(DRAFT) FINAL REPORT

Regional Freight Study

CONNECTED FREIGHT KC 2050

A Plan in Action

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Acronyms and Abbreviations

ADT	Average Daily Traffic
AM	Morning
B2B	Business-to-Business
B2C	Business-to-Consumer
BA	Bachelor of Arts
BS	Bachelor of Sciences
CMV	commercial motor vehicle
CPKC	Canadian Pacific Kansas City
DOT	Department of Transportation
EV	Electric Vehicle
FAC	Freight Activity Center
FAF	Freight Analysis Framework
FHWA	Federal Highway Administration
FIP	Freight Investment Plan
FRATIS	Freight Advanced Traveler Information System
GHG	Greenhouse Gas
GIS	Geographic Information System
GMC	Goods Movement Committee
GSP	Gross State Product
IIJA	Infrastructure Investment and Jobs Act
IT	Information Technology
ITS	Intelligent Transportation System
LDCMPO	Lawrence-Douglas County Metropolitan Planning Organization
MARC	Mid-America Regional Council
MoDOT	Missouri Department of Transportation
MS	Master of Sciences
NASS	National Agricultural Statistics Service
NS	Norfolk Southern
PM	Afternoon
PSP	Planning Sustainable Places
PTRPC	Pioneer Trails Regional Planning Commission
SPPC	Sustainable Places Policy Committee

TAZ	Transportation Analysis Zone
TTPC	Total Transportation Planning Committee
UP	Union Pacific
USDA	United States Department of Agriculture
VMT	Vehicle Miles Traveled

1. Introduction

The Connected Freight Kansas City (KC) 2050 Plan is intended to harmonize the Kansas City region's various freight goals and priorities. This plan was developed through data analysis and an understanding of key industry trends, best practices, and technical analysis. Throughout the course of developing the Connected Freight KC 2050 Plan, the analysis and recommendations were anchored by robust engagement with diverse groups with a stake in the freight system and guided by the Goods Movement Committee (GMC). The Mid-America Regional Council (MARC) GMC is a subcommittee of the Total Transportation Policy Committee (TTPC). It acts as an advisory body to the TTPC on matters involving freight project priorities and policy considerations that affect the movement of freight into, around, and out of the metropolitan area. The committee provides a public forum for regional freight stakeholders to discuss public-private collaborations, public outreach, and other topics related to goods movement.

The Kansas City region has a unique advantage as a centrally located multimodal freight hub, providing connections between rail, aviation, highway, and maritime systems. The region's planning partners, MARC, Lawrence-Douglas County Metropolitan Planning Organization (LDCMPO), and Pioneer Trails Regional Planning Commission (PTRPC) and their partners developed this plan to leverage these freight system opportunities to support economic and workforce development in the region.

The Connected Freight 2050 Plan tackles key issues like balancing rural and urban freight needs, aligning regional freight policies to prioritize freight in project selection, equipping local governments with knowledge of freight development impacts, and crafting public policies that merge land use and transportation planning suited to Kansas City's geographic strengths. Additionally, the plan features a freight profile and system map of the study area, offering a thorough perspective of the regional freight landscape.

2. Critical Issues for Kansas City Region

Early in the process, MARC, LDCMPO, and PRTPC identified the critical issues faced by each agency to help establish the plan's innovative freight planning process framework. Given the fast-paced, rapidly evolving nature of the freight industry, effective freight planning should be proactive and adaptive. The traditional freight planning process tends to be more reactive than proactive and is not perceived as an effective tool to address these issues. Nonetheless, goods movement issues affect stakeholders, municipalities, and other planning groups who are seeking regionally coordinated solutions. Consequently, these planning agencies aimed to set guidelines that would not only maintain their relevance to the freight industry but also position them as leaders in advancing the vision of freight planning for the region. Critical issues were

identified to consistently address how public decisions intersect with industry development. These issues include:

- **Balancing rural and urban representation of freight needs, policies, and project prioritization:** The Kansas City region faces the challenge of ensuring both rural and urban freight needs are adequately represented and prioritized. Urban areas often have higher freight traffic due to dense industrial clusters, while rural areas may face issues such as inadequate infrastructure. The opportunity lies in creating policies that balance these needs, ensuring equitable distribution of resources.
- **Harmonizing regional freight policies to elevate freight within the project selection process:** Aligning regional freight policies to prioritize freight in project selection is crucial for the efficient movement of goods. The challenge is to integrate diverse policies from various jurisdictions into a cohesive framework. By harmonizing these policies, the region can leverage its multimodal advantages and enhance overall freight efficiency.
- **Providing resources to educate local governments on the expected impacts of freight development and goods movement:** Local governments often lack the necessary knowledge and resources to understand the impacts of freight development. The challenge is to bridge this knowledge gap and equip them with tools to make informed decisions. Opportunities exist in conducting workshops, sharing best practices, and providing technical assistance to foster a deeper understanding of freight impacts.
- **Developing public policies that integrate land use and transportation planning reflective of the Kansas City region's geographic advantages:** Public policies need to reflect the unique geographic strengths of the Kansas City area, such as its position as a multimodal freight hub. The challenge is to integrate land use and transportation planning to maximize these advantages. By creating policies that align land development with transportation infrastructure, the region can achieve sustainable growth and improved freight movement.

The relationship between these critical issues lies in their interconnected nature. Addressing one issue often impacts others, creating a ripple effect. For instance, harmonizing regional freight policies can lead to better-balanced rural and urban freight needs, while educating local governments can enhance the development of integrated land use and transportation policies. By tackling these issues collectively, the Kansas City region can build a robust and efficient freight system that supports economic and workforce development.

3. Planning Goals

The Plan's goal-setting process began with an extensive analysis of various planning documents, including the long-range plans of each planning agency, unincorporated and incorporated

communities, and the comprehensive statewide freight plans of Missouri and Kansas. Commonalities were identified across these documents to ascertain study area objectives.

This process also involved collaboration among multiple stakeholders, including local and state transportation agencies, freight industry representatives, and community organizations. These stakeholders identified key focus areas including improving the efficiency and reliability of freight operations, enhancing multimodal connections, and addressing environmental impacts.

These goals reflect a collaborative, multifaceted strategy designed to enhance the overall freight transportation system in the Kansas City study region, ensuring it supports economic growth, sustainability, and improved quality of life for its residents.

- **Transportation Options and Economic Vitality:** Enhance transportation options and economic vitality with a greater focus on the regional industries/businesses that are reliant on freight transportation, create high-paying jobs, and enhance workforce skills.
- **Safety, Security and Resiliency:** Enhance safety, security, and resiliency of the freight transportation system for all users and under all weather conditions.
- **Maintenance and Service:** Maintain freight transportation system assets in good condition and improve connections to multi-customer and multimodal freight service facilities.
- **Mobility and Reliability:** Improve efficiency and reliability of freight operations for all users and for all seasons.
- **Public Health:** Address freight related public health and quality of life issues.
- **Environment and Energy Conservation:** Reduce impacts of freight on the natural environment and support energy conservation by reducing engine idling, greenhouse gas emissions, and encouraging efficient freight operations.
- **Innovation:** Support state and national initiatives and partnerships for advancement in commercial vehicle technology and service innovation.

4. Stakeholder Engagement

The stakeholder engagement process for the Connected Freight KC 2050 Plan played a crucial role in ensuring that the freight planning process was inclusive and effective. Engaging stakeholders such as government agencies, industry representatives, and community organizations allowed the planners to gather a broad range of perspectives, ensuring that the plan accounted for the diverse needs and challenges faced across the region. This outreach not only fostered dialogue on freight-related issues but also helped organizations understand their potential roles in the planning process. By involving diverse viewpoints, the engagement efforts

encouraged collaboration and built a framework for integrating stakeholders into the decision-making process, thereby enhancing the overall effectiveness and applicability of the plan.

The engagement process was organized into three themed conversations: **The Situation Today, Proactive Planning Scenarios**, and **Future Freight Trends.**

The Situation Today: This phase took place from winter to fall 2024 and involved stakeholder conversations to introduce the Connected Freight KC 2050 Plan and gather input for proactive planning scenarios. Participants included various committees, councils, and industry representatives. They discussed issues encountered in goods movement, potential improvements, important considerations, future challenges, and the roles and goals of the GMC. Key issues identified included inadequate freight infrastructure, job training, and the need for alternative funding sources.

Proactive Planning Scenarios: Building on the previous conversations, this phase focused on the economic impacts of freight from fall 2024 to winter 2025. Participants reviewed policies and growth trends, discussed incentives for freight competitiveness, and identified key characteristics of a successful freight economy. Suggestions included improvements in location strategies, transportation connections, and workforce development.

Future Freight Trends: This phase, from winter to spring 2025, explored various scenarios such as *"Wild Wild West"* and *"Shifting Patterns"* to understand potential future impacts on freight dynamics. Participants reviewed these scenarios and applied tools from a sample proactive planning toolbox, rating their effectiveness for addressing big picture issues and potential risks. They considered tools such as legislative advocacy, mapping future port locations, and traffic incident management strategies. The most effective tools were identified for each region.

The stakeholder engagement process for the Connected Freight KC 2050 Plan was instrumental in fostering inclusive discussions and collaboration. By involving diverse stakeholders, the process ensured that the freight planning addressed the varied needs and challenges of the region. This collaborative effort laid the groundwork for informed decision-making and a comprehensive, adaptable plan that reflects the shared vision of the community.

5. Regional Freight Picture

This section provides a comprehensive overview of the critical elements necessary for understanding and addressing freight operations in the Kansas City region. It encompasses a detailed profile of the study area, maps and descriptions, land use and industry clusters, freight flow profiles, regional truck travel patterns within the region, and infrastructure assessment. Additionally, it outlines the goals and objectives aimed at enhancing the freight system and includes an overview of the GMC. By compiling this information, stakeholders can develop informed strategies to optimize freight operations, support economic growth, and improve workforce development. Understanding these interconnected aspects is essential for building a robust and efficient regional freight system that meets the diverse needs of both rural and urban areas.

5.1 Study Area Profile

5.1.1 Study Area Map and Description

The study area (**Figure 1**) encompasses 19 counties within the Kansas City metropolitan region, spanning both sides of the state line between Missouri and Kansas. This comprehensive region includes notable entities such as the LDCMPO in Kansas and the PTRPC in Missouri. This collaboration marks the first instance where these agencies have joined forces to address regional freight policy and planning, reflecting a significant step towards unified development and efficient goods movement across the Kansas City area.

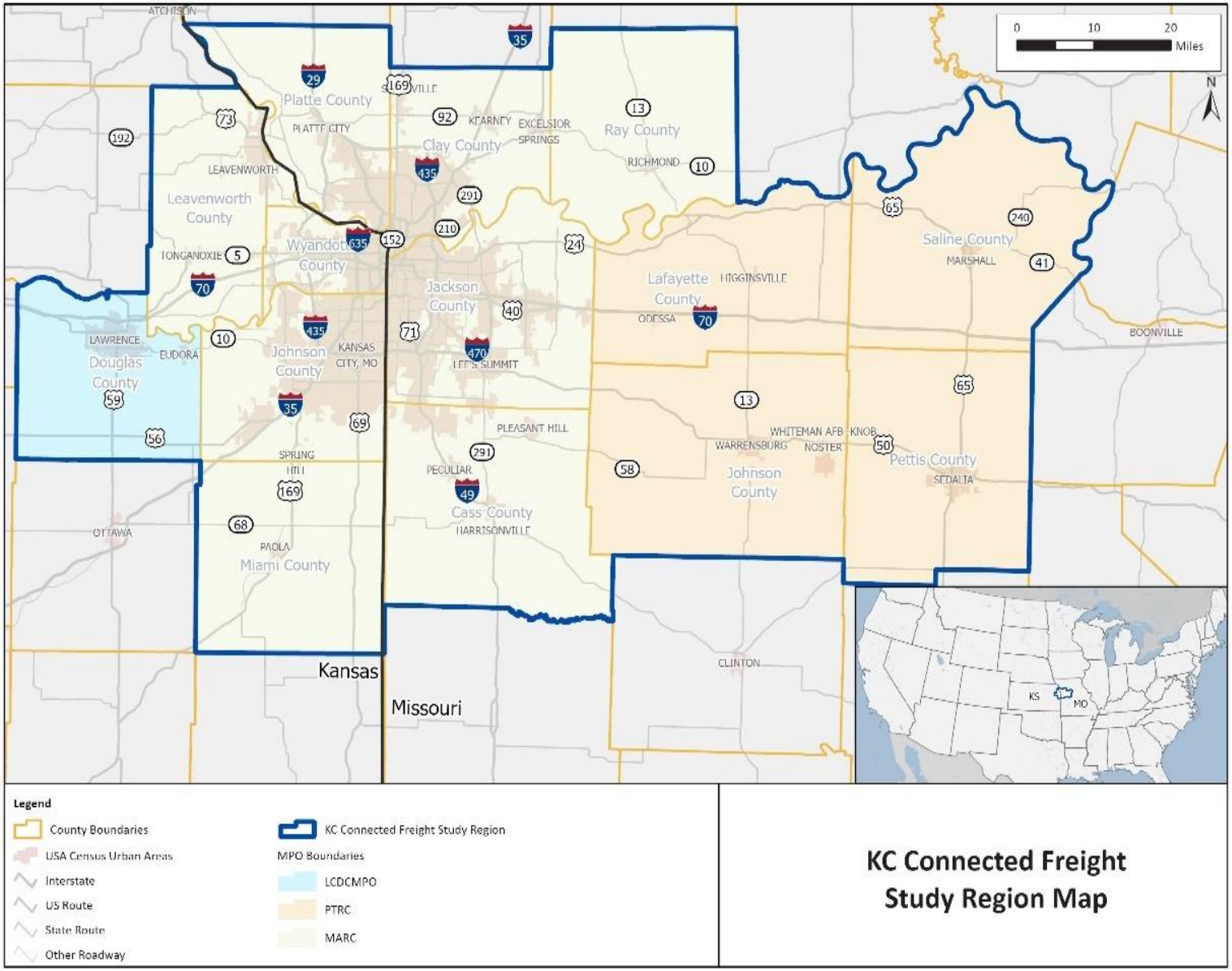


Figure 1. Region Map

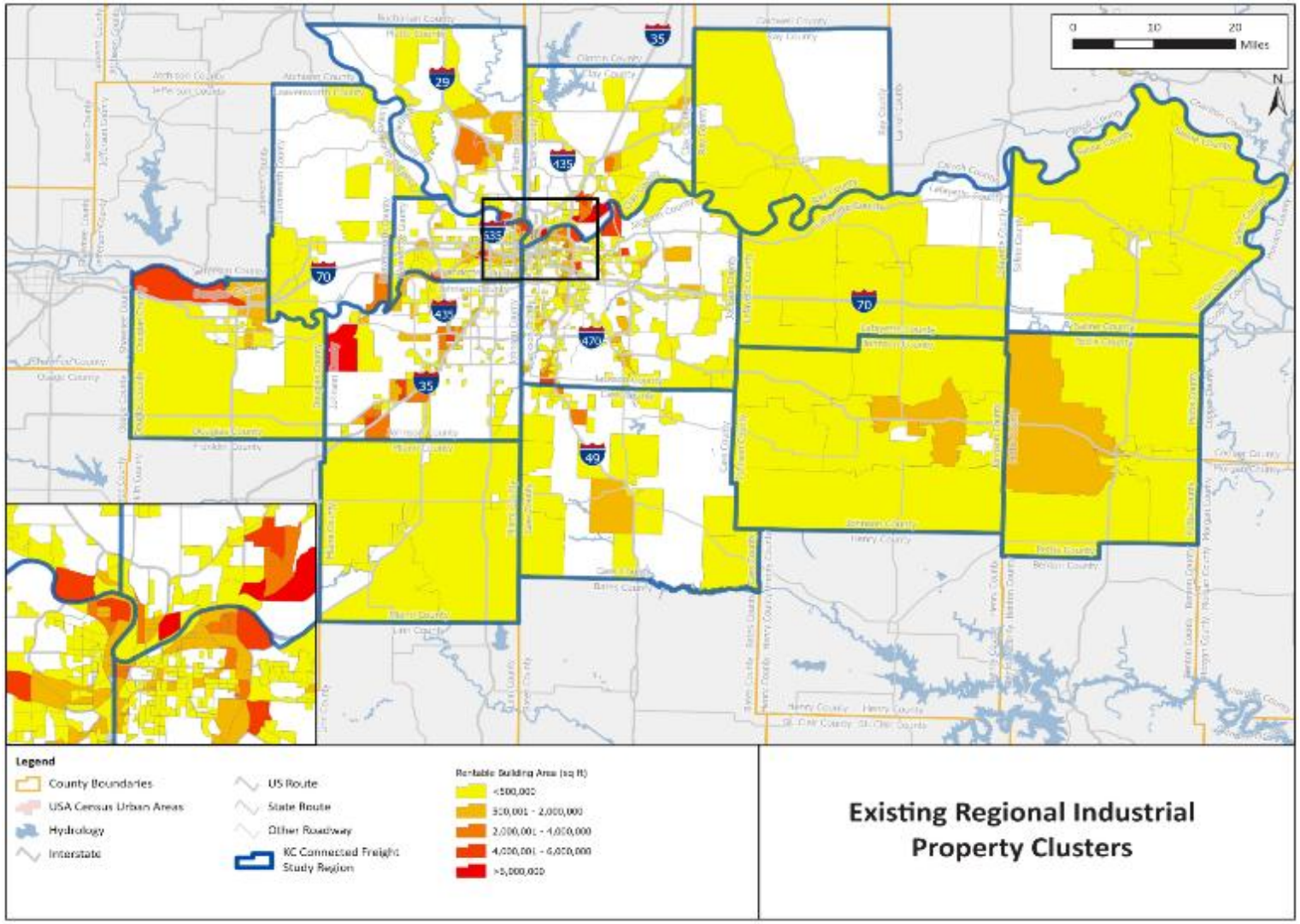
5.1.2 Commercial and Industrial Land Use Overview

The relationship between industrial and commercial land uses and freight movement is essential for fostering economic growth and maintaining efficient supply chains. These land uses often serve as hubs for logistics, warehousing, and manufacturing activities that depend heavily on timely and reliable transportation networks. By analyzing how these spaces are utilized, planners and stakeholders can identify patterns, anticipate challenges, and implement strategies to optimize freight operations. This approach not only addresses current logistical demands but also prepares regions for future growth, enhancing productivity and sustainability in the ever-evolving landscape of goods movement.

