per year from 1984 to 2007, which is lower than the rate of growth experienced by the Midwest region and the nation during that time. Between 2007 and 2017, Kansas City's CPI-U grew at an average annual rate of 1.6 percent, at an annual rate of 1.5 percent for the Midwest region, and at an average annual rate of 1.7 percent for the United States. It should also be noted that the CPI-U for all the three geographical locations sharply increased between 2007 and 2008 and decreased between 2008 and 2009.

Table 4-14 Consumer Price Index for All Urban Consumers

Year	Kansas City MSA	Growth	Midwest	Growth	US City Average	Growth
1984	104.5	-	103.6	-	103.9	-
1985	107.7	3.1%	106.8	3.1%	107.6	3.6%
1986	108.7	0.9%	108.0	1.1%	109.6	1.9%
1987	113.1	4.0%	111.9	3.6%	113.6	3.6%
1988	117.4	3.8%	116.1	3.8%	118.3	4.1%
1989	121.6	3.6%	121.5	4.7%	124.0	4.8%
1990	126.0	3.6%	127.4	4.9%	130.7	5.4%
1991	131.2	4.1%	132.4	3.9%	136.2	4.2%
1992	134.3	2.4%	136.1	2.8%	140.3	3.0%
1993	138.1	2.8%	140.0	2.9%	144.5	3.0%
1994	141.3	2.3%	144.0	2.9%	148.2	2.6%
1995	145.3	2.8%	148.4	3.1%	152.4	2.8%
1996	151.6	4.3%	153.0	3.1%	156.9	3.0%
1997	155.8	2.8%	156.7	2.4%	160.5	2.3%
1998	157.8	1.3%	159.3	1.7%	163.0	1.6%
1999	160.1	1.5%	162.7	2.1%	166.6	2.2%
2000	166.6	4.1%	168.3	3.4%	172.2	3.4%
2001	172.2	3.4%	172.8	2.7%	177.1	2.8%
2002	174.0	1.0%	174.9	1.2%	179.9	1.6%
2003	177.0	1.7%	178.3	1.9%	184.0	2.3%
2004	180.7	2.1%	182.6	2.4%	188.9	2.7%
2005	185.3	2.5%	188.4	3.2%	195.3	3.4%
2006	190.1	2.6%	193.0	2.4%	201.6	3.2%
2007	194.5	2.3%	198.1	2.7%	207.3	2.8%
2008	201.2	3.4%	205.4	3.7%	215.3	3.8%
2009	201.0	-0.1%	204.1	-0.6%	214.5	-0.4%
2010	205.4	2.2%	208.0	2.0%	218.1	1.6%
2011	213.5	4.0%	214.7	3.2%	224.9	3.2%
2012	218.5	2.3%	219.1	2.0%	229.6	2.1%
2013	221.6	1.4%	222.2	1.4%	233.0	1.5%
2014	222.7	0.5%	225.4	1.5%	236.7	1.6%
2015	222.3	-0.2%	224.2	-0.5%	237.0	0.1%
2016	224.1	0.8%	226.1	0.8%	240.0	1.3%
2017	228.2	1.9%	229.9	1.7%	245.1	2.1%
2018	-	-	234.3	1.9%	251.1	2.4%
2019	-	-	237.8	1.5%	255.7	1.8%
2020	-	-	240.0	1.0%	258.8	1.2%
Compounded Annual Growth	**1984-2007**	**2.7%**	**1984-2007**	**2.9%**	**1984-2007**	**3.0%**
	2007-2017	**1.6%**	**2007-2017**	**1.5%**	**2007-2017**	**1.7%**

Source: Bureau of Labor Statistics, CPI-U Not Seasonally Adjusted
Note: The Kansas City MSA CPI data was discontinued after 2017

Figure 4-18 Consumer Price Index for All Urban Consumers



Source: Bureau of Labor Statistics, CPI-U Not Seasonally Adjusted
Note: The Kansas City MSA CPI data was discontinued after 2017

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Chapter 5

Travel Demand Modeling

This chapter describes the development and calibration of the travel demand model that was used to evaluate the proposed US 69 express lanes. The travel demand modeling methodology that was used to develop the traffic and toll revenue forecasts for the express lanes is summarized in **Figure 5-1**.

A profile of the existing traffic demand that was observed along the US 69 corridor and other major roadways in the study area is presented in **Chapter 2** based on the data collected along the US 69 corridor and selected screenlines, speed data along US 69 and potential competing routes, and other travel characteristics. These travel characteristics became the foundation upon which the travel demand model was developed and calibrated. The model development for the traffic and toll revenue estimation process involved three levels of analysis as described below.

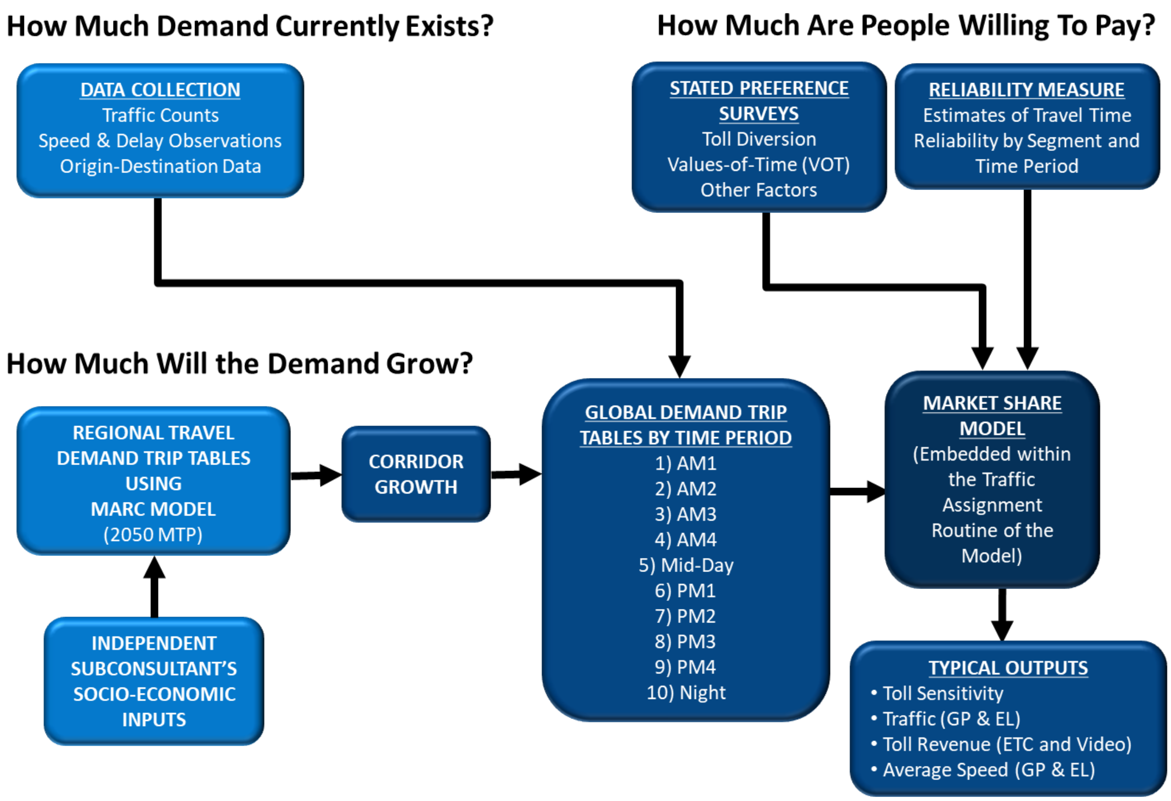
1. ***Global Demand Estimates*** – The global demand is an estimate of the amount of total traffic demand that will likely use the US 69 corridor under existing and future conditions. An economic assessment of the regional socioeconomics was performed as part of this study to provide a gauge of what the total global demand will be in the future within the corridor. Regional highway networks, obtained from the MARC model, were reviewed to ensure that the future planned improvements within the US 69 study area as well as the overall Kansas City metro region were updated to incorporate the latest planned infrastructure improvements. Updated regional socioeconomic data developed by an independent subconsultant (as described in **Chapter 4**) was used to develop global travel demand estimates for the US 69 study corridor. The updated socioeconomic data was incorporated within the MARC travel demand model to develop existing and future year trip tables.

2. ***Travel Time Reliability Coefficients*** – Travelers make their decisions regarding the use of express lanes based on many factors, which include the need to reliably reach their intended destination. Without the reliability component, traditional toll road utilization models tend to underestimate the level of express lanes usage typically observed when based solely on travel time savings. Corridor reliability was assessed under current conditions using *NPMRDS* traffic congestion information to measure the variability in travel times along the US 69 corridor during each peak period. This analysis produced a ratio representing the typical increase in travel time over the average travel time due to congestion issues as a proxy for reliability. The average travel times estimated by the travel demand model were then adjusted using the reliability ratio coefficient as a measure of drivers' perception of the worst-case congestion condition typically experienced along the general-purpose (GP) lanes and the reliability buffer they tend to overlay when making a routing and travel decision. These coefficients were estimated for discrete segments by direction along the US 69 corridor for each individual time period used in the model.

3. ***Market Share Model*** – The market share model was used to estimate the traffic that will choose to use the express lanes under varying congestion characteristics and toll rates. The share of the corridor traffic that uses the express lanes is based on several factors that include the location of access points in relation to the GP lane configuration, the time savings offered by the express lanes, and the magnitude of toll rates charged.

The flow chart in **Figure 5-1** shows the general relationship between the various analysis components and provides an overview of the forecasting methodology.

Figure 5-1 Travel Demand Modeling Process



Note: GP – General Purpose Lanes, EL – Express Lanes

5.1 Model Development and Refinements

The socioeconomic forecasts and highway networks from the MARC's *Connected KC 2050 Plan* (2050 MTP) regional model were used as the basis for developing the travel demand model for this study. Trip tables generated from MARC's model were used for the 2019 base year as well as 2026, 2040, and 2050 forecast years based on the revised socioeconomics. The MARC model produces hourly trip tables for each of the 24 hours in a day. The hourly trip tables generated from the MARC model were for a single combined mode and were not segregated into auto and truck trips or occupancy levels. The highway networks obtained from the MARC model included roadway segment parameters such as length, functional class, area type, number of lanes, speed, and capacity.

Express lanes projects typically need to be studied in more detailed time periods to evaluate the operational characteristics of the corridor that may necessitate differing pricing regimes to effectively manage traffic within the lanes. Toll rate sensitivity analyses and testing was performed for each identified time period to gauge the optimum level of toll rates to ensure that the express lanes operate above a minimum travel speed of 50 miles per hour.

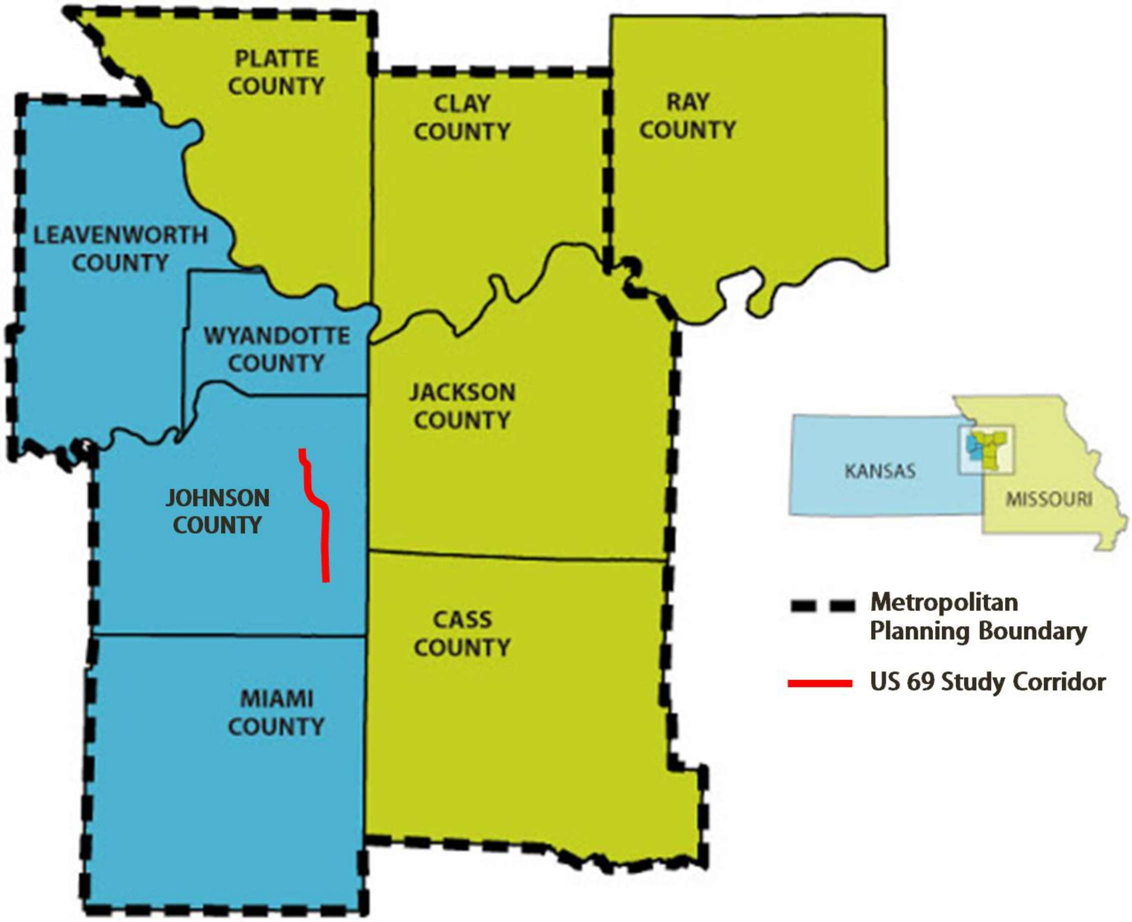
The highway networks obtained from MARC encompassed eight counties that were segmented into 2,510 TAZs. The modeling area boundary is shown in **Figure 5-2.** Because the model included the entire KC metro region, it covered a large area surrounding the US 69 express lanes study corridor and included all major competing and connecting routes within the study area. The networks and associated trip tables were used within the market share model to develop traffic and toll revenue estimates for the US 69 express lanes and are described in more detail in subsequent sections.

The official trip tables, provided by MARC, were at the hourly level as described earlier. The demand for express lanes like the ones proposed along the US 69 corridor is sensitive to traffic congestion which varies significantly during different times of the day. This typically requires a more detailed assessment of the traffic patterns during peak and off-peak periods to evaluate the operational characteristics of the corridor. The traffic demand and resulting congestion typically necessitates differing pricing regimes to effectively maintain traffic flow at or above targeted minimum speeds or level of service. To model the varying traffic conditions during different times of the day, the model used for this study included ten time periods. The hourly trip tables for the mid-day and overnight hours, when there is no significant congestion and lower traffic demand, were combined to save model computational time. The toll rates are also expected to remain at minimum levels during the mid-day and overnight hours because there is minimal congestion during these off-peak hours. The ten time periods that were used in the model are listed below:

- AM1 Peak Period – 5:00 AM to 6:00 AM
- AM2 Peak Period – 6:00 AM to 7:00 AM
- AM3 Peak Period – 7:00 AM to 8:00 AM
- AM4 Peak Period – 8:00 AM to 9:00 AM
- Mid-day Period – 9:00 AM to 3:00 PM
- PM1 Peak Period – 3:00 PM to 4:00 PM
- PM2 Peak Period – 4:00 PM to 5:00 PM
- PM3 Peak Period – 5:00 PM to 6:00 PM
- PM4 Peak Period – 6:00 PM to 7:00 PM
- Night Period – 7:00 PM to 5:00 AM

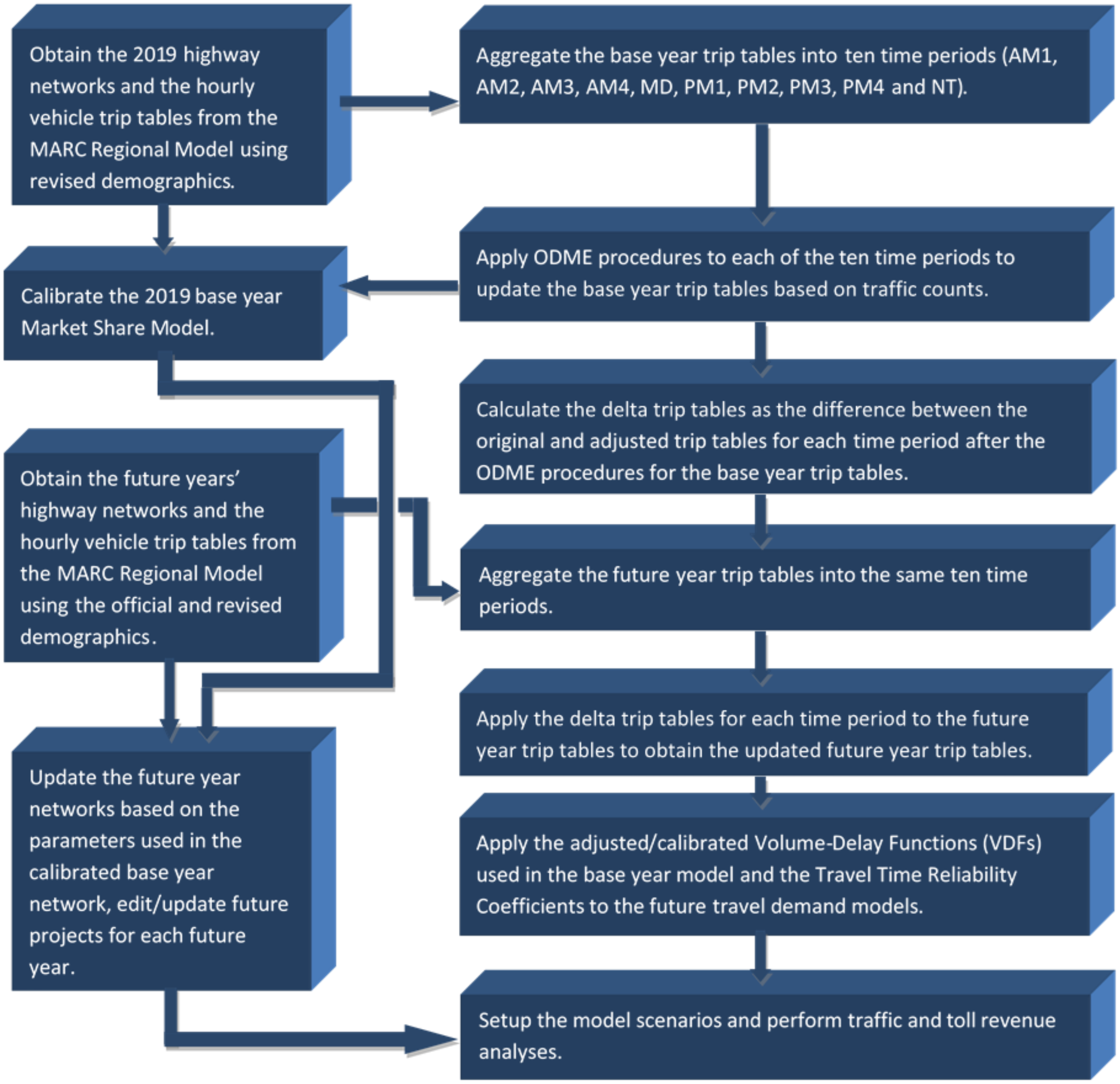
An Origin-Destination Matrix Estimation (ODME) technique was then applied to update the trip tables to better reflect existing traffic volumes along the major highways and screenlines within the study area based on recently collected data, as described in **Chapter 2**. The ODME procedure was applied to each of the ten time periods separately, and an extensive evaluation was performed to ensure the trip tables generated from the ODME procedure reasonably reflected the existing traffic characteristics along the US 69 corridor as indicated by both the traffic counts and observed travel speeds. Delta trip tables were calculated using the before and after ODME trip tables for each of the ten time periods for the base year. These delta trip tables were then applied to future year trip tables separately for each time period to reflect the corrections applied to the base year model.

Figure 5-2 Modeling Area Boundary



The overall modeling process used in the study is summarized in **Figure 5-3** and described in further detail in subsequent sections.

Figure 5-3 Flowchart of the Modeling Process



5.2 Global Demand Estimates

The global traffic demand (defined as the total potential traffic traveling within the US 69 corridor including collector-distributor roads, general purpose lanes, and express lanes) was estimated using the regional travel demand model. The regional travel demand model was used in two ways: 1) to provide the base travel patterns, and 2) to develop traffic growth characteristics. The model development for the future global demand estimates required updates to the highway network, the development of a socioeconomic database, and finally trip table modifications, which are all described in more detail below.

5.2.1 Highway Network

The Kansas City regional highway network based on the *Connected KC 2050* metropolitan transportation plan was used as the base network for this study. *Connected KC 2050* was also referenced to review and update the roadways within the US 69 study area; and to ensure the future projects and highway improvements were correctly coded in all future year networks to reflect their intended phasing. The US 69 corridor was edited to incorporate the "as-built" configuration of the study corridor and included the configuration and location of ramps, segment lengths and number of travel lanes. Specific opening dates for several of the future background projects within the 2050 MTP for the region were updated based on input from KDOT staff.

Other elements also reviewed in the networks included centroid connections, free flow speeds, link lengths, number of lanes, and link capacities. The updated networks were tested to ensure that all the network characteristics were reasonably incorporated in the model.

5.2.2 Socioeconomic Assumptions

MARC's socioeconomic forecasts adopted by the MARC Board of Directors were developed using information from the 2018 population estimates from the Census Bureau, residential building permit data from the Greater Kansas City Homebuilders Association, the Longitudinal Employer–Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES) employment data from the Census Bureau and the Quarterly Census of Employment and Wages (QCEW) from the U.S. Department of Labor. EBP, an independent subconsultant was contracted to review these socioeconomic factors and update them at the corridor level. The independent socioeconomic assessment was undertaken to evaluate the validity of the current and anticipated growth of population and employment for Johnson County as well as the overall Kansas City Metropolitan Area (which encompasses the regional modeling area) for the years 2019, 2025, 2040 and 2050. The independent socioeconomic review is summarized in **Chapter 4** and the full report from EBP describing the socioeconomic review is included as **Appendix A** to this report.

Another important due diligence review of the MARC socioeconomic database was undertaken by comparing the respective regional and county-level total population and employment forecasts from several other independent sources, including the U.S. Census Bureau and the U.S. Bureau of Labor Statistics. The traffic and toll revenue estimates for the US 69 corridor based on the revised socioeconomics datasets as well as those based on the official MARC forecasts are presented in **Chapter 6**.

5.3 Model Calibration

The screenline counts collected in October and November 2020, the US 69 corridor mainline and ramp counts and the regional daily counts were analyzed, and the travel characteristics for each individual time period used in the model were extracted and summarized where applicable. The traffic data based on this analysis was used as the basis to calibrate and adjust the model parameters as warranted and is summarized in more detail in the following sections.

5.3.1 Traffic Assignment Calibration

Table 5-1 lists the ratios of the model-estimated and observed vehicle-miles-traveled (VMT) along links categorized by area-type (AT) and facility-type (FT) for the daily traffic along the roadway links where traffic data was collected. **Table 5-2** reflects the number of (one-way) model links where traffic count observations were made for each AT and FT category. **Table 5-1** shows that on a 24-hour basis the model-estimated VMT for the overall area-type (row totals) and the facility-type (column totals) categories were within 14 percent of the observed VMT. The overall estimated VMT for the model was within one percent of the observed VMT.

Table 5-3 through **5-12** illustrate the same information for each of the ten individual time periods used in the model as defined earlier in this chapter. **Table 5-13** shows the number of (one-way) model links for which hourly count data was available to support the estimation of VMT ratios for each time period. There were some variations in the VMT ratios for individual time periods along minor arterials, collectors and ramps, however, the overall VMT ratios for the two main facility-type categories, freeways and expressways were within ten percent. It is worth noting that most travel occurs along these two FT categories and they account for a majority of the overall VMT in the region.

Table 5-1 Estimated/Observed VMT Ratios for Daily Traffic

AT\FT	Interstates	Expwys	Minor Art	Principal Art	Collectors	Art Ramps	Fwy Ramps	ALL
CBD Fringe	1.00	1.00	1.01	1.02	1.42	1.07	0.97	1.00
Urban	1.01	1.01	1.00	1.06				1.01
Suburban	1.00	1.00	1.03	1.02	1.01	1.00		1.00
Rural	1.01	1.03	1.63	1.00	1.09	1.01		1.03
ALL	**1.00**	**1.01**	**1.14**	**1.01**	**1.14**	**1.07**	**0.97**	**1.01**

Table 5-2 Number of One-way Links with Counts used in the Estimation of Daily VMT Ratios

AT\FT	Interstates	Expwys	Minor Art	Principal Art	Collectors	Art Ramps	Fwy Ramps	ALL
CBD Fringe	50	20	28	6	4	29	20	157
Urban	8	1	2	6				17
Suburban	38	26	4	11	4	5		88
Rural	28	24	10	5	16	1		84
ALL	**124**	**71**	**44**	**28**	**24**	**35**	**20**	**346**

Table 5-3 Estimated / Observed VMT Ratios for AM1 Peak Period

AT\FT	Interstates	Expwys	Minor Art	Principal Art	Collectors	Art Ramps	Fwy Ramps	ALL
CBD Fringe	0.94	1.10	1.11	1.03	3.07		0.84	1.00
Urban								
Suburban	1.01	1.04	1.42		0.95			1.04
Rural	0.78	1.07	0.98		1.37			0.98
ALL	**0.92**	**1.08**	**1.14**	**1.03**	**1.50**		**0.84**	**1.00**

Table 5-4 Estimated / Observed VMT Ratios for AM2 Peak Period

AT\FT	Interstates	Expwys	Minor Art	Principal Art	Collectors	Art Ramps	Fwy Ramps	ALL
CBD Fringe	0.98	1.03	1.05	1.00	1.76		1.00	1.01
Urban								
Suburban	1.00	1.01	1.43		1.01			1.02
Rural	0.95	1.02	0.98		1.16			1.00
ALL	**0.98**	**1.02**	**1.09**	**1.00**	**1.23**		**1.00**	**1.01**

Table 5-5 Estimated / Observed VMT Ratios for AM3 Peak Period

AT\FT	Interstates	Expwys	Minor Art	Principal Art	Collectors	Art Ramps	Fwy Ramps	ALL
CBD Fringe	1.03	0.97	1.01	1.01	1.26		1.07	1.01
Urban								
Suburban	0.96	1.02	1.01		0.99			1.00
Rural	1.12	1.01	0.99		1.05			1.03
ALL	**1.03**	**0.99**	**1.01**	**1.01**	**1.08**		**1.07**	**1.01**

Table 5-6 Estimated / Observed VMT Ratios for AM4 Peak Period

AT\FT	Interstates	Expwys	Minor Art	Principal Art	Collectors	Art Ramps	Fwy Ramps	ALL
CBD Fringe	1.01	1.02	1.01	1.01	1.36		0.92	1.01
Urban								
Suburban	1.00	1.02	1.01		1.02			1.01
Rural	1.26	1.12	1.00		1.02			1.14
ALL	**1.03**	**1.06**	**1.01**	**1.01**	**1.09**		**0.92**	**1.04**

Table 5-7 Estimated / Observed VMT Ratios for Mid-Day Period

AT\FT	Interstates	Expwys	Minor Art	Principal Art	Collectors	Art Ramps	Fwy Ramps	ALL
CBD Fringe	0.99	1.01	1.02	1.01	1.42		0.93	1.00
Urban								
Suburban	1.00	1.00	1.00		1.02			1.00
Rural	1.02	1.06	1.00		1.02			1.05
ALL	**1.00**	**1.02**	**1.01**	**1.01**	**1.10**		**0.93**	**1.01**

Table 5-8 Estimated / Observed VMT Ratios for PM1 Peak Period

AT\FT	Interstates	Expwys	Minor Art	Principal Art	Collectors	Art Ramps	Fwy Ramps	ALL
CBD Fringe	0.98	1.00	0.99	1.00	1.53		0.97	0.99
Urban								
Suburban	0.98	1.02	0.96		1.02			1.01
Rural	0.98	0.99	0.99		1.06			0.99
ALL	**0.98**	**1.00**	**0.99**	**1.00**	**1.15**		**0.97**	**1.00**

Table 5-9 Estimated / Observed VMT Ratios for PM2 Peak Period

AT\FT	Interstates	Expwys	Minor Art	Principal Art	Collectors	Art Ramps	Fwy Ramps	ALL
CBD Fringe	1.00	1.00	1.00	1.01	1.53		1.09	1.01
Urban								
Suburban	0.98	1.00	1.02		1.01			0.99
Rural	0.97	0.99	0.98		1.24			0.99
ALL	**1.00**	**0.99**	**1.00**	**1.01**	**1.21**		**1.09**	**1.00**

Table 5-10 Estimated / Observed VMT Ratios for PM3 Peak Period

AT\FT	Interstates	Expwys	Minor Art	Principal Art	Collectors	Art Ramps	Fwy Ramps	ALL
CBD Fringe	1.05	1.00	1.00	1.00	1.51		1.15	1.03
Urban								
Suburban	0.98	0.99	1.11		0.98			1.00
Rural	0.99	0.97	1.00		1.31			0.98
ALL	**1.03**	**0.98**	**1.01**	**1.00**	**1.22**		**1.15**	**1.01**

Table 5-11 Estimated / Observed VMT Ratios for PM4 Peak Period

AT\FT	Interstates	Expwys	Minor Art	Principal Art	Collectors	Art Ramps	Fwy Ramps	ALL
CBD Fringe	1.01	1.03	1.01	1.00	1.38		1.12	1.02
Urban								
Suburban	1.08	1.01	1.00		1.02			1.03
Rural	1.04	1.15	0.99		1.07			1.12
ALL	**1.02**	**1.07**	**1.01**	**1.00**	**1.13**		**1.12**	**1.05**

Table 5-12 Estimated / Observed VMT Ratios for Night Period

AT\FT	Interstates	Expwys	Minor Art	Principal Art	Collectors	Art Ramps	Fwy Ramps	ALL
CBD Fringe	0.98	1.00	0.99	1.01	1.29		0.89	0.99
Urban								
Suburban	1.04	0.99	1.02		1.01			1.01
Rural	0.99	1.26	0.99		1.07			1.17
ALL	**0.99**	**1.09**	**0.99**	**1.01**	**1.11**		**0.89**	**1.04**

Table 5-13 Number of One-way Links with Counts used in the Estimation of Time Period VMT Ratios

AT\FT	Interstates	Expwys	Minor Art	Principal Art	Collectors	Art Ramps	Fwy Ramps	ALL
CBD Fringe	10	10	24	2	4		2	52
Urban								
Suburban	2	8	4		4			18
Rural	4	6	2		16			28
ALL	**16**	**24**	**30**	**2**	**24**	**0**	**2**	**98**

In addition to the comparison of the estimated versus observed VMTs, four screenlines were developed along the corridor, as shown in **Figure 5-4**, and complemented with regional spot counts in the study area to analyze the total corridor traffic trends and to compare the base model outputs with the current traffic characteristics within the US 69 corridor. Screenlines 2, 3 and 4 were selected to cross the US 69 corridor while Screenline 1 runs parallel just to the east of US 69.

Table 5-14 shows the comparison between the model estimated volumes and the observed traffic for the four screenlines shown in **Figure 5-4**. The table shows the 24-hour observed traffic counts and the corresponding 24-hour model estimated traffic volumes for each of the individual count locations as well as the total traffic across each screenline. The table also shows the percentage variation in model-assigned volumes as compared to the observed traffic counts. The total estimated screenline volumes are within three percent of the observed counts for all four screenlines, which is well within the acceptable target of +/- ten percent variation. Hence, the overall model calibration based on the total screenline volumes was considered to be reasonable.

Figure 5-4 Screenline Locations

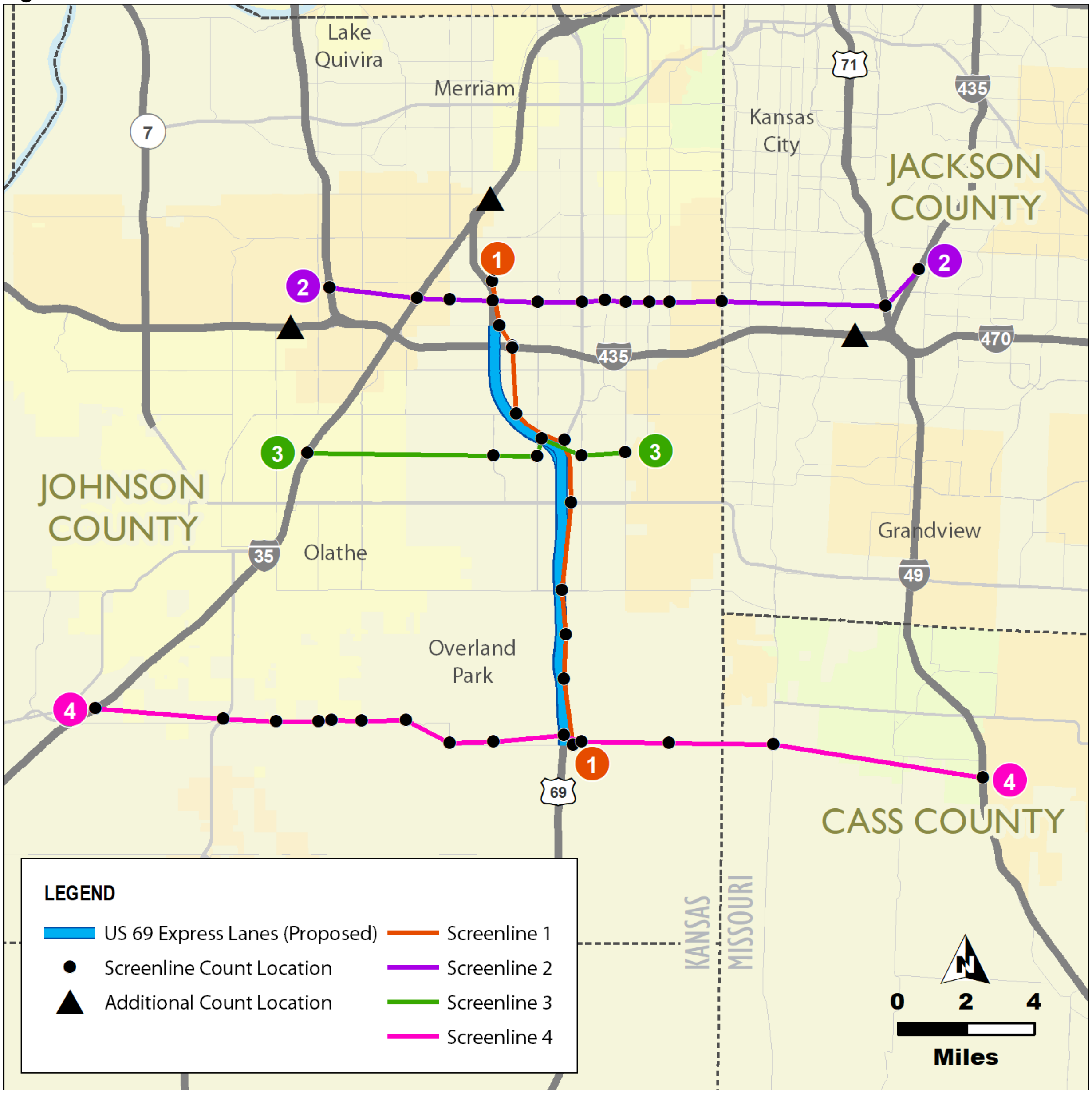


Table 5-14 Observed and Estimated Screenline Volumes

ID	Location Description	2019 Average Weekday Counts	Model Volume	% Difference
Screenline 1: East of US 69				
SC-21	179th Street	4,900	6,000	22.4%
SC-210	103rd Street	17,500	17,500	0.0%
SC-211	95th Street	28,700	28,800	0.3%
SC-22	167th Street	2,800	3,600	28.6%
SC-23	159th Street	26,300	26,700	1.5%
SC-24	151st Street	33,200	33,400	0.6%
SC-26	135th Street	53,900	53,600	-0.6%
SC-27	Blue Valley Parkway	33,500	42,600	27.2%
SC-28	119th Street	27,500	28,200	2.5%
SC-29	I-435	174,400	172,900	-0.9%
Screenline 2 Total:		**402,700**	**413,300**	**2.6%**
Screenline 2: North of IH 435				
SP-7	I-435	83,600	86,700	3.7%
SC-31	I-35	111,000	113,400	2.2%
SC-310	State Line Road	25,400	25,200	-0.8%
SC-32	Quivira Road	18,700	18,700	0.0%
SC-33	US 69	97,700	95,900	-1.8%
SC-34	Antioch Road	18,300	18,100	-1.1%
SC-35	Metcalf Avenue	36,100	36,400	0.8%
SC-36	Lamar Avenue	2,700	4,300	59.3%
SC-38	Roe Avenue	7,800	8,000	2.6%
SP-3	US 71	84,100	84,000	-0.1%
SP-4	I-435	93,800	93,600	-0.2%
Screenline 3 Total:		**579,200**	**584,300**	**0.9%**
Screenline 3: North of 127th Street				
SC-42	I-35	122,900	123,400	0.4%
SC-46	Switzer Road	10,100	14,200	40.6%
SC-47	Antioch Road	21,000	21,000	0.0%
SC-48	US 69	64,900	61,300	-5.5%
SC-49	Metcalf Avenue	16,700	17,800	6.6%
SC-410	Nail Avenue	21,200	20,500	-3.3%
Screenline 4 Total:		**256,800**	**258,200**	**0.5%**
Screenline 4: North of 175th Street				
SP-6	I-35	55,900	55,500	-0.7%
SC-61	US 169	27,000	26,900	-0.4%
SC-610	Metcalf Avenue	4,100	4,300	4.9%
SC-611	Mission Road	1,200	1,300	8.3%
SC-612	Holmes Road	4,900	4,700	-4.1%
SC-62	Ridgeview Road	3,000	3,600	20.0%
SC-63	Renner Road	2,100	2,200	4.8%
SC-65	Lackman Road	3,000	3,200	6.7%
SC-66	Pflumm Road	2,300	2,700	17.4%
SC-67	Quivira Road	1,100	1,200	9.1%
SC-68	Switzer Road	1,900	1,900	0.0%
SC-69	US 69	36,500	36,800	0.8%
SP-5	I-49	49,200	50,200	2.0%
Screenline 6 Total:		**192,200**	**194,500**	**1.2%**

SC-64 is not included because it was not included in the travel demand model

5.3.2 Network Speeds Calibration

The model results were also reviewed to confirm that the congested travel speeds estimated by the model along the US 69 corridor were reasonable. This analysis was performed to ensure that the toll traffic predicted by the model was based on acceptable estimates of speeds and travel times along the corridor. This was an essential part of the model calibration since the level of congestion in the corridor is the primary reason for diversion of traffic to the express lanes. **Figure 5-5** shows the location of the various routes where the speed and delay data were collected.

