CHAPTER 1

Purpose and Need

This chapter discusses the basic information for the I-70 First Tier Environmental Impact Statement (FTEIS) including what the project is about, where it is located, and why improvements are needed to I-70 on the Missouri side of the Kansas City Metropolitan Area (KC Metro).

What is the I-70 First Tier Study About?

The Missouri Department of Transportation (MoDOT) and the Federal Highway Administration (FHWA) are proposing to improve the I-70 corridor from the Kansas state line to east of I-470. The National Environmental Policy Act (NEPA) process promotes efforts that prevent or minimize impacts to the human and natural environment in considering projects like improving I-70. The FTEIS is the primary NEPA environmental documentation that evaluates the social, economic, and environmental effects of the improvement strategies for I-70. The I-70 FTEIS in KC Metro is following a tiered process consisting of a First Tier and multiple Second Tier environmental studies and documents. Generally, First Tier documents address the transportation problems to be solved and potential corridor improvement strategies in an initial, higher level environmental impact analysis. First Tier documents frame and narrow the boundaries and scope for future, smaller Second Tier studies. The Second Tier environmental document process will occur after this study is complete and will likely consist of several documents based on logical termini and independent utility for sections of the corridor.

As a result of the First Tier process, the Study Team will seek the following outcomes:

- Approval of a Preferred Strategy for improving I-70 in KC Metro including a plan for prioritizing improvements.
- Identification of portions of I-70 that can be considered "sections of independent utility" (SIU) for analysis in future Second Tier studies.

What is a Purpose and Need?

A Purpose and Need identifies the reasons a proposed project is needed.

What is meant by improvement strategies?

Improvement strategies are general, high level transportation improvement opportunities to address transportation issues, such as traffic congestion, existing pavement, bridge, and interchange ramp deficiencies, and/or insufficient transit projects.

What are logical termini?

Logical termini are rational beginning and ending points for a transportation improvement and for a review of the environmental impacts.

What is a SIU?

A Section of Independent Utility (SIU) is a section of a larger project that can function on its own, without further improvements to adjoining road sections.

- Environmental documentation that can be referenced by Second Tier studies and reduce the amount of duplication between studies.
- Public and agency consensus and understanding around the overall improvement plan.

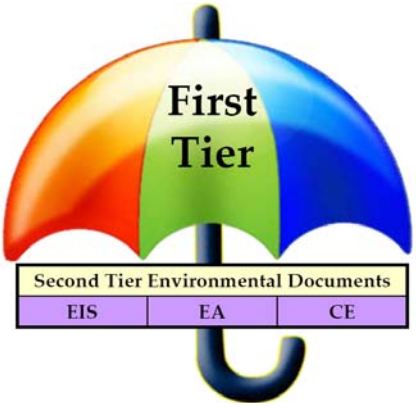


Illustration of the Tiered Environmental Process. The First Tier Study covers a corridor that will be broken down into multiple future Second Tier environmental studies.

What is the I-70 FTEIS Study Area?

The I-70 FTEIS Study Area is located entirely in Jackson County, Missouri and includes all land within 100 feet on either side of the existing highway right-of-way along the corridor and within 300 feet of the existing highway right-of-way at interchanges on I-70. This project on I-70 is approximately 18 miles long and extends from the end of the last ramp east of the Missouri and Kansas state line to east of the I-470 interchange, including the Kansas City, Missouri downtown loop. An expanded Study Area consisting of 1,000 feet on either side of the highway including the downtown loop is being evaluated for land use and socioeconomic studies. For most of this length, I-70 is a four- or six-lane divided and fully access-controlled interstate highway. The I-70 FTEIS Study Area is shown in **Figure 1.1** at the end of this chapter.

I-470 was determined to be the eastern logical termini for the I-70 FTEIS for a number of reasons. I-470 is a major interstate in the Kansas City region, the I-70 statewide study used I-470 as its termini which reduces study overlap, and a purpose and need study is being conducted on I-470.

On the west end of the Study Area, the I-70 FTEIS extends to the last ramp east of the Missouri and Kansas state line and includes the entire Kansas City downtown loop. The downtown loop as the logical termini was determined due to the number of interstate and freeway connections to downtown loop and the complex interrelatedness of the entire loop.

Why is I-70 in KC Metro Important?

The 18 mile I-70 corridor and the entire downtown loop are vital to serving regional transportation demands including commuters, transit, and freight movements. In addition to

serving regional needs, I-70 in the Kansas City metropolitan area is also the main artery for traffic traveling to and from other cities and places across the state and nationally. Some of the I-70 traffic traveling through Kansas City is bound for major cities and towns in Missouri and other adjacent states of Kansas, Nebraska, Iowa, and Illinois.

What Studies Were Completed for the I-70 Corridor before the FTEIS?

The need to improve the I-70 corridor and the adjoining transportation system has been identified by numerous studies. The following discusses previous and/or current studies that involve the I-70 corridor.

