TEAM KENTUCKY®
TRANSPORTATION CABINET

2022 Kentucky Freight Plan

Approved by FHWA-KY May 3, 2023

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Abbreviations and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ADD	Area Development Districts
BIL	Bipartisan Infrastructure Law
EPA	Environmental Protection Agency
FAST Act	Fixing America's Surface Transportation Act
FRA	Federal Railroad Administration
IIJA	Infrastructure Investment and Jobs Act
ITTS	Institute for Trade and Transportation Studies
KDA	Kentucky Department of Aviation
KFP	Kentucky Freight Plan
KIPDA	Kentuckiana Regional Planning & Development Agency
KYOVA	Metropolitan Planning Organization for Kentucky, Ohio, and West Virginia
KYTC	Kentucky Transportation Cabinet
LAMPO	Lexington Area Metropolitan Planning Organization
LRSTP	Long-Range Statewide Transportation Plan
MAASTO	Mid-America Association of State Transportation Officials
MAFC	Mid-America Freight Coalition
MAP-21	Moving Ahead for Progress in the 21st Century Act
MPO	Metropolitan Planning Organization
MRO	Maintenance Rating Program
NHFP	National Highway Freight Program
NHS	National Highway System
OKI	Metropolitan Planning Organization for Ohio, Kentucky, and Indiana
PHMSA	Pipeline and Hazardous Materials Safety Administration
SASHTO	Southern Association of State Highway and Transportation Officials
SETTS	Southeastern Trade and Transportation Study
SHSP	Strategic Highway Safety Plan
STIP	Statewide Transportation Improvement Program
TETC	Transactions on Emerging Topics in Computing
TPIMS	Truck Parking Information Management System
TZD	Toward Zero Deaths
USDOT	United States Department of Transportation
WTAB	Water Transportation Advisory Board

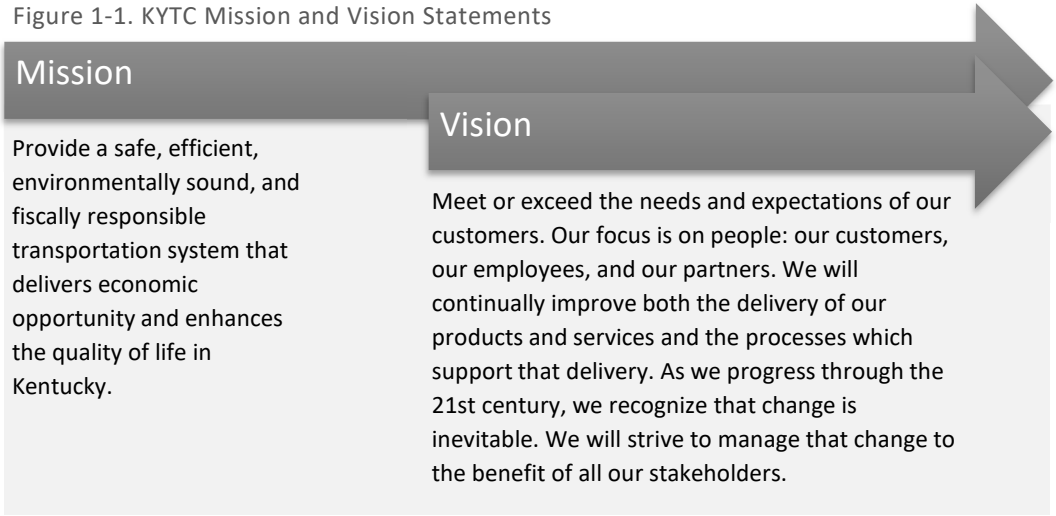
1. Introduction

The 2022 Kentucky Freight Plan (KFP) was designed to supplement Kentucky Transportation Cabinet's (KYTC) 2022 Long-Range Statewide Transportation Plan (LRSTP). The LRSTP outlines KYTC's larger mission and vision for the future (**Figure 1-1**). Freight mobility is an important factor in achieving both aspirations.

The movement of freight is vital for every citizen in the Commonwealth. From the dairy farmer bringing in feed and shipping out milk, to the mine or quarry worker bringing in heavy equipment and shipping out raw materials, to the grocery store customer who expects to find their needed goods stocked on the shelves. Each has a need to transport raw materials, finished goods and products to be sold or to consume raw materials, finished goods, and products. KYTC's mission for all transportation system users as shown in Figure 1-1, is to "Provide a safe, efficient, environmentally sound, and fiscally responsible transportation system that delivers economic opportunity and enhances the quality of life in Kentucky."

Similarly, the Cabinet's aviation, rail, riverport, and transit plans were created to supplement the LRSTP. Combined with the KFP, these modal plans provide a more detailed view of the Kentucky multimodal transportation system.

Figure 1-1. KYTC Mission and Vision Statements



1.1. State Freight Plan Purpose

Kentucky businesses and individual residents are reliant on the freight transportation system of roads, railroads, waterways, airports, and pipelines for the goods they use daily. Each investment in the freight transportation system that increases throughput, improves efficiency, and reduces costs that have a direct, positive impact on Kentucky's economy. At the same time, freight transportation requires significant expenditures of energy to move large quantities of industrial and consumer goods over long distances. Many agencies and businesses develop policies, investments, and programs to understand and mitigate the risks of freight transportation and to improve environmental quality and safety for all transportation system users.

The Kentucky Freight Plan has a long-term outlook and is intended to serve the needs of KYTC and its partners to improve freight transportation by accomplishing the following process:

- Documenting freight assets (see *Section 2*)
- Defining freight goals and performance measures (*see Section 3*)
- Identifying future needs (see *Section 8*)
- Recommending strategic initiatives (see *Section 9*)
- Devising implementation strategies (see *Section 9*)

This plan considers highway, rail, aviation, and waterway needs. The plan also describes the current pipeline system but does not provide investment or policy recommendations for it.

1.1.1. Freight Plan Development and Governance

In 2017, KYTC updated their 2016 KFP. This update was specifically designed to both support Kentucky's freight mobility and to comply with the federal requirements found in the Moving Ahead for Progress in the 21st Century Act (MAP-21) and Fixing America's Surface Transportation Act (FAST Act). The 2022 KFP serves as an update to the 2017 plan, as such, includes new State Freight Plan requirements found in the Infrastructure Investment and Jobs Act (IIJA), also known as the 2021 Bipartisan Infrastructure Law (BIL). A summary of the specific BIL requirements and where they are addressed in this plan is included as an attachment.

The IIJA requires state freight plans to include supply chain cargo flows, an inventory of commercial ports, findings and recommendations from any multi-state freight compacts, the impacts of e-commerce on freight infrastructure, the considerations of military freight, and an assessment of truck parking facilities in the state.

1.2. Coordination with State Long-Range Transportation Plan and Other Modal Plans

The Kentucky Freight Plan (KFP) integrates previous freight planning work developed by KYTC and its partners. By doing so, the KFP serves as a vehicle to convene, consolidate, and coordinate key takeaways from this effort into one State Freight Plan that is to be a supplement to the LRSTP.

Coordinated Plans

The KFP integrates several freight plans developed by KYTC and its partners, including:

- National Freight Strategic Plan
- Kentucky Highway Plan/STIP
- Kentucky Truck Parking Assessment and Action Plan
- State Rail Plan
- Kentucky Riverports, Highway and Rail Freight Study
- Strategic Highway Safety Plan
- Statewide Aviation System Plan
- MPO Freight Plans
- Mid-America Freight Coalition Multijurisdictional Plans

1.2.1. National Freight Strategic Plan

The National Freight Strategic Plan defines the United States Department of Transportation's (USDOT) vision and goals for the national multimodal freight system, assesses the conditions and performance of the freight system and barriers to freight system performance, and defines strategies to achieve its vision and goals. The Department uses this plan to guide national freight policy, programs, initiatives, and investments, inform state freight plans, identify freight data, and research needs, and provide a framework for increased cross-sector, multijurisdictional, and multimodal coordination, and partnerships.[1] The plan outlines three goals:

- Safety – Improve the safety, security, and resilience of the national freight system.
- Infrastructure – Modernize freight infrastructure and operations to grow the economy, increase competitiveness, and improve quality of life.
- Innovation – Prepare for the future by supporting the development of data, technologies, and workforce capabilities that improve freight system performance.

1.2.2. Kentucky Highway Plan/Statewide Transportation Improvement Program

Every two years, KYTC submits a draft Kentucky Highway Plan (Six-Year Plan) to the Kentucky General Assembly. The Highway Plan is developed with an ongoing process where KYTC, with the Area Development Districts (ADDs), Metropolitan Planning Organizations (MPOs), and highway district offices identify and prioritize projects for future highway plans. After the General Assembly approves the Highway Plan, KYTC develops the Statewide Transportation Improvement Program (STIP) which contains all federally funded transportation projects programmed over the next four years. The development of a Freight Investment Plan will be coordinated with both efforts.

[1] USDOT. "National Freight Strategic Plan: Executive Summary," 2021, pg. 1-2.

1.2.3. Kentucky Truck Parking Assessment and Action Plan (2022)

Truck drivers that cannot find available parking are forced to park on highway ramps, empty lots, and even residential areas, creating safety challenges for truck drivers and the traveling public. Long-distance truck drivers are typically paid by the mile but have a limit on the number of hours they can drive. As they approach their federal time limit, drivers must make a tough decision, weighing safety risks against productivity. Do they park in a nearby available spot and stop early, or do they continue driving and risk not finding a spot before their time runs out? From an economics standpoint, truck drivers lose over $4,600 in earnings each year because of this paradox.

To help address these challenges, KYTC developed a statewide Truck Parking Assessment and Action Plan. This project is designed to:

- Identify truck parking supply and demand across the state and on major corridors
- Focus on safety and in particular, unauthorized parking on highway ramps
- Leverage existing KYTC right-of-way to identify low cost/high impact opportunities to increase truck parking capacity
- Act now by completing a preliminary conceptual design and estimate of new, upgraded parking facilities

1.2.4. Kentucky Statewide Rail Plan (2015)

The vision of the State Rail Plan was to support and work with private rail carriers to provide a safe, reliable, efficient, and effective rail transportation system for the movement of passengers and freight within Kentucky, as well as to connect to domestic and international markets. KYTC recognizes that an effective rail system will help alleviate highway congestion, contribute to economic development, improve public safety, improve energy efficiency, and reduce greenhouse gas emissions. The goals of the 2015 Kentucky Statewide Rail Plan include:

- Preservation – Encourage the preservation of the largely privately owned and operated rail system within Kentucky
- Economic Development – Support economic development by working to provide roadway connectivity to the national rail system and state intermodal facilities
- Customer Relationships/Transportation Planning Process – Strengthen customer relationships with the rail industry through communication, cooperation, and information exchange in the KYTC transportation planning process
- Safety and Security – Enhance highway-railroad at-grade crossing safety and reliability to ensure mobility and maintain safe access

1.2.5. Kentucky Riverports, Highway and Rail Freight Study (2022)

The KYTC Riverports, Highway & Rail Freight Study's focus was to better understand the breadth and depth of Kentucky's multimodal freight infrastructure, recommend a priority list of improvements based on potential return, identify potential partnerships and funding sources, and better communicate overall strengths with businesses who have a need for these services. One of the outcomes was a marketing toolkit for economic development leaders, riverport managers, local governments, and others to use to promote the network for both foreign and domestic commerce.

1.2.6. Strategic Highway Safety Plan

Kentucky's Strategic Highway Safety Plan (SHSP) was updated in 2020. The SHSP serves as an umbrella guide to increase coordination, communication, and cooperation among federal, state, and local agencies, along with nonprofit organizations and other highway safety advocates for reducing preventable motor vehicle crashes. Toward Zero Deaths (TZD) is a safety strategy adopted by KYTC as a central theme that guided the development of the SHSP. This strategy supports a data-driven approach that targets specific areas for improvement and employs proven countermeasures. TZD leverages an interdisciplinary approach by integrating engineering, enforcement, education, and emergency services strategies.

1.2.7. Kentucky State (Grade Crossing) Action Plan (2022)

The KYTC Division of Right of Way, Utility and Rails recently developed a State Action Plan to address Highway-Rail Grade Crossings issues across the Commonwealth. According to the Federal Railroad Administration, "An action plan is an important part of the grade crossing program management process. It is the mechanism to implement an organizational strategy. While the strategic plan is vital to creating the framework for a State to meet its goals and support its mission statement, it is the action plan that provides how a State may accomplish this.

1.2.8. Statewide Aviation System Plan (2017)

The KYTC Department of Aviation (KDA) conducted a Statewide Aviation System Plan that sought to inventory and categorize the facilities and assets at the state's 59 airports and help KDA assess how well the airport system performed operationally and economically. It developed recommendations for improving the state's aviation system. The plan gathered information from each airport about its facilities, aircraft activity, environmental compliance, and safety and security aspects of the airport. Additionally, data related to the direct economic impact of each airport was collected from the airport and associated business tenants.

1.2.9. MPO Freight Plans

Four of Kentucky's MPOs - the Kentuckiana Regional Planning & Development Agency (KIPDA), KYOVA Interstate Planning Commission, OKI Regional Council of Governments and the Lexington Area Metropolitan Planning Organization (LAMPO) have developed regional freight plans or studies. Each of these plans detail freight needs and recommendations to improve freight mobility in their respective regions. Since most of Kentucky's freight moves through these metropolitan areas, it will be critical to integrate their key recommendations in the KFP.

1.2.10. Mid-America Freight Coalition

The Mid-America Freight Coalition (MAFC) is a regional organization that cooperates in the planning, operation, preservation, and improvement of transportation infrastructure in the Midwest. The ten states of the AASHTO Mid-America Association of State Transportation Officials (MAASTO) share key interstate corridors, inland waterways, and the Great Lakes. In addition to being a regional convenor on freight issues, MAFC has published several reports that support freight movement across the Midwest.

1.2.11. Institute for Trade and Transportation Studies

The Institute for Trade and Transportation Studies (ITTS) serves a similar function as MAFC, except that it covers the Southern Association of State Highway and Transportation Officials (SASHTO) region. The Institute has recently undertaken regional studies that look at freight bottlenecks, economic development and an update to the Southeastern Trade and Transportation Study (SETTS).

1.2.12. The Eastern Transportation Coalition

The Eastern Transportation Coalition is a partnership of 19 states and the District of Columbia focused on connecting public agencies across modes of travel to increase safety and efficiency. Formerly the I-95 Corridor Coalition, the Eastern Transportation Coalition has evolved from a small, highway-focused group to more than 200 public agencies working together to address the pressing challenges facing the eastern corridor with a focus on Transportation Systems Management & Operations, Freight, and Innovation. Kentucky recently joined the Coalition to provide an opportunity to collaborate on freight transportation needs, issues, and investments with throughout the eastern U.S., but especially with their neighbors in Tennessee and Virginia.

1.2.13. Appalachian Regional Commission

The Appalachian Regional Commission (ARC) is an economic development partnership agency of the federal government and 13 state governments focusing on 423 counties across the Appalachian Region. ARC's mission is to innovate, partner, and invest to build community capacity and strengthen economic growth in Appalachia. KYTC is an active participant in the ARC, using it as an opportunity to coordinate freight planning and investment decisions with its neighboring states of Ohio, Tennessee, Virginia, and West Virginia.

1.3. Moving Forward

The plan is designed to tell the Kentucky freight story. The story begins with the development of goals, inventory of the freight system, and current conditions. Current trends, strengths, and weaknesses of the system are then analyzed. The document concludes with a series of recommendations for KYTC's future freight planning efforts followed by KYTC's Freight Investment Plan for National Highway Freight Program funding. The 2022 KFP was designed to be compliant with the FAST and IIJA Acts.

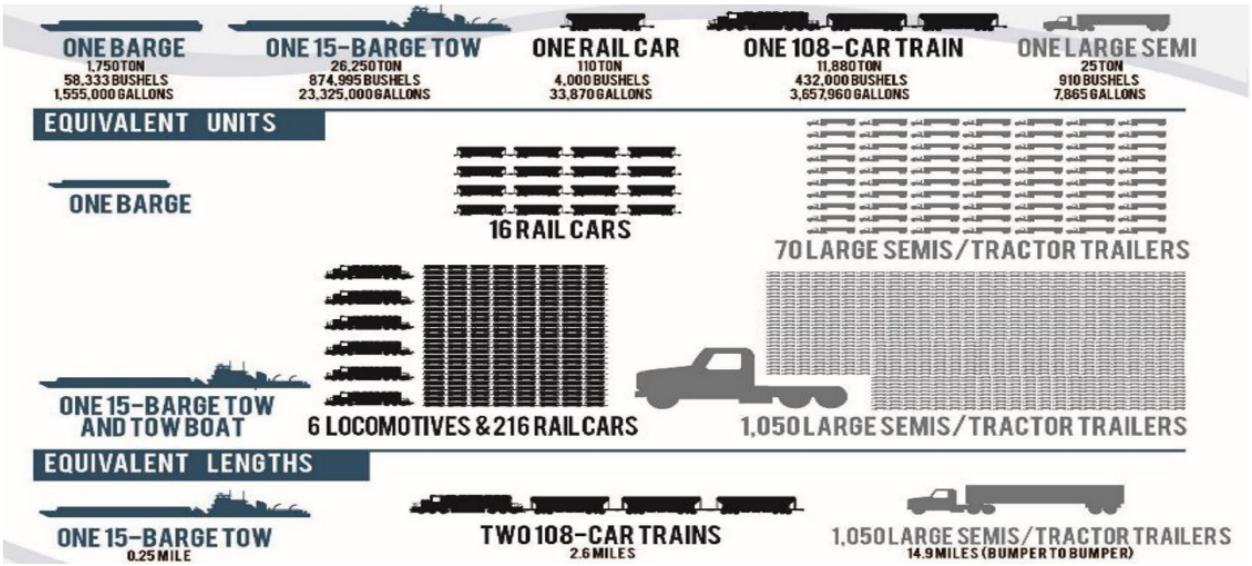
2. Kentucky Freight System

2.1. Multimodal Freight System

An efficient, multimodal freight transportation network is essential to the economic well-being of Kentucky. All modes play a role when moving goods, and the choice between modes is frequently related to the location, type of commodity, price of shipment, and connections to other modes. A comparison of modes, as shown in **Figure 2-1** illustrates the cargo carrying capacity by various modes. While modes may vary in terms of capacity, energy, safety, and environmental impacts, each mode serves an important role in the freight system. They must work together to create a connected and resilient network.

KYTC's 28,000 miles of state-maintained roadways provide critical connectivity to the commonwealth's rail, maritime, air cargo and pipeline facilities. This connectivity plays an integral part in the supply chain; therefore, it is essential that KYTC invest in ongoing maintenance, operational improvements, and ability to move freight efficiently and safely. While KYTC's formal jurisdiction is limited on rail, pipeline, and air cargo facilities – the Cabinet maintains strong relationships with private infrastructure providers to ensure the multimodal freight system works as one holistic system for the betterment of the Kentucky economy.

Figure 2-1. Comparison of Cargo Carrying Capacity by Mode



Source: Kentucky Transportation Cabinet, 2021.

Kentucky's multimodal freight system enables the commonwealth to capitalize on its geographically strategic location. Kentucky is located within 600 miles of over 60 percent of the nation's population, personal income, and manufacturing.

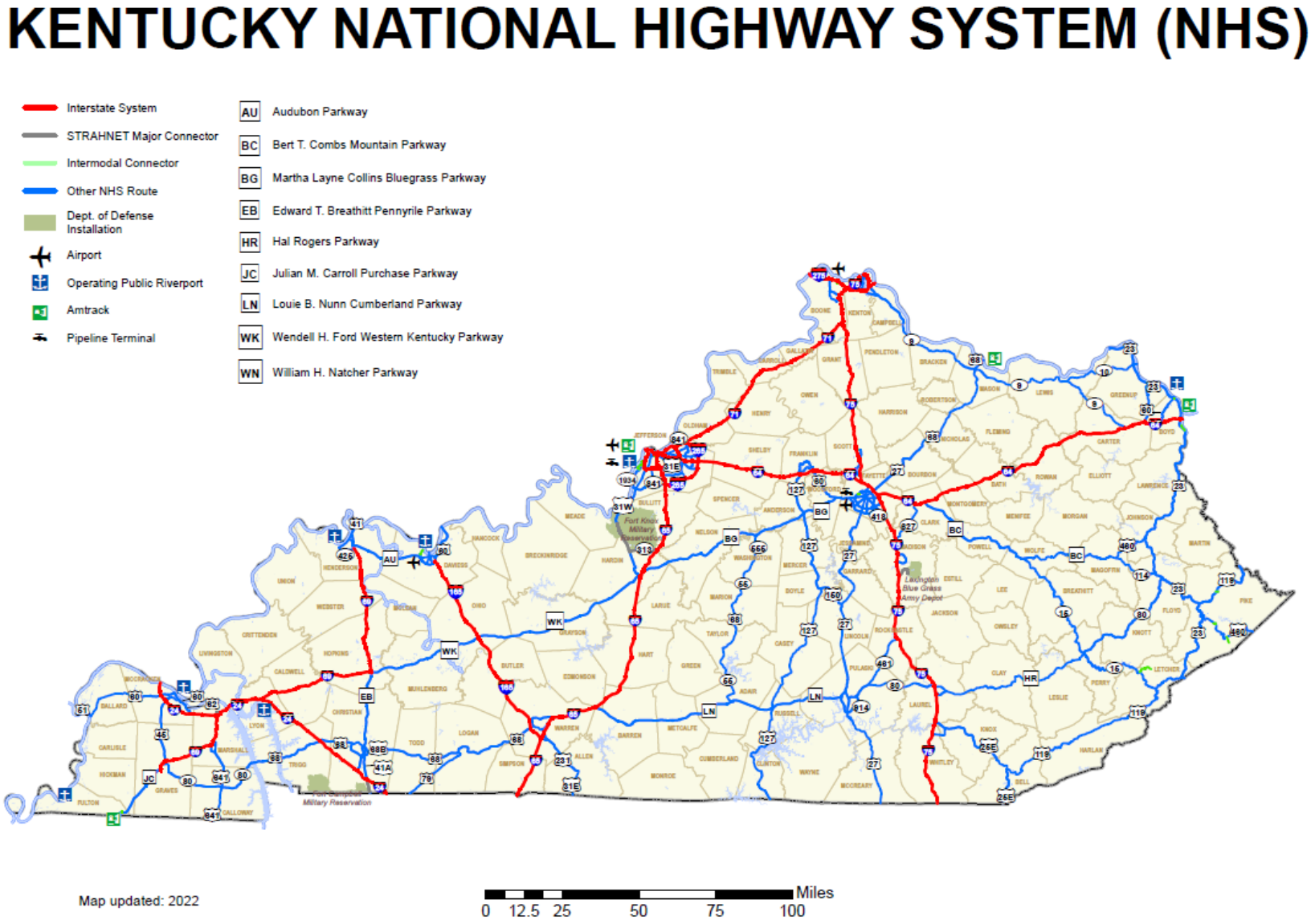
- **Highway** – The commonwealth is served by 6 major interstates and 10 state parkways, including more than 500 miles of the federally designated Primary Highway Freight System.
- **Rail** – Major freight rail networks—including five Class I railroads, one Class II railroad, and seven Class III railroads—operate across Kentucky.
- **Water** – Kentucky is bordered on three sides by navigable rivers. The Ohio River forms the 660-mile northern border and is the longest of the three border rivers. The Mississippi River forms the western border, and the eastern side of the commonwealth is bordered by the Big Sandy River and Tug Fork. There are approximately 1,600 miles of U.S. Army Corps of Engineers (USACE) designated navigable waterways in Kentucky, of which approximately 1,050 miles are commercially navigable.[2]
- **Air** – Kentucky has six commercial airports, including two major shipping hubs that are home to UPS Worldport (Louisville) and DHL Express/Amazon Air (Covington). In 2020, the Louisville International Airport was ranked third in the U.S. for annual air freight tonnage shipments.[3] Additionally, Kentucky has 26 other general aviation airports with runway lengths greater than 5,000 feet, making them capable of handling larger cargo planes. This versatile transportation network, further highlighted in the following sections, makes Kentucky a practical location for moving freight locally, regionally, and to all points of the globe.
- **Pipeline** – Kentucky's pipeline network is approximately 41,000 total miles. This network plays a critical role in moving oil, natural gas, and other commodities throughout the commonwealth.

2.2. Highways

In 2018, Kentucky's highway system was comprised of over 80,000 centerline miles of public roads. KYTC maintains 35 percent of this system, nearly 28,000 miles. The commonwealth has over 3,600 miles of federal/state truck network routes, with an average of 11 percent trucks on this network.[4] Kentucky also has over 14,000 bridges, of which approximately 9,000 are state maintained. According to the Freight Analysis Framework Version 5 (FAF5), more than 379,000,000 tons of freight were moved by truck on Kentucky's highways in 2017. **Figure 2-2** illustrates the National Highway System (NHS) in Kentucky.

[2] Kentucky Transportation Cabinet, 2014 Long-Range Statewide Transportation Plan, 2022.
[3] Kentucky Cabinet for Economic Development, Kentucky Economic Development Guide, 2022.
[4] KYTC DataMart Traffic Data: (HIVEi) KYTC - Query.

Figure 2-2. Kentucky National Highway System



Source: Kentucky Transportation Cabinet, 2022.

2.2.1. Highway Freight Network

2.2.1.1 Kentucky Highway Freight Network

KYTC developed a performance-based project selection process for the Kentucky Highway Plan. One of the key components for identifying criteria for the selection process was developing a state highway freight network that represents Kentucky's critical freight corridors. By creating this network, KYTC can identify and address freight system mobility issues. The Cabinet chose a 4-tier structure for the Kentucky Highway Freight Network. The following criteria were used to develop this network:

- Tier 1 – National Regional Significance
  - USDOT designated Primary Freight Network (PFN)
  - Any segment of road (regardless of functional class) that has over 7,000 vehicles in Average Annual Daily Truck Traffic (AADTT)
  - Manual revisions to ensure freight network connectivity

- Tier 2 – Statewide Significance
  - All remaining segments of interstate or parkway not on the PFN
  - Any segment of road (regardless of functional class) with AADTT of 4,000 to 7,000
  - Manual revisions to ensure freight network connectivity

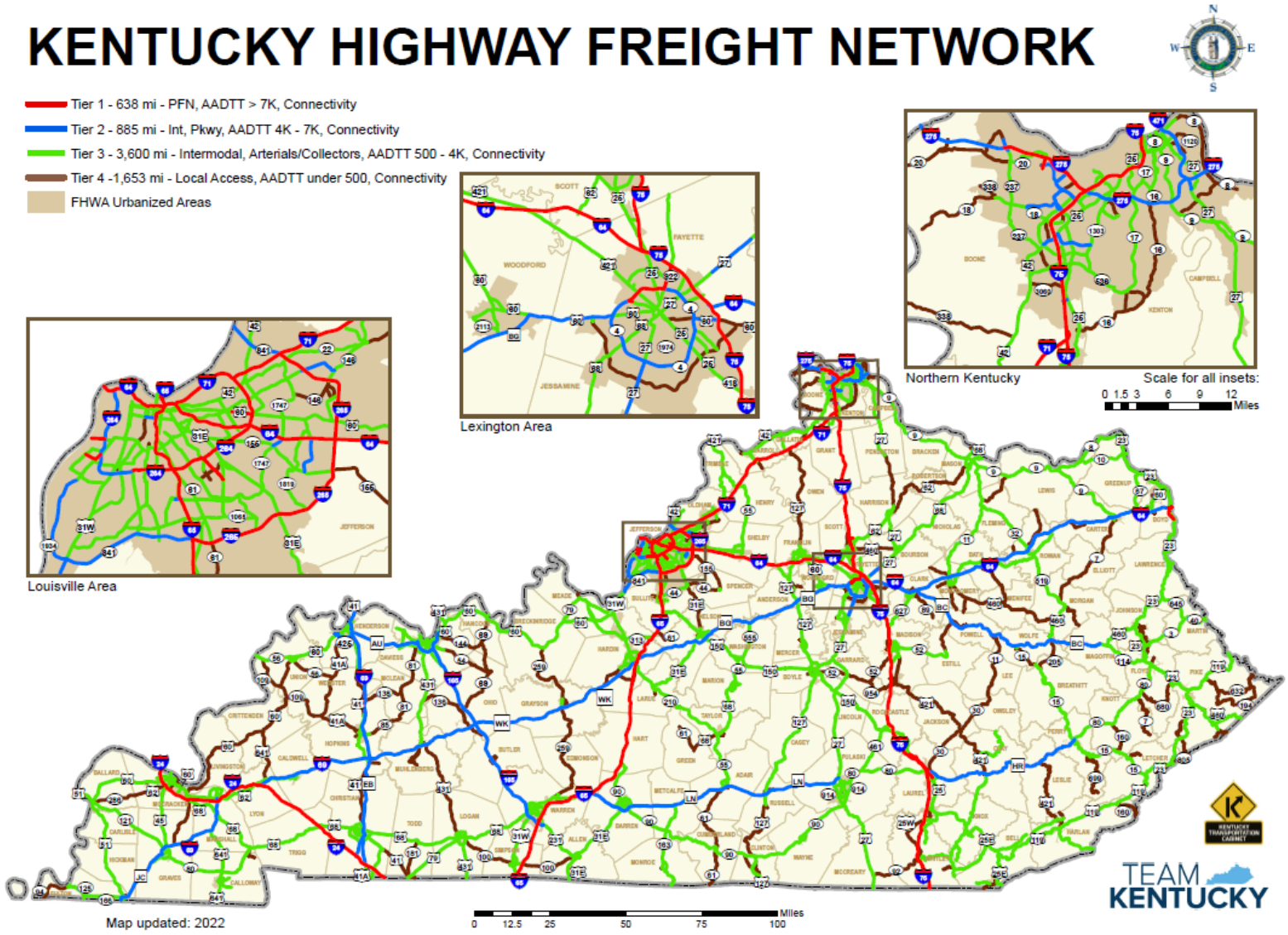
- Tier 3 – Statewide Regional Significance
  - NHS Intermodal connectors recognized by/filed with the Federal Highway Administration (FHWA)
  - Arterials and collectors with AADTT of 500 to 4,000
  - Manual revisions to ensure regional connectivity

- Tier 4 – Local Access Significance
  - Access to major freight generators
  - Local access for freight (first mile, last mile)
  - Manual revisions to ensure network connectivity
  - AADTT less than 500

The process began with a purely data-driven identification of the tiers. Each tier includes manual revisions necessary to ensure connectivity and limit to 50 miles between local Kentucky Highway Freight Network access points.

After the Kentucky Highway Freight Network was determined, KYTC shared the methodology and maps of the network with attendees of the Kentuckians for Better Transportation 2015 Annual Conference, all 12 highway district offices, and each of the commonwealth's MPO and ADD offices for review and comment. The 2022 network, made up of 7,130 centerline miles, is shown in **Figure 2-3**, with a breakdown of mileage for each tier. The Kentucky Highway Freight Network is updated on January 1st of each year to reflect changes to the road network.

Figure 2-3. Kentucky Highway Freight Network



Source: Kentucky Transportation Cabinet, 2022.

2.2.1.2 National Highway Freight Network

The National Highway Freight Network (NHFN) is a network of strategically important highway corridors for the movement of freight across the country. This network was designed to assist different states in strategically directing resources toward improved system performance for efficient movement of freight on highways, including the national highway system, freight intermodal connectors and air cargo transportation systems. The NHFN is composed of the following four roadway sub-systems:

- Primary Highway Freight System (PHFS): The network of highways identified as most critical to freight movements based on an FHWA assessment of heavy commercial average daily traffic volumes. This network consists of 37,436 centerline miles of Interstate highways and 4,082 centerline miles of non-Interstate highways.
- Other Interstate Highways: All other segments of Interstate not included in the PHFS are also included in the NHFN.
- Critical Urban and Rural Freight Corridors (CUFC, CRFC): These highways provide critical connections between the PHFS, Interstate highway system and freight intensive areas.

Table 2-1 lists the PHFS routes in Kentucky, as designated by FHWA. The rest of the Kentucky portion of the NHFN, including the PHFS intermodal connectors, can be viewed on the FHWA Freight Management and Operations' National Highway Freight Network webpage.

Table 2-1. Primary Highway Freight System (PHFS) Routes

State	Route	Start Point Intersection	End Point Intersection	Length (Miles)
KY	I-24	IL/KY Line	KY/TN Line	93.33
KY	I-264	I64	I71	22.88
KY	I-265	I64	4.51 Miles North of I64	4.51
KY	I-275	KY 212	I-275 / I-71 / I-75	3.98
KY	I-64	IN/KY Line	I-65	5.14
KY	I-64	I-264	I-75	62.22
KY	I-64	US-23	KY/WV Line	0.71
KY	I-65	TN/KY Line	KY/IN Line	137.46
KY	I-71	I-65	I-75	96.81
KY	I-75	TN/KY Line	I-71	172.83
KY	KY 1934	Kramers Lane (K5L)	I-264	0.52
KY	KY 4	KY 1682 (K12L)	KY 922	3.03
KY	KY 757	US 23	End at Coal Terminal	1.52
KY	KY 922	KY 4	I-75	1.79
KY	US 23	Former KY 757	I64	0.38
Total				**607.11**

Source: USDOT Federal Highways Administration, 2017.

In Kentucky, 776 miles of highways were initially designated by FHWA to the NHFN. KYTC is limited to 75 miles of Critical Urban Freight Corridors and 150 miles of Critical Rural Freight Corridors. In the months that followed the initial NHFN designation, KYTC shared information about the network with MPOs, Area Development Districts (ADDs), Highway District Offices (HDOs), the Kentucky Freight

Advisory Committee for Transportation, and other stakeholder groups. KYTC requested MPOs designate routes to the Critical Urban Freight Corridor (CUFC) component of the network. A combined total exceeding 105 miles had been requested from four MPOs. KYTC reviewed the submittals internally (in collaboration with the MPOs) to reach the 75-mile limit. The IIJA included additional mileage of roadway for CUFC, and KYTC will begin to identify additional segments when guidance is provided by USDOT.

The Kentucky CUFC network is listed below in **Table 2-2** and shown in **Figure 2-4**. The CUFC_ID refers to a route facility type descriptor defined by FHWA and may be viewed here.

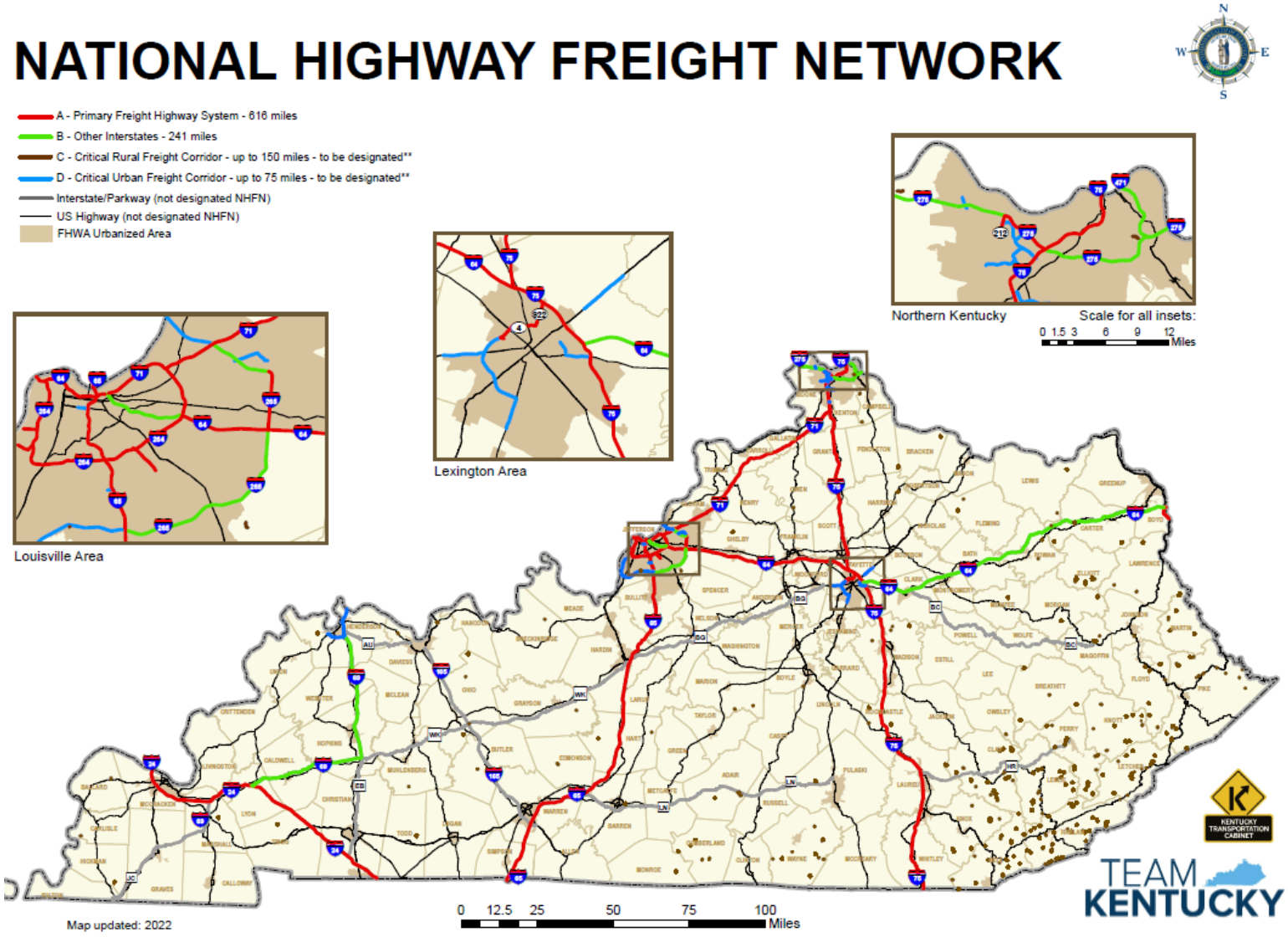
Table 2-2. Critical Urban Freight Corridors

MPO	County	RTE_UNIQ	Route No	Start Point	End Point	Length	CUFC_ID
Louisville	Jefferson	056-KY-0841 -000	KY 841	0.000	10.250	10.250	K
Louisville	Jefferson	056-KY-0841 -000	KY 841	34.727	38.881	4.154	K
Louisville	Jefferson	056-KY-1447 -000	KY 1447	6.470	9.242	2.772	J
Louisville	Jefferson	056-KY-1747 -000	KY 1747	0.347	0.837	0.490	H
Louisville	Jefferson	056-KY-1934 -000	KY 1934	0.000	7.182	7.182	J
Louisville	Jefferson	056-US-0150 -000	US 150	1.930	2.730	0.800	J
OKI	Boone	008-KY-0236 -000	KY 236	0.000	3.600	3.600	J
OKI	Boone	008-KY-0237 -000	KY 237	10.300	11.200	0.900	J
OKI	Boone	008-KY-0338 -000	KY 338	0.000	0.360	0.360	J
OKI	Boone	008-KY-0717 -000	KY 717	0.000	1.729	1.729	K
OKI	Boone	008-KY-1017 -000	KY 1017	0.000	3.210	3.210	K
OKI	Boone	008-KY-1829 -000	KY 1829	0.000	1.930	1.930	J
OKI	Boone	008-KY-3076 -000	KY 3076	0.000	1.148	1.148	J
OKI	Boone	008-US-0042 -000	US 42	13.910	14.384	0.474	J
OKI	Kenton	059-KY-0236 -000	KY 236	2.277	2.801	0.524	J
OKI	Kenton	059-KY-1829 -000	KY 1829	0.000	1.024	1.024	J
Lexington	Fayette	034-KY-0004 -000	KY 4	0.000	6.336	6.336	K
Lexington	Fayette	034-KY-0004 -000	KY 4	11.603	12.554	0.951	K
Lexington	Fayette	034-US-0027 -000	US 27	0.000	2.412	2.412	J
Lexington	Fayette	034-US-0027 -000	US 27	11.417	15.278	3.861	J
Lexington	Fayette	034-US-0060 -000	US 60	1.536	4.693	3.157	K
Lexington	Fayette	034-US-0060 -000	US 60	10.176	12.040	1.864	K
Henderson	Henderson	051-KY-0136 -000	KY 136	18.650	19.548	0.898	H
Henderson	Henderson	051-KY-0425 -000	KY 425	0.000	4.747	4.747	I
Henderson	Henderson	051-US-0041 -000	US 41	10.750	20.977	10.227	K

Source: Kentucky Transportation Cabinet. 2017.

KYTC has identified nearly 87 miles of Critical Rural Freight Corridors (CRFC) along the Kentucky Highway Freight Network and were approved by FHWA in October 2017. The Kentucky Highway Freight Network was designated primarily using a data-driven process supplemented by connectivity to known major freight generators in the state. As such, the CRFC network in Kentucky is derived from routes with very high average daily truck traffic and that provide first mile / last mile access to freight facilities. KYTC will amend the Kentucky Freight Plan when guidance is received from FWHA on new mileage thresholds.

Figure 2-4. Kentucky Routes on the National Highway Freight Network



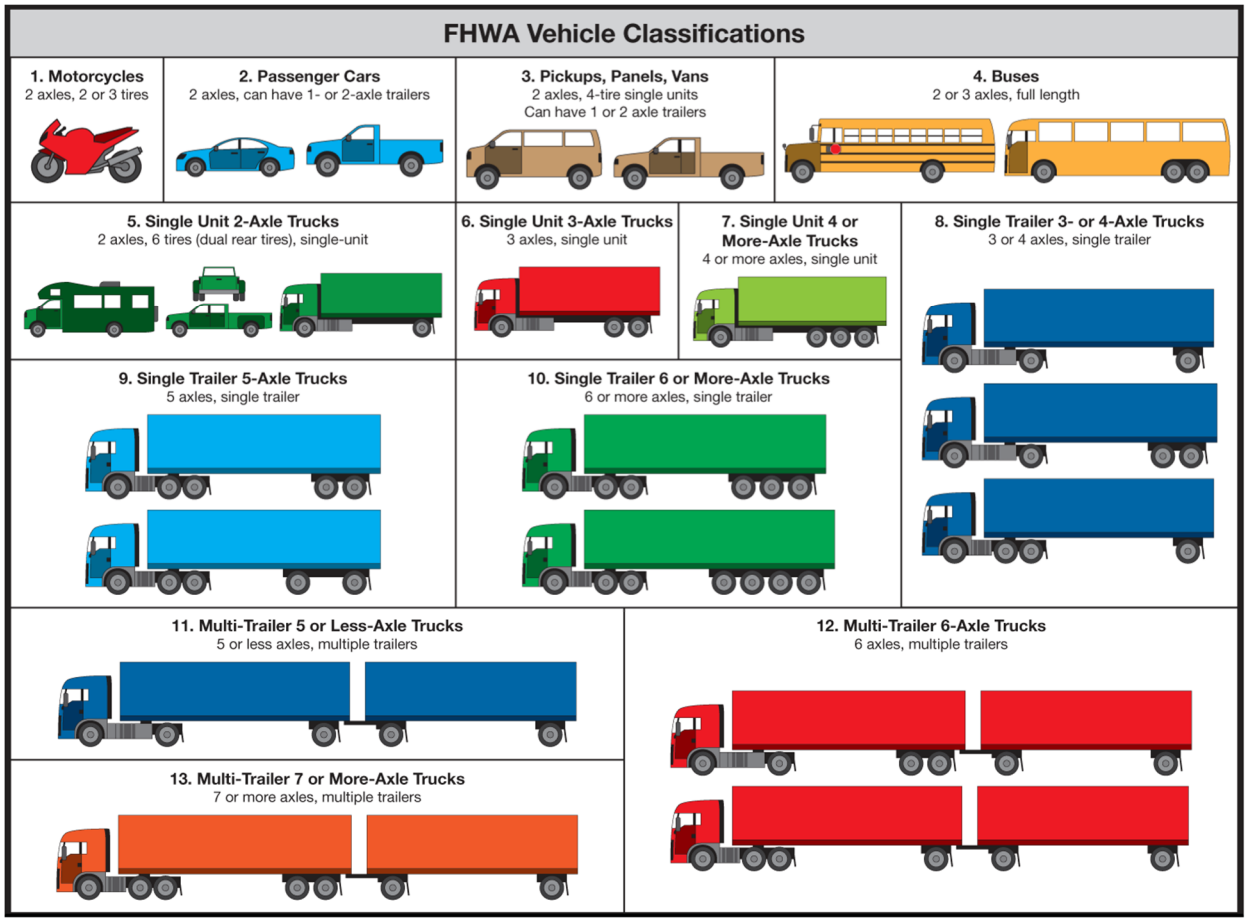
Source: Kentucky Transportation Cabinet, 2022.

2.2.2. Trucks (Commercial Vehicles)

In the purview of the KFP, trucks are regarded as commercial vehicles. Trucking is the predominant mode of freight transportation in Kentucky—trucks serve most markets, from long-distance interstate commerce to the "last mile" of intermodal goods.

The FHWA classification system recognizes nine types of trucks, as shown in **Figure 2-5**. FHWA classes 5 through 7 are medium-duty trucks, while classes 8 through 13 are heavy-duty trucks. Tractor-trailer vehicles combine a tractor with a semitrailer, trailer, or both and have four or more axles (also known as "semis" or "18-wheelers"). Medium-duty trucks typically transport freight through the region, while heavy-duty trucks are for long-hauls across a state or to national destinations.

Figure 2-5. FHWA Vehicle Classification



Source: TxDOT Traffic Recorder Instruction Manual, 2012.

Freight movements by truck in Kentucky rely heavily on the Interstate Highway System. Because trucks perform the initial pickup and delivery for most goods and commodities moved by air, rail, and water, the connector routes between the freight transportation modes are a critical link to facilitate the smooth movement of freight. Often these connectors or "last mile" segments are under local jurisdiction.

As shown in **Figure 2-4**, I-64 and I-24 provide much of the east-west movement for trucks, while I-69, I-75, I-65, and I-71 facilitate north-south truck freight movements. Along these six main interstate

highways are 17 static weigh station facilities (see **Figure 2-8**) with six located in pairs at three locations on either side of the highway median. Seven of the weigh stations also have rest havens, which provide overnight parking spaces and restroom facilities for trucks drivers. These state-controlled sites are needed to ensure compliance with federal and state regulations and laws. Recent technology—including weigh-in-motion (WIM) devices, the Pre-Pass system, enhanced sign lighting, and advanced traveler information—have enhanced the safety and efficiency of freight travel in Kentucky.

2.2.2.1 Truck Parking

For over a decade, parking availability has been among the trucking industry's top concerns. Increasing freight volumes and regulatory changes have also intensified the demand for truck parking. The primary drivers behind this increase include:

- **Hours of Service:** The Federal Motor Carrier Safety Administration (FMCSA) made regulatory changes that reduced the number of consecutive hours a truck driver can drive. While these changes have been since modified, they still significantly impact the utilization of demand for truck parking facilities.
- **Electronic Logging Devices:** Federal law mandated that trucking operations shift from a paper to an electronic logbook that automatically tracks a driver's activities based on the truck's operations. The mandate has led to stricter enforcement of the hours of service (HOS) regulations.
- **Productivity Expectations:** Rising customer expectations for shorter delivery times and an increasingly cost competitive marketplace have placed pressure on truck drivers to maximize their driving time.

Truck drivers that cannot find available parking are forced to park on highway ramps, empty lots, and even residential areas. This creates safety challenges for truck drivers and the traveling public. Long distance drivers often face the issue of deciding to stop early at a nearby available spot or continue to their federal time limit and risk not finding a safe parking spot later.

