Appendix A: Economic Impacts and Key Industry Maps

Appendix A Introduction, Methodology, and Data

Chapter 2 addresses the economic impacts related to freight in Kansas, including freight service providers and the trade-related impacts facilitated by the transportation industries.

Freight services facilitate economic activity associated with the production and consumption of goods traded. Trade-oriented impacts include the production of intermediate and final goods, the reallocation of intermediate goods, and consumption of final goods. Kansas-specific goods movements are translated into economic activity by tracing directional commodity values through commodity-industry economic interrelationships.

In addition to encapsulating economic activity directly relating to provisioning freight services (e.g., the trucking industry), translating economically-relevant freight values into trade-related impacts demonstrates the role of freight in Kansas' economy. Such economic impact analysis provides a complementary perspective for traditional freight-related analysis that emphasizes movement volume (tons and/or units) and the route/facility capacity. Appendix A contains a series of maps showing the key industry locations across the state.

1.1 Impact Terminology

Economic impacts of freight are categorized into two activities: freight service providers, and trade users; three types: direct, indirect, and induced; and, five measures: jobs (employment), income, value-added, output, and taxes.

Activities:

- *Freight Service Providers* – Impacts associated with provisioning freight services (e.g., the truck industry) include primarily modal transportation, but also includes support and administrative operations. Service provider impact estimates are based on existing transportation industry data in IMPLAN® (e.g., "truck transportation"), proportioned by the freight-related composition for certain aggregate industries.[1]

- *Trade Users* –Impacts associated with shippers/receivers using freight services for goods movement (intermediate and final goods), excepting the freight industries itself. Trade-related impacts are estimated via tracing Kansas-specific commodity values (from IHS TRANSEARCH®) through commodity-industry interrelationships (from IMPLAN®) as a gauge to how freight goods movements are interconnected throughout the economy.

[1] Such aggregate transportation industries (i.e., "rail transportation" and "air transportation") were disaggregated into respective freight and passenger subcomponents by proportionally applying the United States Census County Business Patterns data for air, and AMTRAK data for rail.

Types:

- *Direct* – Calculated service providers and trade users impacts.
- *Indirect* – Impacts associated with the suppliers that provide intermediate goods and services to the directly impacted industries.
- *Induced* – Impacts associated with the re-spending of earned income from both the direct and indirect industries in the study area.[2]
- *Total* – Summation of direct, indirect, and induced types.

Measures:[3]

- *Jobs (Employment)* – Measured in terms of full-time-equivalent (FTE) job-years.
- *Income* – Wage/salary earnings paid to the associated jobs.
- *Value-Added* – Net additional economic activity (i.e., total output less gross intermediate inputs), synonymous with GRP (gross regional product); includes employee and proprietor income, other income types, taxes, etc., required to produce final goods and services.
- *Output* – Total sales value associated with all levels of economic activity (comprised of gross intermediate inputs and value added, combined).
- *Taxes* – Various taxes on production and imports (sales, property, excise, etc.), fines, fees, licenses, permits, etc. resulting from business economic activity; and, include all federal, state, and local tax revenues.

1.2 Data Sources and Models

Two predominate data sources/models were obtained and applied: IMPLAN® as the underlying economic model for Kansas; and, the IHS TRANSEARCH® database for commodity movement values (for the trade-user impacts). Additionally, United States Census County Business Patterns data was used to isolate freight-only service provider impacts for the aggregated air transportation sector, and AMTRAK data for rail.

1.2.1 TRANSEARCH®

Developed by IHS Global Insight, TRANSEARCH® is an extensive database of North American freight,[4] compiled from various industry, commodity, and proprietary sources, including from some of the largest rail and truck freight carriers, with base- and future-year, county-level freight estimates. TRANSEARCH® establishes market-specific production tonnages by industry/commodity, drawn mostly from IHS Global Insight's Business Markets Insights (BMI) database, supplemented by trade associations, industry reports, and federal government data.

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[2] Note that the indirect and induced impact types are often referred to, jointly, as multiplier impacts.
[3] Monetary measures are presented in constant 2014 dollars (income, value-added, output, and taxes).
[4] NATFA-related and excludes international freight traffic from countries other than Canada and Mexico.

However, the comprehensiveness of TRANSEARCH® varies by mode. Originally built for private sector truck and rail users, other modes subsequently-added lack extensiveness, especially due to the NAFTA-focused geography. As such, water movements to/from Asia, the Middle East, Europe, South America, etc. are excluded; and, similarly, non-NAFTA and small volume air movements are excluded. Lastly, pipeline movements are perhaps the most under-represented mode due to insufficient federal government reporting requirements and private sector data-sharing. Nonetheless, TRANSEARCH® arguably provides the most comprehensive and internally-comparable database of freight, especially of the two major modes (truck and rail) and, as such, is utilized for trade-related freight impacts.

1.2.2 IMPLAN®

IMPLAN® v3 is an economic modeling, input-output based, social account matrix software used to estimate the economic impacts to a defined geography (i.e., Kansas) ensuing from assumed changes in an industry or commodity. A social account matrix reflects the economic interrelationships between various industries (and commodities), households, and governments in a given timeframe[5] and measures the economic interdependency of each industry on others through impact multipliers. Multipliers are developed within IMPLAN® from regional purchase coefficients, production functions, and socioeconomic data for each impact variable and are geographically-specific. IMPLAN® is one of the most commonly accepted models used for economic impact analysis and estimation throughout the country.

Additionally, IMPLAN® provides commodity-to-industry production and absorption matrices that enable the quantification, for example, of how inbound commodities are used (absorbed) across Kansas industries in respective production processes to create final goods and services, or by institutions for final consumption. Further, algorithms developed translate commodity (Standard Transportation Commodity Classification, or STCC) data into IMPLAN® industry categories to estimate the impacts associated with directional commodity movements.

1.2.3 COMBINED

TRANSEARCH® commodity detail is bridged with the IMPLAN® model to assess the freight-related interrelationships within the Kansas economy, and derive the economic impacts. TRANSEARCH® provides commodity data for translation into detailed economic interrelationships between commodities, industries, and institutions, via the IMPLAN® model.

IMPLAN® does not identify commodity value movements (only the underlying commodity to industry structure), and TRANSEARCH® does not provide the economic interrelationships necessary to determine how the commodity movements interact within the economy. As such, the two sources are combined to derive the freight-related economic impacts to Kansas. Lastly, both the commodity detail and the IMPLAN® model reflect year 2014 activity.

IMPLAN® v3 for 2014 is structured with 536 industries/commodities (NAICS3 level); and, given such resolution, is most-amenable to bridging with a STCC4 commodity structure (700+ four-digit specific commodities), such that the bridge is a close 1:1 with a (mostly) straightforward

[5] Results pertain to one-year *static* impacts for year 2014 flows (in year 2014 values), and do not provide any *dynamic* or feedback changes over a projected time horizon.

concordance. However, as the IHS TRANSEARCH® database available to KSDOT is truncated to a STCC2 hierarchy (40 aggregate commodity groupings), the IMPLAN® model was thus aggregated into 86 industries (NAICS2 level) to better-accommodate the STCC2 limitations. In unavoidably doing so, the modeling and analysis at the aggregated level thus introduces some biases (e.g., aggregation bias) and limits the transparency and accuracy of estimates.

1.3 Freight Value

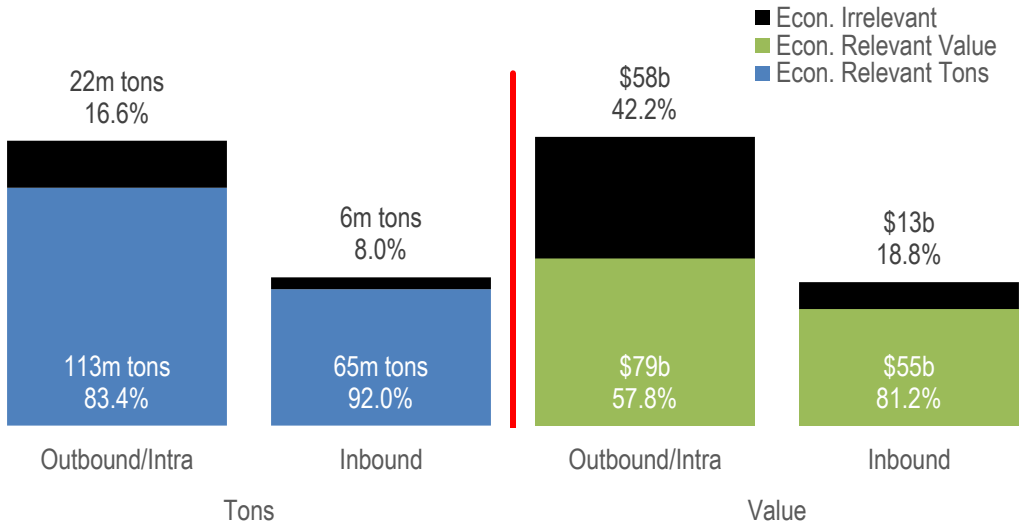
Applied freight data for trade-user estimates are based on the information presented in Task 4.2 (Commodity Flow Analysis), sourced from IHS TRANSEARCH®. However, while the flow analysis focuses on tonnage on Kansas infrastructure, the trade-related impacts are a function of value and the relationship to economic activity in the state. As such, the freight data are summarized in **Table 1** and **Figure 1** by economically-relevant direction and commodity, and reflecting some adjustments vis-à-vis the commodity flow data (which includes all movements, including those economically irrelevant). Considerations and adjustments to the freight data for applicability into this economic analysis include the following.

Table 1: Economically-Relevant Freight (Direction/Commodity)

SCTG2	Commodity	Tons		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	
OUTBOUND/INTRA						
01	Farm Products	38,395,691	34.1%	$14,581	18.4%	$380
20	Food or Kindred Products	11,487,103	10.2%	$13,650	17.2%	$1,188
29	Petroleum or Coal Products	13,191,158	11.7%	$12,267	15.5%	$930
37	Transportation Equipment	1,032,781	0.9%	$11,857	15.0%	$11,481
28	Chemicals or Allied Products	5,042,698	4.5%	$9,200	11.6%	$1,824
35	Machinery	311,179	0.3%	$4,001	5.1%	$12,858
30	Rubber or Miscellaneous Plastics	600,869	0.5%	$2,531	3.2%	$4,212
34	Fabricated Metal Products	753,277	0.7%	$2,337	3.0%	$3,102
36	Electrical Equipment	179,866	0.2%	$1,740	2.2%	$9,674
32	Clay, Concrete, Glass, or Stone	8,735,796	7.7%	$1,705	2.2%	$195
	Remaining Commodities	33,014,639	29.2%	$5,328	6.6%	$161
	Total	*112,745,057*	*100.0%*	*$79,197*	*100.0%*	*$702*
INBOUND						
37	Transportation Equipment	1,039,621	1.6%	$12,292	22.3%	$11,824
01	Farm Products	13,596,141	21.0%	$7,332	13.3%	$539
20	Food or Kindred Products	4,526,736	7.0%	$6,490	11.7%	$1,434
28	Chemicals or Allied Products	3,256,101	5.0%	$5,433	9.8%	$1,669
11	Coal	13,998,507	21.6%	$3,735	6.8%	$267
29	Petroleum or Coal Products	4,536,483	7.0%	$3,391	6.1%	$748
36	Electrical Equipment	245,287	0.4%	$3,181	5.8%	$12,968
33	Primary Metal Products	1,371,084	2.1%	$2,406	4.4%	$1,755
30	Rubber or Miscellaneous Plastics	498,338	0.8%	$1,975	3.6%	$3,963
35	Machinery	202,934	0.3%	$1,844	3.3%	$9,087
	Remaining Commodities	21,490,750	33.2%	$7,139	12.9%	$332
	Total	*64,761,982*	*100.0%*	*$55,218*	*100.0%*	*$853*

Source: CDM Smith and IHS Transearch®

Figure 1: Economically-Relevant Freight (Comparison with Total Freight)



1.3.1 Directional Movements

Economically-relevant directions include outbound (originating within Kansas, terminating beyond), inbound (originating beyond Kansas, terminating within), and intra (originating and terminating within Kansas). Such directional movements are economically relevant because the respective production and/or consumption of such traded goods occur in-state. However, through traffic (originating and terminating beyond Kansas) is not directly applicable to freight users (shippers/receivers) in Kansas, and are thus excluded; albeit, such movements bear on the magnitude of freight service providers (carriers) in Kansas.

1.3.2 Irrelevant Commodities

Certain commodity groups physically moved across Kansas infrastructure are economically irrelevant from a trade perspective, pertaining to neither Kansas consumption (intermediate, or final) or production, regardless of economically-relevant direction:

- STCC40, Waste or Scrap Materials;
- STCC42, Shipping Containers (empty TEUs/FEUs);
- STCC48, Waste; and,
- STCC50, Secondary Traffic[6]

In the first three groups, the production and/or consumption-related trade value is effectively null; as such, the tons associated with these commodities yields no translation into trade-related economic activity. However, such *Waste*, *Scrap*, and *Shipping Containers* movements are physically repositioned and thus yield some service provider-related (carrier) economic activity.

In contrast, *Secondary Traffic*, which is included within TRANSEARCH® to encapsulate short-haul intermodal drayage and repositioning movements by truck, is a significant value. However,

[6] STCC50 is a TRANSEARCH®-designation not normally included in the STCC hierarchy, to reflect the truck drayage portion of rail-truck intermodal movements.

including the value of such *Secondary Traffic* movements into the trade-users-related impacts would be a duplication of the primary modal movement. As such, the *Secondary Traffic* is excluded from the analysis from a trade-perspective; and such exclusion is the primary reason why the economically-relevant freight data below is a subset proportion of the total movements along the infrastructure network in Kansas.

1.3.3 Intrastate Movements

Intrastate movements are combined with outbound movements, since both reflect industry production within Kansas.

1.3.4 Outbound/Intrastate

Combining outbound and intrastate directions, 113 million tons of economically-relevant freight, valued at $79 billion, originates in Kansas in 2014, representing 83 percent and 92 percent of all outbound/intrastate freight movements. Impacts associated with outbound/intrastate movements are derived by mapping the freight values with the respective industrial production in Kansas from the IMPLAN® model. Top five commodities by value:

1. Farm Products ($14.6 billion; 18%)
2. Food or Kindred Products ($13.7 billion; 17%)
3. Petroleum or Coal Products ($12.3 billion; 16%)
4. Transportation Equipment ($11.9 billion; 15%)
5. Chemicals or Allied Products ($9.2 billion; 12%)

1.3.5 Inbound

Economically-relevant inbound commodities destined to Kansas in 2014 amount to 64.8 million tons and $55.2 billion, representing 58 percent and 81 percent of the respective total inbound movements. Inbound commodities are translated into economic impacts by mapping the value of the inbound goods via the absorption of such respective goods into the industry production in Kansas. Top five commodities by value:

1. Transportation Equipment ($12.3 billion; 16%)
2. Farm Products ($7.3 billion; 9%)
3. Food or Kindred Products ($6.5 billion; 8%)
4. Chemicals or Allied Products ($5.4 billion; 7%)
5. Coal ($3.7 billion; 5%)

1.3.6 Intramodal Overlap

Translating economically-relevant directional commodity values into trade-related impacts results in a potential overlap between the directional impacts. Such a potential overlap, or double-counting, is possible where the outbound/intrastate impacts stem (partially, or wholly) from inbound commodities utilized in industrial activity that produces primary or byproduct commodities thereafter shipped in- or out-of-state (intrastate or outbound movements,

respectively)[7]. Within each mode, the directionally- and industry-specific impacts were compared and any potential redundancies are subtracted-out.[8]

1.3.7 Intermodal Overlap

Intermodal overlap potential likewise similarly exists; however, determining that potential is more difficult given the myriad multi-modal-industry-commodity permutations; and such nuances are beyond the analysis scope. Despite that, the major intermodal overlap potential conflict (rail-truck) is effectively handled through the exclusion of *Secondary Traffic*, per the IHS TRANSEARCH® definition as a catch-all drayage and repositioning commodity category. As such, the rail-truck intermodal overlap is attributed to rail in the results.

1.4 Economic Impacts

Impacts are summarized for each of five major transportation modes (truck, rail, water, air, and pipeline) by activity (service providers, trade users, and a combined total), type (direct, indirect, induced, and an economic total), and measure (employment, income, value added, output, and tax revenue) for year 2014 to provide a comprehensive perspective on how freight in Kansas impacts the economy.

Summary-level impacts from all freight-related activity (both service providers and trade users combined) by mode and measure/type are presented below in **Table 2**.

1.4.1 Direct

Accounting for both the freight service providers and the trade facilitated by such providers, the direct economic impact to Kansas from all freight activity amounts to 372,610 jobs in 2014, earning $22.0 billion by producing $34.8 billion in value-added (gross state product, or GSP), which equates to $108.2 billion in output (the sales value of goods/services) taxed to yield $2.1 billion to local, state, and federal coffers.

1.4.2 Total

Incorporating multiplier impacts (indirect and induced) associated with direct freight activity translates into an additional 446,620 jobs earning $22.2 billion, by producing $36.2 billion in GSP. In total, the direct and multiplier impacts related to freight activity amounts to 819,230 jobs in 2014, earning $44.2 billion by producing $71.0 billion in GSP, equating to $180.0 billion in output, taxed to yield $2.1 billion to local, state, and federal coffers.

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[7] An example: seeds imported by farmers (inbound) into Kansas are used as intermediary inputs into the farm industry, translating into crop farming economic activity. As industrial crop farming is not subsistence farming, the farm products produced are shipped within (intrastate) and beyond (outbound) Kansas for further processing (food products) or direct consumption. Such outbound/intrastate farm product movements are thus also translated into crop farming-related economic activity. A potential impact overlap thus arises when the inbound seed is used to produce farm products subsequently-transported outbound/intrastate. As such, various inbound commodities may be associated with the same economic activity as different (but related) outbound commodities – the potential redundancy must be removed.

[8] An example: #XXX tons worth $YYY of inbound seeds translate into $100 million of crop farming-related economic activity; #ZZZ worth $AAA of farm products shipped outbound/intrastate translate into $500 million of crop farming-related activity. $600 million aggregation would potentially be double-counting $100 million if the inbound seeds are used entirely in producing the $500 million farm products.

Table 2: Total Freight Activity-Related Impacts by Mode and Economic Measure/Type

Measure/Type	Truck	Rail	Water	Air	Pipe	Total
EMPLOYMENT *						
Direct	244,690	106,370	30	20,380	1,140	372,610
Indirect	159,190	65,130	40	7,150	1,040	232,550
Induced	140,280	63,390	20	8,580	1,790	214,060
Total	544,160	234,890	90	36,120	3,970	819,230
INCOME **						
Direct	$14,067	$6,715	$1	$1,011	$243	$22,037
Indirect	$9,160	$3,765	$2	$402	$56	$13,385
Induced	$5,746	$2,597	$1	$352	$73	$8,769
Total	$28,974	$13,077	$4	$1,765	$372	$44,191
VALUE ADDED **						
Direct	$22,402	$10,816	$1	$1,257	$309	$34,785
Indirect	$14,364	$5,836	$3	$644	$76	$20,923
Induced	$9,998	$4,520	$1	$613	$128	$15,260
Total	$46,764	$21,172	$5	$2,514	$513	$70,968
OUTPUT **						
Direct	$71,225	$32,416	$9	$3,975	$531	$108,156
Indirect	$31,122	$12,566	$7	$1,261	$177	$45,133
Induced	$17,452	$7,890	$2	$1,070	$223	$26,637
Total	$119,799	$52,872	$18	$6,306	$931	$179,926
TAX REVENUE **						
Direct	$1,009	$904	$0	$99	$67	$2,079
Indirect	$1,193	$489	$0	$50	$6	$1,738
Induced	$869	$393	$0	$53	$11	$1,326
Total	$3,071	$1,786	$0	$202	$84	$5,143

Source: CDM Smith, IHS TRANSEARCH® and IMPLAN®; totals may not sum due to rounding
** employment rounded to the nearest ten job-years*
*** in millions of 2014 dollars*

A majority of the freight-related impacts are intuitively attributable to the major freight modes: trucking and rail, followed by air, pipeline, and water. Such an impact distribution is predominately a function of the freight values hauled via the respective modes across Kansas infrastructure – descending by mode in the same sequence as the total impacts.

Depending on measure and type for all freight modes combined, between 82 percent and 94 percent of the freight activity impacts are trade-user related, with the remaining 6.3 percent to 18 percent pertaining to freight service providers. A detailed breakdown by freight activity for each mode (service providers versus trade users) are in Section 4.

It is important to contextualize the preceding economic impact estimates, as it is difficult to visualize hundreds of thousands of jobs and billions of dollars, etc. As such, the economic impacts are compared with the existing economic composition of Kansas in 2014, by the exact same existing economic measures as the presented economic impacts, per **Table 3**.

Table 3: Kansas Economic Measures, 2014

Measure	Value
Employment	1,883,641
Income *	$95,166
Value Added *	$150,764
Output *	$329,432
Tax Revenues *	$9,829

Source: IMPLAN®
** in millions of 2014 dollars*

Accounting for both the providers (carriers) and users (shippers/receivers), the direct impacts associated with Kansas-related freight amount to between 20 percent (employment) and 33 percent (output) of the statewide economy, per Table 4. Accounting for supplier-related impacts (indirect) and the income re-circulation impacts (induced), the total economic impacts pertaining to all freight-related activity in Kansas amounts to between 44 percent (employment) and 55 percent (output) of the statewide economy. Such estimates exemplify the extent to which the Kansas economy is reliant on the transportation infrastructure network, especially with regards to the interstate and international connections that facilitate trade.

Table 4: Total Freight Activity-Related Impacts, Percent of Economy

Measure/Type	Truck	Rail	Water	Air	Pipe	Total
EMPLOYMENT *						
Direct	13.0%	5.6%	0.001%	1.1%	0.1%	19.8%
Indirect	8.5%	3.5%	0.002%	0.4%	0.1%	12.5%
Induced	7.4%	3.4%	0.001%	0.5%	0.1%	11.4%
Total	28.9%	12.5%	0.005%	1.9%	0.2%	43.5%
INCOME **						
Direct	14.8%	7.1%	0.001%	1.1%	0.3%	23.2%
Indirect	9.6%	4.0%	0.002%	0.4%	0.1%	14.1%
Induced	6.0%	2.7%	0.001%	0.4%	0.1%	9.2%
Total	30.4%	13.7%	0.004%	1.9%	0.4%	46.4%
VALUE ADDED **						
Direct	14.9%	7.2%	0.001%	0.8%	0.2%	23.1%
Indirect	9.5%	3.9%	0.002%	0.4%	0.1%	13.9%
Induced	6.6%	3.0%	0.001%	0.4%	0.1%	10.1%
Total	31.0%	14.0%	0.004%	1.7%	0.3%	47.0%
OUTPUT **						
Direct	21.6%	9.8%	0.003%	1.2%	0.2%	32.8%
Indirect	9.4%	3.8%	0.002%	0.4%	0.1%	13.7%
Induced	5.3%	2.4%	0.001%	0.3%	0.1%	8.1%
Total	36.4%	16.0%	0.006%	1.9%	0.3%	54.6%
TAX REVENUE **						
Direct	10.3%	9.2%	0.001%	1.0%	0.7%	21.2%
Indirect	12.1%	5.0%	0.002%	0.5%	0.1%	17.7%
Induced	8.8%	4.0%	0.001%	0.5%	0.1%	13.4%
Total	31.2%	18.2%	0.004%	2.1%	0.9%	52.4%

Source: CDM Smith, IHS TRANSEARCH® and IMPLAN®; totals may not sum due to rounding
** employment rounded to the nearest ten job-years*
*** in millions of 2014 dollars*

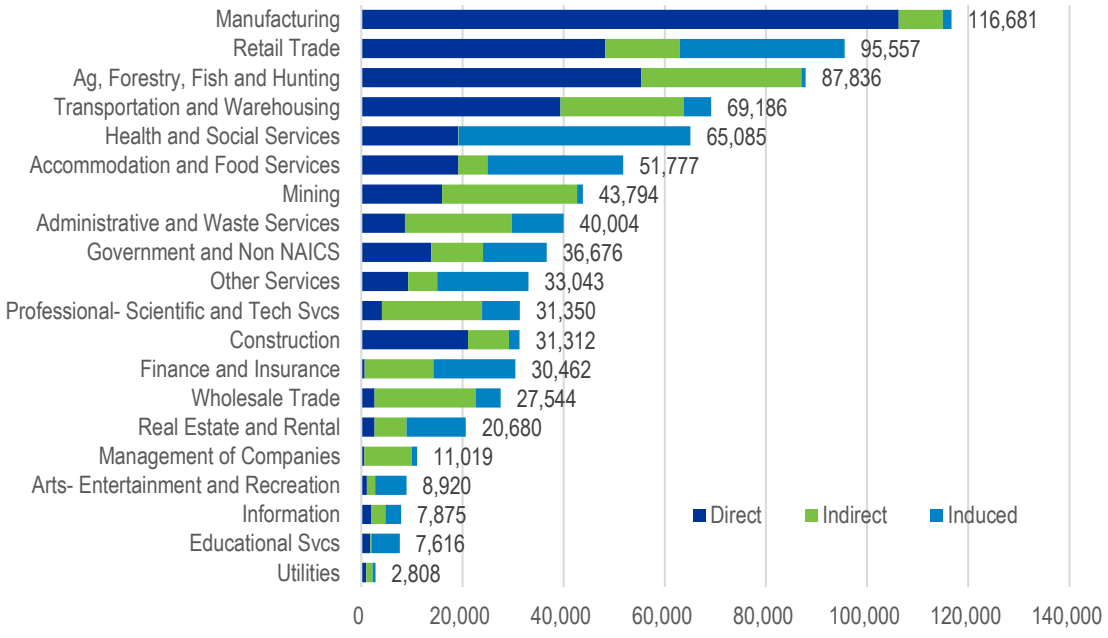
Impacts relating to Kansas freight are distributed across various industries, including not only the freight service industries (modal carriers) but all the other industries depending on the direct physical movement of goods (trade). Employment impacts by industry are presented in Table 5 and graphically in Figure 2.

Table 5: Total Freight Activity-Related Employment by Industry

Industry Description	Direct	Indirect	Induced	Total	Percent
Manufacturing	106,233	8,736	1,712	116,681	14.2%
Retail Trade	48,240	14,747	32,570	95,557	11.7%
Ag, Forestry, Fish and Hunting	55,316	31,710	810	87,836	10.7%
Transportation and Warehousing	39,375	24,397	5,414	69,186	8.5%
Health and Social Services	19,127	136	45,822	65,085	7.9%
Accommodation and Food Services	19,185	5,746	26,846	51,777	6.3%
Mining	15,944	26,751	1,100	43,794	5.4%
Administrative and Waste Services	8,643	21,125	10,236	40,004	4.9%
Government and Non NAICS	13,792	10,249	12,635	36,676	4.5%
Other Services	9,289	5,759	17,995	33,043	4.0%
Professional- Scientific and Tech Services	4,061	19,792	7,496	31,350	3.8%
Construction	21,108	8,096	2,108	31,312	3.8%
Finance and Insurance	654	13,590	16,218	30,462	3.7%
Wholesale Trade	2,607	20,057	4,880	27,544	3.4%
Real Estate and Rental	2,622	6,314	11,745	20,680	2.5%
Management of Companies	599	9,363	1,057	11,019	1.4%
Arts- Entertainment and Recreation	1,080	1,679	6,160	8,920	1.1%
Information	1,949	2,832	3,094	7,875	1.0%
Educational Services	1,820	176	5,620	7,616	0.9%
Utilities	961	1,303	545	2,808	0.3%
Total	*372,605*	*232,558*	*214,063*	*819,225*	*100.0%*

Source: CDM Smith, IHS TRANSEARCH® and IMPLAN®

Figure 2: Total Freight Activity-Related Employment by Industry



Source: CDM Smith, IHS Transearch® and Implan®

1.4.3 INDUSTRY IMPACTS

Employment impacts are categorized by the North American Industry Classification System (NAICS) using the top-level two-digit industries. The employment impacts amount to 819,230 when combining all freight modes and reflecting total impacts. More than half (53%) of the employment impacts are concentrated within the top five industries of *Manufacturing*; *Retail Trade; Agriculture, Forestry, Fishing and Hunting; Transportation and Warehousing; and, Health and Social Services.*

Of the top five, all but *Health and Social Services* employment impacts are directly related to freight whereas the impacts to *Health and Social Services* are mostly a re-spending of the extra income. *Construction* is most directly-related to freight as well however it did not rank within the top five.

1.4.4 MODAL IMPACTS

Detailed impacts by modal activity, including the directionally-related composition of trade user impacts, are presented in **Table 6** through **Table 15** in Section 4. As noted, the largest impacts are attributable to the truck and rail modes, with about 95 percent of the total impacts associated to the two combined; the remaining 5 percent is attributed to the non-surface modes, with most to airborne freight. Such modal impacts are mostly a function of the associated trade values facilitated by the respective modes from IHS Transearch®.

- Trucking constitutes the largest modal impacts, with 544,160 total employees in Kansas associated either directly with the trucking industry (23,390) and users (221,300) or the associated multiplier effects (299,470). Over 90 percent of the modal impacts (depending on measure/type) are trade-related, with the directions closely-balanced in total. However, outbound/intra-related directional trade facilitates a larger relative multiplier impact and more-productive jobs[9] than the inbound-related impacts.

- Freight rail is attributed the second-largest impacts, with 234,890 total employees: 5,420 directly employed in freight rail, 100,960 directly use freight rail carrier services to trade goods, and multiplier impacts include another 128,520. Similar to trucking, most impacts are trade-related, accounting for over 90 percent, excepting direct taxes (71%). Directionally, impacts associated with inbound rail are larger than outbound, especially employment-related. However, the outbound/intra-impacts are associated with a higher relative multiplier and more-productive per employee than inbound-related impacts.

[9] higher monetary-measure impacts (income, output, etc.) per direct employment

Table 6: Truck Impacts by Activity and Economic Measure/Type

Measure and Type	Services	Trade Users			Service and Trade
		Outbound/Intra	Inbound	Trade Total	
Employment *					
Direct	23,390	89,050	132,250	221,300	244,690
Indirect	12,650	87,560	58,980	146,540	159,190
Induced	12,670	68,570	59,040	127,610	140,280
Total	*48,710*	*245,180*	*250,270*	*495,450*	*544,160*
Income **					
Direct	$1,395	$6,144	$6,528	$12,672	$14,067
Indirect	$696	$5,198	$3,266	$8,464	$9,160
Induced	$519	$2,807	$2,419	$5,226	$5,745
Total	*$2,610*	*$14,149*	*$12,213*	*$26,362*	*$28,972*
Value Added **					
Direct	$1,725	$10,614	$10,063	$20,677	$22,402
Indirect	$1,039	$7,937	$5,388	$13,325	$14,364
Induced	$903	$4,885	$4,210	$9,095	$9,998
Total	*$3,667*	*$23,436*	*$19,661*	*$43,097*	*$46,764*
Output **					
Direct	$3,844	$40,503	$26,877	$67,380	$71,224
Indirect	$2,228	$17,883	$11,011	$28,894	$31,122
Induced	$1,577	$8,526	$7,350	$15,876	$17,453
Total	*$7,649*	*$66,912*	*$45,238*	*$112,150*	*$119,799*
Tax Revenue **					
Direct	$42	$349	$618	$967	$1,009
Indirect	$77	$683	$433	$1,116	$1,193
Induced	$78	$424	$366	$790	$868
Total	*$197*	*$1,456*	*$1,417*	*$2,873*	*$3,070*

Source: CDM Smith, IHS TRANSEARCH® and IMPLAN®

** employment rounded to the nearest ten job-years; totals may not sum due to rounding*

*** in millions of 2014 dollars*

Table 7: Truck Impacts, Percentage of Economy

Measure and Type	Services	Users	Total
Employment			
Direct	1.2%	11.7%	13.0%
Total	*2.6%*	*26.3%*	*28.9%*
Income			
Direct	1.5%	13.3%	14.8%
Total	*2.7%*	*27.7%*	*30.4%*
Value Added			
Direct	1.1%	13.7%	14.9%
Total	*2.4%*	*28.6%*	*31.0%*
Output			
Direct	1.2%	20.5%	21.6%
Total	*2.3%*	*34.0%*	*36.4%*
Tax Revenues			
Direct	0.4%	9.8%	10.3%
Total	*2.0%*	*29.2%*	*31.2%*

Source: CDM Smith, IHS TRANSEARCH® and IMPLAN®

Table 8: Rail Impacts by Activity and Economic Measure/Type

Measure and Type	Services	Trade Users			Service and Trade
		Outbound/Intra	Inbound	Trade Total	
Employment *					
Direct	5,420	32,710	68,240	100,950	106,370
Indirect	4,220	29,520	31,390	60,910	65,130
Induced	5,340	25,230	32,820	58,050	63,390
Total	*14,980*	*88,460*	*132,450*	*219,910*	*234,890*
Income **					
Direct	$636	$2,398	$3,681	$6,079	$6,715
Indirect	$242	$1,768	$1,755	$3,523	$3,765
Induced	$219	$1,033	$1,345	$2,378	$2,597
Total	*$1,097*	*$5,199*	*$6,781*	*$11,980*	*$13,077*
Value Added **					
Direct	$1,725	$3,801	$5,289	$9,090	$10,815
Indirect	$353	$2,729	$2,754	$5,483	$5,836
Induced	$381	$1,798	$2,340	$4,138	$4,519
Total	*$2,459*	*$8,328*	*$10,383*	*$18,711*	*$21,170*
Output **					
Direct	$2,650	$14,825	$14,940	$29,765	$32,415
Indirect	$851	$5,923	$5,792	$11,715	$12,566
Induced	$666	$3,139	$4,085	$7,224	$7,890
Total	*$4,167*	*$23,887*	*$24,817*	*$48,704*	*$52,871*
Tax Revenue **					
Direct	$265	$124	$515	$639	$904
Indirect	$27	$226	$236	$462	$489
Induced	$33	$156	$203	$359	$392
Total	*$325*	*$506*	*$954*	*$1,460*	*$1,785*

Source: CDM Smith, IHS TRANSEARCH® and IMPLAN®

** employment rounded to the nearest ten job-years; totals may not sum due to rounding*

*** in millions of 2014 dollars*

Table 9: Rail Impacts, Percentage of Economy

Measure and Type	Services	Users	Total
Employment			
Direct	0.3%	5.4%	5.6%
Total	*0.8%*	*11.7%*	*12.5%*
Income			
Direct	0.7%	6.4%	7.1%
Total	*1.2%*	*12.6%*	*13.7%*
Value Added			
Direct	1.1%	6.0%	7.2%
Total	*1.6%*	*12.4%*	*14.0%*
Output			
Direct	0.8%	9.0%	9.8%
Total	*1.3%*	*14.8%*	*16.0%*
Tax Revenues			
Direct	2.7%	6.5%	9.2%
Total	*3.3%*	*14.9%*	*18.2%*

Source: CDM Smith, IHS TRANSEARCH® and IMPLAN®

Table 10: Water Impacts by Activity and Economic Measure/Type

Measure and Type	Services	Trade Users			Service and Trade
		Outbound/Intra	Inbound	Trade Total	
Employment *					
Direct	10	10	0	10	20
Indirect	30	10		10	40
Induced	10	10	0	10	20
Total	*50*	*30*		*30*	*80*
Income **					
Direct		$1		$1	$1
Indirect	$2	$0	$0	$0	$2
Induced	$1				$1
Total	*$3*	*$1*	*$0*	*$1*	*$4*
Value Added **					
Direct	$0	$1	$0	$1	$1
Indirect	$3	$1		$1	$4
Induced	$1	$1	$0	$1	$2
Total	*$4*	*$3*		*$3*	*$7*
Output **					
Direct	$6	$3		$3	$9
Indirect	$6	$1	$0	$1	$7
Induced	$2	$1		$1	$3
Total	*$14*	*$5*	*$0*	*$5*	*$19*
Tax Revenue **					
Direct	$0	$0	$0	$0	$0
Indirect					
Induced	$0	$0	$0	$0	$0
Total					

Source: CDM Smith, IHS TRANSEARCH® and IMPLAN®

** employment rounded to the nearest ten job-years; totals may not sum due to rounding*

*** in millions of 2014 dollars*

Table 11: Water Impacts, Percentage of Economy

Measure and Type	Services	Users	Total
Employment			
Direct	0.001%	0.001%	0.001%
Total	*0.003%*	*0.002%*	*0.005%*
Income			
Direct	0.000%	0.001%	0.001%
Total	*0.003%*	*0.002%*	*0.004%*
Value Added			
Direct	0.000%	0.001%	0.001%
Total	*0.003%*	*0.002%*	*0.004%*
Output			
Direct	0.002%	0.001%	0.003%
Total	*0.004%*	*0.002%*	*0.006%*
Tax Revenues			
Direct	0.000%	0.001%	0.001%
Total	*0.002%*	*0.002%*	*0.004%*

Source: CDM Smith, IHS TRANSEARCH® and IMPLAN®

Table 12: Air Impacts by Activity and Economic Measure/Type

Measure and Type	Services	Trade Users			Service and Trade
		Outbound/Intra	Inbound	Trade Total	
Employment *					
Direct	30	6,010	14,340	20,350	20,380
Indirect	40	3,610	3,500	7,110	7,150
Induced	20	3,850	4,710	8,560	8,580
Total	*90*	*13,470*	*22,550*	*36,020*	*36,110*
Income **					
Direct	$1	$416	$594	$1,010	$1,011
Indirect	$2	$215	$185	$400	$402
Induced	$1	$158	$193	$351	$352
Total	*$4*	*$789*	*$972*	*$1,761*	*$1,765*
Value Added **					
Direct	$2	$478	$778	$1,256	$1,258
Indirect	$3	$332	$309	$641	$644
Induced	$1	$275	$336	$611	$612
Total	*$6*	*$1,085*	*$1,423*	*$2,508*	*$2,514*
Output **					
Direct	$9	$2,187	$1,779	$3,966	$3,975
Indirect	$7	$663	$591	$1,254	$1,261
Induced	$2	$481	$587	$1,068	$1,070
Total	*$18*	*$3,331*	*$2,957*	*$6,288*	*$6,306*
Tax Revenue **					
Direct	$1	$19	$80	$99	$100
Indirect		$26	$24	$50	$50
Induced	$0	$24	$29	$53	$53
Total	*$1*	*$69*	*$133*	*$202*	*$203*

Source: CDM Smith, IHS TRANSEARCH® and IMPLAN®

** employment rounded to the nearest ten job-years; totals may not sum due to rounding*

*** in millions of 2014 dollars*

Table 13: Air Impacts, Percentage of Economy

Measure and Type	Services	Users	Total
Employment			
Direct	0.002%	1.1%	1.1%
Total	*0.005%*	*1.9%*	*1.9%*
Income			
Direct	0.001%	1.1%	1.1%
Total	*0.004%*	*1.9%*	*1.9%*
Value Added			
Direct	0.001%	0.8%	0.8%
Total	*0.004%*	*1.7%*	*1.7%*
Output			
Direct	0.003%	1.2%	1.2%
Total	*0.005%*	*1.9%*	*1.9%*
Tax Revenues			
Direct	0.005%	1.0%	1.0%
Total	*0.008%*	*2.1%*	*2.1%*

Source: CDM Smith, IHS TRANSEARCH® and IMPLAN®

Table 14: Pipe Impacts by Activity and Economic Measure/Type

Measure and Type	Services	Trade Users			Service and Trade
		Outbound/Intra	Inbound	Trade Total	
Employment *					
Direct	930	210	0	210	1,140
Indirect	920	130		130	1,050
Induced	1,680	110	0	110	1,790
Total	*3,530*	*450*		*450*	*3,980*
Income **					
Direct	$231	$11		$11	$242
Indirect	$48	$8	$0	$8	$56
Induced	$69	$5		$5	$74
Total	*$348*	*$24*	*$0*	*$24*	*$372*
Value Added **					
Direct	$302	$8	$0	$8	$310
Indirect	$65	$10		$10	$75
Induced	$120	$8	$0	$8	$128
Total	*$487*	*$26*		*$26*	*$513*
Output **					
Direct	$489	$42		$42	$531
Indirect	$152	$25	$0	$25	$177
Induced	$209	$14		$14	$223
Total	*$850*	*$81*	*$0*	*$81*	*$931*
Tax Revenue **					
Direct	$65	$2	$0	$2	$67
Indirect	$5	$1		$1	$6
Induced	$10	$1	$0	$1	$11
Total	*$80*	*$4*		*$4*	*$84*

Source: CDM Smith, IHS TRANSEARCH® and IMPLAN®

** employment rounded to the nearest ten job-years; totals may not sum due to rounding*

*** in millions of 2014 dollars*

Table 15: Pipe Impacts, Percentage of Economy

Measure and Type	Services	Users	Total
Employment			
Direct	0.05%	0.01%	0.06%
Total	*0.19%*	*0.02%*	*0.21%*
Income			
Direct	0.24%	0.01%	0.26%
Total	*0.37%*	*0.02%*	*0.39%*
Value Added			
Direct	0.20%	0.01%	0.21%
Total	*0.32%*	*0.02%*	*0.34%*
Output			
Direct	0.15%	0.01%	0.16%
Total	*0.26%*	*0.02%*	*0.28%*
Tax Revenues			
Direct	0.66%	0.02%	0.68%
Total	*0.81%*	*0.04%*	*0.85%*

Source: CDM Smith, IHS TRANSEARCH® and IMPLAN®

- Airborne freight is third to truck and rail, with 36,120 jobs associated with the service and use. A vast majority of the airborne freight impacts (99.5+%) are attributable to the users shipping and receiving mostly high value/weight cargo. Service-related impacts are disproportionately small for airborne freight relative to surface modes because dedicated air freight services are small in relation to the air cargo that is opportunistically carried in the belly of passenger planes with such related employment dedicated mostly to the primary function as passenger services.

- Pipeline impacts are a relatively small proportion of the total impacts, amount to 3,970 jobs, most of which are attributed to the industry itself. A small trade-related impact component is a function of the comparatively small value associated with pipeline movements in the IHS TRANSEARCH® database (<0.01% of all economically-relevant trade values for all modes, combined).

- Waterborne freight impacts are likewise a relatively small proportion of total impacts for similar reasons: a very small trade value associated with outbound *Nonmetallic Minerals* (rocks/aggregate) and a niche river services industry. In total, the impacts associated with waterborne freight in Kansas amounts to 90 jobs.

1.5 Next Steps

This economic analysis of existing freight in Kansas serves to recognize the contribution of freight to the economy, and contextualize the mostly behind-the-scenes interaction of goods between people, businesses, and institutions. Additionally, the estimated economic impacts may be considered as some criteria, or decision-making factor, in prioritization of transportation infrastructure developments – that is, a proposed development or improvement could be framed within the context of the existing relative economic contribution.

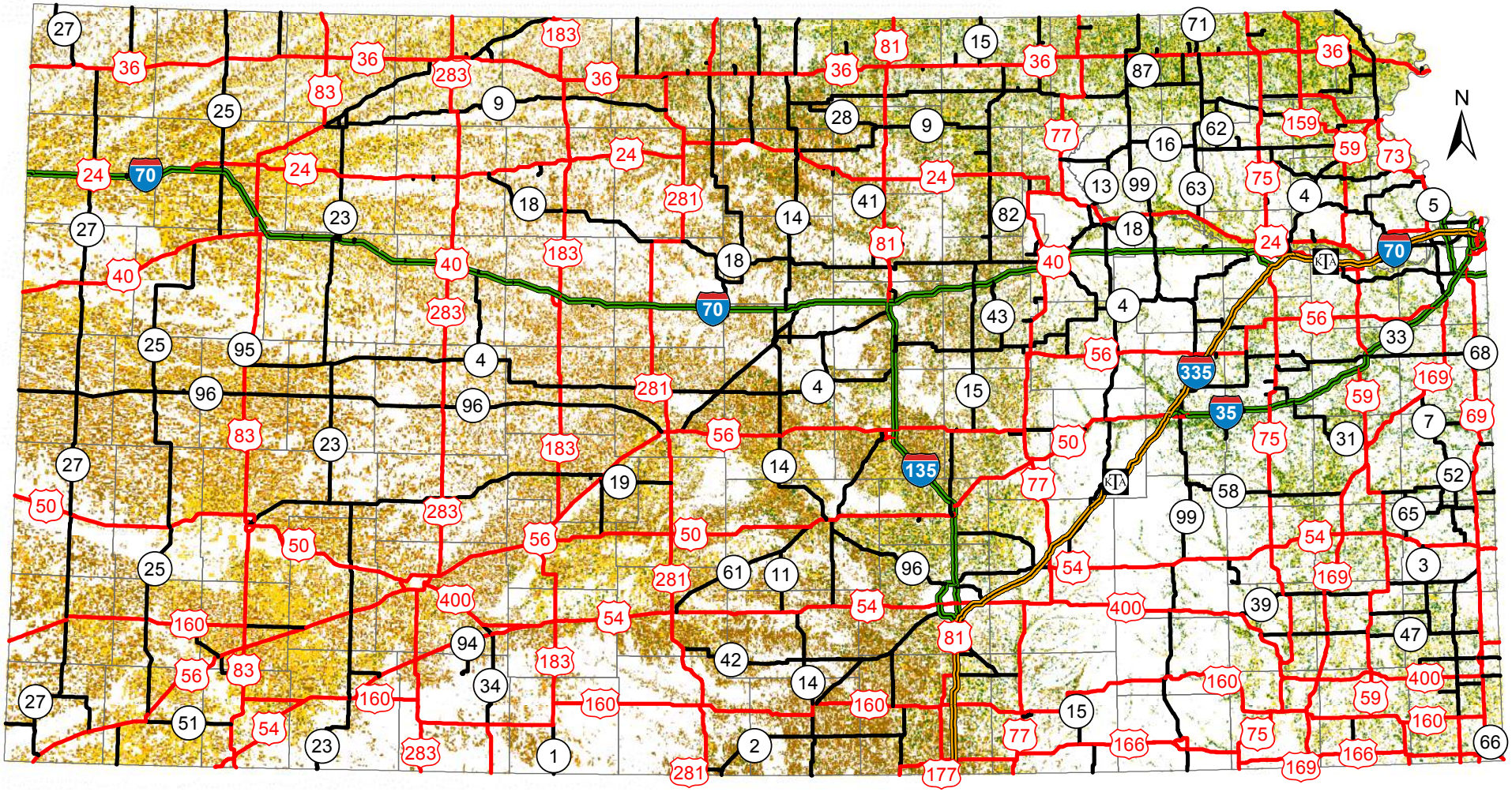
For economically-relevant trade data routed along specific infrastructure (e.g., trade via trucks on a highway network), routes could be characterized by relative economic relevance via a more-detailed application of this analysis (route-level resolution). Such detailed attribution could be incorporated into a ranking or prioritization scheme.

Kansas Transportation and Crop Map

Highways

Kansas Department of Transportation

Kansas Transportation and Crop Map 2016 - Wheat, Corn, Soybeans and Sorghum



USDA

NASS

Corn 698,640,000 Bushels

Sorghum 268,450,000 Bushels

Soybeans 192,480,000 Bushels

Winter Wheat 467,400,000 Bushels

Turnpike

Interstate

U.S. Route

State Route

PREPARED BY THE

KANSAS DEPARTMENT OF TRANSPORTATION

BUREAU OF TRANSPORTATION PLANNING

0 10 20 30 40 50

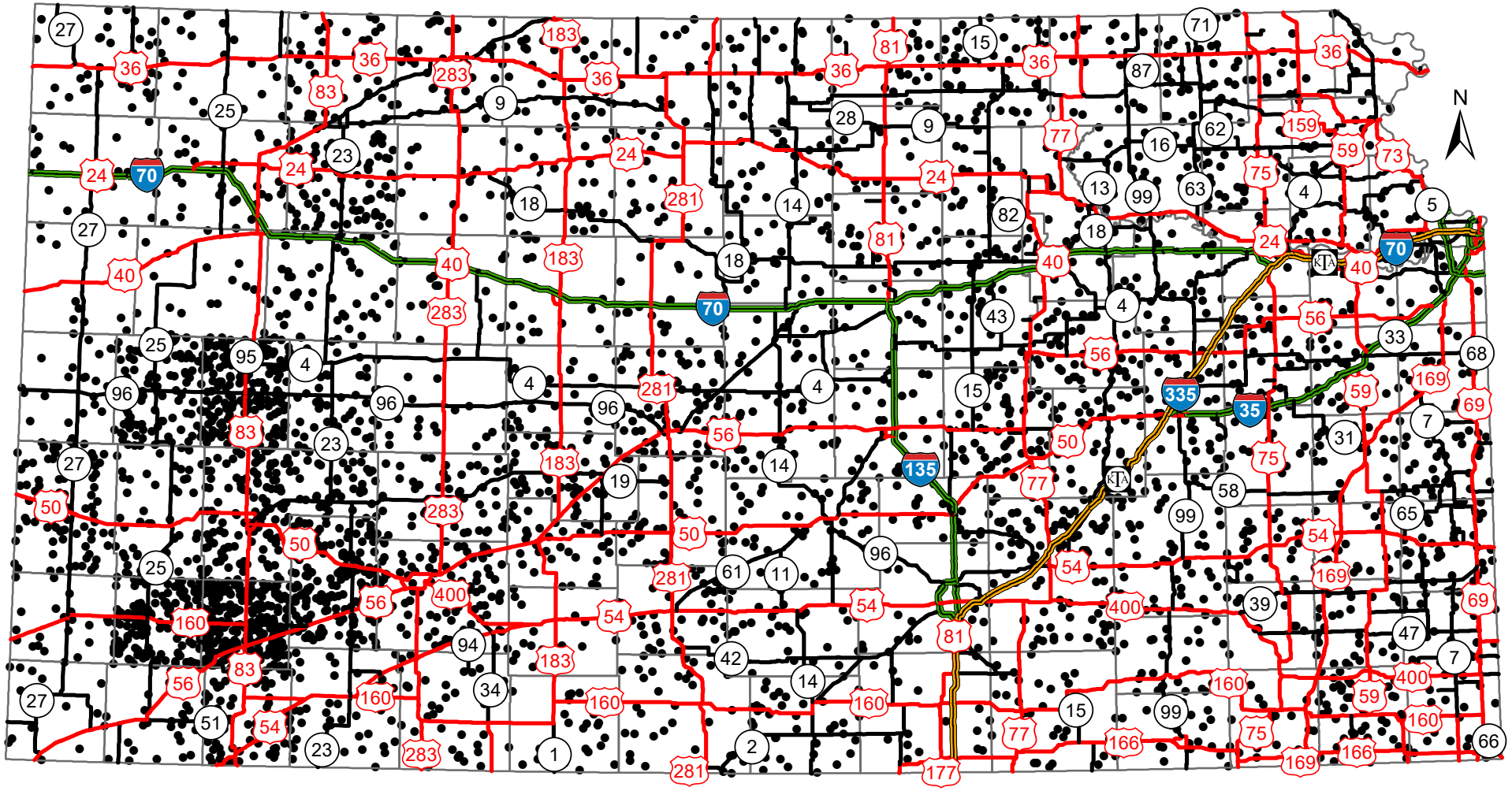
Miles

MAP CREATED Tuesday, February 14, 2017

KDOT makes no warranties, guarantees, or representations for accuracy of this information and assumes no liability for errors or ommissions.

