CAMBRIDGE SYSTEMATICS

Bi-State Region Freight Plan

Final Report

prepared for

Bi-State Regional Commission

prepared by

Cambridge Systematics, Inc.

with

Parsons Brinckerhoff
A. Strauss-Wieder
InTrans

September 30, 2015

Bi-State Region Freight Plan

Final Report

prepared for

Bi-State Regional Commission

prepared by

Cambridge Systematics, Inc.
115 South LaSalle Street, Suite 2200
Chicago, IL 60603

with

Parsons Brinckerhoff
A. Strauss-Wieder
InTrans

date

September 30, 2015

Table of Contents

List of Tables

List of Figures

1.0 Introduction

The Bi-State region is comprised of five counties spanning two States – Iowa and Illinois. As of the 2010 Census the region had a population of approximately 425,000. The region is split by one of the largest river systems in the world, the Mississippi River System, which presents a challenge to both personal and freight mobility. Goods movement is largely driven by the industrial and consumer demands of a region; major industries such as Alcoa, Deere & Company and Tyson call the Quad Cities home. The Bi-State nature of the region means that these businesses must consider Illinois' and Iowa's unique regulatory environments as part of their day-to-day operations. These, and other, infrastructure and operational issues were explored as part of this freight commodity efficiency study, and a plan to overcome them will be developed.

This Freight Plan worked through a process to build consensus and identify projects, programs and strategies to guide investment in the multimodal freight transportation system in the two-state region. During Freight Plan development the following questions were answered:

- **Vision** – What does the region want from its freight system?
- **The Bi-State Freight System Infrastructure** – What is the current and planned status of freight system components and services?
- **The Demand for Freight** – What is the current freight system demand today? In the future?
- **External Factors and Trends** – What drives the freight system demand in the region? What changes should the region plan for in the future?
- **The Bi-State Freight System Needs Assessment** – Where are improvements needed to best match the supply and demand? Which are most important?
- **Recommendations** – What are the next steps toward advancing the Bi-State Region's vision given anticipated needs and system conditions?
- **Rationale for Investment of Public Funds in the Freight System** – What is the value of public investment in the freight system to the region? How should the Region pay for the needed improvements?

To help bring focus to the study on those aspects of the freight system most important to the Bi-State Region, freight goals were established as part of Freight Plan development that related to goals already in place as part of the *2040 Quad Cities Long Range Transportation Plan*. The Freight Plan goals are:

- **Economy** - Use the Bi-State Freight System Support the Region's Economy
- **Infrastructure** - Maintain and Enhance Highway System Infrastructure
- **Operations** - Promote Freight Rail System Operational Efficiencies

- **Access and Modal Options** - Increase Accessibility and Mobility Options for the Region
- **Resiliency** - Work Towards System Resiliency and Reliability

Stakeholder outreach was continuous throughout Freight Plan development. A Key Stakeholder Committee was established that met three times during development. One-on-One interviews were conducted with key businesses in the Bi-State Region to better understand their perspectives and needs. An on-line survey was distributed to gather an inventory of freight system needs from a wide range of public and private sector freight stakeholders. And, a ½ day charrette was held with key Freight Plan partners to discuss/confirm recommendations prior to publication.

This multipronged process that blended stakeholder outreach with technical analysis provided a comprehensive multimodal evaluation of the Bi-State Region's freight system and identified issues where the Bi-State Regional Commission and its public and private sector freight partners should consider focusing on in the future. This report documents the *Bi-State Region Freight Plan* in the following sections.

- **Section 2.0 – Bi-State Region's Economy.** This section provides the economic context of the Bi-State Region, provides current and expected future multimodal commodity flow profiles, and presents short and long term supply chain and logistics trends that may change the future of how goods are moved in the Bi-State Region.
- **Section 3.0 – Infrastructure.** This section presents an inventory of the Bi-State Region's multimodal freight infrastructure and system activity. It also provides some information on the conditions of key portions of the highway system.
- **Section 4.0 – Freight System Performance Measures.** This section presents background information on performance measures, why they are important, and insight into Federal performance measurement guidance. Best practice freight performance measures are recommended for the Bi-State Region.
- **Section 5.0 – Freight System Needs, Issues and Opportunities.** This section describes the outreach conducted during the study, and links this stakeholder feedback and the results of data analysis to define the top needs, issues and opportunities in the Bi-State Region. These are organized around five key goals for the region to focus on in the future.
- **Section 6.0 – Freight System Investments.** This section identifies the physical infrastructure investments needed today on the highway system and outlines the types of future freight projects that could provide the Bi-State Region benefits if pursued on the non-highway freight systems.
- **Section 7.0 – Supporting Strategies.** This section recognizes that physical infrastructure projects, alone, will not be sufficient to address the numerous

needs that exist internal and external to the Bi-State Region. An array of supporting strategies have been identified to address freight system needs and issues related to policy, organization, partnerships and funding.

- **Section 8.0 – Strategy Evaluation and Expected Outcomes.** For select strategies a qualitative (and quantitative, as data were available) assessment was conducted to determine the level of benefits certain types of freight projects may provide.
- **Section 9.0 – Next Steps and Implementation.** This section briefly notes how the findings in this report should be used by the Bi-State Region and its public and private sector freight partners to advance Plan recommendations.

Supplemental to this Report are two key study deliverables:

- **Modal Profiles.** Five profiles were developed to represent the four key freight modes in the region and to provide an overview of key industries and commodity movements. These profiles combine the physical system inventories and stakeholder perspectives of Task 1 with the commodity flow and needs analysis conducted in Task 2. The profiles include:
  - Industry and Commodity Flows,
  - Highways,
  - Rail,
  - Water, and
  - Air.
- **Commodity Flow Analysis Tool.** The Commodity Flow Analysis Tool combines current and future year freight commodity flows and existing facility points in a common database that can be queried in a variety of ways. The data can be accessed by selecting a county of interest to find out about it -- commodity flows by mode and origin-destination (O-D), truck link volumes, air and port volumes, and other. Or can be accessed by focusing on a flow or type of modal move. Locational (Lat-Long) data is available on each data record in the O-D and the facility tables. This tool was used to develop the regional commodity flow snapshot in Section 2.4, and will be provided to Bi-State Regional Commission for their continued use.

2.0 The Bi-State Region's Economy

This section provides the economic context of the Bi-State Region, and describes how the people and industries in the region connect to each other and to the freight transportation system. At its very base, the people of the Bi-State Region are the "drivers" of the local economy. The first part of this section presents the region's economic and demographic characteristics, including population, income, and education. Freight-related industries in the region are then described, including an assessment of how each relies on the various modal components of the freight system to convey goods to market. A description of the key commodities conveyed by each mode today and anticipated in the future is also included. And last, this section presents short and long term supply chain and logistics trends that may impact, and change the future of, goods movement in the Bi-State Region.

2.1 Existing Socioeconomic and Demographic Characteristics

Population

The Bi-State Region includes Scott County (IA), Rock Island County (IL), Henry County (IL), Mercer County (IL), and Muscatine County (IA), with a total population of 423,940 in 2013. The Quad Cities Area, which includes portions of Rock Island and Scott Counties, is considered to be the core of the Bi-State Region and comprises approximately 74 percent of total population. The Bi—State Region has a mix of urban and rural areas of varying size and population, as shown in Table 2.1. Out of the five Bi-State counties, Scott County is the largest at 160,080, and Mercer County is the smallest at 16,325. The population of the region grew by 1.4 percent between 2009 and 2013. Additionally, the number of households in the Bi-State Region was 171,024 in 2013, an increase of 0.9 percent since 2009.

Table 2.1 Population by County in Bi-State Region, 2009-2013

	2009	2010	2011	2012	2013
Rock Island County, IL	146,670	147,524	147,625	147,504	147,477
Henry County, IL	49,523	50,477	50,465	50,378	50,260
Scott County, IA	162,994	162,184	163,667	165,432	167,080
Mercer County, IL	16,440	16,551	16,497	16,421	16,325
Muscatine County, IA	42,448	42,501	42,634	42,729	42,798
TOTAL	**418,075**	**419,237**	**420,888**	**422,464**	**423,940**

Source: American Community Survey 5-Year Estimates, 2009-2013.

The median age of the Bi-State Region has been increasing in all counties, with the exception of Henry County. The biggest change occurred in Mercer County; between 2009 and 2013, the median age increased from 39.1 to 44.0, a 12.5 percent change. By contrast, Henry County's median age decreased from 42.1 to 41.8, a -0.7 percent change. However, the median age appears to be increasing throughout the region.

Income and Education

Household income has been increasing in the Bi-State Region. Henry County has the highest household income at $53,136 in 2013, followed by Rock Island County at $52,940. Table 2.2 provides a summary of the household incomes over a five-year period.

Table 2.2 Household Income by County in Bi-State Region, 2009-2013

	2009	2010	2011	2012	2013
Rock Island County, IL	$48,618	$49,164	$50,698	$52,284	$52,940
Henry County, IL	$51,200	$50,909	$51,216	$52,700	$53,136
Scott County, IA	$45,585	$46,226	$46,726	$48,205	$48,702
Mercer County, IL	$50,188	$51,025	$51,134	$51,675	$51,425
Muscatine County, IA	$50,656	$49,964	$51,274	$53,002	$52,735

Source: American Community Survey 5-Year Estimates, 2009-2013.

The percentage of high school graduates has increased substantially in the Quad Cities Area, from 74 percent in 1990 to 89.6 percent in 2009. In addition, the percentage of college graduates (Bachelor's Degree) increased from 17.1 percent to 26.7 percent during the same period. There are a number of local educational opportunities in the area, which has two community colleges, a technical/trade collect, one four-year college, two universities, a chiropractic college, and a graduate center.

Workforce (Employment and Economy)

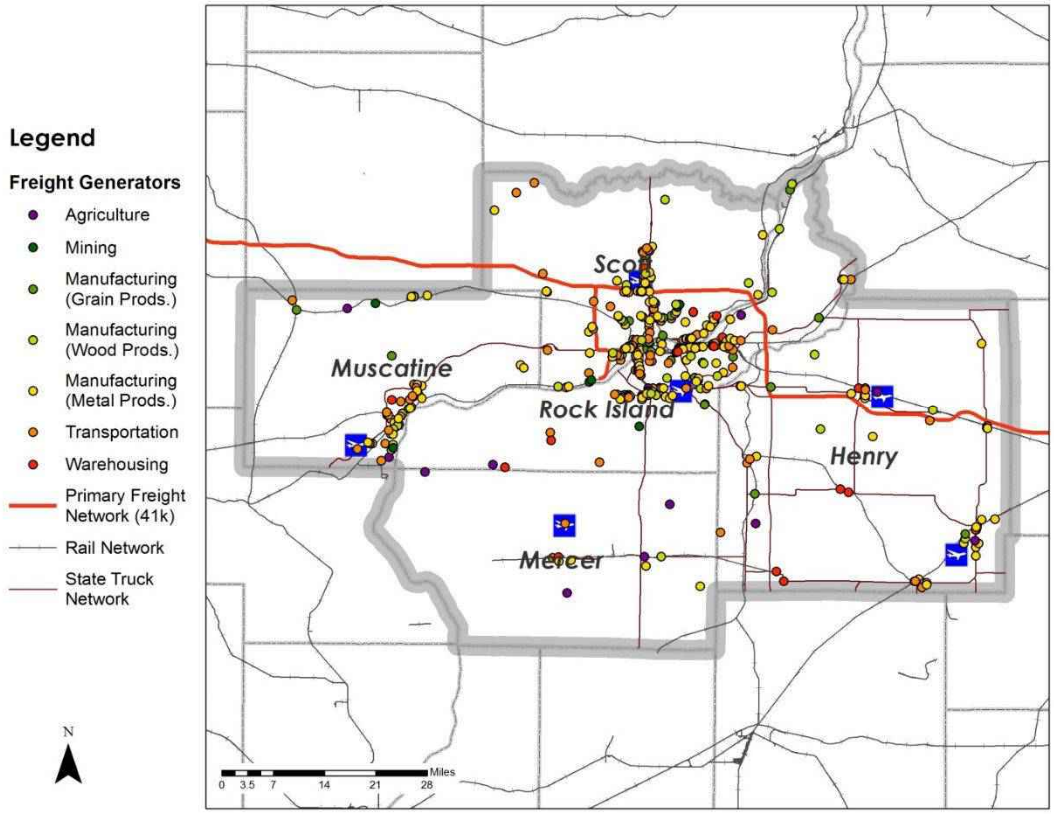
The economy within the Bi-State Region has expanded from its primarily farming-centric industry to add focus areas in multiple types of manufacturing, and overall has experienced periods of decline and recovery since the beginning of the 1980s. After peaking in 1980, the workforce declined sharply and has since grown to 202,034 in 2013. Between 1990 and 2009, the percent of workers employed in manufacturing decreased, but it remains the 2nd largest sector employer in the Bi-State Region. Additionally, the education, health, and social services industries experienced an increase in employees during this same period. By 2009, this sector became the largest employer in the region, followed by manufacturing and retail trade.

There are several major employers in the Quad Cities area, the largest being the Rock Island Arsenal, which employs over 8,000 people. The Rock Island Arsenal is a manufacturing and logistics center for the U.S. military, with most employees specializing in highly skilled manufacturing jobs, logistics, procurement, planning, and scientific studies. Other major employers in the area include Genesis Health Systems, Trinity, Tyson Fresh Means Inc., Alcoa, and Kraft Foods. There is one Fortune 100 company in the Bi-State Region, Deere & Company (#80), headquartered in Moline, IL with several other facilities within the region.

2.2 Freight-Related Industries

Areas with high concentrations of manufacturing operations, also known as "production clusters", have special needs in terms of attracting and retaining transportation services and workforce. These clusters, of which there are several, throughout the Bi-State Region, contain a critical mass of activity, either in one industry or in several related industries, that lead to efficiencies in transportation, production, or services. In the Bi-State Region there are a number of clusters of freight-related industries such as agriculture, retail trade, and warehousing, as shown in Figure 2.1. These clusters have strong links to other firms within the region and beyond, for example raw materials used in the production of these products may come from the local area (crops and farm animals, for example), or can arrive in bulk quantities by railcar, truck, or barge. The composition of and relationships between freight-related industries in the Bi-State region are described further in this section.

Figure 2.1 Industry Clusters in the Bi-State Region



Source: ReferenceUSA.

The Bi-State Region is a hub for manufacturing activity, with 58 firms with over 100 employees and almost 200 firms with between 20 and 100 employees located in the region. Bi-State also has a high number of small-sized firms (20-49 employees), particularly in the retail trade and construction sectors. Retail trade comprises the highest number of firms for all sizes. Table 2.3 summarizes the information by sector for the Bi-State Region.

Table 2.3 Freight-Related Industries and Number of Bi-State Region Firms

(NAICS) Industry	# Firms 20-49 Employees	# Firms 50-99 Employees	# Firms >100 Employees
(11) Agriculture, Forestry, Fishing and Hunting	N/A	N/A	N/A
(21) Mining	N/A	N/A	N/A
(22) Utilities	N/A	N/A	N/A
(23) Construction	165	90	17
(31-33) Manufacturing	100	90	58
(42) Wholesale Trade	90	73	22
(44-45) Retail Trade	317	163	65
(48-49) Transportation and Warehousing	60	44	19

Source: ReferenceUSA, 2014. Due to small sample size, data on Agriculture, mining, and utilities were not available.

There are several freight-related industries that are strong throughout the five counties of the Bi-State Region, as determined by location quotient (LQ) analysis, a method for determining whether an industry has a greater share of local employment compared to the country as a whole. The LQs displayed in Table 2.4 are an indication of the Bi-State's competitive advantages - where the region has the greatest comparative proportions of employment. Notably, all five counties have a high share of manufacturing employment, particularly in Muscatine, which has 3.46 times more employment concentration in this sector compared to the national average. Additionally, all counties except Muscatine have high shares of wholesale trade employment. In addition, Henry, Scott, and Mercer counties have strong employment in retail trade and construction industries. Mercer county has a particularly high proportion of employment in agriculture, (2.47) compared to the other counties. Muscatine County also has a strong concentration of utilities (2.15) and transportation and warehousing employment (1.3).

Table 2.4 Freight Related Industry Location Quotients of Five Bi-State Region Counties (Base Area: U.S., All Industries)

(NAICS) Industry	Rock Island County, IL	Henry County, IL	Scott County, IA	Mercer County, IL	Muscatine County, IA
(11) Agriculture, Forestry, Fishing and Hunting	0.12	ND*	0.18	2.47	0.29
(21) Mining	0.16	ND	0.03	NC*	0.32
(22) Utilities	ND	ND	0.70	ND	2.15
(23) Construction	0.76	1.37	1.16	1.31	0.77
(31-33) Manufacturing	1.58	1.67	1.36	2.27	3.46
(42) Wholesale Trade	1.33	1.40	1.09	1.12	0.57
(44-45) Retail Trade	0.92	1.32	1.15	1.15	0.82
(48-49) Transportation and Warehousing	ND	ND	0.83	ND	1.30

Source: U.S. Department of Labor, Bureau of Labor Statistics, 2013.

*ND indicates Not Disclosable; NC indicates Not Calculable

Note: An LQ score of one indicates that an industry has the same share of employment as it does nationwide; a score greater than one indicates a greater share of employment; a score less than one indicates a lesser share of employment.

As mentioned, manufacturing employment is particularly strong in the Bi-State Region compared to the rest of the nation. Table 2.5 isolates key manufacturing industry sub-sectors that generate freight activity. Rock Island has a high concentration of machinery manufacturing employment (6.69), while Henry County has a notably high level of fabricated metal product manufacturing (4.52). Muscatine County has two substantially high location manufacturing quotients: primary metal (15.10) and furniture and related products (49.58).

Table 2.5 Key Manufacturing Industry Location Quotients of Five Bi-State Region Counties (Base Area: United States, All Industries)

(NAICS) Industry	Rock Island County, IL	Henry County, IL	Scott County, IA	Mercer County, IL	Muscatine County, IA
(311) Food manufacturing	ND*	0.46	1.83	ND	5.39
(331) Primary metal manufacturing	0.61	ND	11.47	NC*	15.10
(332) Fabricated metal product manufacturing	1.79	4.52	1.12	2.70	0.32
(333) Machinery Manufacturing	6.69	1.82	3.78	ND	2.17
(337) Furniture and related product manufacturing	0.51	ND	0.40	NC	49.58

Source: U.S. Department of Labor, Bureau of Labor Statistics, 2013.

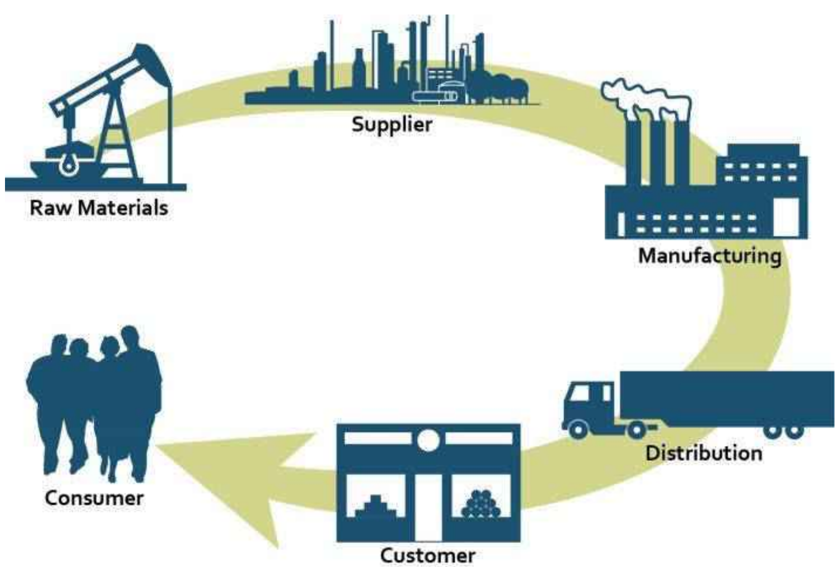
*ND indicates Not Disclosable; NC indicates Not Calculable

Note: An LQ score of one indicates that an industry has the same share of employment as it does nationwide; a score greater than one indicates a greater share of employment; a score less than one indicates a lesser share of employment.

2.3 Link Between Transportation and Industry

Industries and the transportation sector are linked through movements on the ***supply chain***. Supply chains are defined as the movement of goods from where they are produced to where they are consumed. In general, the functionality of supply chains is dependent on access to reliable and cost-effective transportation networks. Figure 2.2 illustrates a conceptual supply chain.

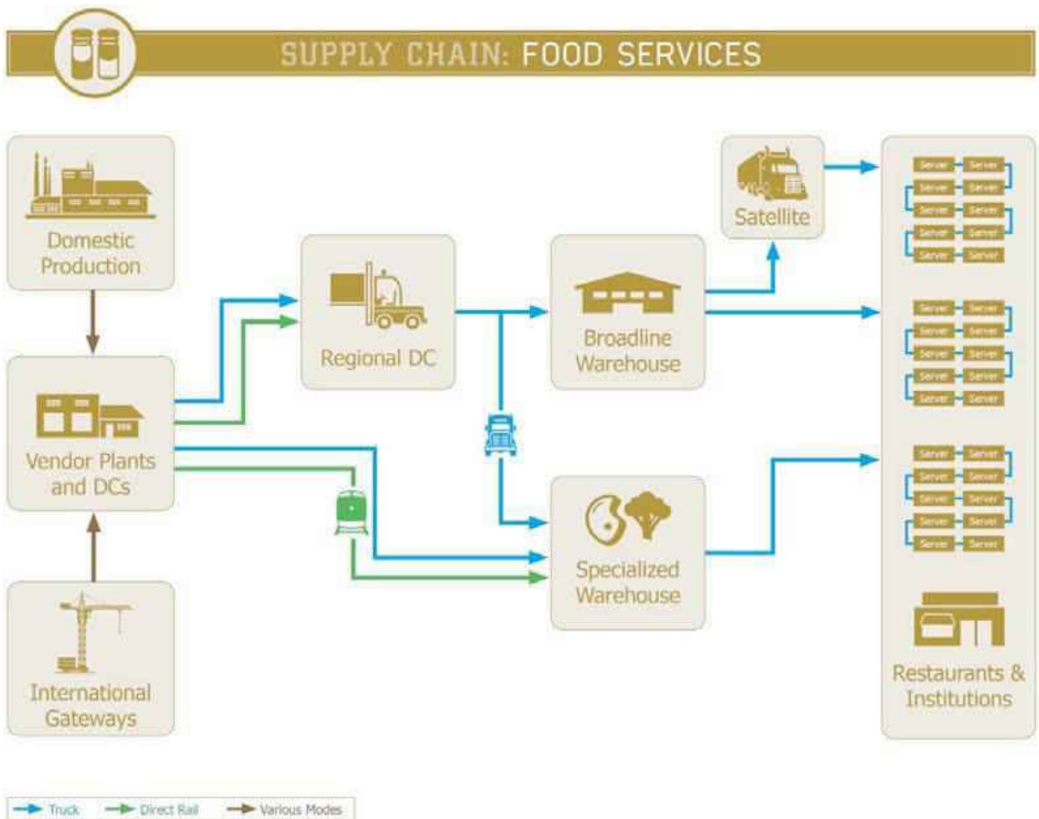
Figure 2.2 Visualization of a Supply Chain



Source: Cambridge Systematics

An agricultural supply chain, for example, might begin with farmers and ranchers in the rural areas of the Bi-State Region who receive inputs via rail of fertilizer and grain, and then send cattle and dairy products to the food processing and food manufacturing industries located in the Quad Cities. These industries may also receive other inputs – manufactured equipment, packaging material, and other materials– that are either shipped locally or may be imported from Asia or Latin America. The food manufacturer might then move products to a regional distribution center for customers in the Midwest, or ship their products cross-country for export. An example of such a supply chain is in Figure 2.3.

Figure 2.3 Food Services Supply Chain Example



Source: Transportation Research Board of the National Academies, *NCFRP Report 14: Guidebook for Understanding Urban Goods Movement*, 2012.

In the Bi-State Region, supply chains are complex, and include numerous business-to-business and business-to-consumer transactions. Many of the supply chain steps may occur within the region or the States of Illinois or Iowa, but some supply chains may go far beyond the region, especially those for imported products, or locally produced goods ultimately destined for export. In many respects, the Bi-State Region can be likened to a ***production location*** – the region is distinguished by the number of manufacturing operations in the area. Warehouses, distribution centers and transportation service providers are located in the region – many near large operations in support functions that form industry "clusters," which are described further in following sections. In addition, production operations that use similar freight services and/or input products may select to locate nearby. Such agglomerations or clusters help in terms of attracting and retaining the needed transportation services and workforce by creating a critical mass of activity.

General Industry Use of Transportation Modes

Table 2.6 examines the modal usage of the freight-related industries in the Bi-State Region. Truck is a key element of all industries, as even goods moving via other modes often use truck for last mile connections. Rail and water serve the agriculture, mining, manufacturing and trade sectors, while air is mostly used for the transport of high value manufactured goods and consumer products. Pipeline transport is important for moving crude oil and other energy sector goods.

Table 2.6 Modal Usage of Freight-Related Industries

(NAICS) Industry	Highway	Rail	Water	Air	Pipeline
(11) Agriculture, Forestry, Fishing and Hunting	●	●	●	○	○
(21) Mining	●	●	◐	○	●
(22) Utilities	●	●	◐	○	●
(23) Construction	●	◐	○	○	○
(31-33) Manufacturing	●	●	○	◐	○
(42) Wholesale Trade	●	●	○	○	○
(44-45) Retail Trade	●	◐	○	◐	○
(48-49) Transportation and Warehousing	●	●	○	◐	○

Key: Less important ○ ◐ ● More Important

Freight-Generating Industry Clusters and the Link to the Transportation System

Three industry clusters that are critical to the Bi-State Region's economy and transportation system are:

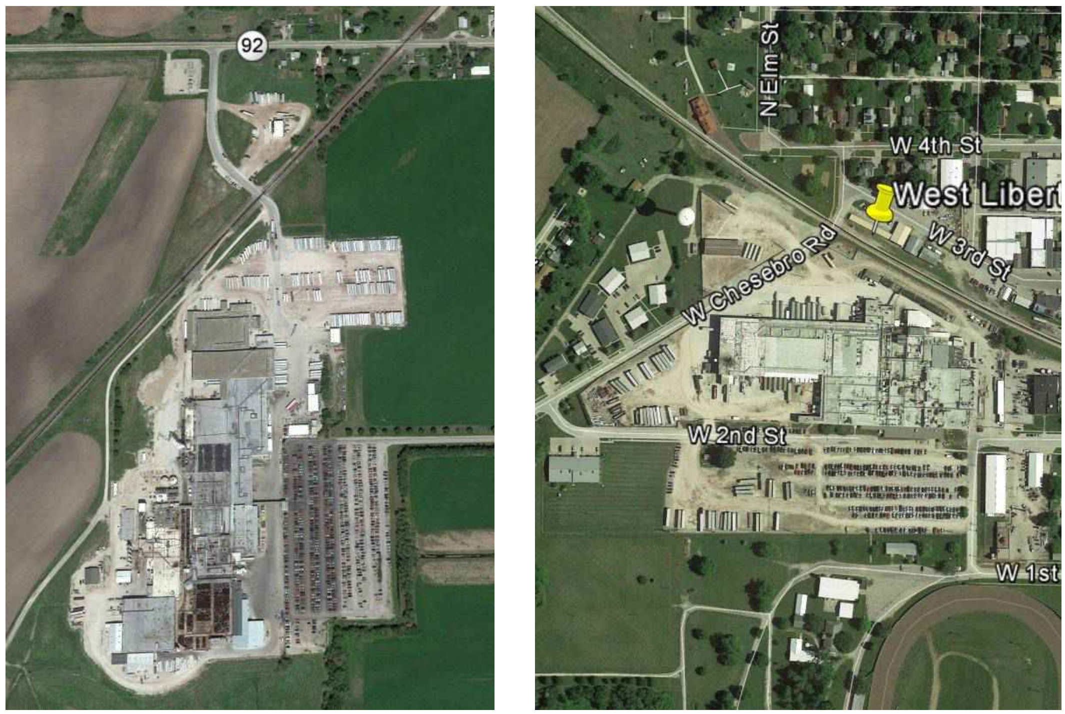
- Transportation Equipment Production,
- Steel Fabrication Operations, and
- Agricultural and Farm Animal Processing.

These are further examined in the following sections.

Agricultural and Farm Animal Processing

A wide range of agricultural and farm animal processing operations are located in the Bi-State Region. Some of these facilities are located in rural settings, such as Tyson Fresh Meats in Hillsdale, IL. Some are in more suburban settings, such as Heinz in Muscatine, IL and West Liberty Foods and Iowa Turkey Growers Cooperative in West Liberty, IA, as shown in Figure 2.4.

Figure 2.4 Agricultural and Farm Animal Processing Clusters



Left: Tyson Fresh Meats in Hillsdale, IL; **Right:** Heinz in Muscatine, IL and West Liberty Foods in West Liberty, IA

Source: Google

West Liberty Foods demonstrates the history of and commitment to food processing in the area. Initially established over 70 years ago, the Iowa Turkey Growers Cooperative was formed by 47 Iowa-based turkey growers in 1996 to acquire the plant from Oscar Mayer when the company announced that it was going to close the facility.[1] Since that time, West Liberty Foods has expanded and opened new facilities elsewhere in the State.

West Liberty Foods also demonstrates how the characteristics of an operation share the freight services needed – the company processes turkeys into products that require temperature control going to a variety of customers and customer locations. Trucks are used for the transport of live animals and can be more efficient for the

1 "Our Story". West Liberty Foods. https://www.wlfoods.com/history.aspx

movement of the end of products. Accordingly, the location is not rail served; it is a truck operation.

Rail service works better for carload movement of bulk products. River Valley Cooperative, with several locations in the Bi-State Region, has a corporate objective "to increase the efficiency and productivity of our members' agribusiness operations."[2] As a facility with silos that serves as a collection point for grains, the River Valley Coop locations in Geneseo, IL and Galva, IL are located adjacent to freight rail lines.

The Kent Corporation's Grain Processing Corporation (GPC) in Muscatine, IA as described elsewhere in this report, is a wet milling company that makes products including ethyl alcohol, corn starches for food markets, maltrodextrin (corn syrup solids), corn oil, and corn-based cat litter – all of which are inputs for other industries. The Muscatine facility moves 60 percent of its outbound bulk products by rail. Indeed, large rail yards serve the location, along with barge services.

Steel Fabrication Operations

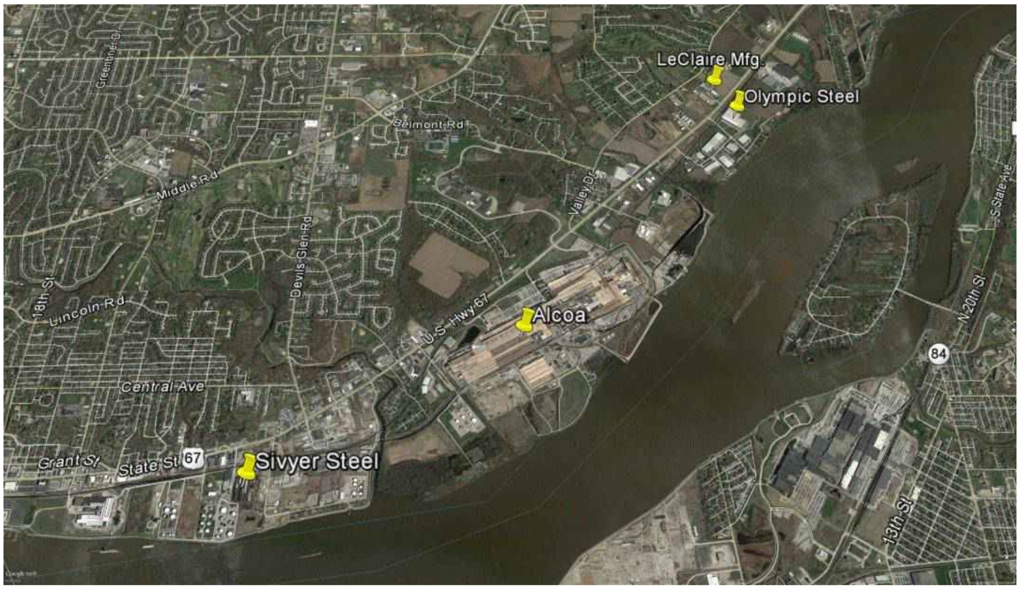
The Bi-State Region has a large number of steel fabrication companies, ranging from very large to smaller, more specialized firms. The larger companies, which handle larger quantities, generally require rail service. Clustering occurs around rail service locations, as well as where the needed specialized workforce can be found. The steel companies require freight rail, particularly for receipt of the raw materials, for cost efficiency. However, as discussed elsewhere in this report, when the rail service is not cost and/or time effective, trucking services must be used, which can lower the competitive value of a location.

Bettendorf, IA demonstrates the clustering of steel fabrication industries in an area as shown in Figure 2.5. Bettendorf has a significant Alcoa operation located along the Mississippi River. The Sivyer Steel Corporation, LeClaire Manufacturing (a maker of aluminum castings and machining), and Olympic Steel are located nearby.

Access to rail services also draws operations requiring this service. In the case of the Bettendorf example, two plastics companies – Berry and Graystone Manufacturing – are located within the industrial cluster.

[2] River Valley Cooperative. http://www.rivervalleycoop.com/about-us

Figure 2.5 Steel Fabrication Cluster



Source: Google

Transportation Equipment Production

The Deere Company, often referred to as John Deere, is headquartered in Moline, IL, with Harvester Works in this location (Figure 2.6), tractor cab assembly operations and engine works operations in Waterloo, IA, and a manufacturing operation in Ankeny, IA.[3] The company, which is estimated to earn $1.9 billion in 2015,[4] is likely the transportation equipment company most often associated with the region.

The company, which produces a range of commercial and consumer products, overhauled its supply chain in 2004 to reduce inventory costs and optimize their network.[5] The company, which supports 2,500 North American dealerships and exports overseas, went to a two-tiered distribution center (DC) operation, with inventory maintained at large DCs near production locations, at merge centers that combine inventory from various plants, and at dealerships. As expected for a transportation equipment production facility, the Moline operation is rail served.

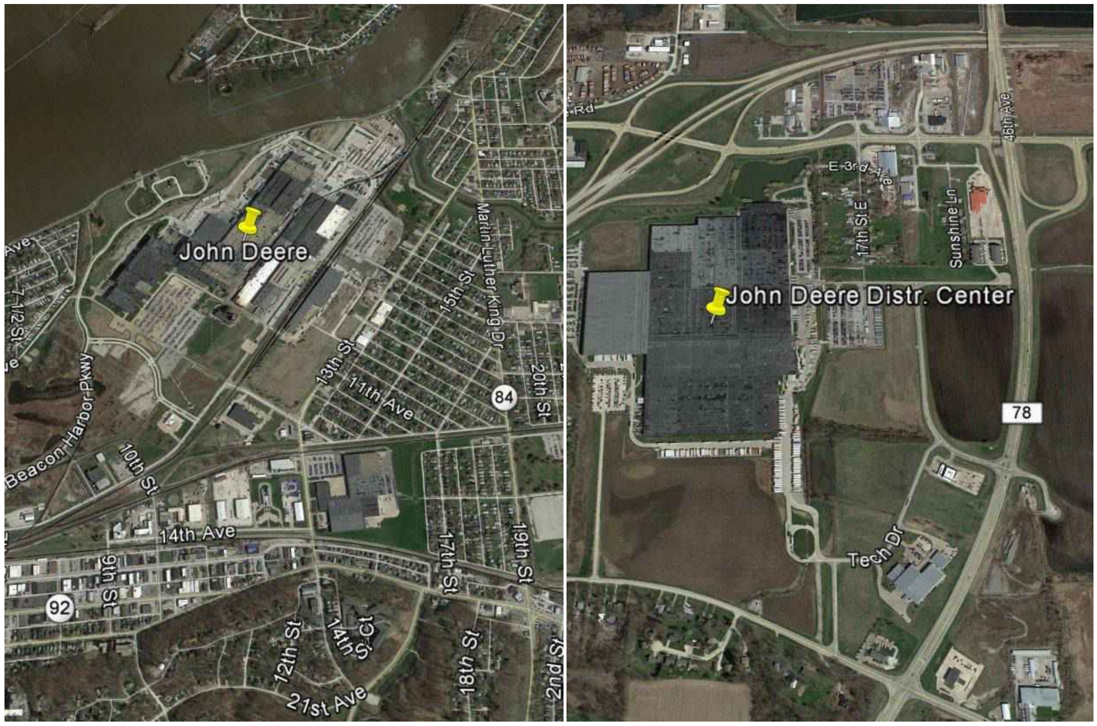
---

[3] "Factory Tours". Deere & Company. http://www.deere.com/en_US/corporate/our_company/fans_visitors/tours_attractions/factorytours.page?

[4] "Deere Announces Second-Quarter Earnings of $690 Million". Deere & Company. http://www.deere.com/en_US/corporate/our_company/investor_relations/financial_data/earnings_releases/2015/secondqtr15.page?

[5] "A Supply Chain Overhaul That Delivers It All to Deere & Co". Supply Chain Brain. http://www.supplychainbrain.com/content/research-analysis/supply-chain-innovation-awards/single-article-page/article/a-supply-chain-overhaul-that-delivers-it-all-to-deere-co-1/

Figure 2.6 Transportation Equipment Cluster



Left: John Deere headquarters in Moline, IL **Right:** John Deere distribution center in Milan, IL.

Source: Google

The company's largest DC, shown in the figure, is in Milan, IL. According to a published report,[6] this DC is the company's North American Parts Distribution Center and is:

- Originally opened in 1975, the facility was expanded by nearly 382,000 square feet in 2009 to 2.6 million square feet.
- A 24/7 operation with 550 workers.
- A centralized full-line distribution centers stocking slower moving and obsolete parts to support depots, independent dealers and customers around the world.

Typical of a parts DC, this facility is truck served, without rail operations.

The company's Davenport, IA distribution facility is a regional distribution center for articulated dump trucks, log skidders, harvesters, and other industrial and agricultural equipment, as well as a training center.

[6] "John Deere's Global Parts Distribution Network Strategy". MWPVL International. http://www.mwpvl.com/html/john_deere.html

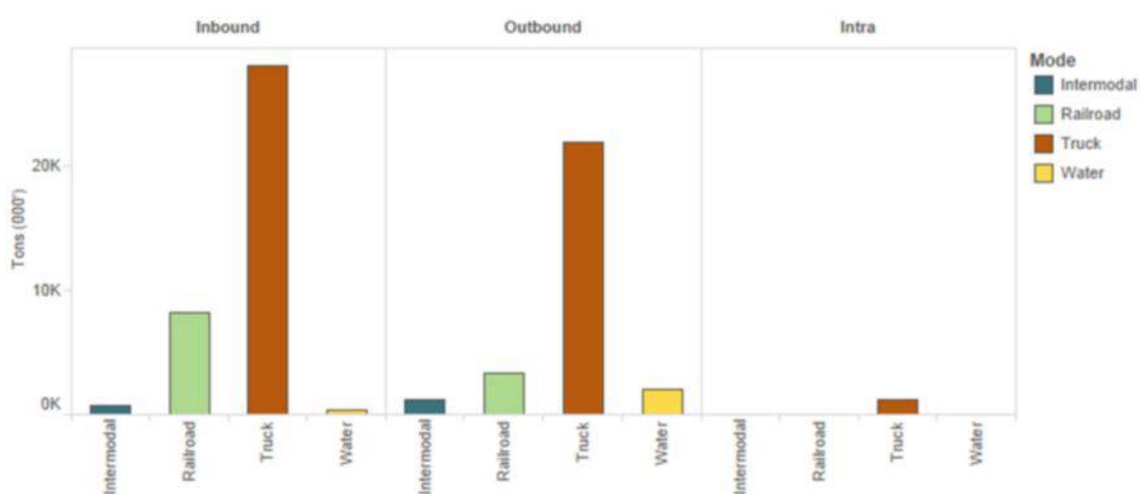
The Bi-State Region has additional transportation equipment operations. The Union Tank Car Company, for example, has a large repair and maintenance operation in Muscatine, IA. Union Tank Car is North American's leading manufacturer, lessor and maintainer of railroad tank cars used primarily by the chemical, petrochemical and food industries.[7] As a rail car operation, the facility is rail served.

2.4 REGIONAL COMMODITY FLOW PROFILE

In terms of total tonnage and value, the vast majority of freight shipped to, from, and within the Bi-State Region is moved via truck as shown in Figures 2.7 and 2.8. Following truck, rail is the second most dominant mode. Interestingly, both truck and rail inbound tonnages are higher than outbound tonnages. Conversely, outbound value for both modes is higher than inbound value. This suggests that processing of those inbound goods is taking place which increases their value before they are shipped out. This is consistent with the Bi-State Region's role as a regional production and manufacturing hub.

These commodity flow characteristics are largely expected to continue into the forecast year, 2040. As seen in Figures 2.9 and 2.10, trucking remains the dominant mode in terms of total tonnage and value. It is still followed by rail at a distant second by both measures. Though the value of outbound commodities is expected to show strong growth over the forecast period, it is predicted to be overtaken by inbound commodities. This occurrence would mark the reversal of the current state of region as shipping out commodities that are more valuable than those shipped in.

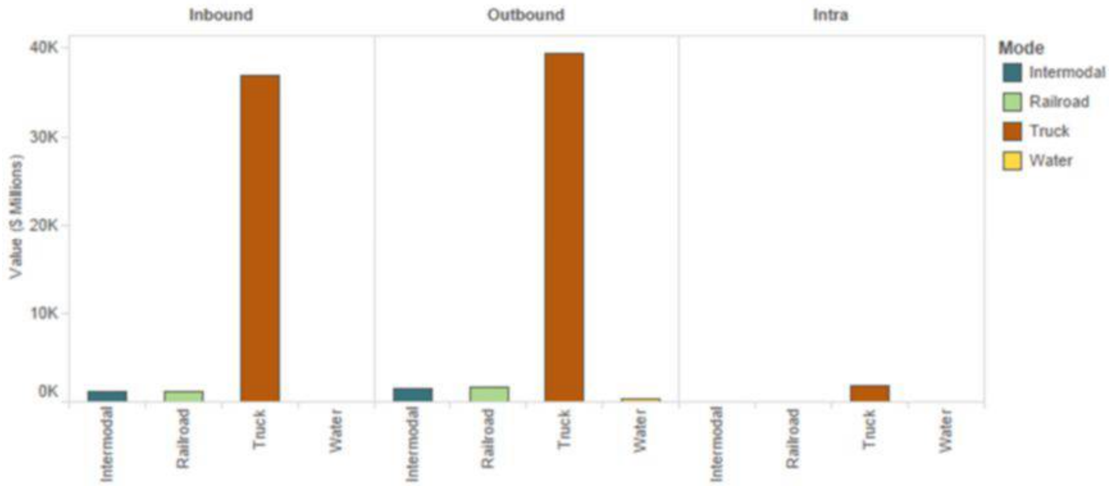
Figure 2.7 Bi-State Region Commodities by Mode and Direction, 2007 (Tons)



Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

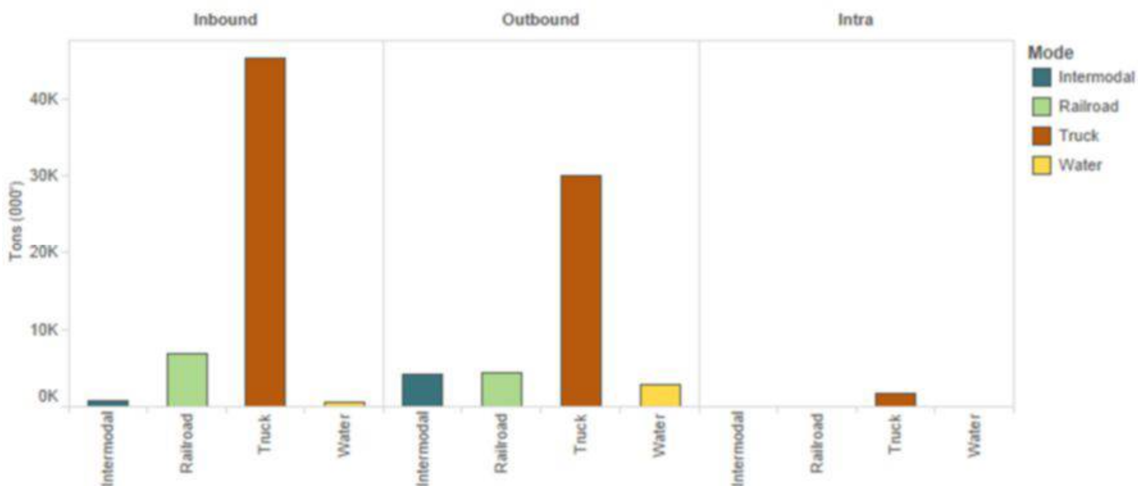
7 "Union Tank Car Company". The Marmon Group: A Berkshire Hathaway Company. http://www.marmon.com/union_tank_car_company_bc.html.

Figure 2.8 Bi-State Region Commodities by Mode and Direction, 2007 (Value)



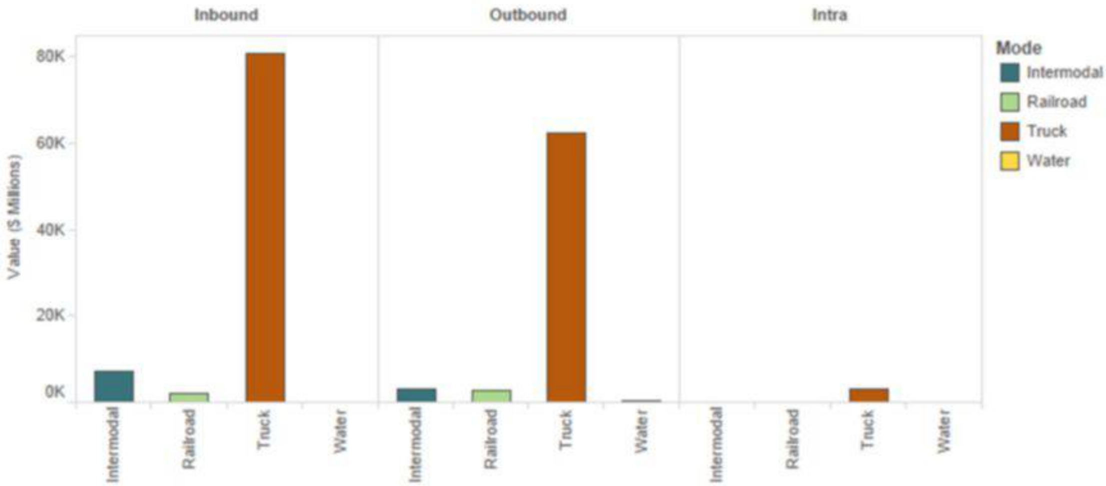
Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Figure 2.9 Bi-State Region Commodities by Mode and Direction, 2040 (Tons)



Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Figure 2.10 Bi-State Region Commodities by Mode and Direction, 2040 (Value)



Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

These relationships between tonnage share and value share by mode and direction are further detailed in Tables 2.7 and 2.8 which show the base and forecast years, respectively. Differences between value and tonnage by direction are due to the very nature of the mode and characteristics of the region. For instance, rail is typically economically viable only over long distances thus explaining why it has much larger share of inbound and outbound traffic and a very small share of internal freight flows. Trucking is more economically viable for transporting commodities that are lower in weight and higher in value over distances that are typically shorter than rail trips. Thus, trucking has much larger share of value than tonnage for the Bi-State Region.

Table 2.7 Bi-State Region Modal Share by Tonnage and Value, 2007

Tons (1,000)								
Mode	**Inbound**	***Percent***	**Outbound**	***Percent***	**Intra**	***Percent***	**Total**	***Percent***
Truck	28,123	*75%*	21,998	*77%*	1,148	*97%*	51,269	*76%*
Railroad	8,207	*22%*	3,275	*11%*	25	*2%*	11,506	*17%*
Intermodal	690	*2%*	1,218	*4%*	2	*0%*	1,911	*3%*
Water	354	*1%*	2,051	*7%*	7	*1%*	2,412	*4%*
Total	**37,374**		**28,542**		**1,182**		**67,098**	
Value ($ Millions)								
Mode	**Inbound**	***Percent***	**Outbound**	***Percent***	**Intra**	***Percent***	**Total**	***Percent***
Truck	36,945	*94%*	39,414	*92%*	1,898	*99%*	78,258	*93%*
Railroad	1,154	*3%*	1,722	*4%*	17	*1%*	2,893	*3%*
Intermodal	1,135	*3%*	1,480	*3%*	0	*0%*	2,615	*3%*
Water	50	*0%*	261	*1%*	0	*0%*	311	*0%*
Total	**39,284**		**42,877**		**1,915**		**84,077**	

Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Table 2.8 Bi-State Region Modal Share by Tonnage and Value, 2040

Tons (1,000)								
Mode	**Inbound**	**Percent**	**Outbound**	**Percent**	**Intra**	**Percent**	**Total**	**Percent**
Truck	45,356	85%	30,028	72%	1,645	97%	77,029	79%
Railroad	6,946	13%	4,417	11%	29	2%	11,392	12%
Intermodal	733	1%	4,295	10%	5	0%	5,033	5%
Water	531	1%	2,897	7%	12	1%	3,440	4%
Total	53,566		41,637		1,691		96,894	
Value (Millions)								
Mode	**Inbound**	**Percent**	**Outbound**	**Percent**	**Intra**	**Percent**	**Total**	**Percent**
Truck	80,761	89%	62,228	91%	3,095	97%	146,083	90%
Railroad	2,149	2%	2,772	4%	18	1%	4,940	3%
Intermodal	7,268	8%	3,215	5%	81	3%	10,564	7%
Water	101	0%	329	0%	0	0%	431	0%
Total	90,279		68,544		3,194		162,018	

Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Major Freight Commodities by Tonnage

Table 2.9 and Figure 2.11 detail the freight commodities moving in the Bi-State Region, by tonnage. At the regional level, Cereal Grains are by far the primary commodity using the Bi-State Region's freight system as it represents 28 percent of traffic by tonnage. The next largest commodity is Gravel, which represents half the tonnage that Cereal grains do at 14 percent. The prevalence of Cereal grains on the freight network is even more impressive considering that given the same volume Gravel is much heavier than Cereal grains. Yet, the total tonnage of Gravel is far less. This indicates that the difference in the number of shipments of the two commodities is even more pronounced.

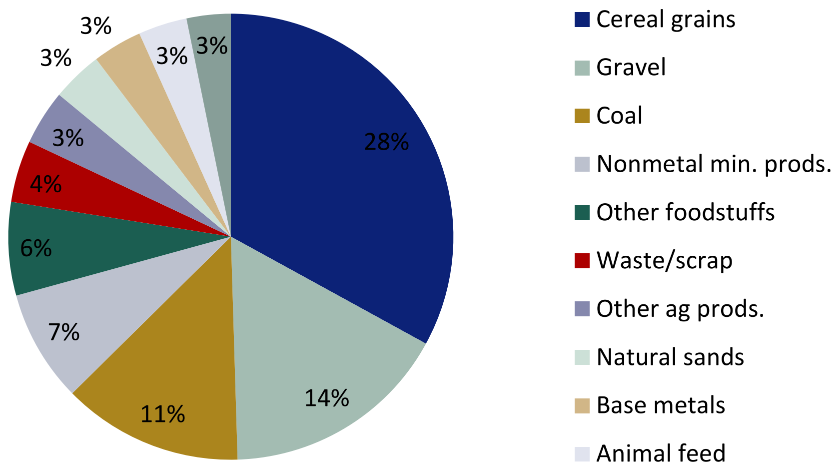
Table 2.9 Major Freight Commodities by Tonnage, 2007

Commodity Type	Inbound (000')	Percent	Outbound (000')	Percent	Intra (000')	Percent	Total (000')	Percent
Cereal grains	10,020	27%	8,188	29%	273	23%	18,481	28%
Gravel	5,589	15%	3,475	12%	204	17%	9,269	14%
Coal	7,349	20%	N/A	0%	N/A	0%	7,349	11%
Nonmetal min. prods.	2,075	6%	2,319	8%	158	13%	4,552	7%
Other foodstuffs	1,358	4%	2,366	8%	69	6%	3,794	6%
Waste/scrap	958	3%	1,511	5%	56	5%	2,524	4%
Other ag. prods.	1,345	4%	858	3%	28	2%	2,230	3%

Natural sands	1,018	3%	986	3%	57	5%	2,061	3%
Base metals	713	2%	1,259	4%	50	4%	2,022	3%
Animal feed	715	2%	1,239	4%	19	2%	1,974	3%
Fertilizers	507	1%	1,242	4%	46	4%	1,795	3%
Total	37,361		28,540		1,183		67,087	

Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Figure 2.11 Major Freight Commodities by Total Tonnage, 2007



Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Though, the dominance of Cereal grains on the Bi-State Region's network is expected to continue into the future it will not be as pronounced. Table 2.9 and Figure 2.12 detail the freight commodities moving in the Bi-State region, by tonnage, in the year 2040. In the forecast year, Gravel is predicted to increase by 5 percentage points to 19 percent while Cereal grains are expected to decrease by 1 percentage point to 23 percent. Overall, the total growth for all commodities over this period is predicted to be as much as 44 percent.

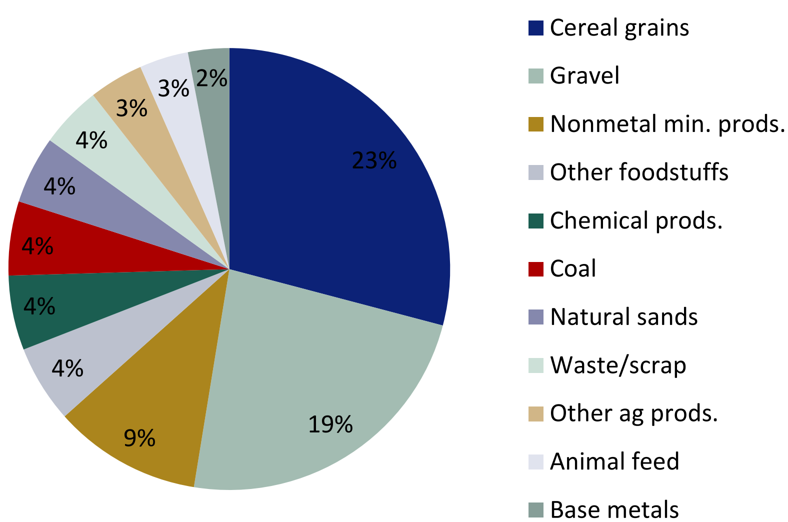
Of the region's major freight commodities, Chemical Products will likely exhibit the strongest growth over the forecast period. As shown in Table 2.11, the tonnage of Chemical Products will increase by 352 percent overall and 3.9 percent annually. Gravel is a distant second at 194 percent overall and 2.0 percent annually. Because of these predicted growth trends, the top ranking commodity categories in the Bi-State Region will change over time. Nonmetal Mineral Products, Other Foodstuffs, and Natural Sands all move up by one spot. Chemical Products achieve the highest change as this category improves its ranking by 7. Coal, Waste/ Scrap, and Other Agricultural Products all decrease in ranking. However, of those commodities only Coal decreases in actual tonnage.

Table 2.10 Major Freight Commodities by Tonnage, 2040

Commodity Type	Inbound (000')	Percent	Outbound (000')	Percent	Intra (000')	Percent	Total (000')	Percent
Cereal grains	14,157	26%	7,873	19%	233	14%	22,263	23%
Gravel	8,446	16%	9,128	22%	368	22%	17,941	19%
Nonmetal min. prods.	3,968	7%	4,021	10%	297	18%	8,287	9%
Other foodstuffs	1,886	4%	2,392	6%	56	3%	4,333	4%
Chemical prods.	2,576	5%	1,466	4%	139	8%	4,181	4%
Coal	4,150	8%		0%		0%	4,150	4%
Natural sands	1,777	3%	1,910	5%	106	6%	3,793	4%
Waste/scrap	1,604	3%	1,765	4%	78	5%	3,448	4%
Other ag prods.	1,865	3%	1,157	3%	29	2%	3,050	3%
Animal feed	1,083	2%	1,645	4%	21	1%	2,749	3%
Base metals	1,212	2%	1,045	3%	42	2%	2,299	2%
Total	53,568		41,637		1,689		96,894	

Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Figure 2.12 Major Freight Commodities by Total Tonnage, 2040



Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Table 2.11 Major Freight Commodities by Tonnage, 2007 to 2040

Commodity Type	Total Tons 2040 (000')	Percent	Rank Change	Total Increase	Annual Increase
Cereal grains	22,263	23%	0	120%	0.6%
Gravel	17,941	19%	0	194%	2.0%
Nonmetal min. prods.	8,287	9%	1	182%	1.8%
Other foodstuffs	4,333	4%	1	114%	0.4%
Chemical prods.	4,181	4%	7	352%	3.9%
Coal	4,150	4%	-3	56%	-1.7%
Natural sands	3,793	4%	1	184%	1.9%
Waste/scrap	3,448	4%	-2	137%	0.9%
Other ag. prods.	3,050	3%	-2	137%	1.0%
Animal feed	2,749	3%	0	139%	1.0%
Base metals	2,299	2%	-2	114%	0.4%

Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Major Freight Commodities by Value

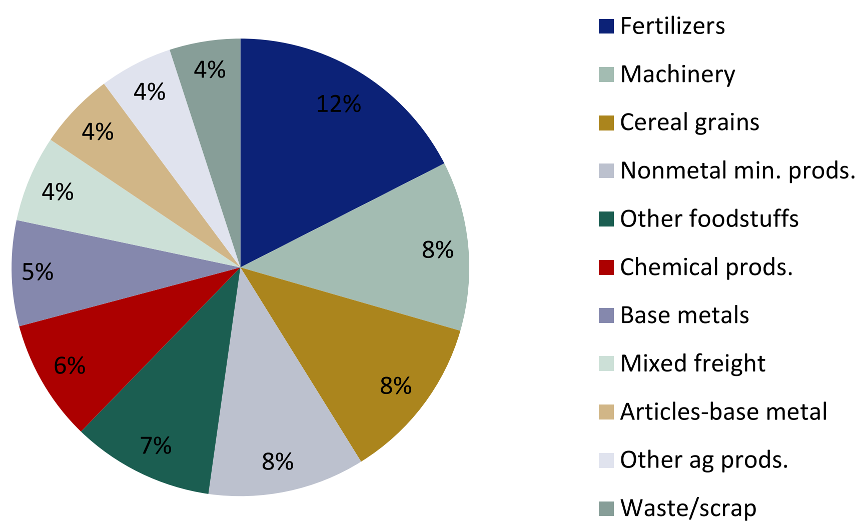
A similar analysis of the region's commodity flows by value grants a different perspective of the Bi-State Region's freight system. As shown in Table 2.12 and Figure 2.13, Fertilizers is the dominant commodity. It represents 12 percent of the total value of goods in the region. Three commodity groups (Machinery, Cereal grains, and Nonmetal mineral products) follow fairly closely behind at 8 percent each. These results suggest that there is much more parity in the freight system in terms of the value of goods being shipped. However, given that Cereal grains are near or at the top of both lists implies that it is very important to consider in freight planning initiatives.

