

HENNEPIN COUNTY FREIGHT STUDY

2016

Task 2: Commodity Flow Analysis



Contents

Introduction _____ 1

Commodity Flow Analysis _____ 2

Highway Freight _____ 14

Rail Freight _____ 30

Waterborne Freight _____ 45

Air Freight _____ 49

Appendix _____ 56

Introduction

Hennepin County is undertaking a Freight Study to understand how the County's transportation networks are being used for the handling of freight. The study will examine how current freight uses are evolving, and how projected trends may affect the County's priorities, projects, and policies regarding the freight system. This technical memo documents Task 2 of this study, which entailed analyzing the commodity flows of Hennepin County's highways and other freight-significant roadways, rail, air, and water system elements for a nominal base year of 2014 and a forecast year of 2040.

The remainder of this report is organized into five sections, plus appendixes. The first section summarizes commodity flows across all major modes moving to, from, and across the County's highway, rail, air and water transportation networks. It includes an assessment of the demand for the freight system, major commodities transported, directional analysis, and the County's major trade partners. The subsequent four sections offer individual modal perspectives for Hennepin County's highway, rail, water, and air networks, respectively. Each includes an analysis of tonnage, value, direction of movement, commodity, and trading partner. In the case of air, the only substantive cargo facility is Minneapolis-St. Paul International Airport (MSP).

The appendixes provide descriptions of the commodity categories used by the different data sources, along with a summary of historical and projected rail traffic through 2040.

Commodity Flow Analysis

This section provides an overview of Hennepin County's freight system, which includes highways, railroads, waterways, and the Minneapolis-St. Paul International Airport (MSP), as illustrated in Figure 1 on page 4. Summary statistics illustrate the freight system demand, including tonnage, value, direction (in, out, within, and through the County), trading partners, and commodity for each of the four freight modes.

The following data was used in this commodity flow analysis for each freight mode:

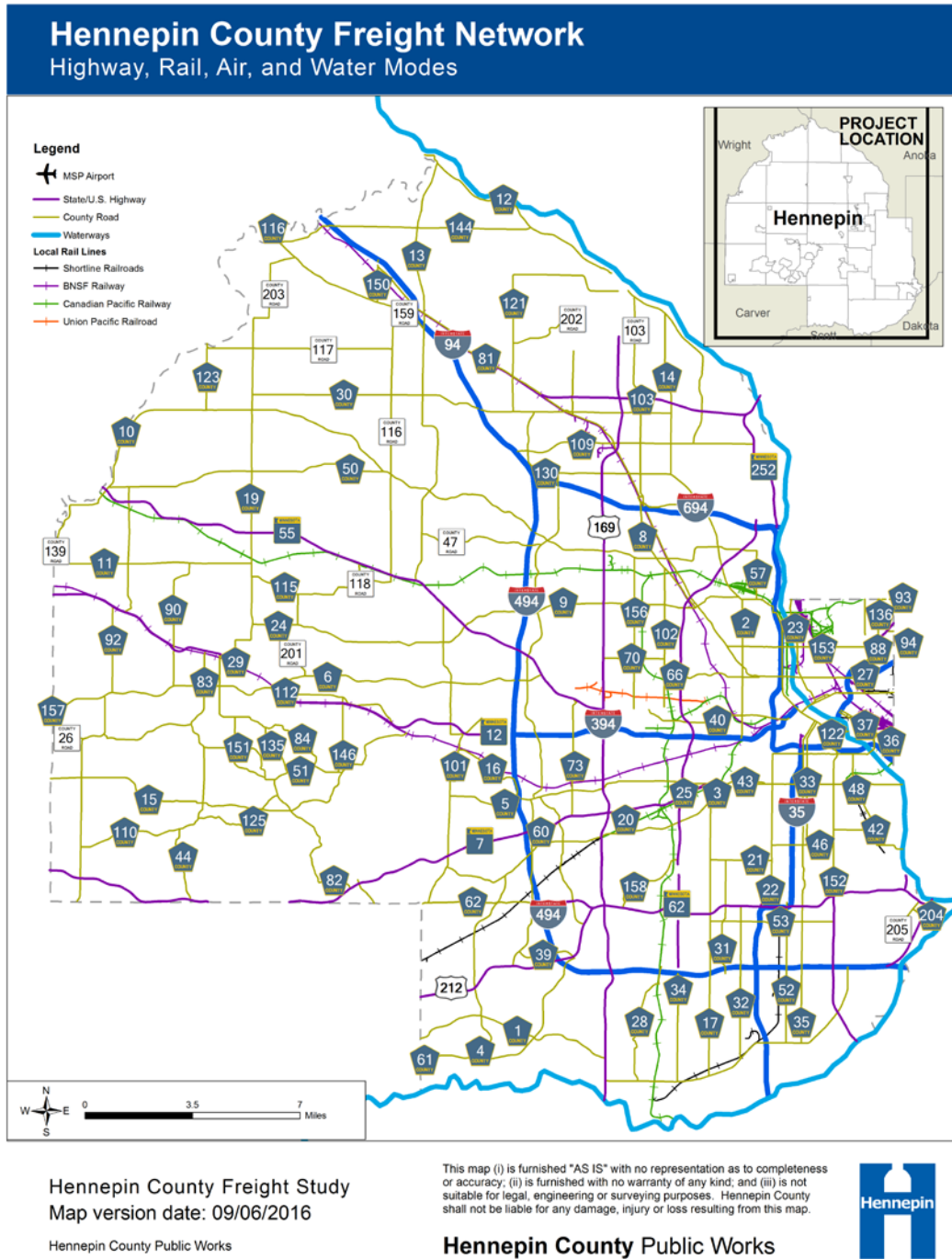
- The primary data source used for highway movement was IHS' **Transearch**, a proprietary dataset that contains detailed information on motor carrier shipments by commodity, equipment type, carrier type, and origin-destination for a 2014 base year and forecast years 2025 and 2040. The geographic resolution varies depending on proximity to Hennepin County, with coverage in Minnesota at the county level, state-level for adjacent states, and census region for the U.S. Canadian and Mexican traffic is also included.
- The 2013 **US Surface Transportation Board (STB) Confidential Waybill Sample** provided detailed information on a sampling of inbound, outbound, and intra-County rail shipments associated with Hennepin County. In order to arrive at the 2014 base year, we applied the growth rate between 2013 and 2014 from the FHWA's **Freight Analysis Framework (FAF4)** to the Waybill Sample for each commodity code. FAF4 contains aggregated annual volume summaries by origin-destination geography (using FAF zones¹), mode, and commodity and provided this information on a historical and forecast basis, using a combination of actual data and modeled behavior. FAF4 has a base year of 2012, with annual estimates for 2013 through 2015, as well as forecasts through 2040.
- Through-County rail traffic for the 2014 base year came from **Rail Traffic History and Forecasts**, produced by Amfahr Consulting, LLC. This report contains the average number of loaded and empty railcars per day on all significant routes over which rail service is provided in Hennepin County. Traffic for trains operated by BNSF, Canadian Pacific (CP), Union Pacific (UP), Progressive Rail, Inc. (PGR), and Twin Cities and Western Railway (TCWR) were estimated for 2011-2015 and forecasted for 2016-2020. The full data summary is reproduced in Table A3 and A4 in the Appendix.
- The **Minneapolis-St. Paul Passenger and Operations Reports**, published by the Metropolitan Airports Commission (MAC), provided annual air cargo statistics at Minneapolis-St. Paul

¹The FAF Zone used for the MSP region includes the following Minnesota counties: Anoka, Benton, Carver, Rice, Sherburne, Dakota, Chisago, Hennepin, Ramsey, Scott, Stearns, Isanti, Washington, Wright, Mille Lacs, McLeod, Goodhue, Le Sueur, and Sibley.

International Airport (MSP) for 2015. Although the base year for rail and highway modes is 2014, this analysis used the base year of 2015 to maintain the integrity of the data. To expand the analysis beyond 2015 tonnage statistics, the growth percentage between 2015 and 2040 **FAF4** data was applied to MAC data. FAF4 data was also used to produce air cargo value for 2014 and 2040 in the MSP FAF Zone, top inbound and outbound air cargo commodities, and top trade regions.

- The **U.S. Army Corps of Engineers Waterborne Commerce Data** provided cargo statistics at the ports of St. Paul and Minneapolis for 2013. However, the Port of Minneapolis closed at the end of the 2014 shipping season, and the data presented here is meant to provide an indication of the types of commodities and volumes that are transported along the Mississippi River System in the Twin Cities metro area, as defined in FAF4. For this purpose, we utilized FAF4's estimated 2014 volumes and a 2040 forecast in terms of tonnage and value to provide a perspective of the top waterborne commodities and trading partners.

Figure 1 Hennepin County Freight Network



Source: Hennepin County Public Works; National Transportation Atlas Database (2015)

FREIGHT SYSTEM DEMAND

In 2014, Hennepin County handled over 828 million tons of freight via truck, rail, water, and air modes, as shown in Figure 2 with an illustration in Figure 3. These values include goods moving to, from, within, and through the County. The vast majority of commodities were transported by truck, a total of 684 million tons comprising 83 percent of total tonnage. Rail was the second-most utilized freight mode, transporting 129 million tons in 2014 (16 percent of total tonnage). Water freight comprised nearly 2 percent of tonnage, and air freight comprised less than 1 percent.

By 2040, total tonnage is expected to increase to over 1.1 billion tons of freight, a total growth of 37 percent and a compound annual growth rate (CAGR) of 1.2 percent. Tonnage transported by truck is expected to grow by 38 percent to 943 million tons, an annual growth rate of 1.2 percent. Rail freight is expected to increase by 32 percent to 170 million tons, an annual growth rate of 1.1 percent. Water² and air freight is expected to grow at higher rates, but overall tonnage will remain comparatively small at 25 million tons and half a million tons, respectively.

As a comparison, the Minnesota GO Statewide System Plan (2015), which utilized a 2012 forecast that was incorporated into FAF 3.5, predicted higher overall growth from 2012 to 2040, an increase of 80 percent from 1 billion tons to 1.8 billion tons. Similar to Hennepin County, trucks handle the vast majority of freight traffic in Minnesota. Truck movement comprised 63 percent of the state's mode share, while rail comprised 25 percent. Consistent with the findings in Hennepin County, statewide mode share is expected to remain largely unchanged through 2040.

Due to data availability, statistics on the value of freight is only presented for traffic moving to, from, and within Hennepin County, excluding through traffic. In 2014, the 69 million tons of inbound, outbound, and intra-County freight transported in Hennepin County was worth over \$103 billion, as shown in Figure 4 and Figure 5. These figures are comparable to the inbound, outbound, and intra-county movements in Figure 6, which displays tonnage by mode and direction. By 2040, the total value of freight transported to, from, and within Hennepin County is expected to increase to over \$225 billion, a total growth of 119 percent and an annual growth rate of 3.1 percent.

Again, the Minnesota GO Statewide System Plan³ predicts significantly higher overall value growth across the State's freight system from 2012 to 2040, an increase of 161 percent from \$912 billion to \$2.3 trillion. Truck movement comprised 67 percent of the state's mode share by value, while rail

²Although the Port of Minneapolis ceased operations in 2014, there is waterborne freight moving on the Minnesota River, which forms the southern boundary of Hennepin County, and to nearby ports such as St. Paul and Savage. Available data from FAF used to calculate total volumes includes waterborne freight for the greater MSP region.

³ Minnesota GO Statewide System Plan forecasts were calculated using the previous version of Freight Analysis Framework version 3 (FAF3) data and have some differences, most notably a higher growth rate for rail traffic than in FAF4.

comprised 21 percent. By 2040, truck mode share is expected to decrease to 63 percent, and rail mode share to 20 percent.

Figure 2 Hennepin County Mode Share by Tonnage, 2014 and 2040

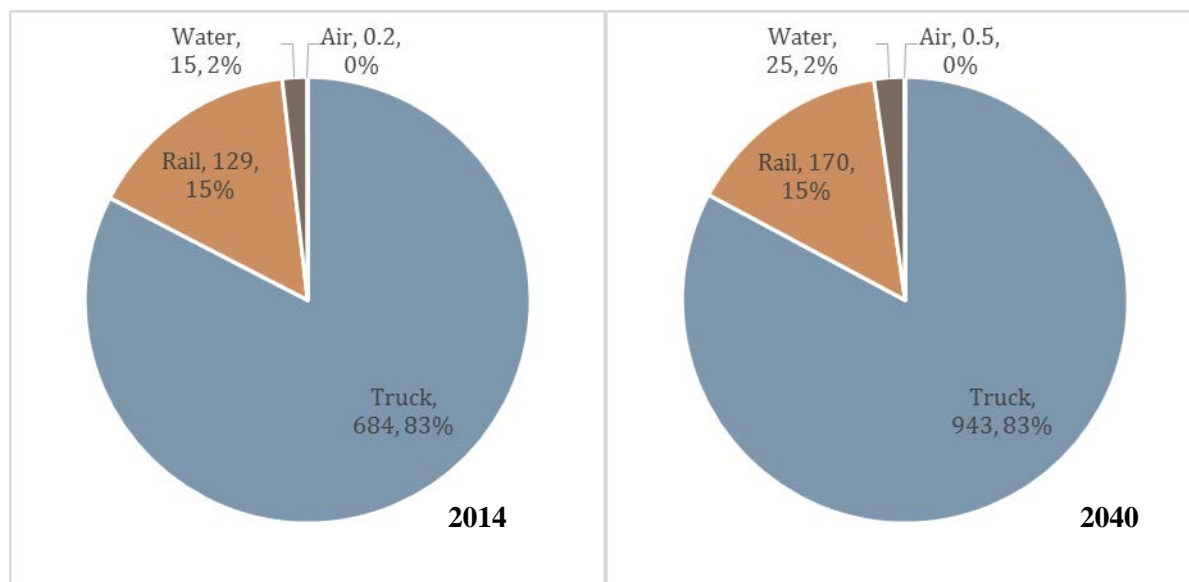
TONNAGE BY MODE						
MODE	2014 TONS (MILLIONS)	% OF TOTAL	2040 TONS (MILLIONS)	% OF TOTAL	TOTAL GROWTH 2014-2040	CAGR 2014-2040
Truck	684	83%	943	83%	38%	1.2%
Rail	129	16%	170	15%	32%	1.1%
Water⁴	15	2%	25	2%	63%	1.9%
Air⁵	0.2	< 1%	0.5	< 1%	116%	3.0%
Total	828	100%	1,137	100%	37%	1.2%

Source: Truck figures from IHS Global Insight Transearch Database, 2014; water figures from Freight Analysis Framework (FAF) 2012 Data; rail figures from STB Confidential Waybill Sample (2013); air figures from Passenger and Operations Reports 2015, Metropolitan Airports Commission (MAC).