Tables 5-15 through **5-17** summarize the model estimated and observed travel speeds for the US 69 corridor as well as other parallel routes within the study area (as shown in **Figure 5-5**) for the AM peak hour (7:00 am - 8:00 am), Mid-Day (9:00 am – 3:00 pm) and the PM peak hour (5:00 pm - 6:00 pm) respectively. The AM and the PM peak hours represent the time periods during which the peak traffic congestion occurs under the existing conditions in the morning and the evening peak periods. The tables highlight the range of observed travel speeds (minimum and maximum) along with the average observed travel speeds and the model-estimated average travel speeds along each segment by direction for each of the three time periods. The tables also provide detailed speed comparison along the US 69 main lanes for each segment between major roadways. In most instances, the model-estimated average speeds are within +/- ten miles per hour (mph) of the observed values. The level of calibration of travel speeds was deemed reasonable given the fact that the travel demand models do not inherently have the capability to directly model freeway traffic operations phenomena such as queue spillbacks, flow metering at bottlenecks, and delays associated with weaving movements. The models also do not explicitly include the delays associated with stop signs and signalized intersections along arterials.

Figure 5-5 Location of Speed and Delay Routes

Table 5-15 Observed and Estimated Travel Speeds During the AM Peak Hour – 7:00 am to 8:00 am

Corridor	Direction	From	To	Observed			Estimated	Difference
				Min	Max	Average		
US 69	NB	199th Street	179th Street	45	79	71	70	-1
US 69	NB	179th Street	151st Street	15	74	57	68	11
US 69	NB	151st Street	Blue Valley Parkway	14	67	30	21	-9
US 69	NB	Blue Valley Parkway	I-435	30	68	57	53	-4
US 69	NB	I-435	103rd Street	38	70	58	45	-12
US 69	NB	103rd Street	I-35	43	71	64	65	1
US 69	SB	I-35	103rd Street	40	69	63	65	2
US 69	SB	103rd Street	I-435	40	72	65	65	-1
US 69	SB	I-435	Blue Valley Parkway	47	68	63	63	0
US 69	SB	Blue Valley Parkway	151st Street	30	69	61	65	4
US 69	SB	151st Street	179th Street	42	71	66	68	3
US 69	SB	179th Street	199th Street	56	74	68	70	-2
Antioch Road	NB	179th Street	151st Street	22	35	29	28	-1
Antioch Road	NB	151st Street	135th Street	17	34	26	16	-10
Antioch Road	NB	135th Street	127th Street	18	31	25	28	3
Antioch Road	NB	127th Street	I-435	26	39	35	29	-5
Antioch Road	NB	I-435	95th Street	25	36	32	42	10
Antioch Road	SB	95th Street	I-435	30	34	32	22	-10
Antioch Road	SB	I-435	127th Street	19	37	32	24	-8
Antioch Road	SB	127th Street	135th Street	13	37	28	30	2
Antioch Road	SB	135th Street	151st Street	11	38	22	34	12
Antioch Road	SB	151st Street	179th Street	26	38	33	42	9
Metcalf Avenue	NB	US 69	I-435	18	41	34	29	-5
Blue Valley Parkway	NB	I-435	95th Street	25	36	31	23	-8
Metcalf Avenue	SB	95th Street	I-435	17	40	31	26	-5
Blue Valley Parkway	SB	I-435	US 69	19	45	33	21	-13
Metcalf Avenue	NB	179th Street	151st Street	20	38	30	28	-1
Metcalf Avenue	NB	151st Street	135th Street	31	38	34	23	-11
Metcalf Avenue	NB	135th Street	127th Street	24	42	31	20	-11
Metcalf Avenue	NB	127th Street	Blue Valley Parkway	28	48	35	42	7
Metcalf Avenue	SB	Blue Valley Parkway	127th Street	12	31	21	25	4
Metcalf Avenue	SB	127th Street	135th Street	31	36	34	30	-4
Metcalf Avenue	SB	135th Street	151st Street	27	40	36	34	-1
Metcalf Avenue	SB	151st Street	179th Street	33	47	39	42	3

Table 5-16 Observed and Estimated Travel Speeds During Mid-Day – 9:00 am to 3:00 pm

Corridor	Direction	From	To	Observed			Estimated	Difference
				Min	Max	Average		
US 69	NB	199th Street	179th Street	45	75	69	70	1
US 69	NB	179th Street	151st Street	22	73	67	68	2
US 69	NB	151st Street	Blue Valley Parkway	32	71	64	64	1
US 69	NB	Blue Valley Parkway	I-435	13	70	64	65	0
US 69	NB	I-435	103rd Street	35	77	61	64	3
US 69	NB	103rd Street	I-35	46	72	64	65	1
US 69	SB	I-35	103rd Street	44	71	65	65	0
US 69	SB	103rd Street	I-435	34	73	66	65	-1
US 69	SB	I-435	Blue Valley Parkway	43	70	64	65	1
US 69	SB	Blue Valley Parkway	151st Street	5	71	56	65	9
US 69	SB	151st Street	179th Street	39	72	66	68	2
US 69	SB	179th Street	199th Street	21	75	67	70	-3
Antioch Road	NB	179th Street	151st Street	1	42	28	27	-0
Antioch Road	NB	151st Street	135th Street	9	42	29	25	-5
Antioch Road	NB	135th Street	127th Street	11	42	33	29	-4
Antioch Road	NB	127th Street	I-435	7	42	32	34	2
Antioch Road	NB	I-435	95th Street	8	41	30	42	12
Antioch Road	SB	95th Street	I-435	6	38	27	27	-0
Antioch Road	SB	I-435	127th Street	7	42	29	25	-4
Antioch Road	SB	127th Street	135th Street	10	41	29	29	0
Antioch Road	SB	135th Street	151st Street	8	42	31	33	3
Antioch Road	SB	151st Street	179th Street	10	42	30	42	12
Metcalf Avenue	NB	US 69	I-435	8	48	31	27	-3
Blue Valley Parkway	NB	I-435	95th Street	17	48	32	29	-2
Metcalf Avenue	SB	95th Street	I-435	7	45	30	28	-2
Blue Valley Parkway	SB	I-435	US 69	9	45	30	29	-1
Metcalf Avenue	NB	179th Street	151st Street	5	44	25	28	4
Metcalf Avenue	NB	151st Street	135th Street	13	45	33	30	-3
Metcalf Avenue	NB	135th Street	127th Street	5	42	29	33	4
Metcalf Avenue	NB	127th Street	Blue Valley Parkway	11	51	36	42	6
Metcalf Avenue	SB	Blue Valley Parkway	127th Street	8	40	22	28	7
Metcalf Avenue	SB	127th Street	135th Street	7	40	30	30	-1
Metcalf Avenue	SB	135th Street	151st Street	4	42	28	34	5
Metcalf Avenue	SB	151st Street	179th Street	6	47	36	42	6

Table 5-17 Observed and Estimated Travel Speeds during the PM Peak Hour – 5:00 pm to 6:00 pm

Corridor	Direction	From	To	Observed			Estimated	Difference
				Min	Max	Average		
US 69	NB	199th Street	179th Street	57	78	70	70	0
US 69	NB	179th Street	151st Street	56	73	66	68	2
US 69	NB	151st Street	Blue Valley Parkway	27	70	62	59	-3
US 69	NB	Blue Valley Parkway	I-435	14	70	45	45	-1
US 69	NB	I-435	103rd Street	18	69	42	41	-1
US 69	NB	103rd Street	I-35	43	70	61	65	4
US 69	SB	I-35	103rd Street	15	71	61	63	2
US 69	SB	103rd Street	I-435	5	71	52	63	11
US 69	SB	I-435	Blue Valley Parkway	5	65	32	47	15
US 69	SB	Blue Valley Parkway	151st Street	7	66	41	41	-0
US 69	SB	151st Street	179th Street	39	73	66	67	2
US 69	SB	179th Street	199th Street	57	75	70	70	0
Antioch Road	NB	179th Street	151st Street	12	36	26	18	-8
Antioch Road	NB	151st Street	135th Street	5	41	25	17	-8
Antioch Road	NB	135th Street	127th Street	10	39	25	27	2
Antioch Road	NB	127th Street	I-435	7	39	25	25	-1
Antioch Road	NB	I-435	95th Street	13	36	26	41	15
Antioch Road	SB	95th Street	I-435	8	35	24	17	-7
Antioch Road	SB	I-435	127th Street	8	43	26	12	-14
Antioch Road	SB	127th Street	135th Street	8	39	26	19	-7
Antioch Road	SB	135th Street	151st Street	9	41	27	23	-4
Antioch Road	SB	151st Street	179th Street	16	40	28	42	14
Metcalf Avenue	NB	US 69	I-435	11	44	31	20	-11
Blue Valley Parkway	NB	I-435	95th Street	10	40	29	18	-11
Metcalf Avenue	SB	95th Street	I-435	5	43	27	21	-6
Blue Valley Parkway	SB	I-435	US 69	12	43	27	16	-11
Metcalf Avenue	NB	179th Street	151st Street	3	36	20	22	2
Metcalf Avenue	NB	151st Street	135th Street	10	41	29	29	-0
Metcalf Avenue	NB	135th Street	127th Street	7	40	25	20	-4
Metcalf Avenue	NB	127th Street	Blue Valley Parkway	20	49	33	39	7
Metcalf Avenue	SB	Blue Valley Parkway	127th Street	5	38	20	15	-4
Metcalf Avenue	SB	127th Street	135th Street	11	39	27	17	-10
Metcalf Avenue	SB	135th Street	151st Street	9	39	24	20	-4
Metcalf Avenue	SB	151st Street	179th Street	8	48	34	34	-0

5.4 Travel Time Reliability Coefficients

The travel time reliability coefficients were incorporated into the travel demand model based on an analysis of historical speed data from *NPMRDS* along the US 69 general purpose lanes. *NPMRDS* speed data was analyzed using hourly data from February through April 2019, and a measure of travel time variability – or "unreliability" – was estimated by directional segments along the US 69 study corridor, for each of the ten time periods used in the model. A coefficient-of-variability (CV) was estimated as shown in the formula below:

$$CV = \frac{Std\ Deviation\ of\ Travel\ Time}{Average\ Travel\ Time}$$

Since travel time frequency distributions tend to be skewed toward the free flow travel time, the average travel time is often close to the normal congested travel time, while the magnitude of the standard deviation is sensitive to the relative distribution of higher-than-average travel times that occur in the corridor. The CV ratio is thus a coefficient with a value greater than or equal to 1.0 and is used to increase GP lane congested travel times to account for measured reliability effects.

Table 5-18 and **5-19** show the range of CV values used on the GP lane segments along the US 69 study corridor in the northbound and the southbound direction, respectively, based on an analysis of the *NPMRDS* speed data.

Table 5-18 Values of Coefficient-of-Variation (CV) by Time Period – US 69 Northbound

From	To	AM1	AM2	AM3	AM4	MD	PM1	PM2	PM3	PM4	NT
199th Street	179th Street	1.09	1.12	1.09	1.07	1.00	1.03	1.04	1.04	1.07	1.00
179th Street	151st Street	1.09	1.12	1.19	1.09	1.00	1.03	1.09	1.04	1.07	1.00
151st Street	Blue Valley Parkway	1.12	1.13	1.29	1.33	1.00	1.22	1.08	1.06	1.06	1.00
Blue Valley Parkway	I-435	1.11	1.11	1.11	1.12	1.00	1.16	1.23	1.34	1.07	1.00
I-435	103rd Street	1.12	1.11	1.09	1.07	1.00	1.13	1.14	1.13	1.08	1.00
103rd Street	I-35	1.14	1.10	1.09	1.09	1.00	1.06	1.06	1.06	1.07	1.00

Reliability coefficients were not applied to the MD and NT periods.

Table 5-19 Values of Coefficient-of-Variation (CV) by Time Period – US 69 Southbound

From	To	AM1	AM2	AM3	AM4	MD	PM1	PM2	PM3	PM4	NT
I-35	103rd Street	1.08	1.09	1.09	1.08	1.00	1.07	1.28	1.40	1.05	1.00
103rd Street	I-435	1.10	1.11	1.10	1.07	1.00	1.06	1.05	1.05	1.06	1.00
I-435	Blue Valley Parkway	1.08	1.10	1.06	1.06	1.00	1.74	2.13	1.83	1.98	1.00
Blue Valley Parkway	151st Street	1.07	1.10	1.19	1.16	1.00	1.69	1.78	1.65	1.56	1.00
151st Street	179th Street	1.06	1.07	1.06	1.19	1.00	1.07	1.05	1.05	1.09	1.00
179th Street	199th Street	1.07	1.10	1.04	1.08	1.00	1.07	1.05	1.04	1.08	1.00

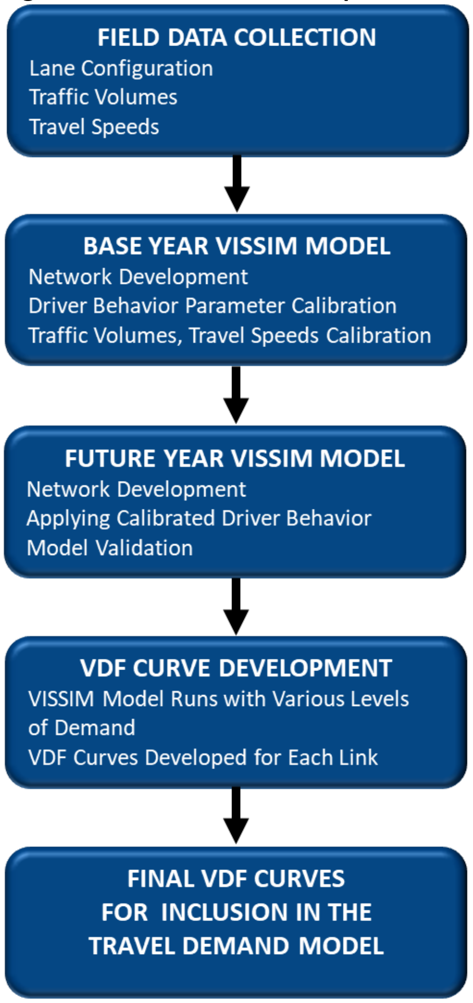
Reliability coefficients were not applied to the MD and NT periods.

5.5 Travel Time Simulation Model (VISSIM)

Travel demand model volume-delay functions (VDFs) and roadway segment capacities typically do not adequately replicate the impacts of merging and weaving maneuvers on the freeway operating speeds and capacity, and nor can they reflect the impacts of downstream queuing along the freeway segments, or the flow metering effects of bottlenecks along the corridor. A microscopic simulation modeling software package called VISSIM was used to assist in estimating the impacts of travel speeds on different segments of the US 69 study corridor, taking into consideration the existing geometric configuration of the corridor and the future configuration that included the proposed express lanes. The VISSIM model attempts to evaluate each vehicle as a separate entity and introduces a certain level of randomness to the vehicles' behavior. The roadway geometry and interaction with other vehicles influences the behavior of each vehicle in the model and provides a profile of the delay characteristics that each link is likely to exhibit as demand builds along the various corridor segments.

Figure 5-6 depicts the VISSIM modeling process and reflects the field data collection, base-year model calibration, future-year VISSIM model development, and the VISSIM model runs used to create VDFs for various segments of the US 69 corridor. The development of the base year model required the current geometric configuration of the US 69 study corridor, the existing traffic volume at each of the entrance and exit ramps, and the current travel speed profiles along the US 69 general purpose lanes.

Figure 5-6 VDF Curves Development Process using VISSIM Simulation Model



The base-year VISSIM network was created by coding the roadway network into the VISSIM model using aerial photographs as the background image and included the number of lanes, location of the auxiliary lanes, and lane drops. The 2019 balanced traffic volume summary was used as an input to the VISSIM model which was calibrated to reflect the traffic characteristics within the corridor for both the AM and the PM peak periods. The traffic volumes and travel speeds generated from the VISSIM model were then compared to the observed data to ensure that the base year VISSIM model adequately reflected the actual traffic conditions.

Future year VISSIM models were developed based on the design files of the future roadway configuration and were used to model the future corridor travel characteristics. Traffic growth rates from the travel demand model were applied to the existing demand and used as an input to the VISSIM simulation models and the results were reviewed to ensure that the models were performing reasonably. A series of VISSIM model runs were performed using differing levels of traffic demand by diverting more traffic from the express lanes to the GP lanes for the AM and the PM peak periods resulting in the development of speed-flow relationships also known as VDF curves for individual highway segments. Several model runs were performed for each peak period by direction of travel along the US 69 corridor. Within each time period, and for each link, a relationship was developed between the traffic demand on each link and the model estimated travel speed. Specific VDF curves were developed for each link along the GP lanes by plotting the relationship between traffic demand and travel speed for the various model runs at different demand levels for each GP lane segment. These volume-delay curves were used within the travel demand model to estimate congestion and traffic assignment was performed using the VDF curves to generate the final set of traffic and toll revenue forecasts.

5.6 Market Share Model

A market share model was embedded within the traffic assignment routine used in the travel demand model to provide an estimate of the traffic and toll revenue forecasts for the express lanes along the US 69 study corridor. The travel time between a path using the express lanes is compared to the travel time along a path using the next best non-toll route (most likely the adjacent GP lanes). For each travel movement, the proportion of motorists expected to use the express lanes was a function of the computed time savings, including the additional impact of the CV and VDF curves as described in **Section 5.4** and **5.5,** and the cost to use the lanes (cost-per-minute saved) versus the value placed on time savings by the motorist (value-of-time or VOT). The share of each traffic movement assigned to the express lanes was based on the estimated distribution of VOT developed from the stated preference surveys of travelers using the US 69 corridor. Motorists with VOTs greater than the cost per minute saved were more likely to choose the express lanes while those with lower VOTs tended to not choose the express lane facility. The choice to use the express lanes along the US 69 corridor is also dependent on the origin-destination patterns of the travelers given that the express lanes will serve travelers whose travel patterns allow them to access the express lanes through the limited number of access locations that are provided along the proposed US 69 express lanes.

5.6.1 Key Parameters

Some of the key parameters that significantly influence the traffic and toll revenue forecasts for the proposed express lanes along the US 69 corridor are:

Value-of-Time – The VOTs used in this study were based on an analysis of the responses provided in the stated preference (SP) survey of the users of US 69 conducted within the corridor in early 2021. Further details regarding the VOT values used in the models are provided in **Appendix B**.

Value-of-Reliability – VORs used in this study were also based on an analysis of the responses provided in the SP survey of the users of US 69. The VOR was estimated to be approximately 60 percent of the VOT. Hence, the CV values applied to the travel time savings to account for the reliability provided by the proposed express lanes (as shown in **Tables 5-18** and **5-19**) were reduced by 40 percent in the models when estimating the diversion of traffic to the express lanes.

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Chapter 6

Traffic and Toll Revenue Estimates

This chapter presents the traffic and toll revenue estimates for the proposed express lanes along the US 69 corridor located in Johnson County, Kansas. These estimates are based on the future configuration of the US 69 corridor described in **Chapter 1,** the historical and existing traffic trends and characteristics as summarized in **Chapter 2**, the background transportation system and anticipated future improvements as discussed in **Chapter 3**, the socioeconomic and demographic trends as highlighted in **Chapter 4,** and the travel demand models and modeling procedures as outlined in **Chapter 5**. The assumptions used in the development of the traffic and toll revenue forecasts, the specific details on the estimated travel time savings, and the share of traffic demand estimated to use the express lanes are also described and summarized herein for the Phase 1 Base Case and Phase 2 scenarios. The resulting transactions and toll revenue estimates developed for a 40-year forecast horizon for the proposed US 69 express lanes are then summarized.

The future toll revenue potential of the US 69 express lanes corridor was evaluated for a Phase 1 Base Case scenario and a Phase 2 scenario for two assumed strategies: (1) Using the official socioeconomic data provided by the MARC, herein referred to as "MARC Phase 1 Base Case" and "MARC Phase 2" and (2) Using the MARC socioeconomic data independently reviewed and updated by EBP, herein referred to as "EBP Phase 1 Base Case" and "EBP Phase 2".

6.1 Project Configuration and Toll Collection

The configuration of the Phase 1 Base Case and Phase 2 along with the preliminary toll gantry locations/toll collection points used in the travel demand model is discussed in this section.

6.1.1 Project Configuration

The US 69 study corridor is approximately 10.5 miles long and currently includes two general-purpose lanes in each direction between 103rd Street and 179th Street. This section of US 69 falls entirely within Johnson County, runs parallel to US 169 and somewhat parallel to I-35, which runs diagonally across Johnson County from southwest to northeast, until they merge a few miles north of the US 69/I-435 interchange. No other interstate intersects the US 69 study corridor, however, the corridor intersects with several major arterials including College Avenue, 119th Street, 135th Street, and 151st Street. Metcalf Avenue and Antioch Avenue are other major arterials running parallel to US 69 a half-mile on either side of the corridor.

The proposed US 69 express lanes will include a single inside lane along the corridor in both directions. The Phase 1 Base Case express lanes are assumed to open in 2026 and the will extend from north of 151st Street to just north of 103rd Street with an ingress/egress location just north of Blue Valley Parkway. The corridor enhancements will also include an additional GP lane between 151st and Blue Valley Parkway and changes to the ramp configuration at 135th Street. The Phase 2 configuration is assumed to open in 2040 will maintain the Phase 1 enhancements and will extend the express lanes from 151st Street to 179th Street. **Figure 6-1** through **6-4** show the proposed configuration of the US 69 express lanes for the Phase 1 Base Case and Phase 2, respectively.

Figure 6-1 US 69 Study Corridor – Express Lanes Phase 1 Base Case Configuration (103rd Street to Blue Valley Parkway)

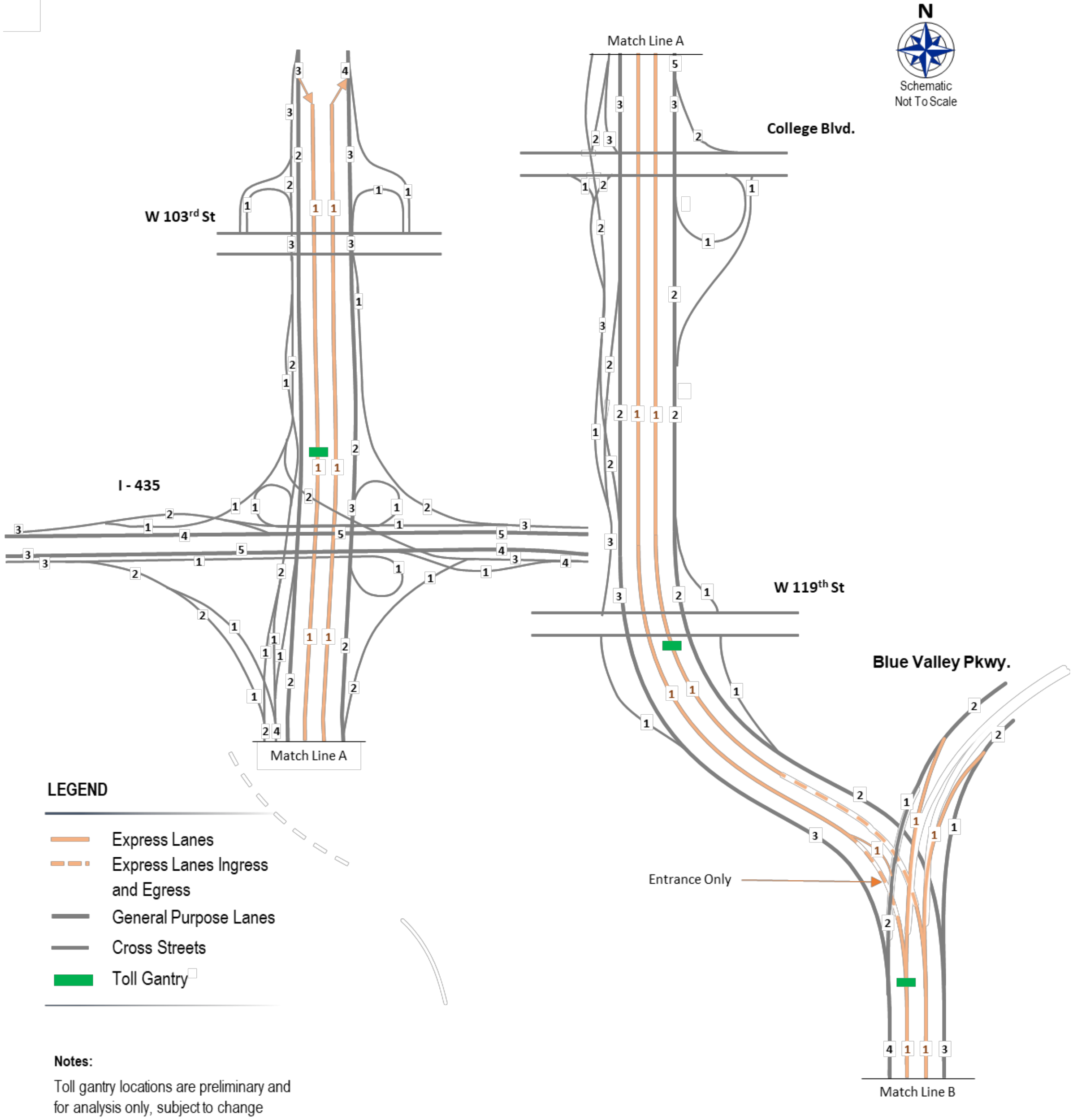


Figure 6-2 US 69 Study Corridor – Express Lanes Phase 1 Base Case Configuration (135th Street to 151st Street)

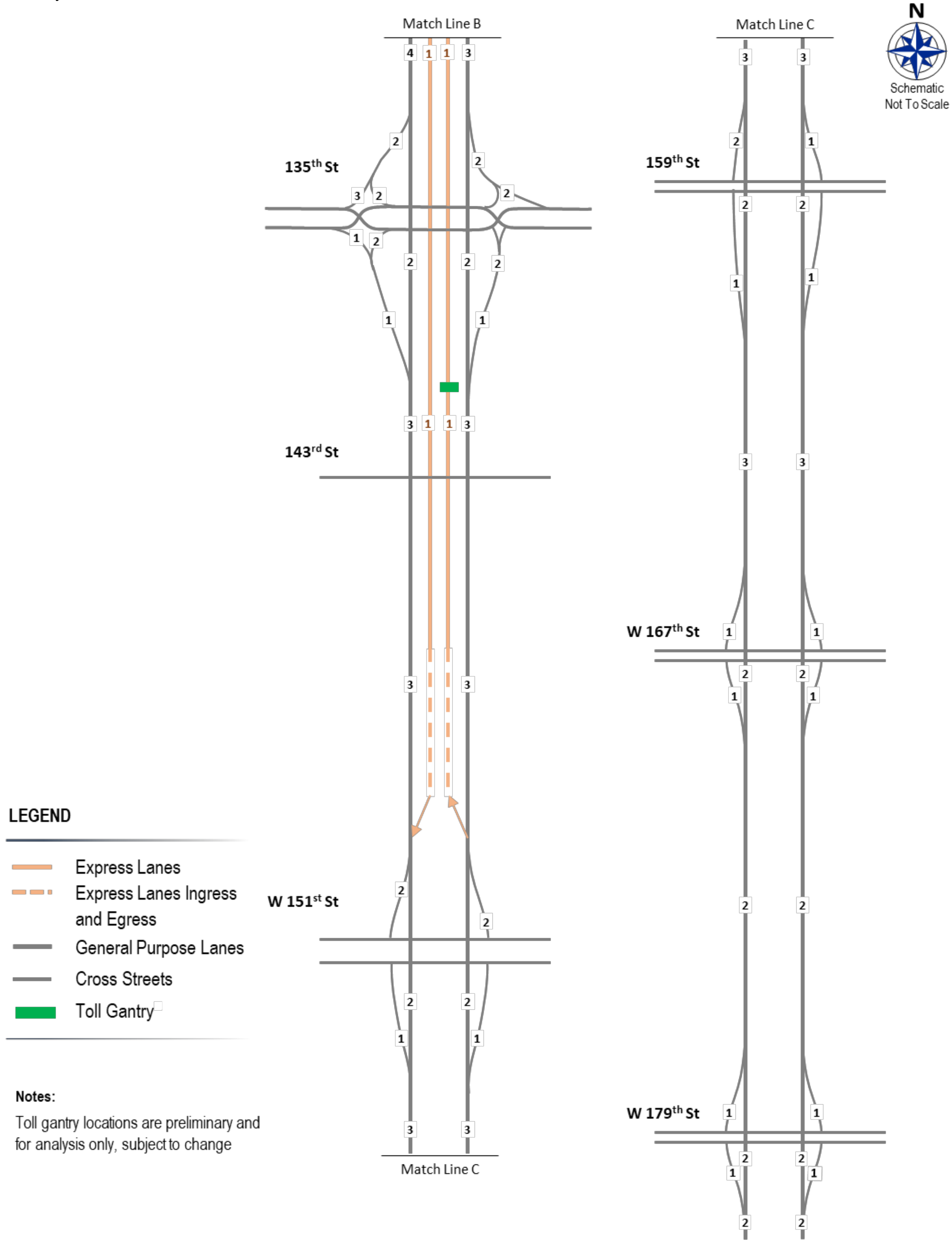


Figure 6-3 US 69 Study Corridor – Express Lanes Phase 2 Configuration (103rd Street to Blue Valley Parkway)

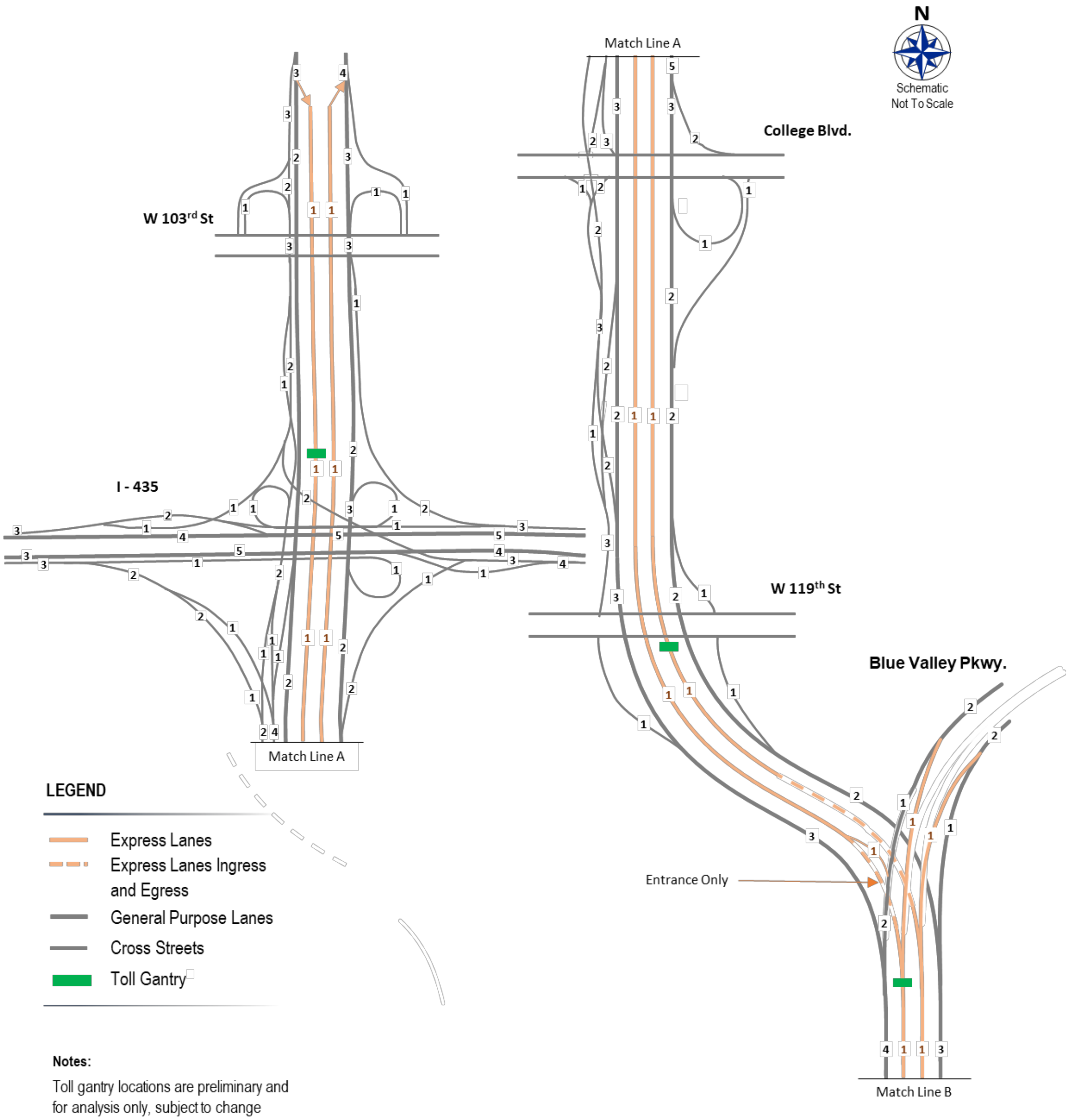
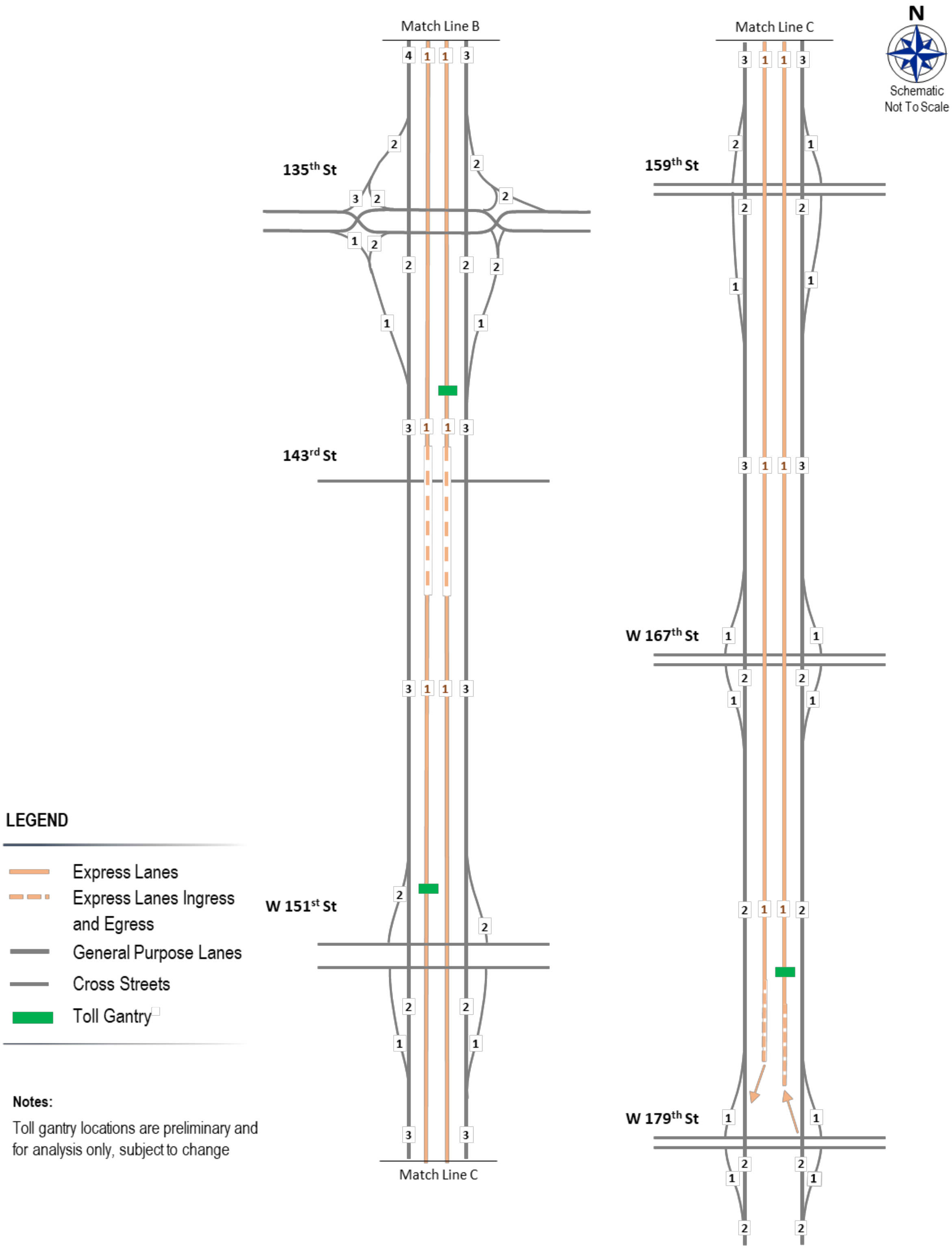


Figure 6-4 US 69 Study Corridor – Express Lanes Phase 2 Configuration (135th Street to 179th Street)



6.1.2 Toll Gantry Locations and Toll Collection

The toll configuration for the study corridor is based on a tolling zone concept where the entire express lanes corridor is divided into three zones with a single toll gantry located within each zone facilitating the implementation of a real-time variable tolling regime along the US 69 express lanes corridor. Each zone consists of a minimum of one express lane ingress and one egress location such that variable tolling is implemented independently within each zone. Under this tolling scheme, users of the express lanes can use the lane on an individual tolling zone basis and can decide whether or not to use the next tolling zone based on the toll rate being charged at the moment they approach the downstream zone. The toll rates fluctuate dynamically based on the traffic demand within the corridor. The toll rates charged are communicated to the drivers through variable message signs in advance of each upcoming tolling zone. This provides an opportunity for users to exit the express lanes if the toll rates for the downstream tolling zone are deemed to be too high. Similarly, the GP lane traffic can also enter the express lanes at any tolling zone if the toll rate charged for that zone is acceptable with respect to the perceived time savings benefit from using the express lanes based on the congestion levels that is experienced in the GP lanes.

