Appendix 4

U.S. 69 Express Toll Lanes Concept of Operations

69 EXPRESS

U.S. 69 Modernization & Expansion Project

U.S. 69 Express Toll Lanes Concept of Operations

DRAFT

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TERMS, ABBREVIATIONS AND DEFINITIONS

The tables below are a comprehensive listing of terms, abbreviations, and definitions applicable to this document.

Table 0-1: Abbreviations

Abbreviation	Term
ALPR	Automatic License Plate Recognition
AET	All-Electronic Tolling (see below for definition)
AVDC	Automatic Vehicle Detection and Classification
AVI	Automatic Vehicle Identification (see below for definition)
BOS	Back Office System (see below for definition)
BVP	Blue Valley Parkway
CCTV	Closed-Circuit Television (camera)
Con-Ops	Concept of Operations (document)
CSC	Customer Service Center (see below for definition)
DMS	Dynamic Message Sign
DVAS	Digital Video Audit System
ETL	Express Toll Lane(s)
GP	General Purpose
GUI	Graphical User Interface
HCTRA	Harris County Toll Road Authority
IBT	Image-Based Transaction (see below for definition)
ITS	Intelligent Transportation System
KDOT	Kansas Department of Transportation
KPI	Key Performance Indicator (see below for definition)
KTA	Kansas Turnpike Authority
LED	Light Emitting Diode
LOS	Level of Service
MPH	Miles per Hour
NB	Northbound
NTTA	North Texas Tollway Authority
NVR	Network Video Recorder
OCR	Optical Character Recognition (see below for definition)
OOS	Out-of-State (license plates)
OTA	Oklahoma Turnpike Authority
PbP	Pay-by-Plate (see below for definition)

Abbreviation	Term
RF	Radio Frequency
RFID	Radio Frequency Identification
ROW	Right-of-Way
RTCS	Roadside Toll Collection System (see below for definition)
SB	Southbound
SOV	Single Occupancy Vehicle
SALPR	Supplemental Automatic License Plate Recognition
TBT	Transponder-Based Transaction (see below for definition)
TMC	Traffic Management Center
TOC	Toll Operations Center
TSA	Toll Services Agreement
TxDOT	Texas Department of Transportation
VPBR	Variable Priced Base Rate (see definition below)
VTMS	Variable Toll Message Sign

Table 0-2: Definitions

Term (Abbreviation)	Definition
All-Electronic Tolling (AET)	A modern tolling method using state-of-the-art technology and automation that allows for tolls to be collected without vehicles having to stop at a toll booth. The method typically uses AVI and/or image capture/review technologies and processes to identify the person responsible for the toll.
Authorized User	An individual authorized to access and utilize a system. The user's access and utilization are determined by proper login credentials and assigned role(s).
Automatic Vehicle Identification (AVI)	A specific AET method that uses radio frequency (RF) identification technology that identifies customers in vehicles using Transponders as they pass fixed antennas and readers for the purpose of toll collection.
Back Office System (BOS)	The suite of hardware and software used to manage customer accounts and perform other toll related operations for the purposes of servicing customers and toll collection.
Business Rules	The set of rules that govern how systems and personnel function and operate, especially in response to the various operating situations that occur during the toll collection process based on business cases and policy decisions.
Customer Service Center (CSC)	The central operations facility that houses and/or utilizes equipment, software, systems and personnel required to establish and manage customer accounts, provide customer service; and manage information and data, including transaction data, for the purposes of servicing customers and toll collection.
Dashboard	A type of GUI-based reporting tool which typically provides real-time, at-a-glance views of KPIs relevant to particular objective(s) or business process(es).
Exempt Vehicle	A vehicle that is eligible to use a toll facility without being charged the toll.
Expected Revenue	The forecasted amount of revenue to be collected from toll transactions assuming 100% will be paid.
General Purpose Lane(s) (GP Lane(s))	The non-tolled lane(s) of travel adjacent to the Express Toll Lane.
Image Review	The system(s) and/or process(es) related to reviewing captured images of license plates, using OCR and/or manually, associated with vehicles that used a toll facility in order to determine License Plate Data for the purpose of toll collection.
Image-Based Transaction (IBT)	A toll transaction for which the toll collection is ultimately based on an associated image, or set of images, of a vehicle's license plate (as opposed to a Transponder-Based Transaction).
Interoperable or Interoperability	Relationship established between two or more tolling agencies or entities based on their systems being capable of capturing, transmitting, receiving, processing and paying for toll transactions resulting when a customer with an account at one agency/entity uses the toll facility of another agency/entity.
Key Performance Indicator (KPI)	Measure or metric used to define and evaluate how successful one or more elements of the System and/or operational areas of the project are performing.
Level of Service (LOS)	A standardized indication of roadway congestion reflecting the relative ease of traffic flow developed by FHWA. LOS A, for example, means free flowing traffic with low volumes and high speeds where traffic density is 0 -11 vehicles/lane/mile. LOS C, for example, means stable traffic flow but with drivers restricted in the freedom to select their own speed where traffic density is 11-18 vehicles/lane/mile.
License Plate Data	Information related to a specific license plate which can be derived from a legible image of the license plate, including the license plate's issuing jurisdiction (e.g., state), alphanumeric characters, and plate type used for the purpose of vehicle owner identification and/or toll collection.
Optical Character Recognition (OCR)	Software that attempts to automatically determine License Plate Data without human review using a captured image or set of images of a license plate.
Pay-by-Plate (PbP)	A service that will be offered by KTA that will allow a customer to pay an owed toll amount based on a license plate image and KTA's invoicing Business Rules.

Term (Abbreviation)	Definition
Reconciliation	The process of comparing two or more sets of data records, typically from different systems, to check that that the individual data sets are complete and in agreement.
Roadside Toll Collection System (RTCS)	The system, including hardware and software, that detects, classifies, and creates toll transactions for vehicles traveling on a toll facility. The RTCS interfaces with and sends to the BOS the toll transactions for processing for the purpose of toll collection.
Toll Rate Schedule	The toll amounts applied to toll transactions.
Toll Zone	The location on a toll facility where AET equipment is installed, including on one or more overhead gantry structures, in order to detect, identify and classify vehicles using the toll facility for the purpose of toll collection.
Transponder	A radio RF device mounted in or on a vehicle that provides a unique identifier for the purpose of toll collection.
Transponder-Based Transaction (TBT)	A toll transaction for which the toll collection is ultimately based on an associated Transponder (as opposed to an Image-Based Transaction).
Variable Priced Base Rate (VPBR)	The toll rate for each segment associated with a 2-axle vehicle using a valid Transponder method of toll collection/payment. This based toll rate for each segment varies based on segment's traffic congestion per the project's variable pricing concepts and is used to calculate the toll rates associated with other Vehicle Classes and vehicles not using a valid Transponder method of toll collection/payment.
Vehicle Class	The approved scheme used to categorize each vehicle (based on, for this project, the vehicle's number of axles) which is used in the framework for the Toll Rate Schedule.
VToll	An industry term referring to an Image-Based Transaction that the BOS determines is actually associated with a valid Transponder and processes accordingly based on the Business Rules.

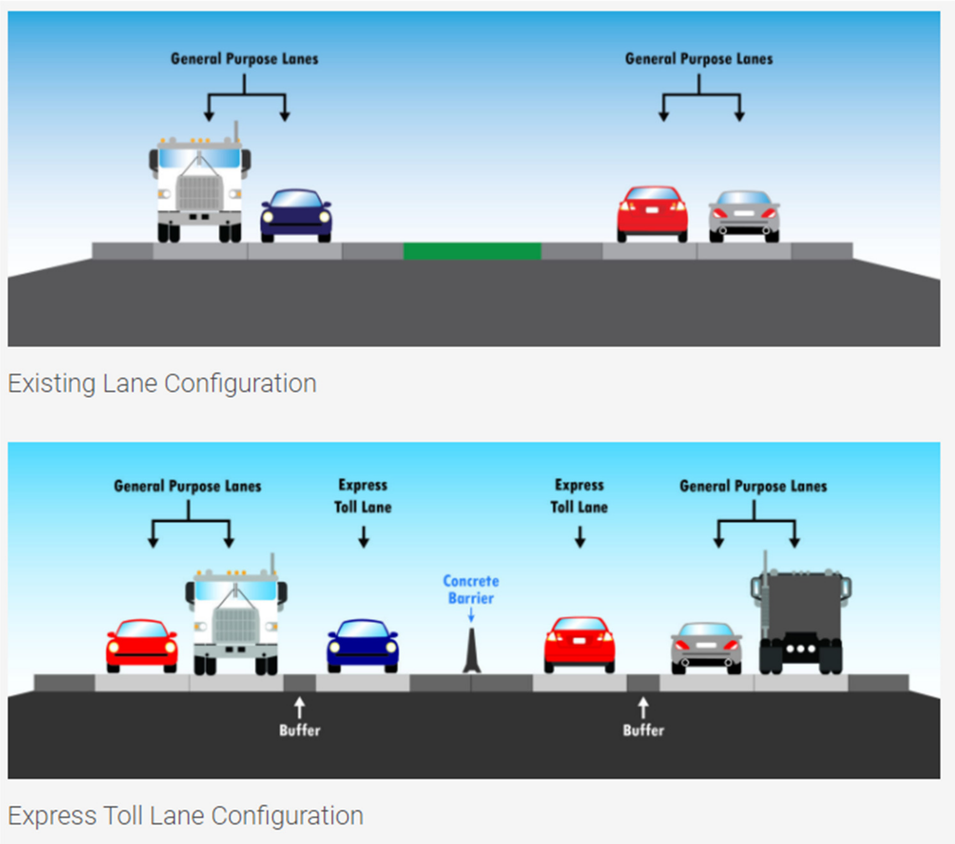
EXECUTIVE SUMMARY

The U.S. 69 Corridor Modernization and Expansion Project is determining how best to address growing safety and congestion issues along the US-69 Corridor. Multiple solutions are being considered to expand US-69 and modify interchanges along the corridor to address these issues. One option being considered would widen US-69 to six lanes from near 103rd Street to 179th Street with the third lane in each direction added as an Express Toll Lane (ETL), as this option could provide additional long-term safety, traffic flow and trip time reliability benefits. The existing lanes, also commonly called general purpose lanes (GP Lanes), would remain toll-free under this option. The portion of U.S. 69 under study runs from just south of 179th Street to just north of 103rd Street in Overland Park, Kansas for a length of just over ten miles.

Express toll lanes (ETLs) have proven to be effective at reducing congestion and improving travel time reliability. ETLs enable drivers to choose if they want to pay a toll to drive in the express lanes in order to achieve more reliable travel time. This has the added benefit of also reducing congestion in the toll-free GP Lanes. To accomplish this, a variable toll rate system will be used where the toll rate changes with traffic volumes to keep the toll lanes flowing smoothly while also improving traffic flow in the toll-free, GP Lanes. The current toll rate is communicated to drivers via signs so drivers can choose for themselves whether they want to pay that price to drive in the ETL.

For the 69 Express Lanes, the third lane in each direction, the ETLs, will be constructed on the inside of existing lanes, where the median and green space currently exists today (see Figure 0-1). The Express Lanes will be constructed at this location to take advantage of right-of-way (ROW) that is already owned by the Kansas Department of Transportation (KDOT). The Express Lanes will be separated from the existing lanes using a buffer and marked with a wide double stripe which is illegal to cross under normal traffic conditions. Northbound (NB) and southbound (SB) traffic will be separated by a concrete barrier.

Figure 0-1: Proposed Express Lanes



In addition to entry and exit locations at the ends of the ETLs, dedicated entry and exit areas will be provided throughout the corridor at strategic locations to maximize use but spaced far enough apart to discourage short trips within the corridor that contribute to increased congestion.

Current Kansas legislation requires tolls to be charged on all users of the ETLs regardless of class, size, or kind of traffic. Therefore, it is anticipated the ETLs will be available 24 hours a day, 7 days a week without restrictions placed on the type or size of vehicles allowed. Tolls will be collected using high-speed All-Electronic Tolling (AET) technology without requiring vehicles to stop to pay. Drivers will be able to use the ETLs and pay the toll using their K-TAG, other approved Transponders, or receive an invoice based on their license plate.

The ETLs' pricing will be set based on traffic conditions, increasing and decreasing as traffic volumes fluctuate throughout the day. The toll price will be calculated to encourage the maximum number of drivers to choose the ETL while still maintaining a reliable trip-time. Toll pricing will be based on a per-trip price, and the trip toll amounts will be displayed to the driver on overhead roadway signs in advance of entering the ETL.

As drivers choose to utilize the Express Lane the number of vehicles in the GP Lanes is reduced thereby easing congestion in the GP Lanes. With nearly 60 express lanes operating throughout the U.S. today, ETL implementations have demonstrated a variety of benefits to users. Some of these benefits include the following:

- Trip-time reliability
- Travel-time savings
- Reduced vehicle hours traveled
- Revenue generation
- Transit improvements – provide faster trips for transit vehicles
- Enhanced overall corridor mobility
- Reduced emissions
- Provide travel options
- Efficient use of capacity

This Concept of Operations document (Con-Ops) was developed in collaboration with the various stakeholders and is intended to be used to communicate how the ETLs would be implemented from a user perspective. The document establishes the framework for design and operations of the Express Lanes. Additionally, the document describes the corridor characteristics; identifies what the Express Lane system will look like and how it will be operated; and suggest the roles of each stakeholder. While the document maintains flexibility for further policy and design decisions that have not been fully defined, it establishes the framework for toll systems specifications and procurement documents, identifies civil elements necessary for the Express Lanes, and provides technical background for stakeholders and community communications.

It is important to recognize a few of the key guidelines established for the development of this project since they influenced many decisions and directions included in the Con-Ops.

- This project is fundamentally a KDOT project. As owner of the facility and lead agency, U.S. 69 will remain a KDOT-owned facility and it will not become part of the Kansas Turnpike Authority (KTA) system.
- KDOT will partner in some manner with KTA to deliver this project in order to leverage partnership efficiencies. The partnership structure will consider the risks to both KDOT and KTA.
- Overall efficiency is best achieved by leveraging the strengths of KDOT, KTA, the City of Overland Park and private industry partners. Operational efficiency leads to decreased costs and increased revenues that can be considered as a local contribution for near-term and long-term improvements to the corridor.

1.0 INTRODUCTION

1.1 Purpose

The Kansas Department of Transportation (KDOT), in partnership with the Kansas Turnpike Authority (KTA) and the City of Overland Park, is evaluating alternatives to improve safety, reduce congestion and improve travel time reliability along U.S. 69. The U.S. 69 Corridor Modernization and Expansion Project - also known as U.S. 69 Express – will widen U.S. 69 to six lanes (three lanes in each direction) and modify interchanges that connect U.S. 69 to the local street network. One option being examined is whether tolling the new lane (also called an ETL) would provide additional long-term safety, traffic flow and trip-time reliability benefits. The existing "free lanes" will remain free. The project also includes an Environmental Assessment (EA) and preliminary engineering necessary to move improvements closer to construction. This document has been prepared to assist in the development of the Express Lanes should KDOT elect to construct them.

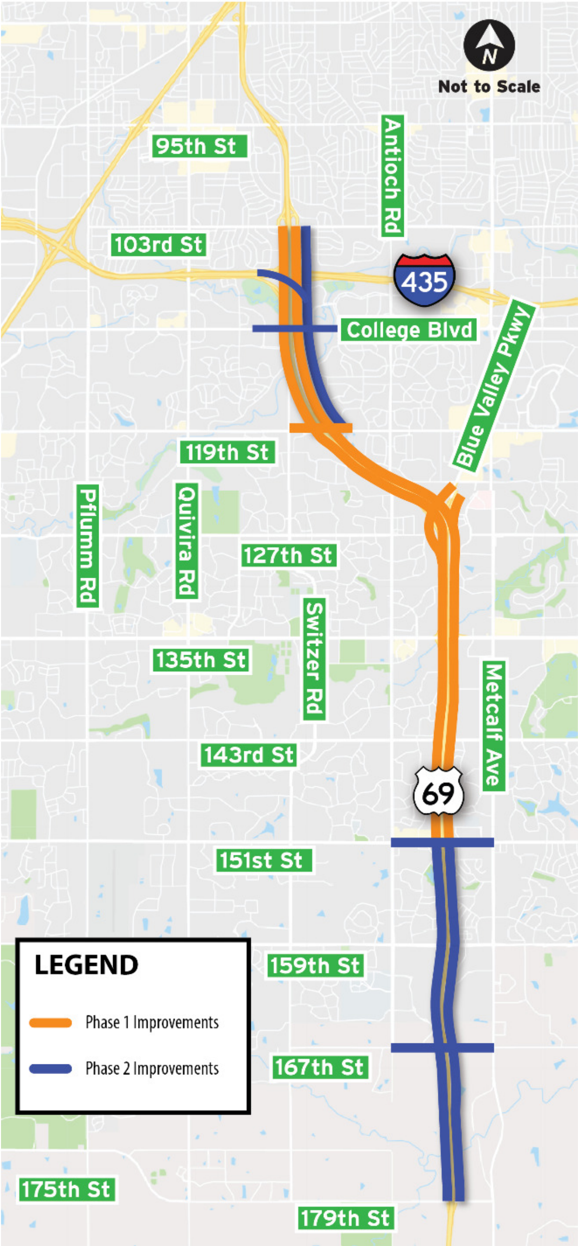
This Con-Ops is intended to describe how the ETLs considered by KDOT operate from a user perspective and set the framework for the design and operational parameters of the Express Lanes. This document serves as transition from policy and project studies to the expectations of the Express Lane user and the technical specifications to be developed for the toll system by describing the operational characteristics. The Con-Ops will be used in the development of the ETL system procurement along with assisting the agencies during operations. Since project policy, agency agreements and technical specifications have not been finalized this document allows for future flexibility to accommodate further refinements.

Figure 1-1: U.S. 69 Express

1.2 Project History

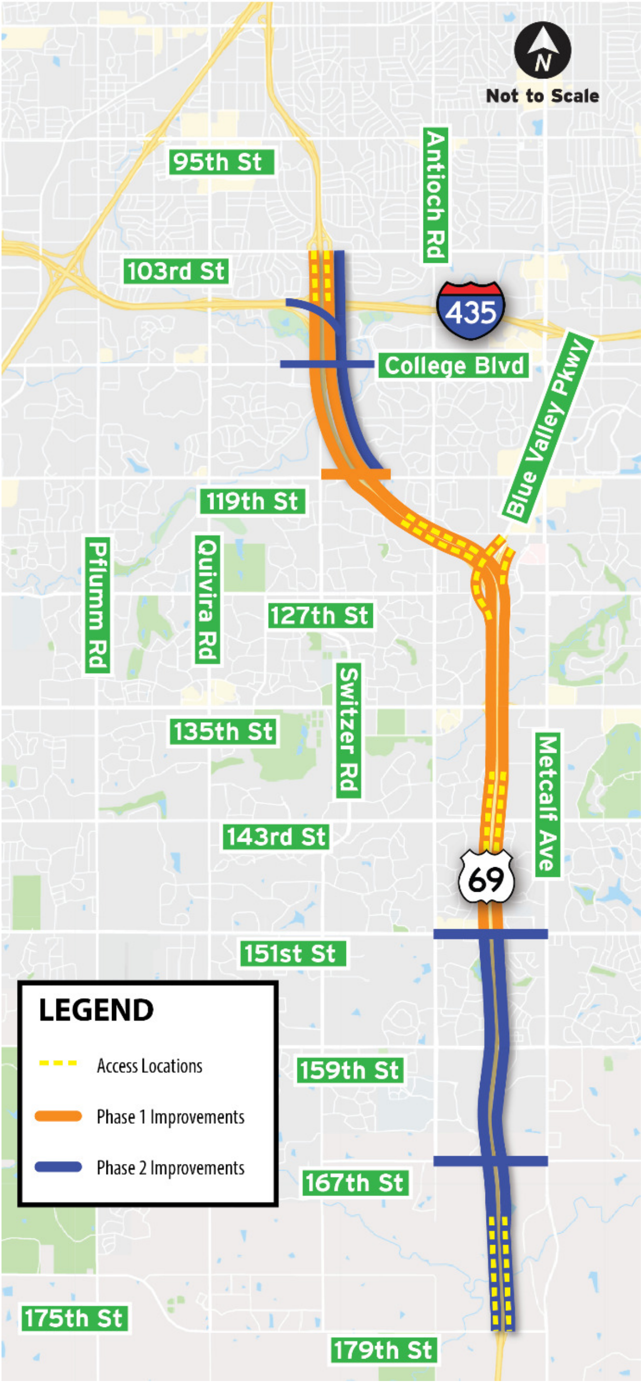
U.S. 69 Express will extend for approximately 10 miles along existing U.S. 69 from north of 103rd Street to south of 179th Street in Overland Park, Kansas as depicted in Figure 1-1. A third lane in each direction, the ETLs, will be constructed on the inside of existing lanes with defined entrance and exit locations, where the median and green space currently exists taking advantage of ROW that is already owned by KDOT. The project is likely to be developed in phases as funding becomes available and traffic demand warrants additional capacity. This document contemplates two phases of development for the entire project. The first phase (Phase 1) will be from north of 103rd Street to north of 151st Street. This segment is approximately 6 miles in length. The remaining 4 miles from north of 151st Street to south of 179th Street are assumed to be developed in a future phase (Phase 2). These phases are shown in Figure 1-2.