⁴ Although the Port of Minneapolis ceased operations in 2014, there is waterborne freight moving on the Minnesota River, which forms the southern boundary of Hennepin County, and to nearby ports such as St. Paul and Savage. Available data from FAF used to calculate total volumes includes waterborne freight for the greater MSP region.

⁵ As discussed in the previous section, air tonnage figures are from 2015. Truck, rail, and water tonnage figures are 2014 estimates.

Figure 3 Hennepin County Mode Share by Tons (in millions of tons), 2014 and 2040



Source: Truck figures from IHS Global Insight Transearch Database, 2014; water figures from Freight Analysis Framework (FAF) 2012 Data; rail figures from STB Confidential Waybill Sample (2013); air figures from Passenger and Operations Reports 2015, Metropolitan Airports Commission (MAC).

Figure 4 Hennepin County Mode Share by Value, 2014 and 2040 (Excluding Through Traffic)

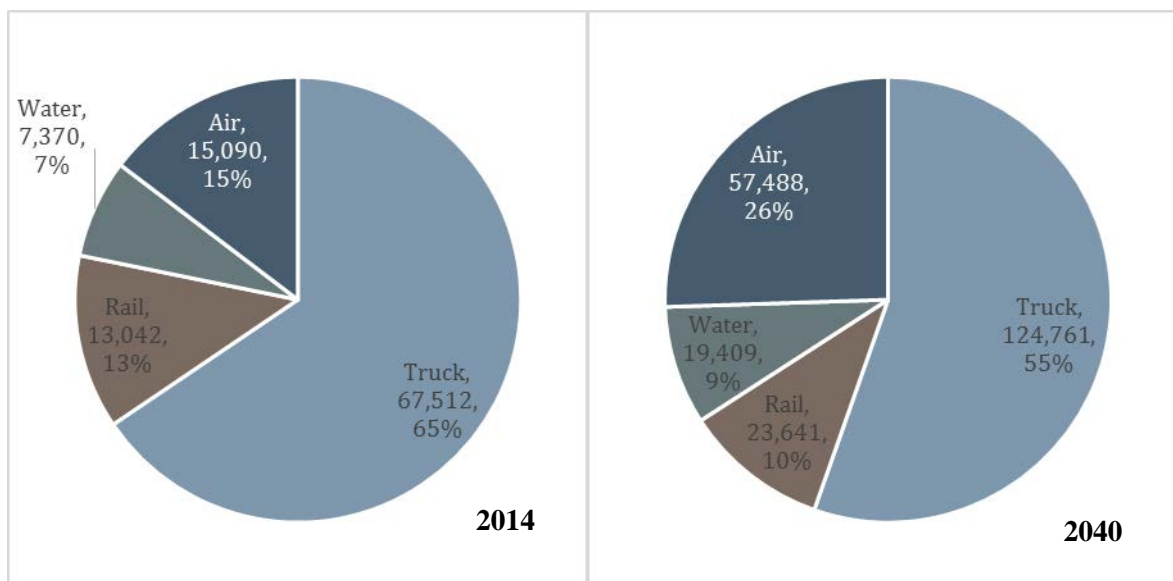
VALUE BY MODE (EXCLUDING THROUGH TRAFFIC)						
MODE	2014 VALUE (\$M)	% OF TOTAL	2040 VALUE (\$M)	% OF TOTAL	TOTAL GROWTH 2014-2040	CAGR 2014-2040
Truck	67,512	66%	124,761	55%	85%	2.4%
Rail	13,042	13%	23,641	10%	81%	2.3%
Water⁶	7,370	7%	19,409	9%	163%	3.8%
Air	15,090	15%	57,488	26%	281%	5.3%
Total	103,014	100%	225,299	100%	119%	3.1%

Source: Truck figures from IHS Global Insight Transearch Database, 2014; rail, water, and air modes from Freight Analysis Framework (FAF) 2012 Data.

Note: Value includes inbound, outbound, and intra-County traffic only.

⁶ Although the Port of Minneapolis ceased operations in 2014, there is waterborne freight moving on the Minnesota River, which forms the southern boundary of Hennepin County, and to nearby ports such as St. Paul and Savage. Available data from FAF used to calculate total volumes includes waterborne freight for the greater MSP region.

Figure 5 Hennepin County Mode Share by Value (in millions of dollars), 2014 and 2040 (Excluding Through Traffic)



Source: Truck figures from IHS Global Insight Transearch Database, 2014; rail, water, and air modes from Freight Analysis Framework (FAF) 2012 Data.
 Note: Value includes inbound, outbound, and intra-County traffic only.

DIRECTIONAL ANALYSIS

Figure 6 presents the breakdown in tonnage transported in, out, through, and within Hennepin County on each of the four freight modes in 2014. The majority of freight travels through the County without stopping, a total of 759 million tons. About 84 percent of through traffic is transported via truck while the remaining tonnage is transported by rail. Another 34 million tons of freight is outbound traffic, with nearly three quarters transported by truck and 20 percent transported by water⁷. Tons traveling inbound totaled 28 million in 2014, with 56 percent transported by truck, 30 percent transported by water, 14 percent transported by rail, and less than 1 percent transported by air. Intra-County traffic comprises the smallest portion of freight movement, totaling 7 million tons. Nearly all of this traffic is transported by truck.

By comparison, FAF4 reports that the Chicago region transported 81 percent of inbound freight traffic via truck and 85 percent of outbound traffic by truck in 2014. Rail traffic in both directions is also higher than in Hennepin County, 17 percent inbound and 11 percent outbound. Furthermore, the State

⁷ Although the Port of Minneapolis ceased operations in 2014, there is waterborne freight moving on the Minnesota River, which forms the southern boundary of Hennepin County, and to nearby ports in St. Paul and Savage. Available data from FAF used to calculate total volumes includes waterborne freight for the greater MSP region.

of Minnesota also has high proportions of inbound and outbound freight by truck, 81 percent and 72 percent in 2014, respectively. Its share of rail traffic is significantly higher than in Hennepin County, 16 percent inbound and 24 percent outbound.

By 2040, traffic is expected to increase substantially in all directions. Figure 7 displays the breakdown in tonnage transported in, out, through, and within Hennepin County on each of the four freight modes, and Figure 8 displays the total growth and annual growth rate of tonnage transported in all directions on each freight mode. Through traffic is expected to increase from 759 million tons to over 1 billion tons, a total increase of 37 percent at an annual growth rate of 1.2 percent. Inbound traffic is expected to increase at the highest rates, from 28 million tons to 43 million tons, a total growth of 55 percent at an annual rate of 1.7 percent. Outbound traffic is projected to increase by 28 percent from 34 million tons to 43 million tons, an annual growth rate of 1 percent.

Notably, inbound traffic by truck is expected to grow at an annual rate of 1.7 percent and outbound traffic by rail is expected to grow at an annual rate of 1.8 percent. To understand the State and regional context, it is helpful to compare County figures to nearby regions. Using FAF4 to compare Hennepin County to the State of Minnesota and the Chicago region, between 2014 and 2040 inbound traffic by truck is expected to grow in Minnesota at 1.0 percent annually and Chicago at 1.2 percent annually, both of which are lower than Hennepin County’s growth rate. In addition, outbound traffic by rail is expected to grow in Minnesota at 0.7 percent annually and Chicago at 2.0 percent annually, which is comparable to Hennepin County’s growth rate.

Figure 6 Hennepin County Total Tonnage by Direction, in Millions of Tons, 2014

TONNAGE BY DIRECTION								
MODE	INBOUND		OUTBOUND		INTRA-COUNTY		THRU-COUNTY	
	Tons	%	Tons	%	Tons	%	Tons	%
Truck	16	56%	25	73%	7	100%	637	84%
Rail	4	14%	2	7%	< 1	0%	122	16%
Water	8	30%	7	20%	-	0%	-	0%
Air	< 1	< 1%	0.1	< 1%	-	0%	-	0%
Total	28	100%	34	100%	7	100%	759	100%

Source: Truck figures from IHS Global Insight Transearch Database, 2014; water figures from Freight Analysis Framework (FAF) 2012 Data; rail figures from STB Confidential Waybill Sample (2013); air figures from Passenger and Operations Reports 2015, Metropolitan Airports Commission (MAC).

Figure 7 Hennepin County Total Tonnage by Direction, in Millions of Tons, 2040

TONNAGE BY DIRECTION								
MODE	INBOUND		OUTBOUND		INTRA-COUNTY		THRU-COUNTY	
	Tons	%	Tons	%	Tons	%	Tons	%
Truck	24	56%	29	67%	9	100%	881	85%
Rail	4	10%	4	9%	< 1	0%	161	15%
Water	14	34%	10	23%	-	0%	-	0%
Air	< 1	< 1%	< 1	< 1%	-	0%	-	0%
Total	43	100%	43	100%	9	100%	1,042	100%

Source: Truck figures from IHS Global Insight Transearch Database, 2014; water figures from Freight Analysis Framework (FAF) 2012 Data; rail figures from STB Confidential Waybill Sample (2013); air figures from Passenger and Operations Reports 2015, Metropolitan Airports Commission (MAC).

Figure 8 Hennepin County Tonnage Growth by Direction, 2014- 2040

TONNAGE GROWTH BY DIRECTION								
MODE	INBOUND		OUTBOUND		INTRA-COUNTY		THRU-COUNTY	
	Total Growth	CAGR	Total Growth	CAGR	Total Growth	CAGR	Total Growth	CAGR
Truck	54%	1.7%	19%	0.7%	27%	0.9%	38%	1.3%
Rail	14%	0.5%	58%	1.8%	28%	1.0%	32%	1.1%
Water	74%	2.1%	50%	1.6%	N/A	N/A	N/A	N/A
Air	49%	1.5%	180%	4.0%	N/A	N/A	N/A	N/A
Total	55%	1.7%	28%	1.0%	27%	0.9%	37%	1.2%

Source: Truck figures from IHS Global Insight Transearch Database, 2014; water figures from Freight Analysis Framework (FAF) 2012 Data; rail figures from STB Confidential Waybill Sample (2013); air figures from Passenger and Operations Reports 2015, Metropolitan Airports Commission (MAC).

Note: CAGR = Compound Annual Growth Rate

Information about value for inbound, outbound, and intra-County traffic by each of the four freight modes in 2014 is presented in Figure 9.

Figure 9 Hennepin County Total Value by Direction, in Millions of Dollars 2014

VALUE BY DIRECTION						
MODE	INBOUND		OUTBOUND		INTRA-COUNTY	
	Value	%	Value	%	Value	%
Truck	17,067	51%	32,241	63%	18,204	100%
Rail	5,703	17%	7,326	14%	13	0%
Water	5,272	16%	2,098	4%	-	0%
Air	5,433	16%	9,657	19%	-	0%
Total	33,475	100%	51,322	100%	18,217	100%

Source: Truck figures from IHS Global Insight Transearch Database, 2014; rail, water, and air modes from Freight Analysis Framework (FAF) 2012 Data.

By 2040, the value of inbound, outbound, and intra-County goods is expected to increase significantly. Figure 10 displays the breakdown in value transported in, out, and within the County in each of the four freight modes, and Figure 11 displays the total growth and annual growth rate of value of goods transported in all directions on each freight mode.

Figure 10 Hennepin County Total Value by Direction, in Millions of Dollars 2040

VALUE BY DIRECTION						
MODE	INBOUND		OUTBOUND		INTRA-COUNTY	
	Value	%	Value	%	Value	%
Truck	38,387	46%	57,007	51%	29,367	100%
Rail	10,877	13%	12,746	11%	18	0%
Water	14,925	18%	4,485	4%	-	0%
Air	19,860	24%	37,628	34%	-	0%
Total	84,049	100%	111,866	100%	29,385	100%

Source: Truck figures from IHS Global Insight Transearch Database, 2014; rail, water, and air modes from Freight Analysis Framework (FAF) 2012 Data.

Figure 11 Hennepin County Value Growth by Direction, 2014- 2040

VALUE GROWTH BY DIRECTION						
MODE	INBOUND		OUTBOUND		INTRA-COUNTY	
	Total Growth	Annual Growth	Total Growth	Annual Growth	Total Growth	Annual Growth
Truck	125%	3.2%	77%	2.2%	61%	1.9%
Rail	91%	2.5%	74%	2.2%	38%	1.3%
Water	183%	4.1%	114%	3.0%	N/A	N/A
Air	266%	5.1%	290%	5.4%	N/A	N/A
Total	151%	3.6%	118%	3.0%	61%	1.9%

Source: Truck figures from IHS Global Insight Transearch Database, 2014; rail, water, and air modes from Freight Analysis Framework (FAF) 2012 Data.

MAJOR TRADING PARTNERS

Hennepin’s top trading partners also vary depending on mode of transport, as shown in Figure 12. While widespread highway infrastructure permits trade activity with virtually any business location, access to rail, water, and air can be more limited for certain parts of the country. For goods traveling via truck, the rest of Minnesota outside Hennepin County was by far the largest trading partner at 40 million tons. Other top trading partners include Iowa (5 million tons), Wisconsin (5 million tons), East North Central (3 million tons), and South Atlantic (1 million tons)⁸. The trade partners by rail are similar to those by highway, but extend further throughout the United States. The top partners include East North Central (2 million tons), West North Central (1 million tons), Mountain (0.5 million tons), Pacific (0.2 million tons), and West South Central (0.2 million tons) regions.

Waterways accessible to Hennepin County provide trade access to several top locations, but primarily to and from areas in Louisiana (8 million tons). However, because FAF does not report origins/destinations for imports/exports, commodities arriving inbound from Louisiana are primarily

⁸ U.S. trade regions are defined as follows: (1) East North Central is comprised of Wisconsin, Illinois, Indiana, Ohio, and Michigan; (2) South Atlantic is comprised of Delaware, Maryland, District of Columbia, West Virginia, Virginia, the Carolinas, Georgia, and Florida; (3) West North Central includes the Dakotas, Nebraska, Kansas, Missouri, Iowa, and Minnesota; (4) West South Central includes the States of Texas, Oklahoma, Arkansas, and Louisiana; (5) Pacific includes Washington, Oregon, California, Alaska, and Hawaii; and (6) Mountain includes Nevada, Idaho, Montana, Utah, Wyoming, Colorado, Arizona, and New Mexico.

coming from the Gulf of Mexico from abroad, and vice versa. Finally, commodities transported by air are primarily transported from and to Chicago, IL (30,000 tons).