The tolling concept evaluated is comprised of a toll gantry in each direction located between 179th Street and 151st Street (Phase 2 only), between 151st Street and Blue Valley Parkway, and between Blue Valley Parkway and 103rd Street as shown in **Figure 6-1** through **6-4**.

Details regarding the assumed toll collection policy are outlined in **Section 6.3**. The toll rates charged for trucks will be based on an (N-1) tolling formula where 'N' is number of axles, such that the toll rates charged to trucks equates to the number of axles minus one, multiplied by the toll rate for passenger cars. In addition, a 50 percent surcharge for video tolling/Pay-by-Plate (PBP) customers was assumed for all vehicles without a valid K-TAG or other interoperable transponder.

6.2 Traffic and Toll Revenue Assumptions

The 40-year traffic and toll revenue estimates for the US 69 corridor were developed based on the following additional basic assumptions:

- The tolls will be collected using automatic vehicle identification (AVI) for vehicles equipped with toll transponders and video tolling (PBM) for vehicles without toll transponders, and there will be no provision for cash tolls. The toll collection operations were assumed to be actively monitored and strictly enforced to minimize the potential revenue loss due to toll evasion.
- The video tolling surcharge will be 50 percent of the transponder toll charge.
- The starting transponder market share for the express lane users was assumed to be 50 percent in 2026, increasing to a maximum market share of 75 percent by 2050 which was assumed to remain constant for all years thereafter.
- No toll leakage adjustments were applied to the toll revenue estimates included in this report. The traffic and toll revenue results therefore reflect **gross** toll revenues which is the sum of transponder and video base revenues on 100 percent of all forecasted vehicles using the express lanes. Video surcharge revenue is included in the total toll revenue shown in the

tables. It was assumed that toll leakage will be incorporated directly in the financial models to align with the collection business rules adopted at a later date.

- Transportation improvements as detailed in the *Connected KC 2050* (MARC 2050) Metropolitan Transportation Plan (MTP) for the Kansas City region adopted in June 2020 by MARC were reviewed and discussed with KDOT for inclusion in the model networks. No other competing routes or capacity improvements were considered to be constructed within the 40-year forecast horizon and no additional GP lane capacity expansions, outside those proposed in Connected KC 2050 described herein, were considered along the study corridor.
- The minimum per mile toll rate was assumed to be 10 cents in 2021 dollars and was escalated at one percent per year applied annually.
- The US 69 express lanes will be well maintained, efficiently operated, and effectively signed and promoted to encourage maximum usage.
- The annualization factor for transactions and toll revenue (transaction and revenue days) for the US 69 corridor were assumed to be 280 days and 265 days, respectively. The weekend revenue reduction was undertaken to reflect the reduced and more evenly distributed weekend demand profiles resulting in lower traffic congestion during the weekends and thus yielding reduced toll rates and lower traffic levels for the express lanes compared to the typical weekday.
- Commercial vehicles/trucks with more than two-axles will be allowed to use the express lanes. However, truck trip tables were not available directly from the MARC models. A post model adjustment was thus made which assumed a two percent truck usage on the express lanes. Trucks were assumed to pay an average of three times the auto toll rate as derived from the average truck-axle distribution along the corridor.
- Estimates of transactions and toll revenue included in this report were adjusted to reflect "ramp-up" during the early years of operation. The ramp-up volume was assumed to be 90 percent of the model estimate in 2026, 95 percent in 2027 and 100 percent in 2028 and for all subsequent years under the Base Case (the segment between 103rd Street to 151st Street). For the section between 151st Street and 179th Street (Phase 2) assumed to open in 2040, the ramp-up was assumed to be 90 percent in 2040, 95 percent in 2041 and 100 percent in 2042 and for all subsequent years.
- High occupancy vehicles (HOV 2+) will not receive discounts. However emergency vehicles and first responders will be allowed to access the express lanes toll-free.
- Toll rates for the years beyond the model horizon year of 2050 were determined based on growth trends between the model years and congestion pricing to maintain the desired minimum speed of 50 mph.
- The express lanes' traffic growth rate is based on the model forecasted growth up to the year 2050 and extrapolated beyond 2050 based on the estimated growth trends between the model years.

- The value-of-time (VOT) and vehicle operating cost were escalated at an average rate of 2.0 percent per year for the forecast period based on an economic analysis of the region. The VOT values were obtained from a stated preference (SP) survey undertaken in early 2021 as described in **Appendix B**.
- Economic growth in the study corridor is based upon data provided by the MARC and the revised socioeconomic projections and growth patterns (by EBP) as described in **Chapter 4** and included as **Appendix A**.
- Motor fuel and any other source of power for operating the motor vehicles will remain in adequate supply and increases in price will not substantially exceed overall inflation over the long-term.
- No local, regional, or national emergency will arise that may abnormally restrict the use of motor vehicles.
- No change will occur in vehicle technology that will significantly affect the vehicle carrying capacity or vehicle operating speeds.

Any significant departure from the above assumptions will materially affect the reported traffic and toll revenue estimates for the US 69 express lanes study corridor.

6.3 Toll Rates

Unlike a typical toll road, express lanes are located within the median of an existing corridor and are aligned to operate next to the GP lanes that provide direct competition as a non-toll option. Because of this design configuration, the express lanes' traffic and toll revenue has a high degree of sensitivity to the operating conditions along the GP lanes. Typically, as toll rates in the express lanes are reduced, a higher share of the GP lane users choose to use the express lanes. The resulting reduction in traffic on the GP lanes then decreases congestion in these lanes. However, as congestion decreases in the GP lanes, the travel time savings associated with the express lanes also decreases, resulting in reduced use of the express lanes. This series of trade-offs continues until an equilibrium is reached between the operating conditions along the GP lanes, the express lanes, and the toll rates charged for the use of express lanes.

Table 6-1 through **6-4** show the nominal tolls along the corridor for the AM and the PM peak hour for each travel direction in 2026, 2040 and 2050 under each of the configuration and socioeconomic growth scenarios analyzed for the proposed US 69 express lanes.

The toll rates beyond 2050 were escalated based on the inflation rate (CPI of 1.0 percent annually). Additional toll rate growth to reflect equivalent congestion pricing was applied if the express lanes service flow speed dropped below 50 mph to ensure an acceptable level-of-service along the express lanes. The minimum toll rates were escalated at 1.0 percent per year.

Table 6-1 Estimated Nominal Tolls at Individual Toll Gantries for EBP Phase 1 Base Case

Gantry		Between 103rd Street and Blue Valley Parkway	Between Blue Valley Parkway and 151st Street
AM Peak Hour (7:00 AM - 8:00 AM)			
2026	NB	$0.40	$0.80
	SB	$0.35	$0.30
2040	NB	$0.75	$1.40
	SB	$0.40	$0.35
2050	NB	$0.85	$2.10
	SB	$0.45	$0.40
PM Peak Hour (5:00 PM – 6:00 PM)			
2026	NB	$0.35	$0.40
	SB	$0.35	$0.75
2040	NB	$0.40	$0.55
	SB	$0.40	$1.50
2050	NB	$0.45	$0.55
	SB	$0.45	$2.15

Table 6-2 Estimated Nominal Tolls at Individual Toll Gantries for MARC Phase 1 Base Case

Gantry		Between 103rd Street and Blue Valley Parkway	Between Blue Valley Parkway and 151st Street
AM Peak Hour (7:00 AM - 8:00 AM)			
2026	NB	$0.40	$0.80
	SB	$0.35	$0.30
2040	NB	$0.75	$3.00
	SB	$0.40	$0.35
2050	NB	$1.80	$4.70
	SB	$0.45	$0.40
PM Peak Hour (5:00 PM – 6:00 PM)			
2026	NB	$0.35	$0.40
	SB	$0.35	$0.75
2040	NB	$0.40	$0.55
	SB	$0.40	$3.00
2050	NB	$0.65	$0.55
	SB	$0.45	$4.65

Table 6-3 Estimated Nominal Tolls at Individual Toll Gantries for EBP Phase 2

Gantry		Between 103rd Street and Blue Valley Parkway	Between Blue Valley Parkway and 151st Street	Between 151st Street and 179th Street
AM Peak Hour (7:00 AM - 8:00 AM)				
2026	NB	\$0.40	\$0.80	
	SB	\$0.35	\$0.30	
2040	NB	\$0.75	\$1.40	\$0.55
	SB	\$0.40	\$0.35	\$0.55
2050	NB	\$0.85	\$2.50	\$0.60
	SB	\$0.45	\$0.40	\$0.60
PM Peak Hour (5:00 PM – 6:00 PM)				
2026	NB	\$0.35	\$0.40	
	SB	\$0.35	\$0.75	
2040	NB	\$0.40	\$0.55	\$0.55
	SB	\$0.40	\$1.50	\$0.55
2050	NB	\$0.45	\$0.55	\$0.60
	SB	\$0.45	\$2.70	\$0.60

Table 6-4 Estimated Nominal Tolls at Individual Toll Gantries for MARC Phase 2

Gantry		Between 103rd Street and Blue Valley Parkway	Between Blue Valley Parkway and 151st Street	Between 151st Street and 179th Street
AM Peak Hour (7:00 AM - 8:00 AM)				
2026	NB	\$0.40	\$0.80	
	SB	\$0.35	\$0.30	
2040	NB	\$0.75	\$2.60	\$1.50
	SB	\$0.40	\$0.35	\$0.55
2050	NB	\$1.20	\$4.00	\$2.50
	SB	\$0.45	\$0.40	\$0.60
PM Peak Hour (5:00 PM – 6:00 PM)				
2026	NB	\$0.35	\$0.40	
	SB	\$0.35	\$0.75	
2040	NB	\$0.40	\$0.55	\$0.55
	SB	\$0.40	\$3.10	\$0.55
2050	NB	\$0.65	\$0.55	\$0.60
	SB	\$0.45	\$5.60	\$0.60

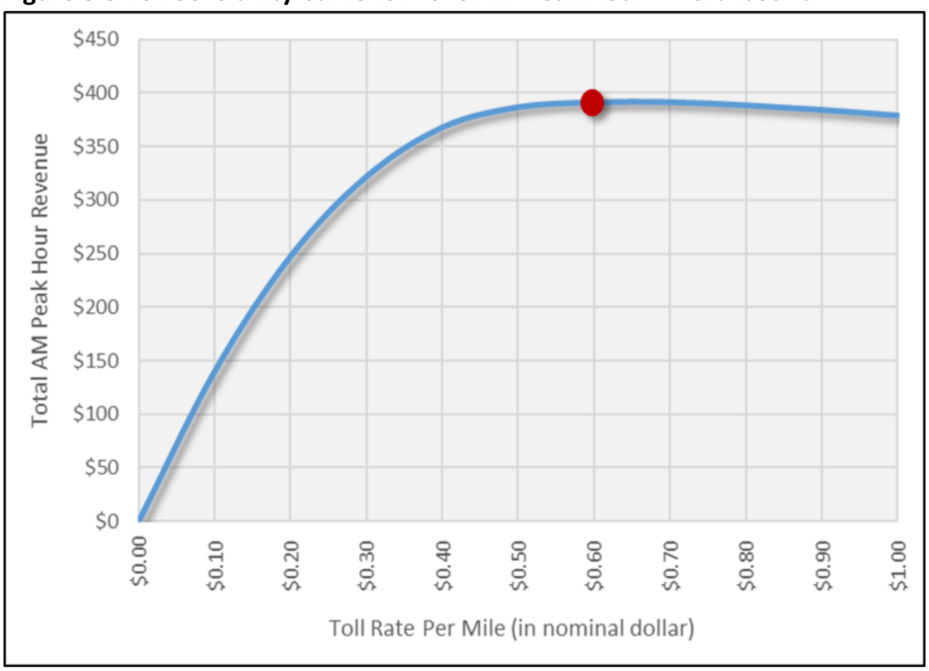
6.4 Toll Sensitivity Analysis

Toll sensitivity analysis involves testing a series of toll rates to determine how price affects traffic demand along the express lanes, taking into account characteristics of the transportation network and motorists' willingness-to-pay tolls.

In general, a toll sensitivity curve suggests that when the toll rate increases, a portion of travelers will divert from the express lanes to non-toll routes and thus decrease the share of toll transactions on the express lanes. The initial increases from a low toll rate level typically result in increased toll revenue until an optimal point where the maximum toll revenue is generated. Additional rate increases beyond this optimal toll rate level yields diminished toll revenue as the magnitude of diverted traffic exceeds the net return generated by the toll rate increase.

CDM Smith evaluated the traffic and toll revenue potential under a range of alternative toll rates for the Phase 2 scenario, using the revised EBP socioeconomic data, for years 2026 and 2050. **Figure 6-5** and **6-6** illustrate the toll sensitivity curves for the US 69 express lanes for future year 2026 for the AM peak hour in the northbound direction and the PM peak hour in the southbound direction, respectively. **Figure 6-7** and **6-8** illustrate the toll sensitivity curves for future year 2050 for the AM peak hour in the northbound direction and the PM peak hour for the southbound direction. These were estimated by testing the uniform impact of toll rate changes at all toll gantries along the US 69 express lanes. Also shown as stars are the assumed toll rates per mile for the express lanes in 2026. These curves demonstrate that overall, there is some potential for revenue enhancement through toll increases above the assumed toll rate levels for the US 69 express lanes, if warranted.

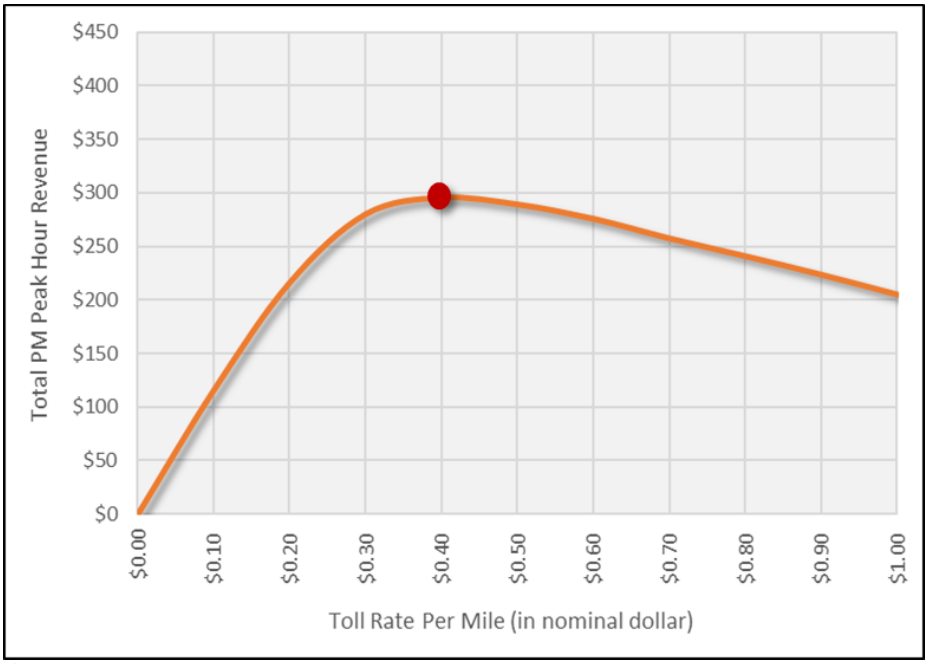
Figure 6-5 Toll Sensitivity Curve for 2026 AM Peak Hour – Northbound



● *Peak toll rate per mile*

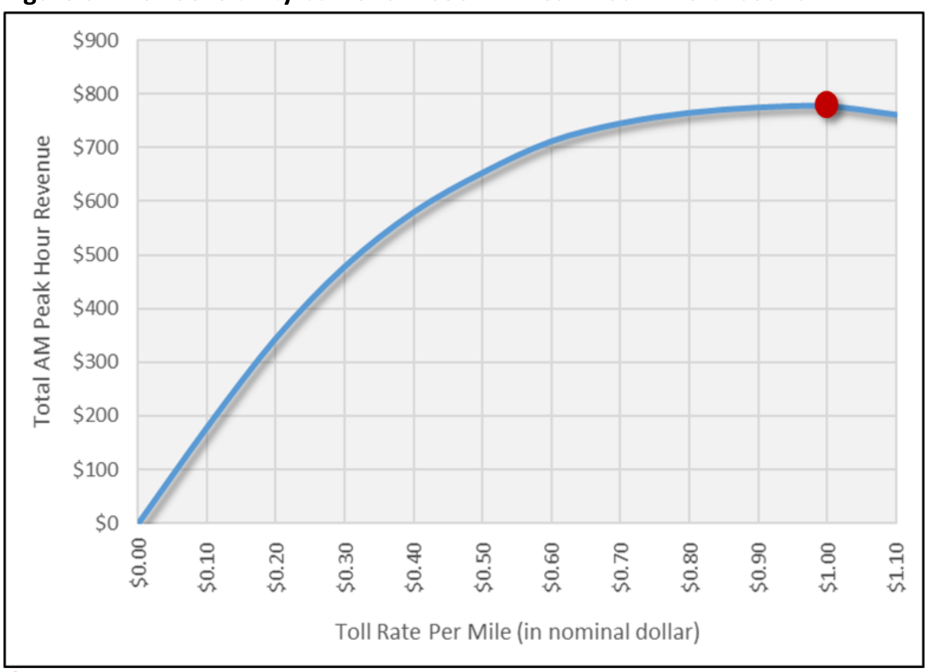
Toll sensitivity curve is for system level and is for the two-axle transponder toll rate

Figure 6-6 Toll Sensitivity Curve for 2026 PM Peak Hour - Southbound



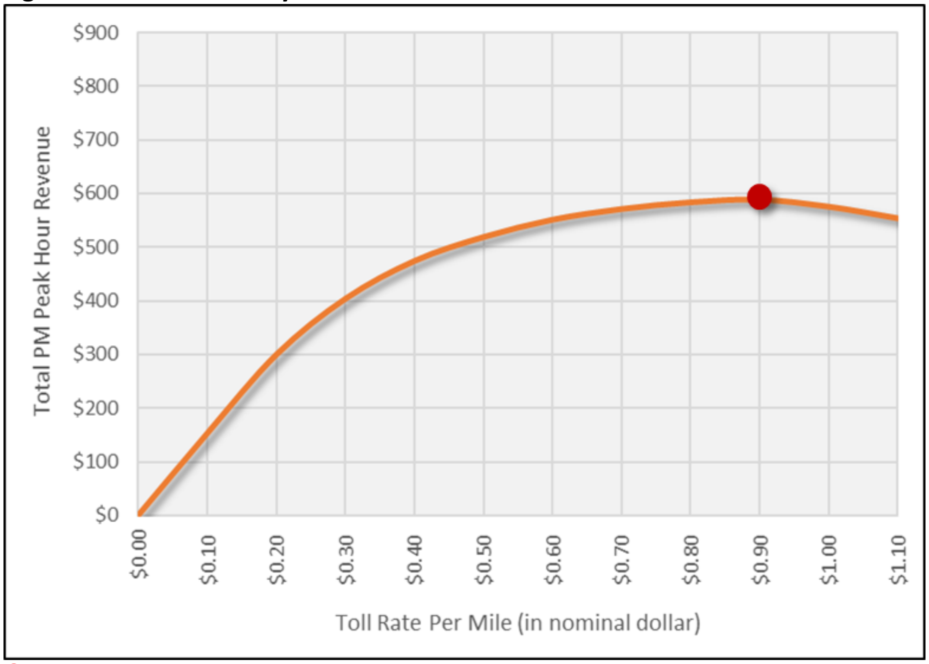
Peak toll rate per mile
Toll sensitivity curve is for system level and is for the two-axle transponder toll rate

Figure 6-7 Toll Sensitivity Curve for 2050 AM Peak Hour - Northbound



Peak toll rate per mile
Toll sensitivity curve is for system level and is for the two-axle transponder toll rate

Figure 6-8 Toll Sensitivity Curve for 2050 PM Peak Hour - Southbound



● *Peak toll rate per mile*
Toll sensitivity curve is for system level and is for the two-axle transponder toll rate

6.5 Express Lanes' Traffic Shares

Projected traffic volumes in 2026, 2040 and 2050 under Phase 2 (using the MARC socioeconomic data) and the proportion of traffic using the express lanes at a representative location within each of the three tolling zones along the US 69 study corridor are summarized in **Table 6-5** and **6-6** for the AM and the PM peak period, respectively.

As shown in **Table 6-5**, express lane traffic along the southern tolling zone (north of 167th Street) and the central tolling zone (north of 135th Street) have the highest share of traffic for all years in the northbound direction during the AM peak period, estimated to be 22 percent in 2040 and 23 percent in 2050, while the lowest share of express lane traffic is estimated to be in northern tolling zone, within the vicinity of 119th Street.

Table 6-5 Express Lanes' Traffic Shares During the AM Peak Period

Year	Direction	North of 167th Street			North of 135th Street			North of 119th Street		
		Express Lane	GP Lanes	EL Share	Express Lane	GP Lanes	EL Share	Express Lane	GP Lanes	EL Share
2026	NB		6,900		3,000	13,200	19%	1,400	11,500	11%
	SB		3,000		500	9,400	5%	100	6,500	2%
2040	NB	3,000	10,600	22%	4,100	14,200	22%	2,300	13,000	15%
	SB	200	4,200	5%	900	9,900	8%	300	7,500	4%
2050	NB	3,300	10,800	23%	4,500	14,800	23%	2,600	13,500	16%
	SB	300	4,300	7%	1,100	10,000	10%	300	7,800	4%

The highest share of express lane traffic is anticipated to be in the southbound direction along the southern tolling zone (north of 167th Street) during the PM peak period (31 percent in 2040 and 29 percent in 2050), as shown in **Table 6-6**. The lowest proportion of express lane traffic is estimated to be at the same location, but in the northbound direction.

Table 6-6 Express Lanes' Traffic Shares During the PM Peak Period

Year	Direction	North of 167th Street			North of 135th Street			North of 119th Street		
		Express Lane	GP Lanes	EL Share	Express Lane	GP Lanes	EL Share	Express Lane	GP Lanes	EL Share
2026	NB		5,100		1,700	15,200	10%	1,400	13,100	10%
	SB		10,200		5,400	17,900	23%	2,100	10,500	17%
2040	NB	700	7,900	8%	2,700	14,800	15%	2,600	13,500	16%
	SB	5,000	11,100	31%	6,400	19,200	25%	3,500	14,800	19%
2050	NB	1,000	7,900	11%	3,500	15,000	19%	3,100	13,900	18%
	SB	5,000	12,000	29%	6,500	20,900	24%	3,500	16,100	18%

6.6 Travel Time Savings Analysis

The primary factor influencing travelers' decision to use an express lane facility is travel time savings offered by the facility. The average travel time savings offered by the US 69 express lanes under Phase 2 using the MARC socioeconomic data in the peak direction of travel in 2026, 2040 and 2050, is summarized in **Table 6-7**. The table illustrates the average model-estimated travel times along the GP lanes and the express lanes for the following selected movements:

- Between 179th Street and 151st Street (southern terminus of the express lanes under Phase 2);
- Between 151st Street and Blue Valley Parkway; and
- Between Blue Valley Parkway and 103rd Street (northern terminus of the express lanes).

As shown in **Table 6-7**, travel time savings offered by the express lanes are expected to be significant during the peak periods. Also, travel time savings in 2050 are expected to be higher than those in 2026 and 2040, since traffic and congestion are anticipated to increase along the study corridor in the future.

During the AM peak period, traveling 4.3 miles from 179th Street to 151st Street along the express lanes will save approximately 3.5 minutes (43 percent) compared to the GP lanes in 2040, and 4.8 minutes (50 percent) in 2050. A trip from 151st Street to Blue Valley Parkway along the express lanes will save approximately 0.5 minutes (11 percent) in 2026, 1.0 minute (22 percent) in 2040 and 1.4 minutes (29 percent) in 2050 compared to traveling on the GP lanes. Similarly, a trip from Blue Valley Parkway to 103rd Street along the express lanes will save approximately 1.3 minutes (37 percent) in 2026, 2.2 minutes (49 percent) in 2040 and 3.0 minutes (57 percent) in 2050 compared to traveling along the GP lanes.

During the PM peak period, the southbound traffic is expected to experience lower travel time savings compared to the AM peak period savings in the northbound direction. The southbound express lanes between 103rd Street and Blue Valley Parkway are expected to result in marginal travel time savings of 0.2 minutes (5 percent), 0.8 minutes (20 percent), and 1.2 minutes (27 percent) in 2026, 2040, and 2050, respectively. The express lanes between Blue Valley Parkway and 151st Street will similarly provide travel time savings of 0.5 minutes (17 percent) in 2026, 0.7 minutes (23 percent) in 2040 and 1.3 minutes (35 percent) in 2050. A trip from 151st Street to 179th Street along the express lanes will save approximately 1.2 minutes (23 percent) in 2040 and 1.6 minutes (29 percent) in 2050 compared to traveling on the GP lanes.

Table 6-7 Travel Time Savings Summary

Time Period	Direction of Travel	US 69 Segment		Distance (miles)	Travel Time (minutes)		Travel Time Savings	
		From	To		Express Lanes	GP Lanes	Minutes	Percent
2026								
AM Peak	Northbound	151st Street	Blue Valley Pkwy	4.1	3.9	4.4	0.5	11%
		Blue Valley Pkwy	103rd Street	2.4	2.3	3.6	1.3	37%
PM Peak	Southbound	103rd Street	Blue Valley Pkwy	3.6	3.3	3.4	0.2	5%
		Blue Valley Pkwy	151st Street	2.9	2.4	2.9	0.5	17%
2040								
AM Peak	Northbound	179th Street	151st Street	4.3	4.6	8.1	3.5	43%
		151st Street	Blue Valley Pkwy	3.4	3.3	4.3	1.0	22%
		Blue Valley Pkwy	103rd Street	2.4	2.3	4.5	2.2	49%
PM Peak	Southbound	103rd Street	Blue Valley Pkwy	3.6	3.2	4.0	0.8	20%
		Blue Valley Pkwy	151st Street	2.2	2.4	3.2	0.7	23%
		151st Street	179th Street	4.3	3.8	4.9	1.2	23%
2050								
AM Peak	Northbound	179th Street	151st Street	4.3	4.8	9.5	4.8	50%
		151st Street	Blue Valley Pkwy	3.4	3.4	4.8	1.4	29%
		Blue Valley Pkwy	103rd Street	2.4	2.3	5.4	3.0	57%
PM Peak	Southbound	103rd Street	Blue Valley Pkwy	3.6	3.2	4.4	1.2	27%
		Blue Valley Pkwy	151st Street	2.2	2.5	3.8	1.3	35%
		151st Street	179th Street	4.3	3.8	5.4	1.6	29%

6.7 Toll Diversion Analysis

The projected AWDT volumes in 2026, 2040 and 2050 (using the MARC socioeconomic data) under Phase 1 Base Case and Phase 2 compared to the No-Build scenario at three representative screenlines within each tolling zone are summarized in **Table 6-8** through **6-10**. **Table 6-8** summarizes the two-way traffic volumes and screenline share (in parentheses) along US 69 and parallel routes just to the east and west of the corridor, north of 167th Street. **Table 6-9** and **6-10** summarize the same data, but for the US 69 segment located north of 135th Street and north of 119th Street, respectively.

As shown in **Table 6-8**, the screenline shares stay consistent for each route for the three scenarios in all years. US 69 traffic increases by three to four percent under Phase 1 Base Case as compared to the No-Build and by four to six percent under Phase 2.

Traffic along the parallel routes is most affected north of 135th Street, as shown in **Table 6-9**. Traffic along these routes decreases by up to nine percent compared to the No-Build scenario, while traffic along US 69 increases by six to ten percent under both the Phase 1 Base Case and Phase 2. However, the screenline shares stay consistent for each route for the three scenarios in all years.

The screenline shares also stay consistent for each route for the three scenarios in all years north of 119th Street, as shown in **Table 6-10**. Traffic along these routes decreases by up to four percent compared to the No-Build scenario, while traffic along US 69 increases by four to seven percent for the Phase 1 Base Case and four to eight percent for Phase 2.

Table 6-8 Screenline North of 167th Street

Year	Scenario	North of 167th Street						
		Quivira Road	Switzer Road	Antioch Road	US 69 (GP+EL)	Metcalf Avenue	Nall Avenue	Mission Road
2026	No-Build	1,300 (2%)	2,450 (4%)	850 (1%)	43,600 (69%)	3,500 (6%)	5,800 (9%)	5,850 (9%)
	MARC Phase 1	1,300 (2%)	2,550 (4%)	950 (1%)	45,250 (69%)	3,550 (5%)	5,900 (9%)	5,850 (9%)
	MARC Phase 2	1,300 (2%)	2,550 (4%)	950 (1%)	45,250 (69%)	3,550 (5%)	5,900 (9%)	5,850 (9%)
2040	No-Build	2,500 (2%)	6,950 (6%)	2,400 (2%)	76,450 (64%)	9,300 (8%)	7,700 (6%)	13,250 (11%)
	MARC Phase 1	2,400 (2%)	6,900 (6%)	2,500 (2%)	78,650 (65%)	9,350 (8%)	7,650 (6%)	13,250 (11%)
	MARC Phase 2	2,400 (2%)	6,750 (6%)	2,350 (2%)	80,100 (66%)	9,100 (7%)	7,550 (6%)	13,200 (11%)
2050	No-Build	3,850 (3%)	6,800 (5%)	3,500 (3%)	79,300 (63%)	10,300 (8%)	8,400 (7%)	14,000 (11%)
	MARC Phase 1	3,900 (3%)	6,850 (5%)	3,650 (3%)	81,850 (63%)	10,450 (8%)	8,400 (7%)	14,000 (11%)
	MARC Phase 2	3,850 (3%)	6,750 (5%)	3,200 (2%)	83,850 (65%)	10,100 (8%)	8,300 (6%)	13,950 (11%)

No-Build and Phase 1 include the US 69 GP lanes only for all years; Phase 2 includes the US 69 GP lanes only in 2026

Table 6-9 Screenline North of 135th Street

Year	Scenario	North of 135th Street						
		Quivira Road	Switzer Road	Antioch Road	US 69 (GP+EL)	Metcalf Avenue	Nall Avenue	Mission Road
2026	No-Build	16,300 (8%)	10,200 (5%)	20,650 (10%)	114,450 (54%)	20,350 (10%)	19,700 (9%)	8,600 (4%)
	MARC Phase 1	15,650 (7%)	9,650 (5%)	20,200 (9%)	121,750 (57%)	18,800 (9%)	19,050 (9%)	8,600 (4%)
	MARC Phase 2	15,650 (7%)	9,650 (5%)	20,200 (9%)	121,750 (57%)	18,800 (9%)	19,050 (9%)	8,600 (4%)
2040	No-Build	21,000 (9%)	9,300 (4%)	26,250 (11%)	122,200 (52%)	27,100 (11%)	20,700 (9%)	10,200 (4%)
	MARC Phase 1	20,450 (8%)	8,600 (4%)	24,800 (10%)	132,600 (55%)	25,650 (11%)	20,400 (8%)	9,950 (4%)
	MARC Phase 2	20,250 (8%)	8,450 (3%)	25,100 (10%)	132,600 (55%)	25,600 (11%)	20,300 (8%)	10,050 (4%)
2050	No-Build	21,500 (9%)	10,100 (4%)	28,100 (11%)	126,950 (51%)	28,350 (11%)	21,550 (9%)	10,700 (4%)
	MARC Phase 1	20,700 (8%)	9,550 (4%)	26,250 (10%)	140,100 (55%)	26,500 (10%)	21,100 (8%)	10,600 (4%)
	MARC Phase 2	20,550 (8%)	9,200 (4%)	26,150 (10%)	139,650 (55%)	26,800 (11%)	20,900 (8%)	10,500 (4%)

No-Build includes the US 69 GP lanes only for all years

Table 6-10 Screenline North of 119th Street

Year	Scenario	North of 119th Street					
		Quivira Road	Switzer Road	Antioch Road	US 69 (GP+EL)	Metcalf Avenue	Nall Avenue
2026	No Build	21,100 (11%)	7,400 (4%)	17,900 (9%)	80,000 (40%)	43,200 (22%)	30,950 (15%)
	MARC Phase 1	20,700 (10%)	7,850 (4%)	17,600 (9%)	83,200 (41%)	42,750 (21%)	31,100 (15%)
	MARC Phase 2	20,700 (10%)	7,850 (4%)	17,600 (9%)	83,200 (41%)	42,750 (21%)	31,100 (15%)
2040	No Build	22,400 (10%)	6,550 (3%)	19,750 (9%)	97,850 (45%)	40,800 (19%)	31,150 (14%)
	MARC Phase 1	22,050 (10%)	6,500 (3%)	19,250 (9%)	103,900 (47%)	40,450 (18%)	30,750 (14%)
	MARC Phase 2	22,050 (10%)	6,600 (3%)	19,150 (9%)	104,200 (47%)	40,450 (18%)	30,700 (14%)
2050	No Build	23,800 (10%)	7,550 (3%)	21,150 (9%)	101,850 (44%)	42,400 (18%)	32,700 (14%)
	MARC Phase 1	23,100 (10%)	7,500 (3%)	20,200 (9%)	108,950 (47%)	42,350 (18%)	32,200 (14%)
	MARC Phase 2	23,200 (10%)	7,650 (3%)	20,450 (9%)	109,700 (47%)	41,850 (18%)	32,150 (14%)

No-Build includes the US 69 GP lanes only for all years
Mission Road not included because it does not extend north of 119th Street

6.8 Estimated Annual Transactions and Gross Toll Revenues

As previously described, the annual transactions and toll revenue estimates for the US 69 study corridor were evaluated under the Phase 1 Base Case and Phase 2 scenario for two assumed socioeconomic growth assumptions, using EBP and MARC socioeconomic forecasts, for the 40-year forecast horizon. The annual transactions and toll revenue estimates based on EBP's socioeconomic forecasts under the Phase 1 Base Case are shown in **Table 6-11**. The annual transactions are estimated to be 4.28 million in 2026 and are estimated to increase to 6.88 million by 2040 and 7.64 million by 2050. The estimated toll revenues generated by the proposed express lanes along US 69 is approximately $2.47 million (nominal) in 2026. The annual toll revenue is estimated to grow to approximately $5.02 million (nominal) by 2040 and $6.41 million (nominal) by 2050. **Figures 6-9** and **6-10** illustrate the variations in the estimated 40-year forecast period annual transactions and toll revenues, respectively. The projected decline in both transactions and toll revenues between 2039 and 2040 is due to the assumed capacity expansion along parallel arterials including Metcalf and Antioch occurring in 2040**. Table 6-12** shows the average annual growth rates for transactions and toll revenues between various forecast years under the Phase 1 Base Case using EBP's revised socioeconomic data.