To help address these challenges, the Kentucky Transportation Cabinet (KYTC) developed a Truck Parking Assessment and Action Plan. The Plan is designed to:

- Identify truck parking supply and demand across the state and on major corridors;
- Focus on safety and in particular unauthorized parking on highway ramps;
- Leverage existing KYTC right-of way to identify low cost/high impact opportunities to increase truck parking capacity; and
- Act now by completing preliminary conceptual design of new/upgrade parking facilities.

2.2.2.2 Truck Parking Supply and Unmet Demand

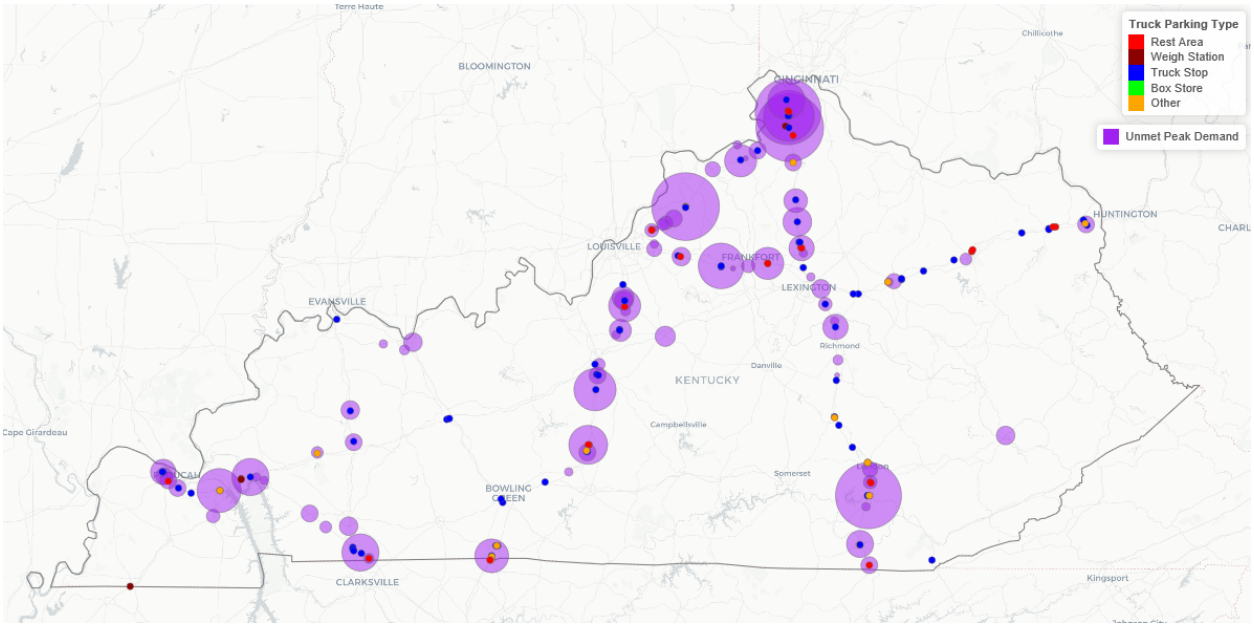
STATEWIDE TRUCK PARKING FACTS

- On an average night, 9,000 trucks compete for 7,196 parking spots.
- Wednesday is the busiest night.
- 82% of truck parking is provided by private sector truck stops.
- 18% of truck parking is provided by KYTC's rest areas, rest havens and weigh stations.

To estimate the areas with the highest levels of unmet demand, parking locations were grouped into clusters, typically located in and around highway interchanges. Clusters were established such that all authorized (rest areas, truck stops, etc.) or unauthorized parking locations (highway ramps) within a one-mile distance were clustered together. An overview of these locations is shown in **Figure 2-6**. The purple circles represent unmet demand for each cluster.

For this assessment, unmet demand is defined as the count of trucks parked for 4+ hour parking events at 1:00 AM, minus the estimated capacity of the facilities at each cluster. The figure shows high levels of unmet demand in northern Kentucky, and the Louisville and Lexington Areas. Additional areas of high unmet demand include I-75 near the Tennessee border, and along I-24 in Western Kentucky.

Figure 2-6. Unmet Peak Demand



Source: KYTC Truck Parking Study, 2022

One of the primary tools developed to summarize and review the results of the parking demand analysis was a web-based Tableau dashboard. This platform allows for an interactive display of the results in both map and chart form. The results update automatically based on the selection of one or more parking locations. In total, the dashboard in **Figure 2-7** summarizes activity at:

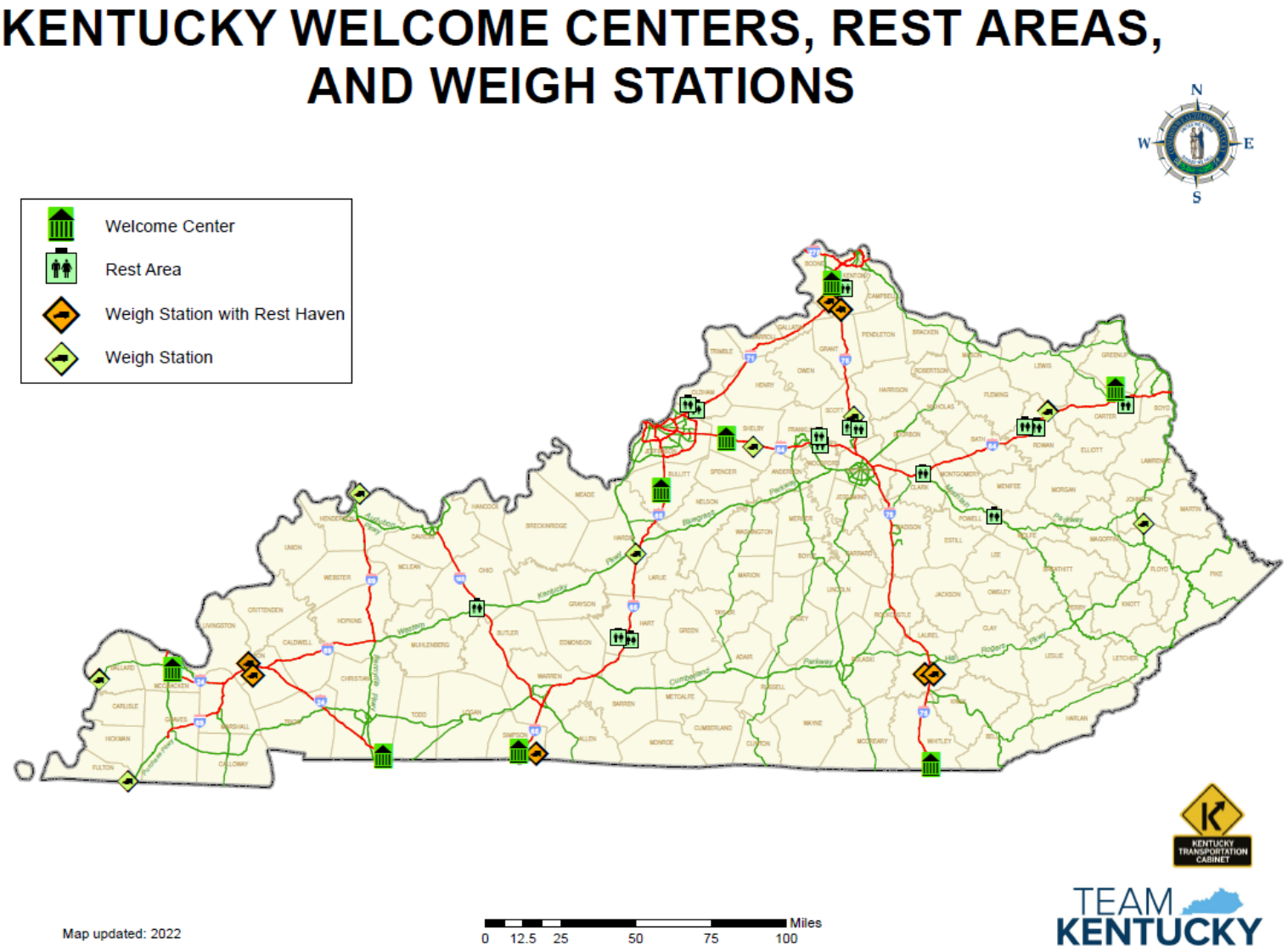
- 23 Public Rest Areas
- 4 Public Weigh Stations
- 74 Privately Operated Truck Stops

- 39 Box Store Parking Lots (e.g., Walmart, Lowes)
- 73 Highway Exit/Entry Ramps
- 15 Other Lots with Unclear Ownership

Figure 2-7. Dashboard Results for I-75 NB Welcome Center Whitley County

Source: KYTC Truck Parking Study, 2022

Figure 2-8. Welcome Centers, Rest Areas, and Weigh Stations



Source: Kentucky Transportation Cabinet, 2022.

2.3. Inland Waterway Network

Kentucky lies in the heart of the nation at the confluence of the nation's inland waterways, as shown in **Figure 2-9**, centrally located to move goods to two-thirds of the U.S. population. With the Ohio River, Mississippi River, Big Sandy River, and Tug Fork bordering the commonwealth, this location offers unique advantages for efficient year-round freight transport of bulk materials, agricultural products, chemicals, minerals, metals, wood, manufactured goods, and containerized freight. Kentucky's well-developed terminals and riverports—supported by enterprise zones, warehouse facilities, ports of entry, and foreign trade zones—link with an intermodal transportation system that forms a network with the world. Containing approximately 1,020 miles of USACE commercially navigable waterways, as listed in **Table 2-3** and shown in **Figure 2-13**, Kentucky is the linchpin between the Great Lakes, Canada, and Mexico, as well as the deep-draft ports of New Orleans, LA, and Mobile, AL, for shipments overseas.[5]

Table 2-3. Commercially Navigable Waterways

River	Commercially Navigable Miles
Ohio	669
Green	108
Tennessee	65
Cumberland	77
Mississippi	82
Licking	7
Big Sandy	12
Total	**1,020**

Source: USACE, River Mile point Dataset, 2022.

The Ohio River accounts for over 30 percent of these miles on Kentucky's navigable waterways. Five of the waterways have one or more locks and dams. The USACE owns and/or operates the locks and dams on the Ohio River, Green River, Cumberland River, and Tennessee River. The locks and dams on the Kentucky River are owned and operated by the Kentucky River Authority. Most of the locks and dams are over 50 years old, and the seven built in the 1930s and 1940s need major rehabilitation or replacement. The Locks and Dams 52 and 53, known as the Olmsted Locks and Dam, were demolished, and new locks and dams were in place by 2022. These were Ohio River's oldest locks and dams, put into operation in 1928 and 1929, respectively. A new Olmsted lock and dam a mile downstream from and lock and dam 53 was completed in 2018 to eliminate the bottleneck that resulted from the antiquated locks and dams 52 and 53. With the new facility complete, the demolition of the old dams is key to ensure ease of passage for the largest commercial vessels. In January 2022, the modernization of the Kentucky Lock received funding for completion from USACE. This project consists in building a new, modernized 1,200-foot lock to work in conjunction with the current 600-foot lock. Upon completion, it is expected that there would be virtually no wait time to lock through.

The Licking River, which connects to the Ohio River, is a navigable waterway that supports the ports in the Cincinnati and Northern Kentucky region. The most northern 7 miles of the Licking River can

[5] Kentucky Transportation Cabinet. Kentucky Riverport Improvement Project. January 22, 2008.

accommodate moving heavy cargo and barge storage. This segment has no locks or dams and can support commercial development. The Tennessee River also connects to the Gulf of Mexico. It leaves Paducah, connects to the Tennessee-Tombigbee Waterway, then to the Tombigbee River to Mobile.

Figure 2-9. Inland River System

Source: Kentucky Riverport Improvement Project, 2008.

2.3.1. Riverports

Kentucky has 10 public riverports, seven of which are operating ports, and three of which are developing ports. Each public riverport has unique characteristics, needs, and visions. The ports largely do not compete with one another, and each is at a different level of development and has different capabilities and strengths, and the ability to stimulate economic development in the surrounding region. Some of the most common commodities handled by the public riverports in Kentucky are fertilizer, grain, sand, aluminum, and steel.[6]

Kentucky's riverports play an important role in facilitating access to the commonwealth's freight transportation system. For example, rail is a vital part of riverport operations for transferring large bulk commodities from one mode to another. The 2021 USACE Port Facility Spreadsheet lists 87 rail-accessed riverport terminals in Kentucky.[7]

[6] Kentucky Transportation Cabinet, Kentucky Riverport Improvement Project, 2008.
[7] U.S. Army Corps of Engineers, Port Facility Spreadsheet, August 2021.

Table 2-4 and **Figure 2-10** provide status and locations of Kentucky's public riverports and existing multimodal network. There are four active riverports in MPO areas and three active riverports in rural or small urban areas. Each of Kentucky's active public riverports, and many of the private river terminals, are critical multimodal freight facilities, providing vital opportunities to improve the efficient movement of freight of importance to the economy of the State. For a more detailed account of the commonwealth's public riverports, see the Kentucky Riverports, Highway & Rail Freight Study on the Kentucky Riverports, Highway and Rail Freight Study webpage.

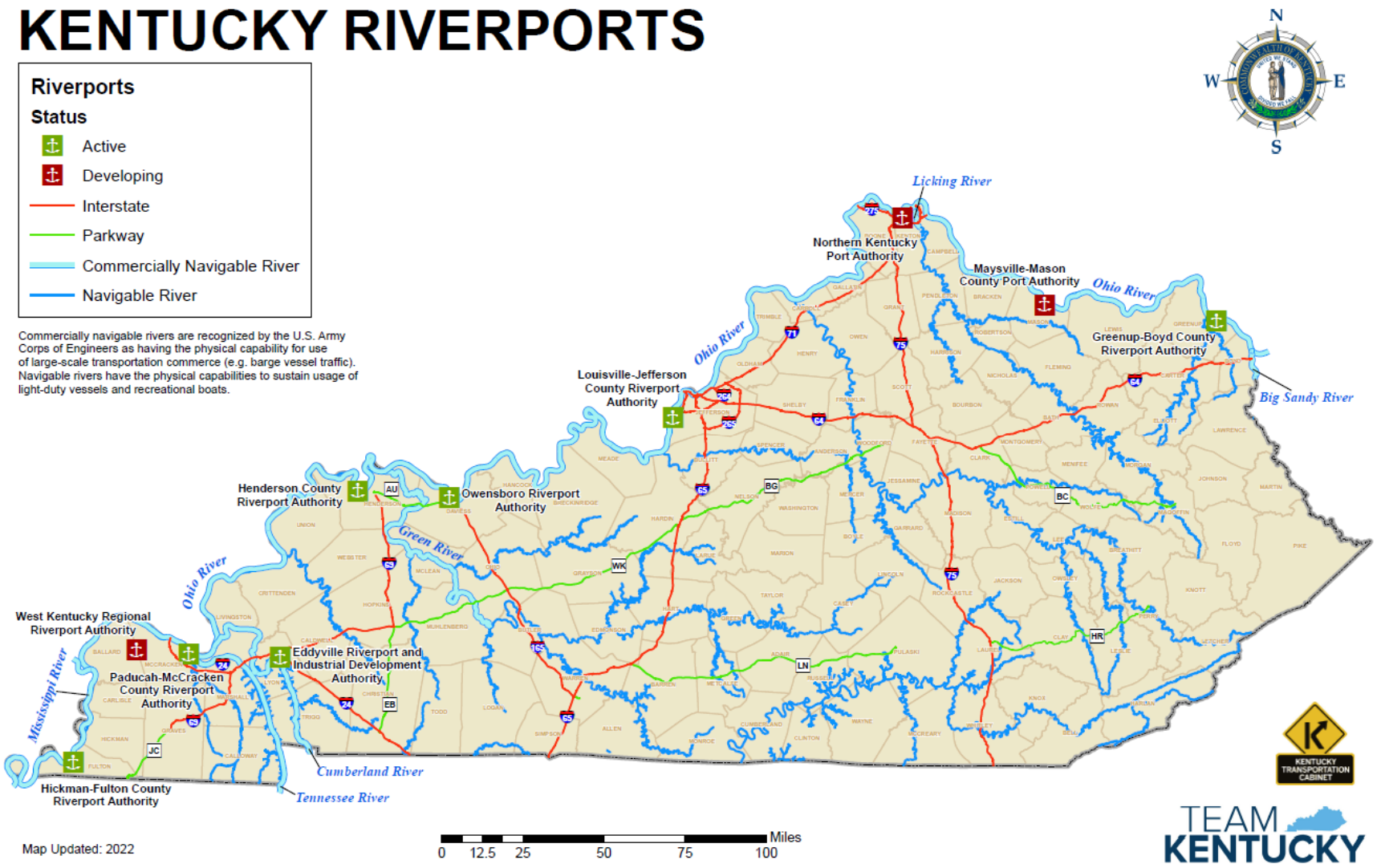
Table 2-4. Kentucky Public Riverports

Riverport Name	KYTC District	Riverport Status
Eddyville Riverport and Industrial Development	1	Active
Greenup-Boyd County Riverport	9	Active
Henderson County Riverport	2	Active
Hickman-Fulton County Riverport	1	Active
Louisville-Jefferson County Riverport	5	Active
Maysville-Mason County Riverport	9	Developing
Northern Kentucky Riverport[8]	6	Developing
Owensboro Riverport	2	Active
Paducah-McCracken County Riverport	1	Active
West Kentucky Regional Riverport	1	Developing

Source: Kentucky Transportation Cabinet, 2022.

[8] In a 2012 joint request to the USACE, the Port of Greater Cincinnati Development Authority and the Northern Kentucky Riverport Authority proposed combining the two ports under a single, expanded port boundary. USACE granted the request, thereby redesignating the then 26-mile Port of Greater Cincinnati boundary to a 226.5-mile boundary that includes the Northern Kentucky Riverport, 7 miles of the Licking River, and stretches from Louisville to Huntington. There are no active land-side facilities or properties held by the Northern Kentucky Riverport. Thus, the status remains "developing."

Figure 2-10. Kentucky Public Riverports



Source: Kentucky Transportation Cabinet, 2022.

2.3.2. Inland Waterway Governance

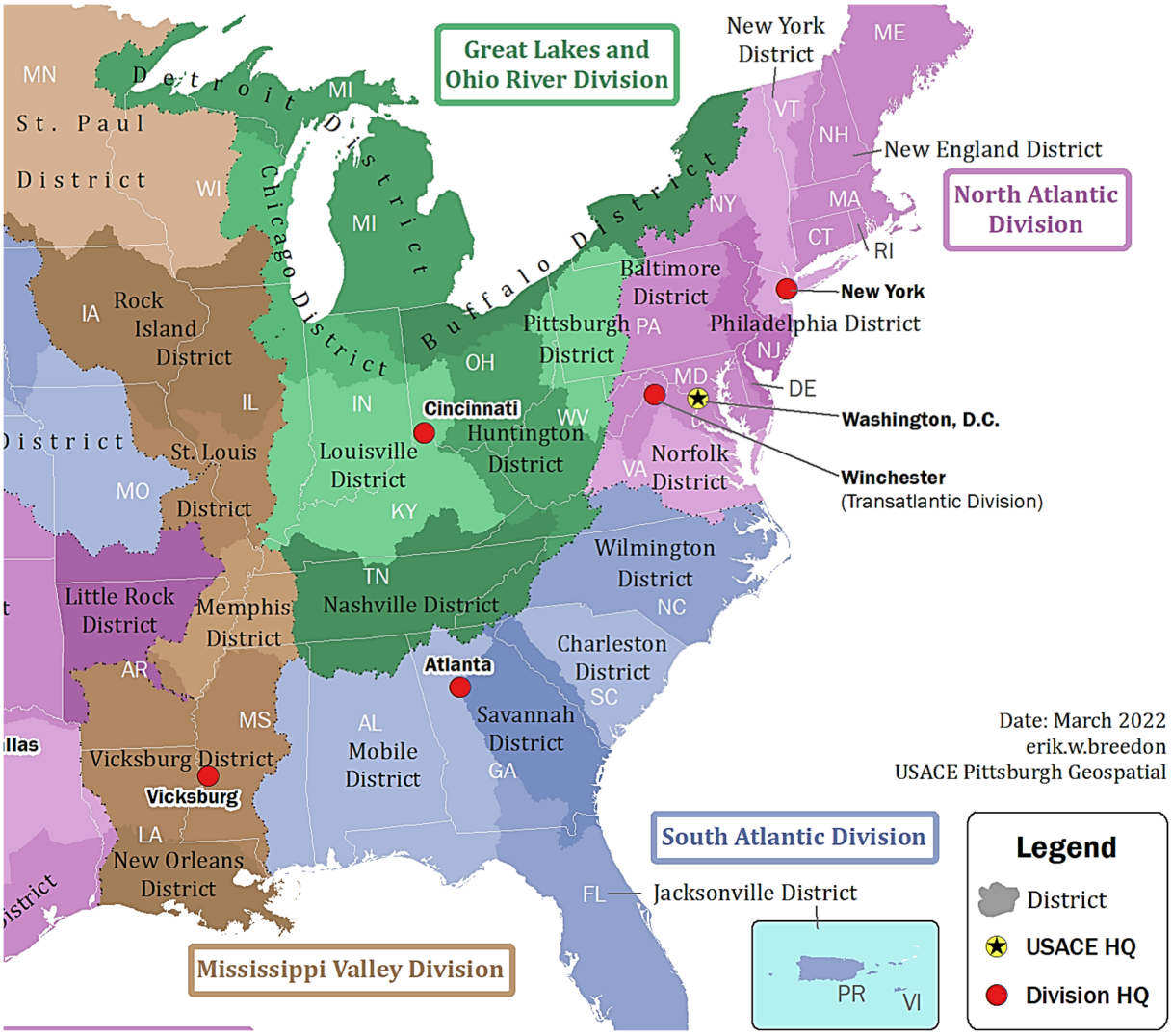
The riverports and inland waterway network in Kentucky are overseen in varying capacities by the USACE, U.S. Coast Guard (USCG), Maritime Administration (MARAD), various port authorities, Kentucky River Authority, and guided by Water Transportation Advisory Board (WTAB). A brief description of each entity's role is described below.

2.3.2.1 U.S. Army Corps of Engineers

There are two divisions and four districts of the USACE with operations in Kentucky. The Louisville, Huntington, and Nashville districts, under the Great Lakes & Ohio River Division, and the Memphis District, under the Mississippi Valley Division (**Figure 2-11**), own and operate the locks and dams on rivers in Kentucky, and they operate and maintain the commercial inland navigation channels, which includes dredging. Kentucky has approximately 1,600 miles of USACE designated navigable waterways, ranking 4th in inland waterway miles across all states in the continental U.S. Of the navigable waterways, 1,020 miles are navigable by commercial vessels.

The Water Resources Reform and Development Act (WRRDA) is the primary legislation by which Congress authorizes the USACE key civil works missions, including navigation, flood risk management, and environmental restoration. The authorities provided in WRRDA help USACE continue to provide value to the nation in developing and maintaining the nation's waterways and harbors, reducing damages from storm events, and restoring the environment.

Figure 2-11. USACE Inland Waterways District Divisions



Source: U.S. Army Corps of Engineers.

2.3.2.2 U.S. Coast Guard

Kentucky is located within the USCG's Eighth Coast Guard District, which covers all or part of 26 states from the Appalachian Mountains and Chattahoochee River in the east, to the Rocky Mountains in the west, and from the U.S.-Mexico border and the Gulf of Mexico to the Canadian border in North Dakota. The Eighth District is responsible for protecting Kentucky's inland navigable waterways to enable safe, secure, and efficient movement of goods.

2.3.2.3 Maritime Administration/Marine Highways

MARAD is the agency within the USDOT focused on waterborne transportation. MARAD's programs promote the use of waterborne transportation and its seamless integration with other segments of the transportation system, as well as the viability of the U.S. merchant marine. MARAD works in many areas involving ships and shipping, shipbuilding, port operations, vessel operations, national security, environment, and safety. Kentucky is part of the MARAD Inland Waterways Gateway which covers 18 states. The office in St. Louis, Missouri is responsible for the upper Mississippi River states, while the

recently (2018) opened office in Paducah, Kentucky is responsible for the Lower Mississippi River and Ohio River states and primarily responsible for Kentucky programs.

In 2007, MARAD established the America's Marine Highway Program to reduce landside congestion through the designation of Marine Highway Routes. The Coast Guard and Maritime Transportation Act of 2012 expanded the scope of the program to efforts that generate public benefits by increasing the utilization or efficiency of domestic freight or passenger transportation on Marine Highway Routes (**Figure 2-12**) between U.S. ports. The three designated Marine Highway Routes that directly serve Kentucky are the following:

- M-55, which includes the Mississippi River corridor along Kentucky's western border
- M-65, which includes the Tennessee River from Paducah to the Tennessee-Tombigbee Waterway
- M-70, which includes the Ohio River corridor forming the commonwealth's northern border, from Ashland to Wickliffe

Designating routes in the Marine Highway System identifies an opportunity to alleviate freight-related congestion on existing parallel land routes, which leads to reduced emissions, energy conservation, increased system resiliency, improved safety, and reduced road maintenance costs.

In December 2020, the Consolidated Appropriations Act of 2021 appropriated available funding for FY 2021 America's Marine Highway Program. This program continues to align with the MARAD Office of Marine Highways and Passenger Services infrastructure goal by "guiding strategic investments for port and landside infrastructure that expand the use of the nation's navigable waters".

Figure 2-12. America's Marine Highway Routes

Source: USDOT Maritime Administration, 2021

2.3.2.4 Riverports and Port Authorities

Kentucky Revised Statute (KRS 65.520) outlines the laws that regulate establishment, powers (further specified in KRS 65.530), and KYTC's oversight of public riverports in Kentucky. According to law, any governmental unit in Kentucky may establish a riverport authority with the KYTC Secretary's approval. Riverport authorities provide oversight on riverport development activities, as well as conduct normal riverport business.

Public riverports are managed by a riverport authority, usually as part of a city or county government, or a joint city-county government partnership. Public riverport authorities are managed by a board of officials, which appoints a riverport director or president. As stated in KRS 65.540, if the authority is established by a city, members of the board are appointed by the mayor of the city. If the authority is established by a county, members of the board are appointed by the county judge/executive with the approval of the fiscal court.

2.3.2.5 Kentucky River Authority

The Kentucky River Authority is an agency that is administratively attached to the Kentucky Finance and Administration Cabinet. Its primary purpose is to operate and maintain the locks and dams on the Kentucky River. These locks and dams were originally built by the USACE.

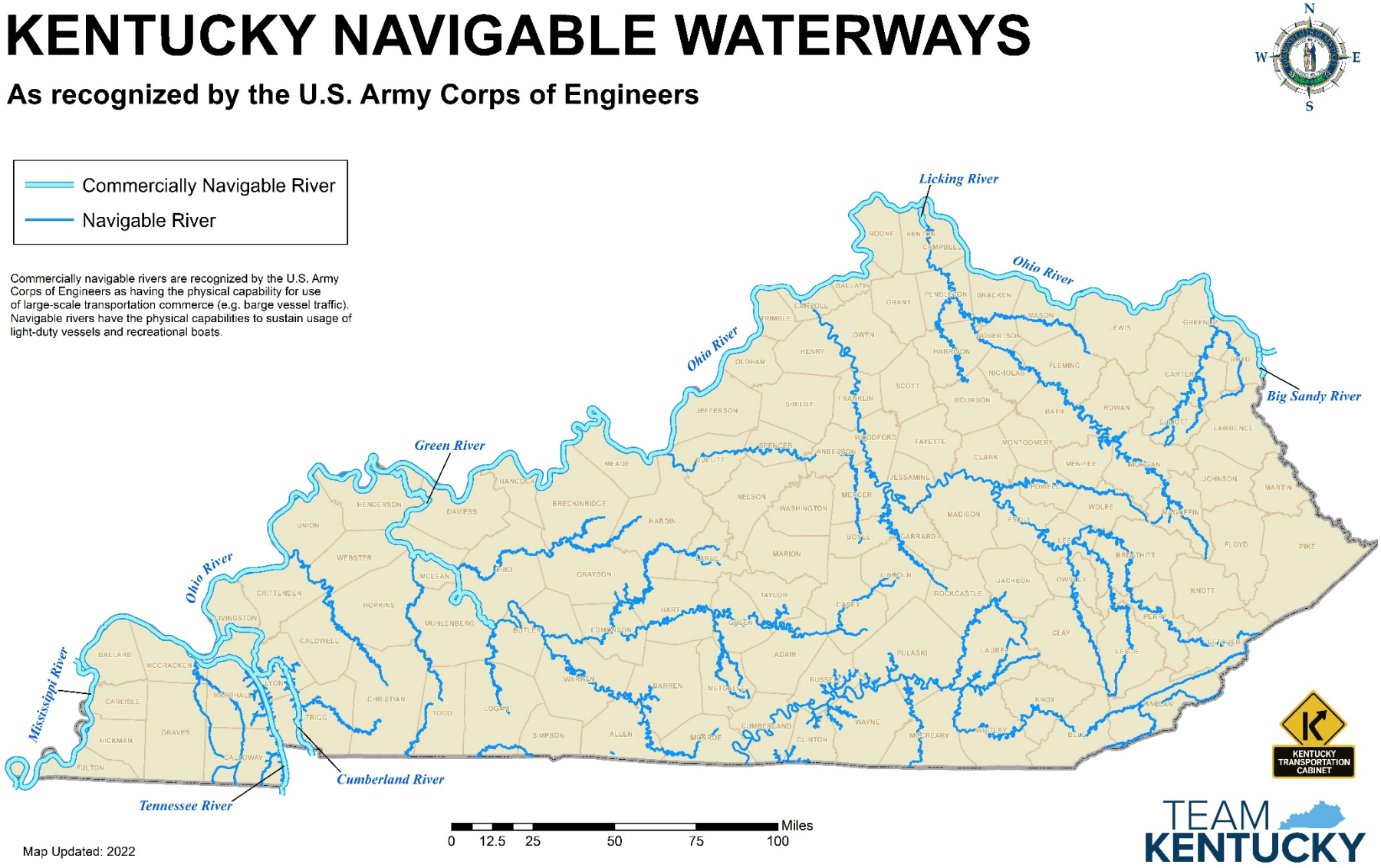
2.3.2.6 Water Transportation Advisory Board

The WTAB was established by the Kentucky General Assembly in 2010, and it is an advisory board to the executive and legislative branches of government on matters concerning water transportation. This board is composed of seven members who are appointed by the Governor, and they serve terms of 4 years. The WTAB's duties are the following:

1. Advising KYTC, the Cabinet for Economic Development, the Governor's Office, and the General Assembly on matters relating to water transportation.
2. Recommending action to enable the Commonwealth to make best use of its waterways and riverports for future economic growth.
3. Assisting in defining the duties and functions of positions within state government responsible for water transportation.
4. Recommending criteria for setting priorities for funding riverport marketing initiatives under the riverport marketing assistance trust fund established in KRS 154.80-140.
5. Evaluating applications submitted by riverports for grants under the riverport marketing assistance trust fund and making recommendations to the granting authority on the disbursement of those funds.
6. Recommending criteria for setting priorities for funding riverport improvements under the riverport financial assistance trust fund established in KRS 174.210.
7. Evaluating applications submitted by riverports for grants under the riverport financial assistance trust fund and making recommendations to the granting authority on the disbursement of those funds.

In July 2021, five Kentucky riverports were awarded $500,000 for critical repairs and equipment replacement, as recommended by the Kentucky WTAB. This investment will improve operations to move cargo more efficiently and safely.

Figure 2-13. Kentucky Navigable Waterways



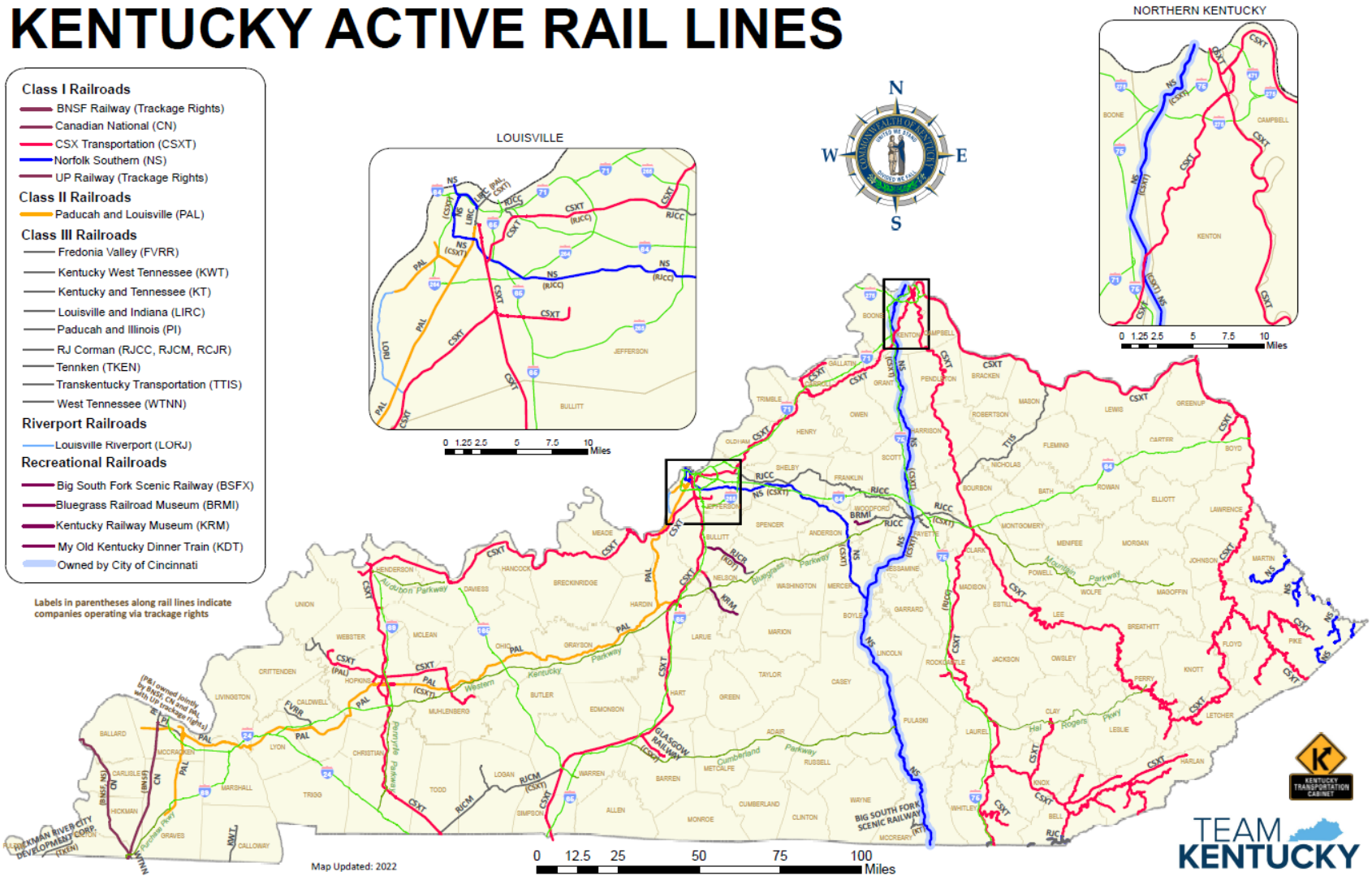
Source: Kentucky Transportation Cabinet, 2022.

2.4. Rail Network

Kentucky plays an important role in the U.S. rail network. According to the Association of American Railroads (AAR), in 2019 Kentucky ranked 20th among all states for originated tonnage, 23rd for originated carloads/units, and 22nd for total tons carried. Freight railroads operating within Kentucky through ownership or trackage rights consist of five Class I railroads, one Class II railroad, and seven Class III railroads (**Figure 2-14**). The Surface Transportation Board (STB) defines a class of railroad based on revenue thresholds adjusted for inflation. As of 2019, the Association of American Railroads (AAR) defines a Class I railroad as a common carrier having annual operating revenues of at least $505 million. A Class II railroad, also referred to as a regional railroad, is a common carrier having annual operating revenues of at least $40 million, or that operates at least 350 miles of road and revenues of at least $20 million. A common carrier is a person or company that transports goods or passengers on regular routes at set rates. A Class III railroad, also known as a short line railroad, is a carrier which is neither a Class I nor a regional railroad.[9]

[9] Association of American Railroads (AAR). *https://www.aar.org/railroad-101/*. Accessed April 2022.

Figure 2-14. Kentucky Active Rail Lines



Source: Kentucky Transportation Cabinet, 2022.

As seen in **Table 2-5**, Kentucky's railroad system includes approximately 2,700 route miles, as of year-end 2021. The five Class I railroads represent approximately 2,185 miles, or approximately 80 percent of the statewide rail system. These railroads are Burlington Northern Santa Fe (BNSF), Canadian National (CN), CSX Transportation (CSXT), Norfolk Southern (NS), and Union Pacific (UP).

In Kentucky, CSXT is the largest railroad company in terms of mainline route mileage, accounting for 1,596 miles, or 59 percent of the total route miles excluding trackage rights. The second largest railroad by mileage is NS, operating on 480 route miles, or almost 18 percent of the statewide rail system. The third largest railroad company by mainline route mileage is the Paducah and Louisville Railway, Inc. (PAL), and this is Kentucky's only Class II (regional) railroad. PAL operates 267 miles of mainline railroad, almost 10 percent of the statewide rail system.

Table 2-5. Freight Railroad Route Miles Operated in Kentucky[10]

Railroad	Class	Miles Owned by Self	Miles Owned by Proprietary/ Leased/ Trackage Rights	% Total (excluding trackage)
Burlington Northern Santa Fe (BNSF)	I	13	45	0.48%
Canadian National (Illinois Central) (Grand Trunk Corp.) (CN)	I	96	1	3.52%
CSX Transportation	I	1,596	351	58.57%
Norfolk Southern (NS)	I	480	1	17.61%
Union Pacific (UP)	I	0	1	0.00%
Paducah & Louisville (PAL)	II	267	45	9.80%
Fredonia Valley Railroad (FVRR)	III	12	0	0.44%
Kentucky and Tennessee Railway (KT)	III	0	8	0.00%
Kentucky West Tennessee Railway (KWT)	III	13	0	0.48%
Louisville & Indiana Railroad (LIRC)	III	4	0	0.15%
Paducah & Illinois (PI)	III	15	0	0.55%
RJ Corman (RJC)	III	130	64	4.77%
TennKen (TKEN)	III	10	0	0.37%
Transkentucky Transportation (TTIS)	III	49	0	1.80%
West Tennessee Railroad (WTNN)	III	1	0	0.04%
Louisville Riverport Railroad (LORJ)	III	9	0	0.33%
Amtrak	Pass.	0	212	0.00%
Big South Fork Scenic Railroad	Rec.	8	0	0.29%
Bluegrass Railroad Museum	Rec.	5	0	0.18%
Kentucky Railroad Museum	Rec.	17	0	0.62%
Total		**2,725**	**728**	**100%**

Source: Kentucky Transportation Cabinet, 2022.

[10] KYTC Data Mart, *KYTC Active Rail*, https://datamart.kytc.ky.gov/, Accessed May 2022.

The table above shows only route miles owned, leased, or with trackage rights by railroad companies, as reported to KYTC on the annual reports from all freight railroads. The individual totals may not accurately represent actual mileage. Multiple railroads own, lease, or have trackage rights on some other sections of track. Some of these railroads operate on trackage rights or through subsidiary railroads.

The Commonwealth of Kentucky does not own or operate any rail assets. When KYTC is considering a location for a new or reconstructed roadway that intersects or lies adjacent to a rail facility, the Cabinet must coordinate its efforts with the railroad company.

Many intermodal facilities located near Kentucky's rail network transfer goods from rail to other freight modes. For example, there are four intermodal facilities in the commonwealth that can transfer containers and/or trailers of cargo from rail to truck. NS operates three facilities, two in Louisville and one in Georgetown, and CSXT operates one facility in Louisville. These multimodal freight facilities are critical to Kentucky, providing vital opportunities to improve the efficient movement of freight of importance to the economy of the state.

The 2015 Kentucky Statewide Rail Plan is available on KYTC's website and is currently undergoing an update, which is scheduled to be completed in 2023.

2.4.1. Rail Governance

The Class I, II, and III railroads are privately owned. The railroad operations, such as service locations, shipping rates, and schedules, are all controlled by the railroad companies themselves and are regulated by the Federal Railroad Administration (FRA) and STB. Below are brief descriptions for the FRA and STB.

2.4.1.1 Federal Railroad Administration

The FRA is a federal agency within the USDOT that is responsible for ensuring the safety of the U.S. passenger and freight rail operations and infrastructure by promoting safe, efficient, and accessible rail transportation. To carry out this responsibility, FRA promulgates and enforces rail safety regulations, consolidates government support of rail transportation activities, administers financial assistance programs, and conducts research and development in support of improved railroad safety and efficiency and national transportation policy.[11]

2.4.1.2 Surface Transportation Board

The STB is an independent adjudicatory body organizationally housed within the USDOT, and it makes independent rulings regarding certain surface transportation economic regulatory matters. The STB's jurisdiction includes railroad rates and service issues, rail restructuring transactions, labor matters, data collection, abandonments, and operational oversight.[12]

2.5. Pipelines

Almost 41,000 miles of pipelines move natural gas, crude oil, refined petroleum products, and highly volatile liquids, flammable liquids, and toxic liquids throughout Kentucky. **Figure 2-15** illustrates the

[11] Federal Railroad Administration, *https://www.fra.dot.gov/Page/P0002*, Accessed on March 29, 2022.
[12] Surface Transportation Board, *https://www.stb.gov/about-stb/*, Accessed on March 29, 2022.

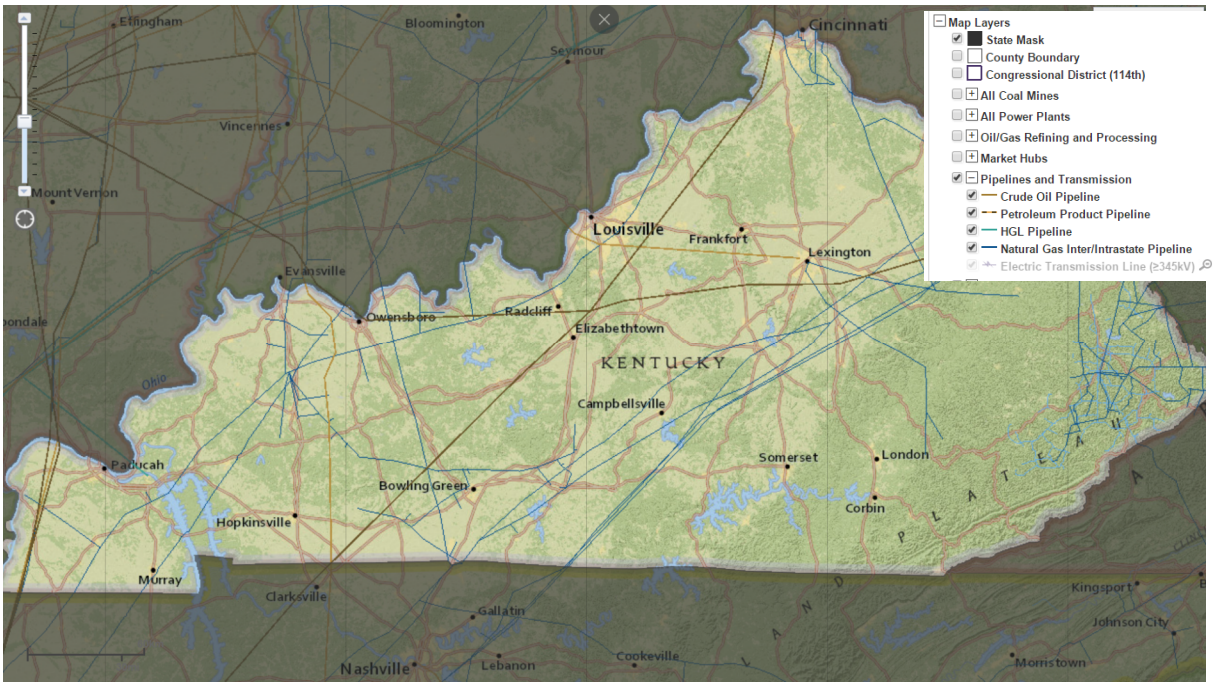
locations of pipelines in Kentucky and **Table 2-6** lists the pipeline mileage by commodity in 2020. Ninety-eight percent of these pipelines transported natural gas, and the total miles of natural gas transmission pipelines are among the highest of any state in the Southeast. The remaining pipelines transported hazardous liquids, which are crude oil, refined petroleum products, and highly volatile liquids, flammable liquids, and toxic liquids.

Table 2-6. Kentucky Pipeline Mileage by Commodity.

Commodity	Pipeline Miles
Natural Gas	Transmission: 6,751 miles Gathering: 352 miles Distribution – Mains: 19,258 miles Distribution – Service: 13,484 miles **TOTAL: 39,846**
Crude Oil	602
Refined Petroleum Products*	91
Highly Volatile Liquids, Flammable Liquids, and Toxic Liquids	273
Total Pipeline Miles	**40,812**

Source: Pipeline and Hazardous Materials Safety Administration, Pipeline Mileage and Facilities. Retrieved November 2021.
*Notes: *Refined petroleum products are obtained by distilling and processing crude oil that are liquid at ambient conditions.*

Figure 2-15. Locations of Pipelines in Kentucky



Source: U.S. Energy Information Administration, State Profile and Energy Estimates. December 2021.

Pipeline operators of natural gas transmission, crude oil, refined petroleum products, and highly volatile liquids, flammable liquids, and toxic liquids include Columbia Gas Transmission, LLC; Columbia Gulf, LLC; Tennessee Gas Pipeline Co. (TGP); Texas Eastern Transmission LP (Spectra Energy Corp); and Texas Gas Transmission, LLC accounted for 74 percent of the operators for natural gas pipelines. Marathon Pipe Line, LLC and Mid-Valley Pipeline Co. accounted for nearly 100 percent of the operators for crude oil pipelines. BP Pipeline (North America), Inc. and Marathon Pipe Line, LLC accounted for 96 percent of the operators for refined petroleum products pipelines. Markwest Ranger Pipeline Company,

LLC accounted for 86 percent of the operators for highly volatile liquids, flammable liquids, and toxic liquids pipelines. The U.S. Energy Information Administration (EIA) maintains a database that provides information on the size and location of natural gas pipeline projects announced or under construction. For example, it lists a small upgrade project called the Mainline 100 and Mainline 200 Replacement Project" by Columbia Gas Transmission.[13]

Kentucky's pipeline network connects to roadways at truck/pipeline terminals where commodities are transferred from pipelines to trucks for further transport on the Kentucky Freight Network. FHWA classifies public roads leading to major intermodal facilities as NHS intermodal connectors, and they account for less than one percent of the NHS mileage. In Kentucky, three NHS intermodal connectors provide access to pipeline terminals: Bells Lane Petroleum/Chemical Pipeline in Louisville, Campground Road Petroleum Pipeline in Louisville, and Louisville/Ashland Oil/Chevron Distribution Center in Lexington.[14]

Pipelines support Kentucky's air cargo industry. Jet fuel that is used at Louisville Muhammad Ali International Airport and the Cincinnati/Northern Kentucky International Airport is refined at the Catlettsburg Refinery (in Boyd County, KY) shipped by pipeline to a barge transfer point, barged down the Ohio River to pipeline junctions that convey the jet fuel to the airports.