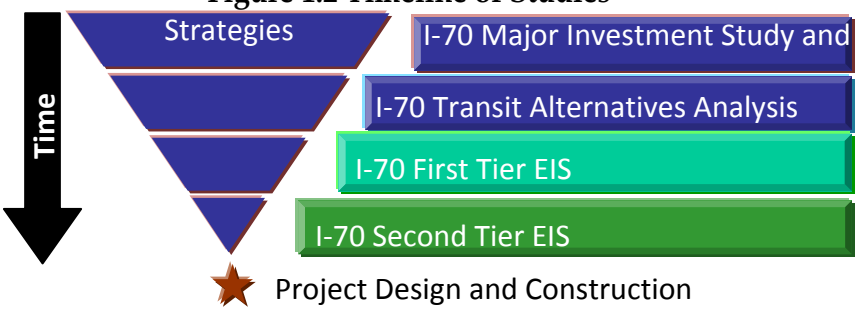
In 2000, MoDOT, the Mid-America Regional Council (MARC), and the Kansas City Area Transit Authority (KCATA) began the I-70 Major Investment Study (MIS) to evaluate the challenges and opportunities associated with I-70 in Jackson County. The I-70 MIS involved a planning process to evaluate long-term transportation needs in the I-70 corridor. The purpose of the MIS was to identify the challenges, needs, goals, and objectives for the corridor as well as develop and analyze potential major transportation improvement strategies. The I-70 MIS was completed in November 2004.

What does Multi-modal mean?

Mutli-modal refers to the different modes of transportation including walking, cycling, public transit, and automobile.

The I-70 Transit Alternatives Analysis, prepared by MARC in June 2005, supplemented the I-70 MIS by providing additional detail on transit alternatives. The purpose of the I-70 Transit Alternatives Analysis was to provide mechanism for the local residents to identify a locally preferred transit strategy within the corridor. The results of this study are also a part of the strategies for the FTEIS. **Figure 1.2** displays the series of studies leading up to the I-70 First Tier EIS and the studies to follow.

Figure 1.2 Timeline of Studies



In January 2007, MoDOT completed a Final Environmental Impact Statement (FEIS) that evaluated the potential impacts of the improvements to the I-29/I-35 corridor from Missouri Route 210 south over the Missouri River and to the northwest corner of the downtown loop. The Selected Alternative consists of adding capacity to the existing I-29/35 roadway and bridge corridor from the northern terminus at M-210 to a connection with the existing downtown loop – the southern terminus. Included in the Selected Alternative is an improvement of the crossing over the Missouri River and modifying the corridor's connection to the downtown loop and connection of the Broadway Extension (US 169) with the downtown street and freeway loop system. The northern side of the downtown loop, designated as I-35/70 and US 24/40, is included in the Selected Alternative[1]. The results of this study will be considered in the second tier studies.

In addition, MoDOT completed the I-70 Supplemental Environmental Impact Statement (SEIS) from I-470 in the Kansas City area to the Lake St. Louis interchange in the St. Louis area, receiving a Record of Decision in August 2009. The I-70 SEIS evaluated if and how truck-only lanes alter the social and environmental impacts and recommendations previously identified through the Improve I-70 EIS process. The study was conducted because of the high numbers of trucks entering and exiting I-70; to determine the ability of connecting roads and communities to accommodate heavy truck traffic; to assess the additional social and environmental impacts; and to determine the connectivity to multi-modal centers.[2] The results of the I-70 SEIS have been coordinated

[1] FHWA-MO-EIS-06-01-F Record of Decision
[2] MoDOT Improve I-70 Supplemental Environmental Impact Statement Spring 2008

within the I-70 FTEIS. The I-70 SEIS concluded truck only lanes would transition into general purpose lanes east of I-470 and additional truck traffic will not divert to I-70 with dedicated truck lanes only on the 200 miles across Missouri.

Why are Improvements needed along I-70 in KC Metro?

The overall purpose for studying I-70 is to determine an improvement strategy for the corridor that is consistent with MARC's Long Range Transportation Plan (LRTP) policy goals and environmental constraints. The I-70 FTEIS is in MARC's 20010-2014 Transportation Improvement Program. Full details on the reasons why improvements are needed to I-70 are found in the Purpose and Need Technical Memorandum located in **Appendix B.** The improvement strategy will address the following items:

- Improve Safety: Reduce crash rates and crash severity on I-70 and the downtown loop.
- Reduce Congestion: Remove key bottlenecks; reduce the potential for ramp back-up onto the freeway; and improve multi-modal travel times in coordination with plans put forward by local and regional agencies.
- Restore and Maintain Existing Infrastructure: Improve bridge and pavement conditions on I-70 and the downtown loop and implement cost-effective investment strategies.
- Improve Accessibility: Provide travel options for all residents; increase safe access across I-70 and the downtown loop for non-motorized travel; support local and regional land use plans.
- Improve Goods Movement: Improve the efficiency of freight movement on I-70 and the downtown loop.

Each of the above elements of the purpose and need for improvements is discussed in more detail in the paragraphs below.

What is a bottleneck?