Based on an analysis of building age distribution, there has been a gradual shift of industrial and commercial buildings and rentable building areas from Jackson County in Missouri to Johnson County in Kansas.

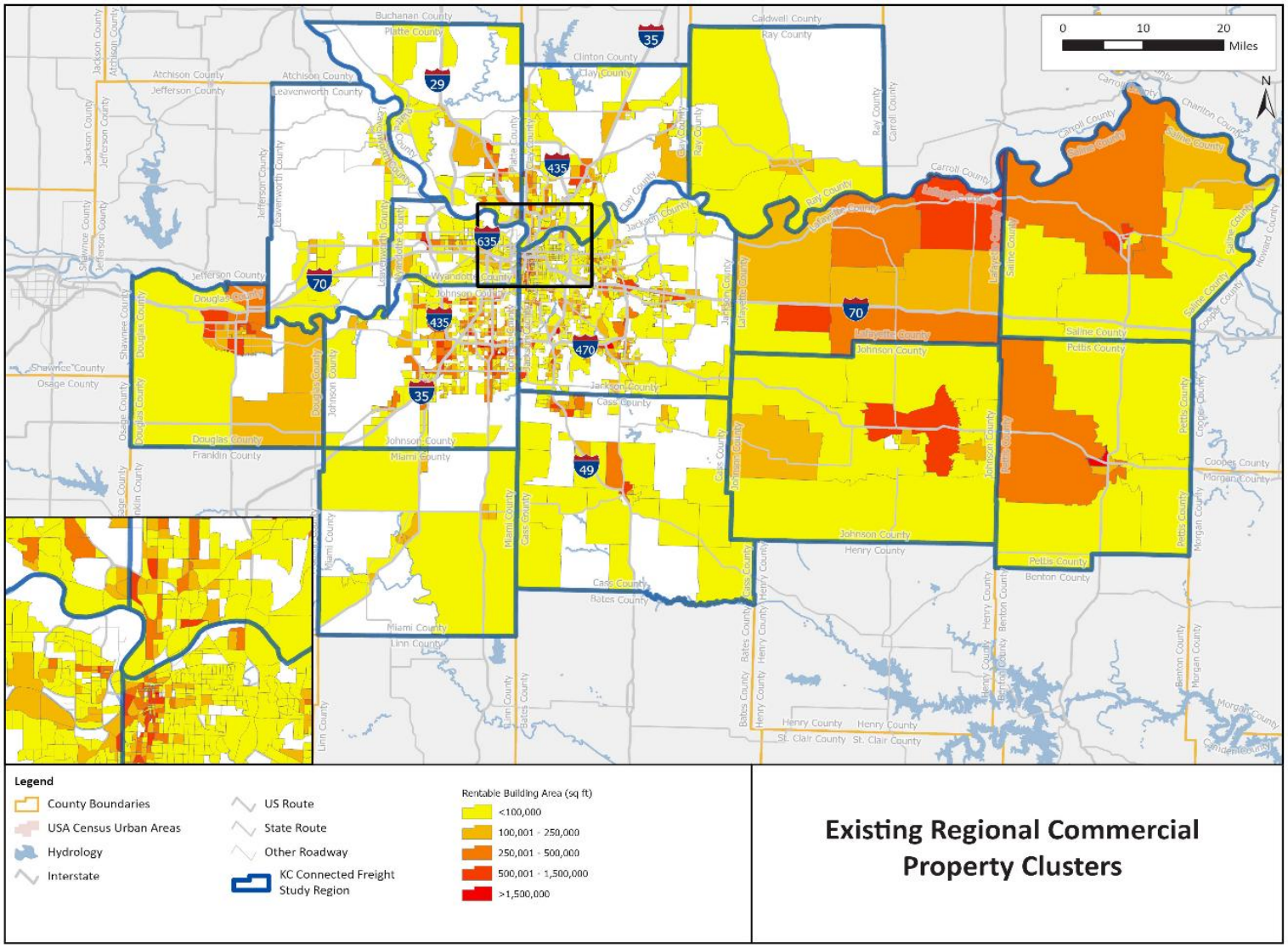
Industrial and commercial rentable building area totals over aggregated geographies[1] in the study region are shown as industry property clusters and commercial property clusters maps in **Figure 2** and **Figure 3**.

[1] Transportation analysis zones (TAZ) in MARC counties and census tracts in non-MARC counties.



Source: CoStar Real Estate Properties Database, MARC's snapshot downloads in April and May 2024; MARC's TAZs geographic information system (GIS) data; ESRI's Census Tract Boundaries GIS data

Figure 2. Existing Regional Industrial Property Clusters Map



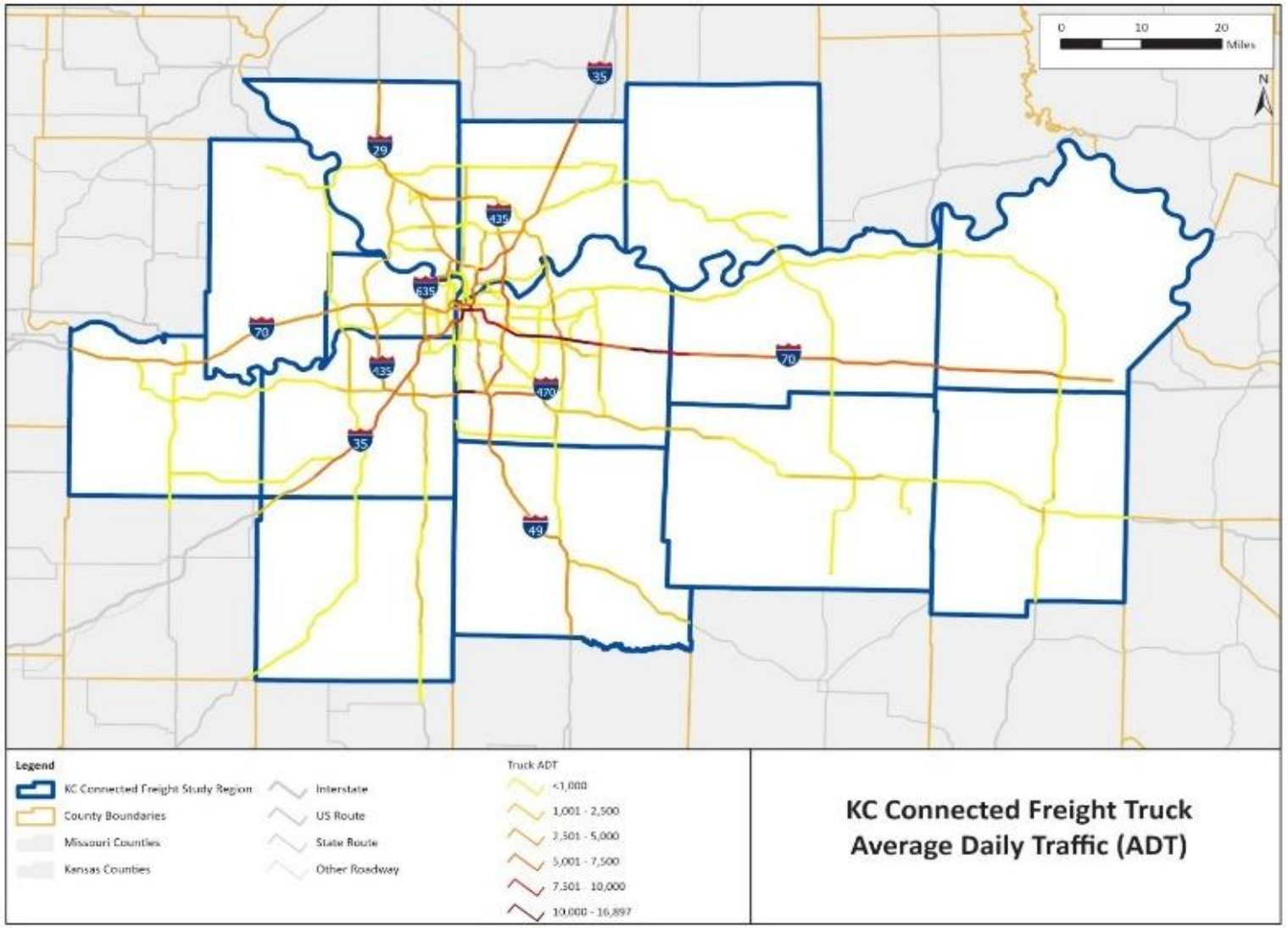
Source: CoStar Real Estate Properties Database, MARC's snapshot downloads in April and May 2024; MARC's TAZs GIS Data; ESRI's Census Tract Boundaries GIS Data

Figure 3. Existing Regional Commercial Property Clusters Map

5.1.3 Truck Traffic and Freight Flow Profiles

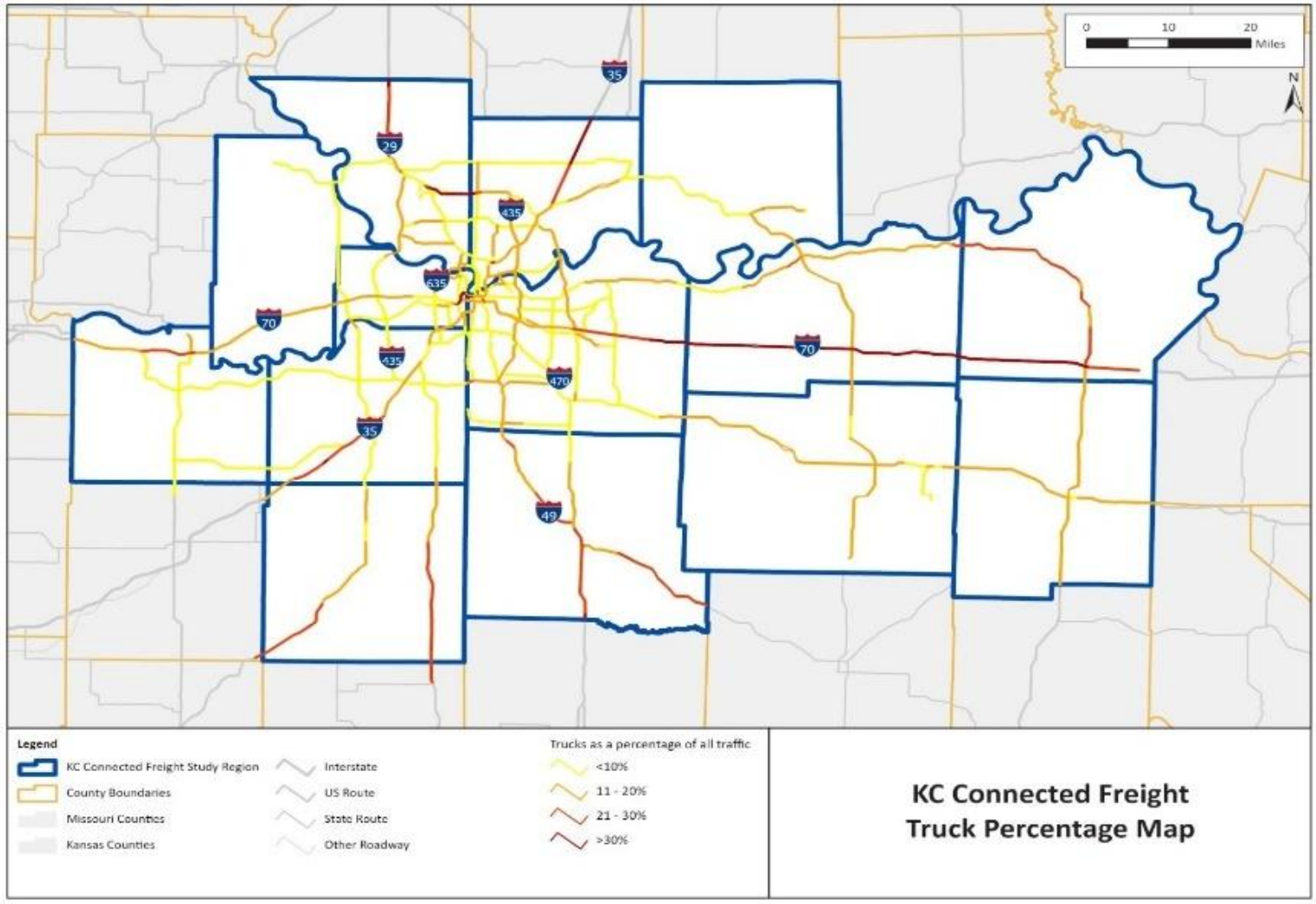
Understanding transportation system congestion and reliability is critical for optimizing freight transportation systems, particularly in regions like the Kansas City metropolitan area, where efficient goods movement plays a pivotal role in economic growth and supply chain management. **Figure 4** shows existing freight truck average daily traffic. **Figure 5** shows existing truck percentage for the study region. By calculating congestion and travel time reliability, planners and researchers can pinpoint bottlenecks, forecast future traffic challenges, and devise strategies to mitigate delays. This analysis not only reduces costs for businesses dependent on timely deliveries but also enhances productivity and supports sustainable regional development.

Truck delays in the Kansas City study region were assessed using data models and travel time reliability analysis. Projections from 2015 to 2050 showed changes in bottlenecks, while 2023 data added insights on how reliable travel times were during peak periods. By combining these findings, estimates of the total impact of truck delays, and identification of areas where bottlenecks are likely to cause the most disruption over time were identified.



Source: MARC's Travel Demand Model Outputs, 2015 and 2050; 2023 INRIX Truck Speeds Data; CDM Smith's Programming and Statistical Analysis

Figure 4. Existing Freight Truck Average Daily Traffic Map



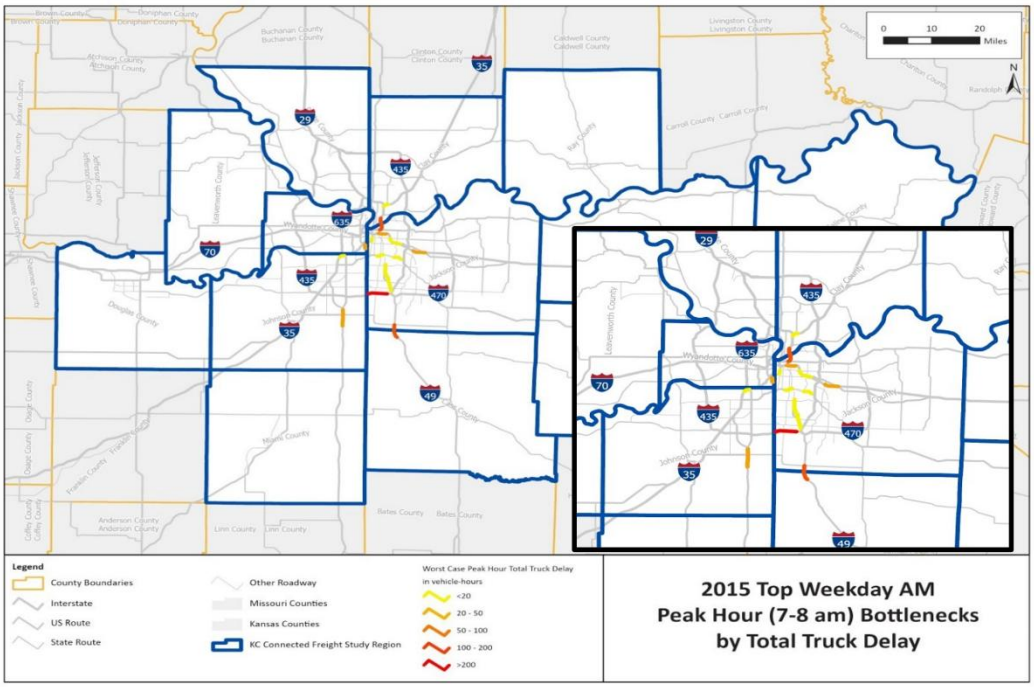
Source: MARC's Travel Demand Model Outputs, 2015 and 2050; 2023 INRIX Truck Speeds Data; CDM Smith's Programming and Statistical Analysis

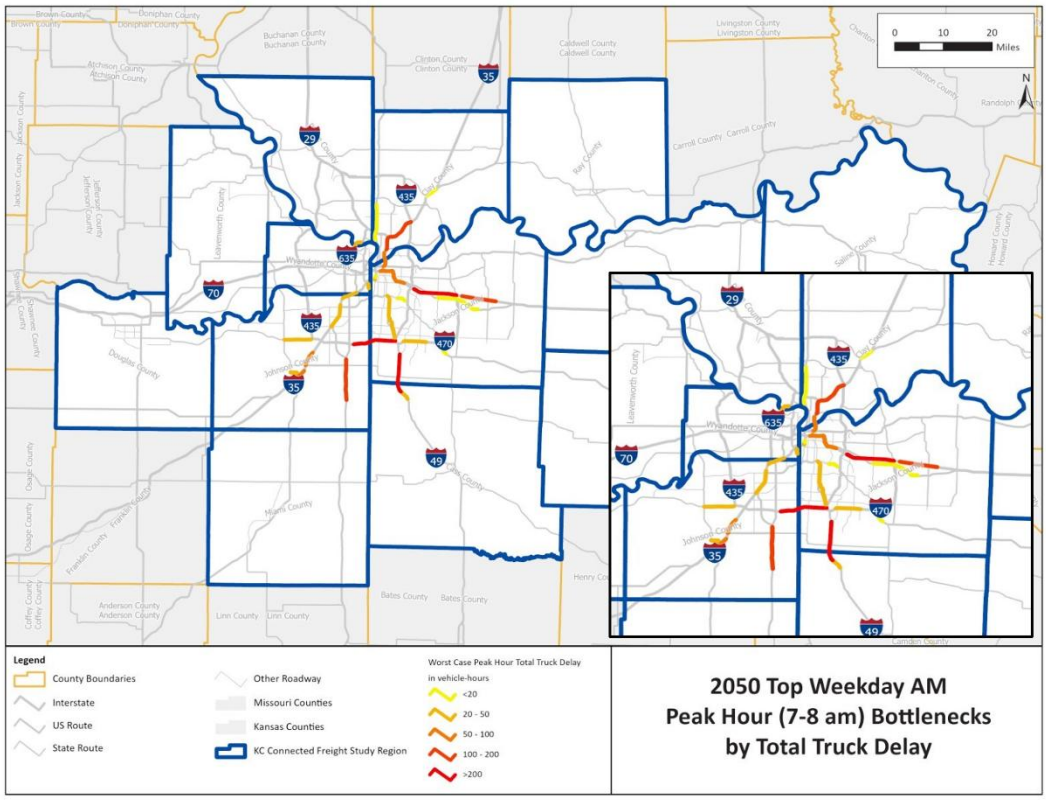
Figure 5. Existing Truck Percentage Map

Bottleneck Analysis

To gain a deeper understanding of the region's traffic dynamics, the plan focused on travel speeds during critical times of day, using data from the MARC region's travel demand model. They analyzed weekday morning peak hours (7–8 AM) (**Figure 6**), evening peak hours (5–6 PM) (**Figure 7**), and free-flow conditions for both the base year 2015 and the projected horizon year 2050. The results revealed a significant challenge: roadway links with a travel time index exceeding 1.50 were marked as severely congested. By grouping nearby congested segments, larger bottleneck zones were defined, with their overall travel time indices carefully calculated.