Table 6-11 Annual Transaction and Gross Toll Revenue Estimates under EBP Phase 1 Base Case

Year	Annual Transactions			Annual Gross Toll Revenues (Nominal Dollars) (2)		
	Transponder	Video	Total	Transponder	Video(1,3)	Total
2026	2,140,000	2,140,000	4,280,000	$997,000	$1,475,000	$2,472,000
2027	2,468,000	2,284,000	4,752,000	$1,185,000	$1,642,000	$2,827,000
2028	2,818,000	2,430,000	5,248,000	$1,392,000	$1,819,000	$3,211,000
2029	3,037,000	2,456,000	5,493,000	$1,542,000	$1,908,000	$3,450,000
2030	3,258,000	2,481,000	5,739,000	$1,697,000	$1,998,000	$3,695,000
2031	3,478,000	2,507,000	5,985,000	$1,857,000	$2,087,000	$3,944,000
2032	3,698,000	2,533,000	6,231,000	$2,023,000	$2,176,000	$4,199,000
2033	3,918,000	2,559,000	6,477,000	$2,193,000	$2,265,000	$4,458,000
2034	4,138,000	2,585,000	6,723,000	$2,368,000	$2,352,000	$4,720,000
2035	4,358,000	2,611,000	6,969,000	$2,548,000	$2,440,000	$4,988,000
2036	4,577,000	2,637,000	7,214,000	$2,734,000	$2,527,000	$5,261,000
2037	4,796,000	2,661,000	7,457,000	$2,924,000	$2,614,000	$5,538,000
2038	5,013,000	2,685,000	7,698,000	$3,120,000	$2,701,000	$5,821,000
2039	5,224,000	2,706,000	7,930,000	$3,320,000	$2,787,000	$6,107,000
2040	4,583,000	2,300,000	6,883,000	$2,741,000	$2,282,000	$5,023,000
2041	4,700,000	2,261,000	6,961,000	$2,865,000	$2,293,000	$5,158,000
2042	4,816,000	2,221,000	7,037,000	$2,991,000	$2,303,000	$5,294,000
2043	4,932,000	2,181,000	7,113,000	$3,119,000	$2,311,000	$5,430,000
2044	5,047,000	2,142,000	7,189,000	$3,250,000	$2,317,000	$5,567,000
2045	5,162,000	2,102,000	7,264,000	$3,384,000	$2,322,000	$5,706,000
2046	5,277,000	2,063,000	7,340,000	$3,519,000	$2,326,000	$5,845,000
2047	5,392,000	2,024,000	7,416,000	$3,657,000	$2,328,000	$5,985,000
2048	5,508,000	1,984,000	7,492,000	$3,798,000	$2,328,000	$6,126,000
2049	5,623,000	1,945,000	7,568,000	$3,940,000	$2,327,000	$6,267,000
2050	5,737,000	1,906,000	7,643,000	$4,085,000	$2,324,000	$6,409,000
2051	5,787,000	1,923,000	7,710,000	$4,183,000	$2,381,000	$6,564,000
2052	5,839,000	1,939,000	7,778,000	$4,284,000	$2,439,000	$6,723,000
2053	5,889,000	1,955,000	7,844,000	$4,386,000	$2,500,000	$6,886,000
2054	5,939,000	1,970,000	7,909,000	$4,491,000	$2,562,000	$7,053,000
2055	5,988,000	1,985,000	7,973,000	$4,599,000	$2,625,000	$7,224,000
2056	6,017,000	1,993,000	8,010,000	$4,688,000	$2,676,000	$7,364,000
2057	6,046,000	2,001,000	8,047,000	$4,778,000	$2,730,000	$7,508,000
2058	6,075,000	2,010,000	8,085,000	$4,871,000	$2,784,000	$7,655,000
2059	6,104,000	2,018,000	8,122,000	$4,965,000	$2,838,000	$7,803,000
2060	6,134,000	2,026,000	8,160,000	$5,061,000	$2,895,000	$7,956,000
2061	6,160,000	2,034,000	8,194,000	$5,158,000	$2,952,000	$8,110,000
2062	6,186,000	2,042,000	8,228,000	$5,256,000	$3,010,000	$8,266,000
2063	6,212,000	2,050,000	8,262,000	$5,356,000	$3,069,000	$8,425,000
2064	6,238,000	2,058,000	8,296,000	$5,459,000	$3,130,000	$8,589,000
2065	6,264,000	2,066,000	8,330,000	$5,563,000	$3,192,000	$8,755,000

(1) Video Revenue includes video surcharge
(2) Nominal Dollars - Year of Expenditure/Collection also referred as future year dollars
(3) No toll leakage adjustments were applied to the toll revenue estimates

Figure 6-9 Annual Transactions under EBP Phase 1 Base Case

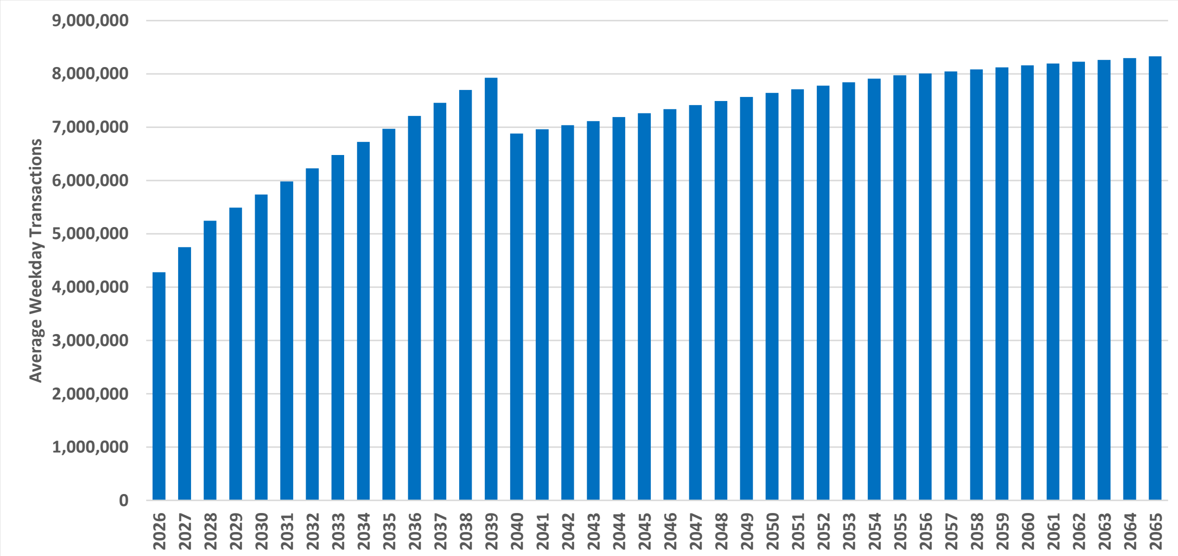


Figure 6-10 Annual Gross Toll Revenues in Nominal Dollars under EBP Phase 1 Base Case

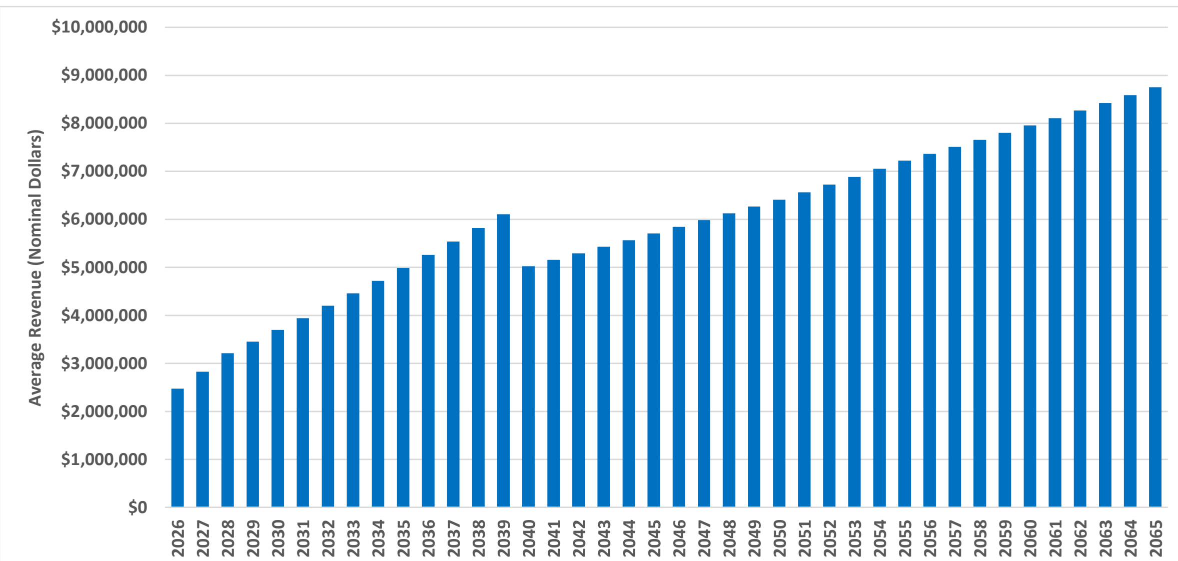


Table 6-12 Annual Transactions and Gross Toll Revenues under EBP Phase 1 Base Case

Year	Annual Transactions	Total Annual Gross Toll Revenues (in nominal dollars)
2026	4,280,000	$2,472,000
2030	5,739,000	$3,695,000
2040	6,883,000	$5,023,000
2050	7,643,000	$6,409,000
2060	8,160,000	$7,956,000
Average Annual Growth Rate		
2026-2030	7.6%	10.6%
2030-2040	1.8%	3.1%
2040-2050	1.1%	2.5%
2050-2060	0.7%	2.2%

The annual transactions and toll revenue estimates under the Phase 1 Base Case scenario using MARC's socioeconomic forecasts are shown in **Table 6-13**. The annual transactions are estimated to be 4.28 million in 2026 and increase to 7.98 million by 2040 and 8.21 million by 2050. The toll revenues generated by the express lanes are estimated to be approximately $2.47 million (nominal) in 2026. The annual toll revenues increase to approximately $7.45 million (nominal) by 2040 and $11.63 million (nominal) by 2050. **Figures 6-11** and **6-12** illustrate the variations in the estimated 40-year forecast period annual transactions and toll revenues, respectively. The projected decline in both transactions and toll revenues between 2039 and 2040 is again due to the assumed capacity expansion along parallel arterials including Metcalf and Antioch occurring in 2040. **Table 6-14** shows the average annual growth rates for transactions and toll revenues between various forecast years for the Phase 1 Base Case scenario using MARC's socioeconomic forecasts.

Table 6-13 Annual Transaction and Gross Toll Revenue Estimates under MARC Phase 1 Base Case

Year	Annual Transactions			Annual Gross Toll Revenues (Nominal Dollars) (2)		
	Transponder	Video	Total	Transponder	Video(1,3)	Total
2026	2,140,000	2,140,000	4,280,000	$997,000	$1,475,000	$2,472,000
2027	2,520,000	2,309,000	4,829,000	$1,266,000	$1,740,000	$3,006,000
2028	2,926,000	2,484,000	5,410,000	$1,567,000	$2,022,000	$3,589,000
2029	3,201,000	2,536,000	5,737,000	$1,810,000	$2,212,000	$4,022,000
2030	3,475,000	2,589,000	6,064,000	$2,063,000	$2,399,000	$4,462,000
2031	3,749,000	2,642,000	6,391,000	$2,325,000	$2,584,000	$4,909,000
2032	4,023,000	2,695,000	6,718,000	$2,596,000	$2,767,000	$5,363,000
2033	4,297,000	2,748,000	7,045,000	$2,877,000	$2,948,000	$5,825,000
2034	4,571,000	2,801,000	7,372,000	$3,166,000	$3,127,000	$6,293,000
2035	4,846,000	2,853,000	7,699,000	$3,465,000	$3,304,000	$6,769,000
2036	5,116,000	2,903,000	8,019,000	$3,774,000	$3,479,000	$7,253,000
2037	5,383,000	2,952,000	8,335,000	$4,091,000	$3,652,000	$7,743,000
2038	5,649,000	2,999,000	8,648,000	$4,418,000	$3,822,000	$8,240,000
2039	5,912,000	3,045,000	8,957,000	$4,754,000	$3,991,000	$8,745,000
2040	5,346,000	2,633,000	7,979,000	$4,055,000	$3,392,000	$7,447,000
2041	5,427,000	2,575,000	8,002,000	$4,344,000	$3,534,000	$7,878,000
2042	5,507,000	2,518,000	8,025,000	$4,639,000	$3,668,000	$8,307,000
2043	5,589,000	2,460,000	8,049,000	$4,939,000	$3,794,000	$8,733,000
2044	5,669,000	2,403,000	8,072,000	$5,244,000	$3,912,000	$9,156,000
2045	5,751,000	2,345,000	8,096,000	$5,554,000	$4,021,000	$9,575,000
2046	5,831,000	2,288,000	8,119,000	$5,870,000	$4,122,000	$9,992,000
2047	5,911,000	2,231,000	8,142,000	$6,191,000	$4,215,000	$10,406,000
2048	5,992,000	2,173,000	8,165,000	$6,517,000	$4,300,000	$10,817,000
2049	6,072,000	2,116,000	8,188,000	$6,848,000	$4,377,000	$11,225,000
2050	6,152,000	2,059,000	8,211,000	$7,185,000	$4,445,000	$11,630,000
2051	6,180,000	2,067,000	8,247,000	$7,346,000	$4,548,000	$11,894,000
2052	6,206,000	2,075,000	8,281,000	$7,511,000	$4,653,000	$12,164,000
2053	6,232,000	2,083,000	8,315,000	$7,680,000	$4,760,000	$12,440,000
2054	6,258,000	2,091,000	8,349,000	$7,853,000	$4,869,000	$12,722,000
2055	6,285,000	2,099,000	8,384,000	$8,030,000	$4,982,000	$13,012,000
2056	6,311,000	2,108,000	8,419,000	$8,211,000	$5,097,000	$13,308,000
2057	6,338,000	2,116,000	8,454,000	$8,396,000	$5,215,000	$13,611,000
2058	6,365,000	2,124,000	8,489,000	$8,586,000	$5,336,000	$13,922,000
2059	6,391,000	2,133,000	8,524,000	$8,780,000	$5,460,000	$14,240,000
2060	6,419,000	2,141,000	8,560,000	$8,978,000	$5,586,000	$14,564,000
2061	6,446,000	2,149,000	8,595,000	$9,182,000	$5,716,000	$14,898,000
2062	6,473,000	2,158,000	8,631,000	$9,389,000	$5,849,000	$15,238,000
2063	6,501,000	2,166,000	8,667,000	$9,602,000	$5,985,000	$15,587,000
2064	6,528,000	2,175,000	8,703,000	$9,820,000	$6,123,000	$15,943,000
2065	6,557,000	2,183,000	8,740,000	$10,043,000	$6,266,000	$16,309,000

(1) Video Revenue include video surcharge
(2) Nominal Dollars - Year of Expenditure/Collection also referred as future year dollars
(3) No toll leakage adjustments were applied to the toll revenue estimates

Figure 6-11 Annual Transactions under MARC Phase 1 Base Case

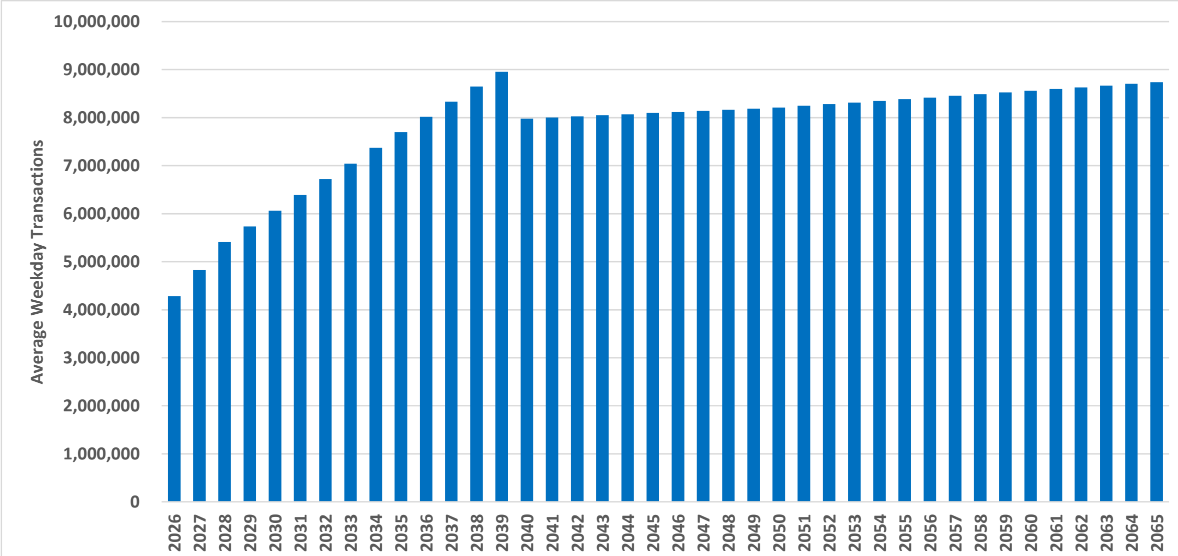


Figure 6-12 Annual Gross Toll Revenues in Nominal Dollars under MARC Phase 1 Base Case

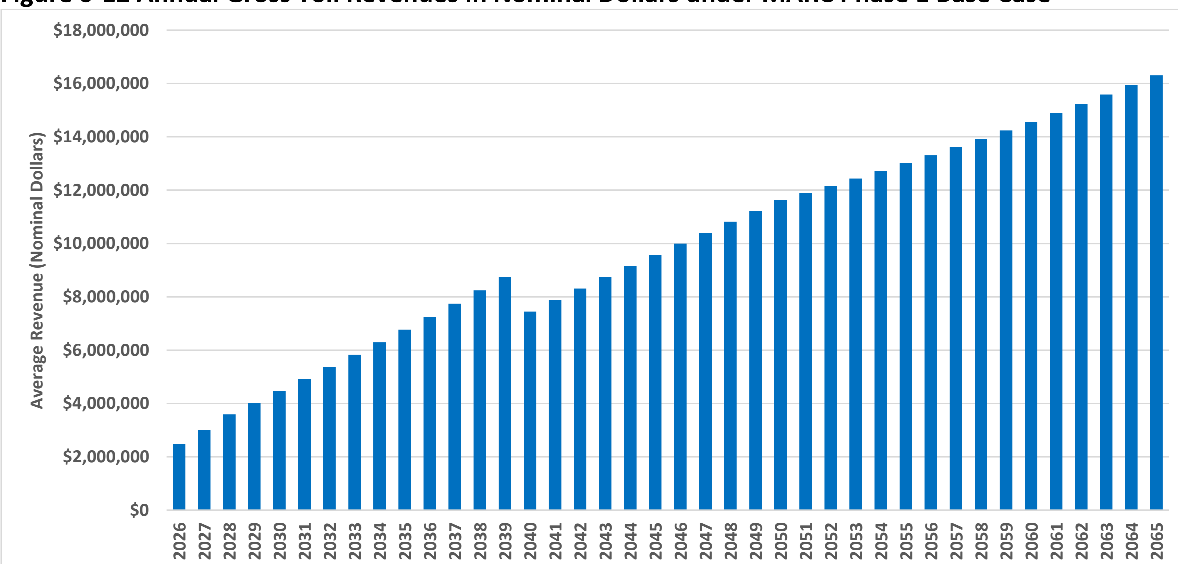


Table 6-14 Annual Transactions and Gross Toll Revenues under MARC Phase 1 Base Case

Year	Annual Transactions	Total Gross Annual Toll Revenues (in nominal dollars)
2026	4,280,000	$2,472,000
2030	6,064,000	$4,462,000
2040	7,979,000	$7,447,000
2050	8,211,000	$11,630,000
2060	8,560,000	$14,564,000
Average Annual Growth Rate		
2026-2030	9.1%	15.9%
2030-2040	2.8%	5.3%
2040-2050	0.3%	4.6%
2050-2060	0.4%	2.3%

The annual transactions and toll revenue estimates generated using EBP's socioeconomic forecast under the Phase 2 scenario are shown in **Table 6-15**. The annual transactions are estimated to be 4.28 million in 2026 and are estimated to increase to about 7.82 million by 2040 and 9.55 million by 2050. The estimated toll revenue generated by the express lanes is estimated to be approximately $2.47 million (nominal) in 2026. The annual toll revenue is estimated to grow to approximately $5.64 million (nominal) by 2040 and $8.15 million (nominal) by 2050. **Figures 6-13** and **6-14** summarize the variations in the estimated annual transactions and annual toll revenue respectively for the 40-year forecast period. The projected decline in both transaction and toll revenue between 2039 and 2040 is more muted under this scenario as any reduction in demand for the express lanes due to the assumed capacity expansion on parallel arterials is mostly offset by the additional traffic and toll revenue generated by the southern extension of the express lanes that is assumed to occur at the same time, in 2040. **Table 6-16** shows the average annual growth rates in annual transactions and annual toll revenue between various forecast years for the Phase 2 scenario using EBP's revised socioeconomic forecasts.

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Table 6-15 Annual Transaction and Gross Toll Revenue Estimates under EBP Phase 2

Year	Annual Transactions			Annual Gross Toll Revenues (Nominal Dollars) (2)		
	Transponder	Video	Total	Transponder	Video(1,3)	Total
2026	2,140,000	2,140,000	4,280,000	$997,000	$1,475,000	$2,472,000
2027	2,468,000	2,284,000	4,752,000	$1,185,000	$1,642,000	$2,827,000
2028	2,818,000	2,430,000	5,248,000	$1,392,000	$1,819,000	$3,211,000
2029	3,037,000	2,456,000	5,493,000	$1,542,000	$1,908,000	$3,450,000
2030	3,258,000	2,481,000	5,739,000	$1,697,000	$1,998,000	$3,695,000
2031	3,478,000	2,507,000	5,985,000	$1,857,000	$2,087,000	$3,944,000
2032	3,698,000	2,533,000	6,231,000	$2,023,000	$2,176,000	$4,199,000
2033	3,918,000	2,559,000	6,477,000	$2,193,000	$2,265,000	$4,458,000
2034	4,138,000	2,585,000	6,723,000	$2,368,000	$2,352,000	$4,720,000
2035	4,358,000	2,611,000	6,969,000	$2,548,000	$2,440,000	$4,988,000
2036	4,577,000	2,637,000	7,214,000	$2,734,000	$2,527,000	$5,261,000
2037	4,796,000	2,661,000	7,457,000	$2,924,000	$2,614,000	$5,538,000
2038	5,013,000	2,685,000	7,698,000	$3,120,000	$2,701,000	$5,821,000
2039	5,224,000	2,706,000	7,930,000	$3,320,000	$2,787,000	$6,107,000
2040	5,150,000	2,674,000	7,824,000	$3,071,000	$2,574,000	$5,645,000
2041	5,394,000	2,670,000	8,064,000	$3,291,000	$2,637,000	$5,928,000
2042	5,642,000	2,666,000	8,308,000	$3,519,000	$2,697,000	$6,216,000
2043	5,836,000	2,632,000	8,468,000	$3,722,000	$2,731,000	$6,453,000
2044	6,030,000	2,598,000	8,628,000	$3,929,000	$2,762,000	$6,691,000
2045	6,221,000	2,564,000	8,785,000	$4,140,000	$2,790,000	$6,930,000
2046	6,412,000	2,529,000	8,941,000	$4,356,000	$2,815,000	$7,171,000
2047	6,603,000	2,494,000	9,097,000	$4,577,000	$2,837,000	$7,414,000
2048	6,793,000	2,460,000	9,253,000	$4,802,000	$2,856,000	$7,658,000
2049	6,979,000	2,423,000	9,402,000	$5,031,000	$2,872,000	$7,903,000
2050	7,166,000	2,386,000	9,552,000	$5,265,000	$2,886,000	$8,151,000
2051	7,259,000	2,417,000	9,676,000	$5,415,000	$2,970,000	$8,385,000
2052	7,354,000	2,448,000	9,802,000	$5,569,000	$3,056,000	$8,625,000
2053	7,450,000	2,480,000	9,930,000	$5,728,000	$3,145,000	$8,873,000
2054	7,543,000	2,510,000	10,053,000	$5,892,000	$3,237,000	$9,129,000
2055	7,637,000	2,541,000	10,178,000	$6,060,000	$3,331,000	$9,391,000
2056	7,702,000	2,562,000	10,264,000	$6,204,000	$3,412,000	$9,616,000
2057	7,768,000	2,583,000	10,351,000	$6,351,000	$3,495,000	$9,846,000
2058	7,836,000	2,604,000	10,440,000	$6,502,000	$3,579,000	$10,081,000
2059	7,903,000	2,626,000	10,529,000	$6,657,000	$3,666,000	$10,323,000
2060	7,971,000	2,648,000	10,619,000	$6,816,000	$3,755,000	$10,571,000
2061	8,006,000	2,659,000	10,665,000	$6,944,000	$3,828,000	$10,772,000
2062	8,041,000	2,670,000	10,711,000	$7,076,000	$3,901,000	$10,977,000
2063	8,076,000	2,681,000	10,757,000	$7,209,000	$3,977,000	$11,186,000
2064	8,111,000	2,693,000	10,804,000	$7,346,000	$4,054,000	$11,400,000
2065	8,147,000	2,704,000	10,851,000	$7,485,000	$4,132,000	$11,617,000

(1) Video Revenue include video surcharge
(2) Nominal Dollars - Year of Expenditure/Collection also referred as future year dollars
(3) No toll leakage adjustments were applied to the toll revenue estimates

Figure 6-13 Annual Transactions for under EBP Phase 2

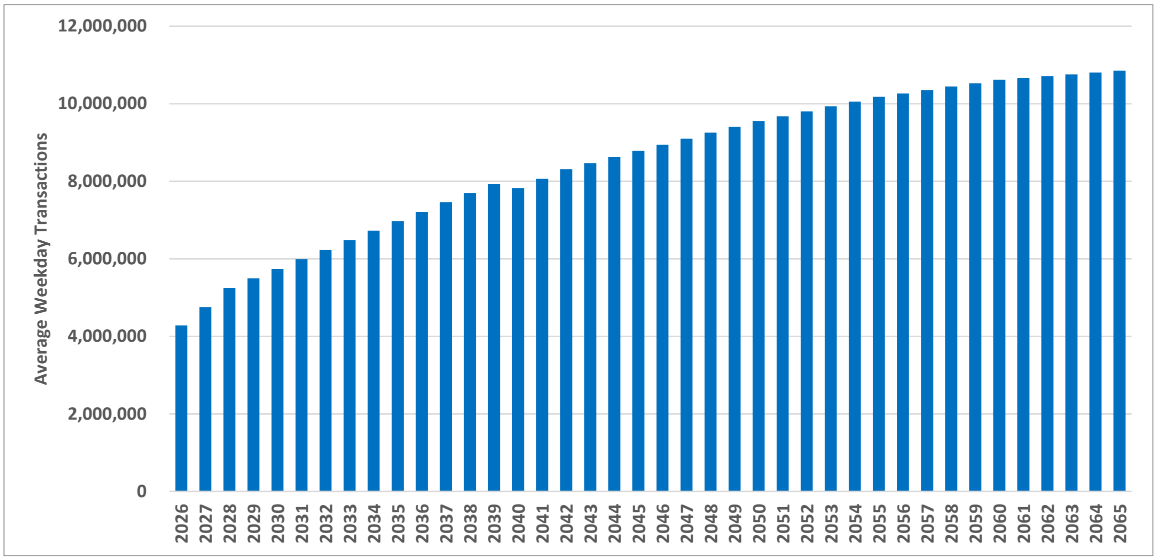


Figure 6-14 Annual Gross Toll Revenues in Nominal Dollars under EBP Phase 2

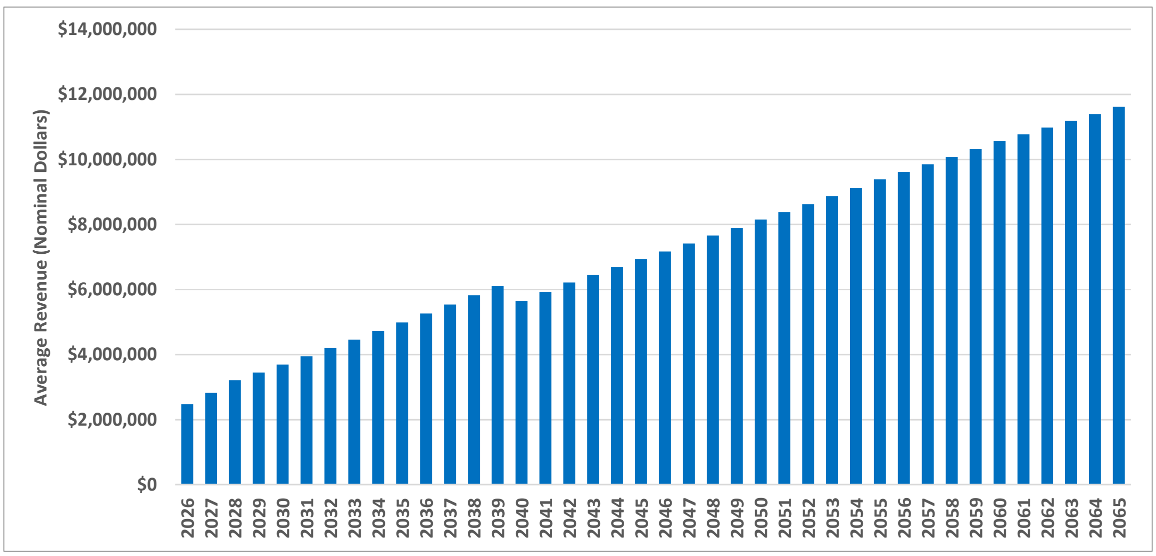


Table 6-16 Annual Transactions and Gross Toll Revenues under EBP Phase 2

Year	Annual Transactions	Total Gross Annual Toll Revenues (in nominal dollars)
2026	4,280,000	$2,472,000
2030	5,739,000	$3,695,000
2040	7,824,000	$5,645,000
2050	9,552,000	$8,151,000
2060	10,619,000	$10,571,000
Average Annual Growth Rate		
2026-2030	7.6%	10.6%
2030-2040	3.2%	4.3%
2040-2050	2.0%	3.7%
2050-2060	1.1%	2.6%

The annual transactions and toll revenue estimates for the Phase 2 scenario using MARC's socioeconomic forecasts are shown in **Table 6-17**. The annual transactions are estimated to be 4.28 million in 2026 and are estimated to increase to about 9.77 million by 2040 and 11.12 million by 2050. The estimated toll revenue generated by the express lanes is estimated to be approximately $2.47 million (nominal) in 2026. The annual toll revenue is estimated to grow to approximately $9 million (nominal) by 2040 and $14.32 million (nominal) by 2050. **Figures 6-15** and **6-16** summarize the variations in the estimated annual transactions and annual toll revenue respectively for the 40-year forecast period. **Table 6-18** shows the average annual growth rates in annual transactions and annual toll revenue between various forecast years for the Phase 2 scenario using MARC's socioeconomic forecasts.

Table 6-17 Annual Transaction and Gross Toll Revenue Estimates under MARC Phase 2

Year	Annual Transactions			Annual Gross Toll Revenues (Nominal Dollars) (2)		
	Transponder	Video	Total	Transponder	Video(1,3)	Total
2026	2,140,000	2,140,000	4,280,000	$997,000	$1,475,000	$2,472,000
2027	2,520,000	2,309,000	4,829,000	$1,266,000	$1,740,000	$3,006,000
2028	2,926,000	2,484,000	5,410,000	$1,567,000	$2,022,000	$3,589,000
2029	3,201,000	2,536,000	5,737,000	$1,810,000	$2,212,000	$4,022,000
2030	3,475,000	2,589,000	6,064,000	$2,063,000	$2,399,000	$4,462,000
2031	3,749,000	2,642,000	6,391,000	$2,325,000	$2,584,000	$4,909,000
2032	4,023,000	2,695,000	6,718,000	$2,596,000	$2,767,000	$5,363,000
2033	4,297,000	2,748,000	7,045,000	$2,877,000	$2,948,000	$5,825,000
2034	4,571,000	2,801,000	7,372,000	$3,166,000	$3,127,000	$6,293,000
2035	4,846,000	2,853,000	7,699,000	$3,465,000	$3,304,000	$6,769,000
2036	5,116,000	2,903,000	8,019,000	$3,774,000	$3,479,000	$7,253,000
2037	5,383,000	2,952,000	8,335,000	$4,091,000	$3,652,000	$7,743,000
2038	5,649,000	2,999,000	8,648,000	$4,418,000	$3,822,000	$8,240,000
2039	5,912,000	3,045,000	8,957,000	$4,754,000	$3,991,000	$8,745,000
2040	6,451,000	3,316,000	9,767,000	$4,876,000	$4,128,000	$9,004,000
2041	6,707,000	3,303,000	10,010,000	$5,305,000	$4,323,000	$9,628,000
2042	6,968,000	3,287,000	10,255,000	$5,749,000	$4,510,000	$10,259,000
2043	7,137,000	3,226,000	10,363,000	$6,139,000	$4,635,000	$10,774,000
2044	7,308,000	3,164,000	10,472,000	$6,538,000	$4,748,000	$11,286,000
2045	7,479,000	3,102,000	10,581,000	$6,945,000	$4,851,000	$11,796,000
2046	7,650,000	3,040,000	10,690,000	$7,361,000	$4,944,000	$12,305,000
2047	7,819,000	2,979,000	10,798,000	$7,786,000	$5,025,000	$12,811,000
2048	7,990,000	2,917,000	10,907,000	$8,220,000	$5,095,000	$13,315,000
2049	8,160,000	2,855,000	11,015,000	$8,662,000	$5,155,000	$13,817,000
2050	8,330,000	2,793,000	11,123,000	$9,114,000	$5,205,000	$14,319,000
2051	8,440,000	2,830,000	11,270,000	$9,394,000	$5,367,000	$14,761,000
2052	8,548,000	2,865,000	11,413,000	$9,682,000	$5,534,000	$15,216,000
2053	8,656,000	2,901,000	11,557,000	$9,979,000	$5,707,000	$15,686,000
2054	8,761,000	2,935,000	11,696,000	$10,286,000	$5,885,000	$16,171,000
2055	8,862,000	2,968,000	11,830,000	$10,602,000	$6,068,000	$16,670,000
2056	8,934,000	2,991,000	11,925,000	$10,877,000	$6,227,000	$17,104,000
2057	9,006,000	3,014,000	12,020,000	$11,159,000	$6,390,000	$17,549,000
2058	9,077,000	3,036,000	12,113,000	$11,448,000	$6,558,000	$18,006,000
2059	9,147,000	3,059,000	12,206,000	$11,746,000	$6,731,000	$18,477,000
2060	9,215,000	3,081,000	12,296,000	$12,051,000	$6,908,000	$18,959,000
2061	9,250,000	3,091,000	12,341,000	$12,304,000	$7,055,000	$19,359,000
2062	9,284,000	3,102,000	12,386,000	$12,562,000	$7,206,000	$19,768,000
2063	9,318,000	3,113,000	12,431,000	$12,826,000	$7,359,000	$20,185,000
2064	9,353,000	3,124,000	12,477,000	$13,096,000	$7,516,000	$20,612,000
2065	9,387,000	3,135,000	12,522,000	$13,372,000	$7,677,000	$21,049,000

(1) Video Revenue include video surcharge
(2) Nominal Dollars - Year of Expenditure/Collection also referred as future year dollars
(3) No toll leakage adjustments were applied to the toll revenue estimates

Figure 6-15 Annual Transactions under MARC Phase 2

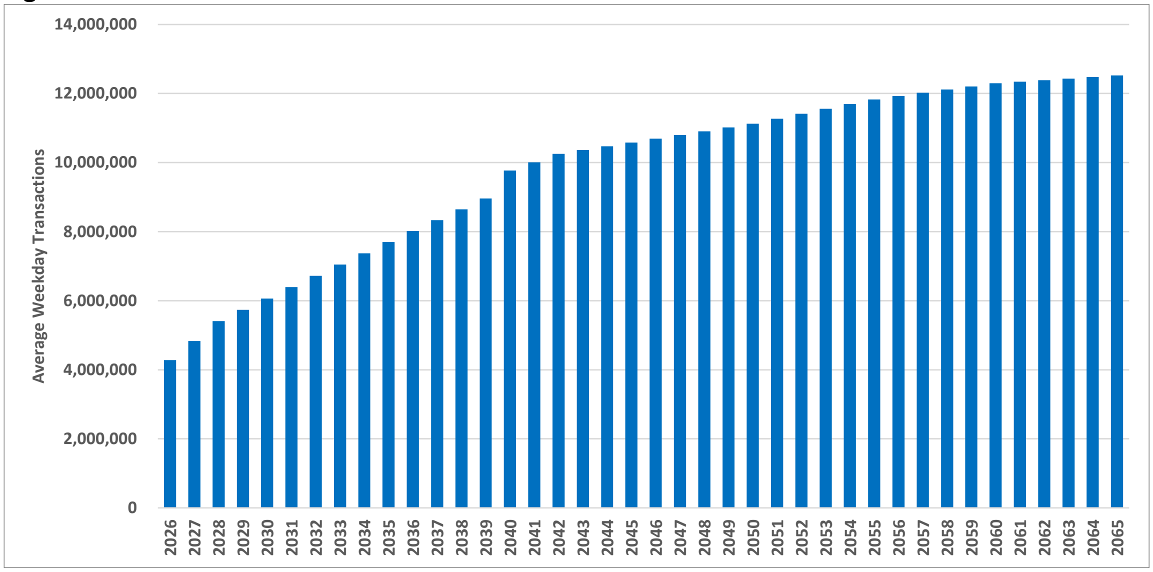


Figure 6-16 Annual Gross Toll Revenues in Nominal Dollars under MARC Phase 2

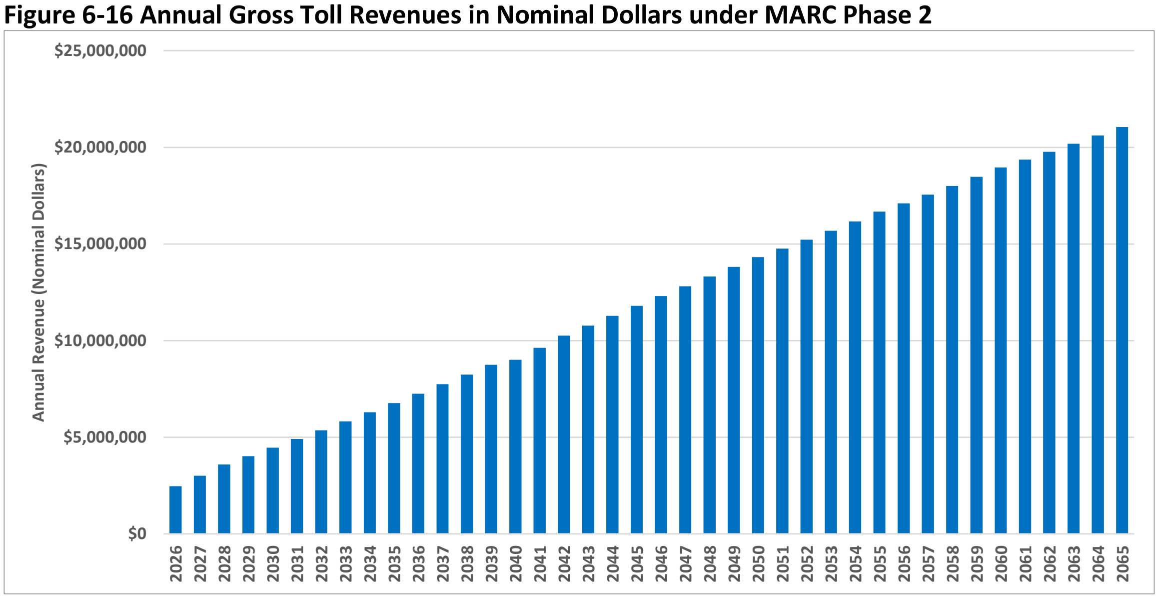


Table 6-18 Annual Transactions and Gross Toll Revenues under MARC Phase 2

Year	Annual Transactions	Total Gross Annual Toll Revenues (in nominal dollars)
2026	4,280,000	2,472,000
2030	6,064,000	4,462,000
2040	9,767,000	9,004,000
2050	11,123,000	14,319,000
2060	12,296,000	18,959,000
Average Annual Growth Rate		
2026-2030	9.1%	15.9%
2030-2040	4.9%	7.3%
2040-2050	1.3%	4.8%
2050-2060	1.0%	2.9%

6.9 Sensitivity Analyses

Sensitivity analyses of the US 69 express lanes were undertaken to quantify the range under which the toll revenue generated by the facility may fall based on varying assumptions regarding key variables influencing the toll revenue potential of the express lanes corridor. The following section describes seven different sensitivity scenarios that were conducted for the years 2026 and 2050 to estimate the impact of several key input variables on the future forecasts of the toll revenues. The scenarios were structured to quantify the downside risk for several while also providing an assessment of the upside potential through the use of the official socioeconomic forecasts from MARC. The following provides a summary of the seven senstivities undertaken for the MARC Phase 2 scenario.