Table 2.12 Major Freight Commodities, Value, 2007

Commodity Type	Inbound (M $)	Percent	Outbound (M $)	Percent	Intra (M $)	Percent	Total (M $)	Percent
Fertilizers	2,326	6%	7,738	18%	290	15%	10,354	12%
Machinery	1,874	5%	5,056	12%	173	9%	7,103	8%
Cereal grains	3,929	10%	2,884	7%	108	6%	6,920	8%
Nonmetal min. prods.	3,064	8%	3,262	8%	237	12%	6,563	8%
Other foodstuffs	2,324	6%	3,485	8%	125	7%	5,933	7%
Chemical prods.	3,173	8%	1,745	4%	182	10%	5,100	6%
Base metals	1,592	4%	2,715	6%	104	5%	4,411	5%
Mixed freight	1,404	4%	2,146	5%	69	4%	3,619	4%
Articles-base metal	1,702	4%	1,377	3%	120	6%	3,199	4%
Other ag. prods.	2,189	6%	828	2%	44	2%	3,061	4%
Waste/scrap	1,114	3%	1,787	4%	66	3%	2,966	4%
Total	39,289		42,876		1,915		84,080	

Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Figure 2.13 Major Freight Commodities by Total Value, 2007



Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Fertilizers is not expected to continue to be the dominant commodity group by value in the Bi-State Region going forward as seen in Table 2.13 and Figure 2.14. In fact, it is predicted that this group will be eclipsed by several other commodities by 2040, namely Machinery, which will take over the top spot. Shipments in this commodity group will account for 15 percent of total value in the region (an increase of 7 percentage points). Shipments in the Chemical Products commodity group follow closely behind at 11 percent (an increase of 4 percentage points). Overall, the total growth in value over the forecast period is nearly 93 percent by 2040.

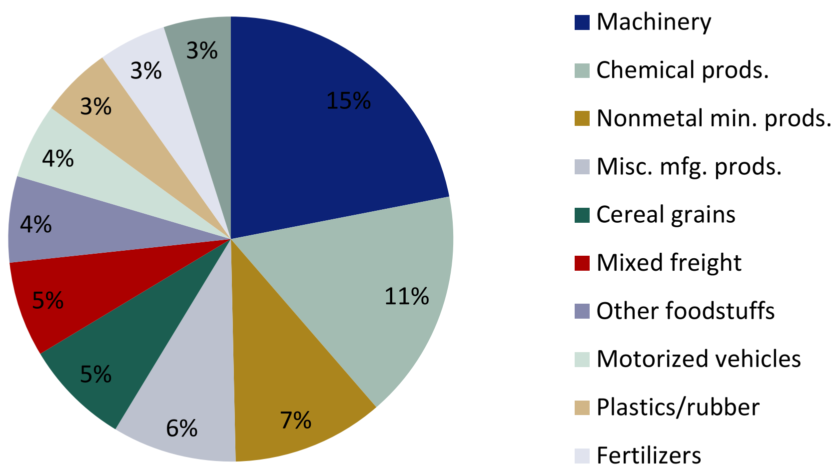
Based on the information in Table 2.14, of the various major commodity groups, Miscellaneous Manufactured Products is expected to lead all others in growth at 442 percent over this period (about 4.6 percent annually). Chemical Products and Machinery also make substantial gains at overall growth percentages of 355 and 335 percent (3.9 and 3.7 percent annually), respectively. As a result of these estimated changes in value, several commodity groups move up in rank from 2007 to 2040. For instance, Chemical Products, Motorized Vehicles, and Plastics/ Rubber all move up 4 spots in the rankings. Miscellaneous Manufactured Products exhibited the greatest change in rank, moving up 11 spots into the top ranking where it was not even in the top 10 in 2007. Fertilizers experienced a decrease in rank almost as dramatic as the increase for Miscellaneous Manufactured Products. It moved down 9 spots. Importantly, this decrease is attributed to the Fertilizers commodity group being projected to lose half its value (and nearly 22 percent of total tonnage) between 2007 and 2040.

Table 2.13 Major Freight Commodities, Total Value, 2040

Commodity Type	Inbound (M $)	Percent	Outbound (M $)	Percent	Intra (M $)	Percent	Total (M $)	Percent
Machinery	8,631	10%	14,728	21%	412	13%	23,772	15%
Chemical prods.	11,058	12%	6,419	9%	623	20%	18,101	11%
Nonmetal min. prods.	5,814	6%	5,687	8%	444	14%	11,946	7%
Misc. mfg. prods.	6,127	7%	3,546	5%	92	3%	9,765	6%
Cereal grains	5,551	6%	2,700	4%	93	3%	8,344	5%
Mixed freight	3,499	4%	3,887	6%	137	4%	7,522	5%
Other foodstuffs	3,126	3%	3,567	5%	100	3%	6,792	4%
Motorized vehicles	3,639	4%	2,192	3%	84	3%	5,915	4%
Plastics/rubber	4,299	5%	1,267	2%	54	2%	5,620	3%
Fertilizers	1,462	2%	3,692	5%	159	5%	5,313	3%
Precision instruments	3,872	4%	1,276	2%	145	5%	5,294	3%
Total	90,281		68,543		3,192		162,018	

Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Figure 2.14 Major Freight Commodities by Value, 2040



Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Table 2.14 Major Freight Commodities by Value, 2007 to 2040

Commodity Type	Total Val 2040 (M $)	Percent	Rank Change	Total Increase	Annual Increase
Machinery	23,772	15%	1	335%	3.7%
Chemical prods.	18,101	11%	4	355%	3.9%
Nonmetal min. prods.	11,946	7%	1	182%	1.8%
Misc. mfg. prods.	9,765	6%	11	442%	4.6%
Cereal grains	8,344	5%	-2	121%	0.6%
Mixed freight	7,522	5%	2	208%	2.2%
Other foodstuffs	6,792	4%	-2	114%	0.4%
Motorized vehicles	5,915	4%	4	221%	2.4%
Plastics/rubber	5,620	3%	4	251%	2.8%
Fertilizers	5,313	3%	-9	51%	-2.0%

Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Bi-State Region Trading Partners

Much of the freight traveling through the Bi-State Region has an origin or destination within one of the two states that comprise the region – Iowa and Illinois. It is unsurprising that by tonnage these are the region's largest trading partners. Together, they account for more nearly two-thirds of the Bi-State Region's trade, as seen in Table 2.15 and Figure 2.15. The next top two of the region's trading partners are not states neighboring Iowa or Illinois, but Wyoming and Louisiana. Wyoming is a major source of coal traveling to the Bi-State region and represents 9 percent of the region's trade by volume; Louisiana includes trade that is destined for export, primarily agricultural products, through the Gulf ports and comprises 4 percent of the volumes.

As shown in Table 2.16 and Figure 2.16, the Bi-State Region's key domestic trading partners in the future will continue to be Iowa and Illinois. However, the Bi-State Region's show stronger growth with other markets, such as trade with Kentucky and Missouri. By 2040, the region's trade will be much more evenly distributed over a larger number of states.

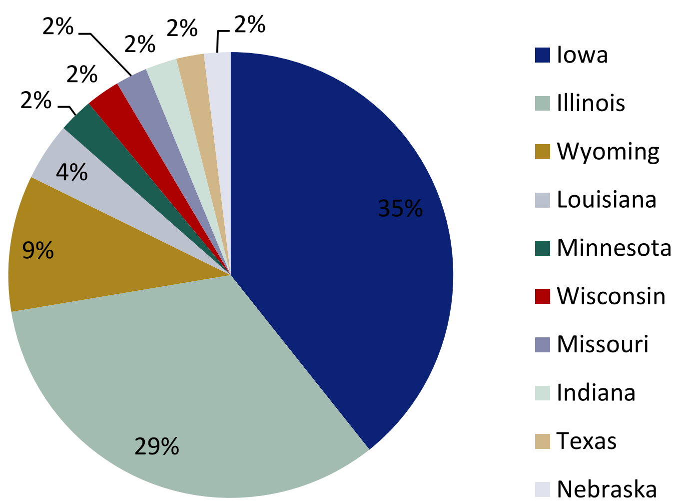
This result could have implications for freight vehicle flows as well. While currently local Illinois/Iowa traffic is dominated by truck, coal from Wyoming arrives via rail, and agricultural products are shipped via barge down to Louisiana, increasing trade could lead to shifting volumes on each of the region's modal networks. As growth in other markets occurs, certain freight flows on the multimodal freight system could potentially become more dominant than at the present. For instance, growth in trade with Missouri could substantially increase traffic on north-south links in the freight network. These include U.S. 61, U.S. 67, the BNSF line to St. Louis, the CP line to Kansas City, and the Mississippi River. Trade growth with Kentucky could likewise increase vehicle traffic on southeasterly system links, namely I-74.

Table 2.15 Major Domestic Trading Partners by Total Tonnage, 2007

State	Tons (000')	Percent
Iowa	23,069	35%
Illinois	19,405	29%
Wyoming	5,808	9%
Louisiana	2,462	4%
Minnesota	1,485	2%
Wisconsin	1,458	2%
Missouri	1,354	2%
Indiana	1,345	2%
Texas	1,176	2%
Nebraska	1,132	2%
Total	65,902	

Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Figure 2.15 Major Domestic Trading Partners by Total Tonnage, 2007



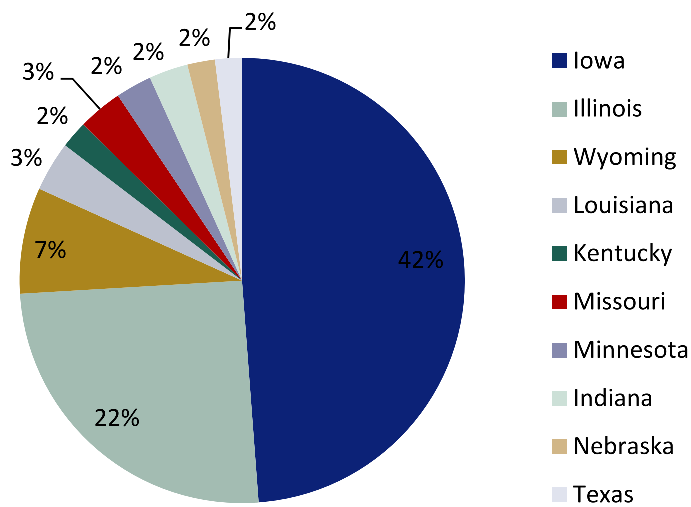
Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Table 2.16 Major Domestic Trading Partners by Total Tonnage, 2007 to 2040

State	Tons 2040 (000')	Percent	Rank Change	Total Increase	Annual Increase
Iowa	40,065	18%	0	174%	1.7%
Illinois	20,721	13%	0	107%	0.2%
Wyoming	6,320	8%	0	109%	0.3%
Louisiana	2,982	8%	0	121%	0.6%
Kentucky	1,631	7%	9	286%	3.2%
Missouri	2,640	4%	1	195%	2.0%
Minnesota	2,134	4%	-2	144%	1.1%
Indiana	2,333	4%	0	173%	1.7%
Nebraska	1,645	3%	1	145%	1.1%
Texas	1,616	3%	-1	137%	1.0%

Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

Figure 2.16 Major Domestic Trading Partners by Total Tonnage, 2040



Source: Parsons Brinkerhoff analysis of disaggregated FAF2.2 2007

2.5 SHORT AND LONG TERM TRENDS

Freight movements to, from, and through the Bi-State Region are increasingly national and global in scope, and are sensitive to market forces as well as the decisions of supply chain and logistics professionals - both from industries within the region as well as beyond. Industries may make business decisions based on these national and global trends, which in turn impact the local system. This section briefly discusses a number of key trends that may affect the Bi-State Region's freight-related industries and transportation system over the coming years.

Expansion of the Panama Canal

Since opening in 1914, the Panama Canal has been a critical element of the global transportation network. The Panama Canal expansion project, expected to be completed in 2016, will allow larger ships to pass through the canal and will increase the annual capacity of the canal by more than 75 percent. The use of larger ships will likely lead to fewer and more concentrated ship calls at larger ports that can accommodate larger vessels and have good access to inland markets. The effect of the expansion on U.S. ports and trade is a much debated topic and will affect future goods movement throughout the U.S.

In the Midwest, the effect may be mixed. The Mississippi River runs between Illinois and Iowa, and has provided trade and transportation benefits to the region for centuries. It has been suggested that the canal expansion may decrease overall transit times to Midwest destinations, incentivize export of grains and agricultural products to Asia via Gulf Coast ports, promote greater containerization of grain, and increase the total energy costs of transportation. However, unreliability of the inland waterway system remains a challenge. Increased regular maintenance and upgrades to the locks, dams, and landside infrastructure on the inland waterway system are likely necessary before any substantial increases in container or bulk export traffic will be realized.

Changing Transportation Landscape for Agriculture Production and Export

Agriculture will continue to be a primary driver of the economy in the Bi-State Region, as well as throughout the Midwest. Iowa is the largest corn-producing state in the country, and also consumes the most corn for processing in ethanol-related facilities. In 2013, Iowa consumed nearly 70 percent of its corn production within the state, and exported 17 percent of its harvested corn. Scott and Muscatine Counties are some of the most productive counties with respect to corn yields (measured in bushels per acre) in 2014.[8] Once harvested, corn is transported through the state by

---

[8] "Iowa Ag News – 2014 Corn County Estimates". United States Department of Agriculture, National Agriculture Statistics Service. February 19, 2015. http://www.nass.usda.gov/Statistics_by_State/Iowa/Publications/County_Estimates/reports/2015/IA_CtyEst_Corn_%2013-14.pdf

truck, rail, and river transportation. Iowa is also the largest producer of soybeans, hogs/pigs, and grains, with a total of 30.5 million acres of farm operations throughout the state.[9] Illinois also has a healthy agriculture industry, and is the second largest producer of grains, corn, and soybeans. The state has 26.9 million acres of farm operations. The majority of the corn production is concentrated in the central portion of the state, while soybeans are concentrated in the central, east, and northern counties.[10]

Changes in agricultural production in the U.S. have altered the delivery of farm products from field to market or processing. Consolidation of small farms into fewer but larger farms and cooperative ventures means that farmers and farming corporations can achieve transportation economies of scale by shipping their own products using their own or hired semitrailer equipment. Consequently, in the Midwest and elsewhere, farmers are shipping more outputs over longer distances via truck compared to the previous pattern where farmers would focus on short moves to local consolidation points and rail terminals. At the same time, Class I railroads are trending more towards unit trains. This is leading agriculture towards larger, 100-plus car, grain shuttle and consolidation facilities, which involve longer shipments via truck to deliver products to these facilities. However, along with increased transportation costs, the shift towards increased truck traffic may provide some increased mobility to grain producers by providing the ability to bypass local grain elevators and railroads and haul directly, albeit over a longer distance, to the processor, to another railroad, or to terminals along the Mississippi River for export to foreign markets.

A Return to U.S. Manufacturing

Support for U.S. manufacturing is a continued priority of the Federal government. Between 2010 and 2015, the U.S. added almost 800,000 manufacturing jobs, the strongest growth since the 1990s. Efforts such as the Department of Commerce Manufacturing Council are poised to continue to grow these jobs on a national scale.[11] U.S. companies are more competitive, and since 2004 have been increasing their competitiveness with almost every major exporter, including China and Southeast

---

[9] "2014 State Agricultural Overview: Iowa" United States Department of Agriculture, National Agriculture Statistics Service. http://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=IOWA

[10] "County Estimates: Illinois". United States Department of Agriculture, National Agriculture Statistics Service. http://www.nass.usda.gov/Statistics_by_State/Illinois/Publications/County_Estimates/index.asp

[11] "U.S. Commerce Secretary Penny Pritzker Announces New Manufacturing Council Members" Press release. **U**.S. Department of Commerce, http://www.trade.gov/manufacturingcouncil/

Asia.[12] These overall trends not only increase the ability of the Bi-State Region to compete on the global market, but also increase the potential for domestic sourcing and selling on the supply chain, reducing logistics costs for manufacturers and customers. In a world increasingly focused on "just in time" delivery, businesses located in the U.S. can easily transport goods to North American markets via multiple modes, and do not require long transit times via sea shipping, reducing the cost and increasing the reliability of bringing the goods to market.

Due to these shifts in global competitiveness, U.S. businesses are increasingly moving their overseas operations to locations in the U.S., or to other Western Hemisphere locations such as Mexico. Many factors influence this "reshoring" or "nearshoring" trend – including labor and production costs, quality control, and transportation savings versus overseas shipping. A 2012 survey found that 37 percent of American manufacturing companies with annual sales above $1 billion reported that they were planning or actively considering shifting production facilities from China to America.[13] Also, the continued congestion and labor issues at both east and west coast ports will continue to add to the transportation costs associated with products imported or exported by sea, increasing the attractiveness of domestic and nearby trading partners.

In addition to competitiveness issues, there are technological changes that are shifting the manufacturing landscape. In particular, 3D printing has emerged as a viable option to distribute manufacturing widely as well as allow for new designs for engineered materials. Bridges can be "printed" in place and assembled with minimal disruption to the traveling public. The implications for large manufacturing, roadway construction and general architectural design are increasingly apparent in terms of cost savings from labor reduction, material recycling, and efficiency. Beyond highway construction, the emergence of 3D printing has substantial impacts for the production of goods. The proliferation of manufacturing sites, with on-site production capability, will change the dynamics of supply chains, allowing firms to print replacement pieces or detailed manufactured devices rather than relying on the movement of freight.

Expansion of E-Commerce

Electronic commerce, known as E-commerce, is the purchase of goods or services online instead of through a traditional brick-and-motor store. E-commerce comprises a growing share of consumer spending as large retailers – such as Amazon.com – offer incentives such as free two-day shipping and a wider variety of delivery options (including Amazing Locker and Amazon Prime). Continued growth in E-commerce

---

[12] Wiseman, Paul. "U.S. Factories More Competitive, Study Says." *USA Today*. April 25, 2014. http://www.usatoday.com/story/money/business/2014/04/25/us-manufacturers-more-competitive/8143611/

[13] "Coming Home." *The Economist,* January 19, 2013. http://www.economist.com/news/special-report/21569570-growing-number-american-companies-are-moving-their-manufacturing-back-united

is likely given the continuation of current trend of a market-based, global economy on an increasingly larger scale. This is leading to new distribution patterns, as distribution centers for Amazon and other retailers are being built near large markets. In 2014 Amazon.com announced plans for a distribution facility in Illinois near the Chicago region, vowing to create to create more than 1,000 full-time jobs. Amazon plans to build several facilities in the state by 2017.[14] Increases in Internet sales can mean an exacerbation of "last-mile" delivery issues in the Bi-State Region, such as increased congestion and wear-and-tear on local roads that normally are not used for freight, but, on the positive side, may drive increased opportunities for distribution and warehousing centers in the region.

New Sources of Domestic Oil and Gas

The energy industry has been booming throughout the U.S. Among the surprising energy industries to emerge over the last ten years is related the hydraulic fracturing of rock. Induced fracturing, or fracking, enables the recovery of deep sources of gas and petroleum products. The technique is commonly applied to shale gases, which has led to substantial increases in freight-related movements associated with this extraction across the Midwest.

Freight-related impacts of fracking are apparent throughout the Midwest, which can result from the increased petroleum-related movements and the direct inputs to the fracking process, such as sand, water, and other chemicals. A single horizontal well typically uses between 3,000 and 10,000 tons of sand. A typical rail car of frac sand contains around 100 tons. In 2009, Class I railroads originated nearly 112,000 carloads of sand and are on track to originate approximately 375,000 carloads in 2013, likely driven by increased frac sand use at drilling wells.

Additionally, with the increase of shale oil drilling in the Bakken Region of North Dakota, the Alberta tar sands, and others, rail systems throughout the Midwest are seeing large increases in crude by rail. According to the Association of American Railroads (AAR), carloads of crude oil on Class I railroads have risen dramatically since 2008, from 9,500 carloads to 407,761 in 2031. In the first half of 2014, 229,798 carloads were transported.[15]

Safety and security issues are at the forefront of many minds in the aftermath of recent, disasters involving unit trains of oil, such as crude oil freight train derailment near the Mississippi River in Illinois in March 2015.[16] Additionally, some have raised concerns over increased crude transported through Iowa, particularly in northwest Iowa. It has been reported that at least 1 million gallons of Bakken crude oil are

---

[14] The Latest on Amazon's New and Planned U.S. Distribution Centers, *Industrial Distribution,* March 9, 2015. http://www.inddist.com/blogs/2015/03/latest-amazons-new-planned-us-distribution-centers

[15] "Moving Crude Oil by Rail." Association of American Railroads, September 2014.

[16] "Crude oil freight train derails in Illinois, no injuries reported." Fox News.

transported each week, passing through larger cities such as Sioux City, IA.[17] Officials have noted that Bakken crude is more flammable than traditional forms of oil, which may contribute to shifts in the preferred transportation of this booming commodity.

Freight Workforce

Logistics continues to be impacted by a shifting labor market throughout the country. There is a shortage of between 35,000 and 40,000 U.S. truck drivers, which has become more pronounced despite increases in driver pay and employee hiring and retention efforts.[18] The lack of qualified drivers constrains total truck fleet capacity even as market conditions have rebounded. Additionally, the problem is contributing to higher transportation prices. Without surplus capacity at a trucking company, any increase in shipment volume must be met by hiring through the trucking spot market, where rates can be up to 30 percent higher. In the Bi-State Region where the vast majority of tonnage is carried by trucks for long haul and first- and last-mile connections, this issue is particularly pronounced.

In the Midwest, reduced trucking capacity could increase pressure on other modes, some of which are facing capacity issues of their own. Airlines, which typically move high-value, low-volume freight, are dealing with labor problems, especially among the smaller regional carriers. While not yet an issue for the larger national carriers that handle the majority of freight service, it could affect capacity at airports within the region, such as O'Hare International Airport, Indianapolis International Airport, and Minneapolis–Saint Paul International Airport, among others.

Working towards a solution to the truck driver shortage, several companies are in the process of testing self-driving technology with freight trucks. Daimler Trucks North America, a U.S.-based company, debuted its Freightliner Inspiration Truck in May 2015. Self-driving trucks have the ability to reduce accidents, traffic, and emissions, in addition to boosting the efficiency and delivery times for cargo throughout the country.[19] This technology could help resolve the labor shortage and increase productivity within the trucking industry.

---

17 "Bakken oil trains run through Iowa." The Des Moines Register. July 7, 2014.

18 "US truck driver shortage getting worse, turnover figures show." Journal of Commerce. April 1, 2015.

19 "Daimler Autonomous Truck Has Huge Commercial Implications." Forbes. May 8, 2015.

3.0 Infrastructure

The first task of developing the *Bi-State Region Freight Plan* was to take inventory of the region's freight infrastructure. The region's freight network encompasses multiple modes of transportation which work together to ensure a smooth flow of goods throughout the states. This section provides a basic physical profile of the current inventory of the multimodal freight system in the Bi-State Region, and builds on information already developed at the state and regional levels through previous Bi-State Regional Commission, Iowa Department of Transportation (IADOT), and Illinois DOT (ILDOT) work on freight infrastructure and freight flows. This section contains the following subsections:

- Section 3.1 - Highway Infrastructure.
- Section 3.2 - Railway Infrastructure
- Section 3.3 - Waterway Infrastructure
- Section 3.4 - Airport Infrastructure
- Section 3.5 - Multimodal Facility Infrastructure
- Section 3.6 - Other Freight Facilities

Each of these sections focuses on describing the infrastructure that comprises each modal system, the use of the system and the current condition of the system. A summary of the findings is provided in subsection 3.7. This information served as a foundation for analysis conducted throughout Plan development.

3.1 HIGHWAY INFRASTRUCTURE

This section presents an inventory of the Bi-State Region's highway infrastructure and system activity. It also provides some information on the conditions of key freight-related portions of the highway system, namely bridges and FHWA designated last-mile intermodal connectors.

Highway Infrastructure Overview

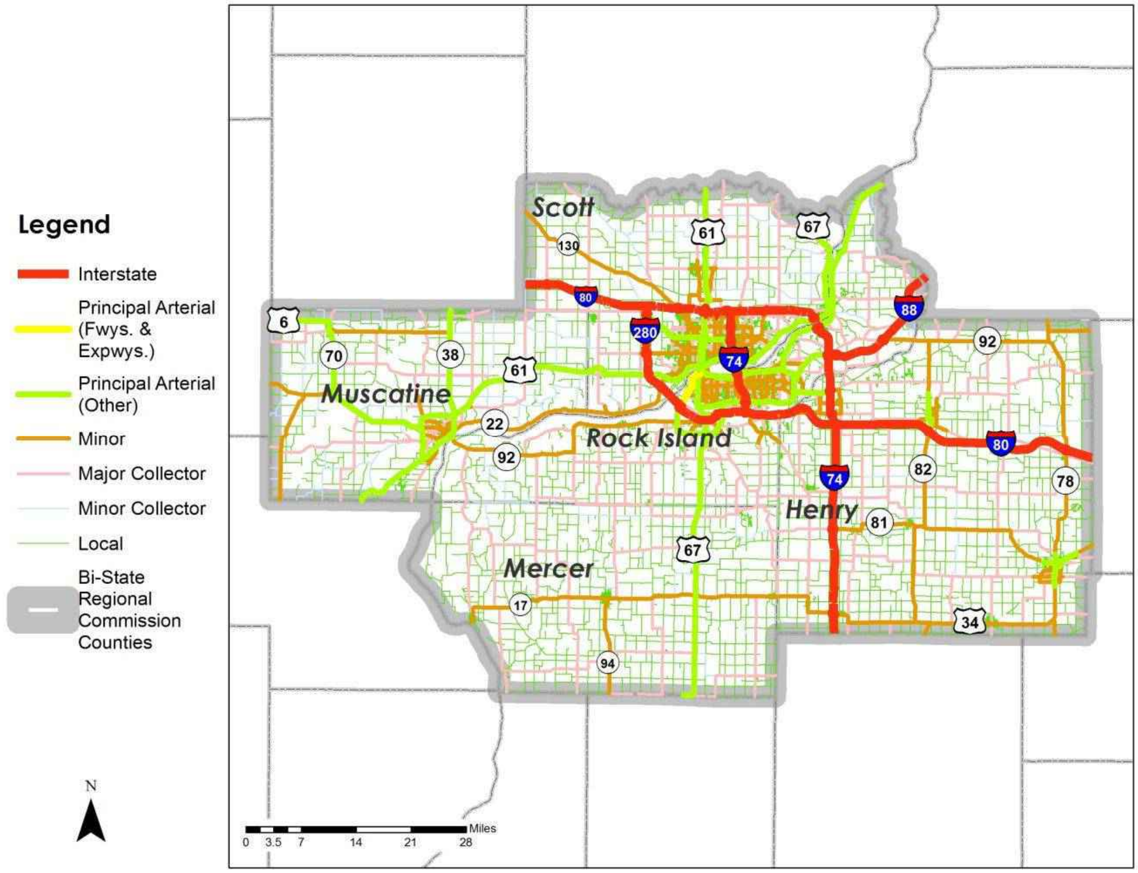
This subsection presents the extent of the Bi-State Region's highway system. It distinguishes the region's roadways by type and provides traffic volumes. The information presented in this section relies heavily on data reported in the Iowa and Illinois Department of Transportations' linear reference systems.

Major Roadways

The Bi-State Region's highway system is distinguished by functional classification. These classifications are based on Highway Performance Monitoring System (HPMS) data and include: Interstate, Principal Arterial (Freeways and

Expressways), Principal Arterials (Other), Minor Arterial, Major Collector, Minor Collector, and Local. Figure 3.1 depicts the Bi-State region's highway system by functional classification.

Figure 3.1 Functional Classification of the Bi-State Region's Highway System



Source: Illinois DOT Illinois Technology Transfer Center, http://gis.dot.illinois.gov/gist2/; Iowa DOT GIMS Database, http://www.iowadot.gov/gis/downloads/default.aspx. Accessed Oct. 14, 2014

What is depicted graphically in Figure 3.1 is presented numerically in Tables 3.1 and 3.2. These tables take inventory of the Bi-State Region's highway infrastructure by functional classification and location (County and State). The data reveals that while in terms of mileage the Illinois portion of the highway system is nearly balanced between the three counties, nearly one-third of the Iowa portion of the highway system is in Scott County. In fact, all of the Iowa portion of the highway system classified as an interstate and over half of the arterials are in Scott County.

Table 3.1 Summary of Highway System Facilities for the Illinois Portion of the Bi-State Region

(County level values may not sum to total values due to rounding.)

	Henry County	Mercer County	Rock Island County	Bi-State Region (IL)
Functional Classification		*Miles of Roadway (Percent of Total)*		
Interstate	72 (54.2%)	- (0.0%)	61 (45.8%)	**133**
Principal Arterial (Other Freeways and Expressways)	- (0.0%)	- (0.0%)	7 (100.0%)	**7**
Principal Arterials (Other)	13 (11.5%)	19 (16.5%)	84 (72.0%)	**116**
Minor Arterial	155 (49.4%)	40 (12.8%)	119 (37.8%)	**314**
Major Collector	257 (39.6%)	163 (25.1%)	229 (35.3%)	**648**
Minor Collector	29 (27.7%)	39 (37.3%)	37 (35.0%)	**105**
Local	1,275 (41.9%)	836 (27.4%)	936 (30.7%)	**3,046**
Total	**1,801 (41.2%)**	**1,097 (25.1%)**	**1,471 (33.7%)**	**4,369**

Source: Illinois DOT Illinois Technology Transfer Center, http://gis.dot.illinois.gov/gist2/; Iowa DOT GIMS Database, http://www.iowadot.gov/gis/downloads/default.aspx. Accessed Oct. 14, 2014

Table 3.2 Summary of Highway System Facilities for the Iowa Portion of the Bi-State Region

(County level values may not sum to total values due to rounding.)

	Muscatine County	Scott County	Bi-State Region (IA)
Functional Classification	*Miles of Roadway (Percent of Total)*		
Interstate	- (0.0%)	64 (100.0%)	**64**
Principal Arterial (Other Freeways and Expressways)	-	-	-
Principal Arterials (Other)	68 (47.1%)	76 (52.9%)	**144**
Minor Arterial	60 (32.1%)	127 (67.9%)	**186**
Major Collector	114 (38.0%)	186 (62.0%)	**300**
Minor Collector	116 (61.6%)	72 (38.4%)	**188**
Local	549 (35.8%)	982 (64.2%)	**1,531**
Total	**906 (37.5%)**	**1,507 (62.5%)**	**2,413**

Source: Illinois DOT Illinois Technology Transfer Center, http://gis.dot.illinois.gov/gist2/; Iowa DOT GIMS Database, http://www.iowadot.gov/gis/downloads/default.aspx. Accessed Oct. 14, 2014

The data also reveal that the majority of the highway system is on the Illinois side of the border, as shown in Table 3.3. Nearly two-thirds of the Bi-State Region's highways are in Illinois, with the caveat that this portion of the Bi-State region consists of three, as opposed to two, counties. The Illinois portion of the region also has more roadways with higher functional classifications. Just over two-thirds of the Bi-State region's interstate highways and over half of its arterials are in Illinois. The balance of infrastructure between Illinois and Iowa is relevant to and has implications for infrastructure funding and asset management. Strictly from an ownership perspective, Illinois is responsible for much more of the Bi-State Region's highway infrastructure.

Table 3.3 Summary of Highway System Facilities for the Bi-State Region

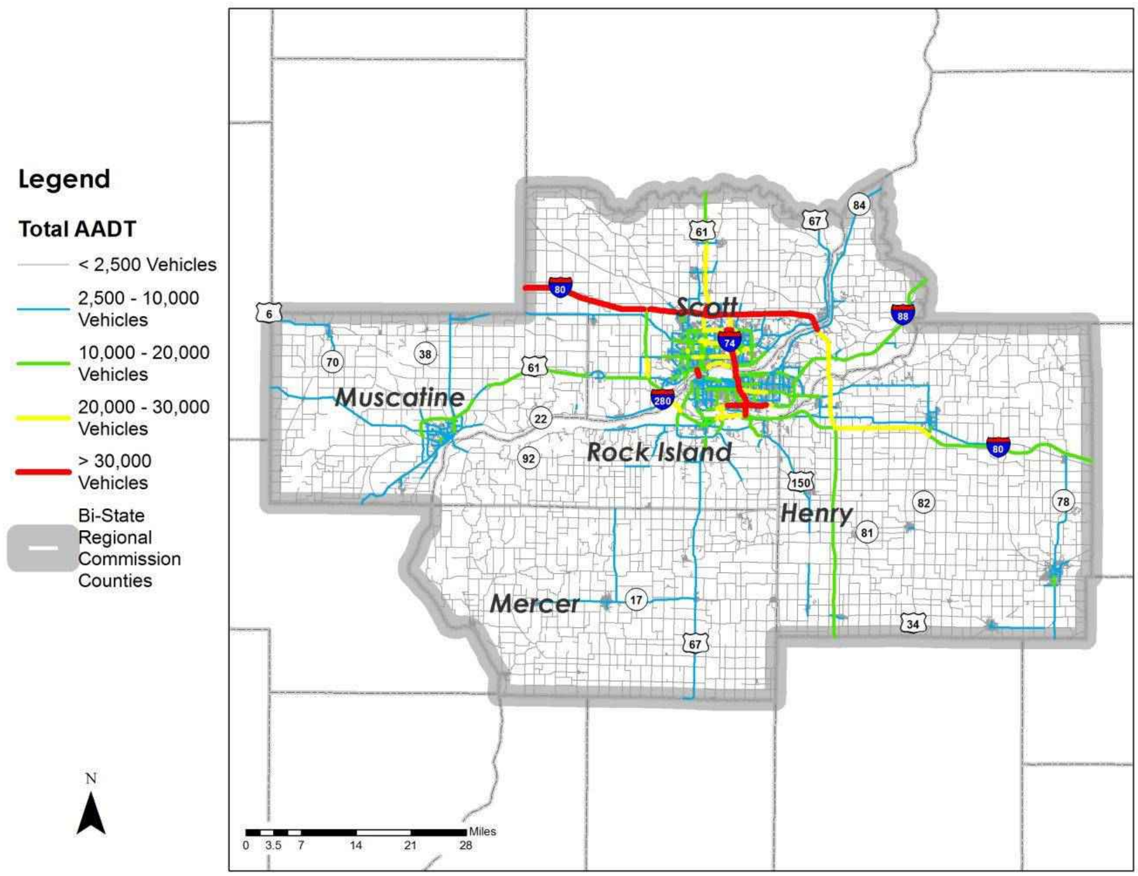
	Bi-State Region	**Illinois**	**Iowa**
Functional Classification	*Miles of Roadway*	*Percent of Total*	
Interstate	197	67.4%	32.6%
Principal Arterial (Other Freeways and Expressways)	7	100.0%	0.0%
Principal Arterials (Other)	260	44.7%	55.3%
Minor Arterial	501	62.8%	37.2%
Major Collector	947	68.4%	31.6%
Minor Collector	293	35.8%	64.2%
Local	4,578	66.6%	33.4%
Total	**6,782**	**64.4%**	**35.6%**

Source: Illinois DOT Illinois Technology Transfer Center, http://gis.dot.illinois.gov/gist2/; Iowa DOT GIMS Database, http://www.iowadot.gov/gis/downloads/default.aspx. Accessed Oct. 14, 2014

Current Volumes

In the previous section, the report discussed the Bi-State Region's highway system in terms of functional classification. This section discusses the Bi-State region's highway infrastructure in terms of volumes. Though the previous section established that the majority of the region's highway system is in Illinois, the Iowa portion of the Bi-State region experiences the highest volumes according to linear reference system (LRS) roadway data provided by the Iowa and Illinois Departments of Transportation. As shown in Figure 3.2, the Iowa portion of I-80 carries more vehicles daily over a greater distance than any other portion of the highway system.

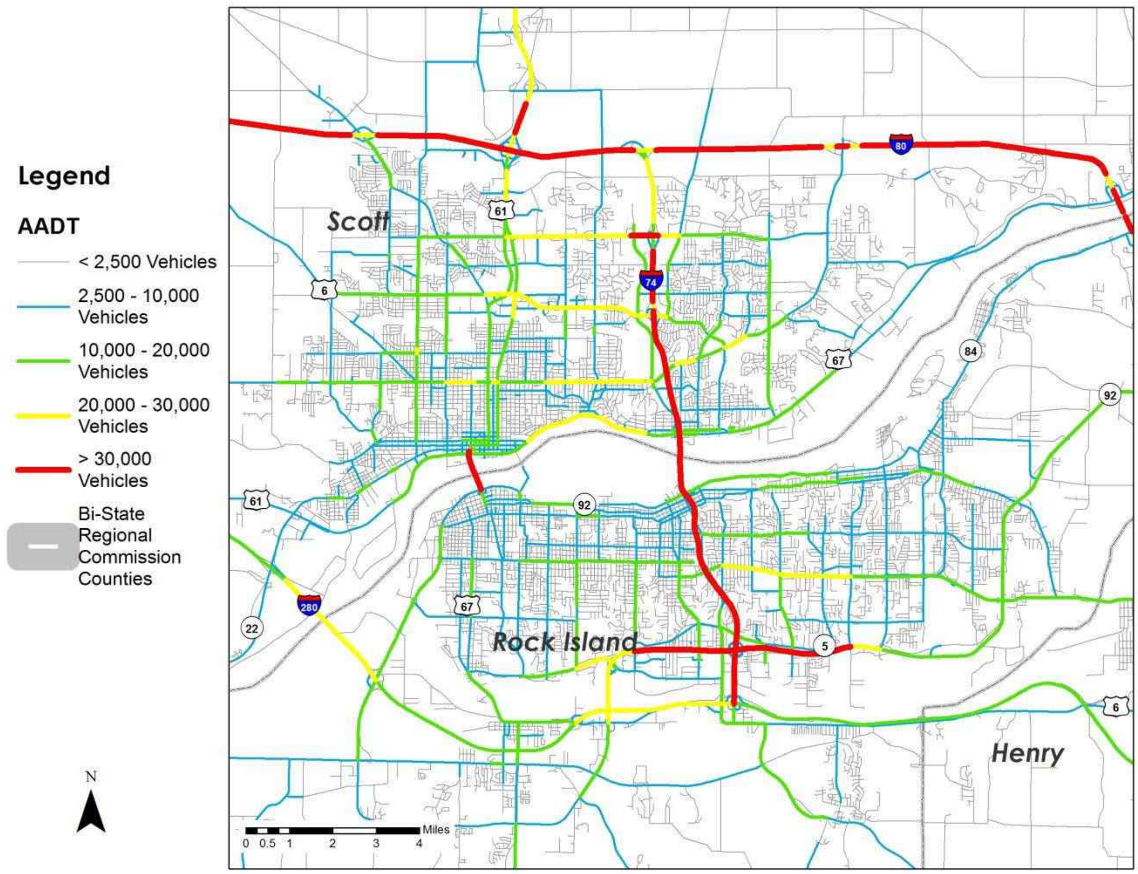
Figure 3.2 Total Volume on the Bi-State Region's Highway System



Source: Illinois DOT Illinois Technology Transfer Center, http://gis.dot.illinois.gov/gist2/; Iowa DOT GIMS Database, http://www.iowadot.gov/gis/downloads/default.aspx. Accessed Oct. 14, 2014

Focusing on the four largest cities in the region (Davenport, Rock Island, Moline, and East Moline), I-74/ US 6, I-80, and SR 5/ John Deere Road exhibit the heaviest volumes. Also, Centennial Bridge on US 67 experiences over 30,000 vehicles daily. Other roadways in the urban core that carry heavy volumes are primarily east-west connectors: Avenue of the Cities (Moline/ East Moline); US 67/ East River Drive, East Locust Street, US 6/ East Kimberly Drive, and East 53rd Street (Davenport).

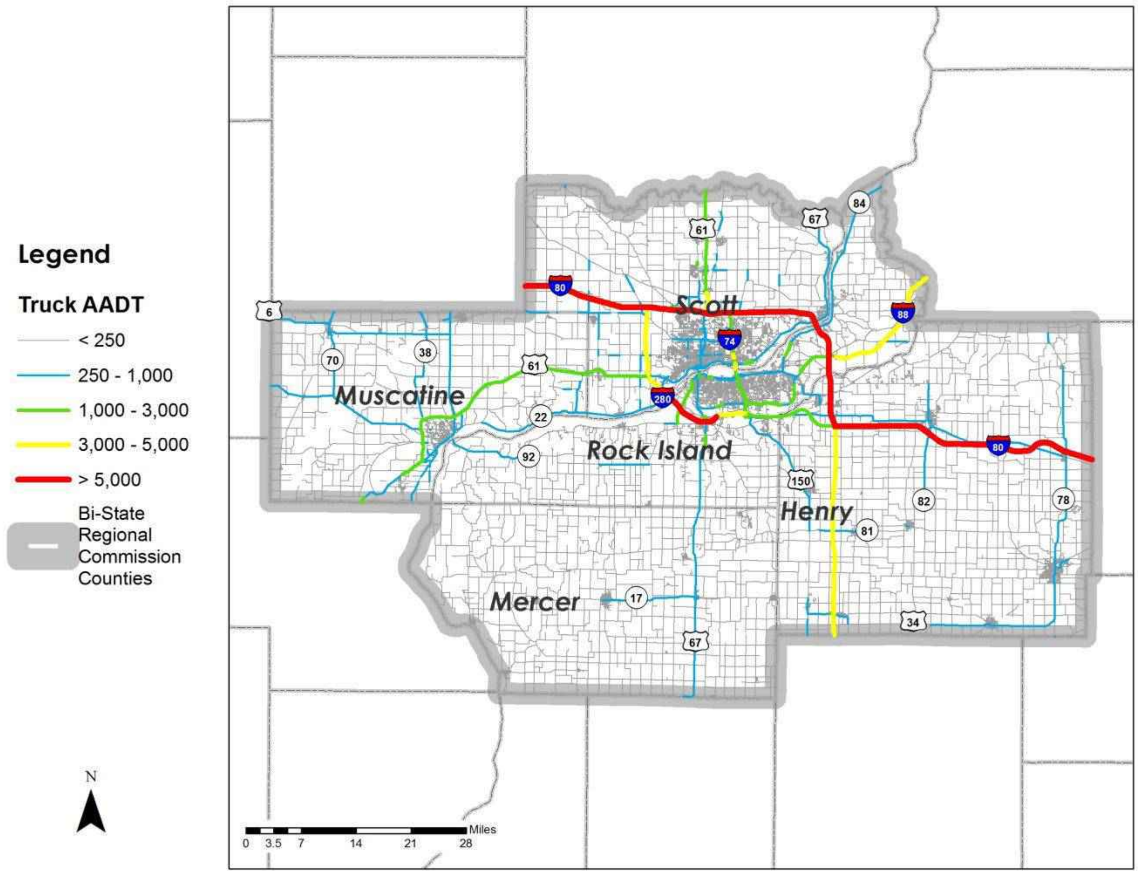
Figure 3.3 Total Highway Volumes in the Urban Core of the Bi-State Region



Source: Illinois DOT Illinois Technology Transfer Center, http://gis.dot.illinois.gov/gist2/; Iowa DOT GIMS Database, http://www.iowadot.gov/gis/downloads/default.aspx. Accessed Oct. 14, 2014

A similar pattern is seen when we focus on truck flows. Intuitively, the Bi-State Region's interstate and US highway system carries the majority of truck flows. As shown in Figure 3.4, the heaviest truck flows in the Bi-State region are along I-80 and the portion of I-280 in Rock Island County. Both of these highways carry more than 5,000 trucks daily. These are closely followed by I-88 in Rock Island County and I-74 in Henry County which on average carry just over 3,600 and 4,100 daily.

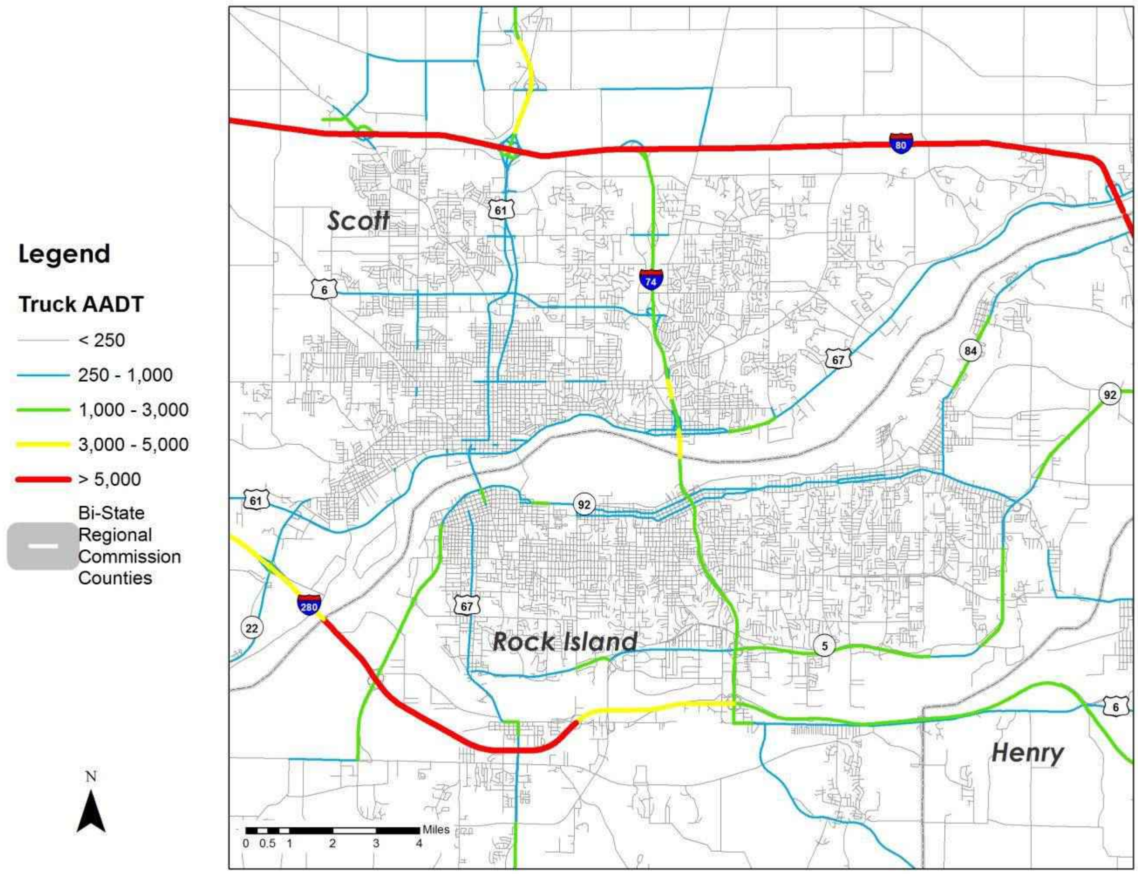
Figure 3.4 Total Truck Volumes on the Bi-State Region's Highway System



Source: Illinois DOT Illinois Technology Transfer Center, http://gis.dot.illinois.gov/gist2/; Iowa DOT GIMS Database, http://www.iowadot.gov/gis/downloads/default.aspx. Accessed Oct. 14, 2014

Again, focusing in on the urban core of the Bi-State Region the majority of north-south truck flows are carried along US Highways 6 and 67. East-West flows through Rock Island County, IL predominately rely on I-280 followed by SR 5/ John Deere Rd. and SR 92. In Scott County, IA east-west truck flows predominately follow portions of SR 22, US 61, and US 67. At the northern end of Scott County, I-80 carries the majority of east-west truck flows.

Figure 3.5 Total Truck Volumes in the Urban Core of the Bi-State Region

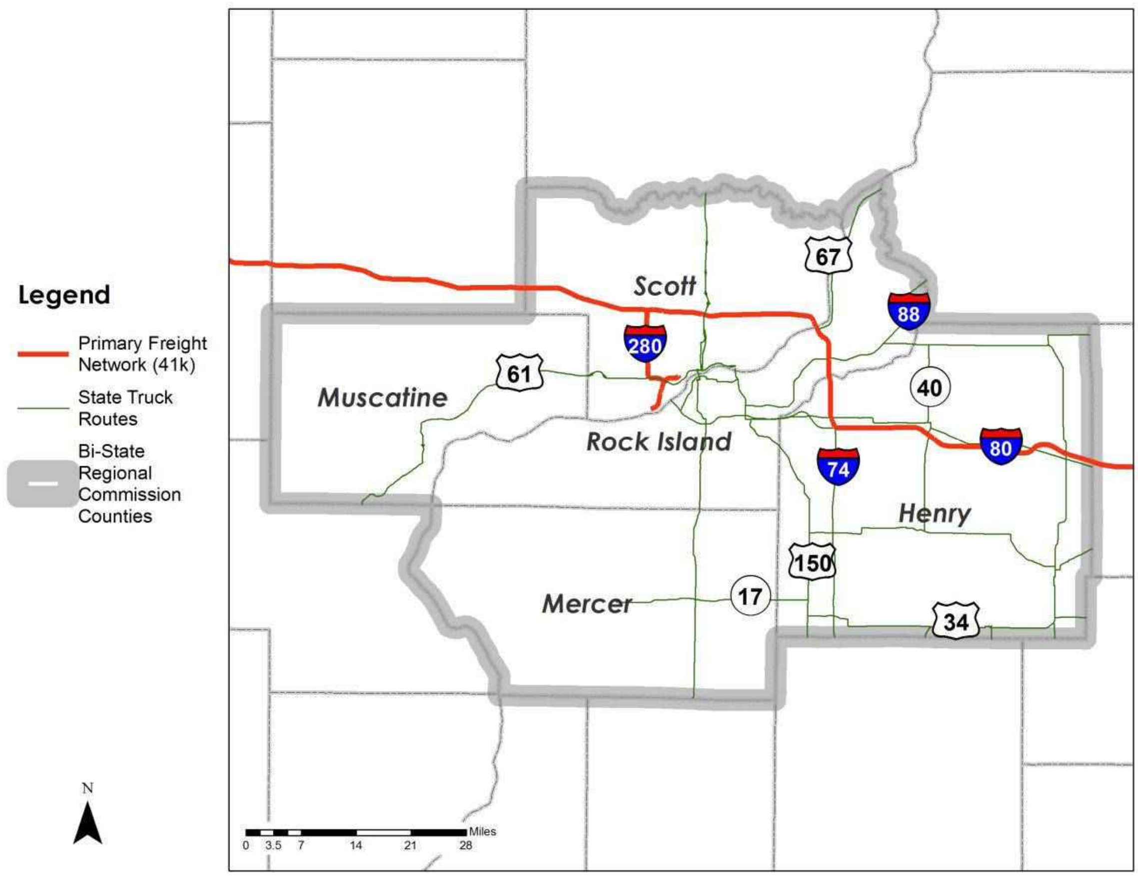


Source: Illinois DOT Illinois Technology Transfer Center, http://gis.dot.illinois.gov/gist2/; Iowa DOT GIMS Database, http://www.iowadot.gov/gis/downloads/default.aspx. Accessed Oct. 14, 2014

Truck-Designated Corridors

Federal legislation passed in 2012 mandated the designation of a national highway primary freight network. In support of the Congressional mandate, States have begun designating State-level truck networks. This subsection presents the portions of the Federal, Iowa, and Illinois highway freight networks within the Bi-State Region. In Iowa, state truck routes are designated as part of the Commercial and Industrial Network. IDOT similarly prepared a truck route network for Illinois. At the national level, FHWA prepared two draft highway primary freight networks: one consisting of 27,000 (27K) highway miles and another consisting of 41,000 miles (41K). The state and Federal freight networks in the Bi-State region are depicted in Figure 3.6.

Figure 3.6 Bi-State Region's National and State Designated Truck Networks



Source: Federal Highway Administration; Illinois DOT; Iowa DOT.

The Federal Highway Primary Freight Network[20] (the 41K mile version) that is in the Illinois portion of the Bi-State region consists entirely of I-80. I-80 is included in the Iowa portion as well, in addition to I-74 and portions of the port and truck/ rail terminal FHWA NHS designated intermodal connectors. Those intermodal connectors are in Davenport, IA and include portions of SR 22/ Rockingham Road and S. Rolff Street.

Highway System Condition

The condition of the highway system is an important indicator of its ability to facilitate mobility in general and goods movement in particular. This section focuses on the pavement condition of last-mile connectors and on the structural condition of bridges that connect the Illinois and Iowa portions of the Bi-State region.

Last-mile Connectors

This portion of the analysis focuses on last-mile connectors, roads leading to major intermodal terminals that provide crucial modal links. As available, the analysis in this section utilizes Highway Performance Monitoring System (HPMS) data to describe in detail conditions on the NHS intermodal connectors. There are three freight-related NHS intermodal connectors in the Bi-State Region: two in Davenport, IA and one in Rock Island, IL. A fourth connector NHS intermodal connector, at Quad City International Airport is designated due to the passenger connectivity it provides, but it also serves a role from some freight.

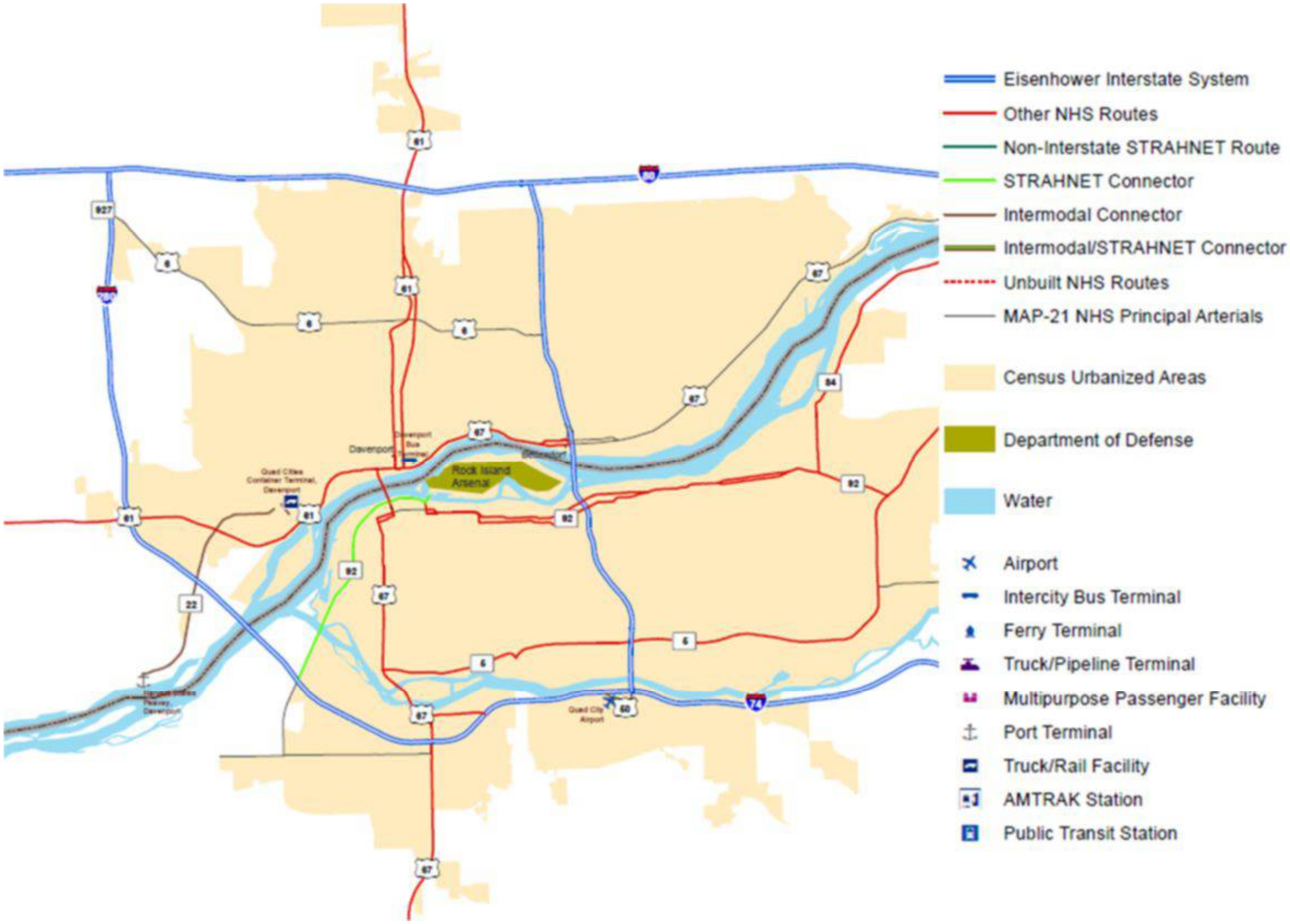
The Bi-State Regional also has a Strategic Highway Network (STRAHNET) connector. STRAHNET is a designation given to roads that provide defense access, continuity, and emergency capabilities for movements of personnel and equipment in both peace and war. There is a connector from I-74 to the Rock Island Arsenal. All of these connectors are shown in Figure 3.7.

The two connectors in Davenport, depicted in Figure 3.8, connect port and rail terminals to the larger national highway system. SR 22/Rockingham Road connects the Harvest States Peavy Port Terminal to I-280. This port primarily deals in commodities related to food and farm products and supports the Bi-State region's agriculture industry. Likewise, SR 22/Rockingham connects to the former Quad Cities Container Terminal, via S. Rolff Street, to I-280. Though the container terminal is now closed, the roadways remain on the NHS.

---

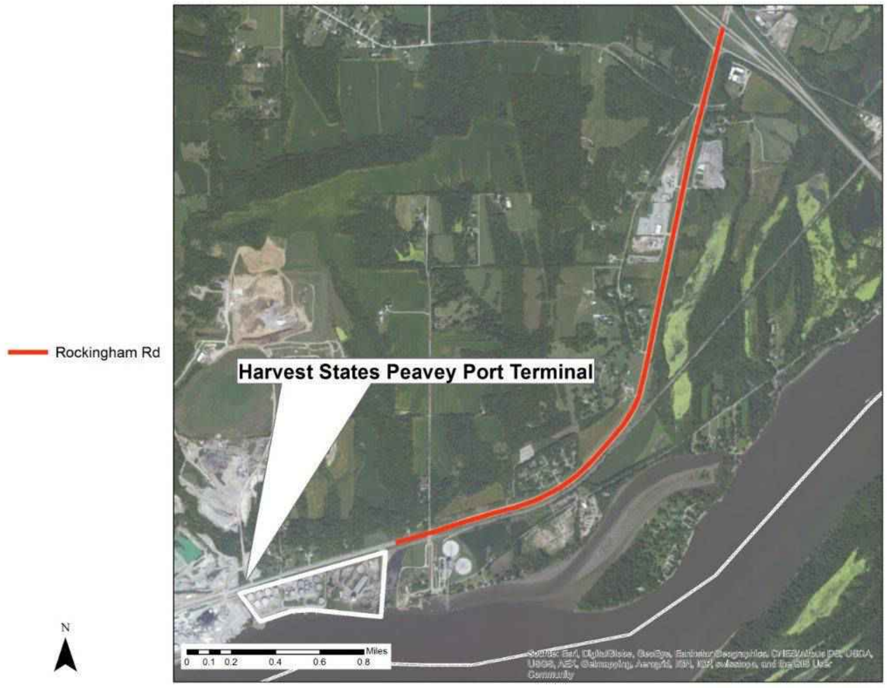
[20] Federal Highway Administration, http://ops.fhwa.dot.gov/Freight/infrastructure/pfn/index.htm, Accessed Dec. 15, 2014.

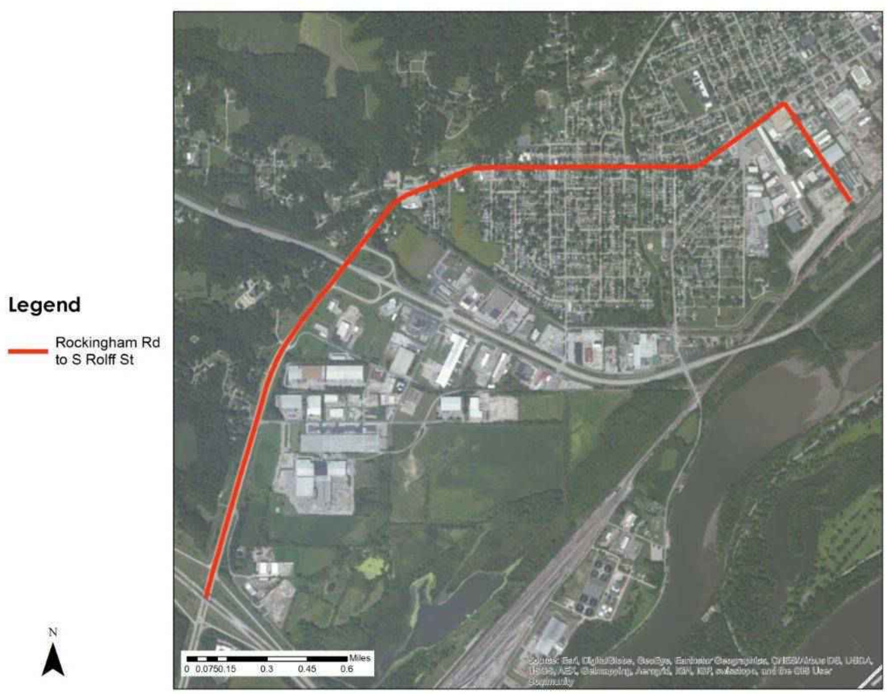
Figure 3.7 National Highway System and Connectors



Source: FHWA, March 2015

Figure 3.8 NHS Intermodal Connectors for the Harvest States Peavy Port Terminal and the Quad Cities Container Terminal





Source: FHWA National Highway System Intermodal Connectors, http://www.fhwa.dot.gov/planning/national_highway_system/intermodal_connectors/, Accessed Dec. 4, 2014; ESRI Resource Center.