2016 Livestock and Transportation

Kansas Department of Transportation



USDA

AGRICULTURE COUNTS NASS

*Based on 2016 Agriculture Survey.
Census is taken once every five years

2016 All Cattle and Calves
1 Dot = 1,500 head

Turnpike
Interstate
U.S. Route
State Route

PREPARED BY THE
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0 10 20 30 40 50
Miles

MAP CREATED Thursday, August 31, 2017

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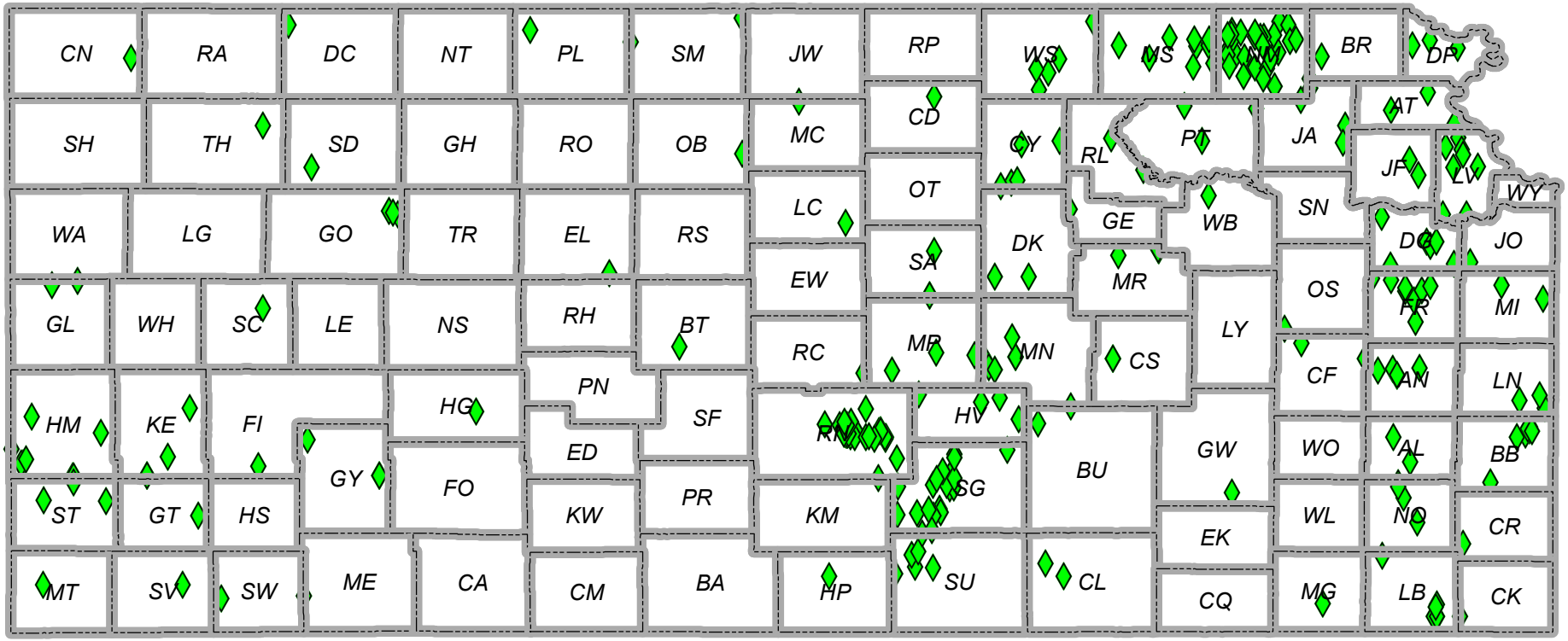
Kansas Dairy Producers
February 2017



Kansas
Department of Agriculture

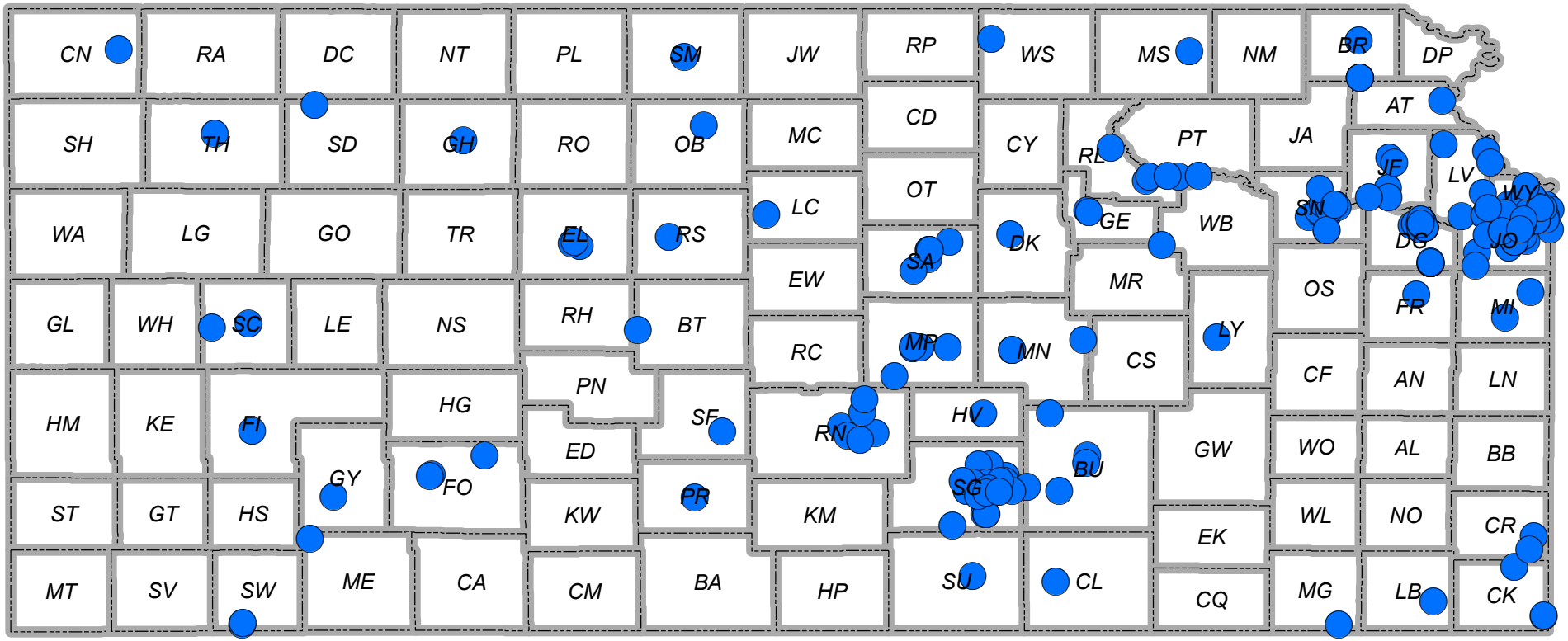
N

Legend

County Boundary

Dairy Producers

Kansas Food Manufactures
February 2017



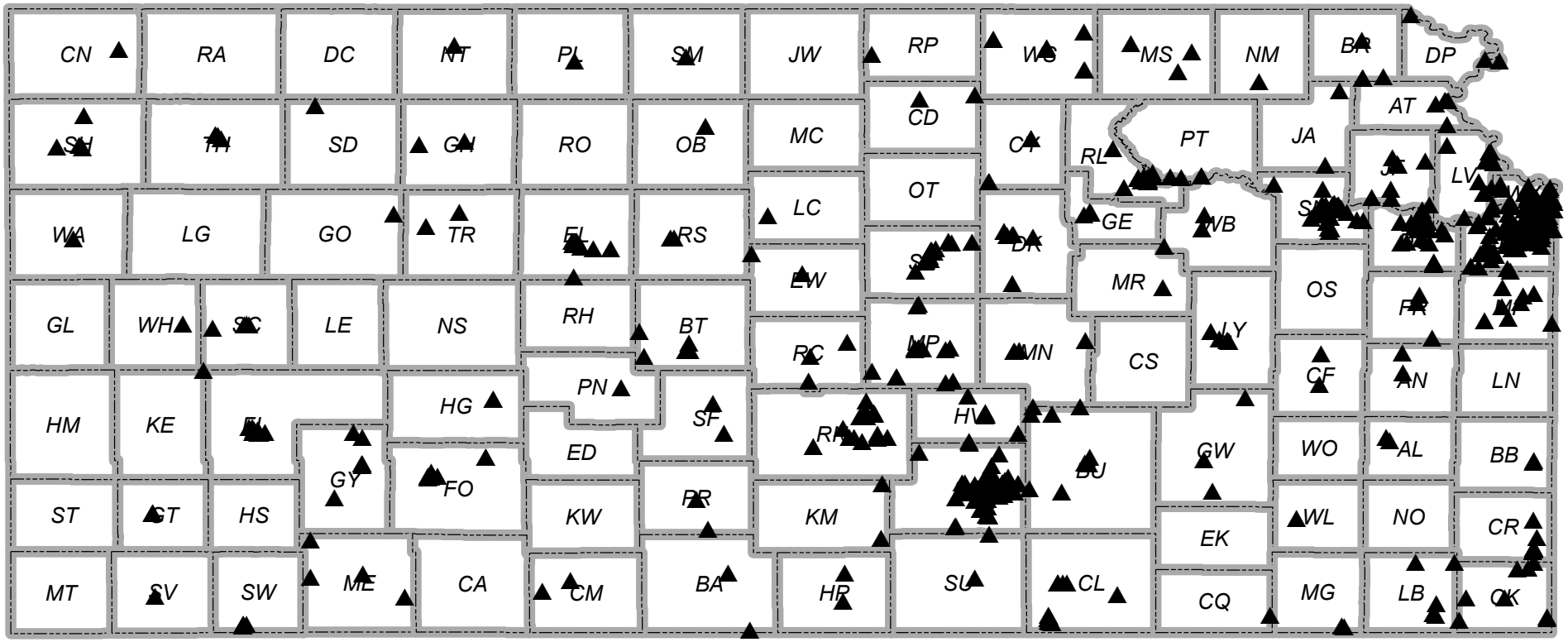
Kansas Department of Agriculture

N

Legend

- Food Manufacture
- County Boundary

Kansas Food Processors
February 2017



Kansas
Department of Agriculture

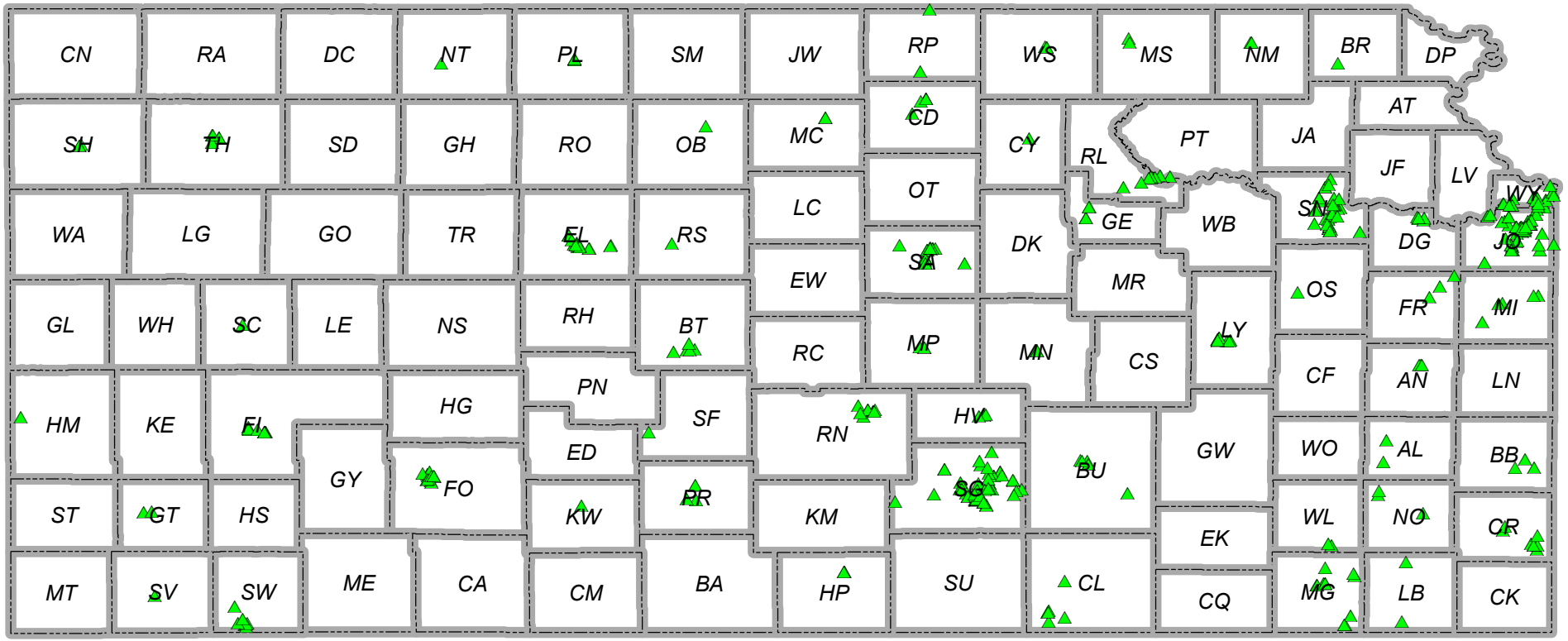
N

Legend

▲ Food Processor

County Boundary

Kansas Food Storage
February 2017



Kansas
Department of Agriculture

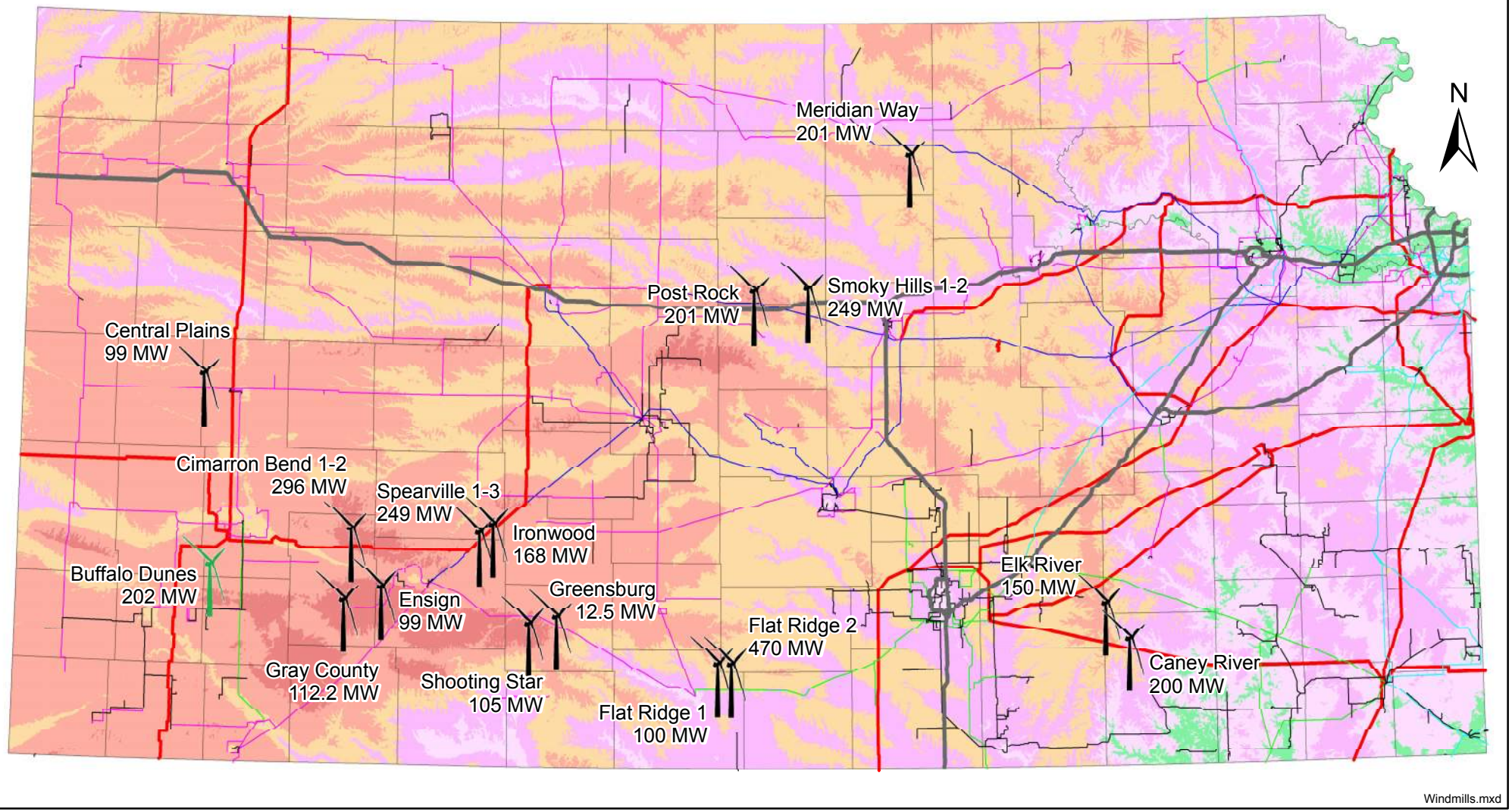
N

Legend

Food Storage

County Boundary

Kansas Wind Resources 2,712 MW Total



Existing

Under Construction

Transmission Lines

345 KV
230 KV
161 KV
138 KV
115 KV
69 KV

Roads

Interstate

Wind Speed at 100 m

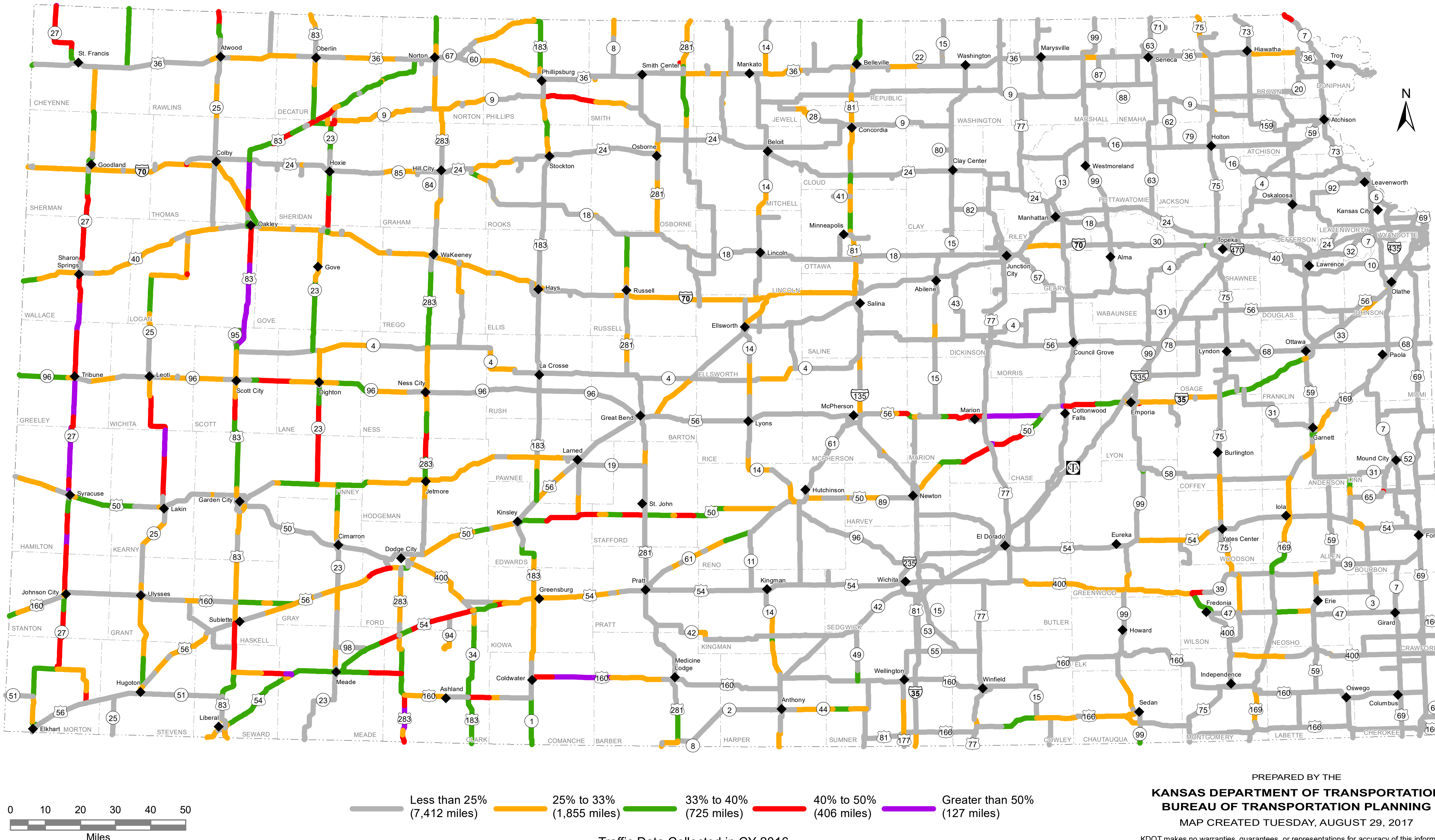
4.0 - 5.5	7.5 - 8
5.5 - 6	8.0 - 8.5
6.0 - 6.5	8.5 - 9
6.5 - 7	9.0 - 9.5
7.0 - 7.5	9.5 - 12

Wind speed at 100 meters data layer was created by AWS Truewind using the MesoMap system and historical weather data.
July 2008

Kansas Corporation Commission
Information Technology
February 20, 2013

Appendix B: Percent Truck Traffic and Interstate Bottlenecks

2016 Percent Truck Traffic
FHWA Class 8 and Above



Less than 25% (7,412 miles)

25% to 33% (1,855 miles)

33% to 40% (725 miles)

40% to 50% (406 miles)

Greater than 50% (127 miles)

Traffic Data Collected in CY 2016

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BUREAU OF TRANSPORTATION PLANNING

MAP CREATED TUESDAY, AUGUST 29, 2017

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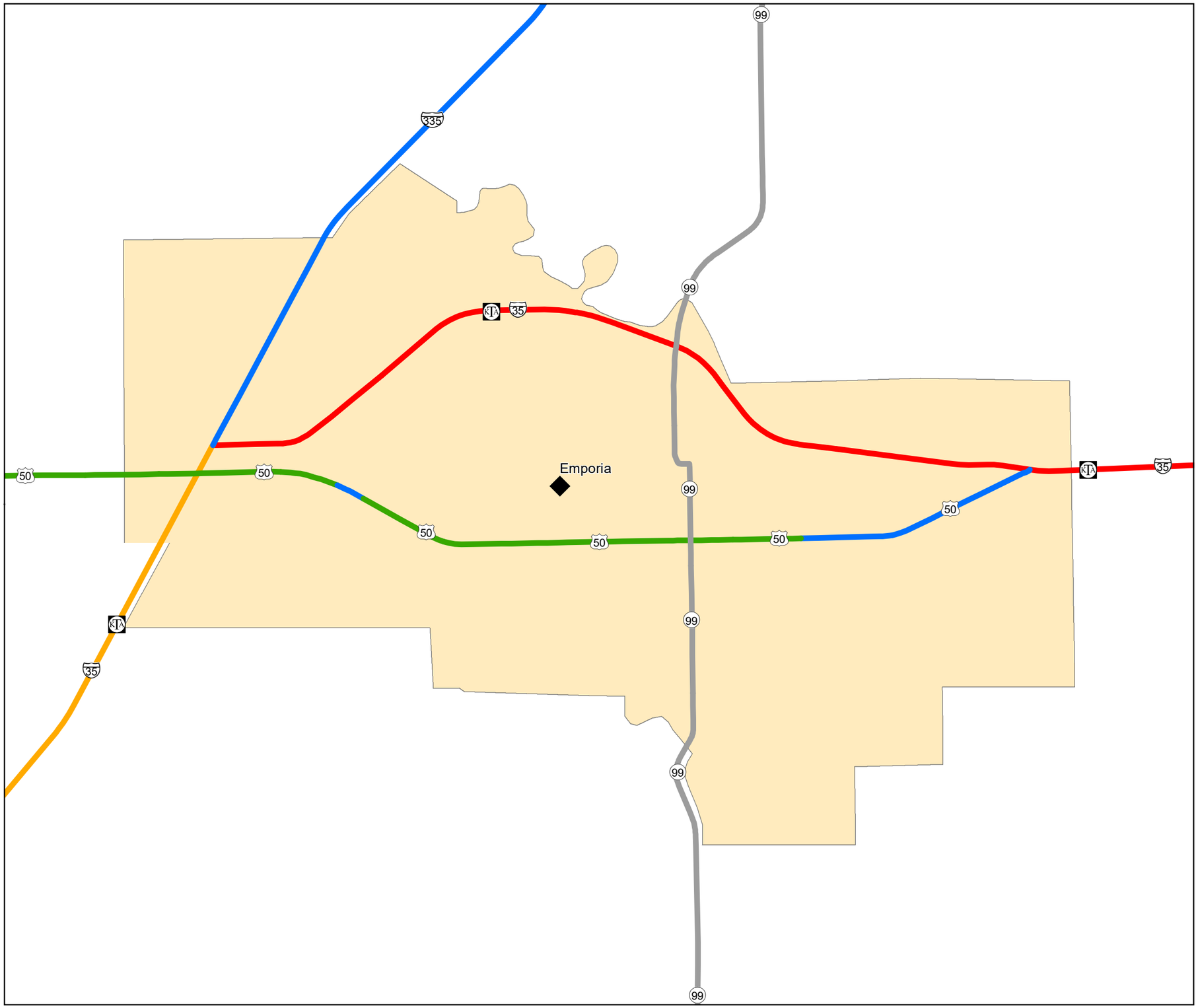

2016
Multi Truck ADT

Multi Truck = Class 8 and above
Traffic Data Collected in CY 2016

Emporia
Urban Area

- Less than 1,000
- 1,000 to 2,000
- 2,000 to 3,000
- 3,000 to 4,000
- Greater than 4,000

N

0 0.2 0.4 0.6 0.8 1
Miles

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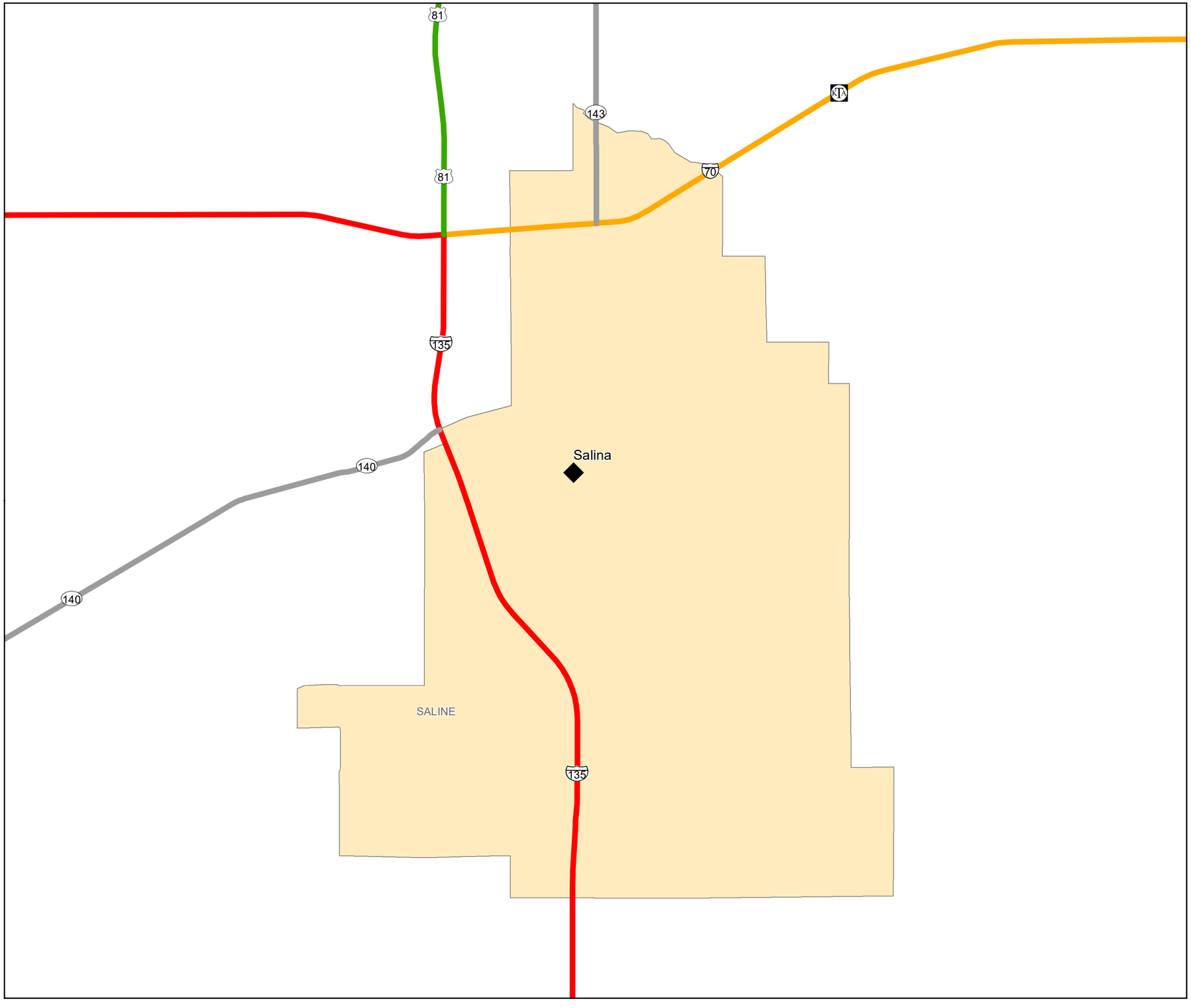

2016
Multi Truck ADT

Multi Truck = Class 8 and above
Traffic Data Collected in CY 2016

Salina
Urban Area

- Less than 1,000
- 1,000 to 2,000
- 2,000 to 3,000
- 3,000 to 4,000
- Greater than 4,000

N

0 0.4 0.8 1.2 1.6 2
Miles

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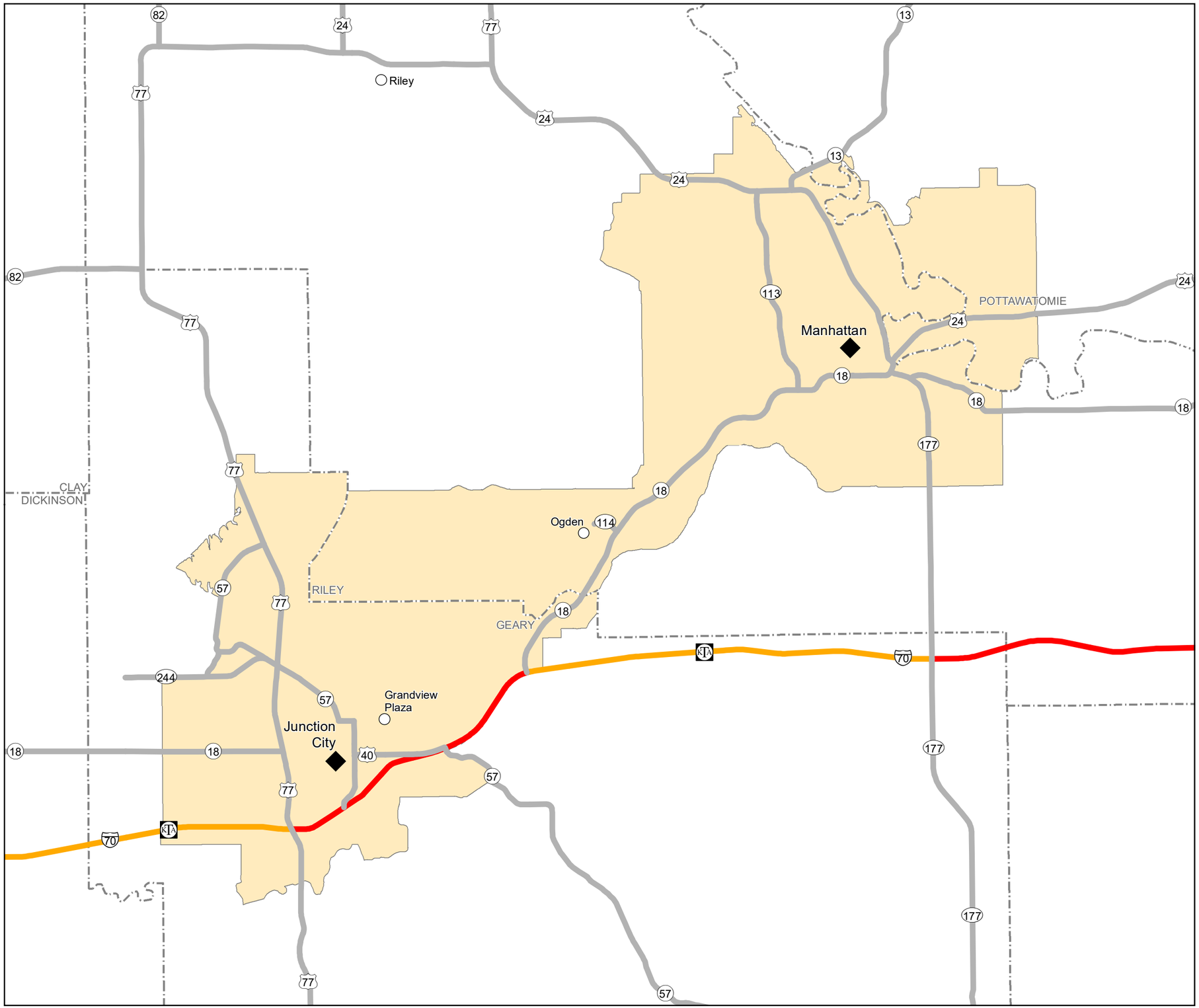

2016
Multi Truck ADT

Multi Truck = Class 8 and above
Traffic Data Collected in CY 2016

FHMPO - Manhattan

- Less than 1,000
- 1,000 to 2,000
- 2,000 to 3,000
- 3,000 to 4,000
- Greater than 4,000

N

0 0.9 1.8 2.7 3.6 4.5
Miles

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MAP CREATED TUESDAY, AUGUST 29, 2017

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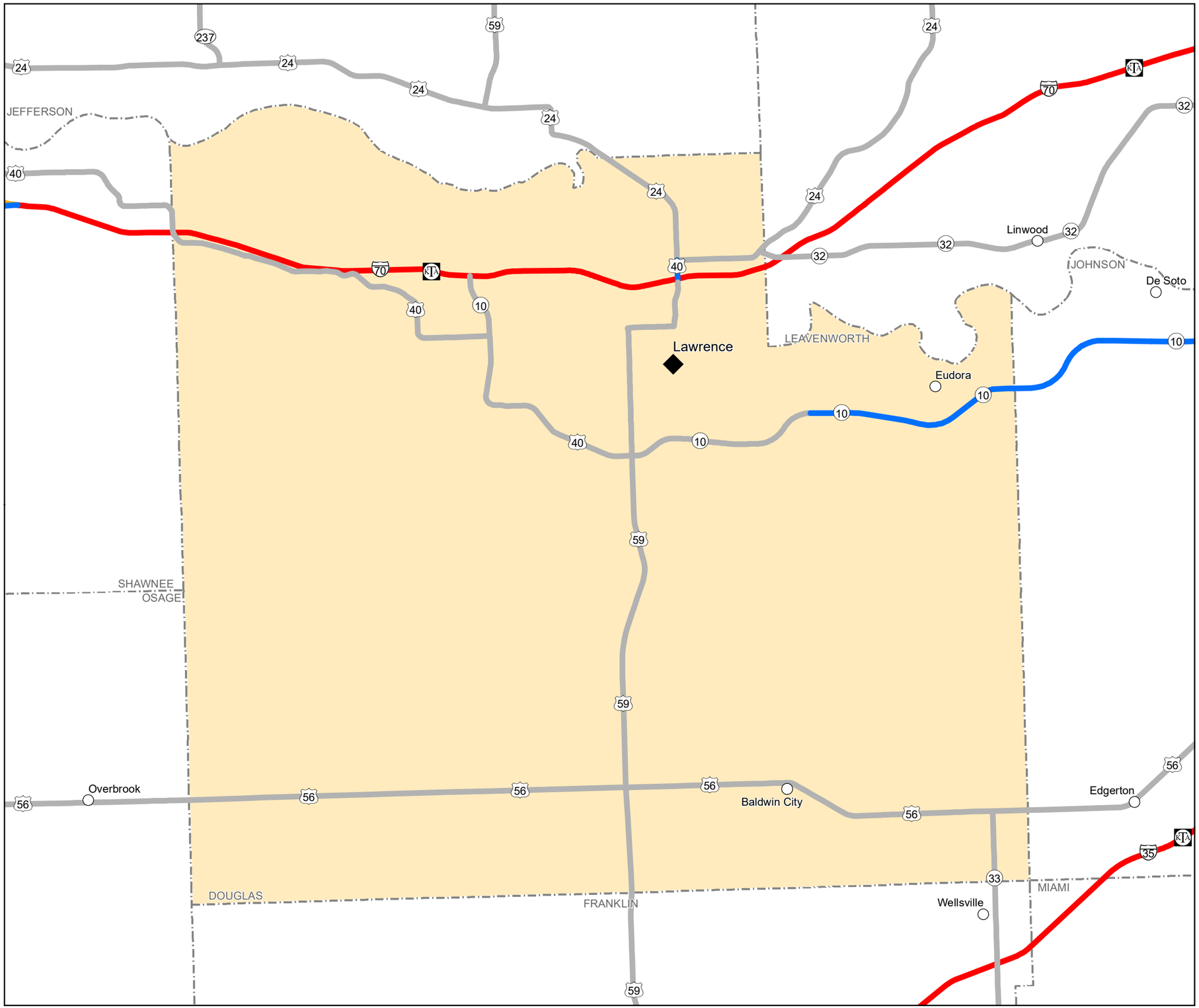

2016
Multi Truck ADT

Multi Truck = Class 8 and above
Traffic Data Collected in CY 2016

L-DC MPO - Lawrence

- Less than 1,000
- 1,000 to 2,000
- 2,000 to 3,000
- 3,000 to 4,000
- Greater than 4,000

N

0 1 2 3 4 5
Miles

PREPARED BY THE
KANSAS DEPARTMENT OF TRANSPORTATION
BUREAU OF TRANSPORTATION PLANNING
MAP CREATED TUESDAY, AUGUST 29, 2017

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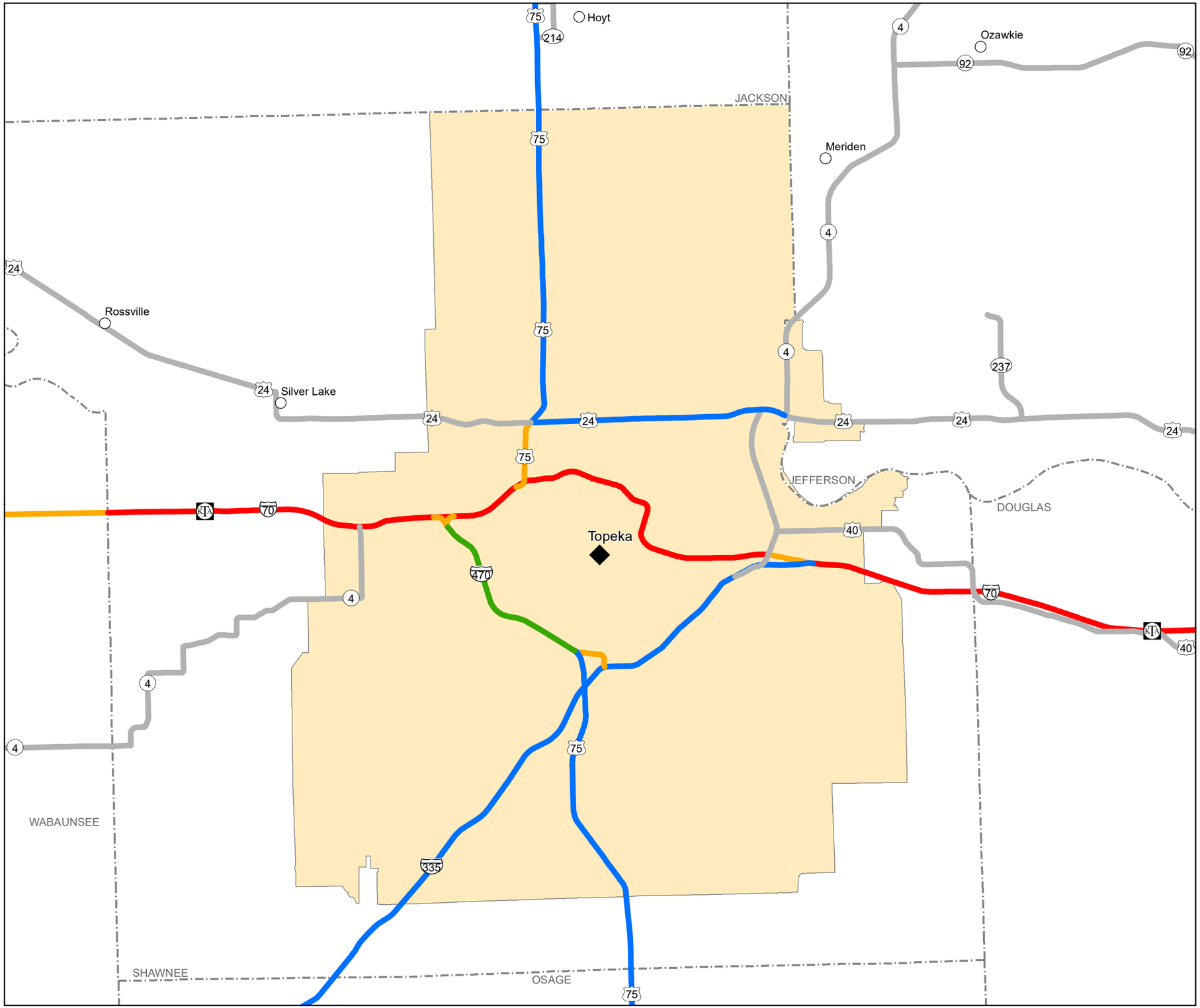

2016
Multi Truck ADT

Multi Truck = Class 8 and above
Traffic Data Collected in CY 2016

MTPO - Topeka

- Less than 1,000
- 1,000 to 2,000
- 2,000 to 3,000
- 3,000 to 4,000
- Greater than 4,000

N

0 1 2 3 4 5
Miles

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MAP CREATED TUESDAY, AUGUST 29, 2017

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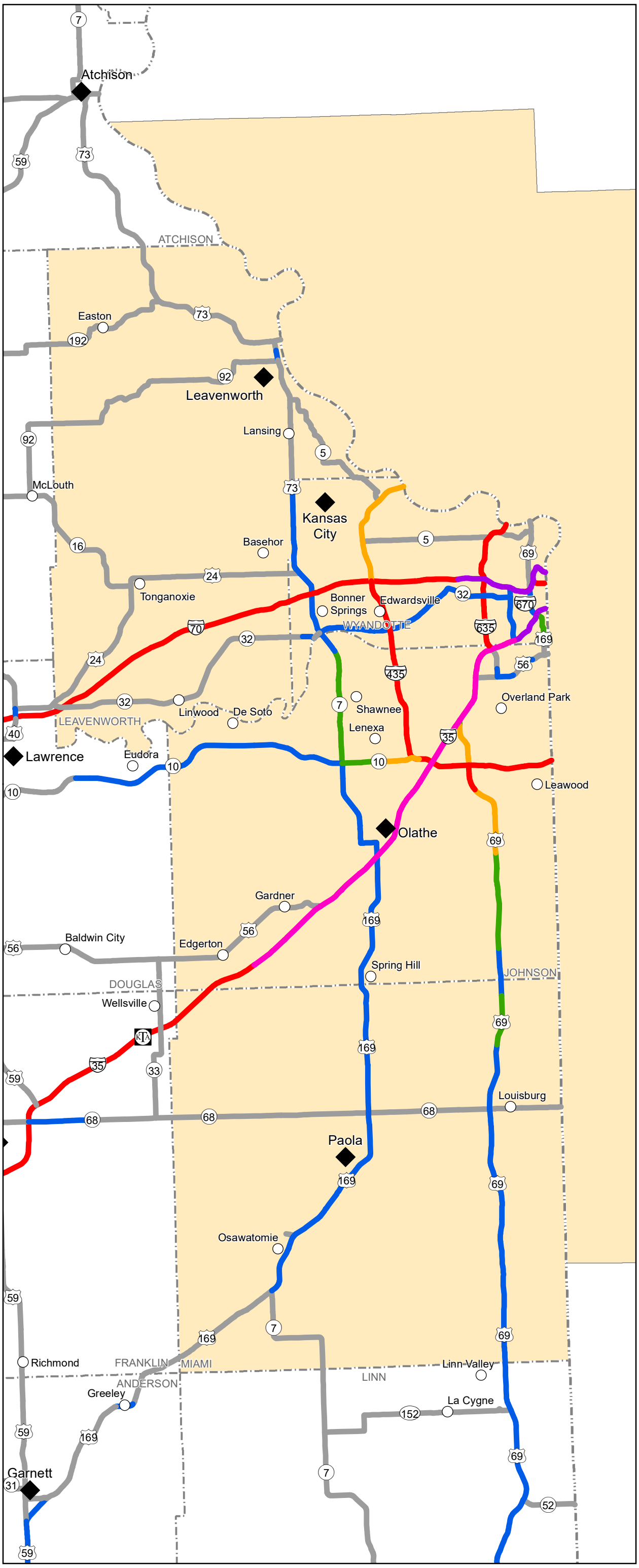

2016
Multi Truck ADT

Multi Truck = Class 8 and above
Traffic Data Collected in CY 2016

MARC - Kansas City

- Less than 1,000
- 1,000 to 2,000
- 2,000 to 3,000
- 3,000 to 4,000
- 4,000 to 7,500
- 7,500 to 10,000
- Greater than 10,000

N

0 2 4 6 8 10
Miles

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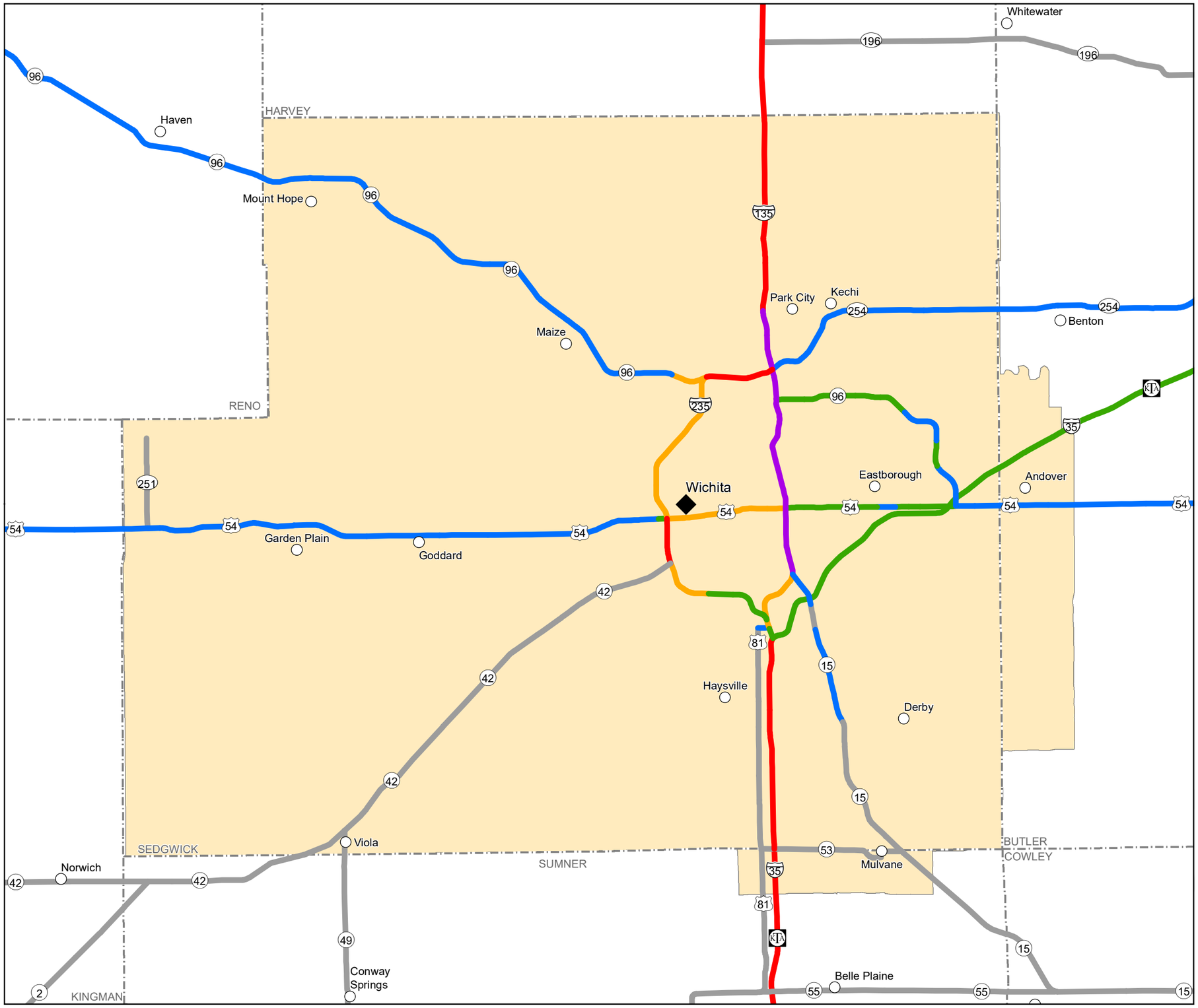