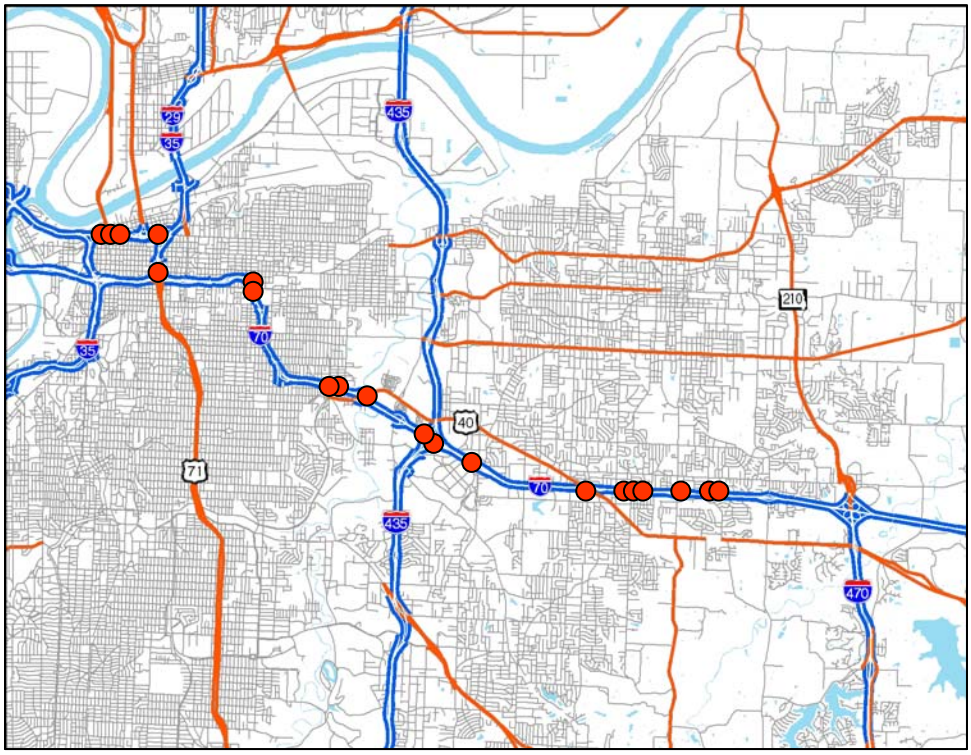
A bottleneck is a section of a road where movement of traffic is limited by the road design. This is often a section of road with a fewer number of lanes, a sharp curve, or traffic joining the road at an interchange. A bottleneck is the most vulnerable point for congestion in a road network and is also referred to as a chokepoint.

Improve Safety

Improving safety within the I-70 FTEIS Study Area must be a key element of improvement strategies. Traffic crashes cost the travelers of I-70 in a variety of ways. Some crashes cost lives, cause severe injury, or result in property damage. Traffic crashes also create congestion from blocked travel lanes resulting in increased gas consumption and lost time. Improvements to I-70 must work to reduce the crash rates compared to the statewide average and to reduce the crash severity.

Crash data were obtained from MoDOT from 2003 to 2007. In the five year period 2003 to 2007, 20 crashes within the Study Area involved a fatality. The locations of those fatal crashes are shown in **Figure 1.3**.

Figure 1.3: Fatal Crash Locations in the Study Area 2003 to 2007



The locations with the highest crash rates between 2003 and 2007 are the downtown loop, westbound from the Benton curve to the downtown loop, eastbound from the Jackson curve to I-435, and at the I-435 interchange.

The locations identified above are defined as undesirable because the crash rate exceeds 150 percent of the statewide average rate of 107.82 crashes per 100 million vehicle miles of travel. The downtown loop and the locations around the Benton and Jackson curves have noticeably higher crash rates compared to the statewide crash rate.

I-70 Eastbound at Lister

The majority of all crashes in the Study Area are rear end (53%) followed by passing (18%) and out of control (17%). Rear end collisions often occur in congested areas as drivers fail to slow down in time for slow moving traffic.

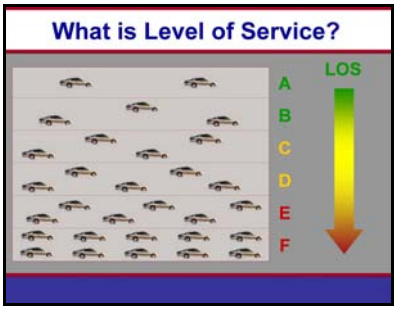
Table 1.1 Crash Types on I-70 (2003 -2007)

Crash Type	Number	Percent
Rear End	3,079	52.6%
Passing	1,036	17.7%
Out of Control	976	16.7%
Other	766	13.0%
Total	**5857**	**100.0%**

Approximately 78 percent of the total crashes cause property damage only and approximately 22 percent cause injury. Approximately 77 percent of all crashes occur in daylight conditions and approximately 81 percent occur on dry pavement conditions. Approximately 30 percent occur during the weekday peak period of traffic (7-9 a.m. and 4-6 p.m.), which has the largest effect on delay for motorists.

What is Level of Service Analysis?

Level of service (LOS) is a measure by which transportation planners determine the quality of service on roadway. The transportation LOS system uses the letters A through F, with A being best and F being worst.



Reduce Congestion

The way the quality of service on a roadway is measured is by the Level of Service (LOS). The general level of service descriptions are described as:

- LOS A represents free flow.
- LOS B is in the range of stable traffic flow at free flow speeds, but the presence of other users in the traffic stream begins to be noticeable.
- LOS C is in the range of stable traffic flow at free flow speeds, but marks the beginning of the range of flow in which the operation of individual users becomes

LOS C or D towards the viewer and LOS A away from the viewer

significantly affected by interactions with others in the traffic stream.

- LOS D represents high-density, but stable traffic flow with slight declines in the travel speed.
- LOS E represents operating conditions at or near the capacity level with noticeable declines in travel speed.
- LOS F is used to define forced or breakdown flow.