The last connector is for the Quad City International Airport and is depicted in Figure 3.9. The roadways US 6, 27th Street, and 69th Street connect the airport to I-74. Quad Cities International Airport is an important element of the overall freight system, acting primarily as a feeder airport for major package express integrators such as UPS and FedEx.[21] The airport facilitates the movement of last-minute and high value goods that are not shipped via larger nearby airports, such as O'Hare International Airport in Chicago, IL. Only one all-cargo carrier, Ameriflight, operates out of Quad City International Airport.

Figure 3.9 NHS Intermodal Connectors for the Quad City International Airport

[21] Metropolitan Airport Authority of Rock Island County (2012). Quad City International Airport: Master Plan Update, http://www.qciaairportmasterplan.com/Exhibits/MLI_Master_Plan%20_DRAFT_Forecast.pdf, Accessed Dec. 29 2014.

Source: FHWA National Highway System Intermodal Connectors, http://www.fhwa.dot.gov/planning/national_highway_system/intermodal_connectors/, Accessed Dec. 4, 2014; ESRI Resource Center.

According to average International Roughness Index (IRI) ratings derived from 2012 HPMS spatial data, pavement conditions on the Bi-State Region's NHS Intermodal Connectors ranges from "good" to "poor."[22] The IRI is an index used to gauge the smoothness of a roadway. It is calculated using an algorithm that takes as input data from the longitudinal profile of a section of roadway. Lower IRI values indicate better pavement conditions (i.e. smoother) while higher values indicate worse conditions (i.e. rougher). The roadways forming the intermodal connector for Quad City International Airport can be classified as "good" (i.e. 27th Street) to "fair" (i.e. US 6 and 69th Street). The connectors for the port and truck/ rail terminals are "mediocre" (i.e., SR 22/ Rockingham Road west of I-280) to "poor" (i.e., SR 22/ Rockingham Road east of I-280). Even within these ratings based on average IRI values, there is a great amount of variation in pavement conditions on the connectors. This is captured in Table 3.4 that presents the range of IRI values.

Table 3.4 Pavement Conditions on the Bi-State Region's NHS Intermodal Connectors

NHS Intermodal Connector	Roadways	Average IRI	IRI Range	Avg. AADT *	Avg. Truck AADT (Percentage)*
Harvest States Peavy Port Terminal	SR 22/ Rockingham Road	204	79-472	4,644	866 (18.6%)
Quad Cities Container Terminal (*Closed*)	SR 22/ Rockingham Road	229	170-195	7,127	4,756 (66.7%)
	S Rolff Street	n/a	n/a	600	n/a
Quad City International Airport	US 6	115	n/a	19,300	1,625 (8.4%)
	27th Street	88	n/a	11,300	n/a
	69th Avenue	168	n/a	11,300	n/a

Source: FHWA National Highway Performance Monitoring System, http://www.fhwa.dot.gov/policyinformation/hpms/shapefiles.cfm, Accessed Oct. 31, 2014.

* Source: Illinois DOT Illinois Technology Transfer Center, http://gis.dot.illinois.gov/gist2/; Iowa DOT GIMS Database, http://www.iowadot.gov/gis/downloads/default.aspx. Accessed Oct. 14, 2014

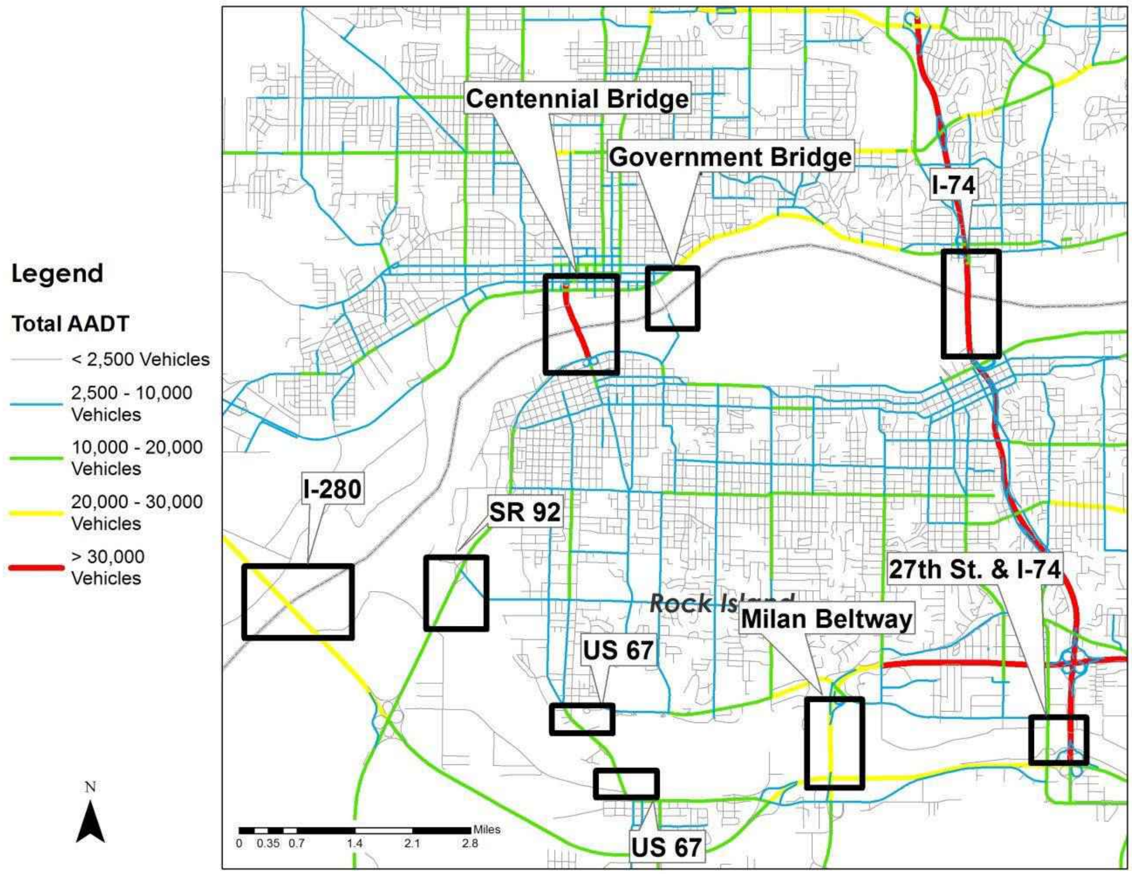
[22] Federal Highway Administration (2000). Chapter 3 – System Conditions. *1999 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance Report*, http://www.fhwa.dot.gov/policy/1999cpr/chap03.pdf, Accessed Dec. 29, 2014.

Also presented in Table 3.4 are the truck volumes on these roadways as reported by the Iowa and Illinois DOTs. Of the intermodal connectors, SR 22/ Rockingham Road has the most truck activity by volume and as a percentage of total traffic. Approximately 4,756 trucks per day utilize this roadway accounting for nearly 67% of its traffic. SR 22/Rockingham Road west of I-280, which connects to the Harvest States Peavy Port Terminal, also has significant truck traffic. Though only approximately 866 trucks per day use this connector they account for nearly 19% of its volume. For the Quad City International Airport, approximately 1,625 trucks per day traverse the portion of US 6 that is a part of this connector representing just over 8% of its volume. Volumes for other roadways forming intermodal connectors for the airport and the container terminal were not reported.

Highway Bridges

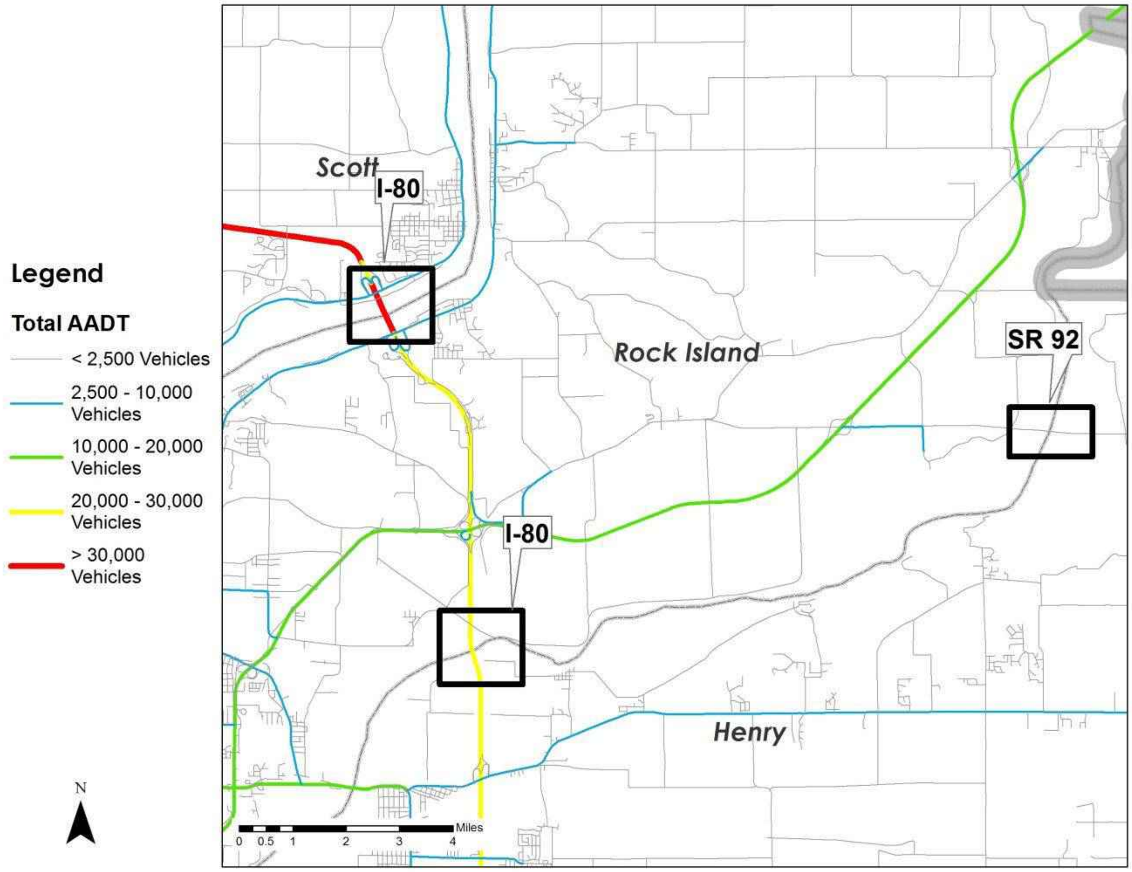
It is important to recognize that the Mississippi River and the Rock River, which both run an east-west course through the region, are considerable obstacles to north-south mobility across the Bi-State region. As such, bridges play a very important role in the movement of goods and people. Figures 3.10 thru 3.12 identify the location of highway bridges in the study region.

Figure 3.10 Inner City Bridges in the Bi-State Region



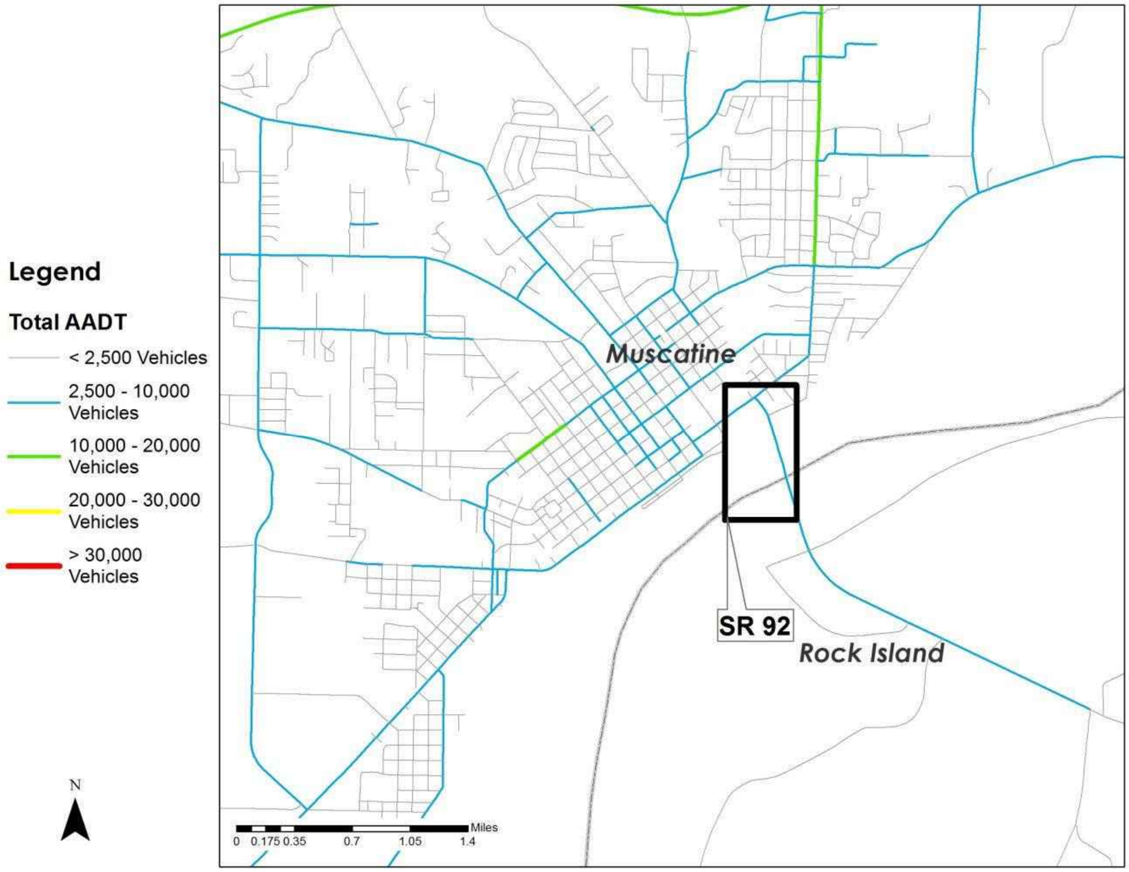
Source: Illinois DOT Illinois Technology Transfer Center, http://gis.dot.illinois.gov/gist2/; Iowa DOT GIMS Database, http://www.iowadot.gov/gis/downloads/default.aspx. Accessed Oct. 14, 2014.

Figure 3.11 Bridges East of the Inner City



Source: Illinois DOT Illinois Technology Transfer Center, http://gis.dot.illinois.gov/gist2/; Iowa DOT GIMS Database, http://www.iowadot.gov/gis/downloads/default.aspx. Accessed Oct. 14, 2014.

Figure 3.12 Bridge on Highway 92 in Muscatine, IA



Source: Illinois DOT Illinois Technology Transfer Center, http://gis.dot.illinois.gov/gist2/; Iowa DOT GIMS Database, http://www.iowadot.gov/gis/downloads/default.aspx. Accessed Oct. 14, 2014.

The sufficiency rating is a numeric value that is indicative of a bridge's sufficiency to remain in service. Sufficiency ratings range from 0%, meaning a bridge is entirely insufficient or deficient, to 100%, meaning that a bridge is entirely sufficient. The sufficiency methodology is based on four separate factors: structural adequacy and safety; serviceability and functional obsolescence; essentiality for public use; and special reductions based on the calculations of the first three factors. Of the bridges crossing the Mississippi River, US 67/Centennial Bridge received the worst sufficiency ratings from both the Iowa DOT (10.8%) and Illinois DOT (3.4%). At the opposite end of the spectrum, I-280 received among the highest ratings by both DOTs (67.9% and 80.9% by Iowa and Illinois, respectively). The I-74 bridge is set to be replaced by the Iowa and Illinois DOTs by 2020.[23]

[23] The Quad City Times, http://qctimes.com/traffic/i--bridge-schedule-laid-out/article_3ae487e6-c419-51c7-8b45-605c95f83fd6.html, Accessed Jan. 6, 2015.

Bridges on US 67 also received the worst sufficiency ratings of bridges crossing the Rock River. The US 67 bridge over the central channel of the Rock River had a sufficiency rating of 48.6, the lowest of all bridges. The I-80 Rock River bridge received the highest rating of 96.5. It is also the busiest in terms of freight traffic as over 9,000 trucks cross this bridge daily, representing over 40% of its total volume. The lowest volume bridge was SR 84, which has about 700 trucks using it daily.

Table 3.5 Sufficiency Ratings on the Bi-State Region's Mississippi and Rock River Bridges

Bridge	Sufficiency Rating (Iowa DOT)	Sufficiency Rating (Illinois DOT)	Avg. Truck AADT (Percentage) *
Mississippi River			
Government Bridge	** n/a	72.4	** n/a
US 67/ Centennial Bridge	10.8	3.4	9,545 (30.5%)
I-74	56.2 (EB); 49.6 (WB)	58.1 (EB); 60.2 (WB)	3,309 (4.7%)
I-280	67.9	80.9	4,329 (19.3%)
I-80	67.0	65	9,971 (29.2%)
SR 92	66.6	66	167 (4.6%)
Rock River			
US 67 (North Channel)		50.4	825 (6.1%)
US 67 (Central Channel)		58	825 (6.1%)
US 67 (South Channel)		48.6	825 (6.1%)
I-74		96.2 (NB); 97.2 (SB)	1,800 (5.3%)
I-80		96.5 (NB); 97.5 (SB)	9,175 (43.9%)
27^{th} St., Moline IL		63.5	n/a
SR 92		85.7 (NB & SB)	2,425 (20.2%)
SR 92 (Henry/ Rock Island County Line)		89.8	200 (10.3%)
SR 84		88	710 (4.8%)
Milan Beltway		81.3	n/a

Source: Illinois DOT Structures Information Management System, http://apps.dot.illinois.gov/bridgesinfosystem/main.aspx, Accessed Dec. 16, 2014 and Feb. 18, 2015; Iowa DOT Office of Bridges and Structures.

* Source: The Iowa DOT GIMS Database (http://www.iowadot.gov/gis/downloads/default.aspx) was used for truck volumes on the Mississippi River bridges; the Illinois Technology Transfer Center Database (http://www.iowadot.gov/gis/downloads/default.aspx) was used for truck volumes on the Rock River bridges. Both databases accessed Oct. 14, 2014.

** Iowa DOT does not maintain this bridge.

In addition to US 67/Centennial Bridge exhibiting among the worst sufficiency ratings, it also has among the largest truck volumes (i.e. all single unit plus combination unit configurations) at 9,545 vehicles per day. This represents approximately 30.5% of the volume on this roadway. Other Mississippi River bridges critical to truck movements include I-80 with just under 10,000 trucks per day and I-280 with just over 4,000 trucks per day. These volumes represent approximately 29% and 19% of those roadways total volumes, respectively.

3.2 Railway Infrastructure

This section describes the rail networks operated by BNSF, Canadian Pacific, and the Iowa Interstate Railroad in the Quad Cities region. The section begins with an overview of rail infrastructure, including owners and operators of the region's rail infrastructure, and follows with an overview of the system conditions for trackage in the Quad Cities.

Railroad Infrastructure Overview

Rail Operators and Facilities

Much of the region's rail infrastructure dates back to the Chicago, Rock Island and Pacific Railroad ("Rock Island"), which was founded in Rock Island, Illinois in the mid-1800's and provided key connections between Chicago and freight centers in the western and southern US. Since then, Quad City railroads have transformed into three separate railroads, Class I's BNSF Railway (BNSF) and Canadian Pacific (CP/DM&E)[24], and Class II, Iowa Interstate Railroad (IAIS).[25] Track ownership is well-defined in the area, though trackage rights are shared by all three for the majority of network in and around the Bi-State region. Figure 3.13 provides an overview of rail operators in the region, and a description of each railroad is provided below. Cities along the railroad are shown for reference.

---

[24] Operates as the Dakota, Minnesota, & Eastern Railroad (DM&E) Railroad Corporation in Iowa and parts of Minnesota.

[25] In the U.S., railroads are regulated by the Surface Transportation Board and classified based on annual operating revenues. According to the Association of American Railroads, current criteria are: Class I: $467 million or more; Class II: $37.4 million but less than $467 million; and Class III: less than $37.4 million.

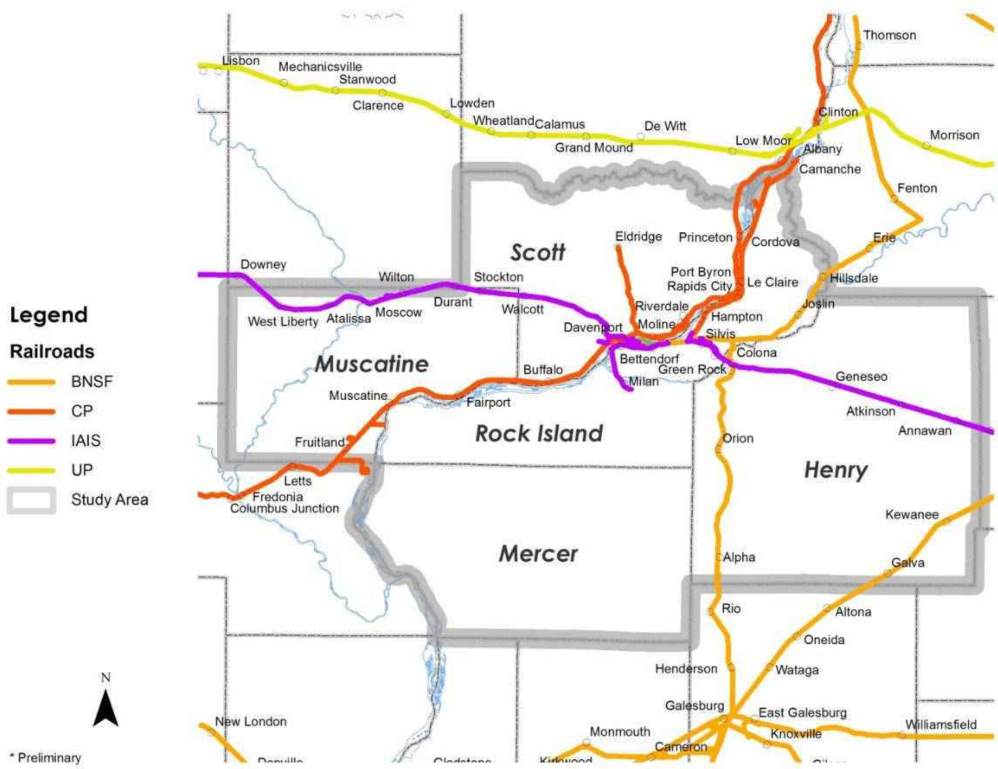
Table 3.6 Study Area Railroad Infrastructure

Railroad	Quad Cities Track Mileage*	Quad Cities Subdivisions	Yard Locations
BNSF	80 Miles	Barstow Mendota	Barstow Rock Island (with IAIS, DM&E) Silvis
CP/DM&E	110 Miles	Davenport Eldridge Nitrin Ottumwa	Bettendorf (with BNSF) Buffalo Muscatine Nahant West Davenport
IAIS	102 Miles	Subdivision 1	Rock Island (with BNSF, DM&E) Silvis

Source: Oak Ridge National Laboratory (ORNL) Operational Network, National Transportation Atlas Database (NTAD)

*Mileages are approximate

Figure 3.13 Study Area Railroad Operators

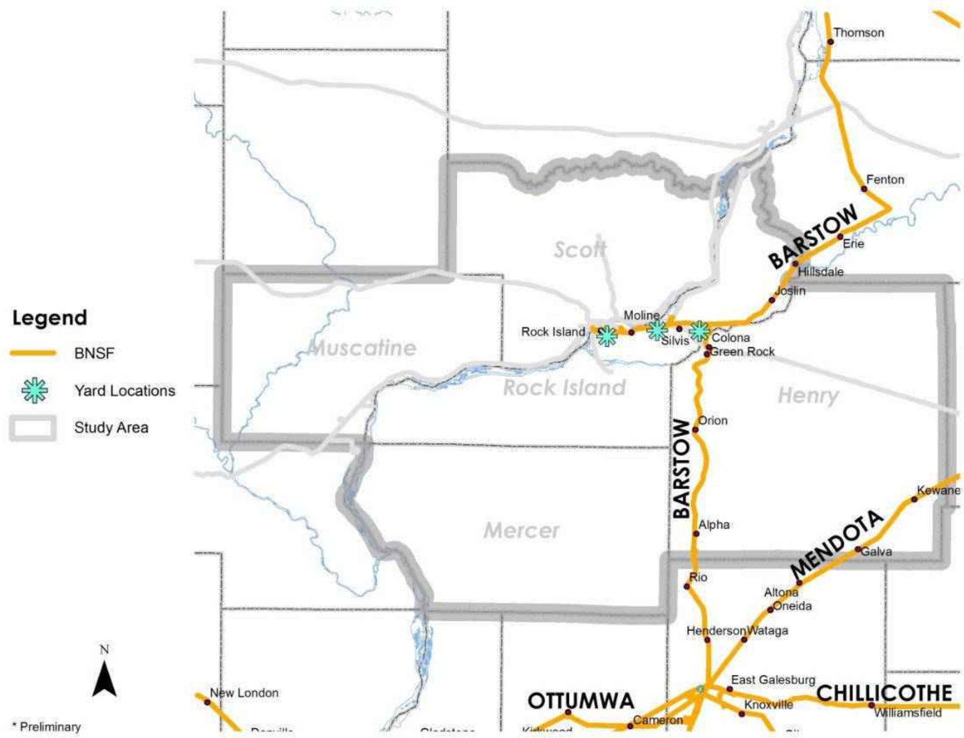


Source: Oak Ridge National Laboratory (ORNL) Operational Network, National Transportation Atlas Database (NTAD)

BNSF Railway

Figure 3.14 provides an overview of the BNSF network in the Quad Cities. BNSF is a Fort Worth, Texas-based Class I railroad that operates in 28 states, with connectivity to Gulf, West Coast, and Pacific Northwest ports, and has key gateway connections in Chicago, Illinois, Kansas City, Missouri, and Memphis, Tennessee. System-wide, BNSF owns and/or operates 32,500 miles of trackage, with approximately 80 miles in the Quad Cities region. BNSF offers key access between the Quad Cities and the Kansas City (Southbound and Westbound Corridors), Twin Cities (Northbound and Westbound Corridors), and Chicago (Eastbound and Southbound Corridors). While there are not intermodal or automotive facilities currently located in the Quad Cities, BNSF's trackage in the region serves as corridors for both types of products. Nearby facilities for both intermodal and automotive goods are in Logistics Park Chicago, St. Paul, Omaha, St. Louis, and Kansas City. The railroad also services ADM's transload facility in Camanche, Iowa, as well as other nearby (non-Quad Cities) transload and team track facilities in Savanna, Illinois (Riverport Railroad). Currently, BNSF operates a yard in Barstow and has operating rights to IAIS' yards at Rock Island and Silvis. BNSF has a major switching yard in Galesburg (just south of Henry County). Note: Subdivision names are labeled in bold. Cities along the railroad are shown for reference.

Figure 3.14 BNSF Railway

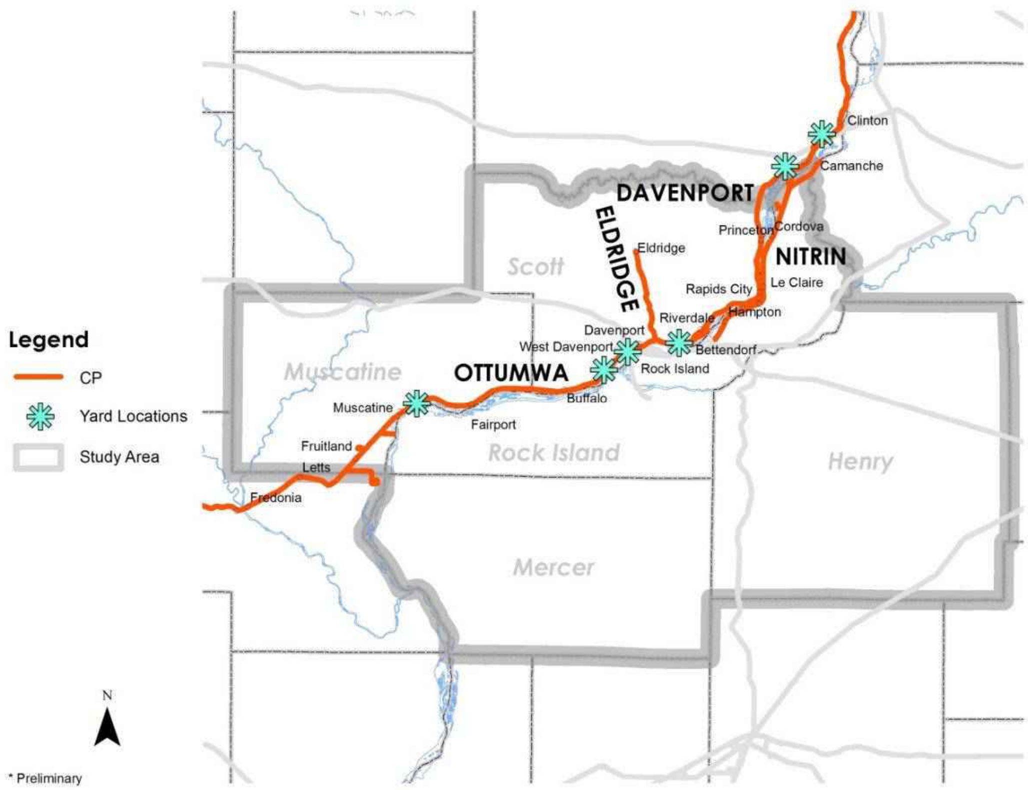


Source: Oak Ridge National Laboratory (ORNL) Operational Network, National Transportation Atlas Database (NTAD)

Canadian Pacific Railway (CP/DM&E)

Figure 3.15 provides an overview of the CP network in the Quad Cities. CP is a Calgary, Alberta-based Class I railroad that spans from the Port of Vancouver (Canada) in the west, to Montreal in the east. CP's US network includes North Dakota, Minnesota, Wisconsin, as well as connects to gateways in Minneapolis/St. Paul, Chicago and Kansas City. System-wide, CP owns and/or operates 13,700 miles, with approximately 110 miles in the Quad Cities region. In Iowa, CP operates as the Dakota, Minnesota, and Eastern Railroad Corp (DM&E) and provides north-south connectivity for the Quad Cities, running parallel to the Mississippi River, on both sides, through the region. In the Quad Cities, CP has transloading facilities in Camanche, Iowa (ADM Terminal Services), Davenport, Iowa (Murray Warehousing; Catch-up Logistics), and Muscatine, Iowa (Cam II Warehouse, Inc). Currently, CP services industries in LeClaire, East Moline, Linwood, Montpelier, Camanche, Fairport, Muscatine, and Fruitland. CP operates yards at Bettendorf, Buffalo, Muscatine, West Davenport, Nahant. Note: Subdivision names are labeled in bold. Cities along the railroad are shown for reference.

Figure 3.15 CP/DM&E Railroad

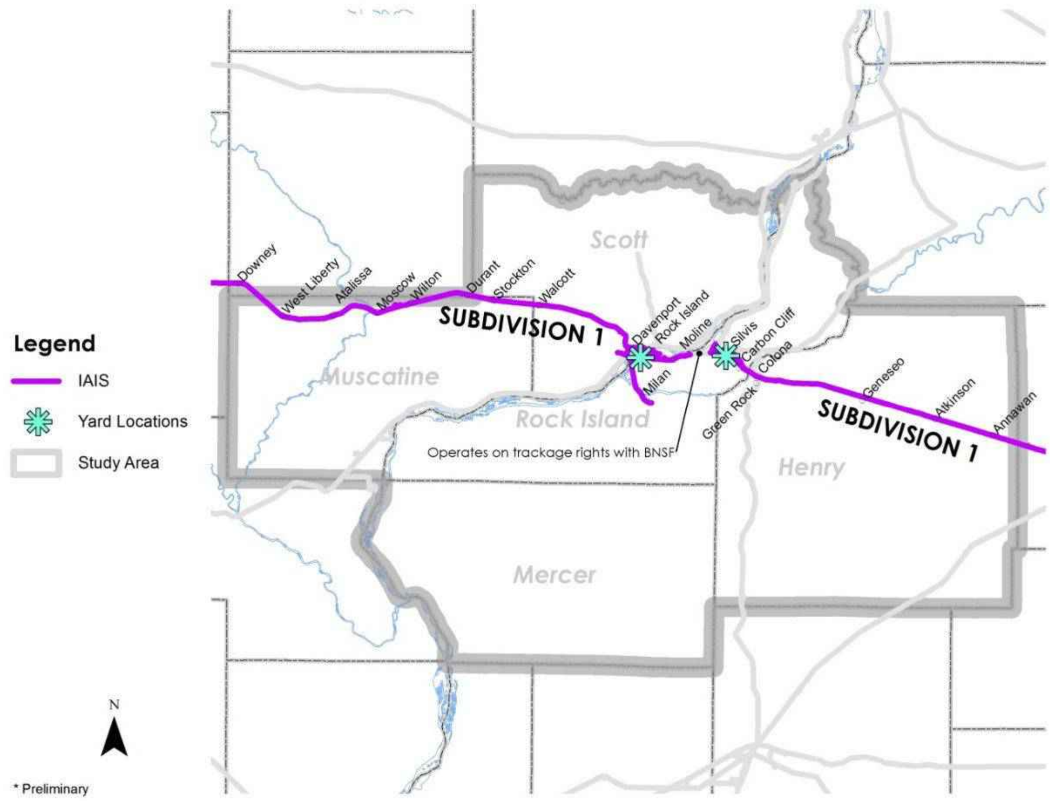


Source: Oak Ridge National Laboratory (ORNL) Operational Network, National Transportation Atlas Database (NTAD)

Iowa Interstate Railroad (IAIS)

Figure 3.16 provides an overview of the IAIS network in the Quad Cities. IAIS is a Class II regional railroad based in Cedar Rapids, Iowa and runs from Council Bluffs, Iowa to Chicago, Illinois. System-wide, IAIS owns and/or operates nearly 600 miles, with 370 miles in Iowa, and 220 miles in Illinois. In the Quad Cities area, IAIS operates approximately 102 miles and provides east-west connectivity through Henry, Rock Island, Scott, and Muscatine Counties. IAIS is one of the rare regional railroads that connects with all seven Class I Railroads throughout its system. In the Quad Cities, IAIS has an interchanges with BNSF and CP/DM&E in Davenport and Rock Island for north and southbound moves. Currently, IAIS services industries in Milan, East Moline, and the Rock Island Arsenal. IAIS operates yards in Rock Island and Silvis. IAIS will also provide rail service to a transload facility at the Eastern Iowa Industrial Center, a facility under construction north of Davenport. Cities along the railroad are shown for reference.

Figure 3.16 Iowa Interstate Railroad

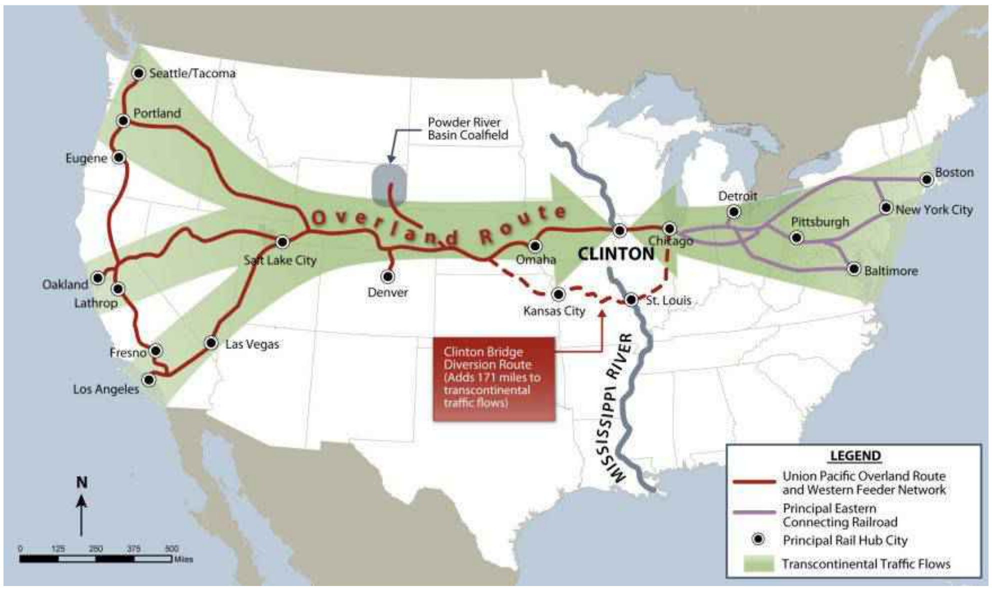


Source: Oak Ridge National Laboratory (ORNL) Operational Network, National Transportation Atlas Database (NTAD)

Union Pacific Railroad (UP)

While UP does not technically operate in any of the Bi-State Commission's five counties, it is important to note that they have a major east-west corridor directly north of Scott County. The "Overland Route" connects UP's system between Chicago and all system points west. Clinton is also an interchange location between CP and UP as shown in Figure 3.17.

Figure 3.17 UP Overland Route



Source: Iowa DOT/UP, 2009 TIGER Application

Aside from the yards and industrial service listed above, there are four active coal-fired power plants in the Bi-State area that are served by BNSF. Table 3.7 displays the plants, and also notes that one, Fair Generating Station recently closed, and two are scheduled for conversion to natural gas power.

Table 3.7 Study Area Rail-Served Coal Power Plants

Facility Name	Facility Location
Alliant Energy M.L. Kapp Generating Station*	Clinton, Iowa
MidAmerican Energy Riverside Generating Station**	Bettendorf, Iowa
Central Iowa Power Cooperative F.E. Fair***	Montpelier, Iowa
Muscatine Power and Water	Muscatine, Iowa
MidAmerican Energy Louisa Generating Station	Muscatine, Iowa

Source: BNSF Railway

* Planned conversion to natural gas in 2015

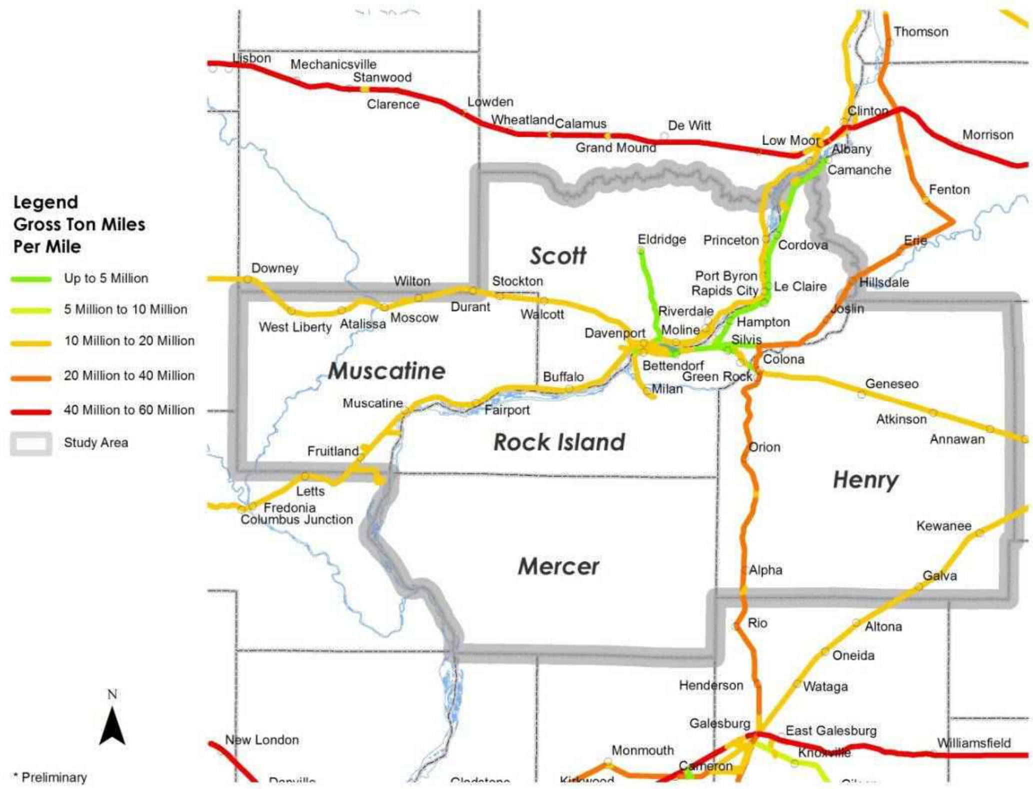
** Planned conversion to natural gas in 2016

*** Closed November 2013

Current Volumes

Density of rail traffic, measured in million gross ton-miles, per mile is substantial around the Quad Cities metro areas, but moderate in the towns along the Mississippi River outside of the urban area. Density is measured by the Federal Railroad Administration (FRA) on a scale of 1-7, with 7 being the highest value. Generally, values at 4 are considered to be medium density. In the Bi-State region, the BNSF line in northern Rock Island and Henry Counties have a density code of 4, as well as the UP line north of Scott County. CP/DM&E has a value of 3 along the Mississippi River and through the Quad Cities metro area. Figure 3.18 provides an overview of rail density in the study area**.** Note: Cities along the railroad are shown for reference.

Figure 3.18 Rail Traffic Density in the Study Area



Source: Oak Ridge National Laboratory (ORNL) Operational Network, National Transportation Atlas Database (NTAD)

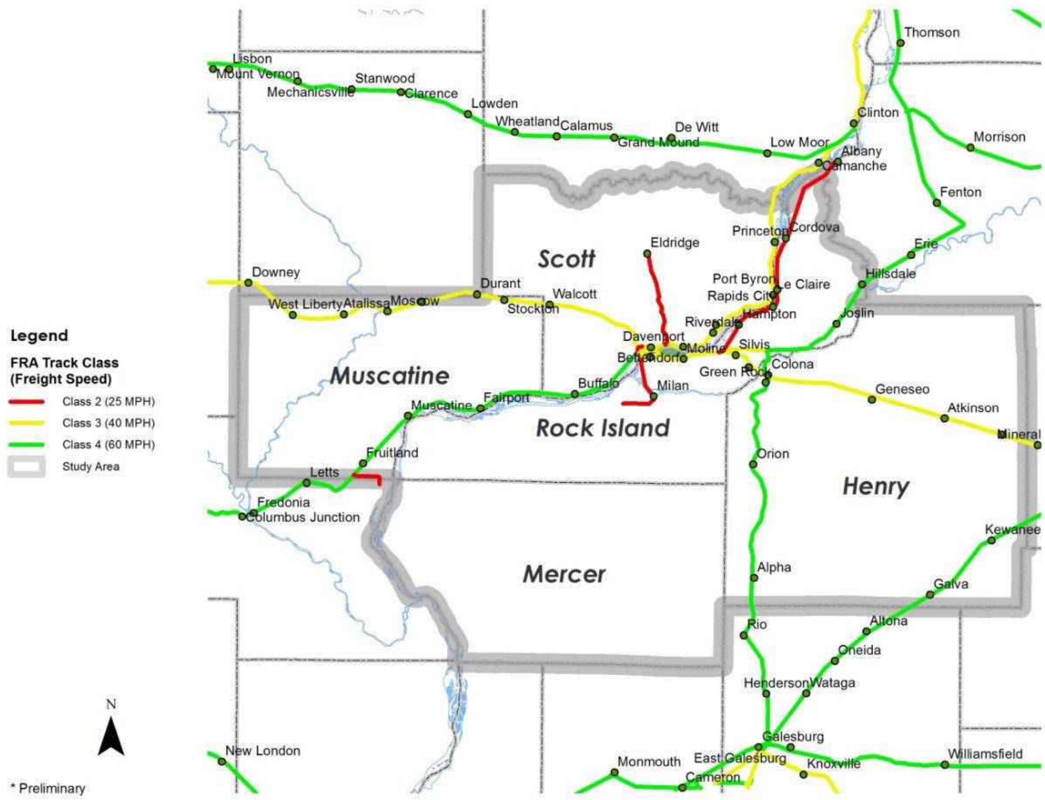
Railroad System Conditions

This section provides an overview of Quad Cities rail system conditions, based on track class, bridge locations, and highway-railroad crossings.

Track Class

The FRA has devised a classification system for track that is based on maximum speed that a freight or passenger train is allowed to travel over a segment.[26] In the Quad Cities, CP/DM&E and BNSF have Class 4 trackage on each of their corridors in the region, meaning that freight trains can operate at 60 MPH, and passenger trains at 80 MPH. For CP/DM&E, this is from Davenport westward, and for BNSF this is through the entire Barstow Subdivision through Henry County. IAIS operates Class 3 track (40 MPH for freight) east and west through the study area, while CP/DM&E's Davenport Subdivision (west of the Mississippi River) is also Class 3. Class 2 track (25 MPH for freight) is present on CP/DM&E's Eldridge and Nitrin Subdivisions (east of the Mississippi River), and IAIS' Milan branchline.

Figure 3.19 Rail Track Class in the Study Area



Source: Oak Ridge National Laboratory (ORNL) Operational Network, National Transportation Atlas Database (NTAD)

---

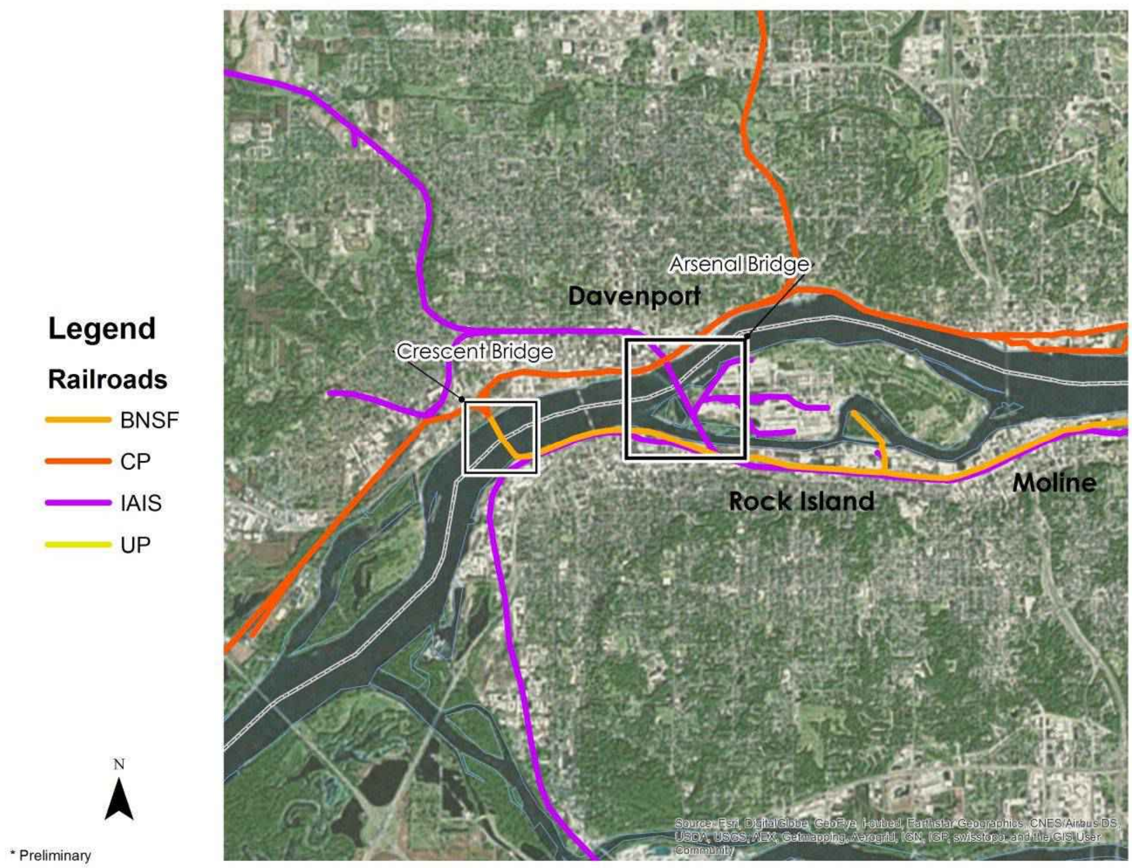
26 http://www.law.cornell.edu/cfr/text/49/213.9

Rail Bridges

The Quad Cities have two key rail bridges that provide access across the Mississippi River in the urban area Figure 3.20. Similar to rail line infrastructure, generally rail bridges are the responsibility of railroads to operate and maintain, including bridge capacity ratings, inspection. The Arsenal Bridge is one exception to this as it is owned by the Federal government and operated by the Rock Island Arsenal. This bridge is a double-track swing span bridge, where barge traffic has right-of-way over vehicular and rail. As a historical note, the rail lines were built above the road to reduce the impact of the locomotive soot coming from the engine by people using the bridge crossing. IAIS uses the bridge which connects Rock Island, Rock Island Arsenal, and Davenport.

The Crescent Rail Bridge is 1.5 miles south of the Arsenal Bridge on the Mississippi. The Crescent is a single-track swing bridge owned by BNSF and connects Rock Island to industrial sites in Davenport/West Davenport. The west side of the bridge enters into a wye with CP/DM&E's Davenport Subdivision.

Figure 3.20 Study Area Railroad Bridges

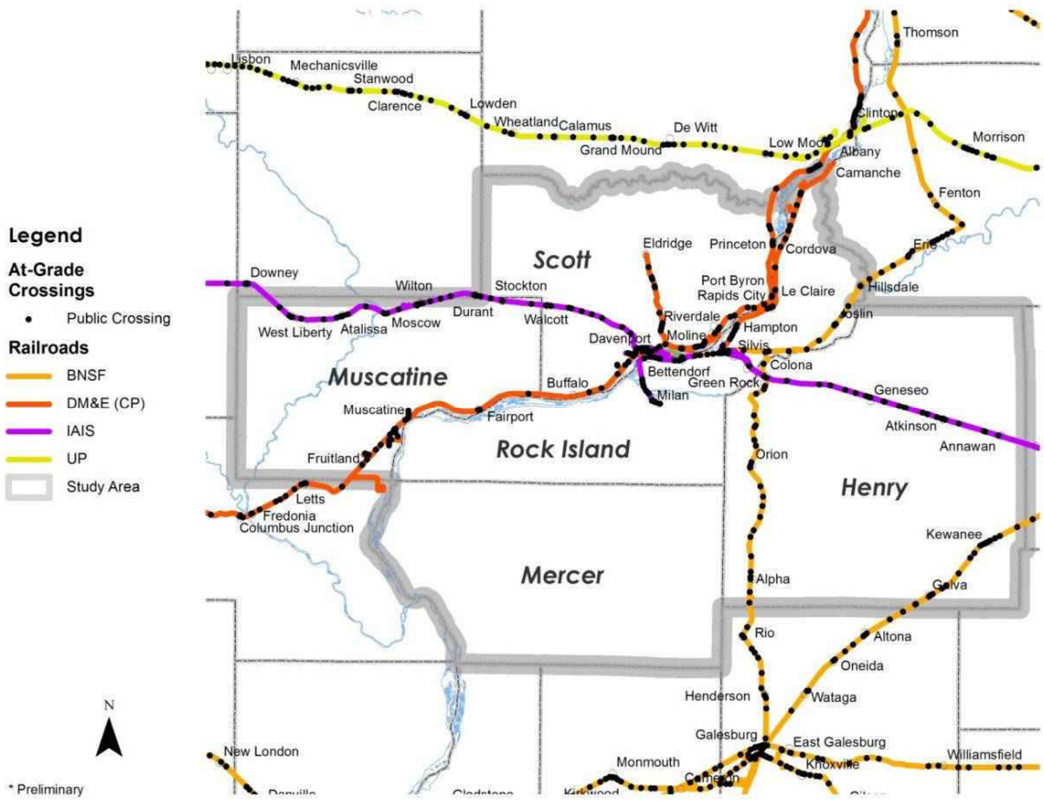


Source: Oak Ridge National Laboratory (ORNL)

At-Grade Rail Crossings

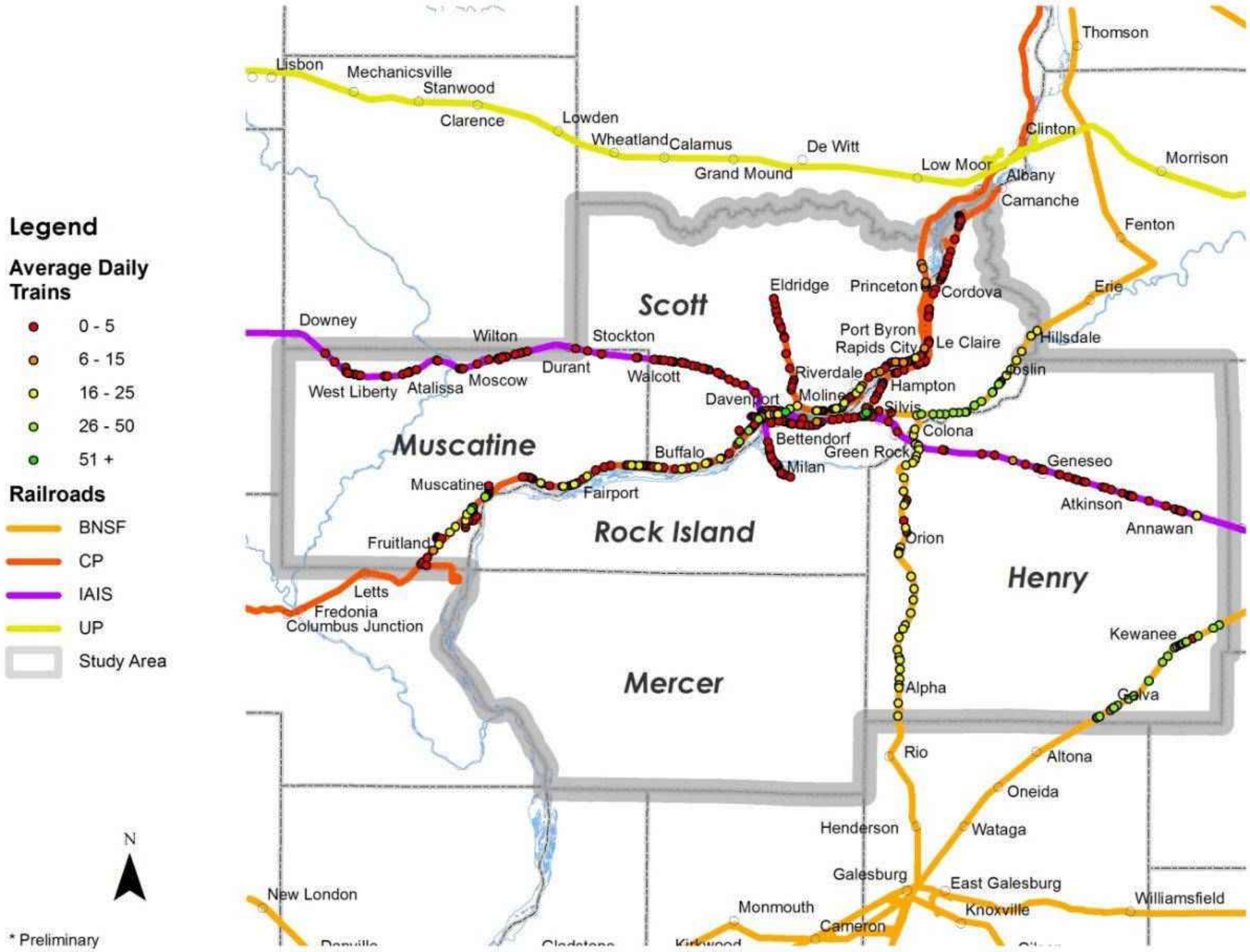
The FRA maintains information on the volume of trains, trucks, and passenger cars at the nation's at-grade highway-rail crossings. In the five Bi-State Region counties, there are 578 at-grade crossings. 315 of these are public crossings, while 263 are private roadways (Figure 3.21). Average daily trains for at-grade crossings vary substantially throughout the Bi-State region, from less than five to more than 130 (Figure 3.22). BNSF's Barstow Subdivision through Henry and Rock Island Counties produces the highest numbers of daily trains, while much of CP/DM&E's operations along the Mississippi River and in/around the metro area also produce 20 or more trains per day. Much of this could be due to switching and interchange operations among the various yards and industrial sites within Rock Island, Moline, and Davenport.

Figure 3.21 At-Grade Highway-Rail Crossings in the Study Area



Source: Oak Ridge National Laboratory (ORNL), Bureau of Transportation Statistics, Federal Railroad Administration (FRA)

Figure 3.22 Average Daily Trains in the Study Area



Source: U.S. Bureau of Transportation Statistics National Transportation Atlas Database and the Federal Railroad Administration Office of Safety Analysis.

State agencies are responsible for updating crossing statistics, but the Quad Cities have fairly new information for many of the most-traveled routes. Table 3.8 displays a sample of the information that's available, and for the purposes of this document, the five crossings with the highest average of trains was selected. E. River Drive, which intersects CP/DM&E in the urban area has the highest number of trains, by far. However, much of this is likely due to the substantial switching that takes place in the industries and yards in that area. Next are multiple crossings that range from 56 – 43 trains per day, which are predominantly east of the urban area on the Barstow Subdivision, and are due to traffic to/from Galesburg.

Table 3.8 Sample At-Grade Highway-Rail Crossings in the Study Area

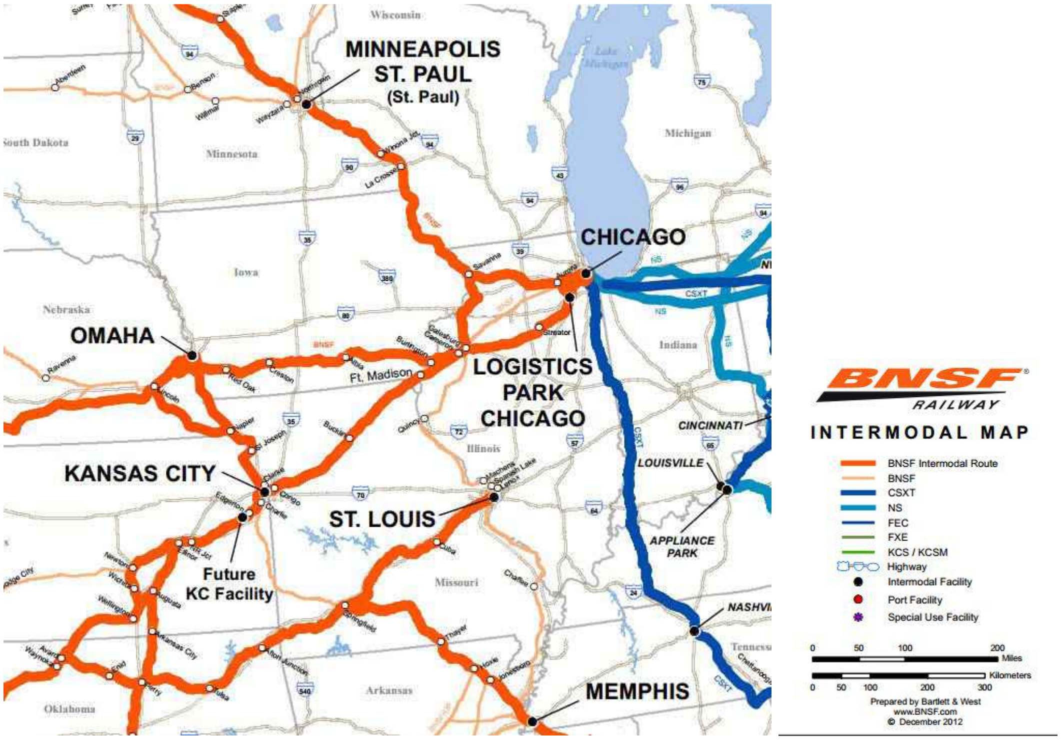
Rank (by total trains)	Route	City	Total Trains	Truck AADT	Total AADT
1	E. River Drive (CP/DM&E)	Davenport	128	5	500
2	13th Avenue (BNSF)	East Moline	56	975	7,500
3	Gallaway St (BNSF)	Barstow	44	1	25
4	38th Avenue (BNSF)	Joslin	43	620	4,450
5	1st Avenue N. (BNSF)	Joslin	43	20	150

Source: The Federal Railroad Administration (FRA) Office of Safety Analysis.