Figure 12 Hennepin County Major Domestic Trading Partners by Total Tonnage, in Millions of Tons, 2014

TOP TRADE PARTNERS BY MODE								
RANK	HIGHWAY		RAIL		WATER		AIR	
	Trade Partner	Tons	Trade Partner	Tons	Trade Partner	Tons	Trade Partner	Tons
1	Rest of Minnesota	40	East North Central	2	Louisiana (all FAF Zones)	8	Chicago IL-IN-WI (IL Part)	0.03
2	Iowa	5	West North Central	1	Buffalo, New York CFS Area	4	Miami, Florida	0.01
3	Wisconsin	5	Mountain	0.5	Iowa	0.5	Cleveland, Ohio	< 0.01
4	East North Central	3	Pacific	0.2	Los Angeles, CA	0.5	Detroit, Michigan	< 0.01
5	South Atlantic	1	West South Central	0.2	Chicago, IL-IN-WI (IN Part)	0.4	Los Angeles, California	< 0.01

Source: IHS Global Insight Transearch Database, 2014; Freight Analysis Framework (FAF) 2012 Data; Surface Transportation Board (STB) Confidential Waybill Sample (2013).

Highway Freight

Trucks are the dominant transportation mode for goods movement in Hennepin County, and its highways are critical to ensuring efficient transportation, as well as connections to multimodal facilities. This section details commodity flows moving to, from, within, and through Hennepin County, and details flows along Hennepin County's highway network. The analysis features statistics on highway demand, tonnage and value summaries, directional flow, top commodities, and trade partners.

HIGHWAY DEMAND

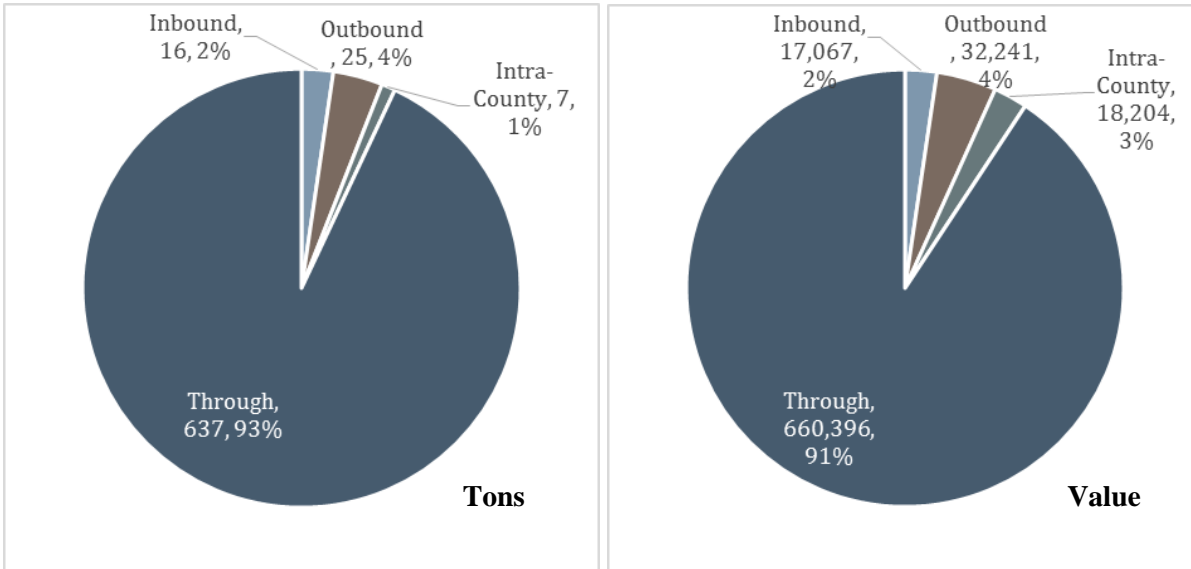
In 2014, 684 million tons of freight worth nearly \$728 billion shipped by truck in Hennepin County, as presented in Figure 13 and Figure 14. The vast majority of tonnage originated outside Hennepin County and traveled through the County without stopping (93 percent) while smaller proportions traveled inbound (2 percent) and outbound (4 percent). A small amount of freight moved from and to destinations within Hennepin County (1 percent), but it was not a significant portion of total freight tonnage or value. Through tonnage was worth over \$660 billion, which is 91 percent of total value in 2014.

Figure 13 Commodity Flow by Truck in Hennepin County, All Directions, 2014

COMMODITY FLOW BY TRUCK				
DIRECTION OF MOVEMENT	2014 TONS (MILLIONS)	% OF TOTAL	2014 VALUE (\$M)	% OF TOTAL
Inbound	16	2%	17,067	2%
Outbound	25	4%	32,241	4%
Intra-County	7	1%	18,204	3%
Through	637	93%	660,396	91%
TOTAL	684	100%	727,908	100%

Source: IHS Global Insight Transearch Database, 2014

Figure 14 Commodity Flow by Truck in Hennepin County by Tons and Value, All Directions, 2014



By 2040, overall tonnage is expected to grow by 38 percent between 2014 and 2040, with a compound annual growth rate (CAGR) equal to 1.2 percent, as presented in Figure 15. Inbound tonnage is expected to grow the fastest, from 16 million tons to 24 million tons by 2040. This is a 54 percent increase over this period, with a CAGR of 1.7 percent. Through tonnage is also expected to grow sizably, a total of 38 percent from 637 million to 881 million (1.3 percent annually).

Figure 15 Tonnage Growth Transported by Truck in Hennepin County, All Directions, 2014-2040

TONNAGE GROWTH					
DIRECTION OF MOVEMENT	2014 TONS (MILLIONS)	2040 TONS (MILLIONS)	GROWTH RATE 2014-2040	CAGR 2014-2040	
Inbound	16	24	54%	1.7%	
Outbound	25	29	19%	0.7%	
Intra-County	7	9	27%	0.9%	
Through	637	881	38%	1.3%	
TOTAL	684	943	38%	1.2%	

Source: IHS Global Insight Transearch Database, 2014

Note: CAGR = compound annual growth rate

In addition, the monetary value of commodities transported by truck in Hennepin County is expected to grow substantially by 2040, from nearly \$728 billion to over \$1.2 trillion, as presented in Figure 16. This is an increase of 70 percent, with an annual growth rate of 2.1 percent. As with tonnage trends, inbound commodities are expected to grow the most, 125 percent overall and 3.2 percent annually. The value of through traffic is also projected to increase significantly, from \$660 billion to over \$1.1 trillion, which is an increase of 68 percent.

Figure 16 Value Growth Transported by Truck in Hennepin County, All Directions, 2014-2040

VALUE GROWTH				
DIRECTION OF MOVEMENT	2014 VALUE (\$M)	2040 VALUE (\$M)	GROWTH RATE 2014-2040	CAGR 2014-2040
Inbound	17,067	38,387	125%	3.2%
Outbound	32,241	57,007	77%	2.2%
Intra-County	18,204	29,367	61%	1.9%
Through	660,396	1,112,043	68%	2.0%
TOTAL	727,908	1,236,804	70%	2.1%

Source: IHS Global Insight Transearch Database, 2014

Note: CAGR = compound annual growth rate

Shipments by highway dominate goods movement in Hennepin County. Figure 17 details the top commodities moved on the County's highway system and is illustrated in Figure 18. Moreover, a wide range of commodities are shipped via highways, and even goods shipped primarily using another modes often rely on trucks for last-mile connections to and from their origins and destinations. Nonmetallic minerals, farm products, and secondary traffic lead truck volumes in terms of tonnage. The secondary traffic commodity category indicates movements of consolidated consumer goods between warehouse and distribution centers.⁹

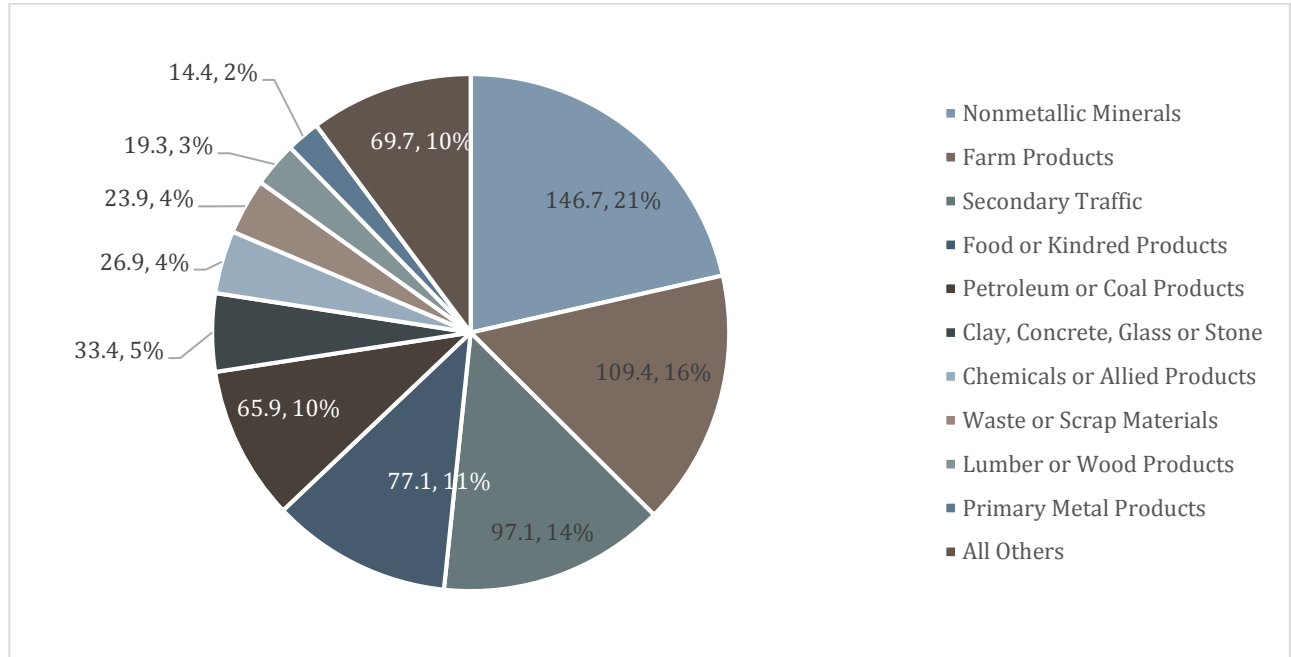
⁹ Figure A1 and Figure A2 in the Appendix provide descriptions for each commodity defined by Standard Transportation Commodity Code (STCC) and Standard Classification of Transported Goods (SCTG), both of which are used throughout this report.

Figure 17 Hennepin County Major Highway Commodities, Total, 2014

MAJOR HIGHWAY COMMODITIES		
COMMODITY (STCC)	2014 TONS (MILLIONS)	% OF TOTAL
Nonmetallic Minerals	147	22%
Farm Products	109	16%
Secondary Traffic	97	14%
Food or Kindred Products	77	11%
Petroleum or Coal Products	66	10%
Clay, Concrete, Glass or Stone	33	5%
Chemicals or Allied Products	27	4%
Waste or Scrap Materials	24	4%
Lumber or Wood Products	19	3%
Primary Metal Products	14	2%
All Others	70	10%

Source: IHS Global Insight Transearch Database, 2014

Figure 18 Hennepin County Major Highway Commodities, 2014



Source: IHS Global Insight Transearch Database, 2014

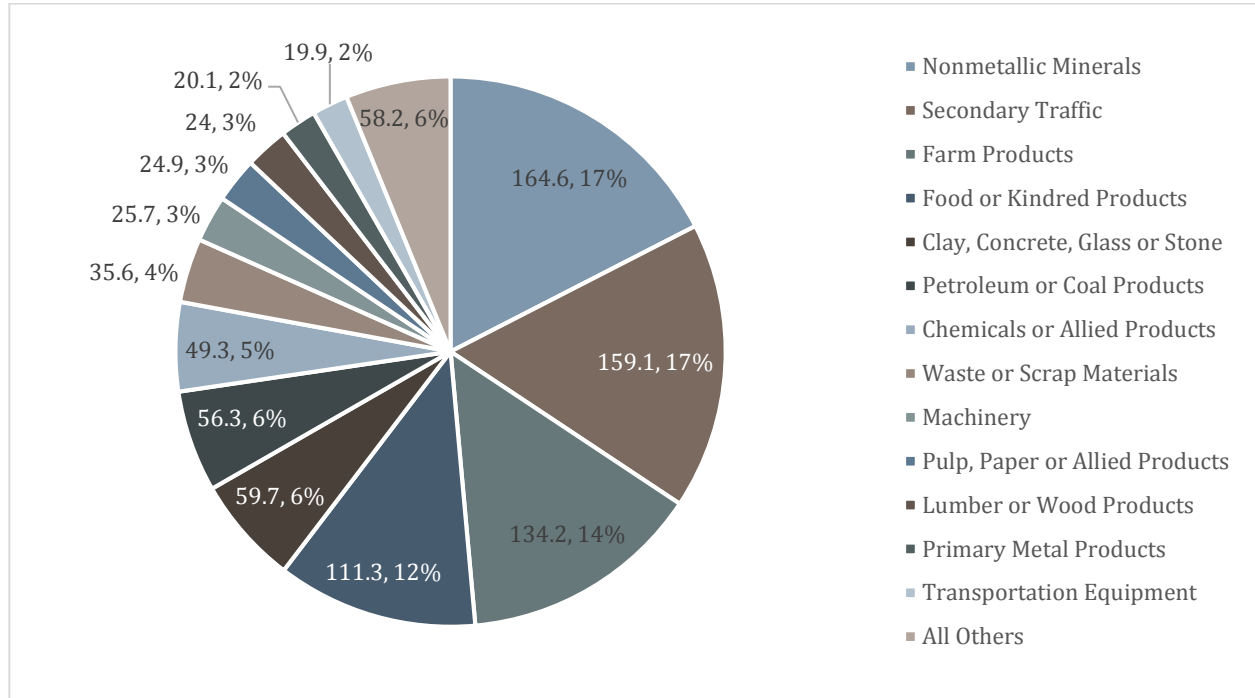
By 2040, the current top commodities will remain largely unchanged, but will increase sizably in tonnage. Figure 19 details the major commodities expected to move over Hennepin County’s highway system in 2040, also illustrated in Figure 20. Nonmetallic minerals will maintain its number one position, but will decline from 22 percent to 18 percent of all goods shipped, as a result of higher projected growth in other commodities. Secondary traffic will move up from the third largest tonnage to second largest, with an increase from 97 million in 2014 to 159 million tons in 2040. A projected annual growth rate of only 0.8 percent will cause farm products to fall from second to third place.