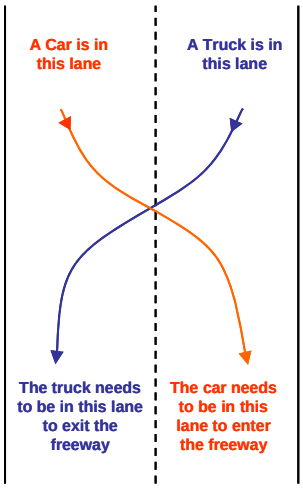
In regard to the quality of service on the I-70 corridor, traffic growth on I-70 and the downtown loop is the result of population and economic growth in the Kansas City area and growth in trips through the region by cars and trucks. The Kansas City area has experienced population growth of 28 percent between 1970 and 2000 with expectations of an additional 21 percent growth in population by 2030 based on forecasts by the Census Bureau and MARC. Jackson County population growth is expected to be near nine percent between 2000 and 2030. Within the Study Area, population growth is focused around Independence and further east in Blue Springs.

What is lane balance?

A lane balance issue occurs when the number of through lanes on the highway changes, usually as a result of a lane drop. An example of this is I-70 westbound at I-435.

Commuter traffic in the study corridor is highly directional with the majority of traffic destined towards the Kansas City downtown loop during the morning and away from the downtown loop during the afternoon peak periods.

What is a weaving section?



The car and truck must cross the other traffic to get to the lane they want to be in.

A level of service (LOS) analysis was completed and shows that relatively severe congestion exists in the I-70 corridor during periods with high commuter traffic. This analysis shows that much of this congestion is likely caused by sub-standard merge, diverge, and weave areas. In addition to improving the merge, diverge, and weave sections in the corridor, basic capacity enhancements (e.g., lane additions) may be required to address the existing needs.

Certain specific locations that appear to be major corridor bottlenecks are as described below:

- Downtown Loop: The downtown loop is congested in the peak hours due to lane balance issues requiring lane changes, closely spaced interchange ramps, and short weaving sections between interchanges. The incoming AM peak is a bottleneck largely because of

the congestion from I-670. The outgoing PM peak experiences congestion in the northeast corner of the downtown loop due to a lane drop at Prospect Avenue. There are four incoming lanes from the downtown loop but only three outgoing lanes east of Prospect Avenue.

- Benton and Jackson Curves: These curves have poor interstate operations due to existing sight distance and geometrics of the roadway. These are areas of higher than average crash rates.

- I-435: I-70/I-435 interchange experiences congestion in the AM peak period in the westbound direction and in the PM peak period in the eastbound direction due to lane balance issues requiring lane changes, closely spaced interchange ramps, and short weaving sections within the interchange. This is caused by lane drops through the interchange and steep grades on I-70 leaving the interchange.

Lane Drop at the I-435 Interchange westbound

- I-470: At the I-70/I-470 interchange congestion tends to occur on I-470 and not on I-70 including short merge, diverge and weaving sections on I-470 north and south of I-70. The issues are related to the closely spaced I-470 interchanges. This congestion affects traffic flow onto and off of I-70.

What is a lane drop?

A lane drop is a reduction in the number of lanes on the roadway. Lane drops are most common within interchanges in the form of an exit only lane.

Weave area on WB I-70 between 23rd and 18th Streets

Measuring Existing Congestion

The Study Team used 2005 traffic data to calculate the levels of services for basic freeway sections, ramp merges and diverges, and weaving sections. This analysis allowed the Study Team to identify which sections of the Study Area with the worst congestion. The analysis results are in **Appendix D**.

The Study Team has set a LOS goal for the peak hour analysis of LOS E in 2030 for the improvement strategies. The existing LOS conditions are described as follows:

Downtown Loop: The existing congestion levels through this section, both eastbound and westbound, is either undesirable or approaching undesirable conditions. The levels of service for the basic freeway sections, weaving sections, and ramps are in the range of LOS D and LOS F. As traffic volumes increase by 2030, the travel conditions and level of service are expected to worsen if there are no improvements.

Downtown Loop to Jackson Curve: The existing traffic congestion through this section, both eastbound and westbound, is currently undesirable. The levels of service for the basic freeway sections, weaving sections, and ramps are predominantly in the range of LOS E and LOS F. Improper lane balance, Benton Avenue curve, and close interchange spacing contribute to the capacity problems in this section. Traffic volumes and congestion are expected to increase by 2030 without any improvements.

I-70 Eastbound at the Jackson Curve

Westbound I-70 at the Benton Curve

Jackson Curve to I-435: The existing congestion levels through this section, both eastbound and westbound, is either undesirable or approaching undesirable conditions. The levels of service for the basic freeway sections, weaving sections, and ramps are in the range of LOS D and LOS E. By 2030, the traffic volumes are expected to grow with increased congestion without any improvements.

I-435: The congestion levels in both directions through the I-435 interchange are undesirable, with levels of service predominantly in the range of LOS E and LOS F. Much of this congestion is due to dropping lanes as I-70 traffic exits to I-435 and traffic merging on and off I-70. There are some planned

interchange improvements to reduce congestion through this section. As traffic volumes increase by 2030, the travel conditions and level of service are expected to worsen if there are no improvements.