2016
Multi Truck ADT

Multi Truck = Class 8 and above
Traffic Data Collected in CY 2016

WAMPO - Wichita

- Less than 1,000
- 1,000 to 2,000
- 2,000 to 3,000
- 3,000 to 4,000
- 4,000 to 5,000
- Greater than 5,000

N

0 1 2 3 4 5
Miles

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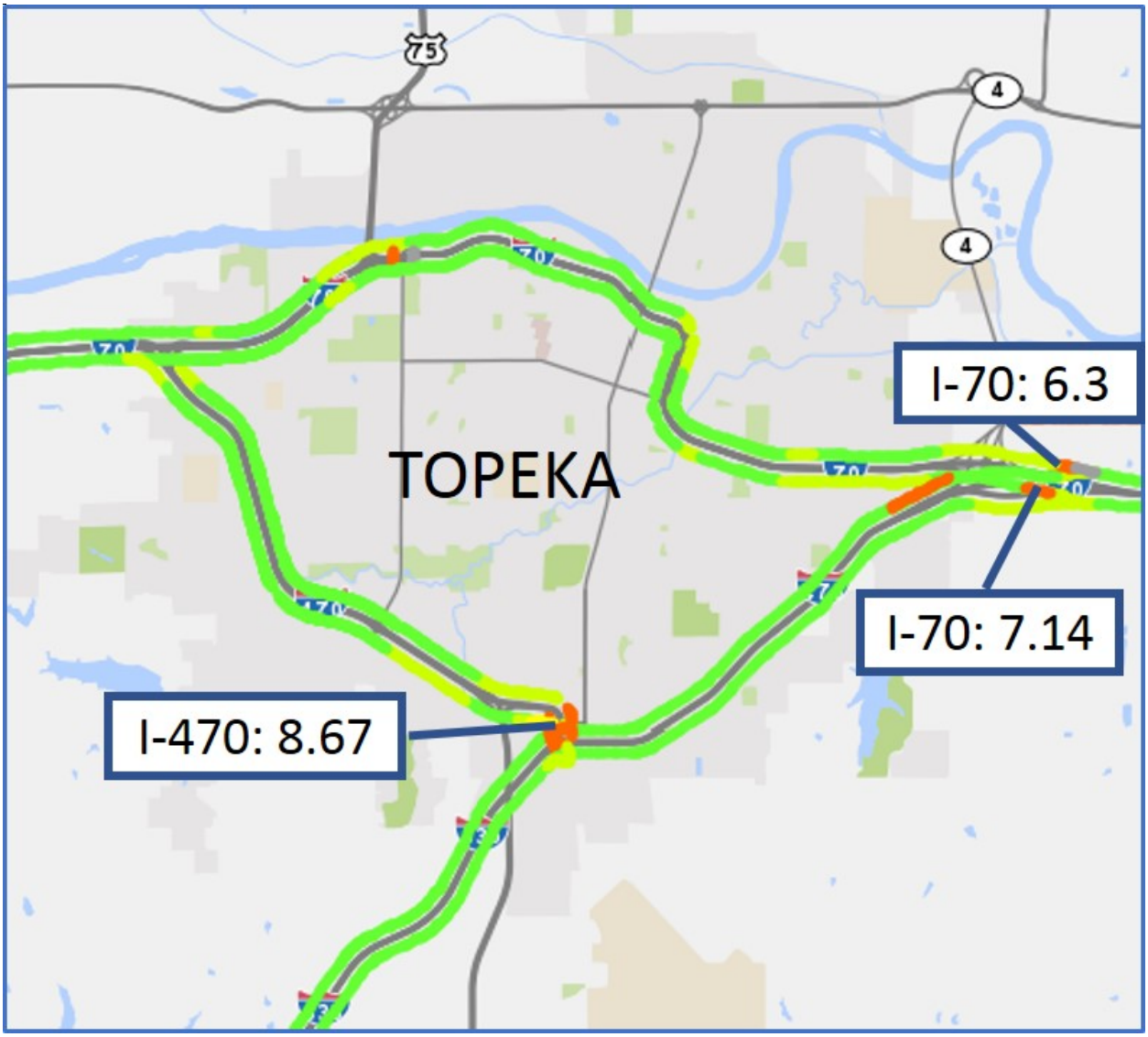
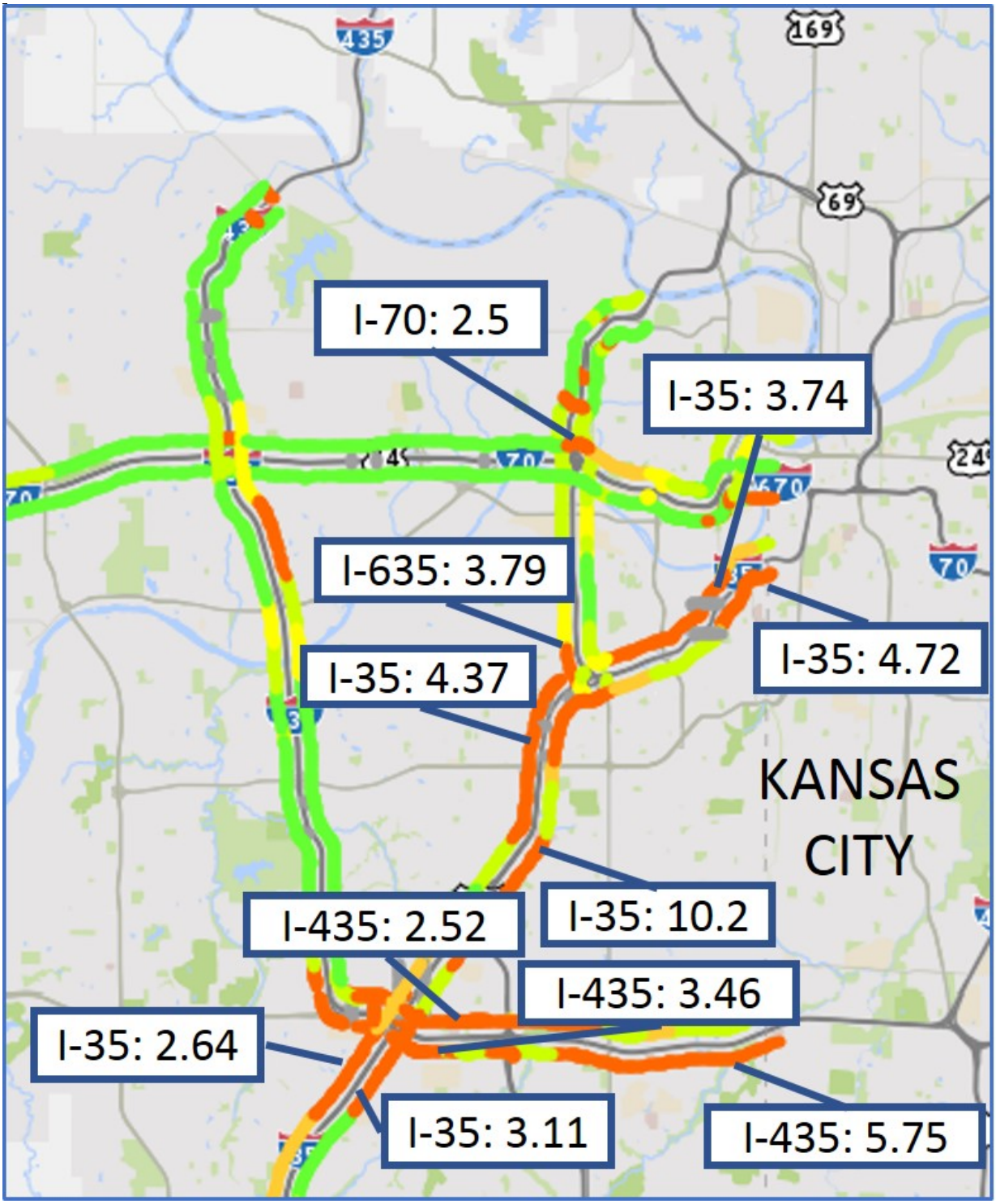
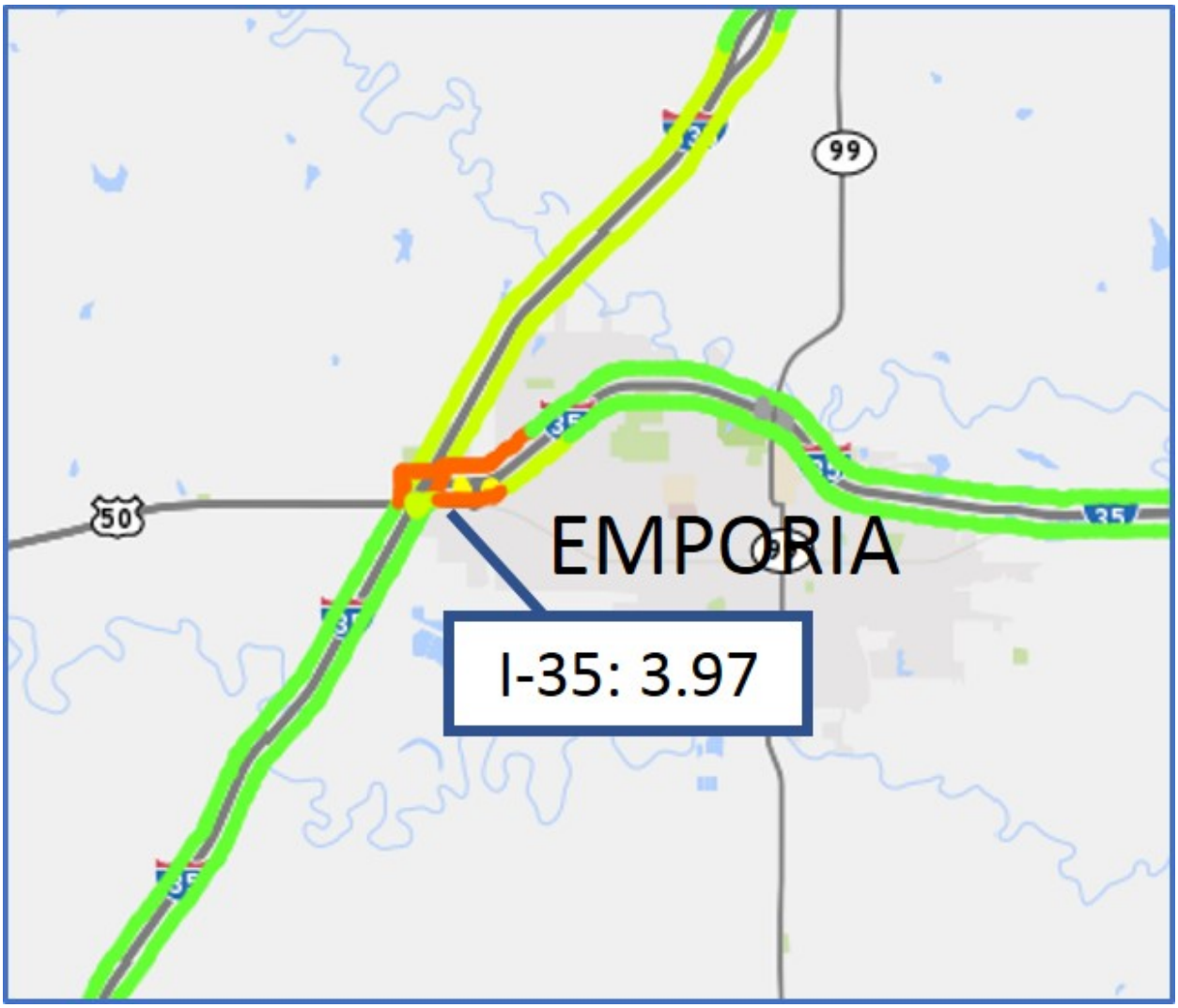
Interstate Bottlenecks Identified with National Performance Management Research Data Set (NPMRDS) information



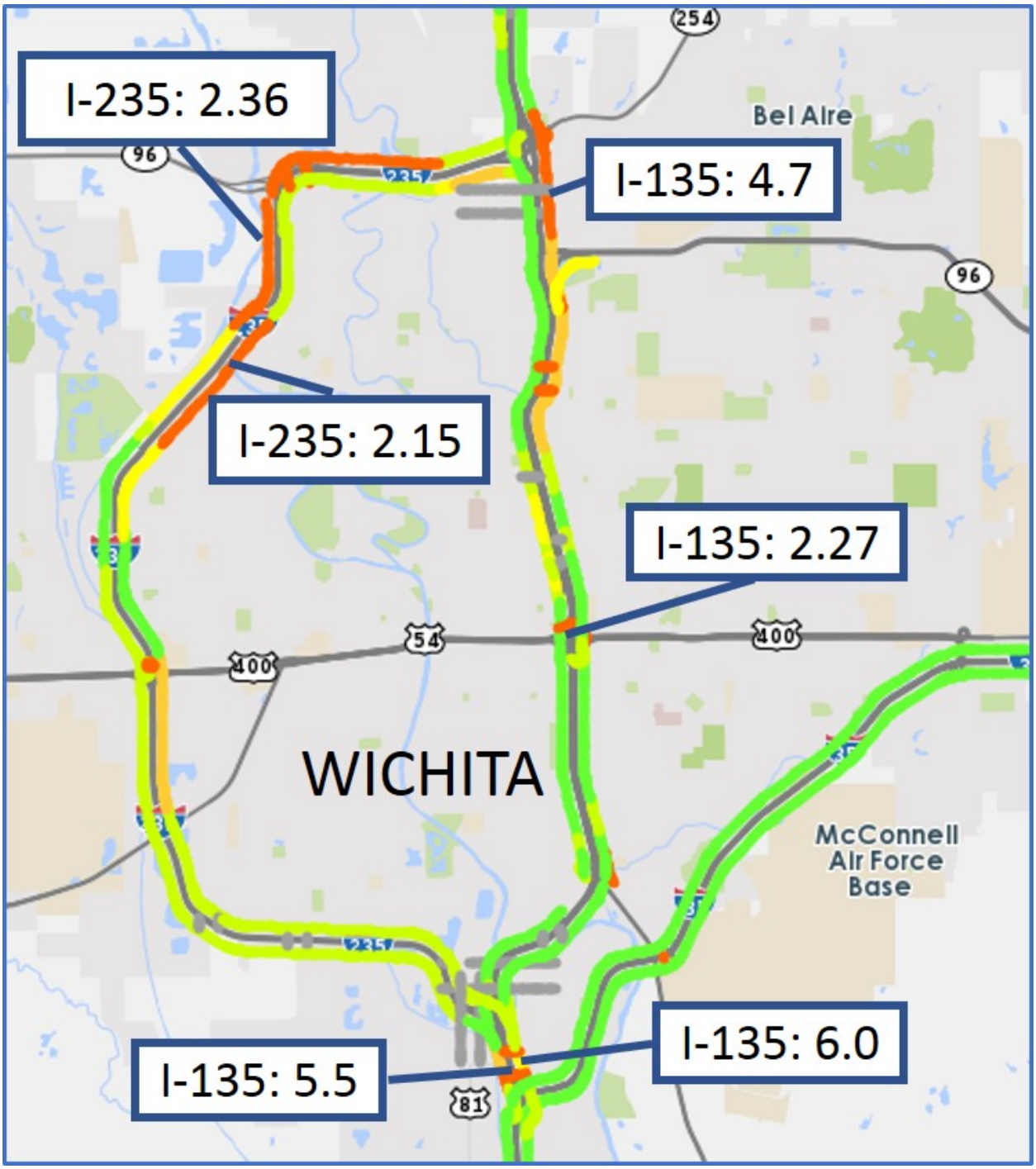
NPMRDS Identified Interstate Congestion in Topeka



NPMRDS Identified Interstate Congestion in Kansas City



NPMRDS Identified Interstate Congestion in Emporia



NPMRDS Identified Interstate Congestion in Wichita

Appendix C: Commodity Flow Analysis

Kansas DOT
Statewide Freight/Rail Plan:
Commodity Flows Analysis

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Executive Summary

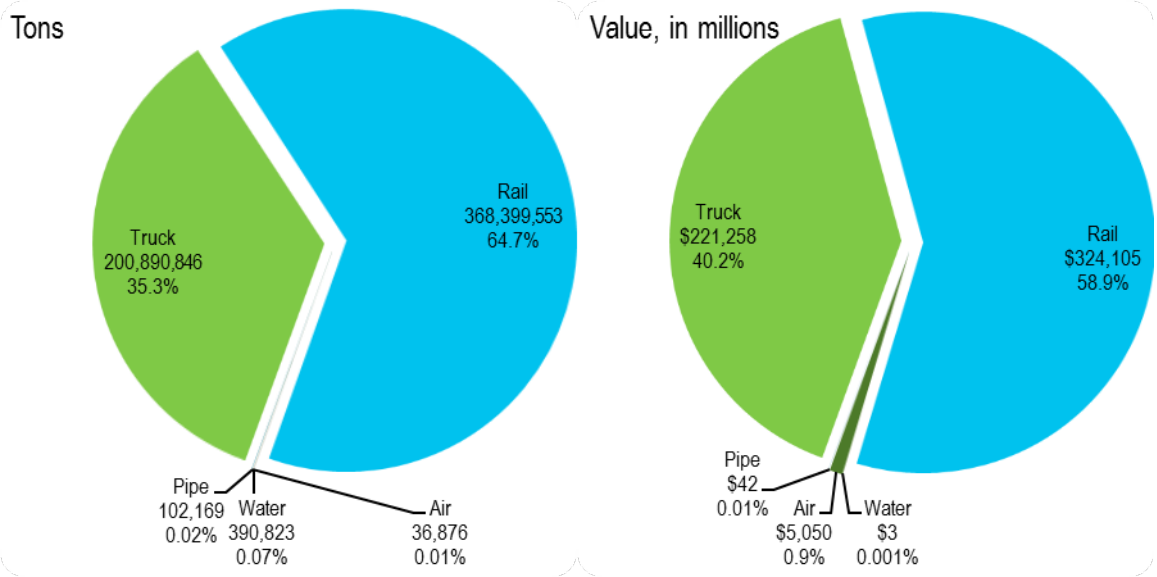
Different analyses perspectives help identify the most important freight movements to Kansas. IHS TRANSEARCH®, STB WAYBILL, and FHWA FAF sources provide Kansas-related freight data by mode, direction, and commodity; by tonnage, units, and value. Each dataset has strengths and weaknesses, and each partially overlaps. Sorting the extensive databases generates different perspectives and observations.

For example, are the most important movements assessed by volume (tons), units (trucks or railcars), shipment value (dollars), commodity type, transport mode, directional movement, or some other factor (e.g., economic relevancy, growth, etc.), or a combination of the abovementioned? As such, the complex multidimensionality precludes a simplified synopsis of all freight dimensions simultaneously, instead necessitating selected partial depictions of the most-salient combinations, with such combinations not exceeding three dimensions at once.

Movement Totals

According to IHS TRANSEARCH® and STB WAYBILL data, almost 570 million tons of freight traversed the Kansas transportation infrastructure network in 2014, valued at over $550 billion (in 2014-dollar values)[1]. Rail and truck carry the significant majority of both tonnage (99.9%) and value (99.1%), as per Figure 1, with the other three modes (air, pipeline, and water) contributing to the remaining sliver.

Figure 1: Total Tons and Value by Mode, 2014



Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

[1] In comparison, the United States' Gross Domestic Product (GDP) in 2014 amounted to $17.2 trillion (Bureau of Economic Analysis); as such, the $550 billion freight value represents about 3.2%.

- *Rail* –largest: 368.4 million tons (64.7% of total) and $324.1 billion (58.9%).
- *Truck* – second largest: 200.9 million tons (35.3%) and $221.3 billion (40.2%).
- Air – third by value: $5.1 billion (0.9%), but small volumes (<0.01%)
- *Water/Pipeline* – relatively insignificant volumes and value compared to other modes

Disaggregation of the movements by direction reveals nuances. Through tonnage dominates directional movements, due almost entirely to rail. Tonnage and value data are tabulated by mode and direction in Table 1, and summarized below:

- *Outbound* – 77.0 million tons from Kansas to out-of-state destinations represent 13.5% of directional volumes, with trucking as the dominate mode (54.7 million, 71.0%), followed by rail (21.9 million, 28.5%). Outbound value is $80.7 billion, for 14.7% of directions.

- *Inbound* – 70.4 million tons from out-of-state destined to Kansas (12.3% of directions) are mostly truck (46.8 million, 66.5%) and rail (23.5 million, 33.5%). Inbound tonnage is valued at $68.0 billion, for 12.4% of directional value.

- *Intrastate* – At 58.1 million tons (10.2% of directions) and valued at $56.2 billion (10.2%), intrastate tonnage movements are the smallest proportion of directional movements. As with inbound and outbound directions, the intrastate movements are comprised mostly of truck (99.0% for tonnage and 98.3% for value).

- *Through* – A total of 364.3 million tons of through movements valued at $345.5 billion, mostly via rail (88.5% for tonnage, and 80.9% for value), comprise the largest relative share of the directional movements (63.9% of volumes and 62.8% of values), highlighting Kansas' role as "bridge" state for long-haul goods.

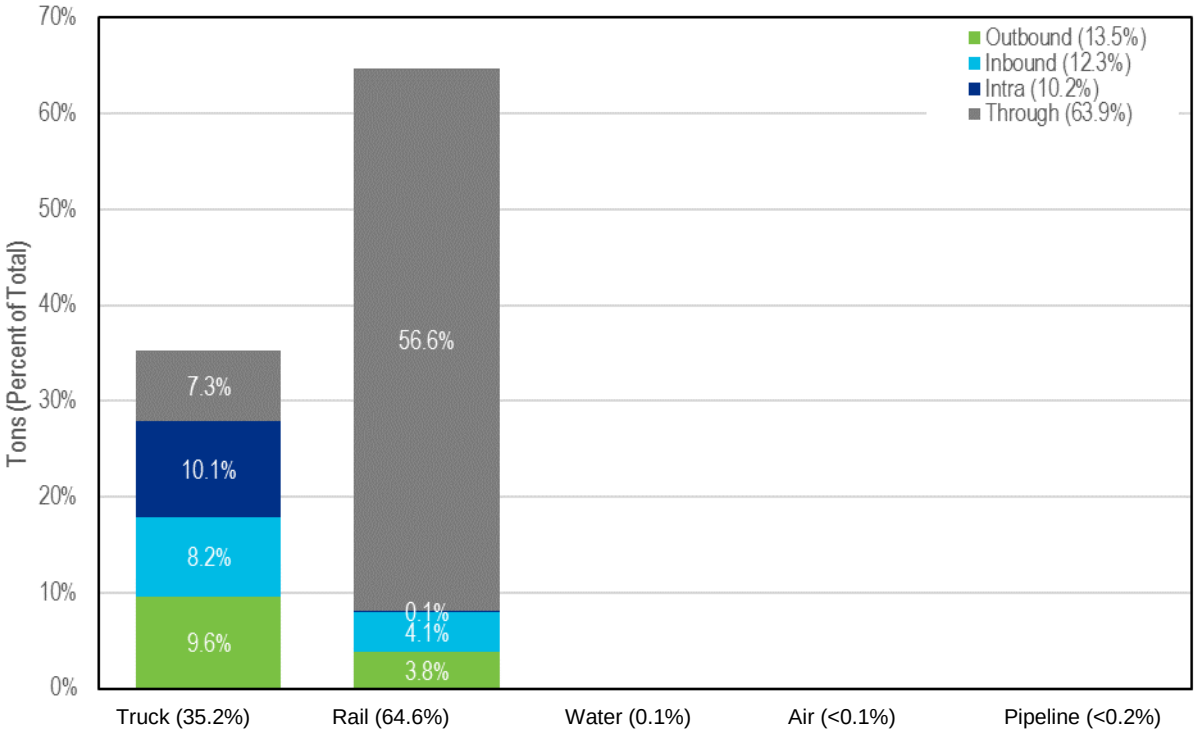
Table 1: Tons and Value by Mode and Direction, 2014

Direction	Truck	Rail	Water	Air	Pipe	Total
Tons						
Outbound	54,660,822	21,919,113	390,823	17,660	34,450	77,022,868
Inbound	46,808,700	23,543,312	#N/A	18,756	#N/A	70,370,768
Intra	57,569,853	489,604	#N/A	460	67,720	58,127,637
Through	41,851,471	322,447,524	#N/A	#N/A	#N/A	364,298,995
Total	200,890,846	368,399,553	390,823	36,876	102,170	569,820,268
Value, in millions						
Outbound	$55,397	$22,622	$3	$2,688	$10	$80,720
Inbound	$44,698	$21,005	#N/A	$2,334	#N/A	$68,037
Intra	$55,258	$901	#N/A	$28	$31	$56,218
Through	$65,905	$279,577	#N/A	#N/A	#N/A	$345,482
Total	$221,258	$324,105	$3	$5,050	$41	$550,457

Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

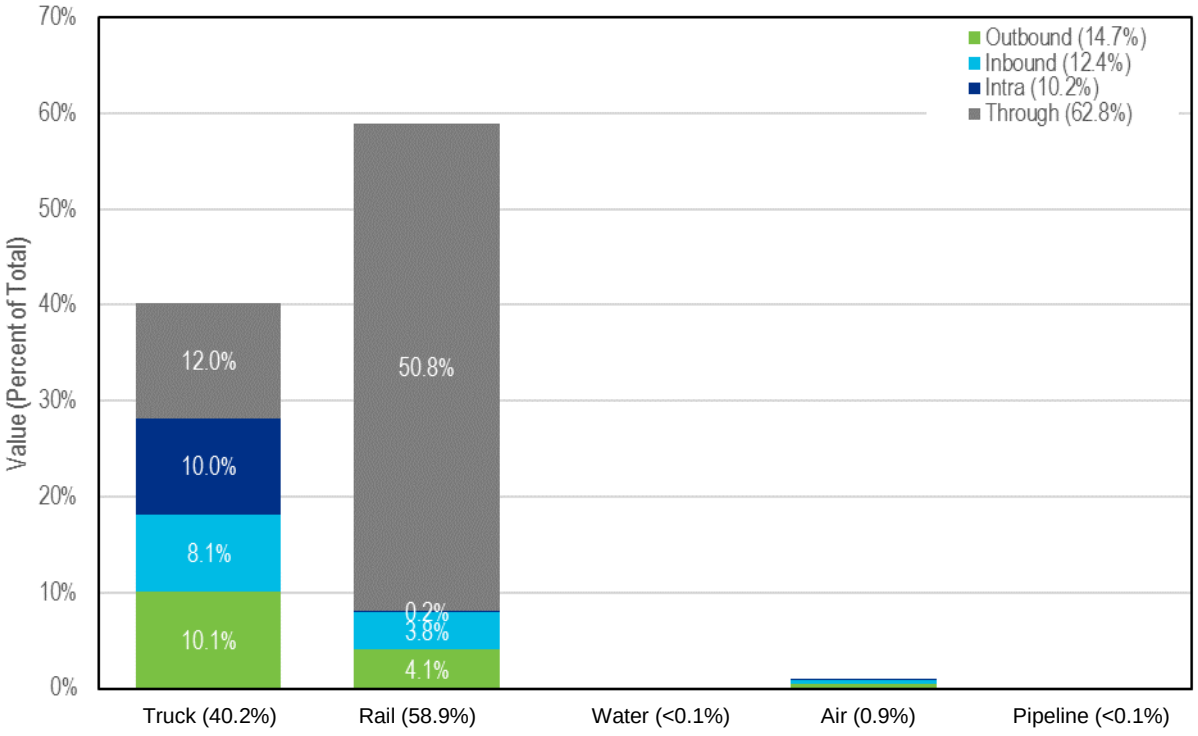
Relative modal and directional shares of total tonnage movements are depicted in Figure 2, and by total value in Figure 3, which clearly indicate that through-based rail movements comprise over half of all freight in Kansas (56.6% of total tonnage and 50.8% of total value). This reinforces the perspective of Kansas' bridge-state for long-haul low value/ton goods.

Figure 2: Tonnage Share by Mode and Direction, 2014



Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Figure 3: Value Share by Mode and Direction, 2014



Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Perspective

Directional movement, commodity tonnage, and commodity value help illustrate the importance of freight movements to Kansas from different perspectives.

Directional Movement – Directional freight movements affect Kansas differently. Inbound commodities from out-of-state comprise two basic types: final goods and intermediate production materials (inputs). Final goods typically go directly to consumers or to retail outlets, while inbound materials are used in Kansas manufacturing or other value-added processes. Similarly, outbound commodities from Kansas to other states also represent the result of value-added Kansas production. Additionally, intrastate Kansas movements represent both value-added Kansas production and/or final product consumption. However, freight movements through Kansas generate little, if any, economic value to the State (i.e., transport service only). Nonetheless, the magnitude of through state rail volumes is important in a freight plan, given the effect on modal infrastructure capacity.

Commodity Tonnage and Value – While important to understand tonnage movements, such observations do not unilaterally address the importance of freight movements to Kansas (other considerations matter such as value, direction, mode, etc.). Top commodity tonnages (via all modes and directions, combined) are led by Coal (181.0 million, 31.8%), followed by Farm Products (81.2 million, 14.3%), and Nonmetallic Minerals (64.2 million, 11.3%); see Table 2. Comparatively, the top commodity value movements (via all modes and directions, combined) are led by Chemicals or Allied Products ($128.2 billion, 23.3%), followed by Transportation Equipment ($92.2 billion, 16.8%), and Secondary Traffic ($66.2 billion, 12.0%), see Table 3.

Table 2: Top Commodities by Tonnage, 2014

STCC2	Commodity	Tons (in thousands)	
		Amount	Percent
11	Coal	181,039	31.8%
01	Farm Prods.	81,241	14.3%
14	Nonmetallic Minerals	64,150	11.3%
20	Food or Kindred Prods.	50,121	8.8%
28	Chemicals or Allied Prods.	40,503	7.1%
46	Misc. Mixed Shipments	34,348	6.0%
29	Petroleum or Coal Prods.	25,361	4.5%
50	Secondary Traffic	22,496	3.9%
32	Clay, Concrete, Glass, or Stone	15,315	2.7%
37	Transportation Equipment	8,275	1.5%
	Remaining Commodities	46,969	8.2%
	Total	569,818	100.0%

Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Table 3: Top Commodities by Value, 2014

STCC2	Commodity	Value (in millions)	
		Amount	Percent
28	Chemicals or Allied Prods.	$128,150	23.3%
37	Transportation Equipment	$92,234	16.8%
50	Secondary Traffic	$66,157	12.0%
20	Food or Kindred Prods.	$44,411	8.1%
01	Farm Prods.	$33,143	6.0%
46	Misc. Mixed Shipments	$29,490	5.4%
29	Petroleum or Coal Prods.	$22,647	4.1%
35	Machinery	$18,212	3.3%
33	Primary Metal Prods.	$17,360	3.2%
11	Coal	$15,844	2.9%
	Remaining Commodities	$82,809	15.0%
	Total	$550,457	100.0%

Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Commodity Tons by Mode – Figure 4 illustrates modal differences by commodity tonnage. Rail leads all major commodity ton movements, with a dominant proportion attributable to a single commodity: Coal. No other single mode-commodity combination is as close to the relative dominance of Coal tonnage; however, truck-bound Farm Products and Nonmetallic Minerals are relatively larger than the remaining mode-commodities.

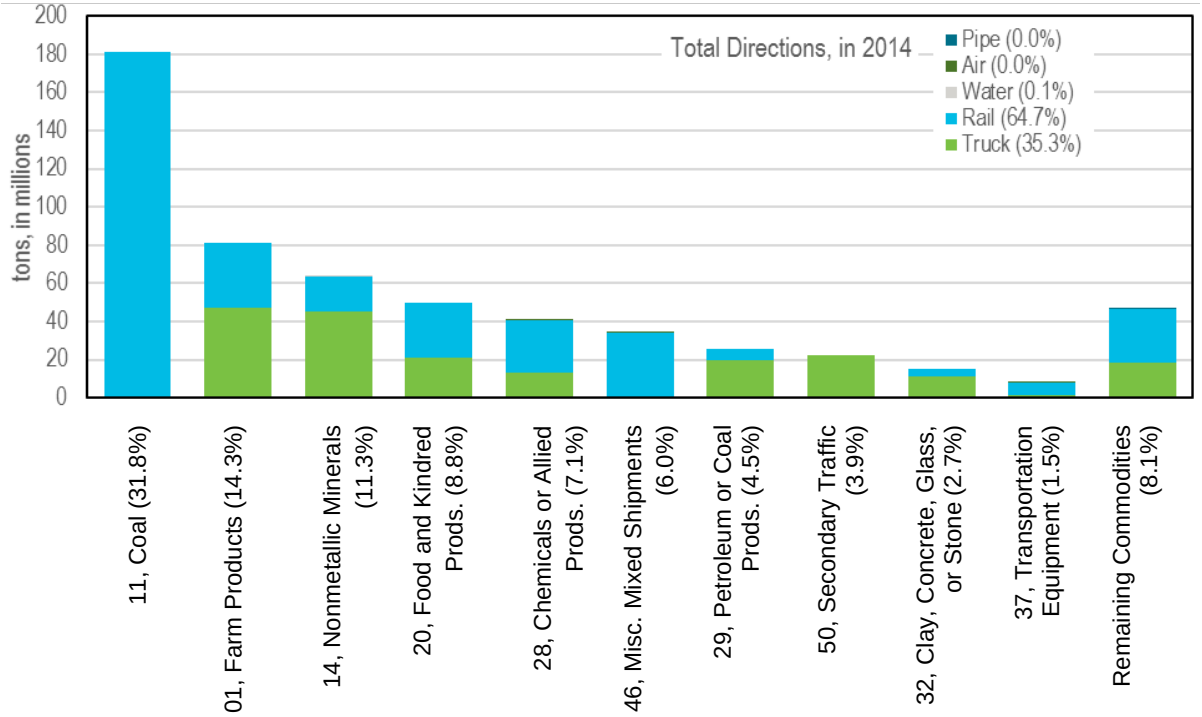
Commodity Value by Mode – Figure 5 shows modal differences by commodity value. A similar pattern is observed in terms of modal concentration (rail then truck dominating); however, the commodity mix is drastically different due to the varying values/ton for certain commodities. In effect, the tonnage that dominates the freight movements are mostly low valued goods (per weight); as such, those commodities (e.g., Coal, Farm Products, and Nonmetallic Minerals) do not tend to represent large portions of the value of the freight moved. Instead, the major commodities by value are relatively higher values per ton, such as Chemical or Allied Products, Transportation Equipment, Secondary Traffic (repositioning), etc.

Forecast

Unfortunately, the available IHS Transearch® database to KSDOT does not include forecasts, and an alternative source, the Federal Highway Administration Freight Analysis Framework (FHWA FAF v4.1) was culled to address general forecast trends in freight. By 2040, FHWA FAF forecasts an increase in tonnage related to outbound, inbound, and intrastate movements combined[2] by 30.5% (1.0% annually) from the 2014 base. In value terms, the forecast for such Kansas-related freight movements amounts to an 49.8% increase (1.6% annually). Compositionally, the directional movements and modal composition is slated to remain relatively constant.

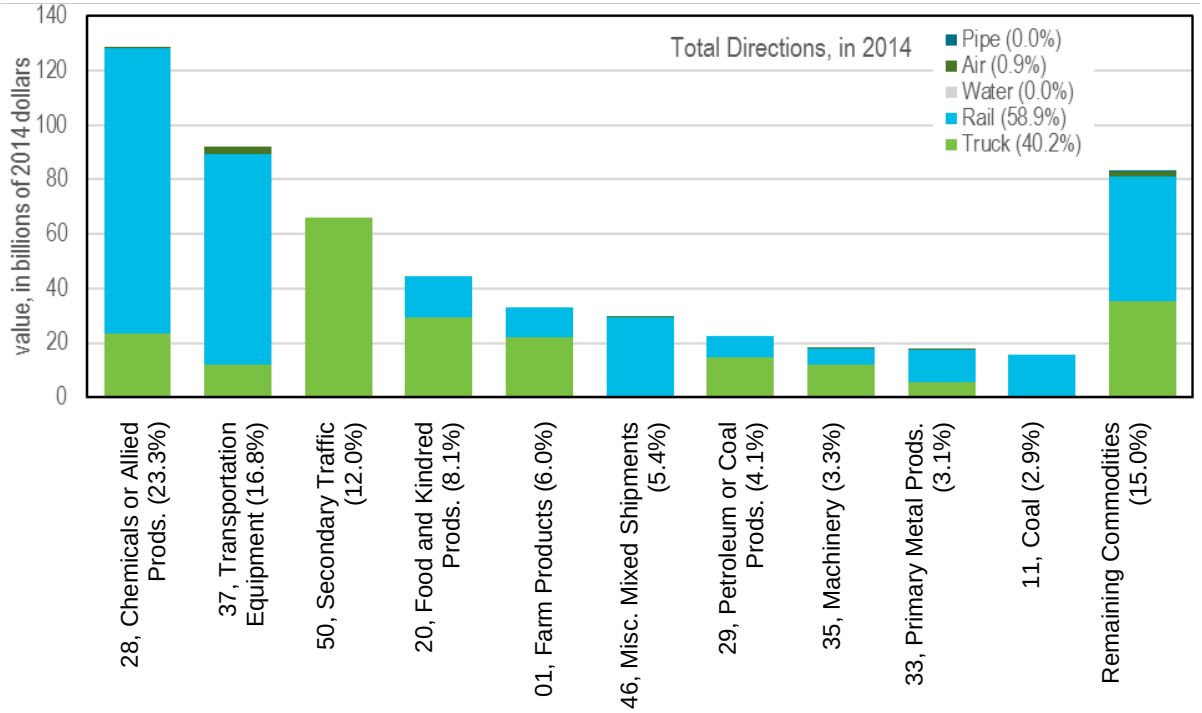
[2] through movements are unavailable from the FHWA FAF v4.1

Figure 4: Top Commodities by Tonnage and Mode, 2014



Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Figure 5: Top Commodities by Value and Mode, 2014



Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

1 Introduction

Millions of tons and billions of dollars' worth of freight traverses Kansas' multimodal freight infrastructure annually. Such freight includes finished goods, materials, and supplies. Central issues concerning freight are identifying the movements most important to Kansas, and identifying options to facilitate/support them. Identifying the importance of, and solutions for, freight comprises several perspectives: volumes (especially compared to capacity), values (especially related to the State economy), and public perception.

In this paper, freight volume (tons), units (trucks or railcars), shipment value (dollars), as reported in the IHS TRANSEARCH®, STB WAYBILL, and FHWA FAF databases, are summarized using tables and charts to simplify understanding. Structurally, the report is as follows:

- Section 1 overviews the commodity reporting conventions and data sources;
- Section 2 summarizes year 2014 volumes, units, and value by mode (truck, rail, port/water, air, and pipeline) and direction (outbound, inbound, intrastate, and through) from the IHS TRANSEARCH® and STB WAYBILL sources;
- Section 3 summarizes growth rate forecasts (2014 to 2040) via the FHWA FAF database;
- Section 4 concludes; and,
- Section 5 is an Appendix with various freight data tables used in the analysis.

1.1 Commodity Reporting Conventions

Three data sources are used to evaluate the various freight flows, which use two different commodity reporting conventions.

Standard Transportation Commodity Code (STCC) – A STCC is a seven-digit numeric code, categorized by 40 commodity groupings, based on a publication specifying physical product information used on waybills and other shipping documents and published/maintained by the American Association of Railroads (AAR). North American Freight Railroads, the Railroad Waybill, the Commodity Flow Survey (CFS), and TRANSEARCH® adopt the STCC coding system. A hierarchical STCC structure allows data collapsibility, enabling summarization of commodity information at various levels (i.e., '01' represents 'Farm Products', '011' identifies 'Field Crops,' '0112' indicates 'Raw Cotton', etc., narrowing in specificity to a seven-digit level). Freight movements are tallied herein at the two-digit aggregated level.

Standard Classification of Transported Goods (SCTG) - The USDOT, US Census Bureau, Statistics Canada, and Transport Canada developed the SCTG to replace the STCC for the 1997 and subsequent Commodity Flow Surveys (CFS). It is a four-tiered hierarchical code (i.e., 2- to 5-digits) similar to the STCC; however, the commodity groupings do not all easily concord with the STCC hierarchy. The 4-digit level SCTG categories reflect industry patterns and transportation characteristics, which can be closely associated with the North American Industry Classification System (NAICS). However, due to data confidentiality, insignificant sample size,

or reliability issues, the 4- and 5-digit SCTG are generally unpublished. FHWA FAF data subscribes to the SCTG commodity structure.

1.2 Data Sources

TRANSEARCH® and the STB WAYBILL both use the STCC reporting convention while the FHWA FAF uses the SCTG. These and other data sources are detailed and contrasted.

TRANSEARCH® – Developed by IHS Global Insight, TRANSEARCH® is an extensive database of North American freight flows, compiled from more than a hundred industry, commodity, and proprietary data exchange sources. TRANSEARCH® combines primary shipment data obtained from some of the nation's largest rail and truck freight carriers with information from public, commercial, and proprietary sources to generate a base year estimate of freight flows at the county level. Further, TRANSEARCH® establishes market-specific production tonnages by industry or commodity, drawn mostly from IHS Global Insight's Business Markets Insights (BMI) database, and supplemented by trade association and industry reports, and United States government-collected data. TRANSEARCH® provides data for NATFA-related trade and excludes international freight traffic from countries other than Canada and Mexico.

However, the comprehensiveness of TRANSEARCH® varies. Originally built for private sector truck and rail users, other modal movement data subsequently added lacks the extensiveness found in other sources. This is because the truck and rail data focus on movements across North America – specifically the NAFTA countries of the United States, Canada, and Mexico. As such, water movements to/from Asia, the Middle East, Europe, South America, etc. are not included. Similarly, non-NAFTA air movements, as well as many other small volume air movements, are not included. Lastly, pipeline movements are perhaps the most under-represented modal movements in TRANSEARCH® due to insufficient U.S. federal reporting requirements and insufficient private sector pipeline data-sharing participation. Nonetheless, TRANSEARCH® arguably provides the most comprehensive database of all movements, especially of the two major modes (truck and rail).

KSDOT obtained a truncated version of the standard TRANSEARCH® product, with some limitations. The truncated version excludes: routed STB WAYBILL (e.g., rail) information, detailed STCC commodity breakdown, and forecasts. Such data availability limitations constrained some of the freight analysis detail, and necessitated compiling and incorporating the STB WAYBILL dataset and the FHWA FAF (for forecasting).

STB WAYBILL – Based on STCC codes[3], the STB WAYBILL provides detailed most-recently available year 2014 movement data by commodity for rail. It uses a 2% stratified sample carload waybills for all rail traffic submitted by rail carriers that terminate 4,500 or more revenue carloads annually. It is a more-robust and accurate estimate of rail movements than the IHS

[3] STB WAYBILL designates freight rail movements via two STCC conventions: one includes the 49xxxxx (HAZMAT-related) and 50xxxxx (bulk movements) STCC designations; the alternative translates those HAZMAT- and bulk-related movements into actual product STCC. Summary data herein pertains to the non-HAZMAT/non-bulk STCC convention.

TRANSEARCH®-derived rail; however, the database itself has limitations that the standard IHS TRANSEARCH® incorporates and makes available. The STB WAYBILL includes tons and carload units, but does not associate a value with the cargo. All values pertaining to rail presented herein are derived from applying proxy commodity- and directional-specific value/ton estimates from IHS TRANSEARCH® to the STB Waybill-reported tonnage movements. Forecasts are unavailable from the source and the routing network is proprietary/unavailable.

FHWA FAF v4.1 – Given the absence of forecasts from the truncated TRANSEARCH®, the Federal Highway Administration's Freight Analysis Framework v4.1 database was mined to obtain growth rate forecasts of modal growth. FHWA FAF integrates year 2012 U.S. Census Bureau Commodity Flow Survey (CFS) and additional sources to provide freight movement metrics in terms of tonnage, value, and domestic ton-miles by region of origin and destination, commodity type, and mode for the current year and forecasts in five-year increments. While FAF is not as exhaustive (excludes railcar unit metrics or through state movements; limited commodity detail; no routing, etc.) as the typical TRANSEARCH®, FAF does provide a means by which to assess future tonnage growth. Note that FAF presents data by two-digit SCTG, which differs notably from the STCC.

Other Potential Data Sources – A more comprehensive analysis of all modes requires supplementing the other three modes (water, air, and pipeline). Water is the quickest and easiest to supplement by using the United States Army Corps of Engineers (USACE) Waterborne Commerce Statistics (obtained at no cost via the internet), which includes all tonnage but excludes values. United States Census USA Trade Online provides additional tonnage and value data on goods shipped between the U.S. and foreign countries; such data can supplement both water and air data provided herein by TRANSEARCH®.

2 Current Freight

The following presents year 2014 freight movements by mode (truck, rail, port/water, air, and pipeline), direction (outbound, inbound, intrastate, and through), and term (tons, units[4], and values), as applicable and available from the IHS TRANSEARCH® and STB WAYBILL databases. Each subsection summarizes modal movements by direction and term, and identifies the top two-digit STCC commodity movements. Graphic data presentation facilities visualization of important commodity movements and related observations, with the supporting tabulated comprehensive data located in the Appendix, in Table 18 through Table 38. Structurally, this report compilation and synopsis facilitates independent review of respective modal sections without dependence on preceding or subsequent subsections.

2.1 Truck, 2014

Kansas truck movements in 2014 totaled 200.9 million tons, valued at $221.3 billion, and carried within 17.6 million units (see Table 4). On average, total truck commodity movements are valued at $1,101/ton. Truck movements represent 35.3% of modal tonnage in Kansas and 40.2% of total modal value in 2014, the second largest relative share following rail.

Direction – As depicted in Figure 6, the directional breakdown for truck movements are similarly distributed between outbound, inbound, intrastate, and through traffic. Intrastate volumes and units are the relatively largest direction, at 28.7% and 35.8%, respectively, of the directional truck movements; however, through traffic is the relatively largest directional movement by value, at 29.8%. A higher proportion of value relative to tonnage for the through traffic reflects the higher average value/ton as compared with the other directions.

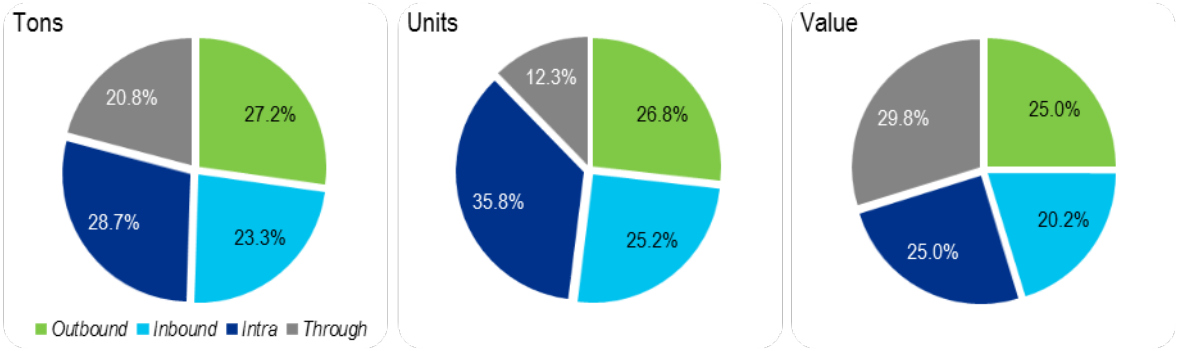
Table 4: Truck by Direction, 2014

Direction	Tons		Units		Value (in millions)		Average
	Amount	Percent	Amount	Percent	Amount	Percent	Value/Ton
Outbound	54,660,822	27.2%	4,708,080	26.8%	$55,397	25.0%	$1,013
Inbound	46,808,700	23.3%	4,425,758	25.2%	$44,698	20.2%	$955
Intra	57,569,853	28.7%	6,288,194	35.8%	$55,258	25.0%	$960
Through	41,851,471	20.8%	2,156,594	12.2%	$65,905	29.8%	$1,575
Total	200,890,846	100.0%	17,578,626	100.0%	$221,258	100.0%	$1,101

Source: prepared by CDM Smith, based on TRANSEARCH for 2014
note totals may not sum due to rounding

[4] units are available and presented only for truck and rail modes

Figure 6: Truck Percentages by Direction, 2014



Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Density – As expected, the major truck freight corridors include the major interstates (I-35, I-70, and I-135), as seen in Figure 7. The densest truck freight routes are along I-35 and I-70, to/from Texas and the West. The map depicts all directions combined; however, for the intrastate movements (28.7% of directional truck tonnage), the IHS TRANSEARCH® database does not allocate *intra-county* movements to the network. As such, a small percentage of the movements are not included in the density map, but the general conclusions and route density relatively would be identical if such data were incorporated.