6.9.1 Value-of-Time Changes (+/- 20 Percent)

Motorists' willingness-to-pay tolls is influenced by a combination of their perceived value-of-time (VOT) and their expected travel time savings. The VOTs for drivers in the study area were estimated using the SP survey conducted in early 2021. The high and low VOT tests assumed an increase and decrease in VOT by 20 percent as compared to the values assumed under the MARC Phase 2 scenario.

6.9.2 Higher Toll Transponder Share

Another sensitivity test was performed by changing the assumed toll transponder transactions' share along the US 69 express lanes. The sensitivity test assumed a higher share of toll transponder transactions than that assumed under the MARC Phase 2 scenario to determine its impact on toll revenue. In 2026, the toll transponder transactions' share was increased to 60 percent (compared to 50 percent under the MARC Phase 2 scenario) reaching 85 percent in 2050 (compared to 75 percent under the MARC Phase 2 scenario).

6.9.3 No Trucks Allowed in the Express Lanes

Under the MARC Phase 2 scenario, commercial vehicles/trucks with more than two-axles are allowed access to the express lanes. A sensitivity test was performed to assess the impact of not allowing truck traffic along the US 69 express lanes.

6.9.4 Transaction and Revenue Days Changes

A weekend revenue reduction was undertaken to reflect the reduced and more evenly distributed weekend demand profiles resulting in lower traffic congestion during the weekends and thus yielding reduced toll rates and lower traffic levels for the express lanes compared to the typical weekday. The high and low transaction and revenue days sensitivity tests assumed a 10 day increase (290 transaction days and 275 revenue days) and decrease (270 transaction days and 255 revenue days) in transaction and revenue days at each toll gantry compared to the transaction and revenue days assumed under the MARC Phase 2 scenario (280 transaction days and 265 revenue days).

6.9.5 No Thoroughfare Improvements

This sensitivity was performed to test the impact of excluding the planned thoroughfare improvements based on *Connected KC 2050* that were assumed to occur in 2040 and 2050 and were included in the MARC Phase 2 scenario.

6.9.6 High Demand Growth

This sensitivity test analyzed the impact of excluding extended telecommuting trends, thereby not assuming a higher rate of work-from-home (WFH) trends as was considered under the MARC Phase 2 scenario. In addition, a 20 percent increase in the VOT in the region was also assumed under this sensitivity test.

6.9.7 Changes in Socioeconomic Growth

This scenario simulated the effect of changes in the socioeconomic growth in the region by +/- five percent as compared to the MARC Phase 2 scenario. Note that for this scenario a reduction/increase of five percent was applied directly to the growth in trip tables as a proxy for the change in socioeconomic growth.

Figure 6-17 and **6-18** show the results of the sensitivity analysis for the US 69 corridor in 2026 and 2050, respectively.

Figure 6-17 Sensitivity Analysis Summary Chart – 2026

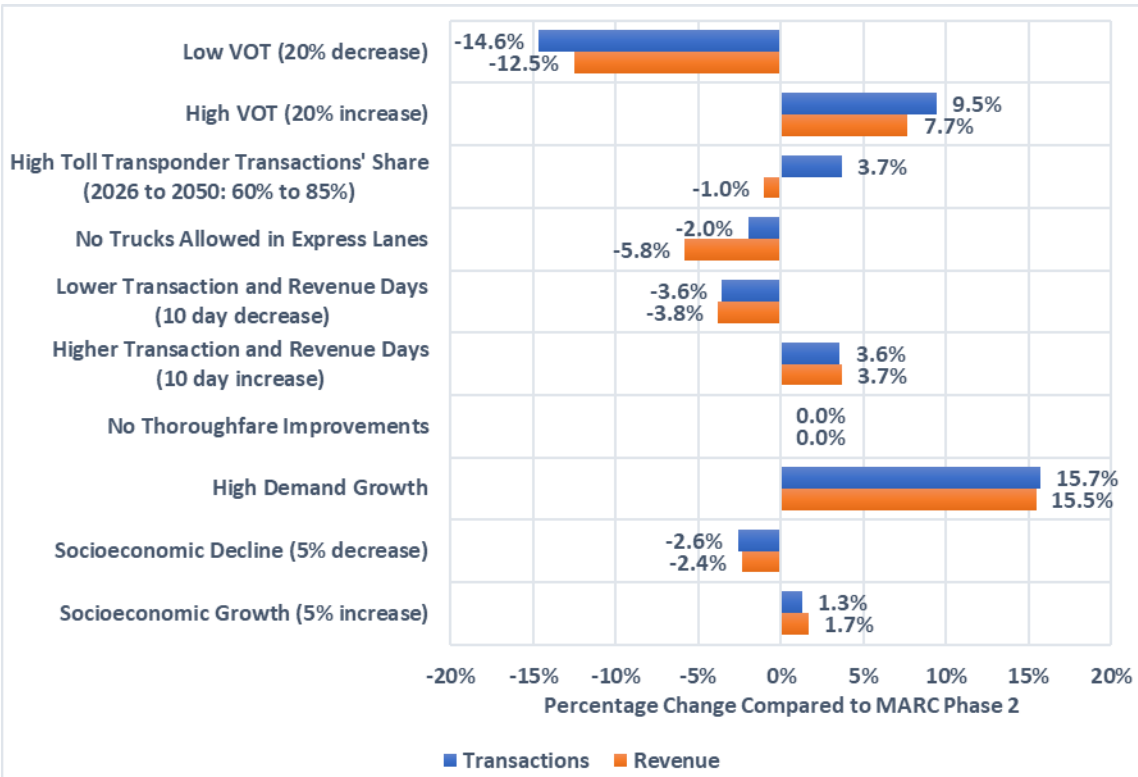
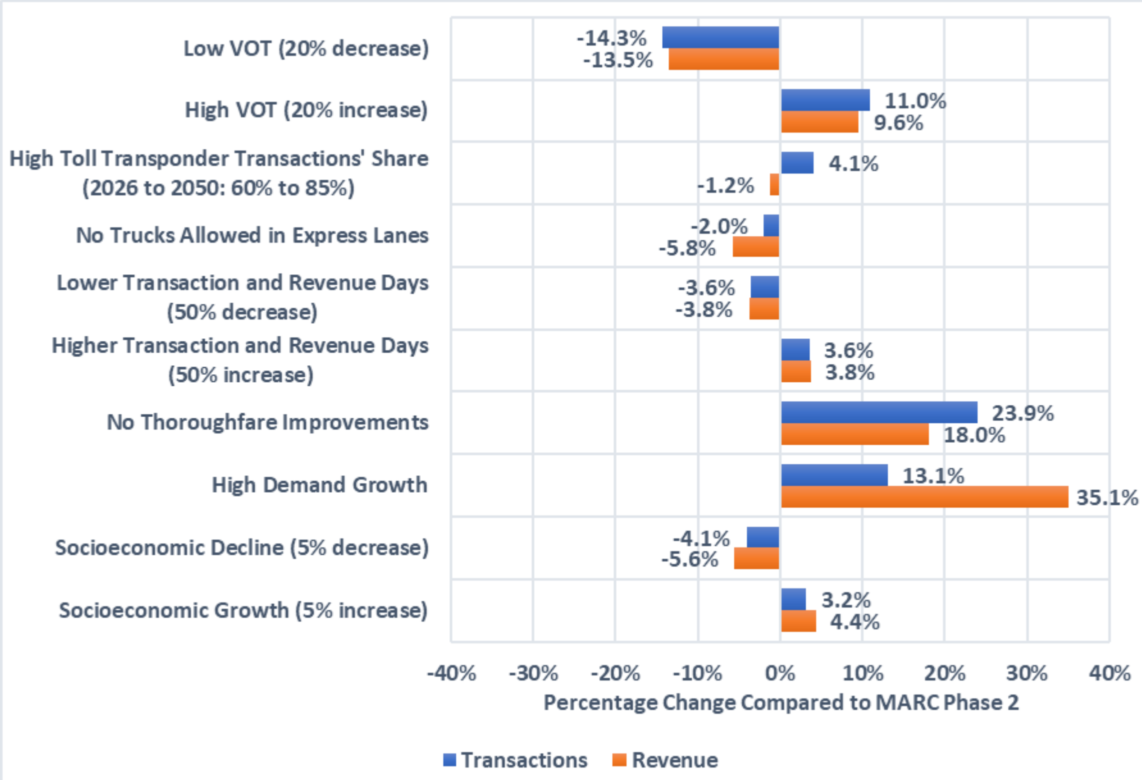


Figure 6-18 Sensitivity Analysis Summary Chart – 2050



As shown in **Figures 6-17** and **6-18**, the results demonstrate that with decreasing VOTs, demand growth, transaction and revenue days or truck share, the traffic and toll revenue potential decreases. Conversely, increasing these values, as well as excluding thoroughfare improvements in 2050, led to higher transactions and toll revenues as compared to the MARC Phase 2 scenario. The higher toll transponder transactions share scenario led to an increase in transactions but a lower revenue due to a decrease in video surcharge revenue.

Table 6-19 provides the annual transaction and gross toll revenue forecasts (in thousands) respectively for the MARC Phase 2 scenario and each of the seven sensitivity scenarios along with the numerical and percentage difference in the annual transaction and gross toll revenue estimates between each of the sensitivity scenarios and the MARC Phase 2 scenario.

Table 6-19 Sensitivity Tests – Impact on Transactions and Toll Revenue

Sensitivity Test	Annual Transactions (in '000s)		Annual Toll Revenue (in '000s)	
	2026	2050	2026	2050
Phase 2 Using MARC Forecasts	**4,280**	**11,123**	**$2,472**	**$14,319**
Low VOT (20% decrease)	**3,653**	**9,534**	**$2,162**	**$12,388**
Difference vs. Base	-627	-1,589	-310	-1,931
Percentage Impact vs. Base	-14.6%	-14.3%	-12.5%	-13.5%
High VOT (20% increase)	**4,685**	**12,342**	**$2,662**	**$15,687**
Difference vs. Base	405	1,219	190	1,368
Percentage Impact vs. Base	9.5%	11.0%	7.7%	9.6%
High Toll Transponder Transactions' Share (2026 to 2050: 60% to 85%)	**4,438**	**11,581**	**$2,447**	**$14,147**
Difference vs. Base	158	458	-26	-172
Percentage Impact vs. Base	3.7%	4.1%	-1.0%	-1.2%
No Trucks Allowed in Express Lanes	**4,195**	**10,906**	**$2,328**	**$13,493**
Difference vs. Base	-85	-217	-144	-826
Percentage Impact vs. Base	-2.0%	-2.0%	-5.8%	-5.8%
Lower Transaction and Revenue Days (10-day decrease)	**4,127**	**10,726**	**$2,378**	**$13,778**
Difference vs. Base	-153	-397	-94	-541
Percentage Impact vs. Base	-3.6%	-3.6%	-3.8%	-3.8%
Higher Transaction and Revenue Days (10-day increase)	**4,433**	**11,521**	**$2,564**	**$14,859**
Difference vs. Base	153	398	92	540
Percentage Impact vs. Base	3.6%	3.6%	3.7%	3.8%
No Thoroughfare Improvements	**4,280**	**13,786**	**$2,472**	**$16,899**
Difference vs. Base	0	2,663	0	2,580
Percentage Impact vs. Base	0.0%	23.9%	0.0%	18.0%
High Demand Growth	**4,954**	**12,578**	**$2,854**	**$19,341**
Difference vs. Base	674	1,455	382	5,022
Percentage Impact vs. Base	15.7%	13.1%	15.5%	35.1%
Socioeconomic Decline (5% decrease)	**4,169**	**10,668**	**$2,413**	**$13,516**
Difference vs. Base	-111	-455	-59	-803
Percentage Impact vs. Base	-2.6%	-4.1%	-2.4%	-5.6%
Socioeconomic Growth (5% increase)	**4,334**	**11,479**	**$2,513**	**$14,951**
Difference vs. Base	54	356	41	632
Percentage Impact vs. Base	1.3%	3.2%	1.7%	4.4%

Appendix A

Independent Economic Review

This appendix contains the documentation of the independent economic review as provided by the subconsultant, *EBP*. This report was provided to CDM Smith in May 2021.

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DRAFT

EBP

TO: Kip Strauss (HNTB) and Yagnesh Jarmarwala (CDM Smith)
FROM: Adam Blair (EBP)
DATE: May 14, 2021
RE: 69 Express Project, Phase 1 Technical Documentation (EBP Task 1 and Task 2)

This document describes the methodology and results EBP employed for (a) developing county- and zone-level socioeconomic forecasts and (b) investigating the presence of major activity centers surrounding US 69 in Johnson County, Kansas. This information will be used in the U.S. 69 traffic and toll revenue estimates.

Executive Summary

EBP's review of the Mid-America Regional Council's (MARC) long-range socioeconomic forecast found an overestimation of 2015 population equaling about 32,400 people. However, the agency's estimates of households and employment are much closer to actual values in 2015. The implication of overestimating population is that the forecast begins with a higher base year when compared with forecasts that begin with actual 2015 population.

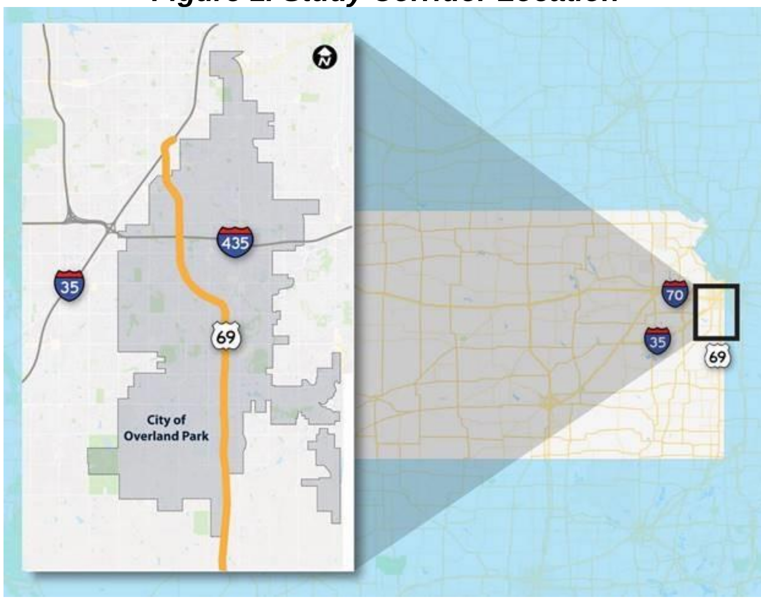
Between today and 2050, EBP expects less population and household growth but slightly more employment growth than what MARC forecasts for Johnson County and the surrounding region. This is due to changes in historical data mentioned above and the use of a different employment forecast source than what MARC uses. By 2050, EBP's high growth scenario exceeds MARC's baseline for population, households, and employment.

At a subcounty level, EBP expects already-developed areas in Johnson County to receive most of the growth in the coming decades. This assessment is based on research of planned and in-progress development projects; input from regional stakeholders; and a review of MARC and Johnson County's own growth assumptions.

Region of Analysis

EBP developed forecasts for an 8-county region that MARC uses in its travel model. The region includes Johnson County, Leavenworth County, Miami County, and Wyandotte County in Kansas, and Cass County, Clay County, Jackson County, and Platte County in Missouri. The study corridor is in Johnson County, Kansas, with its exact location shown in Figure 1 below.

Figure 1. Study Corridor Location



Validating Base Year Data

We began by comparing the 2015 base year forecast produced by MARC to actual estimated historical data to determine how much of a difference exists for population, households, and employment. This step is important because it indicates the extent to which future year forecast differences are explained by differences in the base year or “jumping off point” that growth rates apply to.

The tables below provide a comparison between 2015 MARC values and 2015 population and households from the American Community Survey (ACS) and 2015 employment from the Quarterly Census of Employment and Wages (QCEW), a U.S. Bureau of Labor Statistics product. Table 1 shows that the MARC forecast overestimated 2015 population for most study region counties. Taken together, MARC’s regional population total is about 32,400 above what the ACS estimates the actual population was in 2015. In Johnson County, there is an overestimate of about 13,300 people.

Table 1. Comparison between Forecast and Actual Estimated Population, 2015

County	2015 Population ACS Actual	2015 Population MARC Forecast	Difference
Cass	100,781	101,605	+824
Clay	230,361	235,645	+5,284
Jackson	680,905	687,633	+6,728
Johnson	566,814	580,161	+13,347
Leavenworth	78,227	79,316	+1,089
Miami	32,688	32,552	-136
Platte	93,394	96,091	+2,697
Wyandotte	160,806	163,363	+2,557
MARC Region	**1,943,976**	**1,976,366**	**+32,390**

Sources: MARC and American Community Survey 2011-2015 5-Year Estimates

Table 2 shows that MARC's household forecast for 2015 nearly matches the ACS's estimate of actual households. Regionally, there is an overestimate of just 22 households. In Johnson County, MARC underestimated by 1 household. This indicates that MARC updated its forecast to reflect actual household data from the ACS.

Table 2. Comparison between Forecast and Actual Estimated Households, 2015

County	2015 Households ACS Actual	2015 Households MARC Forecast	Difference
Cass	37,945	37,944	-1
Clay	87,676	87,677	+1
Jackson	274,485	274,488	+3
Johnson	219,735	219,734	-1
Leavenworth	26,747	26,749	+2
Miami	12,560	12,561	+1
Platte	37,556	37,562	+6
Wyandotte	58,870	58,881	+11
MARC Region	**755,574**	**755,596**	**+22**

Sources: MARC and American Community Survey 2011-2015 5-Year Estimates

Table 3 shows that MARC's 2015 forecast underestimated employment at a regional level by about 900 jobs. In Johnson County, MARC underestimated employment by about 16,100 jobs. MARC overestimates employment by about 15,700 jobs in Jackson County, Missouri, which includes part of Kansas City.

Table 3. Comparison between Forecast and Actual Estimated Employment, 2015

County	2015 Employment QCEW Actual	2015 Employment MARC Forecast	Difference
Cass	25,169	26,384	+1,215
Clay	97,566	95,157	-2,409
Jackson	358,270	373,934	+15,664
Johnson	334,691	318,559	-16,132
Leavenworth	20,579	18,705	-1,874
Miami	8,027	8,707	+680
Platte	41,520	41,910	+390
Wyandotte	88,302	89,867	+1,565
MARC Region	**974,124**	**973,223**	**-901**

Sources: MARC and Quarterly Census of Employment and Wages

In conclusion, our review found that the MARC forecast overestimated 2015 population by about 32,400 people. However, its estimates of households and employment are much closer to actual values in 2015. The implication of overestimating population is that the forecast begins with a higher base year when compared with forecasts that begin with actual 2015 population.

Forecast Methodology

EBP developed a base case and two alternative scenario forecasts representing a base case (medium scenario), high growth scenario, and low growth scenario. These scenarios are based on population, household, and employment forecasts developed by Moody's Analytics for the Kansas City region. Moody's produces socioeconomic forecasts used by government agencies and private companies around the world.

In addition to their baseline forecast, Moody's provides alternative forecast scenarios that incorporate different assumptions regarding monetary policy, fiscal policy, the strength of the U.S. dollar, energy prices, and the COVID-19 pandemic. The Moody's baseline forecast represents the most likely outcome. Moody's alternative scenarios S0 and S4 constituted the adopted high growth and low growth scenarios, respectively.

- S0 is Moody's "Upside – 4th Percentile" alternative scenario. According to Moody's, "This above-baseline scenario is designed so that there is a 4% probability that the economy will perform better than in this scenario, broadly speaking, and a 96% probability that it will perform worse."[1]

- S4 is Moody's "Downside – 96th Percentile" alternative scenario. According to Moody's, "In this scenario, there is a 96% probability that the economy will perform better, broadly speaking, and a 4% probability that it will perform worse."

The Moody's baseline forecast is available for individual counties in Missouri and Kansas, whereas the alternative scenario forecasts are available only for the Kansas City metropolitan statistical area (MSA). Because of this, EBP applied county shares from the baseline forecast to the MSA-level scenario forecasts to develop high- and low-growth scenarios at a county level. EBP also developed employment forecasts for three "super sectors": retail, service, and other (e.g., construction, manufacturing, utilities). We did so by applying sector shares from MARC's baseline forecast to total employment by year.

To develop the forecasts, EBP first adjusted the MARC baseline forecast to correct for over- and underestimation described in Tables 1-3. We then applied annual growth rates from Moody's to generate a forecast series for years 2025, 2030, 2040, and 2050. The latest historical year became 2020, which was important for capturing the impacts of the COVID-19 pandemic, especially on employment.

Johnson County Forecasts

This section focuses on Johnson County since it is where the study corridor is located. Figure 2 provides a comparison of MARC's baseline population forecast for Johnson County with EBP's base case (medium), high growth, and low growth forecasts.[2] The figure legend shows growth rates between 2010-2050. Growth rates range from 28 percent under the low growth scenario to 36 percent under the high growth scenario.

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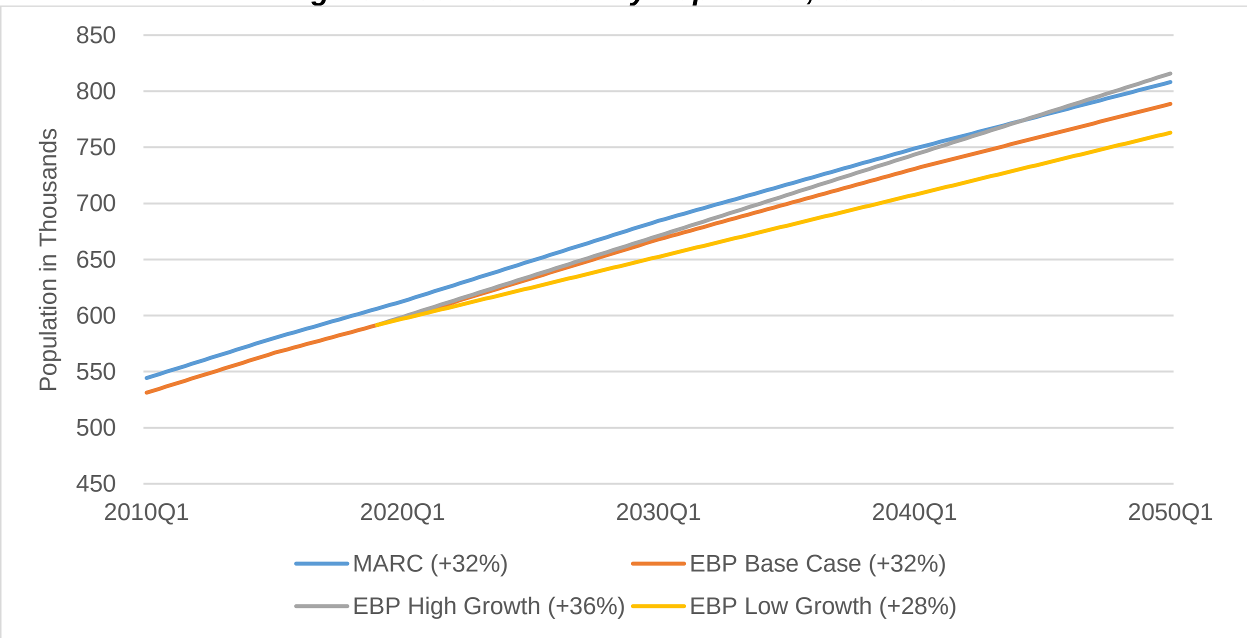
[1] Moody's Analytics, "U.S. Macroeconomic Outlook Baseline and Alternative Scenarios," October 2020.

[2] MARC's baseline forecast is what the agency uses for travel modeling purposes. MARC uses the economic modeling software REMI to generate the forecast (https://www.marc.org/Data-Economy/Forecast/Forecast-Process/Overview).

The base case growth rate is 32 percent, which is the same as MARC's. However, because of MARC's 2015 overestimation described previously, its population forecast is greater than the base case through 2050. In 2050, there is a difference of about 53,000 people between the high growth and low growth scenarios.

Figure 2. Johnson County Population, 2010-2050

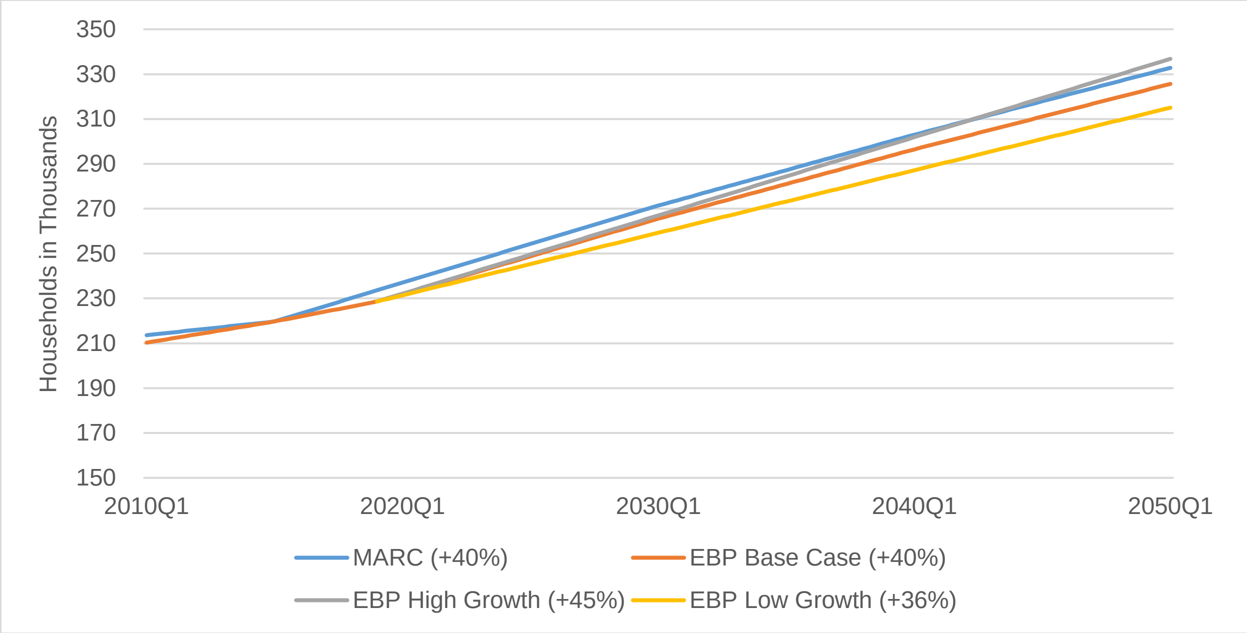


Source: MARC and EBP analysis of Moody's Analytics forecasts
Note: Growth rates for the 2010-2050 period are shown in the legend next to the name of each forecast series.

Figure 3 provides a comparison of MARC's baseline household forecast for Johnson County with EBP's base case (medium), high growth, and low growth forecasts. The figure legend shows growth rates between 2010-2050. Growth rates range from 36 percent under the low growth scenario to 45 percent under the high growth scenario.

The base case growth rate is 40 percent, which is the same as MARC's. MARC barely overestimated households in 2015, which is why the forecasts are essentially the same in that year. However, between 2015-2020, MARC's forecast accelerates at a greater rate than the base case forecast, meaning there is still a difference of about 11,000 households in 2050. The difference between the high and low growth scenarios is about 22,000 households in 2050.

Figure 3. Johnson County Households, 2010-2050



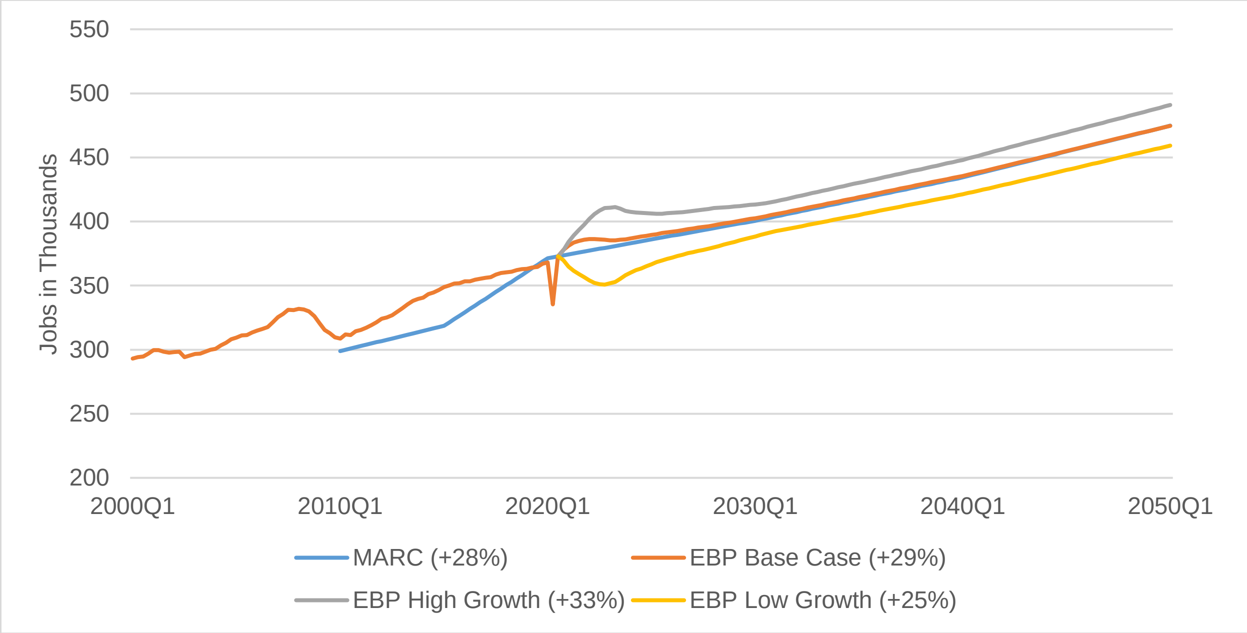
Source: MARC and EBP analysis of Moody's Analytics forecasts
Note: Growth rates for the 2010-2050 period are shown in the legend next to the name of each forecast series.

Figure 4 provides a comparison of MARC's baseline employment forecast for Johnson County with EBP's base case (medium), high growth, and low growth forecasts. The figure illustrates the impact of the COVID-19 pandemic and related business closures on Johnson County employment. In the first half of 2020, employment fell significantly as businesses throughout the county closed. MARC's baseline forecast does not show this impact because it was developed before 2020. (For comparison, Figure 4 also shows how Johnson County employment fell during the 2007-2009 Great Recession.)

After 2020, EBP's base case scenario assumes that employment will return to its pre-COVID trajectory by the mid-2020s, putting it in line with MARC's baseline. Under the high growth scenario, employment will jump considerably following waves of fiscal stimulus before reaching an equilibrium around 2030 at a higher sustained level through 2050. (Moderate job losses could occur between 2023-2024 because of a decrease in stimulus spending, which lowers demand and means some employers require fewer workers.) Under the low growth scenario, Johnson County will experience a short-term recession and not recover to MARC's baseline level by 2050.

The figure legend shows long-term growth rates between 2020-2050. They range from 25 percent under the low growth scenario to 33 percent under the high growth scenario. The base case growth rate is 29 percent, which is 1 percentage point higher than MARC's. The difference in 2050 between the high growth and low scenarios is about 32,000 jobs.

Figure 4. Johnson County Employment, 2000-2050



Source: MARC and EBP analysis of Moody's Analytics forecasts
Note: Growth rates for the 2000-2050 period are shown in the legend next to the name of each forecast series.

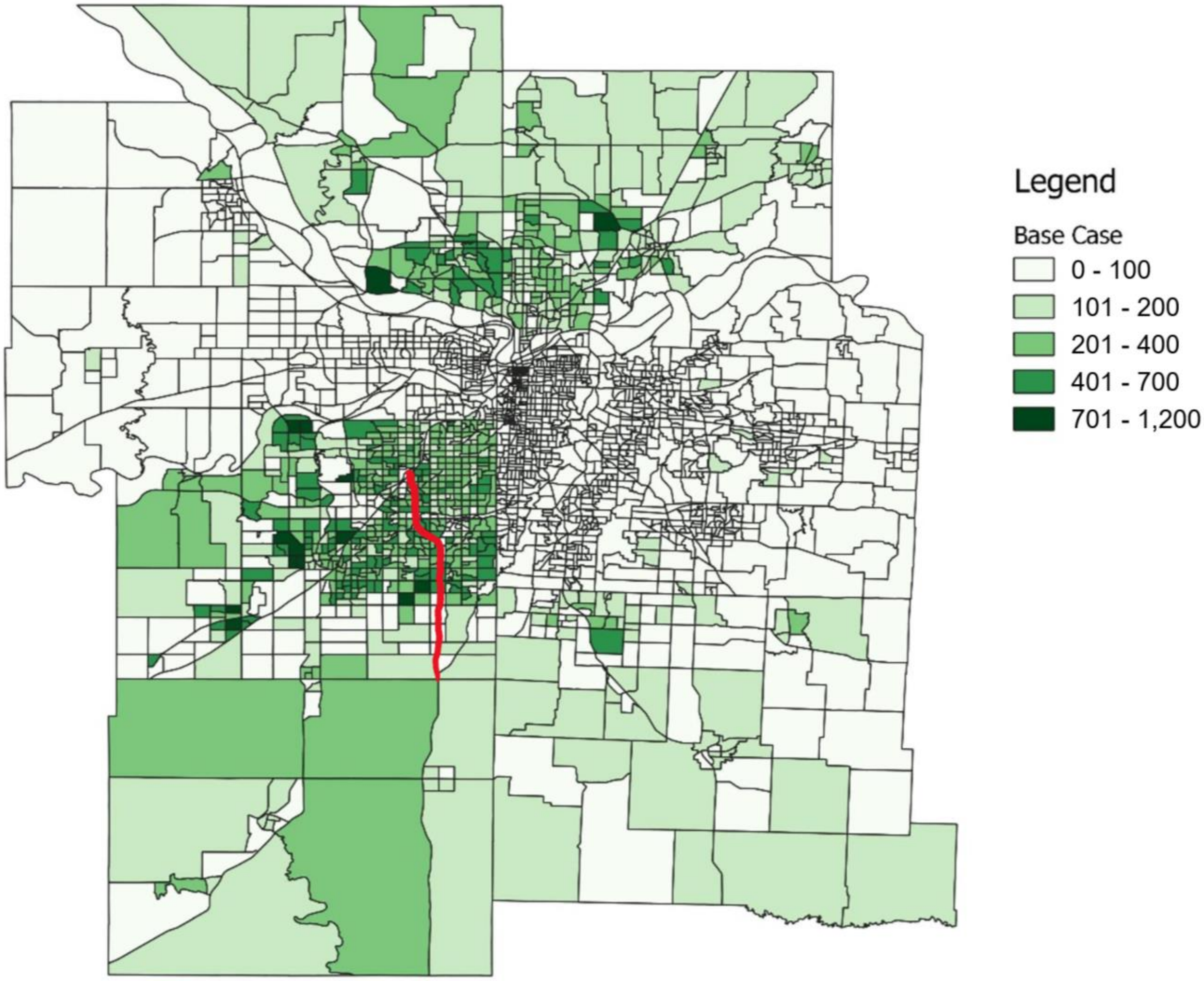
Zonal Allocation

EBP reviewed MARC's zone-level forecasts to determine how the agency expects spatial growth patterns to change in future years. We found that because of methodological changes, growth patterns were not comparable between MARC's interim forecast years (i.e., 2020, 2030, 2040, 2050). Our comparison showed significant declines in population, households, and employment for many zones in the study area and throughout Johnson County. These patterns were deemed unrealistic given Johnson County's historic growth in the zones showing declines.

For this reason, EBP allocated county control totals using zonal shares from MARC's 2019 baseline forecast. This means that while county-level forecasts are different from MARC's, sub-county growth patterns are held constant except for several zones EBP adjusted based on web research and stakeholder input, as described later.

Figure 5 shows the expected zone-level change in population between 2025-2050 under the EBP base case scenario. (The high and low growth scenarios show similar growth patterns but in greater and lesser magnitudes, respectively.) Zones with the greatest expected population growth are in northeast Johnson County and the southern portions of Clay County, Missouri, and Platte County, Kansas.