I-435 to East Project Terminus: The existing congestion levels through this remaining section of the project corridor are either undesirable or approaching undesirable conditions. The levels of service for the basic freeway sections, weaving sections, and ramps are in the range of LOS C and LOS E. As traffic volumes increase by 2030, the travel conditions and level of service are expected to worsen if there are no improvements.

Congestion and Transit Service: Traffic growth and congestion in the I-70 corridor affects bus service that operates on I-70. Currently, travel options along the I-70 corridor include primarily motor vehicles along with limited transit opportunities. There are currently three fixed bus transit routes that use I-70 between downtown Kansas City, Independence, Blue Springs, and Lee's Summit. With the limited options, the majority of travel is done by passenger vehicles. Enhanced modal options in the corridor could have the potential to shift some traffic away from passenger vehicles and thus reduce congestion and environmental impacts such as air quality.

Restore and Maintain Existing Infrastructure

Constructed in the early 1960s, I-70 has outlasted its original design life of 20 years and has carried traffic volumes of both cars and heavy trucks that have far exceeded original expectations. Since the original construction, some interstate design standards have been revised and now leave I-70 with undesirable design features. Improvements proposed as part of the I-70 FTEIS needed to modernize the freeway include both pavement and bridge updates.

Pedestrian bridge east of Van Brunt Boulevard

Improve Accessibility

Often major linear features such as rivers and transportation corridors act as barriers to pedestrians, bicyclists, and those without motor vehicles. The I-70 FTEIS aims to reduce the

barriers to non-motorized travelers by improving connections across I-70 and the downtown loop.

Crossing I-70

The Study Area has 49 bridges and underpasses crossing the freeway which provide opportunities to enhance bicycle and pedestrian accommodations to these structures. Some I-70 bridges and underpasses are connected to interchanges while others only provide access across the freeway. In either case, it is important to provide crossing opportunities for the pedestrians and bicyclists. To supplement the numerous roadway crossings of I-70, there are two pedestrian bridges – one east of the Van Brunt Boulevard interchange connecting at Oakley Avenue and the second east of the Jackson Avenue interchange connecting at Cypress Avenue. The Cypress Avenue pedestrian bridge connects Cypress Park on the south side of I-70 to the residential neighborhood to the north of I-70. The majority of the bridges and underpasses have sidewalk accommodations on at least one side of the street.

Bicycle Facilities

Metro Green Plan developed by MARC identifies a regional bicycle/trail plan for the region. The Kansas City Area has not yet completed the recommended regional network of interconnected bicycle facilities. There are various bicycle lanes and paths available throughout the Study Area, but non-motorized transportation system improvements, along the I-70 corridor or paralleling the corridor, are still needed. Individual projects have been constructed to various standards, some of which offer potential for future inclusion as part of a comprehensive regional bikeway system.

Transit Center

A common pick-up/drop-off location served by multiple transit routes. The transit center in downtown Kansas City is located at 10th and Main Streets.

Transit Routes

KCATA fixed transit routes that parallel or cross I-70 use the city road network. More than 55 KCATA transit routes cross I-70 or the downtown interstate loop as they provide radial service from the transit center in downtown Kansas City. Within the I-70 Study Area, there is one Park and Ride lot at I-70 and Blue Ridge Boulevard. In addition, 8.35 percent of the households in census block groups adjacent to the I-70 Study

Area have no vehicles available. West of I-435, there are 13.29 percent of households in census block groups adjacent to the I-70 Study Area have no vehicles available. East of I-435, there are 3.23 percent of households adjacent to the I-70 Study Area without a vehicle. This indicates that transit, bicycle routes/trails, and pedestrian facilities are an important aspect of the I-70 corridor.

Improvement of accessibility across I-70 for pedestrians, bicyclists, and those without motor vehicles is needed to serve and support the wide variety of land uses adjacent to the freeway.

Improve Goods Movement

Kansas City's mid-continent location makes the region a key location for the movement of goods. National cargo passes through the region by truck, rail, water, and air. Trucks are an important component of the traffic stream in the I-70 corridor. Approximately 11 percent of the vehicles in the corridor are trucks. During the AM peak hour, there are over 350 trucks on I-70 west of I-435 and around 500 trucks use I-70 east of I-435. There are over 380 trucks west of I-435 and over 670 trucks east of I-435 on I-70 during the PM peak hour. By 2030, there are expected to be 20 percent more trucks on I-70 during the AM and PM peak hours.

I-70, I-35, I-29, and U.S. 71 are the primary truck routes in the region. Shipments of local goods often use the interstate system to distribute goods from the manufacturer to the warehouse or from the warehouse to the store. The I-70 FTEIS improvements need to support goods movement by providing less congested, more reliable travel. This will lead to improved freight travel times and reduced operating costs for moving goods.

Summary

The purpose of the I-70 FTEIS is to determine an improvement strategy for the corridor, including future capacity and mode choices, that addresses the key needs outlined in this document. These five key purpose and need goals are:

- Improve Safety
- Reduce Congestion
- Restore and Maintain Existing Infrastructure
- Improve Accessibility
- Improve Goods Movement

The Study Team developed, refined, and evaluated potential I-70 corridor strategies based on the needs outlined in this document while seeking to minimize impacts to the human and natural environment. This development, refinement, and evaluation of the strategies are discussed in the following chapters of this FTEIS.