Commodities – Figure 8, Figure 9, and Figure 10 depict the top two-digit STCC commodities for Kansas truck movements, by tonnage, units, and value, respectively, by direction[5]. Tabular support data is shown in Table 18 through Table 22 (in the Appendix), and is expanded upon in the respective subsections.

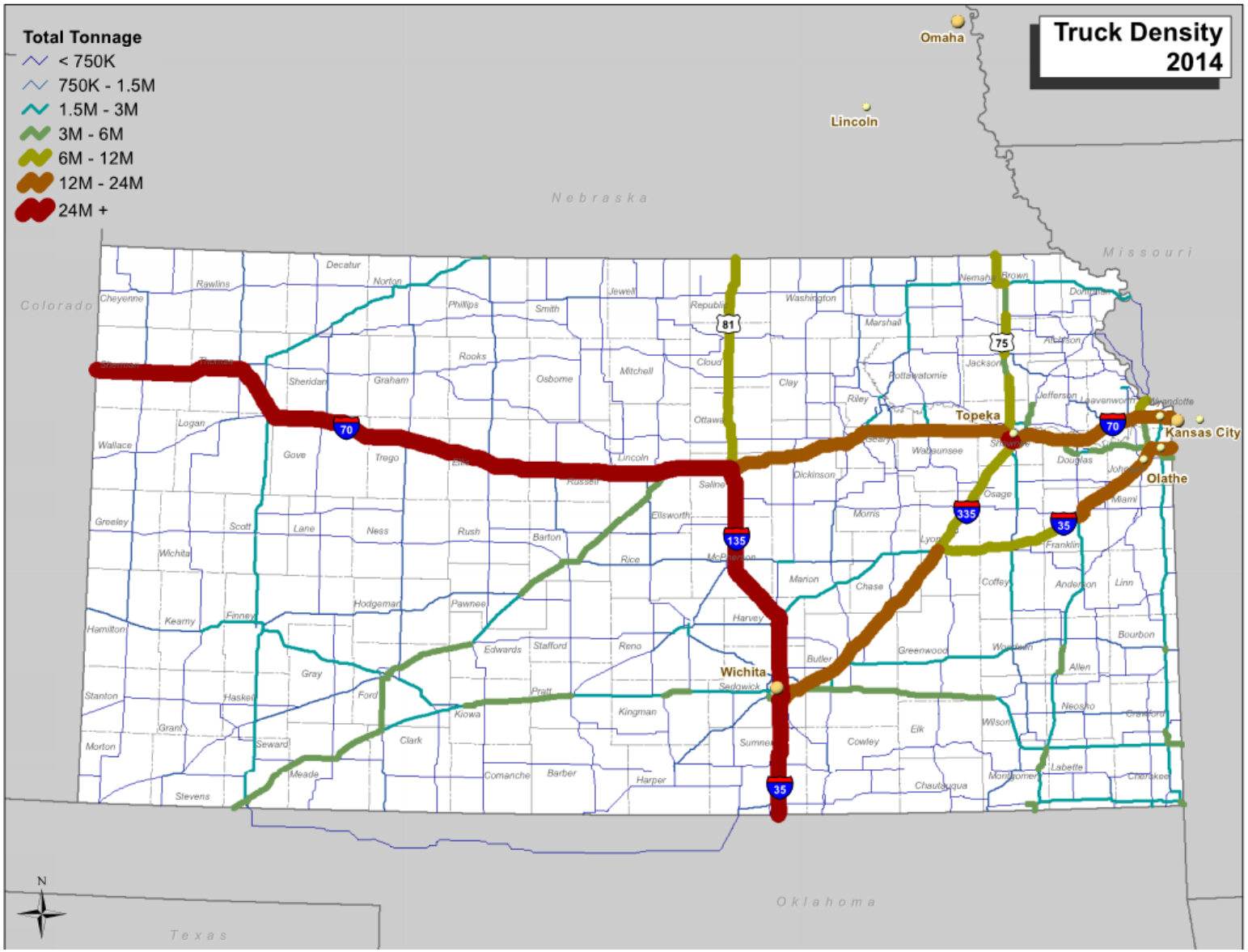
In terms of all truck directions combined, the top five commodities include:

- *by Tonnage*:
  1. Farm Products (47.0 million tons, 23.4% of truck total);
  2. Nonmetallic Minerals (45.5 million, 22.7%);
  3. Secondary Traffic (22.5 million, 11.2%);
  4. Food or Kindred Products (21.1 million, 10.5%); and,
  5. Petroleum or Coal Products (19.7 million, 9.8%)

- *by Units*:
  1. Shipping Containers (7.4 million units, 42.1% of truck total); [6]
  2. Farm Products (2.9 million, 16.4%);
  3. Nonmetallic Minerals (1.9 million, 10.6%);
  4. Secondary Traffic (1.3 million, 7.2%); and,
  5. Food or Kindred Products (0.9 million, 5.2%)

[5] the respective figures identify the top commodities by relative percentage of the depicted term (tons, units, or value), sequenced left-to-right in descending order; the same convention is applied for all modes; the numbers preceding the commodity descriptions are the corresponding STCC2 codes.
[6] Shipping Containers includes empty shipping containers and Semi-Trailers Returned Empty.

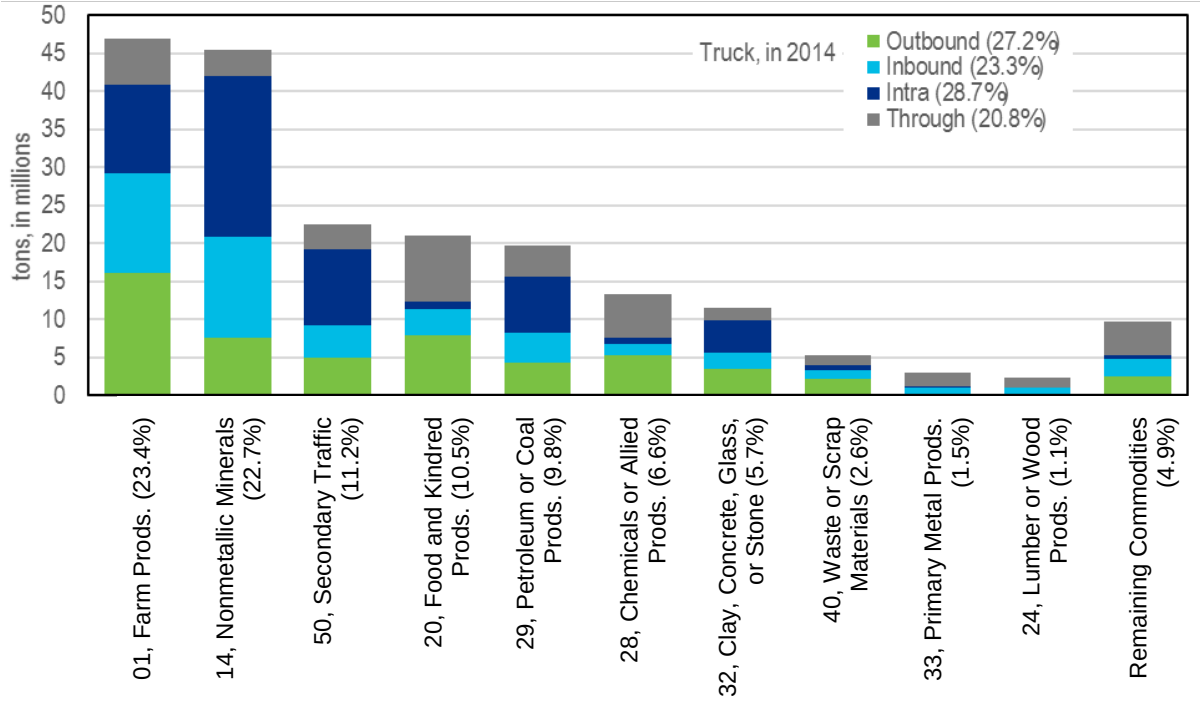
Figure 7: Truck Density, 2014



Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014

- *by Value*:
  1. Secondary Traffic ($66.2 billion, 29.9% of truck total);[7]
  2. Food or Kindred Products ($29.4 billion, 13.3%);
  3. Chemicals or Allied Products ($23.3 billion, 10.5%);
  4. Farm Products ($22.2 billion, 10.0%); and,
  5. Petroleum or Coal Products ($14.6 billion, 6.6%)

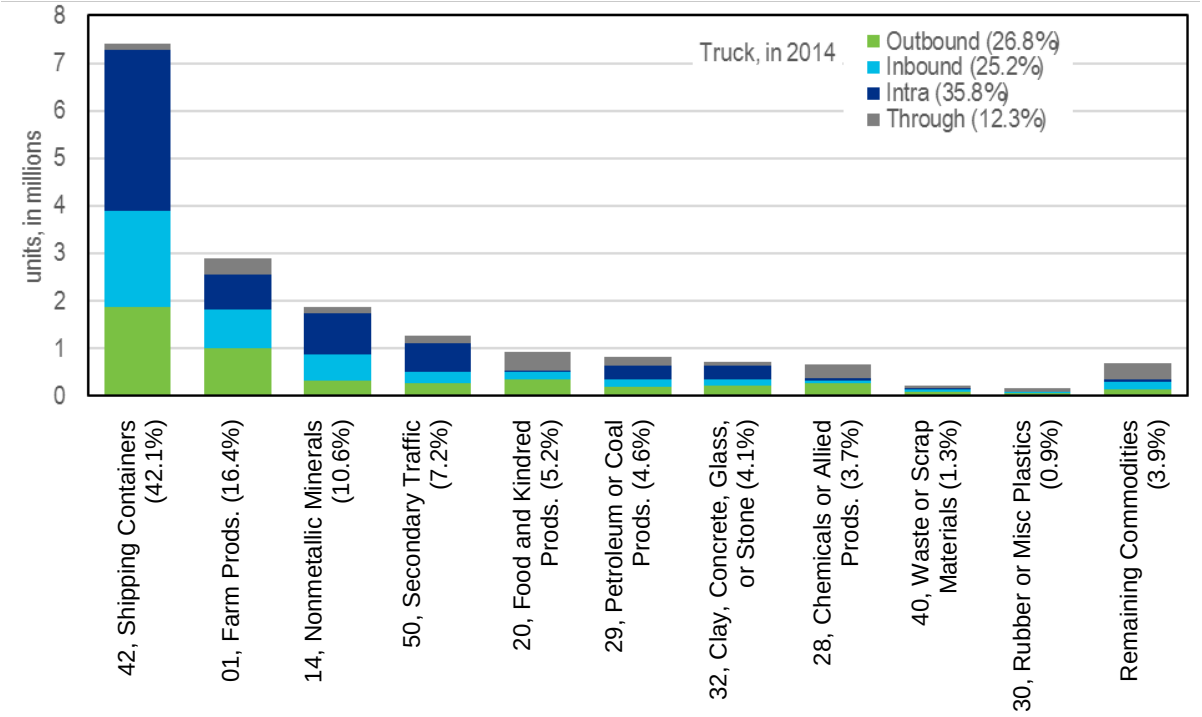
Figure 8: Truck Top Commodities by Tonnage, 2014



Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

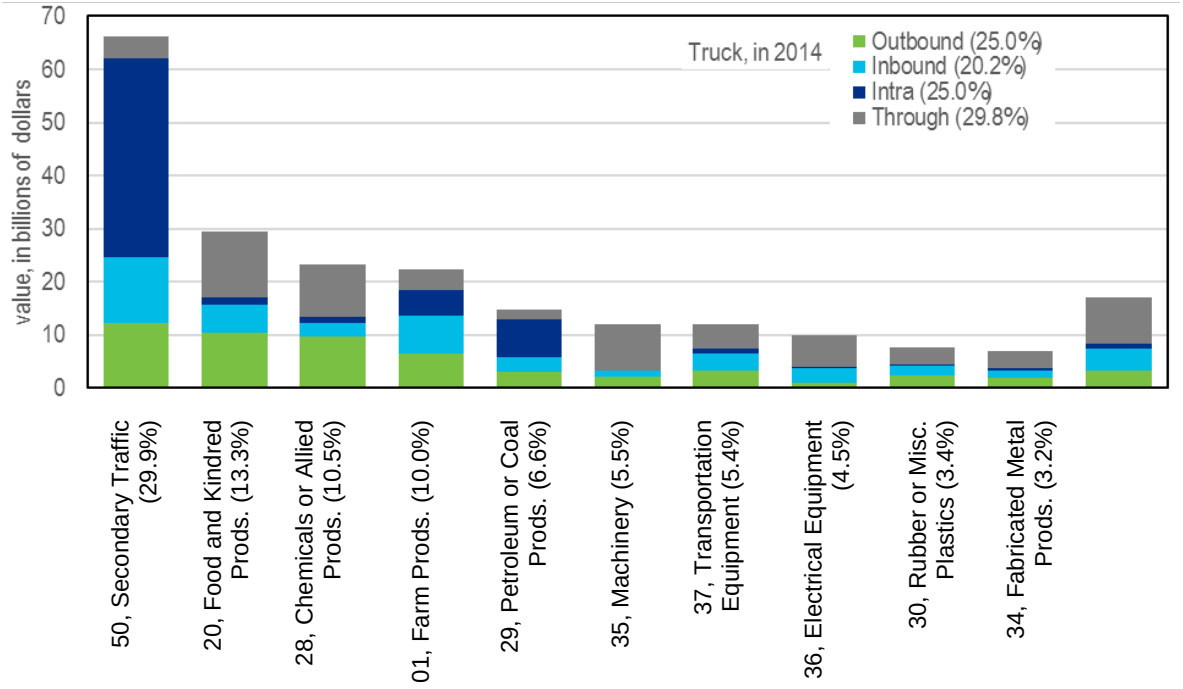
[7] Secondary Traffic includes warehousing and distribution center-related movements, as well as drayage to/from airports, railyards, and other intermodal facilities.

Figure 9: Truck Top Commodities by Units, 2014



Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Figure 10: Truck Top Commodities by Value, 2014



Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

2.1.1 Truck Outbound

Table 18 in the Appendix presents outbound truck commodities from Kansas, in 2014, which total 54.7 million tons (27.2% of directional movements), via 4.7 million units (26.8%), valued at $55.4 billion (25.0%), with an average value/ton of $1,013; top five commodities include:

- *by Tonnage*:
  1. Farm Products (16.2 million tons, 29.6% of outbound total);
  2. Food or Kindred Products (7.9 million, 14.5%);
  3. Nonmetallic Minerals (7.6 million, 13.8%);
  4. Chemicals or Allied Products (5.3 million, 9.6%); and,
  5. Secondary Traffic (5.0 million, 9.1%)

- *by Units*:
  1. Shipping Containers (1.9 million units, 39.5% of outbound total);
  2. Farm Products (1.0 million, 21.3%);
  3. Food or Kindred Products (0.3 million, 7.3%);
  4. Nonmetallic Minerals (0.3 million, 6.6%); and,
  5. Secondary Traffic (0.3 million, 5.9%)

- *by Value*:
  1. Secondary Traffic ($12.1 billion, 21.9% of outbound total);
  2. Food or Kindred Products ($10.4 billion, 18.8%);
  3. Chemicals or Allied Products ($9.7 billion, 17.5%);
  4. Farm Products ($6.6 billion, 11.8%); and,
  5. Transportation Equipment ($3.2 billion, 5.8%)

Outbound Tonnage Origin – Major outbound truck tonnages in 2014 are shown by county origin in Figure 11 and Figure 13. Truck movements destined out-of-state are primarily traveling from Johnson County (5.5 million, 10.1%), Wyandotte County (5.4 million, 9.8%), and Montgomery County (4.6 million, 8.4%).

- *Johnson County:*
  1. Petroleum or Coal Products (1.5 million tons, 27.3% of outbound county total);
  2. Nonmetallic Minerals (1.5 million, 26.9%); and,
  3. Clay, Concrete, Glass, or Stone (0.7 million, 12.1%)

- *Wyandotte County:*
  1. Secondary Traffic (3.0 million tons, 56.2% of outbound county total);
  2. Petroleum or Coal Products (0.8 million, 14.0%); and,
  3. Clay, Concrete, Glass, or Stone (0.7 million, 13.6%)

- *Montgomery County:*
  1. Chemicals or Allied Products (3.9 million tons, 85.5% of outbound county total);
  2. Farm Products (0.3 million, 5.5%); and,
  3. Petroleum or Coal Products (0.1 million, 3.1%)

Outbound Tonnage Destination – Major outbound truck tonnages in 2014 are shown by state destination in Figure 12 and Figure 13. Truck movements destined out-of-state are primarily traveling to Missouri (13.7 million, 25.1%), Oklahoma (8.5 million, 15.5%), and Nebraska (5.7 million, 10.4%).

- *Missouri*:
  1. Nonmetallic Minerals (3.1 million tons, 22.9% of outbound state total);
  2. Secondary Traffic (2.6 million, 19.0%); and,
  3. Petroleum or Coal Products (2.5 million, 17.9%)

- *Oklahoma*:
  1. Farm Products (3.1 million tons, 36.2% of outbound state total);
  2. Nonmetallic Minerals (2.5 million, 29.6%); and,
  3. Chemicals or Allied Products (1.0 million, 11.2%)

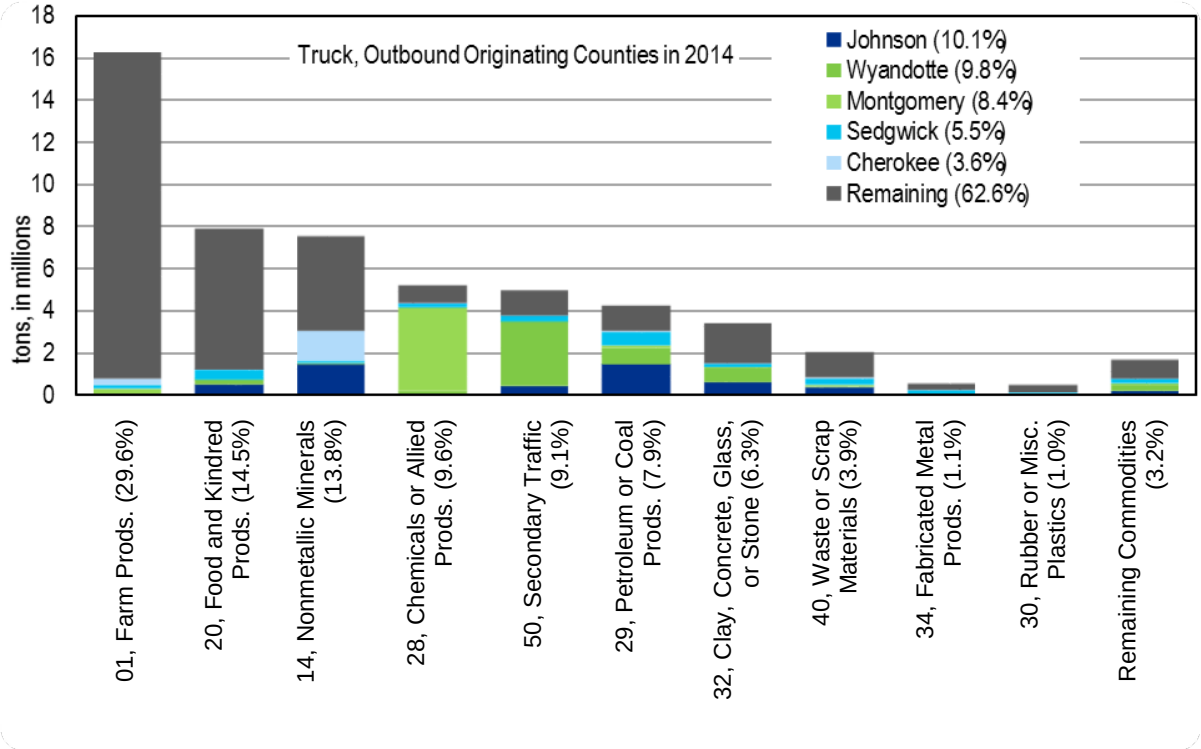
- *Nebraska*:
  1. Farm Products (3.4 million tons, 59.4% of outbound state total);
  2. Nonmetallic Minerals (1.2 million, 21.5%); and,
  3. Food or Kindred Products (0.3 million, 5.7%)

Table 5: Outbound Truck O/D by Commodity, 2014

STCC2		Truck, Outbound Originating Kansas Counties in 2014							
		Johnson	Wyandotte	Montgomery	Sedgwick	Cherokee	Remaining	Total	Percent
01	Farm Prods.	97,860	9,459	250,538	169,231	318,338	15,340,914	16,186,340	29.6%
20	Food or Kindred Prods.	543,467	247,455	8,343	479,287	17,911	6,607,432	7,903,895	14.5%
14	Nonmetallic Minerals	1,485,714	0	106,837	95,315	1,428,123	4,444,138	7,560,127	13.8%
28	Chemicals or Allied Prods.	21,408	212,871	3,921,689	191,300	68,303	838,686	5,254,257	9.6%
50	Secondary Traffic	477,831	3,014,730	25,039	312,654	2,312	1,164,359	4,996,925	9.1%
	Remaining Commodities	2,887,696	1,880,485	273,282	1,767,982	119,949	5,829,885	12,759,279	23.3%
	Total	5,513,976	5,365,000	4,585,728	3,015,769	1,954,936	34,225,414	54,660,823	100.0%
	Percent	10.1%	9.8%	8.4%	5.5%	3.6%	62.6%	100.0%	
STCC2		Truck, Outbound Terminating State in 2014							
		MO	OK	NE	TX	IA	Remaining	Total	Percent
01	Farm Prods.	2,264,557	3,069,929	3,391,332	1,928,047	1,025,756	4,506,720	16,186,341	29.6%
20	Food or Kindred Prods.	587,002	307,471	327,991	760,593	816,275	5,104,563	7,903,895	14.5%
14	Nonmetallic Minerals	3,142,243	2,506,948	1,227,832	171,306	147,065	364,732	7,560,126	13.8%
28	Chemicals or Allied Prods.	144,980	950,432	51,634	843,418	49,330	3,214,462	5,254,256	9.6%
50	Secondary Traffic	2,601,957	384,611	158,296	137,497	280,718	1,433,846	4,996,925	9.1%
	Remaining Commodities	4,960,072	1,254,035	552,638	995,763	428,797	4,567,975	12,759,280	23.3%
	Total	13,700,811	8,473,426	5,709,723	4,836,624	2,747,941	19,192,298	54,660,823	100.0%
	Percent	25.1%	15.5%	10.4%	8.8%	5.0%	35.1%	100.0%	

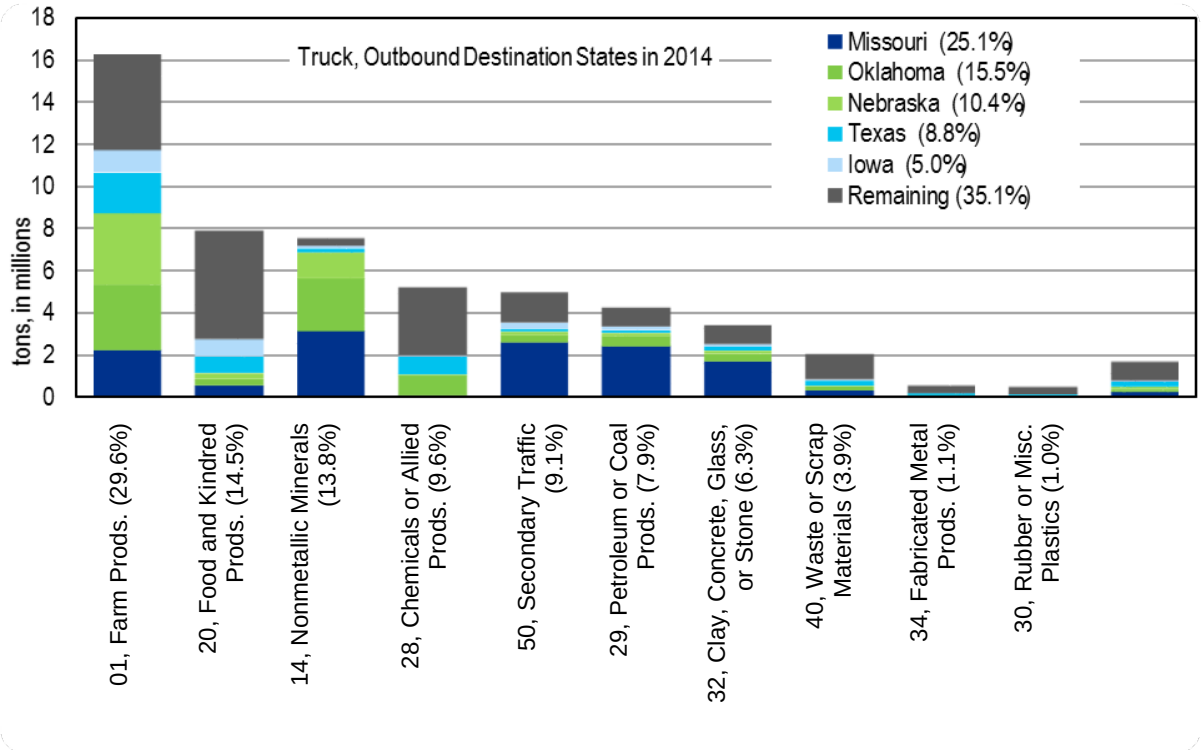
Source: prepared by CDM Smith, based on TRANSEARCH® for 2014
note totals may not sum due to rounding

Figure 11: Truck Outbound Commodities by County Origin, 2014



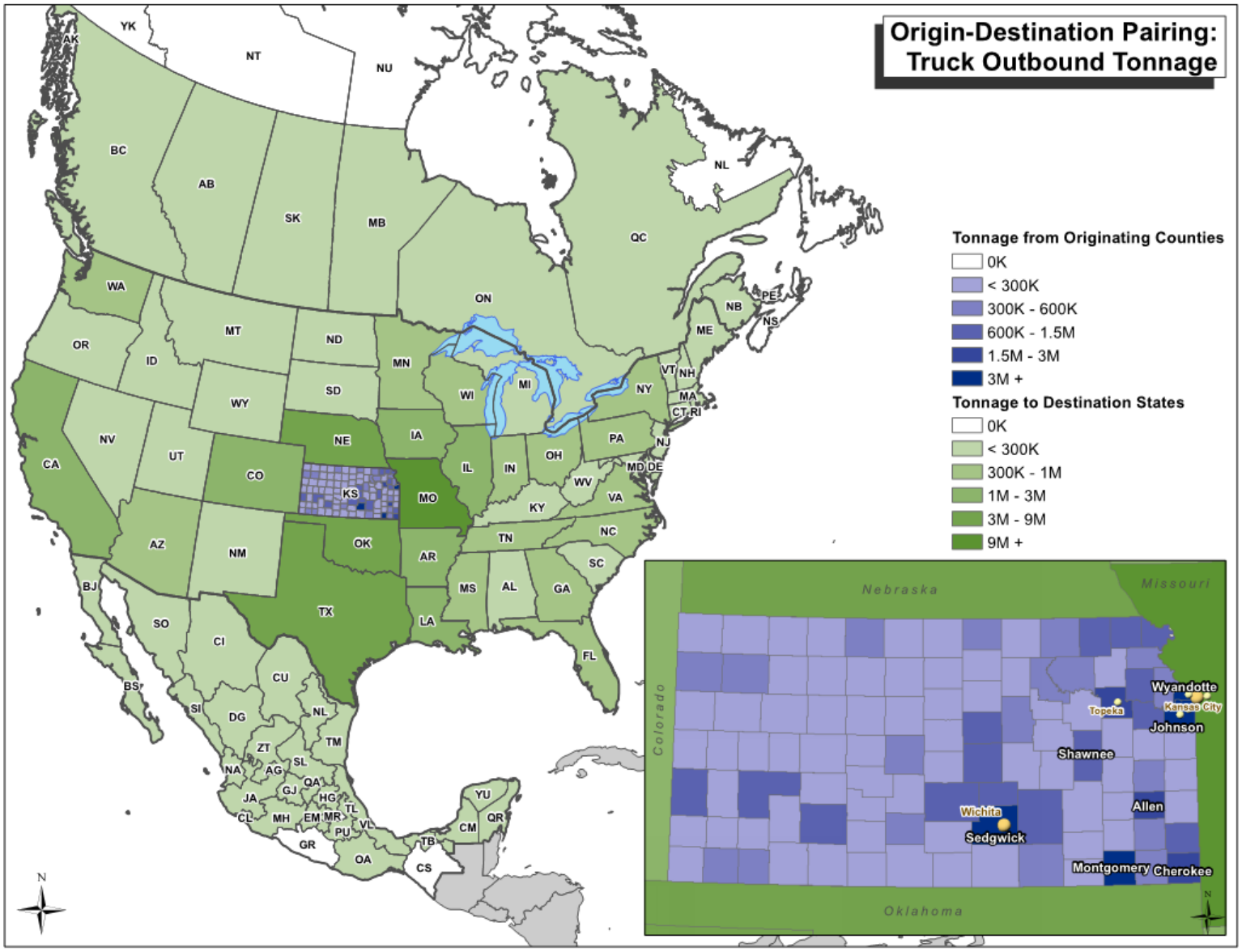
Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Figure 12: Truck Outbound Commodities by State Destination, 2014



Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014, note totals may not sum due to rounding

Figure 13: Truck Outbound by Origin and Destination, 2014



Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014

2.1.2 Truck Inbound

Table 19 in the Appendix presents inbound truck commodities to Kansas, in 2014, which total 46.8 million tons (23.3% of directional movements), via 4.4 million units (25.2%), valued at $44.7 billion (20.2%), with an average value/ton of $955; top five commodities include:

- *by Tonnage*:
  1. Nonmetallic Minerals (13.3 million tons, 28.4% of inbound total);
  2. Farm Products (13.0 million, 27.7%);
  3. Secondary Traffic (4.2 million, 8.9%);
  4. Petroleum or Coal Products (3.9 million, 8.3%); and,
  5. Food or Kindred Products (3.5 million, 7.4%)

- *by Units*:
  1. Shipping Containers (2.0 million units, 46.2% of inbound total);
  2. Farm Products (0.8 million, 18.4%);
  3. Nonmetallic Minerals (0.5 million, 12.4%);
  4. Secondary Traffic (0.2 million, 5.2%); and,
  5. Petroleum or Coal Products (0.2 million, 3.7%)

- *by Value*:
  1. Secondary Traffic ($12.5 billion, 28.0% of inbound total);
  2. Farm Products ($7.1 billion, 16.0%);
  3. Food or Kindred Products ($5.2 billion, 11.6%);
  4. Transportation Equipment ($3.2 billion, 7.2%); and,
  5. Electrical Equipment ($2.7 billion, 6.1%)

Inbound Tonnage Origin – Major inbound truck tonnages in 2014 are shown by state origin in Figure 14 and Figure 16. Truck movements originating out-of-state are primarily traveling from Missouri (17.3 million, 36.9%), Nebraska (7.9 million, 17.0%), and Oklahoma (4.1 million, 8.8%).

- *Missouri*:
  1. Nonmetallic Minerals (9.5 million tons, 54.9% of inbound state total);
  2. Secondary Traffic (2.0 million, 11.4%); and,
  3. Farm Products (1.9 million, 11.3%)

- *Nebraska*:
  1. Farm Products (5.3 million tons, 66.5% of inbound state total);
  2. Nonmetallic Minerals (1.2 million, 15.0%); and,
  3. Petroleum or Coal Products (0.4 million, 5.0%)

- *Oklahoma*:
  1. Farm Products (1.1 million tons, 25.8% of inbound state total);
  2. Nonmetallic Minerals (0.9 million, 21.9%); and,
  3. Petroleum or Coal Products (0.8 million, 19.3%)

Inbound Tonnage Destination – Major inbound truck tonnages in 2014 are shown by county destination in Figure 15 and Figure 16. Truck movements originating out-of-state are primarily

traveling to Johnson County (8.9 million, 19.0%), Sedgwick County (6.0 million, 12.7%), and Wyandotte County (3.1 million, 6.7%).

- *Johnson County:*
  1. Nonmetallic Minerals (4.0 million tons, 45.0% of inbound county total);
  2. Food or Kindred Products (0.9 million, 10.6%); and,
  3. Petroleum or Coal Products (0.8 million, 8.8%)

- *Sedgwick County:*
  1. Nonmetallic Minerals (1.7 million tons, 29.0% of inbound county total);
  2. Farm Products (0.8 million, 13.2%); and,
  3. Food or Kindred Products (0.7 million, 11.4%)

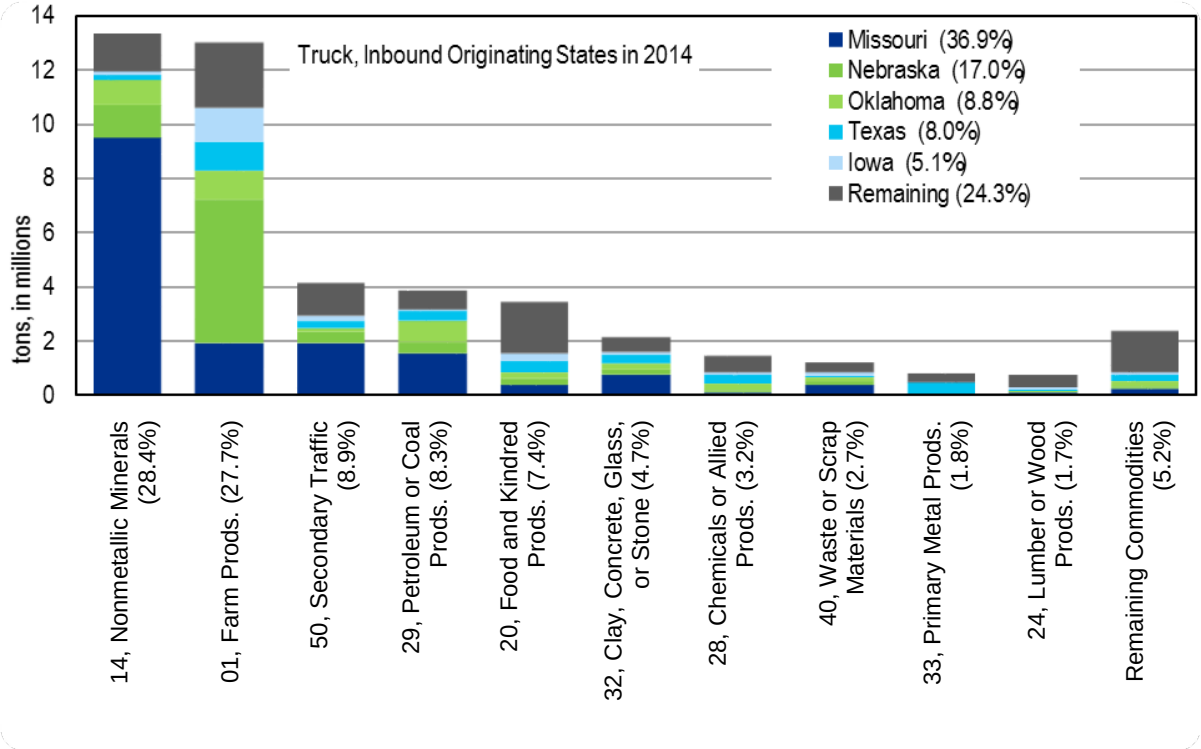
- *Wyandotte County:*
  1. Secondary Traffic (1.9 million tons, 60.8% of inbound county total);
  2. Petroleum or Coal Products (0.3 million, 10.6%); and,
  3. Farm Products (0.3 million, 9.3%)

Table 6: Inbound Truck O/D by Commodity, 2014

STCC2		Truck, Inbound Originating State in 2014							
		MO	NE	OK	TX	IA	Remaining	Total	Percent
14	Nonmetallic Minerals	9,474,150	1,192,033	905,567	199,802	123,338	1,415,510	13,310,400	28.4%
01	Farm Prods.	1,945,382	5,272,496	1,066,684	1,064,218	1,228,833	2,404,783	12,982,396	27.7%
50	Secondary Traffic	1,974,507	377,685	158,627	286,668	193,014	1,191,311	4,181,812	8.9%
29	Petroleum or Coal Prods.	1,595,575	400,111	799,713	357,160	25,819	717,389	3,895,767	8.3%
20	Food or Kindred Prods.	436,331	206,762	261,789	414,263	283,219	1,866,751	3,469,115	7.4%
	Remaining Commodities	1,843,231	485,308	943,247	1,410,622	513,452	3,773,348	8,969,208	19.2%
	Total	17,269,176	7,934,395	4,135,627	3,732,733	2,367,675	11,369,092	46,808,698	100.0%
	Percent	36.9%	17.0%	8.8%	8.0%	5.1%	24.3%	100.0%	
STCC2		Truck, Inbound Terminating Kansas Counties in 2014							
		Johnson	Sedgwick	Wyandotte	Shawnee	Saline	Remaining	Total	Percent
14	Nonmetallic Minerals	3,994,797	1,725,454	156,003	538,296	214,225	6,681,625	13,310,400	28.4%
01	Farm Prods.	428,876	785,682	290,311	283,156	558,617	10,635,754	12,982,396	27.7%
50	Secondary Traffic	747,167	269,626	1,900,667	147,275	70,484	1,046,595	4,181,814	8.9%
29	Petroleum or Coal Prods.	786,375	327,787	330,488	210,903	32,795	2,207,418	3,895,766	8.3%
20	Food or Kindred Prods.	937,907	679,584	128,645	315,294	153,705	1,253,981	3,469,116	7.4%
	Remaining Commodities	1,991,267	2,166,775	320,036	845,346	184,747	3,461,037	8,969,208	19.2%
	Total	8,886,389	5,954,908	3,126,150	2,340,270	1,214,573	25,286,410	46,808,700	100.0%
	Percent	19.0%	12.7%	6.7%	5.0%	2.6%	54.0%	100.0%	

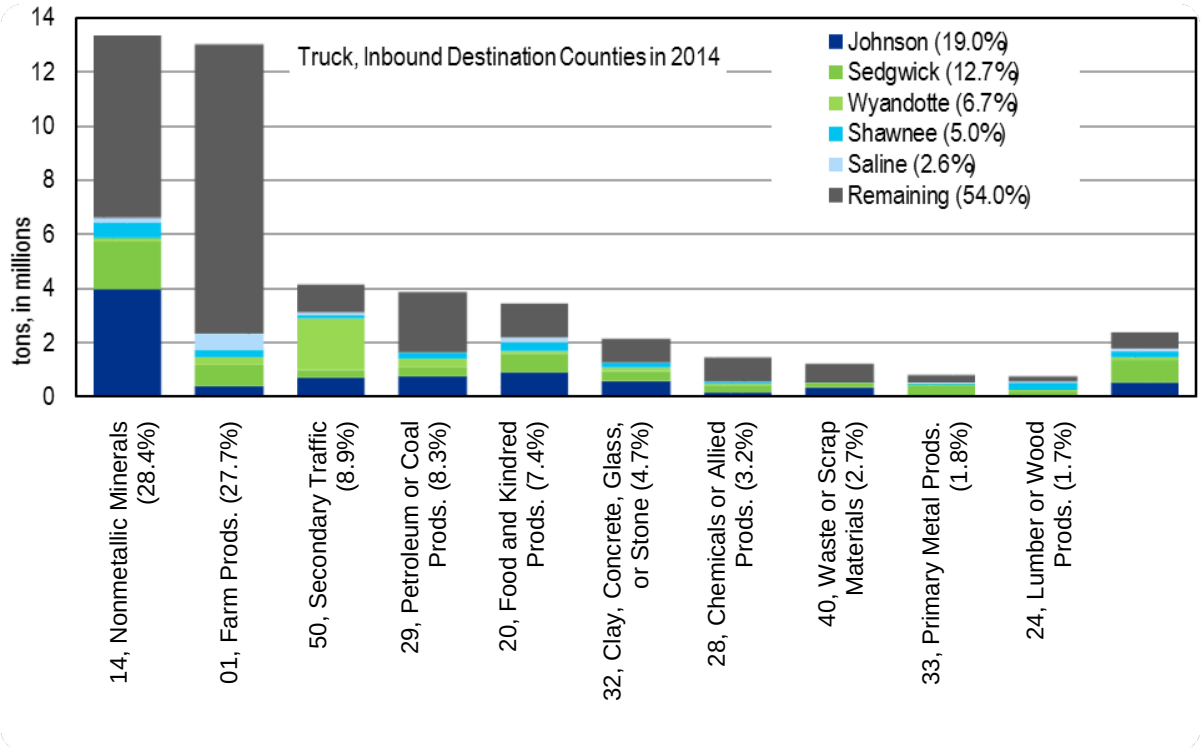
Source: prepared by CDM Smith, based on TRANSEARCH® for 2014
note totals may not sum due to rounding

Figure 14: Truck Inbound Commodities by State Origin, 2014



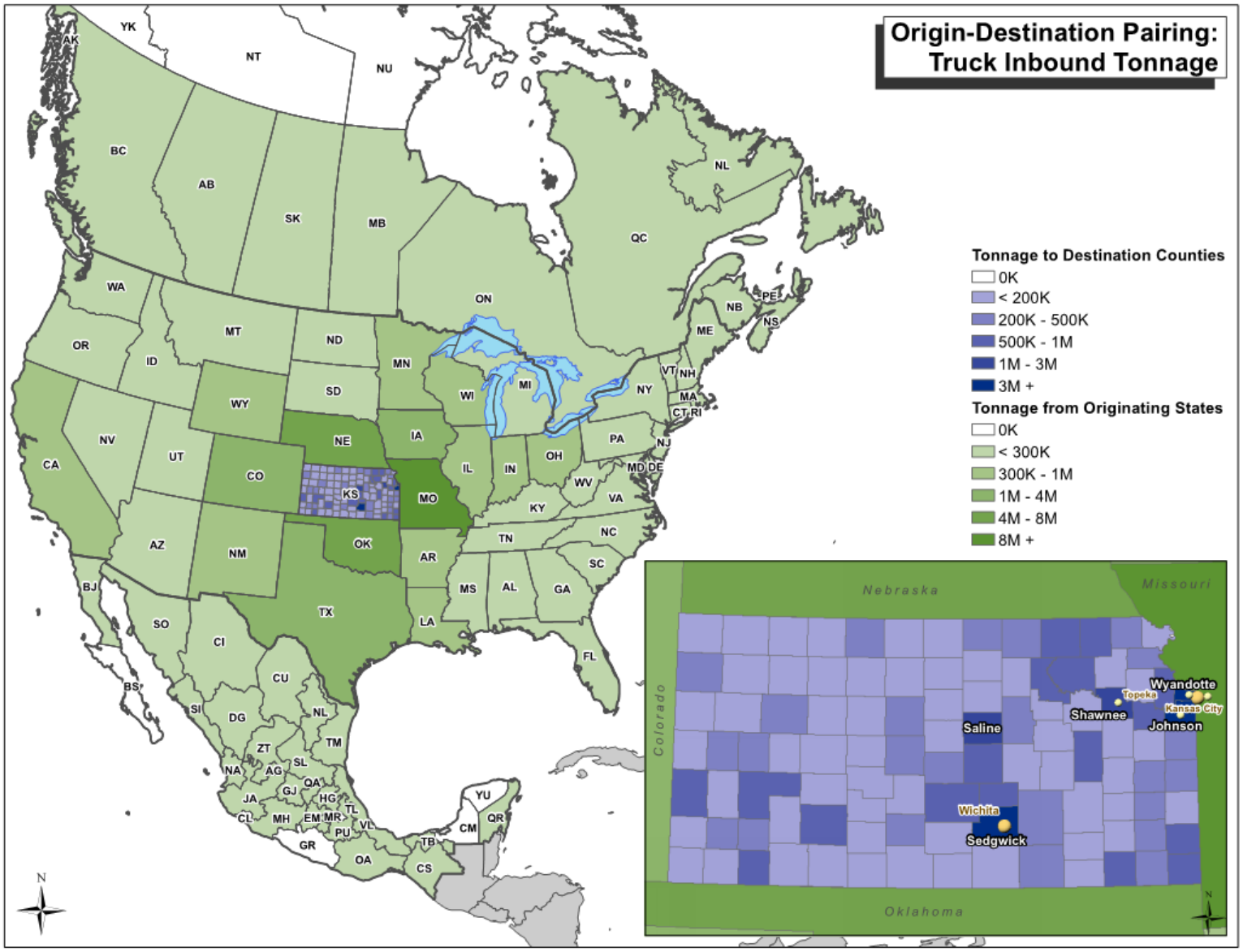
Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Figure 15: Truck Inbound Commodities by County Destination, 2014



Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014, note totals may not sum due to rounding

Figure 16: Truck Inbound by Origin and Destination, 2014



Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014

2.1.3 Truck Intra

Table 20 in the Appendix presents intrastate truck commodities within Kansas, in 2014, which total 57.6 million tons (28.7% of directional movements), via 6.3 million units (35.8%), valued at $55.3 billion (25.0%), with an average value/ton of $960; top five commodities include:

- *by Tonnage*:
  1. Nonmetallic Minerals (21.2 million tons, 36.9% of intra total);
  2. Farm Products (11.7 million, 20.3%);
  3. Secondary Traffic (10.1 million, 17.5%);
  4. Petroleum or Coal Products (7.4 million, 12.9%); and,
  5. Clay, Concrete, Glass, or Stone (4.3 million, 7.5%)

- *by Units*:
  1. Shipping Containers (3.4 million units, 53.8% of intra total);
  2. Nonmetallic Minerals (0.9 million, 13.9%);
  3. Farm Products (0.7 million, 11.5%);
  4. Secondary Traffic (0.6 million, 9.5%); and,
  5. Petroleum or Coal Products (0.3 million, 4.8%)

- *by Value*:
  1. Secondary Traffic ($37.5 billion, 67.9% of intra total);
  2. Petroleum or Coal Products ($7.3 billion, 13.1%);
  3. Farm Products ($4.7 billion, 8.5%);
  4. Food or Kindred Products ($1.4 billion, 2.6%); and,
  5. Chemicals or Allied Products ($1.3 billion, 2.4%)

2.1.4 Truck Through

Table 21 in the Appendix presents through truck commodities moving across Kansas, in 2014, which total 41.9 million tons (20.8% of directional movements), via 2.2 million units (12.3%), valued at $65.9 billion (29.8%), with an average value/ton of $1,575; top five commodities include:

- *by Tonnage*:
  1. Food or Kindred Products (8.7 million tons, 20.8% of through total);
  2. Farm Products (6.2 million, 14.8%);
  3. Chemicals or Allied Products (5.8 million, 13.8%);
  4. Petroleum or Coal Products (4.1 million, 9.7%); and,
  5. Nonmetallic Minerals (3.4 million, 8.1%)

- *by Units*:
  1. Food or Kindred Products (0.4 million units, 17.6% of through total);
  2. Farm Products (0.3 million, 15.9%);
  3. Chemicals or Allied Products (0.3 million, 13.2%);
  4. Petroleum or Coal Products (0.2 million, 7.9%); and,
  5. Secondary Traffic (0.2 million, 7.3%)

- *by Value*:
  1. Food or Kindred Products ($12.4 billion, 18.8% of through total);
  2. Chemicals or Allied Products ($9.9 billion, 15.0%);
  3. Machinery ($8.7 billion, 13.2%);
  4. Electrical Equipment ($6.0 billion, 9.1%); and,
  5. Transportation Equipment ($4.5 billion, 6.9%)

2.2 Rail, 2014

Kansas rail movements in 2014 totaled 368.4 million tons, valued at $324.1 billion, carried by 6.9 million carload units, see Table 7[8]. On average, total rail commodity movements are valued at $880/ton. Rail movements represent 64.7% or modal tonnage in Kansas and 58.9% of total modal value in 2014, by far, the largest modal share.

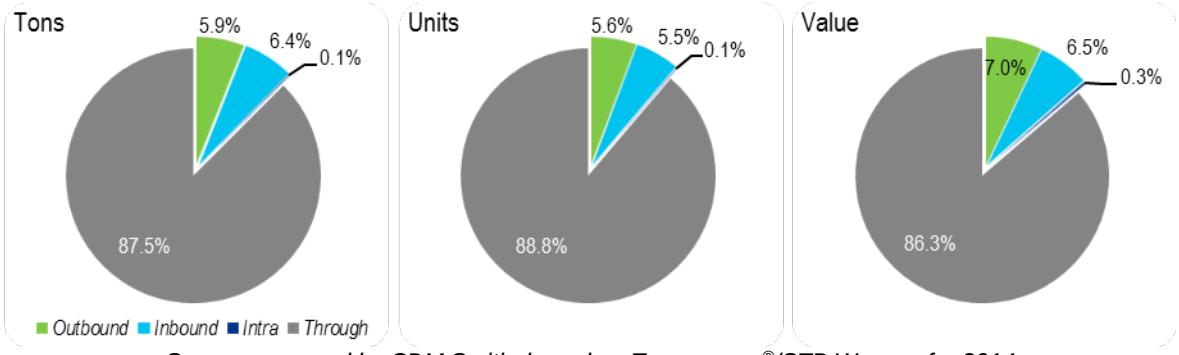
Direction – As depicted in Figure 17, through rail movements dominate directional movements by all three terms: 87.5% of total tonnage, 88.8% of carload units, and 86.3% of value. Inbound and outbound rail each comprise similar shares of the remaining directional movements for rail, with intrastate rail traffic accounting for a fractional percentage.