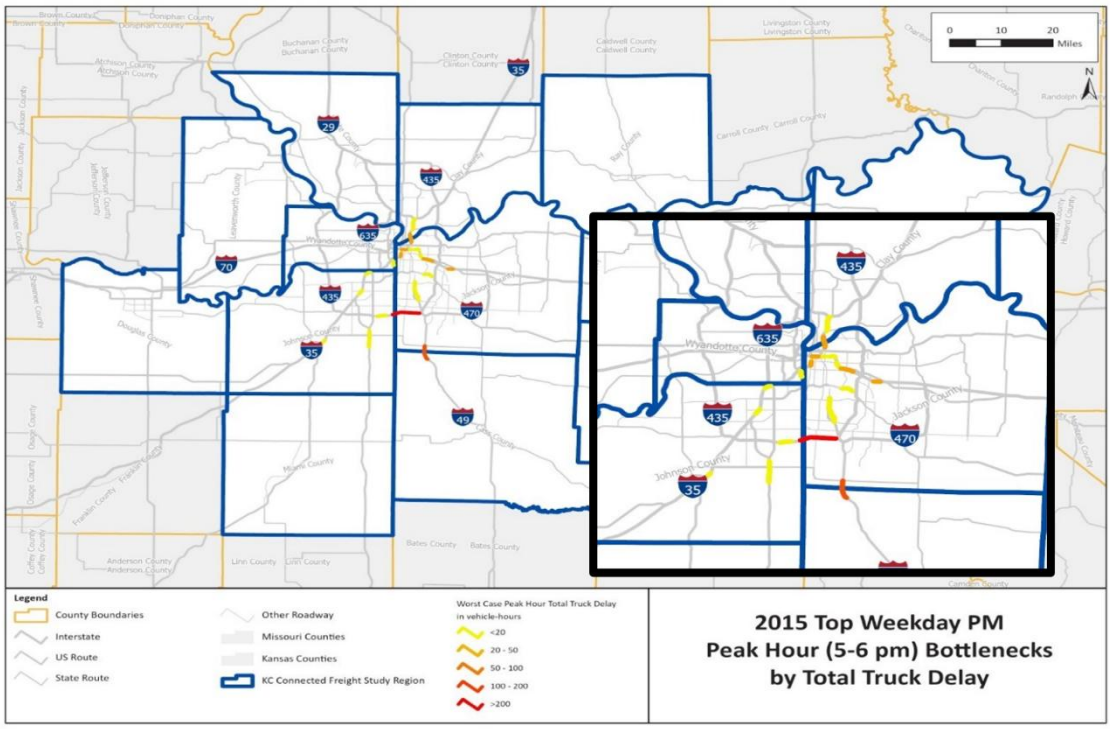
To paint a fuller picture, 2023 INRIX truck speed data was also brought into the fold. For the critical morning (6–10 AM) and evening (3–7 PM) periods, researchers assessed not only the average speeds but also the variability, using 50th and 95th percentile speeds to gauge travel time reliability. Following Federal Highway Administration (FHWA) guidelines, they derived a freight reliability index for each bottleneck segment.

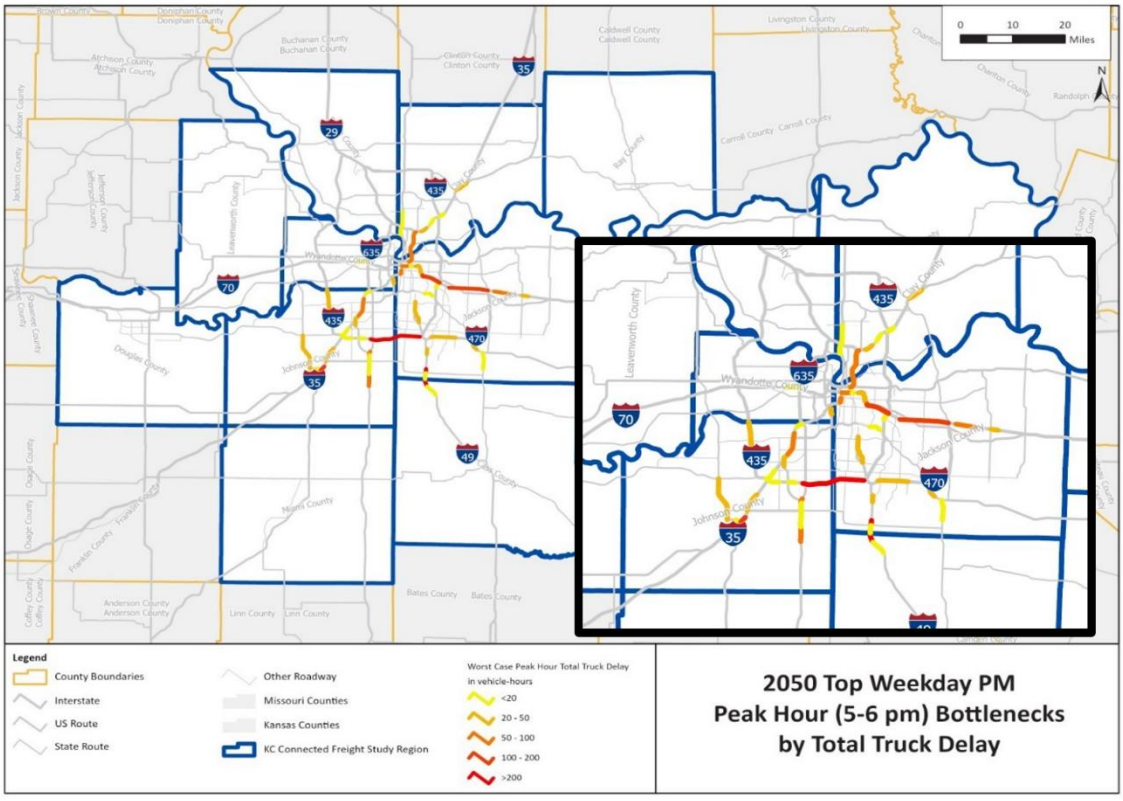




Source: MARC's Travel Demand Model Outputs, 2015 and 2050; 2023 INRIX Truck Speeds Data; CDM Smith's Programming and Statistical Analysis

Figure 6. 2015 and 2050 Top Weekday AM Peak Hour Truck Bottlenecks



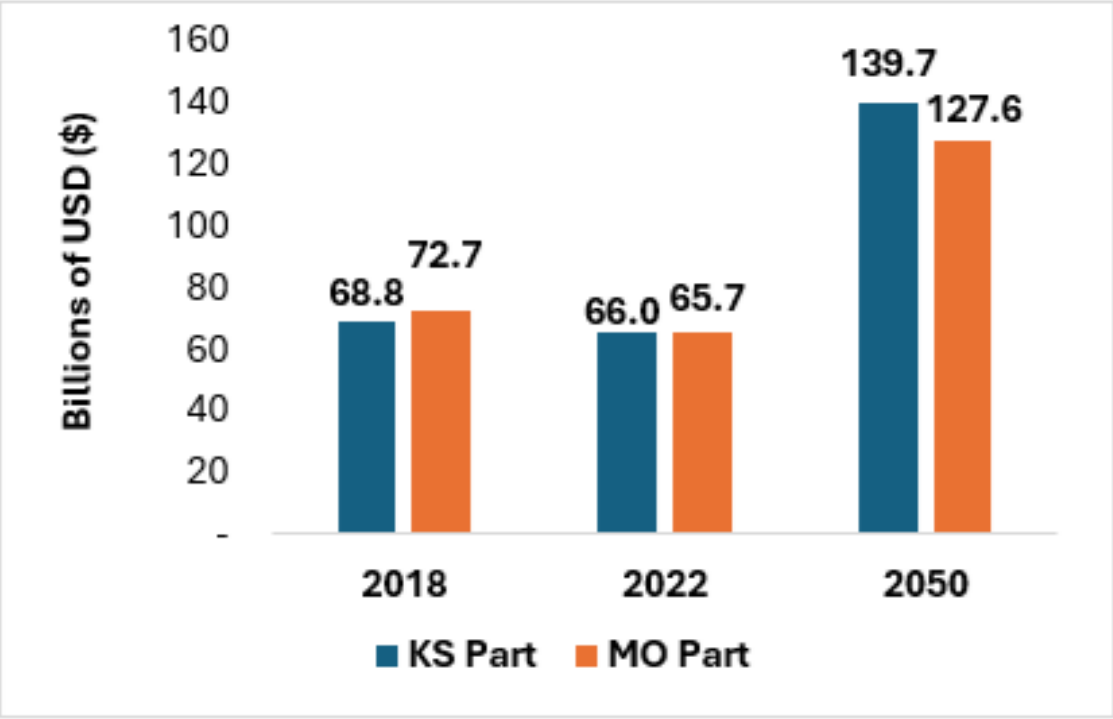


Source: MARC's Travel Demand Model Outputs, 2015 and 2050; 2023 INRIX Truck Speeds Data; CDM Smith's Programming and Statistical Analysis

Figure 7. 2015 and 2050 Top Weekday PM Peak Hour Truck Bottlenecks

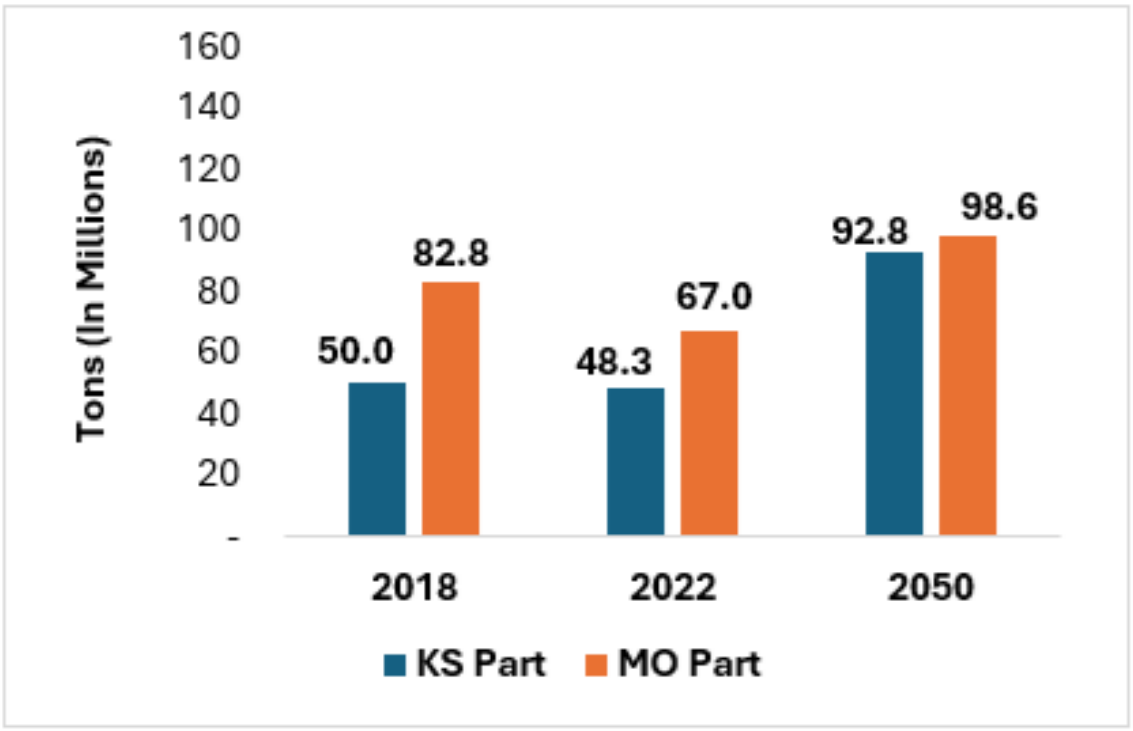
Multimodal Freight Flows

Multimodal freight flows in the study region were analyzed using origin-destination zones in the Freight Analysis Framework (FAF) database version 5.6, released in April 2024. This database, which excludes the impacts of the COVID-19 pandemic, bases its long-term projections on the 2017 benchmark. The study region was divided into two distinct FAF zones—one representing Kansas and the other Missouri. By maintaining separate summaries for these zones, the analysis highlighted their unique contributions to regional freight dynamics. By 2050, Kansas is expected to see a remarkable 112 percent growth in freight value, while Missouri anticipates a 94 percent increase, underscoring the region's critical role in domestic and international trade logistics. Of these, cereal grains and non-metallic mineral products were top commodities by weight for the Kansas side, while natural gas and other fossil products lead on the Missouri side. Mixed freight and motorized vehicles were also among the top commodities by value for both sides. **Figure 8** and **Figure 9** show projected freight tonnage and projected freight value from 2018 to 2050, respectively.