2.5.1. Pipeline Governance

Much like railroads, pipelines are privately owned. They are regulated at the federal level by the Pipeline and Hazardous Materials Safety Administration (PHMSA), while at the state level, Kentucky Public Service Commission (PSC) regulates the pipelines. Below are brief descriptions for the PHMSA and Kentucky PSC.

2.5.1.1 Pipeline and Hazardous Materials Safety Administration

The PHMSA is organizationally housed in the USDOT and has regulatory responsibility for hazardous liquid and gas pipeline transport in the U.S. Federal regulations include minimum standards for safety in design, construction, inspection, testing, operation, and maintenance of pipelines. States are certified by PHMSA to inspect and enforce pipeline safety regulations for intrastate pipeline operators. In Kentucky, the Pipeline Safety Branch of the Kentucky PSC performs this inspection and enforcement.[15]

2.5.1.2 Kentucky Public Service Commission

In 1970, the Kentucky General Assembly selected the Kentucky PSC as the state agency to enforce federal and state pipeline safety laws and regulations for intrastate natural gas transmission pipelines. The Kentucky PSC has jurisdiction over 32 intrastate pipeline operators. The cost of Kentucky's state pipeline safety program is federally reimbursed by up to 80 percent.[16]

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[13] Energy Information Administration. *https://www.eia.gov/naturalgas/pipelines/EIA-NaturalGasPipelineProjects.xlsx.* Accessed November 2021.
[14] Federal Highway Administration. *http://www.fhwa.dot.gov/planning/national_highway_system/intermodal_connectors/kentucky.cfm.* Accessed March 2022.
[15] Pipeline and Hazardous Materials Safety Administration. *http://primis.phmsa.dot.gov/comm/StatePages/Kentucky.htm.* Accessed March 2022.
[16] Kentucky Public Service Commission, *http://www.psc.state.ky.us/Home/PipelineSafety*, Accessed March 2022.

2.6. Air Cargo

Fifty-nine public use airports are located throughout Kentucky providing commuter, private passenger, and/or cargo services (**Figure 2-16**). Kentucky's primary air cargo handling airports are Louisville International Airport and Cincinnati/Northern Kentucky International Airport. According to the Airports Council International – North America (ACI-NA), both airports were ranked in the top 10 in North America and top 25 in the world in terms of total air cargo tonnage in 2020 (**Table 2-7**).[17] The Federal Aviation Administration (FAA) ranked the two airports in the top 10 of cargo services airports in the U.S. in terms of landed weight for 2019 (Louisville International Airport at 3rd and Cincinnati/North Kentucky International Airport at 6th).[18] While the FAA maintains a database for air cargo landings within the U.S., ACI-NA's database accounts for worldwide air cargo activity.

Table 2-7. Kentucky Air Cargo Airports, 2016 and 2020 Cargo Tonnage and Rank

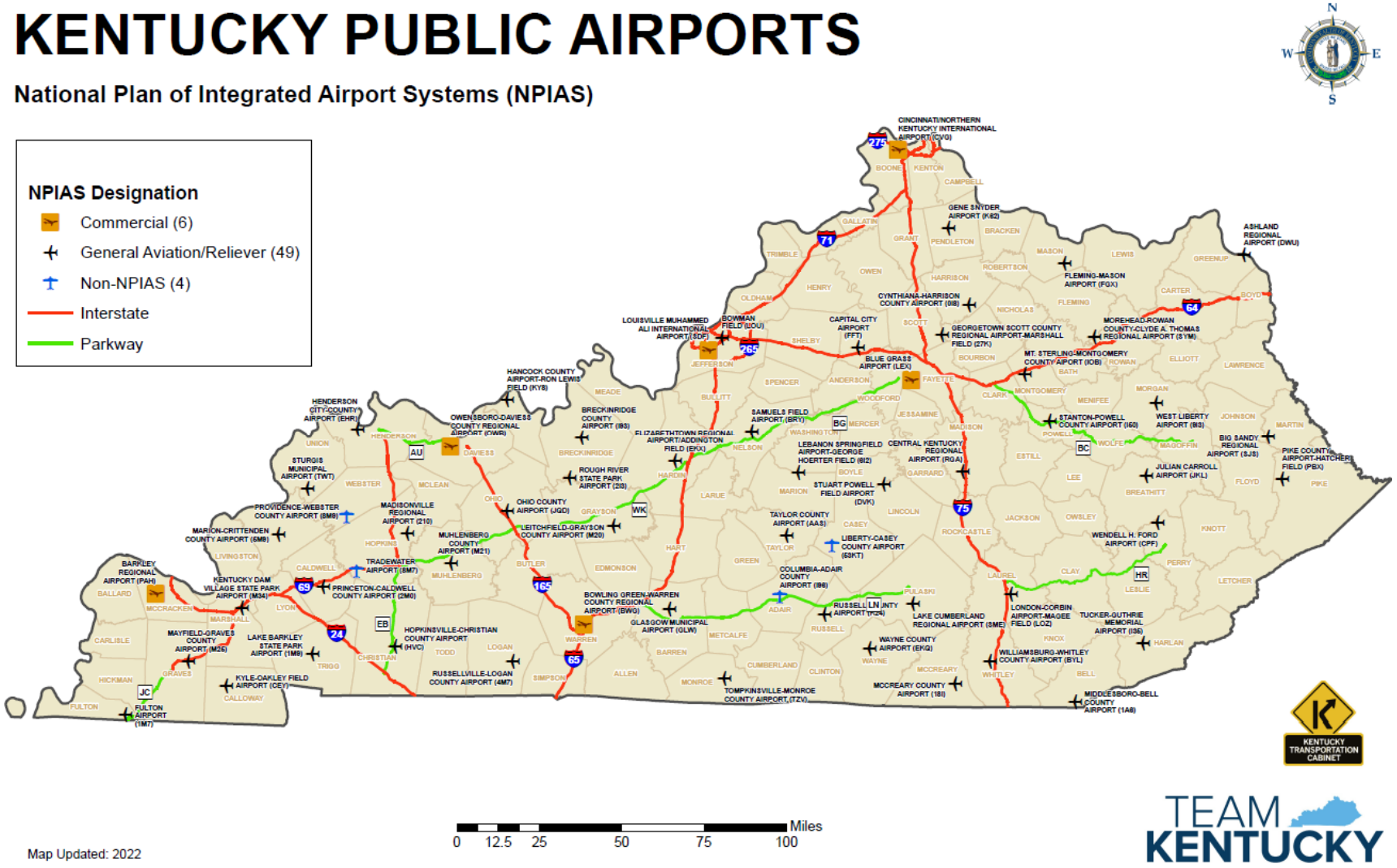
ID	Airport Name	2016 Total Cargo Tonnage*	2020 Total Cargo Tonnage*	2016-2020 CAGR**	North American Rank 2020	Global Rank 2020
SDF	Louisville International Airport	2,437,010	2,917,243	3.66%	3rd	5th
CVG	Cincinnati/Northern Kentucky International Airport	742,256	1,300,758	11.87%	7th	21st

Source: Airports Council International – North America Database
*Note: *Total Cargo – loaded and unloaded freight and mail in metric tons. **CAGR=Compound Annual Growth Rate. Source: Airports Council International – North America (ACI-NA)*

In 2020, Louisville International Airport and Cincinnati/Northern Kentucky International Airport handled over 4.2 million tons of total air cargo, representing an increase of 5.82 percent annually since 2016. More than two-third of the total tonnage handled during this time period occurred at Louisville International Airport. However, the Cincinnati/Northern Kentucky International Airport experienced a faster growth by total tonnage at 11.87 percent annually.

[17] Airports Council International – North America, *https://airportscouncil.org/intelligence/north-american-airport-traffic-reports/*, Accessed March 2022.
[18] Federal Aviation Administration, *http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/previous_years/#2019*, Accessed November 2021.

Figure 2-16. Kentucky Public Airports



Source: Kentucky Transportation Cabinet, 2022.

2.6.1. Louisville Muhammad Ali International Airport

Louisville Muhammad Ali International Airport (SDF) is the primary commercial airport serving the Louisville metropolitan area and attracts travelers from central portions of Kentucky and southern Indiana. It is the busiest airport in Kentucky regarding annual air cargo tonnage, and it is home to WorldPort, the worldwide hub of United Parcel Service, Inc. (UPS). According to the ACI-NA, 2.9 million tons of freight and mail were handled through this airport in 2020. Air cargo carriers benefit from several of Louisville International Airport's competitive advantages, such as central location in the U.S., direct access to the Interstate Highway System via I-65 and I-264, and three runways.

2.6.1.1 United Parcel Service WorldPort

In 2002, UPS opened WorldPort at Louisville International Airport as its international air express hub and the home base of its air cargo operations. In April 2010, UPS completed a $1 billion expansion that increased sorting capacity by 37 percent to 416,000 packages per hour. The WorldPort is now 5.2 million square feet with 155 miles of conveyor belts to sort packages.

More than 150 companies have cited WorldPort as a reason for moving their business facilities and operations to Louisville. The mega-hub is also less than 2 miles from UPS's largest Supply Chain Solutions campus in the world.[19]

2.6.2. Cincinnati/Northern Kentucky International Airport

The Cincinnati/Northern Kentucky International Airport (CVG) is the primary commercial airport serving the Cincinnati metropolitan area. It is the second busiest airport in Kentucky for annual air cargo tonnage and serves as one of DHL's three global hubs. According to the ACI-NA, 1.3 million tons of freight and mail were handled through this airport in 2020.

The Cincinnati/Northern Kentucky International Airport is located on approximately 7,000 acres in the City of Hebron. The airport consists of three parallel runways and one crosswind runway, and each runway is served by at least one parallel taxiway. Direct access to the Interstate Highway System via I-75 and I-275 is one of the major benefits of this airport for air cargo carriers.

2.6.2.1 Amazon Air

In January 2017, Amazon and CVG made the agreement to open an Amazon Air Hub at the location in Northern Kentucky. The $1.5 billion facility partially opened in August 2021, with approximately 24 aircraft parking positions and an estimate of 32 aircraft based out of CVG for a total up of 64 flights per day. Air cargo at CVG grew 14 percent in 2020 and is expected to grow at least 10 percent more by 2022, when Amazon's new facility is fully operational.[20]

2.6.2.2 DHL

[19] Louisville Regional Airport Authority, *https://www.flylouisville.com/corporate/louisville-regional-airport-authority/?msclkid=1a370fc4b07211ec9cd297bd56e8de0b*, Accessed March 2022.
[20] The New York Times, *https://www.nytimes.com/2021/01/12/business/air-cargo-airports-amazon.html*, Accessed March 2022.

Since 2009, DHL has invested more than $280 million in upgrading its operations at the airport to establish a "super hub," one of only three worldwide and the only one in the U.S. DHL's other global "super hubs" are in Hong Kong and Leipzig, Germany. More than 90 percent of the company's volume in the U.S. moves through CVG. Currently ranked as the seventh largest cargo airport in North America, CVG experienced a 14.8 percent increase in cargo tonnage for year-end 2020 according to ACI-NA.

2.6.3. Aviation Governance

Kentucky public airports are governed by regional airport authorities or local boards. A local board is established by any urban-county government, city, county, or city and county acting jointly, or any combination of two or more cities, counties, or both. Different portions/activities at airports are overseen by the U.S. Customs and Border Protection (CBP) and the FAA at the federal level, and by the Kentucky Department of Aviation at the state level. Below are brief descriptions for the CBP, FAA, and Kentucky Department of Aviation.

2.6.3.1 U.S. Customs and Border Protection

The CBP is the largest law enforcement agency of the U.S. Department of Homeland Security. The agency's primary mission is to oversee U.S. borders, ports, and other points of entry to protect the public from terrorist threats and illegal trade and traffic. Regarding aviation, CBP has regulatory authority to limit the locations where a private aircraft entering the U.S. from a foreign area may land. Louisville International Airport, Cincinnati/Northern Kentucky International Airport, and Lexington Blue Grass Airport are the airports in Kentucky designated for CBP inspection services.

2.6.3.2 Federal Aviation Administration

The FAA is the operating mode of the USDOT responsible for the safety of civil aviation. The FAA's major roles include:

- Regulating civil aviation to promote safety
- Encouraging and developing civil aeronautics, including new aviation technology
- Developing and operating a system of air traffic control and navigation for both civil and military aircraft
- Researching and developing the National Airspace System and civil aeronautics
- Developing and carrying out programs to control aircraft noise and other environmental effects of civil aviation
- Regulating U.S. commercial space transportation

In the pursuit of safety, the FAA issues rules and sets standards for both aeronautical equipment and people working in the aviation field.[21]

[21] Federal Aviation Administration, *https://www.faa.gov*, Accessed March 2022.

2.6.3.3 Kentucky Department of Aviation

The Kentucky Department of Aviation is one of the KYTC departments that provides support and service to the 59 public airports, 83 private runways, and 54 heliports within Kentucky. This department administers state and federal funding for airport maintenance and capital improvement projects.[22]

[22] Government of Kentucky, *http://kentucky.gov/government/Pages/AgencyProfile.aspx?AgencyTitle=Aviation,+Department+of*, Accessed March 2022.

3. Goals and Performance Measures

The KFP serves as an independent document that supports the implementation of the commonwealth's LRSTP. The KFP's goals are consistent with the LRSTP's goals and objectives, as well as the National Freight Policy goals. In addition to the goals, the KFP identifies a set of objectives and performance measures that articulate KYTC's freight investment priorities to help define freight system investment needs and identify the desired future performance of the system.

3.1. 2045 Long-Range Statewide Transportation Plan Goals

In 2021-22, KYTC undertook a significant effort to engage Kentuckians to develop an overall transportation vision and goals for Kentucky's future. Through input from the public and focus groups, the LRSTP identified the following vision for Kentucky's future transportation system:

A viable multimodal transportation system providing access and mobility for all users to safely reach their destinations.

To support this vision, a series of goals were developed.

- Enhance safety
- Deliver a high level of maintenance and resiliency
- Establish a reliable flow of people and freight
- Provide local, regional, and global connectivity for communities
- Deliver and operate a system that protects or enhances the natural and human environment

3.2. Alignment with National Freight Policy Goals

The KFP goals were established after reviewing the goals of National Multimodal Freight Policy and the National Highway Freight Program. By focusing on these national goals, the KFP is a required framework for performance measure development.

3.2.1. Goals of the National Multimodal Freight Policy (49 U.S. Code § 70101)

1) Identify infrastructure improvements, policies, and operational innovations that:
    a. strengthen the contribution of the National Multimodal Freight Network to the economic competitiveness of the United States;
    b. reduce congestion and eliminate bottlenecks on the National Multimodal Freight Network; and
    c. increase productivity, particularly for domestic industries and businesses that create high-value jobs;
2) Improve the safety, security, efficiency, and resiliency of multimodal freight transportation;
3) Achieve and maintain a state of good repair on the National Multimodal Freight Network;

4) Use innovation and advanced technology to improve the safety, efficiency, and reliability of the National Multimodal Freight Network;
5) Improve the economic efficiency and productivity of the National Multimodal Freight Network;
6) Improve the reliability of freight transportation;
7) Improve the short and long-distance movement of goods that:
    a. travel across rural areas between population centers;
    b. travel between rural areas and population centers; and
    c. travel from the Nation's ports, airports, and gateways to the National Multimodal Freight Network;
8) Improve the flexibility of states to support multi-state corridor planning and the creation of multi-state organizations to increase the ability of states to address multimodal freight connectivity;
9) Reduce the adverse environmental impacts of freight movement on the National Multimodal Freight Network; and
10) Pursue these goals in a manner that is not burdensome to state and local governments.

3.2.2. Goals of the National Highway Freight Program (23 U.S. Code § 167)

1) Invest in infrastructure improvements and to implement operational improvements on the highways of the United States that:
    a. strengthen the contribution of the National Highway Freight Network to the economic competitiveness of the United States;
    b. reduce congestion and bottlenecks on the National Highway Freight Network;
    c. reduce the cost of freight transportation;
    d. improve the year-round reliability of freight transportation; and
    e. increase productivity, particularly for domestic industries and businesses that create high-value jobs;
2) Improve the safety, security, efficiency, and resiliency of freight transportation in rural and urban areas;
3) Improve the state of good repair of the National Highway Freight Network;
4) Use innovation and advanced technology to improve the safety, efficiency, and reliability of the National Highway Freight Network;
5) Improve the efficiency and productivity of the National Highway Freight Network;
6) Improve the flexibility of states to support multi-state corridor planning and the creation of multi-state organizations to increase the ability of states to address highway freight connectivity; and
7) Reduce the environmental impacts of freight movement on the National Highway Freight Network.

3.3. Freight Plan Goals & Objectives

The KFP goals align with those of the LRSTP, the national multimodal freight policy, the national highway freight program, and other state freight plans. These goals guide the recommendations, freight investment plan, and performance measures to support the progress of the KFP. The goals fall into five different areas: safety, maintenance and resiliency, reliability, accessibility and mobility, and environmental stewardship. The KFP goals and their associated objective are summarized in **Table 3-1**.

Table 3-1. KFP Goals

KFP Goal	Freight Objectives
Safety	• Reduce the number of crashes involving commercial vehicles • Provide adequate truck parking availability • Reduce the amount of disruption to freight movements resulting from crashes • Reduce the amount of conflict between vehicles moving freight, pedestrians, and bicycles
Maintenance and Resiliency	• Improve and preserve pavement and bridge conditions crucial for freight movement • Protect transportation infrastructure crucial for freight movement from extreme weather events, including from flooding and stormwater runoff. • Provide a level of redundancy to the system supporting the freight network
Reliability	• Improve the efficiency of freight transportation and the capacity of freight-related infrastructure throughout Kentucky • Deliver construction and maintenance projects in a manner to reduce freight delays or disruptions • Facilitate the cooperation in the development and operations for all modes which creates seamless trips for goods
Accessibility and Mobility	• Reduce impediments to access multimodal facilities • Address bottlenecks on the freight network • Improve access to freight generators, including energy activity areas and freight-related businesses
Environmental Stewardship	• Reduce the environmental impacts of building, maintaining, and operating Kentucky's transportation system • Reduce greenhouse gas (GHG) emissions and minimize freight impacts to air quality, historically disadvantaged communities, and wildlife habitats • Avoid, minimize, or mitigate environmental impacts related to freight movements

Table 3-2 below demonstrates the alignment of KFP goals with the National Multimodal Freight Policy goals and National Highway Freight Program goals. **Table 3-3** contains additional information on the KFP goals, objectives, performance measures, and indicators.

Table 3-2. Alignment of LRSTP/KFP Goals with National Freight Policy Goals

		National Freight Policy Goals										Highway Freight Program Goals						
		Identify Improvements, Policies, and Innovations	Safety, Security, Resiliency	State of Good Repair	Advanced Technology	Economic Efficiency/Productivity	Reliability	Improve Freight Mobility	Multi-State Planning	Environmental	Not burdensome	Infrastructure & Operational Improvements	Safety, Security, Resiliency	State of Good Repair	Advanced Technology	Network Efficiency & Productivity	Multi-State Coordination	Environmental
KFP Goals	Safety		X	X	X	X	X				X	X	X	X			X	
	Maintenance & Resiliency	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X
	Reliability	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Accessibility and Mobility	X	X		X	X	X	X	X	X	X	X	X		X	X	X	X
	Environmental Stewardship		X		X					X					X	X		X

3.4. Objectives and Performance Measures

The KFP identifies a set of objectives that articulate KYTC's freight goals, help define freight system investment needs, and identify the desired future performance of the freight network. Specifically, performance measures can be used to quantifiably assess freight infrastructure investment. In addition, performance measures can be used to increase communication with the Freight Advisory Committee, the general public, freight stakeholders, and elected officials. Internal to KYTC, performance measures can serve three specific purposes:

PLANNING: Performance measures can be used as a tool to evaluate proposed projects and scenarios to gauge their effectiveness in achieving the KFP's goals. These high-level metrics can create an evaluation of alternatives.

IMPLEMENTATION: Performance measures can be used as a tool to emphasize KFP goals within the policy development, budgeting, programming, and project selection processes. For example, the measures might assist decision-makers in the project selection process by providing metrics about their potential effectiveness.

ACCOUNTABILITY: Performance measures can be used as a tool to facilitate tracking and reporting KYTC's progress in achieving the KFP's goals to support accountability for plan implementation and results.

Performance measures are a tool to achieve the plan, not a grade. These measures must be applied to something within KYTC's control—otherwise a performance measure has no value and only presents a risk of KYTC being held accountable for results they cannot influence. The potential performance

measures listed below are tied to quantitative information where available. They are intended to guide future investment decisions and can also be used to assess the progress of the KFP's implementation. A prominent guiding principle in the development of a performance measure is the utilization of existing data alongside leveraging current (or planned) data collection efforts.

In addition to the performance measures, indicators are identified. Indicators are important data points to monitor the status of the freight system; however, they are outside of the direct influence of KYTC. The performance measures and indicators will be further defined in forthcoming planning activities by KYTC. Additionally, FHWA continues to develop national management standards for the NHS, which encompasses a large portion of Kentucky's freight transportation system. The KFP goals, objectives, performance measures, and indicators are listed in **Table 3-3**. Each measure is designed to track progress towards a pre-determined target.

Table 3-3. KFP Goals, Objectives, Performance Measures, and Indicators

Goal: Enhance safety	
Objectives	**Performance Measures**
• Reduce rates of crashes, injuries, and fatalities involving commercial vehicles • Provide adequate truck parking availability • Minimize the time the freight network suffers interruption from an incident • Reduce the conflict between freight vehicles and pedestrians/ bicycles	• Commercial vehicle crash rate • Grade crossing crash/incident rate
	Indicators
	• Number of public truck parking spaces • Railroad incidents/near-misses • Inland waterway crashes/incidents • Aviation crashes/incidents • Change in tonnage/value/miles • Resiliency – recovery • Hours of downtime on freight network resulting from incidents
Goal: Deliver a high level of maintenance and resiliency	
Objectives	**Performance Measures**
• Keep Kentucky's state highway pavement, bridges, and highway-related assets in good condition • Assist modal partners in achieving state-of-good repair for aviation, riverports, rail, and navigable waterway infrastructure • Maintain a program of public, highway-rail at-grade crossing evaluations • Protect transportation infrastructure crucial for freight movement from extreme weather events, including from flooding and stormwater runoff. • Provide a level of redundancy to the system supporting the freight network.	• Percent of structurally deficient bridges on freight network • Percent of freight network meeting pavement condition targets • Number of weight-restricted bridges on the freight network • Number of vertical restrictions on the freight network • Congestion of the freight network (level of service or volume/capacity) • Reliability (buffer index/planning index) • Pavement and bridge ratings on intermodal connectors and roads leading to major energy/manufacturing centers
	Indicators
	• Percent of publicly owned airports meeting the commonwealth's standards • Rate of dredging • Condition of locks and dams

Goal: Ensure a reliable flow of people and freight	
Objectives	**Performance Measures**
• Improve the efficiency of freight transportation and the capacity of freight-related infrastructure throughout Kentucky • Deliver construction and maintenance projects in a manner to reduce freight delays or disruptions • Facilitate the cooperation in the development and operations for all modes which creates seamless trips for goods	• Congestion on intermodal connectors and roads leading to major energy/manufacturing centers • Reliability on intermodal connectors

Goal: Provide local, regional, and global connectivity for communities	
Objectives	**Performance Measures**
• Reduce impediments to access multimodal facilities • Address bottlenecks on the freight network • Improve access to freight generators, including energy activity areas and freight-related businesses	• Last mile LOS ratings • Bottlenecks (Delay) • Bottlenecks (Reliability)
	Indicators
	• Change in freight ton-miles • Change in freight tonnage movement by mode

Goal: Reduce environmental impact through improved freight system efficiencies	
Objectives	**Performance Measures**
• Reduce the environmental impacts of building, maintaining, and operating Kentucky's transportation system • Reduce emissions and minimize freight impacts to historically disadvantaged communities and wildlife habitats • Avoid, minimize, or mitigate environmental impacts related to freight movements	• MPO air quality ratings • Truck CO_2 emissions per mile on interstate highways
	Indicators
	• Number of freight crashes that require environmental cleanup • Change in freight tonnage movement by mode/fuel

4. Current Conditions

The efficient, reliable, and safe movement of freight relies on a properly maintained transportation system that functions well within anticipated periods of high demand. The condition of Kentucky's transportation system is the result of a variety of factors such as public-sector transportation funding availability, private sector infrastructure investments, system demand, economic conditions, and the quality and timing of capacity and operational improvements and regular maintenance.

This section describes the current condition of the Kentucky freight system by mode – highways, waterways, rail, pipelines, and airports. The conditions include the current state of the freight infrastructure, system performance, and safety.

4.1. Highways

Kentucky has an extensive network of interstates and major highways that support 364 million tons[23] of truck-borne freight annually. This includes two of the nation's busiest north-south interstate corridors (I-75 and I-65), connecting U.S. industries from Canada to Mexico. Kentucky is also home to almost 200 miles of I-64, a major east-west corridor stretching from Norfolk, VA, to St. Louis, MO.

4.1.1. Congestion/Bottlenecks

Freight bottlenecks occur at locations (usually bridges, interchanges, railroad crossings, lane reductions, etc.) where the free flow of goods is disrupted. There are two general types of freight bottlenecks:

- **Recurring:** Peak hour congestion that occurs each day along a segment of highway
- **Non-recurring:** Unpredictable bottlenecks that are likely to occur at specific locations, such as construction zones, crashes, extreme weather conditions, etc.

In May 2021, the American Road & Transportation Builders Association (ARTBA) released a study titled "Throttled: The Economic Costs of Freight Bottlenecks"[24], which estimated that freight bottlenecks cause approximately 659 million truck hours of delay nationwide and a cost loss of $42 billion (2019 $) annually.

4.1.1.1 Congestion/Bottleneck Reports

Since 2002, the American Transportation Research Institute (ATRI) and FHWA have partnered to collect and analyze truck Global Positioning System (GPS) probe data to assess freight movements and bottlenecks in the U.S. Since then, ATRI has published an annual list of the 100 worst freight bottlenecks in the country. In 2022, the report listed the Brent Spence Bridge (owned and maintained by KYTC) as the second worst freight bottleneck in the U.S. in 2021.[25] This bottleneck has significant implications for northern Kentucky freight, particularly in moving goods to/from the Cincinnati/Northern Kentucky

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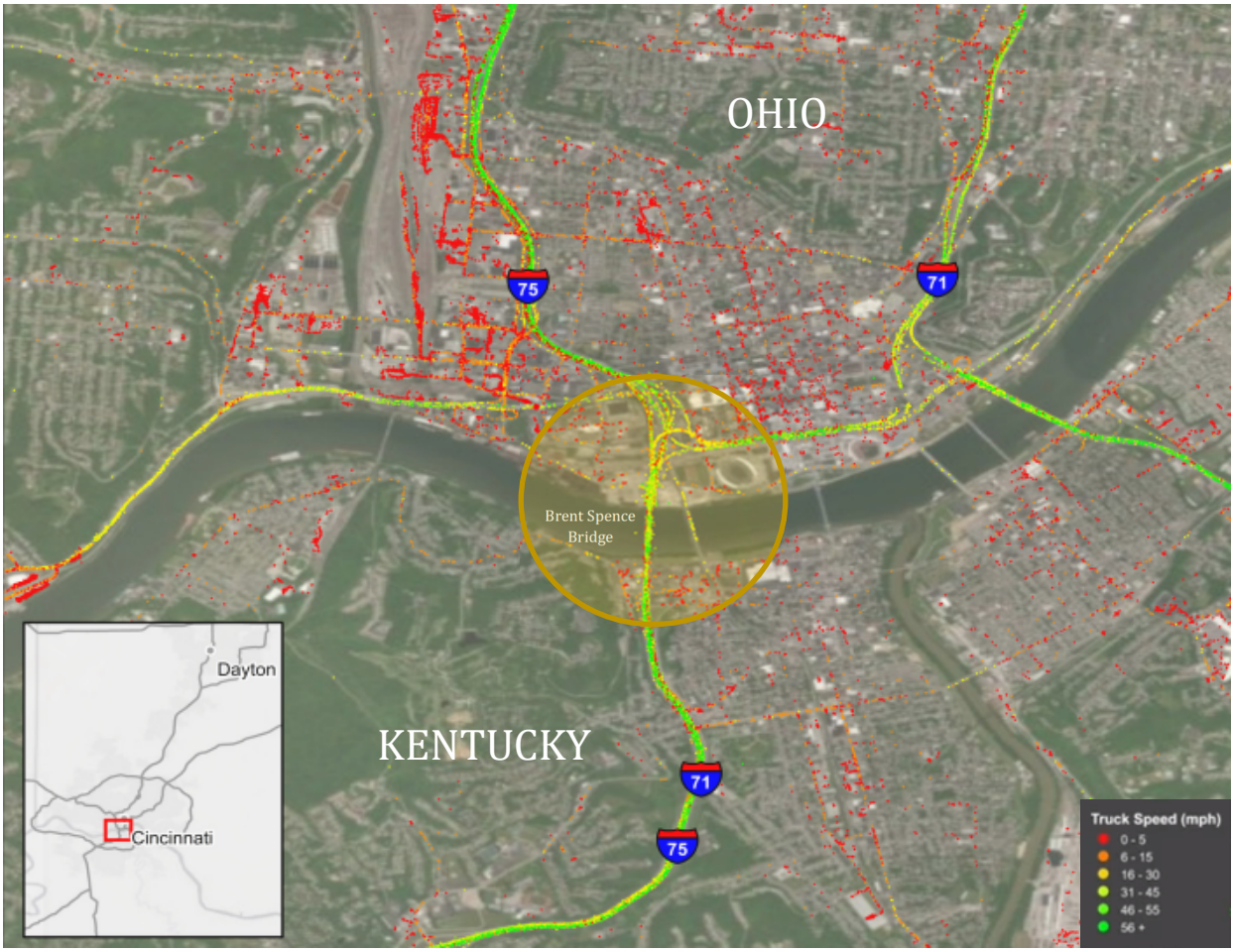
[23] Freight Analysis Framework, using the sum of tonnage for Kentucky as an origin and tonnage for Kentucky as a destination.
[24] American Road & Transportation Builders Association. *Freight Bottlenecks a $42 Billion Hidden Cost on U.S. Economy, Federal Data Shows. https://www.artba.org/2021/05/24/freight-bottlenecks-a-42-billion-hidden-cost-on-u-s-economy-federal-data-shows/*. Accessed May 2022.
[25] American Transportation Research Institute (ATRI), *Top 100 Truck Bottlenecks,* Accessed February 2022.

International Airport (CVG) and surrounding large-scale warehousing and distribution hubs. The bottleneck congests traffic across the bridge into and out of Kentucky, as shown in **Figure 4-1**.

Figure 4-1. ATRI Freight Bottlenecks – Brent Spence Bridge



Source: American Transportation Research Institute, 2022 – animation found here.

The issue of staging trucks for supply and distribution/delivery logistics and required driver rest is a critical issue along Kentucky's highways and particularly near industrial and agriculture areas. Drivers are using interstate ramps, commercial/retail parking lots, and other areas to park and wait for their pick-up/drop-off time window to load and unload. This is creating safety concerns on interstates, conflicts with passenger vehicles, increased congestion at intersections and ramps adjacent to designated and over capacity truck parking areas, and increased emissions and noise from idling trucks to local communities. This also places an increased strain on law enforcement to monitor and enforce illegal parking practices.

4.1.1.2 KYTC Congestion/Bottleneck Analysis

This section presents KYTC's efforts to identify highway locations with the worst congestion using INRIX real-time traffic data. These locations were identified using truck travel time and delay and may be referred to as speed bottlenecks. The bottlenecks highlight where there are major freight mobility issues. The Cabinet recognizes there are many methods to identify, quantify, and rank highway congestion.

Identifying the Top Truck Speed Bottlenecks on Kentucky's Interstate System

In Kentucky, there are 1,138 unique Interstate segments in the 2021 INRIX data. These segments were ranked according to the following two criteria:

- **Lowest Truck Speed:** Average truck travel times on a segment were considered over five time periods: AM, Mid-Day, PM, overnight, and weekend days. The greatest 50th percentile of truck travel time over all five time periods was used to calculate the slowest truck speed on that segment to gauge reliability of travel on a segment with known length.
- **Average Delay:** This measure uses the lowest truck speed (first ranking criterion), compares it to the posted speed limit on a segment, and weighs the resulting speed differential by the length of the segment and the average daily truck traffic on that segment. The resulting measure is the average delay on that segment, ranked from largest to smallest delay for all 1,138 segments.

The final ranking of truck bottlenecks is derived from a combination of the two ranking criteria above, lowest truck speed and average delay, for different locations on the interstate system in Kentucky.

Many of the worst locations are located in Northern Kentucky or in the Louisville region due to the high truck volumes and increased congestion on the interstates in those areas as well as the presence of major river crossings and complex system interchanges. **Table 4-1** summarizes the locations of the top truck bottlenecks on the Kentucky interstate system in 2021.

Table 4-1. Locations of the 2021 Top Truck Bottlenecks on the Kentucky Interstate System

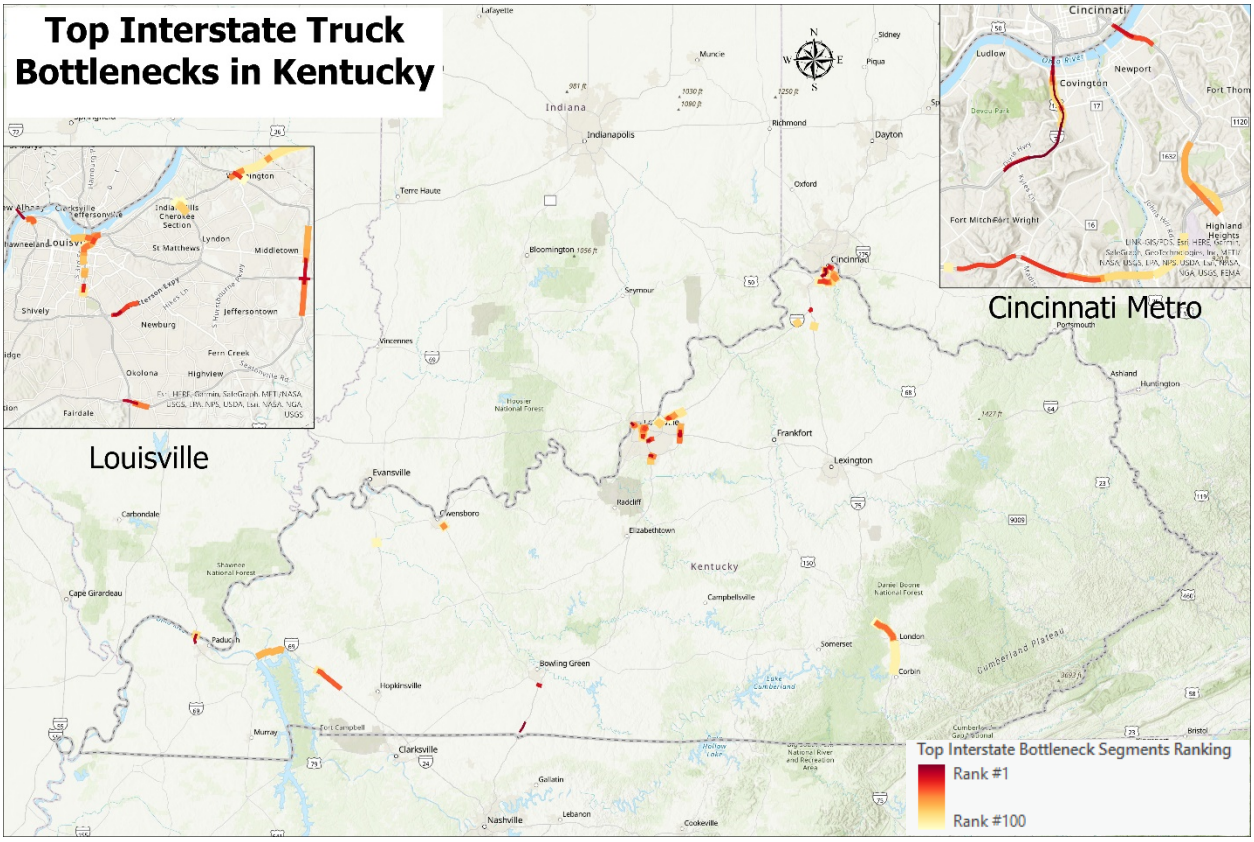
Rank	County	Route	Location	Average Truck ADT	Miles
1	Kenton	I-71	Brent Spence Bridge	23,706	6.43
2	Simpson	I-65	South of I-65/KY-100	12,760	3.49
3	Jefferson	I-64	Sherman Minton Bridge	7,124	1.36
4	Campbell	I-471	Bridge over the Ohio River	9,592	1.63
5	Jefferson	I-265	I-265/I-64 Interchange	10,622	8.79
6	Jefferson	I-264	East of I-65/Watterson Expy Interchange	11,253	1.94
7	McCracken	I-24	Bridge at the Kentucky/Illinois State Line	6,969	2.85
8	Jefferson	I-65	South of I-65/I-64 Interchange	15,034	1.93
9	Kenton	I-275	West of I-471/I-275 Interchange	11,610	5.77
10	Jefferson	I-71	I-71/I-265 Interchange	11,555	8.78
11	Laurel	I-75	North of I-75/KY-80 Interchange	9,269	16.12
12	Jefferson	I-265	East of I-65/I-265 Interchange	14,212	1.45
13	Warren	I-165	I-65/I-165 Interchange	5,039	1.38
14	Daviess	I-165	I-165/US-60-BYP Exit 70	3,044	0.15
15	Jefferson	I-264	I-71/Watterson Expy Interchange	6,769	1.08
16	Webster	I-65	Webster/Henderson County Line	3,141	0.02
17	Laurel	I-75	South of I-75/KY-192 Interchange	10,473	17.59
18	Trigg	I-24	North of I-24/US-68 Interchange	5,281	9.74
19	Campbell	I-471	I-471/I-275 Interchange	13,144	2.51

Rank	County	Route	Location	Average Truck ADT	Miles
20	Grant	I-75	KY-491/Exit 166	10,553	0.01
21	Lyon	I-24	West of I-24/US-62 Interchange	9,514	8.15
22	Jefferson	I-64	I-65/I-64 Interchange	24,191	2.03
23	Boone	I-71	I-71/I-75 Interchange	13,093	0.87
24	Boone	I-71	Boone/Gallatin CL	13,093	0.03
25	Jefferson	I-65	Jefferson/Bullitt County Line	22,168	0.05

Source: Kentucky Transportation Cabinet, INRIX, 2021.

Figure 4-2 shows the locations of these top truck bottlenecks in Kentucky. The higher-ranking bottlenecks show those with a combination of low truck speed and increased average delay,

Figure 4-2. Top Interstate Truck Bottlenecks—Low Truck Speed/High Average Delay



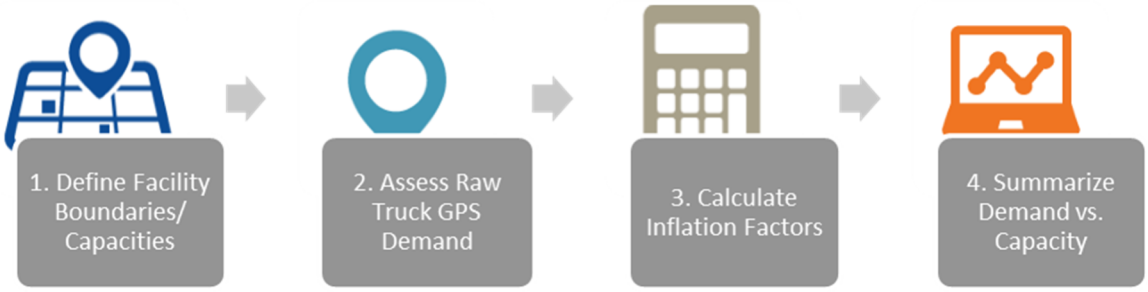
Source: Kentucky Transportation Cabinet, INRIX, 2021.

The state employs several strategies to address freight bottleneck mobility issues. KYTC analyzes the INRIX data to identify and monitor bottlenecks. The more severe congestion locations are considered in the highway project planning process. Example upgrade projects that are planned and/or underway to improve freight movement include the Brent Spence Bridge and Approach Improvements (including a new companion bridge); ongoing widening of I-265 and I-71 and improvements to the I-64/I-265 interchange; widening of I-75 to six lanes through the state.

4.1.1.3 Truck Parking

KYTC recently completed a statewide Truck Parking Assessment and Action Plan. The main objective of this study was to identify and assess truck parking supply and demand on major freight corridors. The analysis approach consisted of a four-step process as shown in **Figure 4-3**.

Figure 4-3. Truck Parking Supply Dataset Development Process



A summary of key findings include:

- Every weekday night, there are approximately 9,000 trucks parked for more than 4 hours.
- There are 7,196 truck parking spots in Kentucky.
- The night with the highest demand for truck parking is Wednesday.
- 82 percent of truck parking spots (5,900) are provided by private sector truck stops.
- 18 percent of parking by KYTC is located at KYTC-owned rest areas and weigh stations.

The locations of existing unmet truck parking demand locations are described in Section 2.2.2 of this plan.

4.1.2. State of Good Repair

Kentucky's roads and bridges receive several condition-based ratings by KYTC that can aid in determining the quality of service being provided to the public. Maintaining a state of good repair is a priority for KYTC, and the Cabinet is currently successful in achieving this priority.

4.1.2.1 Maintenance Rating Program (MRP) Report

The first rating criterion comes from the Maintenance Rating Program (MRP) Report, which is an annual survey of roads conducted by the KYTC Division of Maintenance. This rating is based on a 100-point scale, with a target score of 80. Between 300 and 400 roadway segments, 500 feet in length, are randomly selected in each KYTC district among four road categories: (1) interstates, (2) other NHS roads, (3) state primary and secondary roads, and (4) rural secondary roads.[26] Grades are assigned in several categories, including rideability, potholes, striping, and guide signs. An overall weighted score is assigned to each type of road in each of the 12 highway districts and statewide. Statewide maintenance ratings by roadway type according to the FY 20 Maintenance Rating Program (MRP) Report are shown in **Table 4-2**. The average grades for each roadway type are over the targeted score of 80.

[26] Kentucky Transportation Cabinet, 2020 Maintenance Rating Program Report.

Table 4-2. KYTC Maintenance Statewide Scores

Classification	Score	Grade
Interstates	92.4	A
National Highway System	90.0	B
State Primary and Secondary	81.7	B
Rural Secondary	78.0	C
All Roads	**81.4**	**B**

Source: Kentucky Transportation Cabinet, FY 20 Maintenance Rating Program (MRP) Report.

4.1.2.2 Pavement Conditions

Measures of pavement condition can also provide some insight into service quality. KYTC rates pavement conditions in the commonwealth by classifying pavements in good, fair, or poor condition. The scale used to determine what constitutes good, fair, or poor condition is adjusted based on traffic volume. Thus, routes with higher volumes are expected to be maintained in better condition than routes with lower traffic volumes. Statewide pavement conditions based on 2020 data are presented in **Table 4-3**. There are 25,314 lane-miles of rural secondary roads that were untested for this year.

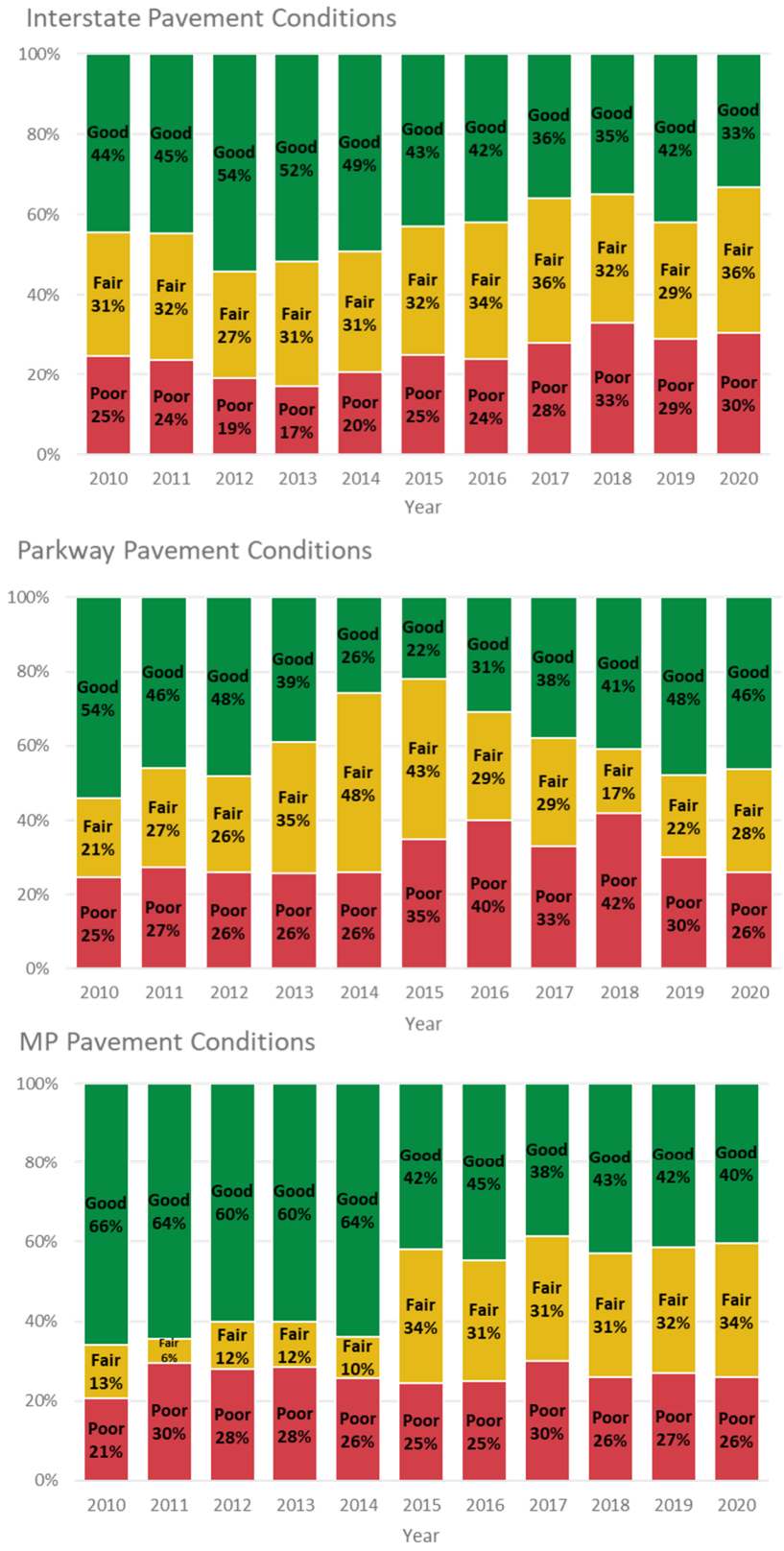
Table 4-3. Statewide Pavement Conditions Data per State Primary Road System (2020)

Network	Lane-Miles Good	% Good	Lane-Miles Fair	% Fair	Lane-Miles Poor	% Poor
Interstates	1,550	33%	1,695	36%	1,424	30%
Parkways	817	46%	489	27%	461	26%
Maintenance Rating Program Segments (MP)	12,996	40%	10,867	34%	8,384	26%
Department of Highway Subtotal	**15,363**	**40%**	**13,051**	**34%**	**10,269**	**27%**
Rural Secondary	N/A	N/A	N/A	N/A	N/A	N/A

Source: Kentucky Transportation Cabinet, Transportation Asset Management Plan (TAMP), 2022.