Table 7: Rail by Direction, 2014

Direction	Tons		Units		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	Amount	Percent	
Outbound	21,919,113	5.9%	386,788	5.6%	$22,622	7.0%	$1,032
Inbound	23,543,312	6.4%	381,768	5.5%	$21,005	6.5%	$892
Intra	489,604	0.1%	6,106	0.1%	$901	0.3%	$1,840
Through	322,447,524	87.5%	6,141,358	88.8%	$279,577	86.3%	$867
Total	368,399,553	100.0%	6,916,020	100.0%	$324,105	100.0%	$880

Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Figure 17: Rail Percentages by Direction, 2014



Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

[8] Tonnage and carload units for rail are from the STB WAYBILL database; values are derived by applying proxy directional- and commodity-specific values per ton from the IHS TRANSEARCH® database.

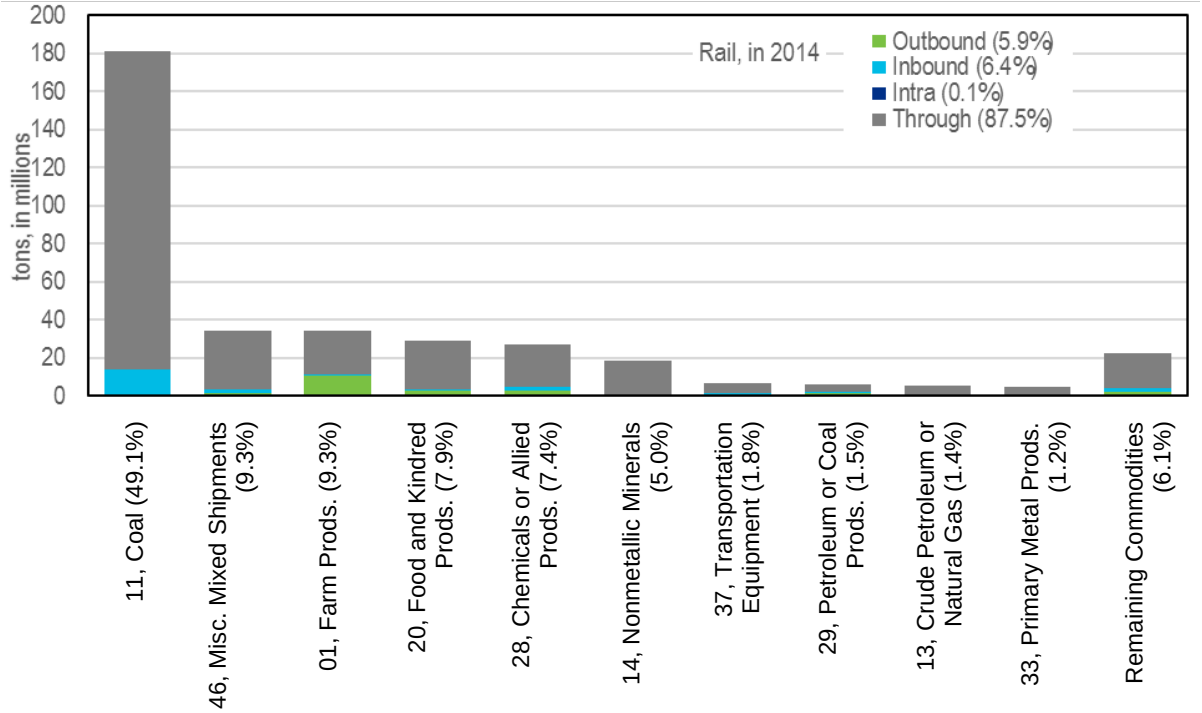
Commodities – Figure 18, Figure 19, and Figure 20 depict the top two-digit STCC commodities for Kansas rail, by tonnage, units, and value, respectively, with a directional composition. Such graphics depict the largest respective commodity movements for rail by direction, and in conjunction with the tabulated data in Table 23 through Table 27, in the Appendix, the top rail commodity movements by direction are identified in the respective subsections.

In terms of all rail directions combined, the top five commodities include:

- *by Tonnage*:
    1. Coal (181.0 million tons, 49.1% of rail total);
    2. Miscellaneous Mixed Shipments (34.3 million, 9.3%);
    3. Farm Products (34.2 million, 9.3%);
    4. Food or Kindred Products (29.0 million, 7.9%); and,
    5. Chemicals or Allied Products (27.2 million, 7.4%)

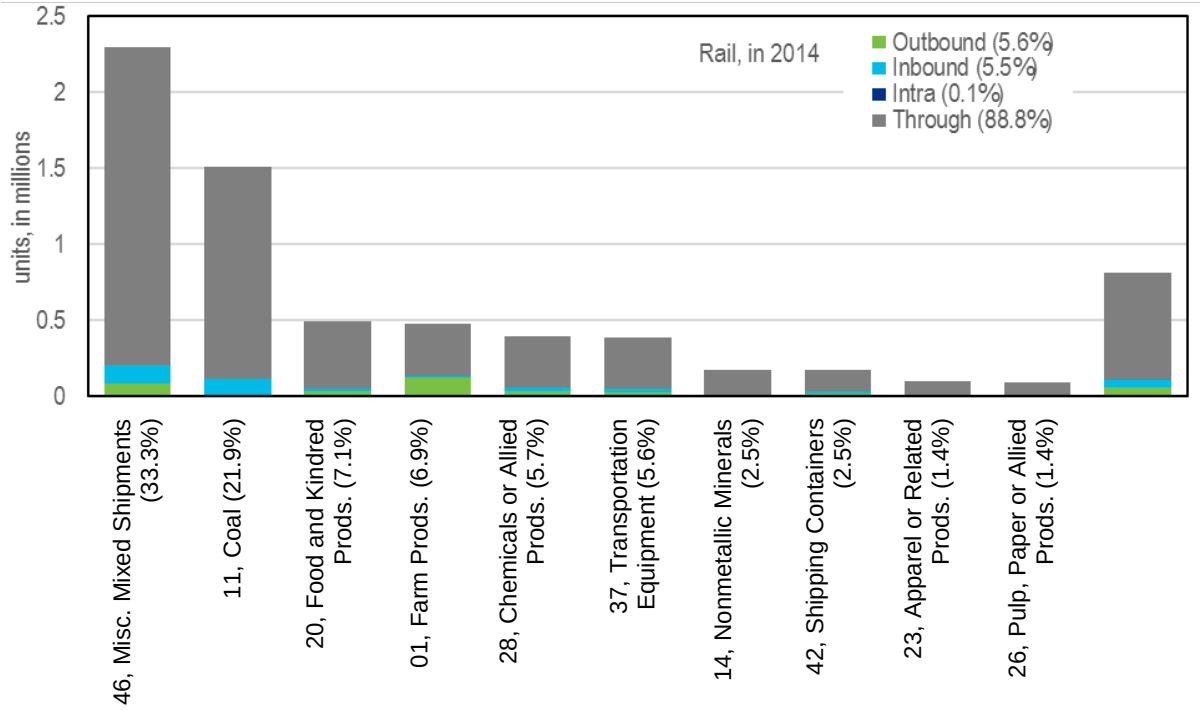
- *by Units*:
    1. Miscellaneous Mixed Shipments (2.3 million units, 33.3% of rail total);
    2. Coal (1.5 million, 21.9%);
    3. Food or Kindred Products (0.5 million, 7.1%);
    4. Farm Products (0.5 million, 6.9%); and,
    5. Chemicals or Allied Products (0.4 million, 5.7%)
- *by Value*:
    1. Chemicals or Allied Products ($104.8 billion, 32.3% of rail total);
    2. Transportation Equipment ($77.4 billion, 23.9%);
    3. Miscellaneous Mixed Shipments ($28.6 billion, 8.8%);
    4. Coal ($15.8 billion, 4.9%); and,
    5. Food or Kindred Products ($15.0 billion, 4.6%)

Figure 18: Rail Top Commodities by Tonnage, 2014



Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

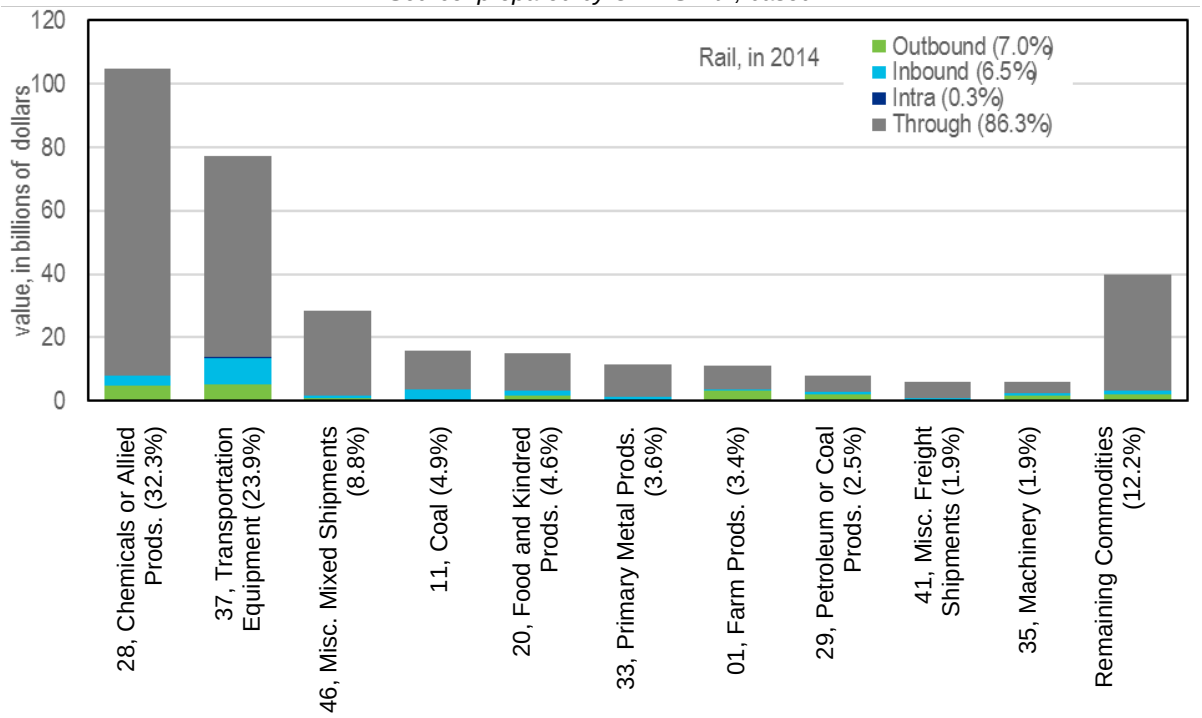
Figure 19: Rail Top Commodities by Units, 2014



Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Figure 20: Rail Top Commodities by Value, 2014

Source: prepared by CDM Smith, based



Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

2.2.1 Rail Outbound

Table 23 in the Appendix presents outbound rail commodities from Kansas, in 2014, which total 21.9 million tons (5.9% of directional movements), via 386,788 carload units (5.6%), valued at $22.6 billion (7.0%), with an average value/ton of $1,032; top five commodities include:

- *by Tonnage*:
  1. Farm Products (10.6 million tons, 48.1% of outbound total);
  2. Chemicals or Allied Products (2.7 million, 12.5%);
  3. Food or Kindred Products (2.5 million, 11.4%);
  4. Miscellaneous Mixed Shipments (1.5 million, 6.8%); and,
  5. Petroleum or Coal Products (1.5 million, 6.7%)

- *by Units*:
  1. Farm Products (0.1 million units, 32.3% of outbound total);
  2. Miscellaneous Mixed Shipments (0.1 million, 21.8%);
  3. Food or Kindred Products (0.0 million, 9.7%);
  4. Chemicals or Allied Products (0.0 million, 8.4%); and,
  5. Transportation Equipment (0.0 million, 6.5%)

- *by Value*:
    1. Transportation Equipment ($5.3 billion, 23.5% of outbound total);
    2. Chemicals or Allied Products ($4.9 billion, 21.4%);
    3. Farm Products ($3.3 billion, 14.8%);
    4. Petroleum or Coal Products ($1.9 billion, 8.4%); and,
    5. Food or Kindred Products ($1.8 billion, 7.8%)

Outbound Tonnage Origin – Major outbound rail tonnages in 2014 are shown by county origin in Figure 21 and Figure 23. Rail movements destined out-of-state are primarily traveling from Wyandotte County (3.5 million, 16.1%), Sedgwick County (2.5 million, 11.2%), and Reno County (2.1 million, 9.7%).

- *Wyandotte County*:
    1. Miscellaneous Mixed Shipments (1.2 million tons, 34.9% of outbound county total);
    2. Farm Products (0.8 million, 23.8%); and,
    3. Transportation Equipment (0.4 million, 11.2%)

- *Sedgewick County:*
    1. Farm Products (0.8 million tons, 33.6% of outbound county total);
    2. Chemicals or Allied Products (0.7 million, 29.7%); and,
    3. Food or Kindred Products (0.6 million, 24.6%)

- *Reno County:*
    1. Farm Products (1.0 million tons, 46.2% of outbound county total);
    2. Petroleum or Coal Products (0.6 million, 28.8%); and,
    3. Nonmetallic Minerals (0.2 million, 10.2%)

Outbound Tonnage Destination – Major outbound rail tonnages in 2014 are shown by state destination in Figure 22 and Figure 23. Rail movements destined out-of-state are primarily traveling to Texas (8.0 million, 36.6%), California (4.2 million, 19.3%), and Illinois (1.8 million, 8.1%).

- *Texas*:
    1. Farm Products (6.1 million tons, 75.3% of outbound state total);
    2. Food or Kindred Products (0.5 million, 6.5%); and,
    3. Chemicals or Allied Products (0.5 million, 5.6%)

- *California*:
    1. Miscellaneous Mixed Shipments (1.2 million tons, 29.3% of outbound state total);
    2. Farm Products (1.1 million, 25.9%); and,
    3. Chemicals or Allied Products (0.7 million, 16.5%)

- *Illinois*:
    1. Farm Products (0.6 million tons, 36.2% of outbound state total);
    2. Food or Kindred Products (0.4 million, 20.1%); and,
    3. Chemicals or Allied Products (0.2 million, 11.2%)

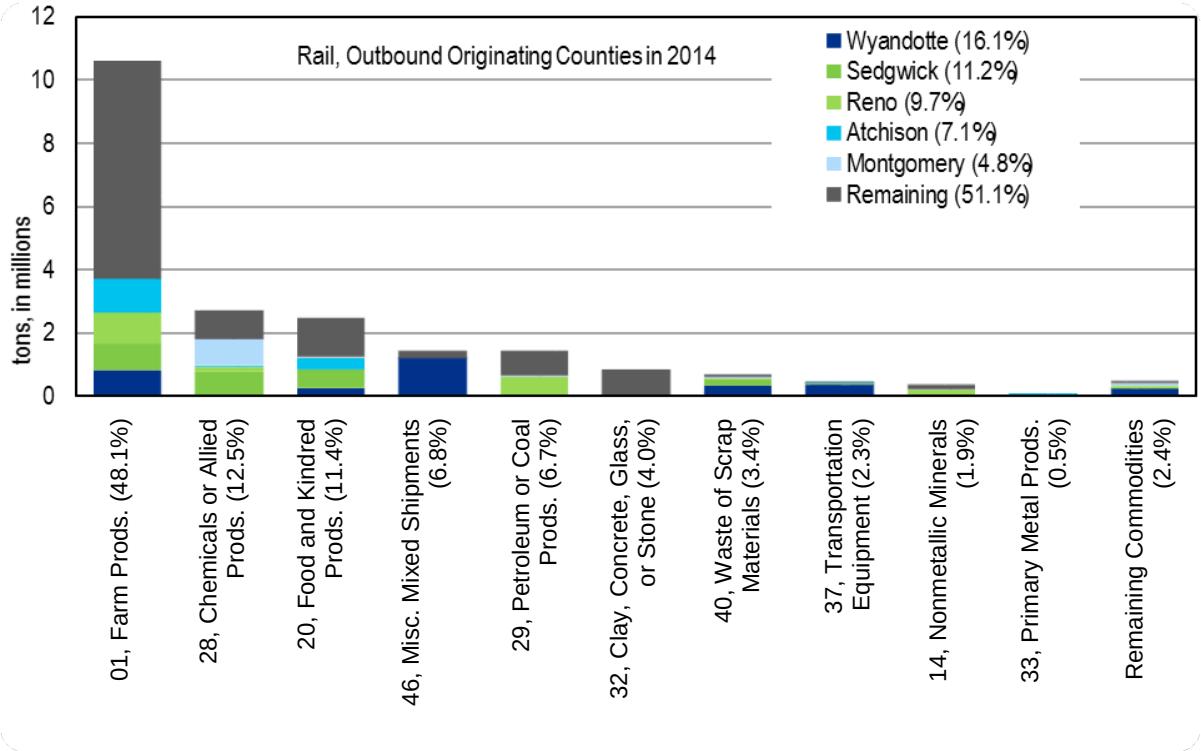
Table 8: Outbound Rail O/D by Commodity, 2014

STCC2		Rail, Outbound Originating Kansas Counties in 2014							
		Wyandotte	Sedgwick	Reno	Atchison	Montgomery	Remaining	Total	Percent
01	Farm Prods.	841,464	824,137	981,952	1,077,241	0	6,825,907	10,550,701	48.1%
28	Chemicals or Allied Prods.	96,960	727,840	157,640	30,400	834,896	888,826	2,736,562	12.5%
20	Food or Kindred Prods.	301,960	602,000	0	320,400	54,224	1,228,580	2,507,164	11.4%
46	Misc Mixed Shipments	1,231,160	0	0	0	0	254,000	1,485,160	6.8%
29	Petroleum or Coal Prods.	6,720	10,680	611,340	0	47,080	784,348	1,460,168	6.7%
	Remaining Commodities	1,050,242	287,006	374,898	119,880	126,300	1,221,032	3,179,358	14.5%
	Total	3,528,506	2,451,663	2,125,830	1,547,921	1,062,500	11,202,693	21,919,113	100.0%
	Percent	16.1%	11.2%	9.7%	7.1%	4.8%	51.1%	100.0%	

STCC2		Rail, Outbound Terminating State in 2014							
		TX	CA	IL	AR	MO	Remaining	Total	Percent
01	Farm Prods.	6,050,119	1,096,642	645,632	404,080	349,468	2,004,760	10,550,701	48.1%
28	Chemicals or Allied Prods.	450,684	696,346	198,728	22,068	92,616	1,276,120	2,736,562	12.5%
20	Food or Kindred Prods.	522,584	498,916	358,560	83,588	398,848	644,668	2,507,164	11.4%
46	Misc Mixed Shipments	16,920	1,240,600	165,320	0	0	62,320	1,485,160	6.8%
29	Petroleum or Coal Prods.	267,292	361,936	38,128	75,952	0	716,860	1,460,168	6.7%
	Remaining Commodities	722,012	337,468	375,336	395,994	102,744	1,245,804	3,179,358	14.5%
	Total	8,029,611	4,231,908	1,781,704	981,682	943,676	5,950,532	21,919,113	100.0%
	Percent	36.6%	19.3%	8.1%	4.5%	4.3%	27.1%	100.0%	

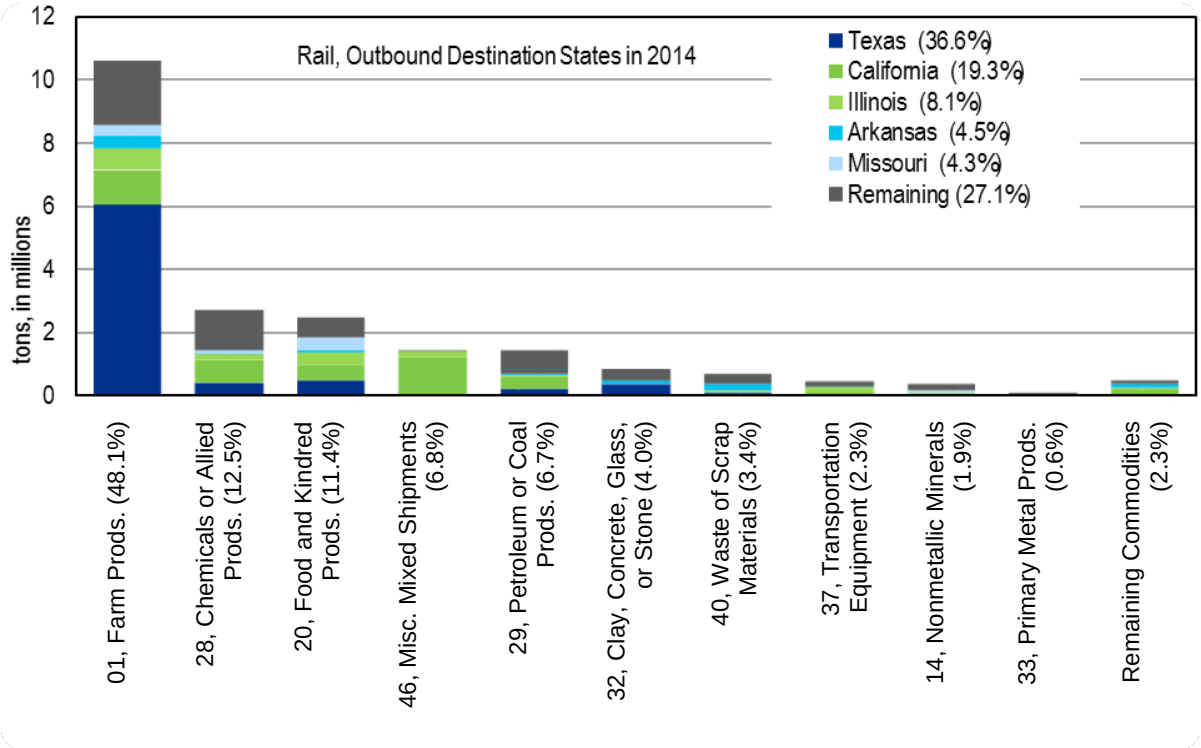
Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Figure 21: Rail Outbound Commodities by County Origin, 2014



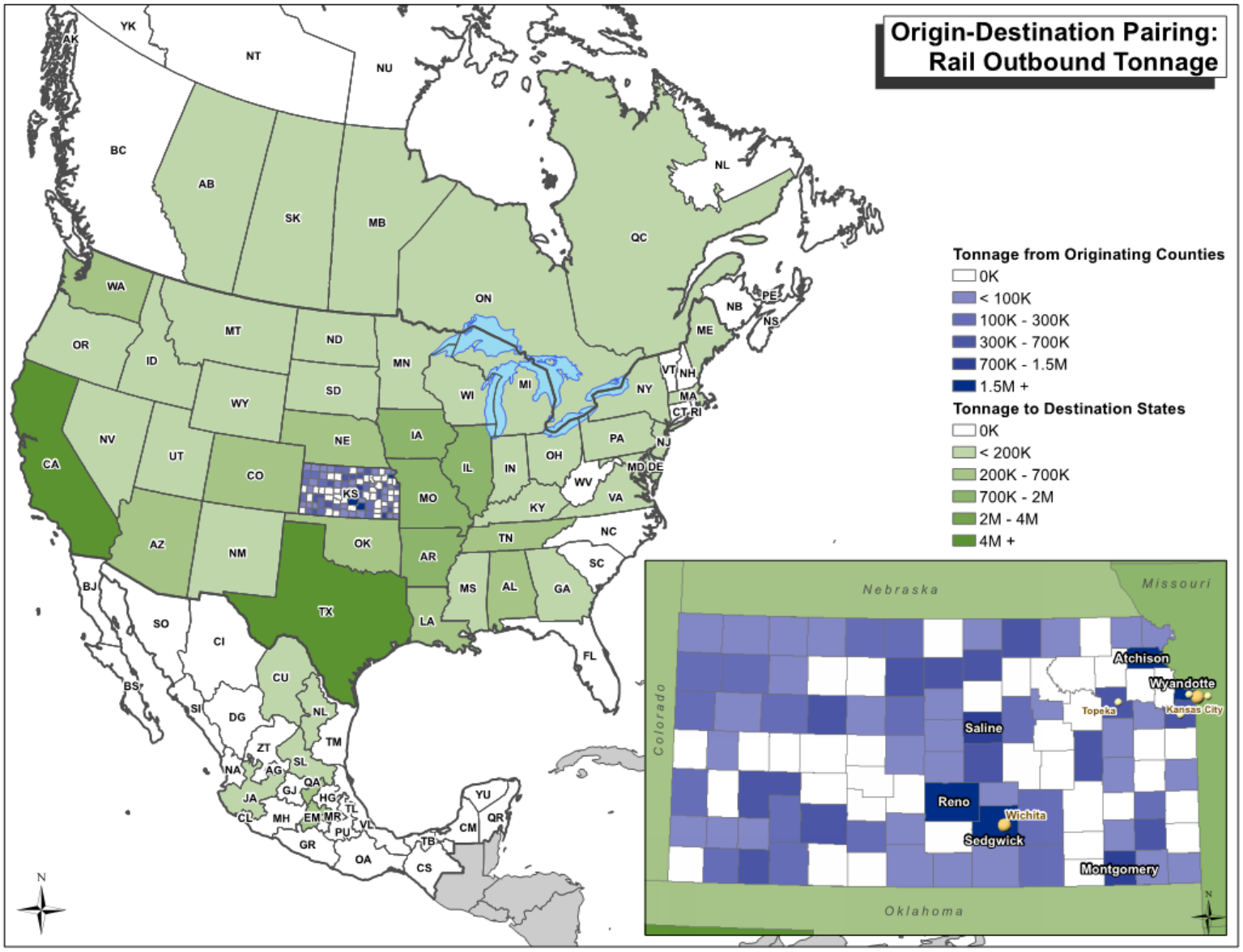
Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Figure 22: Rail Outbound Commodities by State Destination, 2014



Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Figure 23: Rail Outbound by Origin and Destination, 2014



Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014

2.2.2 Rail Inbound

Table 24 in the Appendix presents inbound rail commodities to Kansas, in 2014, which total 23.5 million tons (6.4% of directional movements), via 381,768 carload units (5.5%), valued at $21.0 billion (6.5%), with an average value/ton of $892; top five commodities include:

- *by Tonnage*:
  1. Coal (13.9 million tons, 59.2% of inbound total);
  2. Chemicals or Allied Products (1.8 million, 7.5%);
  3. Miscellaneous Mixed Shipments (1.7 million, 7.2%);
  4. Clay, Concrete, Glass, or Stone (1.2 million, 5.2%); and,
  5. Food or Kindred Products (1.1 million, 4.5%)

- *by Units*:
  1. Miscellaneous Mixed Shipments (122.7 thousand units, 32.1% of inbound total);
  2. Coal (116.8 thousand, 30.6%);
  3. Transportation Equipment (26.3 thousand, 6.9%);
  4. Chemicals or Allied Products (23.8 thousand, 6.2%); and,
  5. Food or Kindred Products (15.3 thousand, 4.0%)

- *by Value*:
  1. Transportation Equipment ($8.1 billion, 38.5% of inbound total);
  2. Coal ($3.7 billion, 17.8%);
  3. Chemicals or Allied Products ($2.9 billion, 14.0%);
  4. Food or Kindred Products ($1.3 billion, 6.3%); and,
  5. Primary Metal Products ($0.9 billion, 4.3%)

Inbound Tonnage Origin – Major inbound rail tonnages in 2014 are shown by state origin in Figure 24 and Figure 26. Rail movements originating out-of-state are primarily traveling from Nebraska (7.6 million, 32.1%), Wyoming (7.4 million, 31.5%), and California (2.0 million, 8.6%).

- *Nebraska*:
  1. Coal (7.3 million tons, 96.2% of inbound state total);
  2. Farm Products (0.2 million, 2.3%); and,
  3. Food or Kindred Products (0.1 million, 1.2%)

- *Wyoming*:
  1. Coal (6.7 million tons, 89.9% of inbound state total);
  2. Clay, Concrete, Glass, or Stone (0.4 million, 5.8%); and,
  3. Chemicals or Allied Products (0.2 million, 2.4%)

- *California*:
  1. Miscellaneous Mixed Shipments (1.5 million tons, 71.3% of inbound state total);
  2. Food or Kindred Products (0.2 million, 9.8%); and,
  3. Chemicals or Allied Products (0.1 million, 5.7%)

Inbound Tonnage Destination – Major inbound rail tonnages in 2014 are shown by county destination in Figure 25 and Figure 26. Rail movements originating out-of-state are primarily

traveling to Pottawatomie County (8.0 million, 34.1%), Wyandotte (5.9 million, 25.0%), and Douglas County (2.5 million, 10.4%).

- *Pottawattamie County*:
  1. Coal (8.0 million tons, 99.8% of inbound county total);
  2. Primary Metal Products (9,600, 0.1%); and,
  3. Chemicals or Allied Products (8,040, 0.1%)

- *Wyandotte County*:
  1. Coal (1.5 million tons, 26.0% of inbound county total);
  2. Miscellaneous Mixed Shipments (1.5 million, 25.3%); and,
  3. Transportation Equipment (0.5 million, 9.2%)

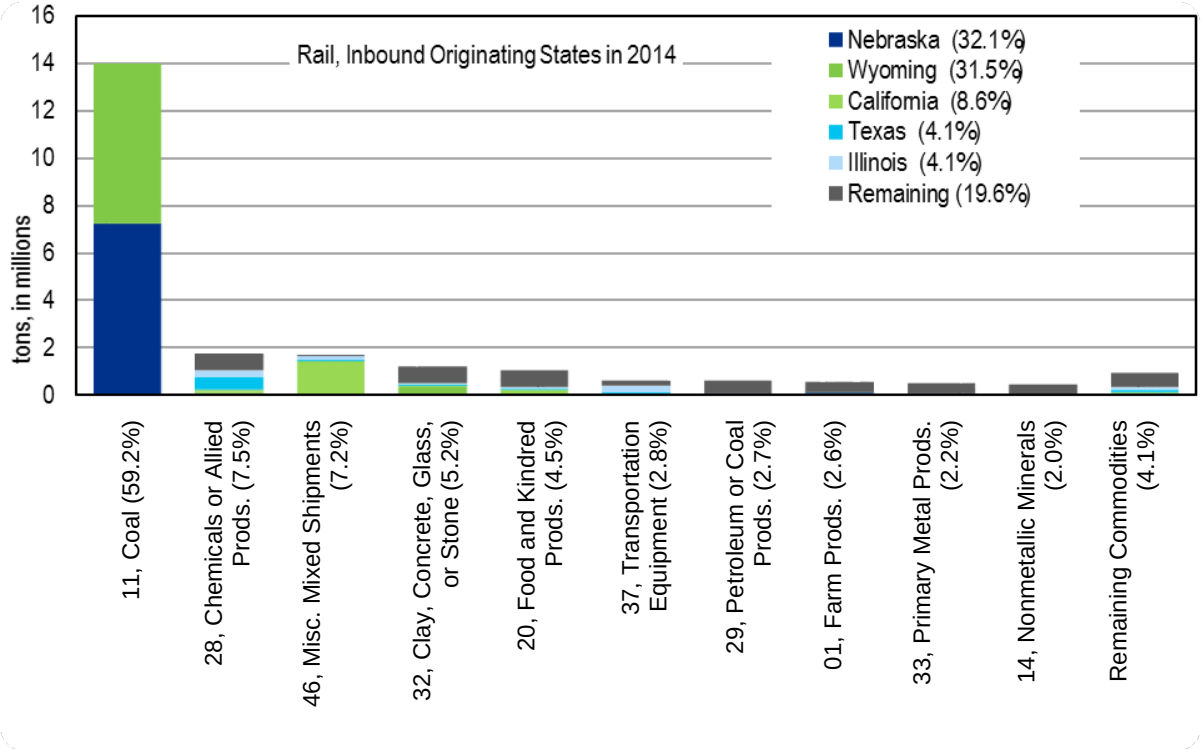
- *Douglas County*:
  1. Coal (2.3 million tons, 92.7% of inbound county total);
  2. Chemicals or Allied Products (0.2 million, 6.4%); and,
  3. Food or Kindred Products (156,128, 0.6%)

Table 9: Inbound Rail O/D by Commodity, 2014

STCC2		Rail, Inbound Originating State in 2014							
		NE	WY	CA	TX	IL	Remaining	Total	Percent
11	Coal	7,265,730	6,660,905	0	0	0	0	13,926,635	59.2%
28	Chemicals or Allied Prods.	0	174,760	115,280	542,582	246,088	685,680	1,764,390	7.5%
46	Misc Mixed Shipments	0	0	1,451,520	22,640	175,120	41,680	1,690,960	7.2%
32	Clay, Concrete, Glass, or Stone	0	427,960	7,640	32,720	68,960	693,252	1,230,532	5.2%
20	Food or Kindred Prods.	88,372	3,960	199,320	27,080	55,920	682,968	1,057,620	4.5%
	Remaining Commodities	199,308	141,708	261,842	348,440	412,160	2,509,717	3,873,175	16.5%
	Total	7,553,410	7,409,293	2,035,602	973,462	958,248	4,613,297	23,543,312	100.0%
	Percent	32.1%	31.5%	8.6%	4.1%	4.1%	19.6%	100.0%	
STCC2		Rail, Inbound Terminating Kansas Counties in 2014							
		Pottawatomie	Wyandotte	Douglas	Finney	Johnson	Remaining	Total	Percent
11	Coal	8,004,034	1,530,180	2,272,895	1,369,918	0	749,608	13,926,635	59.2%
28	Chemicals or Allied Prods.	8,040	513,480	156,128	15,760	59,560	1,011,422	1,764,390	7.5%
46	Misc Mixed Shipments	0	1,486,440	0	0	204,520	0	1,690,960	7.2%
32	Clay, Concrete, Glass, or Stone	0	366,920	0	28,120	493,080	342,412	1,230,532	5.2%
20	Food or Kindred Prods.	0	400,644	15,360	92,440	69,920	479,256	1,057,620	4.5%
	Remaining Commodities	9,600	1,579,817	8,200	242,774	242,760	1,790,024	3,873,175	16.5%
	Total	8,021,674	5,877,481	2,452,583	1,749,012	1,069,840	4,372,722	23,543,312	100.0%
	Percent	34.1%	25.0%	10.4%	7.4%	4.5%	18.6%	100.0%	

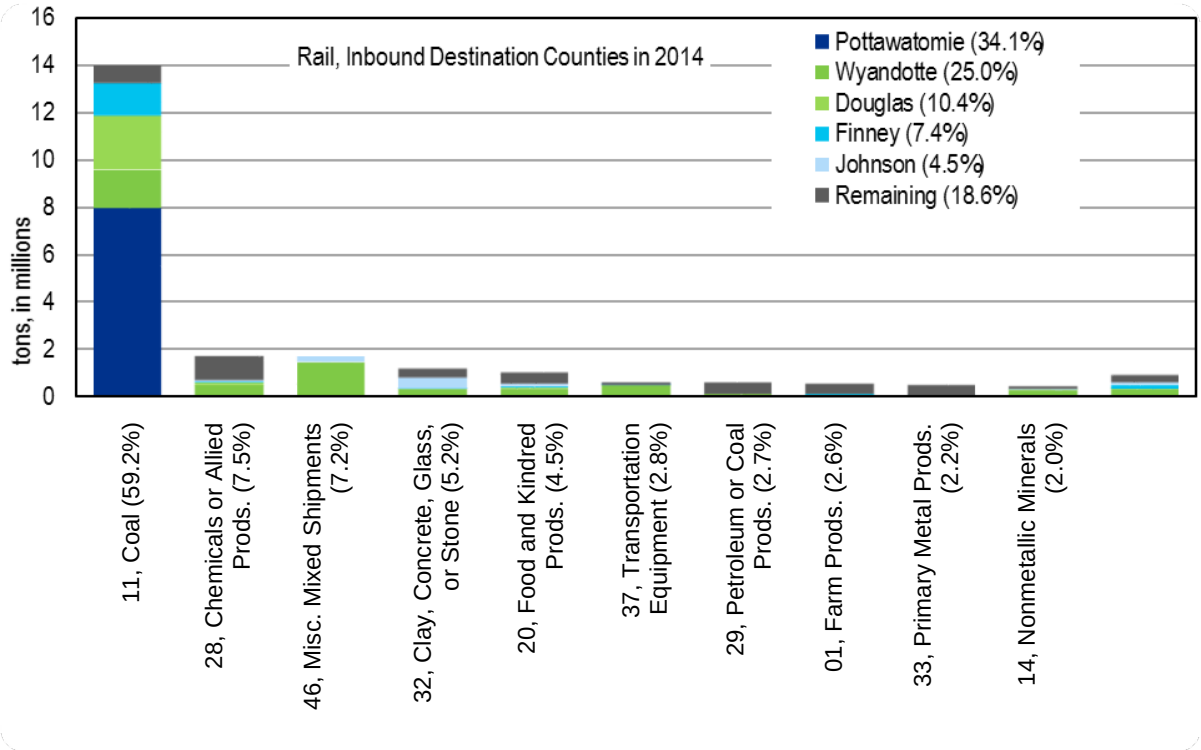
Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Figure 24: Rail Inbound Commodities by State Origin, 2014



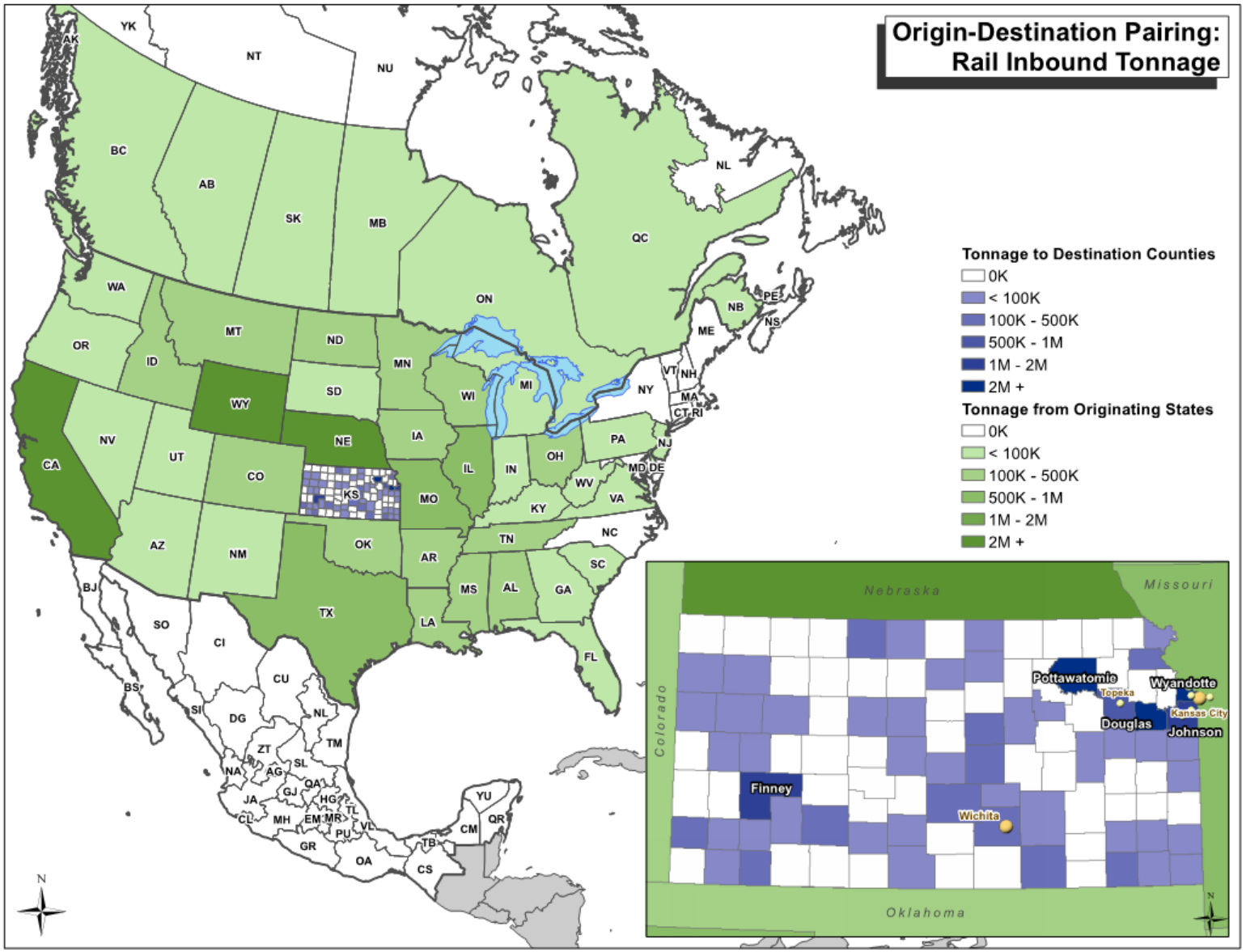
Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Figure 25: Rail Inbound Commodities by County Destination, 2014



Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Figure 26: Rail Inbound by Origin and Destination, 2014



Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014

2.2.3 Rail Intra

Table 25 in the Appendix presents intrastate rail commodities within Kansas, in 2014, which total 489,604 tons (0.1% of directional movements), via 6,106 units (0.1%), valued at $901 million (0.3%), with an average value/ton of $1,841; top five commodities include:

- *by Tonnage*:
  1. Nonmetallic Minerals (144.3 thousand tons, 29.5% of intra total);
  2. Clay, Concrete, Glass, or Stone (113.2 thousand, 23.1%);
  3. Chemicals or Allied Products (102.1 thousand, 20.8%);
  4. Food or Kindred Products (61.4 thousand, 12.5%); and,
  5. Transportation Equipment (39.9 thousand, 8.2%)

- *by Units*:
  1. Transportation Equipment (1.6 thousand units, 25.6% of intra total);
  2. Nonmetallic Minerals (1.5 thousand, 23.8%);
  3. Clay, Concrete, Glass, or Stone (1.1 thousand, 17.7%);
  4. Chemicals or Allied Products (1.0 thousand, 17.0%); and,
  5. Food or Kindred Products (0.6 thousand, 10.5%)

- *by Value*:
  1. Transportation Equipment ($455.8 million, 50.6% of intra total);
  2. Chemicals or Allied Products ($262.9 million, 29.2%);
  3. Clay, Concrete, Glass, or Stone ($75.1 million, 8.3%);
  4. Food or Kindred Products ($49.6 million, 5.5%); and,
  5. Petroleum or Coal Products ($27.9 million, 3.1%)

2.2.4 Rail Through

Table 26 in the Appendix presents the through rail commodities moving across Kansas, in 2014, which total 322.4 million tons (87.5% of directional movements), via 6.1 million carload units (88.8%), valued at $280.0 million (86.3%), with an average value/ton of $867; top five commodities include:

- *by Tonnage*:
  1. Coal (166.9 million tons, 51.8% of through total);
  2. Miscellaneous Mixed Shipments (31.1 million, 9.6%);
  3. Food or Kindred Products (25.4 million, 7.9%);
  4. Farm Products (23.1 million, 7.2%); and,
  5. Chemicals or Allied Products (22.6 million, 7.0%)

- *by Units*:
  1. Miscellaneous Mixed Shipments (2.1 million units, 34.1% of through total);
  2. Coal (1.4 million, 22.8%);
  3. Food or Kindred Products (0.4 million, 7.2%);
  4. Farm Products (0.3 million, 5.6%); and,
  5. Chemicals or Allied Products (0.3 million, 5.5%)

- *by Value*:
    1. Chemicals or Allied Products ($96.7 billion, 34.6% of through total);
    2. Transportation Equipment ($63.6 billion, 22.7%);
    3. Miscellaneous Mixed Shipments ($26.9 billion, 9.6%);
    4. Coal ($12.1 billion, 4.3%); and,
    5. Food or Kindred Products ($11.9 billion, 4.3%)

2.3 Water, 2014

According to IHS TRANSEARCH® data, Kansas water movements in 2014 totaled 390,823 tons, valued at $3 million, pertaining to just outbound Nonmetallic Minerals from Atchison and Leavenworth Counties to Missouri. On average, those movements are valued at $7/ton. Water movements represent 0.001% or modal tonnage and value in Kansas, representing the smallest relative modal movements. As TRANSEARCH® compiles freight movement data on NAFTA-related trade only, the data presented excludes any international ocean-bound freight from/to non-Canada and Mexico origins and/or destinations. A fuller freight perspective on Kansas' water freight movements is obtainable from alternative data sources[9], but would nonetheless represent a fractional percentage of total freight movements pertaining to Kansas, given the landlocked, central location within the continent.

2.4 Air, 2014

Kansas air movements in 2014 totaled 36,876 tons, valued at $5.1 billion, see Table 10. On average, total air commodity movements are valued at $136,944/ton. Air movements represent less than 0.01% of modal tonnage, but due to the very high value/ton, the total air freight value represents 0.9% of total Kansas freight value. As noted for waterborne movements, the TRANSEARCH® database only includes NAFTA-related freight movements; as such, the airborne freight data presented would exclude any non-Canada/Mexico international movements. A fuller freight perspective on Kansas' air freight movements would need to be supplemented with alternative data from another source[10].

Direction – As depicted in Figure 27, the proportional composition of air freight between outbound and inbound in closely split, with inbound tonnage constituting the majority at 50.9%, while outbound, at 53.2% is the majority for value. Outbound share of value exceeds tonnage proportion, given the higher value/ton at $152,227 for outbound relative to inbound at $124,425. Intrastate movements constitute a small remaining directional percentage and through air movements are not provided/applicable.

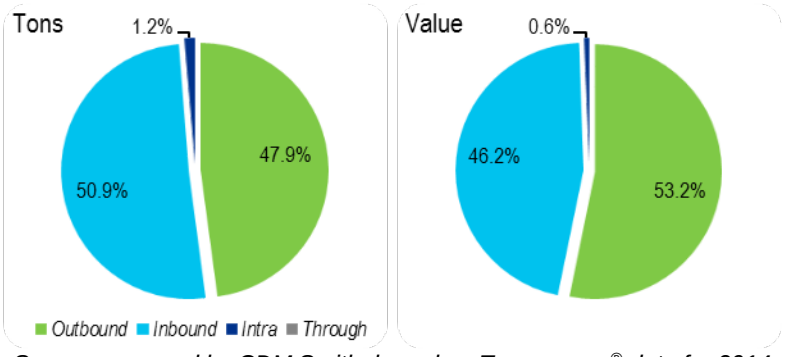
[9] the United States Army Corps of Engineers (USACE) Waterborne Commerce Statistics provides waterborne freight trade data for both domestic and foreign freight movements, and provides a more comprehensive perspective on current port-related freight movements than TRANSEARCH®
[10] the United States Census USA Trade Online database provides detailed airport-related freight movements for all international origins/destinations and provides a supplementary perspective on current air-related freight movements relative to TRANSEARCH®

Table 10: Air by Direction, 2014

Direction	Tons		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	
Outbound	17,660	47.9%	$2,688	53.2%	$152,208
Inbound	18,756	50.9%	$2,334	46.2%	$124,440
Intra	460	1.2%	$28	0.6%	$60,870
Through	#N/A	#N/A	#N/A	#N/A	#N/A
Total	36,876	100.0%	$5,050	100.0%	$136,945

Source: prepared by CDM Smith, based on TRANSEARCH® for 2014
note totals may not sum due to rounding

Figure 27: Air Percentages by Direction, 2014



Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014

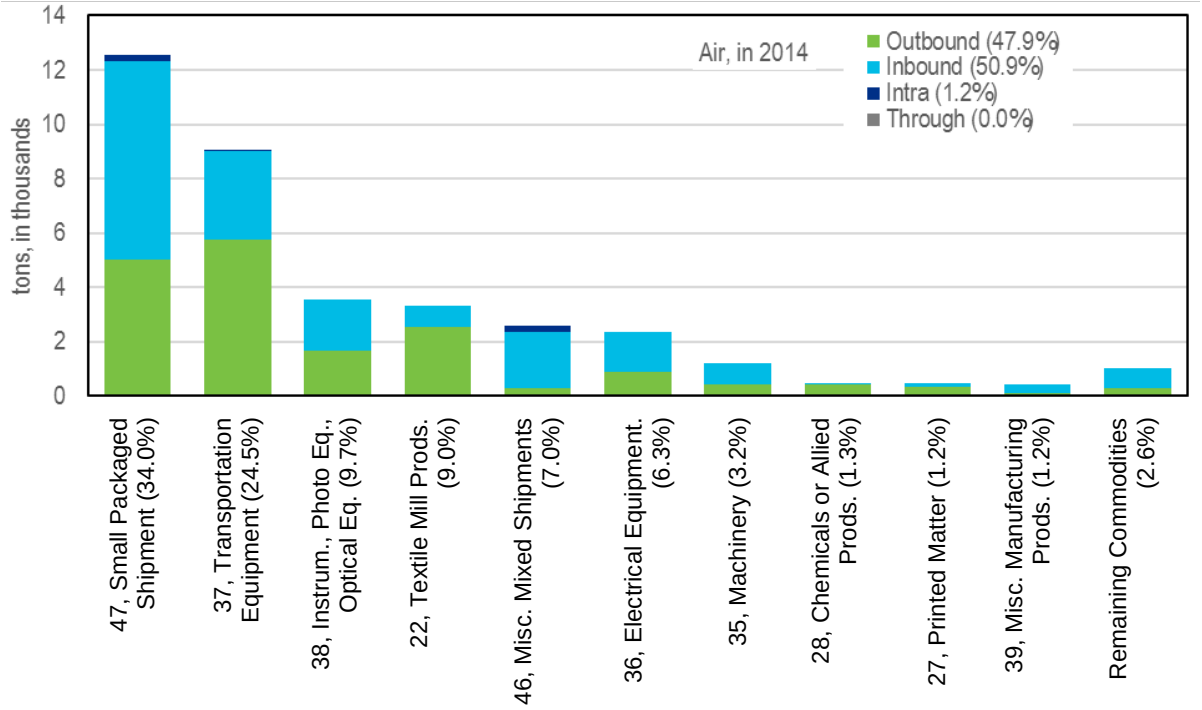
Commodities – Figure 28 and Figure 29 depict the top two-digit STCC commodities for Kansas air, by tonnage and value, respectively, with a directional composition. Such graphics depict the largest respective commodity movements for air by direction, and in conjunction with the tabulated data in Table 29 through Table 32, in the Appendix, the top air commodity movements by direction are identified in the respective subsections.