Proximity to Major Railyards

As noted earlier, the Bi-State region is not home to any substantial rail yards, intermodal facilities, or bulk loading facilities. However, it is within a reasonable rail and truck distance from Class I intermodal facilities, is situated along major shipping lanes for UP and BNSF, and is in close proximity to major classification yards in Savanna and Galesburg, Illinois. From an intermodal perspective, the Bi-State region is approximately 90 miles from the nearest intermodal facility in Rochelle, Illinois, which is UP's Global III Park. UP's Global II facility in Proviso and BNSF's Logistics Park Chicago are about 160 miles from the Bi-State region. The next nearest facilities are in St. Louis, Omaha, and Minneapolis/St. Paul, which are all roughly 300 miles away. Figures 3.23 through 3.25 shown intermodal network maps for BNSF, CP and UP.

Figure 3.23 BNSF Midwest Intermodal Facilities



Source: BNSF Railway

Figure 3.24 Canadian Pacific Intermodal Facilities

Source: Canadian Pacific Railway

Figure 3.25 Union Pacific Intermodal Facilities

Source: Union Pacific Railroad

3.3 WATERWAY INFRASTRUCTURE

This section depicts the Bi-State region's waterways, terminals and other infrastructure related to waterborne commerce. This includes brief summaries of the lock and dam infrastructure, terminals, industrial development information when available, and summarized commodity information moving on the river.

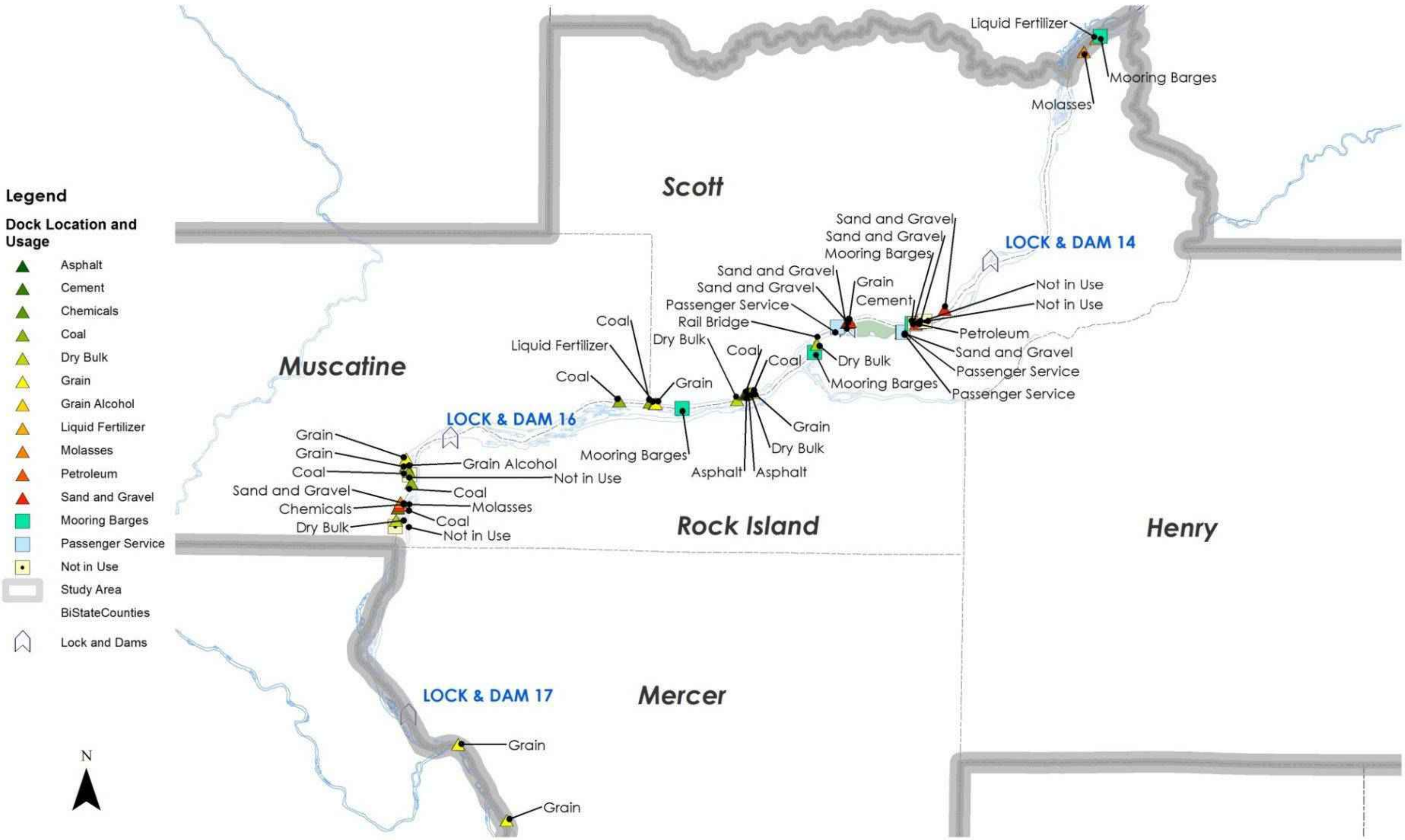
Waterway Infrastructure Overview

Waterway System and Facilities

The Bi-State region is intersected by the Mississippi River which forms the boundary between Iowa and Illinois. As seen in Figure 3.26, this portion of the river includes four lock and dams and numerous terminals/docks which service a variety of commodities. The majority of these terminals/docks are concentrated near the cities of Muscatine, Davenport, and Rock Island.

The characteristics of these four locks and dams, as well as the two auxiliary locks, have a direct influence on the efficiency of this waterway system. Table 3.9 details the attributes of these facilities including the length, width, and lift of each lock chamber. None of these locks have the ability to accommodate a typical 3-barge by 5-barge configuration powered by a single tow. The required length for such a configuration is 1,200 feet. Due to this, barge configurations must be broken apart which requires multiple lockages and can double or triple processing times.

Figure 3.26 Mississippi River System, Bi-State Region



Source: U.S. Army Corps of Engineers Navigation Data Center, 2013.

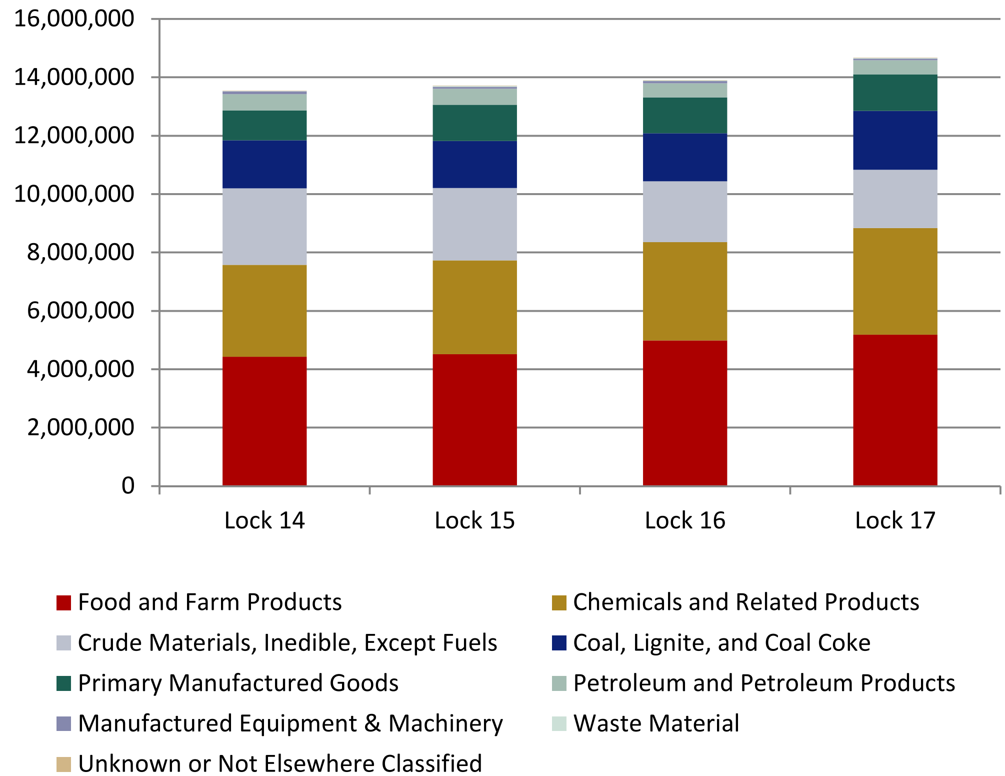
Table 3.9 Key Lock and Dam Characteristics, Bi-State Region

Lock and Dam	River	Navigation Mile	Status	Length (ft.)	Chamber Width (ft.)	Normal Lift (ft.)
Lock 14	Mississippi	493.0	Operational	600	110	11
Aux	Mississippi	493.0	Seasonal	320	80	11
Lock 15	Mississippi	482.9	Operational	600	110	16
Aux	Mississippi	482.9	Operational	360	110	16
Lock 16	Mississippi	457.2	Operational	600	110	9
Lock 17	Mississippi	437.1	Operational	600	110	8

Source: U.S. Army Corps of Engineers, 2013.

Each of these locks and dams processes over 13 million tons each year with tonnage increasing as one travels from north to south on the Mississippi River, as shown in Figure 3.27. The most significant commodity group transported via the waterways in the region is Food and Farm Products representing 33 to 36 percent of total tonnage, depending on which lock is examined. The next highest commodity groups include Chemicals and Related Products, Crude Materials, Inedible, Except Fuels, and Coal, Lignite, and Coal Coke. While the majority of these groups follow the general pattern of increasing traveling southbound, Crude Materials do not follow this same pattern. There is over a 600,000-ton increase in this commodity group between Locks 17 and 14.

Figure 3.27 Mississippi River System Tonnage



Source: U.S. Army Corps of Engineers Lock Data, 2013.

At each lock, the highest tonnage is attributed to Food and Farm Products. Most likely, this is due to the high number of grain shipment facilities in the region. Based on U.S. Army Corps of Engineers (USACE) data, there are seven such facilities in the region as detailed in Table 3.10. The largest facility by capacity is AGRI Grain Marketing in Muscatine with a capacity of 1.1 million bushels. This facility, as well as the other two largest, have an advantage over other grain facilities on the other side of the river as they are served by the CP/DM&E.

Table 3.10 Grain Shipment Facilities, Bi-State Region

Name	River Mile	River Side	Rail	Capacity (bushels)
ADM/Growmark	427.6	L	No	350,000
AGRI Grain Marketing	433.0	L	No	130,000
Grain Processing Corp	453.7	R	Yes	
AGRI Grain Marketing	454.3	R	Yes	1,100,000
AGRI Grain Marketing	469.8	R	Yes	850,000
Harvest State Cooperatives	475.9	R	Yes	750,000
River/Gulf Grain Company				320,000

Note: Capacity information is not available for the Grain Processing Corp as these shipments are of distillers' spent grain and livestock feed which is not the same type of product that the other facilities ship.

Source: U.S. Army Corps of Engineers Port Data, 2013.

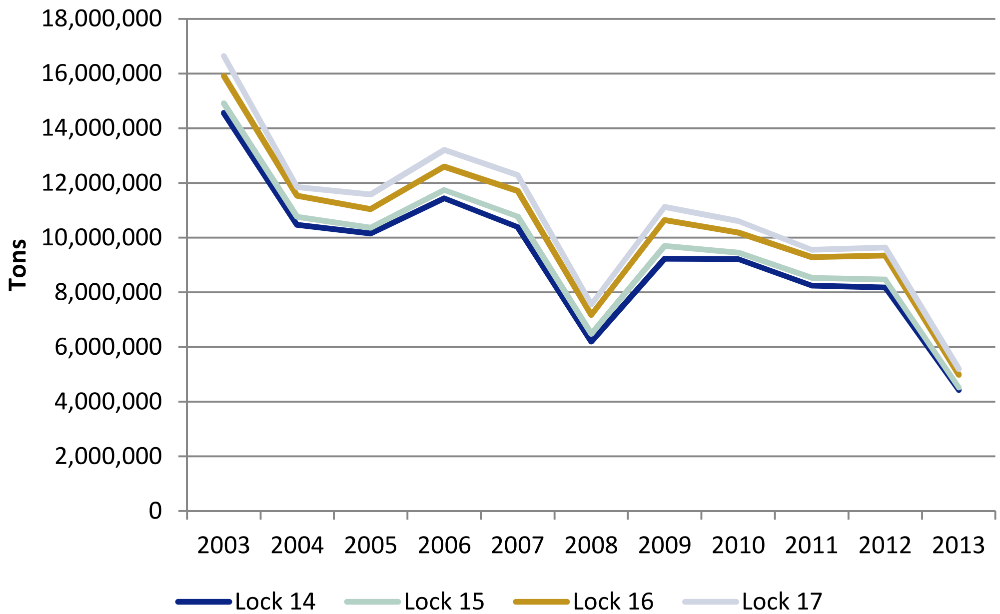
Also of note is the scarcity of information available for the River/Gulf Grain Company. According to USACE data, this facility is located in Davenport. However, they opened a new state-of-the-art facility in Bettendorf in 2010 six miles north of this prior facility.[27] This company has recently focused on the sourcing of non-GMO corn for export and expects to double bushel count between 2013 and 2014. This process was aided by the recent completion of construction of a 150,000 bushel bin.

While this commodity represents the largest proportion of tonnage throughout the region, these volumes have significantly decreased over the years. As seen in Figure3.28, tonnages in 2013 are only 30 percent of what they were in 2003, the most significant drop of any commodity group. Some of this may be a result of reduced through movements in the region, however, decreases are apparent in regional operations as well. Lock 14 processed 4.4 million tons of Food and Farm Product in 2013. Lock 17 processed 5.2 million tons of this commodity in this same year. This shows a net gain between these two locks of 0.8 million tons signifying a large amount of activity in the Bi-State region. However, prior to 2013, this difference used to be well over 1 million tons and was consistently over 2 million tons prior to 2004. This change can either be due to a modal shift, lower production, or simply an outlier of historical trends which will remain to be seen when data is released for 2014 tonnages. Preliminary reports suggest a significant growth in this commodity. As of November 1, year to date tonnages of grain are up 13 percent over the five year average and are at the highest level since 2010. Barge rates have remained above average with the highest rates seen in the Bi-State regional areas near Lock 15 at $46.71 per ton for export bound grain, a rate 70 percent higher than the five-year average.[28]

[27] http://www.rivergulf.com/index.cfm?show=10&mid=4&pid=1

[28] http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5109756

Figure 3.28 Food and Farm Product Tonnage Trends

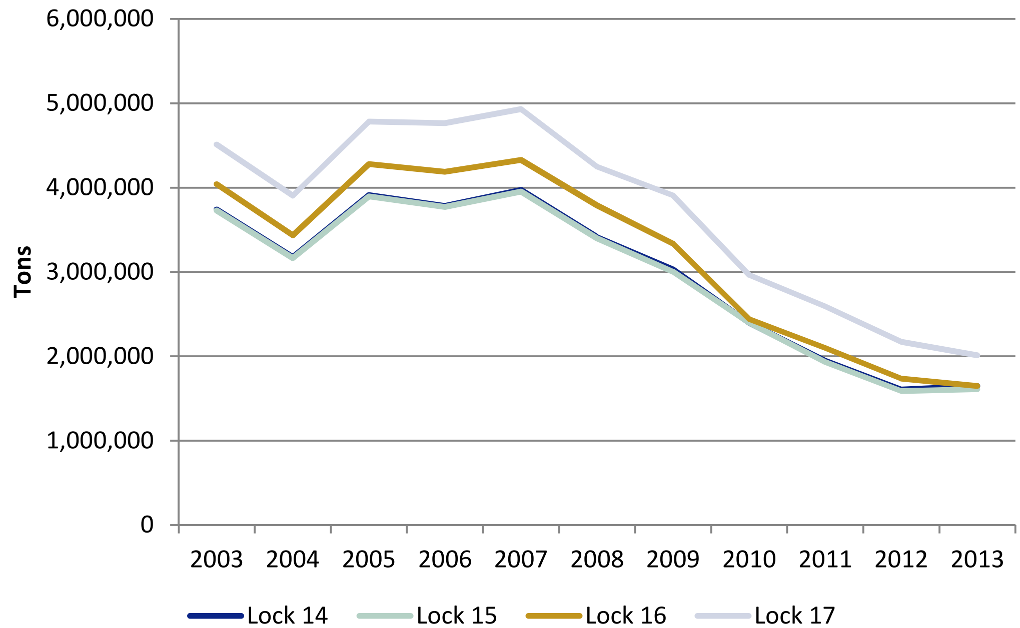


Source: U.S. Army Corps of Engineers, 2013.

Another major commodity experiencing significant reductions in tonnages is coal, lignite, and coal coke. As shown by Figure 3.29, this commodity group is down to only 44 percent of the tonnage seen in 2003. Trends in this commodity are important as there are at least seven facilities which are predominately used for the receipt of coal. Three of these are specifically used for the receipt of coal for plant consumption. The dip in tonnage shown in 2008 could be a result of the 2008 Mississippi River flood. At that time the USACE closed the river to navigation between Lock 11 through Lock 25.[29]

[29] Iowa Flood of 2008, http://en.wikipedia.org/wiki/Iowa_flood_of_2008

Figure 3.29 Coal, Lignite, and Coal Coke Tonnage Trends



Source: U.S. Army Corps of Engineers, 2013.

Due to pressures from environmental groups[30] on the impacts of coal consumption as well as tighter regulations, many coal power plants are ceasing to operate, including plants in Illinois and Iowa[31]. The effects of this have been seen in the Bi-State region with the closing of the Central Iowa Power Cooperative (CIPCO) Fair Station near Montpelier. This facility shut down in November 2013 due to cost inefficiencies associated with the plant that was built in the 1960's.[32] This facility was previously served by the Fair Station Wharf, also owned by CIPCO.

Muscatine Power and Water (MPW) also has its own facility with a service track loop to serve the plant in Muscatine. MPW has made efforts to install sulfur dioxide scrubbers on the newest of its three coal-fired power plants that help to remove the majority of harmful emissions. While they do already have this technology in place, MPW continues to monitor other energy sources. A recent agreement was made with Geronimo Energy to purchase energy from a windfarm

---

[30] United States Environmental Protection Agency, http://www.epa.gov/cleanenergy/energy-and-you/affect/coal.html

[31] Coal Plant Retirements, http://www.sourcewatch.org/index.php/Coal_plant_retirements

[32] http://muscatinejournal.com/news/local/coal-plant-powers-down/article_2c179996-c8d9-50c1-b8b1-eae6f69bc2d1.html

in Jackson County, Minnesota.[33] Should these and other similar facilities begin to close or find alternative energy sources, then coal shipments along the Mississippi River in this region may dwindle further.

Waterway System Conditions

As discussed briefly in the previous section, the characteristics of the locks and dams servicing these commodities play an important role in how efficiently these movement can occur. Table 3.11 details the lock usage along the Mississippi River in the Bi-State region by such attributes as vessel processing time, types of vessels using the locks, number of lockages, and unavailable time.

Of the total waterway traffic in this region, barge traffic encompasses 64 to 89 percent of all traffic through these locks. The lowest percentage is seen at Lock 14 in the northern portion of the region. This is not due to a lower volume of barges in this location but rather a significantly higher volume of recreational traffic. Recreational lockages servicing the 2,810 recreational vessels through this lock account for 34 percent of total traffic at Lock 14. Most likely this is due to the populations of Davenport and Rock Island located just south of this lock. However, this recreational traffic has decreased significantly from the high of over 10,000 vessels serviced annually in the mid-1990s. Similarly proportionate reductions are also seen at the remaining locks in the region.

33 http://muscatinejournal.com/news/local/muscatine-power-and-water-will-continue-to-burn-coal-despite/article_0490851a-28ec-5484-a792-80615810e9c7.html

Table 3.11 Bi-State Region Lock Usage (2013)

	Lock 14	Lock 15	Lock 16	Lock 17
Tons Locked	13,534,616	13,705,556	13,900,123	14,664,956
Number of Barges and Vessels				
Barges Empty (#)	3,268	3,011	3,444	3,137
Barges Loaded (#)	9,103	8,889	8,982	9,437
Total Barges (#)	12,371	11,900	12,426	12,574
Commercial Vessels (#)	1,587	1,779	1,985	1,531
Non-Commercial Vessels (#)	85	50	43	46
Recreational Vessels (#)	2,810	1,410	463	275
Total Vessels (#)	4,482	3,239	2,491	1,852
Number of Lockages				
Commercial Lockages (#)	2,245	2,343	2,527	2,207
Non-Commercial Lockages (#)	82	49	41	40
Recreational Lockages (#)	1,177	578	365	236
Non-Vessel Lockages (#)				
Total Lockages (#)	3,504	2,970	2,933	2,483
Vessel Processing Time				
Average Delay (Tows) (Hrs.)	1.76	2.01	1.42	1.44
Average Processing Time (Hrs.)	0.52	0.66	0.59	0.81
Percent Vessels Delayed (%)	46	52	73	47
Unavailable Time				
Scheduled Unavailabilities (#)		8		1
Scheduled Unavailable Time (Hrs.)		8.22		6.88
Unscheduled Unavailabilities (#)	7	40	19	19
Unscheduled Unavailable Time (Hrs.)	19.22	1,948.77	405.05	619.1
Unavailabilities (#)	19.22	1,956.98	405.05	625.98
Unavailable Time (Hrs.)	7	48	19	20

Source: U.S. Army Corps of Engineers, 2013.

While these recreational vessels can add wait times for barge traffic trying to traverse the area, the largest delays in the region appear to be due to unscheduled unavailabilities at these locks and dams. The most significant delays occur at Lock 15 with nearly 1,950 hours of unscheduled unavailabilities in 2013. Since 2006, this lock has experienced an average of 3,550 hours of delay each year, almost all of which are attributed to unscheduled unavailabilities. It is of no surprise that this lock also experiences the longest average delay of just over 2 hours as well as the second highest percentage of vessels delayed at 52 percent. Lock 16 is the only lock with a higher percentage of vessels delayed with 73 percent of all vessels. Fleeting options are available in the area with some facilities used solely for mooring and fleeting while other are used for both fleeting as well as for the receipt or shipment of goods.

Updated maintenance on these facilities could help to reduce some of these delays. However, some maintenance is unplanned and cannot be avoided. In July 2014, Lock 14 was closed for three days due to a barge colliding with the roller gate. These 100 foot wide roller gates play an important role in regulating the river's water level. The assessment of damage and removal of damaged material had to be done carefully in order to ensure that the entire roller gate did not crumple. Once a repair plan was determined, work was conducted seven days a week from October 1st through November 7th. 2014.[34]

Lock 17 will also undergo some repair and maintenance. This lock was most recently closed June 23rd and 24th, 2014 to replace the miter gate leaf #3. This gate will once again close beginning January 5 through March 6, 2015 to replace the miter gate machinery platforms.[35]

In addition to the maintenance requirements of these facilities, frequent flooding in the Bi-State region also interrupts barge traffic flows. Based on historic crests in the region, the most recent significant flooding has occurred in 2008, 2011, and 2014. In these three years, the historic crests ranged between 20.71 feet and 21.49 feet as measured at Rock Island by the USACE. The major flood stage is considered to be 18 feet.[36] Davenport, the county seat of Scott County, has long been considered the largest city on the Mississippi River with no permanent floodwall or levee. Changes to this were brought about in 2008 with plans to build a 2,000 foot long flood wall and 140 foot levee to protect the Iowa American Water Company which provides water to roughly 131,000 people. This floodwall was completed in October 2013 at a cost of $11.8 million however, the remainder of the city remains unprotected.[37]

---

[34] http://www.mvr.usace.army.mil/Media/NewsStories/tabid/6636/Article/554234/roller-gate-requires-swift-repair.aspx

[35] http://www.iwr.usace.army.mil/Portals/70/docs/IWUB/board_meetings/meeting73/9_UB73_McKee_FY14_and_FY15_Lock_Closures.pdf

[36] http://water.weather.gov/ahps2/hydrograph.php?wfo=dvn&gage=RCKI2

[37] http://www.qconline.com/news/local/davenport-flood-wall-completed/article_24efb100-ccbe-5970-85de-52245a6f81f5.html

3.4 AIRPORT INFRASTRUCTURE

Aviation Infrastructure Overview

The 5-County Bi-State region is home to six airports.

- **Quad City International**, in Rock Island, IL (MLI): The airport is operated by the Metropolitan Airport Authority of Rock Island County, Illinois. The airport has four airlines with nonstop flights to 11 destinations and domestic and international connecting flights. Quad City International is the 3rd busiest airport in Illinois.
- **Davenport Municipal**, in Davenport, IA (DVN): The Davenport Municipal Airport is owned and operated by the City of Davenport. An airport commission, with members appointed by the city, was established to manage and operate the airport. The State of Iowa identifies the facility as an Enhanced Service airport which serves business aviation and is a regional transportation and economic center in the state.
- **Muscatine Municipal**, in Muscatine, IA (MUT): The Muscatine Municipal Airport is owned and operated by the City of Muscatine. The State of Iowa identifies the facility as an Enhanced Service airport which serves business aviation and is a regional transportation and economic center in the state.
- **Kewanee Municipal**, in Kewanee, IL (EZI). The airport is owned by the Kewanee Airport Authority, and primarily serves light general aviation aircraft.
- **Mercer County**, in Aledo, IL (C00); The airport is publically owned by Mercer County, and primarily serves light general aviation aircraft.
- **Gen Airpark**, in Geneseo, IL (3G8): The airport is privately owned and has a grass-field runway. It primarily serves light general aviation aircraft.

Although only Quad City currently has freight facilities and air cargo service, two other airports (Davenport and Muscatine) have the runway infrastructure and instrument procedures to serve air cargo traffic in the future. These three airports, along with Kewanee, are on the National Plans of Integrated Airport Systems Airports (NPIAS)[38] list and are eligible for federal funding. An overview of each of these airports characteristics is shown in Table 3.12. The airports for the Bi-State region and their NPIAS classifications are shown in Figure 3.30.

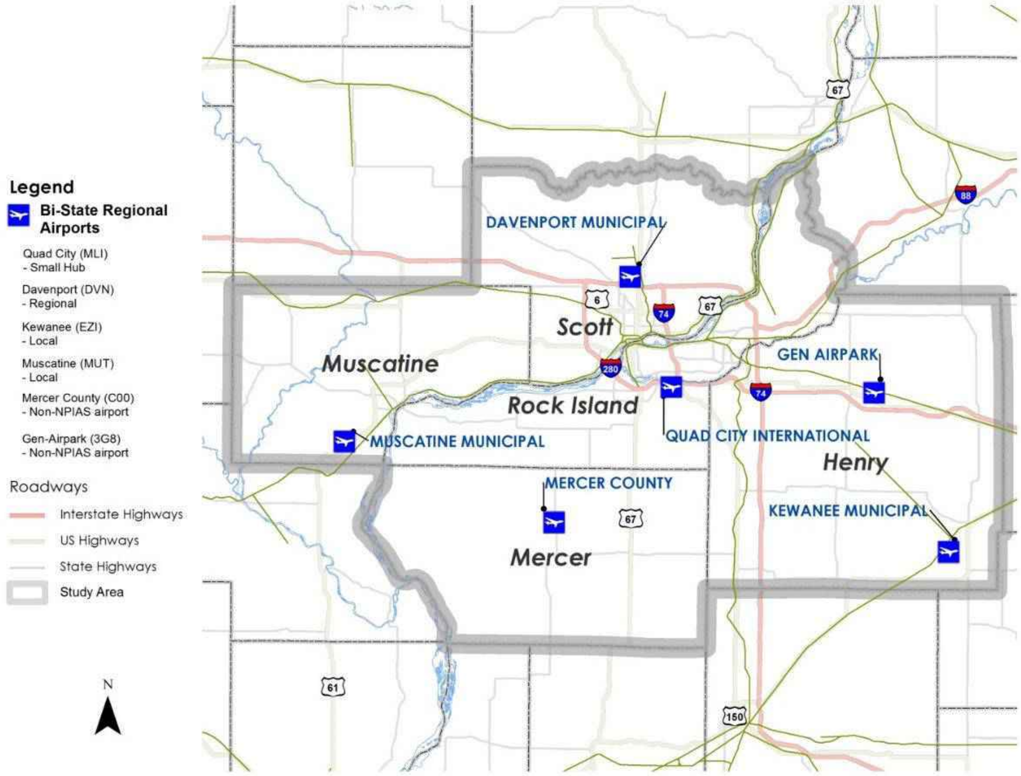
[38] The Federal Aviation Administration's (FAA) National Plan of Integrated Airport Systems (NPIAS) identifies nearly 3,400 existing and proposed airports that are significant to national air transportation and thus eligible to receive Federal grants under the [Airport Improvement Program (AIP)](#).

Table 3.12 Bi-State Region Airport Characteristics

Airport	Location	Identi fier	Operations per day (average)	Runway Length	Instrument Procedures (Y/N)?	Freight Facilities	Other
Quad City International	Rock Island, IL	MLI	90	10,002	Y	44,000 sq. yds.	Foreign Trade Zone; U.S. Customs Service
Davenport Municipal	Davenport, IA	DVN	77	5511	Y	N	
Muscatine Municipal	Muscatine, IA	MUT	39	5500	Y	N	
Kewanee Municipal	Kewanee, IL	EZI	33	4500	Y	N	
Mercer County	Aledo, IL	C00	11	2480	N	N	Not eligible for federal funding
Gen Airpark	Geneseo, IL	3G8	13	2568	N	N	Not eligible for federal funding

Source: Quad Cities International Master Plan Update, 2012; www.airnav.com

Figure 3.30 Bi-State Region Airports



Note: Airports classifications are according to the 2013-2017 FAA NPIAS Report.

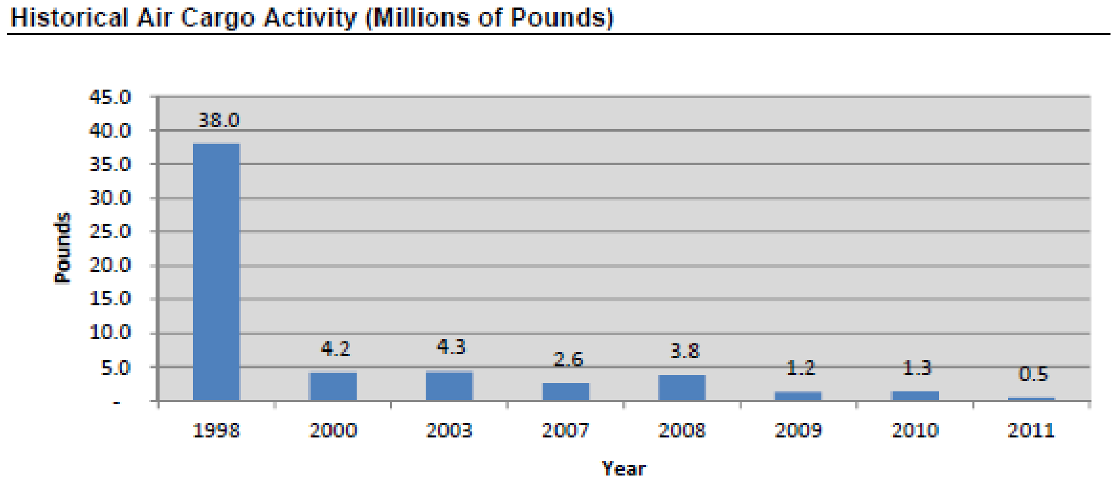
Quad City International is the only airport in the region with passenger and air cargo service. The remainder of the airports in the region primarily serve general aviation traffic. MLI has an Air Freight Complex comprised of three one-story buildings at 44,000 square yards.[39] The airport also maintains an industrial park located along Indian Bluff Road directly west of the airport. The roadways US 6, 27th Street, and 69th Street are a NHS intermodal connector between Quad City airport and I-74.

In the 1990s, MLI was served by scheduled, integrated carriers such as Burlington Air Express (BAX Global), Emery, and Airborne Express, none of which serve the market today. Total cargo activity reached its peak at MLI during 1998 with nearly 38 million pounds of air cargo. The sole remaining air cargo carrier at MLI is Ameriflight. In 2010, Ameriflight operated 260 operations at MLI. The majority of Ameriflight's current operations consist of air feeder service for major package express integrators such as UPS and Fed Ex on smaller, turboprop aircraft. Figure 3.31 depicts total air cargo activity at MLI.

---

[39] Quad Cities International Airport Master Plan Update, 2012

Figure 3.31 Quad Cities International Historical Air Cargo Activity



Source: MLI Airport Activity Statistics

MLI also serves traffic from a number of local businesses. With its world headquarters located in Moline, IL, Deere & Company has a fleet of several business jets based at MLI. As the company has large facilities in Mannheim, Germany; Porto Alegre, Brazil; and Changi, Singapore, visits to these cities are frequent. In October 2010, Deere completed construction of a 70,000-square-foot hangar that replaced a smaller facility that the company had occupied on the south side of the Airport. Additionally, the Rock Island Arsenal (RIA), which is located on Arsenal Island on the Mississippi River, is the largest government owned weapons manufacturing arsenal in the world, and the Quad Cities largest employer. As such, RIA generates a significant amount of itinerant corporate aircraft traffic, both government and civilian, at MLI. Finally, Elliott Aviation is a full service Maintenance Repair and Overhaul (MRO) facility located at the airport that also provides Fixed Based Operator (FBO) services. Elliott's MRO primarily services turboprops and light to midsize business jets.[40]

Air Cargo Trends and Multimodal Connections

Like many regional air cargo facilities, Quad Cities International has been subject to mode shifts away from air cargo, which peaked in the region in the mid-90s, to truck as the primary mode. Only the most time-sensitive goods are shipped by air, yet recent trends have consolidated air freight facilities, and shifted operations to a fewer number of air cargo hubs. Currently, most of the air freight from the Bi-State region is trucked 170 miles to Chicago's O'Hare airport.

Expedited carriers are the primary users of air freight throughout much of the system. FedEx and UPS both have cargo-related operations at MLI, although they do not operate aircraft into MLI, and mostly truck freight to and from the Bi-State

[40] Quad Cities International Airport Master Plan Update, 2012

region to Chicago. FedEx ground has a regional trucking center located directly across the street from MLI. This operation has the ability to transport freight worldwide within 24 hours. UPS operates similarly, with a large facility in nearby Davenport, Iowa.

Scott County and the City of Davenport are developing the Eastern Iowa Industrial Center, an industrial park proximate to the Davenport airport that is ideally located for air to truck multimodal freight shipments. In 2014, Davenport completed a lengthening of one of its runways and has plans to rebuild a second runway, making the airport more suitable for increased operations. There are also proposed efforts to develop a major, rail served, large site, industrial park at the site, which is adjacent to the CP/DM&E rail line. Built on 500+ acres of former farmland, five industries have purchased land since 2012, in addition to seven industries that have located there since 2000.[41]

Figure 3.32 Developing Eastern Iowa Industrial Center

Source: Scott County, IA, http://www.scottcountyiowa.com/planning/eiic.php

---

41 http://qctimes.com/business/eastern-iowa-industrial-center-takes-off/article_bbf16086-02f6-58f8-b467-a42e31d309db.html

Aviation System Conditions

As of 2011, pavement condition at MLI is generally in good condition, with all runways and the majority of taxiways having a pavement condition index of 86-100.[42] According to the 2011 Master Plan Update, several construction projects and studies were planned at the MLI, estimated to cost around $8.8 million. Projects scheduled for 2012 included a master drainage study; the design and construction for FIS/Customs Facility building, snow removal equipment (SRE) building and apron expansion; and an Environmental Assessment for future airport improvements in near-term CIP. For years 2013 through 2015, additional construction projects and studies were estimated to cost $19.6 million.

Davenport recently reconstructed one of its 60 year old runway through a $6.5 million rehabilitation project including removal and replacement of concrete, new lighting and drainage systems, and a new surface completed in 2014.[43] The city has also invested $600,000 in rebuilding the entrance to the airport. The airport is also planning to rehabilitate its primary runway in the future, at a project cost of $12 million.[44]

3.5 Multimodal Facility Infrastructure

The Bi-State region's multimodal facilities were identified in part by using the 2014 National Transportation Atlas Database (NTAD). The Bureau of Transportation Statistics compiled information on the facilities in each State where freight can be transferred between modes of transportation. According to NTAD, there are six defined multimodal facilities in the Bi-State region. Three are in Davenport, two in Rock Island, and a single facility Moline. The four Rail-Truck multimodal facilities are Murray's Warehousing, I & M Rail Link, Dohrn Transfer Co., and Yellow Transportation. The remaining facilities, Air-Truck and Truck-Truck multimodal terminals, are owned by Emery Forwarding and the US Postal Service, respectively. These facilities, along with the rail network and designated truck networks (State and Federal), are shown in Figure 3.33. All of the facilities except for I & M Rail Link appear to be active.

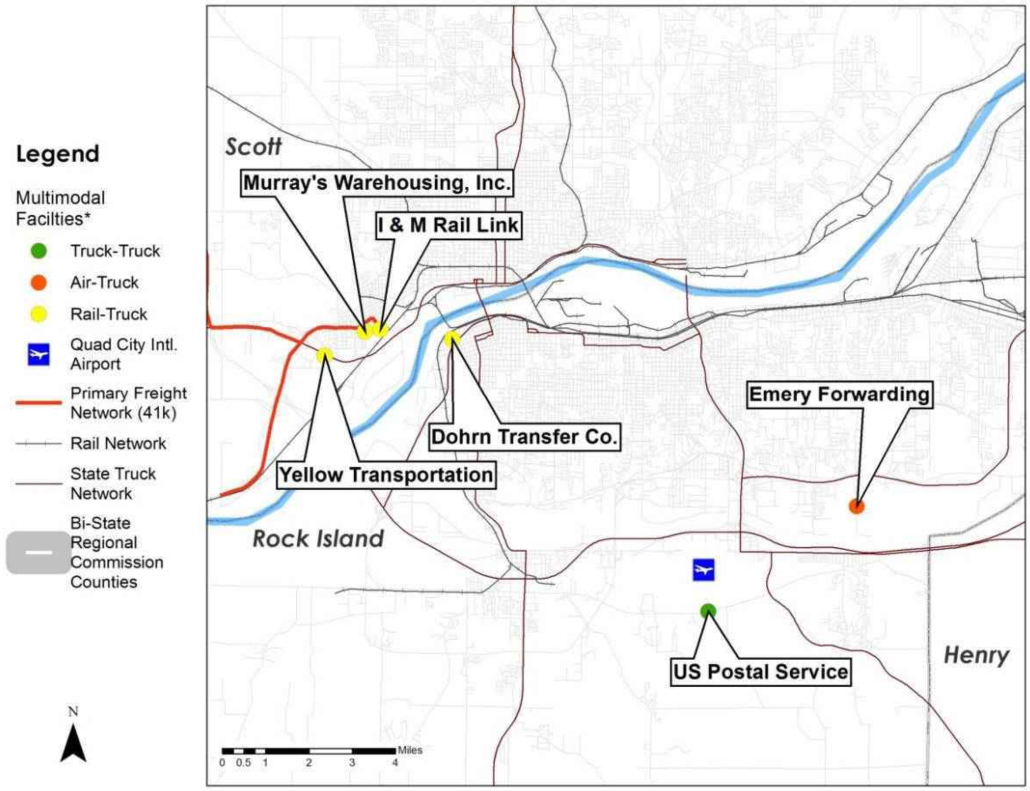
---

42 Quad Cities International Pavement Management Plan, 2012 http://www.qciaairportmasterplan.com/pvmt_mgt.html

43 http://www.cityofdavenportiowa.com/eGov/apps/services/index.egov?view=detail;id=777

44 http://qctimes.com/business/loebsack-announces-extra-m-for-davenport-airport-runway-project/article_a3519b7d-25f0-5043-b4f0-97347b2c5871.html

Figure 3.33 Bi-State Region Multimodal Freight Network



Source: 2014 National Transportation Atlas Database. (Note: The multimodal facility directory was last updated in 2003)

In addition to the facilities identified in NTAD, there are several other multimodal freight facilities in the Bi-State region identified in earlier sections of this report. They include the airports, waterway facilities, rail lines, and terminals linked to the national highway system by last-mile connectors all form the Bi-State region's multimodal system. Based on the location of the multimodal facilities throughout the Bi-State region, they appear to be proximate to the region's existing primary freight infrastructure (rail, truck route networks, airports, and waterways). Close proximity to the freight network suggests that there may be good connectivity as well. However, the region does face known issues that negatively affect connectivity such as its reliance on bridges for cross-State truck movements.

Many of the Bi-State region's multimodal freight facilities lie in the urban core of the region (i.e. the portions of Davenport, Rock Island, Moline, and East Moline encircled by I-80\ I-280). Any multimodal facility that processes truck-involved freight movements relies heavily on the bridges crossing the Mississippi River to move their goods throughout and beyond the region. As pointed out in Section 2.0, though many of these bridges are in good structural condition some of them (namely US 67/Centennial Bridge) are not. Nearly all of them carry significant truck volumes across the two States, both in terms of trucks per day and as a percentage of total volume.

3.6 Other Freight Facilities

To better understand the generators and users of freight in the study area, effort will be made to reach out to economic development agencies within the state and the region to identify freight generating businesses, scale of operation and how they use the system. This process has been started through acquisition of the Reference USA database.[45] Reference USA provides data for goods movement-dependent industries including street address, (for geo-coding), industry classification, number of employees, and sales data that can be used to determine locations of goods movement-dependent companies relative to infrastructure.

For this plan, freight industries are defined as those with the North American Industry Classification System (NAICS) codes listed in Table 3.13.

Table 3.13 Freight Industry NAICS Codes

Sector		Description
11	Agriculture, Forestry, Fishing and Hunting	Establishments primarily engaged in growing crops, raising animals, harvesting timber, and harvesting fish and other animals from a farm, ranch, or their natural habitats.
21	Mining, Quarrying, and Oil and Gas Extraction	Establishments that extract naturally occurring mineral solids, such as coal and ores; liquid minerals, such as crude petroleum; and gases, such as natural gas. The term mining is used in the broad sense to include quarrying, well operations, beneficiating (e.g., crushing, screening, washing, and flotation), and other preparation customarily performed at the mine site, or as a part of mining activity.
23	Construction	Establishments primarily engaged in the construction of buildings or engineering projects (e.g., highways and utility systems). Establishments primarily engaged in the preparation of sites for new construction and establishments primarily engaged in subdividing land for sale as building sites also are included in this sector.
31-33	Manufacturing	Establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products. The assembling of component parts of manufactured products is considered manufacturing, except in cases where the activity is appropriately classified in Sector 23, Construction.
42	Wholesale Trade	Establishments engaged in wholesaling merchandise, generally without transformation, and rendering services incidental to the sale of merchandise. The merchandise described in this sector includes the outputs of agriculture, mining, manufacturing, and certain information industries, such as publishing.
44-45	Retail Trade	Establishments engaged in retailing merchandise, generally without transformation, and rendering services incidental to the sale of merchandise. The retailing process is the final step in the distribution of merchandise; retailers are, therefore, organized to sell merchandise in small quantities to the general public.

45 Reference USA. http://www.referenceusa.com/Static/Home.

Sector		Description
48-49	Transportation and Warehousing	Industries providing transportation of passengers and cargo, warehousing and storage for goods, scenic and sightseeing transportation, and support activities related to modes of transportation. Establishments in these industries use transportation equipment or transportation related facilities as a productive asset. The type of equipment depends on the mode of transportation. The modes of transportation are air, rail, water, road, and pipeline.

Source: U.S. Census Bureau

After extracting Reference USA data for businesses in the noted sectors with 10+ employees in the 5-County Bi-State region, over 1,500 establishments were identified. This data will be verified and supplemented throughout the study, as available.

The following figures provide overview information about "what we know" about these businesses today. Figure 3.34 highlights all industries in the region and shows that NAICS 44-45 has the highest number of industries represented. This is 38 percent for retail trade. NAICS 23, construction, is second with 19 percent and NAICS 31-33, manufacturing is third with 18 percent. Figure 7.2 illustrates that both Illinois and Iowa each have substantial shares of the industry in the region.

Figure 3.34 Freight Industry Profile – All Industries

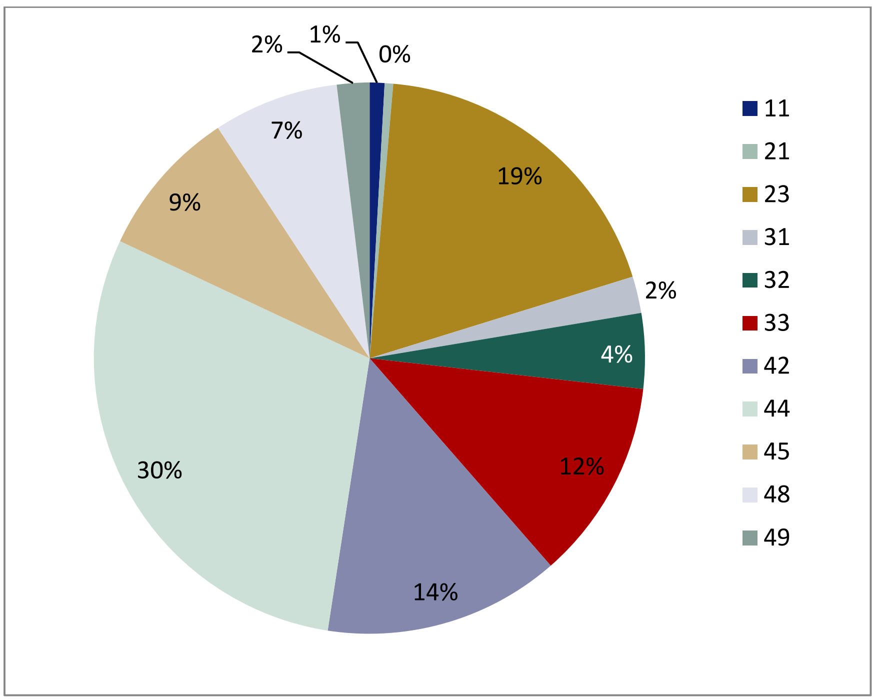
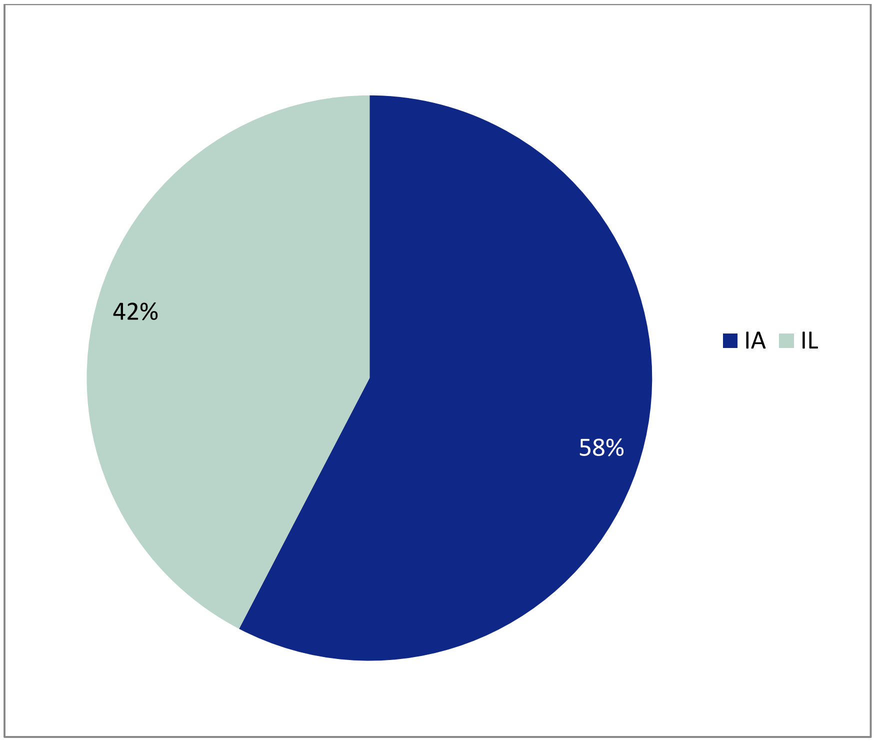


Figure 3.35 Freight Industry Profile – All Industries by State



The next two figures provide an overview of the size of these business. Figure 3.36 illustrates this in terms of number of employees, and highlights that nearly half of the freight generating businesses in the region can be considered small businesses with between 10-19 employees.

Figure 3.37 provides a similar picture, except in terms of annual revenue at the location within the bi-state region. As shown, nearly a quarter of the businesses have revenue between $2.5 and $5 million. There are numerous industries that have less revenue, but also several with substantially more. The region is home to 50 businesses that generate $500 million, or more, in annual revenue at their facilities in the region.

Figure 3.36 Freight Industry Profile – All Industries by Number of Employees

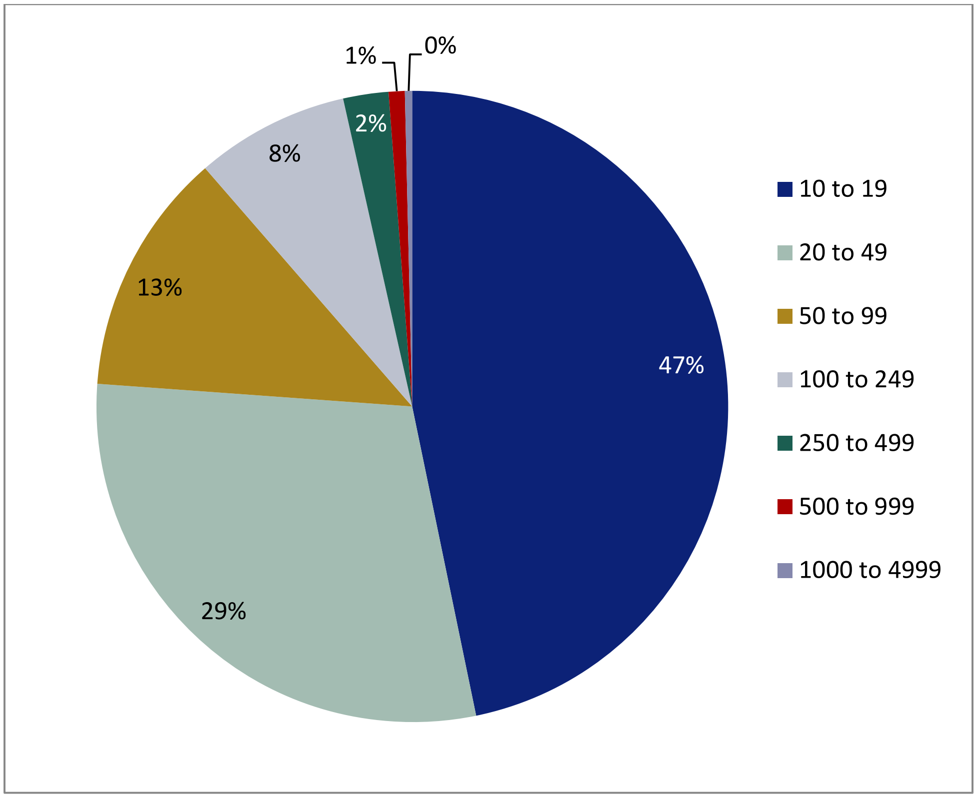
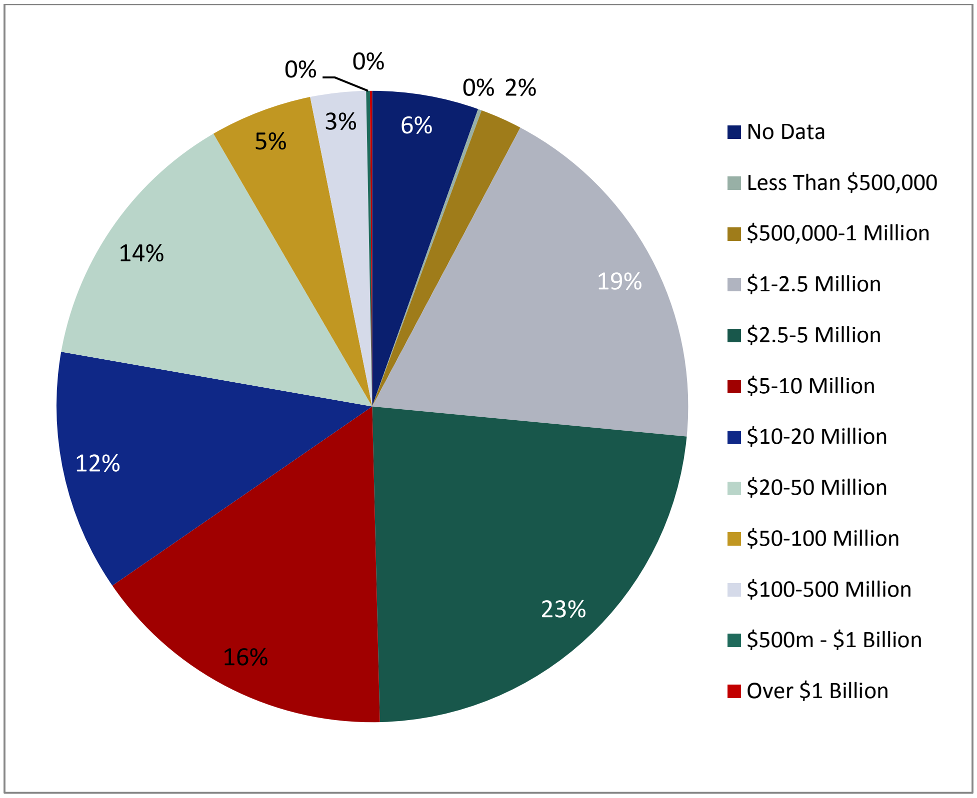


Figure 3.37 Freight Industry Profile – All Industries by Location Revenue



3.7 Summary of Findings

The Bi-State region has an extensive, interconnected multimodal freight system that unites industries within the region to each other, and provides connectivity of the Quad Cities to domestic and international markets. Select findings from the previous section are noted below.

- **Highway Infrastructure.** There are nearly 7,000 miles of roadway in the region. The majority of the region's highway system is in Illinois, however the Iowa portion of the system has the highest volumes. The Iowa portion of I-80 carries more vehicles daily over a greater distance than any other portion of the highway system. The heaviest truck flows are along I-80 and the portion of I-280 in Rock Island County. Both of these highways carry more than 5,000 trucks daily.

  Three NHS intermodal connectors are designated in the region, connecting to port, truck/rail and airport facilities. The roadways forming the intermodal connector for Quad City International Airport can be classified as "good," the connectors for the port and truck/ rail terminals are "mediocre" to "poor."

  There are six highway bridges over the Mississippi River that link the Illinois and Iowa portions of the region and serve as chokepoints to mobility. Of the bridges crossing the Mississippi River, US 67/Centennial Bridge received the worst sufficiency ratings from both the Iowa and Illinois DOTs. At the opposite end of the spectrum, I-280 received among the highest ratings by both DOTs. I-80 bridge received 65 and 60 ratings from Iowa and Illinois, respectively, placing it just behind the I-280 bridge in condition. The US 67/Centennial Bridge also has among the largest truck volumes (i.e. all single unit plus combination unit configurations) at 9,545 vehicles per day. This represents approximately 30.5% of the volume on this roadway. Other bridges critical to truck movements include I-80 with just under 10,000 trucks per day and I-280 with just over 4,000 trucks per day. These volumes represent approximately 29% and 19% of those roadways total volumes, respectively.

- **Railway Infrastructure.** There are three railroads operating in the region; two Class I's, BNSF and CP/DM&E, and one Class II, IAIS. Rail activity is more dense around the Quad Cities metro areas, but moderate in the towns along the Mississippi River outside of the urban area. The BNSF line in northern Rock Island and Henry Counties, and the UP line north of Scott County are moderate density lines. The CP/DM&E has slightly lower density of traffic along the Mississippi River and through the metro areas. Rail operating speeds in the region range from 25 PH to 60 MPH for freight

  Two rail bridges provide access across the Mississippi River in the urban area, and require coordination between all railroads to enable access between Iowa and Illinois. The Arsenal Bridge is a double-track swing span bridge, is owned by the Federal government and operated by the Rock Island Arsenal. IAIS uses the bridge which connects Rock Island, Rock Island Arsenal, and Davenport. The Crescent Rail Bridge is 1.5 miles south of the Arsenal Bridge on the Mississippi. The Crescent is a single-track swing bridge owned by BNSF and connects Rock Island to industrial sites in Davenport/West Davenport. Railcar weight restrictions and limited operating speeds along certain sections of the system result in bottlenecks.

The Bi-State region does not have any substantial rail yards, intermodal facilities, or bulk loading facilities. However, it is within a reasonable rail and truck distance from Class I intermodal facilities, is situated along major shipping lanes for UP and BNSF, and is in close proximity to major classification yards in Savanna and Galesburg, Illinois. The region is approximately 160 miles from the nearest intermodal facilities in Chicago. The next nearest facilities are in St. Louis, Omaha, and Minneapolis/St. Paul, which are all roughly 300 miles away.

- **Waterway Infrastructure.** As previously noted, the Bi-State region is intersected by the Mississippi River which forms the boundary between Iowa and Illinois. This portion of the river includes four locks and dams and numerous port locations which service a variety of commodities. The majority of these ports are concentrated near the cities of Muscatine, Davenport, and Rock Island. The characteristics of these locks and dams have a direct influence on the efficiency of the waterway. None of the locks have the ability to accommodate a typical 3-barge by 5-barge configuration powered by a single tow. The required length for such a configuration is 1,200 feet. Due to this, barge configurations must be broken apart which requires multiple lockages and can double or triple processing times.

  At each lock, the highest tonnage is attributed to Food and Farm Products. Most likely, this is due to the high number of grain shipment facilities in the region. While this commodity represents the largest proportion of tonnage throughout the region, these volumes have significantly decreased over the years.

  Lock and dam infrastructure throughout the inland waterway system have significant maintenance needs as they approach the end their useful life. Scheduled and unscheduled lock unavailabilities, in part due to the USACE policy of "fix on failure" results in delays for barge traffic. The most significant delays occur at Lock 15 with nearly 1,950 hours of unscheduled unavailabilities in 2013. Since 2006, this lock has experienced an average of 3,550 hours of delay each year, almost all of which are attributed to unscheduled unavailabilities. In addition to the maintenance requirements of these facilities, frequent flooding in the Bi-State region also interrupts barge traffic flows.

- **Airport Infrastructure.** The Bi-State region has six airports, although only Quad City (MLI) currently has freight facilities and air cargo service, two other airports (Davenport and Muscatine) have the runway infrastructure and instrument procedures to serve air cargo traffic in the future. MLI has an Air

Freight Complex comprised of three one-story buildings at 44,000 square yards.[46] The airport also maintains an industrial park located along Indian Bluff Road directly west of the airport.

Like many regional air cargo facilities, MLI has been subject to mode shifts away from air cargo, which peaked in the region in the mid-90s, to truck as the primary mode. Only the most time-sensitive goods are shipped by air, yet recent trends have consolidated air freight facilities, and shifted operations to a fewer number of air cargo hubs. Currently, most of the air freight from the Bi-State region is trucked 170 miles to Chicago's O'Hare airport.