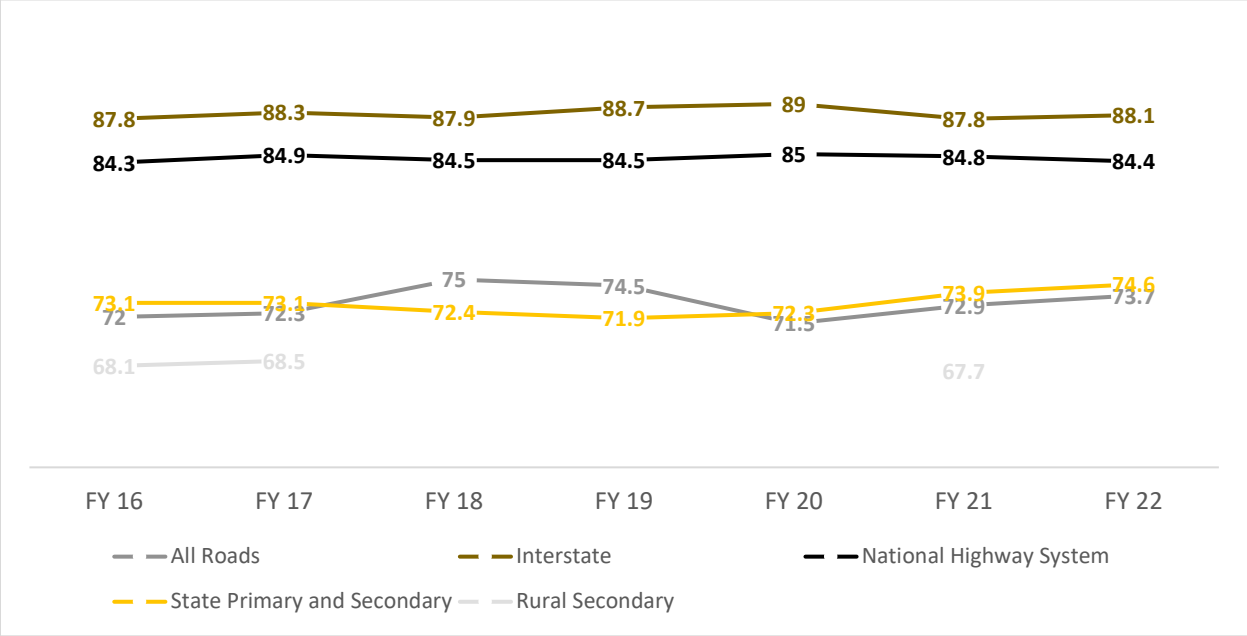
Figure 4-4 provides historic trends for pavement conditions for Interstates, Parkways, and the MP system. Pavement is also graded using the International Roughness Index (IRI), which measures the roughness of pavements. This index provides rideability scores. Statewide rideability scores for all roads and by road type —including Interstate, Parkway, and Rural Secondary, as well as segments selected for the Maintenance Rating Program (MP) —are presented in **Figure 4-5** for FY 2016 through FY 2022. Rideability scores for Rural Secondary are "Blank" for FY 2018 through FY 2020 and for FY 2022 as IRI data was not collected for Rural Secondary routes during these years. Scores below 70 are considered unacceptable.

Figure 4-4. Historic Trends for Interstate, Parkway, and MP Pavement Conditions



Source: Kentucky Transportation Cabinet, Transportation Asset Management Plan (TAMP), 2022.

Figure 4-5. Statewide Rideability Scores for All Roads and by Road Type



Source: Kentucky Transportation Cabinet, FYs Maintenance Rating Program (MRP) Reports.

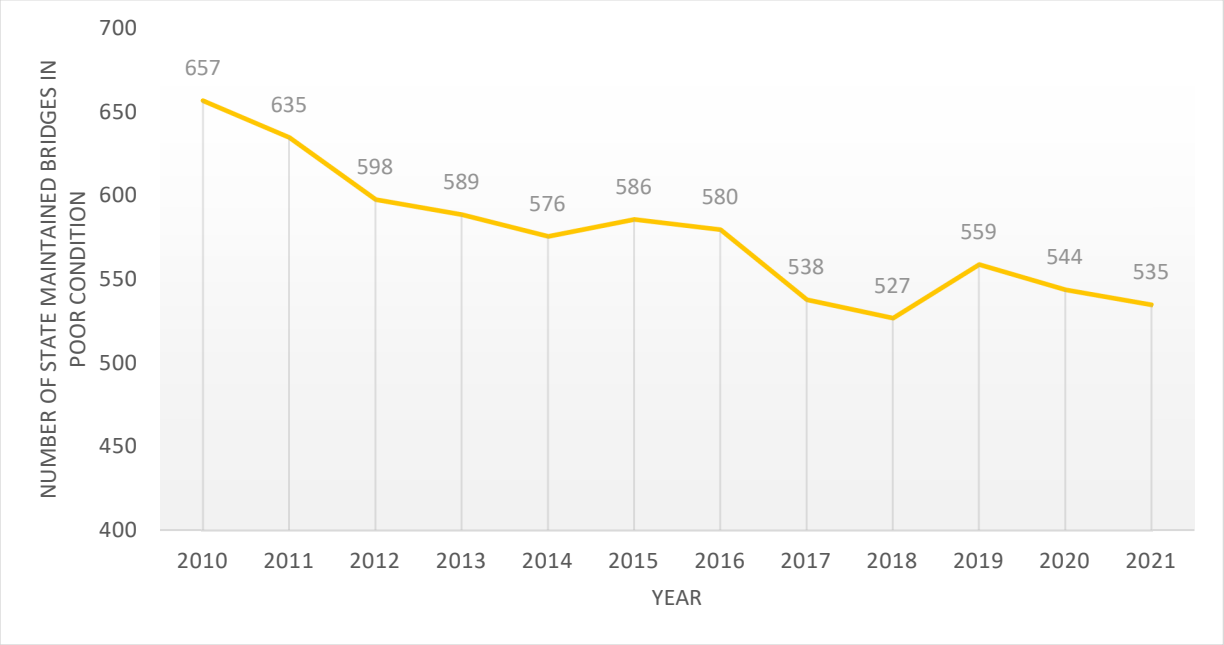
The figure indicates that scores for all roads improved from FY 17 to FY 18, then fell slightly behind through FY 20, and are improving again through FY 22. Interstates followed by highways in the NHS have the highest rating in terms of rideability, with relatively steady variability. Rural Secondary roads have the lowest rideability scores for the years where IRI data was available.

KYTC continues to monitor pavement conditions and address issues that arise as a result of normal traffic conditions. In addition, KYTC pays special attention to roadways that are impacted by oversize/overweight loads such as too and from coal mines, agricultural areas, etc. Additional inspection and more robust pavement treatments are considered based on the outcome of those inspections.

4.1.2.3 Bridge Rating

Kentucky's bridges are also rated annually by KYTC and reported to FHWA. The number of state-maintained bridges in poor condition is displayed in **Figure 4-6**. The figure shows a decrease in the number of bridges in poor condition from 657 in 2010 to 535 in 2021. The number of bridges in poor condition did increase from 2014 through 2015, as well as 2018 to 2019. Based on FHWA's 2021 National Bridge Inventory Data, 6.9 percent of Kentucky's bridges are classified as structurally deficient, with one of the key elements of a bridge being in poor or worse condition. Of these 990 structurally deficient bridges, 27 percent are located on the Interstate system. These bridges may restrict the size and weight of trucks crossing the structure and create load restrictions on major and frequently traveled truck routes. The locations of the most traveled structurally deficient bridges in Kentucky are shown in **Table 4-4**. All of them cross urban interstates and support more than 60,000 daily vehicle crossings.

Figure 4-6. Number of State Maintained Bridges in Poor Condition, 2021.



Source: National Bridge Inventory, 2021.

Table 4-4. Topmost Traveled (all Vehicles) Structurally Deficient Bridges in Kentucky in 2021[27]

County	Year Built	Daily Vehicle Crossings	Type of Bridge	Location
Jefferson	1988	166,770	Urban Interstate	I-65 over Grade Ln
Jefferson	1988	166,770	Urban Interstate	I-65 over Standiford Ln
Jefferson	1959	119,880	Urban Interstate	I-65 over E Kentucky & S Brook St
Jefferson	1957	119,880	Urban Interstate	I-65 over Hill, CSX RR & Burnett
Jefferson	1972	110,389	Urban Interstate	I-64 over 3rd, 5th, Rvr Rd, Belvedere
Jefferson	1965	90,900	Urban Interstate	I-64 over CSX, 1st, Floyd, Preston, River
Jefferson	1974	79,872	Urban Interstate	I-264 EB over Ramp (31W NB to I-264 WB)
Jefferson	1976	72,032	Urban Interstate	I-64 over Old P and L RR (7-13 St)
Jefferson	1984	71,930	Urban Interstate	I-265 over Avoca-Quarry Rd
Jefferson	1969	65,180	Urban Interstate	I-64 Ramp over N Western Pkwy (Ky 3064)

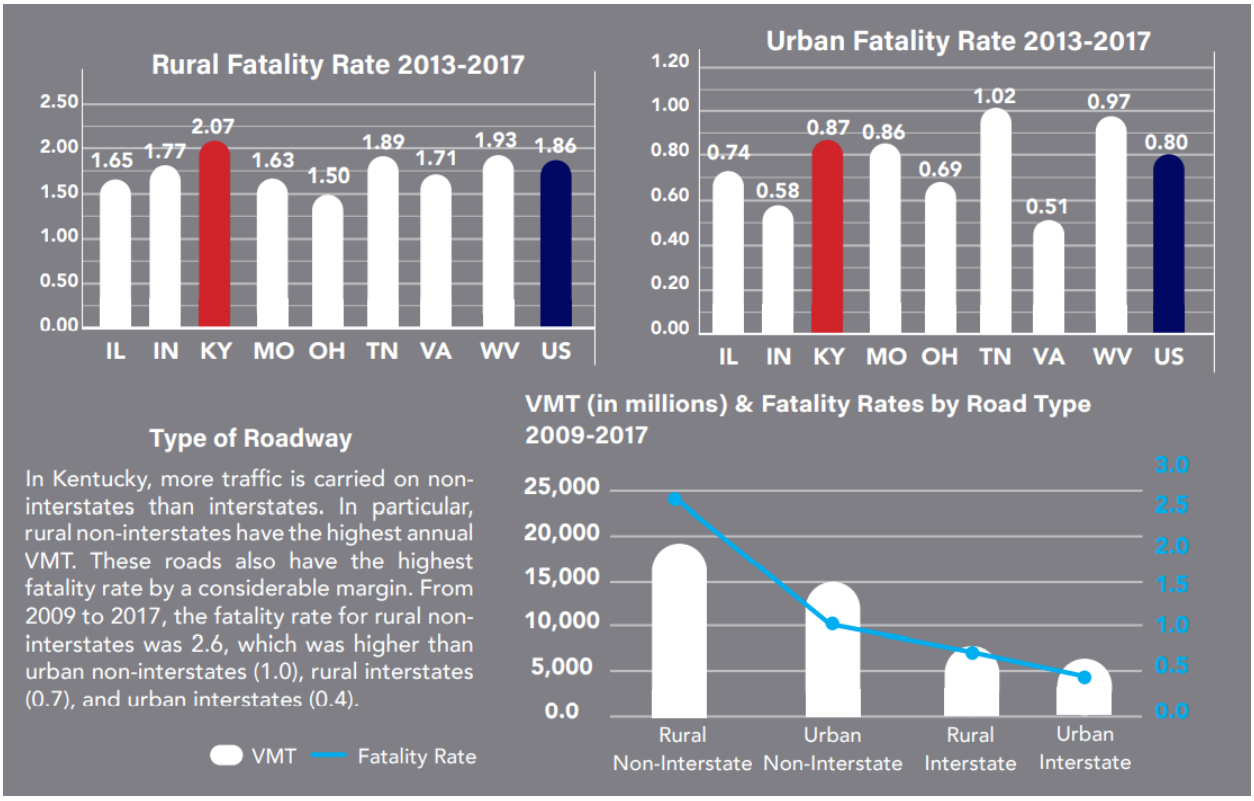
Source: National Bridge Inventory, 2022.

[27] American Road & Transportation Builders Association, 2022 Bridge Profile, *https://artbabridgereport.org/reports/state/KY.pdf*, Accessed May 2022.

4.1.3. Highway Safety

Kentucky currently ranks poorly for fatality rate per hundred million vehicle miles traveled (VMT) as compared to adjacent states and to the U.S. From 2013 to 2017, the rural fatality rate was nearly two and a half times higher than the urban fatality rate. This is significant because more than half of the driving in Kentucky takes place in rural areas, and rural areas experience more crash fatalities involving large trucks than urban areas. **Figure 4-7** illustrates the crash fatality rates for Kentucky, adjacent states, and the U.S. over the same time period, Kentucky had the 12th worst rural fatality rate in the U.S. and ranked worst among all bordering states.

Figure 4-7. Fatality Rate Comparison – All Vehicles



Source: Kentucky Transportation Cabinet, Strategic Highway Safety Plan 2020-2024[28].

4.1.4. Freight Level of Service

KYTC's Freight Level of Service (LOS) template is available for use at the project review level. The Freight LOS provides an inventory of the freight components to be considered at the project level to determine how a project impacts freight movement and whether the project properly addresses the needs of the freight users on the route. The Freight LOS is divided into three sections as follows:

- Assessment of freight movement operating conditions

[28] Kentucky Transportation Cabinet, Strategic Highway Safety Plan 2020-2024, *https://transportation.ky.gov/HighwaySafety/Documents/2020%20SHSP%20SAFE%20KY%20Highway%20Safety%20Plan%20Final%205-20.pdf#search=fatality%20rate*, Accessed November 2021.

- Truck comfort index
- Freight service index

The assessment of freight movement operating conditions uses existing information including proximity to freight routes, bridge weight limits, and road weight rating, among other existing conditions. The truck comfort index uses existing and observed information to present specific project site data, including speed limit, average daily traffic, commercial vehicle crash history, volume to capacity ratio, road geometry, and pavement conditions, among other data. KYTC can supplement the review by including average daily truck traffic and actual truck speeds, among other inputs. The freight service index combines data with on-site observations, including proximity to truck parking, seasonal or consistent commercial vehicle traffic, proximity to the National Network, presence in a bottleneck area of influence, and existence of roadside truck parking, bike lanes, or lane drops, among other observations. The information in the KYTC Freight LOS report is taken from many different sources and on-site observations that provide a snapshot of the freight service conditions, or lack thereof, for the project review team.

4.2. Inland Waterways

With nearly 1,662 navigable miles of which 1,020 are commercially navigable, and 10 public port authorities, Kentucky also provides year-round waterborne commerce. The Ohio River forms Kentucky's entire northern border and is a major tributary of the Mississippi River System. Western Kentucky sits at the confluence of the Ohio and Mississippi rivers, marking the transition between the Upper and Lower Mississippi River. The entire inland waterway system provides a waterway link to Canada via the Great Lakes and to Mexican and South American markets via the deep-water ports of New Orleans, LA, and Mobile, AL. Kentucky also connects the Ohio River to numerous southern cities such as Nashville, TN, via the Cumberland River; Knoxville and Chattanooga, TN, via the Tennessee River; and Mobile, AL, via the Tennessee-Tombigbee Waterway.

4.2.1. Waterway Conditions

The lock and dam system was designed to control the river levels to maintain a minimum channel on the rivers for more reliable navigation. For instance, the Ohio River requires a minimum depth of 9 feet. Five commercially navigable rivers in Kentucky have one or more locks and dams, as shown in **Table 4-5**. The USACE has jurisdiction over all these locks and dams except for those on the Kentucky River, which are owned and maintained by the Kentucky River Authority.

Table 4-5. Kentucky Locks and Dams

USACE District/Authority	River	River Mile Point	Lock & Dam	Main Lock Chamber	Auxiliary Lock Chamber
Huntington District	Ohio	341	Greenup Locks & Dam	1,200'	600'
Huntington District	Ohio	436	Captain Anthony Mehldahl Locks & Dam	1,200'	600'
Louisville District	Ohio	531	Markland Locks & Dam	1,200'	600'
Louisville District	Ohio	604	McAlpine Locks & Dam	1,200'	1,200'
Louisville District	Ohio	720	Cannelton Locks & Dam	1,200'	600'
Louisville District	Ohio	776	Newburg Locks & Dam	1,200'	600'

USACE District/Authority	River	River Mile Point	Lock & Dam	Main Lock Chamber	Auxiliary Lock Chamber
Louisville District	Ohio	846	John T. Myers Locks & Dam	1,200'	600'*
Louisville District	Ohio	918	Smithland Locks & Dam	1,200'	1,200'
Louisville District	Ohio	964	Olmstead Locks & Dam	1,200'	1,200'
Louisville District	Green	9	Green River Locks & Dam No. 1	600'	None
Louisville District	Green	63	Green River Locks & Dam No. 2	600'	None
Nashville District	Cumberland	30	Barkley Locks & Dam	800'	None
Nashville District	Tennessee	22	Kentucky Locks & Dam	600'**	None**
KY River Authority	Kentucky	4	Lock 1	145'	None
KY River Authority	Kentucky	31	Lock 2	145'	None
KY River Authority	Kentucky	42	Lock 3	145'	None
KY River Authority	Kentucky	65	Lock 4	145'	None

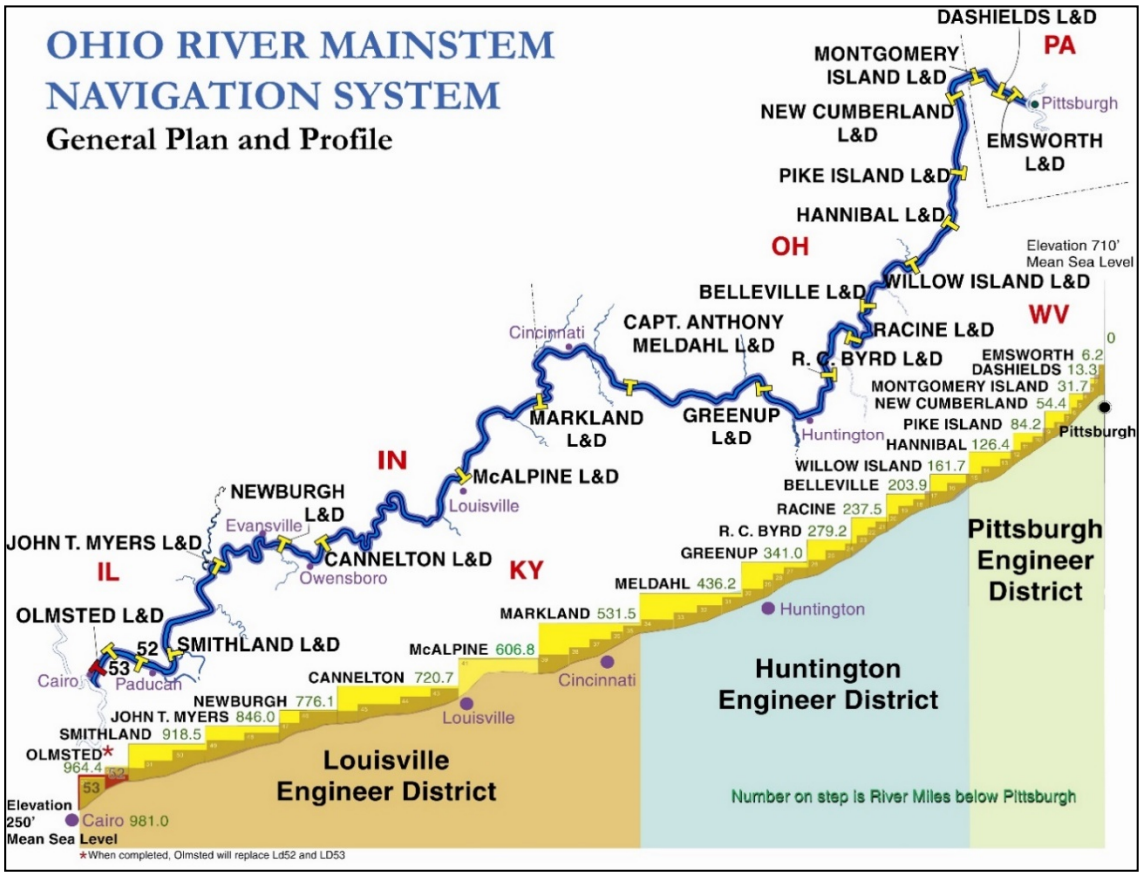
Source: Kentucky Transportation Cabinet, 2022.
**Authorized to expand 600' auxiliary chamber to 1,200', funding not yet obligated.*
***Currently only 600' lock chamber in operation. New 1,200' main lock chamber under construction. Upon completion projected for 2029, lock will have 1,200' main and 600' auxiliary lock chambers.*

The locks and dams on the Ohio River are illustrated in **Figure 4-8**. The majority of these locks and dams were constructed in the 1950s and 1960s. Locks and Dams 52 and 53 were put into operation in 1928 and 1929 respectively. To eliminate aging structures and reduce congestion on the Ohio River, their demolition and replacement by Olmsted Locks and Dam was authorized in 1988. The landside demolition of Locks and Dams 52 (Mile 939) and 53 (Mile 963) was finished in 2021, and their complete demolition is expected by the end of 2022. The construction for the replacement Olmsted Lock and Dam megaproject was completed in August 2018, and became operational by October 2018, greatly reducing tow and barge delays through one of the busiest U.S. inland waterways.

The Kentucky lock addition project is currently taking place on the Tennessee River in western Kentucky. The existing 600-ft Lock currently has one of the longest delay times of any lock in the inland waterway system. Upon completion, the construction of this new 1,200-ft lock is expected to essentially eliminate these delays, thus allowing for additional tonnage and value of commercial cargo and goods to pass through Kentucky Lock. The total project completion date is targeted for the year 2030 as of 2022.[29]

[29] U.S. Army Corps of Engineers, Kentucky Lock Addition Project, *https://www.lrn.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/2939894/kentucky-lock-addition-project/msclkid/kentucky-lock-addition-project/*, Accessed April 2022.

Figure 4-8. Ohio River Locks and Dams

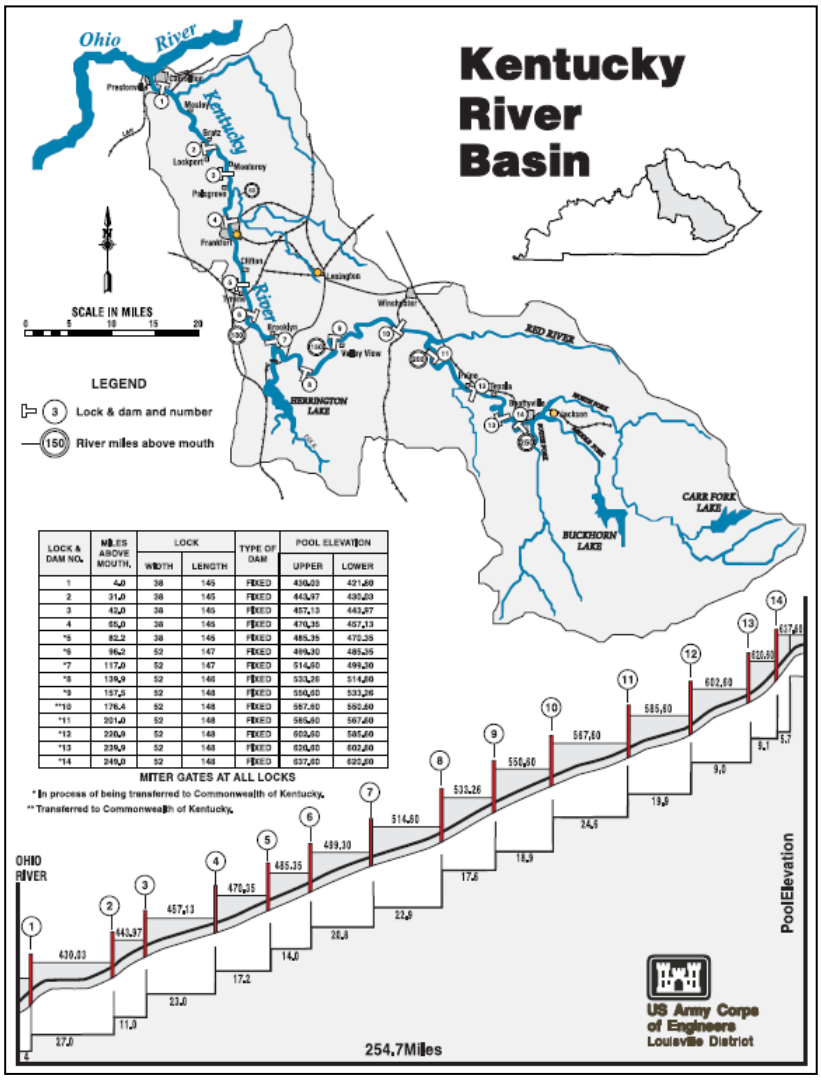


Source: U.S. Army Corps of Engineers, 2022.

The USACE Louisville District operates the two locks and dams on the Green River, with Lock and Dam No.1 located near Henderson and No.2 near Calhoun. Both locks and dams were constructed in the 1950s. The only Cumberland River lock and dam in Kentucky is operated by the USACE Nashville District. Constructed in the 1960s, this lock and dam is located near Grand Rivers in Livingston County. The USACE Nashville District also operates the only Tennessee River lock and dam in Kentucky. This lock and dam are located 20 miles east of Paducah.

Figure 4-9 shows the locks and dams on the Kentucky River. All the locks and dams were originally owned by the USACE but have been transferred over to the Kentucky River Authority. Locks and dams 1 through 4 were originally constructed in the 1830s and 1840s. In 1882, the dams were rebuilt, and since then they have been maintained through repairs and some reconstruction.

Figure 4-9. Kentucky River Locks and Dams



LOCK & DAM NO.	MILES ABOVE MOUTH,	LOCK		TYPE OF DAM	POOL ELEVATION	
		WIDTH	LENGTH		UPPER	LOWER
1	4,0	38	145	FIXED	430,03	421,60
2	31,0	38	145	FIXED	443,97	430,03
3	42,0	38	145	FIXED	457,13	443,97
4	65,0	38	145	FIXED	470,35	457,13
*5	82,2	38	145	FIXED	485,35	470,35
*6	96,2	52	147	FIXED	499,30	485,35
*7	117,0	52	147	FIXED	514,60	499,30
*8	139,9	52	148	FIXED	533,26	514,60
*9	157,5	52	148	FIXED	550,60	533,26
**10	176,4	52	148	FIXED	567,60	550,60
*11	201,0	52	148	FIXED	585,60	567,60
*12	220,6	52	148	FIXED	602,60	585,60
*13	239,6	52	148	FIXED	620,60	602,60
*14	249,0	52	148	FIXED	637,60	620,60

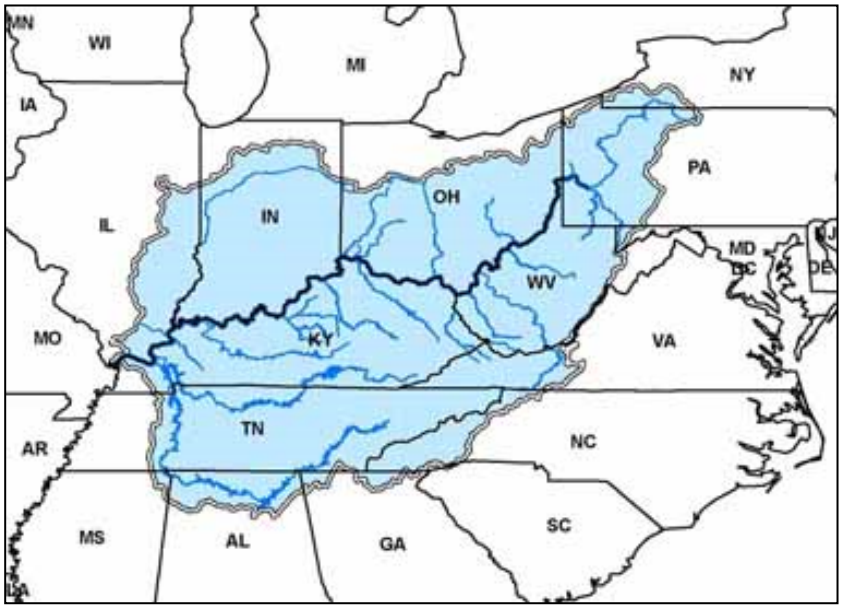
Source: U.S. Army Corps of Engineers. 2022

4.2.2. Waterway Performance

Vast quantities of agricultural and industrial commodities are shipped through Kentucky's waterways. For example, from 2000 to 2010, barges on the Ohio River carried a yearly average of 234 million short tons of commodities on all navigable rivers within the basin. The Ohio River Basin is shown in **Figure 4-10**. Coal, petroleum products, aggregates, agricultural products, construction raw materials, and chemicals are some of the predominant commodities carried by barge on the Ohio River. The Ohio River locks can handle forecasted levels of coal and grain exports; however, the age of the lock and dam

infrastructure affects reliability, which in turn influences the competitiveness of coal and grain exports.[30]

Figure 4-10. Ohio River Basin



Source: The Ohio River - All things fishing on the Ohio River, TheOhioRiver.com, 2022

4.2.3. Waterway Safety

Maritime accidents are common in Kentucky, with so much activity taking place on the multiple river systems flowing through the state. The responsibility for marine incident safety investigations is shared between the National Transportation Safety Board (NTSB) and the United States Coast Guard (USCG). Therefore, a comprehensive picture of marine incidents is difficult to obtain. The adoption of double hulled barges and the infrequent interaction with other modes allows for fewer incidents. According to NTSB, there are five maritime incidents that happened in Kentucky since 2010.[31]

4.2.4. Riverport Conditions and Performance

In July 2022, KYTC completed the Kentucky Riverports, Highway and Rail Freight Study in partnership with the Kentucky Cabinet for Economic Development (CED). It is designed to help the state analyze its riverports and help to find better ways to support waterborne commerce and to further economic growth across the Commonwealth. The study follows up on the 2008 Kentucky Riverport Improvement Project which included a synopsis of information that discussed the existing conditions for each of Kentucky's public riverports such as location, site, facilities, and services offered. The study focused on

[30] U.S. Army Corps of Engineers, Inland Waterways and Export Opportunities, *http://www.lrd.usace.army.mil/Portals/73/docs/Navigation/PCXIN/Inland_Waterways_and_Export_Opportunities-FINAL_2013-01-03.pdf*, Accessed May 2022.
[31] National Transportation Safety Board (NTSB), Common Investigation Fields Database, *https://data.ntsb.gov/carol-main-public/basic-search*, Accessed May 2022.

infrastructure needs and ultimately provided several industry recommendations, including the creation of the Kentucky Water Transportation Advisory Board.[32]

Kentucky's inland ports and terminals provide direct access to the agricultural markets of the Midwestern and North Central states, the industrial and consumer markets of the Northeast, and the distribution networks of the South. The Paducah region is considered a national hub for river shipping, as it is home to numerous barge companies, including Ingram Barge and Crounse Corporation, two of the largest barge operators in the U.S., which serve customers nationwide.

4.2.5. Riverport Planning Toolkit

KYTC created its first Riverport Planning Toolkit in 2018, which is a detailed document riverports can use to report their volume of freight, inventory of facilities, identify freight mobility issues, and share their ongoing maintenance and capital improvement needs. The report was modeled after the "Port Planning and Investment Toolkit" created by the USDOT Maritime Administration (MARAD). KYTC requested each riverport complete the form and will seek updates annually. The report provides KYTC with a snapshot of the services and activities currently present at the riverports but also allows KYTC an opportunity to learn about the needs at each riverport in the foreseeable future. More specifically, and much like the toolkit created by MARAD, this resource can be used to help Kentucky's riverports with the following tasks, among others:

- Evaluate port conditions
- Identify port facilities and services
- Identify freight mobility issues, whether caused by infrastructure or regulatory issues
- Plan capital improvement projects with a 20-year outlook
- Present actionable needs to administrators
- Engage state partners
- Locate and access available funding

The Kentucky Riverport Planning Toolkit is available for download. More information about the Port Planning and Investment Toolkit can be found on the USDOT Maritime Administration website.

4.3. Freight Rail

Kentucky's approximately 2,700 miles of railroad track carry a myriad of freight and provide connectivity to all points in the U.S. Class I track makes up approximately 2,185 miles of Kentucky's rail system and represents the most heavily traveled rail lines by revenue. Kentucky is traversed by CSXT's Chicago, IL to Nashville, TN and Detroit, MI to Atlanta, GA. mainlines, by NS's Cincinnati, OH to Atlanta, GA. and New Orleans, LA. mainlines, and by CN's Chicago, IL to New Orleans, LA. mainline. The Class I railroads are complemented by a network of regional and short line railroads that provide in-state connectivity. The Paducah & Louisville Railway is one example, providing east-west service in Kentucky and connecting with six other carriers at three locations within the state.

[32] Waterways Journal, Kentucky Study Analyzes State's Public Riverports, *https://digital.waterwaysjournal.net/Waterways-Journal-01202020-e-Edition/2/*, Accessed May 2022.

4.3.1. Track Condition Ratings

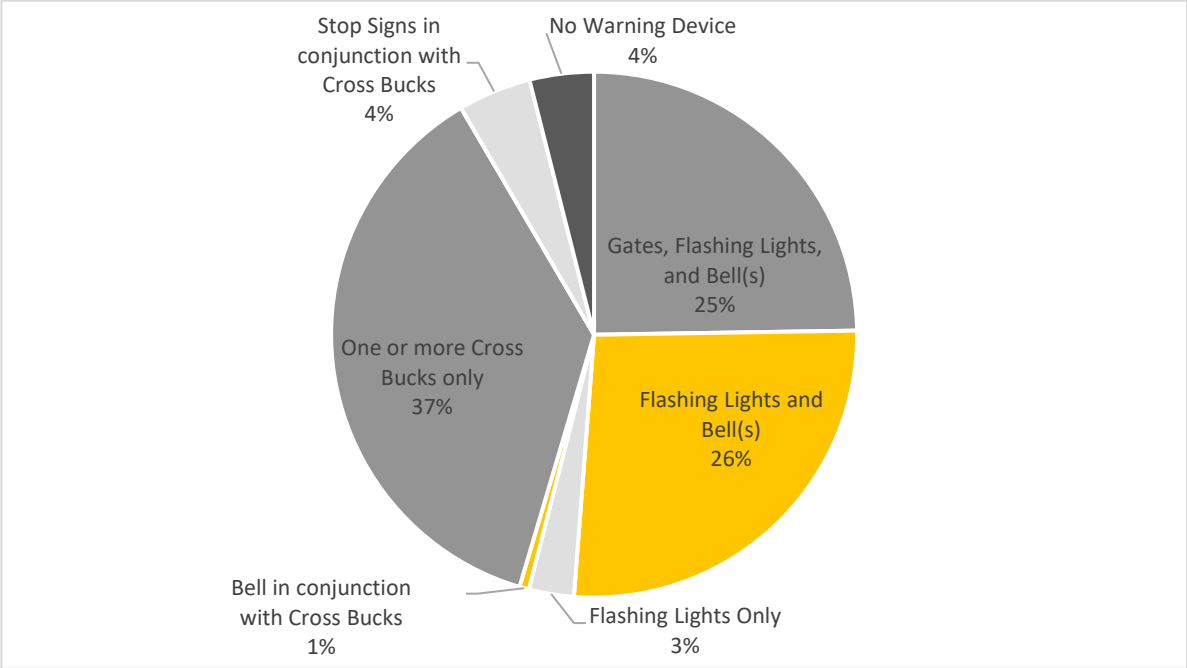
The FRA establishes track structure and track geometry requirements for the different classes of track, with maximum speeds designated for each class. As per FRA's Track Safety Standards found at 49 CFR Part 213 Section 213.9, the classes of track are Excepted Track and Class 1 through 6. The maximum allowable operating speeds for freight trains are 10, 25, 40, 60, 80, and 110mph for track Class 1 through 6 respectively.[33]

Track condition ratings set restrictions on rail operation speeds and weight capacity. Rail facilities in Kentucky are all owned by private companies. Consequently, information on specific privately owned track conditions is not shared with the Cabinet.

4.3.2. Rail Safety

KYTC is currently monitoring a total of 3,770 public crossings. These crossings are composed of 2,424 at-grade crossings which include 34 that are for pedestrian use and 1,346 grade-separated crossings, including 19 that are pedestrian. The inventory of public at-grade crossings lists 1,323 active crossings and 1,101 passive crossings in 2022. According to the FRA Office of Safety, there are 4,258 highway-rail at-grade crossings operating in Kentucky, including 2,172 public and 2,047 private crossings. KYTC's records of public highway-rail at-grade crossings, which are usually more current than the FRA's, indicate 2,424 public crossings in Kentucky, including 1,323 active crossings and 1,101 passive crossings. **Figure 4-11** shows the distribution of public crossing categories by warning devices in Kentucky.

Figure 4-11. Kentucky Railroad Crossings by Warning Device

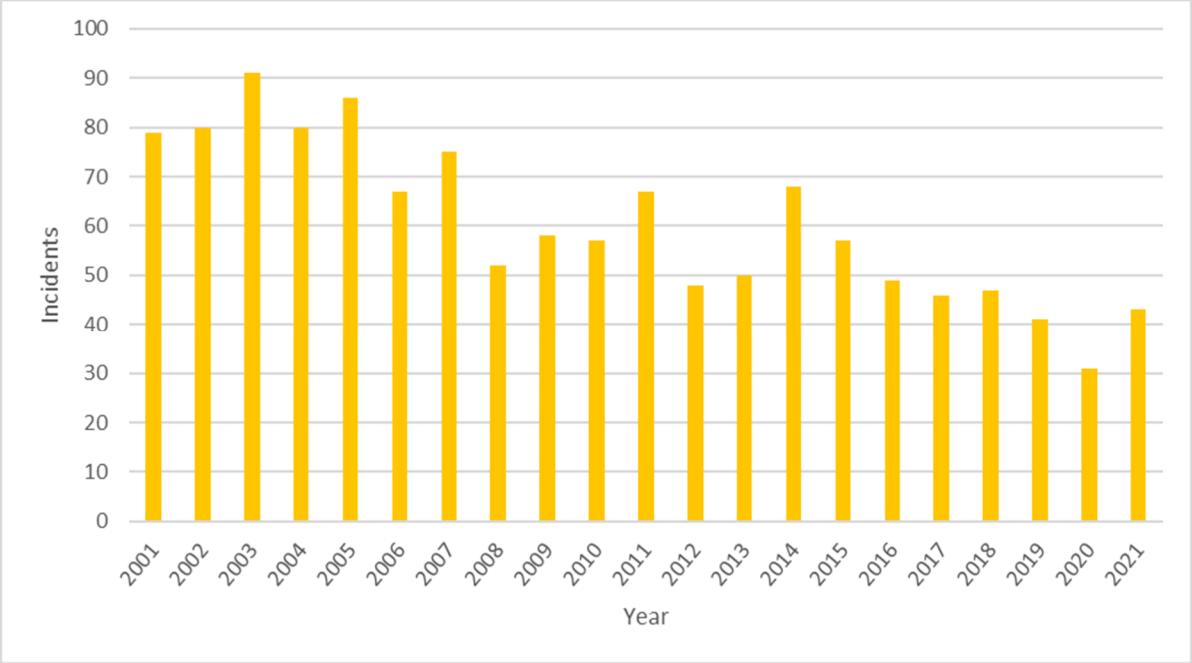


Source: State Action Plan for Highway-Rail Grade Crossings, 2022.

[33] Code of Federal Regulations, Title 49, Subtitle B, Chapter II, Part 213, Subpart A, Section 213.9. https://www.ecfr.gov/current/title-49/subtitle-B/chapter-II/part-213/subpart-A/section-213.9, Accessed May 2022.

Highway-rail at-grade crossing incidents have decreased overall in Kentucky since 2000. **Figure 4-12** shows the highway-rail at-grade crossing incidents from 2000 to 2019. A total of 43 highway-rail at-grade crossing accidents occurred in Kentucky in 2021, compared to 79 in 2001.

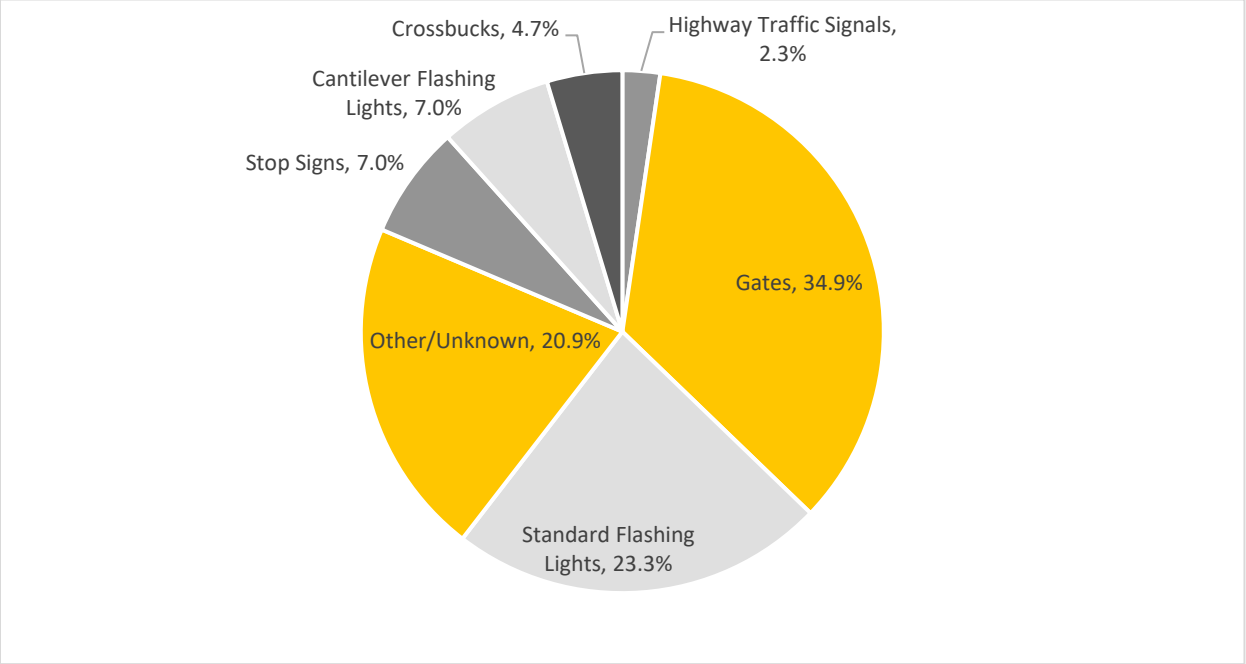
Figure 4-12. Kentucky Highway-Rail At-Grade Crossing Incidents, 2001-2021.



Source: Federal Railroad Administration Accident and Incident Reporting Data, 2022.

There were 43 highway-rail grade crossing incidents in Kentucky in 2021, four of which occurred at private crossings. **Figure 4-13** shows Kentucky public highway-rail at-grade crossing incidents for 2021 by warning devices. Crossbucks, flashing lights, stop signs, and gates account for nearly 94 percent of crossings at which incidents occurred. Crossings without warning devices or unknown account for the remaining 6 percent of incidents.

Figure 4-13. Kentucky Highway-Rail Crossing Incidents by Warning Device[34], 2021.



Source: Federal Railroad Administration Office of Safety, 2022.

FRA maintains statistics on the number of fatalities and injuries at highway-rail at-grade crossings and pedestrian trespass locations. In 2021, Kentucky ranked 27th and 28th in the U.S. respectively for injuries and fatalities at highway-rail at-grade crossing facilities. **Table 4-6** shows the fatality and injury incidents from 2016 to 2021.

Table 4-6. At-Grade Highway-Rail Crossing Injuries and Fatalities[35], 2016-2021

Year	Fatalities	Injuries
2017	3	19
2018	2	10
2019	3	7
2020	2	8
2021	2	6

Source: Federal Railroad Administration Office of Safety, 2022.

4.3.3. KYTC Railroad Annual Report

KYTC is required by KAR Title 603, Chapter 7, Section 090 to regularly update railroad data. This regulation requires that all freight railroads must submit the following information to the KYTC:

[34] Federal Railroad Administration, Highway-Rail Grade Crossing Accident Data, *https://data.transportation.gov/Railroads/Highway-Rail-Grade-Crossing-Accident-Data/7wn6-i5b9*, Accessed May 2022.
[35] Federal Railroad Administration, Highway-Rail Grade Crossing Accident Data, *https://data.transportation.gov/Railroads/Highway-Rail-Grade-Crossing-Accident-Data/7wn6-i5b9*, Accessed May 2022.

- Kentucky Railroad Annual Report (Form TC 59-102);
- Map of all active routes;
- Written notice of abandonments; and
- Reports of accidents resulting in a loss of life.

The annual report and map of all active routes are to be submitted to KYTC's Division of Planning on or before March 31st of each year. With the submitted information, KYTC has records available for rail location reference purposes, future updates of the Kentucky Statewide Rail Plan, and other planning efforts KYTC may pursue. For more information about KYTC's involvement with rail, the Kentucky Statewide Rail Plan can eb viewed on KYTC's website.

4.4. Pipeline

Approximately 41,000 miles of pipelines move natural gas, crude oil, refined petroleum products, and highly volatile liquids, flammable liquids, and toxic liquids throughout Kentucky. The commonwealth has one crude oil refinery that has an operating capacity of approximately 291,000 barrels per calendar day in 2022.[36] Most of Kentucky's natural gas comes from the Big Sandy field located in the eastern part of the commonwealth, which is the largest natural gas field in the Appalachian Basin.

4.4.1. Pipeline Conditions

In Kentucky, ninety-eight percent of the pipelines transport natural gas. The total miles of natural gas transmission pipelines are among the highest of any state in the Southeast.

The Broad Run Expansion project by Tennessee Gas Pipeline (TGP) went in service in the second quarter of 2018. Currently, it provides an incremental 200,000 dekatherms per day of firm transportation capacity on the same capacity path.[37] This project involved the construction of two new compressor stations built in Madison County and the modification and replacement of two existing compressor stations in Powell and Boyd counties.[38]

The Rogersville Shale, which covers eastern Kentucky and parts of West Virginia, Ohio, Maryland, Pennsylvania, and New York, is a potential energy source of oil and gas (**Figure 4-14**). In January 2019, the state announced that the shale tested well on its Kentucky part.[39] In January 2020, the state of Kentucky launched a new study for the shale's potential with an estimated budged of $7.4 million to study the oil and gas potential located in Eastern Kentucky.[40] The Conasauga Shale Research Consortium (CSRC)'s horizontal research well will be drilled from the pilot hole of the Bruin Exploration 1 Young well, highlighted in red in **Figure 4-14.** If the Rogersville Shale becomes a usable energy source, this would result in future expansion of pipelines in Kentucky.