Figure 19 Hennepin County Major Highway Commodities, Total, 2040

MAJOR HIGHWAY COMMODITIES					
COMMODITY	2040 TONS (MILLIONS)	% OF TOTAL	RANK CHANGE	TOTAL CHANGE	ANNUAL CHANGE
Nonmetallic Minerals	165	18%	-	12%	0.4%
Secondary Traffic	159	17%	+1	64%	1.9%
Farm Products	134	14%	-1	23%	0.8%
Food or Kindred Products	111	12%	-	44%	1.4%
Clay, Concrete, Glass or Stone	60	6%	+1	79%	2.3%
Petroleum or Coal Products	56	6%	-1	-15%	-0.6%
Chemicals or Allied Products	49	5%	-	83%	2.4%
Waste or Scrap Materials	36	4%	-	49%	1.5%
Machinery	26	3%	+3	102%	2.7%
Pulp, Paper or Allied Products	25	3%	+1	92%	2.5%
Lumber or Wood Products	24	3%	-2	24%	0.8%
Primary Metal Products	20	2%	-2	40%	1.3%
Transportation Equipment	20	2%	+2	125%	3.2%
All Others	58	6%			

Source: IHS Global Insight Transearch Database, 2014

Figure 20 Hennepin County Major Highway Commodities, 2040



DIRECTIONAL ANALYSIS

Top Inbound Commodities

Inbound commodities comprised 2 percent of the tonnage traveling by truck into the County, a total of 16 million tons in 2014. Figure 21 presents the top inbound commodities by truck, organized to show only the top five by both tonnage and value. Nonmetallic minerals were the top inbound commodity at over 4.5 million tons, but were among the least valuable goods. Food or kindred products was the second-most transported inbound commodity at over 2.5 million tons, but was the top commodity by value. Secondary traffic comprised 11 percent of inbound goods as the third-most transported good, which generally includes shipments of consumer goods that move from multimodal terminals and warehouses and distribution centers. This commodity category was the second-most valuable, worth nearly \$3 billion.

Figure 21 Top 5 Inbound Truck Commodities in Hennepin County by Tonnage and Value, 2014

TOP 5 INBOUND COMMODITIES BY TRUCK						
COMMODITY (STCC)	TONS			VALUE		
	2014 Tons	%	Rank	2014 Value	%	Rank
Nonmetallic Minerals	4,564	29%	1	41	< 1%	20
Food or Kindred Products	2,581	17%	2	3,521	21%	1
Secondary Traffic	1,700	11%	3	2,958	17%	2
Clay, Concrete, Glass or Stone	1,453	9%	4	226	1%	15
Farm Products	1,160	7%	5	672	4%	8
Chemicals or Allied Products	506	3%	7	1,756	10%	3
Fabricated Metal Products	398	3%	8	1,327	8%	5
Rubber or Misc Plastics	346	2%	11	1,358	8%	4

Source: IHS Global Insight Transearch Database, 2014

Note: Tonnage is reported in thousands of tons, value is reported in millions of dollars (USD)

Top Outbound Commodities

Outbound commodities comprised 4 percent of the tonnage traveling out of the County by truck, a total of 25 million tons in 2014. Figure 22 presents the top outbound commodities by truck, organized to show only the top five by both tonnage and value. As with inbound tonnage, outbound nonmetallic minerals led with nearly 10 million tons, but was still among the least valuable commodities.

Secondary traffic was the second-most transported good at nearly 5 million tons, but was the most valuable outbound good, worth nearly \$13 billion. Petroleum and coal products was the third-most significant outbound commodity by tonnage and value at over 4 million tons worth over \$3 billion.

Figure 22 Top 5 Outbound Truck Commodities in Hennepin County, by Tonnage and Value, 2014

TOP 5 OUTBOUND COMMODITIES BY TRUCK						
COMMODITY (STCC)	TONS			VALUE		
	2014 Tons	%	Rank	2014 Value	%	Rank
Nonmetallic Minerals	9,619	39%	1	72	< 1%	17
Secondary Traffic	4,912	20%	2	12,627	39%	1
Petroleum or Coal Products	4,236	17%	3	3,414	11%	3
Waste or Scrap Materials	1,253	5%	4	323	1%	13
Food or Kindred Products	1,083	4%	5	1,733	5%	5
Machinery	416	2%	7	2,960	9%	4
Electrical Equipment	364	2%	10	3,667	11%	2

Source: IHS Global Insight Transearch Database, 2014

Note: Tonnage is reported in thousands of tons, value is reported in millions of dollars (USD)

Top Intra-County Commodities

Intra-County commodities comprised only 1 percent of tonnage traveling to and from locations in Hennepin County by truck, a total of 7 million tons. Figure 24 presents the top intra-County commodities by truck, organized to show only the top five by both tonnage and value. Secondary traffic was by far the most significant intra-County commodity at over 3 million tons worth over \$13 billion, which is 75 percent of the intra-County value. This is likely movement between retail stores and warehouses and distribution centers, as well as multimodal terminals. Petroleum or coal products were the second-most transported product at over 1 million tons valued at over \$1 billion.

Figure 23 Top 5 Intra-County Truck Commodities in Hennepin County, by Tonnage and Value, 2014

TOP 5 INTRA-COUNTY COMMODITIES BY TRUCK						
COMMODITY (STCC)	TONS			VALUE		
	2014 Tons	%	Rank	2014 Value	%	Rank
Secondary Traffic	3,071	45%	1	13,664	75%	1
Petroleum or Coal Products	1,323	19%	2	1,138	6%	2
Nonmetallic Minerals	771	11%	3	6	< 1%	18
Clay, Concrete, Glass or Stone	413	6%	4	45	< 1%	14
Waste or Scrap Materials	297	4%	5	68	< 1%	13
Food or Kindred Products	291	4%	6	484	3%	5
Electrical Equipment	79	1%	10	827	5%	3
Chemicals or Allied Products	53	1%	11	525	3%	4

Source: IHS Global Insight Transearch Database, 2014

Note: Tonnage is reported in thousands of tons, value is reported in millions of dollars (USD)

Top Through Commodities

Through shipments represented by far the most significant portion of overall truck tonnage in Hennepin County, comprising 637 million tons in 2014 (93 percent of all tonnage). These are truck trips that originate outside Hennepin County, but travel through the County to reach their destination. Figure 24 presents the top intra-County commodities by truck, organized to show only the top five by both tonnage and value. As with inbound and outbound goods, nonmetallic minerals was the top through commodity in 2014 with nearly 132 million tons, comprising 21 percent of total tonnage. Out of these commodities, secondary traffic was the most valuable at \$146 billion (22 percent of total). Food or kindred products was also significant in value at \$69 billion (11 percent).

Figure 24 Top 5 Through-County Truck Commodities in Hennepin County, by Tonnage and Value, 2014

TOP 5 THROUGH COMMODITIES BY TRUCK						
COMMODITY (STCC)	TONS			VALUE		
	2014 Tons	%	Rank	2014 Value	%	Rank
Nonmetallic Minerals	132	21%	1	980	< 1%	22
Farm Products	108	17%	2	30,158	5%	8
Secondary Traffic	87	14%	3	145,706	22%	1
Food or Kindred Products	73	12%	4	69,128	11%	3
Petroleum or Coal Products	59	9%	5	22,060	3%	11
Chemicals or Allied Products	26	4%	7	60,347	9%	5
Machinery	12	2%	12	95,381	14%	2
Transportation Equipment	9	1%	15	65,410	10%	4

Source: IHS Global Insight Transearch Database, 2014

Note: Tonnage is reported in millions of tons, value is reported in millions of dollars (USD)

Projected Top Commodities, 2040

By 2040, the top truck commodities in Hennepin County will change slightly from 2014 rankings. Figure 25 presents the top 10 commodities by 2040 with the total growth and annual growth rate for each product. Nonmetallic minerals is projected to be the top commodity in Hennepin County for all directions of transport, with nearly 165 million tons transported, an increase of 12 percent or 0.4 percent annually over this period. Out of the top 10 commodities by 2040, petroleum or coal products is the only good expected to decrease in overall tonnage. It is projected at 56 million tons, which is a decrease of nearly 15 percent or 0.6 percent annually.

Figure 25 Top Projected Truck Commodities in Hennepin County, all Directions, by Tonnage, 2040

PROJECTED TOP 10 COMMODITIES BY TRUCK				
COMMODITY (STCC)	2040 TONS (MILLIONS)	% OF TOTAL	GROWTH RATE 2014-2040	CAGR 2014-2040
Nonmetallic Minerals	165	18%	12%	0.4%
Secondary Traffic	159	17%	64%	1.9%
Farm Products	134	14%	23%	0.8%
Food or Kindred Products	111	12%	44%	1.4%
Clay, Concrete, Glass or Stone	60	6%	79%	2.3%
Petroleum or Coal Products	56	6%	-15%	-0.6%
Chemicals or Allied Products	49	5%	83%	2.4%
Waste or Scrap Materials	36	4%	49%	1.5%
Machinery	26	3%	102%	2.7%
Pulp, Paper or Allied Products	25	3%	92%	2.5%

Source: IHS Global Insight Transearch Database, 2014

Note: CAGR = compound annual growth rate

TOP TRADING PARTNERS

Hennepin County principal truck-oriented trading partners are shown in Figure 26. The remaining counties in Minnesota comprise the majority of trucked tonnage to and from Hennepin County, a total of nearly 40 million tons (68 percent of total tonnage). Over three-quarters of inbound traffic and 55 percent of outbound traffic are also trucked from and to the rest of Minnesota. Iowa is the second-most significant trade partner overall, with over 5 million tons of commodities outbound only.

Figure 26 Hennepin County Trade Regions by Tonnage, in Thousands of Tons, 2014

TOP HENNEPIN COUNTY TRADE REGIONS BY TRUCK						
REGION	2014 TOTAL		INBOUND		OUTBOUND	
	TONS	%	TONS	%	TONS	%
Rest of Minnesota	39,724	68%	27,533	76%	12,191	55%
Iowa	5,317	9%	-	0%	5,317	24%
Wisconsin	4,716	8%	4,716	13%	-	0%
East North Central	2,514	4%	348	1%	2,166	10%
South Atlantic	955	2%	339	< 1%	616	3%
West South Central	833	1%	441	1%	392	2%
West North Central	730	1%	552	2%	177	< 1%
Pacific	710	1%	240	< 1%	471	2%
East South Central	572	1%	213	< 1%	359	2%
Other Regions	2,330	4%	1,760	5%	569	3%
TOTAL	58,400	100%	36,142	100%	22,258	100%

Source: IHS Global Insight Transearch Database, 2014

Hennepin County’s trade partners differ slightly when ranked by value of commodities transported by truck, as shown in Figure 27. However, the top trade partner by value consists of the other Minnesota counties, which was worth over \$62 billion in 2014 (70 percent of total value). Commodities transported from this region to Hennepin County comprised over 77 percent of inbound value, in addition to 54 percent of outbound value.

Figure 27 Hennepin County Trade Regions by Value, in Millions of Dollars, 2014

TOP HENNEPIN COUNTY TRADE REGIONS BY TRUCK						
REGION	2014 TOTAL		INBOUND		OUTBOUND	
	VALUE	%	VALUE	%	VALUE	%
Rest of Minnesota	62,065	70%	47,760	77%	14,305	54%
East North Central	5,178	6%	885	1%	4,293	16%
Wisconsin	3,669	4%	3,669	6%	-	0%
Canada	2,579	3%	1,393	2%	1,187	4%
Iowa	2,555	3%	-	0%	2,555	10%
West South Central	2,076	2%	1,517	3%	559	2%
South Atlantic	1,910	2%	993	2%	917	3%
Pacific	1,770	2%	851	1%	919	3%
East South Central	1,405	2%	664	1%	741	3%
West North Central	1,400	2%	1,108	2%	292	1%
Mountain	867	1%	430	< 1%	437	2%
Other Regions	2,935	3%	2,471	4%	465	2%
TOTAL	88,409	100%	61,740	100%	26,668	100%