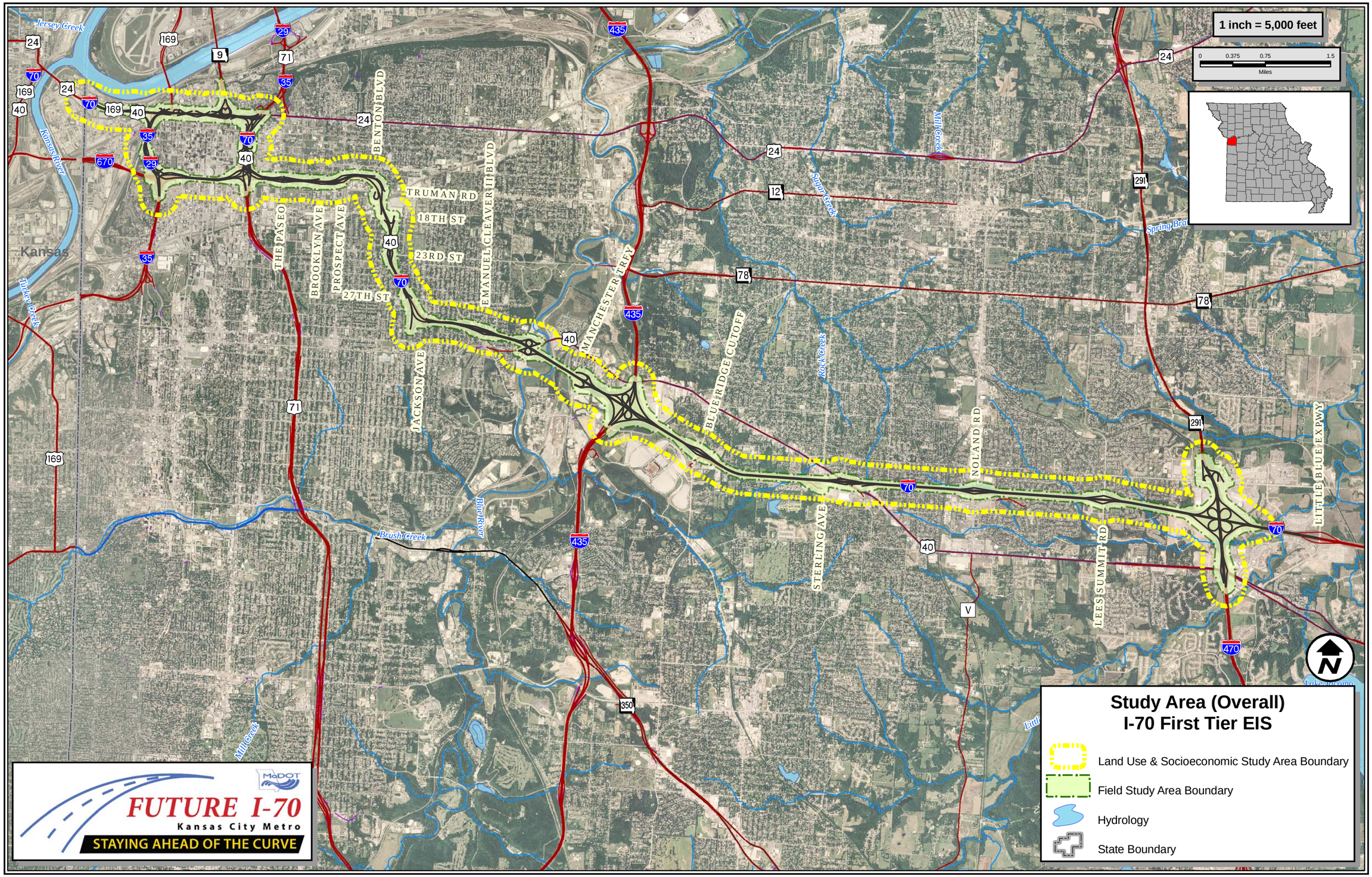


Figure 1.1 Study Area - Overall

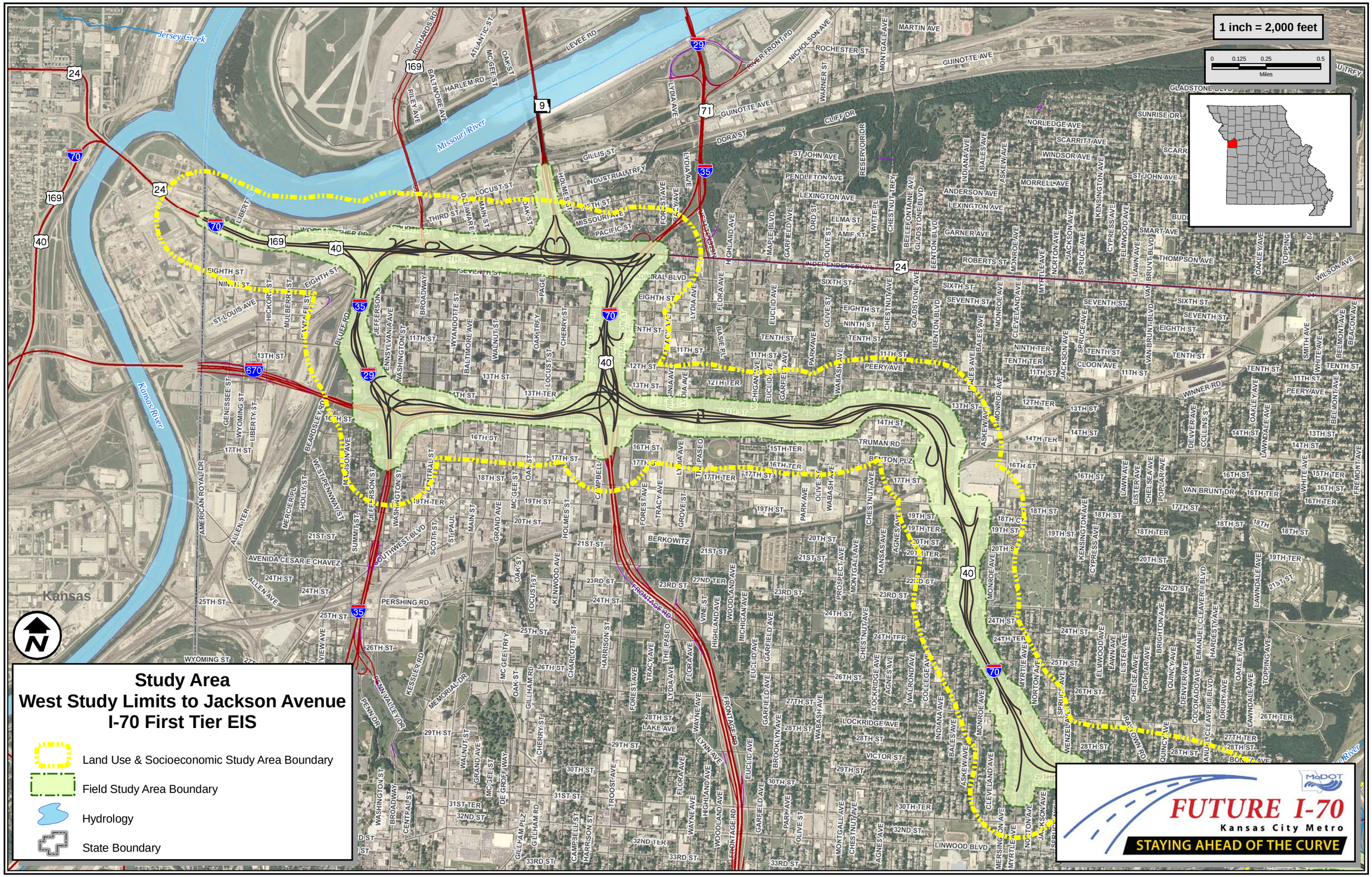