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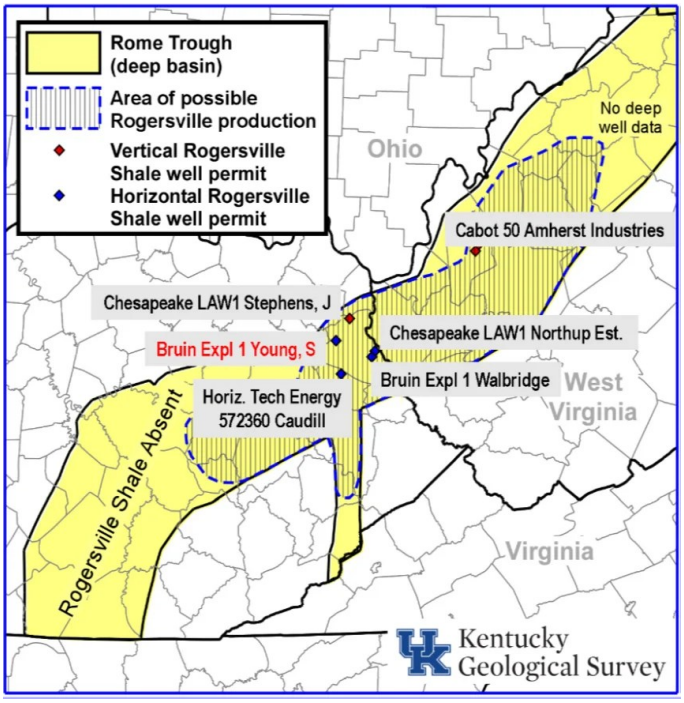
[36] U.S. Energy Information Administration, Kentucky State Energy Profile, *https://www.eia.gov/state/print.php?sid=KY*, Accessed August 2022.
[37] RBN Energy, Broad Run Expansion Project, *https://rbnenergy.com/node/5176*, Accessed May 2022.
[38] NS Energy, Broad Run Expansion Project, *https://www.nsenergybusiness.com/projects/broad-run-expansion-project/*, Accessed May 2022.
[39] Marcellus Drilling New, Rogersville Shale Test Wells in KY, WV Appear to be a Flop, January 7, 2019, *https://marcellusdrilling.com/2019/01/rogersville-shale-test-wells-in-ky-wv-appear-to-be-a-flop/*, Accessed May 2022.
[40] Marcellus Drilling News, Kentucky Launches New Study of Rogersville Shape Potential, January 2, 2020, *https://marcellusdrilling.com/2020/01/kentucky-launches-new-study-of-rogersville-shale-potential/*, Accessed May 2022.

Figure 4-14. Rogersville Shale

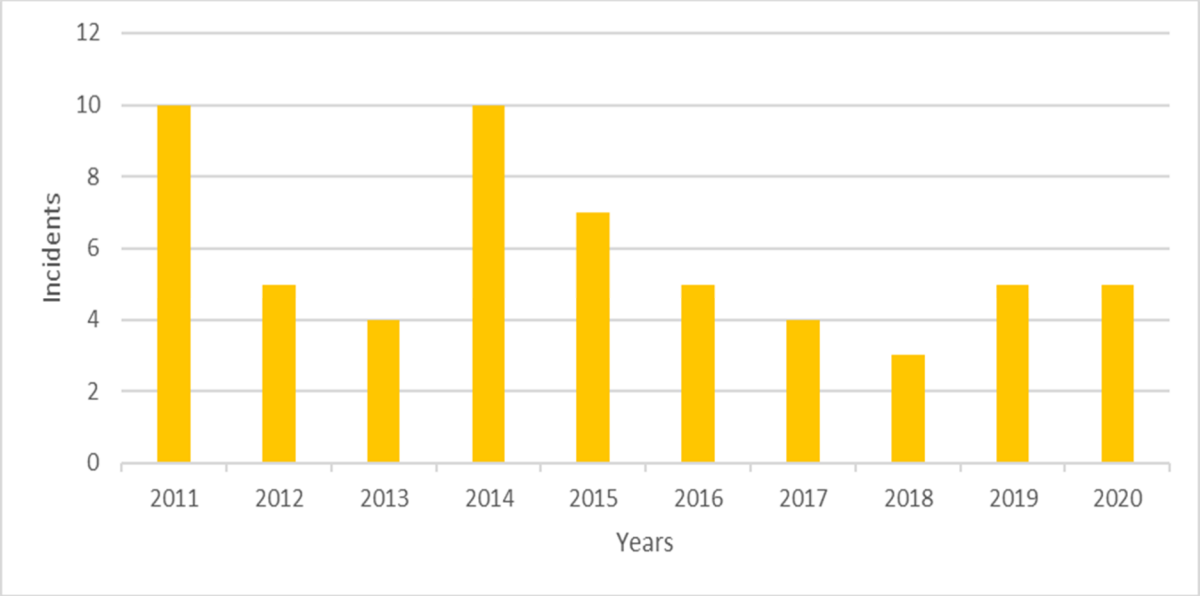


Source: University of Kentucky, 2020.

4.4.2. Pipeline Safety

Pipelines are considered the safest method for transporting energy products. However, when pipeline incidents occur, they can present considerable risks to the public and the environment. The USDOT's PHMSA is responsible for documenting and investigating pipeline incidents and accidents. **Figure 4-15** shows the pipeline incidents, including spills, injuries, and fatalities in Kentucky over the last 10 years. Most of these years experienced less than 10 incidents per year.

Figure 4-15. Kentucky Pipeline Incidents, 2011-2020.



Source: Pipeline and Hazardous Materials Safety Administration, 2021.

4.5. Air Cargo

Rounding out the five modes of transportation, Kentucky is also home to two major air cargo hubs. DHL and Amazon Air both operate major cargo hubs at Cincinnati/Northern Kentucky International Airport (CVG) in Hebron, while UPS operates 'Worldport' hub at Louisville Muhamad Ali International Airport (SDF). These hubs serve as sorting facilities that handle significant volumes of air cargo throughput, a small fraction of which originates in or is destined for Kentucky.

4.5.1. Airport Conditions

A variety of factors, including runway lengths, can impact air cargo service. Runway lengths determine the size of aircraft that can land at an airport. Cargo planes for domestic operations typically require a runway length of 8,000 feet, while international operations usually require a runway of 10,000 feet. As shown in **Table 4-7**, Cincinnati/Northern Kentucky International Airport and Louisville International Airport can handle cargo planes for both domestic and international operations.

Table 4-7. Kentucky Top Cargo Airports

ID	Airport Name	Number of Runways	Longest Runway Length (ft)
CVG	Cincinnati/Northern Kentucky International Airport	4	12,000
SDF	Louisville Muhammad Ali International Airport	3	11,887

Source: Federal Aviation Administration, 2021.

Other factors that can impact air cargo service include:

- **Runway Strength:** A heavy all-cargo jet requires a runway, taxiway, and ramp with sufficient load bearing capacity to handle its weight.
- **Ramp Area:** A sufficient amount of ramp area is necessary to park one or more aircraft and to provide space for equipment loading, cargo staging, and truck access.
- **Available Facilities or Land for Development:** Handling large amounts of specialized air cargo may require additional on-airport facilities. Land adjacent to runways and taxiways may be necessary to attract aviation-related air cargo shippers seeking to construct a cargo ramp, sort center, maintenance hangar, or factory.

As mentioned in *Air Cargo*, Cincinnati/Northern Kentucky International Airport and Louisville Muhammad Ali International Airport were ranked in the top 10 in North America and top 25 in the world in terms of total air cargo tonnage in 2020. Louisville Muhammad Ali International Airport handled over 2.9 million tons of total air cargo, with a North American ranking of 3rd and world ranking of 5th. Over 1.3 million tons of total air cargo was handled at Cincinnati/Northern Kentucky International Airport with a North American ranking of 7th and world ranking of 21st. The Amazon Air Hub began full operation at CVG in August 2021, which may increase total air cargo tonnage and affect the airport's ranking over the next few years as other development take place at the facility.

The performance of air traffic controllers and pilots is perhaps the most critical factor in the capacity of an airport. During the busy periods of an airport, air traffic controllers must manage the traffic demand, balancing arrivals, and departures to ensure efficient operation. For example, if the spacing between aircraft on final approach is not delivered consistently, then larger gaps will lead to increased delays and lower runway throughput.

4.5.2. Air Cargo Safety

The NTSB has the primary role of investigating every civil aviation accident in the U.S., and the FAA also provides input. Safety data for air cargo is difficult to differentiate from other commercial/passenger incidents for two reasons. First, a large portion of air cargo is transported in commercial passenger aircrafts rather than in dedicated air cargo freighters. Second, the NTSB does not differentiate between a passenger/commercial aircraft and a dedicated air cargo freighter.

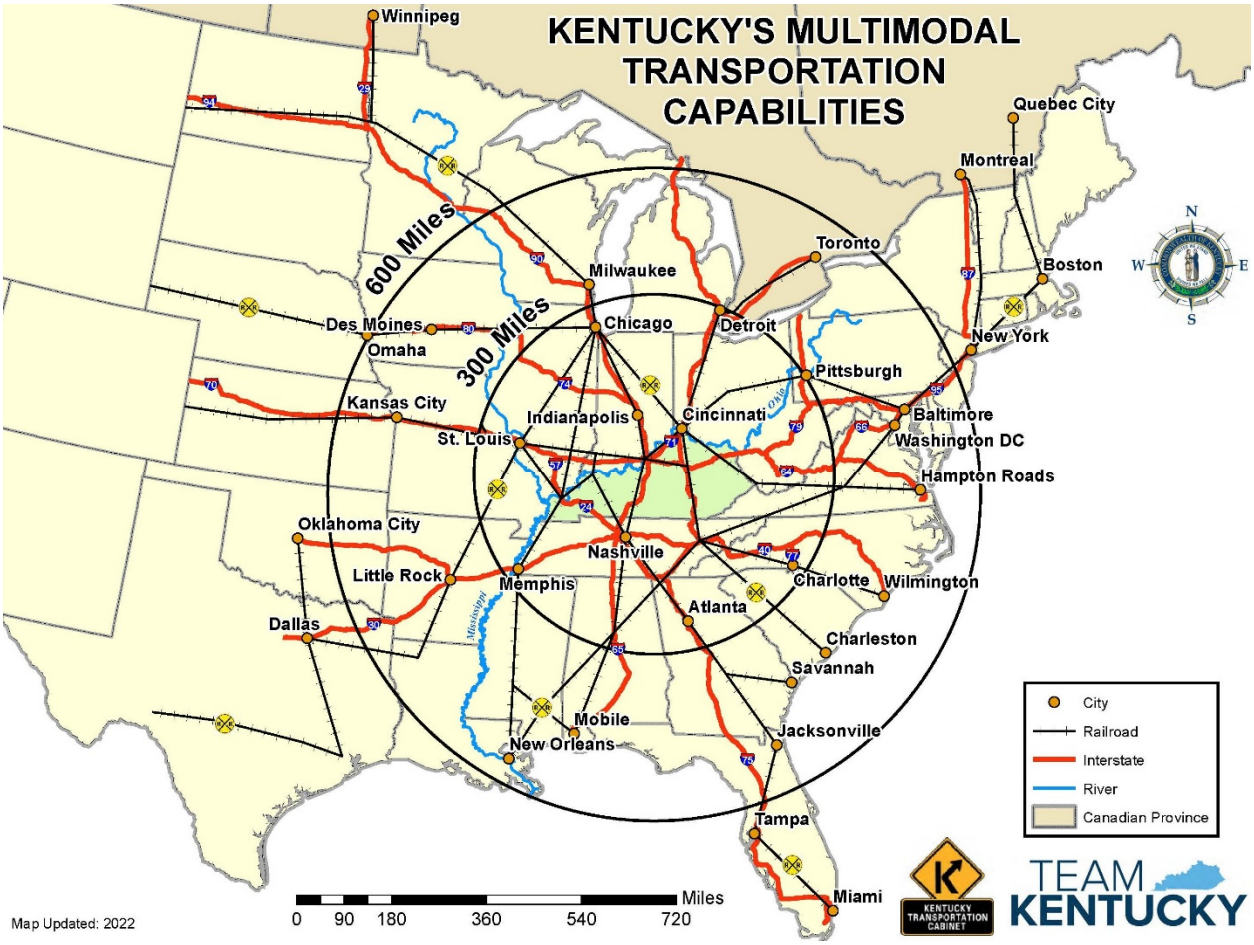
5. Key Industries and Supply Chains

Kentucky's major industries and their respective supply chains are vital drivers of Kentucky's economy. Supply chains are the pathways on which raw materials and production component parts move from their original sources to a production facility, warehouse, retail outlet, and end consumer. Kentucky industries rely on an efficient freight transportation system to meet these needs. This analysis will identify infrastructure crucial to Kentucky's economic future, including critical intermodal connectivity points. Often, these points are where most efficiency is gained or lost during transport. The analysis comprising this section was constructed using existing information and expertise including the KYTC Major Freight Users Inventory (MFUI), Freight Analysis Framework (FAF), and analysis completed by the Institute of Trade and Transportation Studies (ITTS).

5.1. History

Kentucky's economy has always been closely intertwined with its freight transportation system, beginning with the steamboat in the 1800's. While this provided many opportunities for riverside settlements, it left inland towns largely unconnected. During the Industrial Revolution, short line railroads began to connect many of these smaller communities, which provided major economic development opportunities for Kentucky. The success of the railroads allowed for the rapid expansion of the coal industry. A century later, Kentucky is strategically located less than one-and-a-half day's truck drive from most of the nation's eastern and central manufacturing centers, as shown in **Figure 5-1**. While Kentucky's geography provides many economic advantages, it also presents challenges with mountainous terrain, karst areas, and areas prone to flooding.

Figure 5-1. Kentucky's Multimodal Transportation Capabilities

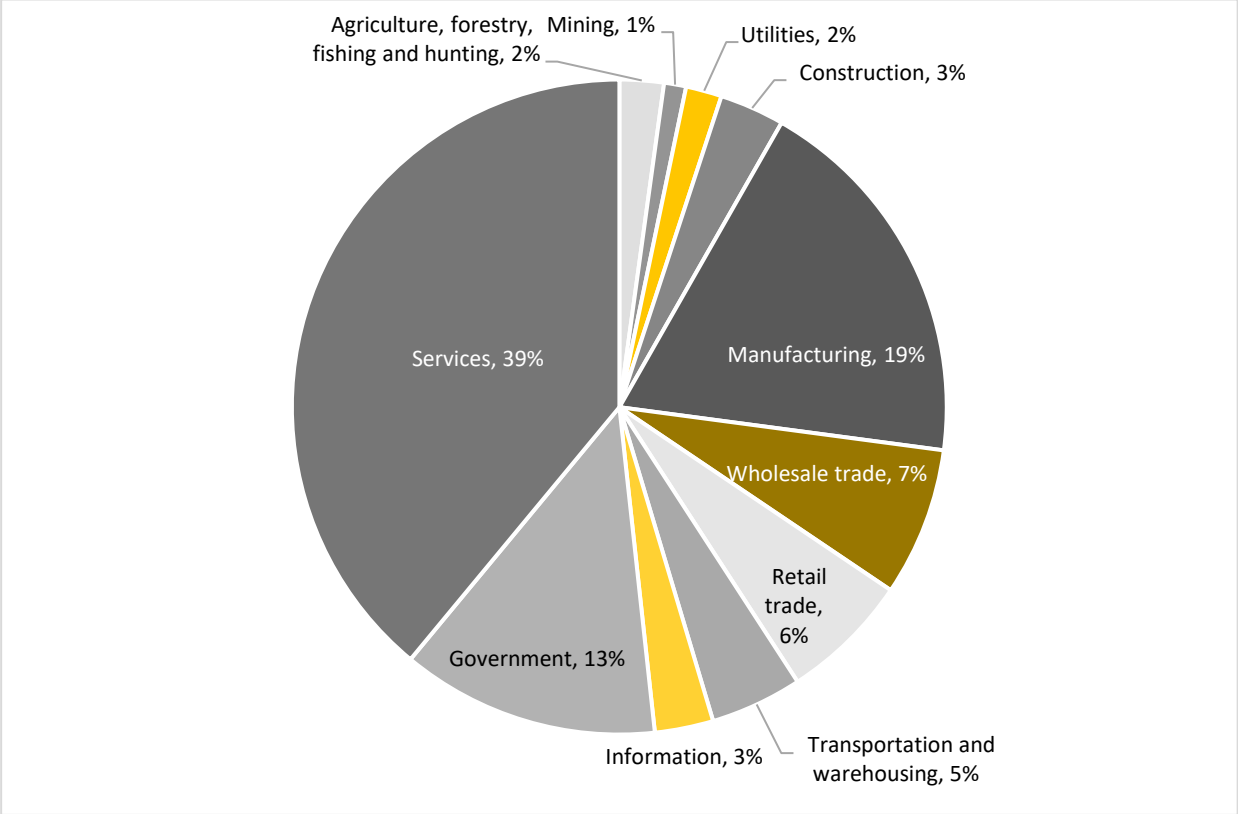


Source: Kentucky Transportation Cabinet, 2022.

The commonwealth's industries, which have shifted in recent decades, are key players in freight transportation. In the 1990s, manufacturing became Kentucky's major industry. Key manufacturing industries include chemical and automotive. In present day, major employment generators are in the transportation equipment and automotive parts industries. In 2011, the services sector (which includes healthcare) exceeded manufacturing as a largest share of the overall Kentucky economy. In terms of employees, UPS has been Kentucky's largest employer since 2005, when it expanded its Louisville air cargo hub.

Figure 5-2 illustrates the industry share of Kentucky's economy by gross domestic product (GDP). Although coal is one of the top commodities transported by weight, mining only accounts for 1 percent of the total economic activity (in terms of GDP). In 2020, FAF's total tonnage for coal in Kentucky is 8.7 percent. With the ongoing trend of powerplant transition from coal to other fuels, coal is expected to play less of a role in the Commonwealth's economy and will likely lead to a continued decrease in rail and waterway traffic required to transport coal through and out of Kentucky, and an overall shift in the mix of commodities on the freight transportation system.

Figure 5-2. Industry Share of Kentucky Economy (GDP)[41]



Source: Bureau of Economic Analysis, 2020.

[41] *Bureau of Economic Analysis, 2020 State Gross Domestic Project by NAICS Code, https://www.bea.gov/data/gdp/gdp-state*, Accessed November 2021.

5.2. Transportation Framework for Supply Chain Decisions

The factors utilized by site selectors when strategically locating new developments include the availability and capacity of the freight transportation system to move raw materials, manufacturing materials, and finished goods along the supply chain. For example, the location of a manufacturing or distribution center will be (in part) based on the presence of current or expected transportation infrastructure to meet these supply chain needs. An overall understanding of the role transportation plays in supply chain decision-making will support KYTC's planning efforts and strategic investment in the freight system.

As part of a National Cooperative Freight Research Program (NCFRP, Report #14) project, supply chain managers developed an overall framework for the selection of various routes and modes to carry freight throughout the product development process (**Table 5-1**). The criteria are balanced against the specific needs of the supply chain, and the best route, mode, or combination of modes is selected.

Table 5-1. Criteria for Analyzing Transportation in Supply Chain Decisions[42]

Criteria	Definition
Time	The time required for the movement of materials within the supply chain. This normally includes moving raw materials to production and then through a distribution network to the ultimate customer.
Network Reliability	The degree of predictability that the stated transportation time will be adhered to during shipping. Reliability is very different than predictable delays such as rush hour congestion. Unlike recurring congestion, this is measurement of risk that the shipment will be impeded by an unexpected delay.
Cost	The cost of transportation cannot produce or hinder the overall price competitiveness of the final product. Cost, along with time and reliability, provides the three major factors of the framework.
Capacity	Evaluation of the selected route/mode(s) capacity to move additional product if necessary.
Safety	The ability of a route/mode(s) to provide a level of confidence that shipped goods will be delivered in good condition.
Availability	Overall availability and accessibility of the route/mode(s). Companies must ensure that shipments are available to both the shipper and the receiver. They also must ensure that if a supply chain manager wishes to ship more goods, there would be available means to transport.

[42] *Rhodes, Suzann. NCFRP Report 14: Guidebook for Understanding Urban Goods Movement, 2012, Pages 6-16.*

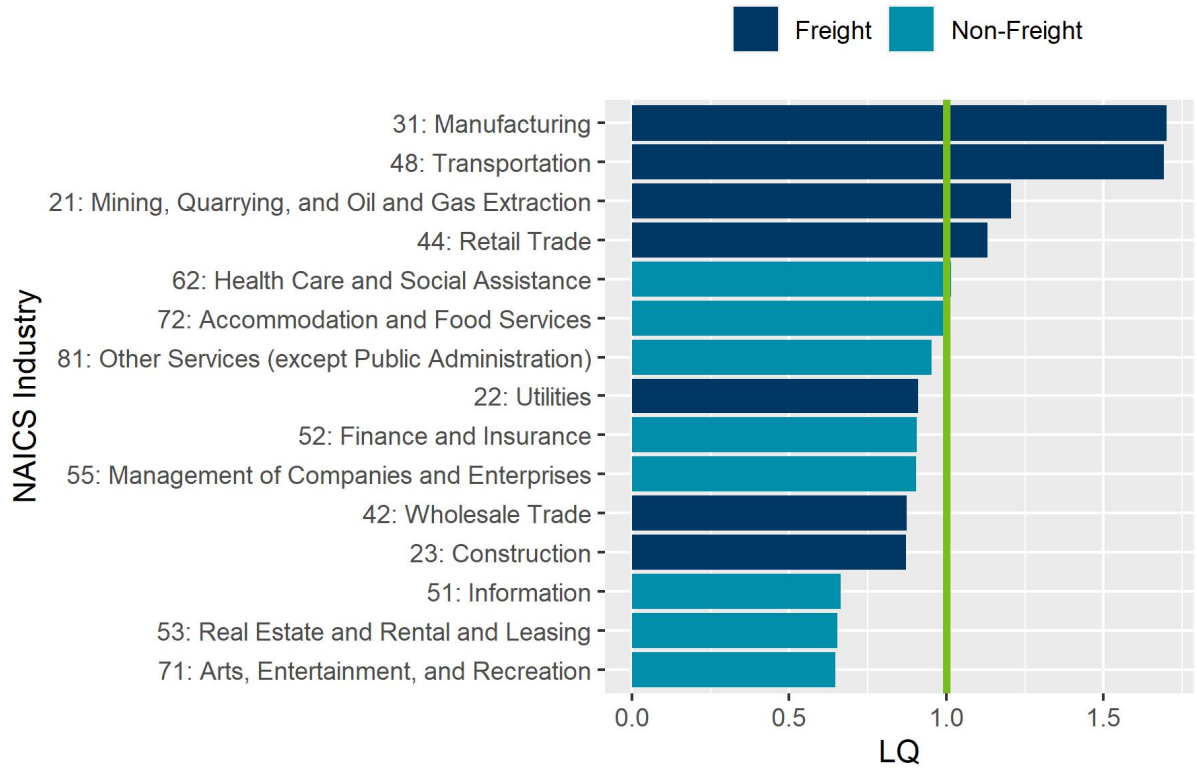
The importance of each freight-related industry to the state's economy can be evaluated through the degree of specialization of that specific industry compared to the national degree of specialization. This evaluation can be measured using a location quotient (LQ) approach, where:

$$\text{LQ} = \frac{Industry\ Emp.\ in\ KY}{Total\ Emp.\ in\ KY} \Big/ \frac{Industry\ Emp.\ in\ US}{Total\ Emp.\ in\ US}$$

A location quotient of 1.0 means that Kentucky has exactly as much employment for that industry as would be expected based on the national employment. A location quotient of 2.0 would indicate that Kentucky has twice the expected level of employment for that industry. Economists assume that industries with a location quotient over 1.0 serve an export market (to other regions or countries).

Kentucky location quotients by NAICS industries are shown in **Figure 5-3** for freight and non-freight industries. The location quotients for each NAICS industry were calculated using 2019 County Business Patterns (CBP) data[43]. The industries with location quotients above 1.0 are Manufacturing (NAICS Code 31), Transportation (NAICS Code 48), Mining (NAICS Code 21), and Retail Trade (NAICS Code 44), and they are all freight-related industries that are more specialized relative to US employment. Manufacturing and Transportation have approximately 1.7 times as many jobs as expected.

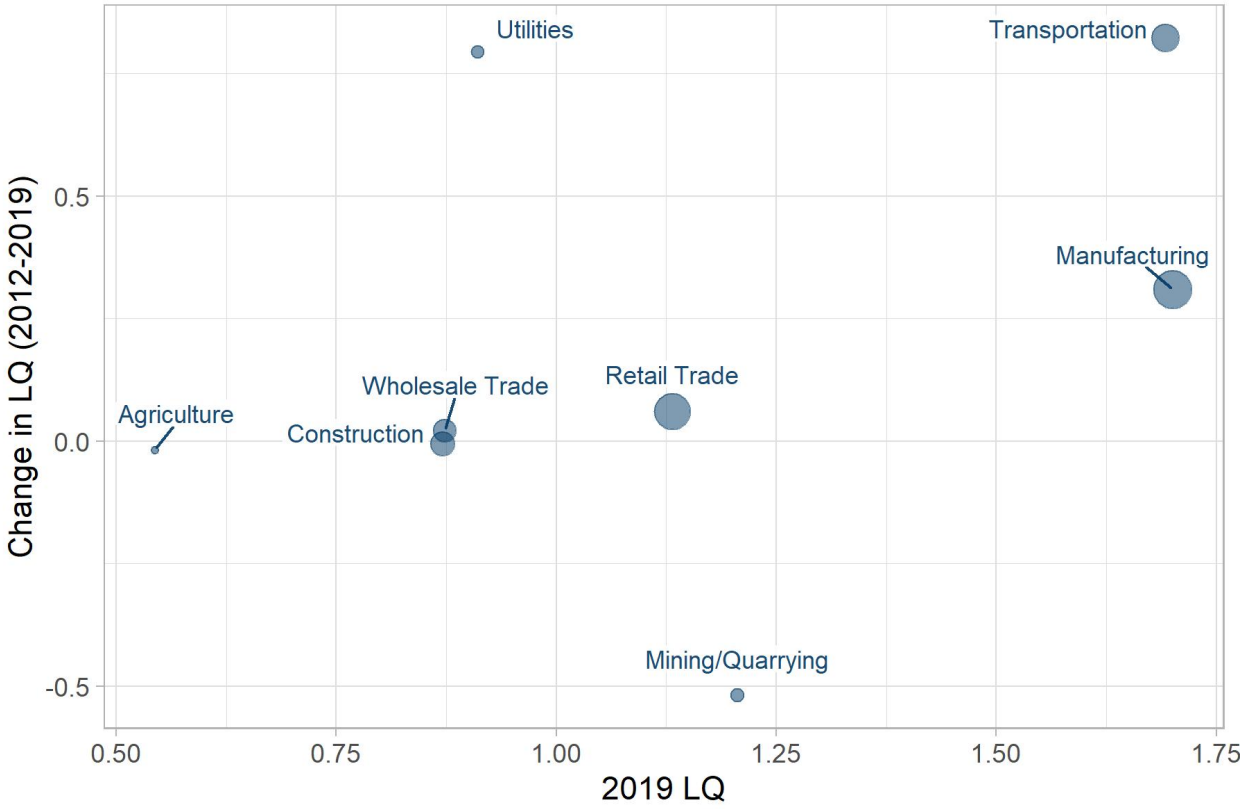
Figure 5-3. Kentucky Location Quotient by NAICS Industries (2019)



[43] U.S. Census Bureau, County Business Patterns: 2019, *https://www.census.gov/data/datasets/2019/econ/cbp/2019-cbp.html*.

Figure 5-4 highlights the change in location quotients for the freight-related industries between 2012 and 2019. Transportation (NAICS Code 48) and Utilities (NAICS Code 22) have experienced the highest levels of growth in terms of location quotients from 2012 to 2019, and Mining (NAICS Code 21) has experienced the largest reduction in location quotient during this period.

Figure 5-4. Kentucky Change in Location Quotients (2012 to 2019)



5.3. Kentucky Freight Corridors

The data driven identification of key corridors for Kentucky's freight system is needed to guide policy and investment decisions that impact the largest and most important freight users in the commonwealth. This identification was completed utilizing the KYTC Major Freight Users Inventory and FAF.

> *The Freight Analysis Framework (FAF) integrates data from a variety of sources to create a comprehensive picture of freight movement among states and major metropolitan areas by all modes of transportation. With data from the 2017 Commodity Flow Survey and additional sources, FAF version 5 (FAF5) provides estimates for tonnage, value, and domestic ton-miles by region of origin and destination, commodity type, and mode for 2017, and forecasts through 2050. Also included are state-to-state flows for these years plus 1997, 2002, and 2007, and 2012, summary statistics, and flows by truck assigned to the highway network for 2017 and 2050.*[44]

5.3.1. Exports

In 2010, the commonwealth created the Kentucky Export Initiative[45] with the goal to increase international exports, which will ultimately lead to job growth. Since its creation, exports have grown from just over $19 billion in 2010 to nearly $25 billion in 2020, outpacing all previous years' exportation levels. These activities have created over 150,000 jobs. **Table 5-2** demonstrates the top ten international export categories for Kentucky in terms of weight and value.

Table 5-2. Kentucky International Exports, 2017

	Ranked by Weight	Kiloton
1	Mixed freight	1032.97
2	Motorized vehicles	557.32
3	Plastics/rubber	435.61
4	Base metals	360.60
5	Wood prods.	313.98
6	Nonmetal min. prods.	305.76
7	Coal	287.48
8	Chemical prods.	199.84
9	Alcoholic beverages	166.12
10	Waste/scrap	165.35

	Ranked by Value	Millions $ (2017 $)
1	Machinery	$12,087.12
2	Motorized vehicles	$5,627.02
3	Electronics	$1,731.55
4	Pharmaceuticals	$1,658.82
5	Plastics/rubber	$1,455.75
6	Base metals	$1,339.25
7	Precision instruments	$1,230.64
8	Chemical prods.	$1,184.31
9	Articles-base metal	$1,064.45
10	Furniture	$678.73

Source FHWA FAF5.

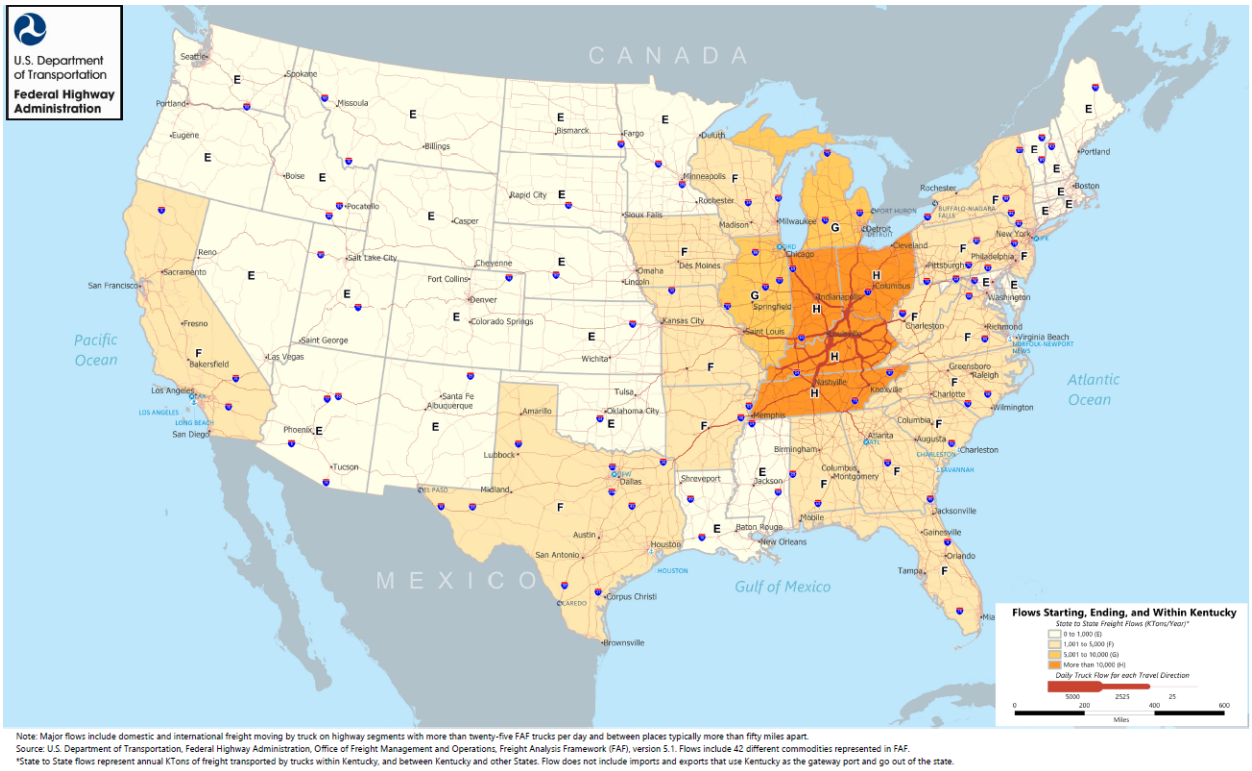
[44] Federal Highway Administration, Freight Analysis Framework Version 5.2, *https://faf.ornl.gov/faf5/*, Accessed February 2022.
[45] Kentucky Export Initiative, *http://www.kyexports.com/*, Accessed February 2022.

While the various exports are transported by air, truck, water, and rail, this document focuses on the exports on the highway network. These intermodal links are critical to the rapidly growing export market in Kentucky. According to the FAF network analysis and illustrated in **Figure 5-5**, I-75, I-71, I-64, and I-69 are critical highway links for Kentucky exports to Canada and Mexico.

5.3.2. National Flows

Kentucky serves as a major junction for the nation's freight network. **Figure 5-5** and **Figure 5-6** demonstrate base year flows (2017) and forecasted flows in 2040[46]. It is important to recognize the multijurisdictional nature of freight. Freight that travels in Kentucky travels throughout the eastern half of the U.S. and has key linkages to ports on the west coast.

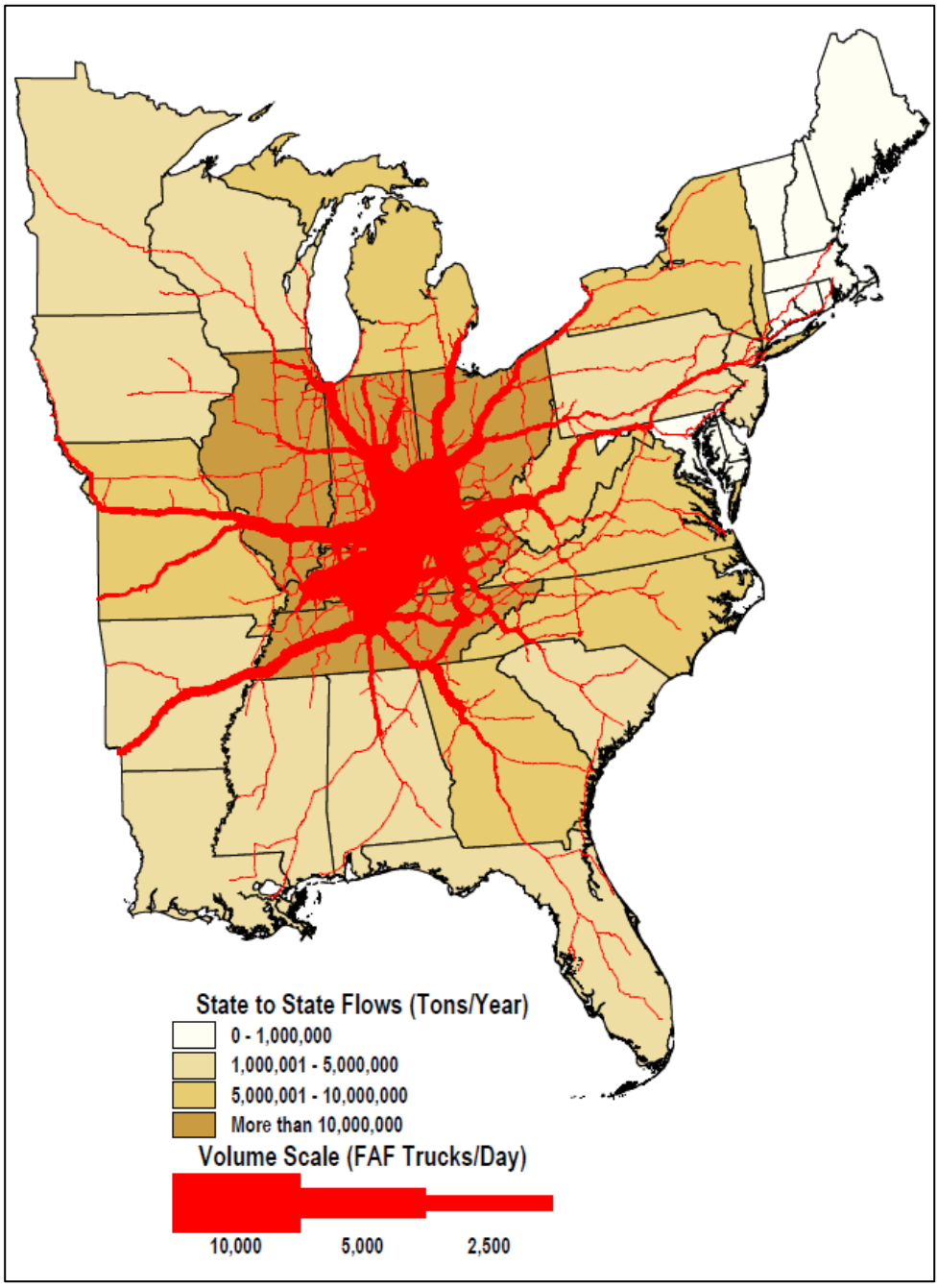
Figure 5-5. Major Flow by Truck To, From and Within Kentucky (2017)



Source: FHWA, Accessed August 2022.

[46] For base year 2007. The national map of major flow by truck to, from, and within Kentucky forecasted for 2050 with base year 2017 has not been released yet by FHWA as of August 2022.

Figure 5-6. Major Flow by Truck To, From and Within Kentucky (2040)[47]



Source: FHWA, Accessed August 2022.

[47] For base year 2007. The national map of major flow by truck to, from, and within Kentucky forecasted for 2050 with base year 2017 has not been released yet by FHWA as of August 2022.

5.3.3. Statewide Flows

While national analysis is important to understand how the bigger freight picture works, statewide analysis is particularly important to KYTC's planning process. The routes identified as critical freight corridors are within KYTC's span of control and are a known part of the planning process. **Figure 5-7** and **Figure 5-8** demonstrate the base flow year in 2017 and forecasted flow in 2050.

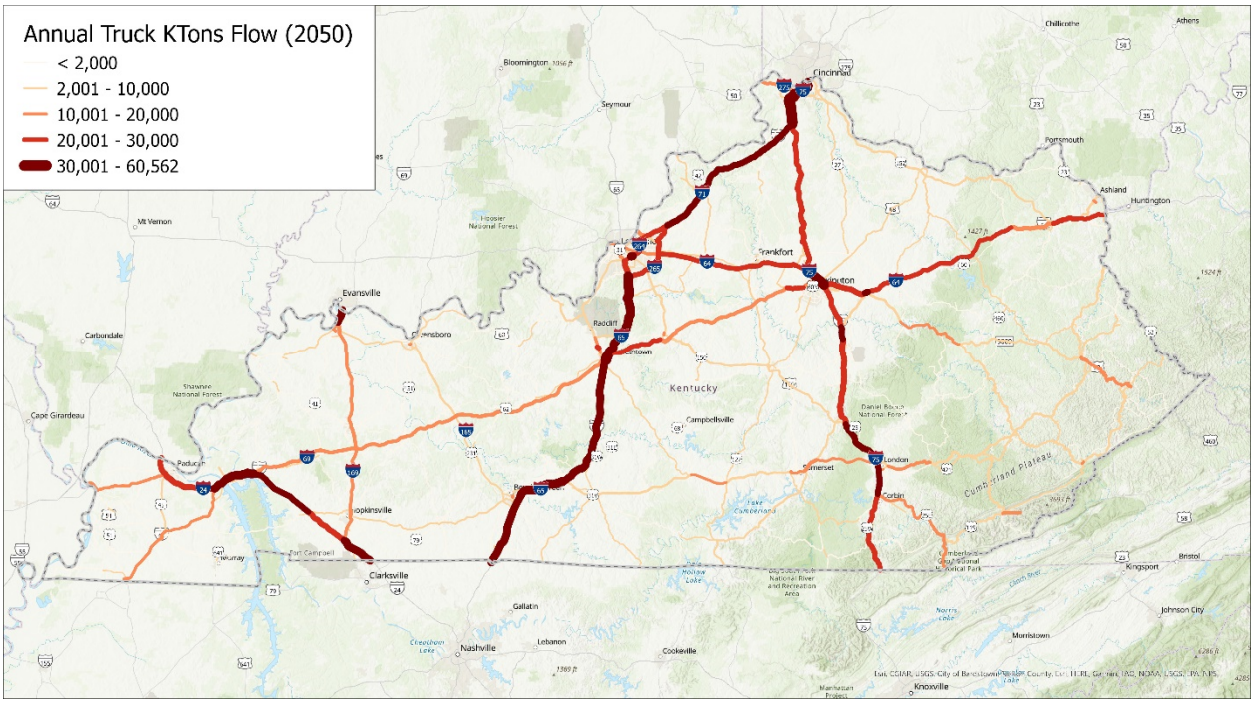
Figure 5-7. Kentucky FAF Freight Tonnage (2017)

Source: FHWA, Accessed August 2022.

The 2050 freight forecast uncovers significant freight challenges for many roads throughout the commonwealth. Significant growth takes place on I-71/75 between the Brent Spence Bridge and the I-71/75 split (**Figure 4-1**). This corridor is particularly crucial for Kentucky's exports to Canada. Additionally, I-65 and I-64 see substantial growth. However, I-65 and I-75 see the highest tonnage on Kentucky's interstate highways. In addition, I-69 shows growth in highway tonnage, but the full impact may be several years away, as adjacent states complete their segments of I-69.

Freight growth is not limited to the Interstate Highway System. Significant growth takes place on the NHS and some principal arterials, reflecting economic growth in rural areas of Kentucky. This is important because, to maintain the supply chain and economic growth throughout the commonwealth, freight investment in Kentucky must be balanced between heavy volume interstate highways and NHS highways that service local freight generators.

Figure 5-8. Kentucky FAF Freight Tonnage (2050)

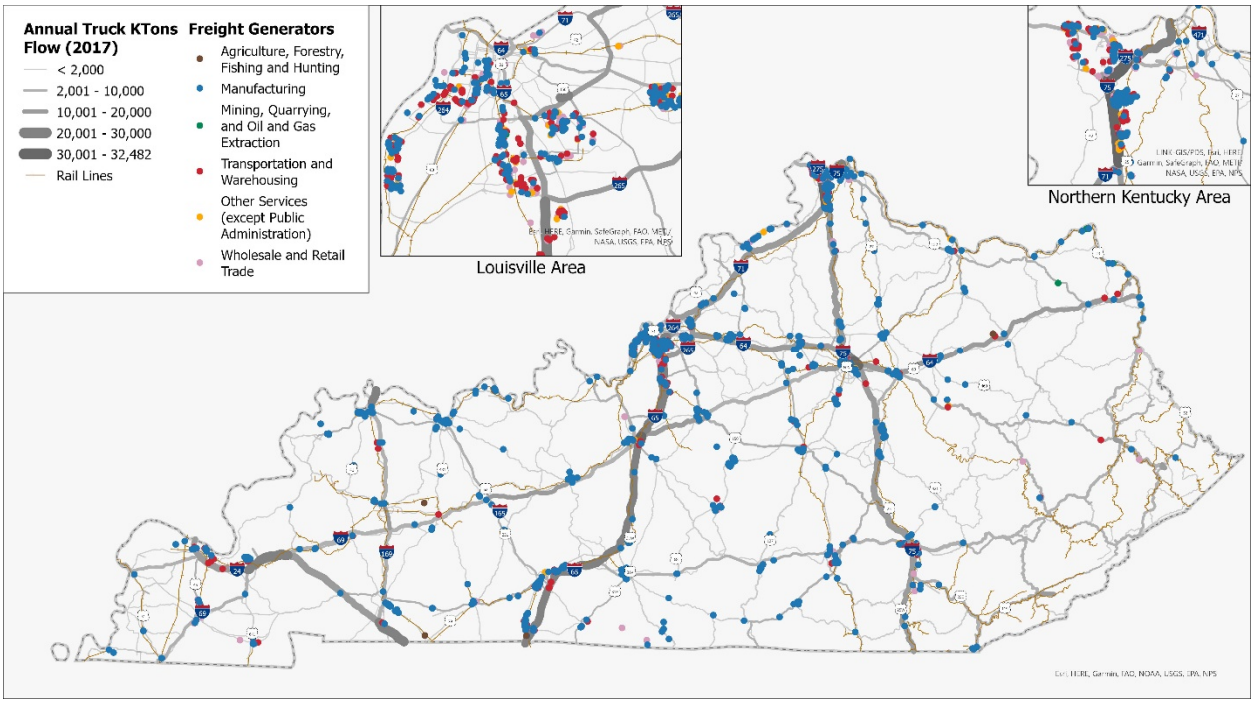


Source: FHWA, Accessed August 2022.

5.3.4. Kentucky Supply Chain

To retain and attract new economic development opportunities, one needs to understand how the supply chain and transportation system interact throughout Kentucky. Supply chains are the pathways that raw materials and production component parts move from their original sources to a production facility, warehouse, retail outlet, and the end consumer. There are significant data limitations when evaluating private companies' supply chains; simply stated, the chains are often proprietary information. However, KYTC developed a robust Major Freight Users Inventory that, when used in combination with statewide FAF freight flows, can begin to give transportation planners a look into the relationship between freight generators and the highway network. This analysis is illustrated in **Figure 5-9**.

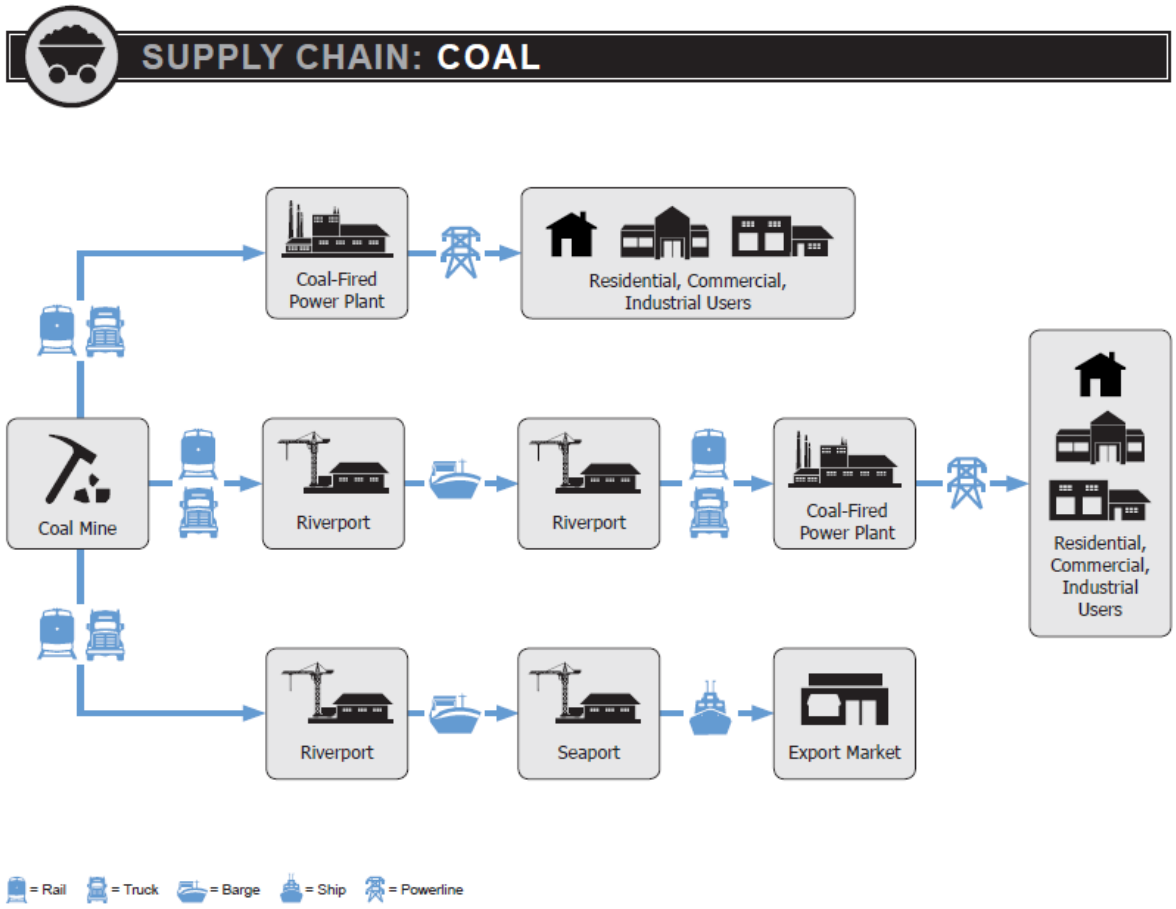
Figure 5-9. Kentucky Freight Generators and Highway Tonnage



Source: FHWA Data Date: 2017, KYTC Trip Generator Data: 2021.