Source: FAF, 2022

Figure 8. Projected Freight Tonnage, 2018–2050



Source: FAF, 2022

Figure 9. Projected Freight Value, 2018–2050

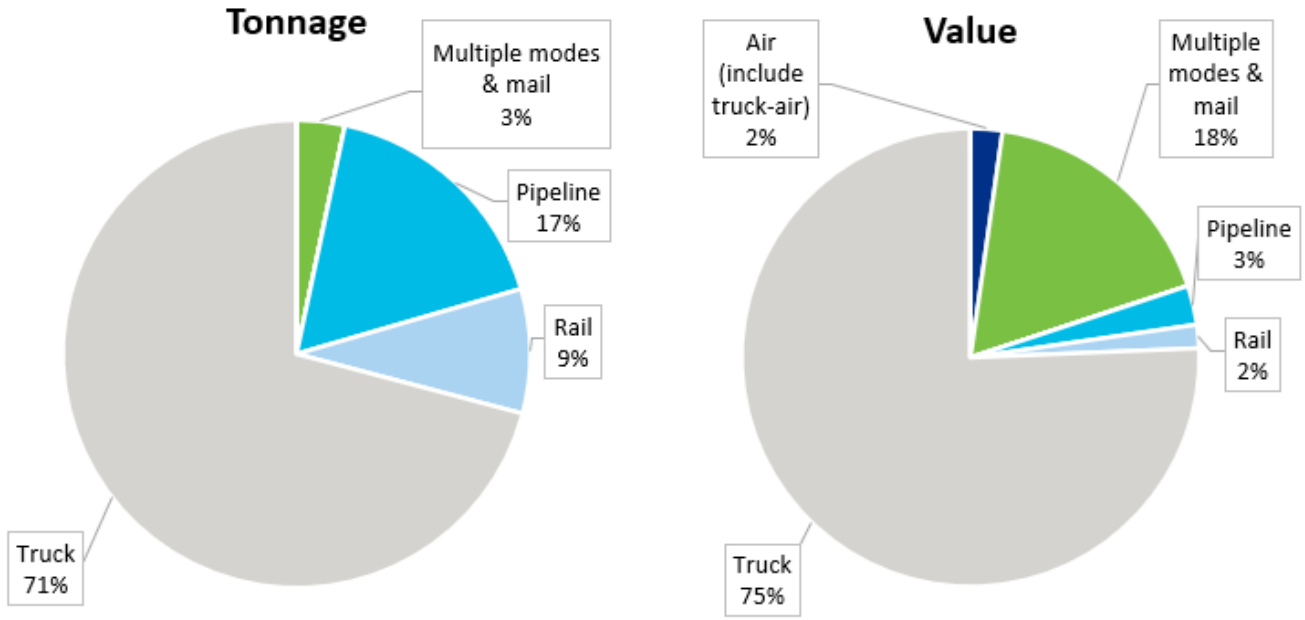
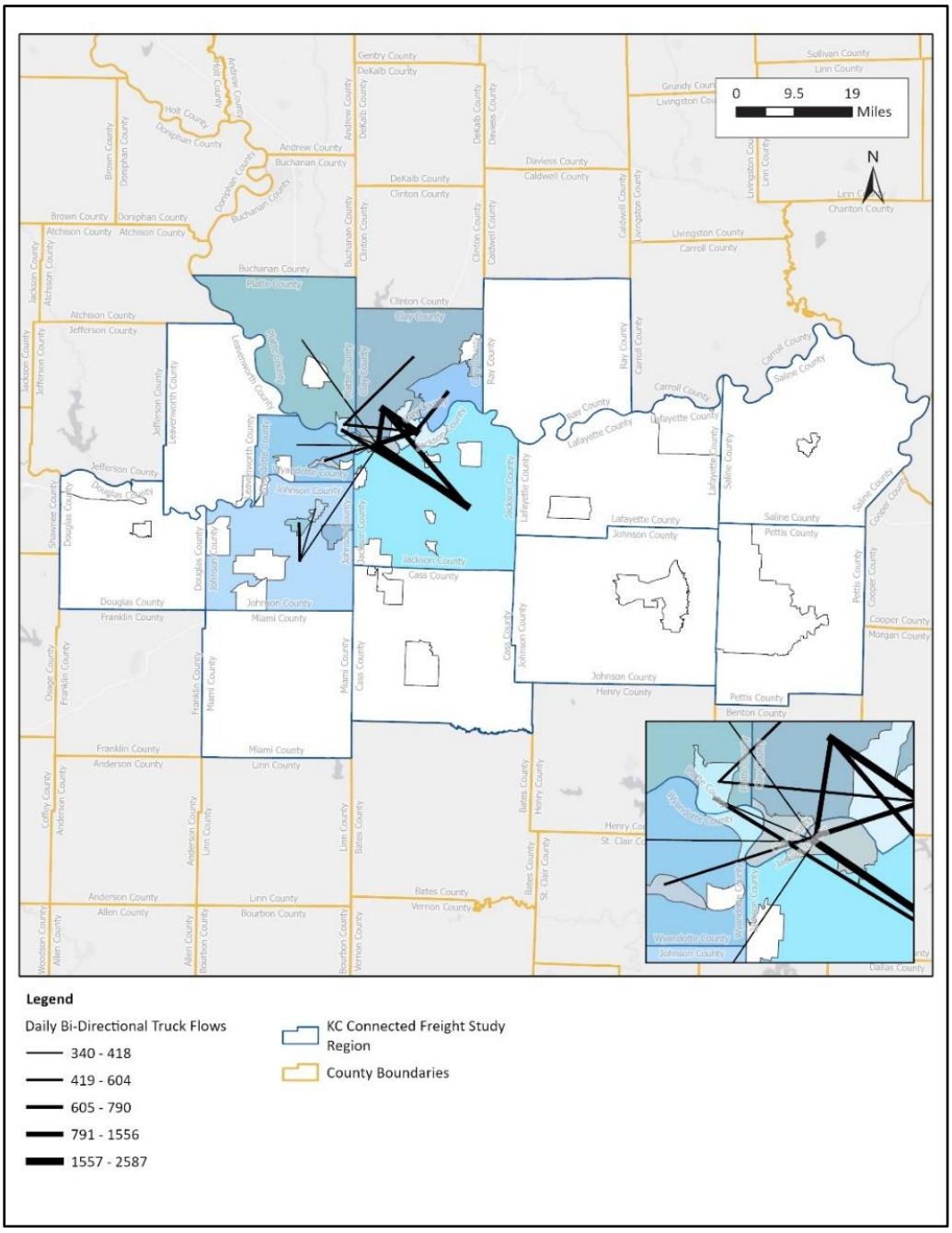


Figure 10. 2022 Mode Split by Tonnage and Value for Kansas Study Area

Intraregional Truck Travel Patterns

The Kansas City region stands as a pivotal nexus for freight transportation in the United States, uniquely positioned as both the third-largest trucking hub and the largest rail hub by tonnage

nationwide. **Figure 11** displays his dynamic region boasts an intricate multimodal freight system encompassing highways, railways, airports, ports, and truck parking facilities, all working in harmony to facilitate the seamless movement of goods. Recent analyses, leveraging advanced Geotab data, have illuminated patterns within interregional truck flows, offering key insights into the vibrant logistics that power the area's economy and underpin its status as a critical player in domestic and international trade.



Source: Geotab Data, September–November 2023

Figure 11. Top 20 Daily Bi-Directional "Internal" Origin-Destination Total Truck (Medium and Heavy) Flows Map

Infrastructure Inventory and Assessment

The Kansas City region is renowned as the third-largest trucking hub and the largest rail hub in the nation by tonnage, the region's transportation infrastructure plays a critical role in facilitating domestic and international trade. The region is also served by major Class I railroads such as Burlington Northern Santa Fe (BNSF) Railway, Canadian Pacific Kansas City (CPKC), Norfolk Southern (NS), and Union Pacific (UP), alongside regional short-line railroads and switching terminals, further enhancing its freight capabilities.

Additional infrastructure includes Kansas City International Airport, the Port of Kansas City, and pipeline systems, complemented by 43 truck parking facilities with 1,614 total spaces. These elements collectively enable efficient intermodal operations and daily truck movements, solidifying Kansas City's critical role in regional and national freight operations.

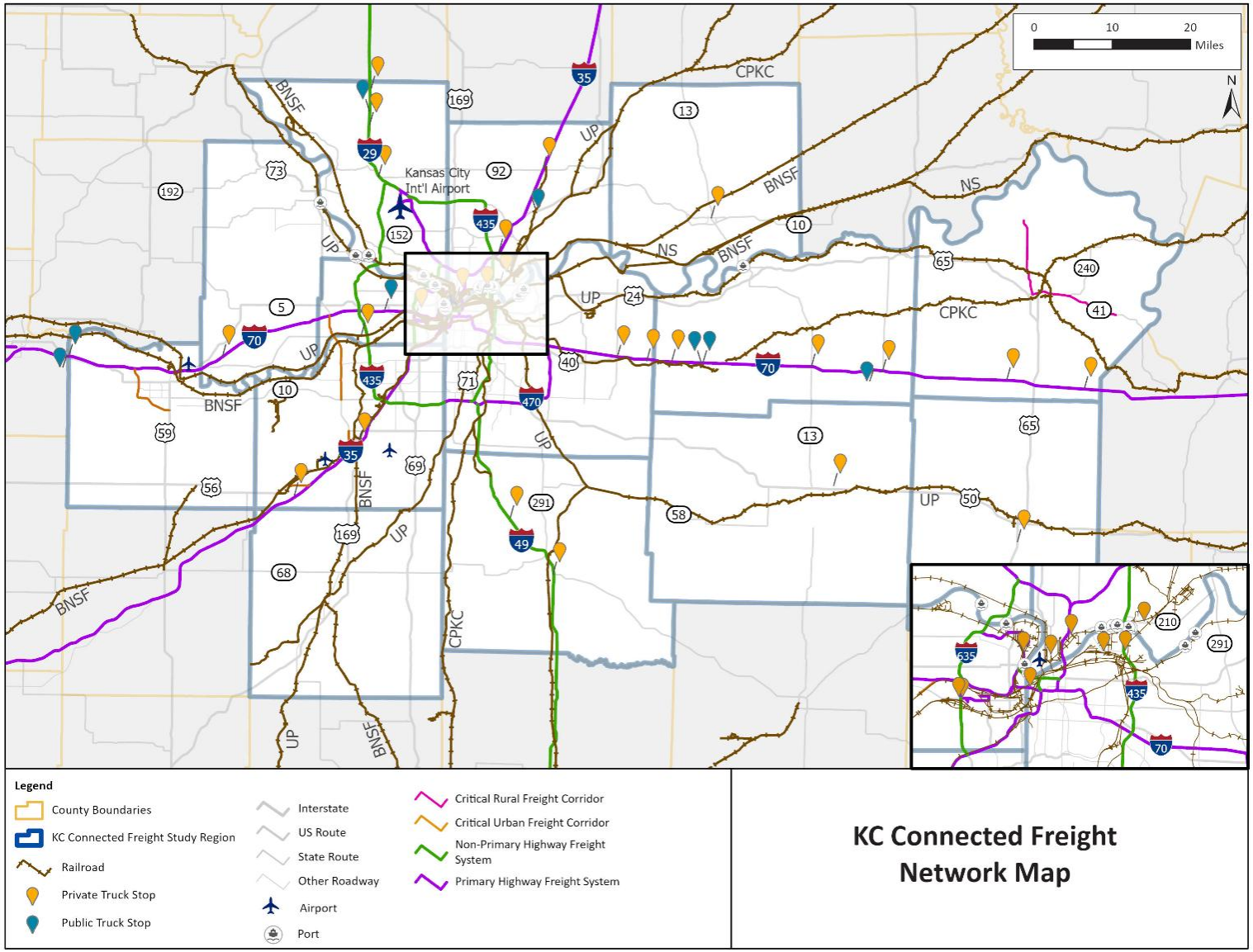


Figure 12. Multimodal Network Map

6. Goods Movement Committee

One key objective of the Connected Freight KC 2050 Plan is highlighting regional freight advocacy of the GMC membership and impact. Acting as an advisory body to the MARC Total Transportation Planning Committee (TTPC), the GMC focuses on freight project priorities and policies that improve accessibility, mobility, and the safety of freight systems. By integrating freight principles into long-range planning, establishing project selection criteria, and fostering public-private partnerships, the GMC seeks to support sustainable and economically beneficial freight strategies. Collaboration with private businesses is emphasized to generate innovative ideas, leverage resources, and promote regional economic development.

Federal laws require MPOs to enhance freight safety and efficiency by improving mobility across transportation systems. The Connected Freight KC 2050 Plan will identify strategies to fulfill these requirements by establishing new goals for the GMC, integrating freight principles into planning, supporting public-private partnerships, and aiding stakeholders in making sustainable freight decisions. In addition, one of the new focus areas of the GMC will be to foster long-term interest and involving private businesses to leverage resources and promote economic growth.

An interagency assessment revealed restructuring the GMC in governance and membership will help to meet the goals identified in this plan. One key finding was that the Sustainable Places Policy Committee (SPPC) shares several objectives with the GMC, including sustainable development, transportation efficiency, economic growth, and environmental conservation. By aligning the GMC's freight-centered mission with SPPC's broader goals offers an opportunity to create a cohesive regional planning approach, streamline freight planning, enhance coordination among stakeholders, and support both urban and rural communities in adapting to evolving regional industries and infrastructure needs.

In addition, based on current planning requirements and regional considerations it was found that expanding the membership of the GMC represents a pivotal step towards bolstering regional freight collaboration. By including the Lawrence-Douglas County MPO and Pioneer Trails RPC, and inviting local chambers of commerce, the committee can draw on their localized expertise and diverse perspectives. This broadened membership base will enable the GMC to address transportation and land-use challenges more effectively, while simultaneously creating new opportunities for regional funding initiatives.

6.1 MARC Goods Movement Committee Recommendations

6.1.1 Sustainable Places Policy Committee Integration

It is recommended to strengthen coordination and integration of GMC and SPPC work plans as MARC updates its transportation committee structure and processes. There are several SPCC focus areas that align with the work the GMC will be focused on including:

- Corridors
- Departments of Transportation (DOT)
- Economic Development and Workforce Development
- Elected Officials
- Environmental Conservation
- Planning Professionals
- Affordable and Equitable Workforce Housing

The recommendation to review and restructure GMC and SPPC work is grounded in several key justifications:

- **Alignment of Objectives:** The GMC and SPPC share common goals related to regional sustainable development, transportation efficiency, and economic growth. Integrating these committees will streamline efforts and foster a more cohesive approach to addressing these interconnected focus areas.
- **Enhanced Collaboration:** By bringing the GMC under the SPPC, the expertise and resources of both committees can be leveraged to facilitate more effective public-private partnerships, stakeholder engagement, and outreach initiatives. This collaboration will enhance the overall impact of goods movement policies and projects.
- **Policy Synergy:** The SPPC's guiding document encompasses several focus areas that align with the work of the GMC, including corridors, environmental conservation, economic development, and housing. This synergy ensures that both committees can work towards their objectives in a complementary and integrated manner.
- **Improved Resource Utilization:** The restructuring will enable more efficient use of resources, as both committees will benefit from shared planning tools, data, and administrative support. This will ultimately lead to better outcomes for regional freight movement and sustainable development initiatives.
- **Strategic Planning:** With the GMC under the SPPC, strategic planning efforts can be more effectively coordinated, ensuring that transportation and land-use strategies are consistently aligned with regional goals. This will support more comprehensive and sustainable growth across the metropolitan area.

Restructuring the GMC and SPPC is a strategic move that will enhance collaboration, optimize resource utilization, and ensure alignment of objectives for the betterment of the region's sustainable transportation and development efforts.

6.1.2 Membership Expansion

Expanding the membership of the GMC to include entities such as the Lawrence-Douglas County MPO and Pioneer Trails RPC is a critical policy and planning consideration that will strengthen regional freight collaboration. This expansion introduces diverse expertise and localized insights, enabling the GMC to better address unique regional transportation and land-use challenges while aligning with broader strategic goals.

Key benefits of this expansion include:

- Enhancing capacity to meet agency requirements by leveraging the specialized knowledge and resources of regional planning entities.
- Broadening strategic perspectives to include diverse community needs and priorities, fostering a more comprehensive approach to freight movement and regional development.
- Increasing opportunities to secure regional funding initiatives by presenting a unified and inclusive vision to funding bodies.
- Facilitating stronger partnerships with local chambers of commerce and economic development organizations, ensuring alignment between freight movement and economic growth strategies.

These considerations emphasize the importance of fostering collaboration among stakeholders to achieve cohesive and inclusive freight planning. By integrating new members and perspectives, the GMC can create policies and initiatives that promote sustainable development, economic vitality, and environmental stewardship across the region.

7. Freight Industry Trends in the Kansas City Region

The challenges of the modern freight industry are multifaceted, requiring innovative strategies to address the complexities of urban and rural networks, while simultaneously supporting regional economic growth. This section explores critical aspects such as first and last mile strategies, which serve as vital components for efficient goods movement, linking production facilities to distribution hubs and ultimately to end-users underscoring the importance of robust infrastructure that integrates agricultural, industrial, and commercial land uses with regional freight corridors and intermodal facilities.

Special emphasis is placed on agricultural land use and its role in developing a farm-to-market network that fosters economic vitality within the study area. Freight transportation emerges as a cornerstone of regional success with its ability to connect supply chains, strengthen economic activity, and support the movement of goods across diverse landscapes. This section delves into

these topics, seeking to address challenges while highlighting the necessity of a cohesive, well-planned freight network to ensure sustainability and efficiency in goods movement.

7.1 First Mile & Last Mile Strategies (Freight Context)

In the general sense of freight transportation and goods movement, the first mile is the transportation of completed goods or products from the factory or production plant to a distribution center. Last mile transport operations include moving these products or goods from a warehouse or distribution center to the desired delivery location, such as retail stores, office and business centers, and residential communities. First and last mile connections link "truck-generating" facilities to mainline routes of travel. These connections are important elements of freight movement because they connect the freight network with access to major highways, airports, and intermodal terminals, such as interstates or major regional highway systems.

Table 1 serves to outline the critical elements of freight transportation systems, emphasizing the connection between agricultural, industrial, and commercial land uses with regional travel corridors and intermodal facilities. By highlighting these elements, the table underscores the necessity for robust infrastructure that supports the efficient transport of goods from production to market. Additionally, it clarifies the exclusion of residential neighborhoods in the regional freight system, ensuring the focus remains on areas that directly contribute to economic activity and supply chain connectivity.

Table 1. First/Last Mile Components

Component	Description
First Mile	Transportation of completed goods from factory to distribution center
Last Mile	Transport from warehouse to delivery location
Connections	Link truck-generating facilities to mainline routes (intermodal facilities)
Roadways	Link freight handling facilities with major travel corridors
Importance	Connect freight network with major highways, airports, intermodal terminals
Classification	Collectors or local routes
Land Uses	Agriculture, commercial, industrial
Residential Neighborhoods	Typically, not part of the regional first mile and last mile system

7.2 Urban and Rural First Mile & Last Mile Strategies for Consideration

First mile/last mile infrastructure policy and strategies for improving freight movement efficiency and reducing shipper costs often differ based on the infrastructure development characteristics

and conditions of the geographies under consideration as well as industry and manufacturing needs. In general, first mile–last mile policies relate to the following:

- Make prioritized and efficient investments in roadway and rail infrastructure through comprehensive freight planning.
- Invest in sustainable freight planning and infrastructure improvements that result in reduced greenhouse gas emissions.
- Enhance vehicle, bicycle, and pedestrian safety through reducing freight and other modal conflicts.
- Lower shipper costs.
- Promote economic development.

Effective first mile/last mile freight strategies for improving freight systems include:

- Urbanized or densely developed areas
  - **Curb space management:** providing adequate curb space for trucks through signage, enforcement, and geometric design details such as curb space lengths, height, and type (rolled/sloped versus raised/high-profile).
  - **Micro freight hubs:** allowance for consolidating similar freight generators and receivers with similar small-package freight shipping and delivery needs into hubs that provide reductions in pick-ups and deliveries resulting in fewer freight vehicles.
  - **Off-peak deliveries:** allow for pick-ups and deliveries during non-peak congestion periods, including early morning and late-night arrival and departure windows.
  - **Autonomous vehicles (cars, vans, drones):** use of driverless vehicles that reduce the impact on congestion and provide efficiency by reducing the number of drivers.
  - **Vehicle size limits:** restricting large vehicles to certain delivery windows (often off-peak periods) or prohibiting congestive-type vehicles from utilizing certain roadway segments, forcing the use of smaller, nimbler, and less congestion-causing vehicles.
  - **Coordinate traffic signal timing:** conduct traffic signal timing studies for urban arterials, placing an emphasis on identifying strategic first mile–last mile corridors to provide optimal signal timing and detection for truck operations and reductions in engine idling and greenhouse gas emissions that result in improved air quality.
  - **Freight design requirement training:** support municipal training on design requirements of freight-intensive development to accommodate freight needs in central business districts.
  - **Freight parking:** develop plans and policies to identify and accommodate safe freight vehicle parking during deliveries without creating additional traffic congestion.