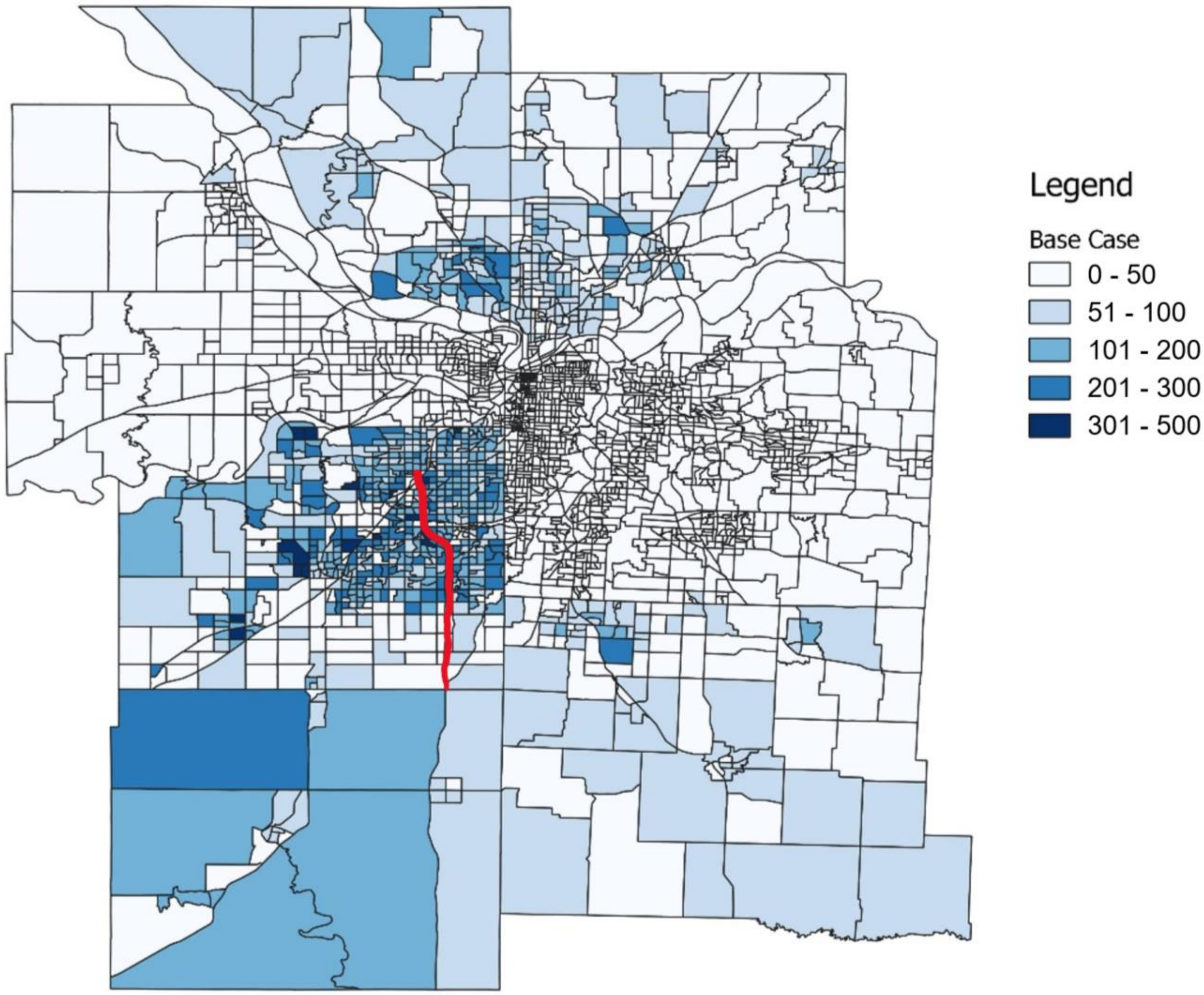
Figure 5. Change in Study Region Population, 2025-2050 (US 69 Corridor Shown in Red)



Source: MARC and EBP analysis of Moody's Analytics forecasts
Note: The portion of US 69 located in Johnson County is shown in red.

Figure 6 shows the expected zone-level change in households between 2025-2050 under the EBP base case scenario. Because households grow in proportion to population, zones with the greatest expected household growth are again in Johnson, Clay, and Platte counties.

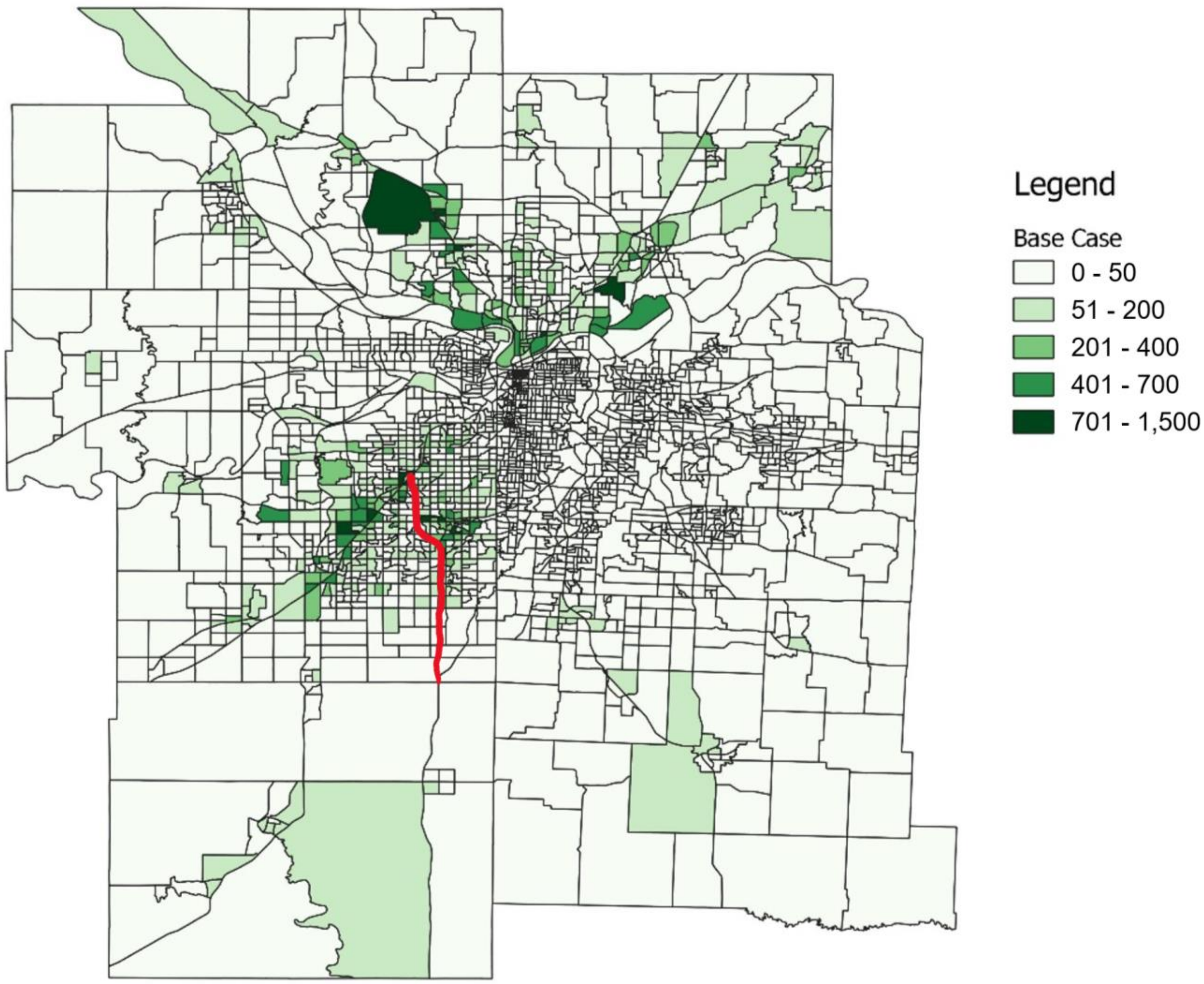
Figure 6. Change in Study Region Households, 2025-2050 (US 69 Corridor Shown in Red)



Source: MARC and EBP analysis of Moody's Analytics forecasts
Note: The portion of US 69 located in Johnson County is shown in red.

Figure 7 shows the expected zone-level change in employment between 2025-2050 under the EBP base case scenario. Zones with the greatest expected employment growth are in Johnson County, especially along I-35 and the northern portion of US 69.

Figure 7. Change in Study Region Employment, 2025-2050 (US 69 Corridor Shown in Red)



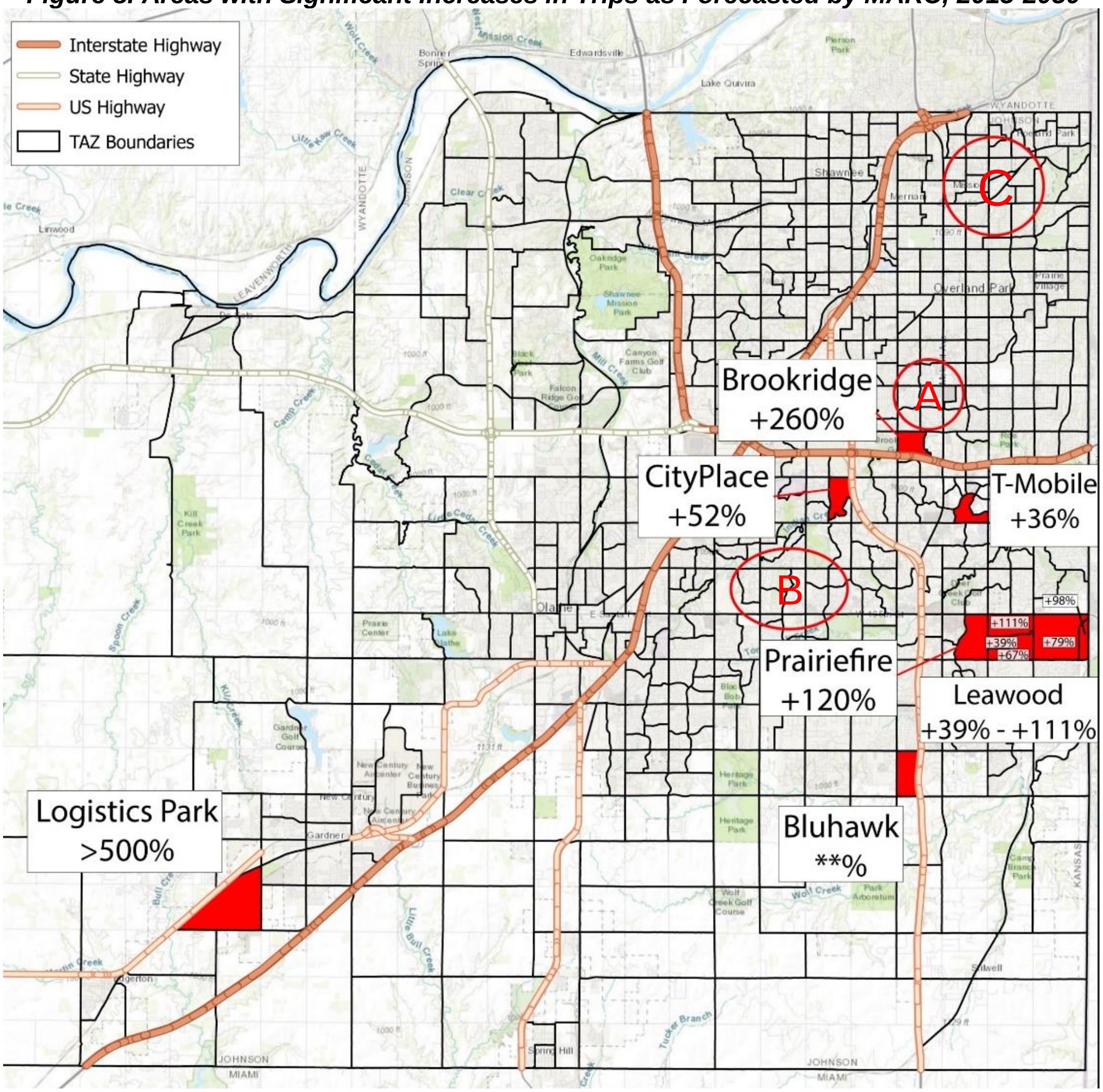
Source: MARC and EBP analysis of Moody's Analytics forecasts
Note: The portion of US 69 located in Johnson County is shown in red.

Stakeholder Input

EBP led a presentation on December 18, 2020, to several stakeholders in the study region. The purpose of the presentation was to solicit feedback on our regional forecasting process. Stakeholders included staff from the City of Overland Park, Johnson County, Mid-America Regional Council, and Kansas DOT, as well as members of the consulting team.

Our presentation included a discussion of MARC's baseline forecast, regional trip origins and destinations, our regional forecast, and several of the zone-level adjustments described above. Stakeholders were in general agreement with the forecasts we presented and the zones we proposed adjustments to. This includes zones with major developments planned or in progress, which are shaded in red in Figure 8. It also includes areas that are experiencing considerable growth without any known developments in the works (indicated with circles “A” and “B”). One exception is an area in the northeast corner of Johnson County where MARC’s forecast indicated there would be a significant increase in trips in future years (indicated with circle “C”). The City of Overland Park disagreed with this assessment as the area consists primarily of single-family homes and there are no known plans for redevelopment or up-zoning.

Figure 8. Areas with Significant Increases in Trips as Forecasted by MARC, 2015-2050



Source: MARC and EBP analysis

Note: Red zones and circles represent areas where significant trip increases are forecast to occur. There is no percentage growth in the zone where Bluhawk is located because the travel model shows that there were zero trips in that zone in 2015. Leawood is comprised of multiple zones; trips in the slowest-growing zone are forecast to increase by 39 percent between 2015-2050 and trips in the fastest-growing zone are forecast to increase by 111 percent.

Individual Zone Adjustments

EBP manually adjusted several zones to reflect stakeholder input and the latest status of major activity centers and planned developments in Johnson County. This step was important because there has been significant real estate activity near the corridor since 2015, which is MARC's most recent historical year. Even though MARC's forecast takes local land use plans into account, EBP determined that several zones warranted significant adjustments to better reflect commercial and residential development projections. Table 4 shows the zone IDs and associated developments that EBP adjusted. All adjusted zones are in Johnson County.

Table 4. Commercial and Residential Developments Receiving Population, Household, and Employment Adjustments

Development	Location	Description	TAZ IDs	Adjustment
Cyan Southcreek Apartments	East of US 69 between W 132nd St and W 135th St	Completed in 2020; 380 units	3248	Increase in population and households
Leawood	Undeveloped parcels along W 135th St between Nall Ave and State Line Rd	Undeveloped parcels on W 135th St totaling 250 acres	3298, 3299, 3300, 3301, 3302	Increase in retail, service, residential and other employment
Edgerton Intermodal Area and Logistics Park	North of US 50 in Edgerton	17M SQFT available in industrial buildings, 14M in distribution facilities	3593, 3595, 3596, 3597	Decrease in retail and service employment; increase in industrial employment
Brookridge Golf Course Redevelopment	North of I-435 between Antioch Rd and Metcalf Ave	Schedule shows 279K SQFT office by 2023, 613K by 2026	3159	Increase in population and households; increase in service employment
Bluhawk Shopping Center	159th St between Antioch Rd and US 69	First phase completed Jan. 2020; 667K SQFT retail, 206K hotel, 309K sports complex, 120K community center	3327	Increase in retail employment and residential
CityPlace Mixed Use Community	College Blvd between Nieman Rd and US 69	346K SQFT office (partially built/occupied), 30K retail planned, 1,100 res units partially built	3175	Increase in population and households; increase in retail, service, and other employment
Prariefire Shopping Center	W 135th St between Lamar Ave and Nall Ave	Planned completion in Dec. 2023; 90K SQFT retail, 60K office, 90 hotel rooms	3297	Increase in retail, service, and other employment
Residential Development Near Blue Valley School Complex	Between W 175th St, W 179th St, and Quivira Rd	Single-family home permits adjacent to Aubry Bend Middle School and Blue Valley Southwest High School	3644	Increase in population and households
T-Mobile Campus Expansion (Aspiria)	At 119th St and Nall Ave	First office bldg. complete in 2023; 1.4M SQFT office, 383K retail, 120 hotel rooms, 600 MF units	3190, 3191, 3192, 3193, 3194, 3195, 3196, 3197, 3198	Increase in population and households; increase in retail, service, and other employment

Source: EBP web research (as of April 2021)

Except for the area surrounding the Blue Valley School Complex, EBP assumed that most new development will happen north of W 167th St, with relatively less happening along the southern portion of the US 69 corridor in Johnson County. This is because recent development patterns indicate that already-developed parts of Johnson County will continue to densify given increased demand for mixed use developments with clustered retail and multifamily housing. EBP also spoke with officials in Miami County and determined that while the county is expected to grow overall in the coming decades, there are no known plans for large developments that justify upward adjustments to MARC's existing zone-level forecasts in that county.

Conclusion

In summary, between today and 2050, EBP expects less population and household growth but slightly more employment growth than what MARC forecasts for Johnson County and the surrounding region. This is due to changes in historical Census data and the use of a different employment forecast source than what MARC uses for its travel demand model.

By 2050, EBP's high growth scenario exceeds MARC's baseline for population, households, and employment. At a subcounty level, EBP expects already-developed areas in Johnson County to receive most of the growth in the coming decades. This assessment is based on research of planned and in-progress development projects; input from regional stakeholders; and a review of MARC and Johnson County's own growth assumptions.

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Appendix B

Stated Preference Survey Report

This appendix contains the documentation of the stated preference survey conducted by CDM Smith in early 2021.

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U.S. 69 Travel Patterns and Stated Preference Survey Report

CDM Smith conducted a travel pattern and stated preference (SP) survey of U.S. 69 travelers in support of the U.S. 69 Express Lanes Level-2 Traffic and Toll Revenue Study. The survey objectives included:

- Collecting information about the origin-destination (OD) patterns and trip characteristics of travelers within the study area
- Estimating the willingness to pay for travel time savings, or value of time (VOT), and travel time reliability, or value of reliability (VOR), for travelers within the study area

The report begins with a discussion of survey administration, followed by the presentation of trip characteristics and travel pattern data. Demographic data and a summary of survey comments are provided next. The report concludes with a summary of the stated choice experiment results, and a discussion of modeling methodology used to produce VOT and VOR estimates for the region. The estimated VOTs were incorporated into the travel demand model to support the traffic and toll revenue estimates.

A full set of screen-captures from the online survey are included in the **Appendix**.

1. Survey Administration

CDM Smith employed an online survey instrument which was open to respondents from January 22, 2021 through February 14, 2021. Approximately 10,000 postcard invitations were directly mailed to addresses with ZIP Codes within a 15-mile buffer of the U.S. 69 corridor study area inviting recipients to participate in the survey. Additionally, the survey link was posted on the Kansas Department of Transportation (KDOT) website, the 69 Express project website, the Overland Park Chamber of Commerce website, and the 69 Express group on the Nextdoor social media app. CDM Smith also conducted a social media marketing campaign using Facebook Business Manager to target ads to Facebook and Instagram account holders with home ZIP Codes within the corridor study area.

1.1 Survey Completion Statistics

A total of 2,513 respondents visited the survey website to attempt the survey. **Figure 1** illustrates that 1,677 (67 percent) completed the full survey, including SP tradeoff questions and demographic questions. An additional 775 respondents (31 percent) completed some portion of the survey, but did not complete all questions in the survey questionnaire. Using the 2019 Census estimate of the adult population of Johnson county (approximately 450,000[1]) as a proxy for the total population of the survey area, the 1,677 completed surveys are sufficient to provide a confidence level of 95 percent and a margin of error of 2.5 percent.

[1] U.S. Census 2019 American Community Survey (ACS) 1-Year Estimates. TableID: S0101. data.census.gov.

The remaining survey respondents (2 percent) were disqualified based on the initial screening question. Respondents were disqualified if they indicated that they had not made a recent trip in the U.S. 69 corridor between 103rd Street and 179th Street, as highlighted in **Figure 2**.

Figure 1 Survey Completion Statistics

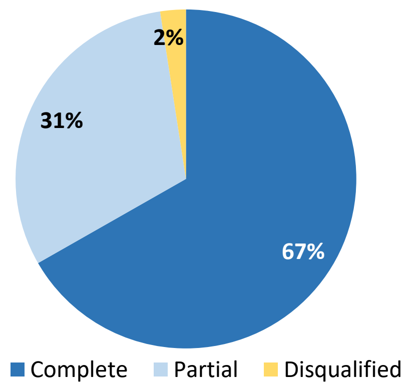
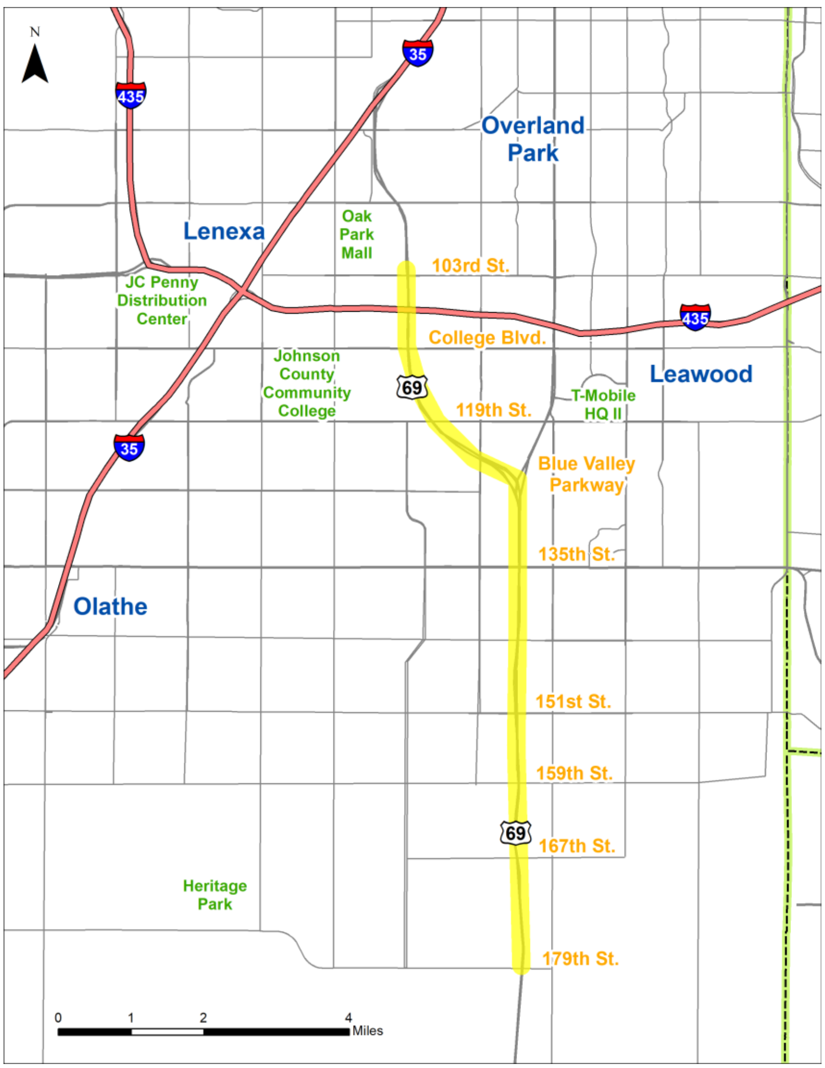


Figure 2 Survey Qualification Study Area Map



1.2 Survey Sample Weighting

The completed survey responses were compared with Johnson County Census demographic data to confirm that a representative sample of the population had been surveyed. It was observed that older age groups and higher income households were oversampled relative to American Community Survey (ACS) 2019 estimates, so the survey dataset was weighted to reflect ACS-suggested age and household income distributions. **Figures 3** and **4** show the final weighted survey distribution of age and household income for Johnson County compared with data from the ACS. The statistics presented in this report are all derived from the weighted survey dataset.

Figure 3 Age Distribution of Weighted Survey

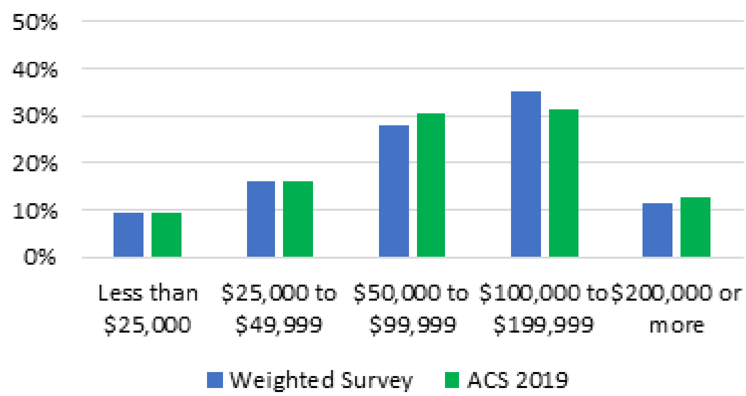
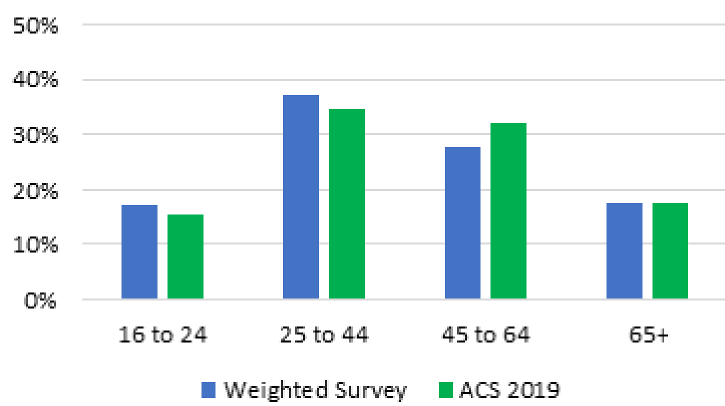


Figure 4 Household Income Distribution of Weighted Survey



2. Trip Characteristics

Respondents who met the required qualifications were asked to focus on their most recent, qualifying one-way trip on U.S. 69, also known as their "reference trip." Respondents were instructed to think of their most recent trip, and not a typical or average trip that they might make, in an attempt to capture as diverse a range of trip types and travel characteristics made by users of U.S. 69 as possible. This data was used to better inform the travel demand modeling process and to provide a clearer picture of the potential market for the facility.

2.1 COVID-19 Pandemic

Respondents were asked to give the date of their reference trip as being made on or before Friday, March 13, 2020, when the President of the United States declared a national emergency in response to the COVID-19 outbreak. In this report, trips made on or before March 13, 2020 are classified as "pre-COVID," while those made on or after March 14 are referred to as "post-COVID." To illustrate the degree to which traffic patterns were affected by COVID-19 mitigation efforts, such as the "stay-at-home" order issued by the governor of Kansas on March 28, 2020 (which went into effect on March 30, 2020), and the subsequent transition to remote work and schooling in the summer and fall of 2020, the pre-COVID and post-COVID trip characteristics data are presented separately and contrasted.

Additionally, it should be noted that while the survey was being conducted in January and February of 2021, the COVID vaccination was in the initial phase of public availability. The "post-COVID" period therefore should not be taken to mean "post-vaccination" conditions.

Figure 5 shows the distribution of reference trips in both the periods. 68 percent of total trips were described as post-COVID trips, and the remaining 32 percent were made before the COVID-19 pandemic.

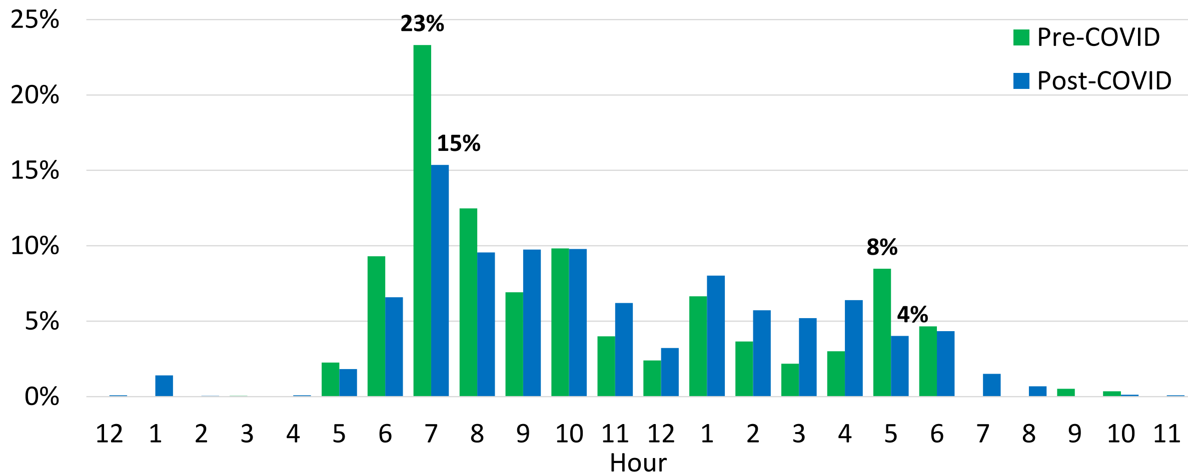
Figure 5 Pre-COVID and Post-COVID Trip Share

2.2 Time of Day of Travel

Respondents were first asked to select the time of day that they began their trip. The full distribution of trip start times is shown in **Figure 6.** For the study corridor, the morning peak is defined as being between 7:00 a.m. and 7:59 a.m., and the evening peak is between 5:00 p.m. and 5:59 p.m. In the pre-COVID period, 23 percent of respondents described a morning peak trip, and 8 percent described an evening peak trip.

As congestion on the corridor reduced due to the impacts of the pandemic, the distribution of trip times flattened out over the course of the day, and peaks became less well-defined. The morning peak share of total trips fell to 15 percent in the post-COVID period, and evening trips fell to 4 percent.

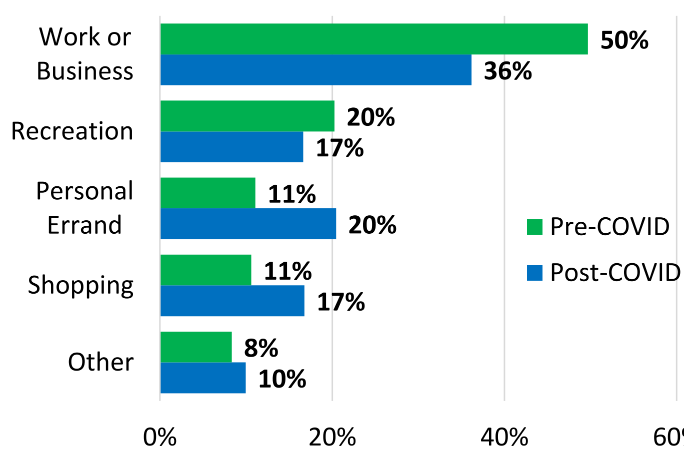
Figure 6 Time of Day of Travel



2.3 Trip Purpose

Survey takers were next asked to choose one of the following trip types that would best describe the purpose of their trip: work commute trip, work-related business trip, recreation trip, shopping trip, personal errand, or some other kind of trip. **Figure 7** provides a summary of respondents' trip purposes for the weighted survey sample of weekday travelers. The combined category of work commute trips and work-related business trips accounted for half of all trips in the pre-COVID period and was reduced to 36 percent of trips in the post-COVID period as many employees transitioned to remote work arrangements. Recreation trips also declined slightly as a share of total trips, from 20 percent to 17 percent, as recreational opportunities were reduced due to COVID-related economic closures.

Figure 7: Trip Purpose



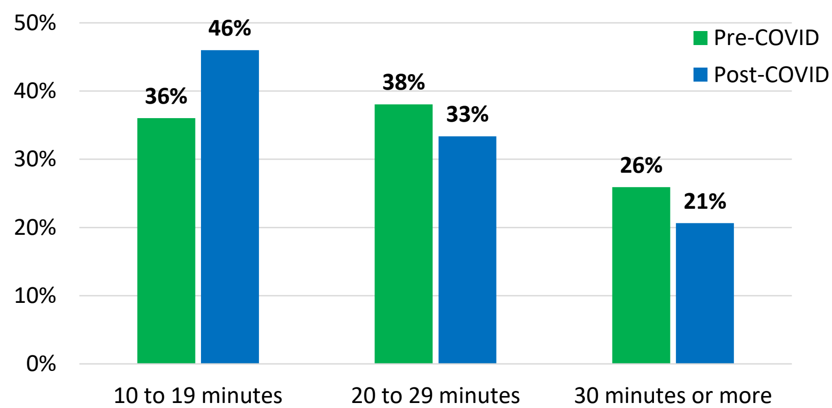
As work commutes and recreational trips decreased, personal errands and shopping trips, such as essential grocery shopping trips, correspondingly increased. Each had contributed 11 percent of total trips in the pre-COVID period, and in the post-COVID period, their shares increased to 20 percent and 17 percent, respectively.

2.4 Trip Travel Time

Survey takers were asked to estimate the time that it took to complete their trip. **Figure 8** shows user-estimated travel times by pre-COVID and post-COVID period.

Prior to the COVID-19 pandemic, U.S. 69 was used for longer trips, with the most common trip duration being 20 to 29 minutes (38 percent of all trips). Additionally, over one-quarter of pre-COVID trips were 30 minutes or more. Short trips were more common in the post-COVID period, with 46 percent of all trips taking less than 20 minutes. This finding again reflects the decrease in the share of longer work commute trips, with the share of shorter duration errands and shopping trips increasing as a percentage of all trips.

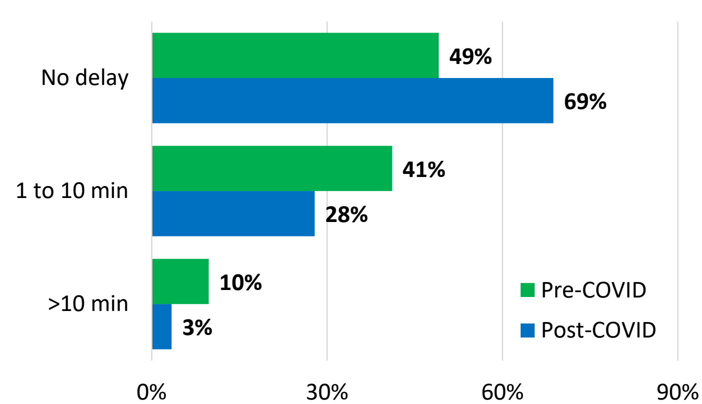
Figure 8: Trip Travel Time



2.5 Peak Hour Delay Time

Users' perceptions of peak hour delay time on U.S. 69 due to congestion, before and after the COVID pandemic, are given in **Figure 9**. Prior to the pandemic, more than half of peak hour travelers described at least some delay on U.S. 69, with most describing a delay of between 1 and 10 minutes (41 percent of the total population). Among those describing a post-COVID trip, the share who said they experienced no delay rose to 69 percent from 49 percent. The share describing delays of more than 10 minutes fell sharply, from 10 percent in pre-COVID times to 3 percent post-COVID.

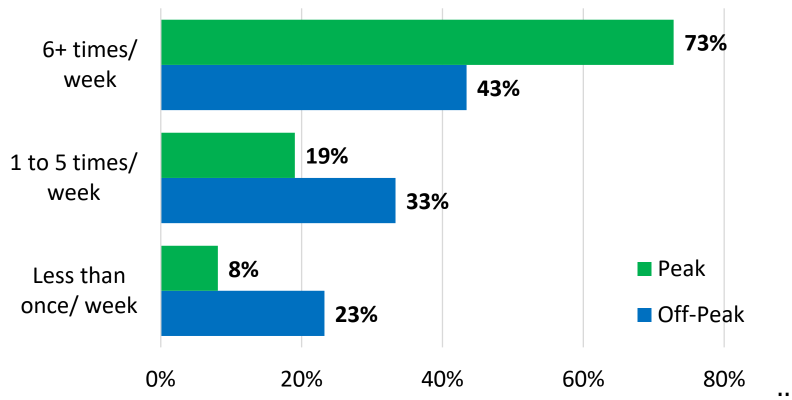
Figure 9: Peak Hour Delay Time Due to Congestion



2.6 Trip Frequency

U.S. 69 trip frequency statistics are given in **Figures 10** and **11**. **Figure 10** segments the data by peak (7:00 a.m. to 7:59 a.m. and 5:00 p.m. to 5:59 p.m.) and off-peak travel, and **Figure 11** contrasts pre-COVID and post-COVID travel.

Figure 10: Trip Frequency in Peak and Off-Peak



As expected, the data suggest that peak hour travelers—most often work commuters—use U.S. 69 more frequently than off-peak travelers. Seventy-three percent of peak travelers reported using the corridor six or more times per week, compared to 43 percent of off-peak travelers.

Figure 11: Trip Frequency Pre-COVID and Post-COVID

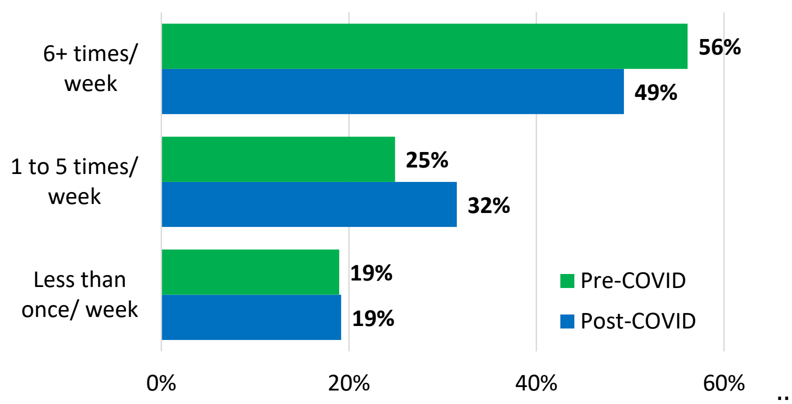


Figure 11 illustrates the impact of the COVID pandemic on frequency of use. The share of highest frequency travelers decreased from 56 percent to 49 percent after the beginning of the pandemic. These travelers shifted into the middle frequency category (1 to 5 times per week), which increased from 25 percent to 32 percent, as residents were encouraged to self-quarantine and avoid unessential travel.

2.7 Alternative Routes and Perceived Travel Time Savings

Possible alternative routes for respondents' reference trips on U.S. 69 are given in the map in **Figure 12**. The most frequently selected alternative route was Metcalf Avenue, which was selected by just under half of all respondents (**Figure 13**). The next most frequently given response was Quivira Road at 31 percent, followed by Nall Avenue at 23 percent. All other alternative routes were chosen by less than 20 percent of respondents.