Although coal is continuing to decline as a result of environmental effects at cola fired power plants, it still remains a large contributor to the Kentucky economy. As illustrated in **Figure 5-10**, the coal supply chain involves different modes of transportation to move this natural resource from the coal mines to coal-fired power plants and the export market. Kentucky's multimodal freight network plays a critical role in this supply chain, as shown in the figure.

Figure 5-10. Kentucky Coal Industry Supply Chain



An overall understanding of the role transportation plays in supply chain decision-making will help to support KYTC's planning efforts and strategic investment in the freight system. As competition continues to grow to attract and retain business, these concepts will help Kentucky compete in the global marketplace.

5.3.5. Critical Connections and the First/Last Mile

As freight volumes grow, the ability of the multimodal freight system to be resilient and responsive to the freight community's needs will be increasingly important to Kentucky's economic future. Although KYTC is constitutionally limited on gas tax allocation and funding of modes other than roadways, it is important to maintain the vital connectivity points with other modes of transportation. The connection points are where most efficiency is gained or lost during freight travel. In Kentucky, these connection points are airports, rail, truck distribution centers, pipelines, and port facilities. The roads leading up to major connectivity points are designated NHS intermodal connectors by FHWA and KYTC. Kentucky's intermodal connectors are listed in **Table 5-3** and are updated biannually.

Intermodal connectors are often maintained by different entities and fall through the cracks in the planning and programming process. Investment in connectors is often in competition with other high-profile projects for ever decreasing transportation funding. Intermodal connectors often suffer

geometric issues, pavement lifecycle, and other challenges that create inefficiencies and reliability issues for freight users.

Table 5-3. Freight NHS Intermodal Connectors[48]

Facility	Criteria	Connector description
Amtrak Station - Catlettsburg	AMTRAK Station	CS 2551 (15th St East in Ashland to Amtrak Station Entrance)
Amtrak Station - Fulton	AMTRAK Station	US 51 (South limits of Purchase Pkwy Interchange to Newton Rd.), Newton Rd (US 51 to Terminal Entrance)
Bells Lane Petroleum/Chemical Pipeline	Truck/Pipeline Terminal	KY 2056 from I-264 W to the Louisville-Ohio River Floodwall
Bells Lane Petroleum/Chemical Port	Port Terminal	KY 2056 - Louisville-Ohio Floodwall to I-264- Same as KY 6
Campground Rd Petroleum Pipeline	Truck/Pipeline Terminal	Campground Rd (Cane Run to Ralph), Kramers Ln (Cane Run to Campground), Ralph Ave (Cane Run to Campground Rd)
Campground Rd Petroleum Port	Port Terminal	Same as above
Cincinnati/N KY International Airport	Airport	KY 212 from I-275 S to the Airport Roadway System
CCI Energy Slones Branch Terminal	Truck/Rail Facility	KY 1441 (US 460 to Clark Elkhorn Tipple #1 Ent), KY 1789 (US 460 to KY 1441)
Greyhound Bus Station - Louisville	Intercity Bus Terminal	FS 8829 (Roy Wilkens to Ali Blvd), FS 8806 (Ali Blvd to Facility)
Ivel Coal Tipple	Truck/Rail Facility	County Rd 1020 - US 23 to Facility
Lexington Blue Grass Airport	Airport	Served by an existing NHS route (Man O War Blvd)
Louisville International Airport	Airport	Grade Ln (I-264 to UPS Feeder Truck Entrance), FS 8879 (I-264 to Facility)
Louisville/Ashland Oil/Chevron Dist. Center	Truck/Pipeline Terminal	KY 1681 - KY 4 Interchange to Facility
McCoy Elkhorn Coal Corp	Truck/Rail Facility	KY 194 - US 119 to Facility
Norfolk Southern Intermodal - Georgetown	Truck/Rail Facility	KY 620 - Facility to I-75 Interchange
Norfolk Southern Intermodal - Louisville	Truck/Rail Facility	Newburg Rd (I-264 to Bishop), Bishop Ln (Newburg to Jennings), Jennings Ln (Bishop to Facility)
Owensboro Riverport	Port Terminal	KY 331 (US 60 to Harbor Rd), Harbor Rd (KY 331 to Facility)
Apex Energy/Cambrian Coal Corp. Tipple	Truck/Rail Facility	KY 80 from US 460 to Facility
Truck to Barge Coal Dock Cluster, Boyd County	Port Terminal	KY 757 from US 23 near Lockwood to 2.3 Miles North

[48] Federal Highway Administration, National Highway System: Intermodal Connectors, *http://www.fhwa.dot.gov/planning/national_highway_system/intermodal_connectors/kentucky.cfm*, Accessed November 2021.

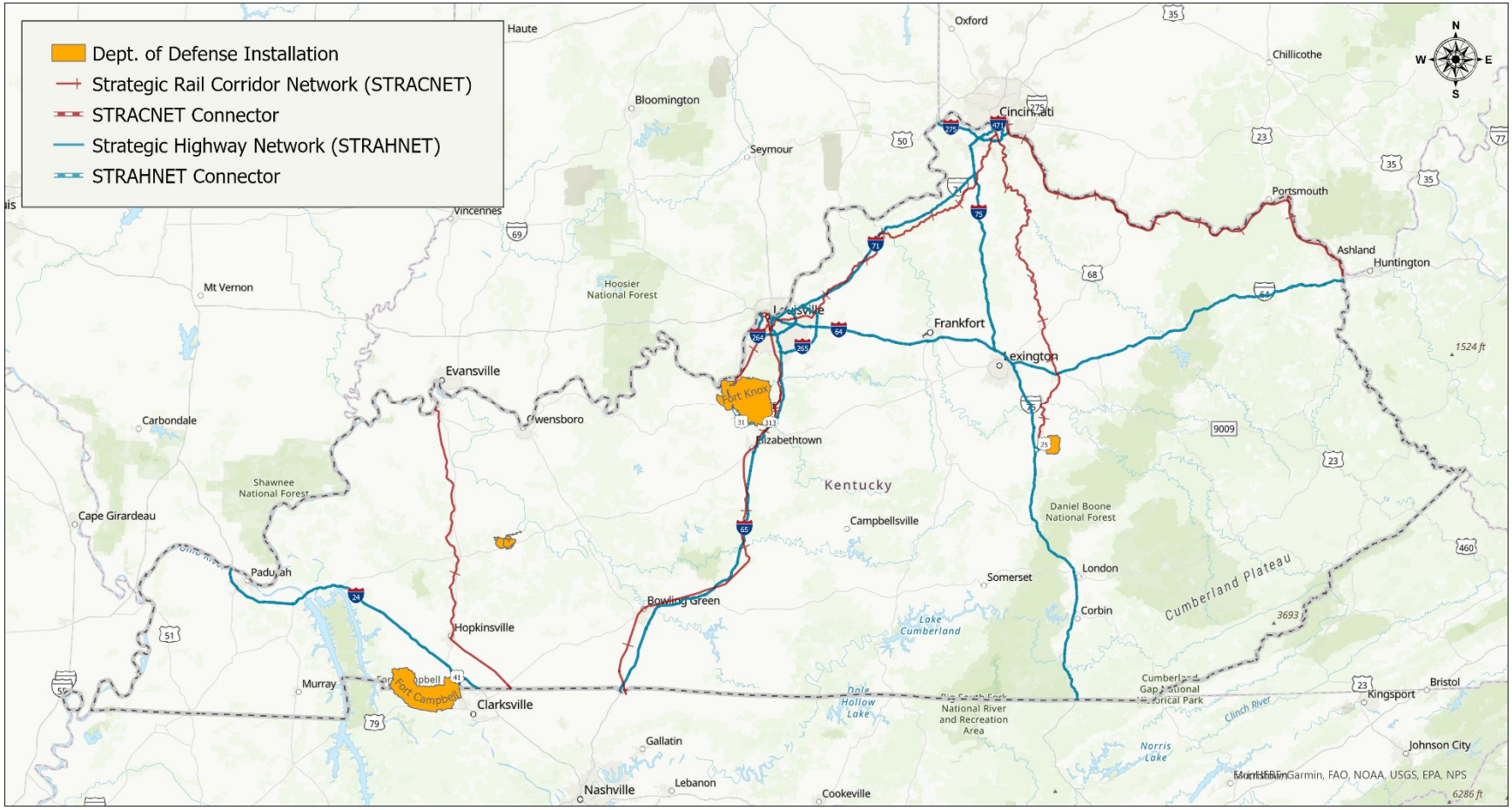
5.4. Kentucky Military Installations

The U.S. military has a significant presence in Kentucky. Military installations require efficient and reliable access to the freight transportation system for national defense purposes. The U.S. military depends on the Kentucky freight system to move cargo to not only support the installations, but also to deploy personnel and equipment for national defense. To meet this critical need, the Strategic Highway Network (STRAHNET) and the Strategic Rail Network (STRACNET) were developed by the Department of Defense (DoD) in coordination with FHWA.[49] The STRAHNET and STRACNET are networks of highways and rail lines, respectively, which provides the U.S. military access, continuity, and emergency capabilities for defense purposes. Kentucky's military installations and networks are shown in **Figure 5-11**.

The state's military installations serve as major freight generators, consumer markets and need connectivity to the freight transportation system. At Fort Campbell, the U.S. Army has its highest concentration of rotary-winged aircraft and its fifth largest concentration of soldiers in the U.S., approximately 30,000. The 101st Airborne Division (Air Assault) is renowned for its unique warfighting capabilities and storied history. Fort Knox is home to a wide diversity of Army units, to include combat, logistics, combat-support, operations, and administrative. Other key installations include the Blue Grass Army Depot and the Wendell H. Ford Regional Training Center (Kentucky National Guard). Also, the Kentucky National Guard has numerous Army and Air Guard units domiciled throughout the state including the 123rd Airlift Wing based in Louisville. Diverse and complex supply chains are necessary to efficiently and reliably provide logistics support to these military sites. Enormous amounts of fuel, food, ammunition, maintenance, equipment & materials, and medical supplies are critical to maintaining these units in a combat-ready posture. Transportation infrastructure to include highways, rail, inland waterways, and air are critical to supporting these supply chains and to support deployment of units.

[49] FHWA, Policy & Governmental Affairs, 2004 Conditions and Performance, Chapter 18, Strategic Highway Network (STRAHNET), *https://www.fhwa.dot.gov/policy/2004cpr/chap18.cfm*.

Figure 5-11. Kentucky Military Installations and Networks



6. Trends and Challenges

Economic changes can impact the freight system positively or negatively depending on the efficiency and adaptability of the transportation network. This section summarizes the internal and external economic trends and challenges related to the movement of goods on Kentucky's freight network.

6.1. Internal Trends and Challenges

Until the 20th century, agriculture was Kentucky's main economic activity. While agriculture remains a key element in the commonwealth's economy, manufacturing grew in importance after the 1930's and took precedence, largely due to an abundance of coal and hydroelectric power. In 2019, Kentucky's leading economic activity was manufacturing, followed by transportation. The energy, automotive, and agriculture trends and challenges in Kentucky and how they affect freight transportation are discussed below.

6.1.1. Energy

According to the U.S. Energy Information Administration (EIA), Kentucky is a major coal-producing state, ranking 7th in 2020 with an output of 24 million short tons of coal, accounting for 4.5 percent of the total U.S. coal production. Approximately 82 percent of Kentucky's coal comes from underground mines in Kentucky's eastern Appalachian counties and in western Kentucky. The rest of the coal comes from surface mines. For electricity generation, coal-burning plants produce approximately 69 percent of Kentucky's electric power. Many coal-fired generation plants on the Ohio River have already or plan to convert to natural gas in the coming years. Natural gas produces 22.6% of the electric power, followed by hydroelectric utilities such as the Barkley and Kentucky dams at 7.9%.

Significant coal production shifts, geographically or by volume, continue to have a dramatic impact on the Kentucky Freight Network. For example, roads that currently serve coal mining operations could continue to see heavy truck traffic, or if projections are correct, the same roads could see a dramatic decrease in heavy-haul traffic. Similarly, the inland waterway system carries a significant amount of Kentucky coal to customers throughout the Mississippi and Ohio River valleys. This excess capacity could provide opportunities to innovate and explore container-on-barge shipping opportunities in the Midwest.

6.1.1.1 Coal Production Shifts

Historically, Kentucky is a net exporter of energy; however, with decreasing coal production and stagnant energy demand, Kentucky's position as an energy exporter has been declining since 1990.

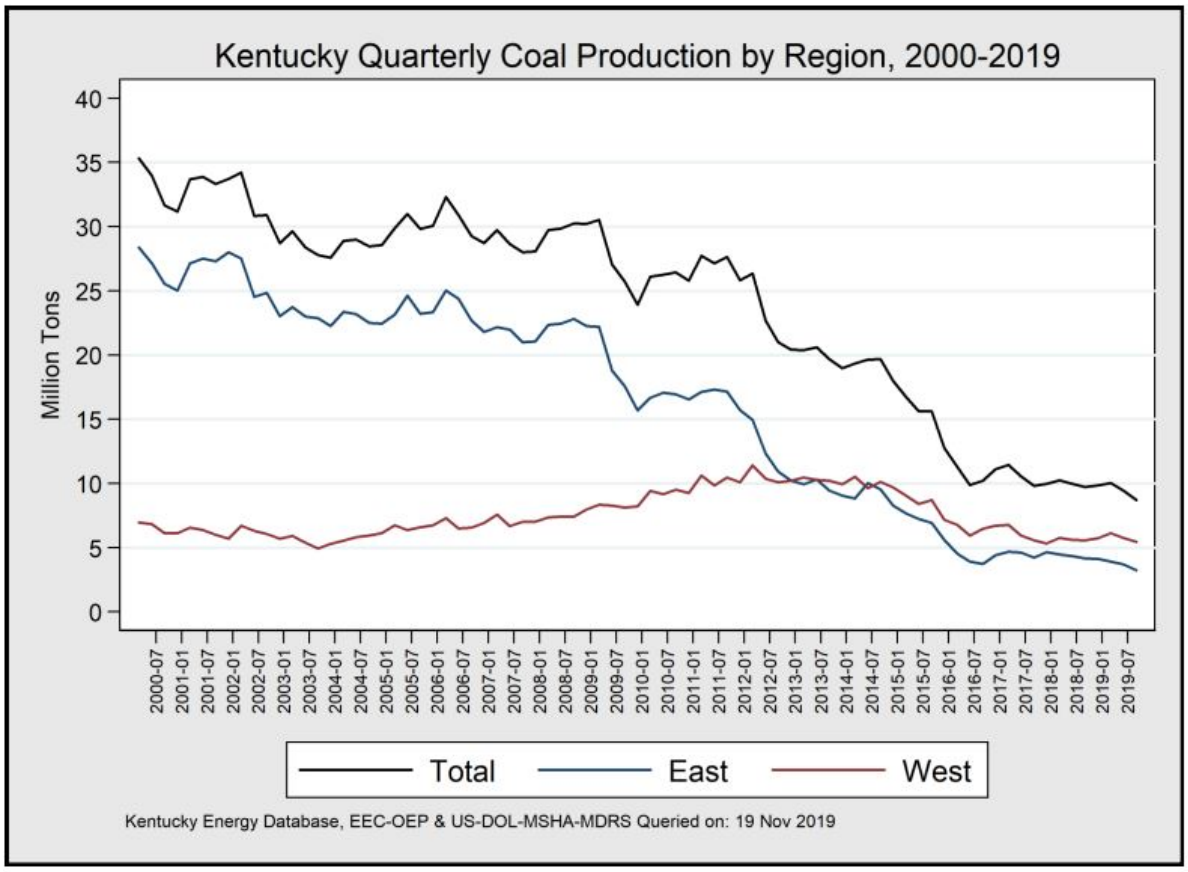
Kentucky has been one of the largest coal-producing state for many years, with about one-fifth of all operating U.S. coal mines, more than all but two other states.[50] Kentucky is the only coal exporting state with two distinct geologic basins: the Central Appalachian Basin of eastern Kentucky and the Illinois Basin of western Kentucky. Coal mining of some form has existed in these basins for at least 220 years,

[50] U.S. Energy Information Administration (EIA), Kentucky State Energy Profile Analysis, *https://www.eia.gov/beta/states/states/ky/analysis.* Accessed November 2021

with more than 8.36 billion tons of coal produced from both geologic basins during that period.[51] Historically, eastern Kentucky has been the primary coal producing region, but in recent years the two regions have been trending in opposite directions. Eastern Kentucky coal has a higher heat content and lower sulfur content, so it burns hotter and cleaner than western Kentucky coal. However, western Kentucky coal is now relatively less expensive by delivered price. The difference is a result of several factors, including transportation costs, ease of access, and mining techniques employed.

Figure 6-1 illustrates the change in total statewide coal production alongside subtotals for eastern and western Kentucky from 2000 to 2019. In 2013, western Kentucky overtook eastern Kentucky in total coal production, generating 51 percent of Kentucky's 80.6 million tons of coal. In 2019, western Kentucky mines accounted for 61 percent of Kentucky coal production, while eastern Kentucky accounted for 39 percent.

Figure 6-1. Kentucky Coal Production, 2000-2019.

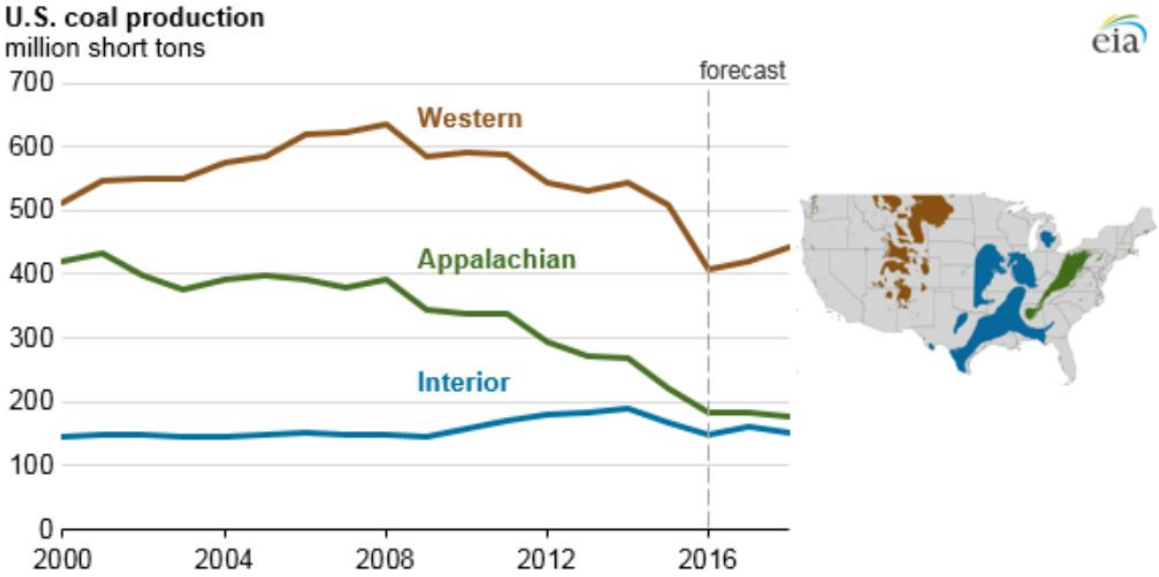


Source: Kentucky Energy and Environment Cabinet[52], 2019.

[51] University of Kentucky, Kentucky Geological Survey, *https://www.uky.edu/KGS/coal/coal-ky-info-coal-production.php*, Accessed November 2021.
[52] Kentucky Energy and Environment Cabinet, Kentucky Quarterly Coal Report, https://eec.ky.gov/Energy/News-Publications/Quarterly%20Coal%20Reports/2019-Q3.pdf, Accessed November 2021.

The decline in eastern Kentucky coal production is representative of the larger decline in Appalachian Basin coal. **Figure 6-2** depicts this decline in comparison to competing coal reserves as a percentage of total U.S. coal production.

Figure 6-2. Historic Coal Production by Geologic Basin



Source: U.S. Energy Information Administration (EIA)[53], 2017.

As shown in the figure above, eastern Kentucky is included in the Appalachian Basin line (green), while western Kentucky is included in the Interior line (blue). Kentucky's decline in coal production coincides with the rise of Powder River Basin coal from Montana and Wyoming (brown). Western coal has seen recent export growth.

As the remaining coal in eastern Kentucky becomes more expensive to mine, coal companies are competing against cheaper fuels including western Kentucky coal, natural gas, and some renewable sources. In 2020, Central Appalachian coal production followed the U.S. coal production trend by falling to its lowest level since 1965. This was largely the result less U.S. electric power sector demand for coal. Kentucky witnessed a decline of 32.7 percent in coal production from 2019 to 2020.[54] According to the United States Geological Survey (USGS) Coal Resource Assessment, annual coal production from the Appalachian Basin will enter a period of irreversible decline over the next several decades.

In 2020, approximately 69% of electricity produced in Kentucky was coal-generated, a larger share than all but three other states. Coal has historically been the cheapest and most stable energy source, since it can easily be stockpiled and used when needed, unlike natural gas and renewables. The cost of natural

[53] U.S. Energy Information Administration (EIA), Today in Energy, *U.S. coal production and coal-fired electricity generation expected to rise in near term*, February 8, 2017, https://www.eia.gov/todayinenergy/detail.php?id=29872, *Accessed August 2022.*
[54] U.S. Energy Information Administration (EIA), Today in Energy, In 2020, *U.S. coal production fell to its lowest level since 1965*, July 15, 2021, https://www.eia.gov/todayinenergy/detail.php?id=48696, Accessed August 2022.

gas has decreased significantly in recent years but is still more expensive than coal. Despite its decline, coal is expected to remain a major component of Kentucky's energy profile for the foreseeable future.[55]

6.1.1.2 Power Plant Conversions – Coal to Natural Gas

Across the U.S., approximately 102 gigawatts of coal-fired power plant capacity retired between 2010 and the first quarter of 2019. According to the EIA, another 17 gigawatts of coal-fired capacity is set to be retired by 2025. Two of the largest coal-fired power plant retirements in the U.S took place in Kentucky in 2020.[56]

Factors influencing this trend of retiring older, less efficient coal-fired power generators include slowing growth in electricity demand, shifts in relative fuel prices, increasing availability of high-efficiency natural gas combined-cycle power plants, and environmental compliance costs.[57] Most coal generators in Kentucky were constructed between the mid-1950s and 2010, and several have been retrofitted with environmental controls to meet air quality emissions standards. However, many others need further upgrades, as standards have become more stringent.

Since coal has encompassed a large percentage of commodities being moved across Kentucky, the trend of power plant conversions has significant implications on the way freight moves throughout Kentucky's freight system.

6.1.1.3 Kentucky Coal Movement Out of State

Foreign coal remains a small part of total U.S. coal consumption, but Central Appalachian coal is especially vulnerable to the competition as it loses market share to natural gas and coal from elsewhere in the U.S.

In 2020, 30 percent of Kentucky coal stayed in state, while 69 percent was exported out of state. The remaining 1 percent was shipped overseas. Eastern Kentucky coal was sold mostly to southeastern U.S. states (Georgia being the largest consumer), while western Kentucky coal (59 percent) was mostly used in state. Kentucky remains the single largest user of Kentucky coal, increasing its consumption as other states decreased consumption.

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[55] Kentucky Energy and Environment Cabinet, Energy News Publications, Coal Facts, *https://eec.ky.gov/Energy/News-Publications/Pages/Coal-Facts.aspx*, Accessed November 2021.
[56] U.S. Energy Information Administration (EIA), Today in Energy, *More U.S. coal-fired power plants are decommissioning as retirements continue*, *https://www.eia.gov/todayinenergy/detail.php?id=40212*, Accessed November 2021.
[57] U.S. Energy Information Administration (EIA), Today in Energy, *27 gigawatts of coal-fired capacity to retire over next five years*, *http://www.eia.gov/todayinenergy/detail.cfm?id=7290*, Accessed November 2021.

Table 6-1 provides 2017 freight transportation statistics for coal in Kentucky.

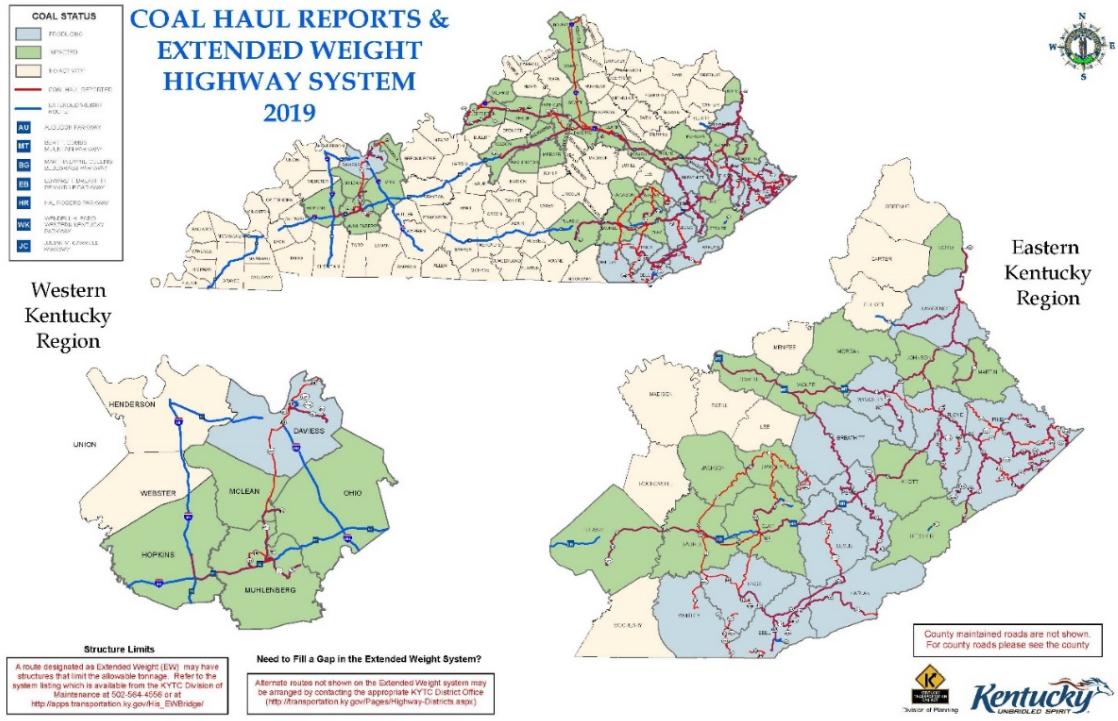
Table 6-1: Freight Statistics – Coal

	Thousand Tons			Commodity Thousand Tons Share		Commodity Value Share	
Year	**2012**	**2017**	**Change**	**2012**	**2017**	**2012**	**2017**
Within Kentucky	41,165	17,635	-57%	25%	11%	2.0%	0.8%
From Kentucky	114,015	40,427	-65%	32%	24%	1.7%	0.8%
To Kentucky	62,198	11,862	-81%	20%	7%	0.8%	0.1%

Source: Freight Analysis Framework Summary Statistics, 2022.

In 2017, coal was the second ranked commodity transported from and within Kentucky, and third ranked commodity transported to Kentucky by tons. By commodity value, coal was ranked outside the top 10 commodities by value as a shipment to, from, and within Kentucky.[58] Due to the production of coal on the eastern and western portions of the state, significant volumes of coal are shipped on Kentucky's roadways. **Figure 6-3** illustrates the major coal producing counties in Kentucky, the highways on which coal is transported, and the counties included in the road transport of coal.

Figure 6-3. Kentucky Coal Haul Highway System (2019)[59]

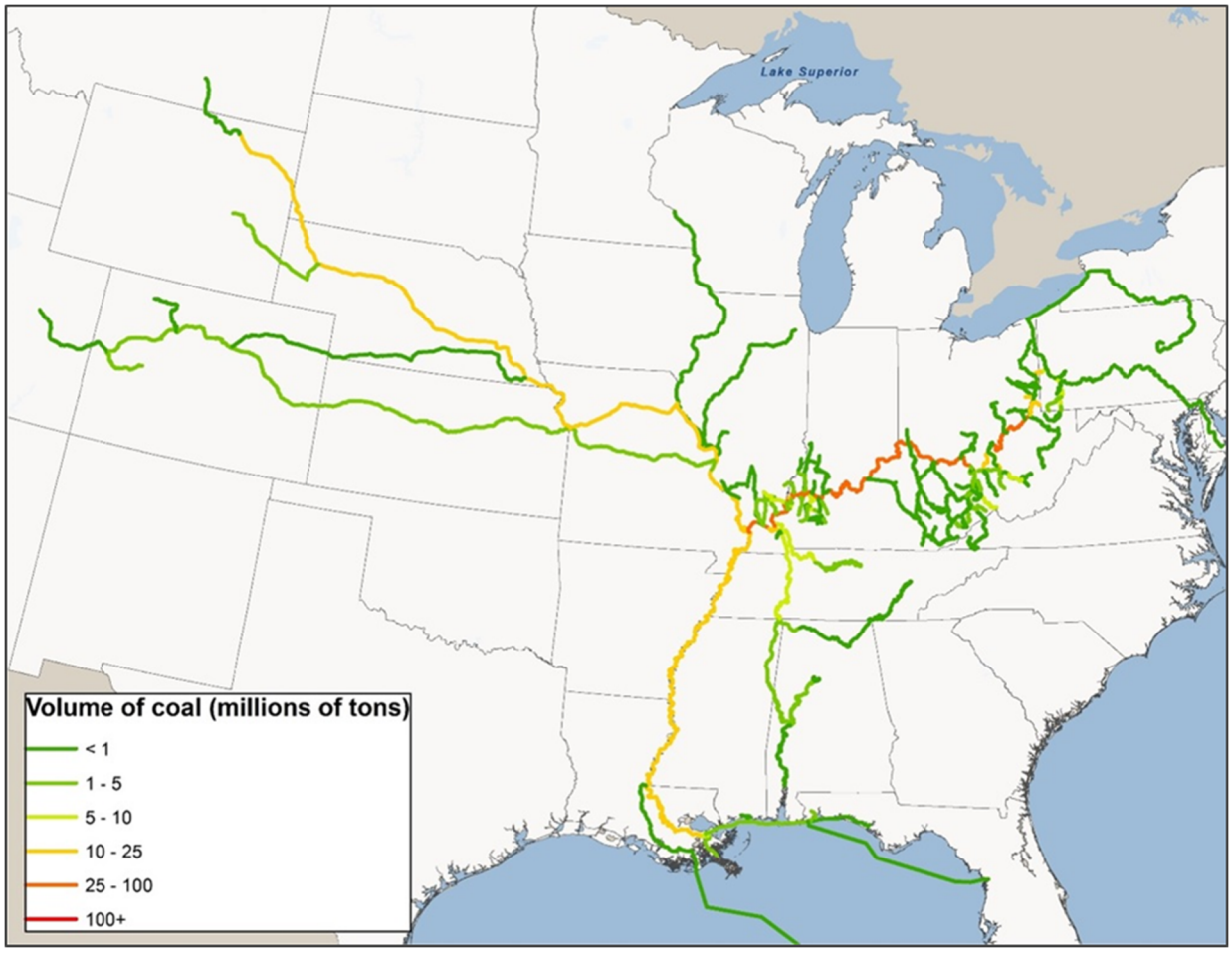


Source: Kentucky Transportation Cabinet, 2019.

[58] Freight Analysis Framework, FAF5.2, Summary Statistics, *https://faf.ornl.gov/faf5/SummaryTable.aspx*
[59] Kentucky Transportation Cabinet, Coal Haul Highway System, 2019, *https://transportation.ky.gov/Planning/Pages/Coal-Haul-Highway-System.aspx*.

In terms of tonnage, commodity transport consists largely of coal on the Ohio River and the Tennessee-Tombigbee Waterway. Railroads are also integral for the delivery of coal from mines to power plants. **Figure 6-4** illustrates the full intermodal routes of coal shipments on the Ohio River.

Figure 6-4. Full Intermodal Routes of Coal Shipped on the Ohio River



Source: Kentucky Transportation Center and the University of Kentucky.

6.1.2. Automotive

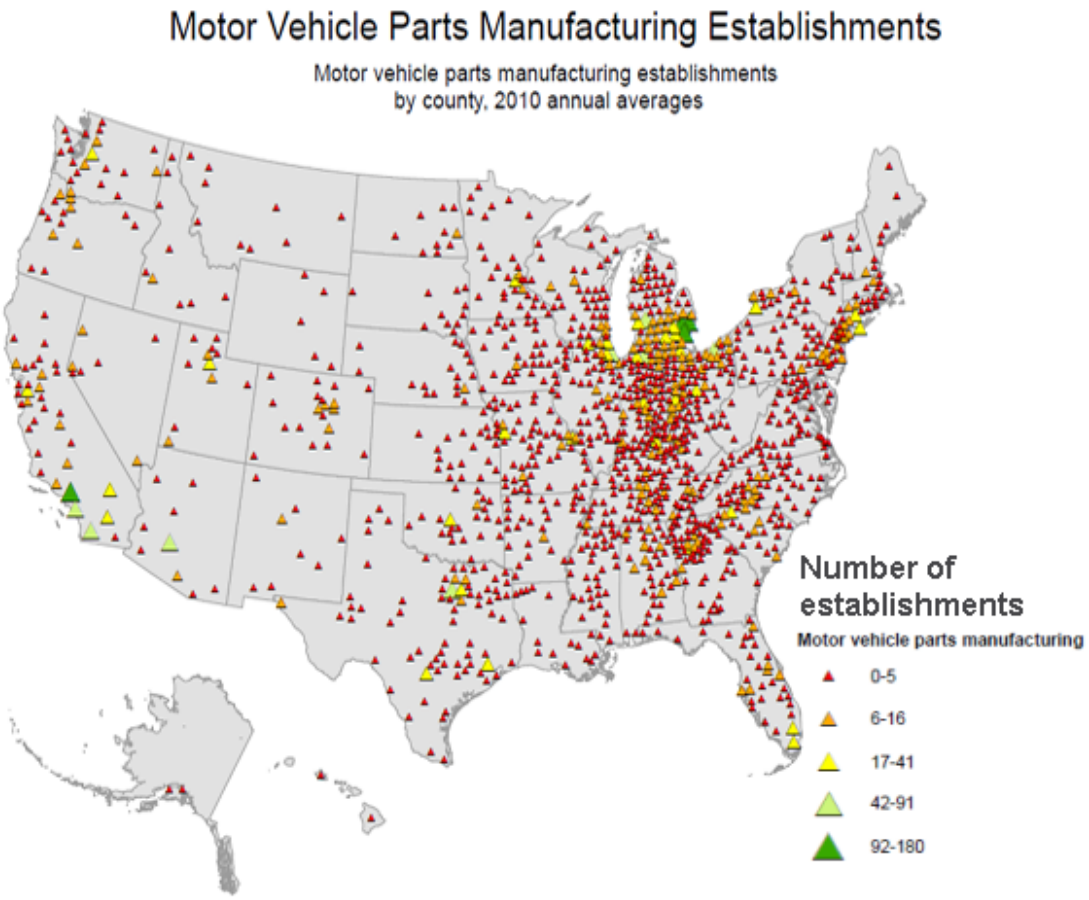
Kentucky is the top-ranking producer state of cars, light trucks, and SUVs per capita. Also, ranking third in the U.S. (behind Michigan and Ohio) in auto production by state, accounting for 11.2 percent of total U.S. auto production. There are more than 520 automotive-related companies in the state, employing over 100,000 people, as well as four assembly plants and over 490 parts suppliers located in state. In 2019, Kentucky automotive-related exports totaled $4.8 billion.[60]

[60] Kentucky Cabinet for Economic Development, Automotive Industry, *https://ced.ky.gov/Existing_Industries/Automotive.*

Automotive-related industries in Kentucky contribute nearly $14.3 billion to the state's GPD, representing approximately 7.8 percent.[61] The success of Kentucky's automobile industry can be primarily attributed to its geographic location along the north-south rail and highway distribution corridors, which are tapped into United States-Mexico-Canada Agreement (USMCA) flows.

Nationally, a concentration of automotive manufacturing exists along a multistate north-south corridor, roughly following the paths of I-65 and I-75, both of which transect Kentucky and parallel NS and CSXT rail lines. The northern half of auto manufacturing largely consists of domestic manufacturers (Ford, GM, and Chrysler), while the southern half consists of foreign manufacturers (Nissan, Toyota, BMW, Mercedes-Benz, and Volkswagen). Scattered throughout the U.S. are thousands of parts suppliers and manufacturers who are integrated into the automotive supply chain that extends from Canada to Mexico. **Figure 6-5** is a map of motor vehicle-related firms throughout the U.S.

Figure 6-5. Automotive Industry in the U.S.



Source: U.S. Bureau of Labor Statistics, 2010.

Louisville is home to two Ford assembly plants: the Kentucky Truck Plant (KTP) and the Louisville Assembly Plant (LAP). The KTP assembles Ford F-Series Super Duty pick-up trucks, the Ford Expedition, and the Lincoln Navigator. The Louisville Assembly Plant assembles the Ford Escape and Lincoln

[61] Kentucky Automotive industry Association, *Economic Impact of the Automotive Industry in Kentucky*, *https://kyautoindustry.com/wp-content/uploads/2015/07/Regional_Forum_Presentation.pdf.*

Corsair, but also has the capability to simultaneously produce the company's Focus, Fiesta, and Fusion models to meet demand. In October 2021, Ford announced its new plan of building the largest electric battery plant in the U.S. next to I-65 in Hardin County. This project will break economic development records in the state and will set the bar globally for battery production, with a capital investment nearing $6 billion.[62] Most recently, Envision AESC announced a $2 billion investment to build a lithium-ion battery plant in Bowling Green, Warren County, Kentucky.[63]

Toyota opened its first assembly plant outside of Japan in 1986 in Georgetown, Kentucky, and has since then produced more than 13 million vehicles and nearly 14 million powertrain units.[64] Today, Toyota Motor Manufacturing Kentucky (TMMK) is the company's largest vehicle manufacturing plant in the world. TMMK has two vehicle production lines and a powertrain, engine, and axle facility, and has a production capacity of 550,000 vehicles and more than 600,000 engines annually. [65] Starting in 2023, TTMK will begin assembling integrated dual fuel cell (FC) modules destined for use in hydrogen-powered, heavy-duty commercial trucks.

Lastly, Bowling Green has been the exclusive production home of Chevrolet's high-performance Corvette since 1981, with more than 1 million manufactured to date.[66]

Figure 6-6 illustrates the automotive-related plants and suppliers in Kentucky.

[62] Commonwealth Journal, Kentucky leading the automotive industry of the future, October 8, 2021, *https://www.somerset-kentucky.com/opinion/columns/kentucky-leading-the-automotive-industry-of-the-future/article_427054b5-bd48-5011-8627-aafcd3da1e9a.html*

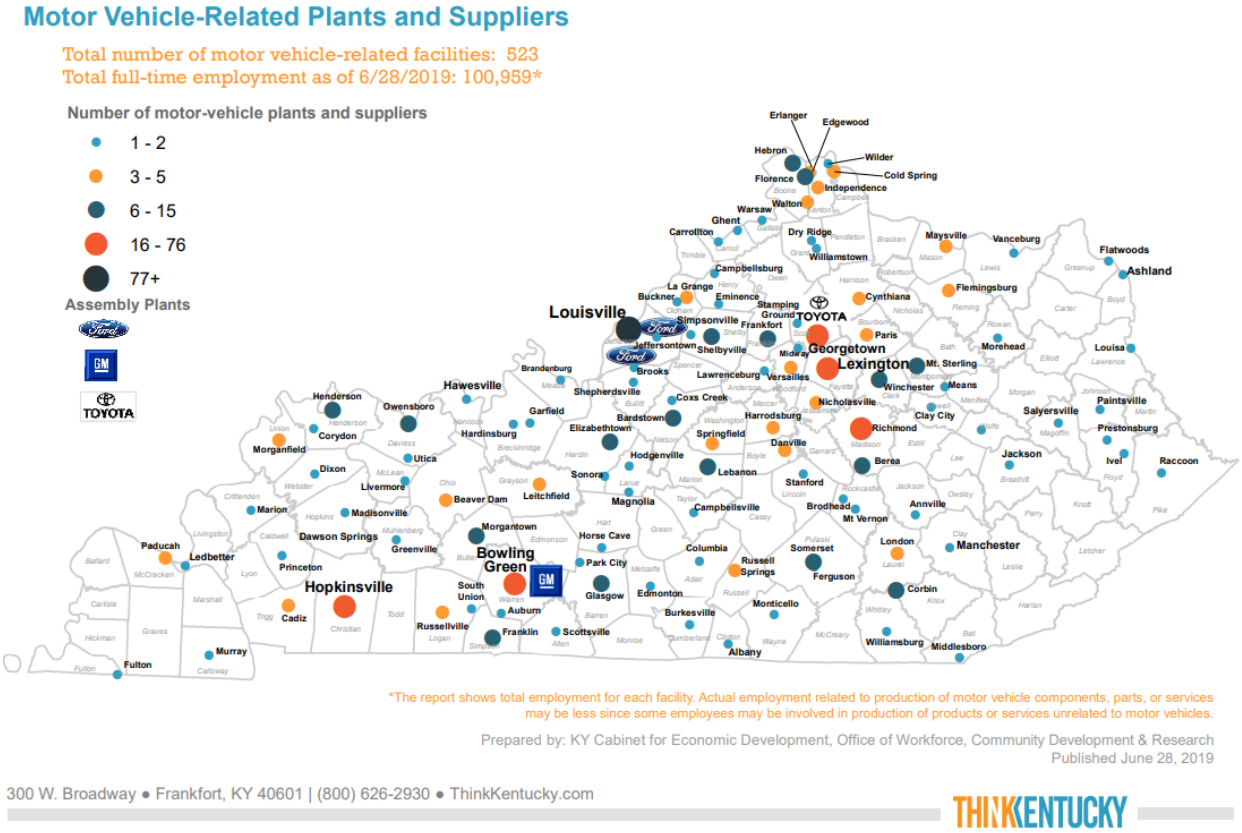
[63] Kentucky Cabinet for Economic Development, Gov. Beshear: Envision AESC's Investment in 30GWh Kentucky Gigafactory Creates 2,000 New Jobs and Solidifies the Commonwealth as New Electric Vehicle Battery Capital, April 13, 2022, *https://ced.ky.gov/Newsroom/NewsPage/20220413_EnvisionAESC*.

[64] Toyota Newsroom, Toyota's Largest Plant in the World Finds a Home in Kentucky, September 16, 2021, *https://pressroom.toyota.com/toyotas-largest-plant-in-the-world-finds-a-home-in-kentucky/*.

[65]Toyota Newsroom, *Toyota Motor Manufacturing Kentucky (TMMK), March 30, 2022, https://pressroom.toyota.com/facility/toyota-motor-manufacturing-kentucky-tmmk/.*

[66] Toyota Newsroom, *Toyota to Assemble Fuel Cell Modules at Kentucky Plant in 2023,* August 25, 2021, *https://pressroom.toyota.com/toyota-to-assemble-fuel-cell-modules-at-kentucky-plant-in-2023/.*

Figure 6-6. Automotive Industry in Kentucky



Source: Kentucky Cabinet for Economic Development, 2019.

Motor vehicles are transported by truck on car carrier trailers, by rail on 'autorack' rail cars, or by sea on car carrier ships. Autoracks have two or three decks and can carry up to 20 vehicles, but the average is around 12 vehicles. Domestically assembled vehicles are transported from assembly plant to dealership either by truck or a combination of truck and rail depending on distance to destination. Costs rise substantially for car carrier truck routes that are more than a few hundred miles. Generally, after vehicles are transported by rail, trucks carry the vehicles for the final leg from the railhead to the dealership, which is typically up to 75 miles. The average rail journey for a new car in the U.S. is approximately 1,300 miles. Automakers, which generate 8 to 9 percent of total rail freight, have little leverage with railroads, since there are no cost-effective alternatives to shipping vehicles via rail. Vehicles assembled overseas arrive into coastal ports and are accepted into the existing domestic transport system.

From Kentucky, motor vehicle rail shipments are typically transported from the assembly plant to an onsite rail yard, where the rail cars are organized and shipped out to a railhead near their destination market. Toyota in Georgetown and Ford's two Louisville plants are major drivers of rail freight in Kentucky. **Table 6-2** provides freight transportation statistics for motorized vehicles in Kentucky in 2017.

Table 6-2. Freight Statistics – Motorized Vehicles

	Thousand Tons			Commodity Thousand Tons Share		Commodity Value Share	
Year	**2012**	**2017**	**Change**	**2012**	**2017**	**2012**	**2017**
Within Kentucky	2,968	7,468	152%	2%	2%	25%	13%
From Kentucky	9,308	14,213	53%	3%	3%	21%	19%
To Kentucky	6,807	13,431	97%	2%	2%	14%	10%

Source: Freight Analysis Framework Summary Statistics, 2017.

In 2020, motorized vehicles were the fifth ranked commodity transported from and to Kentucky, and the ninth ranked commodity shipped within Kentucky by tons. By commodity value, motorized vehicles are the top-ranking commodity transported from and within Kentucky, and third ranked commodity transported to Kentucky.[67]

While commodity ton-miles decreased from 2017 to 2020, new automotive investment and lighter vehicles held the commodities value share relatively stable. As this industry continues to grow it will put increased pressure on the freight transportation system in Kentucky, particularly on the rail and highway systems, which bear the brunt of movement of motor vehicles.

6.1.3. Agriculture

Most agriculture is geographically dispersed due to its reliance on land. It cannot simply locate near its customers, especially since more and more of those customers are global. Agricultural production depends on a complete transportation system that includes all major modes of transportation (truck,

[67] Federal Highway Administration, Freight Analysis Framework Version 5.2, *https://faf.ornl.gov/faf5/*.

rail, barge, aircraft, and ocean vessel), with their complementary and competitive roles in transporting farm goods. Due to its cyclical nature during annual periods of growth in volume, agriculture, in turn, puts pressure on the transportation system. Many agricultural commodities are perishable, seasonal, and of relatively low value, making efficient and appropriate transportation challenging but critical.

Kentucky remains one of the nation's major agricultural states. Kentucky ranks second among states, after North Carolina, in the production of tobacco. The Commonwealth's other major cash crops are corn, soybeans, and hay. Kentucky's farmers also raise livestock, mostly cattle and horses. The breeding and selling of thoroughbred horses are Kentucky's most valuable source of livestock income. Most of the thoroughbred horses come from pastures located in the state's bluegrass region, which includes Lexington.