Examples of this include middle two-way left turn lanes (in an otherwise two-lane area) that double as short-term or temporary parking lanes and temporary staging lots that allow for metered freight delivery flow in areas of high-density shipment receiving.

- Rural or non-urbanized areas
  - **Increase signage and wayfinding:** designate truck routes and provide enhanced signage emphasizing routes providing first mile–last mile routing for major freight generators in rural areas so that the first mile–last mile network is readily known to providers.
  - **Increase truck parking capacity:** provide additional overnight, rest, and respite facilities for long-haul freight shipping vehicles to service outlying rural areas.
  - **Rural-focused freight vehicle design requirements:** ensure adequate lane and shoulder widths, pavement thickness, and appropriate load ratings on roads, bridges, and parking areas through training and design manuals.
  - **Environmental enhancements:** local and regional policies and ordinances focused on reducing engine idling, greenhouse gas emissions, and engine braking will improve air and noise pollution. Signage and other notification methods for drivers are essential to successful reduction or mitigation of noise and air impacts.
  - **Manage conflicts:** protect rural freight generator clusters and areas of high importance and implement "freight-first" policies to reduce conflicts at those clusters and at ports, airports, and intermodal hubs.
  - **Educate and train:** educate and train local and regional rural planning stakeholders about freight operations and economic and quality of life impacts resulting from inefficient operations.
  - **Coordinate** freight plans and programs of municipalities.
  - **Prioritize** freight focused projects.
  - **Encourage** consolidation of freight focused land developments into a freight hub with rail access.
  - **Preserve** deteriorating roads, rails, and bridges.
  - **Maintain** a minimum vertical clearance on first and last mile designated routes.
  - **Locate** value added services (logistics, packaging, and labeling) and employee housing close to new freight focused land developments.

7.3 Rural and Agricultural Freight Impacts

Freight movement in rural areas faces unique challenges, particularly in agricultural regions where the transportation of large volumes of farm crops and commodities intersects with

infrastructure that is often inadequate to support such demands. Roads that are not designed for the oversized farming vehicles frequently used during harvest seasons can cause significant inefficiencies and safety concerns. Additionally, traffic counts used to determine road funding often fail to account for seasonal spikes in usage during harvest months, underrepresenting the true load these routes bear. This, paired with funding mechanisms that prioritize low traffic volumes without considering the economic value of the commodities moved, perpetuates infrastructure inadequacies in vital agricultural areas.

To address these challenges, it is important to establish a comprehensive approach. First, prioritize upgrading rural roadways to handle seasonal agricultural traffic, including wider lanes and reinforced surfaces capable of supporting heavy equipment. Introduce funding models that account for the economic value of agricultural freight, ensuring that infrastructure investments reflect the region's contributions to the economy. Seasonal adjustments in traffic counts during peak harvest periods could provide a more accurate representation of roadway usage, influencing fairer allocation of resources. Additionally, fostering partnerships between local governments and farming communities can help identify specific needs and implement targeted improvements that can be documented in the regional planning process as priorities for the area, for example MoDOT's unfunded needs list. Finally, integrating farm-to-market logistics into regional freight planning ensures a more resilient and efficient transportation network for agricultural areas.

7.4 Agricultural Land Use Overview

In the region, about 4,800 square miles or 62 percent of the total land area is occupied by farms.[2] This averages 52 percent on the Kansas side of the study area and 66 percent on the Missouri side of the study area. Agriculture forms larger than 75 percent of the total land areas in Douglas County in Kansas and Johnson, Pettis, and Saline counties in Missouri (**Table** 2).

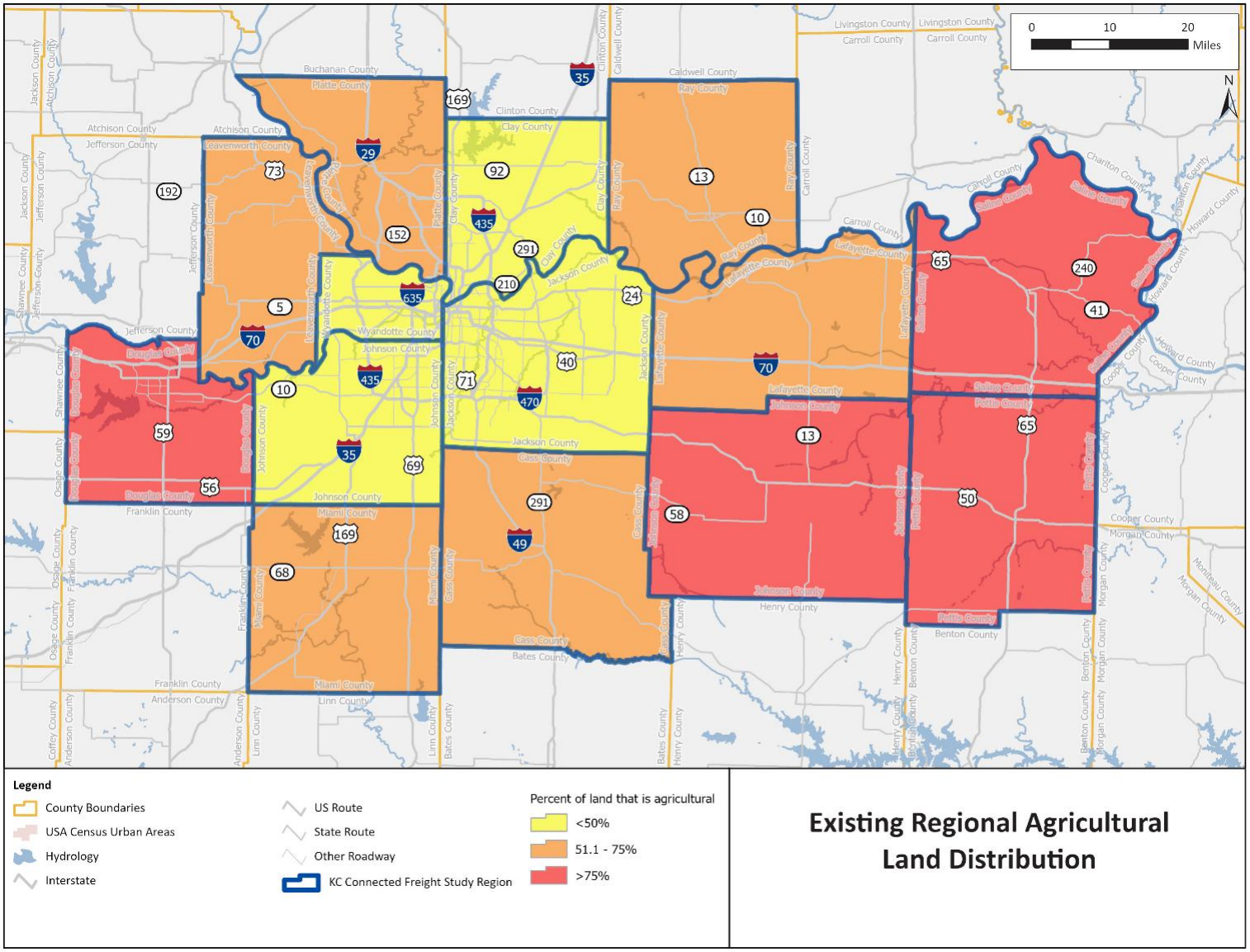
Agricultural land use in the region plays a significant role in shaping freight movement, as the vast expanses of farmland generate considerable volumes of freight, particularly during harvest seasons. This extensive agricultural activity necessitates the transportation of goods such as crops and livestock along rural roads and through logistics hubs, placing immense pressure on infrastructure that is often underfunded or inadequately maintained. **Figure 13** outlines the concentration of agricultural land in areas like Douglas County, Kansas, and regions in Missouri, such as Johnson and Saline counties, amplifies these challenges, as freight traffic must navigate routes not designed for heavy or oversized vehicles. The seasonal nature of agricultural production further complicates logistics, creating peaks in freight demand that strain existing networks. To mitigate these impacts, strategic investment in rural freight infrastructure, such as

[2] As per United States Department of Agriculture (USDA), a farm is any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the year. Land in farms consists of agricultural land used for crops, pasture, or grazing. This includes cropland for growing crops as well as ranches for raising livestock.

road widening, reinforcement, and the integration of farm-to-market logistics, is essential to support the economic lifeline provided by agriculture in the region.

Table 2. Farm Occupancy

Region	Percentage Occupied by Farms
Overall Total	62%
Kansas (study area)	52%
Missouri (study area)	66%
Douglas County (Kansas)	>75%
Johnson County (Missouri)	>75%
Pettis County (Missouri)	>75%
Saline County (Missouri)	>75%



Source: USDA National Agricultural Statistics Service (NASS), 2022 Census of Agriculture County Profiles, and U.S. Census' Land Area Data

Figure 13. Existing Regional Agricultural Land Distribution Map

7.5 Farm-to-Market Route Identification

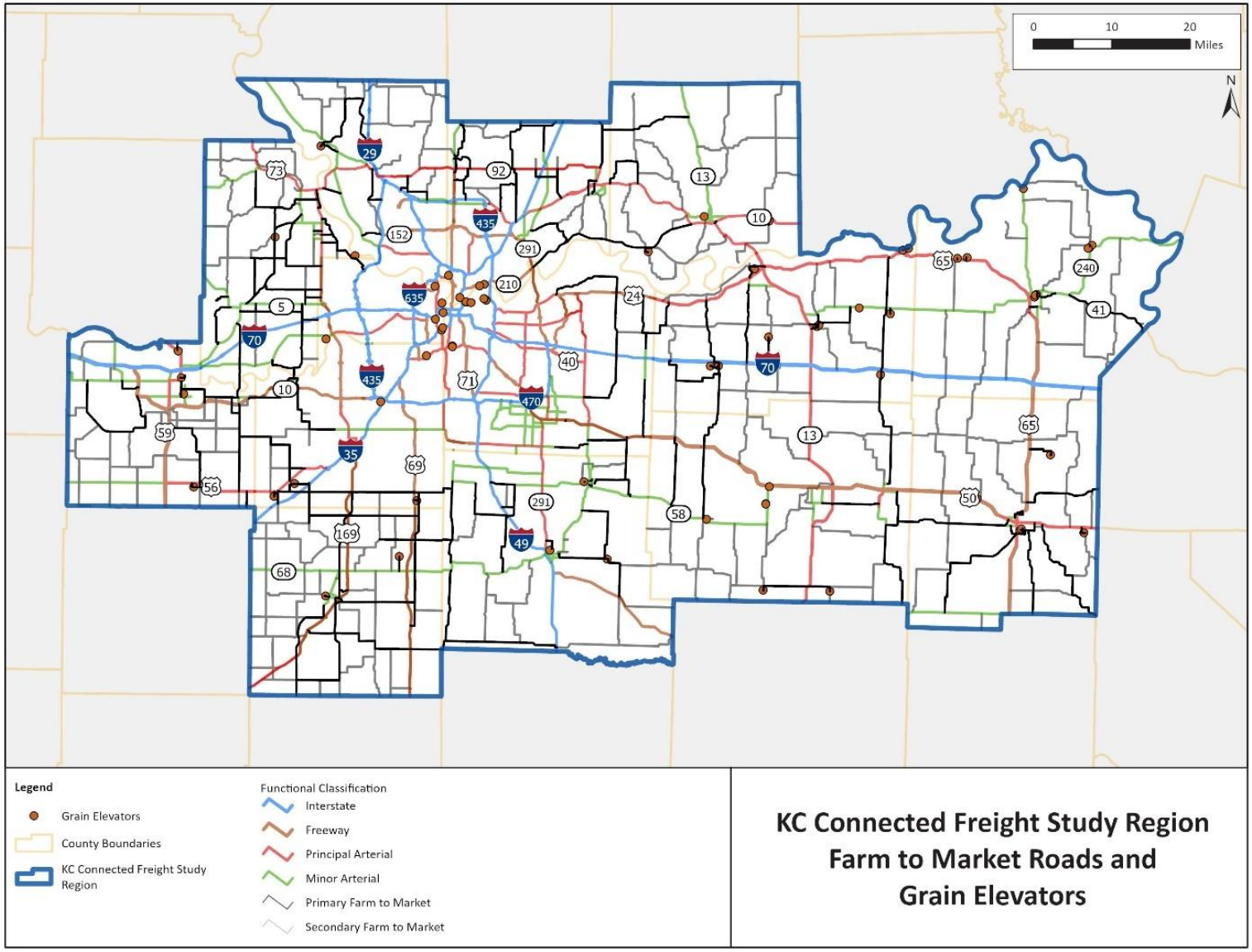
Identifying farm-to-market routes is crucial to addressing these challenges and providing state DOTs with the context needed to allocate resources effectively. A clear framework highlighting the importance of these routes enables planning agencies to advocate for targeted investments that enhance connectivity between farms and markets. Such efforts ensure that rural regions receive the attention and funding necessary to recognize the economic significance of agricultural freight, paving the way for improved infrastructure, better safety standards, and enhanced efficiency in the movement of farm commodities.

7.5.1 Farm-to-Market Methodology

Major rural collectors with an average daily traffic (ADT) of 1,000 or more vehicles were identified. These segments were analyzed for connections to the arterial network and grain elevators/food processing sites to complete the “Primary Farm-to-Market” designation. All other collectors were classified under a “Secondary Farm-to-Market” designation. The primary and secondary farm-to-market networks were evaluated, and minimal network extensions were added to ensure connectivity to the nearest arterial or freeway network.

7.5.2 Farm-to-Market Network Map

Applying the methodology, primary farm-to-market roads (in black) and secondary farm-to-market roads (in grey) were identified for the study region as shown in **Figure 14**.



Source: MARC, Missouri Department of Transportation (MoDOT), and LDCMPO Road Network with Functional Classification and ADT data; Google Maps' Grain Elevator Facilities Data; Missouri Department of Agriculture Licensed Grain Dealer/Warehouse Database Listings; Kansas State University's Mapping of Cooperative and Non-cooperative Grain Locations in Kansas; CDM Smith's Analysis

Figure 14. Farm-to-Market Network Map

7.6 Economic Impact of Freight

Freight planning plays a pivotal role in bolstering economic development by ensuring the efficient movement of goods and resources across regions. The collaborative efforts outlined in the Kansas City region's freight plan underscore this connection, as they aim to address critical economic elements and transportation strategies. Enhancing freight corridors, addressing congestion, and adopting technological innovations are essential strategies that not only support industries reliant on freight but also strengthen economic resiliency and competitiveness in the region. The Connected Freight KC 2050 initiative exemplifies this synergy, aiming to create a robust multimodal network that underpins the region's economic vitality.

7.6.1 Statewide Economic Development Elements Overview

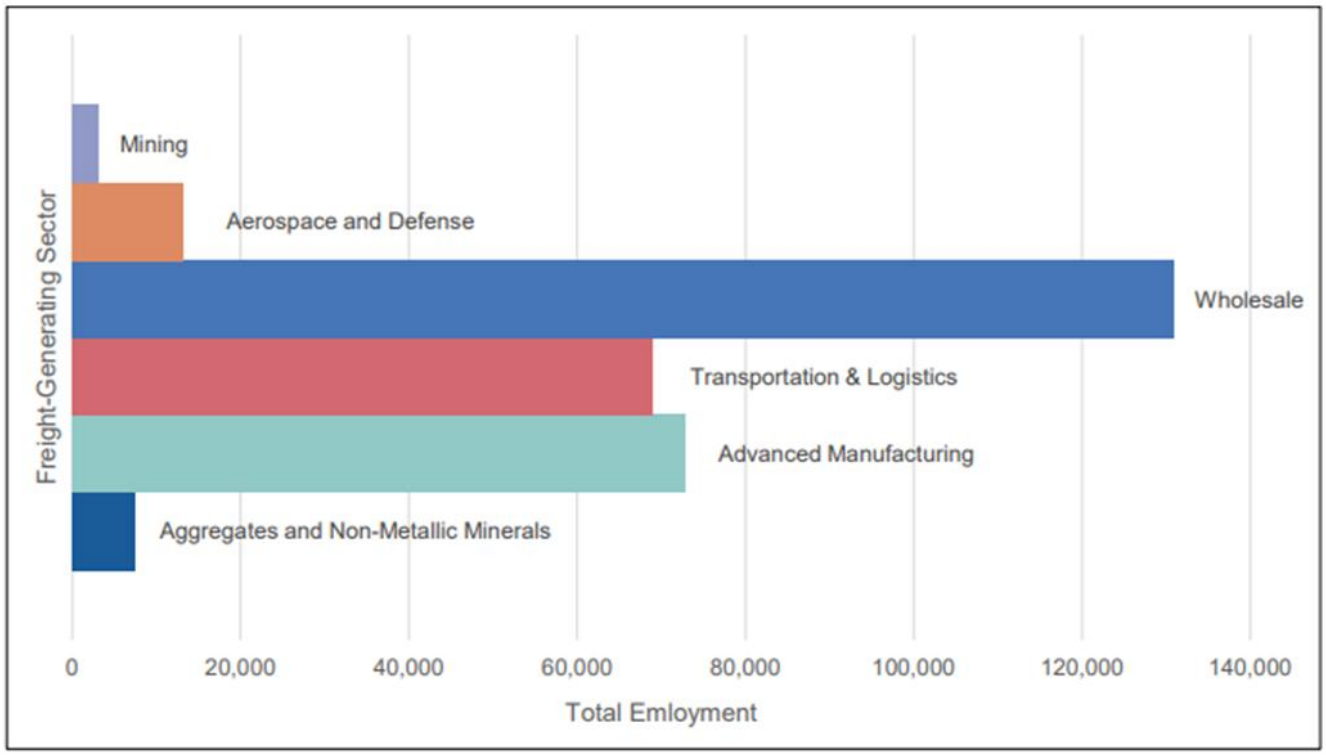
Missouri Department of Transportation

The economic contributions of freight-reliant industries in **Missouri equate to a freight-related gross state product (GSP) of over $41 billion in 2019**. Key sectors include agriculture, advanced manufacturing, and wholesale trade, which collectively support nearly 477,000 jobs and contribute significantly to the state's economy.