Source: IHS Global Insight Transearch Database, 2014

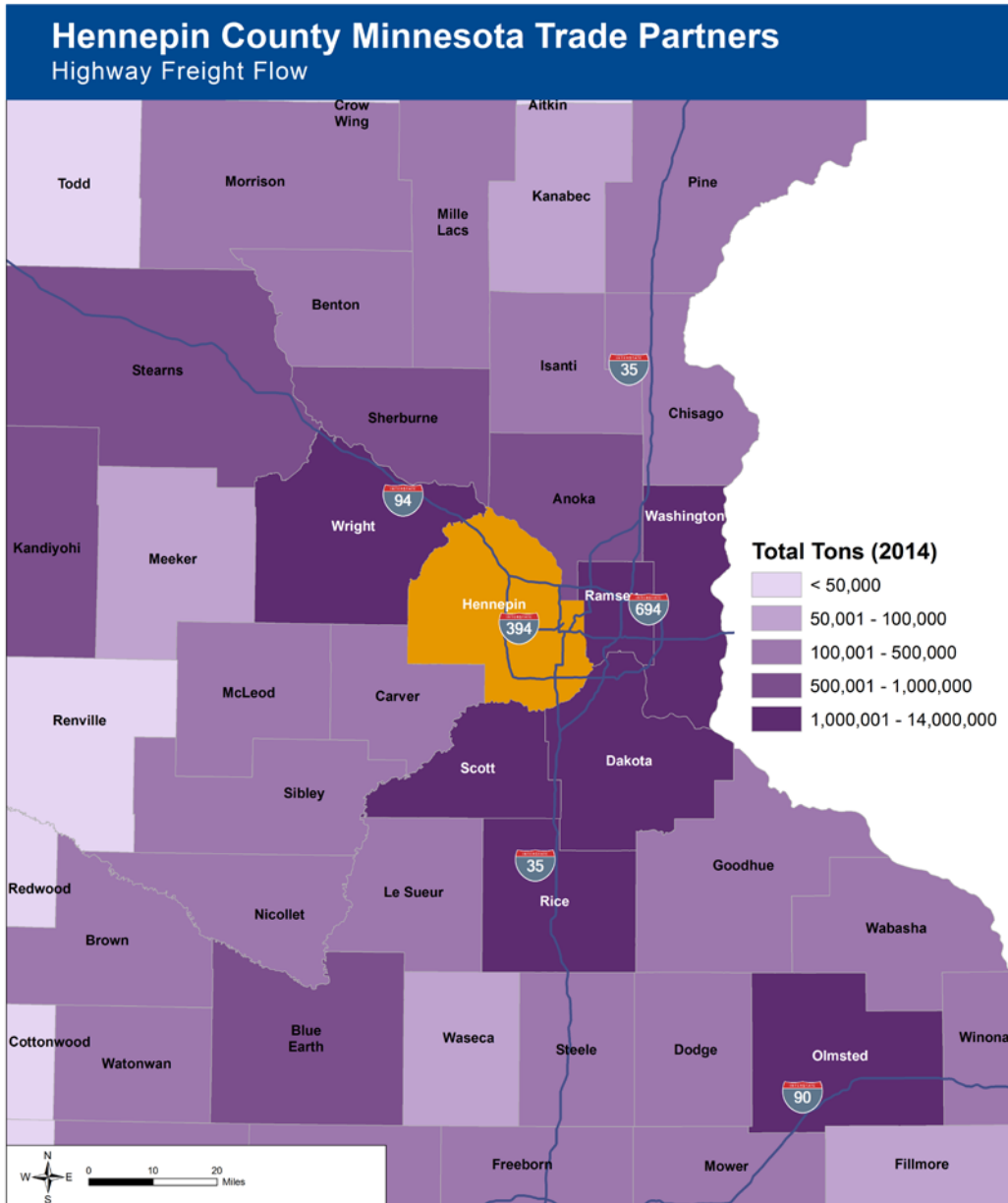
A substantial portion of Hennepin County truck activity occurs with other Minnesota counties, between major population centers and major warehouse and distribution hubs, particularly the adjacent Ramsey County. This local activity is shown in Figure 28 and Figure 29. Trade with Ramsey County comprised 10 percent of all Minnesota-based tonnage, totaling over 4 million tons worth \$11 billion. Other important Minnesota Counties include Dakota County (2 million tons), Scott County (1.5 million tons), Washington County (1.25 million tons), and Olmstead County (1.2 million tons).

Figure 28 Top 5 Minnesota-Based Trade Regions by Truck, 2014

TOP 5 MINNESOTA-BASED TRADE PARTNERS BY TRUCK					
REGION	2014 TOTAL TONS		2014 TOTAL VALUE		
	TONS (THOUSANDS)	% MN TOTAL	VALUE (\$M)	% MN TOTAL	
Ramsey County, MN	4,016	10%	11,232	18%	
Dakota County, MN	1,888	5%	1,433	2%	
Scott County, MN	1,556	4%	690	1%	
Washington County, MN	1,249	3%	1,105	2%	
Olmsted County, MN	1,201	3%	794	1%	

Source: IHS Global Insight Transearch Database, 2014

Figure 29 Map of Minnesota-Based Trade Partners by Truck, 2014



Hennepin County Freight Study
Map version date: (09/06/2016)

Hennepin County Public Works

This map (i) is furnished "AS IS" with no representation as to completeness or accuracy; (ii) is furnished with no warranty of any kind; and (iii) is not suitable for legal, engineering or surveying purposes. Hennepin County shall not be liable for any damage, injury or loss resulting from this map.

Hennepin County Public Works



Source: IHS Global Insight Transearch Database, 2014; Hennepin County Public Works

Rail Freight

This section features detailed information on commodity flow along Hennepin County's freight rail network. The analysis features statistics on freight rail volume (in tons and units), service type (carload and intermodal¹⁰) summaries, directional flow, top commodities, and trade partners.

RAIL FREIGHT DEMAND

In 2014, 95 percent of rail traffic traveled through the County without stopping, accounting for 4.3 million units and 122 million tons. Much of this traffic was comprised of crude oil, ores, and grain travelling from the Upper Midwest and Great Plains to Chicago and Eastern markets, as will be discussed in Figure 33. Over 6 million tons of freight and over 194 thousand units originated and/or terminated in Hennepin County, as presented in Figure 30 and Figure 31. Compared to through traffic, smaller volumes traveled inbound (3 percent) and outbound (2 percent). A minimal volume of freight moved within Hennepin County, accounting for less than 1 percent of total rail traffic.

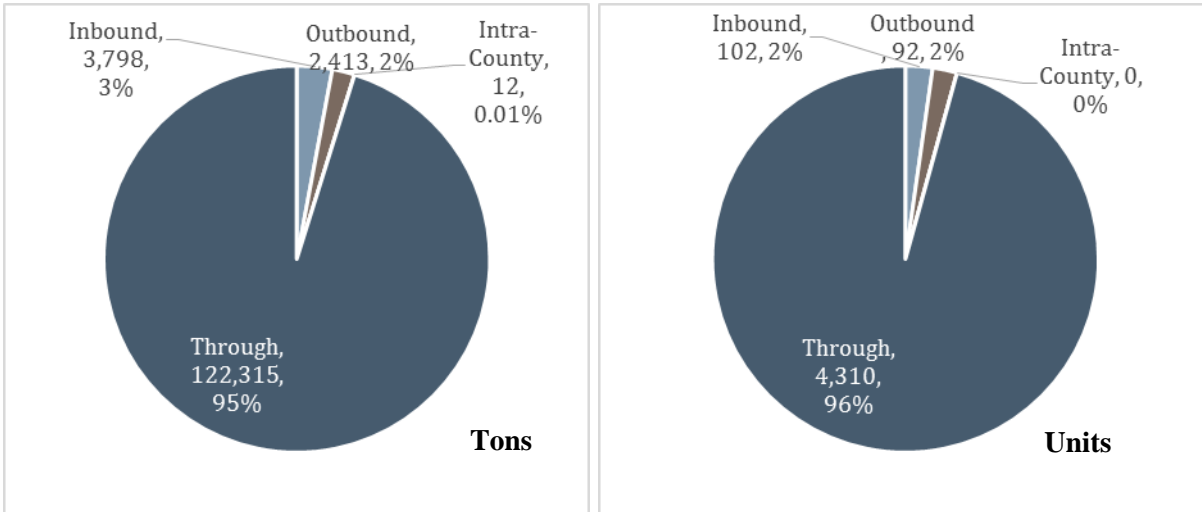
Figure 30 Commodity Flow by Rail in Hennepin County, All Directions, 2014

COMMODITY FLOW BY RAIL				
DIRECTION OF MOVEMENT	2014 TONS (THOUSANDS)	% OF TOTAL	2014 UNITS (THOUSANDS)	% OF TOTAL
Inbound	3,798	3%	102	2%
Outbound	2,413	2%	92	2%
Intra-County	12	< 1%	<1	< 1%
Through	122,315	95%	4,310	96%
Total	128,526	100%	4,503	100%

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; Freight Analysis Framework (FAF) 2014 Data as reported by Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA); Amfahr Consulting, LLC Traffic History and Forecasts, 2015.

¹⁰It is important to note that the Surface Transportation Board (STB) Confidential Waybill Data, the primary data source for this analysis, reports quantities in intermodal units and carload units. Intermodal units have approximately 1/3 to 1/5 the capacity of carload units, which results in a sizable disparity in average tonnage handled on a unit basis.

Figure 31 Commodity Flow by Rail in Hennepin County in Tons and Units, All Directions, 2014



Overall, rail tonnage is expected to grow by 31 percent between 2014 and 2040, with a compound annual growth rate (CAGR) equal to 1 percent.¹¹ Outbound tonnage is expected to grow the fastest, from 2.4 million tons to 3.8 million tons by 2040. This is a 58 percent increase over this period, with a CAGR of 1.7 percent. Inbound tonnage is expected to grow somewhat slower, but is substantially greater in weight, from 3.8 million tons to 4.3 million tons. This is a 14 percent increase, with a CAGR of 0.5 percent. By comparison, the Minnesota GO Statewide Rail Plan forecasted an 83 percent overall increase in tonnage from 2012 to 2040, with the highest growth occurring in through traffic (120 percent increase) and inbound traffic (80 percent increase).

¹¹ Note that Union Pacific closed intermodal (trailer train) operations at its East Minneapolis yard in 2015, and will no longer be servicing Triple Crown at this facility.

Figure 32 Rail Freight Tonnage Growth for Hennepin County, 2014 – 2040, by Direction

TONNAGE GROWTH BY RAIL				
DIRECTION OF MOVEMENT	2014 TONS (THOUSANDS)	2040 TONS (THOUSANDS)	TOTAL GROWTH 2014-2040	CAGR 2014-2040
Inbound	3,798	4,345	14%	0.5%
Outbound	2,413	3,803	58%	1.7%
Intra-County	12	16	27%	0.9%
Through	122,315	161,414	32%	1.1%
Total	128,526	169,578	31%	1.0%

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; Amfahr Consulting, LLC Traffic History and Forecasts, 2015; growth rates calculated using Freight Analysis Framework (FAF) 2014 Data.

Note: CAGR = compound annual growth rate

In 2014, over \$13 billion of freight was transported to, from, and within Hennepin County via rail, as shown in Figure 33. The value of outbound commodities comprises the largest share of overall value, worth over \$7 billion (56 percent). By 2040, overall value is expected to grow by 81 percent to nearly \$24 billion, an annual increase of 2.3 percent. Inbound value is expected to grow the fastest, from \$5.7 billion to \$10.8 billion by 2040. This is a 91 percent increase, with a CAGR of 2.5 percent.

Figure 33 Value of Rail Commodities in Hennepin County, 2014 – 2040, by Direction

COMMODITY FLOW BY RAIL						
DIRECTION OF MOVEMENT	2014 VALUE (\$M)	%	2040 VALUE (\$M)	%	TOTAL GROWTH 2014-2040	CAGR 2014-2040
Inbound	5,703	44%	10,877	46%	91%	2.5%
Outbound	7,326	56%	12,746	54%	74%	2.2%
Intra-County	13	< 1%	18	< 1%	38%	1.3%
Total	13,042	100%	23,641	100%	81%	2.3%

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; Freight Analysis Framework (FAF) 2014 Data.

TOP COMMODITIES

Compared to the top highway commodities, there is less transparency in understanding the top commodities moving by rail. This is because mixed freight, which comprises 27 percent of all tonnage as the top commodity, is nearly any kind of freight that can be moved in a trailer or container. However, commodities can be understood better by service type. Figure 34 details the top railroad commodities by tonnage and service type, and Figure 35 details the top commodities by units and service type. The top three commodities transported via carload service are cereal grains, base metals, and wood products. By contrast, the top three commodities moved by intermodal service type are mixed freight, transportation equipment, and milled grain products. However, note that the transportation equipment for Hennepin County was primarily comprised of the movement of empty containers. Transportation equipment carload movements are primarily railroad cars. Approximately 80 percent of rail intermodal tonnage does not have a reported commodity.¹²

Figure 34 Major Railroad Commodities Originating and/or Terminating in Hennepin County by Service Type, in Tons, 2014

MAJOR RAILROAD COMMODITIES: TONS						
RANK	CARLOAD			INTERMODAL		
	Commodity (SCTG)	2014 Tons (Millions)	%	Commodity (SCTG)	2014 Tons (Millions)	%
1	Cereal grains	1.2	28%	Mixed freight	1.7	80%
2	Base metals	0.4	10%	Transport equip.	0.1	5%
3	Wood prods.	0.4	10%	Milled grain prods.	< 0.1	1%
4	Milled grain prods.	0.4	9%	Basic chemicals	< 0.1	1%
5	Nonmetal min. prods.	0.3	7%	Other foodstuffs	< 0.1	1%
6	Waste/scrap	0.3	7%	Coal & petroleum prods.	< 0.1	1%
7	Nonmetallic minerals	0.2	6%	Textiles/leather	< 0.1	1%
8	Fertilizers	0.2	4%	Cereal grains	< 0.1	1%
9	Other foodstuffs	0.2	4%	Misc. mfg. prods.	< 0.1	1%
10	Coal	0.1	3%	Machinery	< 0.1	1%

¹² Note that pass-through rail movements are not included in this demand analysis.

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; Freight Analysis Framework (FAF) 2014 Data as reported by Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA).

Note: Transportation Equipment (SCTG 37) primarily refers to the movement of empty containers and railcars.

Figure 35 Major Railroad Commodities Originating and/or Terminating in Hennepin County by Service Type, in Units, 2014

MAJOR RAILROAD COMMODITIES: UNITS

RANK	CARLOAD			INTERMODAL		
	Commodity (SCTG)	2014 Units	%	Commodity (SCTG)	2014 Units	%
1	Cereal grains	13.1	28%	Mixed freight	104.0	70%
2	Base metals	4.4	9%	Transport equip.	21.8	15%
3	Wood prods.	4.4	9%	Coal and petroleum prods.	2.4	2%
4	Milled grain prods.	4.1	8%	Motorized vehicles	2.2	1%
5	Transport equip.	3.2	7%	Misc. mfg. prods.	1.9	1%
6	Waste/scrap	3.0	6%	Milled grain prods.	1.5	1%
7	Nonmetal min. prods.	2.8	6%	Textiles/leather	1.5	1%
8	Nonmetallic minerals	2.8	6%	Other foodstuffs	1.5	1%
9	Newsprint/paper	1.9	4%	Machinery	1.4	1%
10	Fertilizers	1.7	4%	Basic chemicals	1.4	1%

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; Freight Analysis Framework (FAF) 2014 Data as reported by Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA).

Note: Units reported in thousands

Note: Transportation Equipment (SCTG 37) primarily refers to the movement of empty containers and railcars.

Cereal grains is the top commodity via carload service at 28 percent and is expected to grow annually at 2.4 percent. Transportation equipment is also expected to see high growth (5.4 percent annually overall; however note that this is primarily the movement of empty containers/railcars), whereas commodities such as wood products, milled grain, base metals and waste/scrap will see relative decreases in their commodity rank. Figure 36 details the top railroad commodities by tonnage and service type, and Figure 37 details the top commodities by units and service type.