In terms of all air directions combined, the top five commodities include:

- *by Tonnage*:
  1. Small Packaged Shipments (12.5 thousand tons, 34.0% of air total);
  2. Transportation Equipment (9.0 thousand, 24.5%);
  3. Instrument, Photo, and Optical Equip. (3.6 thousand, 9.7%);
  4. Textile Mill Products (3.3 thousand, 9.0%); and,
  5. Miscellaneous Mixed Shipments (2.6 thousand, 7.0%)

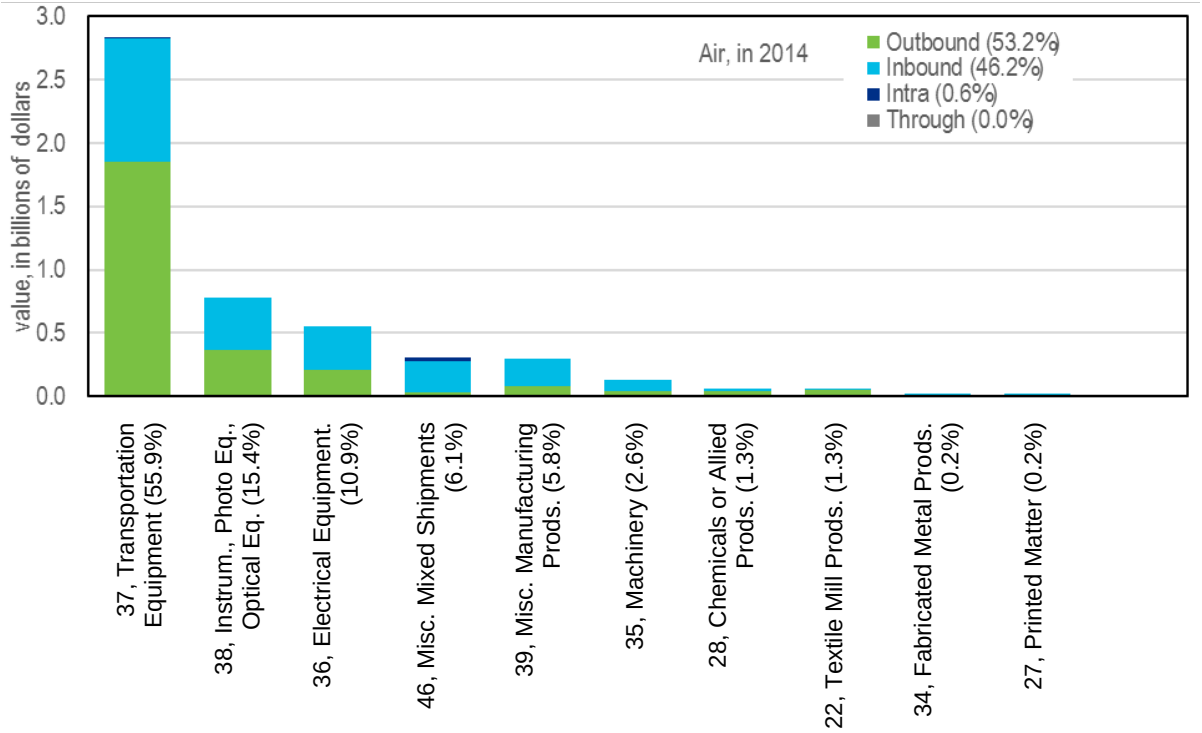
- *by Value*:
  1. Transportation Equipment ($2.8 billion, 55.9% of air total);
  2. Instrument, Photo, and Optical Equip. ($0.8 billion, 15.4%);
  3. Electrical Equipment ($0.5 billion, 10.9%);
  4. Miscellaneous Mixed Shipments ($0.3 billion, 6.1%); and,
  5. Miscellaneous Manufacturing Products ($0.3 billion, 5.8%)

Figure 28: Air Top Commodities by Tonnage, 2014



Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Figure 29: Air Top Commodities by Value, 2014



Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014, note totals may not sum due to rounding

2.4.1 Air Outbound

Table 29 in the Appendix presents outbound air commodities from Kansas, in 2014, which total 17,660 tons (47.9% of directional movements), valued at $2.7 billion (53.2%), with an average value/ton of $152,227; top five commodities include:

- *by Tonnage*:
  1. Transportation Equipment (5.7 thousand tons, 32.5% of outbound total);
  2. Small Packaged Shipments (5.0 thousand, 28.5%);
  3. Textile Mill Products (2.5 thousand, 14.4%);
  4. Instrument, Photo, and Optical Equip. (1.7 thousand, 9.4%); and,
  5. Electrical Equipment (0.9 thousand, 5.0%)

- *by Value*:
  1. Transportation Equipment ($1.8 billion, 68.8% of outbound total);
  2. Instrument, Photo, and Optical Equip. ($0.4 billion, 13.4%);
  3. Electrical Equipment ($0.2 billion, 7.8%);
  4. Miscellaneous Manufacturing Products ($0.1 billion, 3.1%); and,
  5. Textile Mill Products ($0.0 billion, 1.8%)

2.4.2 Air Inbound

Table 30 in the Appendix presents inbound air commodities to Kansas, in 2014, which total 18,756 tons (50.9% of directional movements), valued at $2.3 billion (46.2%), with an average value/ton of $124,425; top five commodities include:

- *by Tonnage*:
  1. Small Packaged Shipments (7.3 thousand tons, 38.8% of inbound total);
  2. Transportation Equipment (3.3 thousand, 17.4%);
  3. Miscellaneous Mixed Shipments (2.0 thousand, 10.9%);
  4. Instrument, Photo, and Optical Equip. (1.9 thousand, 10.1%); and,
  5. Electrical Equipment (1.4 thousand, 7.7%)

- *by Value*:
  1. Transportation Equipment ($1.0 billion, 41.8% of inbound total);
  2. Instrument, Photo, and Optical Equip. ($0.4 billion, 17.8%);
  3. Electrical Equipment ($0.3 billion, 14.6%);
  4. Miscellaneous Mixed Shipments ($0.2 billion, 10.6%); and,
  5. Miscellaneous Manufacturing Products ($0.2 billion, 9.1%)

2.4.3 Air Intra

Table 31 in the Appendix presents intrastate air commodities to Kansas, in 2014, which total 460 tons (1.2% of directional movements), valued at $28 million (0.6%), with an average value/ton of $60,730. Miscellaneous Mixed Shipments and Small Packaged Shipments are the only two relevant commodities.

2.5 Pipeline, 2014

Kansas pipeline movements in 2014 totaled 102.2 thousand tons, valued at $42 million, see Table 11. On average, total pipeline commodity movements are valued at $410/ton. Pipeline movements represent less than 0.02% or modal tonnage in Kansas and 0.01% of total modal value in 2014, according the IHS TRANSEARCH® database.

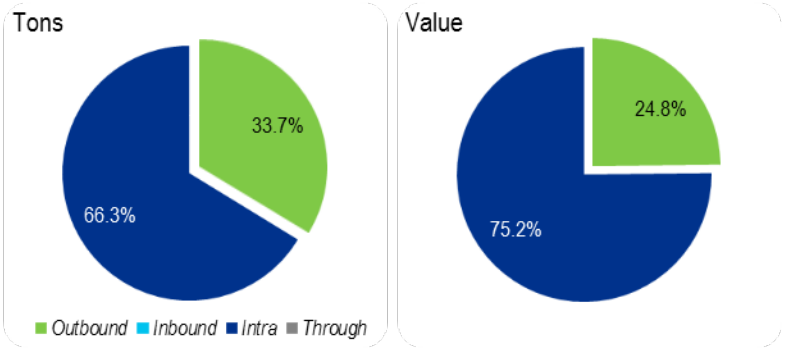
As depicted in Figure 30, only outbound and intrastate directions exist for pipeline in Kansas, with intrastate constituting about twice the volume as outbound and three times the value.

Table 11: Pipeline by Direction, 2014

Direction	Tons		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	
Outbound	34,450	33.7%	$10	24.8%	$290
Inbound	#N/A	#N/A	#N/A	#N/A	#N/A
Intra	67,720	66.3%	$31	75.2%	$458
Through	#N/A	#N/A	#N/A	#N/A	#N/A
Total	102,170	100.0%	$41	100.0%	$411

Source: prepared by CDM Smith, based on TRANSEARCH® for 2014
note totals may not sum due to rounding

Figure 30: Pipeline Percentages by Direction, 2014



Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014

As Kansas pipeline movements comprise just one STCC2 commodity (STCC 13: Crude Petroleum and Natural Gas) and two directions (outbound and intrastate), graphical depictions of the top two-digit STCC commodities are unwarranted, as are the aggregated directional top commodity outline and detailed Appendix tables.

3 Forecast Freight

Given the available IHS TRANSEARCH® database to KSDOT is a truncated version relative to the standard product and does not include forecasts, the FHWA FAF data was culled to determine relative growth in freight by mode, direction, and commodity. FHWA FAF and IHS TRANSEARCH® are notably different regarding non-surface modes; FAF does not include through traffic; and, the commodity compositions are different. As such, direct comparison between the sources is not attempted herein and should be cautioned. FHWA FAF forecast data is presented, with focus on the relative growth projected via that data source. As through traffic is excluded from the FHWA FAF, the directional subtotals presented account for the combination of outbound, inbound, and intrastate movements for Kansas; however, total national freight forecasts were obtained to serve as a crude proxy for through traffic growth.

Tonnage across the Kansas freight network is forecast, by FHWA FAF, to grow 30.5% from 2014 to 2040 (1.0% annually), as summarized in Table 12. While waterborne and airborne freight are forecast to exhibit the fastest growth rates of the modes (3.8% and 3.5% annually, respectively), growth is from a relatively small tonnage base in 2014, and has little bearing on the absolute tonnage growth projected on the entire network. In contrast, truck growth is forecast to grow by 33.9% (1.1% annually), and rail at 11.6% (0.4% annually). Directionally, the growth projections are all similar, with a slightly greater growth in inbound relative to outbound and intrastate freight projections.

Table 12: Tonnage Forecast by Mode and Direction, 2014 to 2040

Direction	Truck	Rail	Water	Air	Pipe	Total
2014						
Outbound	52,413,268	36,428,929	1,777,261	38,992	41,314,883	131,973,333
Inbound	53,644,432	20,335,728	743,745	43,707	49,103,829	123,871,441
Intra	153,396,620	1,316,832	30,688	863	12,268,499	167,013,502
Through	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Total	259,454,320	58,081,489	2,551,694	83,562	102,687,211	422,858,276
2040						
Outbound	67,617,587	46,194,027	4,757,540	94,768	54,395,573	173,059,495
Inbound	79,015,374	16,801,526	2,018,627	105,715	68,492,172	166,433,414
Intra	200,685,836	1,832,397	20,290	2,383	9,651,094	212,192,000
Through	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Total	347,318,797	64,827,950	6,796,457	202,866	132,538,839	551,684,909
Annual % Growth						
Outbound	1.0%	0.9%	3.9%	3.5%	1.1%	1.0%
Inbound	1.5%	-0.7%	3.9%	3.5%	1.3%	1.1%
Intra	1.0%	1.3%	-1.6%	4.0%	-0.9%	0.9%
Through *	1.2%	0.5%	1.1%	4.2%	1.3%	1.1%
Total	1.1%	0.4%	3.8%	3.5%	1.0%	1.0%
Total % Growth						
Outbound	29.0%	26.8%	167.7%	143.0%	31.7%	31.1%
Inbound	47.3%	-17.4%	171.4%	141.9%	39.5%	34.4%
Intra	30.8%	39.2%	-33.9%	176.2%	-21.3%	27.1%
Through *	36.6%	13.8%	32.1%	192.6%	38.7%	34.5%
Total	33.9%	11.6%	166.4%	142.8%	29.1%	30.5%
Growth in Tons						
Outbound	15,204,319	9,765,098	2,980,279	55,776	13,080,689	41,086,161
Inbound	25,370,942	-3,534,202	1,274,882	62,008	19,388,343	42,561,973
Intra	47,289,216	515,565	-10,398	1,520	-2,617,405	45,178,498
Through	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Total	87,864,477	6,746,461	4,244,763	119,304	29,851,627	128,826,632

* through growth reflects national totals as proxy

Source: prepared by CDM Smith, based on FHWA FAF v4.1 data for 2014 and 2040
note totals may not sum due to rounding

3.1 Truck Forecast

Table 13 depicts outbound, inbound, and intrastate truck estimates for Kansas in 2014 and 2040 from the FHWA FAF. Truck tonnage is forecast to increase 33.9% (1.1% annually) over that future horizon, and value is forecast to increase 46.5% (1.5% annually). Inbound traffic is projected to increase more quickly than outbound or intrastate truck movements.

Table 13: Truck Forecast by Direction, 2014 to 2040

Direction	2014		2040		Percent Change	
	Amount	Percent	Amount	Percent	Total	CAGR
Tons						
Outbound	52,413,268	20.2%	67,617,587	19.5%	29.0%	1.0%
Inbound	53,644,432	20.7%	79,015,374	22.8%	47.3%	1.5%
Intra	153,396,620	59.1%	200,685,836	57.8%	30.8%	1.0%
Through *	#N/A	#N/A	#N/A	#N/A	36.6%	1.2%
Total	259,454,320	100.0%	347,318,797	100.0%	33.9%	1.1%
Value, in millions						
Outbound	$102,544	36.8%	$150,800	37.0%	47.1%	1.5%
Inbound	$78,043	28.0%	$124,850	30.6%	60.0%	1.8%
Intra	$97,781	35.1%	$132,165	32.4%	35.2%	1.2%
Through *	#N/A	#N/A	#N/A	#N/A	70.1%	2.1%
Total	$278,368	100.0%	$407,815	100.0%	46.5%	1.5%

** through growth reflects national totals as proxy*
Source: prepared by CDM Smith, based on FHWA FAF v4.1 data for 2014 and 2040
note totals may not sum due to rounding

Table 33 in the Appendix summarizes truck-based commodity tonnage growth from 2014 to 2040; top five commodities include:

- *by Tonnage in 2040*:
  1. Cereal Grains (81.6 million tons, 23.5% of truck total);
  2. Nonmetal Mineral Products (30.9 million, 8.9%);
  3. Animal Feed (22.5 million, 6.5%);
  4. Mixed Freight (20.2 million, 5.8%); and,
  5. Fuel Oils (18.5 million, 5.3%)

- *by Tonnage Percent Growth*:
  1. Electronics (139.4%, 3.4% CAGR);
  2. Precision Instruments (128.7%, 3.2% CAGR);
  3. Waste/Scrap (98.7%, 2.7% CAGR);
  4. Machinery (97.9%, 2.7% CAGR); and,
  5. Building Stone (97.7%, 2.7% CAGR)

- *by Tonnage Volume Growth*:
  1. Cereal Grains (11.9 million tons, 0.6% CAGR);
  2. Nonmetal Mineral Products (11.2 million, 1.7% CAGR);
  3. Animal Feed (8.0 million, 1.7% CAGR);
  4. Natural Sands (6.5 million, 1.9% CAGR); and,
  5. Mixed Freight (4.8 million, 1.1% CAGR)

3.2 Rail Forecast

Table 14 depicts outbound, inbound, and intrastate rail estimates for Kansas in 2014 and 2040 from the FHWA FAF. Rail tonnage is forecast to increase 11.6% (0.4% annually) over that future horizon, and value is forecast to increase 40.0% (1.3% annually). As through rail traffic is a large current movement (see Section 2.2.4), a forecast of such movement would be ideal from FHWA FAF. In the absence of through movement data from the FAF, the national total for rail was obtained, which estimates 13.8% tonnage growth (0.5% annually) over that timeframe.

However, as most of Kansas through rail is coal, it is worth noting that the national total rail forecasts for Coal, from 2014 to 2040, declines 38.2% (1.8% annually).

Table 14: Rail Forecast by Direction, 2014 to 2040

Direction	2014		2040		Percent Change	
	Amount	Percent	Amount	Percent	Total	CAGR
Tons						
Outbound	36,428,929	62.7%	46,194,027	71.3%	26.8%	0.9%
Inbound	20,335,728	35.0%	16,801,526	25.9%	-17.4%	-0.7%
Intra	1,316,832	2.3%	1,832,397	2.8%	39.2%	1.3%
Through *	#N/A	#N/A	#N/A	#N/A	13.8%	0.5%
Total	58,081,489	100.0%	64,827,950	100.0%	11.6%	0.4%
Value, in millions						
Outbound	$12,236	60.6%	$16,237	57.5%	32.7%	1.1%
Inbound	$7,630	37.8%	$11,573	41.0%	51.7%	1.6%
Intra	$319	1.6%	$442	1.6%	38.8%	1.3%
Through *	#N/A	#N/A	#N/A	#N/A	68.9%	2.0%
Total	$20,185	100.0%	$28,252	100.0%	40.0%	1.3%

** through growth reflects national totals as proxy*
Source: prepared by CDM Smith, based on FHWA FAF v4.1 data for 2014 and 2040
note totals may not sum due to rounding

Table 34 in the Appendix summarizes rail-based commodity tonnage growth from 2014 to 2040; top five commodities include:

- *by Tonnage in 2040*:
  1. Cereal Grains (44.0 million tons, 67.9% of rail total);
  2. Coal (6.3 million, 9.7%);
  3. Other Foodstuffs (2.4 million, 3.7%);
  4. Fertilizers (2.3 million, 3.6%); and,
  5. Basic Chemicals (1.8 million, 2.7%)

- *by Tonnage Percent Growth*:
  1. Furniture (435.5%, 6.7% CAGR);
  2. Electronics (269.8%, 5.2% CAGR);
  3. Textiles/Leather (186.3%, 4.1% CAGR);
  4. Machinery (136.9%, 3.4% CAGR); and,
  5. Other Ag Prods. (127.2%, 3.2% CAGR)

- *by Tonnage Volume Growth*:
  1. Cereal Grains (9.3 million tons, 0.9% CAGR);
  2. Other Foodstuffs (1.0 million, 2.1% CAGR);
  3. Fertilizers (0.8 million, 1.5% CAGR);
  4. Basic Chemicals (0.7 million, 1.8% CAGR); and,
  5. Milled Grain Prods. (0.4 million, 1.9% CAGR)

3.3 Water Forecast

Table 15 depicts outbound, inbound, and intrastate water estimates for Kansas in 2014 and 2040 from the FHWA FAF. Water tonnage is forecast to increase 166.4% (3.8% annually) over that future horizon, and value is forecast to increase 225.9% (4.6% annually). Kansas-related

waterborne movements are forecasted to grow two-to-three times as quickly as the national total in waterborne movements (as per the through traffic proxy).

Table 15: Water Forecast by Direction, 2014 to 2040

Direction	2014		2040		Percent Change	
	Amount	Percent	Amount	Percent	Total	CAGR
Tons						
Outbound	1,777,261	69.7%	4,757,540	70.0%	167.7%	3.9%
Inbound	743,745	29.1%	2,018,627	29.7%	171.4%	3.9%
Intra	30,688	1.2%	20,290	0.3%	-33.9%	-1.6%
Through *	#N/A	#N/A	#N/A	#N/A	32.1%	1.1%
Total	2,551,694	100.0%	6,796,457	100.0%	166.4%	3.8%
Value, in millions						
Outbound	$1,806	33.9%	$5,383	31.0%	198.0%	4.3%
Inbound	$3,497	65.7%	$11,953	68.9%	241.8%	4.8%
Intra	$21	0.4%	$14	0.1%	-33.9%	-1.6%
Through *	#N/A	#N/A	#N/A	#N/A	96.3%	2.6%
Total	$5,324	100.0%	$17,350	100.0%	225.9%	4.6%

** through growth reflects national totals as proxy*
Source: prepared by CDM Smith, based on FHWA FAF v4.1 data for 2014 and 2040
note totals may not sum due to rounding

Table 35 in the Appendix summarizes water-based commodity tonnage growth from 2014 to 2040; top five commodities include:

- *by Tonnage in 2040*:
  1. Cereal Grains (3.8 million tons, 55.3% of water total);
  2. Other Ag Prods. (0.5 million, 8.0%);
  3. Electronics (0.3 million, 4.8%);
  4. Machinery (0.3 million, 4.0%); and,
  5. Milled Grain Prods. (0.3 million, 3.7%)

- *by Tonnage Percent Growth*:
  1. Metallic Ores (539.4%, 7.4% CAGR);
  2. Furniture (453.9%, 6.8% CAGR);
  3. Building Stone (446.2%, 6.7% CAGR);
  4. Precision Instruments (398.8%, 6.4% CAGR); and,
  5. Alcoholic Beverages (397.7%, 6.4% CAGR)

- *by Tonnage Volume Growth*:
  1. Cereal Grains (2.4 million tons, 4.0% CAGR);
  2. Other Ag Prods. (0.4 million, 5.2% CAGR);
  3. Electronics (0.2 million, 5.4% CAGR);
  4. Machinery (0.2 million, 4.9% CAGR); and,
  5. Milled Grain Prods. (0.2 million, 3.7% CAGR)

3.4 Air Forecast

Table 16 depicts outbound, inbound, and intrastate air estimates for Kansas in 2014 and 2040 from the FHWA FAF. Air tonnage is forecast to increase 142.8% (3.5% annually) over that future horizon, and value is forecast to increase 183.2% (4.1% annually). Inbound traffic is

projected to increase more quickly than outbound or intrastate air movements. Kansas-related airborne movements are forecasted to grow slightly more slowly than the national total in airborne movements (as per the through traffic proxy).

Table 16: Air Forecast by Direction, 2014 to 2040

Direction	2014		2040		Percent Change	
	Amount	Percent	Amount	Percent	Total	CAGR
Tons						
Outbound	38,992	46.7%	94,768	46.7%	143.0%	3.5%
Inbound	43,707	52.3%	105,715	52.1%	141.9%	3.5%
Intra	863	1.0%	2,383	1.2%	176.2%	4.0%
Through *	#N/A	#N/A	#N/A	#N/A	192.6%	4.2%
Total	83,562	100.0%	202,866	100.0%	142.8%	3.5%
Value, in millions						
Outbound	$4,182	49.7%	$11,716	49.1%	180.2%	4.0%
Inbound	$3,782	44.9%	$11,015	46.2%	191.2%	4.2%
Intra	$456	5.4%	$1,117	4.7%	145.0%	3.5%
Through *	#N/A	#N/A	#N/A	#N/A	252.9%	5.0%
Total	$8,420	100.0%	$23,848	100.0%	183.2%	4.1%

** through growth reflects national totals as proxy*
Source: prepared by CDM Smith, based on FHWA FAF v4.1 data for 2014 and 2040
note totals may not sum due to rounding

Table 36 in the Appendix summarizes air-based commodity tonnage growth from 2014 to 2040; top five commodities include:

- *by Tonnage in 2040*:
  1. Electronics (51.0 thousand tons, 25.1% of air total);
  2. Machinery (27.2 thousand, 13.4%);
  3. Transport Equip. (22.8 thousand, 11.3%);
  4. Precision Instruments (20.6 thousand, 10.2%); and,
  5. Textiles/Leather (19.4 thousand, 9.6%)

- *by Tonnage Percent Growth*:
  1. Furniture (452.3%, 6.8% CAGR);
  2. Alcoholic Beverages (340.0%, 5.9% CAGR);
  3. Chemical Prods. (263.0%, 5.1% CAGR);
  4. Electronics (230.3%, 4.7% CAGR); and,
  5. Precision Instruments (198.8%, 4.3% CAGR)

- *by Tonnage Volume Growth*:
  1. Electronics (35.5 thousand tons, 4.7% CAGR);
  2. Machinery (17.9 thousand, 4.2% CAGR);
  3. Precision Instruments (13.7 thousand, 4.3% CAGR);
  4. Transport Equip. (12.5 thousand, 3.1% CAGR); and,
  5. Textiles/Leather (10.7 thousand, 3.1% CAGR)

3.5 Pipeline Forecast

Table 17 depicts outbound, inbound, and intrastate pipe estimates for Kansas in 2014 and 2040 from the FHWA FAF. Pipe tonnage is forecast to increase 29.1% (1.0% annually) over that

future horizon, and value is forecast to increase 22.6% (0.8% annually). Of the modal movements reported by FAF, pipeline is forecast to grow most slowly over the horizon.

Table 17: Pipe Forecast by Direction, 2014 to 2040

Direction	2014		2040		Percent Change	
	Amount	Percent	Amount	Percent	Total	CAGR
Tons						
Outbound	41,314,883	40.2%	54,395,573	41.0%	31.7%	1.1%
Inbound	49,103,829	47.8%	68,492,172	51.7%	39.5%	1.3%
Intra	12,268,499	11.9%	9,651,094	7.3%	-21.3%	-0.9%
Through *	#N/A	#N/A	#N/A	#N/A	38.7%	1.3%
Total	102,687,211	100.0%	132,538,839	100.0%	29.1%	1.0%
Value, in millions						
Outbound	$11,787	33.4%	$14,804	34.2%	25.6%	0.9%
Inbound	$18,020	51.0%	$24,275	56.0%	34.7%	1.2%
Intra	$5,531	15.7%	$4,252	9.8%	-23.1%	-1.0%
Through *	#N/A	#N/A	#N/A	#N/A	25.2%	0.9%
Total	$35,338	100.0%	$43,331	100.0%	22.6%	0.8%

** through growth reflects national totals as proxy*
Source: prepared by CDM Smith, based on FHWA FAF v4.1 data for 2014 and 2040
note totals may not sum due to rounding

Table 37 in the Appendix summarizes pipe-based commodity tonnage growth from 2014 to 2040; the only four commodities include:

- *by Tonnage in 2040*:
  1. Coal-N.E.C. (111.8 million tons, 84.3% of pipe total);
  2. Crude Petroleum (18.3 million, 13.8%);
  3. Gasoline (2.1 million, 1.6%); and,
  4. Basic Chemicals (0.4 million, 0.3%)

- *by Tonnage Percent Growth*:
  1. Coal-N.E.C. (34.6%, 1.2% CAGR);
  2. Basic Chemicals (33.6%, 1.1% CAGR);
  3. Gasoline (8.6%, 0.3% CAGR); and,
  4. Crude Petroleum (4.7%, 0.2% CAGR)

- *by Tonnage Volume Growth*:
  1. Coal-N.E.C. (28.8 million tons, 1.2% CAGR);
  2. Crude Petroleum (0.8 million, 0.2% CAGR);
  3. Gasoline (0.2 million, 0.3% CAGR); and,
  4. Basic Chemicals (0.1 million, 1.1% CAGR)

4 Summary

Kansas freight movements comprise a range of commodities moving in different directions (outbound, inbound, intrastate, and through) by various modes (truck, rail, ports, air, and pipeline), measured in different terms (tons, units, and value), and with varying geographic origins and destinations. These various directional movements, modes, terms, and geographies complicate simple summarization. Nonetheless, the following summary highlights major movements in 2014 from the IHS TRANSEARCH® and STB WAYBILL databases, with forecasts from the FHWA FAF.

Total Movements – A combined total 569.8 million tons of freight moved across the transportation network in Kansas in 2014, valued at over $550.4 billion, for an average value per ton of $966.

Modal Summary – Rail and truck modes carry a significant majority of the freight tonnages and values across Kansas' transportation infrastructure, with 99.9% of total tonnage and 99.1% of total value attributable to those two combined modes.

- *Rail* – 368.4 million tons in 6.9 million carload units, valued at $324.1 billion, for an average value per ton of $880. A significant majority of rail tonnage is through, by both tonnage and value – more than half of which, by volume, is comprised of coal. Rail tonnage represents 64.7% of all modal tonnage, and value represents 58.9%.

- *Truck* – 200.9 million tons in 17.6 million units, valued at $221.3 billion, for an average value per ton of $1,101. Directionally, the truck movements are fairly evenly split along the four directions. Truck volumes represent 35.3% of all modal tonnage, with value representing 40.2%.

- *Air* – 36,876 tons valued at $5.1 billion, for an average value per ton of $136,944 – smallest total volumes by mode; but, due to the relatively high values per ton, the total value is the third largest of the modes, although still less than 1.0% of all freight value.

- *Water* – 390,823 tons valued at just $3 million, for an average value per ton of $7 is represented by outbound movements of Nonmetallic Minerals to Missouri.

- *Pipeline* – 102,169 tons of energy-related commodities, valued at $42 million, for an average value per ton of $410 - all of the movements are Crude Petroleum or Natural Gas as either intrastate or outbound movements.

Directional Summary – Commodity movement, and composite terms, vary by direction.

- *Through* – Constitutes almost two-thirds of all directional movements in terms of both tonnage and value (almost entirely rail related). In terms of tonnage, the 364.3 million tons constitutes 63.9% of all directional movements, and in terms of value, the $345.5 billion of through traffic represents 62.8% of total directional value. As through traffic amounts to almost twice as much as the other three directions (inbound, outbound, and

intrastate) combined, the non-Kansas related movements disproportionately uses the Kansas transportation infrastructure. A large portion of the through movement in Coal.

- *Outbound* – About one-seventh of all freight movements for Kansas pertain to outbound movements, with 77.0 million tons, valued at $80.7 billion representing 13.5% and 14.7% of directional movements, respectively. A majority (71.0%) of all outbound tonnage is via truck, the remaining mostly via rail.

- *Inbound* – With similar directional proportions as outbound, inbound movements amount to 70.4 million tons, at 12.3% of all directional tonnage, and $68.0 billion for 12.4% of directional value. As with outbound movements, a majority of the inbound freight is carried via trucks (66.5%) with the remaining inbound coming to Kansas via rail.

- *Intrastate* – Intrastate represents the smallest relative percentage in terms of both tonnages and value, with 58.1 million tons representing 10.2% and $56.2 billion equating to 10.2% of the directional movements.

Notable Commodity Movements – Commodity movements are compared and contrasted.

- *Coal (STCC 11)* – The largest tonnage STCC commodity for all modes and directions, at 181.0 million tons (31.8% of all freight); however, given the relatively low value per ton ($88), the total value of all the such Coal-related movements only totals $15.8 billion, just 2.9% of all freight value. 166.9 million tons are through traffic (92.2%), with the remaining 14.0 million tons as inbound, mostly to the power plant in Pottawatomie County. Most of the through Coal is from Wyoming to Texas (40.1 million), Missouri (29.5 million), Illinois (22.8 million), and various other southern and eastern states (74.5 million)

- *Farm Products (STCC 01)* – The second largest tonnage STCC commodity for all modes and directions, at 81.2 million tons (14.3% of all freight). However, with a relatively small value per ton of $408, the commodity movement is worth $33.2 billion, representing 6.0% of total freight values, the fifth largest valued movement. Most of the Farm Products are moved via truck, with the remaining via rail – with outbound and through directional movements for the commodities amounting to 68.9%.

- *Nonmetallic Minerals (STCC 14)* – Third largest volumes, at 64.2 million tons (11.3% of all freight), but representing just 0.5% of all freight value due to the low value per ton of $46. Intrastate truck movements and through rail are the largest directional-mode movements for Nonmetallic Minerals, at 21.2 million and 17.2 million tons, respectively.

- *Food or Kindred Products (STCC 20)* – The fourth largest tonnage and value commodity movement, with 50.1 million tons, worth $44.4 billion, representing 8.8% and 8.1% of total freight tonnage and value, respectively – more than half of which is through rail.

- *Chemicals of Allied Products (STCC 28)* – The major commodity movement by value, with $128.2 billion dollars, representing 23.3% of all freight value movements. As the commodity has relatively high value per ton, at $3,164, the tonnage contribution to total

movements is a much smaller proportion, with 40.5 million tons representing 7.1% of all freight tonnages. As with many of the other commodities noted, a large portion of this commodity movement pertains to through rail traffic.

Forecasts – In the absence of TRANSEARCH® forecasts, data from the FHWA FAF were culled to estimate general growth expectations by mode and direction (as available). According to the FHWA FAF, the Kansas-relevant combined inbound, intrastate, and outbound freight is projected to increase 30.5% (1.0% annually) from 2014 to 2040. Waterborne and airborne freight movements are forecasted to appreciate most quickly of the modes, at 3.8% and 3.5% annually, respectively. Rail, by contrast is projected to appreciate in volumes by 0.4% annually.

Conclusion – Clearly, from a freight traffic perspective, Kansas is a longer-haul bridge state. The IHS TRANSEARCH® STB WAYBILL and data confirms this assertion with evidence indicating that the significant proportion of freight traversing the transportation network of Kansas is rail-based through traffic (mostly coal). It is thus important to understand the implications of these movements on the freight infrastructure network in Kansas, as a high proportion of the users of the system are accordingly non-Kansas based.

5 Appendix

Table 18: Truck Outbound, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average
		Amount	Percent	Amount	Percent	Amount	Percent	Value/Ton
01	Farm Products	16,186,340	29.6%	1,000,711	21.3%	$6,554	11.8%	$405
08	Forest Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
09	Fresh Fish or Marine Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
10	Metallic Ores	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
11	Coal	3,701	0.0%	149	0.0%	$0	0.0%	$35
13	Crude Petroleum or Natural Gas	6,515	0.0%	288	0.0%	$3	0.0%	$487
14	Nonmetallic Minerals	7,560,126	13.8%	310,984	6.6%	$95	0.2%	$13
19	Ordnance or Accessories	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
20	Food or Kindred Products	7,903,895	14.5%	345,042	7.3%	$10,404	18.8%	$1,316
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	1,216	0.0%	57	0.0%	$7	0.0%	$5,400
23	Apparel or Related Products	158	0.0%	10	0.0%	$1	0.0%	$8,965
24	Lumber or Wood Products	228,105	0.4%	8,770	0.2%	$194	0.3%	$848
25	Furniture or Fixtures	378	0.0%	25	0.0%	$4	0.0%	$10,908
26	Pulp, Paper, or Allied Products	227,357	0.4%	9,388	0.2%	$317	0.6%	$1,396
27	Printed Matter	269,079	0.5%	15,108	0.3%	$586	1.1%	$2,178
28	Chemicals or Allied Products	5,254,257	9.6%	259,081	5.5%	$9,669	17.5%	$1,840
29	Petroleum or Coal Products	4,310,060	7.9%	178,727	3.8%	$3,075	5.6%	$713
30	Rubber or Miscellaneous Plastics	543,871	1.0%	46,007	1.0%	$2,270	4.1%	$4,174
31	Leather or Leather Products	40	0.0%	3	0.0%	$0	0.0%	$4,163
32	Clay, Concrete, Glass, or Stone	3,455,719	6.3%	217,565	4.6%	$507	0.9%	$147
33	Primary Metal Products	226,312	0.4%	9,131	0.2%	$648	1.2%	$2,865
34	Fabricated Metal Products	586,971	1.1%	32,800	0.7%	$1,782	3.2%	$3,037
35	Machinery	224,209	0.4%	16,869	0.4%	$2,134	3.9%	$9,518
36	Electrical Equipment	125,754	0.2%	7,546	0.2%	$1,045	1.9%	$8,313
37	Transportation Equipment	368,896	0.7%	26,393	0.6%	$3,187	5.8%	$8,640
38	Instrument, Photo, and Optical Equip.	14,297	0.0%	1,138	0.0%	$96	0.2%	$6,740
39	Miscellaneous Manufacturing Products	45,454	0.1%	2,362	0.1%	$186	0.3%	$4,098
40	Waste or Scrap Materials	2,121,190	3.9%	84,326	1.8%	$507	0.9%	$239
41	Miscellaneous Freight Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
42	Shipping Containers	#N/A	#N/A	1,857,573	39.5%	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
47	Small Packaged Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
48	Waste	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	4,996,924	9.1%	278,028	5.9%	$12,123	21.9%	$2,426
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	54,660,822	100.0%	4,708,080	100.0%	$55,397	100.0%	$1,013

Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Table 19: Truck Inbound, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	12,982,397	27.7%	815,885	18.4%	$7,142	16.0%	$550
08	Forest Products	5	0.0%	0	0.0%	$0	0.0%	$2,860
09	Fresh Fish or Marine Products	2,284	0.0%	98	0.0%	$3	0.0%	$1,371
10	Metallic Ores	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
11	Coal	71,871	0.2%	2,897	0.1%	$3	0.0%	$35
13	Crude Petroleum or Natural Gas	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
14	Nonmetallic Minerals	13,310,400	28.4%	547,520	12.4%	$194	0.4%	$15
19	Ordnance or Accessories	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
20	Food or Kindred Products	3,469,115	7.4%	151,054	3.4%	$5,164	11.6%	$1,489
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	4,036	0.0%	190	0.0%	$27	0.1%	$6,739
23	Apparel or Related Products	43	0.0%	3	0.0%	$0	0.0%	$8,407
24	Lumber or Wood Products	787,643	1.7%	30,889	0.7%	$358	0.8%	$454
25	Furniture or Fixtures	15,427	0.0%	1,032	0.0%	$76	0.2%	$4,919
26	Pulp, Paper, or Allied Products	419,113	0.9%	17,386	0.4%	$737	1.6%	$1,758
27	Printed Matter	120,765	0.3%	6,787	0.2%	$265	0.6%	$2,196
28	Chemicals or Allied Products	1,491,655	3.2%	72,534	1.6%	$2,468	5.5%	$1,654
29	Petroleum or Coal Products	3,895,766	8.3%	162,158	3.7%	$2,640	5.9%	$678
30	Rubber or Miscellaneous Plastics	494,709	1.1%	41,793	0.9%	$1,955	4.4%	$3,951
31	Leather or Leather Products	226	0.0%	15	0.0%	$3	0.0%	$12,491
32	Clay, Concrete, Glass, or Stone	2,192,618	4.7%	137,878	3.1%	$342	0.8%	$156
33	Primary Metal Products	845,901	1.8%	33,843	0.8%	$1,489	3.3%	$1,761
34	Fabricated Metal Products	456,175	1.0%	25,480	0.6%	$1,509	3.4%	$3,307
35	Machinery	137,785	0.3%	10,263	0.2%	$1,149	2.6%	$8,340
36	Electrical Equipment	222,844	0.5%	13,429	0.3%	$2,749	6.1%	$12,335
37	Transportation Equipment	375,094	0.8%	26,917	0.6%	$3,220	7.2%	$8,584
38	Instrument, Photo, and Optical Equip.	23,550	0.1%	1,873	0.0%	$145	0.3%	$6,145
39	Miscellaneous Manufacturing Products	34,562	0.1%	1,797	0.0%	$142	0.3%	$4,102
40	Waste or Scrap Materials	1,256,253	2.7%	48,466	1.1%	$278	0.6%	$221
41	Miscellaneous Freight Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
42	Shipping Containers	#N/A	#N/A	2,045,154	46.2%	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	16,648	0.0%	810	0.0%	$138	0.3%	$8,274
47	Small Packaged Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
48	Waste	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	4,181,813	8.9%	229,606	5.2%	$12,504	28.0%	$2,990
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	46,808,700	100.0%	4,425,758	100.0%	$44,698	100.0%	$955

Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Table 20: Truck Intra, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	11,658,650	20.3%	721,155	11.5%	$4,681	8.5%	$401
08	Forest Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
09	Fresh Fish or Marine Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
10	Metallic Ores	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
11	Coal	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
13	Crude Petroleum or Natural Gas	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
14	Nonmetallic Minerals	21,243,018	36.9%	873,827	13.9%	$194	0.4%	$9
19	Ordnance or Accessories	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
20	Food or Kindred Products	1,014,647	1.8%	44,262	0.7%	$1,439	2.6%	$1,418
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
23	Apparel or Related Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
24	Lumber or Wood Products	68,594	0.1%	2,666	0.0%	$43	0.1%	$622
25	Furniture or Fixtures	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
26	Pulp, Paper, or Allied Products	40,071	0.1%	1,655	0.0%	$56	0.1%	$1,390
27	Printed Matter	28,508	0.0%	1,599	0.0%	$62	0.1%	$2,188
28	Chemicals or Allied Products	800,535	1.4%	39,556	0.6%	$1,308	2.4%	$1,634
29	Petroleum or Coal Products	7,399,810	12.9%	304,241	4.8%	$7,262	13.1%	$981
30	Rubber or Miscellaneous Plastics	42,958	0.1%	3,633	0.1%	$172	0.3%	$4,011
31	Leather or Leather Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
32	Clay, Concrete, Glass, or Stone	4,297,667	7.5%	274,074	4.4%	$408	0.7%	$95
33	Primary Metal Products	56,975	0.1%	2,284	0.0%	$108	0.2%	$1,889
34	Fabricated Metal Products	158,927	0.3%	8,857	0.1%	$482	0.9%	$3,032
35	Machinery	10,619	0.0%	798	0.0%	$75	0.1%	$7,030
36	Electrical Equipment	27,705	0.0%	1,667	0.0%	$215	0.4%	$7,758
37	Transportation Equipment	114,280	0.2%	8,138	0.1%	$1,055	1.9%	$9,229
38	Instrument, Photo, and Optical Equip.	1,289	0.0%	103	0.0%	$8	0.0%	$6,010
39	Miscellaneous Manufacturing Products	14,451	0.0%	751	0.0%	$56	0.1%	$3,907
40	Waste or Scrap Materials	505,902	0.9%	20,273	0.3%	$112	0.2%	$222
41	Miscellaneous Freight Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
42	Shipping Containers	#N/A	#N/A	3,383,088	53.8%	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
47	Small Packaged Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
48	Waste	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	10,085,246	17.5%	595,567	9.5%	$37,523	67.9%	$3,721
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	57,569,853	100.0%	6,288,194	100.0%	$55,258	100.0%	$960

Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Table 21: Truck Through, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	6,189,902	14.8%	342,634	15.9%	$3,849	5.8%	$622
08	Forest Products	4,419	0.0%	190	0.0%	$31	0.0%	$7,021
09	Fresh Fish or Marine Products	237	0.0%	10	0.0%	$2	0.0%	$8,594
10	Metallic Ores	597	0.0%	24	0.0%	$1	0.0%	$1,404
11	Coal	165	0.0%	7	0.0%	$0	0.0%	$1,958
13	Crude Petroleum or Natural Gas	35,011	0.1%	1,437	0.1%	$14	0.0%	$411
14	Nonmetallic Minerals	3,396,992	8.1%	139,734	6.5%	$148	0.2%	$44
19	Ordnance or Accessories	2,981	0.0%	133	0.0%	$14	0.0%	$4,681
20	Food or Kindred Products	8,694,406	20.8%	378,748	17.6%	$12,371	18.8%	$1,423
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	7,029	0.0%	329	0.0%	$22	0.0%	$3,078
23	Apparel or Related Products	2,874	0.0%	173	0.0%	$31	0.0%	$10,792
24	Lumber or Wood Products	1,217,790	2.9%	47,524	2.2%	$769	1.2%	$632
25	Furniture or Fixtures	66,358	0.2%	4,437	0.2%	$371	0.6%	$5,595
26	Pulp, Paper, or Allied Products	665,618	1.6%	27,606	1.3%	$1,061	1.6%	$1,595
27	Printed Matter	232,201	0.6%	13,048	0.6%	$508	0.8%	$2,186
28	Chemicals or Allied Products	5,781,499	13.8%	284,562	13.2%	$9,866	15.0%	$1,706
29	Petroleum or Coal Products	4,060,693	9.7%	171,100	7.9%	$1,647	2.5%	$406
30	Rubber or Miscellaneous Plastics	778,375	1.9%	65,821	3.1%	$3,175	4.8%	$4,079
31	Leather or Leather Products	794	0.0%	53	0.0%	$11	0.0%	$13,804
32	Clay, Concrete, Glass, or Stone	1,567,339	3.7%	95,903	4.4%	$400	0.6%	$255
33	Primary Metal Products	1,843,312	4.4%	73,871	3.4%	$3,459	5.2%	$1,876
34	Fabricated Metal Products	599,074	1.4%	33,432	1.6%	$3,110	4.7%	$5,192
35	Machinery	763,409	1.8%	56,948	2.6%	$8,702	13.2%	$11,399
36	Electrical Equipment	450,555	1.1%	27,084	1.3%	$5,989	9.1%	$13,292
37	Transportation Equipment	657,700	1.6%	47,495	2.2%	$4,523	6.9%	$6,878
38	Instrument, Photo, and Optical Equip.	50,479	0.1%	4,027	0.2%	$746	1.1%	$14,784
39	Miscellaneous Manufacturing Products	63,686	0.2%	3,307	0.2%	$275	0.4%	$4,311
40	Waste or Scrap Materials	1,439,574	3.4%	55,282	2.6%	$351	0.5%	$244
41	Miscellaneous Freight Shipments	327	0.0%	16	0.0%	$4	0.0%	$12,917
42	Shipping Containers	#N/A	#N/A	122,205	5.7%	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	46,547	0.1%	2,264	0.1%	$447	0.7%	$9,613
47	Small Packaged Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
48	Waste	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	3,231,527	7.7%	157,189	7.3%	$4,007	6.1%	$1,240
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	41,851,471	100.0%	2,156,594	100.0%	$65,905	100.0%	$1,575

Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Table 22: Truck Total, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	47,017,289	23.4%	2,880,385	16.4%	$22,226	10.0%	$473
08	Forest Products	4,424	0.0%	190	0.0%	$31	0.0%	$7,017
09	Fresh Fish or Marine Products	2,520	0.0%	109	0.0%	$5	0.0%	$2,050
10	Metallic Ores	597	0.0%	24	0.0%	$1	0.0%	$1,404
11	Coal	75,737	0.0%	3,053	0.0%	$3	0.0%	$39
13	Crude Petroleum or Natural Gas	41,527	0.0%	1,725	0.0%	$18	0.0%	$423
14	Nonmetallic Minerals	45,510,536	22.7%	1,872,065	10.6%	$631	0.3%	$14
19	Ordnance or Accessories	2,981	0.0%	133	0.0%	$14	0.0%	$4,681
20	Food or Kindred Products	21,082,064	10.5%	919,106	5.2%	$29,377	13.3%	$1,393
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	12,281	0.0%	576	0.0%	$55	0.0%	$4,511
23	Apparel or Related Products	3,074	0.0%	185	0.0%	$33	0.0%	$10,665
24	Lumber or Wood Products	2,302,132	1.1%	89,849	0.5%	$1,363	0.6%	$592
25	Furniture or Fixtures	82,163	0.0%	5,494	0.0%	$451	0.2%	$5,492
26	Pulp, Paper, or Allied Products	1,352,158	0.7%	56,035	0.3%	$2,171	1.0%	$1,606
27	Printed Matter	650,553	0.3%	36,542	0.2%	$1,421	0.6%	$2,185
28	Chemicals or Allied Products	13,327,946	6.6%	655,732	3.7%	$23,311	10.5%	$1,749
29	Petroleum or Coal Products	19,666,330	9.8%	816,226	4.6%	$14,625	6.6%	$744
30	Rubber or Miscellaneous Plastics	1,859,913	0.9%	157,255	0.9%	$7,572	3.4%	$4,071
31	Leather or Leather Products	1,059	0.0%	71	0.0%	$14	0.0%	$13,163
32	Clay, Concrete, Glass, or Stone	11,513,344	5.7%	725,420	4.1%	$1,657	0.7%	$144
33	Primary Metal Products	2,972,500	1.5%	119,129	0.7%	$5,704	2.6%	$1,919
34	Fabricated Metal Products	1,801,146	0.9%	100,569	0.6%	$6,883	3.1%	$3,821
35	Machinery	1,136,022	0.6%	84,879	0.5%	$12,060	5.5%	$10,616
36	Electrical Equipment	826,858	0.4%	49,727	0.3%	$9,998	4.5%	$12,092
37	Transportation Equipment	1,515,971	0.8%	108,943	0.6%	$11,985	5.4%	$7,906
38	Instrument, Photo, and Optical Equip.	89,615	0.0%	7,141	0.0%	$995	0.4%	$11,104
39	Miscellaneous Manufacturing Products	158,153	0.1%	8,218	0.0%	$659	0.3%	$4,167
40	Waste or Scrap Materials	5,322,919	2.6%	208,347	1.2%	$1,247	0.6%	$234
41	Miscellaneous Freight Shipments	327	0.0%	16	0.0%	$4	0.0%	$12,917
42	Shipping Containers	#N/A	#N/A	7,408,020	42.1%	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	63,195	0.0%	3,074	0.0%	$585	0.3%	$9,260
47	Small Packaged Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
48	Waste	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	22,495,511	11.2%	1,260,390	7.2%	$66,157	29.9%	$2,941
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	200,890,846	100.0%	17,578,626	100.0%	$221,258	100.0%	$1,101

Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Table 23: Rail Outbound, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	10,550,701	48.1%	125,098	32.3%	$3,346	14.8%	$317
08	Forest Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
09	Fresh Fish or Marine Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
10	Metallic Ores	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
11	Coal	97,900	0.4%	1,000	0.3%	$20	0.1%	$200
13	Crude Petroleum or Natural Gas	9,160	0.0%	120	0.0%	$5	0.0%	$555
14	Nonmetallic Minerals	405,924	1.9%	4,140	1.1%	$138	0.6%	$339
19	Ordnance or Accessories	7,500	0.0%	512	0.1%	$35	0.2%	$4,681
20	Food or Kindred Products	2,507,164	11.4%	37,616	9.7%	$1,758	7.8%	$701
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	840	0.0%	40	0.0%	$3	0.0%	$3,309
23	Apparel or Related Products	840	0.0%	40	0.0%	$6	0.0%	$7,334
24	Lumber or Wood Products	27,880	0.1%	920	0.2%	$131	0.6%	$4,709
25	Furniture or Fixtures	5,560	0.0%	1,080	0.3%	$33	0.1%	$6,019
26	Pulp, Paper, or Allied Products	27,200	0.1%	1,520	0.4%	$20	0.1%	$748
27	Printed Matter	240	0.0%	80	0.0%	$0	0.0%	$1,312
28	Chemicals or Allied Products	2,736,562	12.5%	32,582	8.4%	$4,852	21.4%	$1,773
29	Petroleum or Coal Products	1,460,168	6.7%	19,548	5.1%	$1,902	8.4%	$1,302
30	Rubber or Miscellaneous Plastics	14,040	0.1%	960	0.2%	$88	0.4%	$6,285
31	Leather or Leather Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
32	Clay, Concrete, Glass, or Stone	869,232	4.0%	8,108	2.1%	$714	3.2%	$822
33	Primary Metal Products	125,200	0.6%	1,680	0.4%	$420	1.9%	$3,358
34	Fabricated Metal Products	7,120	0.0%	440	0.1%	$64	0.3%	$9,019
35	Machinery	75,952	0.3%	1,128	0.3%	$1,748	7.7%	$23,018
36	Electrical Equipment	25,520	0.1%	2,040	0.5%	$270	1.2%	$10,590
37	Transportation Equipment	503,920	2.3%	25,324	6.5%	$5,310	23.5%	$10,536
38	Instrument, Photo, and Optical Equip.	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
39	Miscellaneous Manufacturing Products	3,920	0.0%	240	0.1%	$19	0.1%	$4,840
40	Waste or Scrap Materials	743,710	3.4%	11,079	2.9%	$540	2.4%	$726
41	Miscellaneous Freight Shipments	13,352	0.1%	965	0.2%	$163	0.7%	$12,241
42	Shipping Containers	83,680	0.4%	17,560	4.5%	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	92,840	0.4%	5,400	1.4%	$60	0.3%	$642
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	1,485,160	6.8%	84,280	21.8%	$954	4.2%	$642
47	Small Packaged Shipments	33,040	0.2%	3,240	0.8%	$21	0.1%	$642
48	Waste	4,788	0.0%	48	0.0%	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	21,919,113	100.0%	386,788	100.0%	$22,622	100.0%	$1,032

Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Table 24: Rail Inbound, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	613,744	2.6%	5,874	1.5%	$190	0.9%	$309
08	Forest Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
09	Fresh Fish or Marine Products	760	0.0%	40	0.0%	$1	0.0%	$1,360
10	Metallic Ores	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
11	Coal	13,926,635	59.2%	116,808	30.6%	$3,733	17.8%	$268
13	Crude Petroleum or Natural Gas	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
14	Nonmetallic Minerals	476,057	2.0%	4,362	1.1%	$29	0.1%	$61
19	Ordnance or Accessories	3,320	0.0%	176	0.0%	$16	0.1%	$4,681
20	Food or Kindred Products	1,057,620	4.5%	15,272	4.0%	$1,326	6.3%	$1,254
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	4,400	0.0%	200	0.1%	$15	0.1%	$3,309
23	Apparel or Related Products	480	0.0%	80	0.0%	$3	0.0%	$5,285
24	Lumber or Wood Products	289,520	1.2%	3,152	0.8%	$227	1.1%	$783
25	Furniture or Fixtures	9,360	0.0%	1,000	0.3%	$58	0.3%	$6,173
26	Pulp, Paper, or Allied Products	193,360	0.8%	3,680	1.0%	$156	0.7%	$809
27	Printed Matter	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
28	Chemicals or Allied Products	1,764,390	7.5%	23,808	6.2%	$2,943	14.0%	$1,668
29	Petroleum or Coal Products	640,716	2.7%	8,664	2.3%	$751	3.6%	$1,172
30	Rubber or Miscellaneous Plastics	3,400	0.0%	240	0.1%	$13	0.1%	$3,840
31	Leather or Leather Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
32	Clay, Concrete, Glass, or Stone	1,230,532	5.2%	12,628	3.3%	$191	0.9%	$155
33	Primary Metal Products	525,148	2.2%	5,788	1.5%	$913	4.3%	$1,738
34	Fabricated Metal Products	3,920	0.0%	280	0.1%	$42	0.2%	$10,789
35	Machinery	64,364	0.3%	1,300	0.3%	$608	2.9%	$9,448
36	Electrical Equipment	21,000	0.1%	1,400	0.4%	$93	0.4%	$4,422
37	Transportation Equipment	661,256	2.8%	26,276	6.9%	$8,097	38.5%	$12,244
38	Instrument, Photo, and Optical Equip.	2,080	0.0%	200	0.1%	$38	0.2%	$18,167
39	Miscellaneous Manufacturing Products	8,680	0.0%	760	0.2%	$44	0.2%	$5,062
40	Waste or Scrap Materials	53,128	0.2%	812	0.2%	$35	0.2%	$659
41	Miscellaneous Freight Shipments	56,642	0.2%	2,328	0.6%	$693	3.3%	$12,241
42	Shipping Containers	56,640	0.2%	12,800	3.4%	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	71,280	0.3%	4,080	1.1%	$46	0.2%	$642
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	1,690,960	7.2%	122,720	32.1%	$707	3.4%	$418
47	Small Packaged Shipments	60,480	0.3%	6,280	1.6%	$39	0.2%	$642
48	Waste	53,440	0.2%	760	0.2%	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	23,543,312	100.0%	381,768	100.0%	$21,005	100.0%	$892

Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Table 25: Rail Intra, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
08	Forest Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
09	Fresh Fish or Marine Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
10	Metallic Ores	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
11	Coal	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
13	Crude Petroleum or Natural Gas	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
14	Nonmetallic Minerals	144,300	29.5%	1,456	23.8%	$25	2.8%	$175
19	Ordnance or Accessories	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
20	Food or Kindred Products	61,396	12.5%	644	10.5%	$50	5.5%	$808
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
23	Apparel or Related Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
24	Lumber or Wood Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
25	Furniture or Fixtures	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
26	Pulp, Paper, or Allied Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
27	Printed Matter	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
28	Chemicals or Allied Products	102,080	20.8%	1,040	17.0%	$263	29.2%	$2,575
29	Petroleum or Coal Products	21,120	4.3%	240	3.9%	$28	3.1%	$1,323
30	Rubber or Miscellaneous Plastics	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
31	Leather or Leather Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
32	Clay, Concrete, Glass, or Stone	113,172	23.1%	1,080	17.7%	$75	8.3%	$663
33	Primary Metal Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
34	Fabricated Metal Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
35	Machinery	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
36	Electrical Equipment	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
37	Transportation Equipment	39,936	8.2%	1,566	25.6%	$456	50.6%	$11,414
38	Instrument, Photo, and Optical Equip.	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
39	Miscellaneous Manufacturing Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
40	Waste or Scrap Materials	7,600	1.6%	80	1.3%	$5	0.5%	$616
41	Miscellaneous Freight Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
42	Shipping Containers	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
47	Small Packaged Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
48	Waste	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	489,604	100.0%	6,106	100.0%	$901	100.0%	$1,841

Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Table 26: Rail Through, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	23,059,351	7.2%	345,700	5.6%	$7,381	2.6%	$320
08	Forest Products	16,000	0.0%	600	0.0%	$148	0.1%	$9,263
09	Fresh Fish or Marine Products	22,080	0.0%	1,160	0.0%	$30	0.0%	$1,360
10	Metallic Ores	1,811,615	0.6%	18,265	0.3%	$2,411	0.9%	$1,331
11	Coal	166,939,121	51.8%	1,397,220	22.8%	$12,088	4.3%	$72
13	Crude Petroleum or Natural Gas	5,253,123	1.6%	55,761	0.9%	$2,889	1.0%	$550
14	Nonmetallic Minerals	17,222,858	5.3%	162,809	2.7%	$2,152	0.8%	$125
19	Ordnance or Accessories	31,260	0.0%	1,204	0.0%	$146	0.1%	$4,681
20	Food or Kindred Products	25,413,126	7.9%	440,587	7.2%	$11,900	4.3%	$468
21	Tobacco Products	2,800	0.0%	280	0.0%	$62	0.0%	$22,000
22	Textile Mill Products	52,920	0.0%	4,160	0.1%	$175	0.1%	$3,309
23	Apparel or Related Products	1,202,840	0.4%	96,880	1.6%	$3,893	1.4%	$3,236
24	Lumber or Wood Products	2,618,360	0.8%	36,400	0.6%	$2,131	0.8%	$814
25	Furniture or Fixtures	468,240	0.1%	42,920	0.7%	$2,962	1.1%	$6,326
26	Pulp, Paper, or Allied Products	3,013,920	0.9%	87,200	1.4%	$2,266	0.8%	$752
27	Printed Matter	169,120	0.1%	9,840	0.2%	$953	0.3%	$5,635
28	Chemicals or Allied Products	22,571,817	7.0%	339,239	5.5%	$96,718	34.6%	$4,285
29	Petroleum or Coal Products	3,572,252	1.1%	49,984	0.8%	$5,341	1.9%	$1,495
30	Rubber or Miscellaneous Plastics	640,840	0.2%	48,480	0.8%	$3,873	1.4%	$6,044
31	Leather or Leather Products	7,560	0.0%	560	0.0%	$104	0.0%	$13,804
32	Clay, Concrete, Glass, or Stone	1,589,188	0.5%	24,156	0.4%	$1,610	0.6%	$1,013
33	Primary Metal Products	3,901,280	1.2%	57,464	0.9%	$10,320	3.7%	$2,645
34	Fabricated Metal Products	380,680	0.1%	27,840	0.5%	$2,355	0.8%	$6,186
35	Machinery	407,498	0.1%	26,958	0.4%	$3,665	1.3%	$8,994
36	Electrical Equipment	480,480	0.1%	44,320	0.7%	$4,291	1.5%	$8,930
37	Transportation Equipment	5,545,245	1.7%	333,389	5.4%	$63,562	22.7%	$11,462
38	Instrument, Photo, and Optical Equip.	34,520	0.0%	2,600	0.0%	$627	0.2%	$18,167
39	Miscellaneous Manufacturing Products	337,040	0.1%	33,400	0.5%	$1,781	0.6%	$5,283
40	Waste or Scrap Materials	1,435,048	0.4%	34,188	0.6%	$663	0.2%	$462
41	Miscellaneous Freight Shipments	424,080	0.1%	62,960	1.0%	$5,191	1.9%	$12,241
42	Shipping Containers	693,720	0.2%	140,560	2.3%	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	5,080	0.0%	320	0.0%	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	826,840	0.3%	49,680	0.8%	$531	0.2%	$642
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	31,106,360	9.6%	2,095,564	34.1%	$26,934	9.6%	$866
47	Small Packaged Shipments	660,520	0.2%	63,360	1.0%	$424	0.2%	$642
48	Waste	530,742	0.2%	5,350	0.1%	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	322,447,524	100.0%	6,141,358	100.0%	$279,577	100.0%	$867

Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Table 27: Rail Total, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	34,223,796	9.3%	476,672	6.9%	$10,917	3.4%	$319
08	Forest Products	16,000	0.0%	600	0.0%	$148	0.0%	$9,263
09	Fresh Fish or Marine Products	22,840	0.0%	1,200	0.0%	$31	0.0%	$1,360
10	Metallic Ores	1,811,615	0.5%	18,265	0.3%	$2,411	0.7%	$1,331
11	Coal	180,963,656	49.1%	1,515,028	21.9%	$15,841	4.9%	$88
13	Crude Petroleum or Natural Gas	5,262,283	1.4%	55,881	0.8%	$2,894	0.9%	$550
14	Nonmetallic Minerals	18,249,139	5.0%	172,767	2.5%	$2,344	0.7%	$128
19	Ordnance or Accessories	42,080	0.0%	1,892	0.0%	$197	0.1%	$4,681
20	Food or Kindred Products	29,039,306	7.9%	494,119	7.1%	$15,034	4.6%	$518
21	Tobacco Products	2,800	0.0%	280	0.0%	$62	0.0%	$22,000
22	Textile Mill Products	58,160	0.0%	4,400	0.1%	$192	0.1%	$3,309
23	Apparel or Related Products	1,204,160	0.3%	97,000	1.4%	$3,901	1.2%	$3,240
24	Lumber or Wood Products	2,935,760	0.8%	40,472	0.6%	$2,489	0.8%	$848
25	Furniture or Fixtures	483,160	0.1%	45,000	0.7%	$3,053	0.9%	$6,319
26	Pulp, Paper, or Allied Products	3,234,480	0.9%	92,400	1.3%	$2,442	0.8%	$755
27	Printed Matter	169,360	0.0%	9,920	0.1%	$953	0.3%	$5,629
28	Chemicals or Allied Products	27,174,849	7.4%	396,669	5.7%	$104,776	32.3%	$3,856
29	Petroleum or Coal Products	5,694,256	1.5%	78,436	1.1%	$8,022	2.5%	$1,409
30	Rubber or Miscellaneous Plastics	658,280	0.2%	49,680	0.7%	$3,975	1.2%	$6,038
31	Leather or Leather Products	7,560	0.0%	560	0.0%	$104	0.0%	$13,804
32	Clay, Concrete, Glass, or Stone	3,802,124	1.0%	45,972	0.7%	$2,591	0.8%	$681
33	Primary Metal Products	4,551,628	1.2%	64,932	0.9%	$11,653	3.6%	$2,560
34	Fabricated Metal Products	391,720	0.1%	28,560	0.4%	$2,461	0.8%	$6,284
35	Machinery	547,814	0.1%	29,386	0.4%	$6,021	1.9%	$10,992
36	Electrical Equipment	527,000	0.1%	47,760	0.7%	$4,654	1.4%	$8,831
37	Transportation Equipment	6,750,357	1.8%	386,555	5.6%	$77,424	23.9%	$11,470
38	Instrument, Photo, and Optical Equip.	36,600	0.0%	2,800	0.0%	$665	0.2%	$18,167
39	Miscellaneous Manufacturing Products	349,640	0.1%	34,400	0.5%	$1,844	0.6%	$5,273
40	Waste or Scrap Materials	2,239,486	0.6%	46,159	0.7%	$1,242	0.4%	$555
41	Miscellaneous Freight Shipments	494,074	0.1%	66,253	1.0%	$6,048	1.9%	$12,241
42	Shipping Containers	834,040	0.2%	170,920	2.5%	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	5,080	0.0%	320	0.0%	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	990,960	0.3%	59,160	0.9%	$636	0.2%	$642
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	34,282,480	9.3%	2,302,564	33.3%	$28,595	8.8%	$834
47	Small Packaged Shipments	754,040	0.2%	72,880	1.1%	$484	0.1%	$642
48	Waste	588,970	0.2%	6,158	0.1%	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	368,399,553	100.0%	6,916,020	100.0%	$324,105	100.0%	$880

Source: prepared by CDM Smith, based on TRANSEARCH®/STB WAYBILL for 2014
note totals may not sum due to rounding

Table 28: Water Outbound, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
08	Forest Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
09	Fresh Fish or Marine Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
10	Metallic Ores	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
11	Coal	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
13	Crude Petroleum or Natural Gas	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
14	Nonmetallic Minerals	390,823	100.0%	#N/A	#N/A	$3	100.0%	$7
19	Ordnance or Accessories	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
20	Food or Kindred Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
23	Apparel or Related Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
24	Lumber or Wood Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
25	Furniture or Fixtures	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
26	Pulp, Paper, or Allied Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
27	Printed Matter	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
28	Chemicals or Allied Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
29	Petroleum or Coal Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
30	Rubber or Miscellaneous Plastics	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
31	Leather or Leather Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
32	Clay, Concrete, Glass, or Stone	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
33	Primary Metal Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
34	Fabricated Metal Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
35	Machinery	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
36	Electrical Equipment	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
37	Transportation Equipment	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
38	Instrument, Photo, and Optical Equip.	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
39	Miscellaneous Manufacturing Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
40	Waste or Scrap Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
41	Miscellaneous Freight Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
42	Shipping Containers	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
47	Small Packaged Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
48	Waste	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	390,823	100.0%	#N/A	#N/A	$3	100.0%	$7

Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Table 29: Air Outbound, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
08	Forest Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
09	Fresh Fish or Marine Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
10	Metallic Ores	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
11	Coal	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
13	Crude Petroleum or Natural Gas	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
14	Nonmetallic Minerals	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
19	Ordnance or Accessories	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
20	Food or Kindred Products	0	0.0%	#N/A	#N/A	$0	0.0%	$8,687
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	2,542	14.4%	#N/A	#N/A	$49	1.8%	$19,187
23	Apparel or Related Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
24	Lumber or Wood Products	1	0.0%	#N/A	#N/A	$0	0.0%	$5,105
25	Furniture or Fixtures	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
26	Pulp, Paper, or Allied Products	5	0.0%	#N/A	#N/A	$0	0.0%	$8,324
27	Printed Matter	305	1.7%	#N/A	#N/A	$7	0.3%	$24,271
28	Chemicals or Allied Products	412	2.3%	#N/A	#N/A	$41	1.5%	$100,615
29	Petroleum or Coal Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
30	Rubber or Miscellaneous Plastics	1	0.0%	#N/A	#N/A	$0	0.0%	$32,430
31	Leather or Leather Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
32	Clay, Concrete, Glass, or Stone	6	0.0%	#N/A	#N/A	$0	0.0%	$35,261
33	Primary Metal Products	0	0.0%	#N/A	#N/A	$0	0.0%	$100,042
34	Fabricated Metal Products	259	1.5%	#N/A	#N/A	$8	0.3%	$32,322
35	Machinery	399	2.3%	#N/A	#N/A	$44	1.6%	$110,815
36	Electrical Equipment	888	5.0%	#N/A	#N/A	$209	7.8%	$235,346
37	Transportation Equipment	5,748	32.5%	#N/A	#N/A	$1,849	68.8%	$321,739
38	Instrument, Photo, and Optical Equip.	1,658	9.4%	#N/A	#N/A	$361	13.4%	$218,005
39	Miscellaneous Manufacturing Products	121	0.7%	#N/A	#N/A	$83	3.1%	$688,139
40	Waste or Scrap Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
41	Miscellaneous Freight Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
42	Shipping Containers	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	289	1.6%	#N/A	#N/A	$35	1.3%	$120,782
47	Small Packaged Shipments	5,027	28.5%	#N/A	#N/A	#N/A	#N/A	#N/A
48	Waste	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	17,660	100.0%	#N/A	#N/A	$2,688	100.0%	$152,227

Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Table 30: Air Inbound, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	1	0.0%	#N/A	#N/A	$0	0.0%	$8,452
08	Forest Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
09	Fresh Fish or Marine Products	129	0.7%	#N/A	#N/A	$1	0.1%	$10,075
10	Metallic Ores	0	0.0%	#N/A	#N/A	$0	0.0%	$1,078,027
11	Coal	0	0.0%	#N/A	#N/A	$0	0.0%	$235
13	Crude Petroleum or Natural Gas	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
14	Nonmetallic Minerals	0	0.0%	#N/A	#N/A	$0	0.0%	$1,191
19	Ordnance or Accessories	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
20	Food or Kindred Products	1	0.0%	#N/A	#N/A	$0	0.0%	$7,280
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	761	4.1%	#N/A	#N/A	$15	0.6%	$19,187
23	Apparel or Related Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
24	Lumber or Wood Products	0	0.0%	#N/A	#N/A	$0	0.0%	$5,105
25	Furniture or Fixtures	1	0.0%	#N/A	#N/A	$0	0.0%	$83,057
26	Pulp, Paper, or Allied Products	0	0.0%	#N/A	#N/A	$0	0.0%	$8,324
27	Printed Matter	154	0.8%	#N/A	#N/A	$4	0.2%	$24,271
28	Chemicals or Allied Products	56	0.3%	#N/A	#N/A	$22	0.9%	$393,540
29	Petroleum or Coal Products	0	0.0%	#N/A	#N/A	$0	0.0%	$2,296
30	Rubber or Miscellaneous Plastics	229	1.2%	#N/A	#N/A	$7	0.3%	$32,430
31	Leather or Leather Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
32	Clay, Concrete, Glass, or Stone	1	0.0%	#N/A	#N/A	$0	0.0%	$35,261
33	Primary Metal Products	35	0.2%	#N/A	#N/A	$3	0.1%	$100,042
34	Fabricated Metal Products	122	0.6%	#N/A	#N/A	$4	0.2%	$32,565
35	Machinery	785	4.2%	#N/A	#N/A	$87	3.7%	$110,822
36	Electrical Equipment	1,443	7.7%	#N/A	#N/A	$340	14.6%	$235,440
37	Transportation Equipment	3,272	17.4%	#N/A	#N/A	$976	41.8%	$298,304
38	Instrument, Photo, and Optical Equip.	1,901	10.1%	#N/A	#N/A	$414	17.8%	$218,017
39	Miscellaneous Manufacturing Products	308	1.6%	#N/A	#N/A	$212	9.1%	$688,139
40	Waste or Scrap Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
41	Miscellaneous Freight Shipments	0	0.0%	#N/A	#N/A	$0	0.0%	$966,396
42	Shipping Containers	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	228	1.2%	#N/A	#N/A	$1	0.0%	$2,969
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	2,046	10.9%	#N/A	#N/A	$247	10.6%	$120,782
47	Small Packaged Shipments	7,284	38.8%	#N/A	#N/A	#N/A	#N/A	#N/A
48	Waste	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	18,756	100.0%	#N/A	#N/A	$2,334	100.0%	$124,425

Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Table 31: Air Intra, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
08	Forest Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
09	Fresh Fish or Marine Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
10	Metallic Ores	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
11	Coal	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
13	Crude Petroleum or Natural Gas	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
14	Nonmetallic Minerals	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
19	Ordnance or Accessories	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
20	Food or Kindred Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
23	Apparel or Related Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
24	Lumber or Wood Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
25	Furniture or Fixtures	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
26	Pulp, Paper, or Allied Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
27	Printed Matter	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
28	Chemicals or Allied Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
29	Petroleum or Coal Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
30	Rubber or Miscellaneous Plastics	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
31	Leather or Leather Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
32	Clay, Concrete, Glass, or Stone	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
33	Primary Metal Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
34	Fabricated Metal Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
35	Machinery	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
36	Electrical Equipment	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
37	Transportation Equipment	1	0.2%	#N/A	#N/A	$0	0.9%	$293,549
38	Instrument, Photo, and Optical Equip.	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
39	Miscellaneous Manufacturing Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
40	Waste or Scrap Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
41	Miscellaneous Freight Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
42	Shipping Containers	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	229	49.8%	#N/A	#N/A	$28	99.1%	$120,782
47	Small Packaged Shipments	230	50.0%	#N/A	#N/A	#N/A	#N/A	#N/A
48	Waste	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	460	100.0%	#N/A	#N/A	$28	100.0%	$60,730

Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Table 32: Air Total, 2014

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
01	Farm Products	1	0.0%	#N/A	#N/A	$0	0.0%	$8,452
08	Forest Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
09	Fresh Fish or Marine Products	129	0.4%	#N/A	#N/A	$1	0.0%	$10,075
10	Metallic Ores	0	0.0%	#N/A	#N/A	$0	0.0%	$1,078,027
11	Coal	0	0.0%	#N/A	#N/A	$0	0.0%	$235
13	Crude Petroleum or Natural Gas	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
14	Nonmetallic Minerals	0	0.0%	#N/A	#N/A	$0	0.0%	$1,191
19	Ordnance or Accessories	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
20	Food or Kindred Products	1	0.0%	#N/A	#N/A	$0	0.0%	$7,504
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	3,303	9.0%	#N/A	#N/A	$63	1.3%	$19,187
23	Apparel or Related Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
24	Lumber or Wood Products	1	0.0%	#N/A	#N/A	$0	0.0%	$5,105
25	Furniture or Fixtures	1	0.0%	#N/A	#N/A	$0	0.0%	$83,057
26	Pulp, Paper, or Allied Products	5	0.0%	#N/A	#N/A	$0	0.0%	$8,324
27	Printed Matter	459	1.2%	#N/A	#N/A	$11	0.2%	$24,271
28	Chemicals or Allied Products	468	1.3%	#N/A	#N/A	$64	1.3%	$135,732
29	Petroleum or Coal Products	0	0.0%	#N/A	#N/A	$0	0.0%	$2,296
30	Rubber or Miscellaneous Plastics	229	0.6%	#N/A	#N/A	$7	0.1%	$32,430
31	Leather or Leather Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
32	Clay, Concrete, Glass, or Stone	7	0.0%	#N/A	#N/A	$0	0.0%	$35,261
33	Primary Metal Products	35	0.1%	#N/A	#N/A	$3	0.1%	$100,042
34	Fabricated Metal Products	380	1.0%	#N/A	#N/A	$12	0.2%	$32,400
35	Machinery	1,184	3.2%	#N/A	#N/A	$131	2.6%	$110,820
36	Electrical Equipment	2,330	6.3%	#N/A	#N/A	$549	10.9%	$235,404
37	Transportation Equipment	9,020	24.5%	#N/A	#N/A	$2,825	55.9%	$313,236
38	Instrument, Photo, and Optical Equip.	3,559	9.7%	#N/A	#N/A	$776	15.4%	$218,011
39	Miscellaneous Manufacturing Products	429	1.2%	#N/A	#N/A	$295	5.8%	$688,139
40	Waste or Scrap Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
41	Miscellaneous Freight Shipments	0	0.0%	#N/A	#N/A	$0	0.0%	$966,396
42	Shipping Containers	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	228	0.6%	#N/A	#N/A	$1	0.0%	$2,969
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	2,564	7.0%	#N/A	#N/A	$310	6.1%	$120,782
47	Small Packaged Shipments	12,541	34.0%	#N/A	#N/A	#N/A	#N/A	#N/A
48	Waste	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	36,876	100.0%	#N/A	#N/A	$5,050	100.0%	$136,944

Source: prepared by CDM Smith, based on TRANSEARCH® data for 2014
note totals may not sum due to rounding

Table 33: Truck Forecast Growth, in Tons, 2014 to 2040

SCTG2	Commodity	2014		2040		Percent Change		Volume Δ
		Amount	Percent	Amount	Percent	Total	CAGR	Amount
01	Live Animals/Fish	7,181,825	2.8%	8,882,881	2.6%	23.7%	0.8%	1,701,057
02	Cereal Grains	69,683,835	26.9%	81,552,903	23.5%	17.0%	0.6%	11,869,068
03	Other Ag Prods.	7,567,070	2.9%	9,325,280	2.7%	23.2%	0.8%	1,758,210
04	Animal Feed	14,506,901	5.6%	22,516,629	6.5%	55.2%	1.7%	8,009,729
05	Meat/Seafood	5,040,364	1.9%	8,411,918	2.4%	66.9%	2.0%	3,371,554
06	Milled Grain Prods.	2,464,067	0.9%	3,865,768	1.1%	56.9%	1.7%	1,401,702
07	Other Foodstuffs	7,995,706	3.1%	12,233,166	3.5%	53.0%	1.6%	4,237,460
08	Alcoholic Beverages	760,379	0.3%	1,120,491	0.3%	47.4%	1.5%	360,112
09	Tobacco Prods.	22,883	0.0%	3,201	0.0%	-86.0%	-7.3%	-19,682
10	Building Stone	82,281	0.0%	162,637	0.0%	97.7%	2.7%	80,356
11	Natural Sands	10,589,194	4.1%	17,111,543	4.9%	61.6%	1.9%	6,522,349
12	Gravel	14,285,004	5.5%	17,438,058	5.0%	22.1%	0.8%	3,153,055
13	Nonmetallic Minerals	3,792,228	1.5%	5,422,443	1.6%	43.0%	1.4%	1,630,215
14	Metallic Ores	20,798	0.0%	7,456	0.0%	-64.2%	-3.9%	-13,342
15	Coal	424,660	0.2%	142,811	0.0%	-66.4%	-4.1%	-281,849
16	Crude Petroleum	183,548	0.1%	192,488	0.1%	4.9%	0.2%	8,940
17	Gasoline	10,720,372	4.1%	10,851,496	3.1%	1.2%	0.0%	131,124
18	Fuel Oils	14,966,834	5.8%	18,513,595	5.3%	23.7%	0.8%	3,546,762
19	Coal-N.E.C.	14,543,244	5.6%	17,817,074	5.1%	22.5%	0.8%	3,273,831
20	Basic Chemicals	2,080,135	0.8%	2,608,369	0.8%	25.4%	0.9%	528,234
21	Pharmaceuticals	166,705	0.1%	310,348	0.1%	86.2%	2.4%	143,644
22	Fertilizers	8,417,489	3.2%	11,362,767	3.3%	35.0%	1.2%	2,945,278
23	Chemical Prods.	2,021,719	0.8%	3,752,262	1.1%	85.6%	2.4%	1,730,543
24	Plastics/Rubber	2,499,055	1.0%	3,644,948	1.0%	45.9%	1.5%	1,145,893
25	Logs	387,673	0.1%	458,151	0.1%	18.2%	0.6%	70,477
26	Wood Prods.	2,748,794	1.1%	3,527,817	1.0%	28.3%	1.0%	779,023
27	Newsprint/Paper	944,182	0.4%	1,013,079	0.3%	7.3%	0.3%	68,897
28	Paper Articles	1,118,543	0.4%	1,503,447	0.4%	34.4%	1.1%	384,904
29	Printed Prods.	425,549	0.2%	410,690	0.1%	-3.5%	-0.1%	-14,858
30	Textiles/Leather	847,076	0.3%	826,801	0.2%	-2.4%	-0.1%	-20,276
31	Nonmetal Min. Prods.	19,738,938	7.6%	30,915,425	8.9%	56.6%	1.7%	11,176,487
32	Base Metals	2,894,841	1.1%	3,971,660	1.1%	37.2%	1.2%	1,076,819
33	Articles-Base Metal	2,050,707	0.8%	3,371,241	1.0%	64.4%	1.9%	1,320,534
34	Machinery	2,277,318	0.9%	4,506,742	1.3%	97.9%	2.7%	2,229,424
35	Electronics	1,820,189	0.7%	4,358,307	1.3%	139.4%	3.4%	2,538,118
36	Motorized Vehicles	1,759,609	0.7%	2,176,199	0.6%	23.7%	0.8%	416,590
37	Transport Equip.	221,317	0.1%	380,278	0.1%	71.8%	2.1%	158,960
38	Precision Instruments	36,649	0.0%	83,815	0.0%	128.7%	3.2%	47,166
39	Furniture	732,074	0.3%	1,106,847	0.3%	51.2%	1.6%	374,773
40	Misc. Mfg. Prods.	1,583,222	0.6%	2,408,440	0.7%	52.1%	1.6%	825,218
41	Waste/Scrap	4,448,105	1.7%	8,837,786	2.5%	98.7%	2.7%	4,389,681
43	Mixed Freight	15,403,241	5.9%	20,211,540	5.8%	31.2%	1.1%	4,808,299
99	Unknown	0	0.0%	0	0.0%	0.0%	0.0%	0
	Total	259,454,319	100.0%	347,318,796	100.0%	33.9%	1.1%	87,864,477

Source: prepared by CDM Smith, based on FHWA FAF v4.1 data for 2014 and 2040
note totals may not sum due to rounding

Table 34: Rail Forecast Growth in Tons, 2014 to 2040

SCTG2	Commodity	2014		2040		Percent Change		Volume Δ
		Amount	Percent	Amount	Percent	Total	CAGR	Amount
01	Live Animals/Fish	0	0.0%	0	0.0%	0.0%	0.0%	0
02	Cereal Grains	34,667,432	59.7%	44,010,804	67.9%	27.0%	0.9%	9,343,373
03	Other Ag Prods.	92,972	0.2%	211,189	0.3%	127.2%	3.2%	118,217
04	Animal Feed	401,370	0.7%	574,680	0.9%	43.2%	1.4%	173,309
05	Meat/Seafood	0	0.0%	0	0.0%	0.0%	0.0%	0
06	Milled Grain Prods.	640,093	1.1%	1,044,977	1.6%	63.3%	1.9%	404,884
07	Other Foodstuffs	1,400,145	2.4%	2,417,525	3.7%	72.7%	2.1%	1,017,380
08	Alcoholic Beverages	205,619	0.4%	202,124	0.3%	-1.7%	-0.1%	-3,496
09	Tobacco Prods.	0	0.0%	0	0.0%	0.0%	0.0%	0
10	Building Stone	0	0.0%	0	0.0%	0.0%	0.0%	0
11	Natural Sands	65,749	0.1%	106,380	0.2%	61.8%	1.9%	40,631
12	Gravel	28,360	0.0%	32,380	0.0%	14.2%	0.5%	4,020
13	Nonmetallic Minerals	388,808	0.7%	652,898	1.0%	67.9%	2.0%	264,090
14	Metallic Ores	0	0.0%	0	0.0%	0.0%	0.0%	0
15	Coal	13,669,159	23.5%	6,273,813	9.7%	-54.1%	-3.0%	-7,395,346
16	Crude Petroleum	32,812	0.1%	8,579	0.0%	-73.9%	-5.0%	-24,233
17	Gasoline	95,154	0.2%	142,140	0.2%	49.4%	1.6%	46,986
18	Fuel Oils	675,166	1.2%	687,515	1.1%	1.8%	0.1%	12,349
19	Coal-N.E.C.	313,979	0.5%	282,741	0.4%	-9.9%	-0.4%	-31,238
20	Basic Chemicals	1,090,474	1.9%	1,755,357	2.7%	61.0%	1.8%	664,883
21	Pharmaceuticals	0	0.0%	0	0.0%	0.0%	0.0%	0
22	Fertilizers	1,557,773	2.7%	2,314,763	3.6%	48.6%	1.5%	756,989
23	Chemical Prods.	33,640	0.1%	37,058	0.1%	10.2%	0.4%	3,418
24	Plastics/Rubber	305,047	0.5%	649,279	1.0%	112.8%	2.9%	344,232
25	Logs	8,644	0.0%	15,526	0.0%	79.6%	2.3%	6,881
26	Wood Prods.	198,192	0.3%	382,933	0.6%	93.2%	2.6%	184,741
27	Newsprint/Paper	205,757	0.4%	246,655	0.4%	19.9%	0.7%	40,897
28	Paper Articles	75,864	0.1%	103,412	0.2%	36.3%	1.2%	27,548
29	Printed Prods.	2,858	0.0%	3,342	0.0%	16.9%	0.6%	484
30	Textiles/Leather	12	0.0%	34	0.0%	186.3%	4.1%	22
31	Nonmetal Min. Prods.	535,552	0.9%	889,007	1.4%	66.0%	2.0%	353,455
32	Base Metals	260,755	0.4%	339,982	0.5%	30.4%	1.0%	79,227
33	Articles-Base Metal	64,948	0.1%	145,633	0.2%	124.2%	3.2%	80,684
34	Machinery	42,855	0.1%	101,503	0.2%	136.9%	3.4%	58,648
35	Electronics	4,737	0.0%	17,519	0.0%	269.8%	5.2%	12,782
36	Motorized Vehicles	152,008	0.3%	210,501	0.3%	38.5%	1.3%	58,493
37	Transport Equip.	335,018	0.6%	637,436	1.0%	90.3%	2.5%	302,418
38	Precision Instruments	0	0.0%	0	0.0%	0.0%	0.0%	0
39	Furniture	633	0.0%	3,388	0.0%	435.5%	6.7%	2,755
40	Misc. Mfg. Prods.	11,804	0.0%	23,532	0.0%	99.4%	2.7%	11,728
41	Waste/Scrap	512,812	0.9%	297,437	0.5%	-42.0%	-2.1%	-215,375
43	Mixed Freight	5,288	0.0%	5,913	0.0%	11.8%	0.4%	626
99	Unknown	0	0.0%	0	0.0%	0.0%	0.0%	0
	Total	58,081,489	100.0%	64,827,950	100.0%	11.6%	0.4%	6,746,461

Source: prepared by CDM Smith, based on FHWA FAF v4.1 data for 2014 and 2040
note totals may not sum due to rounding

Table 35: Water Forecast Growth in Tons, 2014 to 2040

SCTG2	Commodity	2014		2040		Percent Change		Volume Δ
		Amount	Percent	Amount	Percent	Total	CAGR	Amount
01	Live Animals/Fish	0	0.0%	0	0.0%	0.0%	0.0%	0
02	Cereal Grains	1,371,723	53.8%	3,755,953	55.3%	173.8%	4.0%	2,384,230
03	Other Ag Prods.	146,325	5.7%	541,173	8.0%	269.8%	5.2%	394,848
04	Animal Feed	80,026	3.1%	108,457	1.6%	35.5%	1.2%	28,431
05	Meat/Seafood	8,481	0.3%	37,622	0.6%	343.6%	5.9%	29,141
06	Milled Grain Prods.	96,885	3.8%	252,022	3.7%	160.1%	3.7%	155,138
07	Other Foodstuffs	45,503	1.8%	109,688	1.6%	141.1%	3.4%	64,185
08	Alcoholic Beverages	901	0.0%	4,483	0.1%	397.7%	6.4%	3,582
09	Tobacco Prods.	4,387	0.2%	2,955	0.0%	-32.6%	-1.5%	-1,432
10	Building Stone	4,520	0.2%	24,687	0.4%	446.2%	6.7%	20,168
11	Natural Sands	0	0.0%	0	0.0%	0.0%	0.0%	0
12	Gravel	1,906	0.1%	2,472	0.0%	29.7%	1.0%	566
13	Nonmetallic Minerals	40,050	1.6%	56,383	0.8%	40.8%	1.3%	16,333
14	Metallic Ores	725	0.0%	4,637	0.1%	539.4%	7.4%	3,911
15	Coal	0	0.0%	0	0.0%	0.0%	0.0%	0
16	Crude Petroleum	116,732	4.6%	73,862	1.1%	-36.7%	-1.7%	-42,869
17	Gasoline	53	0.0%	2	0.0%	-96.3%	-11.9%	-51
18	Fuel Oils	237	0.0%	827	0.0%	249.4%	4.9%	591
19	Coal-N.E.C.	0	0.0%	0	0.0%	0.0%	0.0%	0
20	Basic Chemicals	34,915	1.4%	99,656	1.5%	185.4%	4.1%	64,741
21	Pharmaceuticals	2,047	0.1%	8,500	0.1%	315.3%	5.6%	6,453
22	Fertilizers	151,586	5.9%	243,256	3.6%	60.5%	1.8%	91,670
23	Chemical Prods.	12,146	0.5%	49,705	0.7%	309.2%	5.6%	37,559
24	Plastics/Rubber	52,972	2.1%	160,498	2.4%	203.0%	4.4%	107,526
25	Logs	340	0.0%	520	0.0%	53.0%	1.6%	180
26	Wood Prods.	7,214	0.3%	16,784	0.2%	132.7%	3.3%	9,570
27	Newsprint/Paper	3,725	0.1%	7,209	0.1%	93.5%	2.6%	3,483
28	Paper Articles	2,184	0.1%	5,131	0.1%	134.9%	3.3%	2,947
29	Printed Prods.	1,033	0.0%	2,126	0.0%	105.8%	2.8%	1,093
30	Textiles/Leather	21,658	0.8%	65,614	1.0%	203.0%	4.4%	43,956
31	Nonmetal Min. Prods.	39,633	1.6%	124,127	1.8%	213.2%	4.5%	84,494
32	Base Metals	5,342	0.2%	9,346	0.1%	74.9%	2.2%	4,004
33	Articles-Base Metal	35,211	1.4%	79,218	1.2%	125.0%	3.2%	44,007
34	Machinery	78,022	3.1%	269,280	4.0%	245.1%	4.9%	191,257
35	Electronics	83,539	3.3%	327,790	4.8%	292.4%	5.4%	244,251
36	Motorized Vehicles	25,630	1.0%	49,568	0.7%	93.4%	2.6%	23,938
37	Transport Equip.	2,158	0.1%	6,974	0.1%	223.1%	4.6%	4,816
38	Precision Instruments	3,426	0.1%	17,087	0.3%	398.8%	6.4%	13,662
39	Furniture	22,263	0.9%	123,311	1.8%	453.9%	6.8%	101,048
40	Misc. Mfg. Prods.	34,254	1.3%	113,736	1.7%	232.0%	4.7%	79,481
41	Waste/Scrap	8,584	0.3%	25,424	0.4%	196.2%	4.3%	16,840
43	Mixed Freight	5,359	0.2%	16,375	0.2%	205.6%	4.4%	11,016
99	Unknown	0	0.0%	0	0.0%	0.0%	0.0%	0
	Total	2,551,694	100.0%	6,796,457	100.0%	166.4%	3.8%	4,244,763

Source: prepared by CDM Smith, based on FHWA FAF v4.1 data for 2014 and 2040
note totals may not sum due to rounding

Table 36: Air Forecast Growth in Tons, 2014 to 2040

SCTG2	Commodity	2014		2040		Percent Change		Volume Δ
		Amount	Percent	Amount	Percent	Total	CAGR	Amount
01	Live Animals/Fish	1,080	1.3%	1,158	0.6%	7.2%	0.3%	77
02	Cereal Grains	24	0.0%	59	0.0%	147.1%	3.5%	35
03	Other Ag Prods.	224	0.3%	369	0.2%	65.0%	1.9%	145
04	Animal Feed	276	0.3%	421	0.2%	52.9%	1.6%	146
05	Meat/Seafood	2,279	2.7%	4,739	2.3%	107.9%	2.9%	2,460
06	Milled Grain Prods.	124	0.1%	302	0.1%	143.7%	3.5%	178
07	Other Foodstuffs	177	0.2%	401	0.2%	126.0%	3.2%	224
08	Alcoholic Beverages	1	0.0%	2	0.0%	340.0%	5.9%	2
09	Tobacco Prods.	12	0.0%	8	0.0%	-32.2%	-1.5%	-4
10	Building Stone	0	0.0%	0	0.0%	0.0%	0.0%	0
11	Natural Sands	0	0.0%	0	0.0%	0.0%	0.0%	0
12	Gravel	0	0.0%	0	0.0%	0.0%	0.0%	0
13	Nonmetallic Minerals	3	0.0%	5	0.0%	67.9%	2.0%	2
14	Metallic Ores	0	0.0%	0	0.0%	0.0%	0.0%	0
15	Coal	0	0.0%	0	0.0%	0.0%	0.0%	0
16	Crude Petroleum	0	0.0%	0	0.0%	0.0%	0.0%	0
17	Gasoline	0	0.0%	0	0.0%	-33.3%	-1.5%	0
18	Fuel Oils	24	0.0%	26	0.0%	9.4%	0.3%	2
19	Coal-N.E.C.	24	0.0%	7	0.0%	-69.0%	-4.4%	-17
20	Basic Chemicals	736	0.9%	1,615	0.8%	119.4%	3.1%	879
21	Pharmaceuticals	2,733	3.3%	7,036	3.5%	157.5%	3.7%	4,303
22	Fertilizers	0	0.0%	0	0.0%	0.0%	0.0%	0
23	Chemical Prods.	1,663	2.0%	6,037	3.0%	263.0%	5.1%	4,374
24	Plastics/Rubber	2,642	3.2%	5,448	2.7%	106.2%	2.8%	2,806
25	Logs	0	0.0%	0	0.0%	0.0%	0.0%	0
26	Wood Prods.	51	0.1%	117	0.1%	128.6%	3.2%	66
27	Newsprint/Paper	144	0.2%	262	0.1%	82.1%	2.3%	118
28	Paper Articles	96	0.1%	221	0.1%	129.4%	3.2%	125
29	Printed Prods.	1,325	1.6%	1,667	0.8%	25.8%	0.9%	342
30	Textiles/Leather	8,726	10.4%	19,387	9.6%	122.2%	3.1%	10,661
31	Nonmetal Min. Prods.	551	0.7%	1,487	0.7%	170.1%	3.9%	937
32	Base Metals	1,954	2.3%	3,039	1.5%	55.5%	1.7%	1,085
33	Articles-Base Metal	4,172	5.0%	9,646	4.8%	131.2%	3.3%	5,474
34	Machinery	9,316	11.1%	27,213	13.4%	192.1%	4.2%	17,897
35	Electronics	15,431	18.5%	50,966	25.1%	230.3%	4.7%	35,535
36	Motorized Vehicles	7,234	8.7%	6,591	3.2%	-8.9%	-0.4%	-643
37	Transport Equip.	10,376	12.4%	22,827	11.3%	120.0%	3.1%	12,451
38	Precision Instruments	6,897	8.3%	20,605	10.2%	198.8%	4.3%	13,709
39	Furniture	218	0.3%	1,203	0.6%	452.3%	6.8%	986
40	Misc. Mfg. Prods.	4,842	5.8%	9,536	4.7%	96.9%	2.6%	4,694
41	Waste/Scrap	18	0.0%	43	0.0%	143.4%	3.5%	25
43	Mixed Freight	193	0.2%	424	0.2%	120.2%	3.1%	231
99	Unknown	0	0.0%	0	0.0%	0.0%	0.0%	0
	Total	83,562	100.0%	202,866	100.0%	142.8%	3.5%	119,304

Source: prepared by CDM Smith, based on FHWA FAF v4.1 data for 2014 and 2040
note totals may not sum due to rounding

Table 37: Pipeline Forecast Growth in Tons, 2014 to 2040

SCTG2	Commodity	2014		2040		Percent Change		Volume Δ
		Amount	Percent	Amount	Percent	Total	CAGR	Amount
01	Live Animals/Fish	0	0.0%	0	0.0%	0.0%	0.0%	0
02	Cereal Grains	0	0.0%	0	0.0%	0.0%	0.0%	0
03	Other Ag Prods.	0	0.0%	0	0.0%	0.0%	0.0%	0
04	Animal Feed	0	0.0%	0	0.0%	0.0%	0.0%	0
05	Meat/Seafood	0	0.0%	0	0.0%	0.0%	0.0%	0
06	Milled Grain Prods.	0	0.0%	0	0.0%	0.0%	0.0%	0
07	Other Foodstuffs	0	0.0%	0	0.0%	0.0%	0.0%	0
08	Alcoholic Beverages	0	0.0%	0	0.0%	0.0%	0.0%	0
09	Tobacco Prods.	0	0.0%	0	0.0%	0.0%	0.0%	0
10	Building Stone	0	0.0%	0	0.0%	0.0%	0.0%	0
11	Natural Sands	0	0.0%	0	0.0%	0.0%	0.0%	0
12	Gravel	0	0.0%	0	0.0%	0.0%	0.0%	0
13	Nonmetallic Minerals	0	0.0%	0	0.0%	0.0%	0.0%	0
14	Metallic Ores	0	0.0%	0	0.0%	0.0%	0.0%	0
15	Coal	0	0.0%	0	0.0%	0.0%	0.0%	0
16	Crude Petroleum	17,429,616	17.0%	18,255,365	13.8%	4.7%	0.2%	825,748
17	Gasoline	1,913,314	1.9%	2,078,546	1.6%	8.6%	0.3%	165,232
18	Fuel Oils	0	0.0%	0	0.0%	0.0%	0.0%	0
19	Coal-N.E.C.	83,014,892	80.8%	111,765,020	84.3%	34.6%	1.2%	28,750,128
20	Basic Chemicals	329,388	0.3%	439,907	0.3%	33.6%	1.1%	110,519
21	Pharmaceuticals	0	0.0%	0	0.0%	0.0%	0.0%	0
22	Fertilizers	0	0.0%	0	0.0%	0.0%	0.0%	0
23	Chemical Prods.	0	0.0%	0	0.0%	0.0%	0.0%	0
24	Plastics/Rubber	0	0.0%	0	0.0%	0.0%	0.0%	0
25	Logs	0	0.0%	0	0.0%	0.0%	0.0%	0
26	Wood Prods.	0	0.0%	0	0.0%	0.0%	0.0%	0
27	Newsprint/Paper	0	0.0%	0	0.0%	0.0%	0.0%	0
28	Paper Articles	0	0.0%	0	0.0%	0.0%	0.0%	0
29	Printed Prods.	0	0.0%	0	0.0%	0.0%	0.0%	0
30	Textiles/Leather	0	0.0%	0	0.0%	0.0%	0.0%	0
31	Nonmetal Min. Prods.	0	0.0%	0	0.0%	0.0%	0.0%	0
32	Base Metals	0	0.0%	0	0.0%	0.0%	0.0%	0
33	Articles-Base Metal	0	0.0%	0	0.0%	0.0%	0.0%	0
34	Machinery	0	0.0%	0	0.0%	0.0%	0.0%	0
35	Electronics	0	0.0%	0	0.0%	0.0%	0.0%	0
36	Motorized Vehicles	0	0.0%	0	0.0%	0.0%	0.0%	0
37	Transport Equip.	0	0.0%	0	0.0%	0.0%	0.0%	0
38	Precision Instruments	0	0.0%	0	0.0%	0.0%	0.0%	0
39	Furniture	0	0.0%	0	0.0%	0.0%	0.0%	0
40	Misc. Mfg. Prods.	0	0.0%	0	0.0%	0.0%	0.0%	0
41	Waste/Scrap	0	0.0%	0	0.0%	0.0%	0.0%	0
43	Mixed Freight	0	0.0%	0	0.0%	0.0%	0.0%	0
99	Unknown	0	0.0%	0	0.0%	0.0%	0.0%	0
	Total	102,687,211	100.0%	132,538,838	100.0%	29.1%	1.0%	29,851,627

Source: prepared by CDM Smith, based on FHWA FAF v4.1 data for 2014 and 2040
note totals may not sum due to rounding

Table 38: Total (All Modes) Forecast Growth in Tons, 2014 to 2040

SCTG2	Commodity	2014		2040		Percent Change		Volume Δ
		Amount	Percent	Amount	Percent	Total	CAGR	Amount
01	Live Animals/Fish	7,182,905	1.7%	8,884,039	1.6%	23.7%	0.8%	1,701,134
02	Cereal Grains	105,723,014	25.0%	129,319,720	23.4%	22.3%	0.8%	23,596,706
03	Other Ag Prods.	7,806,591	1.8%	10,078,011	1.8%	29.1%	1.0%	2,271,420
04	Animal Feed	14,988,572	3.5%	23,200,187	4.2%	54.8%	1.7%	8,211,614
05	Meat/Seafood	5,051,124	1.2%	8,454,278	1.5%	67.4%	2.0%	3,403,155
06	Milled Grain Prods.	3,201,169	0.8%	5,163,070	0.9%	61.3%	1.9%	1,961,901
07	Other Foodstuffs	9,441,531	2.2%	14,760,779	2.7%	56.3%	1.7%	5,319,249
08	Alcoholic Beverages	966,900	0.2%	1,327,099	0.2%	37.3%	1.2%	360,200
09	Tobacco Prods.	27,282	0.0%	6,164	0.0%	-77.4%	-5.6%	-21,118
10	Building Stone	86,801	0.0%	187,324	0.0%	115.8%	3.0%	100,524
11	Natural Sands	10,654,943	2.5%	17,217,923	3.1%	61.6%	1.9%	6,562,980
12	Gravel	14,315,270	3.4%	17,472,910	3.2%	22.1%	0.8%	3,157,640
13	Nonmetallic Minerals	4,221,088	1.0%	6,131,729	1.1%	45.3%	1.4%	1,910,640
14	Metallic Ores	21,523	0.0%	12,092	0.0%	-43.8%	-2.2%	-9,431
15	Coal	14,093,819	3.3%	6,416,624	1.2%	-54.5%	-3.0%	-7,677,195
16	Crude Petroleum	17,762,707	4.2%	18,530,294	3.4%	4.3%	0.2%	767,587
17	Gasoline	12,728,894	3.0%	13,072,184	2.4%	2.7%	0.1%	343,290
18	Fuel Oils	15,642,260	3.7%	19,201,964	3.5%	22.8%	0.8%	3,559,703
19	Coal-N.E.C.	97,872,138	23.1%	129,864,842	23.5%	32.7%	1.1%	31,992,704
20	Basic Chemicals	3,535,648	0.8%	4,904,904	0.9%	38.7%	1.3%	1,369,256
21	Pharmaceuticals	171,485	0.0%	325,885	0.1%	90.0%	2.5%	154,400
22	Fertilizers	10,126,849	2.4%	13,920,785	2.5%	37.5%	1.2%	3,793,937
23	Chemical Prods.	2,069,167	0.5%	3,845,062	0.7%	85.8%	2.4%	1,775,894
24	Plastics/Rubber	2,859,715	0.7%	4,460,173	0.8%	56.0%	1.7%	1,600,458
25	Logs	396,658	0.1%	474,197	0.1%	19.5%	0.7%	77,539
26	Wood Prods.	2,954,251	0.7%	3,927,651	0.7%	32.9%	1.1%	973,400
27	Newsprint/Paper	1,153,808	0.3%	1,267,204	0.2%	9.8%	0.4%	113,396
28	Paper Articles	1,196,687	0.3%	1,612,211	0.3%	34.7%	1.2%	415,523
29	Printed Prods.	430,764	0.1%	417,825	0.1%	-3.0%	-0.1%	-12,940
30	Textiles/Leather	877,472	0.2%	911,836	0.2%	3.9%	0.1%	34,363
31	Nonmetal Min. Prods.	20,314,674	4.8%	31,930,046	5.8%	57.2%	1.8%	11,615,372
32	Base Metals	3,162,892	0.7%	4,324,026	0.8%	36.7%	1.2%	1,161,135
33	Articles-Base Metal	2,155,038	0.5%	3,605,738	0.7%	67.3%	2.0%	1,450,700
34	Machinery	2,407,511	0.6%	4,904,737	0.9%	103.7%	2.8%	2,497,226
35	Electronics	1,923,896	0.5%	4,754,582	0.9%	147.1%	3.5%	2,830,686
36	Motorized Vehicles	1,944,481	0.5%	2,442,859	0.4%	25.6%	0.9%	498,378
37	Transport Equip.	568,870	0.1%	1,047,515	0.2%	84.1%	2.4%	478,645
38	Precision Instruments	46,971	0.0%	121,507	0.0%	158.7%	3.7%	74,536
39	Furniture	755,188	0.2%	1,234,749	0.2%	63.5%	1.9%	479,561
40	Misc. Mfg. Prods.	1,634,122	0.4%	2,555,244	0.5%	56.4%	1.7%	921,121
41	Waste/Scrap	4,969,518	1.2%	9,160,689	1.7%	84.3%	2.4%	4,191,171
43	Mixed Freight	15,414,080	3.6%	20,234,252	3.7%	31.3%	1.1%	4,820,172
99	Unknown	0	0.0%	0	0.0%	0.0%	0.0%	0
	Total	422,858,275	100.0%	551,684,907	100.0%	30.5%	1.0%	128,826,632

Source: prepared by CDM Smith, based on FHWA FAF v4.1 data for 2014 and 2040
note totals may not sum due to rounding

Appendix D: Stakeholder Interview Questions

QUESTIONS

RAIL SYSTEM PLAN UPDATE
CLASS I and II SHIPPER INTERVIEWS

April 2017

1. Why do you use rail service for your freight movements as opposed to other modes?

2. If you are using both rail and truck for your shipments, what conditions would be necessary to convert more traffic to rail?