Figure 1-2: U.S. 69 Express Project Phases



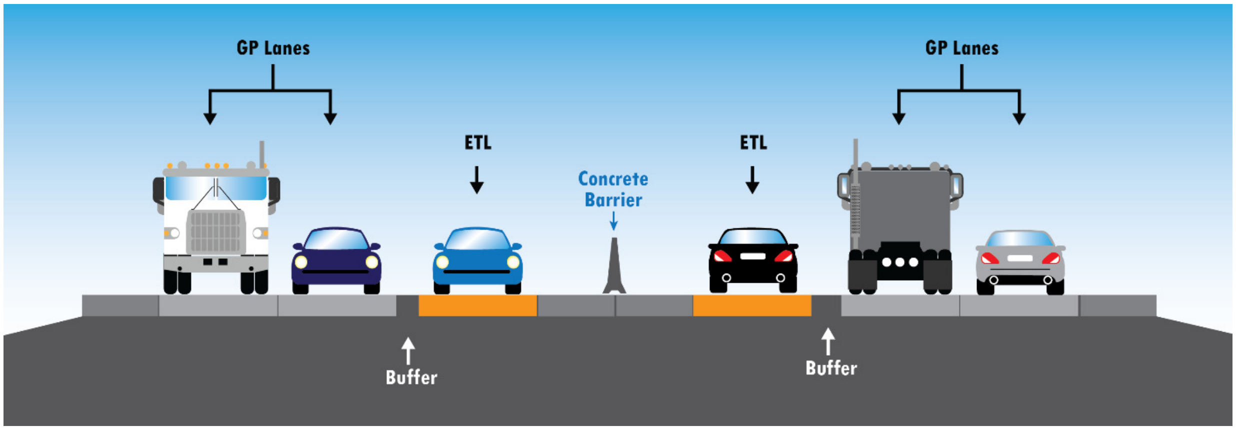
The Express Lane in each direction will be separated from the existing lanes using buffer separation. This buffer separation will be approximately four-foot in width and will have its boundaries marked with a double white stripe. (see Figure 4-2). There will eventually be three entry and three exit locations in each direction as shown in Figure 1-3.

Figure 1-3: Express Lanes Access Locations



NB and SB traffic, as depicted in Figure 1-4 below, will be separated by a concrete median barrier. In addition to adding the third lane in each direction, the U.S. 69 interchanges at Blue Valley Parkway (BVP) and at I-435 will be reconfigured. Improvements to local interchanges and supporting cross streets will be made and existing pavement and bridges will be reconstructed.

Figure 1-4: Typical Section



ETLs reduce congestion and improve travel time reliability by allowing drivers to choose if they want to pay a toll to drive in the free-flowing Express Lanes. This has the added benefit of also reducing congestion in the toll-free GP Lanes. To accomplish this, the toll rate will change with traffic volumes to keep the toll lanes flowing smoothly while also improving traffic flow in the toll-free, GP Lanes. The current toll rate will be communicated to drivers via overhead signs so drivers can choose for themselves whether they want to pay that price to drive in the free-flowing toll lane.

As traffic in the Express Lane increases, the toll rate will also increase to limit the number of people entering the lane. Toll rates will decrease when traffic in the Express Lane decreases to incentivize more vehicles to use the existing capacity in the lane. Shifting vehicles from congested GP Lanes to utilize excess capacity in the Express Lane benefits GP Lanes flow without sacrificing free-flow operations in the Express Lane. Tolls will be collected electronically using K-TAGs and other interoperable Transponders along with license plate images while vehicles travel at highway speeds.

1.3 Goals and Objectives

This Con-Ops document is intended to be flexible and serve as a basis for continuing discussions and interagency coordination throughout the development of U.S. 69 Express. The document includes an overview of the operational requirements; the systems for toll collection and toll pricing; Intelligent Transportation Systems (ITS); monitoring and incident management; maintenance; and public information and outreach. The concepts described in this document are being updated and refined by KDOT, the lead agency for U.S. 69 Express Lanes project, cooperatively with KTA and the City of Overland Park.

This document is divided into sections presenting various features related to how the Express Lanes are anticipated to be developed, operated, and maintained. The following describes what is presented in each of the subsequent sections:

- Section 2 – Existing Conditions: provides a description and overview of the existing corridor.
- Section 3 – Project Needs and Requirements: describes the technology necessary for pricing and toll collection along with Express Lane system operations and maintenance needs.
- Section 4 – Facility Design: identifies the various design standards and requirements for the GP Lanes and Express Lanes, separation and access details, and roadway signing.
- Section 5 – Toll Strategies: presents the general policy for using and operating the Express Lanes including vehicle eligibility, modes of operation and toll rates.
- Section 6 – Roadside Toll Collection System (RTCS): defines the system and subsystem components needed to identify vehicles using the Express Lanes.
- Section 7 – Toll Infrastructure: describes the elements in the Express Lanes and along the corridor that are necessary to support the pricing and toll collection systems such as gantries and toll rate signs.
- Section 8 – ITS: describes the traffic sensors, cameras and message signs in the corridor and the Traffic Management Center.
- Section 9 – Enforcement: provides a general overview of the roles and responsibilities for enforcing Express Lanes operations.
- Section 10 – Roadway Operations and Maintenance: describes how the major components will be operated and who is responsible for providing maintenance.
- Section 11 – Systems Operations and Maintenance: describes how user trips are identified, how toll transactions are processed, how toll rates are established and an overview of general tolling operations.
- Section 12 – Measuring System Effectiveness: provides descriptions of system performance goals.
- Section 13 – Roles and Responsibilities: documents the various parties and their overall responsibilities for delivering, operating and maintaining the project.

1.4 Future Document Revisions

It is anticipated that the U.S. 69 Express Lanes will be developed in phases by KDOT. Therefore, it is anticipated this Con-Ops will be revised as needed to incorporate future construction. It is also recommended to update this document prior to opening the first phase of the project to reflect changes made during design and implementation. As subsequent documents are developed for the project such as the Incident Management Plan, Communications Plan, Toll Policy, and Toll Services Agreement (TSA) they should be appended to this Con-Ops.

2.0 EXISTING CONDITIONS

This section describes present-day U.S. 69 within the U.S. 69 Express project limits, primarily regarding current infrastructure components, traffic characteristics, and operations and maintenance activities.

2.1 Roadway Infrastructure

U.S. 69 is a vital component of the transportation network in the City of Overland Park, the Kansas City metropolitan area and eastern Kansas. Often referred to as the backbone of the City of Overland Park, U.S. 69 extends through the City between the junction with Interstate 35 (I-35) to the southern city limit. It connects many of the primary east-west arterial streets in the City providing connectivity to major employment centers and residential areas. More than 225,000 people and 10,000 businesses are located within five miles of U.S. 69.

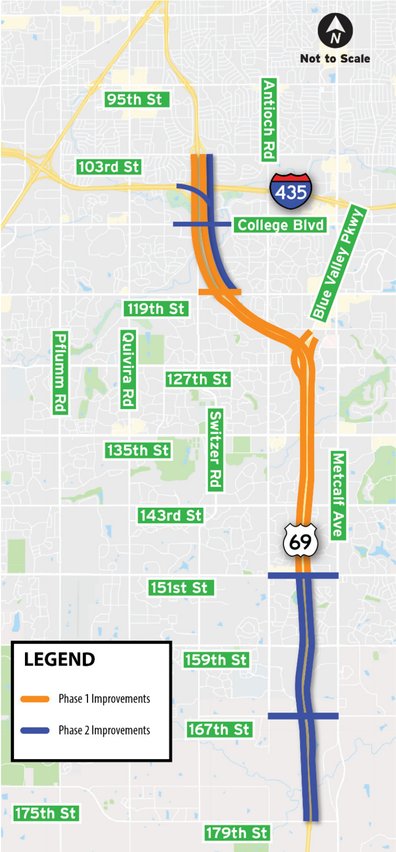
Through the project corridor, U.S. 69 is a fully access-controlled freeway with a posted speed limit of 65 and 70 (south of 167th Street) miles per hour (MPH) with two through lanes in each direction, separated by a grass median. The underlying concrete pavement within the project corridor dates back to the early 1960s and has been maintained and rehabilitated over the past several years with multiple overlay treatments. A photo of existing U.S. 69 within the limits of U.S. 69 Express is presented in Figure 2-1.

Figure 2-1: Existing U.S. 69 (2021)

U.S. 69 stretches approximately 10 miles within the project limits, from 103rd Street south to 179th, with interchanges at I-435, College Boulevard, 119th Street, BVP (partial), 135th Street, 151st Street, 159th Street and 167th Street (partial) and 179th Street. Continuous acceleration/deceleration (auxiliary) lanes are provided between some interchanges for motorists entering and exiting U.S. 69. Additional cross streets (non-interchange) include Antioch Road (overpass), 132nd Street (overpass), 139th Street (underpass) and 143rd Street (underpass). In addition, U.S. 69 bridges over Indian Creek in two locations (north and south of College Boulevard): Tomahawk Creek, just north of 135th Street, and the Blue River north of 179th Street.

It is currently anticipated that U.S. 69 Express will be completed in two phases, identified as the near-term/interim phase ("Phase 1") and the long-term/secondary phase ("Phase 2"). Phase 1 includes six miles from north of 103rd Street to north of 151st Street. Phase 2 will extend U.S. 69 Express an additional four miles from north of 151st Street to south of 179th Street. It should be noted that the phasing limits are still subject to change dependent on additional funding and/or scope changes offered by the design-build team. Figure 2-2 presents a depiction of the U.S. 69 Express Corridor with Phase 1 shown in orange and Phase 2 shown in blue.

Figure 2-2: U.S. 69 Express Project Limits



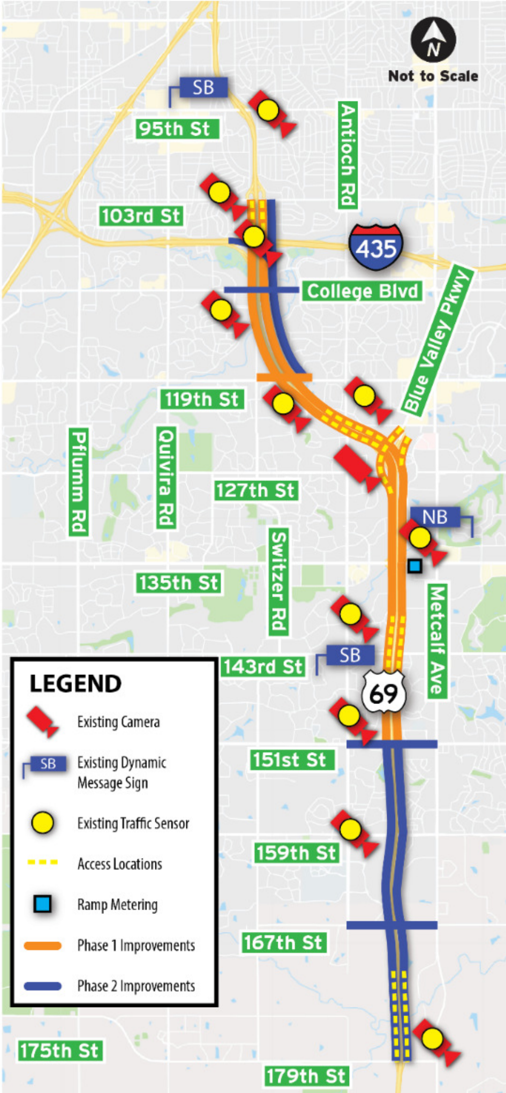
2.2 Intelligent Transportation System (ITS) Infrastructure

There are various ITS components currently utilized along the U.S. 69 corridor in the vicinity of the proposed ETLs, including Closed-Circuit Television (CCTV) cameras, Dynamic Message Signs (DMSs), traffic sensors and ramp meters connected via fiber optic backbone. See Figure 2-3 for approximate locations of all ITS devices and connections.

Closed-Circuit Television (CCTV) Cameras

CCTV cameras are used for monitoring the roadway in support of incident detection and clearance verification, and monitoring weather conditions. There are twelve existing CCTV cameras located within the U.S. 69 project corridor, nine within the Project limits of Phase I and three additional within the limits of Phase 2. From north to south, existing CCTV cameras are located at 103rd Street, I-435 (two CCTVs), south of College Boulevard, south of 119th Street, north of BVP, BVP, north of 135th Street, 143rd Street, 151st Street, 159th Street, and 179th Street.

Figure 2-3: Existing ITS Infrastructure



Dynamic Message Signs (DMSs)

DMSs are used to disseminate event information (incidents, lane closures, weather, etc.), safety messages, travel time messages and special alerts to motorists along the U.S. 69 corridor. There are three DMSs located in the vicinity of the project corridor, one in the NB direction and two in the SB direction. The two DMSs in the SB direction are located approximately one mile north of the northern ETL terminus and just south of 143rd Street. The NB DMS is located just north of 135th Street.

Traffic Sensors

Radar-based traffic sensors are used to measure traffic volume and speeds at points along the U.S. 69 corridor. There are currently eleven traffic sensors located within the U.S. 69 ETL corridor, generally in the vicinity of the existing CCTV units.

Ramp Meters

Ramp meters are devices utilized to regulate the flow of traffic entering roadways according to current traffic conditions. There are currently two ramp meters located on the entrance ramps from 135th Street to NB U.S. 69.

Fiber Optic Backbone

All existing ITS devices along the U.S. 69 corridor utilize a fiber optic backbone, generally running north-to-south within the western ROW limits. ITS communications north of 135th Street make use of a KDOT-owned 48-count fiber within a duct bank owned by Lumen (Century Link) and communications south of 135th Street utilize fibers within a Lumen-owned cable. KDOT maintains an agreement with Lumen regarding how and when access to the duct bank may be granted.

Operations and Maintenance

All existing ITS devices were installed by KDOT for the KC Scout system. KC Scout operates these devices while KDOT contractors provide maintenance.

Software

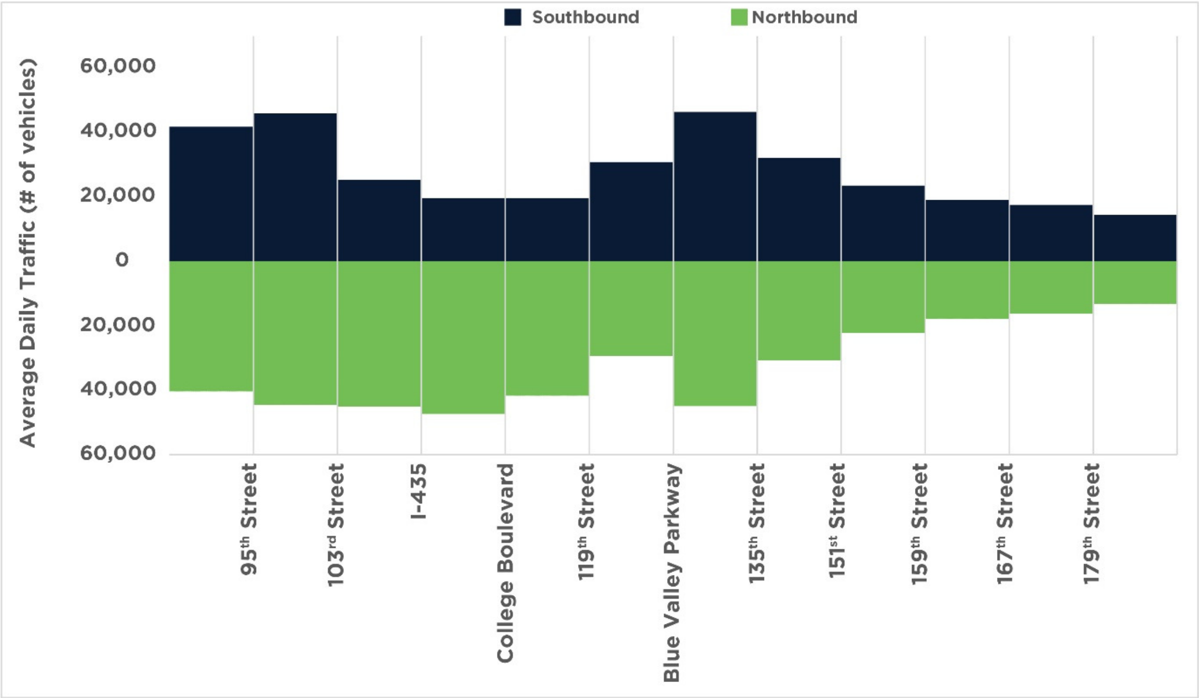
There are several existing software programs used to assist ITS infrastructure operations and maintenance. TransSuite™ Advanced Traffic Management System (ATMS) software is used to operate the ITS infrastructure and monitor system operations. OPS Insights software is used for asset management for the system.

2.3 Traffic Characteristics

Existing Traffic Volumes

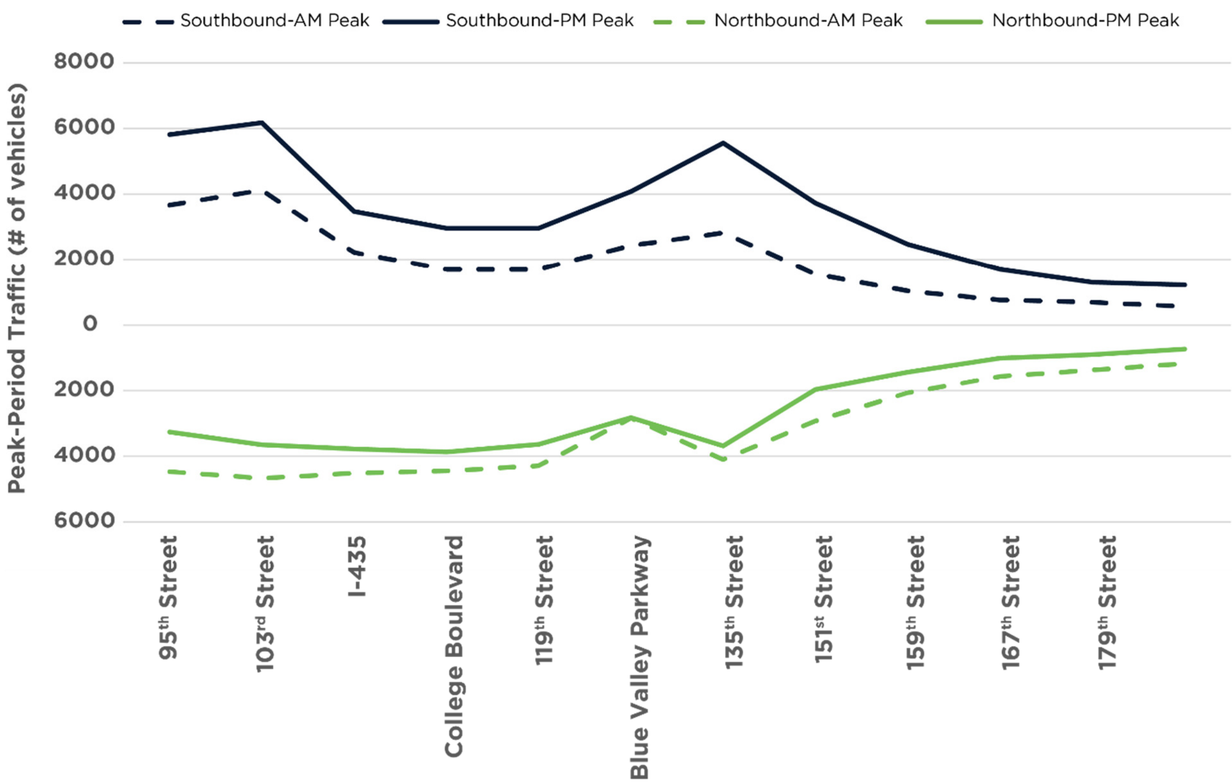
Existing (2019) average daily traffic volumes (U.S. 69 mainline only) can be seen below in Figure 2-4. Generally, cumulative NB U.S. 69 volumes are higher than SB volumes through the corridor, but it should be noted that the SB collector-distributor roadway volumes between 103rd Street and 119th Street are not included. SB volumes entering the study area north of 103rd Street are just under 46,000 vehicles per day (VPD) and drop to just over 17,000 VPD north of 179th Street. NB U.S 69 volumes north of 179th Street are approximately 16,000 VPD, increasing to as much as 47,000 VPD north of College Boulevard.