Figure 1.1 Study Area - West Study Limits to Jackson Avenue

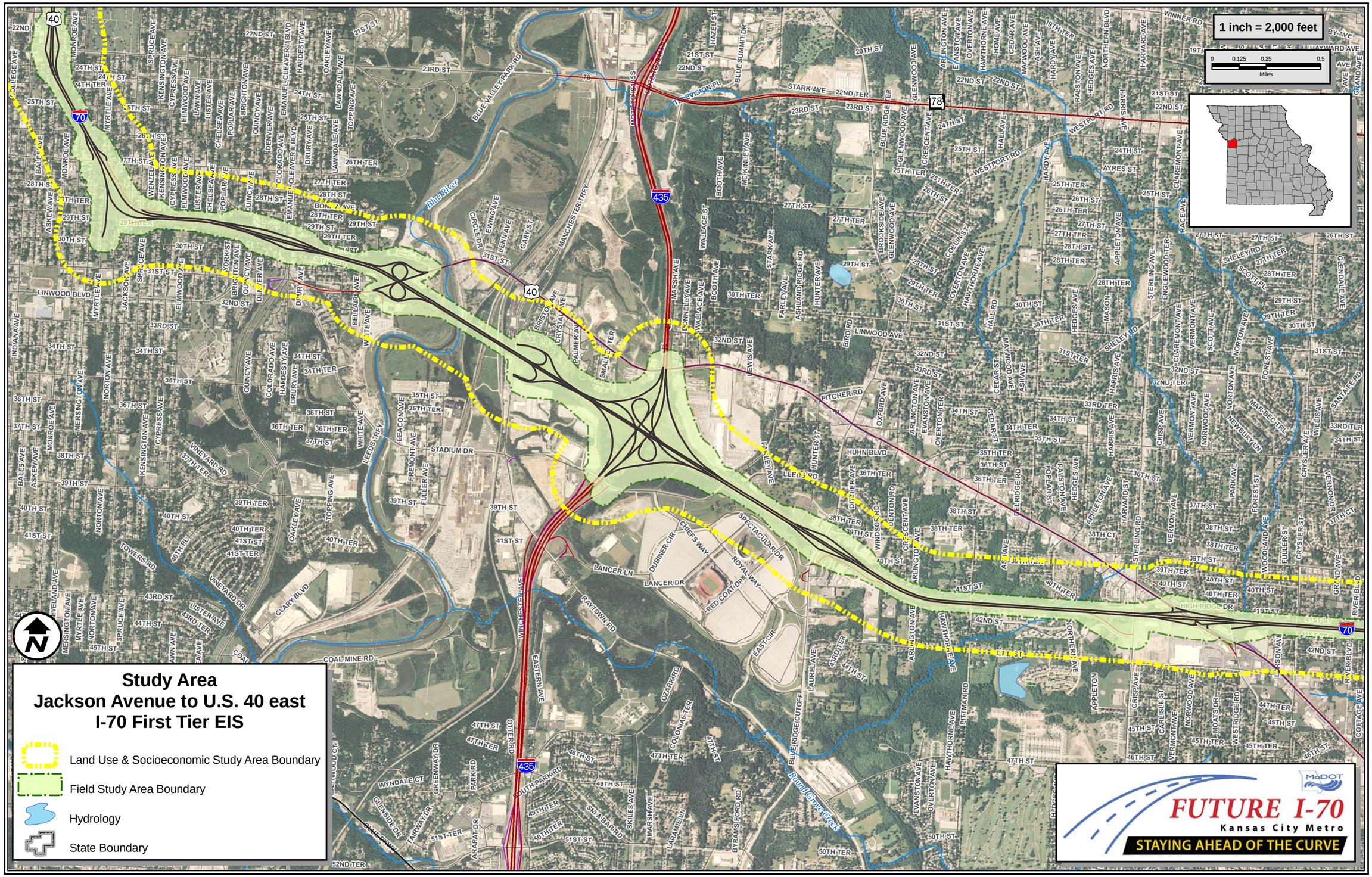


Figure 1.1 Study Area - Jackson