Figure 12: Alternative Routes Maps

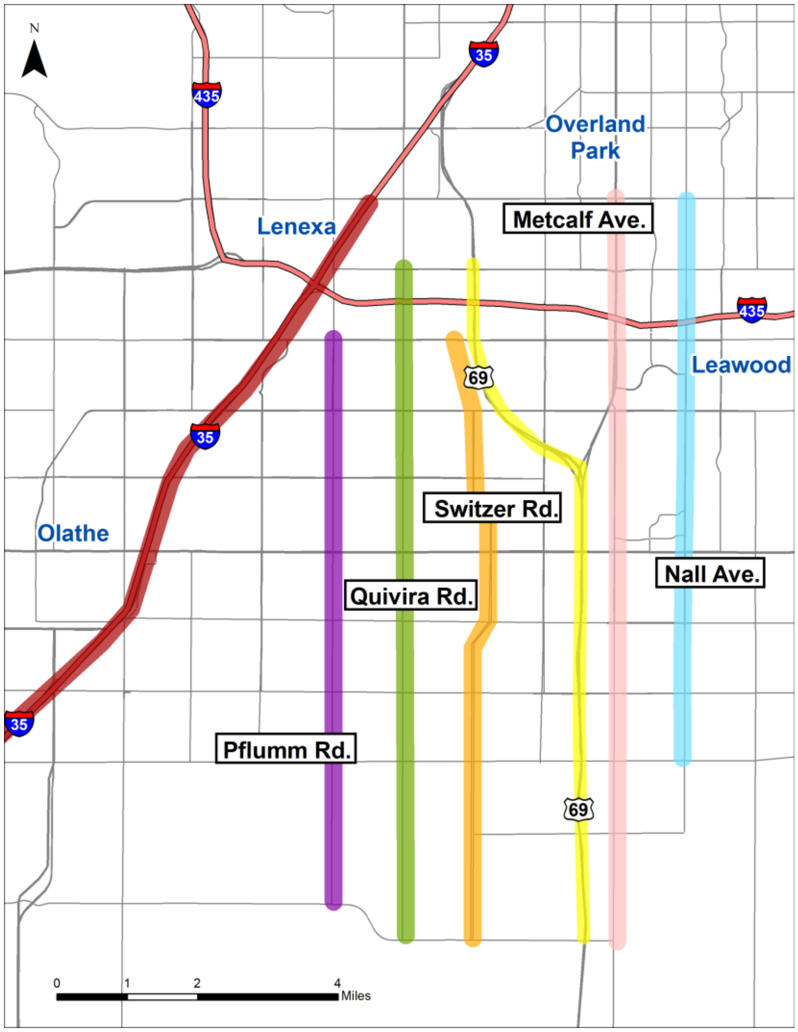
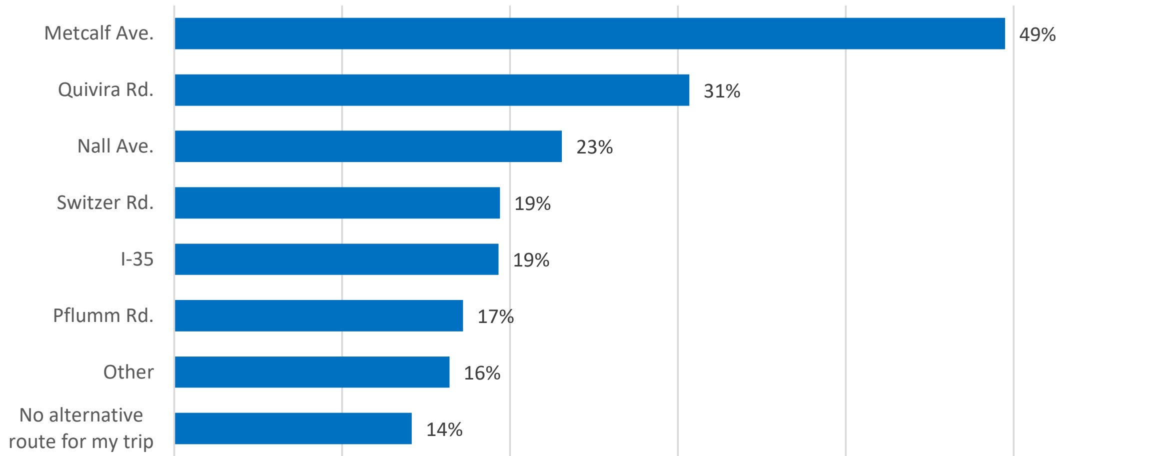


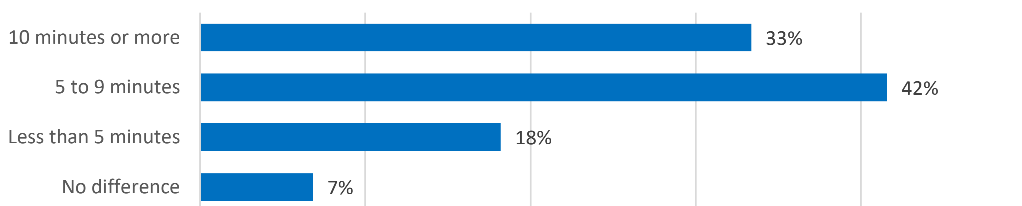
Figure 13: Alternate Routes Preference



Note: Due to multiple possible selections per respondent, total percentage sums to greater than 100%.

Survey takers were next asked to estimate the time savings of using U.S. 69 instead of the alternate routes available to them. Three-quarters of respondents said that U.S. 69 saved at least 5 minutes on their trip compared to an alternate route (**Figure 14**), with 33 percent stating that U.S. 69 provided 10 or more minutes of time savings.

Figure 14: U.S. 69 Time Savings over Alternative Route



3. Travel Patterns

Respondents were asked to identify where they began and ended their overall trip, and which interchanges they used to access and exit the U.S. 69 study corridor.

3.1 Trip Origins and Destinations

Respondents identified the specific location of their origin and destination using an interactive map (**Figure 15**). The origin and destination locations were then geocoded using a Google Maps application programming interface (API).

Figure 15 Trip Origin and Destination Survey Screen Sample

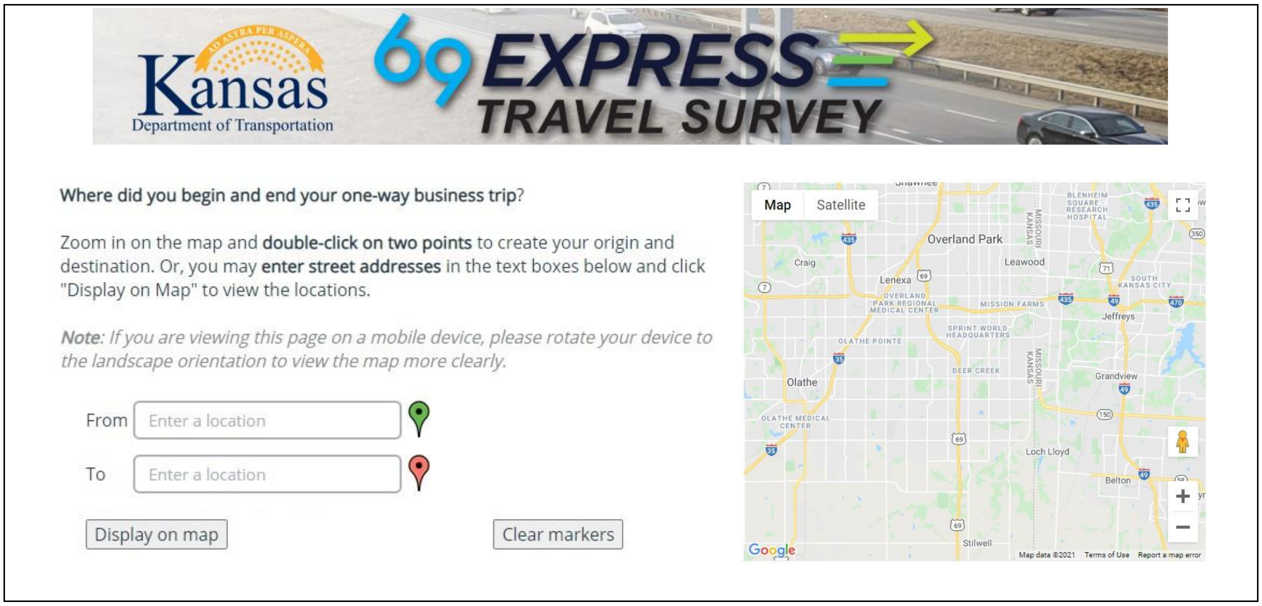


Table 1 shows survey respondents' top eight trip origins and destinations by total trip ends (the sum of trips originating from and ending at each location). These locations were determined by geocoding the geographic coordinates of each user's origin and destination from the Google Maps API, and then spatially joining those points with U.S. Census tracts.

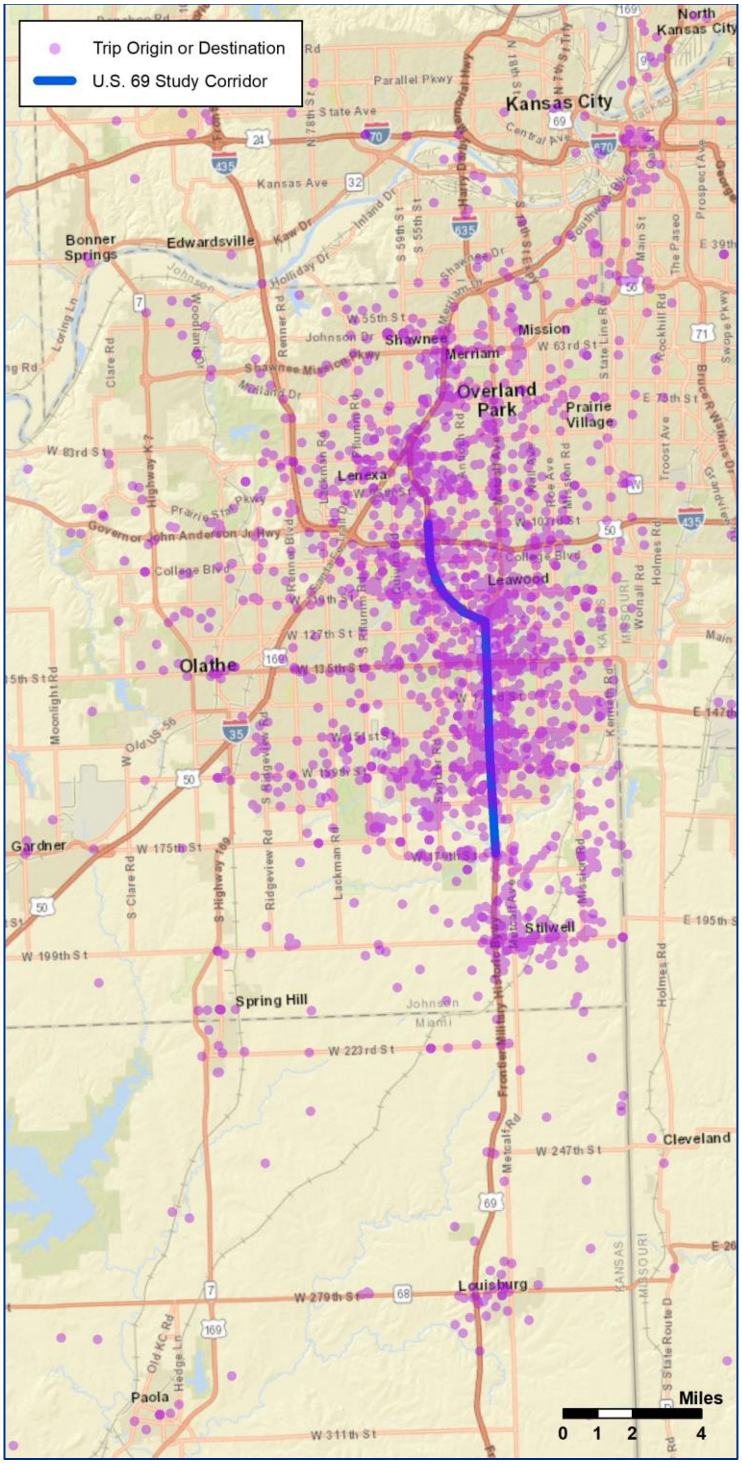
Table 1: Top Origins and Destinations by Community by Respondents

Name	County	Origins	Destinations	Total Trip Ends
Overland Park	Johnson	51%	52%	52%
Olathe	Johnson	13%	7%	10%
Stillwell/Aubry	Johnson	8%	4%	6%
Lenexa	Johnson	5%	6%	5%
Leawood	Johnson	4%	5%	5%
Shawnee	Johnson	3%	2%	3%
Bucyrus	Miami	4%	2%	3%
Louisburg	Miami	2%	2%	2%
All other Johnson County	Johnson	3%	4%	4%
All other Miami County	Miami	2%	1%	2%
All other locations	--	5%	15%	10%
Total	--	100%	100%	100%

The top eight trip origins and destinations collectively represent 85 percent of total trip ends. The top six trip end locations are all located in Johnson County, with the top overall location being Overland Park at 52 percent. In total, Johnson County accounts for 84 percent of total trip ends, followed by Miami County at 7 percent.

The trip ends in Johnson County were all located within an approximate 10-mile radius of the U.S. 69 study corridor, suggesting that the market for the express lanes on the facility will predominately serve local travelers. **Figure 16** displays trip ends from the survey in map form, illustrating the high concentration of trip ends in the communities immediately surrounding the U.S. 69 corridor.

Figure 16: Trip Origins and Destinations



3.2 Interchange Usage

The overall directional split of survey respondents was 56 percent northbound to 44 percent southbound. The distribution of the most frequently used entrance and exit ramps is presented in **Figure 17** for northbound travelers, and in **Figure 18** for those traveling southbound.

The most frequently cited entry point for northbound trips was 179th Street (or points south) at 40 percent of all northbound trips. In total, nearly 90 percent of northbound respondents entered the U.S. 69 corridor at or south of 135th Street. Most northbound travelers exited either at Blue Valley Parkway (17 percent), I-435 (20 percent), or at 103rd Street (or points north) (39 percent).

Figure 17 – Northbound Entrance Ramp and Exit Ramp Usage

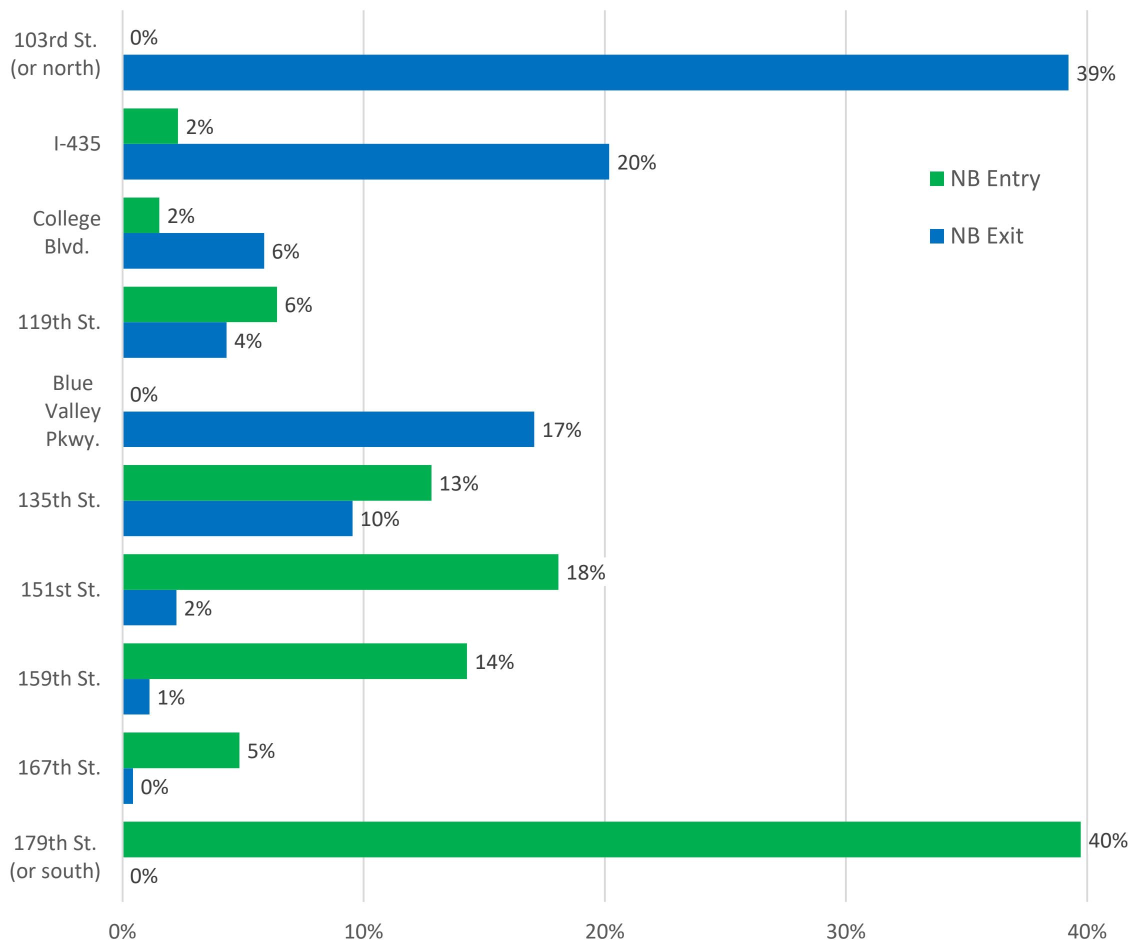
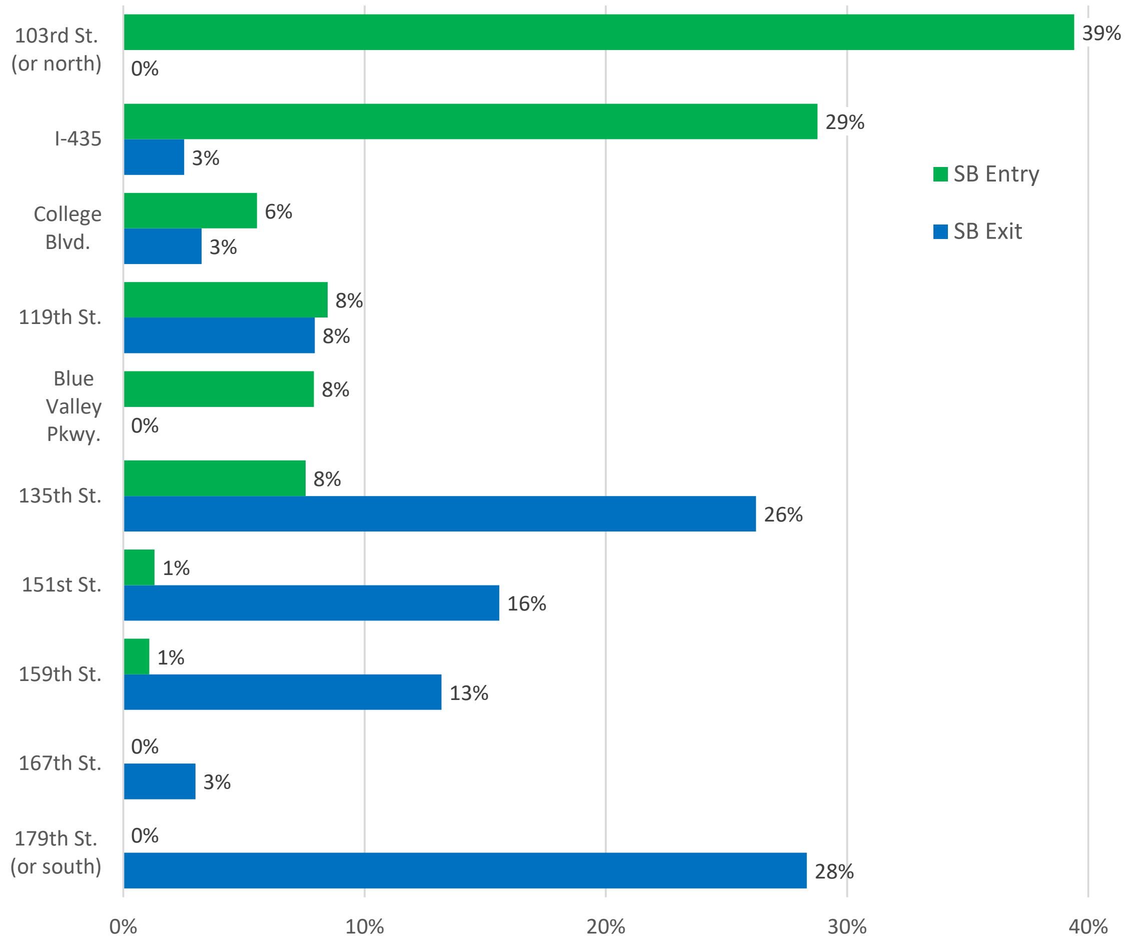


Figure 18 – Southbound Entrance Ramp and Exit Ramp Usage



Among southbound travelers, the two most common entry points were 103rd Street (or points north) (39 percent) and I-435 (29 percent). Like the reciprocal northbound trips, the most common exit points were at or south of 135th Street, with these five locations accounting for nearly 90 percent of southbound exits. The most common exit point was 179th Street (or points south), at 28 percent of total southbound trips.

The complete breakdown of interchange-to-interchange movements is provided in **Tables 2** and **3**. In the northbound direction, the single most commonly reported trip, at 11 percent of all trips, used the full U.S. 69 corridor from 179th Street to 103rd Street. Other common trips, which together accounted for 28 percent of all northbound trips, included 179th to 135th, 179th to Blue Valley Parkway, 151st to 103rd, and 135th to 103rd. The two most common southbound movements were I-435 to 135th Street and 103rd Street to 135th Street at 11 percent and 9 percent, respectively.

Table 2 – Southbound Interchange to Interchange Movements

Entrance		Exit										Total
		1	2	3	4	5	6	7	8	9	10	
1	103rd Street (or north of 103rd)	--	3%	2%	4%	0%	9%	7%	5%	1%	7%	**39%**
2	I-435		--	1%	4%	0%	11%	3%	3%	1%	7%	**29%**
3	College Blvd.			--	0%	0%	2%	2%	1%	0%	1%	**6%**
4	119th Street				--	0%	2%	2%	1%	0%	3%	**8%**
5	Blue Valley Parkway					--	2%	1%	1%	0%	3%	**8%**
6	135th Street						--	1%	2%	0%	5%	**8%**
7	151st Street							--	0%	0%	1%	**1%**
8	159th Street								--	0%	1%	**1%**
9	167th Street									--	0%	**0%**
10	179th Street (or south of 179th)										--	**--**
	Total	**0%**	**3%**	**3%**	**8%**	**0%**	**26%**	**16%**	**13%**	**3%**	**28%**	**100%**

Table 3 – Northbound Interchange to Interchange Movements

Entrance		Exit										Total
		10	9	8	7	6	5	4	3	2	1	
10	179th Street (or south of 179th)	--	0%	1%	2%	7%	7%	2%	3%	5%	11%	**40%**
9	167th Street		--	0%	0%	1%	1%	0%	0%	1%	1%	**5%**
8	159th Street			--	0%	1%	3%	0%	1%	3%	6%	**14%**
7	151st Street				--	0%	5%	1%	1%	4%	7%	**18%**
6	135th Street					--	1%	0%	1%	4%	7%	**13%**
5	Blue Valley Parkway						--	0%	0%	0%	0%	**0%**
4	119th Street							--	0%	3%	3%	**6%**
3	College Blvd.								--	0%	1%	**2%**
2	I-435									--	2%	**2%**
1	103rd Street (or north of 103rd)										--	**--**
	Total	**0%**	**0%**	**1%**	**2%**	**10%**	**17%**	**4%**	**6%**	**20%**	**39%**	**100%**

4. Demographic Questions

To conclude the survey, respondents were asked to provide details about their home ZIP Code, annual household income, age, employment status, and ability to work from home. The information was requested to confirm that a representative sample of travelers was selected from the study area and also to assess how use of U.S. 69 was affected by the transition to remote work during the COVID-19 pandemic. U.S. Census data on household income and age from users' home ZIP Codes were compared with user-reported incomes and ages from the survey to look for agreement between the two datasets.

4.1 Home ZIP Code

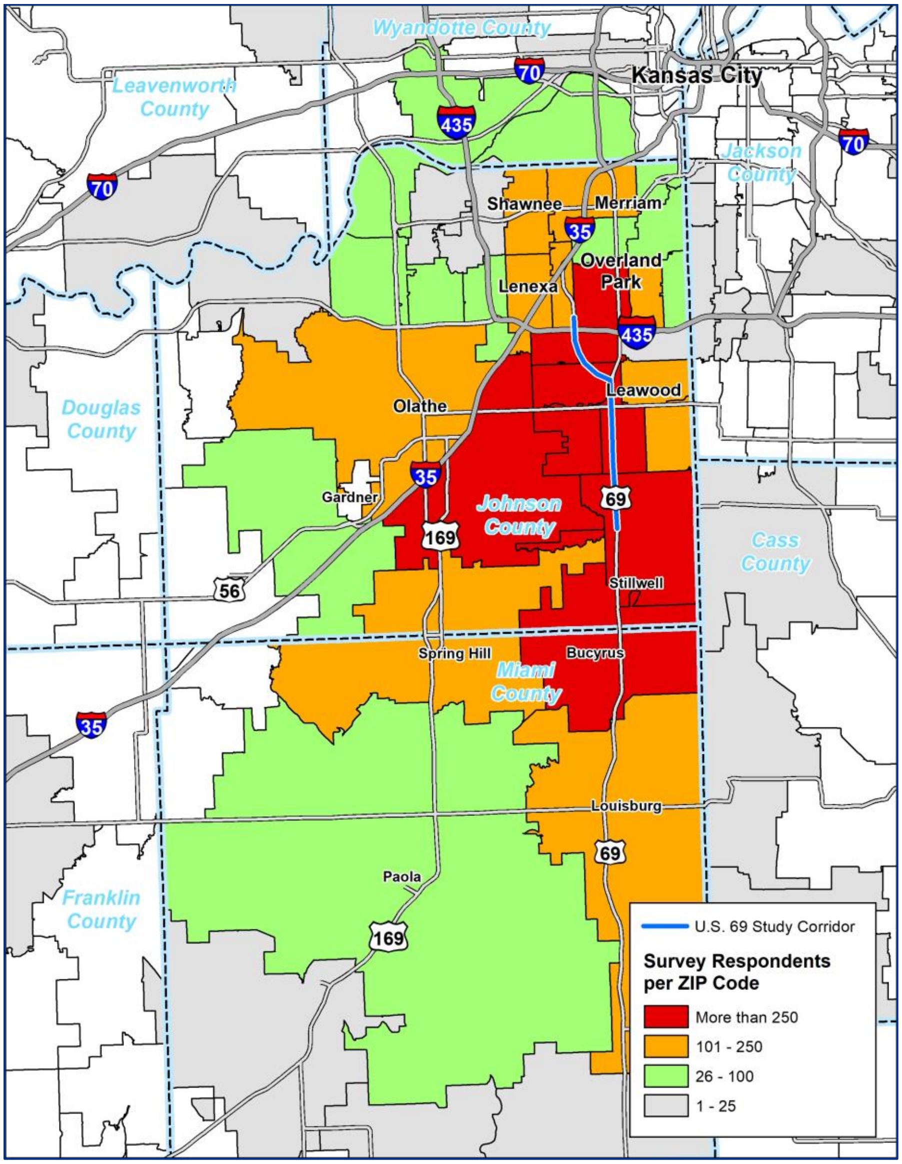
Table 4 provides the top ten communities and their associated ZIP Codes, which together represent 89 percent of all respondents. All the residences are repeated from the list of top eight trip end locations, with Overland Park at the top of the list.

Overall, Johnson County is home to the largest share of respondents, at 85 percent, followed by Miami County at 10 percent. Wyandotte County, Kansas and Jackson County, Missouri represented 2 percent and 1 percent of respondents, respectively. These home communities are mapped in **Figure 19**.

Table 4: Resident ZIP Codes

Community	County	Total (%)
Overland Park (66085, 66221, 66223, 66210, etc.)	Johnson	49%
Olathe (66061, 66062)	Johnson	9%
Stillwell, Aubry (66085)	Johnson	7%
Lenexa (66214, 66215, 66219, 66227)	Johnson	5%
Shawnee (66203, 66216, 66217, 66218, etc.)	Johnson	5%
Bucyrus (66013)	Miami	4%
Leawood (66224, 66209, 66206)	Johnson	3%
Spring Hill (66083)	Miami	3%
Merriam (66202, 66203)	Johnson	2%
Louisburg (66053)	Miami	2%
All other Johnson County	Johnson	4%
All other Miami County	Miami	1%
All others	--	6%
Total Responses		100.0%

Figure 19: Survey Respondents by Resident ZIP Codes



4.2 Household Income

User-reported household incomes from the survey are given in **Table 5**, alongside the expected household income for Johnson County based on 2019 U.S. Census ACS estimates. This ACS distribution of annual household income was then compared with the distribution of user-reported incomes from the survey to determine the representativeness of the survey.

Table 5: Household Income

Household Income	Unweighted Survey	ACS 2019	Weighted Survey
Less than $25,000	3%	9%	9%
$25,000 to $49,999	7%	16%	16%
$50,000 to $99,999	25%	30%	28%
$100,000 to $199,999	40%	31%	35%
$200,000 or more	25%	13%	11%
Total Responses	100%	100%	100%

The results of the comparison show that the survey sampled a higher share of high income households than would be expected, and a corresponding lower share of low income households. To correct for this, the dataset was weighted to match the distribution suggested by the Census. The results of the weighting are also given in **Table 5** and show much closer agreement between the two sources.

The median household incomes for Johnson County and Miami County, the two most common home counties of survey respondents, are $89,000 and $72,000, respectively, according to the ACS. The median household income from the weighted survey dataset was $87,500.

4.3 Age

User-reported ages are giving in **Table 6**. Older populations were overrepresented in the original sample compared to 2019 ACS estimates, with the survey capturing nearly half of its respondents from the 45 to 64 year old age group (46 percent). To correct for this, in addition to weighting to household income, the final survey dataset was weighted by age.

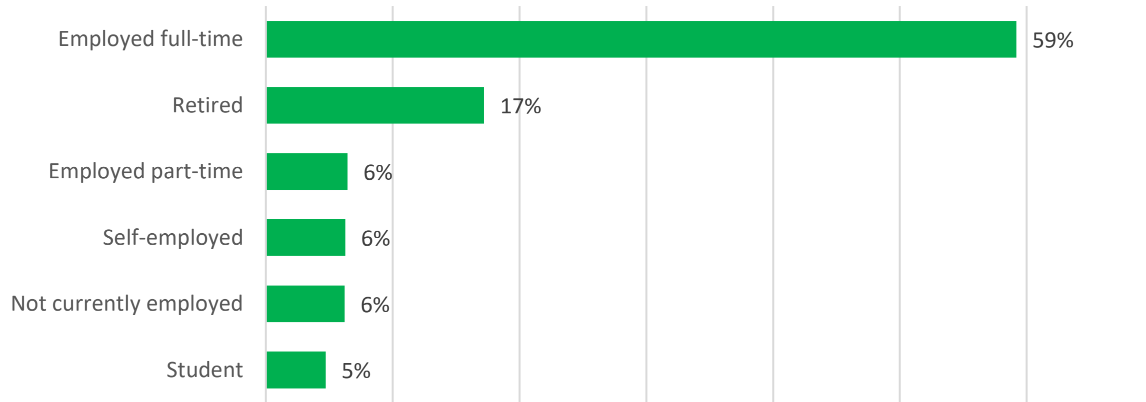
Table 6: Age

Age	Unweighted Survey	ACS 2019	Weighted Survey
16 to 24 years	2%	15%	17%
25 to 44 years	29%	35%	37%
45 to 64 years	46%	32%	28%
65 years or older	22%	18%	18%
Total Responses	100%	100%	100%

4.4 Employment

Employment statistics are given in **Figure 20**. Full-time employees constituted 59 percent of the sample, followed by retirees (17 percent), part-time workers, the self-employed and the unemployed at 6 percent each.

Figure 20: Employment Statistics

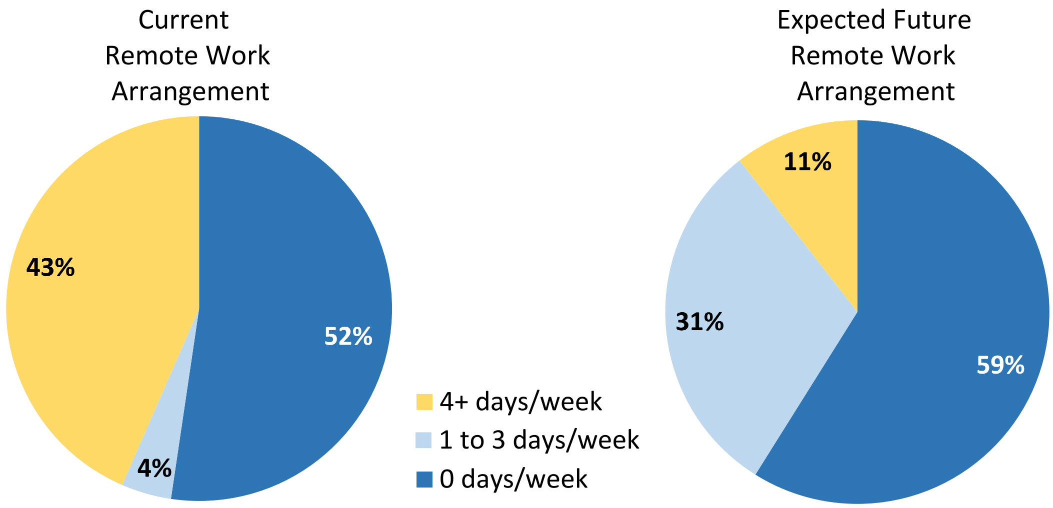


4.5 Remote Work

Following the employment status question, full-time employees (those working four or more days per week) were asked about their current and future remote work status. These questions sought to explain changes in post-pandemic travel patterns observed on U.S. 69 and provide a basis for assumptions about what work commutes might look like in the study corridor in the future.

Figure 21 shows full-time workers' current remote work arrangements on the left and expected future remote work arrangements on the right. Nearly half of respondents (48 percent) reported working remotely at least one day per week currently, with the vast majority of that group (43 percent of the total) reportedly working from home 4 or more days per week. Once the COVID-19 pandemic has been contained, most of the full-time remote workers stated that they expect to begin shifting back to working in the office part-time. The share of full-time remote workers is expected to decrease from 43 percent to 11 percent in the future, while the share of part-time remote workers (1 to 3 days per week) is expected to increase from the current 4 percent to 31 percent. Full-time office workers are expected to increase slightly from 52 percent of all workers to 59 percent.

Figure 21: Remote Work Statistics



5. Survey Comments

Respondents were given the opportunity to leave comments about the survey or the U.S. 69 corridor itself. Over 600 respondents (37 percent of the 1,677 who completed the survey) elected to provide comments. A word frequency analysis was conducted on the comments, the results of which are summarized in **Table 7**. Overall, an estimated 67 percent of comments were categorized as criticisms, and included users' opposition to tolls in general, and the view of the 69 Express project as wasteful spending. The remaining one-third of comments were split evenly between comments that were categorized as positive, and those that were categorized as suggestions or observations. The positive comments noted the need for expansion of U.S. 69 in this corridor to mitigate congestion, and said that they believed adding an express lane (EXL) would be a good way to pay for it. Suggestions included expanding to more than one additional lane, adding a northbound interchange to 167th Street, and keeping the toll as low as possible.

Table 7 – Survey Comments

Classification	Percent
Negative comment	67%
Positive comment	17%
Observation or suggestion for improvement	17%
Total	**100%**

6. Stated Preference Experiments

The stated preference question portion of the survey involved a quantitative experiment designed to estimate respondents' travel preferences and behavioral responses under hypothetical conditions. The details of each respondent's reference trip were used in an orthogonal matrix experimental design to build a customized set of six stated preference scenarios presented to each user. Respondents were asked to select their preferred travel alternative under the conditions presented by selecting either the tolled express lane alternative with a faster travel time (U.S. 69), or the slower, toll-free route. **Figure 22** shows an example trade-off scenario.

Figure 22 Stated Preference Choice Survey Screen Sample

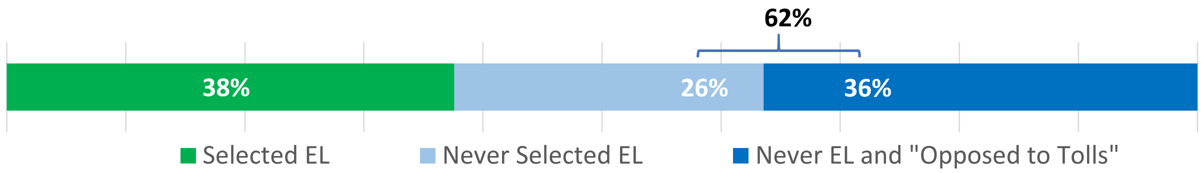
6.1 Stated Preference Statistics

Overall, the express lanes option was selected 15 percent of the time during the SP tradeoff exercises, as shown in **Figure 23**.

Figure 23 – Overall Share of Express Lane and Existing Lane Stated Preference Tradeoff Selections

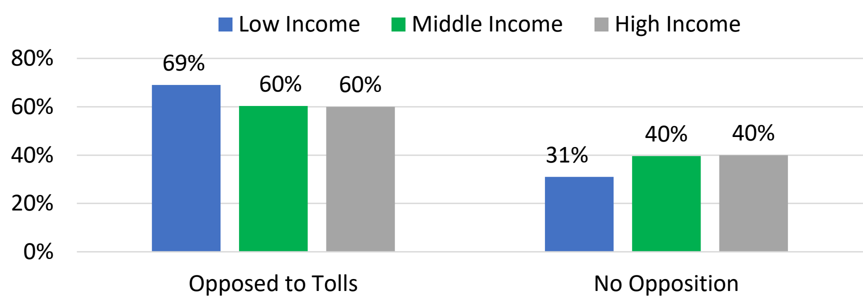
Sixty-two percent of users did not select the express lanes option at all in any of the six tradeoff exercises (**Figure 24**). Selecting the same option all six times, whether it be the express lane or existing lanes option, potentially reflects some level of bias either for or against toll roads on the part of the survey taker. Of the 62 percent who did not choose an express lane, over half (36 percent of all users) gave as their reason for doing so that they are "opposed to tolls." As a result, it is reasonable to conclude that these users may have been exhibiting some bias against tolls while answering the tradeoff questions.