Figure 2-4: Average Daily Traffic Volumes



Peak-hour traffic volumes follow a similar pattern to the average daily traffic volumes. The peak hour is defined as weekdays from 7:30 AM to 8:30 AM and 4:45 PM to 5:45 PM. In general, PM peak-hour traffic levels are higher than the AM levels, and the highest volume is SB traffic between 95th Street and 103rd Street at the northern end of the project. The peak-period traffic volumes can be seen below in Figure 2-5.

Figure 2-5: Peak-Hour Traffic Volumes



2.4 Roadway Maintenance

The existing U.S. 69 corridor's roadway infrastructure components, including pavement, signing and pavement markings are maintained by KDOT.

2.5 Traffic Operations

KC Scout is a traffic management system partnership between KDOT and MoDOT. U.S. 69 through the project corridor is monitored by KC Scout staff from the Traffic Management Center (TMC) located in Lee's Summit, Missouri. KC Scout staff utilize devices located along the facility to manage the corridor and provide motorists with safer, more reliable roadways. KC Scout is responsible for traffic incident management, including detecting, notifying the public and first responders, and coordinating the response to, and clearance of traffic incidents. On-site incident management is provided by the Kansas Highway Patrol and the City of Overland Park Fire and Police Departments.

2.6 Stakeholders

There are many stakeholder groups that will have a role in the design, construction, financing, operations, and maintenance of the proposed U.S. 69 ETL, including:

- KDOT: KDOT will be the project owner and lead agency.

- KTA: KTA will partner with KDOT to leverage toll facility efficiencies, including provisions for the tolling back office and customer service.
- City of Overland Park: U.S. 69 Express falls entirely within the City of Overland Park.
- KC Scout: KC Scout provides traffic and incident management services along U.S. 69 through the project corridor.
- Federal Highway Administration (FHWA): U.S. 69 is part of FHWA's National Highway System and federal dollars are expected to fund a portion of the project costs.
- First Responders: The City of Overland Park Police and Fire Departments have jurisdiction as first responders within the U.S. 69 Express project limits.
- Mid-America Regional Council (MARC): As the regional Metropolitan Planning Organization (MPO), MARC oversees regional transportation planning and funding.

Additional details regarding the roles and responsibilities of stakeholders are provided in Section 13.

3.0 PROJECT NEEDS AND REQUIREMENTS

This section describes what is needed to meet project goals and elicit appropriate implementation and performance requirements for the toll system components. Most project needs and requirements can be divided into two key areas: technology and operations. In addition, considerations should be made for stakeholder coordination and outreach along with identification of new and/or updated Business Rules and operating policies.

KTA will serve KDOT as a vital partner regarding the planning and implementation of this potential project. KTA has a long-standing history maintaining the 236-mile Kansas Turnpike and has been collecting tolls since 1956. The KTA began implementing electronic toll collection in 1995 in the form of the K-TAG Transponder, KTA is currently in the process of converting their entire system to All-Electronic Tolling (AET) and removing manual (cash) toll collection from the roadside. Through this conversion, KTA is modifying their Back Office System (BOS) and developing/revising Business Rules accordingly. To capitalize on the important work being completed by KTA, the partners are currently advancing plans for KTA to process all toll transactions for U.S. 69 Express.

3.1 Technology

Technology needs for a successful toll project include a RTCS and a BOS. The RTCS identifies the customer (by Transponder or license plate), identifies what they're driving (e.g. number of axles) via in-pavement and/or overhead devices, and enforces the proper toll rate accordingly. Data collected from the RTCS is transmitted to the BOS, which functions as a financial system designed to collect toll revenue, and includes all components necessary for transaction processing, account management and billing (among many other capabilities). The BOS also provides the interface necessary for customer interactions regarding disputes, self-service, and point-of-sale needs.

Roadside Toll Collection System

An RTCS will be procured and implemented to provide a complete, functioning, state-of-the-art AET system using Automatic Vehicle Identification (AVI) and video processing for identifying vehicles at all Toll Zones located along the U.S. 69 Express Corridor. The RTCS will need to provide, at a minimum: Automatic License Plate Recognition (ALPR), Optical Character Recognition (OCR), Digital Video Audit System (DVAS), and trip building capabilities. The RTCS will also need to include a dynamic toll pricing software system capable of computing variable toll rates dependent upon traffic volumes in the ETL to maximize ETL utilization and improve overall corridor mobility. It is expected that the RTCS will create complete fully-formed motorist trip transactions and send these transactions to KTA for further processing (i.e., all transactions with correct pricing and associated with the correct vehicle).

In addition to designing and implementing the RTCS described herein, the RTCS vendor contract will include provisions for operations and maintenance of the system for a yet-to-be-determined number of years, as well as specific standards of performance via Key Performance Indicators (KPIs).

Back Office System and Operations

KTA's existing BOS will need to be modified to accommodate trip-built transaction data sent by the U.S. 69 Express RTCS vendor. Additional modifications may be required regarding existing interfaces, billing standards and connectivity accordingly. Regarding BOS operations and customer service, U.S. 69 Express will be a new toll facility in this region of Kansas creating a need for additional training for Customer Service Center (CSC) staff.

ETL Traffic Management and ITS

The RTCS vendor will need to procure and install various ITS devices, including vehicle detection devices to closely monitor traffic conditions along the ETLs and GP Lanes to properly influence efficient ETL mobility. Additional CCTV cameras will also need to be procured and installed to capture images of the Variable Toll Message Signs (VTMSs) and verify toll rates during operations.

Communications Network

Communications network fiber optic cable and duct bank will need to be provided for the entire length of the corridor to support the toll and ITS system components installed for ETL tolling operations. Planning and execution for center-to-center communications links and various network links should comply with KDOT and KTA Information Technology (IT) guidelines. All new fiber optic cables and duct bank will be installed and utilized independently of all existing infrastructure (to remain), including the duct bank owned by Lumen. Leased lines and connections will need to be considered for communications transmissions between the U.S. 69 Express location and KTA's offices and/or the RTCS vendor's operations center.

Signing

Signing for U.S. 69 Express will be important to maintain safe and efficient traffic operations and to communicate toll rates. Clear and concise signage is needed in advance of all ingress and egress (i.e. entry and exit) points, while blending seamlessly with other GP Lane signing along U.S. 69. Ingress signage will include information regarding toll rates, payment methods, and destinations, at a minimum. Once in the ETL, motorists must be informed about egress points in a clear, effective way. Additional details regarding signing along U.S. 69 Express are provided in Section 4.5.

3.2 Operations

Toll System Operations

The RTCS must be able to effectively influence and regulate traffic demand and volumes in the U.S. 69 ETLs via variable toll rates. In addition, the RTCS will need to process transactions by applying the appropriate toll rates and combining all transactions into a single trip for transmission to the BOS. RTCS vendor staff will need to monitor VTMSs (especially during peak travel periods) and provide manual Image

Review and transaction trip building services. The BOS will need to receive trip-based transactions from the RTCS, post to proper accounts and send invoices to customers. The toll systems must also communicate with all parties responsible for activities related to toll rate verifications and/or overrides and toll collection. Additional details regarding toll system operations is provided in Section 11.

Traffic Management Operations

The U.S. 69 Express Corridor will need to be monitored by staff at a TMC and appropriate workstations and video wall space should be dedicated to monitoring the ETL accordingly. When staff is not dedicated to monitoring U.S. 69 Express, KC Scout's ATMS will continuously monitor device functionality and traffic flow and will identify incidents. KDOT and KC Scout will need to revise incident management plans regarding ETLs and document proper coordination with KTA, the RTCS vendor and the City of Overland Park forces, as necessary. Additional details regarding traffic management operations are discussed in Section 10.

Maintenance

It is essential that the infrastructure and devices supporting the ETLs (roadway, ITS, tolling, etc.) be maintained at the appropriate levels to meet all applicable performance requirements. A maintenance plan will be developed to include scheduled and preventative maintenance, as well as considerations for immediate emergency repairs. The communications network should support management software to help detect failed or defective devices. Specifics regarding maintenance for the roadway and toll systems are provided in Sections 10 and 11, respectively.

Enforcement

Effective enforcement is critical to the success of U.S. 69 Express, and more importantly the safety of all motorists. Law enforcement personnel need to make considerations, and define operational responsibilities, for properly identifying violators and issuing citations. Specifics regarding enforcement are discussed further in Section 9.

3.3 Stakeholder Coordination

Stakeholder coordination throughout the development and implementation of U.S. 69 Express is crucial as KDOT seeks to open their first price-managed Express Lanes project. KDOT, KTA, the City of Overland Park, KC Scout, the design-build contractor and RTCS vendor should maintain constant and consistent lines of communication, as applicable.

During planning, design, and construction, KDOT will need support from KTA and the City of Overland Park in obtaining permits, procuring a design-build contractor for the roadway infrastructure improvements, and establishing operating policies. In addition, KTA will need KDOT's support in developing technical specifications for the toll system and procuring the RTCS vendor.

During operations and maintenance, KDOT, KC Scout, KTA and the City of Overland Park (as applicable) will need to coordinate routine roadway maintenance efforts, monitor traffic conditions, manage incidents and associated lane closures.

Additional details regarding roles and responsibilities are provided in Section 13.

3.4 Business Rules and Standard Operating Procedures (SOPs)

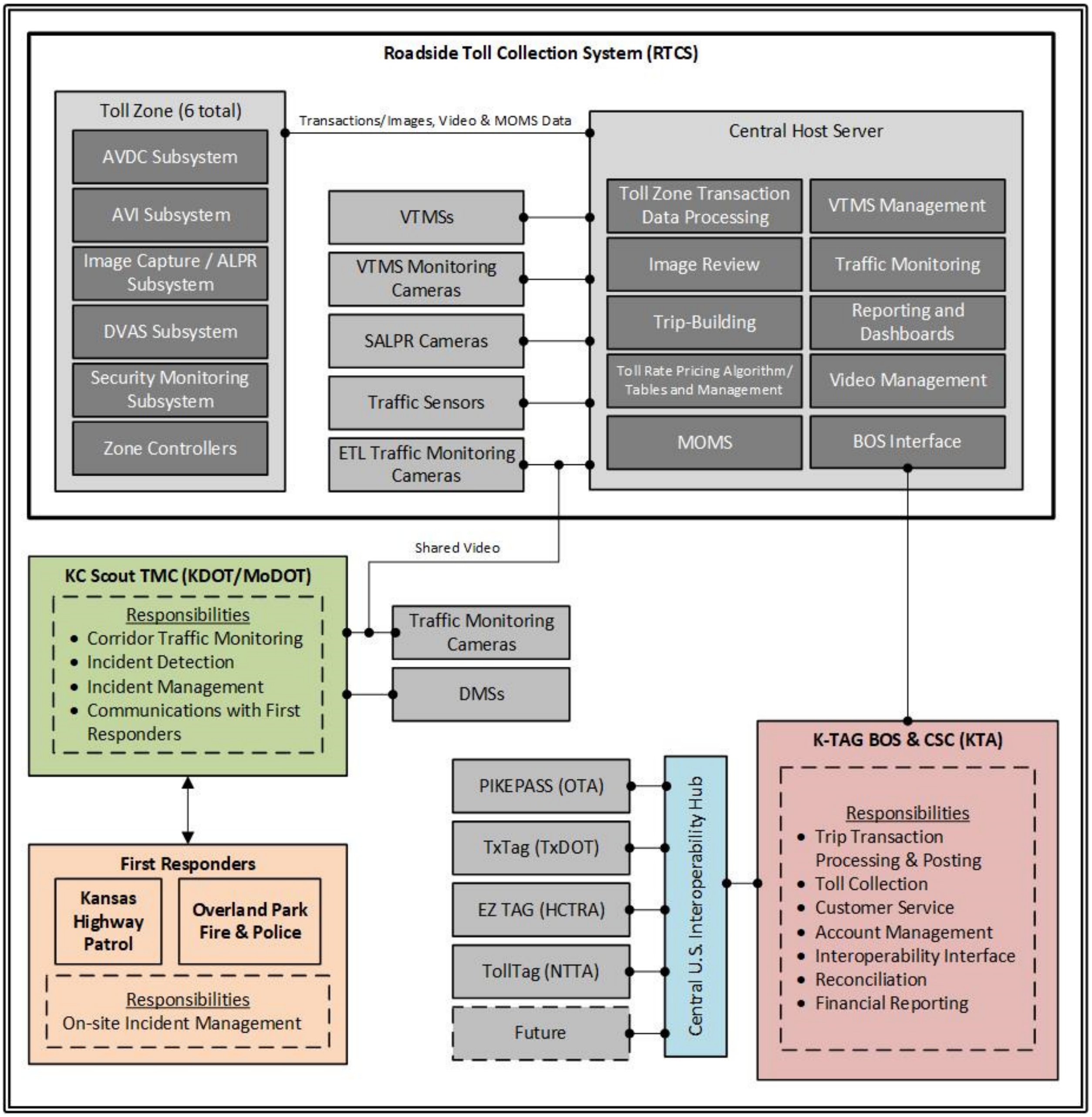
The Business Rules for U.S. 69 Express will need to consider variable pricing, peak-hour traffic demands, hours of operations, and more. Specific to toll rates, Business Rules need to be established regarding base rates, multipliers for different classifications, minimum and maximum rates and rate increases, discounts for Transponder-Based Transactions (TBTs) and/or premiums for Image-Based Transactions (IBTs) and VToll recurrences. Regarding toll collection, Business Rules should consider invoicing practices, fee assessments, collections, acceptable payment methods and the dispute process, among others.

Standard operating procedures (SOPs) related to U.S. 69 Express should be coordinated with KTA and be compatible and consistent with operating procedures of other tolled facilities in Kansas, when possible. SOPs to be developed include, but are not limited to, active incident management impacting the ETLs and GP Lanes, proactive monitoring of variable pricing (including override procedures), use of communication and emergency notification systems, TMC operations (staffing, response, reporting), use of technology systems, and utilization of routing maintenance contractors and local law enforcement. KDOT will ensure that SOPs are reviewed and updated as needed to ensure operations are current and reflect current statutes, Business Rules and/or system improvements.

3.5 Operations Overview

A diagrammatic overview of the 69 ETL operations is depicted in the following figure (Figure 3-1).

Figure 3-1: Diagrammatic Overview of 69 ETL Operations



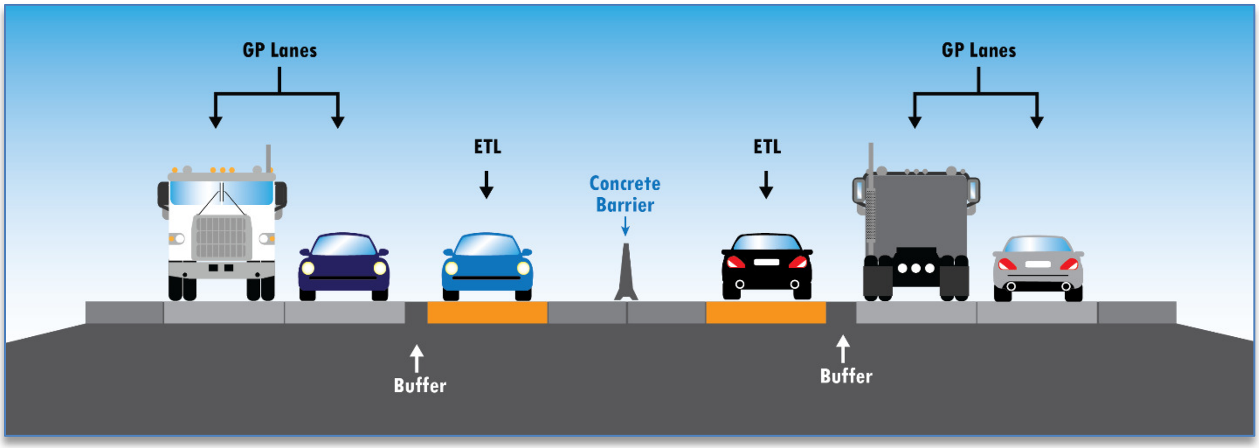
4.0 FACILITY DESIGN

This section describes the various design considerations for U.S. 69 Express, including the typical cross section characteristics, separation treatment, access location details, an overview of the toll segments, signage requirements, and lighting. The U.S. 69 civil infrastructure improvements will be completed by a design-build contractor, procured via a competitive bid process. A two-stage design-build procurement will be utilized to shortlist interested teams based on qualifications (stage 1) followed by a best value evaluation process for shortlisted teams (stage 2).

4.1 Typical Section

All design efforts regarding U.S. 69 Express will be in accordance with KDOT's design manual and standard drawings. The design speed of the U.S. 69 GP Lanes and ETLs will be 70 MPH and the typical section includes 10-foot outside shoulders, two 12-foot lanes, buffer separation (varying width), one 12-foot Express Lane and 10-foot inside shoulders. The proposed typical section of the facility is depicted in Figure 4-1.

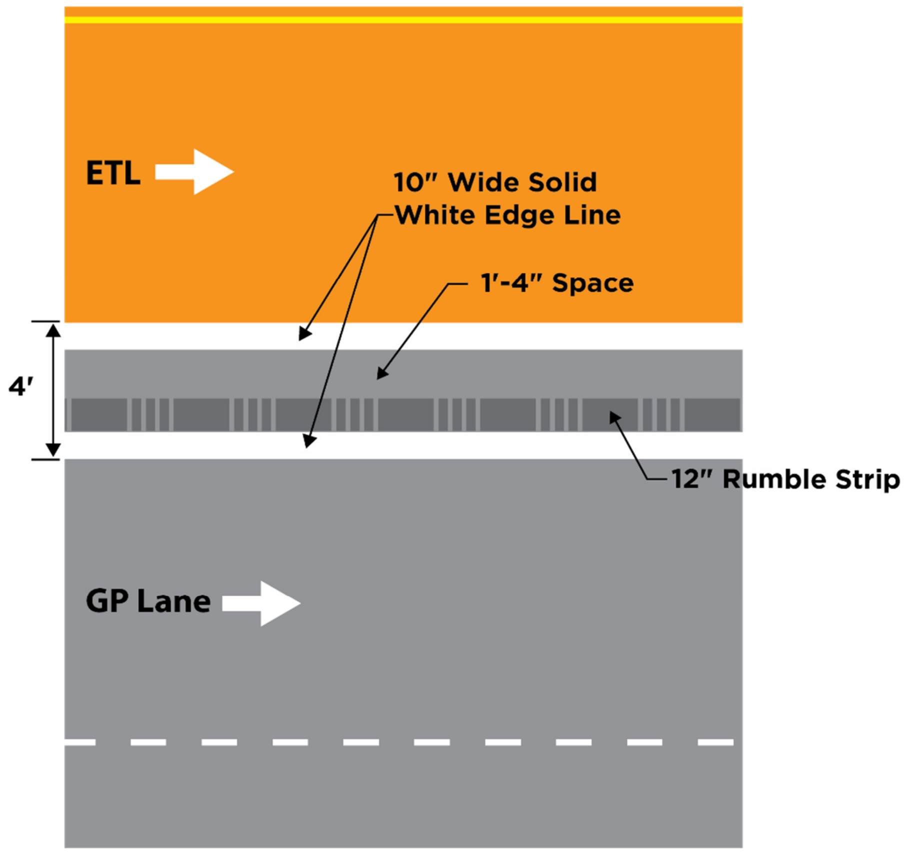
Figure 4-1: Typical Section



4.2 Buffer Separation

The U.S. 69 ETL will be separated from the GP Lanes through buffer striping, which uses pavement markings and a buffer space, as opposed to a physical barrier, to delineate between the ETL and GP Lanes. The width of buffer space will vary between two-feet and four-feet in width, with a four-foot width being utilized where possible. The four-foot buffer marking configuration is shown in Figure 4-2.