Avenue to U.S. 40 east

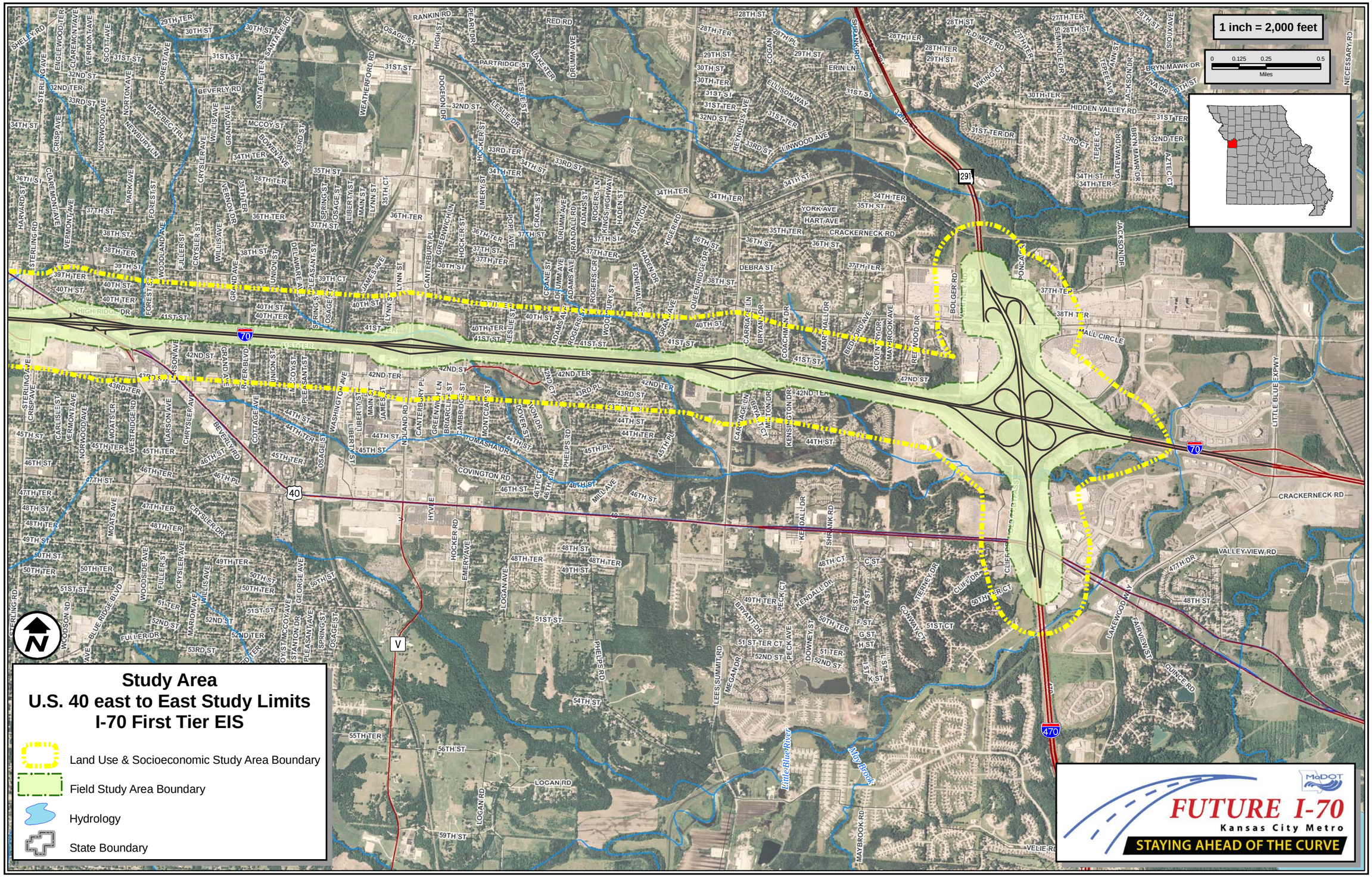


Figure 1.1 Study Area - U.S. 40 east to East Study Limits