As of 2011, pavement condition at MLI is generally in good condition, with all runways and the majority of taxiways being identified with a pavement condition index of 86-100. Davenport recently reconstructed one of its 60 year old runways through a $6.5 million rehabilitation project including removal and replacement of concrete, new lighting and drainage systems, and a new surface completed in 2014. The city has also invested $600,000 in rebuilding the entrance to the airport. The airport is also planning to rehabilitate its primary runway in the future, at a project cost of $12 million.

- **Multimodal Facility Infrastructure and Other Freight Facilities.** There are six defined multimodal facilities, where freight can be transferred between modes of transportation, in the study area; three are in Davenport, two in Rock Island, and a single facility in Moline. The four Rail-Truck multimodal facilities are Murray's Warehousing, I & M Rail Link, Dohrn Transfer Co., and Yellow Transportation. The remaining facilities, Air-Truck and Truck-Truck multimodal terminals, are owned by Emery Forwarding and the US Postal Service, respectively. These facilities, along with the rail network and designated truck networks (State and Federal). All of the facilities except for I & M Rail Link appear to be active. In addition to these designated facilities there are several other multimodal freight facilities in the Bi-State region identified in the modal sections of this report. They include the airports, waterway facilities, rail lines, and terminals linked to the national highway system by last-mile connectors.

  In addition to these transfer facilities, there is significant private industry in both Iowa and Illinois that generate freight and use the multimodal goods movement system as part of their day-to-day activities. Preliminary data show that in the 5-County region there are over 1,500 establishments that have 10+ employees that are considered "freight industries." Each of these businesses generate significant revenue and contribute to the region's economy. Their unique supply chains will be considered in future phases of this planning process.

---

[46] Quad Cities International Airport Master Plan Update, 2012

4.0 Freight System Performance Measures

The development of freight performance measures to support investment, operations, and policy decisions has attracted considerable interest from both public- and private-sector stakeholders. As such, nonprofit organizations, MPOs, State DOTs, and the Federal government have all contributed to the ongoing dialogue surrounding freight performance measures. This section presents background information on performance measures and reviews freight-related performance measures suggested by the American Association of State Highway Transportation Officials (AASHTO) and mandated by Federal legislation. It goes on to discuss how those measures relate to the transportation goals and performance objectives set forth by the Bi-State Regional Commission.

4.1 About Performance Measures

In recent years, the use of performance measures in the public sector has grown significantly, yet implementation remains limited. The scope of performance measures and implementation approaches both vary between states and regions, especially in the area of freight performance measurement. This is due in part to the shared public- and private-sector roles in freight system and "good" data available to develop measures. This section provides background on the purposes of performance measures, expected MAP-21 guidance related to performance measures, and suggested measures the Bi-State Regional Commission (MPO) should consider in evaluating freight system infrastructure, operations and impacts.

Purpose of Transportation System Performance Measures

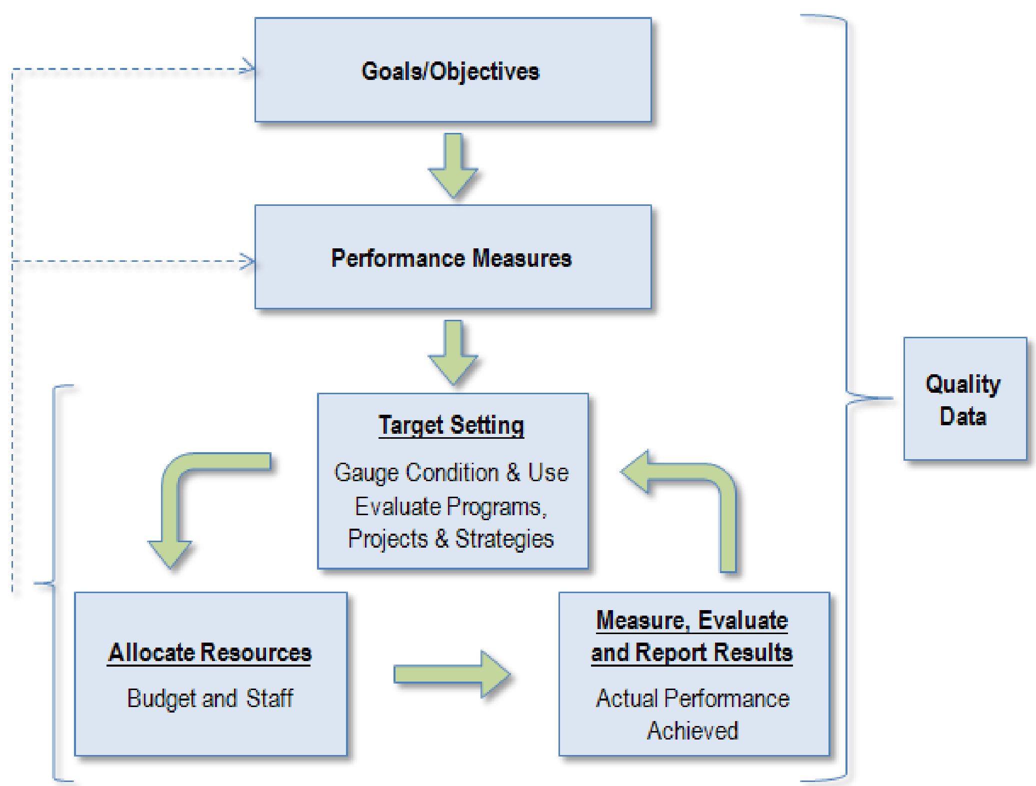
The development and application of performance measures enable agencies to gauge system condition and use, evaluate transportation programs and projects, and help decision makers allocate limited resources more effectively than would otherwise be possible. These can be comprised of different individual types of measurement, such as output measures, outcome measures, indicators, or indices, but collectively are generally referred to as "performance measures." Performance measures are typically applied for the following general purposes:

- **Linking Actions to Goals**. Performance measures can be developed and applied to help link plans and actions to MPO goals and objectives;
- **Prioritizing Projects**. Performance measures can provide information needed to invest in projects and programs that provide the greatest benefits;

- **Managing Performance.** Applying performance measures can improve the management and delivery of programs, projects, and services. The right performance measures can highlight the technical, administrative, and financial issues critical to governing the fundamentals of any program or project;
- **Communicating Results.** Performance measures can help communicate the value of public investments in transportation. They can provide a concrete way for stakeholders to see the MPO's commitment to improving the transportation system and help build support for transportation investments; and
- **Strengthening Accountability.** Performance measures can promote accountability with respect to the use of taxpayer resources. They reveal whether transportation investments are providing the expected performance or demonstrate need for improvement.

In order to best accomplish one or more of these general purposes, a comprehensive performance management process, illustrated in Figure 4.1, is part of the performance measure development process.

Figure 4.1 Performance-Based Planning and Programming Framework



Source: Cambridge Systematics

This iterative approach to performance-based planning is commonly comprised of six fundamental elements that include:

- **Setting Goals and Objectives.** An organization's policy goals and objectives define agency priorities and provide the foundation for performance-based planning and management decisions;
- **Selecting Performance Measures.** Performance measures establish a set of metrics to help organizations gauge system condition and use monitor progress toward achieving a goal or objective;
- **Setting Performance Targets.** Establishing quantifiable targets for each performance measure allows agencies to gauge progress over time relative to a desired goal;
- **Allocating Resources.** An organization builds upon the preceding steps by allocating resources such as time and money through budgeting processes to achieve specific performance targets;
- **Measuring and Reporting Results.** Monitoring and reporting progress to decision-makers and other stakeholders allows organizations to identify key factors influencing performance and necessary actions to improve results; and
- **Data and Analysis Tools.** Effective decision-making through each element of the performance measurement framework requires a solid foundation of accurate, timely, and appropriate data.

While an agency may not have all elements of a comprehensive performance management process in place, most transportation agencies have incorporated at least one of the performance-based elements into their planning process, such as establishing overall agency goals and objectives.

4.2 U.S. DOT MAP-21 GUIDANCE

The U.S. DOT, by way of Moving Ahead for Progress in the 21st Century (MAP-21) legislation has provided guidance on several topics germane to this study, performance measures and state freight plans

Performance Measures

Federal, State and regional transportation agencies have long used asset and performance management techniques to assess, measure, and gauge infrastructural and operational capabilities of their systems. While the approaches differ, agencies tend to measure the same basic physical and operational elements.

In an effort to incorporate uniformity in measures across states and regions and to emphasize a performance-based approach in applying the Federal Highway

Program, the U.S. DOT, by way of MAP-21 legislation,[47] will propose performance measures across key management areas. This approach will incorporate performance management into transportation programs, unify high-level national transportation goals, and link key measures to state and local funding opportunities, as shown in Figure 4.2.

Figure 4.2 Transportation Performance Management and MAP-21

Source: FHWA Transportation Performance Management

The performance measures, to be established by U.S. DOT, will be developed to align with the seven National Goals established as part of the MAP-21 legislation, which include:

- **Safety.** To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- **Infrastructure Condition.** To maintain the highway infrastructure asset system in a state of good repair.
- **Congestion Reduction.** To achieve a significant reduction in congestion on the National Highway System.
- **System Reliability.** To improve the efficiency of the surface transportation system.
- **Freight Movement and Economic Vitality.** To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.

---

[47] Moving Ahead for Progress in the 21st Century Act (MAP-21) Legislation, https://www.fhwa.dot.gov/map21/legislation.cfm

- **Environmental Sustainability.** To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- **Reduced Project Delivery Delays.** To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

Rulemaking for the national performance measures is still in process (not all measures have been announced), but the following table provides an overview of the timeline of activities States and MPOs will need to prepare for related to freight movement once the rulemaking process has started. MPOs will need to coordinate local performance measure development closely with local agencies and states. In the case of the Bi-State Regional Commission this includes both Iowa and Illinois.

Table 4.1 Performance Requirements Summary for Freight Movement

Performance Element	Performance Requirements for Freight Movement
Performance Measures	• Not later than 18 months after date of enactment U.S. DOT, in consultation with State DOTs, MPOs, and other stakeholders will promulgate a rulemaking that establishes measures • Provide not less than 90 days to comment on regulation • Take into consideration any comments • Limit performance measures to those described under 23USC150(c) • U.S. DOT will establish measures for States to use to assess freight movement on the Interstate system
Performance Targets	• States must coordinate, to the maximum extent practical with relevant MPOs in selecting a target to ensure for consistency • MPOs must coordinate, to the maximum extent practical, with the relevant State/s in selecting a target to ensure consistency • Coordination required with public transportation providers • States and MPOs must integrate other performance plans into the performance-based process
Performance Plans	State Freight Plan
Performance Reporting	• State Report on Performance Progress – Required initially by October 1, 2016 and every 2 years thereafter – Report includes: » Performance of Interstate » Progress in achieving all State performance targets » Ways in which congestion bottlenecks in National Freight Plan are being addressed • Metropolitan System Performance Report – Required in transportation plan every 4 or 5 years – Report includes: » Evaluate condition and performance of transportation system

Performance Element	Performance Requirements for Freight Movement
	» Progress achieved in meeting performance targets in comparison with the performance in previous reports » Evaluation of how preferred scenario has improved conditions and performance, where applicable » Evaluation of how local policies and investments have impacted costs necessary to achieve performance targets , where applicable • Statewide Transportation Plan – No required frequency – Optional report on system performance

Source: FHWA, http://www.fhwa.dot.gov/tpm/about/freight.cfm, 03/05/2013.

State Freight Plans

The MAP-21 legislation includes specific guidance for state's developing State Freight Plans, detailed in Section 1118.[48] While the Bi-State Regional Commission is an MPO, there is still a desire to understand this guidance, and apply it as appropriate. This will produce a robust plan for the region, and also help the States of Iowa and Illinois as they develop MAP-21 compliant freight plans understand how the Bi-State Region contributes to state and National goals.

As specified in Section 1118, a State Freight Plan must include a description of how the plan will improve the ability of the State to meet the national freight goals established under 23 U.S.C. 167. These National Freight Policy goals include:

- Improve the contribution of the freight transportation system to economic efficiency, productivity, and competitiveness;
- Reduce congestion on the freight transportation system;
- Improve the safety, security, and resilience of the freight transportation system;
- Improve the state of good repair of the freight transportation system;
- Use advanced technology, performance management, innovation, competition, and accountability in operating and maintaining the freight transportation system; and
- Reduce adverse environmental and community impacts of the freight transportation system.

Also specified in Section 1118, a State Freight Plan must include the performance measures that will guide the freight-related transportation investment decisions of the State. U.S. DOT recommends that this include an analysis of the condition

[48] Interim Guidance on State Freight Plans and State Freight Advisory Committees, Federal Register, https://www.federalregister.gov/articles/2012/10/15/2012-25261/interim-guidance-on-state-freight-plans-and-state-freight-advisory-committees#h-13

and performance of the State's freight transportation system and that analysis includes the identification of bottlenecks in the freight transportation system that cause delays and unreliability in freight movements, as well as other specific locations that are in a poor state of good repair, create safety hazards, or create other performance problems. In general, U.S. DOT recommends that measures of conditions and performance reflect the State's freight transportation goals—for each goal, there would be at least one measure that indicates how well the freight transportation system is doing in achieving that goal. In the Bi-State Region, measures were developed to align with long-range transportation performance objectives, U.S. DOT guidance and freight planning best practices, described later in this section.

4.3 AASHTO Performance Measure Recommendations

The American Association of State Highway Transportation Officials (AASHTO) helped inform FHWA's rulemaking process by providing U.S. DOT with a clear, defensible and unifying statement on each national-level performance measure. The AASHTO Standing Committee on Performance Management (SCOPM) created a Task Force to "assist SCOPM and AASHTO develop a limited number of national performance measures and help prepare AASHTO members to meet new Federal performance management requirements." The Task Force recommended national measures for the Federal-aid highway program in consult with those with in-depth knowledge of the technical aspects of each measure area.[49] These AASHTO recommended performance measures are defined in Table 4.2. As shown, the performance measures are generally grouped by goal area.

[49] AASHTO SCOPM Task Force Findings on National-Level Performance Measures, 2012

Table 4.2 AASHTO Recommended National-level Performance Measures

Goal Area		Expected Measures	Definition
Freight Movement and Economic Vitality	These measures are designed to improve the contribution of the freight transportation system through economic efficiency, productivity, and competitiveness	Annual Hours of Truck Delay (AHTD)	Travel time above the congestion threshold in units of vehicle-hours for Trucks on the Interstate Highway System
		Truck Reliability Index (RI80)	The RI is defined as the ratio of the total truck travel time needed to ensure on-time arrival to the agency-determined threshold travel time (e.g., observed travel time or preferred travel time)
Safety	These measures are designed to improve the safety, security, and resilience of the transportation system	Number of Fatalities*	Five-year moving average of the count of the number of fatalities on all public roads for a calendar year
		Fatality Rate*	Five-year moving average of the Number of Fatalities divided by the Vehicle Miles Traveled (VMT) for a calendar year
		Number of Serious Injuries*	Five-year moving average of the count of the number of serious injuries on all public roads for a calendar year
		Serious Injury Rate*	Five-year moving average of the Number of Serious Injuries divided by the Vehicle Miles Traveled (VMT) for a calendar year
Pavement Condition	These measures are designed to improve the state of good repair of the transportation system	Interstate Pavement in Good, Fair and Poor Condition based on the International Roughness Index (IRI)*	Percentage of 0.1 mile segments of Interstate pavement mileage in good, fair and poor condition based on the following criteria: good if IRI<95, fair if IRI is between 95 and 170, and poor if IRI is greater than 170
		Non-Interstate NHS Pavement in Good, Fair and Poor Condition based on the International Roughness Index (IRI)*	Percentage of .1 mile segments of non- Interstate NHS pavement mileage in good, fair and poor condition based on the following criteria: good if IRI<95, fair if IRI is between 95 and 170, and poor if IRI is greater than 170
		Pavement Structural Heath Index*	Percentage of pavement which meet minimum criteria for pavement faulting, rutting and cracking
Bridge Condition	These measures are designed to improve the state of good repair of the transportation system	Percent of Deck Area on Structurally Deficient Bridges*	NHS bridge deck area on structurally deficient bridges as a percentage of total NHS bridge deck area
		NHS Bridges in Good, Fair and Poor Condition based on Deck Area*	Percentage of National Highway System bridges in good, fair and poor condition, weighted by deck area
System Performance	These measures are designed to improve the contribution of the transportation system through economic efficiency, productivity, and competitiveness	Annual Hours of Delay (AHD)	Travel time above a congestion threshold (defined by State DOTs and MPOs) in units of vehicle -hours of delay on Interstate and NHS corridors
		Reliability Index (RI_{80})	The Reliability Index is defined as the ratio of the 80th percentile travel time to the agency-determined threshold travel time
Congestion Mitigation and Air Quality (CMAQ)	These measures relate to reducing congestion and adverse environmental and community impacts of the transportation system	Criteria Pollutant Emissions	Daily kilograms of on-road, mobile source criteria air pollutants (VOC, NOx, PM, CO) reduced by the latest annual program of CMAQ projects
		Annual Hours of Delay (AHD)	Travel time above a congestion threshold (defined by State DOTs and MPOs) in units of vehicle-hours of delay reduced by the latest annual program of CMAQ projects

Source: AASHTO SCOPM Task Force Findings on National-Level Performance Measures, 2012, *Federal rulemaking has been announced

4.4 Bi-State Region Long-Range Transportation Planning

The Bi-State Region's long-range transportation plan, developed by the Bi-State Regional Commission, indicates that the region has chosen to focus on system preservation and system management as the primary mechanisms to minimize congestion. Expansion of the transportation network is secondary and may be considered after operational measures have been examined. It may also be a primary component to address system efficiency to reduce congestion in certain corridors or facilities.

Transportation Goals

The 2040 Quad Cities Long Range Transportation Plan (LRTP) outlines a number of goals related to residential development, commercial and industrial development, cultural attractions and public spaces, government facilities, urban design, and transportation. Regarding regional planning efforts aimed at the transportation system, the primary goal is to develop a transportation system in the metropolitan area to provide for the safe, secure, efficient, economical, and sustainable movement of people and goods. This and all other goals are implemented through project selection and programming within the transportation improvement program (TIP).

Performance Objectives

The transportation performance objectives drive the implementation of the overall development goals for the Bi-State Region. The transportation performance objectives include:

- Support Economic Vitality
- Increase Transportation System Safety
- Increase Transportation System Security
- Increase Accessibility and Mobility Options
- Promote and Enhance the Environment
- Enhance the Connectivity and Integration Between Modes
- Promote Efficient System Management and Operation
- Emphasize System Preservation

These performance objectives were develop to cover the multimodal transportation system in the region, however several objectives have components that directly relate to goods movement and the freight transportation system, as described below.

- **Accessibility and Mobility Options.** In support of the objective to increase accessibility and mobility options freight plays a central role. A key aspect of this performance objective is to improve connections to existing modal facilities (airports, barge, rail, and truck terminals) and remove or reduce impediments to the movement of goods. In this case, impediments may be physical (e.g., insufficient vertical clearances, poor pavement conditions, etc.) or based in policy (e.g., route restrictions, nuisance ordinances, operating hours, etc.).
- **Connectivity and Integration Between Modes.** Connectivity is just as important an issue in freight transportation as it is in passenger transportation. Long distance shipments often use multiple modes to reach their final destinations. One component of the performance objective to increase connectivity and integration between modes focuses exclusively on goods movement. This is especially important for the Bi-State Region considering that it has immediate access to the trunk route of the U.S. inland waterway system as well as Class I rail service, the interstate highway system, and an international airport. As indicated in the LRTP, the future development of freight facilities in the Bi-State Region should fully leverage this competitive advantage.
- **Economic Vitality.** A key aspect of the economic vitality objective is to improve air freight, barge, rail, and truck terminals to enable competitiveness and address freight reliability and capacity needs. The acknowledgement of the tie between economic vitality and the freight system is important because it has implications for actions taken in regard to transportation planning and programming. This is especially important for the Bi-State Region given manufacturing and production are central to the regional economy and firms in these sectors rely heavy on the freight system.

4.5 Recommended Freight System Performance Measures

The recommended freight system performance measures presented in this section have been organized to align with the performance objectives of the LRTP and expected categories defined by AASHTO, as they relate to goods movement. Generally, best practice categories for freight system performance measures are:

- Economy, Demand
- Safety
- Mobility, Access
- Infrastructure Condition
- Environment

Demand and economy are oftentimes outside the domain of an MPO's data collection programs, and performance measures of these types may be difficult to track and maintain. The term performance "measure" implies that the data can be monitored and improved with specific strategies; the term performance "indicator" reflects data that can be monitored, but is more representative of current conditions and activity. As such, demand and economy performance types are usually reflected as performance "indicators" by MPOs.

Table 4.3 notes recommended freight performance measures/indicators. "A few good measures" have been identified to inform system condition and performance through the "freight lens." As Iowa and Illinois DOTs begin to establish state-level performance measures required as part of MAP-21, the Bi-State Regional Commission should closely coordinate with them to establish appropriate targets and thresholds.

This table can also be used by the Bi-State Regional Commission to assess how closely their existing performance objectives match National goals.

Table 4.3 Recommended Freight System Performance Measures

Bi-State Region Performance Objectives (LRTP)	Applicable AASHTO Goal Area	Freight Performance Measure/Indicator	Category
Support Economic Vitality	Freight Movement and Economic Vitality	Modal Usage (Tons, Value)	Demand, Economy
Increase Transportation System Safety	Safety	Truck-Related Crashes/Mile	Safety
Increase Transportation System Security	N/A	N/A	Safety, Mobility
Increase Accessibility and Mobility Options	Freight Movement and Economic Vitality	N/A	Mobility, Access
Promote and Enhance the Environment	Congestion Mitigation and Air Quality (CMAQ)	N/A	Environment
Enhance the Connectivity and Integration Between Modes	Freight Movement and Economic Vitality	N/A	Mobility, Access
Promote Efficient System Management and Operation	Freight Movement and Economic Vitality, System Performance	Annual Hours of Truck Delay (AHTD) Truck Reliability Index (RI80)	Mobility
Emphasize System Preservation	Pavement Condition, Bridge Condition	Intermodal Connector Pavement Condition based on the International Roughness Index (IRI) Bridge Sufficiency Rating	Infrastructure Condition

As shown in the table, select measures/indicators have been identified to capture (and quantify) areas of importance to both public and private sector freight interests – demand, economy, safety, mobility, and infrastructure condition. These measures were used to quantify system needs. Other non-freight focused measures and qualitative means can be used to determine Bi-State's ability to meet other LRTP performance objectives.

The recommended measures are important to the region for several reasons:

- **Demand and Economy.** Each measure ties into two critical aspects of the region – the economy and the demand it exerts on the freight system. The Bi-State Region is a production and manufacturing hub of the Midwest. Firms in the manufacturing sector continue to be among the largest employers in the region and responsible for a significant share of its economic productivity. From the perspective of these firms, the regional freight system is an integral part of the global supply chain on which they heavily rely. As such, these and other companies exert substantial demands on that system in the form of trucks on the highways, cars on the rail system, and barges on the Mississippi River. Tying the freight performance measures to these two aspects of the region are important for achieving the performance objectives and goals established by long-range planning efforts.
- **Safety.** Safety is perhaps the top concern among transportation agencies. In addition to the obligation to preserve the physical well-being of transportation system users, crashes are among the leading sources of non-recurring congestion. In turn, non-recurring congestion directly affects system reliability and overall performance. Truck crash information allows the Bi-State Regional Commission, and other concerned transportation agencies such as Illinois DOT and Iowa DOT, to identify freight safety hot spots.
- **Mobility and Access.** Improving the freight system so that it can support regional economic competitiveness through increased mobility is a key performance objective as given in the Bi-State Region's LRTP. This objective is reflected in the performance measures by quantifying truck delay and reliability on the road network. Tracking these performance measures make it possible to identify and address truck bottlenecks.
- **Infrastructure Condition.** Poor pavement condition can cause damage to trucks and valuable cargo. It can also impede the flow of traffic contributing to congestion and unreliability. The Mississippi River is the defining geographic feature of the Quad Cities and is an invaluable asset to the region. However, it also forms a physical impediment to the flow of goods within and through the region. Prior analyses have identified bridges as freight chokepoints and safety hotspots. Bridges are therefore an extremely important element of the area's freight system. A performance measure to assess the structural integrity of the region's bridges is critical.
- **Environment.** Despite the importance of freight to economic competitiveness, nationally it has been identified as a significant source of transportation system pollutants. Limiting the negative impacts of goods movement while preserving its benefits is consistent with the long-range performance objective

of protecting and enhancing the environment. A measure has not been defined for this category, but should be explored as freight-specific data are available.

5.0 Freight System Needs, Issues and Opportunities

A variety of quantitative and qualitative data were reviewed to determine the needs, issues and opportunities of the multimodal freight system in the Bi-State Region. This includes the application of performance measures described in Section 4.0, stakeholder feedback and other outreach conducted during this plan described in Appendix A, and the variety of previous freight and transportation related plans developed by the Bi-State Regional Commission and Iowa and Illinois DOTs. The needs, issues and opportunities identified are organized in this Tech Memo by key theme. These themes have been developed to reflect the features most important to the region's freight system, to align with the performance objectives of the 2040 Quad Cities LRTP, and link to U.S. DOT's National Freight Policy goals. These key themes are:

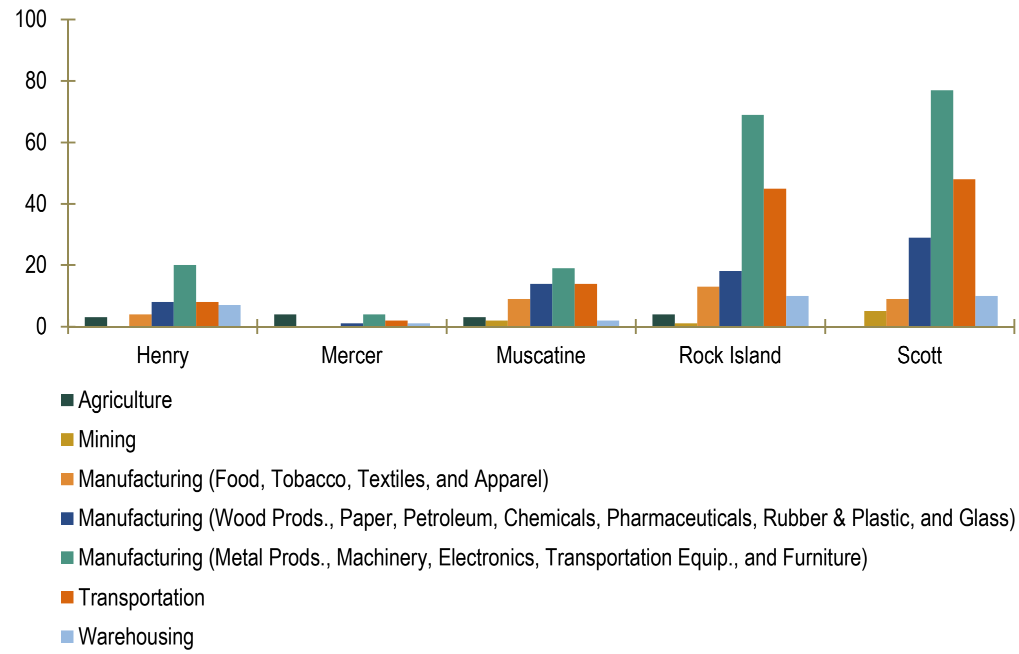
- Use the Bi-State Freight System Support the Region's Economy,
- Maintain and Enhance Highway System Infrastructure,
- Promote Freight Rail System Operational Efficiencies,
- Increase Accessibility and Mobility Options for the Region, and
- Work Towards System Resiliency and Reliability.

Each of the five key themes are discussed in the subsections that follow. Section 5.6 provides an itemized summary of all freight-related needs and issues identified in the Bi-State Region.

5.1 Use the Bi-State Freight System Support the Region's Economy

The Bi-State Region has a strong manufacturing and agricultural base. As described in the previous sections and shown in Figure 5.1, the Bi-State Region is home to a number of industries, in particular agricultural and manufacturing industries that involve shipment of bulk goods (both inbound and outbound) and finished manufactured goods and equipment. Whether destined for international export or moving to a distribution center within the Midwest, reliable transportation options are key to ensuring the smooth movement of goods, maintaining the region's competitiveness, and attracting and retaining industries that are heavily dependent on supply chains and connections to national and international markets.

Figure 5.1 Freight-related Firms in the Bi-State Region



Source: Reference USA.

Demand

Firms that rely on the freight system in the Bi-State Region, such as those within the agricultural and manufacturing sectors play a large and important role in the regional economy. Within the manufacturing sector, firms producing metal products, electronics, machinery, furniture, and wood products are most heavily represented. Businesses that manufacture wood cabinets and countertops, ready-mix concrete, general purpose machinery, and machine shops are prominent in the region as well.

Section 2.0 provides an overview of the demand for freight in the Bi-State region, by mode and commodity. 51 million tons, or 76 percent of the freight in the Bi-State Region is moved via truck. The other 16 million tons move on a combination of the waterway, rail, and air systems. Yet even movements that are eventually destined for multi- or inter-modal transport must make "last mile" connections on the Bi-State region's highway and roadway systems. Industries need efficient connections between the highway system and their facilities, and, alternatively, lack of these connections can limit growth in the region.

Due to the Bi-State Region's rural surroundings, it can be difficult to make efficient connections to major markets. Truck capacity, labor and carrier availability are all essential to providing connections. In some cases, companies shipping from the Bi-State region must work with carriers and/or other industries to find back-haul loads to ensure availability of service. Additional competition in the region – whether on the road or through multimodal connections - would lead to more competitive shipping options for the region's industries.

Economy

The industries are the economic backbone of the Bi-State Region. The region enjoys a well-educated work force and a reasonable business climate. Bi-State provides economic development planning assistance through the Comprehensive Economic Development Strategy (CEDS), which in 2011 emphasized activities such as public-private partnerships, support for existing businesses, and development of new technologies. Other agencies, such as the Henry County Economic Development Partnership, a nonprofit agency that was established in 1992 and currently undertakes planning, categorizing, and data analysis of Henry, Mercer, and Rural Rock Island County also give support to the region's industries, including in Henry County and nearby communities 14 large motor freight carriers and a significant agricultural base. The Partnership also works with legislators in Illinois, and coordinates issues like applying for an enterprise zone application. These types of activities provide opportunities for the region and its' industries to grow and attract new development.

The Bi-State Region has a number of production clusters, for example bulk agricultural commodities. River Valley Cooperative, with several locations in the Quad Cities, has a corporate objective "to increase the efficiency and productivity of our members' agribusiness operations."[50] The Kent Corporation's Grain Processing Corporation (GPC) in Muscatine, IA is a wet milling company that makes products including ethyl alcohol, corn starches for food markets, maltrodextrin (corn syrup solids), corn oil, and corn-based cat litter – all of which are inputs for other industries. The company leases and maintains their own rail cars and is working with Iowa DOT and the Iowa Economic Development Authority to connect a rail spur to Iowa Interstate. These bulk industries heavily rely on the waterway and rail systems to ship their goods efficiently to market.

On the other end of the supply chain, the region's airports provide needed connections to regional and domestic markets. Although not currently providing scheduled air cargo service (except for a UPS feeder market), the Quad City airport is strategically located at the juncture of state and interstate highways, and has available facilities and land for freight and industrial development. This provides an opportunity to develop trade in the future – either through air cargo or multimodal connections. One potential opportunity would be for the airport to find and pursue a "niche" market, i.e. fresh flowers or produce. Another possibility would be developing the airport as a multimodal hub, such as the Rickenbacker facility in Columbus, Ohio. A foreign trade zone may be an opportunity to expand international trade at the airport.

---

[50] http://www.rivervalleycoop.com/about-us.

Establishing sites that are opportune for development in the region with strong connections to the rail, water, or highway system, could be an opportunity to promote economic development. Iowa Interstate Railroad has worked with other groups to identify developable properties in other cities to market to businesses looking for rail served sites. There is also the opportunity for the region to devise incentives for companies to move to the area, and to convey the benefits to the public from major industrial developments, such as tax revenues, jobs, etc.

5.2 MAINTAIN AND ENHANCE HIGHWAY SYSTEM INFRASTRUCTURE

The Quad Cities' highway infrastructure is in good condition and generally meets the needs of the region – but it is not without challenges. Congestion and the structural integrity of bridges is a growing concern throughout the State of Iowa[51] and the Quad Cities, as well. Maintenance responsibilities restrict the number of lanes available at river crossings, which is sometimes exacerbated by two jurisdictions simultaneously performing work. In addition, insufficient vertical clearance have posed a safety concern for trucks operating in the Quad Cities.[52] These and other issues directly affect the highway system's mobility, condition, and safety.

Mobility

The existing roadway network currently provides good connectivity, both in terms of integrating other modes into the overall transportation system and providing access to major population centers. The road network provides motor vehicle access to airports, rail yards, intermodal terminals, and multimodal freight facilities. The interstate highways I-80, I-280, I-74, and I-88 provide important corridors for reaching areas outside the Quad Cities region. Using these highways, industries in the Bi-State Region can reach points north (Minneapolis, MN), south (St. Louis, MO), east (Chicago, IL), and west (Omaha, NE) with relative ease.

Despite the high level of connectivity, the Quad Cities region's roadway network does contain some significant bottlenecks that impede freight flows. Some corridors identified in the 2040 Quad Cities Long Range Transportation as having relatively high congestion include:

- I-74 from 53rd St. (Davenport) to Airport Rd. (Moline);
- U.S. 61 from 65th St. (Davenport) to River Drive (Davenport);
- Avenue of the Cities from Archer Drive (East Moline) to 16th St. (Moline);
- John Deere Rd. from 7th St. (Moline) to 70th St. (Moline);

---

51 Iowa in Motion: Plan Ahead 2040. Long Range Transportation Plan.

52 Quad Cities 2040 Long Range Transportation Plan, pgs. 4-7 to 4-9.

- U.S. 67 from Centennial Bridge (Davenport) to Devil's Glen Rd. (Bettendorf);
- Route 6 from Airport Entrance/I-74 (Moline) to Niabi Zoo Rd. (Coal Valley); and
- IL-92 from 15th St. (Rock Island) to 19th St. (Moline).

In addition, the analysis of truck travel times from National Performance Management Research Data Set (NPMRDS) revealed other locations in the region with significant challenges to mobility. As indicated by relatively large travel time indices, there are a number of roadways in the region with unreliable performance. This makes it difficult for shippers and carriers operating under tight time constraints. Some of the least reliable roadways include:

- E. Mississippi River Dr. and Grandview Ave. in Muscatine County;
- River Dr. and Centennial Bridge in Scott County; and
- Centennial Expressway and 1st Ave. in Rock Island County.

Even worse, some of these roadways are located along corridors with the highest truck volumes in the Bi-State Region or that serve as last-mile connectors. For instance, the U.S. 61/I-80 interchange is a major point of unreliability in the system and is located along the busiest truck corridor in the metropolitan area.

Infrastructure Condition

Two key features of infrastructure are import to the region's highway system state of good repair, bridge condition and pavement condition. The Quad Cities has two major rivers in the region – the Mississippi River and the Rock River. Though both rivers are assets to the community, especially the Mississippi River since it is the primary thoroughfare of the inland waterway system, they also impede the flow of vehicular traffic. The Bi-State Region is linked by five bridges over the Mississippi River – three interstate highway, one U.S. highway, and one local. These bridges are both critical links in the roadway network and system chokepoints as all users must rely on them.

Bridge sufficiency ratings, as shown in Table 5.1, indicate the adequacy of a bridge for continued use. This rating is based 55 percent on structural evaluation, 30 percent on the obsolescence of the bridge design, and 15 percent on the importance of the bridge to the public. A score of 80 or less is required for Federal repair funding, while a score of 50 or less is required to use Federal funding for replacement of the bridge. Based on sufficiency ratings as reported by the Iowa and Illinois DOTs, all of the Mississippi River bridges (except perhaps I-280) are eligible for Federal funding due to low sufficiency ratings. On the Rock River, bridges on U.S. 67and 27th St. (Moline) are eligible for funding given these criteria.

Table 5.1 Sufficiency Ratings on the Mississippi and Rock River Bridges

Bridge	Sufficiency Rating (Iowa DOT)	Sufficiency Rating (Illinois DOT)	Avg. Truck AADT (Percentage) *
Mississippi River			
Government Bridge	** n/a	72.4	** n/a
U.S. 67/ Centennial Bridge	10.8	3.4	9,545 (30.5%)
I-74	56.2 (EB); 49.6 (WB)	58.1 (EB); 60.2 (WB)	3,309 (4.7%)
I-280	67.9	80.9	4,329 (19.3%)
I-80	67.0	65	9,971 (29.2%)
SR 92	66.6	66	167 (4.6%)
Rock River			
U.S. 67 (North Channel)		50.4	825 (6.1%)
U.S. 67 (Central Channel)		58	825 (6.1%)
U.S. 67 (South Channel)		48.6	825 (6.1%)
I-74		96.2 (NB); 97.2 (SB)	1,800 (5.3%)
I-80		96.5 (NB); 97.5 (SB)	9,175 (43.9%)
27th St., Moline IL		63.5	n/a
SR 92		85.7 (NB & SB)	2,425 (20.2%)
SR 92 (Henry/ Rock Island County Line)		89.8	200 (10.3%)
SR 84		88	710 (4.8%)
Milan Beltway		81.3	n/a

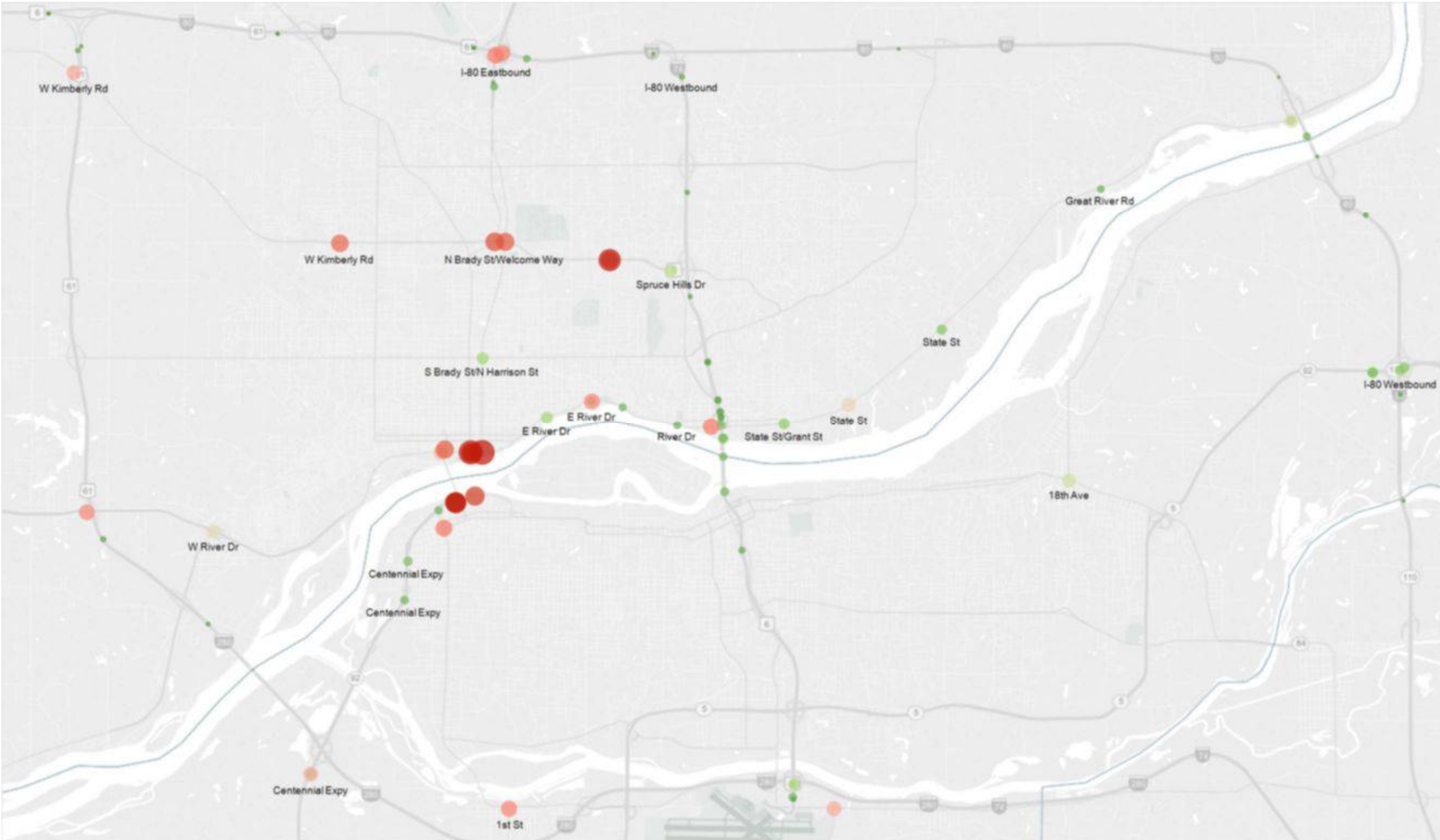
Source: Illinois DOT Structures Information Management System, http://apps.dot.illinois.gov/bridgesinfosystem/main.aspx, Accessed Dec. 16, 2014 and Feb. 18, 2015; Iowa DOT Office of Bridges and Structures.

* Source: The Iowa DOT GIMS Database (http://www.iowadot.gov/gis/downloads/default.aspx) was used for truck volumes on the Mississippi River bridges; the Illinois Technology Transfer Center Database was used for truck volumes on the Rock River bridges. Both databases accessed Oct. 14, 2014.

** Iowa DOT does not maintain this bridge.

As determined from the analysis of truck travel time data from the NPMRDS, bridges are significant chokepoints and sources of unreliability for the network. Figure 5.2 identifies links with high travel time indices. A relatively high travel time index indicates that the average time it takes a truck to traverse that link during peak periods is significantly higher than when the roadway is operating at free flow speed. It is a proxy for unreliability. Particularly, the areas surrounding the U.S. 67/Centennial Bridge in Rock Island and Davenport experience some of the highest levels of unreliability in the region.

Figure 5.2 Truck Travel Time Index (Proxy for Unreliability)



Source: Illinois DOT; Iowa DOT; National Performance Management Research Data Set (NPMRDS).

Pavement condition is also important, as is linked to a roadways suitability to handle goods. According to average International Roughness Index (IRI) ratings derived from 2012 HPMS spatial data, pavement conditions on the Bi-State region's NHS Intermodal Connectors ranges from "good" to "poor."[53] The IRI is an index used to gauge the smoothness of a roadway. It is calculated using an algorithm that takes as input data from the longitudinal profile of a section of roadway. Lower IRI values indicate better pavement conditions (i.e. smoother) while higher values indicate worse conditions (i.e. rougher). The roadways forming the intermodal connector for Quad City International Airport can be classified as "good" (i.e. 27th Street) to "fair" (i.e., U.S. 6 and 69th Street). The connectors for the port and truck/ rail terminals are "mediocre" (i.e., SR 22/ Rockingham Road west of I-280) to "poor" (i.e., SR 22/ Rockingham Road east of I-280). Even within these ratings based on average IRI values, there is a great amount of variation in pavement conditions on the connectors. This is captured in Table 5.2 that presents the range of IRI values.

Table 5.2 Pavement Conditions on the Bi-State Region's NHS Intermodal Connectors

NHS Intermodal Connector	Roadways	Average IRI	IRI Range	Avg. AADT *	Avg. Truck AADT (Percentage)*
Harvest States Peavy Port Terminal	SR 22/ Rockingham Road	204	79-472	4,644	866 (18.6%)
Quad Cities Container Terminal (*Closed*)	SR 22/ Rockingham Road	229	170-195	7,127	4,756 (66.7%)
	S Rolff Street	n/a	n/a	600	n/a
Quad City International Airport	U.S. 6	115	n/a	19,300	1,625 (8.4%)
	27th Street	88	n/a	11,300	n/a
	69th Avenue	168	n/a	11,300	n/a

Source: FHWA National Highway Performance Monitoring System, http://www.fhwa.dot.gov/policyinformation/hpms/shapefiles.cfm, Accessed Oct. 31, 2014.

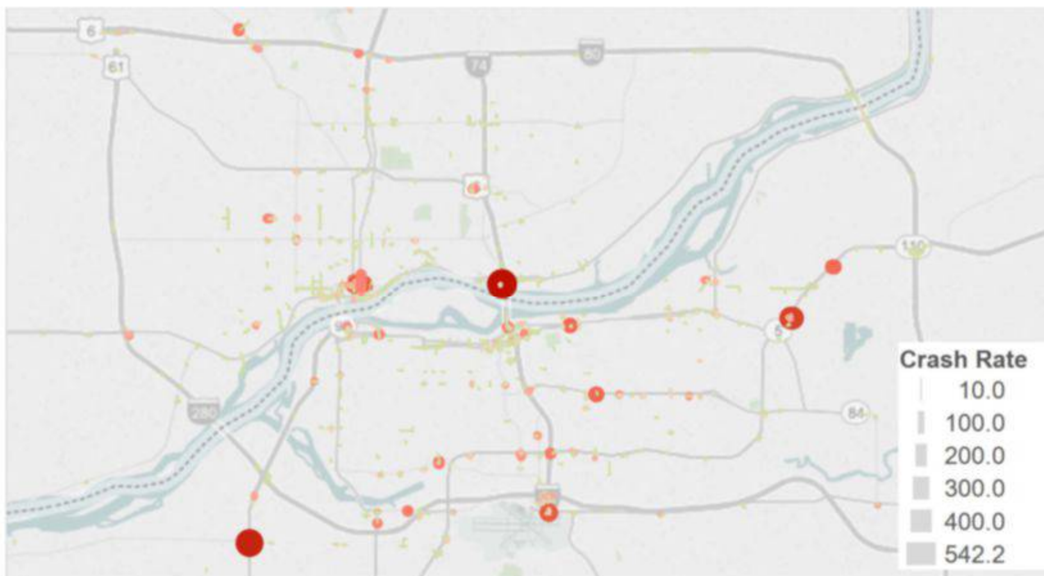
* Source: Illinois DOT Illinois Technology Transfer Center, http://gis.dot.illinois.gov/gist2/; Iowa DOT GIMS Database, http://www.iowadot.gov/gis/downloads/default.aspx. Accessed Oct. 14, 2014

[53] Federal Highway Administration (2000). Chapter 3 – System Conditions. *1999 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance Report*, http://www.fhwa.dot.gov/policy/1999cpr/chap03.pdf, Accessed Dec. 29, 2014.

Safety

Accidents are one of the primary causes of non-recurring congestion, which is a major source of traffic delay. Figure 5.3 illustrates the locations that have a high propensity for being the sites of accidents involving trucks. Accidents involving trucks often require more resources and time to clear the roadway, exacerbating the amount of delay. The truck-involved crash data, which spans 2009 to 2013, points to several areas of concern in the roadway network. The locations with the highest truck-involved crash rates include the intersection between State Street and the I-74 on/off ramp, several blocks surrounding Brady St and 5th Street in downtown Davenport, the intersection between 78th Ave. West and Centennial Expressway, and the intersection between IL-92 and Barstow Rd, among several others.

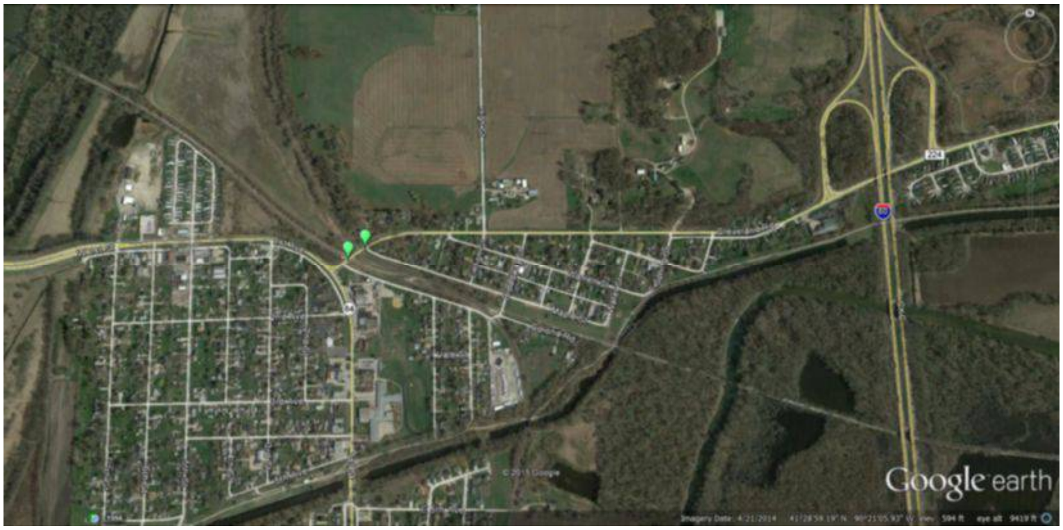
Figure 5.3 Crash Rate – Truck Related Accidents per Mile (2009 to 2013)



Source: Illinois DOT; Iowa DOT.

Grade level rail crossings are another safety concern for the Quad Cities. At-grade highway-railroad crossings often present impediments to efficient highway and rail flows, as well as safety concerns for local communities. One area of concern is Cleveland Road in Colona, IL. As shown in Figures 5.4 and 5.5, this roadway is intersected by both Iowa Interstate Railroad and BNSF (#606977F and #065668W) in very close proximity. In addition, the crossings are only approximately one mile east of the Cleveland Road/I-80 interchange. Further exacerbating the issue is an additional crossing one-quarter mile away at Maple Street. Due to amount of rail traffic through this corridor (and potential future passenger rail), suboptimal sight distance at the intersection, and community concerns, this intersection would be an ideal candidate for a grade crossing study. The study would further examine the safety and operational impacts of the crossings, and identify potential solutions for intersection improvement.

Figure 5.4 At-Grade Crossings in Colona, IL



Source: Google

Figure 5.5 Street Level View of At-Grade Crossings in Colona, IL

Source: Parsons Brinkerhoff photograph.

5.3 PROMOTE FREIGHT RAIL SYSTEM OPERATIONAL EFFICIENCIES

Two Class I and one short line railroad provide service in the region. The Iowa Interstate Railroad (IAIS) bisects the region and runs east-west over trackage rights with both BNSF and CP/DM&E. BNSF interchanges with IAIS in Moline, IL and services industries on the Illinois side of the Mississippi and continues south to Galesburg, IL and north to the Twin Cities. CP/DM&E interchanges with IAIS in Davenport, IA and continues southwest to Kansas City, MO and north to the Twin Cities.

Despite the presence of three railroads, operational challenges still exist. Though rail carriers operating in the Quad Cities offer access to a range of markets throughout North America, the Bi-State Region is not home to any substantial rail yards, intermodal facilities, or bulk loading facilities. The nearest intermodal terminal is the Union Pacific (UP) Global III Park in Rochelle, IL - approximately 90 miles east. The lack of these facilities in the Bi-State Region present significant mobility challenges to shippers in the metropolitan area.

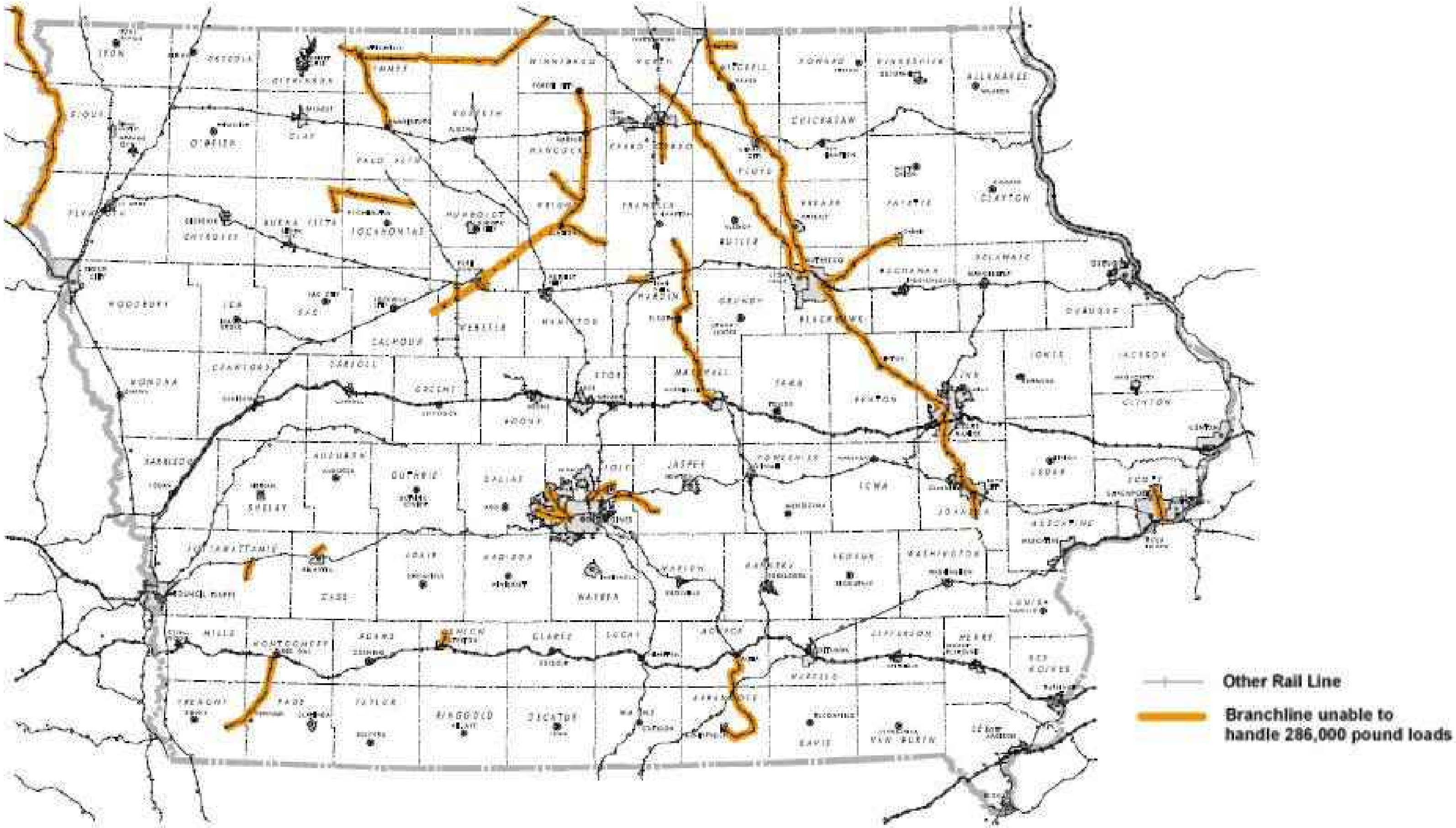
Infrastructure Condition

According to the 2009 Iowa Railroad System Plan, the Eldridge subdivision of the CP/DM&E network is unable to accommodate 286,000 lb. railcars as shown in Figure 5.6. This limits the efficiency of rail service in that corridor and the options available to shippers with rail spurs on that line. Track unable to hold heavier loads require trains to either be split into multiple trains or moved at a much slower speed. Consequently, though the class of track in this corridor allow for freight rail speeds up to 25 mph (see Figure 5.7) typical speeds are around 10 mph.[54] Also, the absence of 286,000-pound compliant rail may also limit the opportunities for industrial and freight-oriented economic development along that corridor. As the inventory of rolling stock becomes increasingly heavier, it is important that all rail lines in the Bi-State Region be able to handle these cars.

In addition, rail bridges are significant freight bottlenecks. At the Arsenal Bridge (IAIS), rail traffic is restricted to 10 mph which results in substantial delays. Besides limited operating speeds, barge movements often delay rail traffic across this bridge and it is not equipped to handle rail cars with standard 286,000 lb. loads.

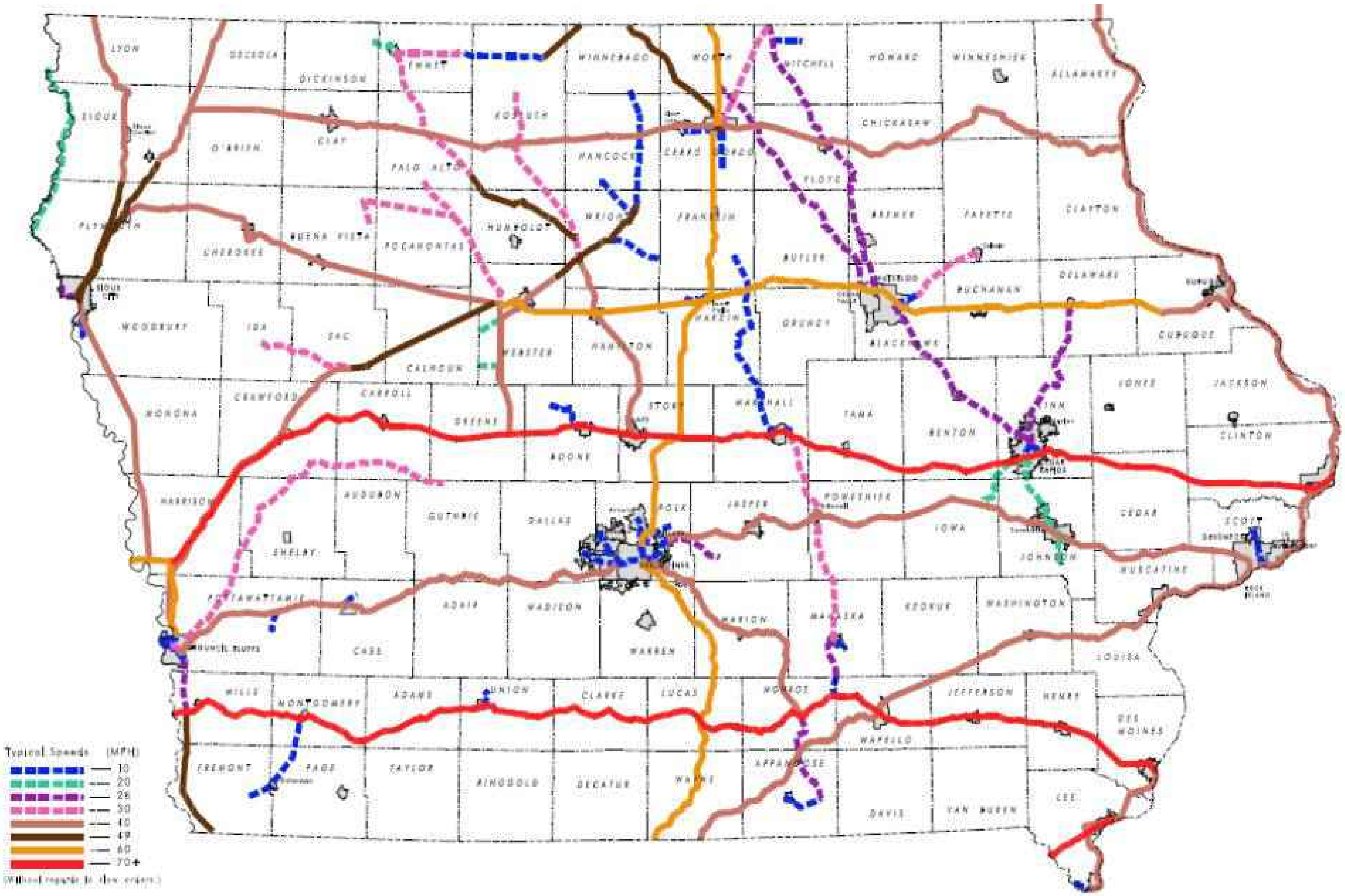
[54] 2009 Iowa Railroad System Plan.

Figure 5.6 Track-Miles Unable to Handle 286,000-Pound Rail Cars



Source: 2009 Iowa Railroad System Plan. Note: Iowa is currently developing an updated State Rail Plan, and this information may be revised.

Figure 5.7 Railroad Track Speeds in Iowa



Source: 2009 Iowa Railroad System Plan.