Agricultural trends in Kentucky are consistent with the trend of population migration out of rural areas and into more urban and suburban settings. Kentucky's rural population share decreased from 69 percent in 1930 to 41 percent in 2010. Increased agricultural efficiency and automation have resulted in increased output that, when coupled with advancements in transportation technology, have enabled population growth to occur far from food production. Many businesses in Eastern Kentucky are adopting high-tech greenhouses to improve the productivity, economic efficiency, and environmental friendliness of the state's agriculture sector.[68]

Between 1950 and 2010, the average farm size in the U.S. increased from 213 acres to 418 acres, while Kentucky's average farm size increased from 86 acres to 163 acres (or by 90 percent) over the same period. Kentucky has 63 percent fewer farms and 29 percent fewer total farm acres in 2010 versus 1950, but over the same period, production volume increased by 283 percent.[69]

Kentucky's agricultural producers rely heavily on rural infrastructure to transport farm products, as crops are moved from production regions by truck, rail, or barge to elevators and processing facilities. As with most commodities, trucks are often the first and last mode in the transport of agricultural products.

Table 6-3 provides freight transportation statistics for all agriculture-related commodities in Kentucky in 2017. The table combines data from the following commodities: live animals/fish, cereal grains, other farm goods, animal feed, meat/seafood, milled grain products, and tobacco products.

[68] Forbes, *High-Tech Greenhouse Could Be The Future of Agriculture*, *https://www.forbes.com/sites/jordanstrickler/2020/08/28/high-tech-greenhouses-could-be-the-future-of-agriculture/?sh=1b93d5f1380f*, Accessed April 2022.
[69] Soy Transportation Coalition, *Rural Infrastructure: A More Productive Path Forward, http://www.soytransportation.org/RuralInfrastructure/KentuckyProfile.pdf,* Accessed November 2021.

Table 6-3. Freight Statistics – Agriculture (All Farm Goods)

	Thousand Tons			Commodity Thousand Tons Share		Commodity Value Share	
Year	**2012**	**2017**	**Change**	**2012**	**2017**	**2012**	**2017**
Within Kentucky	12,150	18,262	50%	7%	11%	6%	7%
From Kentucky	22,032	31,140	41%	6%	10%	7%	5%
To Kentucky	21,586	28,057	30%	7%	9%	5%	4%

Source: Freight Analysis Framework Summary Statistics, 2017.

Of all agricultural freight in Kentucky, cereal grains comprise most shipments by tonnage. To provide additional perspective, **Table 6-4** outlines the freight transportation statistics for cereal grains in 2017.

Table 6-4. Freight Statistics – Agriculture (Cereal Grains)

	Thousand Tons			Commodity Thousand Tons Share		Commodity Value Share	
Year	**2012**	**2017**	**Change**	**2012**	**2017**	**2012**	**2017**
Within Kentucky	5,511	9,977	81%	3%	6%	0.7%	1%
From Kentucky	8,190	13,868	69%	2%	4%	0.3%	0.5%
To Kentucky	7,284	11,557	59%	2%	4%	0.3%	0.4%

Source: Freight Analysis Framework Summary Statistics, 2017.

6.2. External Trends and Challenges

6.2.1. Panama Canal

The Panama Canal, completed in 1914, created one of the most important trade routes in the world, linking the Atlantic and Pacific oceans. The $2.5 billion expansion project of the Panama Canal began in September 2007 and was completed and fully operational in June 2016. The new larger locks allow the passage of neo-Panamax vessels with a throughput capacity of up to 15,000 twenty-foot-equivalent units (TEUs), compared to vessels with a throughput capacity of 4,500 TEUs prior to the expansion. Since then, the segment has experienced steady growth, and the amount of goods passing through has dramatically increased with the new locks now being able to accommodate roughly 79 percent of all cargo-carrying vessels.

Approximately 70 percent of all cargo that passes through the Panama Canal either originated from, or is headed towards the U.S. The long-term effects as well as the scale of the impacts on Kentucky freight flows will not be clear for some time, but some change in the demands on transportation networks, service, and operations is probably bound to happen. These impacts may result in needed improvements to ports, railroads, and interstate highways in western Kentucky.

6.2.2. Near-shoring

Some of the world's largest companies have joined a steady stream of smaller companies in a concept known as near-shoring—returning operations to nearby countries. More U.S. businesses are opting to return manufacturing processes to North America from overseas in response to reduced cost advantages of manufacturing in low-cost countries as well as changes in supply chains. In 2022, these advantages were multiplied considering the logistical challenges posed by the COVID-19 pandemic and rising costs of transportation due to inflation.

An expectation of faster and more direct delivery of goods by the consumer and supply chains becoming more complex—with too many individuals and components—are driving U.S. businesses to start strategizing for near-shoring. Near-shoring allows businesses to streamline their distribution processes so that they are leaner, more efficient, and more collaborative. However, increased investment in freight transportation infrastructure in the U.S., as well as Kentucky, will be needed to improve these supply chains.

6.2.3. New Technology

6.2.3.1 Dedicated Freight Infrastructure

As freight volumes have increased across the U.S. during the past several decades, concepts for dedicated freight infrastructure—like autonomous freight vehicles and dedicated truck lanes — have increasingly entered freight transportation discussions.

Dedicated truck lanes physically separate commercial vehicles from passenger vehicles or mixed traffic flows. In recent years, states including California, Florida, Georgia, Indiana, Missouri, Ohio, and Texas have examined dedicated truck lane concepts. Separating vehicle streams introduces a new level of complexity in highway design (e.g., on-/off-ramps) and operations (dealing with incidents or breakdowns). To date, there are no dedicated truck lanes in Kentucky, and those that do exist elsewhere tend to be relatively short routes serving ports or key border crossings. Benefits associated with dedicated truck lanes include significant safety gains, the potential of adopting high productivity vehicle (HPV) configurations, and the possibility of advanced technologies such as Intelligent Vehicle Initiatives (IVI) and the autonomous truck or self-driving truck.

The KYTC Division of Planning closely monitors proposed changes in overweight / over dimension specifications. KYTC regularly reviews the National Network and implements updates as needed to reflect the movement of freight by overweight / over dimension vehicles. Routes with substantial deterioration because of freight movement will be identified during that process and addressed in partnership with the districts.

6.2.3.2 E-Commerce and Drone Delivery

Electronic commerce (e-commerce) is the use of electronic devices and technologies to conduct commerce, or trade, including buying products on the internet and electronic banking. E-commerce has increased from 5.1 percent of total retail activity in 2012 to 13.3 percent in the second quarter of 2021.[70]

[70] U.S. Census Bureau, Quarterly Retail E-Commerce Sales Second Quarter 2021, *http://www.census.gov/retail/mrts/www/data/pdf/ec_current.pdf*, Accessed November 2021.

It is important to note that e-commerce reached almost 16 percent of total retail activity during the second quarter of 2020 because of the COVID 19 pandemic, an abrupt increase of approximately 40 percent from the first quarter of 2020. To compete, traditional retailers such as Walmart, Target, Lowes, and Home Depot have implemented new strategies like 'buy on-line, pick up in store" and have established more local distribution centers to create expedited supply chains. E-retailers like Amazon and Kroger have constructed a series of centralized distribution centers. This rapid e-commerce requires fast, on-time delivery, which is sensitive to distance and congestion, among other factors. A result of this trend is a higher number of delivery vehicles entering into residential neighborhoods. As residential deliveries increase, a potential concern is an increase in related congestion and wear and tear to the local road network.

One emerging potential alternative strategy for home delivery uses unmanned aircraft, also known as drones. A drone is defined as an unmanned aircraft or ship guided autonomously or by remote control. Particularly, drones may become a preferred transportation mode in the coming years for last-mile time-sensitive deliveries such as pharma products, especially into hard-to-reach areas with a concentration of healthcare facilities.[71] While drones help relieve congestion and traffic on the local road network caused by e-commerce delivery vehicles, they present their own set of challenges, particularly in how their use is governed and in avoiding over-crowded air space. In February 2015, the FAA released proposed rules governing the use of drones for commercial purposes.

6.2.3.3 Electric Vehicles and Alternative Fuel Corridors

KYTC in coordination with the Energy and Environment Cabinet (EEC), the Public Service Commission (PSC), the Federal Highway Administration (FHWA), and several other State Cabinets developed Kentucky's Electric Vehicle (EV) Infrastructure Deployment Plan. The planned public Direct Current Fast Charger (DCFC) network infrastructure in the study is not intended for freight, but freight is a growing part of the EV discussion. Freight companies involved in local and short-distance shipping could develop dedicated charging infrastructure at depots. Long-distance freight could also be served by dedicated charging infrastructure, and would require substantially more power than what is needed at non-freight stations. As the IIJA programs and guidance are fully rolled out, Federal grant funding could become available to support the expansion EV freight shipping. KYTC expects to incorporate guidance related to freight into future EV Plan updates.

Kentucky is also exploring the potential for hydrogen truck refueling stations in the state along the Federally designated Hydrogen Alternative Fuel Corridors. These corridors include I-65, I-75, and I-64.

[71] Aircargo News, *Drones used for last-mile delivery are "here to stay"*, *https://www.aircargonews.net/airlines/drones/drones-used-for-last-mile-delivery-are-here-to-stay/*, Accessed November 2021.

6.2.3.4 Intelligent Transportation Systems (ITS) and Connected / Automated Vehicles (CAV)

KYTC is continuing to build on the ITS framework in the state with several ongoing and new initiatives that could benefit freight. The Truck Parking Information Management System (TPIMS) program (*see7.4)* is one freight related technology initiative that has been implemented and is being examined for possible expansion. The Traffic Response and Incident Management Assisting the River City (TRIMARC) (see *7.3*) systems in Louisville and Northern Kentucky are the ITS systems in both cities and they include mainline and arterial dynamic message signs, cameras, communications equipment, a traffic operations center (in Louisville), and safety patrols. TRIMARC benefits freight by providing traveler information including comparative travel time information, queue warning messages, lane blockage messages, and other safety related messages. It also reduces crashes and congestion through the various strategies and deployments, which also benefits freight flows through these two regions.

Another substantial initiative is in the field of data analytics. KYTC collects, tracks, and analyzes approximately 20 data sets on a continuous basis. Some of the data, such as speed data, is processed every two minutes. The data covers topics such as weather, travel speeds, incidents, work zones, truck parking, snowplow activity, traffic management enter reports, and others. With this data KYTC is able to have a better understanding of system operations and what might be needed to improve operations, including freight related operations. For example, KYTC has detailed data on speeds related to key truck bottlenecks, which can be used to help identify projects and prioritize investments.

KYTC is examining the potential for additional ITS deployments in Northern Kentucky, Louisville, and Lexington. KYTC was recently awarded a federal grant to implement a wrong way driving and safety monitoring/notification system in Louisville and Lexington. The system is focused on identifying major safety issues, and wrong way driving in particular, and notifying drivers using dynamic message signs. KYTC is also looking at expanding the ITS infrastructure in Northern Kentucky, but that effort is in the early planning stages. One other project that is about to be initiated is a Connected and Autonomous vehicle study for I-64 between Louisville and Lexington. This study would likely examine freight as part of a larger look at how CAV technologies might be implemented in Kentucky.

6.2.3.5 Transportation System Management and Operations (TSMO)

KYTC is advancing TSMO strategies to address mobility, reliability, and safety issues across the Commonwealth. This includes the development of a TSMO Program Plan and the integration of TSMO strategies and concepts into planning, design, and construction projects. For example, in Northern Kentucky, queue warning technology has been deployed on I-71/I-75 a major north-south freight corridor. The queue warning technology was implemented both northbound to address recurring and non-recurring congestion approaching the Brent Spence Bridge and southbound for a major work zone. There are also other travel time and safety warning messages displayed in Northern Kentucky that can be helpful to truck drivers. In other parts of the state, KYTC uses Dynamic Message Signs (DMS) to convey important travel information to drivers including truck drivers and other commercial vehicle drivers. There are also safety patrols serving Louisville and Northern Kentucky.

KYTC also has extensive real-time data with processing capabilities that can be used to support current and future TSMO initiatives that benefit freight. KYTC is also completing projects that have a TSMO focus or have TSMO elements within a larger context in several parts of the state.

7. Freight Operational Strategies, Conditions, and Technologies

KYTC employs a myriad of operational strategies and technologies to help meet its goals and, by extension, the National Multimodal Freight Policy goals, and National Highway Freight Program goals. Multiple strategies are used to maintain a transportation system that is as safe, efficient, environmentally sound, and fiscally responsible as possible. Using innovation, KYTC will adapt to increasing demands on the freight system and continue to link users of the system to job opportunities and a growing economy. The following sections highlight some of the innovative strategies and technologies Kentucky employs to keep up with the changing freight landscape.

7.1. Classification Counts

KYTC collects continuous weigh-in-motion (WIM) data from 25-30 sites statewide. WIM data includes volume, direction, speed, vehicle classification, gross vehicle and axle weights, overall vehicle lengths, and individual axle spacing. Some WIM stations are also equipped with tire pressure anomaly detection, thermal cameras that can check motor carriers brake operation, as well as nigh vision cameras that are able to detect whether truck drivers are wearing their seatbelts. KYTC collects vehicle volume data on a three-year schedule from about 17,000 count locations statewide. Of those, KYTC collects FHWA vehicle classification data on at least 25% of the sites on roadways functionally classified Minor Collectors and above. It is these locations that provide commercial vehicle volume data by truck type. KYTC vehicle count station locations can be viewed here.

7.2. Overweight / Over-Dimensional Surveys

All loads are considered for a "Physical Route Overweight Over-Dimensional Survey" if the dimensions or weights could potentially cause damage to property or that may be detrimental to public safety. A Physical Route Overweight Over-Dimensional Survey is mandatory for loads exceeding 15'6" high or any load that has excessive width for the proposed route.[72] Excessive width may be defined as any width greater than the narrowest point of any lanes of travel on the proposed route that would result in the vehicle or load traveling on shoulders or in emergency lanes. Route surveys older than 10 days are not considered due to changing construction zone dynamics. More information about KYTC's Overweight Over-Dimensional Services can be viewed on the Motor Carriers' webpage. The Overweight Over-Dimensional Route Survey Form TC 95-625 is accessible and available for download, and an excerpt can be seen in **Figure 7-1**.

[72] Kentucky General Assembly. Kentucky Administrative Regulations (Title 601 Chapter 001 Regulation 018). *https://apps.legislature.ky.gov/law/kar/titles/601/001/018/*. Accessed April 2022.

Figure 7-1. Overweight - Dimensional Route Survey Form TC 95-625 Excerpt

SECTION 2: ROUTE DETAILS - For additional route details attach a separate sheet.

The following must be considered while physically performing the survey.

- All vertical/horizontal clearance **must** be checked at the highest/widest point of the load and lowest/narrowest of the area where the load will be traveling insuring that all obstructions can be traveled under, over, or ramped safely
- No obstruction can be moved or removed without written permission from the owner.
- A manufacturer's specification drawing must be attached.
- Insure that the weight does not exceed any highway or bridge posted limit.
- All loads over 200,000 lbs must attach a side & rear view drawing with axle spacing & weights.
- Identify all locations where bucket trucks may be needed.

ROUTE *(Name / Number)*	**DIRECTION** *(N S E W)*	**LANE OF TRAVEL** *(Right, Left, Center, Straddle)*	**NOTES: INCLUDE ALL OBSTRUCTIONS WITH MILE POINTS** *(i.e. bridges, lights, wires, mast arms, trees, signs, poles, guardrail, railroad, owner of obstruction & contact information if applicable, etc.)*

7.3. Notify Every Truck (NET) System[73]

The TRIMARC Notify Every Truck Service (NET) alerts commercial vehicle operators of conditions that may interrupt travel on Kentucky's interstates and parkways. The free service is designed to advise drivers via SMS Text and/or email of route specific traffic information regarding closures expected to exceed two hours on interstates or parkways statewide. Alerts are managed from the TRIMARC Regional Traffic Operations Center in Louisville to provide current information on road closures due to unexpected events or planned community activities.

The objectives of NET are to:

- Restore normal flow of vehicular traffic on interstate highways as rapidly as possible, following major incidents, in compliance with Quick Clear Laws
- Reduce the time required to clear the interstate highway system
- Decrease the time emergency responders are required at an incident on the interstate highways
- Reduce secondary accidents
- Reduce pollutants
- Obtain quicker notifications for commercial carriers
- Send a second notice once the incident has been cleared
- Allow commercial carriers to alert their drivers of the delay
- Reduce the total number of vehicles trapped in the queue of major incidents
- Allow commercial carriers to dispatch the necessary assets to clean up incidents

[73] TRIMARC Notify Every Truck, *http://www.notifyeverytruck.com*, Accessed February 2022.

7.4. Traffic Operations/Management Centers

The Traffic Response and Incident Management Assisting the River Cities (TRIMARC)[74] is the largest Traffic Operations Center (TOC) in the state. TRIMARC monitors traffic in the Louisville Metro and the Northern Kentucky regions. It also provides Freeway Service Patrols (FSP) in these areas, overseas the TPIMS statewide and administers the Notify Every Truck (NET) program. Additionally, TOC operators analyze traffic conditions and provide real-time information to motorists in the occurrence of incidents that may negatively affect interstate travel. They use dynamic messaging signs, cameras, and other technologies, to detect, respond to, and clear incidents in a timely with the purpose of improving safety and reducing congestion on the interstates. As part of their Louisville traffic monitoring, TRIMARC holds quarterly Freeway Incident Management (FIM) meetings to review major incidents which required total closures of the interstate within KYTC District 5 (Louisville area). This effort involves representatives from KYTC, FHWA, law enforcement, emergency management, fire, and rescue, towing and recovery, and other emergency responders. The main objective of the team is to mitigate the effects of planned and unplanned events in the future, ensure the safety of travelers and secure peak efficiency on the state's interstate system. Additional information about the TRIMARC Freeway Incident Management (FIM) service can be viewed herehttp://trimarc.org/fim.html.

TRIMARC's Louisville TOC also monitors, manages, and reports on traffic conditions for Boone, Campbell, Gallatin, and Kenton Counties in northern Kentucky. This includes operating dynamic message signs, and cameras as well as monitoring incidents and traffic.

In addition, there is a Statewide Traffic Operations Center operated by KYTC's Office of Highway Safety in Frankfort, KY. This TOC monitors and reports on highway traffic conditions statewide (https://goky.ky.gov/).

The Cumberland Gap Tunnel[75] Authority, located in Middlesboro, KY, operates as a remote Traffic Operations Center for KYTC, but is independent of the Statewide Traffic Operations Center. It uses a variety of technology to monitor, direct, and respond to traffic, locating any potential problems which may arise outside or within the tunnels.

The Lexington Traffic Management Center, called "Real-time Traffic Ticker", operates independently in Lexington, KY. The TOC reports daily on scheduled lane closures. The Lexington-Fayette Urban County Government also operates CCTV cameras and accordingly provides a traffic website[76] to help motorists make more informed travel decisions when traveling Lexington's roadways.

7.5. Truck Parking Information Management System

Kentucky is one of eight states participating in the Mid America Association of State Transportation Officials' (MAASTO) Truck Parking Information Management System (TPIMS). The system uses existing intelligent transportation systems (ITS) infrastructure and capabilities, along with emerging vehicle detection and data collection technologies, to monitor the availability of truck parking at over 150 sites

[74] Traffic Response and Incident Management Assisting the River Cities (TRIMARC). *http://www.trimarc.org/site/pages/About.html*. Accessed April 2022.
[75] Cumberland Gap Tunnel. *http://www.cgtunnel.com/about.html*. Accessed April 2022.
[76] LFUCG Traffic Cameras. *https://trafficvid.lexingtonky.gov/publicmap/*. Accessed April 2022.

across the MAASTO region. This includes 13 parking sites in Kentucky. The real-time truck parking information is shared directly with truck drivers though multiple platforms, including dynamic message signs, navigation tools, and 511 systems.

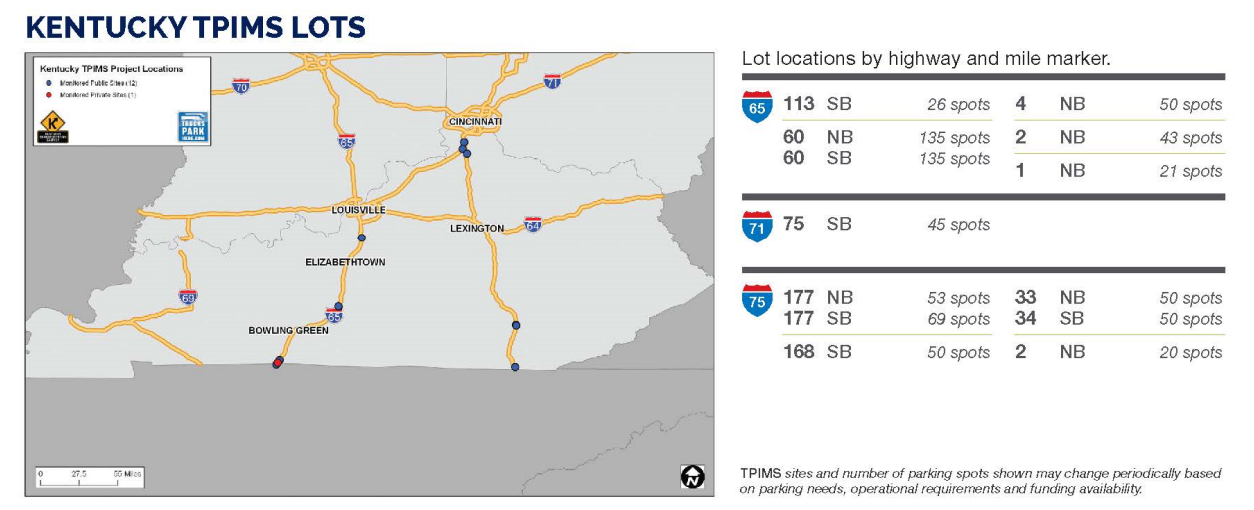
In Kentucky, the system shares truck parking availability via dynamic messaging signs. While TPIMS can be used to share truck parking availability for public and/or private sector facilities, in Kentucky, the system focuses mainly on public facilities - typically rest stops, but also weigh stations. Overall, the Kentucky Truck Parking Action Plan estimated that there are 747 truck parking spaces covered by Kentucky's TPIMS system.

Table 7-1. TPIMS Locations[77]

Highway	Lot Location	Number of Spots
I-65 NB	Rest Area @ MP 0.2	21
I-65 NB	Weight Station @ MP 3.4	50
I-65 NB	Rest Area @ MP 59	135
I-65 SB	Rest Area @ MP 114	26
I-65 SB	Rest Area @ MP 59	135
I-65 NB/SB	Marathon Exit 2 (private property)	43
I-71 SB	Weight Station MP 75	45
I-75 NB	Welcome Center @ MP 1.5	20
I-75 NB	Weigh Station @ MP 33	50
I-75 NB	Rest Area @ MP 177	53
I-75 SB	Rest Area @ MP 177	69
I-75 SB	Weigh Station @ MP 168	50
I-75 SB	Weigh Station @ MP 34	50

Source: TRIMARC, 2022.

Figure 7-2. Kentucky TPIMS Lot Locations



[77] Kentucky Truck Parking, TRIMARC, http://www.trimarc.org/site/pages/TruckParking.html.

8. Freight System Needs

Kentucky has an integrated multimodal freight system that facilitates the efficient, reliable, and safe movement of freight. The challenge to KYTC will be to maintain, operate, and expand the system to meet current and future needs.

To help KYTC plan and invest more effectively and create a transportation system that is well-prepared for the future, it is important to thoroughly assess needs for freight movement and forecast future freight demands. Using the information presented in the previous four sections, this section:

- Identifies the strengths and weaknesses of the existing freight transportation system
- Identifies the future needs of the freight transportation system

The purpose of identifying the needs of Kentucky's freight system is to better inform the decision-making process. The needs discussed in this section have been considered in developing the policy and strategy recommendations in *Section 9* which will help to make implementation of the outcomes more successful.

8.1. Commonalities

The previous sections presented information on various aspects related to the Kentucky freight transportation system: existing inventory, goals and performance measures, current conditions, and future trends and challenges. While the content of each of the previous sections varied, commonalities regarding the freight transportation system could be gleaned from each. This section presents those commonalities and identifies them as a strength or weakness of the Kentucky freight transportation system.

8.1.1. Strengths

A review of the commonwealth's competitive advantages and critical challenges helps identify the strengths of the Kentucky freight system. The strengths are discussed below, grouped into six categories: business climate, connectivity, funding, location, system capacity, and system operations/conditions.

8.1.1.1 Business Climate

Kentucky's current economy is comprised of business sectors that rely on transportation to move raw materials, components, and finished goods. Kentucky is a major player in the auto industry with four assembly plants. Louisville is home to two Ford assembly plants. In Georgetown, Toyota opened its first assembly plant outside of Japan in 1988, the TMMK. Lastly, Bowling Green has been the exclusive production home of Chevrolet's high-performance flagship Corvette since 1981.[78] The location of these assembly plants has led to over 440 automotive suppliers locating in Kentucky.

Ford announced in 2021 its plan of building a new dedicated electric vehicle battery manufacturing complex in Kentucky, creating 5,000 new jobs in the Hardin County area. In addition, Envision AESC is

[78] *Williams, Betsy (2002). "Auto Companies Accelerate Investment in Kentucky". http://businessclimate.com/kentucky-economic-development/auto-companies-accelerate-investment-kentucky. Accessed on March 22, 2016.*

investing $2 billion to build a new Gigafactory in Bowling Green, Warren County, producing battery cells and modules to power the next generation EVs, also creating 2,000 high-value jobs in the region.

Kentucky is also home to two major air cargo hubs. Amazon Air and DHL operate their North American hub at Cincinnati/Northern Kentucky International Airport (CVG), while UPS operates its WorldPort hub at Louisville Muhammad Ali International Airport (SDF). The new Amazon hub at CVG Airport also plays a big role in air cargo growth in the region. Kentucky benefits not only from the direct economic activity that the hubs provide, but also from the growth in the warehousing and distribution industry spurred by the presence of these hubs. Like the auto assembly plants, the locations of air cargo hubs have led to hundreds of other companies locating near these hubs. This has created a friendly business climate for future growth in these sectors and provides support for a robust and reliable freight transportation system throughout Kentucky.

8.1.1.2 Connectivity

Kentucky's highway system is well-connected throughout the state. Accessibility to interstates and parkways has improved for many communities. Investments in converting sections of parkways in the western region as part of the I-69 corridor are well underway, with many sections already complete. In addition to key highway connections, the commonwealth is also well-connected by a network of waterways and railways.

Kentucky not only has good internal connectivity, but is also well-connected to other regions of the U.S. Two of the nation's busiest north-south interstate corridors (I-75 and I-65) run through Kentucky and connect industries across North America from Canada to Mexico. Kentucky also is home to major portions of I-64, which is a major east-west corridor stretching from Norfolk, VA to St. Louis, MO. The commonwealth's entire inland waterway system (see *Section 4.2*) provides a waterway link to Canada via the Great Lakes and to Mexican and South American markets via the deep-water ports of New Orleans, LA. and Mobile, AL. In addition, Kentucky's inland ports and terminals provide direct access to the agricultural markets of the Midwestern and North Central states, to the industrial and consumer markets of the Northeast, and to the distribution networks of the South.

8.1.1.3 Funding

Approximately, 60 percent of the Kentucky Road Fund comes from state motor vehicle fuel taxes, and KYTC is constitutionally limited to using fuel tax revenue to fund roadway projects. The Kentucky Road Fund is supplemented by a vehicle sales tax, also called a usage tax, which typically yields about 25 percent of annual revenue. Registration and licensing fees paid by commercial trucking companies generate 10 percent of revenues, with the remaining 5 percent from vehicle and driver licensing and other fees.

As in most states, the majority of the Kentucky Road Fund is funded through taxes on motor vehicle fuels. However, unlike most states, Kentucky uses a percentage tax rate based on the wholesale cost of fuel, with a per gallon statutory floor of $0.246 per gallon. This amount includes a $0.064 fixed component plus a variable component, which is based on the average wholesale prices of gas. The rate cannot increase by more than 10 percent of the variable rate established at the close of the previous fiscal year. As of February 2020, 23 states including Kentucky have instituted a variable component to their fuel tax. These states have seen their fuel tax rate rise sometime in the last 2 years, while among the 31 states levying a fixed-rate fuel tax, the average length of time since the last fuel tax increase is 16 years. If the fuel tax is going to provide an adequate amount of revenue to fund transportation, the tax

rate needs to be periodically adjusted to at least keep pace with the growth rate in the cost of infrastructure maintenance and construction.[79] Kentucky is doing this by utilizing a variable-rate fuel tax. The state's current tax rates for fiscal year (FY) 2022 stand at about $0.246 per gallon of gasoline and about $0.216 per gallon of diesel and other fuels. These rates have remained unchanged since July 2015.

Traditionally, KYTC used toll credits as the state's federal funding match. However, as of FY 2023, the toll credits have been exhausted. These toll credits were attributed to Kentucky by federal highway law in accordance with calculations that considered past levels of state fund investments (such as state-sponsored toll roads) in the federal highway system. Toll credits did not generate cash and did not provide spendable cash. They did, however, permit KYTC the flexibility to use 100 percent federal funding on federal-aid projects.

Funding made possible through the IIJA provides $22.4 million for grade crossings safety and separations. Projects funded under these programs require a 10 percent match. In fiscal years 2021 and 2022, Kentucky has designated $1,600,000 in funds for the public safety and service improvements of railroads. This is done through funding at-grade rail crossing improvements through the Kentucky Rail Crossing Improvement (KRCI) program. Applicants can apply to the program for grants covering up to 80% of project costs.

Kentucky made available $500,000 per year in grant funding since FY 2013 to active public riverports for dredging and maintenance of access. Since this program began, it has employed a 50/50 match funding requirement. However, due to the relatively small amount of funding, some riverports have provided much more than 50 percent funding to ensure project completion. This state funding level has remained consistent through FY 2023 and FY 2024. Another $1 million was included in the transportation budget for FY 2017 through FY 2018.

8.1.1.4 Location

Kentucky's strategic location facilitates the distribution of goods and materials to a massive industrial and consumer market. Kentucky is at the center of a 34-state distribution area in the eastern U.S. Kentucky's borders are within a day's truck drive or within 600 miles of over 60 percent of the nation's population, personal income, and manufacturing business establishments. In addition, Kentucky is an attractive location for air cargo hubs due to its generally temperate weather and short travel times. From the UPS Louisville hub, approximately 75 percent of the U.S. population is reachable within a 2-hour flight, and a 4-hour flight allows for access to 95 percent of the U.S. population.

Kentucky also lies at the hub of the nation's inland waterways. Positioned advantageously on both the Ohio and Mississippi rivers, its location offers unique advantages for efficient freight transport of bulk materials, agricultural products, chemicals, minerals, metals, manufactured goods, wood, and containerized freight.

8.1.1.5 System Capacity

The size of Kentucky's multimodal transportation system is a strength. There is a well-connected highway system for handling truck freight traffic. Kentucky has significant rail infrastructure with five

[79] Institute on Taxation and Economic Policy (2015). *How Long Has It Been Since Your State Raised Its Gas Tax? http://www.itep.org/pdf/gastaxincreases0515.pdf.* Accessed April 2022.

Class I railroads, one Class II railroad, and 9 Class III railroads to move freight across the state. Rail transportation in Kentucky is increasingly intermodal, providing numerous transloading opportunities between train, truck, and barge. The commonwealth has nine USACE designated commercially navigable waterways, including the Mississippi River and the Ohio River. There are five commercial airports in Kentucky, including two major cargo airports (Louisville International Airport and Cincinnati/Northern Kentucky International Airport), providing Kentucky the third ranking in the nation in total air cargo shipments. There are also 26 other regional airports with runway lengths greater than 5,000 feet, making them capable of handling air cargo shipments.

In addition to Kentucky having a strong existing multimodal transportation system, future improvements (like I-69) are being made in the Jackson Purchase Region (far western part of the State) of the commonwealth to further strengthen the system. In November 2020, KYTC published a planning study to evaluate improvements to increase capacity and improve traffic operations along I-65 between Lebanon and Louisville.[80]

8.1.1.6 System Operations/Condition

According to 2020 data from BTS, Kentucky ranked seventh for best road quality in the country, with only 8 percent of all federal-aid highway miles in poor or mediocre condition.[81] The Maintenance Condition of Kentucky Highways Report (MRP), which is an annual survey of roads conducted by the KYTC Division of Maintenance, indicates scores improved from 2010 to 2020 but have been up and down since. The target grade has been surpassed in the past 10 years. Interstates and NHS roads have consistently had the best ratings, being over the KYTC target grade for each of the past 10 years.[82]

8.1.2. Weaknesses

A review of Kentucky's competitive advantages and critical challenges helps identify the weaknesses in the freight system. The weaknesses are discussed below, grouped into six categories: business climate, connectivity, funding, location, system capacity, and system operations/condition.

8.1.2.1 Business Climate

Historically, Kentucky is a net exporter of energy; however, with decreasing coal production and stagnant energy demand, Kentucky's position as an energy exporter has been declining since 1990. The average delivered cost of coal from Central Appalachia was highest among all coal producing regions due to the cost of production.[83] Nationwide, competition from cheap foreign coal, coal regulations, and rail capacity constraints are making imports more attractive than domestic coal, especially to East Coast power plants.

8.1.2.2 Connectivity

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[80] Kentucky Transportation Cabinet. Bullitt/Jefferson Counties: I-65 Conceptual Improvements Study – Project 05-550.00. *https://transportation.ky.gov/DistrictFive/Pages/I-65-Conceptual-Improvements-Study.aspx*. Accessed November 2021.
[81] Bureau of Transportation Statistics. Kentucky Transportation by the Numbers. *https://www.bts.dot.gov/sites/bts.dot.gov/files/states2020/Kentucky.pdf*. Accessed November 2021.
[82] Kentucky Transportation Cabinet – Division of Maintenance Operations& Pavement Management Branch. FY 2020 Maintenance Conditions of Kentucky Highways. *https://transportation.ky.gov/Maintenance/Documents/Annual Reports/MRP FY20-Statewide.pdf*. Accessed November 2021.
[83] Coal Age (2013). *Coal Transportation Costs Could Hinder Resurgence of Coal Generation.* https://www.coalage.com/features/coal-transportation-costs-could-hinder-resurgence-of-coal-generation/. accessed April 2022.

Navigable rivers in Kentucky depend on the lock and dam system. For instance, the purpose of the Ohio River's locks and dams is to maintain a minimum depth of 9 feet for commercial navigation. The old Olmsted Locks and Dams that were constructed in the 1930's and 1940's have been demolished and replaced with a new Olmsted Lock and Dam. The completion of this project took an extremely long time, during which no other improvement projects could be addressed. The completion of this project will eliminate bottlenecks that resulted from the antiquated locks, ease the passage of larger commercial vessels, and increase connectivity between Kentucky and other states on the Ohio River.

The new I-69 corridor is currently under development in multiple states. The full corridor will provide connectivity across the United States between Michigan and Texas. With the forthcoming completion of the corridor in Indiana (and corresponding river bridge), complete connectivity depends on the incomplete sections of the corridor in the South.

8.1.2.3 Funding

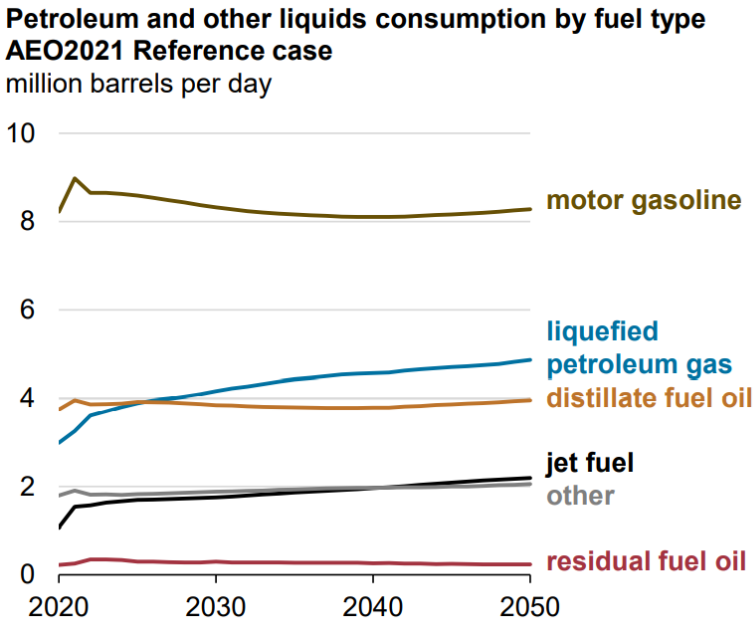
While having a variable-rate fuel tax is a strength for Kentucky, it should be noted that relying heavily on the fuel tax to fund the Kentucky Road Fund could be a disadvantage if revenues aren't adequate to fund transportation. Revenues fluctuate depending on the price of the gasoline and fuel consumption rates. Revenue planning may be difficult because of price uncertainties, especially if an unexpected drop in fuel prices was to occur. In addition to the state fuel tax, a federal fuel tax (18.4 cents per gallon on gasoline and 24.4 cents per gallon of diesel fuel) is collected for the Federal Highway Trust Fund.

The federal gasoline tax has not been increased since 1993, and it is not indexed to inflation. The inflation rate from 1993 until 2020 was 79.1 percent.[84] The buying power of the federal gasoline tax has significantly reduced over the years.

As shown in **Figure 8-1**, U.S. motor gasoline consumption has declined since 2010. Drivers of this reduction include more fuel-efficient vehicles and electric/hybrid vehicles. Motor gasoline consumption is projected to further decline through 2040, and one of the primary contributing factors is more stringent fuel economy standards. In August 2021, USDOT proposed improved fuel economy standards for Manufacture Years (MY) 2024 – 2026 passenger cars and light trucks. The new standards would increase fuel efficiency 8% annually for model years 2024-2026 and increase the estimated fleetwide average by 12 miles per gallon for model year 2026, relative to model year 2021.[85] Decreasing motor gasoline consumption will likely reduce the fuel tax revenues at federal and state levels if there are minimal or no increases in the fuel tax rate or additional funding resources are not identified.

Figure 8-1. U.S. Motor Gasoline and Diesel Fuel Consumption and Product Exports (2020-2050)

[84] US Inflation Calculator. *http://www.usinflationcalculator.com. Accessed November 2021.*
[85] National Highway Traffic Safety Administration (2021). *USDOT Proposes Improved Fuel Economy Standards for MY 2024-2026 Passenger Cars and Light Trucks*. https://www.nhtsa.gov/press-releases/fuel-economy-standards-2024-2026-proposal. Accessed November 2021.



Source: U.S. Energy Information Administration, Annual Energy Outlook 2021.

8.1.2.4 Location

While Kentucky's geography provides many economic advantages, it also presents challenges with mountainous terrain, areas prone to flooding, and air quality issues.

8.1.2.5 System Capacity

Several inactive short line railroads in the Paducah area tie into the Paducah & Louisville Railway, which connects with the CN and CSXT railroads. Improvements on these inactive short line railroad corridors must be a key initiative of KYTC's freight partners.[86]

There are also challenges facing the capacity of the Kentucky highway system. FAF flow analysis shows significant projected growth in freight volumes between 2017 and 2050. Significant growth takes place on I-71/I-75 between the Brent Spence Bridge and the I-71/I-75 split, as shown in **Figure 4-1** in the *Section 4*. I-75 is a direct link to Canadian ports of entry, so this corridor is particularly crucial for Kentucky's exports to Canada. Additionally, I-65 and I-64 are projected to experience substantial freight growth.

8.1.2.6 System Operations/Condition

According to Kentucky's MRP Report, rural secondary roads did not meet the target MRP score from 2010 through 2014, then began improving starting in 2015 with ups and downs through 2021, meeting the target MRP for most of the studied years, and dipping right below it for some of them. In addition, the percentages of pavements in good condition and fair condition have been trending downward and the number of structurally deficient bridges has been increasing. These factors indicate a weakness in the operations on the roadway system. This is especially true for intermodal connectors and last mile

[86] National Association of Development Organizations (2012), *Freight Transportation and Economic Development: Planning for the Panama Canal Expansion*, http://www.nado.org/wp-content/uploads/2012/03/panama.pdf, Accessed November 2021.

connections, which are often maintained by several different entities. Investment in connectors is frequently in competition for ever decreasing transportation funding with other high-profile projects.

I-71/I-75 Brent Spence Bridge between Northern Kentucky and Cincinnati has significant capacity, sight distance, and safety challenges. These concerns have led its replacement project to be considered a high priority for the KYTC, the Ohio Department of Transportation, and the Ohio-Kentucky-Indiana Regional Council of Governments (OKI). As a major freight facility, the Brent Spence Bridge is listed in *Section 10*.

Other modes of transportation, including rail and waterways, also are facing operational challenges. The commonwealth does not own rail assets; therefore, service locations, investments, and shipping rates and schedules are all controlled by the railroad companies themselves. Also, the freight rail reorganization bypasses large sections of the Ohio River Basin, limiting inland connectivity. Potential exists for the creation of a container-on-barge terminal on a waterway in the western part of Kentucky; however, the challenges include an aging lock and dam system, the unreliability of the waterways system, and the breakdown of the container recycling circuit.

8.2. Future Needs

As freight volumes grow, the ability of the multimodal freight system to be resilient and responsive to the freight community's needs will be increasingly critical to Kentucky's economic future. Freight network needs were identified through an analysis of the strengths and challenges of the Kentucky freight system. The following needs have been identified:

- **Economic Development:** Initiate a commonwealth-wide program to impact Kentucky's ability to compete in regional, national, and global markets for many years to come, based on the recommendations in the 2022 Kentucky Riverports, Highway & Rail Freight Study. One of the recommendations is to conduct a detailed, comprehensive study of the economic impacts of water transportation to better understand the importance of the commonwealth's ports and waterways to its economy and quality of life.
- **Safety:** Support and work with private rail carriers to provide a safe, reliable, efficient, and effective rail transportation system for the movement of freight within the commonwealth, as well as connect Kentucky to domestic and international markets. An example is preservation of the eastern Kentucky rail lines despite declining coal production.
- **Multimodal:** Prepare western Kentucky for the ever-changing flow of freight, including developing coordinated plans of action and improvements to ports, railroads, and interstate highways.
- **Safety:** Improve the commercial vehicle crash rates on Kentucky interstates and U.S. highways that have a KAB of greater than 25 percent. This includes multiple sections of I-71, I-69, and US 41.
- **Mobility/Reliability:** Improve key highway bottlenecks, such as the Brent Spence bridge, causing significant implications for northern Kentucky freight.
- **Redundancy/Resiliency:** Build resiliency and redundancy into the freight transportation system to protect current and future investments and to maintain safe operational capabilities during and after extreme weather events or earthquakes. Adaptation of vulnerable freight transportation infrastructure and facilities will require policy changes and investment.

- **Supply Chain:** The ability of KYTC and its partners to understand current and potential future supply chain needs is crucial to making optimal investments in future freight infrastructure. Freight investment in Kentucky must be balanced between high-volume interstate highways, U.S. highways, and last mile connectors that serve more local freight generators, which are critical to maintaining the supply chain and economic growth throughout the commonwealth.
- **Capacity:** Improve the capacity and operations of the rural freight system. Kentucky's agricultural producers rely heavily on rural infrastructure to transport farm products, as crops are moved from production regions by truck, rail, or barge to elevators and processing facilities.
- **Mobility:** The routes identified as critical freight corridors are within KYTC's span of control and should become a known part of the planning process.
- **Air Cargo:** Continue working with the FAA to lengthen additional GA airport runways to 5,000 linear feet. Having at least a 5,000-linear-foot runway opens an airport to more business aviation and thus enhances a community's economic potential.
- **Technology Integration:** Seek opportunities to incorporate and expand Intelligent Transportation Systems (ITS), Information Technology (IT), and other new technologies into freight transportation planning and freight projects.
- **Environmental Impact:** The amount of freight moving through Kentucky is anticipated to continue to increase, without intervention the emissions from this movement will also continue to increase. There is a need for enhanced efficiency across all modes of freight movement to reduce these environmental impacts including climate change, air pollution, stormwater runoff, and wildlife habitat preservation.

9. Recommendations

The Kentucky Freight Plan's overarching recommendation is to improve infrastructure that is most beneficial to freight movement and Kentucky's residents. This section outlines several policy, program, and project-level recommendations, and identifies potential funding sources for future freight investment.

9.1. Program-Level Recommendations

- Focused investment on the Kentucky Freight Network;
- Implement recommendations outlined in the Truck Parking Plan, Aviation Plan, Riverports, Highway & Rail Freight Study, and State Rail Plan;
- Continued focus and expansion of freight performance measures;
- Identify/Monitor/Maintain roadways that support the air cargo, advanced manufacturing, agriculture, and energy industries;
- Sustained work to integrate freight stakeholders in the state and MPO planning process(es);
- Continued partnership with MAFC and regional initiatives like ITTS, TETC, and TPIMS expansion;
- Collaborate with KCED, EDCs, ADDs and MPOs to ensure transportation supports economic development strategies; and
- Update freight modal and system plans on a regular basis.

9.2. Policy-Level Recommendations

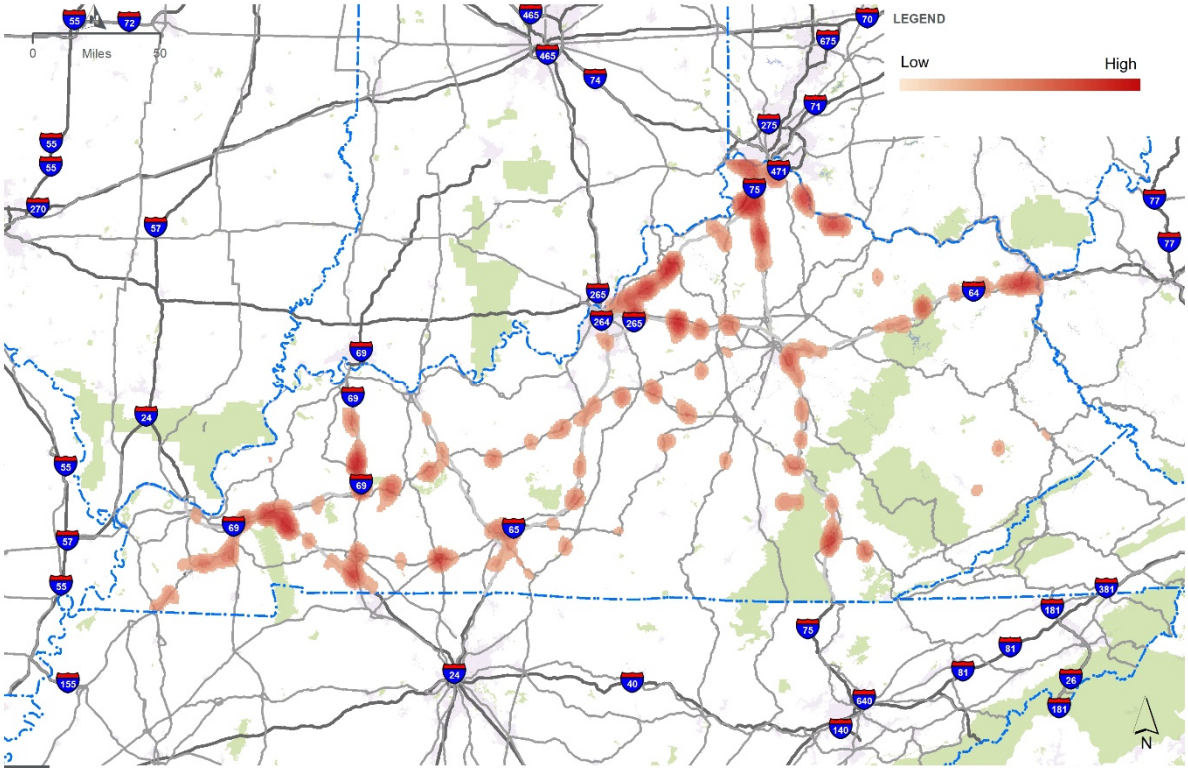
The policy recommendations assist KYTC in focusing its efforts on issues that impact the movement of freight. These types of recommendations address the goals of the Plan through actions, partnerships and research that have direct relevance to the key findings and needs in moving goods throughout the Commonwealth.