Figure 36 Major Railroad Commodities Originating and/or Terminating in Hennepin County by Service Type, in Tons, 2040

MAJOR RAILROAD COMMODITIES: TONS						
RANK	CARLOAD			INTERMODAL		
	Commodity (SCTG)	2040 Tons (Millions)	%	Commodity (SCTG)	2040 Tons (Millions)	%
1	Cereal grains	2.1	28%	Mixed freight	2.3	70%
2	Nonmetallic minerals	0.9	12%	Transport equip.	0.4	13%
3	Wood prods.	0.8	10%	Cereal grains	< 0.1	2%
4	Milled grain prods.	0.7	9%	Milled grain prods.	< 0.1	1%
5	Nonmetal min. prods.	0.5	6%	Misc. mfg. prods.	< 0.1	1%
6	Base metals	0.5	6%	Machinery	< 0.1	1%
7	Waste/scrap	0.4	5%	Basic chemicals	< 0.1	1%
8	Other foodstuffs	0.3	4%	Plastics/rubber	< 0.1	1%
9	Other ag prods.	0.3	4%	Other foodstuffs	< 0.1	1%
10	Transport equip.	0.3	4%	Coal and petroleum prods.	< 0.1	1%

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; Freight Analysis Framework (FAF) 2014 Data as reported by Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA).

Note: Transportation Equipment (SCTG 37) primarily refers to the movement of empty containers and railcars.

Figure 37 Major Railroad Commodities Originating and/or Terminating in Hennepin County by Service Type, in Units, 2040

MAJOR RAILROAD COMMODITIES: UNITS						
RANK	CARLOAD			INTERMODAL		
	Commodity (SCTG)	2040 Units	%	Commodity (SCTG)	2040 Units	%
1	Cereal grains	26.7	28%	Mixed freight	143.5	53%
2	Transport equip.	11.6	12%	Transport equip.	91.9	34%
3	Nonmetallic minerals	10.2	11%	Misc. mfg. prods.	3.8	1%
4	Wood prods.	8.2	9%	Coal and petroleum prods.	3.0	1%
5	Milled grain prods.	7.2	8%	Machinery	2.9	1%
6	Base metals	5.3	6%	Milled grain prods.	2.7	1%
7	Nonmetal min. prods.	4.5	5%	Motorized vehicles	2.7	1%
8	Waste/scrap	3.8	4%	Plastics/rubber	2.5	1%
9	Other ag prods.	3.4	4%	Other foodstuffs	2.3	1%
10	Other foodstuffs	3.2	3%	Basic chemicals	2.3	1%

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; Freight Analysis Framework (FAF) 2014 Data as reported by Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA).

Note: Units reported in thousands

Note: Transportation Equipment (SCTG 37) primarily refers to the movement of empty containers and railcars.

The top rail commodities in Hennepin County change when considering their value, which was calculated from the value of goods traveling to, from, and within the County. The top 3 commodities via carload service in 2014 were base metals, cereal grains, and milled grain products, as shown in Figure 38. By contrast, the top three commodities moved via intermodal service are mixed freight, miscellaneous manufactured products, and textiles/leather, although mixed freight comprised the vast majority of overall value (76 percent).

Figure 38 Major Railroad Commodities Originating and/or Terminating in Hennepin County by Service Type, in Millions of Dollars, 2014

MAJOR RAILROAD COMMODITIES: VALUE						
RANK	CARLOAD			INTERMODAL		
	Commodity (SCTG)	2014 Value (\$M)	%	Commodity (SCTG)	2014 Value (\$M)	%
1	Base metals	382.0	19%	Mixed freight	8,405.7	76%
2	Cereal grains	301.6	15%	Misc. mfg. prods.	663.5	6%
3	Milled grain prods.	166.2	8%	Textiles/leather	450.4	4%
4	Wood prods.	154.3	8%	Machinery	357.4	3%
5	Other foodstuffs	105.2	5%	Electronics	262.7	2%
6	Waste/scrap	97.5	5%	Motorized vehicles	143.4	1%
7	Plastics/rubber	91.2	5%	Articles-base metal	125.0	1%
8	Newsprint/paper	90.9	5%	Plastics/rubber	87.9	1%
9	Motorized vehicles	80.6	4%	Basic chemicals	83.2	1%
10	Basic chemicals	60.8	3%	Paper articles	68.2	1%

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; Freight Analysis Framework (FAF) 2014 Data as reported by Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA).

Note: Transportation Equipment (SCTG 37) was not included in the value analysis, as it primarily refers to the movement of empty containers and railcars.

By 2040, the top commodities by value is expected to shift somewhat, as shown in Figure 39. Cereal grains is projected to emerge as the top commodity by carload service type, followed by base metals and milled grain products. However, mixed freight is expected to remain the top commodity by intermodal service type, followed by miscellaneous manufacturing products and machinery.

Figure 39 Major Railroad Commodities Originating and/or Terminating in Hennepin County by Service Type, in Millions of Dollars, 2040

MAJOR RAILROAD COMMODITIES: VALUE						
RANK	CARLOAD			INTERMODAL		
	Commodity (SCTG)	2040 Value (\$M)	%	Commodity (SCTG)	2040 Value (\$M)	%
1	Cereal grains	569.6	14%	Mixed freight	14,616.6	74%
2	Base metals	471.3	12%	Misc. mfg. prods.	1,221.8	6%
3	Milled grain prods.	304.8	8%	Machinery	576.9	3%
4	Wood prods.	295.1	7%	Electronics	434.3	2%
5	Plastics/rubber	224.7	6%	Textiles/leather	341.5	2%
6	Other foodstuffs	224.4	6%	Articles-base metal	211.7	1%
7	Other ag prods.	183.1	5%	Motorized vehicles	180.3	1%
8	Waste/scrap	127.2	3%	Plastics/rubber	148.5	1%
9	Newsprint/paper	111.2	3%	Basic chemicals	122.5	1%
10	Basic chemicals	107.8	3%	Paper articles	96.1	< 1%

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; Freight Analysis Framework (FAF) 2014 Data as reported by Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA).

Note: Transportation Equipment (SCTG 37) was not included in the value analysis, as it primarily refers to the movement of empty containers and railcars.

There are two primary rail service types, intermodal and carload. As noted earlier, intermodal units have approximately 1/3 to 1/5 the capacity of carload units. Intermodal traffic involves the handling of trailers and containers, which often contain mixed freight, consumer goods, and other high value products. Carload traffic includes a multitude of commodities, including assembled motor vehicles, bulk goods moved in dedicated trains handling commodities such as grain, coal, crude oil, etc., and goods being shipped in carload lots such as chemicals, construction materials and scrap. Figure 40 presents the tonnage and units for each of the four primary service types for 2014. On the tonnage side, 34 percent of commodities were shipped via intermodal movement, a total of over 2 million tons. However, carload traffic comprised the majority of tonnage, with 20 percent dedicated to coal, coke, iron ore, and bulk grain and 46 percent comprising all other carload traffic. On the other hand, when assessing the number of units by service type, intermodal shipments comprised over 75 percent of all units.

Figure 40 Total Rail Tonnage by Service Type, 2014

TONNAGE BY SERVICE TYPE				
SERVICE TYPE	TONS (THOUSANDS)	% OF TOTAL	UNITS (THOUSANDS)	% OF TOTAL
Intermodal	2,068	34%	145	75%
Carload	4,095	66%	47	25%
Total	6,163	100%	192	100%

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013

Top Inbound Commodities

Inbound commodities comprised the largest proportion of goods traveling by rail to the County, a total of nearly 3.8 million tons in 2014. Figure 41 presents the top inbound commodities by rail and service type, organized to show only the top five by both carload and intermodal service. Cereal grains was the top inbound commodity by tonnage at over 860 thousand tons, comprising 29 percent of all inbound commodities via carload service. Mixed freight was the top commodity via intermodal service, a total of 648 thousand tons, comprising 77% of intermodal commodities.

Figure 41 Top 5 Inbound Rail Commodities in Hennepin County by Service Type, in Tons, 2014

COMMODITY (SCTG)	CARLOAD			INTERMODAL		
	2014 Tons	%	Rank	2014 Tons	%	Rank
Cereal grains	863	29%	1	-	0%	20
Base metals	403	13%	2	2	0%	13
Wood prods.	319	11%	3	5	1%	10
Nonmetallic minerals	237	8%	4	-	0%	18
Nonmetal min. prods.	224	7%	5	< 1	0%	6
Newsprint/paper	129	4%	8	17	2%	4
Basic chemicals	67	2%	11	20	2%	3
Transport equip.	39	1%	14	94	11%	2
Machinery	-	0%	38	14	2%	5
Mixed freight	-	0%	42	648	77%	1

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; growth rates calculated using Freight Analysis Framework (FAF) 2014 Data as reported by Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA)

Note: Tons reported in thousands.

Note: Transportation Equipment (SCTG 37) primarily refers to the movement of empty containers and railcars.

Top inbound commodities differ slightly when ranked by value, as shown in Figure 42. This table is organized to show only the top 5 commodities by carload service type and intermodal service type. Base metals, cereal grains, and wood products are the top inbound commodities by carload service type, while mixed freight, miscellaneous manufactured products, and machinery are the top commodities by intermodal service type.

Figure 42 Top 5 Inbound Rail Commodities in Hennepin County by Service Type, in Millions of Dollars, 2014

COMMODITY (SCTG)	CARLOAD			INTERMODAL		
	2014 Value	%	Rank	2014 Value	%	Rank
Base metals	382.0	27%	1	3.8	< 1%	14
Cereal grains	226.9	16%	2	-	0%	22
Wood prods.	120.1	9%	3	2.6	< 1%	15
Newsprint/paper	88.5	6%	4	16.3	< 1%	19
Plastics/rubber	85.5	6%	5	87.9	1%	6
Basic chemicals	46.7	3%	8	70.3	2%	5
Motorized vehicles	45.1	3%	9	98.5	2%	4
Misc. mfg. prods.	7.1	1%	17	265.0	6%	2
Machinery	-	0%	37	258.9	6%	3
Mixed freight	-	0%	41	3,233.2	75%	1

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; growth rates calculated using Freight Analysis Framework (FAF) 2014 Data.

Note: Transportation Equipment (SCTG 37) was not included in the value analysis, as it primarily refers to the movement of empty containers and railcars.

Top Outbound Commodities

Outbound commodities by rail comprise over 2 million tons in 2014. Figure 43 presents the top outbound commodities by rail and service type, organized to show only the top five by both carload and intermodal service. Cereal grains was the top outbound commodity by tonnage at over 284 thousand tons, comprising 24 percent of all outbound commodities via carload service. Mixed freight was the top commodity via intermodal service, a total of 1 million tons, comprising 83 percent of intermodal commodities.

Figure 43 Top 5 Outbound Rail Commodities in Hennepin County by Service Type, in Tons, 2014

COMMODITY (SCTG)	CARLOAD			INTERMODAL		
	2014	%	Rank	2014	%	Rank
	Tons			Tons		
Cereal grains	284	24%	1	20	2%	5
Milled grain prods.	223	19%	2	24	2%	2
Waste/scrap	218	19%	3	8	1%	12
Fertilizers	98	8%	4	-	0%	25
Wood prods.	82	7%	5	3	< 1%	21
Other foodstuffs	33	3%	9	22	2%	2
Coal and petroleum products	3	< 1%	15	21	2%	4
Mixed freight	-	0%	19	1,037	83%	1

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; growth rates calculated using Freight Analysis Framework (FAF) 2014 Data.

Note: Tons reported in thousands.

Top outbound commodities differ notably when ranked by value, as shown in Figure 44. This table is organized to show only the top 5 commodities by carload service type and intermodal service type. Milled grain products, waste/scrap, and cereal grains are the top outbound commodities by carload service type, while mixed freight, textiles/leather, and miscellaneous manufactured products are the top commodities by intermodal service type.

Figure 44 Top 5 Outbound Rail Commodities in Hennepin County, in Millions of Dollars, 2014

COMMODITY (SCTG)	CARLOAD			INTERMODAL		
	2014	%	Rank	2014	%	Rank
	Value			Value		
Milled grain prods.	95.3	18%	1	21.3	< 1%	11
Waste/scrap	76.6	14%	2	3.7	< 1%	19
Cereal grains	74.6	14%	3	5.7	< 1%	16
Motorized vehicles	35.4	7%	4	44.9	1%	9
Fertilizers	31.5	6%	5	-	0%	24
Articles-base metal	-	0%	18	110.2	2%	5
Misc. mfg. prods.	-	0%	19	398.5	6%	3
Textiles/leather	-	0%	36	430.8	6%	2
Electronics	-	0%	38	253.0	4%	4
Mixed freight	-	0%	41	5,172.6	76%	1

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; growth rates calculated using Freight Analysis Framework (FAF) 2014 Data.

Note: Transportation Equipment (SCTG 37) was not included in the value analysis, as it primarily refers to the movement of empty containers and railcars.

TOP TRADING PARTNERS

Hennepin County’s key trading partners for rail commodities are shown in Figure 45, which presents the trade statistics for regions throughout the United States, Canada, and Mexico¹³. Three of these regions comprised nearly 82 percent of all trade inbound and outbound of Hennepin County: Canada (31 percent), East North Central (27 percent), and West North Central (23 percent). In addition, these three regions comprised 78 percent of all inbound rail traffic and 88 percent of all outbound traffic in 2013.

¹³ U.S. trade regions are defined as follows: (1) East North Central is comprised of Wisconsin, Illinois, Indiana, Ohio, and Michigan; (2) South Atlantic is comprised of Delaware, Maryland, District of Columbia, West Virginia, Virginia, the Carolinas, Georgia, and Florida; (3) West North Central includes the Dakotas, Nebraska, Kansas, Missouri, Iowa, and Minnesota; (4) West South Central includes the States of Texas, Oklahoma, Arkansas, and Louisiana; (5) Pacific includes Washington, Oregon, California, Alaska, and Hawaii; and (6) Mountain includes Nevada, Idaho, Montana, Utah, Wyoming, Colorado, Arizona, and New Mexico.

Figure 45 Hennepin County Trade Regions by Rail, in Thousands of Tons, 2014

TOP HENNEPIN COUNTY TRADE REGIONS BY RAIL						
REGION	TOTAL		INBOUND		OUTBOUND	
	Tons	%	Tons	%	Tons	%
Canada	1,946	31%	1,118	29%	828	34%
East North Central	1,656	27%	733	19%	923	38%
West North Central	1,489	24%	1,111	29%	378	16%
Mountain	531	9%	451	12%	80	3%
Pacific	229	4%	157	4%	72	3%
West South Central	212	3%	129	3%	83	3%
Middle Atlantic	54	1%	18	0%	36	1%
South Atlantic	51	1%	41	1%	10	< 1%
East South Central	38	1%	38	1%	-	0%
New England	4	< 1%	-	0%	4	< 1%
TOTAL	6,210	100%	3,798	100%	2,412	100%

Source: Surface Transportation Board (STB) Confidential Waybill Data, 2013; growth rates from Freight Analysis Framework (FAF) 2012 data.