Mobility

The infrastructure condition directly affects freight mobility within and through the Bi-State Region. The railcar weight restrictions and limited operating speeds along certain sections of the system result in bottlenecks. These bottlenecks could be relieved or completely removed if those conditions were improved. For instance, upgrading the track in the CP/DM&E Eldridge subdivision would increase the capacity of this line and decrease delay. Rail bridges are also a source of delay due to the speed restrictions, lack of ability to handle 286K railcars, and general infrastructure condition.

Iowa Interstate Railroad, who is the primary short line provider for companies in the region without a direct Class I railroad connection, needs efficient and reliable connections with other railroads to provide a high level of service. Actions by the Class I railroads to limit service immediately impact customers on the line, and in turn impacts IAIS' operations. For example, if a shipper can't take all of their cars at once and there is a lot of congestion, the railroad can embargo to control traffic movements and congestion on the Class I lines. In the recent past, IAIS has worked on options for additional storage and transloading to mitigate these problems in the region, though permanent solutions are often capital intensive.

The lack of major rail facilities within the Bi-State Region also affects regional mobility. The Bi-State Region's close proximity to Chicago encourages rail operators to serve the Quad Cities out of the larger market, despite the Bi-State Region's role as a production hub. The nearest major classification yards to the Quad Cities are in Savanna and Galesburg, IL. The nearest intermodal terminal is the UP Global III Park in Rochelle, IL - approximately 90 miles east. The lack of these facilities in the Bi-State Region present significant mobility challenges to shippers in the metropolitan area as they must contend with both Quad Cities and Chicago congestion. Also, the absence of these facilities does not allow the region to aggregate freight rail demand from surrounding communities which would help to attract more competitive service.

This problem is likely exacerbated by the orientation of the Bi-State Region's rail infrastructure. At a subregional level, production and manufacturing clusters are spread throughout the Quad Cities. Many of these companies have their own rail spurs granting them access to the system. Though traditional, this setup works to dilute the region's freight rail demand because it is spread over a large geographical area. From the perspective of the Class I carriers, serving all of these disparate points of demand may not be cost efficient. As a result, Bi-State shippers face less than competitive service, and, in some cases, rely on truck for additional capacity to supplement their rail service.

5.4 INCREASE ACCESSIBILITY AND MOBILITY OPTIONS FOR THE REGION

In order for the Bi-State Region to continue to grow and thrive effort must be made to improve freight modal accessibility and increase the mobility options available to shippers. Each mode uniquely facilitates the efficient movement of different types of goods and supports various parts of global supply chains. In fulfilling these roles, it is important that the various freight modes seamlessly connect to each other creating a true multimodal network. The accessibility of each mode, their connectivity to each other, and their implications for the Bi-State Region's environment and overall transportation system are discussed in this section.

Mobility, Access

Each freight transportation mode plays a different role in its support of the Bi-State Region's key industries. The highway system is central to movement of goods across industrial sectors in the Bi-State Region. As it carries the bulk of goods within and through the region, it is the core of the Quad Cities' multimodal freight network. The rail system is also critical many key industries in the Bi-State Region. Though rail is not as heavily utilized in retail trade or the construction industry, it comprises a significant link in the supply chains of most of the region's other primary industrial sectors. The inland waterway system is essential to the region's Agriculture industry and to a lesser extent its Mining and Utilities industries. Those industrial sectors rely more heavily on pipelines. Lastly, is the Bi-State Region's air freight system. Though no single industry sector is completely dependent upon this system, it does play a key role in the Manufacturing, Retail Trade, and Transportation and Warehousing industries.

Though on their own each of these modes supports various Bi-State industries, connections between the modes are what truly allow the system to function in a fluid, multimodal fashion. There are good connections between modes in the Bi-State Region, especially rail-water and highway-water. Rail spurs connect the freight rail system to the highway and inland waterway system networks. These are important connections for bulk and low-value commodities, such as Gravel which is one of the largest commodity flows in the region. Also, rail-water and highway-water connections are critical to the Agriculture industry and the many Food Processing companies within the region.

The connections in the Bi-State Region that are lacking are highway-rail and highway-air. Though the highway system connects the region's shippers needing rail intermodal services to facilities in Chicago, direct connections are needed within the Bi-State Region. Without them, shippers must contend with road congestion in two metropolitan areas as opposed to only one. Likewise, the highway system grants the region's shippers access to the air freight system via air cargo facilities in Chicago. Shippers needing expedited or emergency service are at a disadvantage since trucks must travel a longer distance to access those services.

Environment

Increasing freight mobility and accessibility options for the region can also help the Bi-State Region in achieving its goal of protecting and enhancing the environment. Certain freight modes have lower environmental impacts than others. For example, among freight modes trucks are responsible for the majority of greenhouse gas emissions.[55] In 2011, FHWA estimated that 76 percent of freight transportation greenhouse gas emissions could be attributed to trucking. Though this observation is unsurprising given the much higher tonnage of freight carried by truck than by rail, trucking also results in higher environmental impacts on a per-vehicle basis. The amount of energy used to move one freight car mile is approximately 35 percent lower than the amount of energy used to produce one truck mile.[56] This implies that rail is more energy efficient on a per mile basis than trucking.

There are numerous reasons that trucks move the majority of U.S. freight, speed and the ability to offer door-to-door service chief among them. However, rail could become a more viable option to Bi-State shippers with operational and infrastructure improvements. Making these improvements could induce some shippers to shift certain shipments from truck to rail, which may result in the region achieving an overall lower environmental impact.

5.5 Work Towards System Resiliency and Reliability

Resiliency and reliability are two important concepts in regard to the freight transportation system. In the context of freight, resiliency is the ability of the system to absorb the consequences and reduce the impacts of disruptions while maintaining freight mobility.[57] Reliability, on the other hand, is the consistency of travel times along links in the multimodal freight system network. These are interconnected concepts as an unreliable freight system surely cannot be resilient. For the Bi-State Region, moving towards a more resilient and reliable system means enhancing the connectivity between modes, understanding the weakest links in the region's system (in terms of performance and condition), and providing redundancy to mitigate risks.

---

55 FHWA, Freight Facts and Figures, Table 5-16, http://www.ops.fhwa.dot.gov/Freight/freight_analysis/nat_freight_stats/docs/13factsfigures/table5_16.htm, Accessed June 18, 2015.

56 FHWA Freight Facts and Figures, Table 5-11, http://www.ops.fhwa.dot.gov/Freight/freight_analysis/nat_freight_stats/docs/13factsfigures/table5_11.htm, Accessed June 18, 2015.

57 Transportation Northwest Regional Center, Washington State Freight System Resiliency, http://www.lib.washington.edu/msd/norestriction/b61007389.pdf, Accessed June 18, 2015.

Mobility

Bridges are perhaps the most critical links to achieving a more resilient and reliable freight system in the Bi-State Region. Their condition and performance determine much of the overall system's ability to function at a high level of service. In addition to facilitating the majority of freight flows within the region, the Mississippi and Rock River bridges allow shippers to access air cargo and rail intermodal services in Chicago. The region's reliance on these bridges are evident upon examining their sufficiency ratings, most of which exceed the threshold for Federal repair and/or replacement funds. In addition, the analysis of truck travel times revealed that bridges are significant chokepoints in the metropolitan area.

In addition to the condition of the region's bridges, the condition of waterway facilities also play a role in the resiliency and reliability of the system. The state of the Mississippi River's locks and dams have been noted as a hindrance to fully achieving those two concepts. Improving the condition of these facilities could make them a more viable modal alternative and allow them to better function in conjunction with the rail and highway systems. Connections with those two modes provide the region's shippers last mile connections to the inland water system.

Route redundancy also plays a role in improving resiliency and reliability. An important part of managing system disruptions is providing multiple routes so that shipments can ultimately reach their final destinations. This is magnified by the region's reliance on bridges as a catastrophic event would severely limit the entire system's ability to function. Even in the case of normal disruptions, such as maintenance, redundant routes are necessary in order to maintain an adequate level of service.

5.6 Summary of Freight System Needs, Issues and Opportunities

In each of the previous sections an overview of the needs, issues and opportunities are generally described, but are further articulated and summarized in the following table. This table attempts to consolidate all known information in a single place and includes:

- **Need.** Identification of the needs/issues/opportunities
- **Mode.** Freight mode that is impacted, including truck, rail, water, air, or multimodal (i.e., affecting more than one mode).
- **Type of Issue.** Whether the need/issue/opportunity is one that is physical, operational, and/or organizational/policy in nature.
- **Theme.** Indication of which of the key themes described in the previous sections touch the need/issue/opportunity.

This table is intended to identify areas where the region may have weaknesses related to the goals of this study and which needs/issues/opportunities cut across multiple goals. This information will be used to help generate a prioritized list of existing/future problem areas to be addressed.

Table 5.3 Freight System Needs, Issues and Opportunities

ID	Need/Issue/Opportunity	Type of Need/ Issue/ Opportunity	Mode Impacted	Support the Region's Economy	Maintain and Enhance Highway Infrastructure	Promote Freight Rail Efficiencies	Increase Accessibility and Mobility	Increase System Resiliency
1	Federal funds to maintain the multimodal freight system	Organizational/Policy	Multimodal	✓	✓		✓	✓
2	Need for better freight data	Organizational/Policy	Multimodal	✓	✓		✓	✓
3	Support connections to multimodal facilities outside of the Region that are crucial for Bi-State industries	Physical Infrastructure, Operational	Multimodal	✓	✓		✓	✓
4	First-/last-mile connectivity	Physical Infrastructure	Multimodal	✓	✓		✓	
5	Competitive options for captive shippers in the region	Physical Infrastructure, Operational, Organizational/Policy	Rail	✓		✓	✓	
6	Consider opportunities for Public Private Partnerships	Organizational/Policy	Multimodal	✓			✓	✓
7	Potential for air cargo operations in regional airports, particularly Quad City Intl. Airport	Physical Infrastructure, Operational	Air	✓			✓	
8	Lack of flexible funding that can be used for freight projects	Organizational/Policy	Multimodal	✓			✓	
9	Intermodal rail service within the Bi-State Region	Physical Infrastructure	Rail	✓			✓	
10	Truck driver and other workforce shortages	Operational	Multimodal	✓			✓	
11	Integrate freight considerations into all planning projects	Organizational/Policy	Multimodal	✓				✓

ID	Need/Issue/Opportunity	Type of Need/ Issue/ Opportunity	Mode Impacted	Support the Region's Economy	Maintain and Enhance Highway Infrastructure	Promote Freight Rail Efficiencies	Increase Accessibility and Mobility	Increase System Resiliency
12	Build and strengthen partnerships to address significant freight issues	Organizational/Policy	Multimodal	✓				
13	Educate the public on the importance of freight	Organizational/Policy	Multimodal	✓				
14	Identify freight projects that create a return on investment	Organizational/Policy	Multimodal	✓				
15	Manage and mitigate negative impacts of freight activities	Physical Infrastructure, Operational, Organizational/Policy	Multimodal	✓				
16	Provide and preserve land for freight-focused development adjacent to freight infrastructure	Organizational/Policy	Multimodal	✓				
17	Address chokepoints within and outside of the Bi-State Region that impact the area	Physical Infrastructure, Operational, Organizational/Policy	Multimodal		✓	✓	✓	✓
18	Increase system-wide capacity, across modes (make better use of existing modes)	Physical Infrastructure, Operational, Organizational/Policy	Multimodal		✓	✓	✓	✓
19	Safety at highway-rail grade crossings	Physical Infrastructure, Operational, Organizational/Policy	Truck, Rail		✓	✓		

ID	Need/Issue/Opportunity	Type of Need/ Issue/ Opportunity	Mode Impacted	Support the Region's Economy	Maintain and Enhance Highway Infrastructure	Promote Freight Rail Efficiencies	Increase Accessibility and Mobility	Increase System Resiliency
20	Plan for truck routes/operations in urban areas, vertical clearance	Physical Infrastructure, Operational, Organizational/Policy	Truck		✓		✓	✓
21	Spot roadway expansion, lane additions	Physical Infrastructure	Truck		✓		✓	✓
22	Rail equipment and container shortages	Operational	Rail			✓		✓
23	Achieve 286,000-lb. compliance on the rail system, and adequate horizontal and vertical clearances	Physical Infrastructure	Rail			✓		
24	Quality of rail service and access for Bi-State industries	Operational	Rail			✓		
25	Ensure alternate routing during major bridge construction	Physical Infrastructure, Operational, Organizational/Policy	Truck				✓	✓
26	High truck crash locations and other freight safety hot spots	Physical Infrastructure, Operational	Truck				✓	✓
27	Highway congestion	Physical Infrastructure, Operational	Truck				✓	✓
28	Lock and dam maintenance	Physical Infrastructure	Water				✓	✓

ID	Need/Issue/Opportunity	Type of Need/ Issue/ Opportunity	Mode Impacted	Support the Region's Economy	Maintain and Enhance Highway Infrastructure	Promote Freight Rail Efficiencies	Increase Accessibility and Mobility	Increase System Resiliency
29	Need to maintain adequate navigable depth	Physical Infrastructure	Water				✓	✓
30	Viability of the waterway system for increased goods movement	Physical Infrastructure, Operational	Water				✓	✓
31	Freight system resiliency and redundancy	Physical Infrastructure	Multimodal					✓
32	Rail bridges vulnerable to flooding	Physical Infrastructure, Operational	Rail					✓

6.0 Freight System Investments

This section identifies the physical infrastructure investments needed today on the highway system and outlines the types of future freight projects that could provide the Bi-State Region benefits if pursued on the non-highway freight systems of rail, water, and air. The process to identify freight system infrastructure recommendations in the region employed the following steps:

- **Technical Analysis.** The multimodal freight system was evaluated in Tasks 1 and 2. Identification of system needs, issues, and opportunities for the region were identified through the application of freight system performance measures developed as part of this study.
- **Stakeholder Outreach.** Stakeholder outreach was conducted throughout the study. Perspectives were received from both public and private sector stakeholders through the use of an online survey, one-on-one interviews, and through convening three group meetings with key stakeholders.
- **Review of Previous Studies and Plans.** Candidate projects were also identified through review of past studies and plans. For example, both the *1989 Quad City Intermodal Freight Transportation Study* and the recently completed *2040 Quad Cities Long Range Transportation Plan* (LRTP) included freight-related recommendations. Also, both the Iowa DOT and Illinois DOT have produced state transportation plans with project and policy recommendations that impact the Quad City region.

In addition to this, consideration was given to best practice freight improvements proposed in other MPOs and transportation agencies, and the consultant team's understanding of realistic applications for the Bi-State Region. After an initial long-list of candidate projects were identified, a 1/2 -day charrette was conducted by bringing members of the consultant team together with key project stakeholders, including the funding partners of the Bi-State Regional Commission and both Iowa and Illinois DOTs. During the charrette all project recommendations were reviewed, the list narrowed, as needed, and confirmation that the list was appropriate was received. The stakeholders also indicated their interest in understanding the benefits of pursuing various projects. This evaluation is presented in Section 8.0.

This section presents physical system recommendations in two categories – highway system investments, and non-highway system investments.

6.1 Highway System Investments

Highway system investments have been identified to address identified needs. This section is divided into the following categories:

- **Funded Highway System Projects.** These projects have been identified by the Bi-State Regional Commission and its partners, are noted in the TIP, and are slated to receive funding.
- **Identified, Unfunded Highway System Projects.** These projects have been identified by the Bi-State Regional Commission and its partners, are noted in the TIP, and but do not have funding identified for implementation.
- **Previously Unidentified, Unfunded Highway System Projects.** These projects were identified during the technical analysis phase of this study, are not currently identified in existing plans, and do not have funding identified for implementation.

These projects are noted in the following sections, and mapped in Figure 6.1. A complete listing of highway system projects is provided in Appendix B.

Funded Highway System Projects

Each year the Bi-State Regional Commission prepares the Transportation Improvement Programs (TIP)[58] for the Quad Cities, Iowa/Illinois Metropolitan Planning Area (MPA) and for Region 9 (an area that includes all of Muscatine County and the non-urban portions of Scott County). The TIP is a listing of transportation projects to be funded under federal transportation programs for a four-year period. To be eligible for federal transportation funding, a project must be included in the Transportation Improvement Program (TIP) and derived from a metropolitan long range transportation plan.

The TIP is a result of the comprehensive, coordinated, and continuing (3C) transportation planning process and contains street/highway and transit projects plus related enhancement activities, such as bicycle trail development. In developing the TIP, project priority is given to the initial year annual element of the TIP based on preservation and safety factors. Projects in the second through fourth year annual elements are financially feasible, based on expected funding levels. By programming a project in a particular fiscal year, it is the intent of a jurisdiction to secure the necessary funds and let the project in that year.

As part of this freight study, projects on the TIP were examined with respect to their ability to serve and enhance goods movement. Projects on the truck network that improve infrastructure state of good repair were identified, as well as those projects anticipated to provide increased capacity, improved connectivity and enhance safety. The Top 10 projects anticipated to provide the freight system the greatest benefit are identified in Table 6.1 and Figure 6.1 and amount to over $188M. Additional projects anticipated to benefit freight, and found in the TIP, are included in Appendix B and total over $300M. All cost estimates shown are based on anticipated state, federal, and local sources in year of expenditure dollars as provided by the project sponsor.

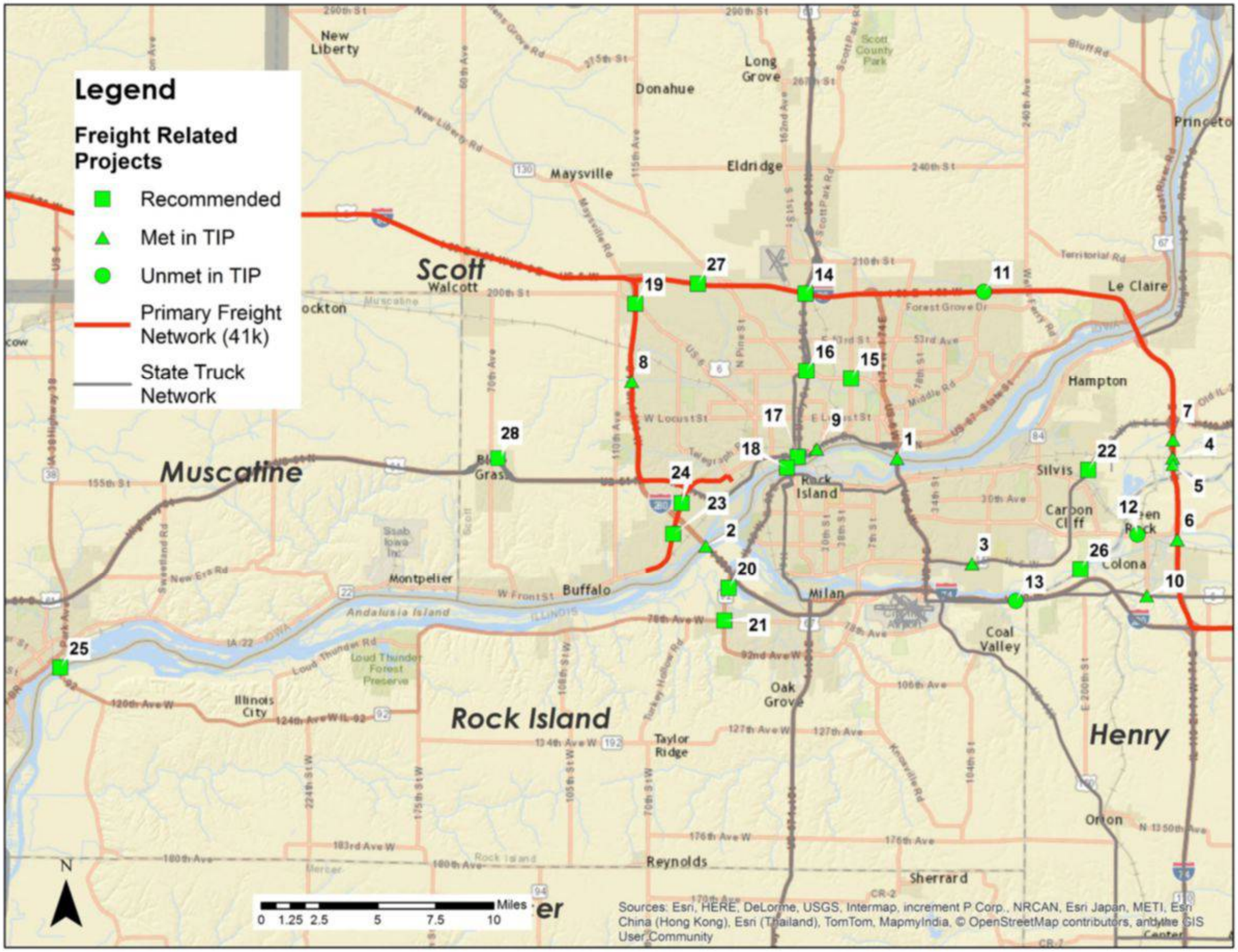
---

[58] Text has been adapted from the Bi-State Regional Commission Transportation Improvement Program documentation

Table 6.1 Funded Highway System Projects

Project Number	Map ID	Project Route	Project Location	Project Description	FY	Total Estimated Cost
IA-14-09	1	I-74	Reconstruction in Bettendorf	Bridge Replacement, Grade and Pave, ROW	FY15	$20,349,000
IL-15-15	1	I 74/US 6	Mississippi River Corridor	Demolition	FY15	$1,500,000
IL-15-16	1	I 74/US 6	Mississippi River Corridor	Misc	FY15	$1,400,000
IL-15-17	1	I 74/US 6	Mississippi River Corridor	Land Acquisition	FY15	$3,600,000
IA-16-03	1	I-74	In Bettendorf and Davenport (Central Section)	ROW, Grade and Pave, Bridge Replacement	FY16	$1,500,000
IA-18-03	1	I-74	In Bettendorf and Davenport (Central Section)	ROW, Grade and Pave, Bridge Replacement	FY18	$55,883,000
IL-18-02	1	I 74/US 6	Mississippi River	Construction Engineering Bridge (New); Misc.; Lighting	FY18	$17,169,000
IL-11-17	2	I-280	Mississippi River SW of Rock Island	P.E. (Phase II) P.E. (Consultant TSL)	FY16	$2,200,000
IL-15-04	3	IL 5/John Deere Rd	0.2 mi W of 38th St to 0.3 mi E of 70th St in Moline	Additional Lanes, Reconstruction, Retaining Wall, Intersection Improvement, Culvert Replacement, Culvert Extension	FY15	$48,000,000
IL-16-01	4	I 80/IL 110	Over BNSF RR 1.1 mi S of IL 5/92	Bridge Replacement	FY16	$8,000,000
IL-16-02	5	IL 80/IL 110	Over Barstow Rd 1.3 Mi S of IL 5/92	Bridge Replacement	FY16	$8,600,000
IL-16-04	6	I 80/IL 110	Over Cleveland Rd, Over IAIS RR, and Over Green River 1.9 Mi N of US 6	Bridge Replacement, Bridge Joint Repair	FY16	$10,200,000
IL-16-03	7	I 80/IL 110	0.8 mi N of Il5/92 to Henry Co. Line	Reconstruction, Resurfacing (INT-2nd)	FY16	$3,700,000
IA-15-11	8	I-280	Duck Creek 3.4 mi S of I-80 in Davenport (WB)	Bridge Replacement	FY15	$900,000
DA-11-11	9	River Dr & 3rd St	River Drive from 3rd St to Oneida Ave and 3rd St from Iowa Street to River Drive	Traffic Synchronization	FY15	$51,500
IL-15-08	10	US 6/IL 84/IL 84A	At IL 84 W of Colona	Intersection Reconstruction	FY15	$4,961,000

Figure 6.1 Highway System Project Recommendations



I-74 Mississippi River Crossing

As shown in Table 2.1 and Appendix A, the project anticipated to provide freight the greatest benefit is the enhancement of the I-74 Mississippi River Crossing. This project is actually the composite of several projects noted on the TIP and is the number one transportation priority in the Bi-State Region.[59]

The I-74 Iowa-Illinois Corridor project involves the replacement of the I-74 Bridge and over six miles of corridor improvements. The bridge itself is functionally obsolete with no shoulders. The Iowa bound span was built in 1935 and the Illinois bound span in 1959. The purpose of the I-74 Bridge Corridor Project is to:

- Improve Safety (to Reduce Crashes)
- Update Corridor Design and Improve Condition
- Improve Traffic Flow
- Improve Dependability of Travel (Travel Time, and Average Speed Through Corridor)
- Improve Opportunities for Other Modes of Transportation
- Enhance Opportunities for Economic Development

The reconstructed I-74 Bridge will have increased protection from seismic occurrences and barge collisions and is being built to last 100 years. The reconstructed I-74 Bridge will have full shoulders allowing for emergency vehicle access in the event of an incident. A rendering of the new bridge is shown in Figure 6.2

The I-74 Mississippi River Bridge Corridor project is positioned to receive local, state and Federal funding, as well as significant additional funds from federal sources. The total cost for the entire six-mile corridor is $1.25 billion, which includes $250 million in reserves and the $88 million already spent on engineering, ROW acquisition, demolition, and portions of the project corridor previously completed. The remaining costs for the central bridge section are estimated at approximately $750 million in the year of expenditure. While the project is listed in current Iowa and Illinois DOT Transportation Improvement Programs, additional discretionary funding would be used for the final year of bridge construction, FY 2021. In addition, the northern section of the corridor from Middle Road to 53rd Street is an independent project to be constructed following the bridge completion. The northern section has not been funded and has a cost of $115 million.

---

[59] Text has been adapted from Bi-State Regional Commission website, *I-74 Bridge on Track for Construction*, March 2015.

Construction on the project will begin in the river in late 2017 and all of 2018. The approaches will be constructed in 2019 and 2020 with the old bridge set for demolition in 2021.

Figure 6.2 I-74 Basket Handle True Arch Twin Bridge over the Mississippi River

Source: Iowa DOT

Identified, Unfunded Highway System Projects

The requirement that transportation plans be fiscally constrained was initially included in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and has been retained through MAP-21. Fiscal constraint ensures that projects included in the TIP are based on available funds or funds that are reasonably expected to be available based on projected revenues.

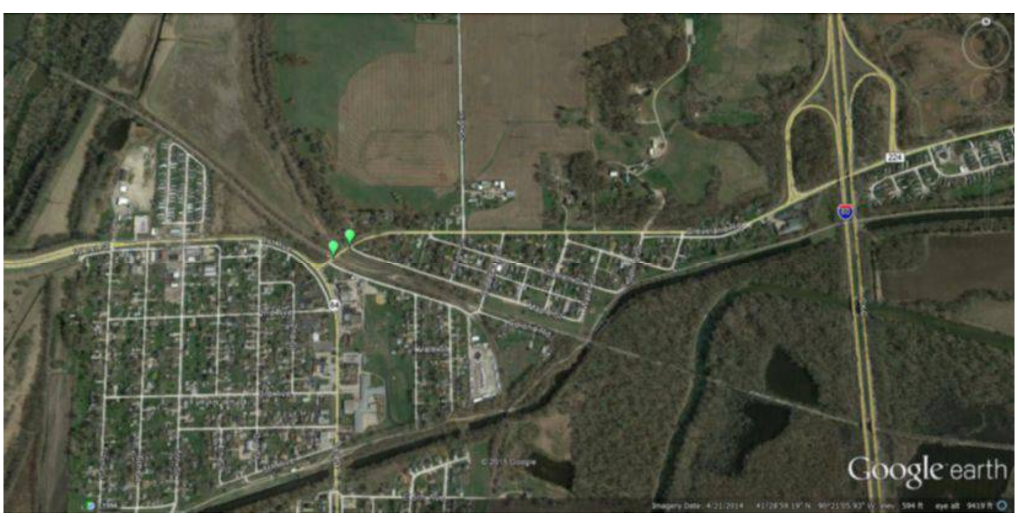
As part of this freight study, projects on the unfunded TIP were examined with respect to their ability to serve and enhance goods movement, in a manner similar to those noted in the previous section on the funded TIP. The following table identifies priority projects that are consistent with the *2040 Quad Cities Long Range Transportation Plan* but have not yet identified a funding source and are not included in the annual elements due to fiscal constraint requirements. These projects total just over $100M. All funding estimates are based on anticipated costs in year of expenditure dollars.

Table 6.2 Identified, Unfunded Highway System Projects

Project Number	Map ID	Project Route	Project Location	Project Description	Total Estimated Cost
BE-12-01	11	I-80	I-80/ Middle Road Interchange	Reconstruction	$29,000,000
IL-13-13	12	IL-84/ Colona Rd	Rock River to I-80, Colona	Reconstruct At-Grade Crossing, Widen to 4 Lanes, Interchange Reconstruction	$59,700,000
CV-13-01	13	US 6	Coal Creek Bridge to Schaffer Creek Bridge, Coal Valley	Engineering & ROW for Widening	$740,000
CV-13-04	13	US 6	Coal Creek Bridge to Schaffer Creek Bridge, Coal Valley	Widening	$12,000,000

As noted in the Section 5.0 Needs Assessment, grade level rail crossings are a safety concern for the Quad Cities. At-grade highway-railroad crossings often present impediments to efficient highway and rail flows, as well as safety concerns for local communities. One area of concern is Cleveland Road in Colona, IL, shown in Figure 6.3. This roadway is intersected by both Iowa Interstate Railroad and BNSF (#606977F and #065668W) in very close proximity. In addition, the crossings are only approximately one mile east of the Cleveland Road/I-80 interchange. Further exacerbating the issue is an additional crossing one-quarter mile away at Maple Street. Due to amount of rail traffic through this corridor (and potential future passenger rail traffic), suboptimal sight distance at the intersection, and community concerns, this intersection would be an ideal candidate for a grade crossing separation. As noted in Table 6.2, this project has been identified, and has been present on the Regions' LRTP for years, but has never been funded.

Figure 6.3 At-Grade Crossings in Colona, IL



Source: Google

Previously Unidentified, Unfunded Highway System Project Concepts

Identification of system needs, issues, and opportunities for the region were identified through the application of freight system performance measures developed as part of this study. In part this method was used to verify projects that have already been defined, but it also enabled the identification of "hot spots" that should be further examined to determine if projects may be warranted in the future.

The data reviewed to flag hot spots included bridge and pavement condition information, truck crash information, and truck speed/delay information. Based on these sources, project concepts shown in Table 6.3 were identified. These concepts have not been defined beyond this, and no costs have been identified.

Table 6.3 Previously Unidentified, Unfunded Highway System Project Concepts

Project Number	Map ID	Route	Location	Concept	Problem
N/A	14	I-80	I-80/ US 61 Interchange	Reconstruction	Unreliability
N/A	15	US 6	US 6/ Jersey Ridge Rd	Operational Improvements/ Spot Capacity Expansion	Unreliability
N/A	16	US 6	US 6/ Brady St/ Welcome Way	Operational Improvements/ Spot Capacity Expansion	Unreliability
N/A	17	US 67	US 6/ Brady St/ Main St	Operational Improvements/ Spot Capacity Expansion	Unreliability
N/A	18	US 67	Centennial Bridge	Reconstruction	Unreliability
N/A	19	I-280	I-280/ US 6 Interchange	Reconstruction	Unreliability
N/A	20	IL-92	Centennial Expy. (South of I-280 Interchange)	Spot Capacity Expansion	Unreliability
N/A	21	IL-92	Centennial Expy./ Andalusia Road	Operational Improvements/ Spot Capacity Expansion	Truck Crashes
N/A	22	IL-92	IL-92/ Barstow Rd	Operational Improvements/ Spot Capacity Expansion	Truck Crashes
N/A	23	IA-22	West of I-280	Routine Maintenance	Pavement Condition
N/A	24	IA-22	East of I-280	Routine Maintenance	Pavement Condition
N/A	25	IA-92	Mississippi River	Reconstruction	Bridge Reconstruction/ Replacement
N/A	26	IL-5	Rock River	System Expansion	Connectivity
N/A	27	I-80	I-80 Corridor	Spot Capacity Expansion	Capacity Expansion
N/A	28	US 61	City of Blue Grass	Upgrades to Telegraph and Loretta Roads to accommodate truck traffic	Pavement Condition/ Connectivity

6.2 NON-HIGHWAY SYSTEM INVESTMENTS

Non-highway system projects are a bit more difficult to identify and describe due to the private sector nature of these freight systems and lack of data in the public domain to quantify the need. As such, these projects are generally described here, and do not have specific costs assigned. Like the highway system investments noted in the previous section, these projects have been selected to meet the needs, issues and opportunities identified during Task 2, and were reviewed by key project stakeholders during the 1/2 day charrette. Each of these projects will rely on partnership with private sector representatives to verify project needs, develop project concepts, and secure project funding, as warranted.

Rail

Four project concepts have been identified to enable the Bi-State Regions rail system to better serve industry needs. These projects include:

- **Intermodal, transload, and/or consolidation facility.** The lack of major rail facilities within the Bi-State Region affects regional mobility. The Bi-State Region's close proximity to Chicago encourages rail operators to serve the Quad Cities out of the larger market, despite the Bi-State Region's role as a production hub. The nearest major classification yards to the Quad Cities are in Savanna and Galesburg, IL. The nearest intermodal terminal is the UP Global III Park in Rochelle, IL - approximately 90 miles east. The lack of these facilities in the Bi-State Region present significant mobility challenges to shippers in the metropolitan area as they must contend with both Quad Cities and Chicago congestion. Also, the absence of these facilities does not allow the region to aggregate freight rail demand from surround communities which would help to attract more competitive service. This problem is likely exacerbated by the orientation of the Bi-State Region's rail infrastructure. At a subregional level, production and manufacturing clusters are spread throughout the Quad Cities. Many of these companies have their own rail spurs granting them access to the system. Though traditional, this setup works to dilute the region's freight rail demand because it is spread over a large geographical area. From the perspective of the Class I carriers, serving all of these disparate points of demand may not be cost efficient. As a result, Bi-State shippers face less than competitive service, and, in some cases, rely on truck for additional capacity to supplement their rail service.

  Intermodal, transload, and/or bulk consolidation facilities that allow goods to shift efficiently between modes should be explored in region. The Bi-State Regional Commission can serve as the coordinating entity to bring public and private partners together to make the "business case" for new or expanded facilities in the region, ensure the long-term feasibility of the market, and pursue funding and investment, as warranted.

- **Rail bridges and lines 286K-compliant, vertical and horizontal clearance.** Infrastructure condition directly affects freight mobility within and through the Bi-State Region. On the rail system, lines that are unable to accommodate standard 286,000 lb. (286K) railcars, and that have limited operating speeds along certain sections of the system, limit the efficiency of rail service and the options available to shippers with rail spurs on those lines. Track unable to hold heavier loads require trains to either be split into multiple trains or moved at a much slower speed. For instance, upgrading the non-286K track in the CP/DM&E Eldridge subdivision would increase the capacity of this line and decrease delay. Rail bridges are also a source of delay due to speed restrictions, lack of ability to handle 286K railcars, clearance limiting maneuverability, and general infrastructure condition. The absence of 286K-compliant rail may also limit the opportunities for industrial and freight-oriented economic development along a corridor. As the inventory of rolling stock used by business becomes increasingly heavier, it is important that all rail lines in the Bi-State Region be able to handle these cars.

The Bi-State Regional Commission should work with local railroads to pursue upgrades that increase the efficiency and connectivity of the regional rail system, including updating railroad infrastructure to handle 286,000 lb. railcars and increased speed in slow-zones and on bridges.

- **New Rail Bridge over Mississippi River.** As noted above, rail bridges in the Bi-State Region are significant freight bottlenecks. At the Arsenal Bridge (IAIS), rail traffic is restricted to 10 mph which results in substantial delays. Besides limited operating speeds, barge movements often delay rail traffic across this bridge and it is not equipped to handle rail cars with standard 286,000 lb. loads. As there are few rail bridges for multiple railroads to use, when these delays occur, there are no options for railroads and the system shuts down.

  The Bi-State Regional Commission should work with the railroads and local industry to determine the potential benefits of additional facilities in the region, especially a new railway river crossing that can be used by all railroads in the region.

- **Rail spurs and connections from Iowa Interstate Railroad.** Iowa Interstate Railroad (IAIS), who is the primary short line provider for companies in the region without a direct Class I railroad connection, needs efficient and reliable connections with other railroads to provide a high level of service. Actions by the Class I railroads to limit service immediately impact customers on the line, and in turn impacts IAIS' operations. For example, if a shipper can't take all of their cars at once and there is a lot of congestion, the railroad can embargo to control traffic movements and congestion on the Class I lines. In the recent past, IAIS has worked on options for additional storage and transloading to mitigate these problems in the region, though permanent solutions are often capital intensive.

The Bi-State Regional Commission should work with local businesses and railroads to increase access to rail facilities in the region including transload facilities and rail spurs, as applicable.

Water

One project concept has been identified to enable the Bi-State Regions waterway system to better serve industry needs.

- **Intermodal, transload, and/or consolidation facility.** Similar to rail system, the presence of facilities that can handle and consolidate goods for transport on the waterway system will increase the attractiveness of the region to industries by allowing them to have multiple options for transporting goods. Intermodal, transload, and/or bulk consolidation facilities that allow goods to shift efficiently between modes should be further explored in region. Already one company in Muscatine, IA is exploring the potential for expanded port facilities and capabilities (including Container on Barge) on their property as a means to provide system redundancy and to help take trucks off the road.

  The Bi-State Regional Commission can assist in this effort to bring public and private partners together to help make the "business case" for new or expanded facilities in the region, ensure the long-term feasibility of the market, and pursue funding and investment, as warranted. The Commission can also serve as an advocate for waterway investments, and support innovative funding and public-private partnerships (such as the 3P's being pursued in Illinois for waterway infrastructure improvements) to invest in the regional waterway system, inland waterway port infrastructure, shipping channel maintenance, and lock and dam infrastructure.

7.0 Supporting Strategies

This section recognizes that physical infrastructure projects, alone, will not be sufficient to address the numerous needs that exist internal and external to the Bi-State Region. An array of supporting strategies have been identified to address freight system needs and issues related to policy, organization, partnerships and funding. In this report, strategies and actions are identified to either mitigate a negative condition or to seize an opportunity. The following subsections are organized by strategy type:

- Physical Infrastructure
- Operations
- Policy, Organization, and Partnerships
- Funding

Each subsection outlines general recommendations, timelines, lead agencies and agency partners, and outlines specific strategies to address issues in each of these areas. Strategies are summarized by type and applicable mode in Table 7.1.

7.1 Physical Infrastructure

Physical infrastructure projects are key to meeting both the performance objectives of the *2040 Quad Cities Long Range Transportation Plan*, as well as the goals of this Bi-State Region freight plan. Highway and rail infrastructure, the waterway system, and the region's rail, water, air, and multimodal terminals literally form the links between businesses and customers that drive the region's economy. In particular, the highway system not only provides direct links for freight moving via truck, but also serves as the first- and last-mile connection between movements on the rail, water, and air systems. Locations where industries are "clustered," and hence have high volumes of truck traffic, are particularly at risk for deterioration over time.

As noted in the LRTP, the region is focused on emphasizing projects that preserve and maintain the existing system and key corridors. This is also a key component of ensuring system resiliency and reliability, and maintaining a system with multiple alternatives (especially among different modes) that is less prone to disruption versus one in disrepair or that relies on a single corridor. Preservation includes addressing existing backlogs, in particular on the waterway system. For example, locks on the waterway system have significant maintenance needs. According to the American Society of Civil Engineers (ASCE) Annual Infrastructure Report Card, the inland waterways in the U.S. received a D- for the condition of the system. Forty-seven percent of all locks maintained by the USACE were classified as functionally obsolete in 2006.

The physical infrastructure system plays a key role in providing access and mobility for the region. In particular, access to multimodal freight hubs is important for supporting these goals. Yet although rail, water, and air access is available within the region to a number of industries, there are others who are not served (or not served at the level they are looking for) or do not have multimodal options. Strategies relating to multimodal access are also in line with a number of LRTP performance objectives, including "Improving air freight, barge, rail, and truck terminals to enable competitiveness and address freight reliability and capacity needs", and "Improving connections to existing modal facilities – airports, barge, rail, and motor freight terminals…"

A number of strategy recommendations have been developed to support the physical infrastructure as part of this freight plan. Some can be accomplished (or at least begun) in the short term, such as ensuring that roadways and grade crossings are well maintained. Others, such as a new multimodal hub or rail bridge will require longer term investment. Many of these projects will require partnership between the Bi-State Regional Commission, Illinois and Iowa DOTs, railroads, USACE, private industry, Chambers of Commerce, and local government. For many of these projects, the Bi-State Regional Commission will be unable to accomplish them on their own, but should play an important and key role to advocate for and coordinate project planning and development among these partners.

- Timeframe: Short to Long-Term
- Lead Organization: Bi-State Regional Commission, Illinois DOT, Iowa DOT, USACE, Railroads
- Agency Partners (other than leads): Local Industry, Chambers of Commerce, Local Municipalities
- Strategy Recommendations:
  - **Develop intermodal and multimodal facilities that allow goods to shift efficiently between modes within the region.** The Bi-State Regional Commission can serve as the coordinating entity to bring public and private partners together to make the "business case" for new or expanded facilities in the region, ensure the long-term feasibility of the market, and pursue funding and investment, as warranted.
  - **Increase safety and mitigate noise at road/rail at-grade crossings.** Projects that increase the safety and reduce the negative impacts of at-grade crossings, including grade-separation projects, should be prioritized in the region, and on the TIP.
  - **Increase the reliability of the waterway system.** The Bi-State Regional Commission can serve as an advocate for waterway investments, and support innovative funding and public-private partnerships to invest in the regional waterway system, inland waterway port infrastructure, shipping channel maintenance, and lock and dam infrastructure.

- **Increase last-mile connectivity to local businesses.** Projects that increase connectivity between local business clusters, multimodal facilities, and the highway system should be prioritized. The Bi-State Regional Commission should work with local businesses and railroads to increase access to rail facilities in the region including transload facilities and rail spurs, as applicable.
- **Expand railway infrastructure and build a new Mississippi River railway crossing.** Rail service in the region is limited by the railway infrastructure and in particular the age of existing rail connections. The BSRC should work with the railroads and local industry to determine the potential benefits of additional facilities in the region, especially a new railway river crossing.
- **Maintain important roadway freight corridors and prioritize projects that mitigate chokepoints and reduce congestion on these corridors.** Projects that advance or maintain the condition of the freight system, or that mitigate freight system congestion should be prioritized.
- **Update railroad infrastructure to handle 286,000 lb. railcars and increased speed in slow-zones and on bridges.** The Bi-State Regional Commission should work with local railroads to pursue upgrades that increase the efficiency and connectivity of the regional rail system.

Additional details on the strategy recommendations to address the physical system needs and issues are found in Table 7.1.

7.2 Operations

Operational strategies are key to supporting the Bi-State Region's freight system. Good operations can help maintain and make best use of existing infrastructure, improve rail access, as well as increase efficiency and address issues of reliability and resiliency. Operational strategies can also help achieve the region's overall goal of enhancing the environment and improving the quality of life through promoting the most energy efficient and lowest-emission freight modes, as well as encouraging technologies that help achieve these goals.

A number of shippers in the Bi-State Region are captive to one rail carrier. Ensuring that the region's industries are served by competitive rail operations that provide fair pricing is critical to efficient goods movement. Due to the current congestion on Class I rail lines and focus on unit trains, there is an opportunity for the Bi-State Region to leverage its access to the short line railroad, Iowa Interstate Railroad (IAIS) to provide alternative shipping options through either transload/consolidation facilities, or access to eastern railroads through Chicago connections.

Operational strategies can also help address issues of resilience and reliability of the system – both for day-to-day and long term connectivity, as well as for challenges due to emergency events such as extreme weather, accidents, or other catastrophic events. Planning should be done ahead of time to understand the region's critical supply chains and bottlenecks so that actions can be taken effectively, such as proactive rerouting of hazardous materials.

- Timeframe: Short-Term
- Lead Organization: Bi-State Regional Commission, Railroads
- Agency Partners (other than leads): Illinois DOT, Iowa DOT, Local Industry, Chambers of Commerce, Local Municipalities
- Strategy Recommendations:
  - **Support strategies to expand rail alternatives.** Many Bi-State Region industries are captive to a single rail shipper. Increasing access to additional rail options will increase competition and ensure more competitive rates and service for local industries.
  - **Continue pursuing programs and projects that reduce emissions.** This includes encouraging cleaner trucks, "green" locomotives, alternative fuels use, mode shift to lower emitting use, idle reduction technology, and others.
  - **Encourage system resiliency and develop disaster contingency plans.** If a catastrophic event occurs, the Bi-State Region should have plans and actions to ensure the highest level of emergency response possible, including proactive hazardous materials routing in advance of an incident.[60]

Additional details on the strategy recommendations to address operational needs and issues are found in Table 7.1.

7.3 Policy, Organization, and Partnerships

Freight is inherently a multimodal, multijurisdictional concept that involves both the public and private sectors. To that end, policy, organization, and partnerships are three aspects of key freight strategies to engage and enthuse freight-related agencies, businesses, and stakeholders, and to ensure the ability to efficiently and effectively transport goods and support the regional economy. As part of this plan, public and private sector representatives, including State DOTs, federal agencies, industries, carriers, and associations in the Bi-State Region were engaged to give input and feedback through the development of this freight plan. These stakeholders should be engaged as valuable partners during implementation of these strategies, and are essential to successful outcomes.

---

[60] Note that communities are taking steps to prepare for disaster. Both Scott and Rock Island/Henry Counties have emergency evacuations plans with some routing recommendations. These are safety sensitive plans held by the County Emergency Management Agencies. Each County also has hazard mitigation plans in place to address reducing hazards, man-made and natural

As the Bi-State Regional Commission does not directly operate or maintain the multimodal freight infrastructure in the region, partnerships are crucial both to mitigating known issues and planning for the future. For example, the maintenance and improvement of the inland waterways is the responsibility of the U.S. Army Corps of Engineers (USACE), and is funded from the Harbor Maintenance Trust Fund, the Inland Waterways Trust Fund (collected as a fuel tax on inland waterway traffic), and other appropriations and cost-sharing structures. Rail and aviation projects also require coordination with and various levels of partnership with the owning and operating railroads, the FAA, and airports. The Bi-State Regional Commission, along with State DOTs, can serve important roles in coordinating, prioritizing, advocating for, and/or sponsoring projects that benefit the region.

Additionally, in order to sustain the freight-related businesses and industries that currently exist in the region, while encouraging new ones to locate within the region, it is essential that employers have access to a large pool of potential employees that are appropriately trained in the skills required for freight-industry jobs. In particular, the trucking profession has difficulty attracting the next generation of drivers due to many factors including long workdays and much time on the road away from home. Programs in cooperation with community colleges and other educational institutions, work training programs through the private sector, or others are important to ensure that an appropriate workforce is available for transportation needs.[61]

- Timeframe: Can begin in the short-term, but should continue over the long-term
- Lead Organization: Bi-State Regional Commission, Illinois DOT, Iowa DOT
- Agency Partners (other than leads): Railroads, Local Industry, Chambers of Commerce, Local Municipalities, Local Educational Institutions
- Strategy Recommendations:
  - **Support existing freight clusters and new freight focused development.** Industries located in freight "clusters" can share horizontal and vertical efficiencies through efficient use of the transportation system and reduced supply chain costs. The Bi-State Regional Commission should support development and re-development of industry clusters in the region, and in particular near existing or planned transportation facilities.
  - **Consider freight in overall project planning across modes.** The impacts to the freight system and local industry should be a consideration when prioritizing and making investments in the transportation system.
  - **Collect freight data.** Due to the large private sector community using the freight system it is often difficult to fully understand system operations

[61] Note that some community colleges locally already offer programs such as truck driver training and certificates in logistics and supply chain management.

and needs. Improved data collection (e.g., truck counts) and data provided by the private sector could help government to do better freight planning.

 - **Cultivate public and private sector dialog.** The Bi-State Regional Commission should convene regular and on-going opportunities for public and private sector freight stakeholders to discuss freight-related issues and priorities for the region. The Bi-State Regional Commission should also engage and partner with federal, state, regional and local public agencies, and with producers, shippers/receivers, carriers and other private sector freight stakeholders to address the regions freight issues together.
 - **Promote workforce development programs for the transportation industry.** Programs in cooperation with community colleges and private sector can be developed to ensure workforce is available for industry needs (e.g., truck drivers).

Additional details on the strategy recommendations to address policy, organization, and partnership needs and issues are found in Table 7.1.

7.4 FUNDING

There is an ongoing need for national freight transportation policies, including guidance and funding mechanisms to allow states to successfully implement their own freight plans. MAP-21 legislation increases the Federal role in freight transportation policy in several ways, including by charging the U.S. DOT with establishing a national freight network, establishing performance measures, and developing a national freight strategic plan. While a historic step forward, the current legislation nevertheless does not address the complete freight "system," which would require true multimodal integration, identification of multimodal freight routes, and performance measures and standards that go beyond our nation's highways. Continued advocacy and support for federal and state freight funding is also necessary to advance this important topic.

- Timeframe: Advocacy and prioritization should begin in the short-term to prepare for short- and long-term opportunities
- Lead Organization: Bi-State Regional Commission, Illinois DOT, Iowa DOT
- Agency Partners (other than leads): Railroads, Local Industry, Chambers of Commerce, Local Municipalities, Local Educational Institutions
- Strategy Recommendations:
  - **Advocate for development of a Regional Port Authority**. In the Bi-State Region there is momentum towards development of a Port Authority. This Authority could advocate for multimodal freight issues, plan, design, operate, and maintain infrastructure, and have revenue generating ability so that it would be self-funded.

- **Advocate for a dedicated source of funding for freight infrastructure**. The Bi-State Regional Commission can serve as an advocate for developing programs, both at the national and state levels. This could be led by a Regional Port Authority, when developed.
- **Identify and prioritize major freight system investments and position the region to apply for grant funds**. To be competitive in federal grant programs, it is vital to have prioritized projects and be able to articulate costs and benefits to the region, and to the nation as a whole. The Bi-State Regional Commission can play a role in developing these opportunities and to align regional public and private stakeholders around priority projects. This could be led by a Regional Port Authority, when developed.

Additional details on the strategy recommendations to address funding issues are found in Table 7.1.

Bi-State Region Transportation Funding

MPOs receive federal and state funding for transportation projects, which are matched locally and summarized annually in the region's Transportation Improvement Program (TIP). There are a number of programs distributing these funds, including the Surface Transportation Program (STP), and others. In the Bi-State Region, in order to move forward, freight transportation projects should appear in the region's long range plan, be identified and prioritized in the TIP (as funds are available), and similarly appear in the Iowa and Illinois State Transportation Improvement Programs (STIP), which pull projects from regional documentation.

The Bi-State Region's transportation programs fall under two TIPs – one covering the Quad Cities MPO planning region, and the other which is Iowa Region 9, which covers some of the more rural areas of the Bi-State Region. These plans outline how transportation dollars are spent, and provide forecast detail for the STP program. Absent dedicated freight funds, STP funding – which can be spent on the NHS - most closely aligns with the highway freight infrastructure projects identified earlier in this Tech Memo. Shown in Figures 7.1 and 7.2 are the estimated available STP funds for the Quad Cities areas of Illinois and Iowa based on current targets and programmed projects. Figure 7.3 reflects similar information for Iowa Region 9.

Figure 7.1 Illinois Portion of Quad Cities Federal Aid – STP Program Funding

ILQC Federal Aid – Surface Transportation Program (STP)					
	2015	2016	2017	2018	2019
STP Target*		$1,151,353	$1,151,353	$1,151,353	$1,151,353
Total Available for Programming		$6,393,106	$552,928	$856,631	$1,367,307
Total STP Programmed		-$6,991,531	-$847,650	-$640,677	$0
STP Balance**	**$5,241,753**	**-$598,425**	**-$294,722**	**$215,954**	**$1,367,307**

* Funding beyond 2015 is subject to reauthorization of MAP-21

** STP funding has been programmed by the Transportation Policy Committee through FFY2020 for the Illinois Quad Cities. Solicitation of projects is anticipated no earlier than late Fall 2015.

Source: DRAFT Bi-State Regional Commission FFY16-19 Transportation Improvement Program documentation

Figure 7.2 Iowa Portion of Quad Cities Federal Aid – STP Program Funding

MPO IAQC Federal Aid - Surface Transportation Program (STP)					
	2015	2016	2017	2018	2019
STP Target*		$3,658,915	$3,659,000	$3,659,000	$3,659,000
Total Available for Programming		$7,033,832	$4,492,710	$5,268,761	$7,463,543
Total STP Programmed		- $6,200,122	- $2,882,949	- $1,464,218	- $7,250,800
STP Balance**	**$3,374,917**	**$833,710**	**$1,609,761**	**$3,804,543**	**$212,743**

* Funding beyond 2015 is subject to reauthorization of MAP-21

** STP funding has been programmed by the Transportation Policy Committee through FFY2019 for the Iowa Quad Cities. Solicitation of projects is anticipated no earlier than late Fall 2015.

Source: DRAFT Bi-State Regional Commission FFY16-19 Transportation Improvement Program documentation

Figure 7.3 Iowa Region 9 Federal Aid – STP Program Funding

Balance Carried Over From 2015*		2016	2017	2018	2019
STP Target		$1,315,000	$1,315,000	$1,315,000	$1,315,000
Total Available for Programming		$1,151,397	$1,169,093	$1,506,635	$1,190,784
Total STP Programmed		-$297,304	-$977,458	-$1,630,851	-$1,579,946
STP Balance*	**-$163,603**	**-$145,907**	**$191,635**	**-$124,216**	**-$389,162**

* The balance for FFY15 reflects project(s) funded/underway

Source: DRAFT Iowa Region 9 FFY16-19 Transportation Improvement Program documentation

As shown in the preceding figures, STP funds are programmed to allow multiyear programming of funds to maximize project efficiencies. Given limited resources this is an effective way to program funds, however it does not allow for short-term flexibility that many freight projects require.

The cost for freight transportation improvement projects identified as part of this freight plan are in excess of the amounts available to the Bi-State Regional Commission, and are multimodal in nature, while project funding in the TIP is generally constrained to surface transportation, primarily highway projects. To successfully complete the projects and follow the strategies outlined in this document, it will be important for the Bi-State Regional Commission to not only identify and prioritize freight-related projects in the TIP, but also seek out opportunities for alternate funding, particularly for non-surface transportation projects.

There is increased focus on freight movement and the multimodal system at the State and Federal level, which may eventually lead to a national freight policy that includes policy and provisions for establishing and maintaining the freight system. Many states have programs that offer financial assistance to short line freight railroad operators, for example. Other programs offer tax incentives for expansion of facilities, spurs or lines for new or expanded business development.

At the current time, funding for major projects is available through the U.S. DOT's Transportation Investment Generating Economic Recovery discretionary grant program; however, the program is highly competitive for a relatively small pot of money. The 2014 program received 1,400 applications totaling $57 billion in project costs—for only $1.5 billion in available grants. Another program that can help advance qualified large-scale projects, such as bridges or major infrastructure investments is the Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides federal credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to finance surface transportation projects of national and regional significance.

Another method for funding is to develop public-private partnerships. In order to effectively create PPPs, improved communication, coordination and formalized partnerships between public and private stakeholders are needed. Much non-highway infrastructure, particularly freight rail and terminals, and water ports, are privately owned and operated. This makes the need for public/private cooperation essential to addressing many freight needs

7.5 Summary of Recommended Strategies

Table 7.1 provides a summary of all recommended strategies described in this section, including the applicable mode, lead and partner organizations, and a summary timeframe.

Table 7.1 Summary or Bi-State Region Freight Strategies

Category	Strategies/Actions	Mode	Lead Organization	Partners	Near Term (0-4 Years)	Longer Term (5-20 Years)
Physical Infrastructure						
	Develop intermodal and multimodal facilities that allow goods to shift efficiently between modes within the region.	Multimodal	BSRC	Iowa and Illinois DOTs; RRs; USACE; Local Industry; COCs		X
	Increase safety and mitigate noise at road/rail at-grade crossings.	Road, Rail	BSRC	Iowa and Illinois DOTs; RRs	X	
	Increase the reliability of the waterway system.	Water	USACE	BSRC; Iowa and Illinois DOTs	X	X
	Increase last-mile connectivity to local businesses.	Highway, Rail	BSRC, RRs	Local Industry; Iowa and Illinois DOTs	X	
	New and expanded railways and rail corridors and rail bridges.	Rail	RRs	BSRC; Local Industry; Iowa and Illinois DOTs		X
	Maintain important roadway freight corridors and prioritize projects that mitigate chokepoints and reduce congestion on these corridors.	Highway	BSRC	Iowa and Illinois DOTs	X	
	Update railroad infrastructure to handle 286K railcars and increased speed in slow-zones and on bridges.	Rail	RRs	BSRC, Iowa and Illinois DOTs	X	
Operations						
	Support strategies to expand rail alternatives.	Rail	RRs	BSRC, Iowa and Illinois DOTs	X	
	Continue pursuing programs and projects that reduce emissions.	Highway	BSRC	Iowa and Illinois DOTs, State and Local Trucking Associations	Already underway	
	Encourage system resiliency and develop disaster contingency plans.	Highway, Multimodal	BSRC	BSRC; Local Industry; Iowa and Illinois DOTs	X	

Category	Strategies/Actions	Mode	Lead Organization	Partners	Near Term (0-4 Years)	Longer Term (5-20 Years)
	Coordination of truck routes/planning in focus truck movements and minimize community impact	Highway	BSRC	Local Governments	X	
Policy, Organization, and Partnerships						
	Support existing freight clusters and new freight focused development.	Multimodal	BSRC	Local Industry; COCs; Local Governments	X	
	Consider freight in overall project planning across modes.	Multimodal	BSRC; Iowa and Illinois DOTs		X	
	Collect freight data.	Multimodal	BSRC	Iowa and Illinois DOTs; RRs; USACE; Local Industry	X	
	Cultivate public and private sector dialog.	Multimodal	BSRC	Iowa and Illinois DOTs; RRs; USACE; Local Industry; COCs; Local Governments	X	
	Promote workforce development programs for the transportation industry.	Highway, Multimodal	Local Educational Institutions	BSRC; Local Industry;	X	
Funding						
	Advocate for development of a Regional Port Authority.	Multimodal	BSRC	Local Industry; RRs; USACE; COCs	X	
	Advocate for a dedicated source of funding for freight infrastructure.	Multimodal	BSRC	Iowa and Illinois DOTs; RRs; USACE; Local Industry; COCs	X	
	Identify and prioritize major freight system investments and position the region to apply for grant funds.	Multimodal	BSRC	Iowa and Illinois DOTs; RRs; USACE	X	

8.0 Strategy Evaluation and Expected Outcomes

As identified in this Plan, the efficiency of freight transportation can be improved in many ways to better serve the needs of the economy and society. However, it is often difficult to choose between the many options available because of the wide range of variables and uncertainties involved. The private and public benefits of these projects need to be considered, for many years into the future, to begin to understand their impacts and identify the types of projects that most merit public attention and investment.

This section facilitates this process in the Bi-State Region by describing the merits of four types of potential freight infrastructure projects. Challenges and opportunities in the movement of freight are discussed, based on local information, to identify the project impacts and characteristics that would be the most beneficial for the region. The objective is to provide information to guide further project planning investigations. Case studies of comparable projects are also presented to highlight best practices. The four project types considered are:

- New rail facility – bulk transload/transflow,
- New rail facility – intermodal containers,
- Rail crossing grade separation (assumed at Colona), and
- New river crossing – rail bridge.