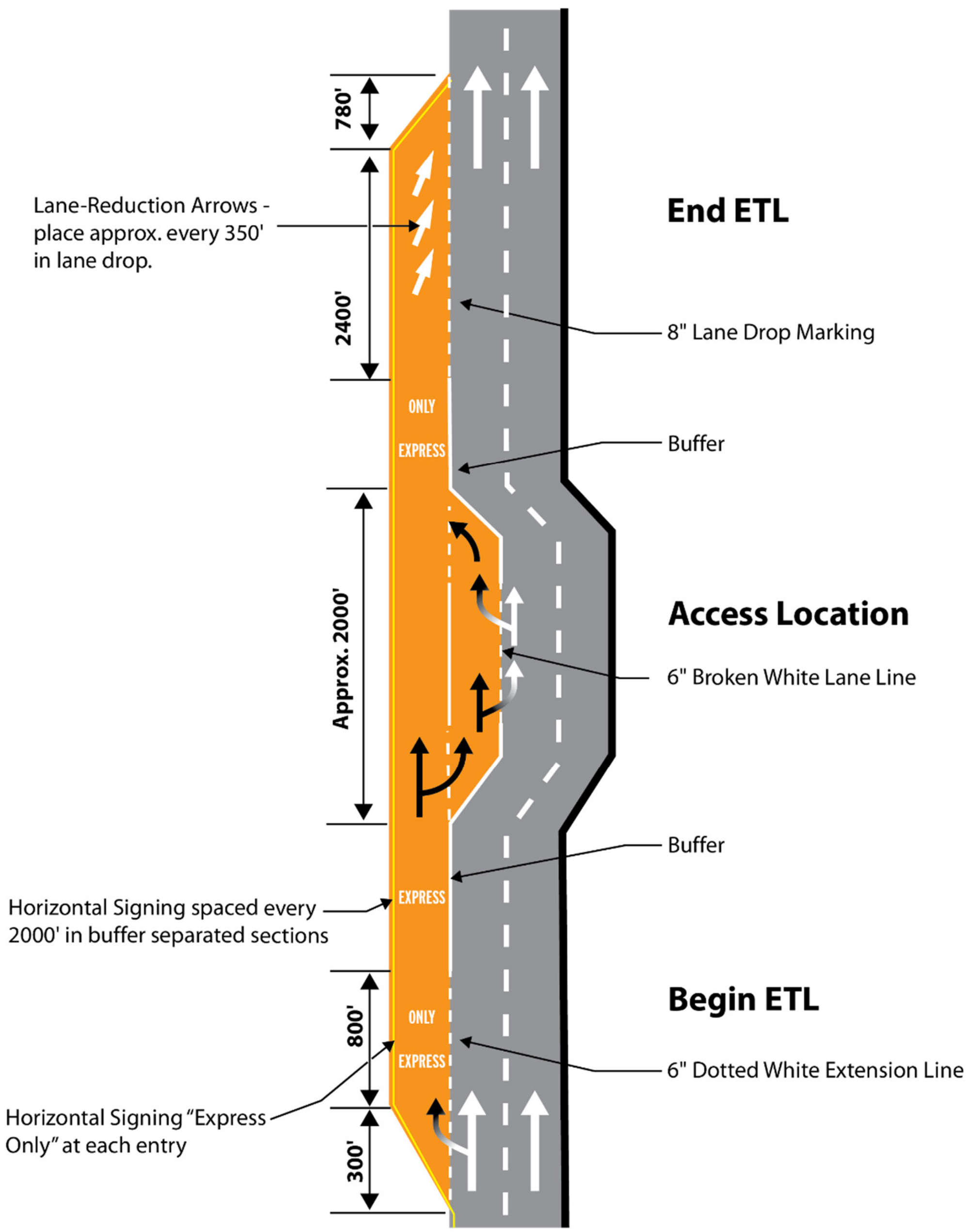
Figure 4-2: Buffer Details



At ingress and egress locations, the buffer pavement markings will consist of single white skip lines to indicate potential weaving. In addition, the U.S. 69 ETLs will include “EXPRESS ONLY” in the form of horizontal signing at each entry and “EXPRESS” every 2,000 feet along buffer-separated sections. ETL marking details are depicted in Figure 4-3.

Other separation techniques such as barrier and continued access were considered but ultimately not recommended for this corridor. Barrier separation using concrete traffic barrier is costly, requires more pavement, results in a larger footprint and will complicate ETLs operations and maintenance over the lifecycle of the project. Separation using raised, flexible delineators was not recommended due to the buffer zone width being reduced to two feet in some locations, along with the difficulties of providing efficient snow removal operations during winter months. Also, flexible delineators will significantly increase routine maintenance cost. Continuous access where there are no restrictions on entry or exit is too porous, difficult to enforce and leads to higher levels of toll evasion.

Figure 4-3: ETL Marking Details

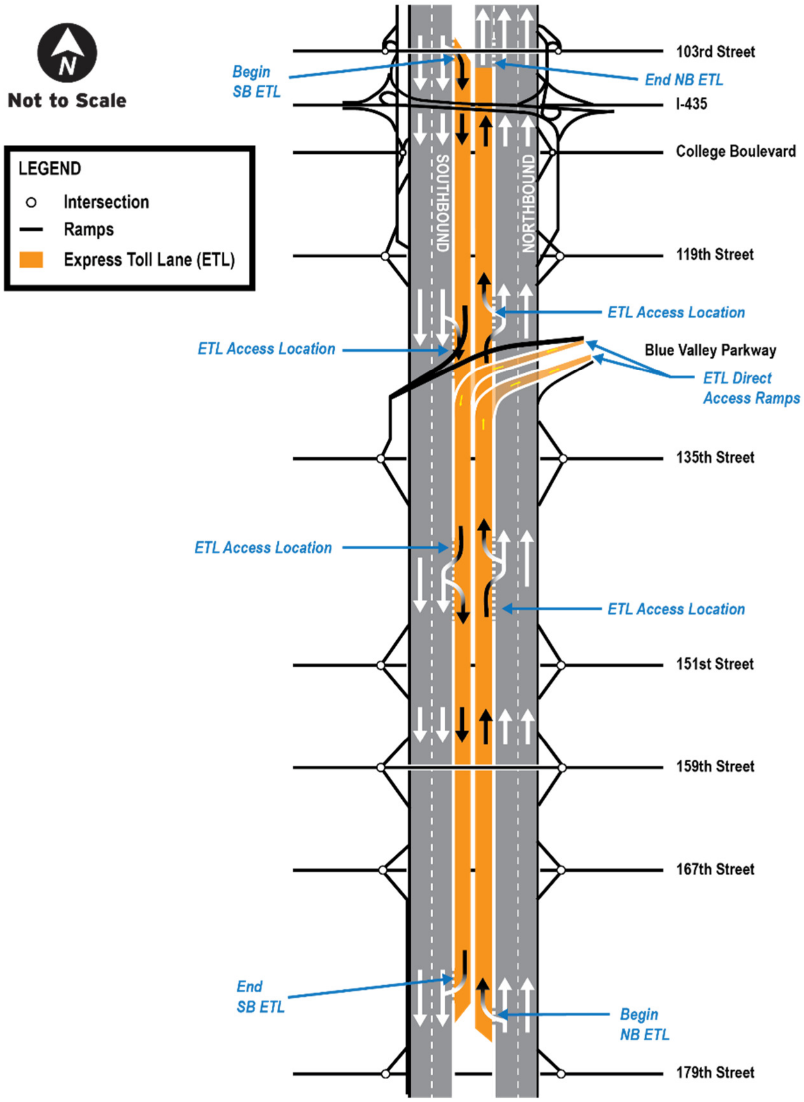


4.3 Access

Access refers to the ability to enter (ingress) and exit (egress) the 69 Express Lanes. Because safety is a primary consideration and U.S. 69 Express will operate using variable pricing, access to the ETLs will be strictly limited through designated access points only. Considerations have been given to driver safety, traffic statistics, and geometric constraints to determine access locations and types. Types of access locations include ingress only (entries), egress only (exit points) or a combination thereof via dedicated weave lanes or direct connector ramps.

The ETLs will have has a total of five access locations in both the SB and NB directions. The approximate locations of all access points are depicted in Figure 4-4.

Figure 4-4: U.S. 69 Express Access Locations



Southbound (SB)

There will be a total of five ETL access locations for SB traffic, three locations for Phase 1, with two additional locations for the Phase 2.

1. The northernmost entrance/ingress into the ETL will be located near 103rd Street.

2. A dedicated ingress point will be located between 119th Street and BVP, allowing ingress for traffic from I-435, College Boulevard and 119th Street and a direct access ramp will offer egress for traffic to move from the ETL to the auxiliary lane connecting the 135th Street exit from SB U.S. 69.

3. A direct access ramp will provide ingress to the ETL for SB traffic on BVP.

4. Phase 2 only: a weave lane is located between 135th Street and 151st Street, allowing ingress for traffic from 135th Street and egress for traffic to 151st, 159th and 167th Streets; prior to the Phase 2 being completed, this access location will serve as the southern terminus to the ETLs in Phase 1.

5. Phase 2 only: the southernmost exit/egress from the ETLs into the GP Lanes will be located just north of 179th Street.

Northbound (NB)

There will be a total of five ETL access locations for NB traffic, four locations for Phase 1, with one additional location for Phase 2.

1. Phase 2 only: the southernmost entrance/ingress into the ETL will be located just north of 179th Street.

2. A weave lane will be located between 135th Street and 151st Street, allowing ingress for traffic from 151st, 159th and 167th Streets and egress for traffic to 135th Street; prior to the Phase 2 being completed, this access location will serve as the southernmost entrance/ingress into the ETL.

3. A direct access ramp will provide egress from the ETL for NB traffic onto BVP.

4. A weave lane will be located between 119th Street and BVP, allowing ingress for traffic from 135th Street and egress for traffic to 119th Street, College Boulevard, I-435 and 103rd Street.

5. The northernmost exit/egress from the ETLs into the GP Lanes will be located near 103rd Street.

4.4 Toll Segments

U.S. 69 Express will be divided into toll segments and separate toll rates will be applied for each segment. For the purposes of pricing and signing, toll segments for the corridor are generally defined as segments between NB and SB access locations. The ETL will have three toll segments – two for the Phase 1 and one additional for the Phase 2, as shown in Table 4-1. Dividing the corridor into toll segments provides greater flexibility to manage demand and gives users more flexibility in utilizing the ETLs.

Table 4-1: Toll Segments - Overview

Toll Segment	Northern Terminus	Southern Terminus
1	103rd Street	119th Street / BVP
2	119th Street / BVP	151st Street
3 (Phase 2 only)	151st Street	179th Street

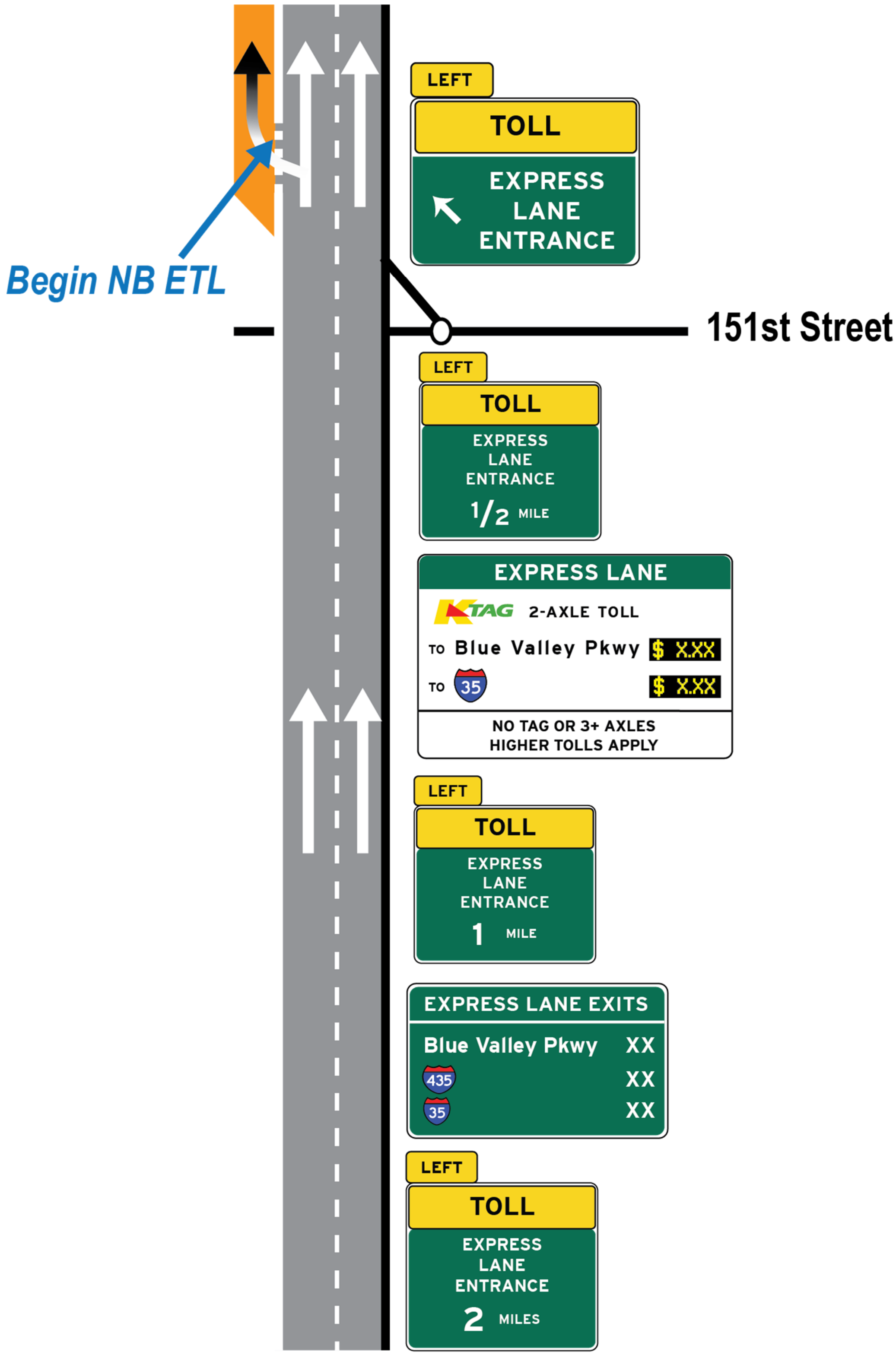
4.5 ETL Signage

Overhead and ground-mounted/roadside signs will be used along the U.S. 69 Express to guide motorists, display toll information, and indicate regulatory information. A combination of static and VTMSs will be provided at the entrance points, all points of ingress/egress and end points. All signage locations will be compliant with the Manual on Uniform Traffic Control Devices (MUTCD). Each VTMS will be a combination of a static sign with one or two electronic Variable Message Sign inserts, utilized to display specific toll rates for ETL segments.

Signage at Entry Points

A sequence of advance overhead signs will be installed in advance of U.S. 69 Express entry points to advise motorists of the approaching ETL entrance, potential exits, toll rate information and toll collection options. The advanced signage will be erected over the left GP Lanes. Figure 4-5 presents example signage to be located at the NB ETL entrance during Phase 1 (just north of 151st Street).

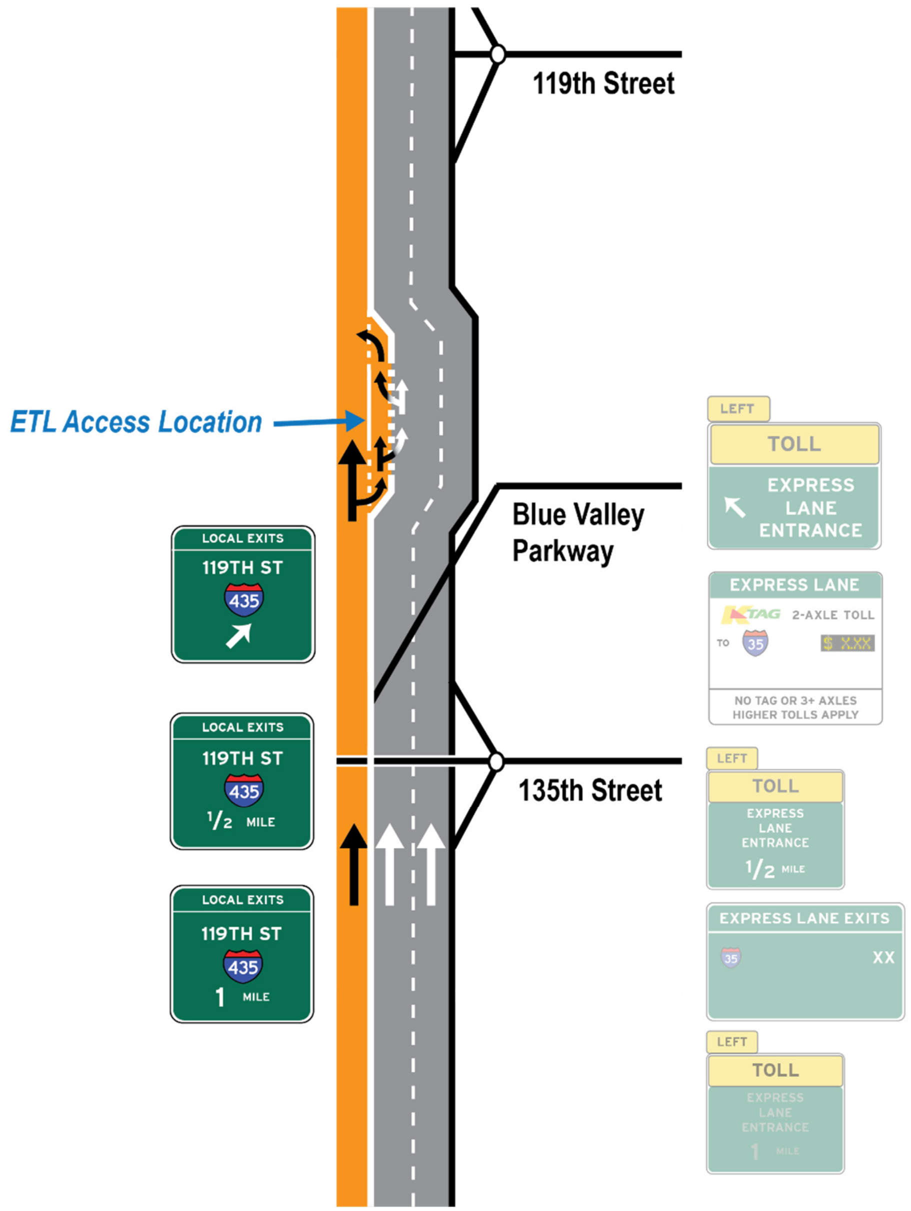
Figure 4-5: ETL Entrance Signage



Signage at Intermediate Ingress/Egress

At locations of intermediate access to and from (ingress/egress) the ETLs, signs will be installed in advance of the access locations to advise motorists of the approaching opportunity to enter or exit the ETL. For motorists in the GP Lanes, overhead static signs and VTMSs will be erected to indicate the entrance, potential exits and toll rate information. For motorists in the ETL, signs will be erected in the median to advise of exit locations and potential downstream destinations. Signage for the NB intermediate ingress/egress lane just north of BVP are depicted in Figure 4-6.