Figure 24 – Share of Survey Takers Never Selecting the Express Lane (EL) Option



The population opposed to tolling (62 percent of the total population) was analyzed by household income level – low (less than $50,000 per year), middle ($50,000 to $99,000 per year), and high (more than $100,000 per year) – to determine the degree to which opposition to tolling was linked with household income. No major connection between income and opposition to tolling was found, as shown in **Figure 25**, though the lower income respondents did tend to oppose tolling at a slightly higher rate than the middle and high income cohorts (69 percent opposition versus 60 percent opposition).

Figure 25 – Opposition to Tolling by Income Level



Additional reasons for never choosing the express lanes option are given in **Figure 26**. Users were permitted to select more than one option, and aside from opposition to tolling at 58 percent, the most common answers given were that the time savings shown was not worth the toll cost (70 percent) and that the express lane did not offer large enough time savings over the free alternative route (39 percent).

Figure 26 – Reasons for Never Selecting the Express Lanes Option

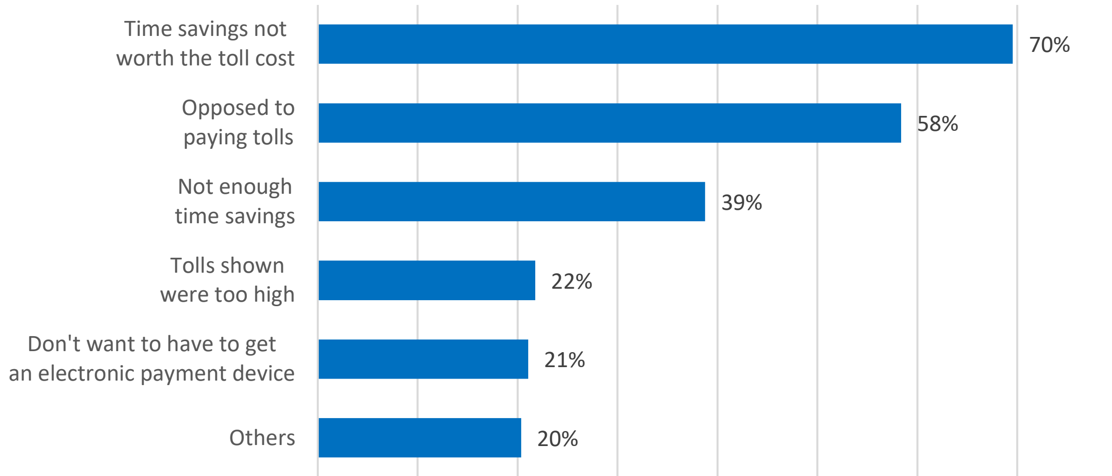
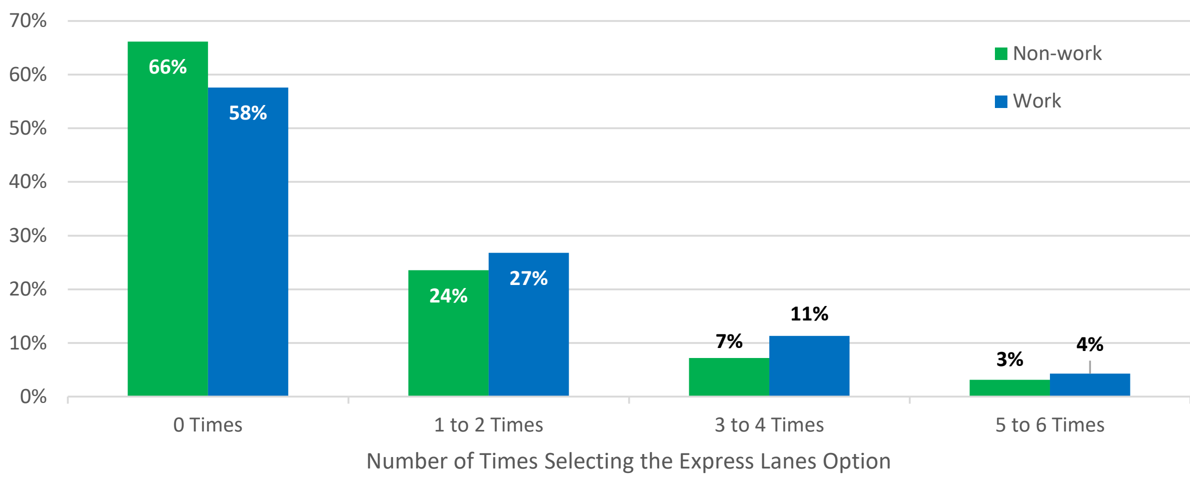


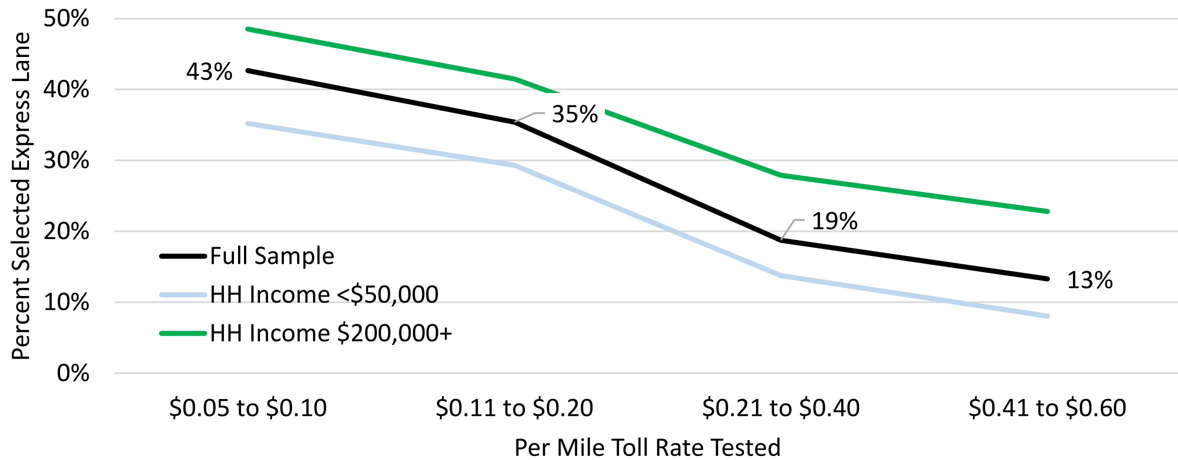
Figure 27 shows the distribution of users choosing the express lanes option between zero and six times during the six tradeoff questions. The data is segmented by trip purpose, with non-work trips shown in light blue and work trips shown in dark blue. The difference between the two groups is slight, but there appears to be a higher propensity to choose the express lanes among the work travelers. For instance, work travelers chose the express lane one or more times 42 percent of the time compared to 34 percent for non-work travelers.

Figure 27 – Number of Times Selecting the Express Lane Option by Frequency of Use of U.S. 69



The toll cost shown in the SP tradeoff questions also affected users' willingness to choose the express lane. The relationship between increasing per mile toll cost shown and the propensity of survey takers to select the express lanes option is shown in **Figure 28**.

Figure 28 – Express Lanes Preference and Increasing Per Mile Toll Cost in Tradeoff Scenarios



Overall, when toll costs were $0.10 per mile or less, respondents chose the express lanes option 43 percent of the time. Only 13 percent of respondents chose the express lanes option when the toll cost presented was greater than $0.40 per mile. **Figure 28** additionally shows that preference for the express lane rose with increasing household income, as expected. Households making $200,000 per year or more selected the express lane option 49 percent of the time at the lowest toll costs, compared to 35 percent of households earning less than $50,000 per year. At the highest toll rates, the highest income households chose the express lane option 23 percent of the time, compared to 8 percent for the lowest income households.

7. Multinomial Logit Model Estimation

Choice modeling is often the only tool available to estimate willingness to pay for hypothetical alternatives. When preparing choice models, it is important to attempt to address their potential limitations so that the greatest possible confidence is given to the results produced. For this exercise, to account for potential toll bias, the model dataset excluded respondents who indicated that opposition to tolling was their reason for never selecting an express lanes option during the SP tradeoff experiments. Additionally, to ensure that sufficient consideration was given to each tradeoff question before users selected their travel preference, the dataset was filtered to include only responses from individuals who had taken at least five minutes to complete the survey. The resulting final dataset contained 6,552 total records from 1,092 individuals.

After data preparation, conventional maximum likelihood procedures were used to estimate coefficients for a set of multinomial logit (MNL) models and calculate VOT for the travel demand model region. The model results are summarized in the following sections.

7.1 Model Segmentation

In addition to the aggregate models for the full sample, the following U.S. 69 express lane market segments were tested:

- Trip purpose (Work or Non-work)

- Time-of-day of travel (Peak or Off-peak)
- COVID-19 conditions (Pre-COVID or Post-COVID)

The coefficients of the MNL models were used to estimate travelers' VOT for the aggregate sample and for each of the above market segments.

7.2 Willingness to Pay for Travel Time Savings

The expression for calculating willingness-to-pay for travel time savings, or VOT, is shown below:

Figure 29 – Value of Time Calculation

$$VOT = 60 * {\beta Time} \Big/ \left(\frac{\beta Cost}{LN(income/1{,}000)}\right)$$

VOT is calculated by dividing the travel time coefficient from the model ($\beta Time$) by the toll cost coefficient ($\beta Cost$) and then multiplying by 60 to convert from dollars per minute to dollars per hour. Because an income-based log transformation was applied to the toll cost attribute prior to model specification, the same transformation was applied to the toll cost coefficient when calculating VOT. In this case, toll cost was transformed by the natural log of household income, in thousands.

Coefficients as well as robust standard error and robust t-statistics from the model for the full sample are given in **Table 8**. VOTs for a full distribution of incomes for the full survey sample and the various market segment models are shown in **Table 9**.

Table 8 – Multinomial Logit Model Full Sample Coefficients

Coefficients	Units	Coefficient Values		
		Value	Robust Std Error	Robust t-stat
Travel Time	Minutes	-0.236	0.0146	-16.24
Toll Cost	Dollars	-2.73	0.169	-16.13
Express Lane Constant	(0,1)	0 (fixed)		
Existing Lane Constant	(0,1)	1.46	0.0743	19.67

Table 9 – Market Segment VOTs ($/Hour) at the Median Household Income Level

Median Household Income	Full Sample VOT	Trip Purpose		Time of Day		COVID-19 Conditions	
		Non-work VOT	Work VOT	Off-peak VOT	Peak VOT	Post-COVID VOT	Pre-COVID VOT
$20,000	$15.55	$ 12.40	$ 18.35	$ 14.55	$ 17.65	$ 13.65	$ 19.10
$50,000	$20.30	$ 16.15	$ 23.95	$ 19.00	$ 23.05	$ 17.85	$ 24.95
$75,000	$22.40	$ 17.85	$ 26.40	$ 20.95	$ 25.45	$ 19.70	$ 27.55
$89,000*	**$23.25**	**$ 18.55**	**$ 27.45**	**$ 21.80**	**$ 26.45**	**$ 20.50**	**$ 28.65**
$100,000	$23.90	$ 19.05	$ 28.20	$ 22.35	$ 27.15	$ 21.00	$ 29.40
$150,000	$26.00	$ 20.70	$ 30.65	$ 24.30	$ 29.50	$ 22.85	$ 32.00
$200,000	$27.50	$ 21.90	$ 32.40	$ 25.70	$ 31.20	$ 24.20	$ 33.80
$250,000	$28.65	$ 22.80	$ 33.80	$ 26.80	$ 32.50	$ 25.20	$ 35.25

***Johnson County median household income**

At the Johnson County median household income of $89,000, the following observations can be drawn from the modeled VOTs:

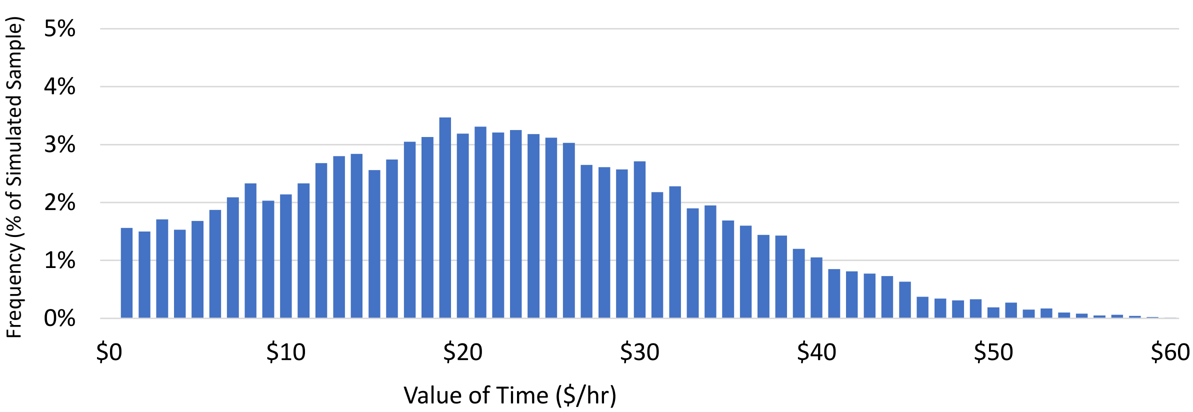
- The VOT for the full survey was calculated as $23.25 per hour.
- Work and business travelers in the survey had VOTs 48 percent higher than non-work travelers ($27.45 per hour compared to $18.55 per hour).
- Peak hour travelers (7 a.m. to 7:59 a.m., and 5 p.m. to 5:59 p.m.), at $26.45 per hour, had a VOT 21 percent higher than those traveling at other times of the day.
- Pre-COVID travelers had the highest VOT of any market segment ($28.65 per hour), with values that were 40 percent higher than those traveling during COVID-19 conditions ($20.50 per hour).

To corroborate the results of the MNL model, a separate estimate for VOT for the study area was also calculated for each census tract by dividing ACS household income by average hours worked. Using USDOT assumptions and recommendations[2], this method of estimation produced a range of VOTs from $16.75 to $26.40 per hour for the study area as a whole, which was consistent with the results of the modeling.

7.3 Mixed Multinomial Logit Model

A Mixed MNL (MMNL) model was estimated using the full unsegmented dataset, with normal distributions used to estimate the coefficients for travel time, toll cost, and travel time standard deviation. The simulation used ten thousand random draws to generate ten thousand estimates of individual VOTs, creating the VOT distribution curve given in **Figure 30**. The resulting mean VOT at the study area median income of $89,000 was $21.40 per hour.

Figure 30 – Mixed Multinomial Log Model Simulated VOT Distribution



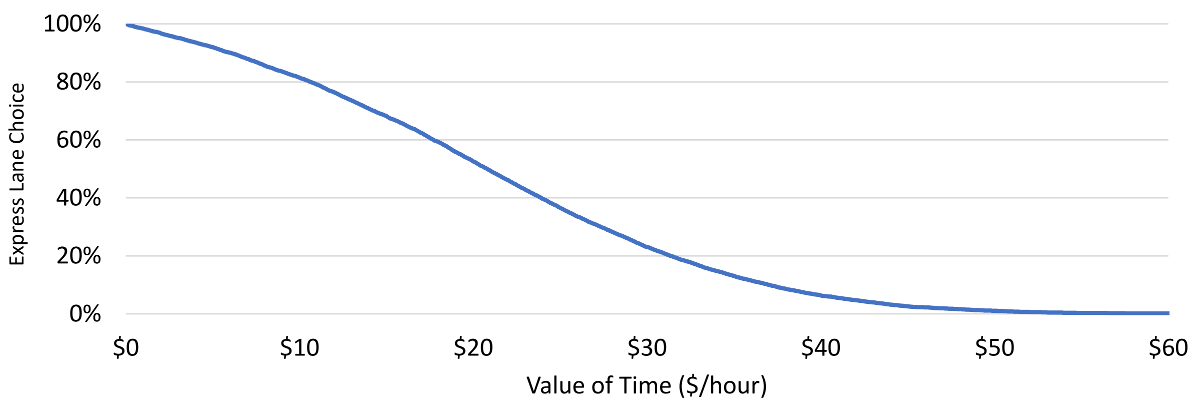
[2] U.S. Department of Transportation. 2016. *Revised Departmental Guidance on Valuation of Travel Time in Economic Analysis*. https://www.transportation.gov/office-policy/transportation-policy/revised-departmental-guidance-valuation-travel-time-economic.

Coefficients, robust standard error statistics, and robust t-statistics from the MMNL model are given in **Table 10**. The coefficients were used to generate the toll choice curve in **Figure 31**, which shows the relationship between VOT and the share of the sample that would choose the express lane. For instance, in terms of toll diversion, when presented with a choice to pay $10 to save one hour of travel time, 80 percent of the simulated population would elect to use the express lane. At the $30 per hour level, the percentage decreases to 23 percent. At $50 per hour, it is reduced to 1 percent.

Table 10 – Mixed Multinomial Logit Model Coefficients

Coefficients	Units	Coefficient Values		
		Value	Robust Std Error	Robust t-stat
Travel Time	Minutes	-0.232	0.0168	-13.78
Travel Time Standard Deviation	Minutes	0.137	0.0698	1.97
Toll Cost	Dollars	-2.98	0.28	-10.63
Express Lane Constant	(0,1)	0 (fixed)		
Existing Lane Constant	(0,1)	1.45	0.0791	18.38

Figure 31 – Mixed Multinomial Logit Model Toll Choice Curve



7.4 Willingness to Pay for Travel Time Reliability

An estimate of VOR for the sampled population was calculated using the coefficient for standard deviation of the travel time estimated by the MMNL model. VOR is calculated in a similar manner as VOT, with the coefficient for the standard deviation of travel time replacing the coefficient for travel time in the equation, as seen in **Figure 32**. Using the coefficient values in **Table 10**, VOR at the study area median income of $89,000 was estimated at $12.40 per hour.

Figure 32 Value of Reliability Calculation

$$VOR = 60 * \beta TimeStd \bigg/ \left(\frac{\beta Cost}{LN(income/1{,}000)} \right)$$

The ratio of VOR to VOT, known as the reliability ratio (RR), is useful in understanding how travelers value travel time reliability relative to time savings. A reliability ratio of 1.0 would suggest that travelers consider the value of reducing the standard deviation of their travel time by one minute to be equal to the value of reducing the travel time of their current trip by one minute.

Dividing the VOR estimate ($12.40) by the VOT estimate from the MMNL model given in the previous section ($21.40) gives a RR of 0.59, which suggests that the sampled travelers value time savings slightly more than travel time reliability in this case.

8. Summary and Conclusion

A successfully developed and implemented OD and SP survey questionnaire gathered information from 2,513 U.S. 69 area travelers. The purpose of the survey was to measure the value of time and value of reliability of travelers within the U.S. 69 express lanes market area as well as identify local trip patterns and typical origins and destinations. The questionnaire collected data on current and pre-pandemic travel behavior and engaged the travelers in a series of stated preference experiments to measure their propensity to use the express lane under a variety of travel time and toll cost conditions.

Choice models were developed to produce estimates of VOT and VOR for travelers in the region. The estimates were reasonable, intuitive, and consistent with what would be expected given the demographic and trip characteristics of the sampled travelers.

From the full dataset of responses, respondent values of time were estimated to range from $15.55 to $28.65 per hour, depending on household income. VOR was estimated at $12.40 per hour at the Johnson County median income level of $89,000. These estimates of values of time, value of reliability, and likelihood to use the U.S. 69 express lanes have been incorporated into the travel demand model to support estimates of traffic and toll revenue.

Appendix – Survey Screenshots

Welcome to the 69 Express Travel Survey!

Welcome to the survey! **Please consider sharing this survey with your friends and family in the Kansas City area!**

Click the **Next** button below to begin.

<u>Your input is extremely valuable to us!</u>

KDOT is asking for just 10 minutes of your time to **help plan improvements on U.S. 69**.

The purpose of this survey is to help KDOT and their partners understand how drivers use US 69 and understand how likely users would be to use express toll lanes if they were added to U.S. 69. This information will be used to help plan improvements to U.S. 69.

For more information on the **69 Express** project, please visit the project website at www.69express.org

Thank you for taking the time to share your thoughts!

This survey is divided into three sections. In this first section, you will be asked to describe the most recent trip that you made using U.S. 69. Please think of your trip as a **one-way trip only**, and **not as a complete round-trip**.

Below is an **example of a one-way trip** that would qualify for this survey:

Were you the driver for a trip on **U.S. 69** in Overland Park that meets all the following criteria?

1. Used any part of **U.S. 69 between 179th Street and 103rd Street** (highlighted in yellow in the map below).
2. Traveled within the **past year** (12 months) on this section of U.S. 69.
3. Traveled on a **weekday** (Monday through Friday).
4. Drove a **passenger vehicle** such as a car, van, or pickup truck (not pulling a trailer, and not driving a multi-axle commercial truck).

○ Yes

○ No

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Did you make this trip before or after quarantine procedures for the COVID-19 pandemic began to take effect around mid-March 2020?

- ○ I made my trip **BEFORE** Saturday, March 14, 2020.
- ○ I made my trip **AFTER** Sunday, March 15, 2020.

Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

You have indicated that you have not made a trip meeting the qualifications on the previous screen. If you have not used U.S. 69 recently, please let us know your reasons why. Select all that apply.

- ☐ I no longer live in the area
- ☐ I rarely make trips that could use U.S. 69
- ☐ There is too much congestion on U.S. 69
- ☐ U.S. 69 does not offer enough time savings (or any time savings at all) for my trip
- ☐ Other ______

Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

Thank you for taking the time to participate in 69 Express Travel Survey. Based on your previous responses there are no more questions for you to answer on this survey.

Thank you again for your time!

69 EXPRESS

Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

What was the primary purpose of your recent one-way trip?

- ○ Commute to or from work
- ○ Work-related business
- ○ Driving yourself to or from school or university
- ○ Picking up or dropping off a child at school or daycare
- ○ Shopping
- ○ Social/recreational (e.g., visiting a friend, going to a park)
- ○ Personal errand (e.g., medical appointment)
- ○ Airport trip
- ○ Other ______

Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

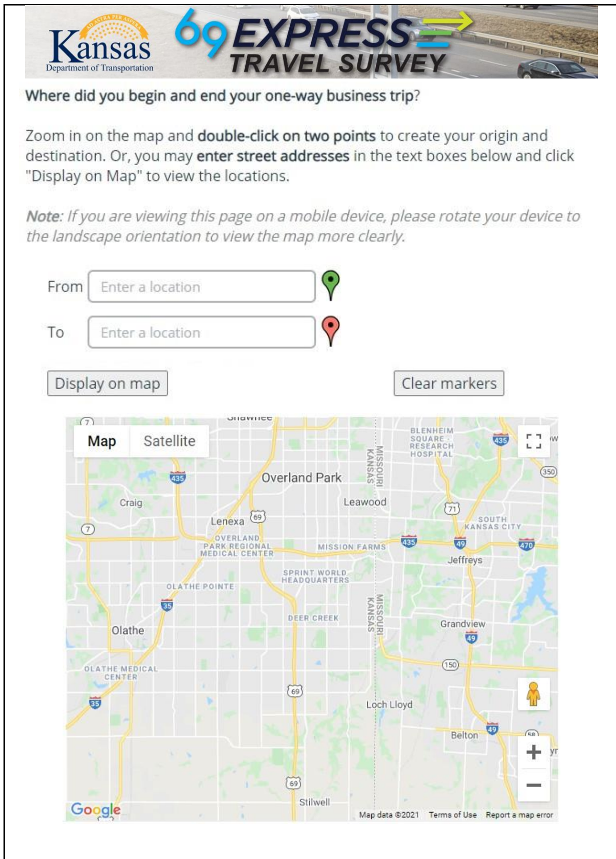
How many people were in the vehicle on this one-way business trip, including yourself?

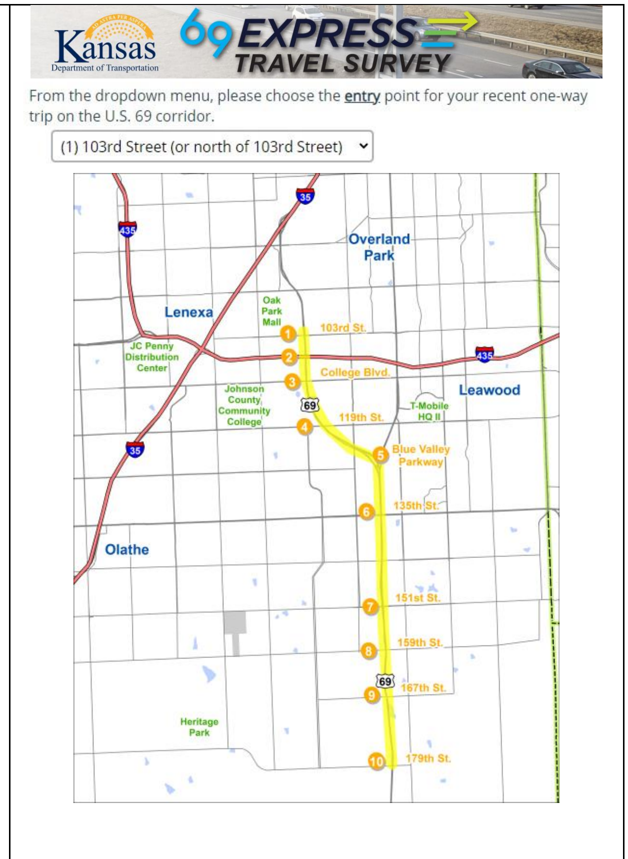
- ◉ 1 (I drove alone)
- ○ 2
- ○ 3
- ○ 4 or more

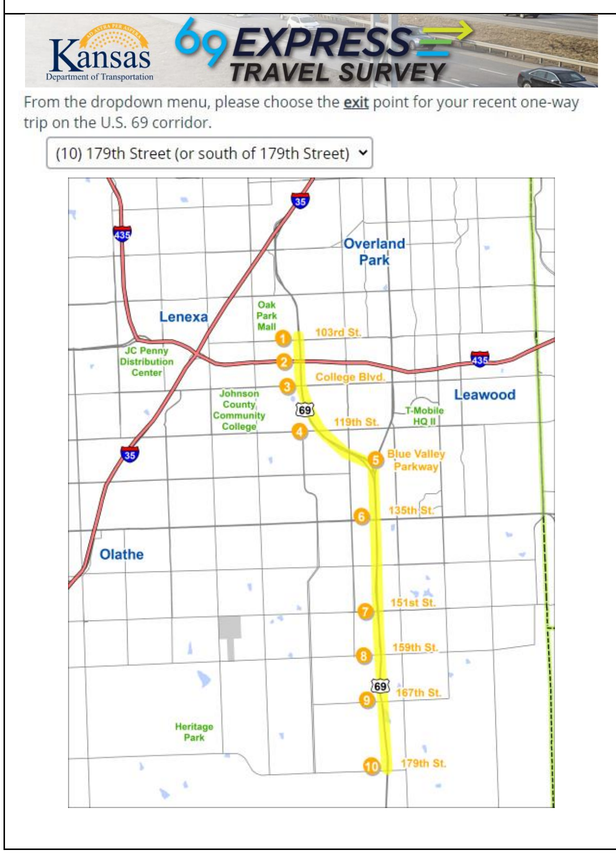
Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

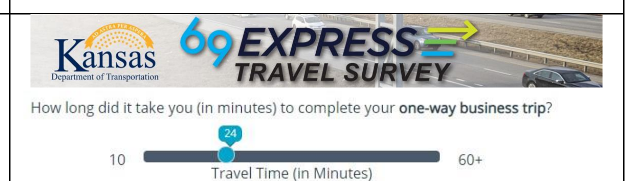
What time did you begin your business trip?

8 ⌄ 00 ⌄ AM ⌄


Kansas
Department of Transportation
69 EXPRESS
TRAVEL SURVEY
Where did you begin and end your one-way business trip?
Zoom in on the map and double-click on two points to create your origin and destination. Or, you may enter street addresses in the text boxes below and click "Display on Map" to view the locations.
Note: If you are viewing this page on a mobile device, please rotate your device to the landscape orientation to view the map more clearly.
From
Enter a location
To
Enter a location
Display on map
Clear markers
Map
Satellite
Overland Park
Leawood
Lenexa
Olathe
Grandview
Belton
Loch Lloyd
Stilwell
Jeffreys
Google
Map data ©2021 Terms of Use Report a map error


Kansas
Department of Transportation
69 EXPRESS
TRAVEL SURVEY
From the dropdown menu, please choose the entry point for your recent one-way trip on the U.S. 69 corridor.
(1) 103rd Street (or north of 103rd Street)
Overland Park
Lenexa
Oak Park Mall
103rd St.
JC Penny Distribution Center
College Blvd.
Leawood
Johnson County Community College
119th St.
T-Mobile HQ II
Blue Valley Parkway
135th St.
Olathe
151st St.
159th St.
167th St.
Heritage Park
179th St.


Kansas
Department of Transportation
69 EXPRESS
TRAVEL SURVEY
From the dropdown menu, please choose the exit point for your recent one-way trip on the U.S. 69 corridor.
(10) 179th Street (or south of 179th Street)
Overland Park
Lenexa
Oak Park Mall
103rd St.
JC Penny Distribution Center
College Blvd.
Leawood
Johnson County Community College
119th St.
T-Mobile HQ II
Blue Valley Parkway
135th St.
Olathe
151st St.
159th St.
167th St.
Heritage Park
179th St.


Kansas
Department of Transportation
69 EXPRESS
TRAVEL SURVEY
How long did it take you (in minutes) to complete your one-way business trip?
24
10
60+
Travel Time (in Minutes)

Kansas Department of Transportation 69 EXPRESS TRAVEL SURVEY

Did you experience any delay due to traffic congestion on U.S. 69 during your one-way business trip?

- ○ No, I did not
- ◉ Yes, I did

You reported that your trip took 24 minutes to complete, with some delay, due to congestion on U.S. 69.

How many minutes would you estimate were added to your business trip because of congestion?

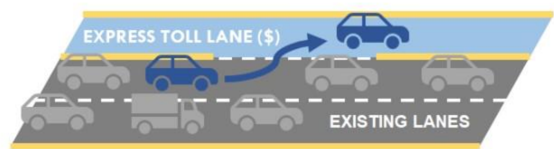
- ○ Congestion added 5 minutes or less
- ○ Congestion added 6 to 10 minutes
- ○ Congestion added 11 to 20 minutes
- ○ Congestion added more than 20 minutes

Kansas Department of Transportation 69 EXPRESS TRAVEL SURVEY

You are now halfway through the survey!

In this section, you will be presented with a series of possible options for making another one-way business trip ***at some point in the future***.

Imagine that U.S. 69 has become **more congested**, and **Express Toll Lanes** have been **added to the roadway to relieve congestion**. Drivers can pay a toll to use the Express Lanes to save time. The tolls will be automatically charged via an electronic toll transponder, such as a K-TAG, so that there is no need to stop and pay the toll in cash at a toll booth.



Express Toll Lane Diagram

For each question, consider if you would prefer to **pay a toll on the new Express Toll Lane** to save time, or **use the non-tolled Existing Lanes for free**.

As a reminder, you have so far described a one-way **business trip** that began at **8:00 AM** and lasted **24 minutes**.

Kansas Department of Transportation 69 EXPRESS TRAVEL SURVEY

Keeping in mind your **business trip** that you previously described in this survey, please choose your preferred option for making that trip again in the future from the following two travel time and toll cost pairings:

○ Express Toll Lane	○ Existing Lanes
Travel Time: **19 minutes** Toll Cost: **$3.00** Save **9 minute(s)**	Travel Time: **28 minutes** Toll Cost: **$0.00**

Kansas Department of Transportation 69 EXPRESS TRAVEL SURVEY

Keeping in mind your **business trip** that you previously described in this survey, please choose your preferred option for making that trip again in the future from the following two travel time and toll cost pairings:

○ Express Toll Lane	○ Existing Lanes
Travel Time: 22 minutes Toll Cost: $3.00 Save 4 minute(s)	Travel Time: 26 minutes Toll Cost: **$0.00**

Kansas Department of Transportation 69 EXPRESS TRAVEL SURVEY

Keeping in mind your **business trip** that you previously described in this survey, please choose your preferred option for making that trip again in the future from the following two travel time and toll cost pairings:

○ Express Toll Lane	○ Existing Lanes
Travel Time: 24 minutes Toll Cost: $4.00 Save 2 minute(s)	Travel Time: 26 minutes Toll Cost: **$0.00**

Kansas Department of Transportation 69 EXPRESS TRAVEL SURVEY

Keeping in mind your **business trip** that you previously described in this survey, please choose your preferred option for making that trip again in the future from the following two travel time and toll cost pairings:

○ Existing Lanes	○ Express Toll Lane
Travel Time: 30 minutes Toll Cost: **$0.00**	Travel Time: 22 minutes Toll Cost: $0.50 Save 8 minute(s)

Keeping in mind your **business trip** that you previously described in this survey, please choose your preferred option for making that trip again in the future from the following two travel time and toll cost pairings:

- ○ Express Toll Lane
  Travel Time: 23 minutes
  Toll Cost: $1.00
  Save 5 minute(s)
- ○ Existing Lanes
  Travel Time: 28 minutes
  Toll Cost: **$0.00**

Keeping in mind your **business trip** that you previously described in this survey, please choose your preferred option for making that trip again in the future from the following two travel time and toll cost pairings:

- ○ Express Toll Lane
  Travel Time: 22 minutes
  Toll Cost: $4.00
  Save 9 minute(s)
- ○ Existing Lanes
  Travel Time: 31 minutes
  Toll Cost: **$0.00**

Why did you not choose the Express Toll Lane option in the previous tradeoff questions? Please select all that apply.

- ☐ Tolls shown were too high
- ☐ Don't want to have to get an electronic payment device
- ☐ Time savings not worth the toll cost
- ☐ Other (please specify) ________
- ☐ Opposed to paying tolls
- ☐ Not enough time savings

You are almost done!

In this final section of the survey, we will ask you for some general information to assist in analyzing the data we have gathered. All information submitted is strictly confidential and will only be used to confirm that we have received a representative sample of the region's population.

What is the 5-digit ZIP code of your home address?

____

Note: All information submitted is strictly confidential and will only be used to confirm that we have received a representative sample of the region's population.

Please estimate your household income from the previous year, before taxes:

- ○ Less than $15,000
- ○ $15,000 to $24,999
- ○ $25,000 to $34,999
- ○ $35,000 to $49,999
- ○ $50,000 to $74,999
- ○ $75,000 to $99,999
- ○ $100,000 to $124,999
- ○ $125,000 to $149,999
- ○ $150,000 to $199,999
- ○ $200,000 to $249,999
- ○ $250,000 or more

Note: All information submitted is strictly confidential and will only be used to confirm that we have received a representative sample of the region's population.

Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

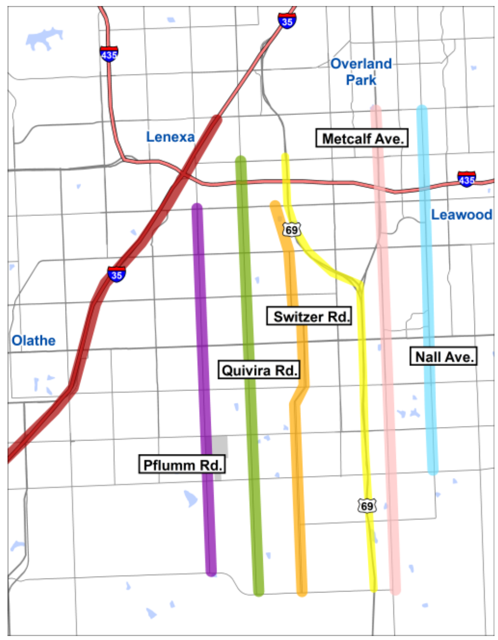
How often do you make ***any kind of trip*** on this section of U.S. 69? Keep in mind that a **round-trip** (for example, to the store and then back home again) would **count as two trips** for this question.

- ○ 10 or more times per week
- ○ 6 to 9 times per week
- ○ 2 to 5 times per week
- ○ 1 time per week
- ○ 1 to 3 times per month
- ○ Less than 1 time per month

Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

Which of the following alternative routes have you used in the past to make a trip like your business trip.

- ☐ I-35
- ☐ Pflumm Rd.
- ☐ Quivira Rd.
- ☐ Switzer Rd.
- ☐ Metcalf Ave.
- ☐ Nall Ave.
- ☐ Other (please specify) ________
- ☐ No alternative route for my trip.



Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

How much time would you estimate that you saved by using U.S. 69 rather than an alternative route to make your trip?

- ○ 10 minutes or more
- ○ 5 to 9 minutes
- ○ Less than 5 minutes
- ◉ No time savings

Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

What is your employment status?

- ○ Employed full-time
- ○ Employed part-time
- ○ Self-employed
- ○ Student
- ○ Student and employed
- ○ Homemaker
- ○ Retired
- ○ Not currently employed

Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

How many days per week do you currently work?

- Once per week
- Twice per week
- Three times per week
- Four times per week
- Five or more times per week

How many days per week do you currently work remotely from your home?

- Zero days (I work in person at my job every day)
- Once per week
- Twice per week
- Three times per week
- Four times per week
- Five or more times per week

Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

Do you believe that your employer will give you the option to work from home, at least part-time, after the COVID-19 pandemic is contained?

- Yes
- No
- Don't know/it depends

Would you take advantage of the option to work from home at least part-time if your employer gives it to you?

- Yes
- No
- Don't know/it depends

How many days per week do you think you will work remotely from your home after the COVID-19 pandemic is contained?

- Zero days (I will work in person at my job every day)
- Once per week
- Twice per week
- Three times per week
- Four times per week
- Five or more times per week
- Don't know/it depends

Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

How old are you?

- 16 to 24
- 25 to 34
- 35 to 44
- 45 to 54
- 55 to 65
- 65 to 74
- 75 years old or older

Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

What is your gender?

- Male
- Female
- Prefer not to answer

Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

If you have any comments about this survey or about the 69 Express Lanes, please enter them in the box below. We value your feedback and will review all of the comments received.

Kansas Department of Transportation — 69 EXPRESS TRAVEL SURVEY

The survey is now complete.

Thank you very much for your participation!

You may now exit the survey.

If you have any questions, please send inquiries to US69TravelSurvey@gmail.com.

69 EXPRESS

CDM Smith

cdmsmith.com