Freight Generating Industries Missouri

- The wholesale industry is the largest with approximately 130,900 employees and 7,400 establishments. This sector accounts for 35.5 percent of employees and over half of all establishments in freight-intensive industries across the state. The wholesale industry supports both business-to-business freight activities and e-commerce distribution centers and warehouses statewide.
- Advanced manufacturing employs 72,900 workers, contributing significantly to freight industry employment.
- Transportation and logistics provide 68,900 jobs and play a critical role in the state's economy.

Combined, these three industries—wholesale, advanced manufacturing, and transportation/logistics—constitute 74 percent of key freight industry employment and over 90 percent of establishments.

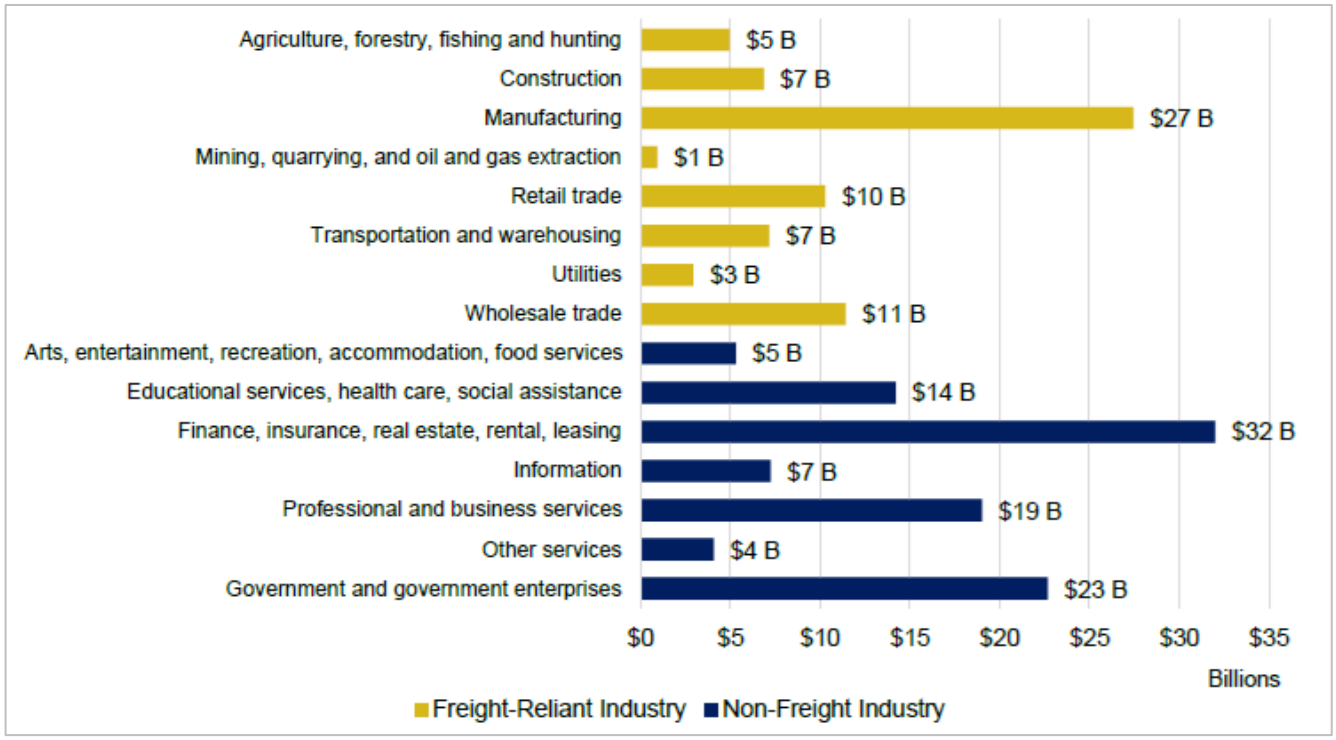


Source: U.S. Census and Transearch

Figure 15. Total Number of Employees in Missouri's Key Freight-Generating Industries

Kansas Department of Transportation

In Kansas, freight-reliant industries contributed 40.8 percent of the state's GDP, amounting to $72 billion in 2019. The primary sectors include manufacturing, wholesale trade, and retail trade, employing over 593,000 individuals.



Source: Kansas State Freight Plan, KDOT, 2022

Figure 16. Kansas Gross Domestic Product by Industry, 2019

7.6.2 Freight Success is Economic Success

Centrally located within the United States, the Kansas City region benefits from unparalleled access to major markets, allowing goods to travel efficiently across the country. This strategic location enables businesses to optimize their supply chains, reduce transportation costs, and meet market demands with greater agility. With key interstate highways, including I-70, I-35, and I-49 intersecting the area, the region is a crossroads for freight movement, connecting the East and West coasts, as well as the northern and southern parts of the country.

This advantageous positioning is further bolstered by the region's extensive multimodal transportation infrastructure. With access to major rail networks, an international airport with strong cargo capabilities, and proximity to inland waterways, the Kansas City region offers a versatile and interconnected freight system. Such infrastructure is particularly appealing to industries reliant on seamless and cost-effective logistics, including advanced manufacturing, agriculture, and wholesale trade. These industries, which are integral to the region’s economy, benefit from the ease of transporting raw materials and finished goods efficiently both regionally and nationally.

As freight-related industries continue to thrive, the Kansas City region demonstrates the symbiotic relationship between its geographic advantages and economic stability. The success of these industries not only amplifies the region's economic resilience but also underscores its

critical role as a driver for national and international commerce, setting a benchmark for other regions aspiring to leverage similar geographic strengths.

7.7 Impacts of Socioeconomic and Freight Factors

Table 3 provides an analysis of the likely impacts of socioeconomic and freight factors. It examines the relationships between regional population trends including total population changes and their influence on freight attraction, as well as the distribution of population growth within sub-regions such as counties, freight analysis zones, and cities.

Table 3. Likely Impacts of Socioeconomic and Freight Factors

Factors	Trend/Projection	Likely Impacts
Population	↑ regional total population	↑ total freight attracted to the region
	↔ sub-region's (county, freight analysis zone, city) share of total change in regional population	↔ concentration of freight attractions in sub-regions and associated congestion and safety issues
	↔ age distribution of population	↔ characteristics of freight attracted (changes in commodity mix and pickup/delivery methods)
Employment	↑ regional total employement	↑ total freight produced from the region
	↔ sub-region's (county, freight analysis zone, city) share of total change in regional employment	↔ concentration of freight productions in sub-regions and associated congestion and safety issues
	↑ employment in specialized goods producing/handling industries and major employers for manufacturing/distribution	↑ economics of scale and ↓ goods production costs ↑ clustering and sharing of resources and ↓ goods handling costs ↑ local sourcing, which leads to ↑ resiliency and sustainability of supply chains ↑ economic vitality
	↔ industry distribution of employment	↔ characteristics of freight produced (changes in commodity mix, shipment mode, size and frequency, ability to produce/handle new products/services)
Economic productivity (output in constant dollars per employee)	↑ labor productivity in goods production/handling industries	↑ total freight produced from the region ↑ support opportunities

Factors	Trend/Projection	Likely Impacts
	↑ use of advanced technologies (information, automation, computation, software, sensing, and networking technologies) in goods production/handling industries	↑ freight product/service innovations, including e-commerce ↑ speed and reliability of freight delivery ↑ visibility of freight to consumers ↑ high-skilled and higher-paying jobs ↓ low-skilled and lower-paying jobs in the sub-region
	↑ output and sales (freigth value) for goods production and handling industries	↑ private investment and jobs for high freight value growth related economic opportunities
GDP contribution	↑ regional or sub-regional (e.g., county, freight analysis zone, city) total GDP contribution	↑ marketability of region or sub-region to prospective businesses for economic development
	↑ value-addition activities in goods production and handling industries	↑ unit price of freight, thus total value of freight produced ↑ high-skilled and higher-paying jobs ↑ private investment and jobs for high value per ton related economic opportunities
	↑ total value of freight moved	↑ jobs for regional workforce

Key: ↑ Increase in, ↓ Decrease in, ↔ Nominal Change

7.8 Workforce in the Connected Freight KC 2050 Plan Study Area

The Connected Freight KC 2050 Plan study area encompasses a region with a significant and growing workforce, particularly within the supply chain industry (**Figure 15** and **Figure 16**). This sector is one of the major private sector employers in the study area, contributing greatly to the local economy through both direct and indirect employment. Supply chain businesses span a wide range, including warehousing, logistics, and freight distribution, all of which require a diverse, skilled workforce. The study area workforce strategy aims to support the growth and development of this vital industry by coordinating efforts to address its workforce needs.

The supply chain industry in the study area is a major private sector employer, experiencing significant growth. Both population and employment are expected to increase steadily over the coming decades. However, recent years have seen a slight decline in overall employment. In

contrast, the supply chain sector has added many jobs and is projected to continue this growth, becoming one of the fastest-growing sectors behind healthcare. This growth highlights the need for a workforce strategy to address the industry's future needs and ensure there are enough workers to fill new positions (**Table 4**).

Table 4. Freight Workforce Summary

Year	Total Population Growth (%)	Total Employment Growth (%)	Total Population	Total Jobs	Supply Chain Jobs Expected
2022–2050	0.82	1.07	2,921,279	1,385,057	43,138

7.8.1 Regional Workforce Strategy

The regional workforce strategy includes comprehensive planning to attract, educate, and retain workers. Regional educational institutions play a crucial role in this effort, collaborating with supply chain businesses to ensure the curriculum aligns with industry demands. Technical schools, community colleges, and universities will need to focus on offering programs ranging from certifications to advanced degrees, preparing individuals for various roles in the supply chain sector. These roles include truck drivers, logisticians, warehouse managers, and executive positions.

Educational Institutional Programming

The regional workforce strategy includes initiatives for ongoing professional development, ensuring that workers can adapt to evolving technologies and practices within the industry. By fostering strong partnerships between supply chain businesses and educational institutions, the strategy seeks to create a robust pipeline of qualified workers, ready to meet the demands of this rapidly growing sector.

Stakeholder Engagement

The success of the workforce strategy depends on the involvement of diverse stakeholder groups, including supply chain stakeholders, educational institutions, and regional organizations to provide a steady pipeline of qualified workers. Identifying champions within each educational institution is crucial for the successful implementation of the workforce strategy.

Stakeholders include:

- **Colleges/Universities:** Provides degreed staff ranging from PhD, Master of Sciences (MS), and Bachelor of Sciences (BS)/Bachelor of Arts (BA) with logistics and Information Technology (IT) degrees. There is an opportunity for staff upskilling with specific certification webinars and AB/AS (Associates) and BA/BS degrees with a logistics emphasis.

- **Community College:** Provides degreed staff with AB/AS degrees. Supports staffing at skilled office positions (logisticians, operations, IT systems) and warehousing/terminal operations management and support positions.
- **High School/Technical School(s):** Provides diploma. Supports warehousing/terminal operations positions and carrier operations (all levels) positions.

7.8.2 Implementation Plan

The primary goal of the workforce strategy implementation plan is to cultivate a robust and responsive talent pool within the supply chain industry. By leveraging the regional educational structure and engaging diverse stakeholder groups, the strategy aims to address workforce needs at all staffing levels. Through an integrated approach that includes universities, community colleges, high schools, and technical schools, the plan endeavors to align educational programs with industry requirements, thereby ensuring the region remains a competitive and innovative player in the supply chain sector. This effort, supported by regular meetings, established goals, and active collaboration with regional organizations, seeks to enhance economic growth and create ample job opportunities for residents.

Workforce Strategy Plan

The workforce strategy plan (**Figure 17**) will cultivate a robust talent pool in the supply chain industry through collaboration with educational institutions, industry stakeholders, and regional organizations. It includes establishing an organization to lead the effort, benchmarking exercises, developing an operating plan with goals and a governance structure, and engaging diverse stakeholders. The plan involves regular meetings, stakeholder discussions, implementing the operating plan, and preparing annual reports to ensure alignment with industry needs and continuous improvement.

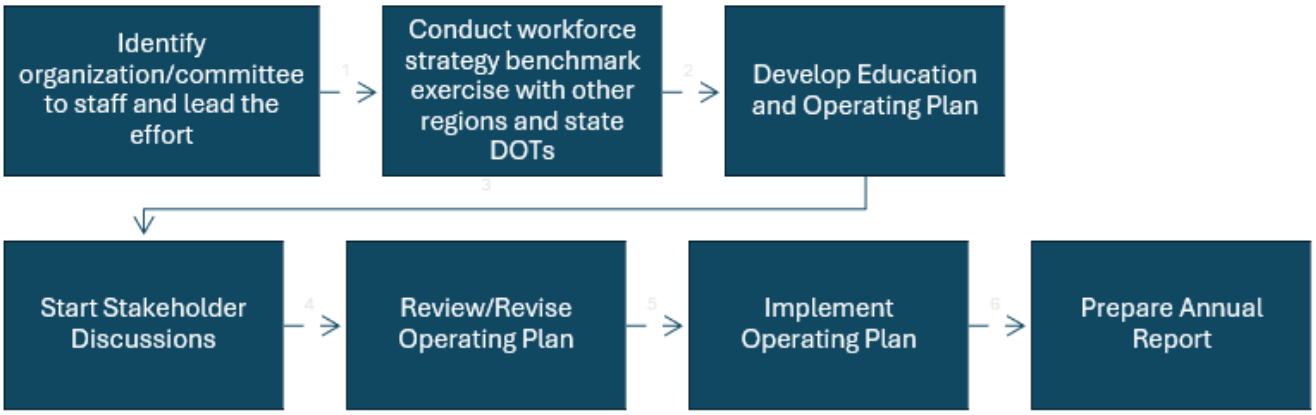
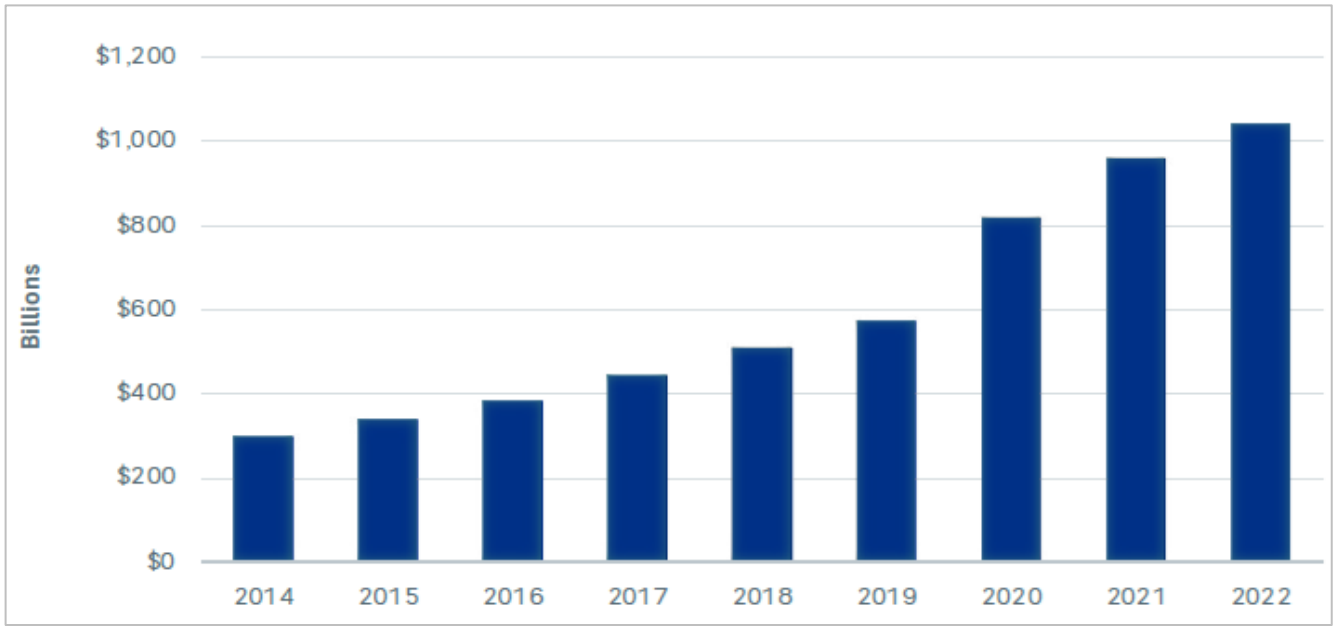


Figure 17. Workforce Strategy Template

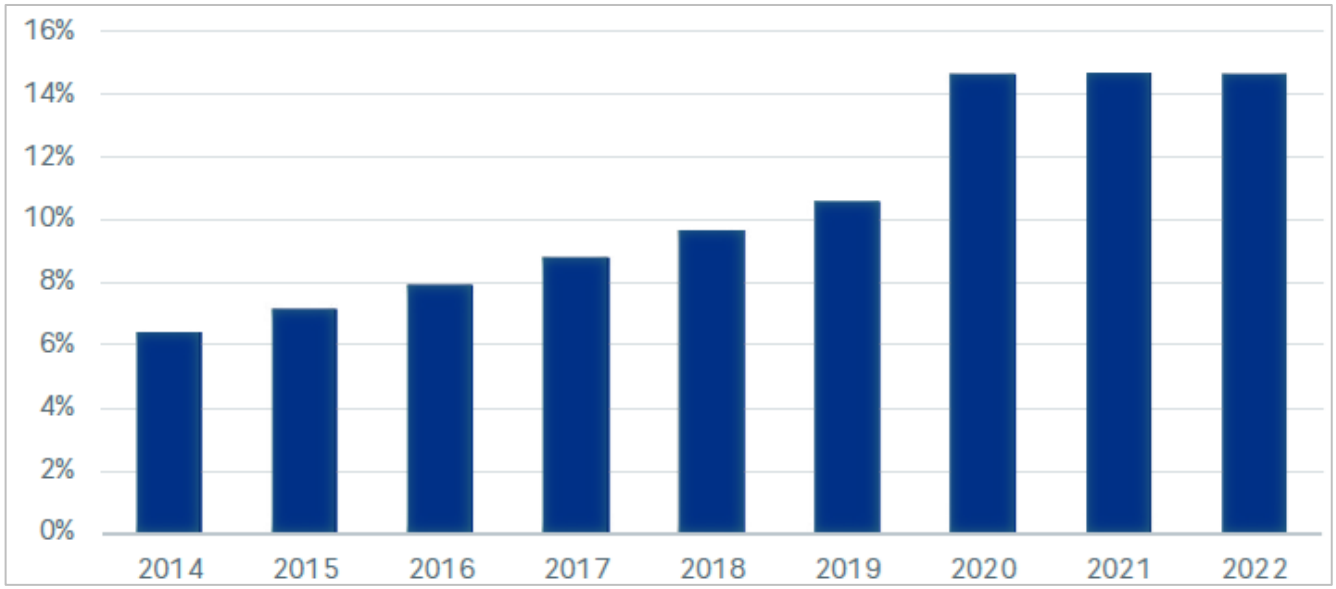
7.9 "The Amazon Effect"

The "Amazon Effect" reflects the shift to online shopping and services. Population in the study region is projected to grow by 547,000 by 2050, with job estimates reaching 1.2 million. Transportation employment growth is expected to generate 43,000 new jobs by 2050, supporting e-commerce expansion. National retail e-commerce sales grew from $300 billion in 2014 to over $1,000 billion in 2022 (**Figure 18**). E-commerce as a percentage of retail sales (**Figure 19**) rose notably during COVID restrictions (2019/2020) and leveled off afterward.