After each project type is discussed in its local context, a parametric benefit-cost analysis is used to approximate its investment value as a function of the key demand and cost variables involved. The objective is to provide a sense of the characteristics of the project that would lead to social benefits that are large enough to rationalize initial investment costs. A key metric displayed is the level of demand per million dollars of investment required to achieve benefit-cost ratios greater than 2 and 4. This was calculated using comparable assumptions to those used in applications for the U.S. DOT's TIGER Grant program. Principally, it relies on monetizing impacts using widely accepted valuations. Our experience developing these types of analysis for freight projects around the U.S. is that the results are fairly robust once the demand and the capital costs have been determined. This produces good approximations of the results that would be observed in more detailed studies. The key benefit areas considered are:

- State of good repair – avoided maintenance costs,
- Economic competitiveness – reduced user costs,
- Sustainability – reduced pollution, and

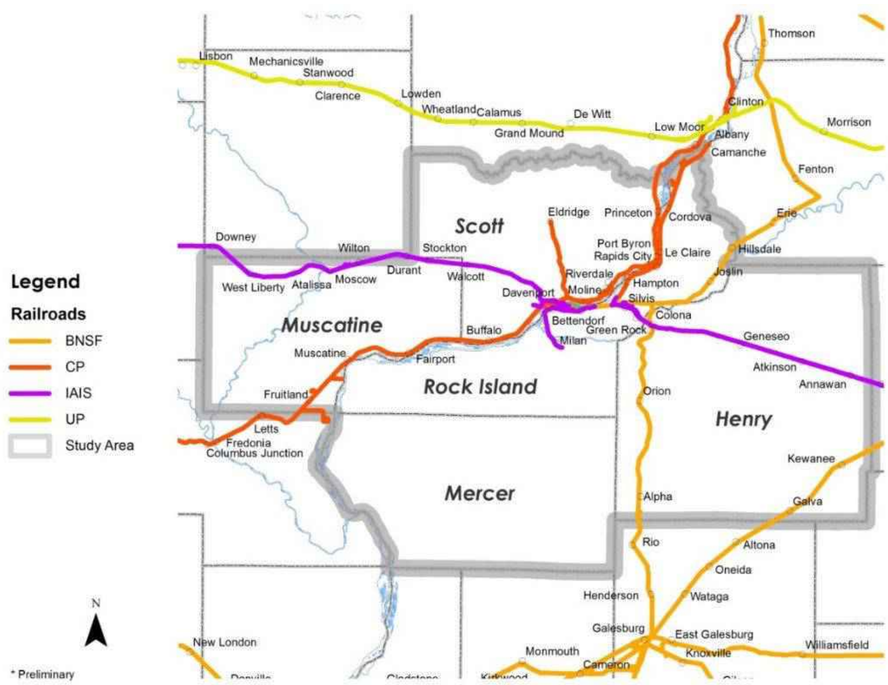
- Safety – reduced crashes.

This approach allows for project benefits and costs to be considered in the initial stages of the project selection process without having to define and conceptualize actual projects at a level that may not be possible at present. The parametric benefit-cost analysis indicates the level of demand required for different types of projects to be viable. This, combined with the contextual description of how the projects could be implemented in the Bi-State Region, serves as a useful starting point for discussing freight projects and choosing features that are most relevant for the region. The next step would be to conduct a market analysis to determine the actual demand for these projects, and see if the needed capacity can actually be delivered at low enough capital costs for the project to be favorable from a public benefits perspective.

8.1 NEW RAIL FACILITY – BULK TRANSLOAD/TRANSFLOW

The region is served by three railroads: BNSF, CP/DM&E and IAIS. There are two heavily used east-west corridors across the Midwest that flank the Bi-State Region – the UP on the north and the BNSF on the south. The location of the Bi-State Region is reasonably convenient for rail freight but has some constraints – it is 20 to 30 miles to truck finished goods to the UP line in Clinton, IA.

Figure 8.1 Map of Railroads in Bi-State Region



Source: Oak Ridge National Laboratory (ORNL) Operational Network, National Transportation Atlas Database (NTAD)

Many rail freight users are served by bulk transload/transflow terminals. At these terminals, liquid or dry bulk commodities are transferred between railcars and other modes – principally truck and/or barge. Study participants cited a bulk transload/transflow terminal as an important opportunity for the region. The Bi-State Region has a number of aspects that make it a good candidate for a new bulk rail facility: infrastructure on water, roads and railroads; a high number of bulk goods driven industries; and available land.

Study participants showed a strong preference for a new bulk facility in the region. Each manufacturing plant or industry needs truck or rail freight service to survive – either to deliver raw input goods or to ship the final product. One important success story described later in this section has three freight modes active (truck, rail and barge), and a liquid gas pipeline capability to barge. There is knowledge among industry leaders that having a rail freight option saves money.

The value of a new rail facility for bulk would depend on the following:

- **Commodities** - the types of commodities hauled in and out of the region – economy of scale for bulk goods movement
- **Skilled Workers** - the type of employment and the skill sets of workers prevalent in the region – surrogate for the bulk commodities that could be shipped out of a new rail facility
- **Industrial Sites** - the size and proximity of the industrial sites – to achieve economy of scale
- **Railroads** - the working system of the railroads (BNSF, CN and IAIS) for a collaborative approach to serving industries that work with bulk shipments.

A specific site has not been identified for this potential project, so a generic location was utilized in the benefit-cost analysis development process.

Market Factors

The FHWA Freight Analysis Framework commodity flow database (FAF, described in Section 2.0) shows that the top rail demand drivers by weight in the region are coal, cereal grains, food products, alcoholic beverages (ethanol), and base metals.

Of these, coal can be discarded because it is delivered directly to coal burning plants in the region, and it is decreasing in volume as part of an ongoing energy shift to natural gas. Looking past coal, the opportunities for a bulk rail facility include both inbound and outbound loads – especially agricultural and manufactured products -- as identified in industry surveys and confirmed by the ReferenceUSA industry cluster data. The following conclusions can be drawn from the ReferenceUSA industry data:

- Some industry clusters have formed along transportation corridors such as interstate highways and the Mississippi River, though many sites are located stand-alone in rural locations.

- Overall, the Bi-State Region is defined as a production location—it has a number of manufacturing operations in the area. The raw materials used in production may come from the immediate area, such as agricultural crops and farm animals, or can arrive in large bulk quantities by rail. Customers might be located in the area, in North America or overseas. Warehouses, distribution centers, and transportation service providers are often located near large operations in support functions. In addition, production operators that use similar freight services and/or input products may select to locate nearby.
- The key production clusters are:
  - agricultural crops and farm animal processing,
  - steel fabrication operations, and
  - transportation equipment production.

This information suggests there are many opportunities for a new rail bulk facility in the region, and that it probably should be designed to efficiently handle truck, rail, and barge-related traffic. A recent report from a town in the Bi-State Region (Milan, IL) indicated that:[62]

- There are in place 46 barge terminals in the region that, by definition, transfer bulk commodities. 21 of these have rail connections.
- The facility owners have no apparent reason to form a joint venture with each other for a shared bulk rail facility. The railroads cover the region fairly well and activating your own spur makes better sense.
- In the Quad Cities area, a successful bulk terminal is not designed around rail, only. It is most efficient if it has three modes: rail, highway, and water. This approach uses the infrastructure of the region to its fullest, allows year-round activity, and ensures that the shipper is obtaining the very lowest shipping cost.

From the economic profile of agricultural and manufactured goods the following observations stand out:

- For low value non-perishable agricultural goods in and out (fertilizer) it is most efficient to use truck-rail-barge for both directions.
- For high value and/or perishable agricultural goods in and out (chicken-to-meat) it is most efficient to use truck in and freezer truck out.
- For low value raw materials in and high value manufactured goods out (furniture, specialized metal goods) it is most efficient to use rail or truck in and truck out. The final products need to be protected from damage and also require just-in-time delivery, reliability, specific destinations as part of supply chain manufacturing, and therefore are less conducive for rail transportation.

---

[62] http://www.milanil.org/docs/MilanCommunityProfile_Dec%202011.pdf

The IAIS, because it is one of the few regional railroads that connects to the entire Class I railroad network, could be an important asset to the Bi-State Region.

Success Story

An important success story for the new construction of a bulk facility is Rock Island River Terminal Corp in Rock Island, IL[63], completed in 2013. The 66,240-square-foot facility unloads and stores bulk fertilizer — offering barge loading/unloading, with rail and truck transfer. The terminal also loads and unloads a variety of other materials for transfer to truck and rail. Some of the reasons why this project succeeded include:

- Serves mainly fertilizer market, focusing on a single product.
- Access to the IAIS, CP/DM&E and BNSF railroads was planned in advance.
- Has modern hoisting/conveying/storage systems that are faster and cheaper.
- Connected to truck, rail spur (newly built), and water. The rail connection allows year-round shipping of commodities during the 2-3 months of the year that the river cannot be used. True multi-modal, keyed to the weather and realities of the region.
- Covered truck bays on two sides of the facility, reducing delay.
- City of Rock Island partnered with the Rock Island River Terminal Corp to build. Public-private win-win.
- City of Rock Island receives $175,000 in annual property taxes.
- 10 employees expanded to 15 after completion. Significant economic development has been generated.
- Land was leased from the city until 2095.

Benefit-Cost Valuation

The economic efficiency of a potential bulk rail facility will depend critically on: (1) the freight demand the facility is able to attract, and (2) the costs of building and operating the facility. Other variables are also important, but these two will likely have the largest impact. A benefit-cost framework was used to quantify the favorability of investing in this type of facility, as a function of these two variables. For the other factors the analysis assumed:

- Truck miles avoided per shipment: 100 miles
- Average tons per truckload: ~22 tons
- Growth of bulk market after 4 year ramp-up: 2.5%

---

63 http://qctimes.com/business/new-ri-barge-terminal-expands-capacity/article_c2297f7b-566a-516f-9d55-6755e99bd54f.html.

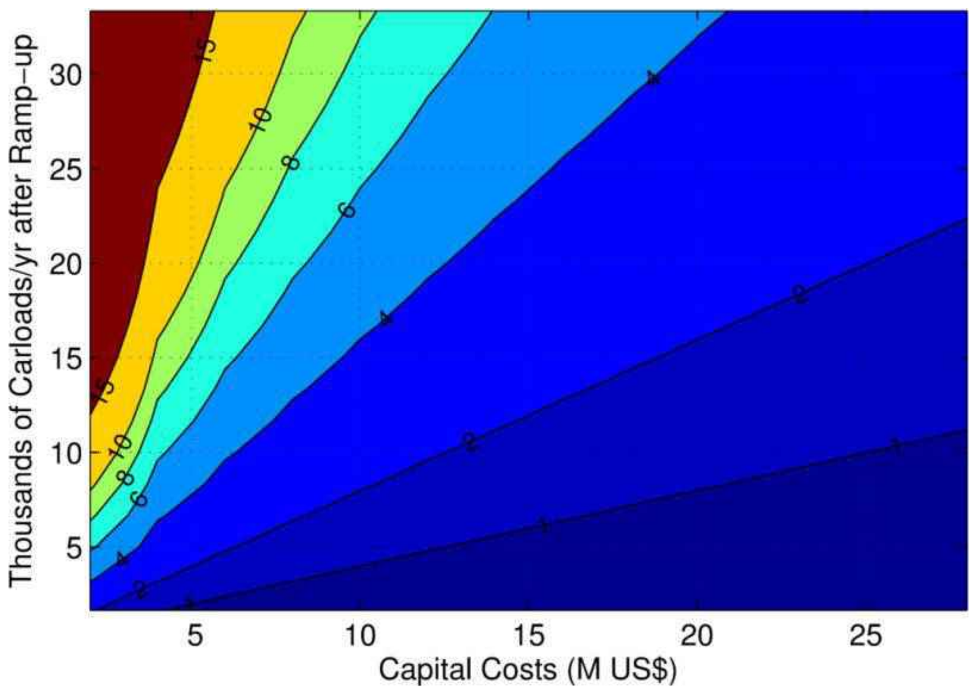
- Rail to truck mileage circuity: 1.12
- Average weight of rail carload: 60 tons
- Discount provided by rail costs over trucking: 20%
- Analysis horizon: 30 years of operations
- Emission rates: PRISM rates tailored for U.S. DOT project evaluation

These represent approximations of the most likely characteristics of the potential facility. Some of these parameters are more uncertain than others, but in most cases they don't vary widely across the U.S. It is assumed that the facility takes 3 years to be designed and built, and another 4 years for the demand to ramp-up. The main benefits of the facility would be reducing the trucking needed to place bulk products on the railroad system. This is essentially represents a mode shift from truck to rail. Benefits and costs are discounted at a rate of 7% per year, following U.S. DOT guidance.

The results of the analysis are shown in Figure 8.2. The benefit-cost ratios (BCR) are displayed as the demand of the facility and capital costs vary. Blue coloring indicates a low BCR ratio, representing a project for which benefits are small relative to capital costs. To achieve a BCR of 2 or more the facility would need to handle more than 800 carloads per year after ramp-up for every $1 million of capital cost. For a BCR of 4 or more the facility would need to handle more than 1,600 carloads per year after ramp-up for every $1 million of capital costs. These ratios appear fairly stable as facility costs increase, and therefore could be extrapolated beyond the ranges shown in the figure. A second observation is that the BCR changes almost linearly with the demand of the facility, principally because it has a very direct effect on the calculation of benefits.

These results can help to start defining the characteristics of a bulk rail facility that makes sense from an economic perspective. The next step in the analysis should be to conduct a market study to ascertain whether such demand levels could be sustained by facilities that cater to different bulk commodities and with facility capacities. A subset of these projects will likely pass this initial economic evaluation, and then would require a more detailed commodity-specific evaluation, using input from stakeholders, to assess its viability. Uncertainty can be incorporated into this analysis by analyzing projects over a range of likely demands and capital costs.

Figure 8.2 BCR for Bulk Rail Projects @ 7% Discounting



Source: Parsons Brinckerhoff Analysis

8.2 NEW RAIL FACILITY - INTERMODAL

One definition of intermodal is "the transfer of products involving multiple modes of transportation - truck, railroad or ocean carrier." Every year, nearly 25 million containers and trailers are moved using intermodal transportation. Electronics, mail, food, paper products, clothes appliances, textiles and auto parts all take a ride on the country's intermodal network. In fact, intermodal is growing faster than any other mode of transportation. Intermodal combines the best abilities of different transportation modes to deliver service, savings and solutions to shippers. By working together, trucking companies, intermodal marketing companies, ocean and river steamship lines and railroads provide cost-effective, reliable, efficient, and safe way to move freight from origin to destination. Throughout the process, intermodal facilitators, or third-party logistics providers, arrange for each piece of the move from pick up to drop off.[64]

To a railroad, "intermodal" means specifically a rail service that carries intermodal shipping containers, which are transferred between trucks or marine terminals and railcars at an Intermodal Rail terminal. There are several characteristics of the Bi-State Region that would facilitate the development of a new intermodal facility. This includes having access to rail and highway infrastructure and counting with an industry base that could potentially benefit from the project. However, there

64 http://www.intermodal.org/information/factsheet.php

are several issues that need to be addressed first, principally: competition with line-haul truck service and with other intermodal terminals nearby.

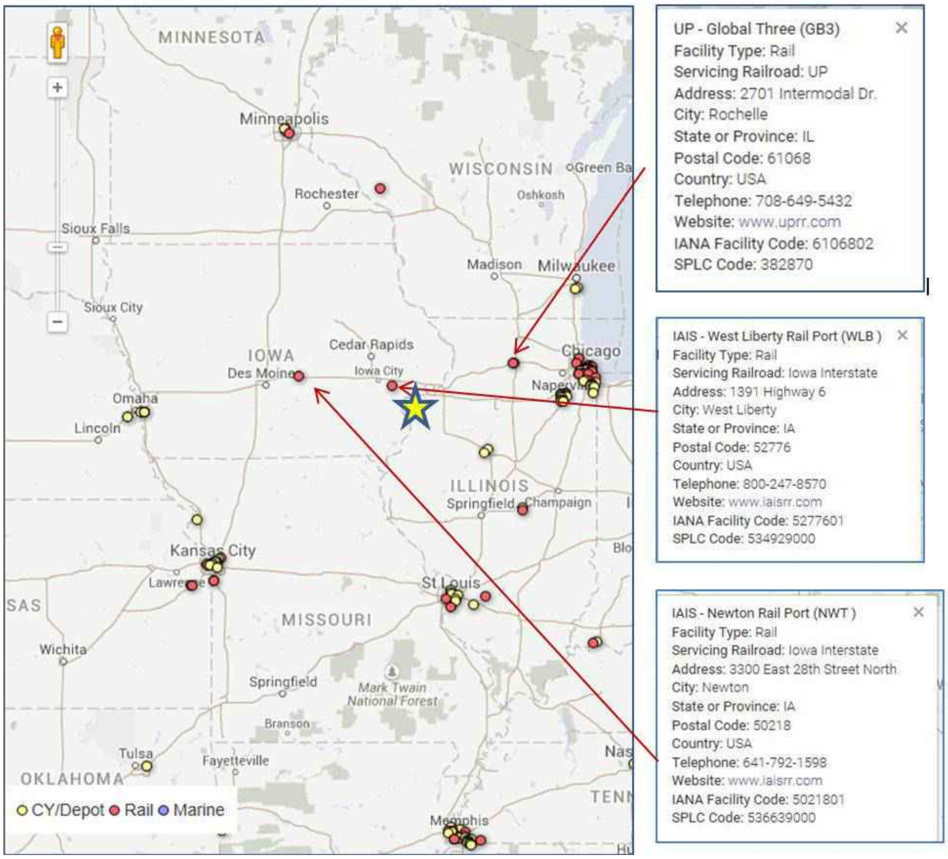
A specific site has not been identified for this potential project, so a generic location was utilized in the benefit-cost analysis development process.

Market Factors

The geographic radius of competition of existing intermodal facilities is an important factor affecting the viability of a new facility. Key considerations include the following:

- Very large clusters of intermodal facilities are located in Minneapolis, Chicago, St. Louis, Kansas City, and Omaha/Council Bluffs. These centers "cover the waterfront" – in the sense they are readily accessible by trucking. Figure 8.3 marks the Bi-State Region with a yellow star. Container Yard (CY) Depot, Rail and Marine Intermodal facilities are also mapped.
- Class I railroads prefer to cluster as much traffic as possible at as few facilities as possible, to maximize rail operating efficiencies; in addition intermodal service from the Bi-State Region to the eastern U.S. would have to interchange between railroads, which makes an all-rail operation less competitive with trucking for traffic moving in that direction.
- However, railroads can and will provide intermodal service to smaller users – provided the business is sufficiently large, reliable (week-over-week), and profitable. For example, UP's Rochelle, IL facility has capitalized on rail intermodal markets in eastern Iowa/western Illinois, as an alternative to Chicago.
- Intermodal rail can potentially be linked not only to truck-in/truck-out operations, but also to container on barge operations. The key would be for the barge to generate increases in rail traffic (to justify rail service), and vice versa (to support the barge service). This concept is currently being explored as a possible opportunity for Muscatine, IA.

Figure 8.3 Intermodal Rail Facilities



Source: Intermodal Association of North America[65]

Success Story

Although the new transload facility being constructed in the Davenport industrial park[66] will have the capability to offer intermodal rail service, it is not planned for major multi-user traffic volumes. To date, the Bi-State Region has not generated enough demand to warrant railroad investment in local intermodal rail terminals, as opposed to the current practice of truck drayage to Rockford, Chicago, and other established hubs. To overcome this disadvantage, the keys may be to: identify core local users who will commit to the local facility; leverage connections to water to increase (if possible) rail traffic; and consider a multi-purpose rail facility that handles containers as well as other railcar and commodity types, as a hedge against the risks of variability in container demand.

65 http://www.intermodal.org/information/directories/naifd.php

66 Davenport approves bid for $11.3M transload facility http://www.qconline.com/news/local/davenport-approves-bid-for-m-transload-facility/article_97598297-78c1-5558-96c9-9770d6f0bd35.html

About 40 miles north of the Bi-State Region is the city of Clinton, IA, population 27,000 (in 2013). German manufacturer RAIL.ONE Group entered the U.S. market in 2014 with the opening of a $22 million concrete rail tie plant in Clinton's Lincolnway Railport. The plant is the global company's newest and "one of the most modern production facilities in the concrete tie industry." The company marked the facility's opening with a ceremonial send-off of a UP train with the first full load of concrete ties. RAIL.ONE eventually will employ 65 workers in Clinton. The city first envisioned the development of a railport 17 years ago. The Lincolnway Railport is one of the region's largest development sites with direct rail service. The UP's northern main line cuts across the region. In less than a year, the plant was built and producing concrete rail ties, which RAIL.ONE will supply to its main customer, UP, and the company hopes to do business with other U.S. railroads. According to Larry Huinker, the plant's manager, the plant will produce up to 600,000 rail ties a year. Its railyard, where it will store the finished ties before UP transports them, can hold 175,000 ties at a time. "UP is a big reason we're in Clinton," he said. "Almost 60 trains a day go by us. We're very excited to be a partner with UP."

The opening of the first railport tenant has helped spark an increase in inquiries by other potential companies, "to have a Class I rail into the park, it's a big deal." RAIL.ONE's decision to locate in Clinton is key to attracting other companies such as Utah-based Nevada Railroad Materials, a wooden railroad tie recycler. And an additional 10-12 companies have inquired about the railport and other areas in the region. Mike Kirchhoff, the railport development corporation's CEO, said the railport positions Clinton, IA with a "unique asset." "Rail sites are a premium. Sometimes cities don't do a good job of reserving land for industrial development," he said, adding it then becomes difficult to develop a sizable rail site. Kirchhoff credited Clinton, IA for having the vision years ago. With the congestion happening in Chicago railyards, where UP has a district hub, Kirchhoff said "there's a great opportunity for us because we're only 2 ½ hours away. We're the next logical place to have distribution of consumer goods and materials." Working with the state of Iowa and the German-American Business Association, the railport development group plans to send a delegation to Germany to hold workshops for other companies considering an expansion to the U.S. "These guys did it from scratch. We want to grease the wheels (to help others)," he said.[67]

The Clinton, IA project succeeded because:

- Was designed to serve concrete railroad ties – single or main product.
- Access to a Class I (UP) - planned in advance.
- Rail port is linked with manufacturing - creates both manufacturing and shipping jobs.

---

[67] http://www.quadcitiesfirst.com/news-and-events/2014/05/02/railone-opens-22-million-plant-in-clinton/.

- Includes original and recycled "production" – Creates value coming and going.
- City-private partnership - Public-private win-win.
- International partner – International- U.S. win-win.
- Leverages one of the known commodities (stone, rock, and gravel, manufactured goods, agricultural goods), the highly skilled work force, Class I rail access, and significant water resources (Mississippi River) – all four elements of success are available in the Bi-State Region as well.

This particular facility does not handle containers. However, a modified "railport" concept, handling a diversified set of railcar types including containers, could potentially be successful in eastern Iowa.

Benefit Cost Valuation

The economic efficiency of an intermodal rail facility will depend critically on: (1) the container demand the facility is able to attract, and (2) the costs of building and operating the facility. Other variables are also important, but these two will have the largest impact. A benefit-cost framework was used to quantify the favorability of investing in this type of facility, as a function of these two variables. For the other relevant factors the analysis assumed:

- Truck miles avoided per shipment: 1,000 miles
- Average tons per container: 16.5 tons
- Growth of intermodal market after 4 year ramp-up: 2.5%
- Rail to truck circuity: 1.14
- Average drayage distance: 75 miles each way
- Discount provided by rail costs over trucking: 10%
- Analysis horizon: 30 years of operations
- Emission rates: PRISM rates tailored for U.S. DOT project evaluation

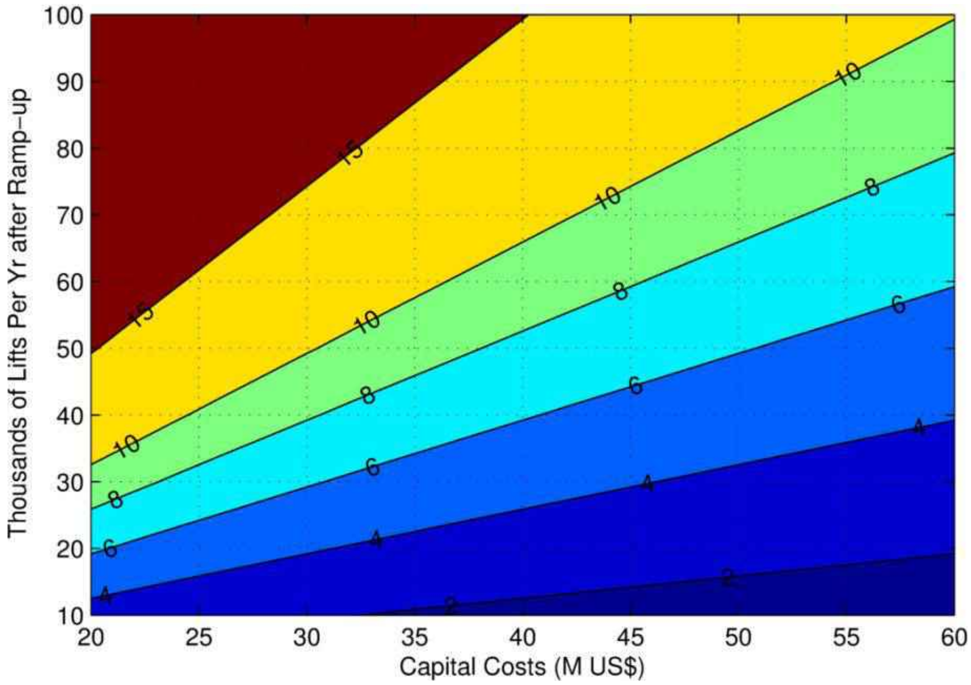
These represent approximations of the most likely characteristics of the potential facility. Some of these parameters are more uncertain than others, but in most cases they don't vary significantly across the U.S. It is assumed that the facility takes 3 years to be designed and built, and another 4 years for the demand to ramp-up. The main benefits of the facility would be shifting cargo from long-haul trucks to rail. Benefits and costs are discounted at a rate of 7% per year, following U.S. DOT guidance.

The results of the analysis are shown in Figure 8.4. The BCR are displayed as the demand of the facility and capital costs change. Blue coloring indicates a low BCR ratio, which represents a project for which benefits are small relative to capital costs. To achieve a BCR of 2 or more the facility would need to handle more than 340 containers per year after ramp-up for every $1 million of capital cost. For a

BCR of 4 or more the facility would need to handle more than 680 containers per year after ramp-up for every $1 million of capital costs. These ratios appear fairly stable as facility costs increase, and therefore could be extrapolated beyond the ranges shown in the figure. A second observation is that the BCR changes almost linearly with the demand of the facility, principally because it has a very direct effect on the calculation of benefits.

These results can help start defining the characteristics of an intermodal rail facility that makes sense from an economic point of view. Just like with the analysis of bulk-rail facilities, a market analysis would now need to be conducted to see how many containers could be attacked by the project. This would depend mainly on whether the shipper savings that are offered by the intermodal service would be large enough to induce the mode-shifts needed to compensate the investment costs of the facility. The facility would need to be sized with enough extra capacity initially to be able to accommodate multiple decades of growth in the intermodal market.

Figure 8.4 BCR for Intermodal Rail Project @ 7% Discounting



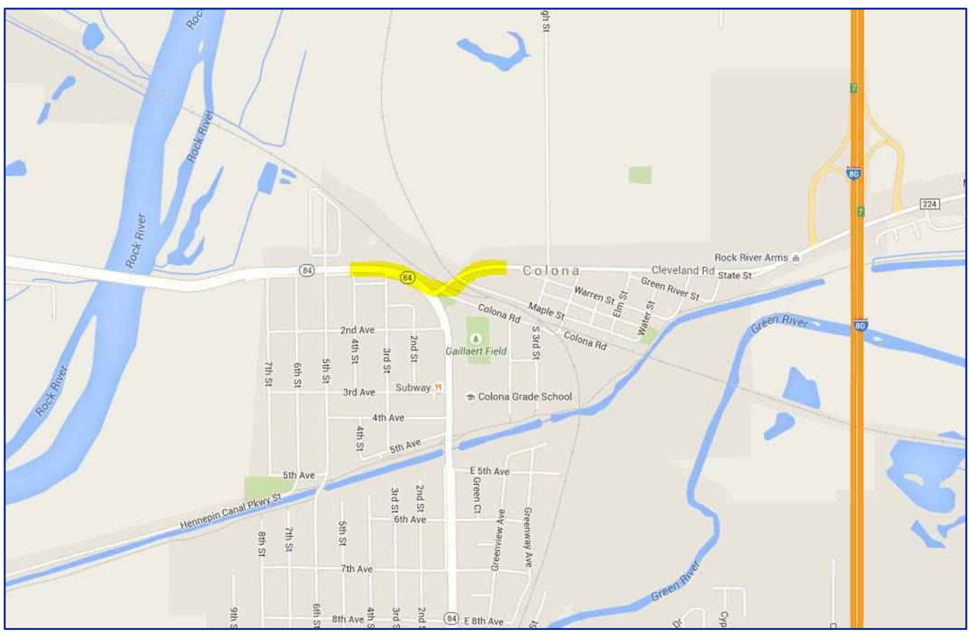
Source: Parsons Brinckerhoff Analysis

8.3 Rail Crossing Grade Separation – Colona Crossing

There are several highway-rail grade crossings in the Bi-State Region that could potentially warrant grade separations. This study considered one possibility which has been a long-recognized issue on the Illinois side of the region.

The highlighted roadway in Figure 8.5 shows the grade crossing location, near the intersection of IL 84 at Colona/Cleveland Road within the city of Colona in Henry County. Colona is part of the Quad Cities metropolitan area and has a population of 5,200 as of 2010. The highlighting in the figure below shows how a vehicle traveling east on IL 84 will navigate a "dip" then continue east on Colona/Cleveland Road to access I-80. At the point of the "dip," the vehicle is also making a 90 degree left turn then immediately crossing two separate at grade railroad tracks. The rail tracks are about 0.1 mile apart at the crossing.

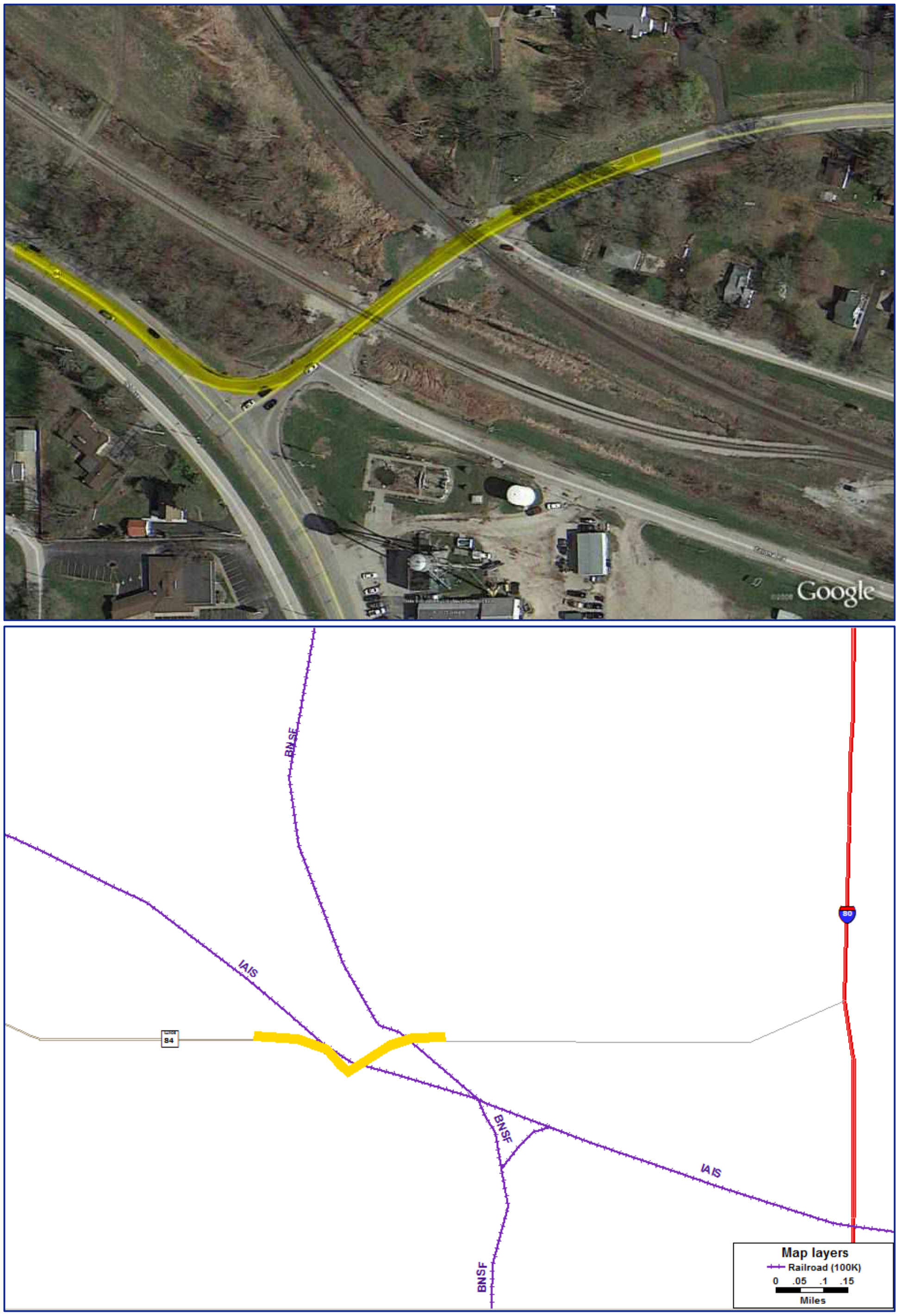
Figure 8.5 Map of Colona Grade Crossing



Source: Google

Figure 8.6 shows a close-up with the same capture of the area outlining the traffic sight lines, safety and through-put issues. Vehicles passing through this area to and from the I-80 Exit (Exit #7 – known as Cleveland Road when it hits the interstate) have various destinations in Colona, Carbon Cliff, and potentially East Moline. The screen capture shows how readily a vehicle can get "caught" in a left turn bay, between rail tracks on a railroad track if a train is passing through or stopped on one or both tracks.

Figure 8.6 View of Colona Grade Crossing



Source: Google

The figure also shows what is happening with the rail lines in the Colona area. While the danger is with cars and trucks making the turn onto Colona Road (highway), immediately southeast of the Colona area rail freight is hitting what is known as the "Colona wiggle" where BNSF and IAIS cross.

A project to improve this grade crossing location has been on the Bi-State Regional Commissions LRTP for many cycles, but has not yet advanced.

The last accident recorded at this grade crossing happened in May 28, 2007. An automobile was struck at by a train going 30mph, killing the driver.

Benefit Cost Valuation

The economic efficiency of a grade separation project is primarily a function of: (1) the vehicular traffic on the road affected, (2) the volume of trains crossing each day, and (3) the costs of the grade separation. Other variables are also important, but these three will have the largest impact. A benefit-cost framework was used to quantify the favorability of making these types of investments, as a function of these two variables. Several parameters were obtained specifically for Colona Road, but others were obtained from nationwide averages or comparable projects. For the other relevant factors the analysis assumed:

- Value of time of traffic flow: 19.28/person-hr
- Maintenance cost avoided of operating a similar grade crossing: $23,000/year
- Long-run traffic growth rate: 1%
- Idle fuel burnt: 0.01gallons/minute (TTI Urban Mobility)
- FRA's Web-Accident Prediction System for Cleveland Rd: 0.0248 accidents /year
- Emission rates: PRISM tailored for U.S. DOT project evaluation
- AADT on Cleveland Rd: 7,300 FRA's Web-Accident Prediction System for Colona Road
- Delay model:
  - Train length: 6,000ft
  - Train speed: 25mph
  - Gate closing and opening time: 0.6 minutes
  - Queue dissipation rate: 900 veh/hr-lane
  - Did not consider time-of-day traffic peaks
  - Traffic occurs evenly during 16 hrs of the day (note: more detailed models of grade crossing delay incorporate time-of-day considerations).

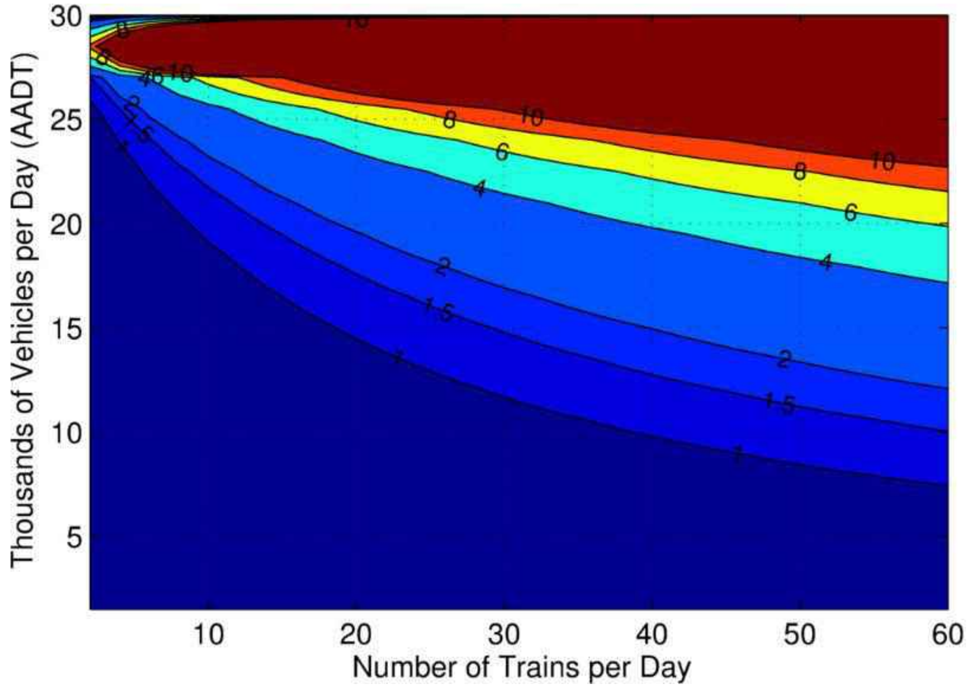
These represent approximations of the most likely characteristics of the grade crossing separation. Some of these parameters are more uncertain than others, but in most cases they are fairly standard across the U.S. It is assumed that the facility takes 3 years to be designed and built. Cleveland Road (location of Colona

Crossing) currently only has one lane in each direction, therefore the maximum traffic volume considered was 29,000, which roughly corresponds to the maximum capacity of the road. However, the current traffic volume at Cleveland Road is significantly smaller, at 7,300 AADT. Up to 60 trains per day were considered because there are two railroads that cross Cleveland Road, and being single-tracked they likely have a capacity of 30 trains per day each (varies with the train mix). Benefits and costs are discounted at a rate of 7% per year, following U.S. DOT guidance.

The results of the analysis are shown in Figures 8.7 through 8.9. The BCR are displayed as the demand of the facility and capital costs change. Results are presented in this way so that different grade crossings with different train and vehicular traffic volumes can be analyzed quickly. Blue coloring indicates a low BCR ratio, which represents a project for which benefits are small relative to capital costs. Figure 8.7 shows the results for the case where the project cost is $5 million. Grade separations usually cost at least twice as much, but these results are shown to indicate that even at these investment levels it would take about 60 trains a day for the project to have a BCR greater than 1 given the current AADT on Colona Crossing of 7,300. At the higher and more realistic investment costs of Figure 8.8 and Figure 8.9, the grade separation appears even less favorable. It is important to clarify that a more in-depth study is required to conclude that the benefits of this grade separation are not substantial. While it is true that grade separations are typically considered in cases with higher traffic volumes, the specific safety concerns at the Colona Crossing could represent strong motivation to pursue this project further. The approach used to quantify the safety benefits of the project in the parametric BCA relied on a nationwide analysis performed by the FRA to predict accident rates and not on a detailed study of local data and conditions. This type of study would be needed for project evaluation.

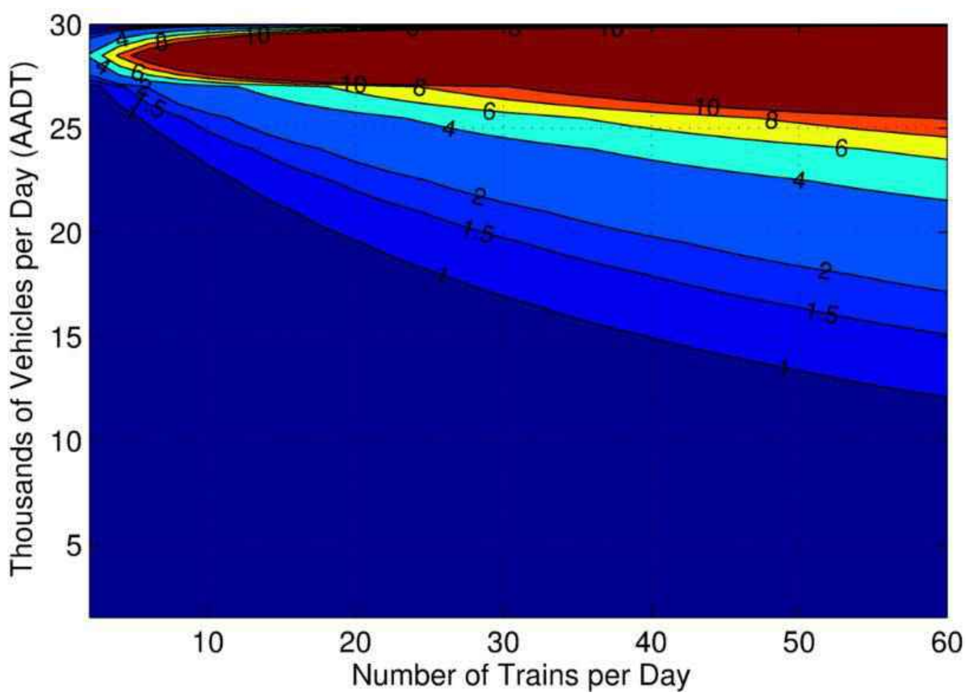
It is important to note that the BCR increases rapidly once traffic volumes approach the capacity of the roadway, taken to be 29,000 in this analysis. Queues will form quickly operating at these conditions and they will take an increasing amount of time to clear, presenting more savings opportunities for reducing delay. Therefore, grade crossings with traffic volumes that saturate capacity should be prioritized for further study. These results can help start defining the characteristics of a grade separation project, at Cleveland Road or any other road, that makes sense from an economic point of view.

Figure 8.7 BCR for $5M Grade Separation Project @ 7% Discounting



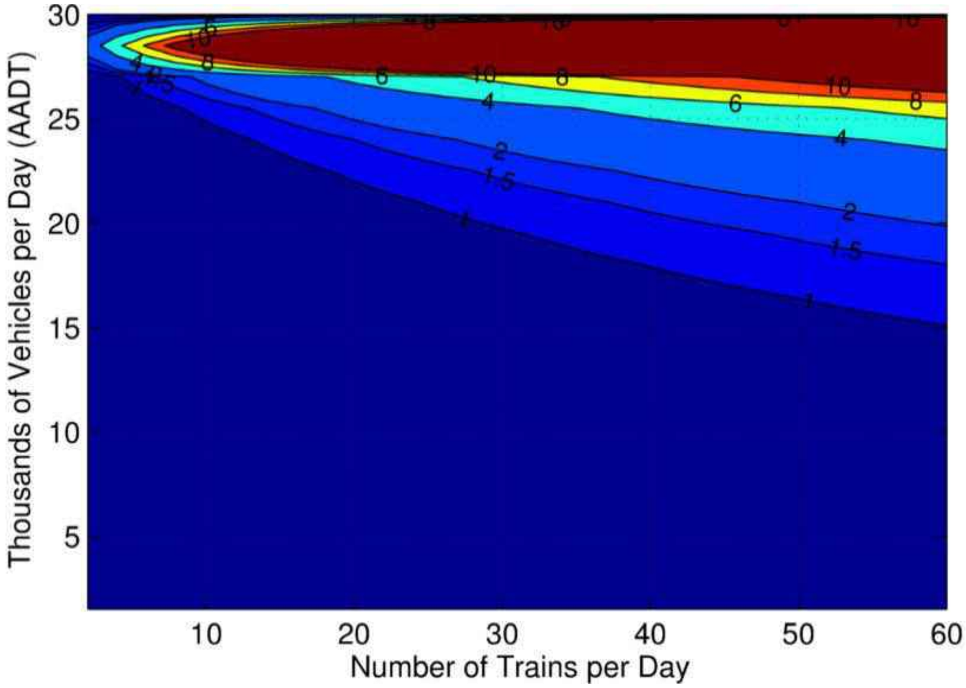
Source: Parsons Brinckerhoff Analysis

Figure 8.8 BCR for $10M Grade Separation Project @ 7% Discounting



Source: Parsons Brinckerhoff Analysis

Figure 8.9 BCR for $15M Grade Separation Project @ 7% Discounting



Source: Parsons Brinckerhoff Analysis

8.4 NEW RIVER CROSSING – RAIL BRIDGE

The Mississippi River divides the Bi-State Region limiting truck and rail freight movements to a small number of bridges. Crossing capacity is adequate on highways given the I-74 corridor project bridge replacement funded by Illinois and Iowa and underway at this time.

On the rail side, freight movements are limited to one of two key rail bridges to cross the Mississippi River. The Government Bridge, also known as the Arsenal Bridge, is owned by the Federal government and connects Rock Island, Rock Island Arsenal and Davenport. It is a double tracked fixed bridge. The Crescent Rail Bridge lies 1.5 miles south of the Arsenal Bridge. It is a single-track swing bridge owned by BNSF and connects Rock Island to industrial sites in Davenport/West Davenport. The west side of the bridge enters into a wye with CP/DM&E's Davenport subdivision.

The Iowa DOT recently conducted a study of railroad bottlenecks and identified the Government Bridge as the only Bi-State Region rail freight bottleneck of note. The current bridge structure, the fourth in a succession at this location, includes a swing section to accommodate traffic navigating the locks. The double tracks of rail above the road level are an unusual feature for a bridge.[68]

Rail traffic on the Government Bridge is restricted to 10 mph. Since the IAIS line owns the bridge and allows CP/DM&E and BNSF to use it, there is a good opportunity for a replacement bridge to

Government Bridge

Coordinates	41°31′09″N 90°34′01″W
Carries	2 lanes of roadway 2 rail lines
Crosses	Mississippi River
Locale	Davenport, Iowa and Rock Island Arsenal, Illinois
Maintained by	Federal government of the United States
Characteristics	
Design	two riveted Pratt trusses five riveted Baltimore trusses one pin-connected Baltimore swing truss[1]
Material	steel
Total length	1,608 feet (490 m)[2]
Width	27 feet (8 m)[2]
Longest span	365 feet (111 m) (swing); longest fixed spans 258 feet (79 m)[3]
Number of spans	8
History	
Designer	Ralph Modjeski[1]
Constructed by	U.S. Army
Opened	1896
Statistics	
Daily traffic	16,800[2]

68 en.wikipedia.org/wiki/Government_Bridge

provide efficiency to all three railroads in the region. Other points to include are:

- Is it feasible to replace this bridge in an adjacent area, upstream or downstream? If yes, the 1,608 feet span (total length) could be used for cost estimation.
- Government Bridge carries both vehicle traffic and rail traffic currently. It is double tracked for rail. Would replacement need the roadway element? Would the rail need to be double tracked?
- Government Bridge currently has a swing section to accommodate barge traffic navigating the locks. Could that function continue as required? Or would we leave it permanently open and let vehicles and rail freight use the replacement rail bridge and other highway facilities. Demolish the Government Bridge once replacement is in place? Security needs at the national level would suggest keeping a back-up rail bridge over this important river in working order, even with a replacement rail bridge built. It is also unlikely this bridge would be demolished as it is a designated National Landmark.
- The freight partners survey and interview process identified access to rail and getting cheaper and faster rail connections – but they did not note any particular bridge replacement location.
- A new rail freight transfer facility, whether bulk or intermodal, could be located so that would be served efficiently by the replacement rail bridge.

Benefit Cost Valuation

The economic efficiency of the bridge rehabilitation will depend critically on: (1) the freight demand that can be accommodated by removing operational bottlenecks on the bridge, and (2) the costs of building the new bridge. The investments will also have positive impacts on general vehicular traffic, in addition to freight movement. These should also be considered in a benefit-cost analysis of the investment, however they are omitted in this case because they lie outside the scope of this work. The benefit-cost framework is only applied to the freight traffic on the bridge. The benefits result from the increase of rail capacity on the bridge, which would allow for additional tonnage to be transported through this corridor. It is assumed that without the investments, the bridge represents a bottleneck to rail freight movement in the region. The analysis also assumed:

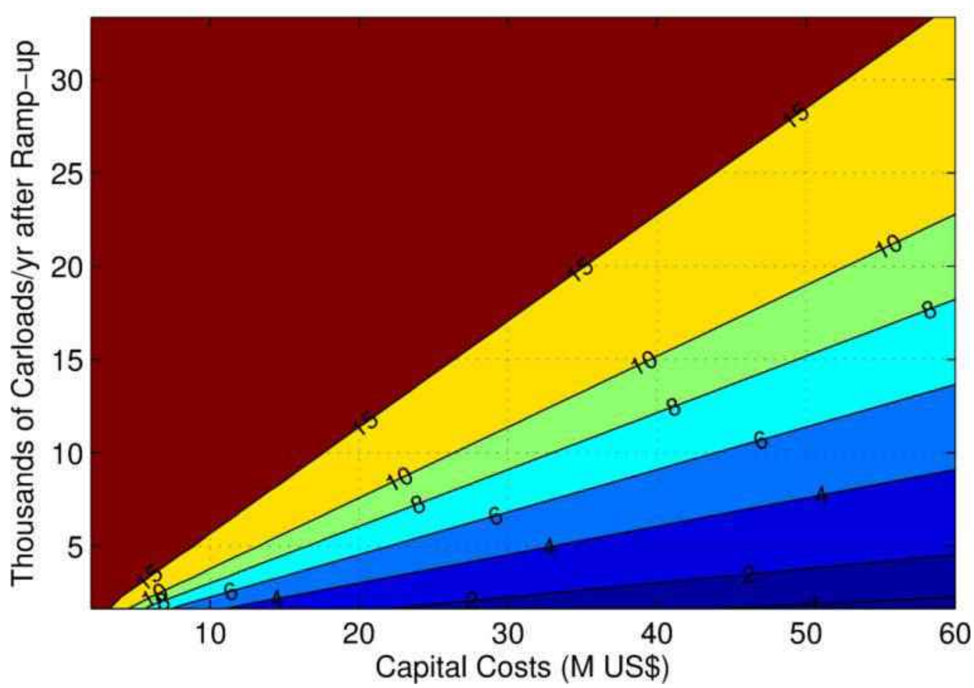
- Truck miles avoided per shipment: 1,000 miles
- Average tons per truckload: ~21 tons
- Growth of bulk market after 4 year ramp-up: 2.5%
- Rail to truck circuity: 1.12
- Discount provided by rail costs over trucking: 20%

- Analysis horizon: 30 years of operations
- Emission rates: PRISM tailored for U.S. DOT project evaluation

These represent approximations of the most likely characteristics of the traffic that would use the bridge. Some of these parameters are more uncertain than others, but in most cases they are fairly standard across the U.S. It is assumed that the facility takes 3 years to be designed and built, and another 4 years for the demand to ramp-up. The main benefits of the facility would be in permitting the mode shift from truck to rail. Benefits and costs are discounted at a rate of 7% per year, following U.S. DOT guidance.

The results of the analysis are shown in Figure 8.10. The BCRs are displayed as the demand of the facility and capital costs change. Blue coloring indicates a low BCR ratio, which represents a project for which benefits are small relative to capital costs. It is difficult to make an assessment of the bridge replacement based solely on this information, because it does not include a monetization of benefits for passenger vehicles. The results of this analysis would have to be combined with a broader benefit-cost analysis to account all relevant benefits of the project.

Figure 8.10 BCR for Rail Bridge Project @ 7% Discounting



Source: Parsons Brinckerhoff Analysis

9.0 Next Steps and Implementation

Each of the physical system projects and supporting strategy recommendations identified for the Bi-State Region's freight system meet the goals identified in this Plan, as well as have received the agreement on need by the key public and private sector stakeholders that were part of developing this Plan. However, determining which of these projects should be prioritized over others can often be a matter of subjection. As noted in Section 8.0, Strategy Evaluation, projects such as a new bulk rail facility or a new rail bridge could make good investments for the region, but there are additional key factors that must be in place for recommendations to be advanced.

This Freight Plan was developed as "the Region's Freight Plan." The Plan not only identifies freight system needs and outlines recommendations, but it also entailed extensive stakeholder outreach so that both public and private sector, multimodal and multi-jurisdictional partners could begin a conversation on freight in the region, and begin to achieve consensus on what steps should be taken next. This Plan can be used as a tool to continue this process in that:

- All freight system recommendations can be found in a single place,
- The Bi-State Region now has the ability to regularly monitor implementation activities, and
- Roles for all public and private sector freight stakeholders have been identified.

The summary of strategy recommendations noted building relationships and fostering collaboration between partners as near-term steps, and as steps for the Bi-State Regional Commission to lead. The Bi-State Regional Commission has already decided to take one significant step to ensure freight remains integral to the transportation conversation in the Region. As part of their FFY16 work program the MPO has received funding to convene a local freight forum, much like the group of public and private stakeholders that were convened as part of developing this freight plan. It is suggested that in order to continue to make progress toward implementing the recommendations identified in this plan, that the freight forum use this Plan as a starting point for actions.

A. Outreach Summary

This appendix summarizes the outreach conducted as part of the *Bi-State Region Freight Plan.* One-on-one stakeholder interviews were conducted with key industries and agencies in the region. Additionally, an online survey was developed and distributed to regional stakeholders. Each of these is summarized below.

A.1 Stakeholder Interviews

Detailed interviews were conducted with public and private-sector freight stakeholders in the Bi-State Region. The focus of these interviews was to:

- Understand how stakeholders used the freight system in the Bi-State Region and its connections to the broader world;
- Understand how the freight system is an integral part of the region's industries; and
- Obtain the perspective of needs and issues of the freight system, including physical, operational, and institutional needs.

A list of stakeholders interviewed is included in Table A.1.

Table A.1 Summary of Stakeholders Interviewed

Name	Public or Private Sector	Agency Affiliation or Industry	Primary Mode(s)	County
Aaron Tennant and Nora Coyne-Logan	Private	Tennant Truck Lines	Highway and Warehousing Services	Henry County, IL
Mark Schulenberg	Private	Alcoa, Inc	Highway, Rail	Scott County, IA
Brian Johnson	Public	Quad City Airport	Aviation	Rock Island County, IL
Carrie Evans	Private	Iowa Interstate Railroad (IAIS)	Rail	N/A
Gary Carlson	Private	HNI Corporation		Muscatine County, IA
John Tobin	Private	SSAB		Muscatine County, IA
Judd Halting	Private	Patriot Fuels	Highway, Rail	Henry County, IL
Osama Siadeh	Private	Grain Processing Corporation (Kent Corporation)	Highway, Rail, Intermodal, Water, Air	Muscatine County, IA
Kathleen Repass	Public	Henry County Economic Development Partnership		Henry County, IL

Needs, Issues, and Opportunities

A number of comments relating to needs, issues, and opportunities were identified by stakeholders during the interview process. These are categorized according to the findings discussed in Section 3.0. In order to retain confidentiality, a summary of these findings are presented at the summary level below, and individual comments are summarized in Table A.2.

- **Use the Bi-State Freight System to Support the Regional Economy.** The Bi-State Region is home to a number of agricultural and manufacturing industries that involve shipment of bulk goods (both inbound and outbound) and finished manufactured goods and equipment (mostly outbound, but a number of companies bring in component parts). Reliable transportation options are key to maintaining the region's competitiveness and attracting and retaining industries that are heavily dependent on supply chains and connections to national and international markets.
- **Maintain and Enhance Highway System Infrastructure.** Highways provide access both for truck traffic and for connections to intermodal facilities, such as those in Chicago, Rockford, or Kansas City. The highway infrastructure in the region is in generally good condition, but there are key chokepoints on the system. The region is reliant on a number of bridges that connect the Illinois and Iowa sides of the region; many of these bridges are outdated or do not have the capacity needed for future growth or the geometrics to allow for safe travel via trucks. Other state connections with high volumes of truck traffic, such as Highway 61 south of Muscatine, also are in need of capacity expansions.
- **Promote Freight Rail System Operational Efficiencies.** Two Class I railroads (BNSF and CP/DM&E) and one shortline railroad (Iowa Interstate) connect the region. However, many of the industries using rail connections are captive to only one of these regions. Additionally, due to the geography of the region, shipments often have to move between Class I railroads to reach Bi-State industries, causing service delays. The need for additional service and competition between the railroads is a key issue for a number of industries in the region, some of which see the lack of reliable rail service as an impediment to growth. Due to the lack of competitive rail service, industries are reportedly relying on truck. In addition to delays, lack of equipment and high rail rates are reported as challenges for the region. One area industry interviewed reported losing long-distance customers due to rail service issues.
- **Increase Access and Mobility Options for the Region.** Like the highway system, rail bridges serve as bottlenecks for the region. The Crescent Bridge may sometimes flood and be unusable. Both the Crescent and Arsenal Bridges have speed and load restrictions, limiting the mobility through the region. Air shipments are vital to the economy, but are mostly trucked to and from the region to hubs, primarily Chicago. The majority of the air freight, including expedited package service via FedEx and UPS is sent through O'Hare Airport.

The Chicago Terminal and intermodal yards in Joliet, IL is also used by industries in the Bi-State Region for rail intermodal service for both domestic and export goods.

- **Work Towards System Resiliency and Reliability.** Resiliency and reliability on each of the major modes is a key issue for the Bi-State Region, and a lack of competitive options is seen as a barrier to growth in the region. Truck is serving as a proxy for intermodal, air and rail service due to the lack of local service for area industries. This means that these industries are subject to traffic congestion in and around Chicago, as well as congestion on the railways and air system. Bridges in the region are a chokepoint for both trucks and railroads, and construction or other delays on bridges can lead to significant detours or delays. The construction on I-74, and in the future, I-80 and projected to have serious impacts on truck travel through the region. On the waterway, companies are hesitant to rely heavily on the waterway system due to lack of maintenance funding and seasonal unavailability, yet are simultaneously investigating ways to increase use of and reliability of the system. Private investment into barge facilities is underway in the region.