Goal 1: Enhance Safety

- Encourage participation of freight stakeholders in the development of future KYTC safety plans
- Work with legislators and the railroads to expand grade crossing safety funding opportunities
- Partner with the Kentucky State Police (KSP) to address safety – specifically truck parking and overweight truck enforcement
- Expand the MAASTO Regional Truck Parking Information Management System (TPIMS) initiative to include more locations in Kentucky
- Implement recommendations from the Truck Parking Assessment and Action Plan to reduce unauthorized truck parking on highway ramps and shoulders
- Encourage increased truck safety analysis in the next KYTC Strategic Highway Safety Plan
- Support engineering improvements ranging from technical improvements, such as landing and navigational aids, weather monitoring equipment, and rescue and firefighting equipment, to simpler treatments, such as runway lighting, land acquisition for protection zones, and fencing to prevent wildlife incursions onto runways.

- Reduce impact of animal-vehicle collisions. By its design, transportation infrastructure poses negative impacts on wildlife habitat and movement. As shown on **Figure 9-1**, numerous animal-vehicle collisions occur for vehicles moving freight across Kentucky. The Kentucky Crash Data Analysis Tool (CDAT) database shows that between 2015 to 2019, there were 414 collisions between trucks and animals on Kentucky roadways. One mitigation technique to reduce the frequency of these collisions is the construction of wildlife crossings. These crossings allow wildlife to move more safely between habitat areas through an underpass or overpass, bypassing the roadway. There are currently no dedicated wildlife crossings installed on Kentucky roadways. However, there are several tunnels in the state that effectively provide wildlife crossings. These include the Cochran Hill and East End Tunnels in the Louisville area and the Cumberland Gap Tunnel on the Kentucky/Tennessee border. Given the impact on driver safety and wildlife preservation, KYTC will consider new purpose-built wildlife crossings in areas where a safety analysis and wildlife considerations warrant. These crossings would be added where they are needed and feasible to improve the safety of drivers, enhance the preservation of wildlife, and protect the environment.

Figure 9-1. Kentucky Animal-Truck Collision Density



Source: KY CDAT Database 2015-2019.

Goal 2: Deliver a high level of maintenance and resiliency

- Increase corridor-level investment in facilities that show high truck volumes and declining pavement/bridge quality
- Further evaluate multimodal freight corridors for the redundancy and resiliency to mitigate the impacts and severity of extreme weather or natural disasters on the multimodal freight system

- Mitigate air, water and noise pollution by developing infrastructure and associated support structures and measures to minimize local and regional impacts resulting from freight movement.
- Mitigate freight flow disruptions along key freight corridors (especially those with resiliency/redundancy issues) by closely monitoring bridge inspection reports
- Determine KYTC's role in encouraging new technologies (such as truck platooning, Unmanned Aerial Vehicles (UAV), etc.) as methods to prolong the state's infrastructure.
- Work with railroads (through the development of the Kentucky Statewide Rail Plan) to identify issues and needs on their network(s)
- Implement recommendations of the Kentucky Riverport, Highway and Rail Freight Study that pertain to riverport maintenance and overall resiliency of the waterway system
- Continue to work with the riverports to identify opportunities and solve unique riverport infrastructure challenges throughout Kentucky

Goal 3: Ensure a reliable flow of people and freight

- Work with the Kentucky State Police (KSP) to develop and implement alternative route plans for major incidents/unplanned closures
- Work to identify and improve highway connectivity with other modes
- Improve and expand Intelligent Transportation Systems (ITS) technology along key corridors to increase efficiency and reliability
- Actively work to reduce the impact and address freight bottlenecks
- Proactively protect KYTC assets from potential freight-related incidents
- Identify potential barriers restricting freight movements, plan work zones, detours to handle freight vehicles, etc.

Goal 4: Provide local, regional, and global connectivity for communities

- Partner with local governments and private partners to proactively manage the condition of intermodal connectors and connectivity points
- Develop a program to educate local officials on the importance of intermodal connectors and work with local officials to mitigate negative impacts of the projected increase in truck traffic volumes
- Identify and address any first or last mile gaps near major manufacturing hubs and multimodal connectivity points

Goal 5: Reduce environmental impact through improved freight system efficiencies

- Support the use of CMAQ funds for freight-related transportation projects that reduce emissions, with specific attention to the localized air quality impacts of freight movement
- Ensure that new freight infrastructure and state-supported freight facility investments analyze, mitigate, and improve the impacts of freight movement on wildlife habitat loss, flooding, and stormwater runoff.
- Partner with industry associates to develop alternative fueling infrastructure for freight movement modes. Alternative fueled modes will improve freight movement efficiency and reduce GHG emissions and air pollution.

9.3. Project-Level Recommendations

KYTC will work to progress the projects identified in the 2022-2028 Kentucky Highway Plan. Specifically, the Cabinet will focus on developing the mega-projects identified in the plan – many of which are along major freight corridors, or in the case of the Brent Spence Bridge a national freight bottleneck. The mega-projects are defined as a project with over $1 billion costs. Advancing improvements to the I-64 Kentucky Reiver Bridges was also identified as a high priority project. The current projects include:

- I-69 Ohio River Crossing Project (Henderson)
- Mountain Parkway Widening (Campton to Salyersville)
- Brent Spence Bridge Project (Covington)
- I-64 Kentucky River Bridges project (Franklin County)

9.4. Funding Programs for Freight-Related Projects

Funding multimodal freight projects can be difficult due to funding restrictions at the state and federal levels. For example, the Kentucky Road Fund is constitutionally mandated to be used only on highways. The purpose and use of public funds are defined by legislative bodies through the budgeting process, while environmental, labor, and procurement laws affect processes and expenditures for all aspects of transportation projects from planning through maintenance. Federal and state funding programs for freight-related projects are summarized below.

9.4.1. Key Federal Freight Funding and Financing Provisions

Various federal grant/loan opportunities are available for freight-related projects, and each of the programs has its own unique requirements. Most of the funding for freight-related improvements is administered through the USDOT, with additional funding from non-USDOT sources. Following the passage of the IIJA in late 2021, the FHWA announced that it will provide $52.5 billion in funding to all 50 states and the District of Columbia, constituting the largest Federal Highway apportionment in decades. This apportioned funding for FY 2022 represents an increase of more than 20% as compared to FY 2021. This funding will help reduce the backlog of major repairs for highways and bridges and support community-based strategies to reduce traffic deaths and serious injuries. The federal transportation infrastructure funding and financing programs are discussed in this section.

9.4.1.1 National Highway Freight Program (NHFP)

The National Highway Freight Program (NHFP) was established with the passage of the FAST Act and continued with the subsequent IIJA/BIL. The NHFP includes new freight planning policy, a new National Highway Freight Network (NHFN), and new formula funding for freight projects. To be eligible for NHFP funds, freight projects must contribute to the efficient movement on freight on the NHFN and be identified in the freight investment plan. In addition to highway projects, any surface transportation project to improve the flow of freight into and out of a freight intermodal or freight rail facility is an eligible project KYTC's freight investment plan is presented in the *Section 10*.

9.4.1.2 Multimodal Projects Discretionary Grant Program (MPDG)

The Multimodal Project Discretionary Grant (MPDG) is a combined Notice of Funding Opportunity (NOFO) that allows the use of one application to apply for up to three separate USDOT funding opportunities:

- MEGA: known statutorily as the National Infrastructure Project Assistance program (49 U.S.C. 6701)
- INFRA: known statutorily as the Nationally Significant Multimodal Freight and Highway Projects program (23 U.S.C. 117)
- Rural Surface Transportation Grant: (23 U.S.C. 173)

9.4.1.3 The MEGA Grant Program

The MEGA program (known statutorily as the National Infrastructure Project Assistance program) is a new program enacted as part of the IIJA that will support large, complex projects that are difficult to fund by other means and likely to generate national or regional economic, mobility, or safety benefits.

A total of $5 billion is available from FY 2022 through FY 2026.

Eligible applicants for the MEGA grant program include:

- A state or a group of states
- A metropolitan planning organization
- A unit of local government
- A political subdivision of a State
- A special purpose district or public authority with a transportation function, including a port authority
- A Tribal government or a consortium of Tribal governments
- A partnership between Amtrak and one or more other types of entities described in this list,
- A group of entities described in this list

Eligible projects under the MEGA grant program include:

- A highway or bridge project carried out on—
    - the National Multimodal Freight Network;
    - the National Highway Freight Network; or
    - the National Highway System;
- A freight intermodal (including public ports) or freight rail project that provides a public benefit
- A railway-highway grade separation or elimination project
- An intercity passenger rail project
- Certain public transportation projects that are eligible for Federal Transit Administration funding under Title 49, United States Code, and is a part of one of other eligible project types listed above.

9.4.1.4 Infrastructure for Rebuilding America Grants (INFRA)

The Nationally Significant Freight and Highway Projects (NSFHP) program provides financial assistance—competitive grants, known as the Infrastructure for Rebuilding America or INFRA grants, or credit assistance—to nationally and regionally significant freight and highway projects that align with the program goals. These goals include improving the safety, efficiency, and reliability of the movement of freight and people, generating national or regional economic benefits, improving connectivity between modes of freight transportation, and addressing the impact of population growth on the movement of people and freight. A total of $7.25 billion is available from FY 2022 through FY 2026.

Eligible applicants for the INFRA program include:

- A state or a group of states
- A metropolitan planning organization that serves an urbanized area (as defined by the Bureau of the Census) with a population of more than 200,000 individuals
- A unit of local government or a group of local governments
- A political subdivision of a State or local government
- A special purpose district or public authority with a transportation function, including a port authority
- A federal land management agency that applies jointly with a State or group of States
- A Tribal government or a consortium of Tribal governments
- A multistate corridor organization
- A multistate or multijurisdictional group of entities described in this list

9.4.1.5 Rural Surface Transportation Grant Program (RURAL)

The Rural Surface Transportation Grant Program (RURAL) will support projects to improve and expand the surface transportation infrastructure in rural areas to increase connectivity, improve the safety and reliability of the movement of people and freight, and generate regional economic growth and improve quality of life. RURAL is a new program enacted as part of the IIJA in 2021. A total of $1 billion is available from FY 2022 through FY 2026.

Eligible applicants for RURAL include:

- States
- Regional transportation planning organizations
- Local governments
- Tribal governments

Eligible projects under RURAL include:

- Highway, bridge, or tunnel projects eligible under the National Highway Performance Program, Surface Transportation Block Grant Program, or the Tribal Transportation Program
- Highway freight projects eligible under the National Highway Performance Program
- Highway safety improvement projects
- A project on a publicly-owned highway or bridge improving access to certain facilities that support the economy of a rural area

- An Integrated mobility management system, transportation demand management system, or on-demand mobility service

9.4.1.6 Rebuilding American Infrastructure with Sustainability and Equity Program (RAISE)

The Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Program, referred to statutorily in the IIJA as the Local and Regional Project Assistance Program, continues to provide USDOT an opportunity to invest in road, rail, transit, and port projects that promise to achieve national objectives. Through RAISE and through previous iterations of the program (TIGER and BUILD), USDOT has awarded nearly $9.9 billion to fund projects that have had a significant local or regional impact.

Eligible applicants for RAISE include:

- States and the District of Columbia
- Any territory or possession of the United States
- A unit of local government
- A public agency or publicly chartered authority established by one or more States
- A special purpose district or public authority with a transportation function, including a port authority
- A federally recognized Indian Tribe or a consortium of such Indian Tribes
- A transit agency
- A multi-state or multijurisdictional group of entities that are each separately eligible

Capital projects eligible under RAISE include:

- Highway, bridge, or other road projects eligible under Title 23, United States Code
- Public transportation projects eligible under Chapter 53 of Title 49, United States Code
- Passenger and freight rail transportation projects
- Port infrastructure investments (including inland port infrastructure and land ports of entry)
- The surface transportation components of an airport project eligible for assistance under Part B of Subtitle VII of Title 49, United States Code
- Intermodal projects
- Projects to replace or rehabilitate a culvert or prevent stormwater runoff for the purpose of improving habitat for aquatic species while advancing the goals of the RAISE program
- Projects investing in surface transportation facilities that are located on Tribal land and for which title or maintenance responsibility is vested in the federal government
- Any other surface transportation infrastructure project that the Secretary of Transportation considers to be necessary to advance the goals of the RAISE program

Planning projects eligible under RAISE include:

- Development of master plans, comprehensive plans, integrated land use and transportation plans, or corridor plans

- Planning activities related to the development of a multimodal freight corridor, including those that seek to reduce conflicts with residential areas and with passenger and non-motorized traffic
- Development of port and regional port planning grants, including statewide or multi-port planning within a single jurisdiction or region
- Risk assessments and planning to identify vulnerabilities and address the transportation system's ability to withstand probable occurrence or recurrence of an emergency or major disaster

9.4.1.7 National Highway Performance Program

The National Highway Performance Program (NHPP) guides activities and provides funding related to the condition and performance of the Interstate System and NHS. It ensures that investments of federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a state's asset management plan for the NHS.[87] The purposes of the NHPP are:

- to provide support for the condition and performance of the National Highway System;
- to provide support for the construction of new facilities on the National Highway System;
- to ensure that investments of Federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a state's Transportation Asset Management Plan (TAMP) for the National Highway System; and
- to provide support for activities to increase the resiliency of the National Highway System to mitigate the cost of damages from sea level rise, extreme weather events, flooding, wildfires, or other natural disasters.

Unless otherwise noted, all eligible projects must be located on the Interstate or National Highway System. KYTC will receive $495 million in total NHPP apportioned funds from FY 2022 through FY 2026. States are permitted to transfer up to 50 percent of the NHPP dollars to other programs, including the Surface Transportation Program (STP), Highway Safety Improvement Program (HSIP), and the Congestion Mitigation and Air Quality Improvement program (CMAQ).

9.4.1.8 Surface Transportation Program Block Grant Program (STBG)

The Surface Transportation Block Grant Program (STBG) provides flexible funding for projects on any federal-aid highway, on bridges on any public roads, and on bridge and tunnel inspection and inspector training.[88] Eligible freight projects also include bridge clearance increases to accommodate double-stack freight trains, capital costs of advanced truck stop electrification systems, freight transfer yards, and truck parking facilities.

9.4.1.9 Congestion Mitigation and Air Quality Program (CMAQ)

The Congestion Mitigation and Air Quality Program (CMAQ) program is a flexible funding transportation improvement program that was continued in the IIJA/BIL to help meet the requirements of the Clean Air Act. CMAQ funds supports transportation projects that reduce mobile source emissions in areas

[87] U.S. Department of Transportation, FHWA, *https://www.fhwa.dot.gov/map21/factsheets/freight.cfm*, Accessed July 2022.
[88] Ibid

designated by the U.S. The EPA determines that Federal CMAQ funds must be spend in non-attainment or maintenance areas. Eligible activities include those related to rail intermodal freight transportation improvements. CMAQ funding is administered jointly by the FHWA and FTA and is allocated among the states based on the severity of their air quality status.

9.4.1.10 Diesel Emissions Reductions Act (DERA)

The EPA awards competitive grants under the Diesel Emissions Reductions Act (DERA) National Grants Program. The purpose of the program is to achieve significant reductions in diesel emissions and exposure, particularly from fleets operating in areas designated by the Administrator as poor air quality areas. In 2021, the EPA awarded approximately $46 million to applicants in competitive grants under this Act towards lower diesel emissions.

9.4.1.11 Highway Safety Improvement Program

The Highway Safety Improvement Program (HSIP) supports projects that improve the safety of road infrastructure. These projects could add capacity; improve alignment or operations, such as intersections and curves; or make road improvements, such as signing, pavement markings, or adding rumble strips.

9.4.1.12 Motor Carrier Safety Assistance Program (MCSAP)

The Motor Carrier Safety Assistance Program (MCSAP) is a fiscal year fund provided by the Federal Motor Carrier Safety Administration (FMSCA) to improve driver safety and reduce the number and severity of crashes, injuries and fatalities involving commercial motor vehicles. The FY 2021 authorization amount was approximately $304 billion, and FMSCA expects to award a similar allowed amount in full under a future authorization effective for FY 2022. Only the state lead agency (as designated by the Governor) is eligible to apply for MCSAP grant funding by submitting a commercial vehicle safety plan (CVSP), in accordance with the provisions of 49 CFR 350.201 and 205. Individuals and businesses are not eligible.

9.4.1.13 High Priority Grant Program

The High Priority (HP) grant program is a competitive discretionary grant program designed to provide federal financial assistance to enhance CVSP activities, maintain innovative technology, and fund new project(s) not included in the CVSP that will have a positive impact on CMV safety.

The HP grant program provides financial assistance to carry out activities and projects that augment motor carrier safety which may include:

- Supporting participation in performance and registration information systems management
- Conducting safety data improvement projects
- Increasing public awareness and education on CMV safety
- Targeting unsafe driving of CMV and Non-CMV in areas identified as high-risk crash corridors
- Improving the safe and secure movement of hazardous materials
- Improving safe transportation of goods and persons in foreign commerce
- Demonstrating new technologies to improve CMV safety
- Otherwise improving CMV safety and compliance with CMV safety regulations

Applicants other than state lead agencies are also eligible for HP grants that improve CMV safety.

9.4.1.14 The Transportation Infrastructure Finance and Innovation Act (TIFIA)

The Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides federal credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to finance surface transportation projects of national and regional significance. The goal of TIFIA financing is to leverage federal resources and stimulate private capital investment in transportation infrastructure. TIFIA financing is available for large-scale public or private transportation projects. The program is aimed at large projects with a minimum value of approximately $50 million.

Historically, TIFIA has been a useful tool for large, complex transportation infrastructure projects that needed low-cost financing. TIFIA is a flexible tool that allows borrowers to customize their loan terms and amortization. However, this flexibility can prolong the application process due to the custom negotiations the Bureau and its advisors undertake with each borrower.

With TIFIA Lite (a new program), experienced borrowers with strong credit and small, shovel-ready projects can access an expedited application process. By agreeing to use a loan template with standard terms and forgoing the typical negotiation process, borrowers can access the traditional benefits of TIFIA (low interest rate, payment deferral up to five years, no pre-payment penalties, etc.) with a shorter review process. Projects eligible for TIFIA Lite can be approved up to six months faster than an average TIFIA application. Eligible projects can receive up to a $100 million loan.

9.4.1.15 Consolidated Rail Infrastructure and Safety Improvements Program (CRISI)

The Consolidated Rail Infrastructure Safety Improvements Program funds Capital Project development and implementation under the FRA to improve the safety, efficiency, and reliability of intercity passenger and freight railroads. Projects eligible for funding under this grant program include, but are not limited to, highway-rail grade crossing improvement projects, deployment of railroad safety technology, rail line relocation and improvement projects, and other capital projects that help mitigate congestion at chokepoints affecting rail service and facilitate ridership growth along heavily traveled rail corridors.

9.4.1.16 Railway-Highways Crossing (Section 130) Program

Funds to improve railway-highway crossings are set-aside from the federal HSIP apportionment. The program provides funds for the elimination of hazards at railway-highway crossings and is apportioned to states by formula.

9.4.1.17 Railroad Crossing Elimination Program (RCE)

The Railroad Crossing Elimination (RCE) Program is a new grant program established under the IIJA that provides funding for highway-rail or pathway-rail grade crossing improvement projects that focus on improving the safety and mobility of people and goods.

Eligible applicants for RCE include:

- States, including the District of Columbia, Puerto Rico, and other United States territories and possessions
- A political subdivision of a state
- A federally recognized Indian Tribe
- A unit of local government or a group of local governments

- A public port authority
- A metropolitan planning organization
- A group of the entities described above

Eligible projects under RCE include:

- Highway-rail grade separation or closure, including through the use of a bridge, embankment, tunnel, or any combination thereof
- Track relocation
- Improvement or installation of protective devices, signals, signs, or other equipment at crossings
- Measures to improve safety related to a separation, closure, or track relocation project
- Other means to improve the safety if related to the mobility of people and goods at highway-rail grade crossings (including technological solutions)
- The planning, environmental review, and design of any other eligible project type

9.4.1.18 Federal Rail Safety Improvement Act of 2008

The Federal Rail Safety Improvement Act primarily addresses rail safety through regulations. It also authorizes grants for investing in rail technology, railroad safety infrastructure, rail grade crossing improvements, and education, subject to annual appropriations. Provisions under this act are administered by the FRA.

9.4.1.19 Railroad Rehabilitation and Improvement Financing Program (RRIF)

The Railroad Rehabilitation and Improvement Financing (RRIF) program provides direct federal loans and loan guarantees to finance the development of railroad infrastructure. Under this program, established in 1998, the FRA provides up to $35 billion in direct loans and loan guarantees. The loans can be used to refinance outstanding infrastructure debt and new projects such as to include new signal installations, signal upgrades, signal relocation, crossing surface rehabilitation, and crossing closures. The program helps to finance project investments directly, up to the total cost of the project. State and local governments, government-sponsored authorities, corporations, railroads, and others can participate in the program.

9.4.1.20 America's Marine Highway Program (AMHP)

The MARAD Marine Highway program (AMHP) was established by Section 1121 of the Energy Independence and Security Act of 2007 to reduce landside congestion through the designation of Marine Highway Routes. Section 405 of the Coast Guard and Maritime Transportation Act of 2012 further expanded the scope of the program to increase the utilization and efficiency of domestic freight or passenger transportation on Marine Highway Routes between U.S. ports. The National Defense Authorization Act for Fiscal Year 2016 then expanded the definition of short sea shipping to include freight vehicles carried aboard commuter ferry boats and cargo shipped in discrete units -- or packages that are handled individually, palletized, or unitized specifically for transport.

9.4.1.21 Port Infrastructure Development Program (PIDP)

The Port Infrastructure Development Program (PIDP) is a discretionary grant fund administered by the U.S. Maritime Administration (MARAD) that helps strengthen, modernize, and improve maritime systems and gateway ports to supports the efficient movement of commerce in the U.S. For FY 2022, the IIJA appropriated $450 million to the PIDP, including $3.32 million for the Bulk Yard Infrastructure Revitalization and Expansion Project in Paducah, KY.

9.4.1.22 U.S. Army Corps of Engineers Harbor Maintenance Trust Fund (HMTF)

The USACE is responsible for maintaining federal navigation channels. Under the Harbor Maintenance Trust Fund (HMTF), the principal legislative vehicle for guiding the USACE Civil Works Program under the 2014 Water Resources Reform and Development Act (WRRDA), expenditures will increase each year until 2025, when 100 percent of available funds will be directed towards operations and maintenance activities. The HMTF is funded by a Harbor Maintenance Tax (HMT) on imported and domestic waterborne cargo and cruise passengers. This fund is used to cover the USACE's cost of dredging channels, maintaining jetties and breakwaters, and operating locks along the coasts and in the Great Lakes. The HMTF may be drawn on only with an appropriation by Congress.

9.4.1.23 Inland Waterways Users Trust Fund for Locks and Dams (IWTF)

The Inland Waterways Trust Fund (IWTF) was established by the Water Resources Development Act of 1986. The act established a federal marine fuel tax of $0.29 per gallon on barge fuel paid by shippers using the navigation channels, to support 50 percent of the cost of inland waterway infrastructure development and rehabilitation projects. In 2015, the barge fuel tax increased from $0.20 per gallon with the passing of the Achieving a Better Life Experience (ABLE) Act. The increase raises approximately $25 million in additional annual funds, helping cut down on the backlog of maintenance projects, like the Olmsted Locks and Dam. The Annual Construction Funding from the Inland Waterways Trust Fund reached approximately $400 million from 2016 through 2018, declining in 2019 to $329.8 million and $335 million in 2020.[89]

9.4.1.24 Federal Aviation Administration Airport Improvement Program (AIP)

The Airport Improvement Program (AIP) is administered by the FAA and provides grants for planning and developing public-use airports that are included in the National Plan of Integrated Airport Systems (NPIAS). For large and medium primary hub airports, the grant covers 75 percent of eligible costs (or 80 percent for noise program implementation). For small primary, reliever, and general aviation airports, the grant covers a range of 90 to 95 percent of eligible costs, based on statutory requirements. Eligible projects include improvements related to enhancing airport safety, capacity, security, and environmental concerns. In general, sponsors can use AIP funds on most airfield capital improvements or repairs and, in some specific situations, for terminals, hangars, and non-aviation development. Kentucky airports received a total of approximately $482 million of AIP funding from FY 17 to FY 21, with approximately 45 percent ($213.8 million) of funds received in FY 20.[90]

9.4.1.25 Advanced Transportation and Congestion Management Technologies Deployment Program (ATCMTD)

[89] Infrastructure Report Card, Inland Waterways, 2021, https://infrastructurereportcard.org/wp-content/uploads/2020/12/Inland-Waterways-2021.pdf, Accessed August 2022.
[90] Federal Aviation Administration, Airport Improvement Program (AIP) Grant Histories, https://www.faa.gov/airports/aip/grant_histories#history, Accessed August 2022.

The purpose of the Advanced Transportation and Congestion Management Technologies Deployment Program (ATCMTD) is to make competitive grants for the development of model deployment sites for large scale installation and operation of advanced transportation technologies to improve safety, efficiency, system performance, and infrastructure return on investment.

9.4.1.26 Innovative Technology Deployment (ITD)

The Federal Motor Carrier Safety Administration (FMCSA) established the Innovative Technology Deployment (ITD) Program as part of the FAST Act of 2015 and continued under IIJA/BIL to improve commercial motor vehicle safety and productivity. The purpose of the ITD Program is to simplify enforcement operations on high-risk operators, increase efficiency and effectiveness of commercial vehicle safety programs through targeted enforcement, reduce Federal/State and industry regulatory and administrative costs, achieve nationwide deployment of the program, with all jurisdictions participating, and improve security of data and improve sharing of commercial vehicle data within States and between States and FMCSA.

9.4.1.27 Department of Commerce

The U.S. Department of Commerce (DOC) administers federal funding for grants and cooperative agreements in the form of discretionary and nondiscretionary funds. The grants most germane to freight are administered by the Economic Development Administration (EDA). The EDA provides public works funds for distressed communities to revitalize, expand, and upgrade their physical infrastructure to attract new industry, encourage business expansion, diversify local economies, and generate or retain long-term, private sector jobs, and investment.

9.4.2. State Transportation Funding Programs/Sources

The state highway fund is constitutionally mandated, to be used only on highways. However, the Kentucky General Fund provides the mechanism for state funding for rail projects on a competitive basis with other statewide needs. Recent rail funding initiatives include the Kentucky Short Line Railroad Assistance (KSRA) Fund and Kentucky Railroad Crossing Improvement (KRCI) Fund. The following subsections describe state-based transportation funding programs and sources available for transportation projects.

9.4.2.1 Kentucky Road Fund

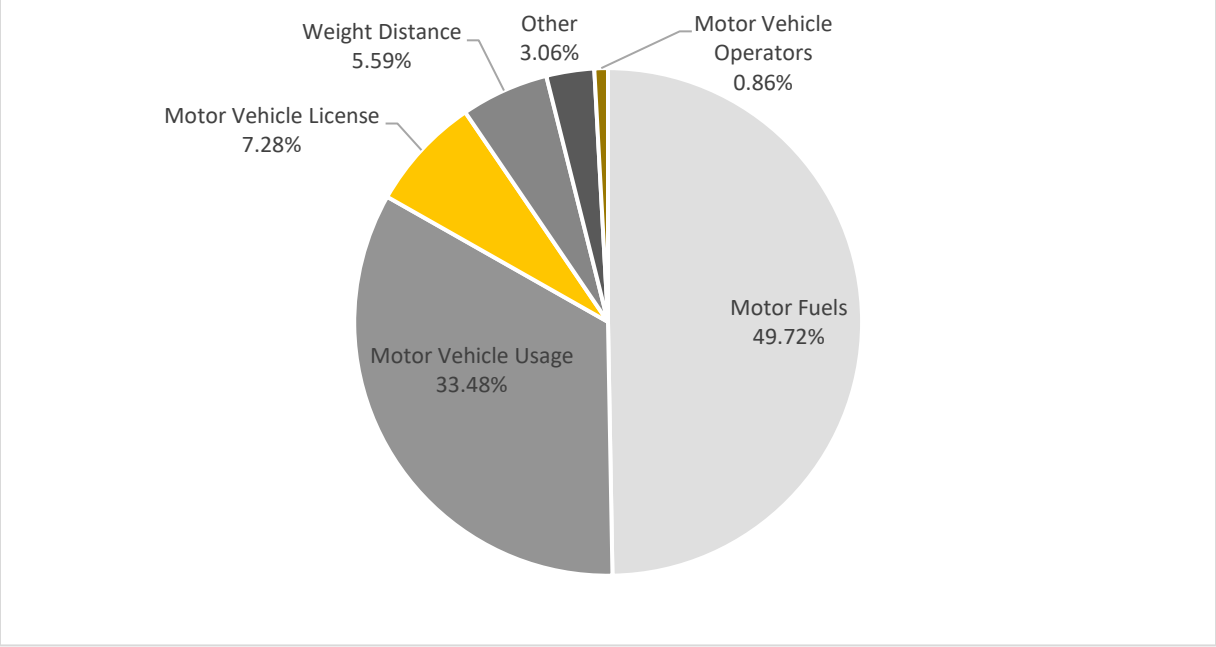
The Kentucky Road Fund is funded through four revenue sources: fuel taxes, usage taxes, registration fees, and licensing fees. Approximately 50 percent comes from state taxes on motor vehicle fuels as shown in **Figure 9-2**. Kentucky uses a percentage tax rate based on the wholesale cost of fuel, with a per gallon statutory floor of $0.246 per gallon. This amount includes a $0.064 fixed component plus a variable component, which is based on the average wholesale prices of gas. The rate cannot increase by more than 10 percent of the variable rate established at the close of the previous fiscal year. Current tax rates for stand at about $0.26 per gallon of gasoline and about $0.23 per gallon of diesel.

Kentucky Constitution, Section 230*: Money not to be drawn from Treasury unless appropriated -- Annual publication of accounts -- Certain revenues usable only for highway purposes.*

No money shall be drawn from the State Treasury, except in pursuance of appropriations made by law; and a regular statement and account of the receipts and expenditures of all public money shall be published annually. No money derived from excise or license taxation relating to gasoline and other motor fuels, and no moneys derived from fees, excise or license taxation relating to registration, operation, or use of vehicles on public highways shall be expended for other than the cost of administration, statutory refunds and adjustments, payment of highway obligations, costs for construction, reconstruction, rights-of-way, maintenance and repair of public highways and bridges, and expense of enforcing state traffic and motor vehicle laws.

The vehicle sales tax, also called a usage tax, makes up about 25 percent of annual revenue. Registration and licensing fees paid by commercial trucking companies generate approximately 10 percent of fund revenues, with the remaining 5 percent from vehicle and driver licensing and other fees.

Figure 9-2. Sources of Revenue for State Road Fund



Source: General Fund and Road Fund Receipts for Fiscal Year 2020.

One of the greatest challenges confronting KYTC is managing public expectations with limited funding available to meet the commonwealth's highway needs. Highway maintenance costs are far from routine when a major bridge can cost $200 million to replace, a mile of interstate highway can cost $5 to $10

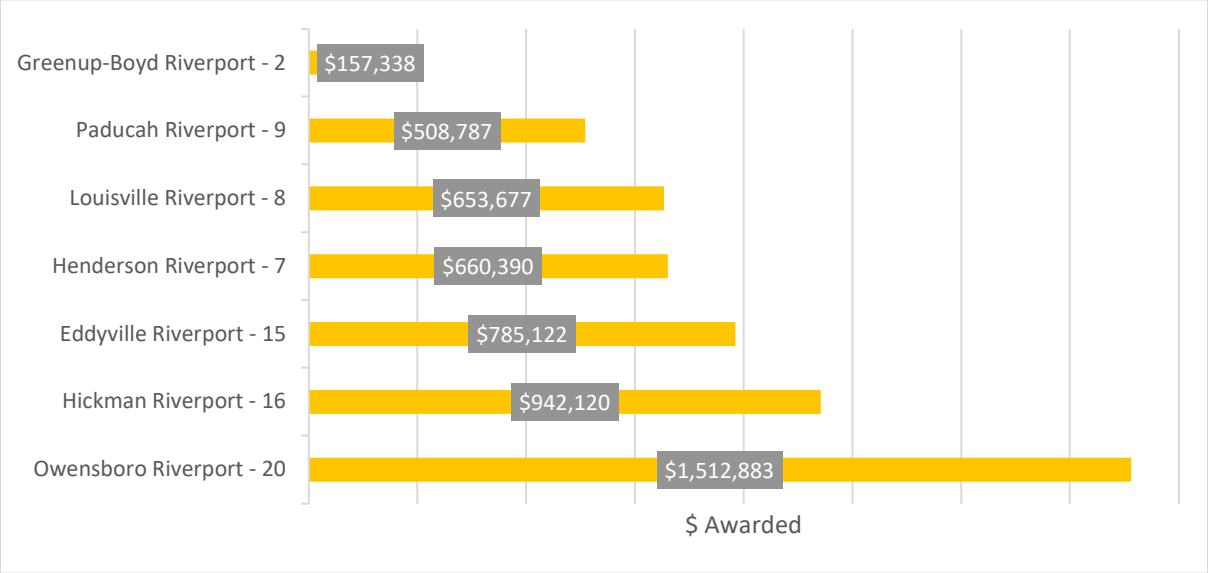
million to repair, and overall identified highway needs throughout Kentucky total more than $50 billion. In the face of these overwhelming basic needs, KYTC's Recommended Highway Plan is predicated upon several assumptions about the revenue stream that is expected for future state and federal highway construction programs administered by the Cabinet.

Until recently, Kentucky's federal highway program was largely matched with toll revenue credits. These credits were attributed to Kentucky by the federal government according to calculations that consider past levels of state fund investments (such as state-sponsored toll roads) in the federal highway system. The toll revenue credits did not generate cash and could not be counted as real cash when used as a match. However, the credits allowed KYTC the flexibility to use 100 percent federal funding on federal-aid projects. This provided KYTC the option to allocate more of its own funding for state projects under complete state control and oversight.

9.4.2.2 Kentucky Riverport Improvement

In 2012, the Kentucky General Assembly appropriated $500,000 in dollar-for-dollar matching funds in FYs 2013 and 2014 for the Riverport Improvement Program. The purpose of this program is to improve public riverports within Kentucky, with improvements originally limited to dredging and maintenance of access. This enactment has continued annually through FY 2023, designating $500,000 from the General Fund in each fiscal year. The project limitations have since been removed now allowing for any project that provides dredging or improves Riverport facilities, infrastructure, or critical material handling equipment. These funds are made available to public riverports, and specific projects are recommended to the KYTC Secretary by the WTAB. This board advises state agencies, the Governor's Office, and General Assembly concerning matters affecting waterways. The General Assembly has appropriated this funding for riverport improvement grants and has tasked the WTAB with prioritizing the funds for optimum utilization. **Figure 9-3** shows the number of riverport improvement grants and total state grant funding awarded to each riverport listed from FY 2013 to FY 2023.

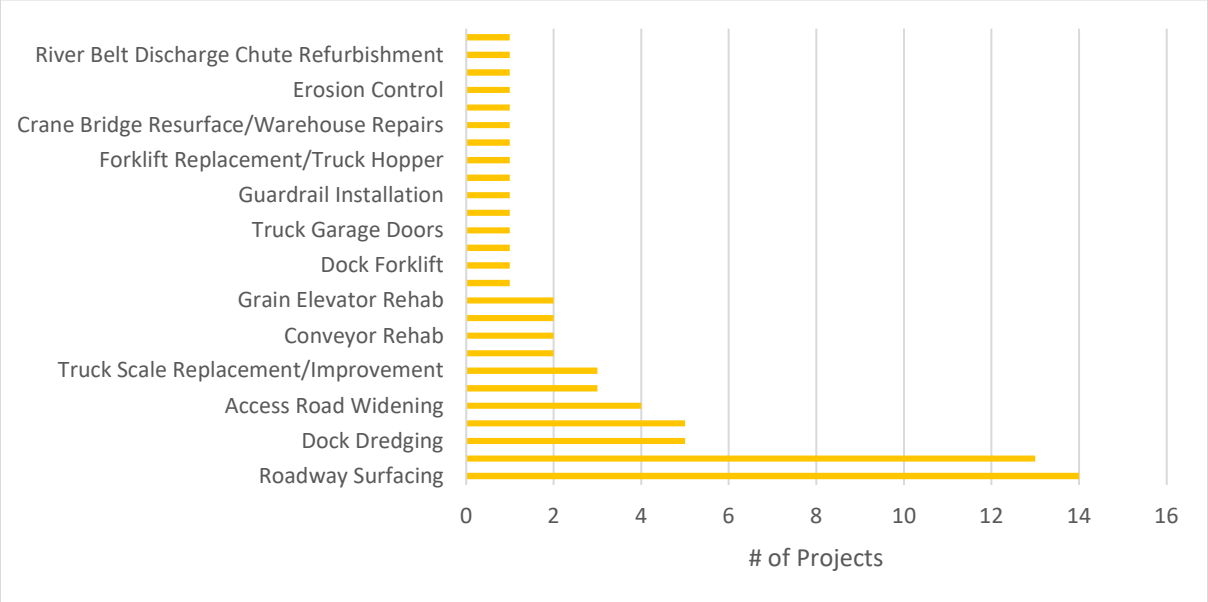
Figure 9-3. FY 2013 to FY 2023 Riverport Improvement Grants



Source: Kentucky Riverport Improvement (KRI) Grant Program, 2022.

A summary of all project types of the awarded riverport improvement grants are shown in **Figure 9-4**. Over half of the project types involved railroad rehabilitation and roadway surfacing.

Figure 9-4. Summary of all Kentucky Riverport Improvement Project Types



Source: : Kentucky Riverport Improvement (KRI) Grant Program, 2022.

9.4.2.3 Kentucky Railroad Crossing Improvement Fund

In June 2021, the commonwealth announced that it was awarding $2.5 million to improve at-grade rail crossings and boost multimodal freight transportation. The funds were issued through the Kentucky Rail Crossing Improvement (KRCI) Program, jointly administered by KYTC Division of Planning and Division of Right of Way and Utilities. The program will fund 80 percent of the total project cost to maintain and improve public at-grade rail crossings in 10 Kentucky counties, and the program recipients will provide a 20 percent match. Another $1.6 million was entered into the Transportation Budget by the Kentucky Legislature for FY 2021 and FY 2022 to make additional rail safety improvements. These funds have been restricted to public safety and service improvements of railroads, including at-grade railroad crossing reconstruction, railroad crossing safety equipment improvements, and the removal of obstructive vegetation.

9.4.2.4 Freight Enhancement Loan Fund

The Kentucky Highlands Freight Enhancement Loan Fund primarily is used to provide lines of credit to finance operating costs for transportation-related businesses in the Kentucky Highlands service area. In addition, the Kentucky Highlands may use fund proceeds to provide fully collateralized equipment financing for eligible borrowers. The origin of the fund is through the FY 2004 Omnibus Appropriations Act. The funds passed through FHWA and are administered by KYTC.

9.5. Next Steps

The 2022 Kentucky Freight Plan documents freight assets, identifies future needs, and recommends an overall freight strategy comprised of programs and policies. The KFP was created with the intention of guiding the work of the Cabinet in achieving its visions, "striving to be national leaders in transportation who provide transportation infrastructure and services for the 21st century that deliver new economic opportunities for all Kentuckians."

The next step is important. KYTC must respond to the regulations set forth in new federal transportation legislation (the BIL/IIJA) and communicate—to both the private sector and the public—Kentucky's commitment to supporting economic development and addressing freight transportation needs.

10. Freight Investment Plan

KYTC's Strategic Highway Investment Formula for Tomorrow (SHIFT) has been the Cabinet's data driven project prioritization process since 2018. SHIFT is a tool to create a more balanced plan shaped by state and local transportation leaders' input. The approach helps bring balance and dependability to Kentucky's over-programmed Highway Plan. SHIFT is a collaborative model that uses measurable data to assess the benefits of planned projects and compare them to each another. The model includes inputs from the following data types: safety, asset management, congestion, economic growth, and benefit/cost. The overall prioritization process is divided into eight steps:

The List
- KYTC starts with a list of projects previously identified by state and local transportation leaders (Area Development Districts, Metropolitan Planning Organizations and KYTC Districts). These leaders may add or subtract projects at this stage.

Sponsorship
- To move forward, projects must either be sponsored by local transportation leaders or be committed projects – those listed in the previous State Highway Plan with funding beyond the design phase. Each ADD, MPO and District are allocated a number of sponsorships based on population, lane miles and number of counties served. After consulting with local elected officials, transportation leaders choose which projects to sponsor.

Review and Scoring
- Each project is reviewed and scored on a scale of 0 to 100 with a formula that uses objective measures for five key attributes – safety, congestion, asset management, economic growth and benefit/cost. Projects of statewide significance – interstates, parkways and other major connecting routes – are scored first. The remaining projects, known as regional projects, are scored using a similar formula.

Statewide Priorities
- KYTC identifies the top scoring statewide projects and about one-third are selected for priority funding. The remaining statewide projects are considered during the next phase.

Local Boosting
- Local transportation leaders take the lead role in prioritizing regional priorities, which include highways and local roads as well as the remaining statewide projects. Using local insights, ADDs, MPOs and KYTC Districts may "boost" the scores for their top priority projects, adding 15 points to their base scores on the 0-to-100 point scale. Projects boosted by both the District and ADD/MPO receive an additional 30 points – a "turbo boost."

Regional Priorities
- Kentucky is divided into four geographic regions – each containing three contiguous KYTC districts. Each region gets an equal allocation of funds. The top ranking projects in each region are the priorities considered in drafting the State Highway Plan.

Recommended State Highway Plan
- KYTC combines the statewide and regional priorities to help develop the Governor's Recommended State Highway Plan, which is presented to the General Assembly.

Enacted State Highway Plan
- During the legislative session, lawmakers fine-tune the plan based on additional information and funding availability. The result is the Enacted State Highway Plan, which includes two years of funded projects and spending priorities for the following four years.

10.1. National Highway Freight Program Funds

KYTC's Freight Investment Plan applies National Highway Freight Program (NHFP) funding from federal fiscal years 2023-2031 to three projects that address major freight mobility challenges on the National Highway Freight Network. Potential eligible projects were identified in the 2022 SHIFT process. Those projects were reviewed, narrowed down by KYTC staff, and were validated as the highest priority freight needs in Kentucky, and received the committee's support for inclusion in the Freight Investment Plan (and subsequent NHFP funding).

With the passage of the IIJA/BIL, the forecast period for a freight plan was extended from five to eight years. With this change, the final out years of the Freight Investment Plan will include projects that are not part of a STIP/TIP or the Kentucky Highway Plan (Six Year Plan). KYTC understands that law and that FHWA intends the Freight Investment Plan to be a living document. With this understanding, the projects and funding amounts listed are subject to future SHIFT and Kentucky Highway Plan development processes, but this is especially true for FY 2023 and FY 2030. KYTC will use State Road Fund (SRF) dollars as matching funds. If the projects are let for substantially different cost than the current estimate, the STIP/TIP and freight investment plan will be adjusted in accordance with KYTC's agreement with FHWA – KY Division. **Table 10-1.** Freight Investment Plan (Million $) shows the KY 2023 to KY 2030 Freight Investment Plan fund allocations for the Brent Spence Companion Bridge Project, I-69 Ohio River Bridge Project, and the I-64 Kentucky River Bridges Project.

Table 10-1. Freight Investment Plan (Million $)

	Brent Spence Companion Bridge		I-69 Ohio River Bridge		I-64 Kentucky River Bridges		Total	
FY	**NHFP**	**SRF**	**NHFP**	**SRF**	**NHFP**	**SRF**	**NHFP**	**SRF**
2023	25	5	-	-	**-**	**-**	**25**	**5**
2024	25	5	-	-	**-**	**-**	**25**	**5**
2025	25	5	-	-	**-**	**-**	**25**	**5**
2026	20	4	5	1	**-**	**-**	**25**	**5**
2027	10	2	15	3	**-**	**-**	**25**	**5**
2028	-	-	25	5	**-**	**-**	**25**	**5**
2029	-	-	-	0	**25**	**5**	**25**	**5**
2030	-	-	-	0	**25**	**5**	**25**	**5**

11. Attachments

11.1. IIJA/BIL State Freight Plan Requirements Checklist

BIL State Freight Plan Requirement	Location in KY Freight Plan
(1) an identification of significant freight system trends, needs, and issues with respect to the State;	Chapter 6 Chapter 8
(2) a description of the freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions of the State;	Section 1.2 Chapter 3 Chapter 9
(3) when applicable, a listing of: (A) multimodal critical rural freight facilities and corridors designated within the State under section 70103 of this title; and (B) critical rural and urban freight corridors designated within the State under section 167 of title 23	Section 2.2.1
(4) a description of how the plan will improve the ability of the State to meet the national multimodal freight policy goals described in section 70101(b) of this title and the national highway freight program goals described in section 167 of title 23;	Section 3.2
(5) a description of how innovative technologies and operational strategies, including intelligent transportation systems, that improve the safety and efficiency of freight movement, were considered;	Section 6.2.3 Section 7.5
(6) in the case of routes on which travel by heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles) is projected to substantially deteriorate the condition of roadways, a description of improvements that may be required to reduce or impede the deterioration;	Section 4.1.2 Section 6.2.3
(7) an inventory of facilities with freight mobility issues, such as truck bottlenecks, within the State, and for those facilities that are State owned or operated, a description of the strategies the State is employing to address those freight mobility issues;	Section 4.1.1 Section 8.2 Section 9.2
(8) consideration of any significant congestion or delay caused by freight movements and any strategies to mitigate that congestion and delay;	Section 4.1.1 Section 4.2.1 Section 4.2.5 Section 6.2.3
(9) a freight investment plan that, subject to subsection (c)(2), includes a list of priority projects and describes how funds made available to carry out section 167 of title 23 would be invested and matched; and	Chapter 10
(10) the most recent commercial motor vehicle parking facilities assessment conducted by the State under subsection (f);	Section 1.2.3 Section 2.2.2 Section 7.5
(11) the most recent supply chain cargo flows in the State, expressed by mode of transportation;	Section 5.3.3 Section 5.3.4
(12) an inventory of commercial ports in the State;	Section 2.3.1
(13) if applicable, consideration of the findings or recommendations made by any multi-State freight compact to which the State is a party under section 70204;	n/a

BIL State Freight Plan Requirement	Location in KY Freight Plan
(14) the impacts of e-commerce on freight infrastructure in the State;	Section 6.2.3
(15) considerations of military freight;	Section 5.4
(16) strategies and goals to decrease: (A) the severity of impacts of extreme weather and natural disasters on freight mobility; (B) the impacts of freight movement on local air pollution; (C) the impacts of freight movement on flooding and stormwater runoff; and (D) the impacts of freight movement on wildlife habitat loss; and	Section 3.3 Section 9.2
(17) consultation with the State freight advisory committee, if applicable.	Section 2.2.1 Section 3.4

TAYLOR SIEFKER WILLIAMS design group

2022 KENTUCKY FREIGHT PLAN