Source: Washington State Joint Transportation Committee, Retail Delivery Fee Analysis, June 2024, page 18, Figure 3

Figure 18. U.S. Retail E-Commerce Sales, 2014–2022



Washington State Joint Transportation Committee, Retail Delivery Fee Analysis, June 2024, page 18, Figure 4

Figure 19.E-Commerce Share of U.S. Retail Sales, 2014–2022

Another measure of national e-commerce for business-to-consumer (B2C) and business-to-business (B2B) can be found in **Table 5** and **Table 6** with modest growth from 2018 to 2022 and 2018 to 2024, respectively; B2C experienced noticeable growth from 2018 to 2024 during COVID.

Table 5. Percent E-Commerce Sales for Wholesale Trade Using U.S. Census, Annual Wholesale Trade Survey – U.S. Merchant Wholesalers – Total and E-Commerce Sales Data

By Year	2018	2019	2020	2021	2022
E-Commerce % for Wholesale Trade (B2B)	32.6%	33.6%	35.6%	33.8%	33.0%

Key: B2B = Business to Business Source: Vtrans, OIPI VTrans Project, Ongoing

Table 6. Percent E-Commerce for Retail Trade Using U.S. Census, Quarterly E-Commerce Report, Supplemental Tables

By Year	2018	2019	2020	2021	2022	2023	2024
E-Commerce % for Retail Trade (B2C)	9.7%	10.6%	14.6%	14.6%	14.6%	15.3%	16.1%

Key: B2C = Business to Consumer Source: Vtrans, OIPI VTrans Project, Ongoing

E-commerce and parcel delivery, particularly through Intra/Multiple Modes & Mail, are projected to see significant growth in freight tonnage in the study area (**Table 7**). This trend aligns with a broader long-term shift in purchasing and delivery habits, expected to drive an increase in delivery vehicles and freight vehicle miles traveled annually through 2050.

Table 7. Regional E-Commerce Indicator Forecast

Movement Type/Mode	2020	2050 Low Forecast	2050 Medium Forecast	2050 High Forecast	Percent Change per Year, 2020–2050
Freight Value (in millions of 2017$)					
Intra/multiple modes and mail	27,559	28,985	28,725	28,456	0.11% (L), 0.14% (M), 0.17% (H)
Freight Weight (in 000s of Tons)					
Intra/multiple modes and mail	60	134	143	148	4.13% (L), 4.63% (M), 4.88% (H)
Freight Value per Ton (in 2017$/ton)					
Intra/multiple modes and mail	1,653	3,891	4,116	4,202	4.51% (L), 4.97% (M), 5.14% (H)

The expected 4 to 5 percent growth in e-commerce and home delivery will lead to increased congestion, vehicle emissions, and truck vehicle miles traveled (VMT) near distribution and fulfillment centers, as well as residential areas. While these activities will pose environmental challenges, they also bring economic benefits, including increased employment, necessitating a skilled and available workforce.

7.10 Potential E-Commerce and Home Delivery Actions

Monitoring e-commerce and home delivery business growth could be worthwhile to understand the negative impacts (increased congestion, increased vehicle emissions) and the positive impact of increased employment. This growth could result in additional delivery centers and fulfillment centers being built that will require mitigating land use compatibility issues and developing the necessary additional workforce. Being aware of trends in e-commerce and home delivery over the next decade will be important to managing the negative and positive impacts tied to growth in these sectors of the economy.

7.10.1 Potential Actions

There are several potential proactive actions to consider related to e-commerce and home delivery:

- **Micro Hubs** (small logistics facilities that serve as a go between larger warehouses and final delivery points): In the denser portions of the study area, the potential use of micro-hubs in residential/commercial areas for home delivery services could be a solution to reduce the increasing number of vehicles and VMT.

- **Consider a Home Delivery Fee:** The potential use of a new state level/regional level home delivery fee to support transportation related projects may be beneficial. Several states (Colorado, Minnesota) have recently started to assess fees on taxable retail items delivered to addresses in their respective states.
- **Distribution/Fulfillment Center Building:** With the expected growth of e-commerce and home delivery, additional distribution centers and fulfillment centers will need to be built. From an awareness standpoint, the location of these new centers and related impacts needs to be understood and anticipated with a land use/location strategy and willingness to negotiate mitigation of negative impacts with developers.
- **Warehouse Automation:** Understanding warehouse automation technology trends and potential workforce needs to maintain automated warehouses could be part of the regional workforce strategy. This includes communicating with industry stakeholders to understand supply chain trends and impacts on workforce needs.

7.11 National Tariff Policy Impacts

7.11.1 Tariff Impacts on Freight

Tariffs have significant impacts on freight and related industries. Newly proposed tariffs, including those on imports from China, Mexico, and Canada, are expected to increase production costs and disrupt supply chains. Retaliatory tariffs by affected countries will exacerbate these challenges by increasing costs for exporters. Freight demand, employment, and economic growth in affected regions will likely decline due to these disruptions.

Industries are responding by exploring alternatives such as shifting supply chains, stockpiling materials, and increasing domestic production, though these measures have limitations. The manufacturing, warehousing, and logistics sectors are particularly vulnerable to immediate and long-term impacts. Freight-dependent industries in the study area, employing 23.7 percent of the regional workforce, are expected to face job cuts and economic downturns. Tariffs could also affect up to 43 percent of import freight value and 63 percent of export freight value in the study area.

Key industries like manufacturing, retail, and logistics will experience price hikes, supply chain disruptions, and reduced demand. The study area's economic ecosystem, including vulnerable communities reliant on freight-related jobs, will feel these effects most acutely.

7.11.2 Potential Tariff Scenarios

With uncertainty regarding how tariffs will impact supply chains, the following potential tariff response scenarios have been identified using the current understanding of historical tariff-induced price increases and/or subsequent trade policies.

Private Sector Solutions

Firms relying on imports from potentially impacted countries have reportedly begun efforts to mitigate cost increases and supply chain disruptions. Some firms are assessing the source locations of parts of their supply chains and are seeking suppliers in countries that are unaffected by potential tariffs. It is unclear how variables such as changes in material or production cost, resource availability, and potential for additional tariffs could further impact these supply chain shifts.[3] Relocating production could also prove too costly or time-consuming for some industries. Relocation could also permanently or temporarily reduce freight demand in certain regions while manufacturers adapt to new prices and supply chain changes.

Other import-reliant businesses have also reportedly stockpiled resources used in their production processes in preparation for potential tariffs to reduce the price of their goods and materials. Stockpiling could still result in a long-term reduction of freight demand if supply dwindles, and this solution may not mitigate the overall impact on freight after tariffs are in effect.

Domestic Manufacturing Changes

It is uncertain whether tariffs will ultimately increase onshore manufacturing as intended, or if potential inflation and subsequent price hikes will ultimately prevent an increase in domestic production.[4] While long-term freight demand will likely decrease regardless of the scenario, a return of some domestic manufacturing could mitigate some of the impacts. However, it is uncertain how quickly firms can adjust their supply chains accordingly with domestic production increases, and if a potential overcapacity of goods due to stockpiling and/or higher domestic production could further impact freight systems and costs due to a sudden increase in domestic shipping demand.

Tariff Application and Magnitude

Some newly imposed tariffs have been targeted at specific industries, particularly those that produce raw materials such as steel, metals, lumber, oil, and agricultural goods.[5] Retaliatory tariffs have also been made or proposed on similar domestic exported goods such as raw materials used for goods manufacturing. However, future exceptions could be made for certain goods with limited availability or industry-specific uses. For example, tariffs instituted under President Trump's previous administration included exceptions for firms such as Apple for components that could only be produced in China, and the United States has already indicated that tariffs impacting domestic automobile production will be temporarily suspended.[6]

[3] https://news.bloomberglaw.com/in-house-counsel/looming-tariffs-prompt-companies-to-protect-supply-chains
[4] https://www.freightwaves.com/news/freight-markets-brace-for-impact-of-proposed-tariffs
[5] https://abcnews.go.com/Business/tariffs-effect/story?id=119380711
[6] https://www.thescxchange.com/finance-strategy/plan/navigating-uncertainty-the-impact-of-trump-s-proposed-tariffs-on-global-supply-chains

7.11.3 Potential Industry Impacts to the Kansas City Region

Economic and Employment Impacts

Any major tariffs to critical industries will likely lead to job cuts, raise the price of goods, and significantly impact on the United States economy.[7] The employment impact on the study area will likely vary and be widespread. Nearly one-quarter of study area jobs are in industries directly connected to or reliant on freight and the movement of goods (**Table 8**), the majority of which will be impacted by domestic and retaliatory tariffs. Historical tariff impacts have shown that overall productivity will likely experience a downturn, with employment cuts as one of the primary factors.[8].

Table 8. Most Affected Freight-Dependent Industries by Employment in Study Area

Industry	Jobs – 2023	% of Total Regional Jobs
Total jobs – freight dependent industries	**274,550**	**23.7%**
Manufacturing	47,734	4.1%
Retailers	93,374	8.1%
Specialty Contractors	40,826	3.5%
Warehousing	20,882	1.8%
Truck transportation	15,208	1.3%

7.12 Strengthening Local Economies Amid National and Global Challenges

Trade instability, driven by geopolitical tensions, tariff fluctuations, supply chain disruptions, and retaliatory trade policies, poses significant challenges to regions dependent on freight and manufacturing industries. Preparing for and mitigating the impacts of these disruptions requires a proactive approach to strengthen regional resilience and ensure economic stability in the face of national and global uncertainties.

Table 9 outlines key recommendations for regional resilience, focusing on economic diversification, technological innovation, and sustainable practices, alongside fostering collaboration and adaptation.

Table 9. Strengthening Local Economies Amid National and Global Challenges Strategies Overview

Strategy	Details
Economic Diversification	Encouraging industry variety, supporting local businesses, building export-resilient systems

[7] https://news.darden.virginia.edu/2025/02/04/qa-what-are-tariffs-and-how-will-they-affect-us/
[8] https://www.nber.org/digest/202502/tariffs-and-us-labor-productivity-evidence-gilded-age

Strategy	Details
Strengthening Supply Chain Resilience	Regionalized supply chains, stockpiling and resource management
Leveraging Technological Innovation	Adopting advanced manufacturing techniques, data-driven decision making
Fostering Collaboration and Partnerships	Public-private partnerships, regional trade alliances
Investing in Workforce Development	Upskilling and retraining programs, strengthening STEM education
Promoting Sustainability and Green Practices	Adopting circular economy principles, investing in renewable energy

Building resilience to national and global trade instability requires a multifaceted approach that addresses economic diversification, supply chain resilience, technological innovation, collaboration, workforce development, and sustainability. By implementing these high-level recommendations, regions can adapt to evolving trade dynamics, safeguard economic stability, and thrive in the face of global uncertainty.

7.13 Truck Parking

Increasing traffic volumes on Missouri and Kansas highways, as well as urban roadways, are intensifying challenges for truck operators in finding suitable parking spaces. Addressing these capacity issues is crucial and requires a collaborative approach through policy reforms, infrastructure expansion, and technological innovations to create a safer, more efficient, and inclusive trucking industry.

Jason's Law legislation was enacted in 2012 to enhance the safety of truck drivers and address truck parking shortages. Part of the law required the state DOTs to assess their capability to provide adequate truck parking and rest facilities. This legislation is supported by the collection of pertinent data, an understanding of trends in truck parking needs and supply and addressing any questions from Congress and the truck industry regarding parking.

Truck parking concerns include a variety of topics such as the lack of available and secure parking, absence of a dedicated IIJA program, understanding driver preferences (lighting, facilities), roadway and driver safety, assessing the scale of the problem and trends, current parking availability in both private and public sectors, potential financing trends (public-private partnerships), evolving parking and staging needs by location and industry (ports), the impact of changes in logistics operations on parking and staging requirements, truck routing and parking applications, and state parking programs and shovel-ready projects.

7.13.1 Proactive Truck Parking Solutions

Truck parking challenges in Kansas City have become a pressing issue, with increasing instances of trucks parking overnight in undesignated locations near the urban core (**Table 10**). This not only poses safety risks for both truck operators and local motorists but also underscores the need for comprehensive and collaborative solutions. Addressing this issue requires a multifaceted approach involving policy reform, infrastructure development, and technological innovations to ensure safe and accessible parking.

Table 10. Urban Area Truck Parking Solutions

Solution	Description
Collaborating with city officials	Designate specific parking zones for trucks, particularly in industrial area
Reservation system	Implement systems for overnight parking to ensure availability and reduce unauthorized parking
Designating urban truck parking areas	Work with neighborhoods and landowners to designate or allow parking for truck drivers to access to vehicle near their homes
Real-time parking availability systems	Provide systems to help drivers local legal parking spots quickly and efficiently
Community education initiatives	Inform public and property owners about the importance of designated truck parking and risks of unauthorized parking

Table 11. Rural Area Truck Parking Solutions

Solution	Description
Partnerships with private landowners	Create additional parking spaces in less congested rural areas through collaboration
Constructing new truck stops	Build more stops and rest areas along major highways for convenient parking options
Technological solutions	Utilize GPS tracking and mobile apps to assist drivers in locating available parking spaces in remote areas
Coordination with local governments	Ensure adequate signage and access to parking facilities in rural regions
Enforcement of parking regulations	Increase regulation enforcement to deter unauthorized parking and improve safety

7.14 Freight System Resiliency

A resilient transportation network is vital for the freight industry's long-term success, especially in the face of increasing risks from extreme weather, natural disasters, and other emergencies. Such risks can disrupt freight movement, jeopardize supply chains, and negatively impact economic stability. By enhancing emergency preparedness and management, the freight industry can mitigate these disruptions, ensuring continuity of operations and safeguarding crucial goods and resources during critical times. Resilience includes not only addressing immediate crises but also proactively assessing vulnerabilities, adapting infrastructure, and planning for evolving hazards like climate change.

7.14.1 Overview

In 2024, MARC launched a related planning initiative, titled Natural Hazards Transportation Risk Assessment. The initial phase of this project involves identifying and understanding stakeholder needs and has not yet established overall resiliency outcomes and initiatives. Consequently, the Connected Freight KC 2050 Plan is not intended to precede the MARC Resiliency Transportation Plan in defining roles, responsibilities, and recommendations for improving regional multimodal mobility resiliency. The Connected Freight KC 2050 Plan provides recommendations to integrate freight components into the Natural Hazards Transportation Risk Assessment as it develops. These components include a roadmap to identify freight stakeholders, their roles and responsibilities to ensure freight movement, and necessary elements that can impact efficient freight movement as part of the MARC Natural Hazards Transportation Risk Assessment.

7.14.2 Freight Resiliency Definition and Goals

MARC adopted a definition for resilience which includes social, economic, and environmental systems to cope with hazardous events, trends or disturbances, responding or reorganizing in ways that maintain the organization’s essential function, identity, and structure while also maintaining the capacity for adaptation, learning, and transformation.

Transportation Resilience Definition

- Systems of communication are coordinated and accessible.
- Critical assets for basic activities and mobility are prioritized in an equitable manner for the most vulnerable areas.
- Emergency preparedness plans are equitably tailored to each community’s infrastructure and population while balancing the regional vision of resilience.
- Transportation infrastructure is designed for regional hazards and climate change.

Resilience Goals

MARC defines resilience as the ability of social, economic, and environmental systems to withstand and adapt to hazards while maintaining essential functions. The transportation resilience goals focus on equitable access, public health and safety, environmental sustainability, transportation options, and economic vitality. Emphasis is placed on minimizing disruptions, fostering safety, reducing greenhouse gas (GHG) emissions, supporting multimodal travel, and ensuring economic development while addressing climate and extreme weather impacts.