Table A.2 Needs, Issues, and Opportunities Identified by Bi-State Stakeholders

Comment	Mode	SUPPORT THE REGIONAL ECONOMY	MAINTAIN AND ENHANCE HIGHWAY INFRASTRUC-TURE	PROMOTE FREIGHT RAIL EFFICIENCIES	INCREASE ACCESSIBI-LITY AND MOBILITY	INCREASE SYSTEM RESILIENCY
To develop trade, the airport should find a "niche" market, i.e. flowers, or connections to road/rail intermodal facilities similar to the Rickenbacker facility in Columbus, Ohio. A foreign trade zone may be an opportunity to expand international trade at the airport.	Air	✓				
Both the Quad City and Davenport airport should be examined simultaneously to address joint challenges and complement activities at each.	Air	✓				
The airport is currently focused on ongoing challenges at the airport include airside renovations and expansion around the terminal and general aviation ramps. The airport also expects more emphasis on "best use" for the innovation park and other industrial developments on the land side. What we see on the horizon is a greater effort on airport authority to assist with best use with innovation park or other developments.	Air	✓				
The airport is located on Airport Road, which is a state highway that is described in the Illinois 2040 plan to be expanded to a 4-lane road with a bike path on both sides. However, this has been reported as unlikely due to the closeness of I-280.	Air, Truck				✓	
A number of switches must be made to bring goods into our plant. The product comes in on BNSF and is handed off into a CP/DM&E yard. However, BNSF must move the goods from the CP/DM&E yard to our facility. This causes delay – transit times from Canada to Galesburg may be shorter than Galesburg to the Bi-State region. We transload from Comanche to bypass this issue with Galesburg or to Galesburg directly during flooding scenarios; however this is too costly for general business.	Rail	✓		✓	✓	✓
Out of 60 switches per month at the facility, CP/DM&E may miss 20, i.e. no one comes to pick up the rail cars or they do not follow the published schedule.	Rail	✓		✓		

Comment	Mode	SUPPORT THE REGIONAL ECONOMY	MAINTAIN AND ENHANCE HIGHWAY INFRASTRUC-TURE	PROMOTE FREIGHT RAIL EFFICIENCIES	INCREASE ACCESSIBI-LITY AND MOBILITY	INCREASE SYSTEM RESILIENCY
We would be interested in additional rail service, and have discussed with Iowa Interstate. The estimated cost is about $30 million to provide additional competitive service.	Rail	✓		✓	✓	
We have lost West Coast customers due to rail service issues.	Rail	✓		✓		
Expansion options are limited due to a lack of rail capacity and equipment.	Rail	✓		✓		
We would like a rail spur that allows for more competition for rail service. CP/DM&E does not provide adequate service to the region – rail cars must sit in Muscatine for 4-5 days before they are picked up by CP/DM&E. Furthermore, the shippers are subject to congestion in KSC and Chicago terminals.	Rail	✓		✓	✓	
Need to identify developable properties in other cities to market to businesses looking for rail served sites.	Rail	✓				
Due to current rail service and equipment availability issues, goods are shipped via truck past Chicago to Pittsburgh and beyond.	Rail		✓			
Big problem with rail access. Due to RR agreements, there are significant delays in getting materials into our facilities. Railroads need to coordinate to provide better service to the Bi-State Region.	Rail			✓		
Railroad tracks in Davenport over the Crescent Bridge are vulnerable to flooding, which can raise water levels higher than the bridge (17.6 feet).	Rail				✓	✓
Rail service is a big challenge on the CP/DM&E line, including service reliability and equipment availability.	Rail			✓		
Efficient and reliable connections with other railroads are key to short-line rail success. There is a need for additional storage and transloading operations on the short line in order to mitigate issues with Class I rail service.	Rail			✓	✓	✓

Comment	Mode	SUPPORT THE REGIONAL ECONOMY	MAINTAIN AND ENHANCE HIGHWAY INFRASTRUC-TURE	PROMOTE FREIGHT RAIL EFFICIENCIES	INCREASE ACCESSIBI-LITY AND MOBILITY	INCREASE SYSTEM RESILIENCY
Iowa Interstate has received many requests for tank car storage in the past couple of months due to oil prices and supply chain patterns – there is a need for additional storage capacity..	Rail			✓	✓	✓
More intermodal (rail and waterway) service is needed. Rail service is limited due to bottlenecks in Chicago and the West Coast. More waterway service will help increase competition.	Rail, Water, Truck	✓		✓	✓	
Permitting and dealing with the states is ok, but it would be nice to see more coordination/harmonization.	Truck	✓	✓			
Regulatory issues are a challenge, including hours of service, insurance regulations, drug testing databases for the drivers. These contribute to the severe labor shortage.	Truck	✓	✓			
Funding for the Highway Bill is critical. Increasing the motor fuel tax is the only viable option for the trucking industry.	Truck	✓	✓			
There is a lack of carrier availability in the region – more competition would make shipping more competitive.	Truck	✓	✓			
Federal transportation funding which allows investment in maintenance of roads and bridges, congestion mitigation, and other projects, needs to be addressed. Iowa Legislature studies show that the state is short by 15 million dollars annually in road maintenance and construction funds. Labor availability is a national ongoing issue, due to driver shortages and hours of service regulations.	Truck	✓	✓			
Finding qualified drivers for locally owned companies is challenging due to the small labor pool.	Truck	✓	✓			
Growth at the Bi-State facility is limited by available truck capacity, both on the system as well as labor and carrier availability.	Truck	✓	✓			
Raising weight limits from 80K to 96K for routes heavily used by agriculture traffic through the region	Truck	✓	✓		✓	

Comment	Mode	SUPPORT THE REGIONAL ECONOMY	MAINTAIN AND ENHANCE HIGHWAY INFRASTRUC-TURE	PROMOTE FREIGHT RAIL EFFICIENCIES	INCREASE ACCESSIBI-LITY AND MOBILITY	INCREASE SYSTEM RESILIENCY
A truck driver shortage is causing logistical challenges. GPC is working with carriers to ensure service by ensuring dedicated lanes and working with carriers to obtain backhaul loads.	Truck	✓	✓			
A push towards a higher ethanol blend standard in US fuel (currently at 10 percent in IL) will allow for increased growth and jobs in the region.	Truck	✓				
Overall the region has great infrastructure. Condition of the Interstate system is fair in the region. Secondary system is pretty good and truck parking is available.	Truck		✓			
The I-74 bridge construction will cause a lot of local "pain" until it opens in 2021. For example, hauling goods from the Deere plants in Moline to Davenport, for example, will be challenging. Alternate routes on I-280 or I-80 may mean a 45 minute delay. Arsenal Bridge or Route 67 are unavailable.	Truck		✓		✓	✓
Would like to see another lane on Interstate 80 between Quad Cities and Iowa City to relieve congestion	Truck		✓		✓	
I-74 on the Illinois side in the Quad Cities is in awful condition. I-74 on the Iowa side not as bad but still in poor condition.	Truck		✓		✓	
Vertical clearance issues can be found on I-74 from the Quad Cities to Peoria – a max height of 14'2". With combines, tractors, etc. it presents some challenges for anything going east. Currently we have to route OSOW loads up a ramp and back down, or they will go across I-80 over to south Peru and then I-39 down.	Truck		✓		✓	
Safety is an issue on the I-74 bridge and I-80 Quad Cities and Iowa City due to congestion	Truck		✓		✓	
Highway 61 south of Muscatine should be expanded from 2 lanes to 4 lanes to improve safety and relieve congestion.	Truck		✓			

Comment	Mode	SUPPORT THE REGIONAL ECONOMY	MAINTAIN AND ENHANCE HIGHWAY INFRASTRUC-TURE	PROMOTE FREIGHT RAIL EFFICIENCIES	INCREASE ACCESSIBI-LITY AND MOBILITY	INCREASE SYSTEM RESILIENCY
As part of "Access Iowa", Highway 61 and 218 projects across the state have 50 miles of roadway left to improve – mostly areas with bridges and small towns.	Truck		✓			
A connection between the John Deere Expressway and Route 6 is needed to increase connectivity in the region and bypass congestion in the Quad Cities.	Truck		✓		✓	
Highway 61 south of Muscatine should be expanded to 4 lanes to connect to Bellington, Mt. Pleasant, and the Walmart distribution center due to the high volume of truck traffic.	Truck		✓		✓	
Traffic congestion is not an issue in the region, but the airport is aware that additional commercial and industrial development south and west of the airport may lead to congestion in the future.	Truck, Air		✓		✓	
Opportunities for transloading and rail service would increase the competitiveness of the region.	Truck, Rail	✓	✓	✓	✓	
Would like an intermodal hub for the region, potentially located in Muscatine. Currently, intermodal containers are shipped via Chicago, and a local hub would avoid a trip via truck. This is option favored by a number of local industries.	Truck, Rail	✓			✓	
Resiliency on the river system is lacking. In the last few years, shipping via water has been affected by weather events such as drought and flood, as well as river maintenance due to weather events, i.e. flooding that increase the need for dredging.	Truck, Rail, Water					✓
Need a facility to ship containers via barge. Additional barge docks in the region would also allow for growth.	Water	✓				

Comment	Mode	SUPPORT THE REGIONAL ECONOMY	MAINTAIN AND ENHANCE HIGHWAY INFRASTRUC-TURE	PROMOTE FREIGHT RAIL EFFICIENCIES	INCREASE ACCESSIBI-LITY AND MOBILITY	INCREASE SYSTEM RESILIENCY
Underutilization of the waterway should be fixed. A Port Authority should be created to take advantage of the transloading. From the trucking perspective this would be desirable to reduce the length of haul (esp. from a labor perspective) – the shorter length of haul the easier it is, so if we can utilize rail and barge when we can, we can use the resources for the most efficient or necessary movements for trucks.	Water, Truck, Rail	✓			✓	✓
The most obvious issue is the River, which creates a weak point in the system and can be a barrier because goods need to get across it.	Water, Truck, Rail					✓

Stakeholder Interview Summaries

Tennant Truck Lines

Aaron Tennant

Tennant Truck Lines was began in 1946 as a livestock hauler to Chicago. Today the company also hauls machinery, equipment and mixed goods. The core business is equipment hauling using open deck specialized lowboys. The company employs 240 people in the Bi-State Region and revenues are estimated to be about $60 million, annually. The company coordinates regularly with the American Trucking Association, the Truckload Carriers Association, the Illinois Trucking Association, and the Iowa Motor Trucking Association.

Tennant has a fleet of about 200 which they primarily use to move equipment from manufacturing plants to dealers, and a significant portion of their business originates or terminates in the Bi-State Region. Tennant hauls products for John Deere, Caterpillar, KC Holland, Alcoa and other manufacturers, including farm equipment, construction, and haulers. The company also brings products inbound to these manufacturing plants, including raw materials such as steel and aluminum ore. The company does have a general commodities division of about 30-40 trucks. About 20% and 10% of their products hauled and exports and imports, respectively.

On-time delivery is a key metric for Tennant's service, especially for commodities. Safety is another priority for all loads.

Alcoa, Inc.

Mark Schluenberg

Alcoa, Inc. is a global lightweight metals manufacturer started in 1888 that manufactures a range of goods for the aerospace, automotive, transportation, and consumer products industries. Customers include Boeing, Airbus, Bombardier, Ford, and others. The company employs 2,400 people in the Bi-State Region and 64,000 world-wide, and has over 650 different locations.

In an average month in 2014, the company shipped 57 million pounds, with 8.5 million (15 percent) exports. For larger customers, Alcoa will ship products directly to their warehouses, or to a distribution center for smaller customers. Some goods require a complex supply chain, with goods being shipped between businesses for different parts of the manufacturing process before going to the consumer. Alcoa ships around 100 loads a day out of the Bi-State Region by truck. Raw materials are brought in by a combination of truck and rail. Transload and intermodal shipments are also used, mostly outbound out of Chicago and inbound to bypass local rail issues due to captive service and railroad agreements which cause delays. Alcoa will also occasionally use UPS air freight out of Chicago for international shipments.

Cost and reliability are most important to Alcoa's shipments. The goods are generally very expensive so Alcoa uses a group of core carriers whenever possible to prevent damage.

Quad City Airport

Bryan Johnson

The Quad City Airport sits on 2600 acres of land in Rock Island, IL. The airport is operated by an independent governing airport authority with members drawn from the communities that support the airport as a taxbase. It served as a small hub with air freight from the mid-1990s to 2000, with carriers such as DHL, Airborne Express, Burlington Air Freight, and UPS. 30 million pounds of freight were shipped annually. Due to national economic changes and the upheaval of the air freight industry, many of these carriers have consolidated or explored modal alternatives, leading to a hub-and-spoke system that caused a severe reduction in air freight service to Quad City. Currently, Ameriflight, a UPS contractor, provides air freight service to Quad City 5 times weekly. The airport also serves "on demand" traffic for Bi-State industries.

The airport has a number of cargo facilities that have been transitioned to ground-based services, including a customs facility and an engineering firm. The airport also lease a number of buildings to local industry. An industrial park, branded as an "innovation park" west of the airport includes publishing, printing, marketing companies. The airport is also working with a developer to build a two-acre light-manufacturing facility. A FedEx distribution center is located across the street, but only provides ground service. Recently, a Holiday Inn Express opened on airport property to service airport and highway traffic on I-280.

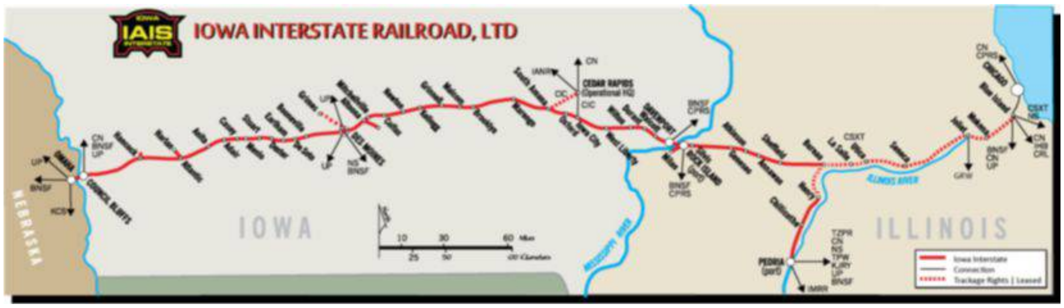
The airport pavement infrastructure is in good condition and the primary runway was rehabilitated within the last 5 years. Most challenges to the field deal with typography, including drainage and waterway location, and close proximity to I-280, Highway 150, and Highway 6.

Iowa Interstate Railroad

Carrie Evans

Iowa Interstate Railroad (IAIS) operates nearly 600 miles between Chicago, IL and Council Bluffs, IA, and largely parallels I-80 (Figure A.1). Despite only operating in two states, IAIS provides many connections, and is one of the few regional railroads that connects to the entire Class I railroad network, including BNSF, UP, CN, CP, KCS, CSX, and NS at multiple locations. IAIS bisects the Quad Cities, and operates about 100 miles in the region; this includes a branch line from Rock Island, IL south to Milan, IL. The railroad interchanges with BNSF at Rock Island, and with CP/DM&E at Davenport, IA. The railroad also connects with all Class I's in Chicago, and UP in Council Bluffs, IA.

Figure A.1 Iowa Interstate Railroad Network



Customer service is key to IAIS' success, and the company prides itself on being a nimble railroad that is quick to respond to customer needs. The railroad often acts as a bridge between smaller shippers (less than unit train) and larger markets and Class I railroads. The current commodity mix is primarily agricultural-based, including service to three ethanol plants. The Milan Branch is also home to a steel warehouse that requires regular shipments of coils in the Quad Cities.

Another major facility in the area is the Rock Island River Terminal, which was recently expanded to include a large fertilizer shed. IAIS delivers rail cars and fertilizer on barges, and distributes products on rail cars. The facility could add services and options via transloading.

IAIS also can service Eldridge, IA facilities via trackage rights over CP/DM&E. The line is brand new, however bridges are very old and they would have to be upgraded to handle the traffic. The line also includes a lot of crossings and presents obstacles for safe movements, as FRA regulations require crew to protect a "shoving movement': when a train is in a reverse movement for several miles.

HNI Corporation

Gary Carlson

Headquartered in Muscatine, IA, HNI is the 2nd largest furniture manufacturer in North America with multiple subsidiary companies, including three office furniture manufacturing plants in the Bi-State Region. Brands include Hann Furniture, Gunlock, Heat and Glow, Harmon Stove, and others. Items manufactured in Muscatine include furniture, fireplaces, and glass walls. HNI employs over 4,000 people in Muscatine manufacturing plants and the company is valued at $2.5 billion.

The company receives 200 truckloads a day to and from the Muscatine plant. Inbound supplies include steel, wood, particle board, glass, and other commodities. A limited amount of wood is brought in via rail car. Outbound goods are primarily finished products destined to a furniture dealer or wholesaler, or for large shipments to an end customers such as for an office furniture dealer supplying a new building. The company also operates warehouses in the Quad Cities which function as storage space for raw material and "work in process" inventory for the Muscatine plants. A small amount of inbound materials move intermodally through Chicago. Five percent of inbound and outbound goods are international, primarily to China, Brazil, Mexico, and the Middle East.

HNI provides specialized products and so reliability and service quality are extremely important to the business. Product damage is a large concern with shipping. HNI reports that it works with Iowa DOT regarding regulations as well as the Muscatine Chamber of Commerce on local issues.

Henry County Economic Development Partnership

Kathleen Repass

The Henry County Economic Development Partnership is a nonprofit agency that was established in 1992. In 2012, the agency applied for a federal grant to do planning, categorizing, data analysis of Henry, Mercer, and Rural Rock Island County. In Henry County and nearby communities there are 14 large motor freight carriers and a significant agricultural base.

The goal is to make partnerships with businesses in the area, find out what their needs are, shore up relationships with individual communities. There are 14 communities of varying sizes in Henry County. The Partnership also works with legislators in Illinois, and coordinates issues like applying for an enterprise zone application. The Partnership focuses on strategic issues impacting a number of the local communities.

SSAB

John Tobin

SSAB is a steel manufacturing company located in the Bi-State Region. It came to the region in 1996 after pursuit by the State of Iowa. The facility was previously owned by Ipsco, who had a relationship with CP/DM&E and helped build up access to the rail line and I-80. The company employs 450 people in the Bi-State Region.

SSAB brings in 1.5 million tons of scrap metal and ships out 1.25 million tons of steel a year. The company averaged 28,000 tons of scrap inbound and 39,300 tons of steel outbound by truck, monthly in 2014. They averaged 77,600 tons inbound and 58,300 tons outbound via rail. Some scrap (5 percent) is brought in via rail, but does not have a barge dock and must rely on Alter for a barge facility. Scrap metal is sourced from St. Paul, MN, Chicago, IL, St. Louis, MO, and Kansas City, MO. Customers include Caterpillar, John Deere, railcar builders, ship builders, wind towers, and barges.

Travel time and on-time reliability are key freight considerations for SSAB.

Kent/ Grain Processing Corporation (GPC)

Osama Shiadeh

Kent Corporation (the parent company for Grain Processing Corporation, or GPC) has been headquartered in Muscatine, IA since 1943, with five Iowa locations and two other U.S. locations. The company employs 1,000 in Muscatine; 2,000 nationwide, and has annual revenues of about $1.5 billion. GPC is a wet milling company that makes products including ethyl alcohol, corn starches for food markets, maltrodextrin (corn syrup solids), corn oil, and corn-based cat litter. GPC sees significant advantages in the Bi-State location due to being close to suppliers and raw materials, which are primarily sourced from the Midwest and Plains states.

Ninety percent of GPC's shipments are domestic, moving to all 50 states out of Muscatine. Ten percent of the shipments are international. From Muscatine, 30 percent move outbound by truck, 60 percent by rail, and 10 percent by intermodal (including water shipments). Some international samples move via air by expedited carrier (i.e., FedEx). Most inbound materials are brought via truck from Midwest locations. Intermodal moves are trucked to Chicago and railed to ports for export. The plant also ships via water directly from the plant to the Mississippi between March and November.

Multimodal shipping options are important to GPC's business. GPC is a captive rail shipper to CP/DM&E. The company leases and maintains their own rail cars. The company is working with Iowa DOT and the Iowa Economic Development Authority to connect a rail spur to Iowa Interstate Railroad. The company is also in the initial stages of constructing a river port that will handle bulk and potentially container traffic in Muscatine. As most customers do not want to carry inventory, GPC is focused on delivering just-in-time shipments.

Patriot Fuels

Judd Halting

Patriot Fuels is an ethanol facility established in 2005 located in Annawan, IL (Henry County). It was created out of a project by the Henry County Economic Development Partnership which determined that there was enough demand in the region to support the ethanol facility. The company produces 130 million gallons of ethanol, annually, and employs 60 in the Bi-State region.

Patriot Fuels' location gives it easy access to I-80, Route 6, and Route 78 and it brings in 200 truckloads of corn each day from Illinois. It ships one unit train a week that are loaded via 6 ladder tracks, built by Patriot, that give it access to IAIS. A co-product with ethanol is dried grain feed, which is loaded out via container trucks and 50 trucks per day are shipped to Joliet, IL, where it is shipped via rail for export via markets including Rhode Island, Florida, and North Carolina. The company also sells goods via waterway down to Peoria and Pekin, IL.

Freight efficiency is a key metric for Patriot Fuels. As many as 300 grain trucks per day are processed on the scales; the goal is to process each truck in less than one minute. The company uses a number of modes and markets to provide low cost service and ship where the best price is available; more competition on the transportation system will allow the company to be more competitive with other shippers.

A.2 ONLINE SURVEY

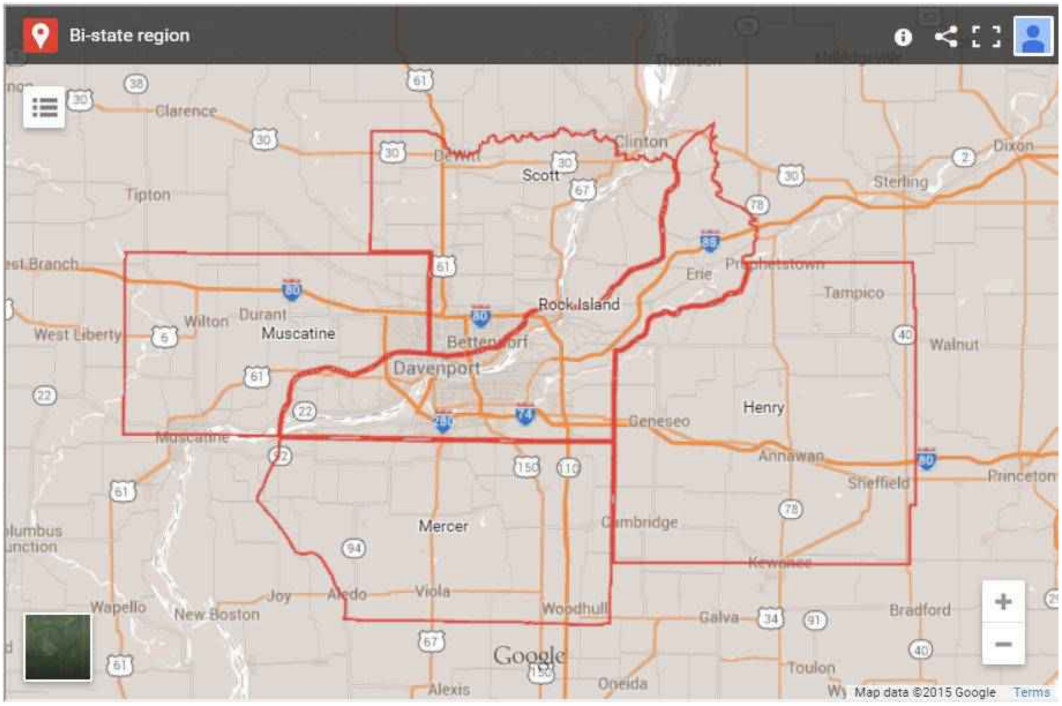
An online survey was designed for identifying the issues and needs of the freight system in the Bi-State Region and sent to companies that have business in the region by email. The survey was prepared with survey Qualtrics software and was open to respondents during April 1 – May 14 2015 period.

The survey had three main sections. In the first section, contextual questions were presented to the respondents in order to understand their companies in general and their use of freight system in the region. The responder companies presented small and large companies in the region from each county, which were mostly in agriculture and manufacturing sectors. The dominant mode used by the companies to ship and receive goods was truck; followed by rail and intermodal modes as the next commonly used modes respectively.

The second section included questions to identify freight system issues and needs in the region. Questions on the amount of freight by mode and potential issues the companies run into were presented. Access to other modes of transportation for intermodal freight transportation was the most cited issue by the responders across all modes. The need for initiatives in the region to improve the capacity and accessibility of intermodal freight transportation was expressed by the responders. Size and weight limits and infrastructure condition were also reported as major issues.

The last section in the survey was designed for economics and policy questions. In order to support growth in freight and logistics industries, developing a better intermodal infrastructure was suggested. This comment also echoes other comments within the survey regarding the need for a better intermodal infrastructure in the region. Travel time reliability was reported as the most important factor to companies or their clients in terms of routing or shipping to/from/through the Bi-State region. Labor shortages in the region was another issue that affected companies' ability to ship from the region. Following sections of this appendix presents the survey data and main findings.

Figure A.2 Bi-State Region Counties



Contextual Questions

The initial questions of the survey related specifically to how often respondent companies use the freight system in the Bi-State Region. The companies were asked about their location in the Bi-state Region, their sectors, number of employees, revenue ranges, freight modes that they use and organizations they communicate/work with regarding freight issues in the region.

The survey had responders from each county in the Bi-State Region and some companies were located in more than one county. The county with most locations was Muscatine County with four reported company locations. The companies were shipper (three), manufacturer (three) or carrier (one) companies; one company was in agriculture, forestry and fishing sector while the others were in manufacturing. Three companies categorized themselves in the "other" category among which one company reported to be a Class 1 Railway.

Question 1. Where is your company located in the Bi-State Region?

Answer	%
IL - Henry County	29%
IL - Rock Island County	14%
IL - Mercer County	14%
IA - Muscatine County	57%
IA - Scott County	43%
Outside the Bi-State Region (please enter City, State)	0%

Question 2. What category does your company fit into? (You may select more than one.)

Answer	Response	%
Shipper	3	43%
Manufacturer	3	43%
Carrier	1	14%
3PL Provider	0	0%
Other	2	29%

Question 3. What industry classification most accurately describes your company?

Answer	%
Agriculture, Forestry and Fishing	14%
Mining	0%
Utilities	0%
Construction	0%
Manufacturing	43%
Wholesale Trade	0%
Retail Trade	0%
Transportation and Warehousing	0%
Waste Management	0%
Other	43%

The companies that responded to the survey were typically smaller or larger sized companies in terms of number of employees. Two companies had 19 or fewer employees while three companies had above 1,000 employees. The responder companies presented three ranges of revenue with one responder for each range: $500,000–$1 million, $100–500 million, and $500 million–$1 billion.

Question 4: Approximately how many employees does your company employ in the Bi-State Region?

Answer	%
19 or fewer	40%
20–49	0%
50-99	0%
100–249	0%
250–499	0%
500–999	0%
Greater than 1,000	60%

Question 5. What is the annual revenue of your company in the Bi-State Region?

Answer	%
Less than $500,000	0%
$500,000–$1 million	33%
$1–2.5 million	0%
$2.5–5 million	0%
$5–10 million	0%
$10–20 million	0%
$20–50 million	0%
$50–100 million	0%
$100–500 million	33%
$500 million–$1 billion	33%
Over $1 billion	0%

The companies use all modes of transportation for shipping and receiving goods. Truck is the dominant mode with six responders, followed by rail with five responders. Intermodal, air and waterborne were less commonly used with four, three and two responses respectively. When companies were asked with which state or regional agencies they coordinated with regarding freight transportation regularly, two companies reported companies reported the Bi-State Regional Commission, two reported the Iowa Department of Transportation and one reported the Illinois Department of Transportation. Three companies did not have such communication with any agency. Other agencies the companies communicated with regarding freight transportation were local trucking and warehousing companies and the Quad Cities Development group.

Question 6. By what mode(s) does your company typically ship and receive goods? (You may select more than one.)

Answer	%
Truck	86%
Rail	71%
Air	43%
Waterborne	29%
Intermodal	57%

Question 7. What state/regional agencies do you coordinate with regarding freight transportation on a regular basis?

#	Answer	Response	%
1	Bi-State Regional Commission	2	40%
2	Illinois Department of Transportation	1	20%
3	Iowa Department of Transportation	2	40%
4	Other	0	0%
5	None	3	60%
Text Response			
Within the Bi-State area several local trucking and warehousing companies.			
Quad Cities Development Group; local units of government and economic development organizations.			

Freight System Issues and Needs in the Bi-State Region

The next set of questions were designed for identifying freight system issues and needs in the region. Questions on the amount of freight by mode and potential issues the companies run into were presented.

Four companies responded regarding their annual volume of freight by truck. The share of freight shipment by truck changed from 20 % to almost all freight volume of a company as presented in the table.

Question 8. In the Bi-State Region, what volume and percentage of freight does your company ship annually by truck?

Truckloads/tons	% of all shipments
25,000 truckloads	50%
30,000 truckloads	99%
50,000 tons	20%

The freight volume by rail was lower for the same companies, except one. For that particular company the freight volume shipped by rail was 60% as opposed to 20% by truck. The percentage of freight shipped by intermodal transportation varied by company and changed from 3% to 30%. It was typically the second most preferred method of freight transportation. Air and water modes were minimally used by the companies and constituted less than five percent of freight volume.

Question 9. In the Bi-State Region, what volume and percentage of freight does your company ship annually by rail?

Carloads/tons	% of all shipments
520 carloads	15%
3000 carloads	.5%
3000 tons	60%

Question 10. In the Bi-State Region, what volume and percentage of freight does your company ship annually by intermodal transportation?

Twenty-foot equivalent units (TEUs)	% of all shipments
3000 TEUs	30%
3000 TEUs	3%
500-1000 tons	10%

Question 11. In the Bi-State Region, what volume and percentage of freight does your company ship annually by air?

Tons	% of all shipments
10	5%
2000	1%

Question 12. In the Bi-State Region, what volume and percentage of freight does your company ship annually by water?

Tons	% of all shipments
200,000 -300,000 tons	N/A
160,000 tons	3%

Except one company, which uses interstate highways and other roads and highways equivalently, the responders heavily used interstate highways for their shipments.

Question 13. Within the Bi-State Region, what percentage of your shipping is on:

Interstate highways?	Other roads and highways?
70%	30%
50%	50%
85%	15%
98%	2%

Major issues companies are faced when shipping by trucking in the Bi-State Region, in the order of most reported to least, were

1. Access to ports, rail or intermodal connectors
2. Size and weight limits
3. Roadway condition/maintenance
4. Congestion/reliability
5. Safety

Vertical clearance was not listed as an issue by the responders.

Question 14. When shipping by trucking in the Bi-State Region, which of these are issues for your business?

#	Answer	Response	%
1	Access to ports, rail or intermodal connectors	4	100%
3	Roadway condition/maintenance	2	50%
4	Congestion/reliability	2	50%
5	Vertical clearance	0	0%
6	Size and weight limits	3	75%
7	Safety	1	25%
8	Other	0	0%

When responders were asked to elaborate on the issues that they run into when shipping by trucking in the region, they responded with particular problems for the most three reported issues above. The lack of having close by intermodal ports and the issues with reaching to the closest intermodal port in Chicago were mentioned. One responder noted the shortage of drayage drivers for transportation to Chicago, congestion of intermodal yards, and that the dray between the Bi-State Region and Chicago is expensive. Poor conditions of some of the highways and a need for increasing weight limits were also mentioned.

Question 15. When shipping by trucking in the Bi-State Region, which particular issues do you run into?

For "Access to ports, rail or intermodal connectors"

Describe the issues	Where do you see the issues?
The closest intermodal port is Chicagoland.	There is a shortage of drayage drivers within Chicago. The intermodal yards are congested. It is expensive to dray between Muscatine County and Chicago.
Being in the heartland, need to go via either East or West Coast ports and / or Canada.	Not close enough.

For "Roadway condition/maintenance"

Describe the issues	Where do you see the issues?
Keep the highways maintained.	some are in poor conditions

For "Size and weight limits"

Describe the issues	Where do you see the issues?
Need to increase the gross weight from 80,000 lbs to 96,000 lbs.	Utilize less trucks on the highways

The next category of questions were on the issues companies are faced when shipping by rail in the Bi-State Region. Issues in the order of most reported to least, were

- Access to Class I services, short lines, intermodal services
- Congestion/ bottlenecks/ reliability
- Other (railroad rates)

Question 16. When shipping by rail in the Bi-State Region, which of these are issues for your business?

Answer	Response	%
Access to Class I services, short lines, intermodal services	2	67%
System condition/ maintenance	1	33%
Congestion/ bottlenecks/ reliability	2	67%
Safety	0	0%
Other	1	33%

Responders emphasized the need for accessibility to more railroad classes, issues with the lack of reliability and railroad rates.

Question 17. When shipping by rail in the Bi-State Region, which particular issues do you run into?

For "Access to Class I services, short lines, intermodal services"

Describe the issues	Where do you see the issues?
Serviced by only one Class I RR.	Captive shipper

For "Congestion/ bottlenecks/ reliability"

Describe the issues	Where do you see the issues?
Reliability	Does not exist.

For "Other"

Describe the issues	Where do you see the issues?
railroad rates	N/A

The following category of questions were on the issues companies are faced when shipping by water in the Bi-State Region. The only issue reported in this category was access to ports, road/rail connectors. The lack of connection to rail system and the need for an intermodal terminal on the Mississippi River were emphasized by a responder.

Question 18. When shipping by rail in the Bi-State Region, which of these are issues for your business?

Answer	%
Access to ports, road/rail connectors	100%
System condition/ maintenance	0%
Bottlenecks/ reliability	0%
Safety	0%
Other	0%

Question 19. When shipping by water in the Bi-State Region, which particular issues do you run into?

For "Access to ports, road/rail connectors"

Describe the issues	Where do you see the issues?
No connection to Rail system / road	Need a terminal on the Miss. river with access to rail / road.

Then, potential issues when shipping by air were presented to the responders. Availability of air freight and air freight facilities was the only selected option by a responder. Again, the inconvenience of getting the freight to Chicago was noted.

Question 20. When shipping by air in the Bi-State Region, which of these are issues for your business?

Answer	%
Airport landside access	0%
Availability of air freight and air-freight facilities	100%
Safety	0%
Other	0%

For "Availability of air freight and air-freight facilities"

Describe the issues	Where do you see the issues?
We usually truck the air freight to Chicago.	Lack of adequate air freight facilities.

After the issues of freight transportation in the region when shipping by different modes were identified by the responders, they were asked to rank the most needed improvements for region's transportation infrastructure. Below, lower ranks show more needed improvements. As presented in the table, intermodal facilities were by far the most needed improvement.

Question 21. What is the most needed improvement for the Bi-State Region's transportation infrastructure?

Rank the Bi-State Region's transportation infrastructure in terms of which needs the MOST improvements to which needs the LEAST. (1 needs the most improvement.)

Answer	Elements that need improvement - Mean Rank
Intermodal facilities	1.33
Rail	3.00
Transload facilities	3.67
Ports and Waterways	3.75
Highway	4.00
Air	4.33

In the following questions, responders were asked to identify the types of projects below are most critical to improving freight mobility. For roads, Highway capacity improvements and roadway and bridge maintenance were equally ranked as the most critical projects to improve freight mobility. For rail, intermodal or transload improving rail/port connections and developing new transload/intermodal facilities were equally ranked as the most important projects. For air, expanding air cargo service at Quad City International Airport was ranked as the most important project. Finally, for ports and waterways, expanding or adding port facilities was ranked as the most important waterway project.

Question 22. In the Bi-State Region, which of the types of projects below are most critical to improving freight mobility?

Please rank all items you think are critical, from MOST to LEAST important.

FOR ROAD

Answer	Rank roadway projects (1=most important) - Mean Rank
Highway capacity improvements	2.00
Roadway and bridge maintenance	2.00
Highway interchange improvements	3.00
System management/operational strategies (congestion pricing, managed lanes, ITS)	3.00
Dedicate truck lanes	6.00
Vertical clearance	6.00
Centralized information resources (e.g. real-time congestion, truck stop parking availability, etc.)	6.50
Truck parking	7.50

FOR RAIL, INTERMODAL OR TRANSLOAD.

Answer	Rank rail, intermodal and transload projects (1=most important) - Mean Rank
Improve rail/port connections	1.50
New transload/intermodal facility development	1.50
Rail capacity enhancements	4.00
Improve road/rail connections at existing transload facilities	4.00
Bridge maintenance	5.00
Availability of equipment, (e.g. containers)	5.50
Eliminate at-grade crossings (rail-rail or roadway-rail)	6.50

FOR AIR

Answer	Rank air projects (1=most important) - Mean Rank
Expand air cargo service at Quad City International Airport	1.50
Attract air cargo service to other regional airports	2.00
Expand Quad City International Airport	2.50
Expand other regional airports	4.00
Improve roadway connections to airport facilities	5.00
Airport maintenance	6.00

FOR PORTS AND WATERWAYS

Answer	Rank waterway projects (1=most important) - Mean Rank
Expand or add port facilities	1.00
Lock improvements along the Mississippi River	2.00
Improve landside access to port facilities	2.00
Improved channel maintenance	4.00

Economics

The following section in the survey was designed for economics and policy questions. Two responders noted that labor shortages affected their ability to ship from the region. Four responders believed the region was equally competitive compared to neighboring regions. In order to support growth in freight and logistics industries, developing a better intermodal infrastructure was suggested. This comment also echoes other comments within the survey regarding the need for a better intermodal infrastructure in the region. Travel time reliability was reported as the most important factor to companies or their clients in terms of routing or shipping to/from/through the Bi-State Region.

Question 23. What policy/regulatory/logistics trends are affecting your ability to ship goods to/from/within the Bi-State Region?

(e.g. national Hours-of-Service regulation, labor shortages, the U.S. economy as a whole)

Text Response
Labor shortages (driver)
HOS. Rail service, labor shortages

Question 24. How competitive is the Bi-State Region compared to neighboring regions?

Answer	%
More competitive	0%
Equally competitive	100%
Less competitive	0%

Question 25. What can Bi-State Region public sector agencies do to support growth in freight and logistics industries?

Text Response
Develop a better intermodal infrastructure.
Need option to choose from Railroads to facilities.

Question 26. What factors are most important to your company or clients in terms of routing or shipping to/from/through the Bi-State region?

(e.g. cost, reliability, congestion, accessibility to customers, just-in-time delivery)

Text Response
On time delivery
Reliability then cost.

B. Highway System Investments Listing

The following tables provide additional information on highway system investments recommended as part of this Plan.

- **Table B.1. - Funded Highway System Projects.** These projects have been identified by the Bi-State Regional Commission and its partners, are noted in the TIP, and are slated to receive funding. These projects are estimated to cost just over $310M.
- **Table B.2 - Identified, Unfunded Highway System Projects.** These projects have been identified by the Bi-State Regional Commission and its partners, are noted in the TIP, and but do not have funding identified for implementation. These projects are estimated to cost just over $101M.
- **Table B.3 - Previously Unidentified, Unfunded Highway System Projects.** These projects were identified during the technical analysis phase of this study, are not currently identified in existing plans, and do not have funding identified for implementation. Costs have not been identified for these projects.

The following fields are used to describe freight projects identified as part of this Plan. Not all fields are applicable to all projects:

- **Project Number** – Number identification used in the TIP
- **Map ID** – Convention developed for this Plan; refers to Figure 6.1
- **Project Route** – Primary route affected
- **Project Location** – General location of project on route, or project boundaries
- **Project Description** – General description of project
- **Plan Justification** – convention used in the TIP to note basis of inclusion
  - **LRP40 -** Project identified in 2021 - 2040 Priority of 2040 Long-Range Plan
  - **MAINT -** Projects designed to prolong the life of the existing roadway (system preservation) without expanding capacity
  - **OTHER -** Other
  - **CMP -** Transportation projects that improve the operating efficiency of the existing transportation system
- **Fiscal Year** – Year funded in the TIP

- **Expected Relative Impact** - Convention developed for this Plan; qualitative estimate of relative benefit project may have on goods movement
- **Need, Issue, Opportunity** - Convention developed for this Plan; link to need, issue or opportunity identified as part of this Plan
- **Type of Need/Issue** - Convention developed for this Plan; identification if the need is related to physical infrastructure, system operations, or both
- **Total Estimated Cost** - Cost estimate provided by project sponsors to reflect cost in year of construction

Table B.1 Funded Highway System Projects

Project Number	Map ID	Project Route	Project Location	Project Description	Plan Justifica-tion	FY	Expected Relative Impact	Need, Issue, Opportunity	Type of Need/Issue	Total Estimated Cost
IA-14-09	1	I-74	Reconstruction in Bettendorf	Bridge Replacement, Grade and Pave, ROW	LRP40	FY15	Very High	Highway Congestion/ Address Regional Chokepoints/ Freight System Resiliency	Physical Infrastructure, Operational	$20,349,000
IL-15-15	1	I 74/US 6	Mississippi River Corridor	Demolition	LRP40	FY15	Very High	Highway Congestion/ Address Regional Chokepoints/ Freight System Resiliency	Physical Infrastructure, Operational	$1,500,000
IL-15-16	1	I 74/US 6	Mississippi River Corridor	Misc	LRP40	FY15	Very High	Highway Congestion/ Address Regional Chokepoints/ Freight System Resiliency	Physical Infrastructure, Operational	$1,400,000
IL-15-17	1	I 74/US 6	Mississippi River Corridor	Land Acquisition	LRP40	FY15	Very High	Highway Congestion/ Address Regional Chokepoints/ Freight System Resiliency	Physical Infrastructure, Operational	$3,600,000
IA-16-03	1	I-74	In Bettendorf and Davenport (Central Section)	ROW, Grade and Pave, Bridge Replacement	LRP40	FY16	Very High	Highway Congestion/ Address Regional Chokepoints	Physical Infrastructure	$1,500,000
IA-18-03	1	I-74	In Bettendorf and Davenport (Central Section)	ROW, Grade and Pave, Bridge Replacement	LRP40	FY18	Very High	Highway Congestion/ Address Regional Chokepoints/ Freight System Resiliency	Physical Infrastructure	$55,883,000
IL-18-02	1	I 74/US 6	Mississippi River	Construction Engineering Bridge (New); Misc.; Lighting	LRP40	FY18	Very High	Highway Congestion/ Address Regional Chokepoints/ Freight System Resiliency	Physical Infrastructure	$17,169,000
IL-11-17	2	I-280	Mississippi River SW of Rock Island	P.E. (Phase II) P.E. (Consultant TSL)		FY16	Very High	State of Good Repair	Physical Infrastructure, Operational	$2,200,000

Project Number	Map ID	Project Route	Project Location	Project Description	Plan Justifica-tion	FY	Expected Relative Impact	Need, Issue, Opportunity	Type of Need/Issue	Total Estimated Cost
IL-15-04	3	IL 5/John Deere Rd	0.2 mi W of 38th St to 0.3 mi E of 70th St in Moline	Additional Lanes, Reconstruction, Retaining Wall, Intersection Improvement, Culvert Replacement, Culvert Extension	LRP40	FY15	Very High	State of Good Repair	Physical Infrastructure, Operational	$48,000,000
IL-16-01	4	I 80/IL 110	Over BNSF RR 1.1 mi S of IL 5/92	Bridge Replacement	MAINT	FY16	High	State of Good Repair	Physical Infrastructure, Operational	$8,000,000
IL-16-02	5	IL 80/IL 110	Over Barstow Rd 1.3 Mi S of IL 5/92	Bridge Replacement	MAINT	FY16	High	State of Good Repair	Physical Infrastructure, Operational	$8,600,000
IL-16-04	6	I 80/IL 110	Over Cleveland Rd, Over IAIS RR, and Over Green River 1.9 Mi N of US 6	Bridge Replacement, Bridge Joint Repair	MAINT	FY16	High	State of Good Repair	Physical Infrastructure, Operational	$10,200,000
IL-16-03	7	I 80/IL 110	0.8 mi N of Il5/92 to Henry Co. Line	Reconstruction, Resurfacing (INT-2nd)	MAINT	FY16	Moderate	State of Good Repair	Physical Infrastructure	$3,700,000
IA-15-11	8	I-280	Duck Creek 3.4 mi S of I-80 in Davenport (WB)	Bridge Replacement	MAINT	FY15	High	State of Good Repair	Physical Infrastructure, Operational	$900,000
DA-11-11	9	River Dr & 3rd St	River Drive from 3rd St to Oneida Ave and 3rd St from Iowa Street to River Drive	Traffic Synchronization	CMP	FY15	Moderate	Spot Roadway Widening/ Lane Additions/ Address Regional Chokepoints	Physical Infrastructure	$51,500
IL-15-08	10	US 6/IL 84/IL 84A	At IL 84 W of Colona	Intersection Reconstruction	MAINT	FY15	Moderate	State of Good Repair	Physical Infrastructure, Operational	$4,961,000

Project Number	Map ID	Project Route	Project Location	Project Description	Plan Justifica-tion	FY	Expected Relative Impact	Need, Issue, Opportunity	Type of Need/Issue	Total Estimated Cost
IA-15-01	N/A	I-80	Co Rd Y30 9 mi E of IA 38	Bridge Deck Overlay	MAINT	FY15	Low	State of Good Repair	Physical Infrastructure, Operational	$317,000
IA-15-02	N/A	I-74	Mississippi River (NB)	Bridge Rehabilitation, Lighting	MAINT	FY15	Low	State of Good Repair	Physical Infrastructure, Operational	$1,025,000
IA-15-03	N/A	I-74	Mississippi River (SB)	Bridge Rehabilitation, Lighting	MAINT	FY15	Low	State of Good Repair	Physical Infrastructure, Operational	$1,025,000
IA-15-04	N/A	I-280	I-80 S to Mississippi River (EBL/WBL)	Grade and Pave, Traffic Signs	MAINT	FY15	Low	State of Good Repair	Physical Infrastructure, Operational	$13,897,000
IA-15-06	N/A	US 67	Mississippi River Bridge	Revetment	MAINT	FY15	Low	State of Good Repair	Physical Infrastructure	$275,000
IA-15-07	N/A	I-74	I-80 to Mississippi River	Patching	MAINT	FY15	Low	State of Good Repair/ Freight System Resiliency	Physical Infrastructure, Operational	$150,000
IA-15-08	N/A	I-280	I-80 to Mississippi River	Patching	MAINT	FY15	Low	State of Good Repair	Physical Infrastructure, Operational	$150,000
IA-15-09	N/A	I-280	Mississippi River	Bridge Rehabilitation, Bridge Washing	MAINT	FY15	Low	State of Good Repair	Physical Infrastructure, Operational	$20,000
IA-15-10	N/A	I-80	Mississippi River In Le Claire (State Share)	Bridge Painting/Washing	MAINT	FY15	Routine Maintenan ce	State of Good Repair	Physical Infrastructure	$75,000
IA-15-12	N/A	IA 461	In Davenport, From River Dr. to 12th St. (SB) - State Share	Pavement Rehab	MAINT	FY15	Low	State of Good Repair	Physical Infrastructure, Operational	$800,000

Project Number	Map ID	Project Route	Project Location	Project Description	Plan Justifica-tion	FY	Expected Relative Impact	Need, Issue, Opportunity	Type of Need/Issue	Total Estimated Cost
IA-15-13	N/A	I-80	Cedar Co. to Mississippi River	Patching	MAINT	FY15	Low	First- and Last-Mile Connectivity/ Spot Roadway Widening, Lane Additions	Physical Infrastructure, Operational	$200,000
IA-15-14	N/A	I-80	I-74 to Mississippi River	Traffic Signs	MAINT	FY15	Routine Maintenan ce	First- and Last-Mile Connectivity/ Address Regional Chokepoints	Operational	$1,000,000
IA-15-15	N/A	I-74	Mississippi River Bridge Approach Span in Bettendorf (EB&WB)	Bridge Deck Overlay	MAINT	FY15	Low	First- and Last-Mile Connectivity/ Address Regional Chokepoints	Physical Infrastructure, Operational	$1,000,000
DA-11-06	N/A	US6/Kimb erly Rd	Intersection of US 6 and Division St.	Intersection Improvements, Turn lane construction from 600 ft S of US6 to 550 ft N of US 6, and from 450ft W of Division to 600 ft E of Division	CMP	FY15	Moderate	State of Good Repair	Physical Infrastructure, Operational	$375,000
IL-15-07	N/A	I 88/IL 5/IL 110/IL 92	0.5 mi W of I-80 / IL 92 to 0.2 mi NE of 122nd Ave N of Fargo Rd	Resurfacing (INT-2nd), Cold Milling, Patching	MAINT	FY15	Low	First- and Last-Mile Connectivity	Physical Infrastructure, Operational	$14,500,000
IL-15-09	N/A	I 74/US 6	Mississippi River in Moline	Lighting, Bridge Rehab	MAINT	FY15	Low	State of Good Repair	Physical Infrastructure, Operational	$2,000,000
IL-15-10	N/A	US 67	IL 92, RR & Mississippi River in Rock Island	RIP RAP, Misc.	MAINT	FY15	Routine Maintenan ce	State of Good Repair	Physical Infrastructure, Operational	$500,000
IL-15-12	N/A	I 74	Over 1st Ave to 7th Ave in Moline	Bridge Deck Repairs	MAINT	FY15	Low	State of Good Repair	Physical Infrastructure, Operational	$3,000,000

Project Number	Map ID	Project Route	Project Location	Project Description	Plan Justifica-tion	FY	Expected Relative Impact	Need, Issue, Opportunity	Type of Need/Issue	Total Estimated Cost
IL-15-13	N/A	I 80/IL 110	Rock River to I-74	Patching	MAINT	FY15	Low	State of Good Repair	Physical Infrastructure, Operational	$1,500,000
IL-15-14	N/A	I 74/ I 80/ IL 110	US 6 to IL 81	Resurfacing	MAINT	FY15	Low	State of Good Repair	Physical Infrastructure, Operational	$16,800,000
IA-16-01	N/A	I-74	Mississippi River (NB)	Bridge Rehabilitation, Lighting	MAINT	FY16	Low	Address Regional Chokepoints	Physical Infrastructure	$25,000
IA-16-02	N/A	I-74	Mississippi River (SB)	Bridge Rehabilitation, Lighting	MAINT	FY16	Low	State of Good Repair	Physical Infrastructure, Operational	$25,000
IA-16-04	N/A	US 67	Mississippi River Bridge	Revetment	MAINT	FY16	Low	Highway Congestion/ Address Regional Chokepoints	Physical Infrastructure, Operational	$25,000
IA-16-05	N/A	I-74	I-80 to Mississippi River	Patching	MAINT	FY16	Low	State of Good Repair/ Freight System Resiliency	Physical Infrastructure	$150,000
IA-16-06	N/A	I-280	I-80 to Mississippi River	Patching	MAINT	FY16	Low	State of Good Repair/ Freight System Resiliency	Physical Infrastructure	$150,000
IA-16-07	N/A	I-280	Mississippi River	Bridge Rehabilitation, Bridge Washing	MAINT	FY16	Low	State of Good Repair/ Freight System Resiliency	Physical Infrastructure	$20,000
IA-16-08	N/A	I-80	Mississippi River In Le Claire (State Share)	Bridge Washing	MAINT	FY16	Routine Maintenance	State of Good Repair/ Freight System Resiliency	Physical Infrastructure	$75,000
IA-16-09	N/A	I-74	I-74 (WB) Over I-80	Bridge Deck Overlay	MAINT	FY16	Low	State of Good Repair	Physical Infrastructure, Operational	$270,000
IA-16-10	N/A	I-80	Co Rd Z30, 3.5 mi W of US 67 (WB & EB)	Bridge Widening	MAINT	FY16	Low	State of Good Repair	Physical Infrastructure, Operational	$1,126,000

Project Number	Map ID	Project Route	Project Location	Project Description	Plan Justifica-tion	FY	Expected Relative Impact	Need, Issue, Opportunity	Type of Need/Issue	Total Estimated Cost
IA-16-11	N/A	I-80	CEDAR CO TO MISSISSIPPI RIVER	Patching	MAINT	FY16	Low	State of Good Repair	Physical Infrastructure, Operational	$200,000
DA-15-03	N/A	Kimberly Rd. (US 6)	Kimberly Rd. Bridge over Duck Creek	Bridge Rehab	MAINT	FY16	Low	State of Good Repair	Physical Infrastructure	$120,000
IA-17-01	N/A	US 67	Mississippi River Bridge	Revetment	MAINT	FY17	Low	State of Good Repair	Physical Infrastructure, Operational	$25,000
IA-17-02	N/A	I-74	Mississippi River (NB)	Bridge Rehabilitation, Lighting	MAINT	FY17	Low	State of Good Repair	Physical Infrastructure	$425,000
IA-17-03	N/A	I-74	Mississippi River (SB)	Bridge Rehabilitation, Lighting	MAINT	FY17	Low	State of Good Repair	Physical Infrastructure, Operational	$425,000
IA-17-04	N/A	I-80	Mississippi River In Le Claire (State Share)	Bridge Washing	MAINT	FY17	Routine Maintenance	State of Good Repair	Physical Infrastructure, Operational	$75,000
IA-17-05	N/A	I-280	I-80 to Mississippi River	Patching	MAINT	FY17	Low	State of Good Repair	Physical Infrastructure, Operational	$150,000
IA-17-06	N/A	I-280	Mississippi River	Bridge Rehabilitation, Bridge Washing	MAINT	FY17	Routine Maintenance	State of Good Repair	Physical Infrastructure, Operational	$20,000
IA-17-07	N/A	I-74	I-80 to Mississippi River	Patching	MAINT	FY17	Low	State of Good Repair	Physical Infrastructure, Operational	$150,000
IA-17-08	N/A	I-80	1.1 mi E of Co Rd Y40 to Co Rd Z30 (WB) - Various Locations	Pavement Rehab	MAINT	FY17	Low	State of Good Repair	Physical Infrastructure, Operational	$12,421,000

Project Number	Map ID	Project Route	Project Location	Project Description	Plan Justifica-tion	FY	Expected Relative Impact	Need, Issue, Opportunity	Type of Need/Issue	Total Estimated Cost
IA-17-09	N/A	I-74	I-74 (EB) over I-80	Bridge Rehab	MAINT	FY17	Low	State of Good Repair	Physical Infrastructure, Operational	$580,000
IA-17-10	N/A	I-80	CEDAR CO TO MISSISSIPPI RIVER	Patching	MAINT	FY17	Low	State of Good Repair	Physical Infrastructure, Operational	$200,000
IL-17-03	N/A	I 74/US 6	Mississippi River in Moline	Bridge Rehab	MAINT	FY17	Low	State of Good Repair	Physical Infrastructure, Operational	$800,000
IA-18-01	N/A	I-74	Mississippi River (NB)	Bridge Rehabilitation, Lighting	MAINT	FY18	Low	State of Good Repair	Physical Infrastructure	$25,000
IA-18-02	N/A	I-74	Mississippi River (SB)	Bridge Rehabilitation, Lighting	MAINT	FY18	Low	State of Good Repair	Physical Infrastructure, Operational	$25,000
IA-18-04	N/A	US 67	Mississippi River Bridge	Revetment	MAINT	FY18	Low	State of Good Repair	Physical Infrastructure, Operational	$25,000
IA-18-05	N/A	I-280	Mississippi River	Bridge Rehabilitation, Bridge Washing	MAINT	FY18	Low	State of Good Repair	Physical Infrastructure, Operational	$20,000
IA-18-06	N/A	I-80	Mississippi River In Le Claire (State Share)	Bridge Washing	MAINT	FY18	Routine Maintenan ce			$75,000
IA-18-07	N/A	I-74	I-80 to Mississippi River	Patching	MAINT	FY18	Low	State of Good Repair	Physical Infrastructure, Operational	$150,000
IA-18-08	N/A	I-280	I-80 to Mississippi River	Patching	MAINT	FY18	Low	State of Good Repair	Physical Infrastructure, Operational	$150,000

Project Number	Map ID	Project Route	Project Location	Project Description	Plan Justifica-tion	FY	Expected Relative Impact	Need, Issue, Opportunity	Type of Need/Issue	Total Estimated Cost
IA-18-09	N/A	I-80	CEDAR CO TO MISSISSIPPI RIVER	Patching	MAINT	FY18	Low	First- and Last-Mile Connectivity	Physical Infrastructure	$200,000
IL-18-03	N/A	I 280	Mississippi River SW of Rock Island	Bridge New Deck; Bridge Rehabilitation	MAINT	FY18	Low	State of Good Repair	Physical Infrastructure, Operational	$25,000,000
IL-18-04	N/A	I 280	Mississippi River to 0.4 Mi E of Airport Rd in Milan	Resurfacing (INT-3rd); Patching; Cold Milling	MAINT	FY18	Low	State of Good Repair	Physical Infrastructure, Operational	$5,500,000
RI-18-01	N/A	IL92 - East Section	24th Street to Moline	Relocating IL92 from 7th Ave	Not Given	FY18	Low	State of Good Repair	Physical Infrastructure, Operational	$5,500,000
IL-15-18	N/A	I 80	0.5 mi E of I-74/I-80 interchange to 0.5 mi W of IL 82	Resurfacing	MAINT	FY15	Low	State of Good Repair	Physical Infrastructure, Operational	$10,000,000

Table B.2 Identified, Unfunded Highway System Projects

Project Number	Map ID	Project Route	Project Location	Project Description	Plan Justification	Need, Issue, Opportunity	Type of Need/Issue	Total Estimated Cost
BE-12-01	11	I-80	I-80/ Middle Road Interchange	Reconstruction	LRP-I	Safety/ Highway Congestion/ First- and Last-Mile Connectivity	Physical Infrastructure, Operational	$29,000,000
IL-13-13	12	IL-84/ Colona Rd	Rock River to I-80, Colona	Reconstruct At-Grade Crossing, Widen to 4 Lanes, Interchange Reconstruction	LRP40	First- and Last-Mile Connectivity/ Spot Roadway Widening, Lane Additions/Freight System Resiliency and Redundancy	Physical Infrastructure, Operational	$59,700,000
CV-13-01	13	US 6	Coal Creek Bridge to Schaffer Creek Bridge, Coal Valley	Engineering & ROW for Widening	LRP40	First- and Last-Mile Connectivity/ Spot Roadway Widening, Lane Additions/Freight System Resiliency and Redundancy	Physical Infrastructure, Operational	$740,000
CV-13-04	13	US 6	Coal Creek Bridge to Schaffer Creek Bridge, Coal Valley	Widening	LRP41	First- and Last-Mile Connectivity/ Spot Roadway Widening, Lane Additions/Freight System Resiliency and Redundancy	Physical Infrastructure, Operational	$12,000,000

Table B.3 Previously Unidentified, Unfunded Highway System Project Concepts

Project Number	Map ID	Route	Location	Concept	Reason	Need, Issue, Opportunity	Type of Need/Issue	Total Estimated Cost
NA	14	I-80	I-80/ US 61 Interchange	Reconstruction	Unreliability	Address Regional Chokepoints/ Highway Congestion/ Freight System Resiliency & Reliability	Physical Infrastructure, Operational	NA
NA	15	US 6	US 6/ Jersey Ridge Rd	Operational Improvements/ Spot Capacity Expansion	Unreliability	First- and Last-Mile Connectivity/ Freight System Resiliency & Reliability	Physical Infrastructure, Operational	NA
NA	16	US 6	US 6/ Brady St/ Welcome Way	Operational Improvements/ Spot Capacity Expansion	Unreliability	First- and Last-Mile Connectivity/ Freight System Resiliency & Reliability	Physical Infrastructure, Operational	NA
NA	17	US 67	US 6/ Brady St/ Main St	Operational Improvements/ Spot Capacity Expansion	Unreliability	First- and Last-Mile Connectivity/ Freight System Resiliency & Reliability	Physical Infrastructure, Operational	NA
NA	18	US 67	Centennial Bridge	Reconstruction	Unreliability	Address Regional Chokepoints/ Highway Congestion/ Freight System Resiliency & Reliability	Physical Infrastructure, Operational	NA
NA	19	I-280	I-280/ US 6 Interchange	Reconstruction	Unreliability	Address Regional Chokepoints/ Highway Congestion/ Freight System Resiliency & Reliability	Physical Infrastructure, Operational	NA
NA	20	IL-92	Centennial Expy. (South of I-280 Interchange)	Spot Capacity Expansion	Unreliability	First- and Last-Mile Connectivity/ Freight System Resiliency & Reliability	Physical Infrastructure, Operational	NA
NA	21	IL-92	Centennial Expy./ Andalusia Road	Operational Improvements/ Spot Capacity Expansion	Truck Crashes	First- and Last-Mile Connectivity/ Freight System Resiliency & Reliability	Physical Infrastructure, Operational	NA
NA	22	IL-92	IL-92/ Barstow Rd	Operational Improvements/ Spot Capacity Expansion	Truck Crashes	First- and Last-Mile Connectivity/ Freight System Resiliency & Reliability	Physical Infrastructure, Operational	NA
NA	23	IA-22	West of I-280	Routine Maintenance	Pavement Condition	State of Good Repair/ First- and Last-Mile Connectivity/ Freight System Resiliency & Reliability	Physical Infrastructure, Operational	NA

Project Number	Map ID	Route	Location	Concept	Reason	Need, Issue, Opportunity	Type of Need/Issue	Total Estimated Cost
NA	24	IA-22	East of I-280	Routine Maintenance	Pavement Condition	State of Good Repair/ First- and Last-Mile Connectivity/ Freight System Resiliency & Reliability	Physical Infrastructure, Operational	NA
NA	25	IA-92	Mississippi River	Reconstruction	Bridge Reconstruction / Replacement	State of Good Repair/ First- and Last-Mile Connectivity/ Freight System Resiliency & Reliability	Physical Infrastructure, Operational	NA
NA	26	IL-5	Rock River	System Expansion	Connectivity	First- and Last-Mile Connectivity/ Freight System Resiliency & Reliability	Physical Infrastructure, Operational	NA
NA	27	I-80	I-80 Corridor	Spot Capacity Expansion	Capacity Expansion	Highway Congestion/ Address Regional Chokepoints	Physical Infrastructure, Operational	NA