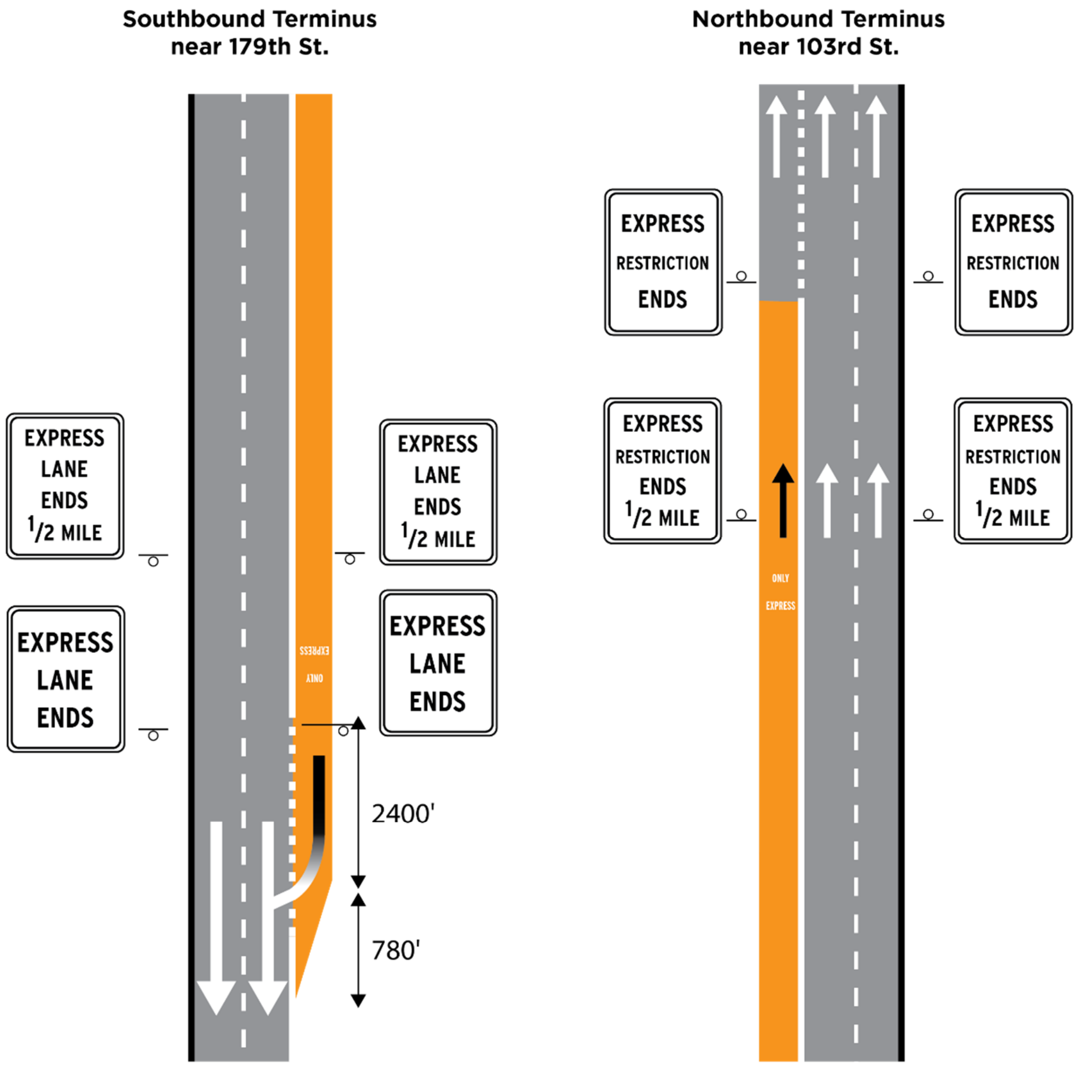
Figure 4-6: ETL Intermediate Ingress/Egress Signage



Signage at End Points

A sequence of ground-mounted or overhead signs will be installed in advance of U.S. 69 Express end points to advise motorists of the approaching ETL terminus. The signs will be located both in the median and to the right of the outside shoulder for the understanding of all motorists. For SB motorists (for both Phase 1 and Phase 2) end-point signage will indicate that the lane is ending, and a merge is required. For NB motorists, corresponding signage will indicate that the ETL restriction will be ending, but the lane will continue north as a GP Lane. Both situations are, as depicted in Figure 4-7.

Figure 4-7: Express Lane Exit Signage



Ancillary Signage

Additional corridor signage will be required to communicate specific requirements or restrictions associated with the ETLs. These ancillary, ground-mounted signs will be erected at regular intervals along the U.S. 69 Express Corridor. Figure 4-8 presents representative ancillary signage regarding buffer restrictions.

Figure 4-8: Ancillary Signage

4.6 Lighting

Overhead highway lighting (in accordance with ANSI/IES standards) will be provided on the ETLs in select locations to improve safety and minimize motorist confusion. Although lighting considerations have not been finalized, it is expected that a mix of conventional and high-mast lighting will be provided continuously from the northern end of U.S. 69 Express to 135th Street. Between 135th Street and 179th Street, lighting should be provided at all access locations and interchanges. Lighting provided at interchanges will adhere to KDOT's standard specifications.

5.0 TOLL STRATEGIES

This section describes various fundamental strategies that will be used to support the operations of the ETLs. These operational strategies are intended to ensure that users of the project corridor are provided with a reliable travel option, especially during typical hours of congestion.

5.1 Eligible Vehicles

The 69 ETLs will not have any Vehicle Class restrictions on vehicles eligible to use the Express Lanes. All classes of motorized vehicles, including passenger cars, motorcycles, box trucks, tractor-trailer trucks, and vehicles with an item in-tow (e.g., boat, trailer, recreation vehicle, etc.) will be eligible to use the 69 ETLs when the lanes are not closed. As a result, the following concepts will apply:

- The structure of the toll rate scheme will be based, in part, on Vehicle Classes and the scheme will clearly be messaged to the public (e.g., roadway signage, website, etc.)
- The RTCS will not only detect vehicles but also classify vehicles and apply the proper toll rate based, in part, on Vehicle Class
- In an effort to identify vehicles and vehicle owners by license plates:
    - The RTCS will capture and process both rear and front images of vehicles
    - The RTCS and BOS will identify and process license plate characters, jurisdiction and plate-type (for jurisdictions were plate type is necessary)
- Vehicle Class restriction enforcement will not be required

Note that pedestrians and non-motorized vehicles (e.g., bicycles) will not be allowed on the ETLs.

Kansas statute 68-20,120 (h) states that "tolls shall be charged on all users of the toll project or turnpike project regardless of class, size or kind of traffic." As a result of this, the ETLs also will not have any vehicle occupancy requirements and vehicles with multiple occupants will be charged the same toll rate as Single Occupancy Vehicles (SOVs). As a result, the following concepts apply:

- The structure of the toll rate scheme will not be based in any part on vehicle occupancy
- Drivers will not be required to declare vehicle occupancy
- The RTCS will not be required to detect vehicle occupancy
- Vehicle occupancy enforcement will not be required

In addition, no toll rate discount will be given for electric vehicles (EVs) or low emission vehicles (LEVs).

The ETLs will not be a "Transponder only" facility and will not require users to be pre-registered before they use the ETLs. The toll for a vehicle using the ETL will be able to be paid either by 1) the use of a valid and accepted Transponder associated with a valid pre-registered toll account or by 2) the use of a captured legible image of the vehicle's license plate.

The Transponders that will be accepted for use on the ETLs will be the same as the Transponders currently accepted for use on KTA's toll facilities as follows:

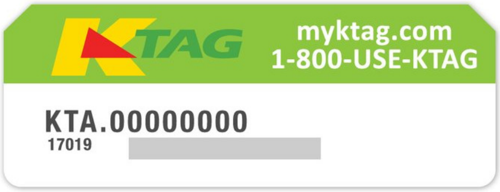
- K-TAG (KTA)
- BancPass (authorized by KTA; issued through local retailers)
- PIKEPASS (Interoperable via Oklahoma Turnpike Authority (OTA))
- TxTag (Interoperable via Texas Department of Transportation (TxDOT))
- EZ TAG (Interoperable via Harris County Toll Road Authority (HCTRA))
- TollTag (Interoperable via North Texas Tollway Authority (NTTA))
- BancPass (authorized by and Interoperable via TxDOT; issued through Texas retailers)
- NATIONALPASS
- Bestpass
- PrePass

It is anticipated that as national toll interoperability continues to increase more Transponders will be accepted on the ETLs as KTA adopts these interoperability changes.

The use of license plates for toll collection will be based on KTA's Business Rules, including Business Rules related to VTolls billing/invoicing and pursuing out-of-state plates.

The following figure (Figure 5-1) shows the sticker version of KTA's K-TAG that customers will mount on the inside surface of the windshield of their vehicle.

Figure 5-1: KTA's Sticker K-TAG



5.2 Modes and Hours of Operations

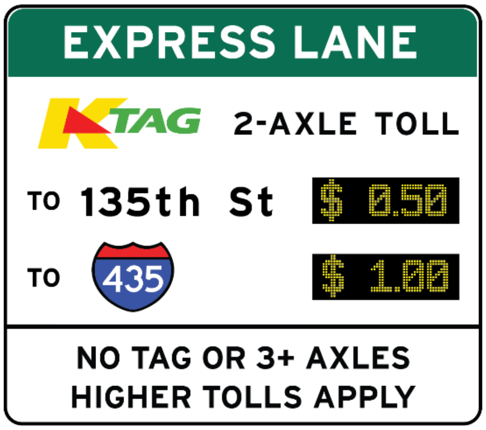
The ETLs will, independently by direction and by segment, be operated in one of the following modes:

- Normal Operations
- Tolls Waived
- Express Lane Closed

The ETLs will typically be open to traffic and operating in normal operations mode 24 hours a day, 7 days a week. In normal operations mode, the toll rates displayed on the VTMSs and charged to users will be variable essentially resulting in a range of toll rates with the highest toll rates being charged during highest traffic congestion periods and the lowest toll rates being charged during lowest traffic congestion periods in order to manage traffic and maintain the desired Level of Service (LOS) in the ETL.

The following figure (Figure 5-2) is an example VTMS that indicates the toll rate related to various destinations for users of the ETL.

Figure 5-2: Example VTMS Indicating ETL Normal Operations



There can be times when one or more ETL segments are operated in a “tolls waived” mode. During a “tolls waived” mode, the respective toll rates will be set to $0.00, the respective VTMSs will be set to display “FREE”, and vehicles will be able to use the ETLs free of charge (regardless of traffic conditions). This mode will commonly be used when a major traffic incident has occurred in the GP Lanes and traffic is being diverted into the ETL for incident traffic management. It is anticipated the normal operations mode would apply during all minor traffic incidents.

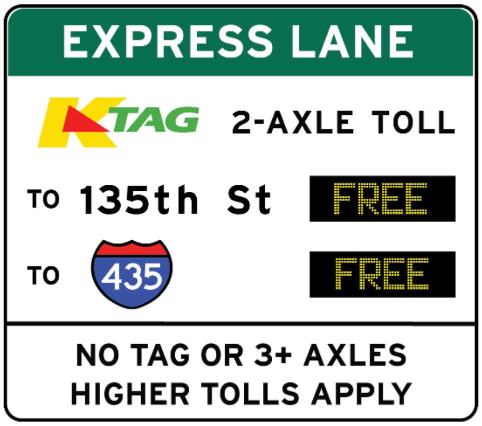
The following figure (Figure 5-3) shows a condition where vehicles were forced to use the Express Lane in order to circumvent an incident that occurred in the GP Lanes.

Figure 5-3: Example of GP Lanes Incident

Source: Central Texas Regional Mobility Authority

The following figure (Figure 5-4) is an example VTMS that indicates “FREE” during a condition of no toll being charged for ETL usage.

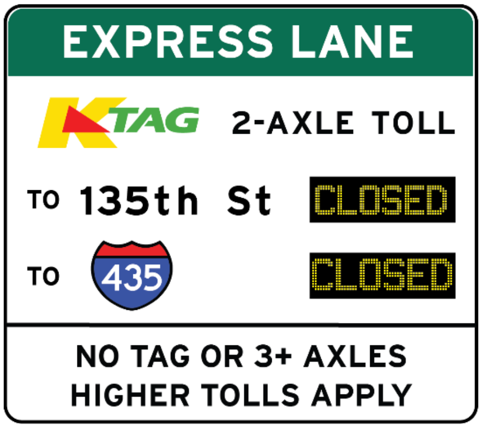
Figure 5-4: Example VTMS Indicating ETL Tolls Being Waived



There can also be times when one or more ETL segments are operated in a "closed" mode. This mode will commonly be used when maintenance is required to be performed on the RTCS and it is required that vehicles not use the respective ETL segment(s). It is expected that the periods of planned routine maintenance of RTCS equipment located in or around the ETLs will be limited in frequency and duration and would typically occur during off-peak hours.

The following figure (Figure 5-5) is an example VTMS indicating that one of the upcoming segments is closed to traffic making the respective destination inaccessible via the ETL.

Figure 5-5: Example VTMS Indicating a Closed ETL Segment



If and when one or more ETL segments are in the Express Lane Closed mode of operations, the RTCS will still be used to detect, record and capture images of a vehicle that enters and violates the closed ETL condition. Based on relevant statutes, Business Rules, and coordination with KTA and law enforcement, the data and images can result in closed lane violation notices being issued.

5.3 Toll Rate Fundamentals and Exempt Vehicles

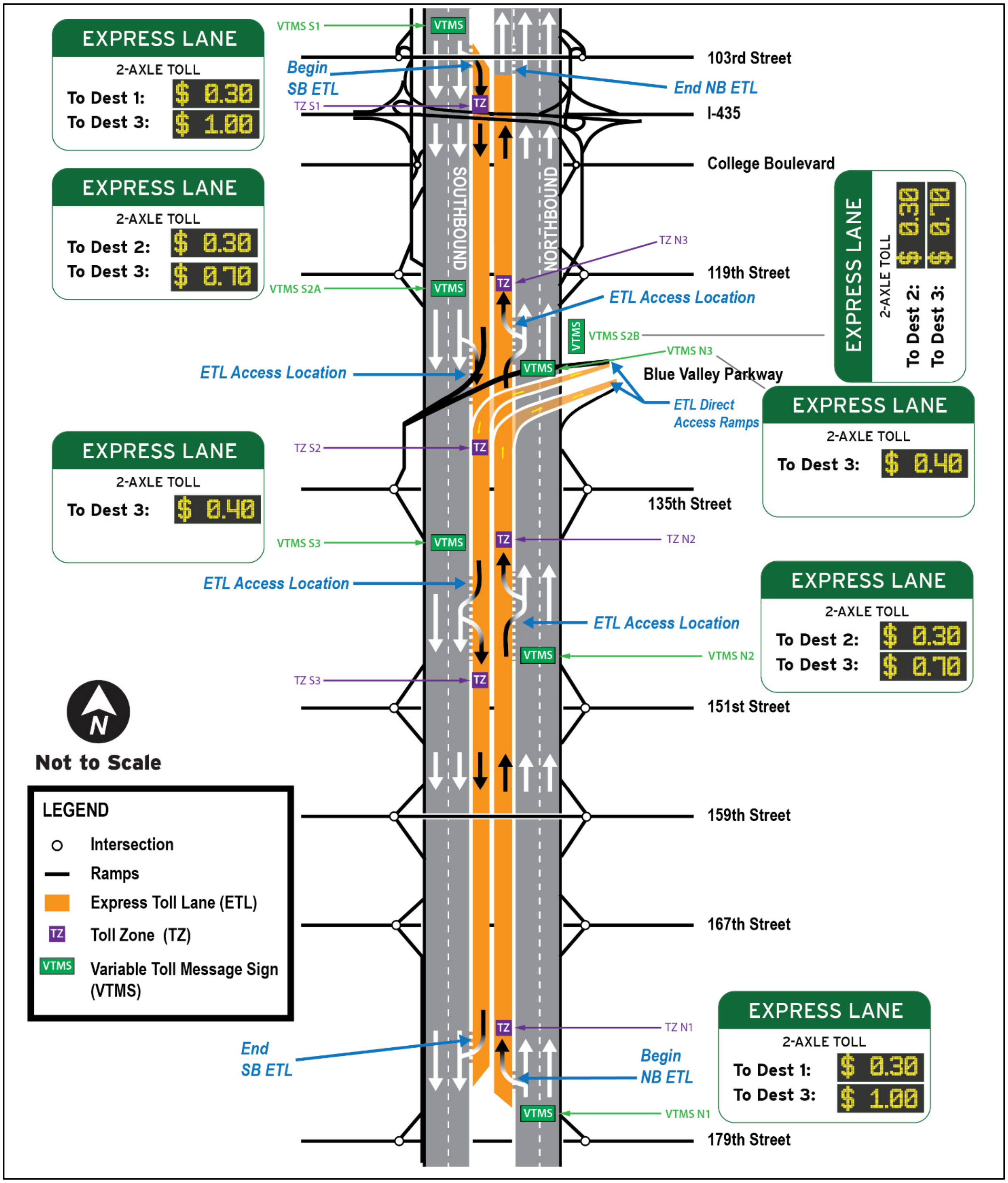
The RTCS will use a variable pricing toll rate structure to manage the operations of the ETLs in an effort to maintain a minimum desired LOS in the ETLs, especially during the corridor's peak hours of travel. The system will include traffic sensors typically located every half mile throughout the corridor which will detect and record traffic conditions (in both the ETLs and GP Lanes). It is anticipated that the toll rates will vary based on the dynamic traffic data and an algorithm using pre-configured parameters. A future toll rate policy will be developed that details the process for monitoring traffic and changing toll rates.

In addition to being based on the concept of variable pricing, the complete toll rate structure (commonly referred to as the Toll Rate Schedule) for the ETLs will also be based on:

- Trips (origin/ingress and destination/egress locations and segments traveled)
- Vehicle Class (based on the vehicle's number of axles)
- Method of toll collection (Transponder or license plate)

The following figure (Figure 5-6) depicts the U.S. 69 corridor, including the U.S. 69 Express Lanes. The depiction is not to scale and includes functional locations of ingresses and/or egresses, Toll Zones and VTMSs (conceptually generalized).

Figure 5-6: U.S. 69 Corridor Diagram (with U.S. 69 Express Lanes)



For the purposes of the Toll Rate Schedule, each ETL direction is divided into segments based on the ingress and egress locations. The Toll Rate Schedule will include toll rates for each segment and the toll amount charged to a vehicle will be determined by the segments traveled on during the vehicle's one-way trip which will start at an ingress (entrance) location and ends at an egress (exit) location.

The following table (Table 5-1) lists the ETL segments, by construction phase and direction of travel. Note that the segment designation code below for each segment matches the designation of the segment's Toll Zone (see figure above, Figure 5-6).

Table 5-1: ETL Segments - Details

<table>
<tr><th>Construction Phase</th><th>Travel Direction</th><th>Segment Designation Code</th><th>Abbreviated Segment Designation</th><th>Northern Terminus</th><th>Southern Terminus</th><th>Length (approx.)</th><th>Ingress</th></tr>
<tr><td rowspan="5">Phase 1</td><td rowspan="2">NB</td><td>N2</td><td>151st to BVP</td><td>119th St./BVP</td><td>151st St.</td><td>2.25m</td><td>between
151st St. & 135th St.</td></tr>
<tr><td>N3</td><td>135th to 103rd</td><td>103rd St.</td><td>119th St./BVP</td><td>3.72m</td><td>between
135th St. & 119th St.</td></tr>
<tr><td rowspan="3">SB</td><td>S1</td><td>103rd to 135th</td><td>103rd St.</td><td>119th St./BVP</td><td>3.72m</td><td>near 103rd St.</td></tr>
<tr><td rowspan="2">S2</td><td rowspan="2">BVP to 151st</td><td rowspan="2">119th St./BVP</td><td rowspan="2">151st St.</td><td rowspan="2">2.25m</td><td>between
119th St. & 135th St.</td></tr>
<tr><td>via BVP DC</td></tr>
<tr><td rowspan="2">added in Phase 2</td><td>NB</td><td>N1</td><td>179th to 151st</td><td>151st St.</td><td>179th St.</td><td>4.52m</td><td>near 179th St.</td></tr>
<tr><td>SB</td><td>S3</td><td>151st to 179th</td><td>151st St.</td><td>179th St.</td><td>4.52m</td><td>between
151st St. & 135th St.</td></tr>
</table>

The following table (Table 5-2) lists all of the possible ETL trips, by construction phase and direction of travel. Note that the segments identified in the trip descriptions below help show how the trips map to segments (and Toll Zones).