Waterborne Freight

This section features detailed information on commodity flow along Hennepin County's waterway network. As noted below, there currently are no ports in Hennepin County nor goods moving through the county; the information presented in this section is based on 2013 data, the last full year of operation for waterborne traffic in Hennepin County. However goods still flow on the Minnesota River on Hennepin County's southern border, as well as to the river ports in St. Paul, and thus have an impact on the Hennepin County freight system. The analysis will feature statistics on waterway demand, directional flow, top commodities, and trade partners.

WATERWAYS OVERVIEW

Minnesota is uniquely situated for waterway movements as it is located on both the Mississippi River and the Great Lakes via Lake Superior. The Mississippi River provides access to river ports along the entire Mississippi River System as well as the Gulf of Mexico via New Orleans. The Great Lakes-St. Lawrence Seaway provides access to other ports along the Great Lakes through to the Atlantic Ocean. However, there are currently no ports in Hennepin County. The Upper St. Anthony Falls Lock and Dam closed permanently in late 2014, and there is no longer access to the Mississippi River System beyond River Mile 853.9 in downtown Minneapolis.¹⁴ Previously, three river terminals were located along the Mississippi River in this section, and processed under 600,000 tons annually, while the river ports in St. Paul and the terminals along the Minnesota River in Savage processed substantially more, 5.5 million tons and 2 million tons annually, respectively.¹⁵

Commodity data from the United States Army Corps of Engineers was examined to determine the amount and makeup of freight flowing through the region. Commodities shipped via waterways are comprised primarily of lower value, bulk materials, as detailed in Figure 46. In 2013, the largest commodity by tonnage was Soil, Sand, Gravel, Rock and Stone at nearly 23 percent of overall tonnage. Fertilizers, Cement and Concrete were the second and third-largest volume commodities, comprising 17 percent and 14 percent of total tonnage, respectively.

¹⁴ <http://www.mvp.usace.army.mil/Missions/Navigation/LocksDams/UpperStAnthonyFalls.aspx>

¹⁵ Minnesota Department of Transportation, 2016 Statewide Freight Network Plan.

Figure 46 Top 10 Waterway Commodities at St. Paul and Minneapolis, Total, 2013

MAJOR WATERWAY COMMODITIES, 2013			
RANK	COMMODITY	TONS	%
1	Soil, Sand, Gravel, Rock and Stone	1,216,752	23%
2	Fertilizers	915,648	17%
3	Cement and Concrete	747,219	14%
4	Other Non-Metal. Min.	499,167	9%
5	Wheat, Corn, Rice, and Oats	488,695	9%
6	Petroleum Products	381,789	7%
7	Iron Ore and Scrap	343,884	7%
8	Oilseeds (Soybeans)	279,483	5%
9	Coal	225,423	4%
10	Sodium Hydroxide, Inorganic Elements, Oxides, and Halogen Salts, Metallic Salts	100,170	2%

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

Information about tonnage growth and value growth for waterborne commodities was drawn from the FAF for the MSP region; however, because this particular FAF zone is comprised of 19 counties¹⁶, the data is illustrative of commodities moving on the waterways surrounding Hennepin County. Statistics for tonnage growth are presented in Figure 47. Overall, tonnage is expected to grow by 63 percent between 2014 and 2040, with a compound annual growth rate (CAGR) equal to 1.9 percent. Outbound tonnage is expected to grow from over 6.6 million tons to 10 million tons by 2040. Notably, inbound tonnage is expected to increase from over 8 million tons to nearly 14.5 million tons. This is a 74 percent increase, with a CAGR of 2.1 percent.

¹⁶ This FAF Zone includes the following Minnesota counties: Anoka, Benton, Carver, Rice, Sherburne, Dakota, Chisago, Hennepin, Ramsey, Scott, Stearns, Isanti, Washington, Wright, Mille Lacs, McLeod, Goodhue, Le Sueur, and Sibley.

Figure 47 Water Freight Tonnage Growth for MSP Region, 2014 – 2040, by Direction

TONNAGE GROWTH BY WATER: MSP				
DIRECTION OF MOVEMENT	2014 TONS (THOUSANDS)	2040 TONS (THOUSANDS)	GROWTH RATE 2014-2040	CAGR 2014-2040
Inbound	8,334	14,469	74%	2.1%
Outbound	6,691	10,041	50%	1.6%
Total	15,025	24,510	63%	1.9%

Source: Freight Analysis Framework (FAF) 2012 Data.

Note: CAGR = compound annual growth rate.

Projections for growth in the value of waterborne commodities in this FAF Zone are presented in Figure 48. Overall, value is expected to grow by 163 percent between 2014 and 2040, with a CAGR equal to 3.8 percent. The value of outbound goods is expected to grow from \$2 billion to nearly \$4.5 billion by 2040. Inbound value is expected to increase significantly, from nearly \$5 billion to nearly \$15 billion. This is a 183 percent increase, with an annual growth rate of 4.1 percent.

Figure 48 Water Freight Value Growth for MSP Region, 2014 – 2040, by Direction

VALUE GROWTH BY WATER: MSP				
DIRECTION OF MOVEMENT	2014 VALUE (\$M)	2040 VALUE (\$M)	GROWTH RATE 2014-2040	CAGR 2014-2040
Inbound	5,272	14,925	183%	4.1%
Outbound	2,098	4,485	114%	3.0%
Total	7,370	19,409	163%	3.8%

Source: Freight Analysis Framework (FAF) 2012 Data.

Note: CAGR = compound annual growth rate.

TOP TRADING PARTNERS

The MSP Region has several key trade partners for waterborne commodities. Figure 49 presents the trade statistics on trading partners. The trade regions are defined by the Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA) as FAF zones. In general, commodities by water traveled to and from 72 different FAF zones in 2014, but the most amount of tonnage (over 8 million tons) came from Louisiana. However, because FAF does not report origins/destinations for imports/exports, commodities arriving inbound from Louisiana are primarily coming from the Gulf of

Mexico from abroad, and vice versa. Buffalo, NY is another top region for water commodities, comprising 24 percent of the total. Iowa, Los Angeles, CA, and the Indiana portion of the greater Chicago Metropolitan region are the remaining top trade regions for goods by water. In total, these five regions transported over \$4.8 billion in goods to and from MSP in 2014.

Figure 49 Minneapolis – St. Paul Inbound Trade Regions by Water, in Thousands of Tons, 2014

TOP 5 TRADE REGIONS BY WATER: MSP

TRADE PARTNER (FAF ZONE)	2014 TONS (THOUSANDS)	% OF TOTAL	2014 VALUE (\$M)	% OF TOTAL
Louisiana (all FAF Zones)	8,267	55%	2,078	28%
Buffalo, NY CFS Area	3,584	24%	391	5%
Iowa	498	3%	21	< 1%
Los Angeles, CA	487	3%	2,312	31%
Chicago IL-IN-WI (IN Part)	371	2%	19	< 1%

Source: Freight Analysis Framework (FAF) 2012 Data.

Air Freight

This section features detailed information on commodity flow to and from Minneapolis-St. Paul International Airport (MSP). The analysis will feature statistics on air cargo demand, tonnage and value summaries, directional flow, top commodities, and trade partners.

MINNEAPOLIS – ST. PAUL INTERNATIONAL AIRPORT OVERVIEW

According to the Metropolitan Airports Commission (MAC), over 219,000 tons of freight shipped by air to and from MSP airport in 2015, as presented in Figure 50. Expedited cargo, which refers to package service by expedited carriers such as FedEx, comprised the vast majority of tonnage at MSP in 2015 at 92 percent. This type of cargo enplaned 51 percent of the time and deplaned 49 percent of the time. Mail cargo comprised a mere 8 percent of total 2014 cargo, and was split relatively evenly between deplaned and enplaned volumes.

Figure 50 Tonnage at Minneapolis – St. Paul Airport, All Directions, 2015

COMMODITY FLOW BY AIR: MSP

CARGO TYPE	INBOUND		OUTBOUND		TOTAL	
	Tons	% of Cargo Type Total	Tons	% of Cargo Type Total	Tons	% of Total
Freight/Express	97,036	48%	104,517	51%	201,553	92%
Mail	9,330	52%	8,852	49%	18,182	8%
Total	106,366	100%	113,368	100%	219,734	100%

Source: Passenger and Operations Reports 2015, Metropolitan Airports Commission (MAC)

Several major airline carriers transport cargo to, from, and through MSP airport, as shown in Figure 51. Delta carried by far the most tonnage (83 percent overall), transporting nearly 85 percent of deplaned and 81 percent of enplaned tonnage. Sun County and United also carry notable amounts of cargo through MSP. Sun Country transported 7 percent of total volumes and United transported 4 percent of total volumes in 2015. Together, these three carriers comprised 95 percent of total volume by major airline carriers. Overall, 36,000 tons deplaned at MSP and nearly 31,000 tons enplaned at MSP, totaling nearly 67,000 tons in 2015.

Figure 51 Tonnage by Airline at Minneapolis – St. Paul Airport, All Directions, 2015

COMMODITY FLOW BY AIRLINE CARRIER: MSP						
AIRLINE CARRIERS	INBOUND		OUTBOUND		TOTAL	
	Tons	%	Tons	%	Tons	%
Delta	30,706	85%	24,929	81%	55,634	83%
Sun Country	2,052	6%	2,920	10%	4,972	7%
United	1,195	3%	1,619	5%	2,813	4%
Southwest	1,246	3%	810	3%	2,056	3%
US Airways	227	< 1%	228	< 1%	455	< 1%
Air France	315	< 1%	25	< 1%	339	< 1%
American	169	< 1%	113	< 1%	282	< 1%
Icelandair	146	< 1%	14	< 1%	159	< 1%
Alaska Airlines	98	< 1%	33	< 1%	131	< 1%
Condor	60	< 1%	1	< 1%	61	< 1%
Great Lakes	0.1	< 1%	0.0	< 1%	0.1	< 1%
Total	36,211	100%	30,691	100%	66,902	100%

Source: Passenger and Operations Reports 2015, Metropolitan Airports Commission (MAC)

In addition cargo transported by major passenger airlines, there is also a significant amount of cargo transported by major cargo/freight carriers, specifically DHL, FedEx, and UPS. The trade statistics for these carriers are presented in Figure 52. FedEx transports the majority of the cargo at 57 percent of the total weight. FedEx also ships the majority of deplaned (50 percent) and enplaned (63 percent) volume. Together these three carriers deplane nearly twice the tonnage as the passenger airlines, over 69,000 tons in 2015. Additionally, these carriers enplane over 81,000 tons of cargo, which is 54 percent of total cargo/freight carrier tonnage. Overall, over 150,000 tons of cargo were transported by DHL, FedEx, and UPS in 2015.

Figure 52 Tonnage by Major Expedited Carrier at Minneapolis – St. Paul Airport, All Directions, 2015

COMMODITY FLOW BY EXPEDITED CARRIER: MSP						
EXPEDITED CARRIERS	INBOUND		OUTBOUND		TOTAL	
	Tons	%	Tons	%	Tons	%
DHL	3,990	6%	2,785	3%	6,776	4%
FedEx	34,355	50%	50,893	63%	85,248	57%
UPS (includes Bemidji)	31,106	44%	27,593	34%	58,699	39%
Total	69,452	100%	81,271	100%	150,723	100%

Source: Passenger and Operations Reports 2015, Metropolitan Airports Commission (MAC)

Statistics for tonnage growth are presented in Figure 53. Inbound tonnage is expected to grow by 4 percent annually between 2015 and 2040, from over 106,000 tons to over 287,000 tons. Outbound tonnage is expected to grow by 4.6 percent annually during the same period, from over 113,000 tons to nearly 306,000 tons, totaling 593,000 in both directions.

Although air cargo is predicted to increase at MSP, one of the biggest challenges in growing operations is the airport’s proximity to Chicago. Not only is most domestic freight carried via truck, many local manufacturing companies use Chicago as their primary gateway to destinations throughout North America and abroad.¹⁷

Figure 53 Tonnage at Minneapolis – St. Paul Airport, All Directions, 2040

TONNAGE GROWTH BY AIR: MSP						
CARGO TYPE	INBOUND		OUTBOUND		TOTAL	
	Tons	%	Tons	%	Tons	%
Freight/Express	258,682	48%	278,624	52%	537,307	91%
Mail	28,719	51%	27,247	49%	55,966	9%
Total	287,401	100%	305,872	100%	593,273	100%

Source: Passenger and Operations Reports 2015, Metropolitan Airports Commission (MAC). Growth rates from FAF 2012 Data.

Note: CAGR = compound annual growth rate.

¹⁷ http://metroairports.granicus.com/MetaViewer.php?view_id=1&clip_id=1213&meta_id=2261

Statistics for value growth for air commodities is presented in Figure 54. This data was not available from MAC and thus comes from a different data source, FAF4, because the value of the freight transported by air is the most important element of its activity in the region. Overall, value is expected to grow by 281 percent between 2014 and 2040, with a compound annual growth rate (CAGR) equal to 5.3 percent. Inbound and outbound tonnage is projected to grow at similar rates. Outbound tonnage is expected to grow from nearly \$10 billion to \$38 billion by 2040. This is a 290 percent increase over this period, with a CAGR of 5.4 percent. Inbound tonnage is expected to grow from \$5 billion to nearly \$20 billion. This is a 266 percent increase, with an annual growth rate of 5.1 percent.

Figure 54 Air Freight Value Growth for MSP Region, 2014 – 2040, by Direction

VALUE GROWTH BY AIR: MSP				
DIRECTION OF MOVEMENT	2014 VALUE (\$M)	2040 VALUE (\$M)	GROWTH RATE 2014-2040	CAGR 2014-2040
Inbound	5,433	19,860	266%	5.1%
Outbound	9,657	37,628	290%	5.4%
Total	15,090	57,488	281%	5.3%

Source: Freight Analysis Framework (FAF) 2012 Data

Note: CAGR = compound annual growth rate.