- **Access to Opportunity:** Support a connected system that enables access to all activities, allowing people to succeed by removing transportation barriers. Aligning the transportation system to resiliency by maintaining and enhancing transportation connectivity through minimizing impacts from disruptions.
- **Public Health and Safety:** Foster healthy communities and individuals by providing safe and secure places to live, walk, bike, ride the bus, and drive with clean air to breathe. Transportation system alignment to resilience includes focusing on safety and security that has direct co-benefits of enhancing resilience by protecting and saving all segments of the population from extreme weather and climate impacts.
- **Healthy Environment:** Prioritize and support investments that reduce pollution and GHG emissions in addition to preserving and restoring ecosystem health. GHG emissions that drive climate impacts at the local and global level will be considered for mitigation to the extent feasible along with heat island impacts and other key environmental concerns in the MARC Transportation Resiliency Plan.
- **Transportation Choices:** Provide a range of transportation choices for communities across the region to allow for ease of travel as well as public health and environmental benefits. Fostering of mode choice will improve system redundancy and provide options for emergency evacuations and management.
- **Economic Vitality:** Maintain a multimodal transportation system that supports the efficient movement of people and goods and promotes economic development. The supply chain should be considered when moving towards goals defined in the MARC Transportation Resiliency Plan.

7.15 Freight Resiliency Plan

7.15.1 Natural Hazards Transportation Risk Assessment

MARC's Natural Hazards Transportation Risk Assessment aims to enhance resilience by prioritizing critical infrastructure, addressing extreme weather impacts, and supporting community preparedness. Key goals include securing basic needs during disruptions, creating a risk assessment for climate hazards, and developing a regional adaptation strategy. The

assessment incorporates community surveys and interactive mapping to gather data on disruptions and improve transportation planning. It emphasizes flexibility, community concerns, robustness, and proactive measures to mitigate climate-related challenges.

7.15.2 Freight Resiliency and Planning Coordination

Freight resiliency planning is essential for mitigating the impacts of extreme weather and natural disasters on transportation networks. It involves integrating freight considerations into state Freight Plans and Transportation Asset Management Plans, addressing gaps such as undefined goals, stakeholder collaboration, and data shortages. Effective strategies include early incorporation of freight principles, conducting community surveys, and engaging stakeholders like the GMC. The MARC Natural Hazards Transportation Risk Assessment plays a key role in outlining methodologies, strategies, and responsibilities to enhance infrastructure and supply chain resilience.

7.15.3 Freight Resiliency Improvement Plan Recommendations

An integral part of the MARC Resiliency Improvement Plan involves a comprehensive collection of recommendations and suggestions aimed at fortifying the region's infrastructure and supply chain against extreme weather conditions and emergency situations. These strategies emphasize the importance of collaboration between public and private entities, the use of up-to-date resources, and a thorough understanding of roles and responsibilities. Addressing both short-term and long-term resiliency challenges will help improve the overall resilience of study area infrastructure and the supply chain.

- **Stakeholders:** Organize a complete collection of interested freight parties representing the private and public sectors, project-term and long-term durations related to resiliency of the infrastructure and supply chain owners, economic development groups, and all levels of government.
- **Tools/Models/Databases:** Understanding and use of the latest Resiliency Improvement Plan project related tools, models, and databases used nationwide.
- **Responsibility Matrix:** Create and get buy-in on a responsibility matrix covering infrastructure and supply chain considerations. This matrix will need to illustrate the study area's regional stakeholders, and their role related to ensuring transportation system resiliency. Understanding of agency-specific roles will assist the public to better understand resiliency in the region and responsible parties.
- **Technology Impacts:** Freight is at the leading edge of technology; it will be important to understand those impacts in the context of resiliency related to peripheral impacts to infrastructure and supply chains (i.e. heavier vehicle batteries impact to infrastructure and emergency preparedness)

- **Resiliency Coverage:** The MARC Resiliency Improvement Plan project should focus on resiliency challenges associated with system infrastructure owned and operated by state and local governments. Awareness of supply chain resiliency considerations and direct project involvement by supply chain owners (private sector) in the MARC Resiliency Improvement Plan project will benefit both private and public stakeholders by identifying and addressing common challenges, ownership responsibilities and roles, and practical short-term and long-term solutions.

7.16 Land Use and Freight

The Connected Freight KC 2050 Plan conducted a land use policy analysis that provides an overview of the Kansas City regional land use and policy context that regulates and directs freight development to specific areas of the region. Special emphasis is given to accommodating and expanding FACs in areas with favorable commercial or industrial zoning designations. The plan also explores the potential impacts expansion that regional freight investments may have on future land use planning, community character, the environment, workforce development, and quality of life. National and Local FAC definitions were reviewed and documented in concert with a local land use policy review to develop a regional FAC identification methodology. The FAC identification methodology was employed to determine essential infrastructure needs and key focus areas for regional local governments. This method seeks to identify that proper land use regulations and infrastructure investments are implemented, thereby supporting the optimal expansion of current FACs or attracting new significant regional freight investments.

7.16.1 Freight Activity Center Identification

To identify land use policy opportunities and constraints associated with expanding existing FACs or developing new ones, a literature review was conducted of regional transportation plans, county, and local land use plans. All county general/comprehensive plans available online were reviewed. Considering the large number of incorporated communities within the Kansas City region, only incorporated communities with populations greater than 100,000 with general/comprehensive plans available online were reviewed and synthesized. Documentation of policies from these plans is intended to serve as a baseline for identifying key policies local governments in the Kansas City region should consider when expecting freight in areas with commercial and industrial land use designations and zoning. Please note land use policies for Kansas City were not described in the land use analysis due to its generalized format, which did not allow for explicit extraction of data compared to other cities with populations over 100,000.

7.16.2 Assessment of Freight Activity Centers Criteria

The FAC identification process was carried out through a comprehensive two-step methodology aimed at ensuring precision and relevance in determining areas critical for freight activity.

The first step involved drawing clear boundaries for FACs. This meticulous subdivision resulted in the creation of a total of 121 FAC zones, each representing specific industrial land use regions.

The second step was the identification of top FACs based on three key criteria: industrial land area (approximate), rentable building area related to warehousing or distribution, and rentable building area associated with manufacturing and food processing. The analysis revealed that the top 37 FAC zones.

Figure 20 shows the distribution of industrial land use across the study region and how the top 37 FACs (white highlighted zones) align with these. The non-top FACs (grey highlighted zones) carry limited and scattered amounts of industrial land uses. **Figure 21** shows how well the industrial land uses in the FACs are served by major freight access modes.

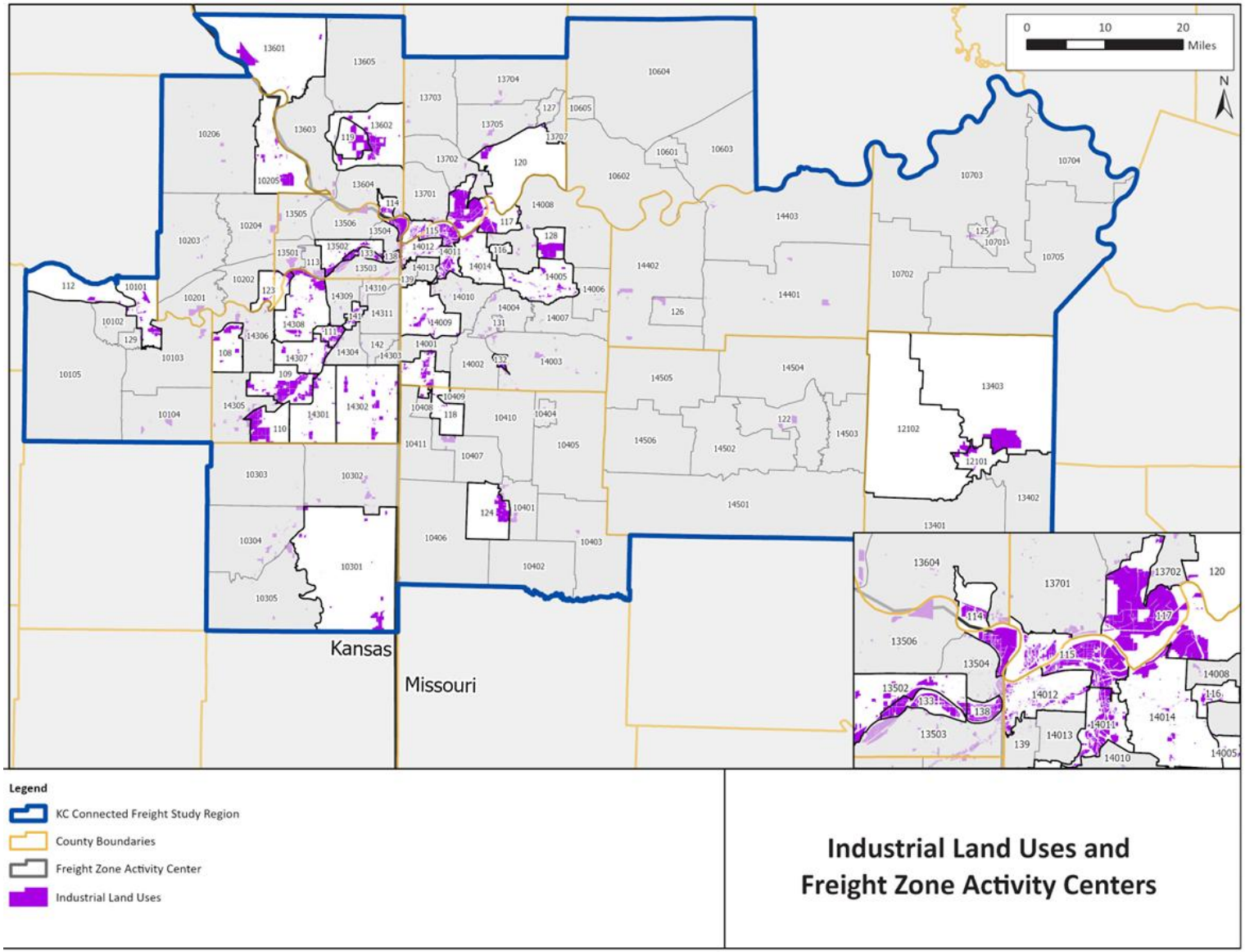


Figure 20. Study Region Freight Activity Centers

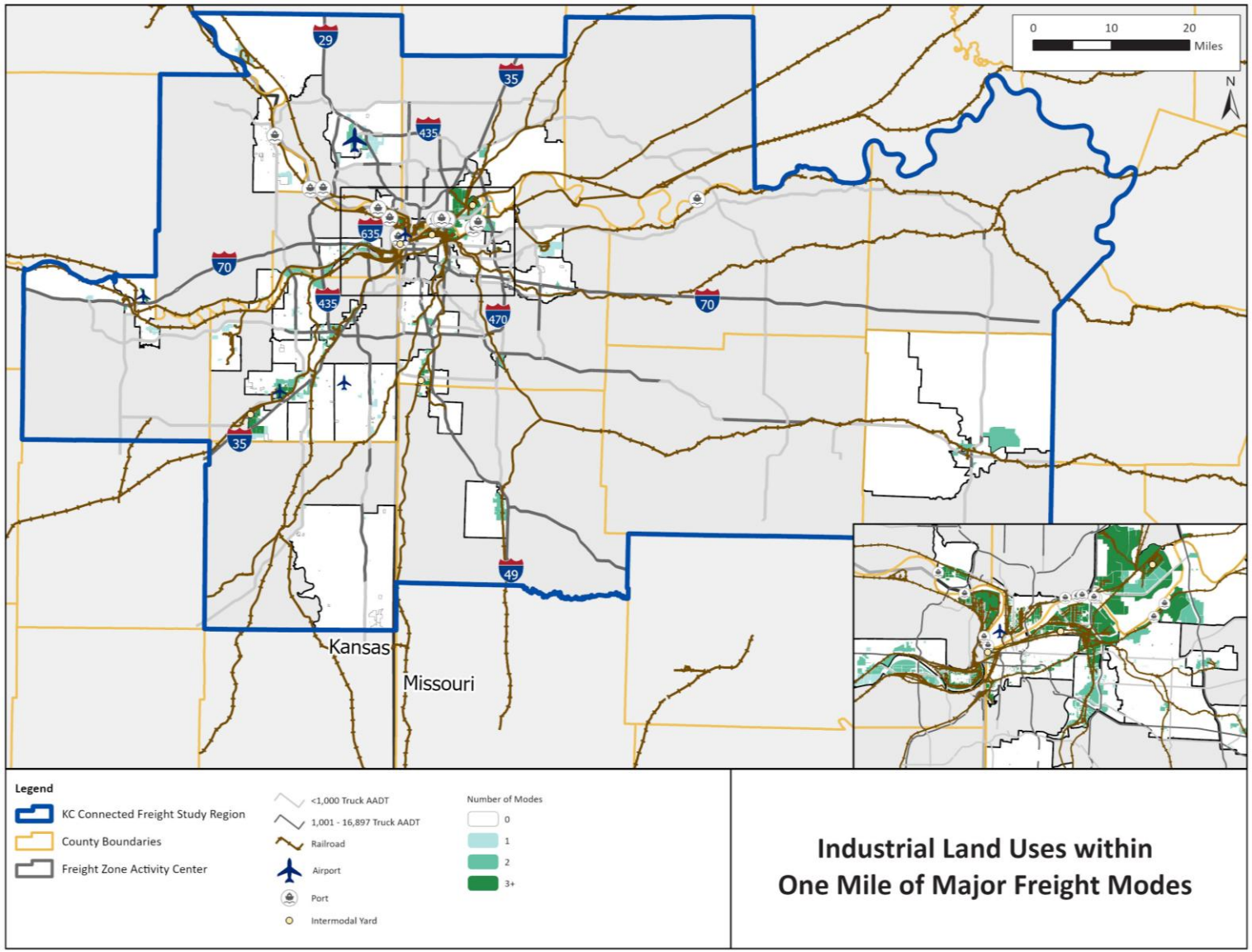


Figure 21. Freight Activity Centers and Major Freight Access Modes for Industrial Land Uses

7.16.3 Freight Planning Considerations for Local Government

Transportation Infrastructure, Site Considerations, and Economic Development are all land use policy focus areas that should serve as a baseline for identifying key considerations local governments in the Kansas City region should examine when fostering freight development in areas with commercial and industrial land use designations and zoning. This process not only highlights potential opportunities for enhancing freight infrastructure but also explores the regulatory frameworks that could support sustainable growth. By aligning land use policies with economic goals and transportation needs, policymakers can create environments that facilitate efficient freight movement while minimizing adverse impacts on local communities.

These considerations are intended to guide local governments in developing an efficient freight system and accommodating new or expanded FAC developments. Incorporating these elements into local freight planning efforts will ensure expansion of existing FACs or location of new FACs in local communities will provide economic benefits while protecting quality of life for all citizens. All recommendations for consideration by local governments when expecting freight are sorted into the three broad categories and subcategories of FAC accommodating land use and infrastructure characteristics.

1. Transportation Infrastructure
    - Capacity (network)
    - Accessibility, Connectivity, and Siting
    - Safety
2. Site Considerations
    - Service Infrastructure (utilities, public amenities, water, sewer, etc.)
    - Environmental (water, waste, emissions)
    - Offsite Impacts (adjacent developments)
3. Economic Development
    - Workforce, Economy, and Quality of Life

The insights derived from these plans serve as a foundation for strategic decision-making and help guide investments that strengthen the region's freight network. A land use checklist was developed as a resource for planning agencies, local municipalities, and other entities to identify considerations related to freight commercial and industrial development "What to Expect When Expecting Freight: A Guide for Local Freight Planning."

7.16.4 Integrating Freight with Complete Streets

Integrating freight into complete streets requires clear concepts, policies, and strategies within the Kansas City region (**Table 12**). This approach addresses challenges in merging complete streets applications with freight movements and deliveries. The aim is to enhance mobility and efficiency for all users, including drivers, pedestrians, bicyclists, and public transit riders of all ages and abilities.

In general, state and local governments may not restrict truck access on and within one mile of Interstate Highways and Federal-aid Primary Routes per 23 CFR 658.

Table 12. Integrating Freight Complete Streets

Theme	Details
Urban, Suburban & Rural Applications	Develop safe, accessible, and efficient transportation systems can be achieved by categorizing infrastructure designs into context zones tailored to urban, suburban, and rural development patterns. Special emphasis should be placed on rural areas to enhance safety, foster economic growth, improve connectivity, empower local communities, and promote public health.
Embrace Challenges with Freight	Address conflicts between local streets and freight movement, solutions should focus on redesigning street features to accommodate the needs of large vehicles while maintaining safety for pedestrians and cyclists, including widening lanes, optimizing on-street parking, improving intersection design for better navigation, and creating dedicated parking and loading zones.
Freight Supportive Actions	Include freight considerations such as designated truck routes, last-mile delivery strategies, intelligent transportation systems (ITS) to facilitate efficient goods movement while maintaining safety for all users.

7.16.5 Best Practices

Freight supportive actions to integrate into Complete Streets policies include:

- Truck Route Networks
  - Designated truck routes should be studied for current trends in truck movement and appropriate road geometries to ensure efficient connectivity.
  - Time-of-day turn restrictions, and arterial restrictions can help reduce conflicts between vehicles, pedestrians, and bicycles.
- Last-Mile Strategies
  - Last-mile delivery involves moving goods from a warehouse or distribution center to the final delivery location.

  - Complete streets applications should consider curb management, parking arrangements, and designated loading/unloading spaces in coordination with time-of-day strategies.

- Technology
  - ITS can support the management of urban road freight transportation by providing real-time information to road users.
  - ITS can include traveler information, truck parking, ramp metering, and incident management directives.
- Land Use Policies
  - Reinvestment in existing industrial spaces.
  - Scenario and regional planning to bring stakeholders together for common understanding.
  - Zoning tools to preserve industry and limit freight impacts.
  - Promoting context-sensitive site and building design features.
  - Developing collaborative relationships among cities for effective road freight transportation management.
  - Public-private partnerships that promote urban road freight transportation management in metropolitan areas.