Table 5-2: ETL Trips

Construction Phase	Travel Direction	Trip Designation Code	Trip Designation (abbreviated	Trip Description [associated Segment(s)]
Phase 1	Northbound (NB)	NB2A	151st to BVP	151st to BVP/119th/I-435 [N2]
		NB2B	151st to 103rd	151st to End ETL (north of 103rd) [N2+N3]
		NB3	135th to 103rd	135th to End ETL (north of 103rd) [N3]
	Southbound (SB)	SB1A	103rd to 135th	Begin ETL (north of 103rd) to 135th [S1]
		SB1B	103rd to 151st	Begin ETL (north of 103rd) to 151st [S1+S2]
		SB2A	BVP to 151st	119th/BVP to 151st [S2]
added in Phase 2	Northbound (NB)	NB1A	179th to 151st	179th to 135th [N1]
		NB1B	179th to BVP	179th to BVP/119th/I-435 [N1+N2]
		NB1C	179th to 103rd	179th to End (north of 103rd) [N1+N2+N3]
	Southbound (SB)	SB1C	103rd to 179th	Begin ETL (north of 103rd) to End ETL (179th) [S1+S2+S3]
		SB2B	BVP to 179th	119th/BVP to End ETL (179th) [S2+S3]
		SB3	151st to 179th	135th to End ETL (179th) [S3]

In summary, the framework for the Toll Rate Structure is represented by the table below (Table 5-3). Note again that toll rates for trips (see Table 5-2) are determined by aggregating the toll rates of the related segments.

Table 5-3: Toll Rate Structure Framework

			Transponder		Pay-by-Plate (PbP)	
Travel Direction	Segment Designation Code	Abbreviated Segment Designation	2 Axles (Variable Priced Base Rate (VPBR))	3+ Axles (n = number of axles)	2 Axles	3+ Axles
NB	N2	151st to BVP	$VPBR_{N2}$	($VPBR_{N2}$) X (n-1)	$VPBR_{N2}$ + PbP adder	[($VPBR_{N2}$) X (n-1)] + PbP adder
	N3	135th to 103rd	$VPBR_{N3}$	($VPBR_{N3}$) X (n-1)	$VPBR_{N3}$ + PbP adder	[($VPBR_{N3}$) X (n-1)] + PbP adder
SB	S1	103rd to 135th	$VPBR_{S1}$	($VPBR_{S1}$) X (n-1)	$VPBR_{S1}$ + PbP adder	[($VPBR_{S1}$) X (n-1)] + PbP adder
	S2	BVP to 151st	$VPBR_{S2}$	($VPBR_{S2}$) X (n-1)	$VPBR_{S2}$ + PbP adder	[($VPBR_{S2}$) X (n-1)] + PbP adder
NB	N1	179th to 151st	$VPBR_{N1}$	($VPBR_{N1}$) X (n-1)	$VPBR_{N1}$ + PbP adder	[($VPBR_{N1}$) X (n-1)] + PbP adder
SB	S3	151st to 179th	$VPBR_{S3}$	($VPBR_{S3}$) X (n-1)	$VPBR_{S3}$ + PbP adder	[($VPBR_{S3}$) X (n-1)] + PbP adder

The framework above is based on the following concepts:

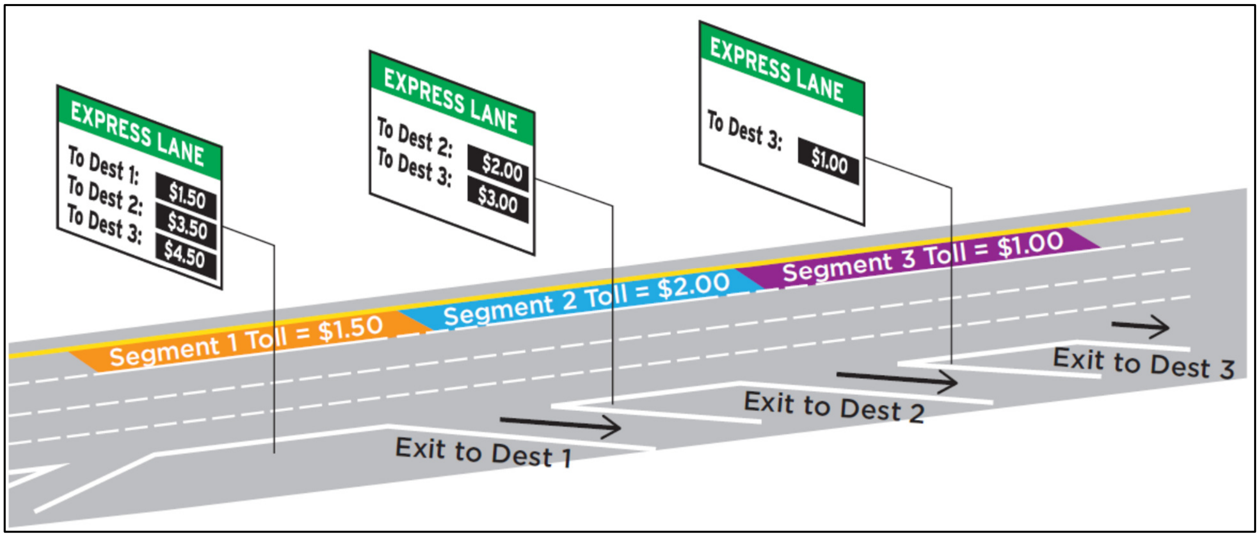
- VPBR for each segment is the toll rate a 2-axle vehicle is charged to use the segment (as displayed on the VTMS; dependent on traffic/time-of-use).
- A vehicle with more than 2 axles is charged the respective VPBR multiplied by (n-1), where “n” is the vehicle’s number of axles (a vehicle with 3 axles, for example, pays twice the respective VPBR since (n-1) = 2).
- An additional surcharge (which can be a fixed amount or a percentage-based amount, depending on the adopted toll policy) is added to the toll (“PbP adder”) for a vehicle that does not have a valid Transponder and is billed by KTA’s PbP process. Note that the most recent commissioned

traffic and revenue study assumes a 50% surcharge for PbP vehicles (to cover the additional cost of processing transactions and collecting tolls through mailed invoices).

It is anticipated that the future adopted toll policy will determine how the actual VPBRs and surcharge are initially established and periodically adjusted.

The following figure (Figure 5-7) depicts the trip-based toll pricing concept. For example, a vehicle that enters the ETL at the beginning (i.e., start of Segment 1), travels only on Segment 1 and exits to Destination 1 will pay the toll only for Segment 1 ($1.50 in this example); while a vehicle that enters the ETL at the beginning (i.e., start of Segment 1), travels all three segments and exits to Destination 3 will pay the sum of all three segments ($4.50 in this example). In summary, a vehicle is only charged a toll for the actual segment(s) they use during their trip on the ETL.

Figure 5-7: Trip-Based Toll Pricing



The trip-based toll pricing also includes the following concepts:

- The toll amount charged for a vehicle that uses the ETL is based on the toll amount(s) displayed on the VTMS where it entered the ETL. If a vehicle passes a subsequent VTMS during its trip in the ETL, the information displayed on that other VTMS does not impact the toll amount charged.
- Since the toll rate is variable, (i.e., the rate varies based on traffic congestion and/or time-of-day), if the system changes the toll rate after a vehicle passes the VTMS but prior to passing the initial Toll Zone, the toll rate charged will be the lesser of the two rates.

It is anticipated that the adopted toll policy will allow the following vehicles to be exempt from tolls and use the ETL for free (commonly referred to as Exempt Vehicles):

- Registered transit vehicles: based on the adopted toll policy and Business Rules, these vehicles will require to pre-register prior to using the ETLs (and must use the ETLs with a provided Transponder or the license plate on file)

- Emergency/First-Responder vehicles: based on the adopted toll policy and Business Rules, these vehicles will either be required to pre-register prior to using the ETLs or will be visually identified and processed as an Exempt Vehicle during the Image Review process.

Any legitimate Exempt Vehicle that is inadvertently charged a toll can have the toll waived if the customer follows KTA's toll dispute process and related Business Rules.

6.0 ROADSIDE TOLL COLLECTION SYSTEM

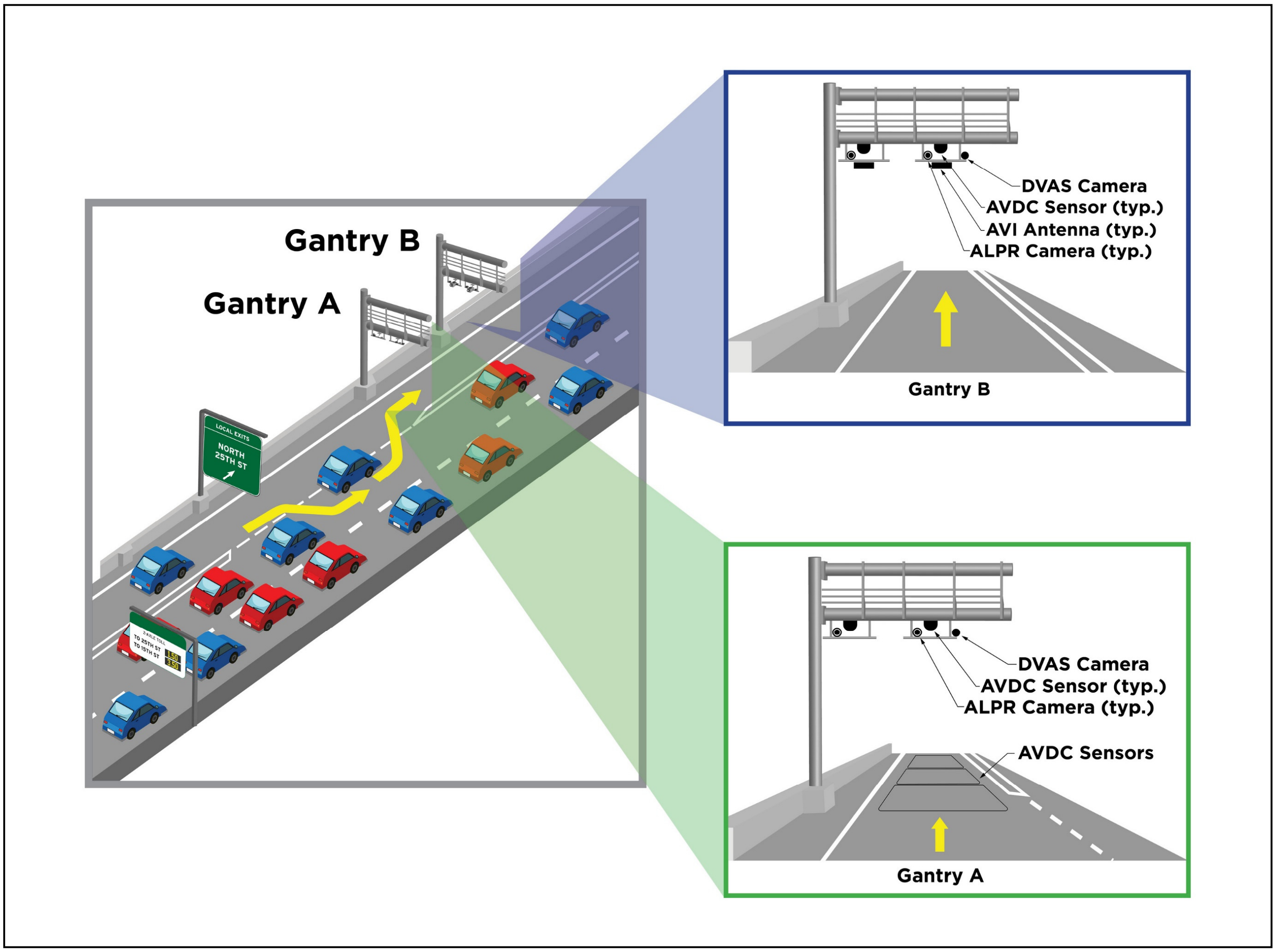
The RTCS will be based on proven technology commonly used on tolling and managed lanes projects and will includes various subsystems that are designed, installed and integrated together in a manner that supports determining and displaying variable toll rates, toll collection and traffic management. The subsystems associated with each Toll Zone will be integrated with a set of redundant high-availability computers located near each Toll Zone, commonly referred to as the Zone Controllers. The Zone Controllers at each Toll Zone throughout the corridors will be networked together and communicate with a set of central RTCS host computer servers (commonly referred to as the central host server) that collect, process and manage all of the transactional data and images from the Toll Zones and eventually forward the information to the BOS for the purpose of toll collection. The RTCS's major subsystems located in and on the corridor will be as follows and are described in further details below:

- Automatic Vehicle Detection and Classification (AVDC)
- AVI
- Image Capture and ALPR Cameras
- DVAS
- Toll Zone Security Monitoring Cameras
- Traffic Sensors
- VTMSs
- VTMS Monitoring Cameras
- Traffic Monitoring Cameras
- Supplemental Automatic License Plate Recognition (SALPR) Cameras

Various equipment related to the AVDC, AVI, image capture and DVAS subsystems will be installed on the Toll Zones gantries. See Figure 6.2 for a photo of a KTA ramp Toll Zone on which the ETL Toll Zone design will be based.

The following figure (Figure 6-1) depicts the major RTCS subsystem equipment that will be installed on the toll gantries at a typical ETL Toll Zone.

Figure 6-1: RTCS Equipment on Toll Gantries at a Typical Toll Zone



See Section 7.2 for additional infrastructure details regarding the Toll Zone gantries.

6.1 Automatic Vehicle Detection and Classification (AVDC)

The AVDC subsystem at each Toll Zone will consist of in-pavement loops and overhead scanners that will detect the presence of and determine the classification of each vehicle that passes through the Toll Zone. By detecting the presence of vehicles, the AVDC subsystem will assist in the proper creation of toll transaction records by accurately framing transactions, triggering image capture cameras, and correctly associating the captured transactional data and images to vehicles. The AVDC subsystem will also identify the number of axles each vehicle has and will classify the vehicle accordingly (i.e., 2-axle vehicle, 3-axle vehicle, etc.). Vehicle classification is needed to charge each vehicle the proper toll rate. The incorporation of multiple loops and scanners in each Toll Zone will provide redundancy which will help to minimize single points of failure and maximize system performance.

See Section 7.2 for additional infrastructure details regarding the Toll Zone gantries.

6.2 Automatic Vehicle Identification

The AVI subsystem at each Toll Zone will consist of Radio Frequency Identification (RFID) readers and overhead antennae that will detect and read Transponders in vehicles which pass through the Toll Zone. As a vehicle equipped with an acceptable Transponder (see Section 7.1) passes, the AVI subsystem will read the Transponder's unique identification number and communicate the Transponder's unique identification number to the Zone Controllers. In order to read the various acceptable Transponders, and also support the nation's advancement towards national toll interoperability, the AVI subsystem will includes tri-protocol readers and will be designed and configured to read SeGo (6B), 6C and IAG (TDM) protocol Transponders commonly used throughout the tolling industry.

See Section 7.2 for additional infrastructure details regarding the Toll Zone gantries.

6.3 Image Capture and ALPR Cameras

Each Toll Zone will also contain an image capture subsystem designed to capture and store front and rear images of each vehicle that passes through the Toll Zone. This subsystem will include:

- Front and rear high-resolution color ALPR cameras (and non-distracting illumination) that capture digital images of a vehicle's license plate(s)
- Computers (commonly referred to as image servers) that store and forward the captured images for further processing to identify license plate information (i.e., issuing jurisdiction (e.g., state), characters, and plate type)

As part of the image processing and information determination processes, ALPR software (using OCR) and vehicle identification and matching algorithms) will help to identify the needed information for each transaction. If, during this automated process, the system's confidence level regarding the accuracy of the identified information for any transaction falls below a configurable threshold, manual Image Review will be used to further to process the transaction's images.

See Section 7.2 for additional infrastructure details regarding the Toll Zone gantries.

6.4 Digital Video Audit System (DVAS)

Each Toll Zone will also contain a DVAS subsystem designed to capture and store continuous video of vehicles passing through the Toll Zone. This subsystem will include:

- Upstream and downstream facing cameras that capture continuous digital video of vehicles entering and exiting the Toll Zone
- Network Video Recorders (NVRs) that efficiently store (for no less than 90 days) the captured video (along with overlayed synchronized transactional data from the Zone Controllers) and allow remote Authorized Users to view both live and recorded streaming video.

The DVAS will be used primarily for system performance auditing but also can also be a tool to help research and resolve a variety of issues, including issues regarding Toll Zone equipment.

See Section 7.2 for additional infrastructure details regarding the Toll Zone gantries.

6.5 Toll Zone Security Monitoring Cameras

Each Toll Zone will also contain a security monitoring subsystem designed to capture and store video of potential security threats in and around the Toll Zone. This subsystem will include:

- Cameras facing critical Toll Zone areas that capture digital video triggered by security sensors
- Digital Video Recorders (DVRs) that efficiently store (for no less than 90 days) the captured video and allow remote Authorized Users to view both live and recorded video

The subsystem will be used to mitigate security threats and investigate security related events in and around the Toll Zones.

6.6 Traffic Sensors

The RTCS will include a traffic sensing and measuring subsystem consisting of traffic sensors installed along the U.S. 69 corridor essentially between the northern and southern limits of the ETLs. Traffic sensors will be located approximately every half mile and provide traffic sensing and measurement of not only the ETLs but also the GP Lanes at these locations. This subsystem will primarily be used to support traffic and incident management functionality and operations by measuring, recording and reporting lane occupancy, vehicle density and vehicle speeds for each individual lane to assist in determining the proper variable toll rate based on real-time traffic conditions. Secondarily, the subsystem will support traffic and incident management.

See Section 7.4 for additional infrastructure details regarding the poles on which the traffic sensors are installed.

6.7 Variable Toll Message Signs (VTMSs)

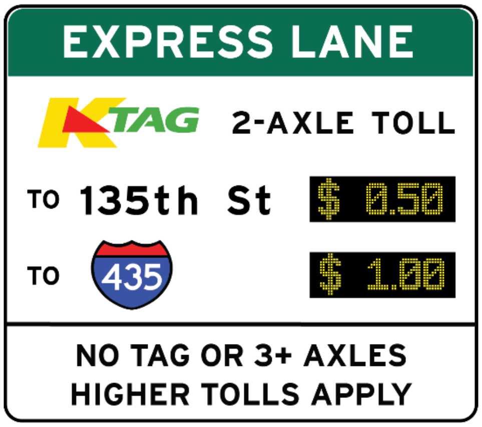
The RTCS will includes a subsystem consisting of VTMSs (often also referred to as toll rate signs) installed over the GP Lanes prior to each ETL ingress that will display toll rates (for 2-axle vehicles using valid Transponders) and short operational messages (i.e., “FREE” or “CLOSED”) to drivers. See Section 6.2 for more information regarding the various modes of operations and related VTMS messages.

Each VTMS will essentially be a hybrid sign comprised of a static sign panel with one or more full-matrix Light Emitting Diode (LED) display insets. One VTMS will be located prior to each ETL ingress location and will inform drivers in the GP Lanes of the prevailing toll rate for one or more possible destinations via the upcoming ETL. Since the amount of information that can be displayed on a single sign is limited, a VTMS will only accommodate up to two destinations. As such, if more than two destinations are possible for a given ingress location, the respective VTMS will includes information only for the nearest (also least expensive) destination and the furthest (also most expensive) destination.

In general, the toll rate information displayed on a VTMS will help a driver decide whether they want to enter and use the ETL or stay in the GP Lanes (non-tolled) to travel to their destination.

The following figure (Figure 6-2) depicts a typical VTMS.

Figure 6-2: Typical VTMS



See Figure 5-6 for a map that depicts the functional location of each VTMS in the corridor and the concept of signed trips.

The following table (Table 6-1) lists the VTMSs, by construction phase, direction of travel and associated segment.

Table 6-1: VTMSs

Construction Phase	Travel Direction	Segment Designation Code	Ingress	VTMS
Phase 1	Northbound (NB)	N2	between 151st St & 135th St	N2
		N3	between 135th St & 119th St	N3
	Southbound (SB)	S1	near 103rd St	S1
		S2	between 119th St & 135th St	S2A
			via BVP direct connector	S2B
Added in Phase 2	Northbound (NB)	N1	near 179th St	N1
	Southbound (SB)	S3	between 135th St & 151st St	S3

Note that due to the fact that SB segment S2 will have two different ingresses (one from the GP Lanes and one from BVP (via a direct connector)), VTMS S2A and VTMS S2B will be identical in both form and function and will display the same toll rates.

Also, see Figure 4-6 for a depiction of the typical ETL access signing concept which includes VTMSs.