3. Are you served by more than one railroad?

4. Do you see a value in expanded transload or intermodal opportunities such as rail-to-truck or rail-to-barge? If so, please explain.

5. Tell us about your experience in potential future growth of your work with steamship companies and movement of containers from ship to intermodal facilities and empty containers from intermodal facilities to ship.

6. Are there commodities which used to be moved by rail but no longer are? If so, why the change?

7. Are there any specific rail service improvement projects that would help you? If so, what are they, and how would they help? Please describe the projects.

8. Are there any state regulations impacting your freight movements or rail service? What changes would you suggest?

9. Are there other means in which the public sector might assist you increase your use of rail service?

10. Are you optimistic, neutral, or pessimistic about the future of your rail freight use, and why?

QUESTIONS

FREIGHT PLAN UPDATE
TRUCKING INTERVIEWS

May 2017

1. What percentage of your freight travels via truck?

2. How much of your freight is shipped via containers? (Domestic and International)

3. If you are using both rail and truck for your shipments, what conditions would be necessary to convert more traffic to rail?

4. What is the most significant issue that trucking experiences in serving your needs?

5. Do you see a value in expanded transload or intermodal opportunities such as rail-to-truck or rail-to-barge? If so, please explain.

6. How often do you experience truck capacity issues? What are the reasons?

7. Are there any specific highway improvement projects that would help you? If so, what are they, and how would they help? Please describe the projects.

8. Are there any state regulations impacting your freight movements? What changes would you suggest?

9. Are there other means in which the public sector might assist you to be more competitive (i.e. faster service or lower costs)?

10. Are you optimistic, neutral, or pessimistic about the trends you see and options you have to move your goods and commodities in the freight?

Appendix E: KFAC Members

Appendix E: 2016 Kansas Freight Advisory Committee Members

First Name	Last Name	Title	Business
Richard	Carlson	Secretary of Transportation	Kansas Department of Transportation
Catherine	Patrick	State Transportation Engineer	Kansas Department of Transportation
Steve	Hewitt	Chief Executive Officer	Kansas Turnpike Authority
David	Jacobson	Director of Engineering	Kansas Turnpike Authority
Merrill	Atwater	Director of Aviation	Kansas Department of Transportation
Steve	Kelly	Lawrence Chamber of Commerce	Kansas Department of Commerce
Susan	NeuPoth Cadoret	Business and Community Development	Kansas Department of Commerce
Jackie	McClaskey	Secretary of Agriculture	Kansas Department of Agriculture
Josh	Roe	Assistant Secretary	Kansas Department of Agriculture
Tom	Catania	Troop I - MCSAP	Kansas Highway Patrol
Jeff	Stewart	KDOT District 3 Engineer	Kansas Department of Transportation
Tom	Whitaker	Executive Director	Kansas Motor Carrier Association
Rick	Backlund	Kansas Division Administrator	Federal Highway Administration
Paul	Cristina	Director, Public Private Partnerships	BNSF Railway
Lindsey	Douglas	Director of Public Affairs (KS/MO)	Union Pacific Railroad
Pat	Cedeno	Senior Vice President Sales & Marketing	WATCO Companies
Jerry	Vest	Senior Vice President Government & Industry Affairs	Genesee & Wyoming Railroad
Kevin	McIntosh	Assistant Vice President - State and Local Relations	Kansas City Southern
Mike	Kelley	Chief Sustainability Officer	YRC Worldwide
John	Prather	Vice President Corporate Relations, Retired	Groendyke Transportation, Inc.
Kimberly	Bonhart	Vice President of Government Affairs	UPS
Joe	Pimple	President/General Manager	Sauder Fabrication
Edward	Cross	President	Kansas Independent Gas and Oil Association
Patrick	Robinson	Vice President of Development	NorthPoint Development
Ron	Seeber	Senior Vice President of Government Affairs	Kansas Grain and Feed Association
Ron	Achelpohl	Director of Transportation and Environment	Mid-America Regional Council
Phil	Nelson	Interim Director	Wichita Area Metropolitan Planning Organization
Bob	Temple	Chief Operating Officer	Wind River Grain
Karyn	Page	President/CEO	Kansas Global Trade Services
Carolyn	Dunn	Executive Director	Stafford County Economic Development
Chris	Gutierrez	President	KC Smartport
Sally	Chope	Transportation and Logistics Director	Siemens USA
Ashley	McMillan-Hutchinson	Executive Director	Cloud County Economic Development
Tom	Palace	Executive Director	Kansas Petroleum Marketers and Convenience Store Assoc of KS
Mark	Augustine		Triplett, Inc.
Jim	Beason	Policy Chairman	Chautauqua County Farm Bureau
Taylor	Nebel		TSSCC Technologies
Kasi	Morales	Executive Director	McPherson Industrial Development Company

Appendix F: Prioritization Process

Appendix F – Freight Project Prioritization Process

This appendix describes the highway and rail project scoring rubric, data sources, and results in detail. The scoring rubric includes metrics corresponding to the four goal areas established by the KFAC:

- **Mobility –** The extent to which a project improves goods movement efficiency, for instance by relieving a bottleneck, improving access to a key freight generator, or improving a physical constraint that impedes freight flows.
- **Safety –** Projects improve safety if they address a truck crash hotspot or otherwise promote safe operations.
- **Economic development –** The extent to which a project is likely to create jobs (measured by job impact ratios), or whether it improves access to a Kansas Department of Commerce targeted industry sector.
- **Environment –** Whether the project improves air quality by relieving a freight bottleneck or promoting a truck to rail mode shift.

For ranking purposes, project scores were weighted using the weights assigned by the KFAC for each goal area during the November 15, 2016 prioritization exercise. These weights are: Mobility, 36 percent; Safety, 30 percent; Economic Development, 22 percent; and Environment, 12 percent.

The following sections describe the ranking criteria and scoring rubric by mode, followed by the prioritized/tiered freight project lists and maps.

Highway

The highway analysis utilized GIS and manual methods to acquire metrics used in project scoring. The analysis relied on the Highway Performance Monitoring System (HPMS) for the physical network data necessary to calculate volume to capacity ratios and vehicle miles traveled and the TRANSEARCH network data for link economic impact estimates, supplemented with KDOT data as available. The highway scoring criteria are described below.

Mobility

Mobility was assessed through four metrics:

- **Freight bottlenecks** were identified by reviewing the Long-Range Transportation Plans of Kansas MPOs. This list was then cross-referenced with the freight network to assess whether each project relieves a freight bottleneck. Capacity projects that address an identified bottleneck received two points; others received no points.
- **Substandard bridges** were identified with the 2016 National Bridge Inventory. Projects that improve or replace a bridge in Kansas with vertical clearance of less than 15 feet or that are load restricted to less than 120,000 pounds received two points; all others received zero points.

- If a project **enhances multimodal freight connections** between the freight network and other modes or improves/constructs truck parking capacity, it received two points. Truck parking areas were identified using the *Kansas Statewide Freight Network Truck Parking Plan*.

- **Capacity projects** that are located on a segment of roadway that is congested (as measured by the road's volume to capacity or V/C ratio) received two points, while those on less congested segments received zero points. V/C ratios were calculated using the number of lanes, average annual daily traffic (AADT), and Functional Classification of the highway. Capacity projects are defined as projects that improve the capacity of the network, including additional lanes, passing lanes, shoulders, Super-2 upgrades, or similar.

Safety

Safety was assessed by calculating truck-involved crash rates per 100 million vehicle miles traveled (VMT). This normalizes highway segments so that different segments can be compared directly against one another regardless of traffic volumes. The crash rates were sorted into quintiles, with projects located on segments with the highest truck-involved collision rates (top quintile) receiving eight points, those in the fourth quintile receiving six points, projects in the third quintile receiving four points, projects in the second quintile getting two points, and projects in the bottom quintile getting zero points.

Economic Development

The economic development impacts of highway freight projects were evaluated via three metrics:

- **Improved access to freight generators –** This metric awarded points to projects that improve road access to key freight generators. Freight generators was identified using the Kansas Rail Plan (for grain elevators) and web research combined with the InnovateKansas 'ExpertFinder' tool which is maintained by Kansas State University.[1] ExpertFinder businesses were filtered by industry to identify freight-dependent industries such as manufacturing, warehousing and distribution, and wholesale/retail trade. The tool also lists freight-intensive land uses such as industrial parks, and these were included in the assessment. To isolate large freight generators, results from the ExpertFinder tool were filtered to only include firms that employ 500 or more people, or have revenues greater than $200 million. Projects that are in economically distressed counties[2] and are likely to improve access to these generators received two points; those that are not in economically distressed counties receive one point; and those that do not improve access to a freight generator receive zero points. The likelihood that a project would improve access to a freight generator was based on a ZIP code assessment.

- **Economic impact –** The freight highway network segments were economically ranked using freight flow information from the TRANSEARCH database. This was accomplished by

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[1] The ExpertFinder tools is available at http://innovatekansas.org/expertfinder/.

[2] Economic distress was determined using Economic Development Administration criteria: a 24-month average unemployment rate that is at least one percent higher than the national average, or 2015 per capita money income or per capita personal income that is less than 80 percent of the national average.

estimating the aggregate employment ratio per value of economically relevant Kansas freight movements by direction[3],then applying those ratios to the directional freight values per TRANSEARCH highway link to develop employment impact estimates by link. This was then matched to highway project data in GIS to identify project freight-related impacts. Impact estimates for projects that included two or more highway segments were weighted by the proportion of the project falling within each link. Projects were sorted into bins using their "natural breaks" and scored accordingly.[4]

- **Improved access to targeted industry sectors –** The Kansas Department of Commerce has identified several industries as targeted sectors for the state economy. These include alternative energy (wind, renewable fuels, and solar power); warehousing and distribution; bioscience (animal and human health, bio-energy, and agricultural and bio-based products); advanced manufacturing (aerospace and advanced materials); and value-added agriculture and food processing.[5] Targeted industry data for dairy producers, food processors, and food storage firms was provided by the Kansas Department of Agriculture. Biofuel refining facilities were located using the National Renewable Energy Resources (NREL) Biofuels Atlas.[6] These businesses were cross-referenced with the project list to identify those that were likely to improve access to these industries, using their ZIP codes or actual locations where GIS data were available. Those that do received two points; others received zero points.

Environmental Impacts

Impacts to air quality were assessed qualitatively by reviewing project descriptions. Projects that address a freight bottleneck were assumed to reduce emissions and received eight points; those that do not received zero points.

Table D.1 provides detailed descriptions of the highway freight project prioritization filters, scoring factors, and data sources.

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[3] Economically relevant freight excludes through movements and freight with zero value such as scrap and empty shipping containers. Directionality accounts for the differing impacts of products made in Kansas vs. those that are shipped to the state for sale/consumption.

[4] "Natural breaks" refers to a data clustering method that classifies data points in a series by minimizing each class's deviation from the class mean while maximizing each class's deviation from the means of other classes. It therefore sets boundaries between classes where there are relatively large differences in the data values, i.e. the natural breaks.

[5] http://kansascommerce.com/index.aspx?nid=451

[6] https://maps.nrel.gov/biofuels-atlas/#/?aL=yilN7K%255Bv%255D%3Dt&bL=groad&cE=0&lR=0&mC=40.21244%2C-91.625976&zL=4

Table D.1: Highway Project Scoring Metrics

Freight Plan Goal Area	Prioritization Filter	Project Scoring Factors	Data Source(s)
Mobility	Address Freight Bottlenecks	Addresses freight bottlenecks identified from MPO Long Range Transportation Plans. ▪ Project identified in proximity to bottleneck – 2 points ▪ Project not in proximity to freight bottleneck – 0 points	▪ MPO Long Range Transportation Plans ▪ NPMRDS
Mobility	Reduce Number of Substandard Bridges	Improves or replaces bridge on Kansas Freight Network with vertical clearance of less than 15 ft. or weight restricted to less than 120,000 pounds. ▪ Yes – 2 points ▪ No – 0 points	▪ National Bridge Inventory
Mobility	Enhance Multimodal Freight Connections	Improve/construct connection from freight network to freight rail, intermodal facility, port, or airport or improve/construct truck parking areas for freight network. ▪ Yes – 2 points ▪ No – 0 points ▪ Manual check for truck parking areas, received 2 points also	▪ FHWA Intermodal Facility and Intermodal Connector files ▪ Kansas Rail Plan (shuttle grain elevators) ▪ Manual assessment for rail intermodal facilities ▪ Kansas Statewide Freight Network Parking Plan
Mobility	Improve Freight Network Capacity	Capacity projects that address congested highway segments. ▪ V/C ratio equal to or above .80 – 2 points ▪ V/C ratio less than .80 – 0 points	▪ HPMS
Safety	Improve High Crash Locations	Addresses high truck crash location. Projects were binned by crash rate and scored accordingly. ▪ Top quintile – 8 points ▪ 4th quintile – 6 points ▪ 3rd quintile – 4 points ▪ 2nd quintile – 2 points ▪ Bottom quintile – 0 points	▪ HPMS ▪ KDOT crash data
Economic Development	Improve Access to Freight Generators	Projects improve access route to a freight generator. ▪ Yes, and project is in an economically distressed county – 2 points ▪ Yes, but project is not in an economically distressed county – 1 point ▪ No – 0 points	▪ Kansas Rail Plan (large grain elevators) ▪ InnovateKansas ExpertFinder tool ▪ Economic Development Administration (county level distress indicators)
Economic Development	Economic Impact	Projects were binned by estimated employment impacts using a natural breaks classification and scored accordingly. ▪ Top class – 4 points ▪ 4th class – 3 points ▪ 3rd class – 2 points	▪ TRANSEARCH

Freight Plan Goal Area	Prioritization Filter	Project Scoring Factors	Data Source(s)
		▪ 2nd class – 1 point ▪ Bottom class – 0 points	
Economic Development	Improve Access to Targeted Industry Sector	Project improves access to a Kansas Department of Commerce targeted industry sector. ▪ Yes – 2 points ▪ No – 0 points	▪ Kansas Department of Agriculture (food processing facilities) ▪ National Renewable Energy Laboratory (biofuels facilities) ▪ Kansas Corporation Commission (Wind power)
Environmental Impacts	Reduce Impacts to Air Quality	If a project addresses a freight bottleneck, it will have a positive impact on air quality as a result of less congestion and stop and go traffic. ▪ Yes – 8 points ▪ No – 0 points	▪ Manual Assessment

Results

Tables D.2, D.3, andD.4 provide the Tier 1, 2, and 3 highway freight project lists respectively. Figures D.1, D.2, and D.3 show the locations of the projects on maps.

Table D.2: Tier 1 Highway Freight Projects

Project ID	Route	Location	Improvement	Source	Urban/Rural
2	US-69	119th St to I-35 & I-35 to 75th St	Reconstruct US-69 Corridor to 6 lanes in Johnson County	KDOT	Urban
4	I-135	I-135/36th St (2 miles south of South Junction of I-135/US-50)	Improve Interchange in Harvey County	KDOT	Rural
6	I-70	K-7 Interchange	Interchange Improvements in Wyandotte County	KDOT	Urban
7	I-70	K-7 Interchange	Interchange Improvements in Wyandotte County	KDOT	Urban
8	US-24	K-7 Interchange	Interchange Improvements in Wyandotte County	KDOT	Urban
9	US-24	K-7 Interchange	Interchange Improvements in Wyandotte County	KDOT	Urban
10	I-70	K-7 Interchange	Interchange Improvements in Wyandotte County	KDOT	Urban
11	I-70	K-7 Interchange	Interchange Improvements in Wyandotte County	KDOT	Urban
12	I-70	K-7 Interchange	Interchange Improvements in Wyandotte County	KDOT	Urban
19	I-70	Polk/Quincy Viaduct & approach roadway	Polk/Quincy Viaduct & approach roadway	KDOT	Urban
20	I-70	Polk/Quincy Viaduct & approach roadway	Polk/Quincy Viaduct & approach roadway	KDOT	Urban

Project ID	Route	Location	Improvement	Source	Urban/Rural
22	US-69	K-47 to RS-169	Road Improvements in Crawford County	KDOT	Rural
25	I-70	The Lewis & Clark Viaduct in Kansas City, KS	Bridges for the Lewis & Clark Viaduct in Kansas City, KS	KDOT	Urban
38	I-235/I-135/K-254	I-235/I-135/K-254 Interchange	Interchange Improvements in Sedgwick County	KDOT	Urban
45	I-235	Bridges #079 & #080 on I-235 in Sedgwick County	Bridge Replacement on I-235 in Sedgwick County (S/O K-42)	KDOT	Urban
54	K-99	K-99 in Wabaunsee County	Roadway Improvements in Wabaunsee County	KDOT	Rural
57	K-18	11th Street to Wildcat Creek Dr.		Flint Hills	Urban
60	I-70/Kansas Turnpike	K-10 Lecompton Interchange E to Douglas/Leavenworth County Line	Widen to 6 lanes	Lawrence	Urban
61	I-35 and Gardner Rd Interchange	I-35 and Gardner Rd Interchange	Construction of a 5-legged roundabout on each side of the interchange	MARC	Urban
64	K-32	Turner Diagonal Interchange	Interchange Improvements in Wyandotte County	MARC	Urban
65	I-35	South of 75th St. to South of 67th St.	Widen 6 to 8-lane, increase NB vertical clearance under 75th Street	MARC	Urban
67	I-35	119th St Interchange	Interchange Improvements in Johnson County	MARC	Urban
69	I-435	87th Street Interchange	Interchange Improvements in Johnson County	MARC	Urban
70	I-435	95th Street Interchange	Interchange Improvements in Johnson County	MARC	Urban
71	I-70	Turner Diagonal Interchange Re-configuration	Re-configuration and reconstruction of existing interchange.	MARC	Urban
76	US-54	Wiedemann to 127th St. E.-Phase IIC	Widen Road	WAMPO	Urban
77	I-235	US-54 and Central Interchanges	Interchange Improvements in Sedgwick County	WAMPO	Urban
81	US-54/400 (W Kellogg)	119th-135th	Widen Road	WAMPO	Urban
82	US-54/400 (W Kellogg)	151st-167th	Widen Road	WAMPO	Urban
83	I-235	I-235 Kellogg Interchange (Phase 2-4)	Interchange Improvements in Sedgwick County	WAMPO	Urban

Figure D.1: Map of Tier 1 Highway Freight Projects

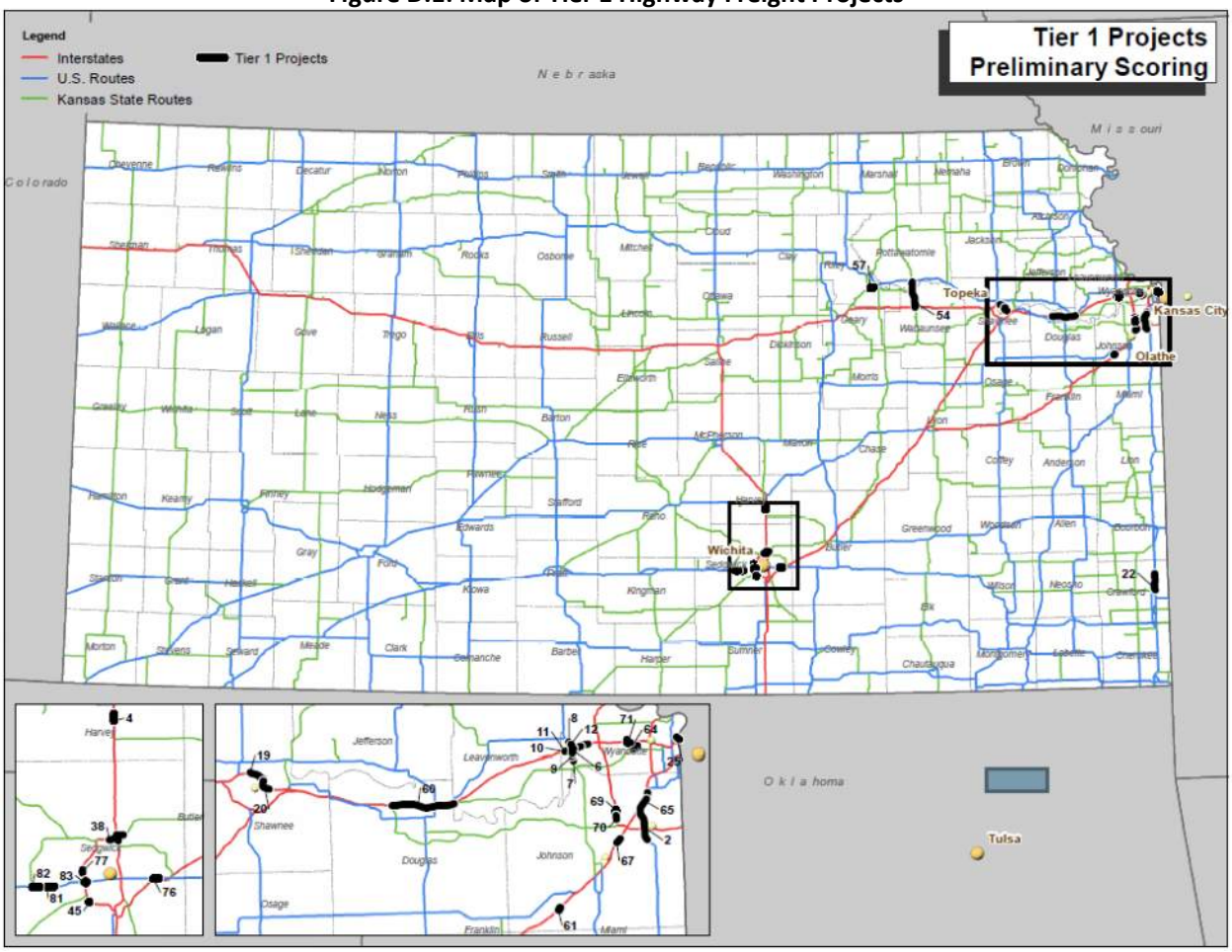


Table D.3: Tier 2 Highway Freight Projects

Project ID	Route	Location	Improvement	Source	Urban/Rural
1	US-54	K-14 west junction to existing 4-lane east of Kingman	Kingman bypass	KDOT	Rural
5	I-70	West of K-25(Colby) to southeast of RS-886(Mingo)	Pavement Replacement in Thomas County	KDOT	Rural
16	US-83	north of Haskell/Finney county line to south junction of US-83/US-83B	Pavement Reconstruction in Finney County	KDOT	Rural
21	US-69	3 miles north of Arma to CR/BB county line	Construct upgradeable expressway in Crawford County	KDOT	Rural
27	US-169	Highway Improvement in Montgomery County	Highway Improvement in Montgomery County	KDOT	Rural
28	US-400	East of US-400/K-7, east for 2 miles	Passing Lanes on US-400 in southeast Kansas	KDOT	Rural
29	US-169	1.5 mile south of RS 11 to north junction of US-169/US-59	Road Reconstruction in Anderson County	KDOT	Rural
32	US-54	US-83 to northeast of RS 1987	Construct 4-lane in Seward County	KDOT	Rural
33	US-54	US-83 to 0.6-mile northeast RS 1987	Construct 4-lane in Seward County	KDOT	Rural
34	I-35	Bridge #001 on I-35 in Johnson County (Sunflower Road)	Bridge Replacement in Johnson County (Sunflower Road)	KDOT	Urban
36	I-235	Bridges #104, #105, #106, #107, #355, #109 & #110 in Sedgwick County	I-235 Bridges Improvements in Sedgwick County (west of I-135)	KDOT	Urban
37	I-435	State Avenue Interchange in Wyandotte County	State Avenue Interchange in Wyandotte County	KDOT	Urban
39	US-50	US-50 in Ford County	Mill, overlay, and passing lanes in Ford County	KDOT	Rural
40	US-50	3rd St. to east junction US-83	Road Reconstruction in Finney County	KDOT	Rural
41	US-169	North of Allen/Neosho County Line to south of US-54	Highway Improvement in Allen County	KDOT	Rural
42	US-169	5 miles north of Allen/Neosho County line north for 7.1 mile	Highway Improvement in Allen County	KDOT	Rural
43	US-169	3 miles north of K-47 to 1.7 miles north of Neosho/Allen County Line	Roadway Reconstruction in Neosho County	KDOT	Rural
49	US-69	Bridge #004 on US-69 in Crawford County	Bridge Replacement in Crawford County (north of US-160)	KDOT	Rural

Project ID	Route	Location	Improvement	Source	Urban/Rural
53	US-54	Intersection Improvements at Barber Drive	Intersection Improvements in Sedgwick County	KDOT	Urban
58	K-18	Wildcat Creek Drive to I-70		Flint Hills	Urban
59	K-10/South Lawrence Trafficway	US-59/Iowa W to I-70/Kansas Turnpike	Widen to 4 lanes with a New Interchange at Wakarusa	Lawrence	Urban
62	K7, Dennis to Santa Fe Turn Lane additions	K7, Dennis to Santa Fe Turn Lane additions	Add turn lanes on K-7 (Parker St.) between Dennis Ave and Santa Fe	MARC	Urban
68	191st Street	191st Street, Gardner Road to Four Corners	Improve 191st Street to asphalt 40-foot roadway and curb and gutter	MARC	Urban
75	SW Wanamaker Rd./SW Huntoon St/I-470 Ramps		Roadway/Repair/Replace	Topeka	Urban
78	KTA bridge - 159th St. E.	KTA bridge - 159th St. E.	Bridge	WAMPO	Urban
79	KTA Bridge - Prairie Creek Rd.	KTA Bridge - Prairie Creek Rd.	Bridge	WAMPO	Urban
80	61st St. N.	Broadway west 1/2 mi to W-VCF Bridge	Road	WAMPO	Urban
85	K-15	I-135 to 71st Street S (Meadowlark Blvd)	Signal Coordination/Interconnect	WAMPO	Urban

Figure D.2: Map of Tier 2 Highway Freight Projects

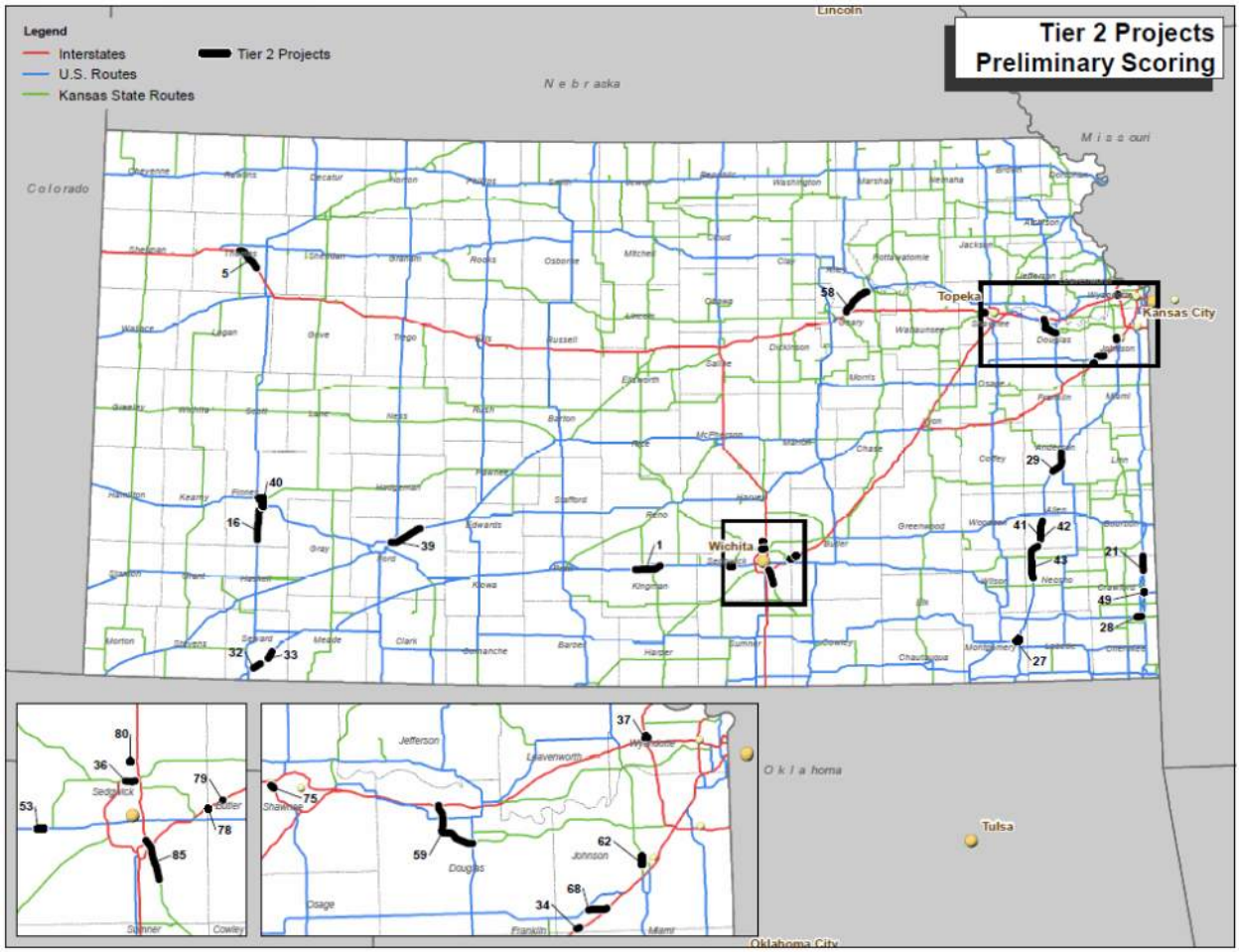
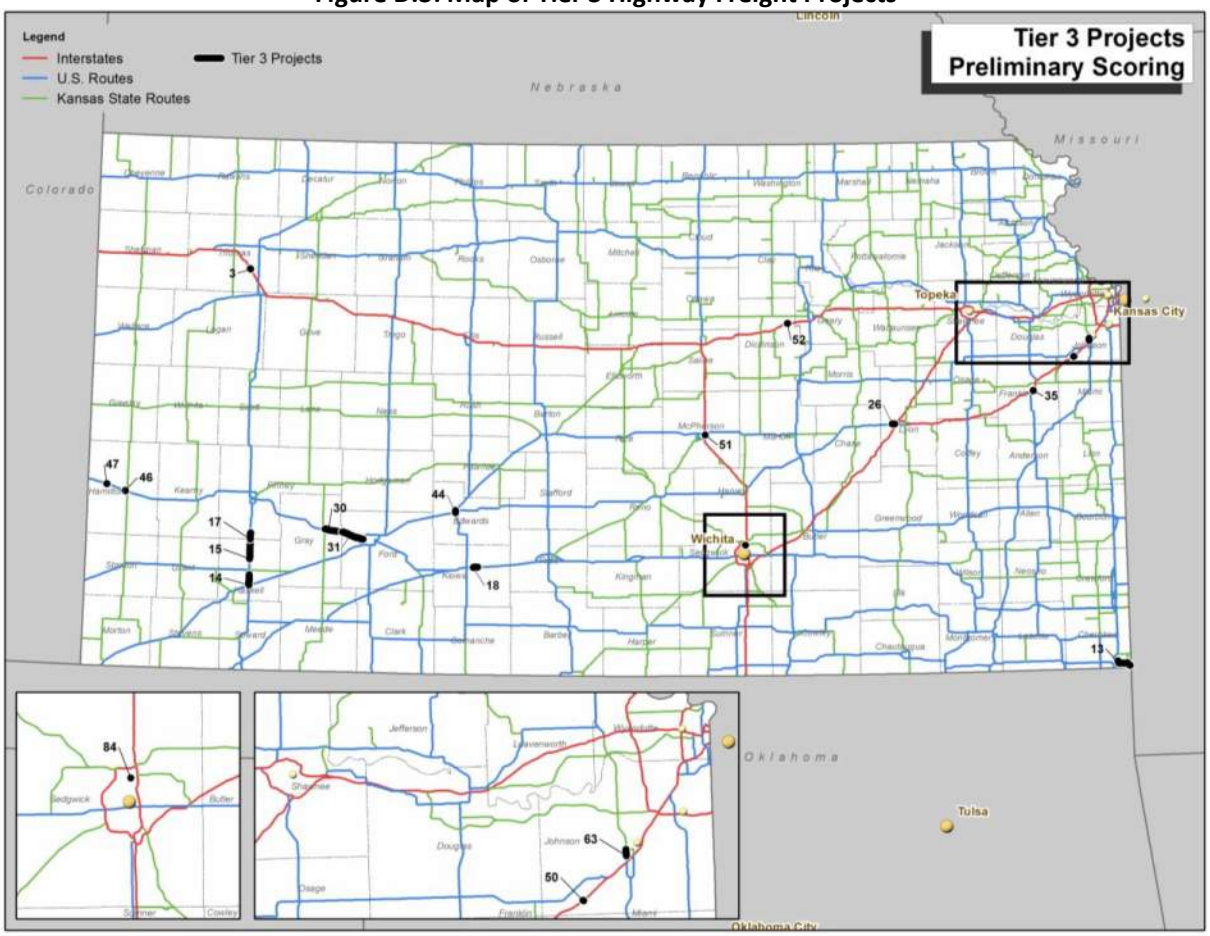


Table D.4: Tier 3 Highway Freight Projects

Project ID	Route	Location	Improvement	Source	Urban/Rural
18	US-54	US-54 in Greensburg Area	Construct Interchange on US-54 in Kiowa County	KDOT	Rural
3	I-70	South Fork Solomon River (Bridge #027)	Replace Bridge on I-70 in Thomas County	KDOT	Rural
13	US-400	Pittsburg Bypass to Kansas/Missouri Line	Highway Improvements on US-166 in Cherokee County	KDOT	Rural
14	US-83	Sublette to South of US-160	Pavement Reconstruction on US-83 in Haskell County	KDOT	Rural
15	US-83	4.5 miles north of US-160 to Haskell/Finney County Line	Pavement Reconstruction on US-83 in Haskell County	KDOT	Rural
17	US-83	Haskell/Finney County Line north for 2.5 miles	Pavement Reconstruction on US-83 in Finney County	KDOT	Rural
26	US-50	4.5 miles east of Lyon/Chase County Line to existing 4-lane	Construct 4-Lane Expressway US-50 in Lyon County	KDOT	Rural
30	US-50	Cimarron east limits to Gray/Ford County line	Roadway Reconstruction in Gray County	KDOT	Rural
31	US-50	Gray/Ford County line to 1.7 miles east of US-50/US-400	Construct 4-lane Expressway on US-50 in Ford County	KDOT	Rural
35	I-35	Bridge #025 on I-35 in Franklin County	Bridge Replacement in Franklin County (Montana Rd)	KDOT	Rural
44	US-183	Kinsley to US-56	Roadway Reconstruction in Edwards County	KDOT	Rural
46	US-50	Bridge #019 on US-50in Hamilton County	Bridge Replacement on US-50 in Hamilton County (Warner Rd)	KDOT	Rural
47	US-50	Bridge #010 on US-50in Hamilton County	Bridge Replacement on US-50 in Hamilton County (E Bridge Creek)	KDOT	Rural
50	I-35	Bridge #007 on I-35 in Johnson County (199th Street)	Bridge Replacement in Johnson County (199th St)	KDOT	Urban
51	I-135	Bridge #025 on I-135 in McPherson County	Bridge Replacement on I-135 in McPherson County (Kiowa Rd)	KDOT	Rural
52	I-70	Bridge #030 on I-70 in Dickinson County	Bridge Replacement on I-70 in Dickinson County (Chapman Creek)	KDOT	Rural
63	Lone Elm Rd old 56 Hwy to 151st St	Lone Elm Rd old 56 Hwy to 151st St	Widen from 2-lane to a 4-lane divided arterial	MARC	Urban

Project ID	Route	Location	Improvement	Source	Urban/Rural
84	29th St. N. & Broadway Intersection	29th St. N. & Broadway Intersection	Intersection Improvements	WAMPO	Urban

Figure D.3: Map of Tier 3 Highway Freight Projects



Rail

Rail project scoring relied on more manual techniques since GIS data are not as widely available. The rail scoring criteria and methodology are described below.[7]

Mobility

- **Improves freight rail bottlenecks or adds capacity to rail freight network –** Projects were evaluated manually to assess whether they improve a freight rail bottleneck or add capacity to the rail network. This includes projects to improve track to 286,000 lb. standard. Those that do received two points, while those that do not received no points.

- **Improves rail access to freight generators –** This metric used the same definition of freight generators as in the highway mode. Projects received two points if they are proximate to a Kansas freight generator, as measured by a ZIP code analysis in GIS.

Safety

Rail crossing safety projects were assessed by compiling Federal Railroad Administration (FRA) grade crossing data by county for the most recent five years. Grade crossing projects were awarded four points if they are in a county with more than 10 grade crossing accidents during this period, while those in counties with between five and 10 incidents got one point and those in counties with fewer than five accidents received no points.

Economic Development

Economic development impacts were evaluated based on probable truck traffic delay at grade crossings. The TRANSEARCH highway link data developed in the highway scoring process was used to identify roadway links that cross Class I rail lines. Intersections that are already grade separated were excluded since they are not creating truck delay. Projects that are proposing grade separations for the remaining crossings received scores by quintile ranging from zero to four points based on the link economic impact factors calculated for the highway assessment.

Environmental Impacts

Rail freight projects were assessed to determine whether they address a bottleneck or if they are likely to shift freight from trucks to rail; if they meet either criteria, they received four points.

Table D.5 lists the proposed freight rail project prioritization filters, scoring factors, and data sources.

[7] Note that rail projects were not scored or ranked since only 12 of them were identified for the prioritization process. However, the proposed method is described here as a reference for future prioritization efforts.

Table D.5: Proposed Freight Rail Project Scoring Metrics

Freight Plan Goal Area	Prioritization Filter	Project Scoring Factors	Data
Mobility	Improves Freight Rail Bottlenecks or Adds Capacity to Network for Freight	Adds capacity through double tracking, improved signalization, and/or new or expanded passing sidings or addresses other rail bottlenecks, or improves track to 286,000 lb. standard. ▪ Yes – 2 points ▪ No – 0 points	▪ Manual
Mobility	Improve Rail Access to Freight Generators	Project is proximate to a Kansas freight generator. ▪ Yes – 2 points ▪ No – 0 points	▪ InnovateKansas ExpertFinder tool
Safety	Improves Rail Safety	Address crash locations reducing rail/vehicle interfaces. County-level crash data from the FRA was converted to points as follows: ▪ Counties > 10 accidents during period - 4 points ▪ Counties with 5-10 accidents during period – 2 points ▪ Counties <5 accidents during period – 0 points	▪ Federal Railroad Administration
Economic Development	Reduces Delays to Truck Traffic at Grade Crossings	Cross-reference grade separation projects with highway link network data from TRANSEARCH to identify locations where rail traffic is delaying truck traffic. ▪ Top quintile – 4 points ▪ 4th quintile – 3 points ▪ 3rd quintile – 2 points ▪ 2nd quintile – 1 point ▪ Bottom quintile – 0 points	▪ TRANSEARCH
Environmental Impacts	Reduces Impacts to Air Quality or Promotes Mode Shift from Truck to Rail	If a project addresses a freight bottleneck or encourages mode shift from trucks to rail, it will have a positive impact on air quality. ▪ Yes – 4 points ▪ No – 0 points	▪ Manual

Results

Table D.6 shows the Tier 1 rail freight projects (i.e., all 12 rail projects identified during the prioritization process). Figure D.4 depicts the location of each project, except for the more general project needs that could not be mapped since they do not apply to a specific location.

Table D.6: Tier 1 Rail Freight Projects

Project ID	Route	Location	Improvement	Source
55	Kansas & Oklahoma Railroad (Watco)	US-56 Southwest of Great Bend	Crossing Safety Improvements	KDOT
56	Kansas & Oklahoma Railroad (Watco)	US-281 in Sawyer	Crossing Safety Improvements	KDOT
57	South Kansas & Oklahoma Railroad (Watco)	US-169 (Walnut St.) in Coffeyville	Crossing Safety Improvements	KDOT
66	BNSF	207th Street	New bridge over BNSF tracks	MARC
72	UP	15th Street Elwood	Crossing Safety Improvements	St. Joseph/Elwood
73	UP	7th Street Elwood	Crossing Safety Improvements	St. Joseph/Elwood
74	UP	Vermont Street Elwood	Crossing Safety Improvements	St. Joseph/Elwood
****	BNSF and UP	Various	Rail Crossing Consolidation and Separation Program	Railroads
****	Kyle Railroad (Genesee & Wyoming)	Network wide	Increase rail to 286K lbs. throughout network	Railroad
****	Kyle Railroad (Genesee & Wyoming)	Yuma Sub	Bridge replacement Yuma Subdivision	Railroad
****	Kyle Railroad (Genesee & Wyoming)	Network wide	Upgrade and replace selected bridges throughout network	Railroad
****	Kyle Railroad (Genesee & Wyoming)	Western and Central Kansas	Bulk shuttle loader(s)	Railroad
****	Kansas and Oklahoma Railroad (Watco)	Western and Central Kansas	Bulk shuttle loader(s)	Railroad

** Project represents a general, non-specific need and therefore could not be mapped.

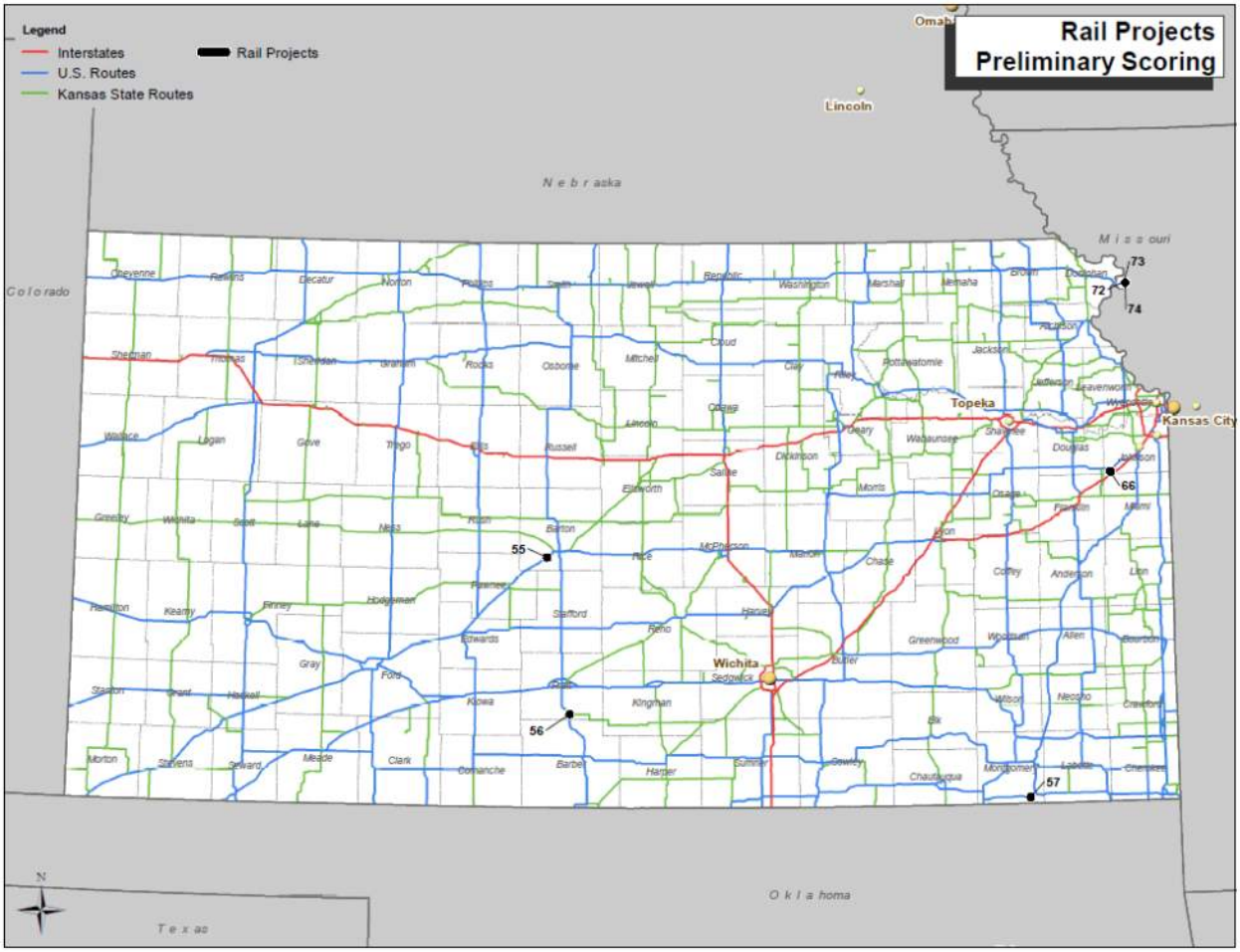



Figure D.4: Map of Tier 1 Rail Freight Projects