The design and operation of the VTMS subsystem will also include the following concepts:

- Each VTMS will display new pricing/messages immediately upon receipt
- Authorized Users will have the ability to manually override automated pricing/messages (used, for example, during conditions involving incident management)
- Each VTMS will acknowledge the receipt and posting of new pricing/messages
- Each VTMS will have self-diagnostic capabilities and will detect and report malfunctions
- Each VTMS will be able to use historical toll rate information to generate a locally-stored default time-of-day toll rate table which will become effective in the event of loss of communications to the VTMS

6.8 VTMS Monitoring Cameras

The RTCS will also include a VTMS monitoring subsystem which will consist of a camera installed at each VTMS location designed to provide a real-time view of the VTMS and to capture and store images of toll rate and operational mode changes displayed on the VTMS. This subsystem will include:

- Cameras that provide real-time digital video of each VTMS
- NVRs that efficiently store (for no less than 180 days) the captured video-based images (along with overlayed time and location information) and allow remote Authorized Users to view both live streaming video and recorded images.

These cameras will be time-synchronized to the RTCS and will provide the means for Toll Operations Center (TOC) operators to visually confirm that the VTMS displays are correct. This subsystem will also serve as a tool that can potentially help research and resolve customer disputes related to toll rates.

6.9 Traffic Monitoring Cameras

The RTCS will also include a traffic monitoring subsystem consisting of pan/tilt/zoom (PTZ) CCTV cameras installed along the U.S. 69 corridor essentially between the northern and southern limits of the ETLs. Although KDOT has similar traffic monitoring cameras in the corridor (operated by KC Scout), these additional RTCS-specific traffic monitoring cameras will be designed and located as follows:

- One camera with an unobstructed and appropriate view of each ingress location to help monitor the traffic entering the ETLs
- Additional cameras to ensure full camera-view coverage of the ETLs to help with incident detection and management

The design and operation of this traffic monitoring subsystem will also incorporate the following concepts:

- TOC operators will have primary PTZ control of each camera
- Camera views will be shared with KC Scout
- Video from these cameras will not be recorded

See Section 6.3 for additional infrastructure details regarding the traffic camera poles.

6.10 Supplemental ALPR (SALPR) Cameras

The RTCS will also include a supplemental ALPR (SALPR) subsystem consisting of some additional ALPR cameras installed along the ETLs at various traffic sensor stations (these stations will provide the SALPR cameras with access to power and network communications).

This subsystem will be designed to capture and store rear images of each vehicle that passes by the SALPR camera in order to determine if the vehicle has possibly entered the ETL at a location other than an appropriate ingress location (commonly referred to as a toll avoidance violator). This subsystem will include:

- High-resolution color ALPR cameras (and non-distracting illumination) that capture digital images of a vehicle's rear license plate
- Computers (commonly referred to as image servers) that store and forward the captured images for further processing to determine identifying license plate information (i.e., issuing jurisdiction (e.g., state), characters, and plate-type)

Similar to the Toll Zones' image capture and ALPR cameras subsystem, ALPR software (using OCR) and vehicle identification and matching algorithms) will help to identify the needed information for each image captured by the SALPR cameras. If, during this automated process, the system's confidence level regarding the accuracy of the identified information for any image falls below a configurable threshold, manual Image Review will be used to further to process the image.

See Section 6.4 for additional infrastructure details regarding the poles on which SALPR cameras will be installed.

In addition to the RTCS elements described above, including the various major subsystems, Zone Controllers, and central host server, the RTCS will also include components that support the following TOC functionality:

- Transaction processing, including Image Review, trip-building and pricing
- BOS interfacing and Reconciliation
- Monitoring and auditing
- System maintenance management
- Toll rate and traffic management
- Reporting and dashboards

See Section 11 for additional details regarding these operational functionalities.

7.0 TOLL INFRASTRUCTURE

The design and construction of the infrastructure that supports the installation and operations of the ETLs RTCS will be based on proven concepts commonly used on tolling and managed lanes projects.

7.1 Toll Zones

A Toll Zone is the physical location on a tolled facility where AET equipment is installed, including on one or more overhead gantry structures, in order to detect, identify and classify vehicles using the toll facility for the purpose of toll collection. For the 69 Express facility, a Toll Zone will typically be located immediately after each ETL ingress location. See Figure 5-6 for the functional location of each ETL Toll Zone.

The U.S. 69 Express facility will contain six Toll Zones (one associated with each segment). The following table (Table 7-1) lists each Toll Zone (and associated segment), by construction phase and direction of travel.

Table 7-1: ETL Toll Zones

Construction Phase	Travel Direction	Toll Zone	Toll Segment	Segment Designation (abbreviated)
Phase 1	Northbound (NB)	N2	N2	151st to BVP
		N3	N3	135th to 103rd
	Southbound (SB)	S1	S1	103rd to 135th
		S2	S2	BVP to 151st
added in Phase 2	Northbound (NB)	N1	N1	179th to 151st
	Southbound (SB)	S3	S3	151st to 179th

Note that the pavement in the Toll Zone area will be concrete, be at least 75-feet in length, contain minimal steel (to minimized interference with the RTCS's in-pavement AVDC sensors), and comply with KTA's Toll Zone pavement design standards.

Figure 7-1 below is a photo of a KTA ramp Toll Zone on which the U.S. 69 Express Toll Zone design is based.

7.2 Toll Gantries

Each Toll Zone will include a pair of overhead cantilevered twin-arm style gantry structures (commonly referred to as toll gantries) on which various RTCS equipment will be installed. As vehicles traveling in the ETL pass under the toll gantries, the RTCS will detect, identify, and classify each vehicle to a high degree of accuracy. The design of the ETL's toll gantries will be based on a KTA ramp Toll Zone (see Figure 7-1) and will comply with KTA's toll gantry design standards.

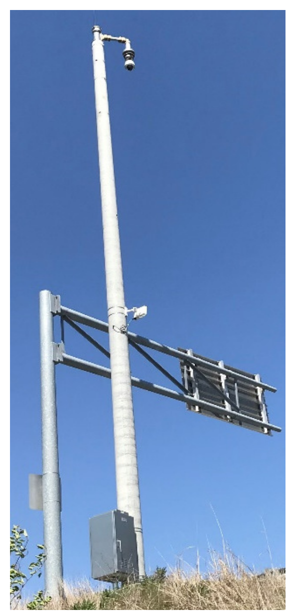
Figure 7-1: Photo of a KTA Ramp Toll Zone

7.3 Traffic Camera Poles

Where RTCS traffic cameras will not be installed on sign structures, toll gantry structures or other similar structures, the RTCS traffic cameras will be installed on dedicated spun-concrete poles. These poles will be of sufficient height to provide adequate views of the corridor for the purpose of incident detection and traffic management. These poles will also include internal wireways, camera mounting provisions, pole mounted cabinets, lightning protection, and integrated camera lowering devices. In addition, these traffic camera poles will comply with KDOT's ITS standard design details and specifications.

Figure 7-2 is a photo of a typical KDOT spun-concrete pole with ITS traffic monitoring camera.

Figure 7-2: Photo of a KDOT ITS Traffic Monitoring Camera



7.4 Poles for Traffic Sensors and SALPR Cameras

The RTCS infrastructure will include poles on which RTCS traffic sensors and SALPR cameras will be installed. These traditional ITS-style galvanized steel poles will typically be located in the corridor's median (either base mounted or barrier mounted) and will be of sufficient height to allow each installed sensor (typically two per pole, one per travel direction) to perform properly (i.e. by detecting traffic in all directional travel lanes (i.e., ETL and GP Lanes serving the same direction)). Any SALPR camera will be typically mounted lower than any of the traffic sensors in a manner that allows the camera to capture "side-fire" rear-view images of passing vehicles. These poles will also include internal wireways, sensor mounting provisions (up to two sensors per pole), camera mounting provisions (up to two cameras per pole), and pole-mounted cabinets. In addition, these poles will comply with KDOT's ITS standard design details and specifications.

Figure 7-3 is a photo of an example traffic sensor pole with dual sensors and a pole mounted cabinet.

Figure 7-3: Photo of a KDOT ITS Traffic Sensor Station

7.5 Roadside Equipment Huts

The RTCS infrastructure will include a toll equipment hut located at each Toll Zone installed on a concrete foundation with barrier protection and provisions for the safe parking of a maintenance vehicle. These traditional ITS-style huts will typically be located off of the GP Lanes' right shoulder within the corridor's ROW no further than 125-feet from the Toll Zone gantries (distance limitation is due primarily to AVI reader-to-antenna cable length restrictions). These huts will provide a secure and environmentally controlled location to house various RTCS Toll Zone equipment, including Zone Controllers, AVI readers, DVAS services, ALPR servers, DVRs, NVRs, network communications devices, and Uninterruptible Power Supplies (UPSs). The huts will also include electrical power panels, HVAC equipment, and security provisions. In addition, these huts will comply with KTA's design standards.

Figure 7-4 is a photo of roadside toll equipment hut at a KTA ramp Toll Zone on which the 69 ETL Toll Zone design is based.

Figure 7-4: Photo of a KTA Roadside Toll Equipment Hut

7.6 Communications Network

The RTCS's supporting infrastructure will include robust, reliable, and secure data communications networks. The architecture and design will include supporting the following communication needs:

- Roadway Network (fiber-based)
- RTCS to TOC
- RTCS to TMC
- RTCS to BOS (KTA's BOS)

7.7 Electrical Power

The RTCS's supporting infrastructure will include typical electric utility power provisions that provide required electrical power to the RTCS equipment. The planning, design, and installation of these provisions will be coordinated with KDOT and the local electric utility provider and will comply with applicable standards and codes. Where practical, multiple equipment locations (e.g., Toll Zone and nearby traffic monitoring camera) can be served by the same electric utility power drop/meter if distances allow.

The electric power provisions will not include any permanent generators. Instead, the design, installation, and operations of the Toll Zones and VTMSs will include provisions for connecting portable generators to provide backup electrical power to essential equipment. The RTCS provider's scope of work will include providing, operating, and maintaining portable generators. In addition, the Toll Zones will also include provisions for uninterruptible power supplies (UPSs) that will provide electric power conditioning along with some limited backup electric power.

7.8 Maintenance Vehicle Parking Areas

The design and installation of each Toll Zone will include provisions for a maintenance vehicle parking area adjacent to the roadside equipment hut. The design of the parking areas will consider safety for both maintenance personnel and roadway traffic.

8.0 INTELLIGENT TRANSPORTATION SYSTEM

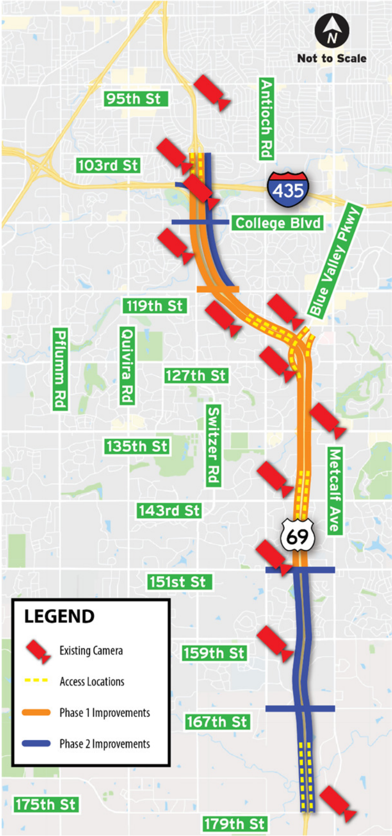
ITS technologies are used to enhance transportation safety and mobility. While there are many different ITS technologies, the existing and planned technologies focus on reducing the impact of traffic incidents and providing drivers information to help them make good, well informed, travel decisions. Traffic flow sensors are used to identify anomalies in normal traffic flow that may indicate a traffic incident. When traffic incidents are identified, traffic monitoring cameras along the roadway allow operators at the TMC to manage the incident in coordination with the first responders. The TMC operators also share the incident warning information with drivers through DMSs along the roadway and web-based applications. The overall objectives are to reduce the impact of traffic incidents by reducing their duration and reducing secondary crashes resulting from incident related congestion.

8.1 Traffic Monitoring Cameras

Traffic monitoring cameras are deployed along a roadway corridor to provide video of traffic operations. Typically, video from these cameras is primarily viewed by operators at the TMC, but it can also be shared with other traffic operations agencies, first responders and the public. The monitoring cameras have pan, tilt, and zoom capabilities to allow the full roadway to be viewed and to zoom in on traffic incidents when needed.

Along the U.S 69 corridor there are existing traffic monitoring cameras deployed that provide nearly a complete view of the corridor as far south as 199th Street. The cameras are controlled by the KC Scout TMC operators and the video from the cameras is shared with the City of Overland Park. The video can also be viewed on the KC Scout website. The existing cameras are mounted on a mixture of steel and spun concrete poles. Figure 8-1 shows the general camera locations.

Figure 8-1: Existing Camera Locations



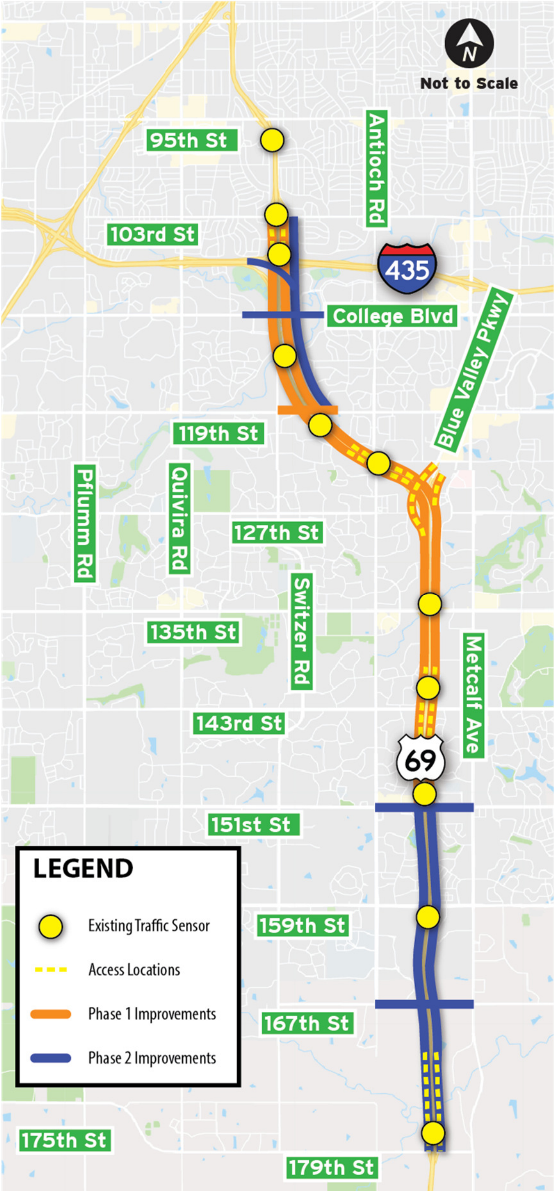
To facilitate the operations of the Express Lanes, supplemental traffic monitoring cameras will be deployed and operated by the RTCS vendor to provide video surveillance of the Express Lanes ingress and egress points and Toll Zones. The RTCS vendor will also deploy additional traffic monitoring cameras along the corridor to allow them to better monitor the corridor and manage the ETL operations. Video from the supplemental traffic monitoring cameras will be shared with KC Scout and the City of Overland Park. The RTCS vendor will retain primary control of these cameras to ensure they can use them as they need to manage the Express Lanes operations.

8.2 Traffic Flow Monitoring

While there are various technologies that can be used for traffic flow monitoring the currently preferred technology are radar-based units that measure speeds, volume, and lane occupancy at points along the roadway. This data is used to identify congestion based on speeds dropping below free flow speeds and the density of vehicles per lane increasing. Congestion development can occur at bottlenecks where traffic volume nears and exceeds the roadway capacity. This is considered recurring congestion because the congestion develops generally in the same locations and at the same time each weekday. The other type of congestion is non-recurring, which results when the roadway capacity is reduced by a traffic incident.

In conjunction with most of the cameras along the U.S. 69 corridor, the KC Scout system has radar detection units. The yellow dots on Figure 8-2 are the locations where there is a radar detector. KC Scout uses these detectors to monitor traffic flow to identify congestion. The speed data collected is also used to develop estimated travel times along the corridor that are posted on DMSs.

Figure 8-2: Existing Traffic Sensors



Traffic flow monitoring is critical for the Express Lanes. Traffic flow must be monitored to ensure that free flow conditions can be maintained through dynamic pricing. If a real-time dynamic pricing scheme is implemented the toll rates will be set based on traffic flow data collected by the sensors. Even if a fixed variable rate toll scheme is used, the traffic flow data is needed to make periodic adjustments to the toll rate based on recent traffic flow conditions. Because the traffic flow data is critical to the Express Lanes operation, the toll system operator will deploy and maintain traffic flow sensors primarily for the setting toll rates. These traffic sensors will collect both Express Lane and GP Lane traffic flow data. The traffic flow data from the sensors will be shared with KC Scout.

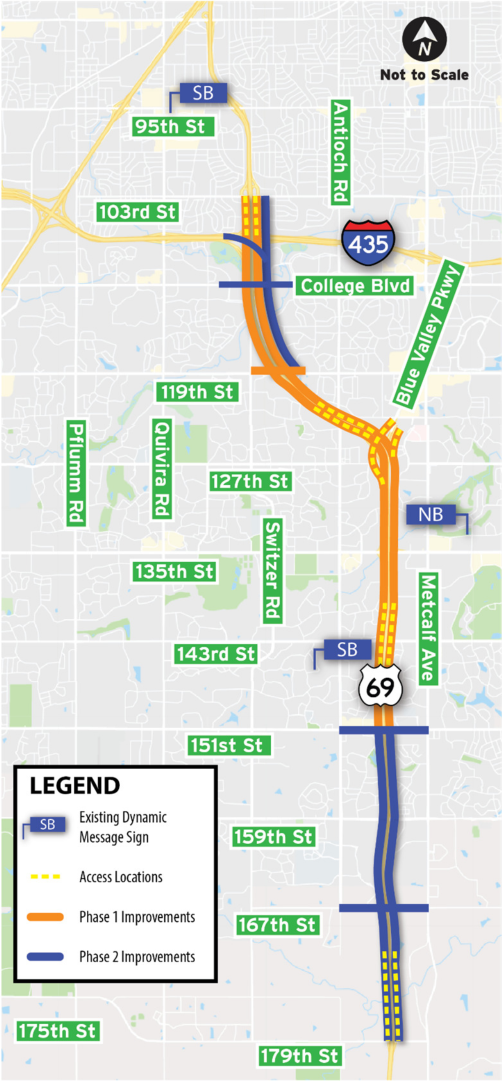
8.3 Dynamic Message Signs

DMSs are used to provide motorists traffic related messages as they drive down the road. The messages can be used to make drivers aware of traffic incidents or provide other information on traffic flow. The KC Scout system provides estimate travel times to downstream destinations on DMSs. The Express Lanes will use hybrid static/DMSs to provide current toll rates. These signs are discussed in Section 6.7. These signs use LED matrix displays to provide the variable messages.

The KC Scout system has three DMSs serving the project corridor. As shown in Figure 8-3, two are in the SB direction. One SB sign is just north of 95th Street and the other is just south of 143rd Street. The NB sign is located north of 135th Street. These signs provide travel time messages and safety messages during normal traffic operations. When traffic incidents occur, the signs will display messages providing information on the incident.

The Express Lanes will have VTMSs providing toll rate information, which are discussed in more detail in Section 7.7. There will not be any additional general purpose DMS deployed with the Express Lanes project.

Figure 8-3: Existing Dynamic Message Signs



8.4 Communications Network

To allow ITS technologies to function and provide their benefits a communications network is required. The communications network transmits data and video between ITS devices in the field and the TMC. The communications network can also transmit data and video between TMCs. Communications networks are primarily fiber-optic based networks with some supplemental wireless communications. A fiber-optic based network provides the bandwidth required to communicate data and video from many ITS devices and is more reliable than a wireless network.

The existing KC Scout communications network is a fiber-optic based metro area network that generally has a star topology. Along the section of the U.S. 69 corridor south of 135th Street a daisy chained ring topology is used. In this area, fibers in a private telecom company's (Lumen) cables are used to make the network connections. KDOT has access to these fibers in exchange for letting Lumen locate their fiber infrastructure in KDOT limited-access ROW. The agreement with Lumen also provides KDOT access to empty conduits in the Lumen installed duct bank. North of 135th Street a KDOT-owned 48-strand fiber optic cable is installed in one of the KDOT conduits in the Lumen duct bank.

A fiber-optic based communications network for U.S. 69 Express is needed to support ITS devices and the toll system. This network will provide network connections to cameras, VTMSs and traffic flow sensors. The same network will support the toll system operations. The ability of the Express Lanes to collect the Expected Revenue through tolls is critical, so this network must be robust to limit communications downtime. Given this critical nature a separate communications network for the Express Lanes will be implemented.

Using conduit from the Lumen duct bank, to which KDOT has access, was considered to carry the Express Lanes communications network fiber optic backbone, but it was decided that a new conduit duct bank would be installed. Use of the KDOT conduits in the Lumen duct bank would present challenges. To access the KDOT conduit in the Lumen duct bank, new splice vaults would need to be installed along the duct bank. Installing the new splice vaults would require on-site coordination by Lumen, which can be a scheduling challenge. The continuity of the KDOT conduits is also a consideration. Some conduit repairs would likely be needed. Experience using these conduits at other locations has found the need for some conduit repairs to have a continuous conduit run along a corridor.

8.5 Traffic Management Center

With the ETLs being constructed adjacent to the GP Lanes only separated by a striped buffer, traffic operations are directly linked. Traffic incidents in the Express Lanes will impact traffic operations in the GP Lanes and traffic incidents in the GP Lanes will likely impact the Express Lanes operations. Given this direct link, traffic operations management and incident management in the Express Lanes corridor will remain the responsibly of the KC Scout TMC. The KC Scout TMC will not be responsible for operation of the RTCS. The RTCS vendor will be responsible for managing the RTCS. The RTCS vendor will have a TOC. The TOC could be an existing facility the vendor operates, or it could possibly be co-located with KTA. This location and functionality will be determined during development of the RTCS technical requirements.

Coordination/Communications with Express Lanes Operations Center

When there are incidents that impact traffic operations in the Express Lanes corridor, the KC Scout TMC will need to coordinate with the Express Lanes operations center. Operators at the KC Scout TMC will need to notify the Express Lanes operations center when there is an incident. The incidents can be planned or unplanned. Planned incidents would include roadway construction or maintenance in the corridor or major events that will impact traffic demand. For these planned incidents coordination will occur prior to the incident. Unplanned incidents are primarily traffic crashes. They can impact the GP Lanes, the ETLs or both. Given the unplanned nature of these incidents the coordination required will be real-time once the incident is identified and continue as the incident is managed and cleared.

Some incidents impacting the Express Lanes corridor may warrant closure of the Express Lane or operating the lane toll free. Definitive protocols will be needed to be developed for when these scenarios are implemented. Developing these protocols will involve policy decisions balancing safety concerns against revenue loss concerns. These protocols must be developed before the Express Lanes are opened.

Coordination/Communications with Law Enforcement

Coordination and communications with law enforcement for the Express Lanes corridor will not change from the current process. Currently the KC Scout TMC, Overland Park Police and the Kansas Highway Patrol have well established coordination and communications protocols for dealing with traffic incidents. The addition of the Express Lanes will not impact the coordination and communications.

9.0 ENFORCEMENT

Traffic law enforcement helps to reduce automobile crashes and thereby the resulting injuries, fatalities, and damage to property. The City of Overland Park Police Traffic Safety Unit and the Kansas Highway Patrol are responsible for enforcing traffic laws in the U.S. 69 corridor. The addition of the Express Lanes will not change these responsibilities.

The Express Lanes will be separated from the GP Lanes by solid double white lines that are only broken at ingress/egress locations. State statues and Overland Park ordinances need to be reviewed and revised if needed to make crossing a double white line a traffic offense. The penalty for the offense of crossing the double white line must be made significant enough to deter drivers from accessing the express lane by crossing the double white line.

Access to the ETLs will not be limited to certain types of vehicles, so enforcement of vehicle type limitations will not be required. With video tolling there also is not a need for enforcement concerning users of the ETLs that do not have a compatible toll tag Transponder since the video tolling system will capture images of license plates of vehicles to allow collection of revenue from users without a toll Transponder.

A final potential area of enforcement is habitual express lane users that do not pay the tolls that they owe. On roadway enforcement will not initially be used to deal with unpaid tolls. Administrative processes will be used to collect the unpaid tolls. It is not anticipated at this time that law enforcement will be required to do this type of enforcement. Depending on the success of the administrative process after opening the ETL, this decision may need to be revisited to address habitual users that fail to pay.

9.1 Roles and Responsibilities

The Overland Park Police Department and the Kansas Highway Patrol are responsible for enforcing the local ordinance and state statute limiting access to the Express Lanes at designated ingress and egress locations. The local ordinance and state statute will not allow drivers to cross the double white line. Within the Overland Park Police Department, the Traffic Safety Unit is primarily responsible for enforcement of traffic ordinance violations. The Overland Park Police Department Traffic Safety Unit will have the primary responsibility of enforcement of the prohibition on crossing the double white line to ensure safe ETL operations and payment of tolls are not evaded.

9.2 Roadway Accommodations for Enforcement

As discussed above, ETLs focused enforcement is limited to ticketing drivers that cross the double white lines to access the toll lanes along sections not defined and delineated as ingress and egress locations. This enforcement can be done by officers driving in traffic or parked on either the outside or inside shoulders. The proposed roadway cross section has a twelve-foot wide shoulder on the outside and a ten-foot wide shoulder on the inside of the travel way, so there is sufficient room for parking when needed. Wider enforcement parking areas were discussed but were determined to not be needed.

9.3 Enforcement Technologies

Enforcement technologies that have been used for toll lanes include no toll tag alert beacons at Toll Zones, in-vehicle no-toll-tag alerts and habitual unpaid toll system user alerts. The two no-toll-tag alert system options are triggered when a vehicle without a toll tag passes through a Toll Zone. This type of enforcement is not needed with video tolling, so the technology is not needed. The unpaid toll system alerts would notify enforcement officers when a user with a significant number of unpaid tolls passes through a Toll Zone. As discussed above, on-roadway enforcement action to address unpaid tolls will not be done at this time, so notification of users that habitually do not pay their tolls will not be needed. This real-time notification technology can be added in the future if roadway enforcement actions are needed.

9.4 Traffic Codes

Currently, State of Kansas statues and City of Overland Park ordinances do not prohibit crossing of a double white line, so the state traffic statues must be revised to make crossing a double white line a traffic violation with a significant penalty for the offence. KDOT will need to work with the Kansas Legislature to modify the state statues. Similarly, the Overland Park Public Works Department and the Police Departments will need to work with the city council to pass a new ordinance.

10.0 ROADWAY OPERATIONS AND MAINTENANCE

Safe and effective roadway operations and maintenance considers the overall process of managing and overseeing the wide range of functions, duties, responsibilities, and activities necessary for tolled facilities such as U.S. 69 Express.

10.1 ETL Hours of Operations

The ETLs will operate 24 hours a day, 7 days a week for both directions of travel. Being fully open to toll traffic will help maximize the efficiency of traffic operations and the overall performance of both the Express Lanes and the GP Lanes, as well as minimize driver confusion regarding the ETLs.

10.2 Roadway Maintenance

Roadway maintenance includes removing debris from the roadway, snow plowing, roadway repair, signing repairs, pavement markings and other activities and is essential for the successful operations of the facility. KDOT will provide for all roadway infrastructure maintenance on U.S. 69 Express and considerations should be made to establish standards for roadway maintenance, including clear goals that can be used to guide and monitor the maintenance processes and procedures. Special attention should be paid to routine debris removal from the ETL, shoulder and buffer zone. This will likely require frequent (e.g. monthly) sweeping cycles for these areas.

10.3 Facility Monitoring

KC Scout operations personnel at the TMC will be assigned to monitor U.S. 69 Express and will be responsible for checking the lanes for disabled vehicles, coordinating the removal of disabled vehicles (or other debris) from the lanes, and completing incident reports as required. KC Scout personnel may also be responsible for (as impacting U.S. 69 Express functionality) coordinating work with KDOT forces and coordinating construction and/or maintenance activities. A project-specific communications plan will be developed to identify necessary agency contacts and defining the proper protocol for notifying the various entities.

10.4 Incident Management

Incident management will play a critical role in ensuring that the U.S. 69 ETL provide a reliable trip option to customers. Incidents in the ETL and GP Lanes can result in long delays as well as safety concerns regarding debris and secondary incidents. A comprehensive incident management plan will be developed prior to the opening of the ETL and should describe the process of coordinating the resources of KDOT, KC Scout, KTA, City of Overland Park, Kansas Highway Patrol and all contractors involved to detect, respond to, and clear traffic incidents as quickly as possible to reduce the impacts of incidents on safety and congestion, while protecting the safety of on-scene responders and the traveling public.

10.5 Special Events and Emergency Management

Toll-paying customers expect an enhanced travel experience at all times, but especially during recurring congestion (i.e. peak hours) and non-recurring congestion (e.g. incidents or special events). The incident management plan should address travel time reliability, toll charges during special events and the process for notifications and authorization to adjust or waive toll charges. In the case of a catastrophic event (natural or man-made), U.S. 69 Express should be opened to all motorists (toll-free use). It is expected that law enforcement would be available during such events to provide guidance to the travelling public accordingly.

11.0 SYSTEMS OPERATIONS AND MAINTENANCE

The overarching goal regarding the operations and maintenance of the various 69 ETL systems will be to ensure safe and predictable travel on the U.S. 69 corridor (within the project limits). Although many elements of the RTCS operations and maintenance will be highly automated, operators and maintenance staff will be provided with system functionality that will allow them to monitor the system and manage traffic real-time in an effort to achieve this goal. Efficient and effective system functionality along with proper system maintenance will help ensure that system performance is as expected and that the operations can be performed as needed.

The RTCS will include functionality that supports the following operations and maintenance efforts:

- Toll transaction processing, including Image Review, trip-building and pricing
- BOS interfacing and reconciliation
- Monitoring and auditing
- System maintenance management
- Toll rate and traffic management
- Reporting and dashboards

11.1 Toll Transaction Processing

From the RTCS perspective, toll transaction processing begins with the generation and collection of data and images at the Toll Zones. It ultimately results in a complete data record (commonly referred to as a fully formed transaction) and image set for the trip of each vehicle that uses the ETLs being transmitted to KTA's BOS for further processing and toll payment collection.

The RTCS operations will include the following elements regarding toll transaction processing:

- <u>Image Review:</u> refers to the system functionality and operational processes related to reviewing (using automation (e.g., OCR) and, when necessary, manual review) captured images of license plates associated with vehicles that used the ETL in order to determine License Plate Data (i.e., the license plate's issuing jurisdiction/state, characters, and plate type)
- <u>Trip-building:</u> refers to the system functionality and operational processes related to combining (using automation and, when necessary, manual review) transaction information from individual Toll Zones associated with a vehicle's trip on the ETL into a single transaction record representative of the trip
- <u>Pricing:</u> refers to the system functionality and operational processes related to assigning the correct toll rate information (using automation and, when necessary, manual review) to trip transactions based on the date, time, trip origin/destination, and Vehicle Class

Some of the key data elements included in a fully formed transaction are as follows:

- Trip details (i.e., from a system perspective, indication of which Toll Zones the vehicle passed through during its trip; from a customer's perspective, description of the vehicle's origin and destination)
- Date and timestamp
- Vehicle Class
- Transponder number (if a Transponder was read)
- License Plate Data (if a license plate was used to build the trip)
- Toll rate information
- Data that correlates all the images associated with the trip

The complete listing of data elements included in a fully formed transaction, and the format of those data elements, will be specified in an agreed-upon RTCS-to-BOS Interface Control Document (ICD) (see below).

11.2 BOS Interfacing and Reconciliation

The RTCS operations will include system functionality and processes that support the system-to-system interfacing between the RTCS and BOS. The design and operations of this interface will be based on and comply with requirements that will be developed for the project and specified in documents such as the Business Rules, ICD, and TSA. The interface will support the transmission of data and images between the RTCS and BOS and the operations will reconcile the information to ensure the transmissions are complete and accurate.

11.3 Monitoring and Auditing

The RTCS operations will include system functionality and processes that support RTCS monitoring and auditing. The system will be monitored by both automation (e.g., traffic incident alerts, MOMS alarms and alerts (see below), etc.) and operations personnel to ensure the system is performing as expected, including meeting the required KPIs. The RTCS will also be audited routinely to ensure the system is performing as expected and verify that the system performance is not degrading over time.

11.4 System Maintenance Management

The RTCS operations will include system functionality and processes that support and manage system maintenance. Proper system maintenance will help ensure that system performance is as expected and that the operations can be performed as needed. The RTCS will include an integrated Maintenance On-line Management System (MOMS) that will monitor the status of various equipment and system processes and send an alert and/or generate an alarm when issues are detected. Also, the MOMS will include:

- Maintenance ticket creation (automatically and manually) and management
- Response time and repair time recording and reporting
- Spare parts inventory management

- Remote diagnostics capability

11.5 Toll Rate and Traffic Management

The RTCS operations will also include system functionality and processes that support toll rate and traffic management. Fundamentally, the traffic will be managed through toll rates and although the adjusting of the variable toll rates (which will be displayed on the VTMSs and charged to users) will usually be highly automated, operators will be provided with system functionality that will allow them override the system determined toll rates as necessary according to an approved toll rate policy. The operators will be able to view and monitor each VTMS using the dedicated VTMS monitoring cameras and the system will record all toll rate changes. It will be important for the operators to closely monitor the toll rates and traffic during peak-hours.

11.6 Reporting and Dashboards

The RTCS will also include system functionality that supports the generation of operational reports and dashboards. Dashboards will allow authorized users and operators to quickly view various KPIs and easily ascertain if any issues are occurring. Reporting functionality will allow authorized users and operators to generate pre-determined reports and ad-hoc reports needed to support the operations. The suite of reports will include system and operational performance reports, financial reports, and traffic reports.

12.0 MEASURING SYSTEM EFFECTIVENESS

12.1 Key Performance Indicators and Goals

The performance of the 69 Express Lanes system and operations will be measured against the following KPIs and goals:

Table 12-1: KPIs and Goals

KPI	Goal
Travel-time Reliability	45 MPH for 90% of the time over a 180-day monitoring period during morning and evening weekday peak hours
Customer Issues	The quantity of daily customer contacts received by the CSC indicating an issue with the ETLs diminishes over time
Image Review Backlog	The Image Review queue does not contain any transaction older than 2 business days
Trip-building Backlog	The trip-building queue does not contain any transaction older than 4 business days
Transaction Transfer and Reconciliation	All transactions older than 5 business days have been transferred to the BOS, acknowledged, and reconciled
RTCS Availability	Each month, the RTCS is available 99.99% of the time, excluding scheduled maintenance outages
AVI Accuracy	The RTCS accurately reads and assigns Transponders for at least 99.90% of all vehicles that pass through any ETL Toll Zone
AVDC Accuracy	The RTCS accurately detects and classifies at least 99.80% of all vehicles that pass through any ETL Toll Zone
Image Capture Accuracy	The RTCS accurately captures and correlates legible license plate images (at least 1 front-view image of the vehicle and 1 rear-view) for at least 99.90% of all vehicles that pass through any ETL Toll Zone
Image Review Accuracy	99.80% of all transactions that are Image Reviewed are Image Reviewed accurately

While this table provides an initial list of KPIs, it should be noted that additional KPIs will be added as the project advances and policies, agreements and technical specifications are finalized.

12.2 Performance Assessment

The system and operational performance against the KPIs will continually be measured, monitored, and reported. KPIs will also be routinely assessed, and modified as needed, to ensure efficient operations and employment of best practices. The project will also include continued assessment of and, if necessary, improvements to the system and operations to ensure successful performance.

13.0 ROLES AND RESPONSIBILITIES

Critical to the long-term success of any toll project is the establishment and documentation of the governance, policies, operations and maintenance and communication guidelines and corresponding responsibilities. The following guidelines are based on KDOT's objectives for this project, and the perspectives of the City of Overland Park and the KTA.

- U.S. 69 Express is fundamentally a KDOT project and will remain a KDOT roadway.
- KDOT is funding the project.
- U.S. 69 Express will not become part of the KTA system.
- KDOT will partner in some manner with KTA to deliver this project that will consider the risks to both KDOT and KTA.

U.S. 69 ETLs introduce additional requirements which require KDOT and its partners to work collaboratively together to refine and implement. Therefore, it is important to clearly define roles and responsibilities for each agency. The Roles and Responsibilities table below (Table 13-1identifies the major roles anticipated for each party and whether they are in a lead or supporting role.

While this section does not provide an exhaustive list of all roles and responsibilities required for the project it does present many of the key activities necessary to establish early project direction and provides guidance for subsequent project needs, technical documents, and agency agreements.

An agreement between KTA and KDOT should establish the terms and conditions for toll system procurement, operating performance, customer services, transaction processing, and revenue management. The agreement should address covering all of KTA's necessary costs to perform the contracted activities.

The following table identifies the "lead" and, if needed, a "support" role for each responsibility. The lead is intended to be the entity principally in charge of the activity and ultimately responsible for either performing the task or ensuring its completion. The lead will be the contracting entity should an ensuing contract with a third party be necessary to complete the activity. The entity identified in a support role will assist the lead entity in completing the activities but will not have overall responsibility or contracting obligations.

Table 13-1: Roles and Responsibilities

Roles and Responsibilities	*KDOT*	*KTA*	*Overland Park*
Project Development and Delivery			
Project Planning and Environmental – coordinate with all stakeholders and secure necessary approvals and project permits	Lead		
Project Procurement – develop legal and technical contract documents and procure a design-builder for the roadway infrastructure improvements	Lead		
Contract Administration and Construction Oversight – manage and provide oversight of all design-builder activities	Lead		
Project Funding – provide necessary funds for construction, operations, and maintenance	Lead		Support
Project Policy – establish operating policy consistent with legal authority and department goals and objectives	Lead	Support	Support
Toll Policy and Toll Rates – determine operating parameters and toll policy that establishes toll rates	Lead		
Express Lane Toll Civil and ITS Requirements – develop technical specifications and contract requirements for the RTCS.	Support	Lead	
Roadside Toll System Procurement and Oversight – lead the procurement of the RTCS and provide oversight and contract administration during installation.	Support	Lead	
Operations and Maintenance			
Roadway Operations and Maintenance – provide routine roadway O&M for the entire corridor to include the GP Lanes and Express Lanes.	Lead		
Express Lanes Roadside Toll System O&M – provide oversight of the vendor operating and maintaining the RTCS to include equipment maintenance, Image Review, creating trip-based transactions, and dynamic pricing system operations.	Support	Lead	
Express Lanes Operations – monitor traffic and adjust the toll policy as needed to achieve department goals and objectives.	Lead	Support	
Back Office System (BOS) Development – provide necessary enhancements to the existing back office toll system to accommodate the express lane transactions.	Support	Lead	
Distribute Transponders and provide account management services – procure and distribute K-Tags and establish and maintain associated customer accounts.		Lead	

Roles and Responsibilities	*KDOT*	*KTA*	*Overland Park*
Back Office Transaction Processing and Invoicing – receive trip-based transactions from the Express Lanes and post to customer's accounts, process to/through Interoperable systems, and invoice customers including registered owner lookups.		Lead	
Customer Service – provide complete account management services including website and call center options for Express Lane users to receive payments, manage accounts and answer customer questions and disputes.	Support	Lead	
Violation Collections – provide collection services for unpaid invoices to include placing registration holds in accordance with established policy and procedures.	Support	Lead	
Roadway TMC Operations - continue to utilize KC SCOUT to monitor and communicate with emergency response operators.	Lead	Support	Support
Incident Management – respond to all roadway incidents to safely restore traffic flow.	Lead	Support	Support
Express Lane Violation Enforcement – provide law enforcement to monitor illegal movements in/out of the Express Lanes in addition to general traffic law enforcement.	Support		Lead
Performance Monitoring and Reporting – collect data and compile the information, analyze results, and produce reports detailing traffic, operations, and revenues.	Lead	Support	Support
Communications and Marketing			
Project Spokesperson – provide a spokesperson authorized to communicate on behalf of KDOT.	Lead		
Community Outreach – meet with the community and provide information on impacts during project development and construction along with educational materials for Express Lanes operations.	Lead	Support	Support
Marketing and Branding – develop project branding and execute a marketing plan in advance of the Express Lanes opening.	Lead	Support	Support
Customer Communications: Policy and Roadway – provide updated information on toll rate changes, Express Lane modifications, and general roadway information such as closures and construction updates.	Lead		
Customer Communications: Toll Payments – provides information related to customer accounts, toll charges, and invoices.		Lead	