TOP COMMODITIES

Inbound Commodities

Inbound commodities comprised nearly half the goods traveling by air to and from MSP, a total of over 106,000 tons in 2015. Figure 55 presents the value statistics for the top five inbound commodities according to FAF. On the commodity level, it is more beneficial to understand the value of the transported goods as opposed to the tonnage, because large or heavy items are rarely moved by air due to transport costs. Precision instruments were by far the most valuable commodity shipped to the region, valued at over \$2 billion in 2014 (totaling 43 percent of total inbound value). Electronics was the second-most valuable commodity at nearly \$1.5 billion, comprising 27 percent of total value. Machinery was the third-most valuable inbound commodity at \$292 million, followed by miscellaneous manufacturing products at \$291 million and motorized vehicles at \$285 million. Together, these top commodities comprised 85 percent of the total value of inbound goods shipped by air to the MSP region.

Figure 55 Top 5 Inbound Air Commodities in Minneapolis – St. Paul by Value, 2014

TOP 5 INBOUND COMMODITIES: MSP		
COMMODITY (SCTG)	2014 VALUE (\$M)	% OF TOTAL VALUE
Precision instruments	2,307	43%
Electronics	1,489	27%
Machinery	292	5%
Misc. mfg. prods.	291	5%
Motorized vehicles	285	5%

Source: Freight Analysis Framework (FAF) 2012 Data

Outbound Commodities

Outbound commodities comprised over half the goods traveling by air to and from the MSP region, a total of over 113,000 tons in 2015. Precision instruments was by far the most valuable commodity shipped to the region, valued at over \$4.5 billion in 2014 (48 percent of total outbound value). Electronics was also a significant outbound product, valued at over \$2 billion (24 percent). Machinery was the third-most valuable inbound commodity at \$878 million, followed by waste/scrap at \$302 million and plastics/rubber at \$268 million. Together, these top commodities comprised over 88 percent of the total value of inbound goods shipped by air to the MSP region.

Figure 56 Top 5 Outbound Air Commodities in Minneapolis – St. Paul by Value, 2014

TOP 5 OUTBOUND COMMODITIES: MSP		
COMMODITY (SCTG)	2014 VALUE (\$M)	% OF TOTAL VALUE
Precision instruments	4,670	48%
Electronics	2,343	24%
Machinery	878	9%
Waste/scrap	302	3%
Plastics/rubber	268	3%

Source: Freight Analysis Framework (FAF) 2012 Data

TOP TRADING PARTNERS

The MSP Region has several key trade partners for air commodities. Figure 57 presents the trade statistics on trading partners for outbound commodities. The trade regions are defined by the Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA) as FAF zones. In general, outbound commodities by air traveled to 129 different FAF zones in 2014, but the most amount of tonnage (38,000 tons) went to the Chicago metro area, comprising 39 percent of outbound tonnage by air. Miami, Florida is another important region for outbound commodities, with 6 percent of the total tonnage. New Orleans, Louisiana, Cleveland, Ohio, and New York City are the remaining top trade regions for outbound goods. In total, these five regions received over \$5 billion in goods from MSP in 2014.

Figure 57 Minneapolis – St. Paul Outbound Trade Regions by Air, in Thousands of Tons, 2014

TOP 5 OUTBOUND TRADE REGIONS BY AIR: MSP

TRADE PARTNER (FAF ZONE)	TONS (THOUSANDS)	% OF TOTAL	VALUE (\$M)	% OF TOTAL
Chicago IL-IN-WI (IL Part)	38	39%	2,803	29%
Miami FL	6	6%	816	9%
New Orleans LA-MS (LA Part)	4	4%	901	9%
Cleveland OH	3	3%	458	5%
New York NY-NJ-CT-PA (NY Part)	3	3%	238	3%

Source: Freight Analysis Framework (FAF) 2012 Data

Figure 58 presents the trade statistics on trading partners for inbound commodities. Inbound commodities by air traveled to 131 different FAF zones in 2014, but the most amount of tonnage (16,000 tons) went to Chicago, comprising 28 percent of inbound commodities by air. Atlanta, Georgia is another important region for inbound commodities, with 9 percent of the total. Miami, Cleveland, and Detroit are the remaining top trade regions for inbound goods. In total, these five regions shipped over \$1.7 billion in goods to MSP by air in 2014.

Figure 58 Minneapolis – St. Paul Inbound Trade Regions by Air, in Thousands of Tons, 2014

TOP 5 INBOUND TRADE REGIONS BY AIR: MSP					
TRADE PARTNER (FAF ZONE)	TONS (THOUSANDS)	% OF TOTAL	VALUE (\$M)	% OF TOTAL	
Chicago IL-IN-WI (IL Part)	16	28%	1,068	20%	
Atlanta GA	6	10%	318	6%	
Miami FL	5	9%	43	< 1%	
Cleveland OH	3	4%	222	4%	
Detroit MI	2	3%	63	1%	

Source: Freight Analysis Framework (FAF) 2012 Data as reported by Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA)

Appendix

Figure A1 SCTG Commodity Code Descriptions

SCTG COMMODITY CODE DESCRIPTIONS		
2-DIGIT CODE	COMMODITY	DESCRIPTION
01	Live animals/fish	Includes live animals, poultry, fish, and other live animals.
02	Cereal grains	Includes field crops such as wheat, corn, rye, oats, and other seeds.
03	Other agricultural products	Comprised of vegetables, fruits (fresh and dried), nuts, flowers, oil seeds, and other agricultural products.
04	Animal feed	Forage products, residues and waste from food industries used in animal feeding, other products of animal origin not elsewhere classified.
05	Meat/seafood	Fresh or frozen meat, fish, and poultry products.
06	Milled grain products	Comprised of processed field crops into flours and meals, in addition to bakery and baked products such as pasta, dough, baked snack products, rice preparations, and other processed bakery products.
07	Other foodstuffs	Includes dairy products, processed or prepared vegetables, fruit, and nuts, coffee/tea, oils, sugars and confectionary products, edible oils, and non-alcoholic beverages.
08	Alcoholic beverages	Beer, wine, spirits, and denatured ethyl alcohol (not for human consumption).
09	Tobacco products	Cigarettes and other manufactured tobacco products.
10	Building stone	Calcareous monumental or building stone.
11	Natural sands	Sands and quartz sands used for construction, building, and other uses.
12	Gravel	Gravel and crushed stone.
13	Nonmetallic minerals	Includes various types of salts, including table salt, clays, sulfur, asbestos, and other non-metallic minerals.

14	Metallic ores	Includes iron, copper, nickel, aluminum, lead, zinc, and other ores.
15	Coal	Non-agglomerated and agglomerated coal.
16	Crude petroleum	Crude petroleum oil and oils obtained from bituminous minerals.
17	Gasoline	Includes gasoline and gasoline blends, aviation turbine fuel, kerosene, ethanol and ethanol blends.
18	Fuel oils	Fuel oils including diesel, Bunker C, and biodiesel.
19	Coal and petroleum products	Includes lubricating oils and greases, and gaseous hydrocarbons such as liquefied natural gas (LNG), propane, butane, and others.
20	Basic chemicals	Includes a variety of inorganic chemicals (i.e. sodium hydroxide and hydrogen chloride) and organic chemicals (i.e. phenols and organic dyes).
21	Pharmaceuticals	Any pharmaceutical products.
22	Fertilizers	And fertilizer products, such as manufactured fertilizer products, slag, or other materials.
23	Chemical products	Includes paints and varnishes, inks, essential oils, glues, and other chemical products.
24	Plastics/rubber	Articles of plastic and rubber, including tubes, pipes, packaging goods, foam, and other products.
25	Logs	All logs for pulping, lumber, fuel wood, and other untreated wood products.
26	Wood prods.	Contains lumber and other manufactured wood parts.
27	Newsprint/paper	Wood pulp, newsprint, toilet/facial tissue, and other rolled paper and paperboard in large rolls or sheets.
28	Paper articles	Household paper products, wallpaper, envelopes, and other paper or paperboard articles.
29	Printed products	Books, newspapers, journals, and other printed products.
30	Textiles/leather	Textile fibers and clothing, carpets, and articles of leather.
31	Non-metallic mineral products	Features products made from ceramic, glass, concrete, and other plaster products.

32	Base metals	Contains metal products such as iron, steel, copper, and aluminum, among others.
33	Articles-base metal	Pipes, tubes, and fittings, structures and structural parts, hand tools, and other articles of base metal.
34	Machinery	Features a number of types of engines, energy generators, pumps, climate control machinery, household heavy appliances, and other types of tools and manufacturing machinery.
35	Electronics	Electric motors, appliances, entertainment products, computers, and other electronic components and parts.
36	Motorized vehicles	Examples include personal vehicles, vehicles for the transport of goods, tractors, motor cycles, bicycles, and motor vehicle parts such as chassis, wheels, and other parts.
37	Transport equip.	Includes railway equipment, aircraft and spacecraft, ships, boats, and floating structures.
38	Precision instruments	This includes a number of specialized apparatuses such as optical elements, photocopying machines, surveying or geophysical equipment, or medical devices.
39	Furniture	All types of furniture, mattresses and supports, lamps, and illuminated signs.
40	Misc. manufactured products	Includes a variety of manufactured goods, including toys, musical instruments, artwork, and other manufactured products.
41	Waste/scrap	Includes both metallic waste and scrap and non-metallic waste and scrap.
43	Mixed freight	Virtually all kinds of freight that can be moved in a trailer or container and is not reported as a specific commodity. The primary commodities handled in this manner consist of consumer goods, including packaged foods, electronics, office supplies, and durable goods, along with a broad range of intermediate components for manufacturing, such as auto parts.
99	Unknown	Unknown or not available.

Source: Freight Analysis Framework (FAF) 2012 Data as reported by Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA)

Figure A2 STCC Commodity Code Descriptions

STCC COMMODITY CODE DESCRIPTIONS		
2-DIGIT CODE	COMMODITY	DESCRIPTION
01	Farm Products	All types of fruits, vegetables, livestock, animal products, cotton, grain, and other farm products.
08	Forest Products	Includes barks, gum, and other forest products.
09	Fresh Fish or Marine Products	Fresh fish and marine products.
10	Metallic Ores	Includes iron, copper, nickel, aluminum, lead, zinc, and other ores.
11	Coal	Includes all coal products.
13	Crude Petroleum or Natural Gas	Crude petroleum, natural gas, and natural gasoline products.
14	Nonmetallic Minerals	This category includes a variety of construction and building products, such as stone blocks or crushed rock materials.
19	Ordnance or Accessories	Guns, ammunition, military equipment, and other ordnance or accessories.
20	Food or Kindred Products	This category includes animal products, produce, and other processed foods and beverages.
21	Tobacco Products	Cigarettes, cigars, chewing tobacco, and other processed tobacco.
22	Textile Mill Products	Woven fabrics, knit fabrics, yarn, silk, carpets, and other textile goods.
23	Apparel or Related Products	All types of apparel and accessories.
24	Lumber or Wood Products	Lumber, forest materials, and other manufactured wood products.
25	Furniture or Fixtures	All types of furniture and fixtures.
26	Pulp, Paper or Allied Products	Paper, pulp, wallpaper, envelopes, boxes, and other paper products.

27	Printed Matter	Newspaper, periodicals, greeting cards, and other printed matter.
28	Chemicals or Allied Products	Industrial chemicals, pharmaceutical drugs, cosmetics, soap and detergents, paint, and other chemical products.
29	Petroleum or Coal Products	Petroleum, refined products, asphalt, and miscellaneous coal and petroleum products.
30	Rubber or Misc Plastics	Includes tires, inner tubes, rubber or plastic footwear, and other products.
31	Leather or Leather Products	Finished and industrial leather, leather footwear, luggage, and other leather goods.
32	Clay, Concrete, Glass or Stone	All types of clay, glass and glassware, concrete/cement, and stone.
33	Primary Metal Products	Includes steel, iron, lead, copper, and other primary metal products.
34	Fabricated Metal Products	Includes cans, cutlery, tools, hardware, bolts/nuts, and other fabricated metal products.
35	Machinery	Engines, farm machinery/equipment, elevators, special tools, construction machinery, and other types of machinery.
36	Electrical Equipment	Electrical equipment, switchboards, household appliances, electric lamps, and other electrical equipment.
37	Transportation Equipment	Includes motor vehicles, truck trailers, aircraft, ships, boards, and others.
38	Instrum, Photo Equip, Optical Eq	Scientific equipment, medical devices and equipment, watches/clocks, and others.
39	Misc Manufacturing Products	Jewelry, toys, games, sporting goods, office supplies, and other miscellaneous manufactured goods.
40	Waste or Scrap Materials	Ashes, scrap, chemical waste, and other miscellaneous waste.
41	Misc Freight Shipments	Miscellaneous freight shipments and special commodities.
42	Shipping Containers	Shipping containers, semi-trailers returned empty, and other empty equipment.

43	Mail or Contract Traffic	Mail, express, and contract traffic.
46	Misc Mixed Shipments	Mixed shipments (Multi-STCC), FAK and miscellaneous shipments (mostly intermodal).
47	Small Packaged Freight Shipments	Small packaged freight shipments, including less-than-carload shipments (LCL).
50	Secondary Traffic	Generally includes shipments of consumer goods that move from multimodal terminals and warehouses and distribution centers.

HENNEPIN COUNTY FREIGHT STUDY TASK 2: COMMODITY FLOW ANALYSIS

Figure A3 Rail Traffic Summary in Units (unless otherwise specified), 2011-2020

HENNEPIN COUNTY ESTIMATED RAIL TRAFFIC SUMMARY

COMMODITY	ESTIMATED TRAFFIC, UNITS					FORECAST TRAFFIC, UNITS				
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Trailers / Containers*	1,912	1,979	2,072	1,800	1,825	2,071	2,146	2,201	2,245	2,270
Crude Oil	216	640	1,132	1,267	1,196	1,017	915	915	915	915
Ore	244	361	386	402	293	153	238	304	360	362
Grain	665	585	556	619	700	704	706	706	706	706
Lumber	314	315	328	350	366	384	396	404	408	412
Vehicles	335	288	304	285	295	304	310	316	319	322
Empty Cars	4,967	5,459	6,060	5,665	5,574	5,561	5,699	5,859	5,981	6,041
Ethanol	42	40	36	34	42	42	42	42	42	43
Potash	67	68	70	71	72	73	73	74	75	76
LPG	39	60	78	102	129	142	142	142	142	142
Lumber / Plywood	6	6	6	6	7	7	7	7	7	7
Steel & Steel Products	3	3	3	4	4	4	4	4	4	4
Petroleum Products	2	2	2	2	2	2	2	2	2	2
Flour	12	12	12	12	12	13	13	13	13	13
Plastic Pellets	6	6	6	6	6	6	6	6	6	6
Wheat	9	9	9	9	9	10	10	10	10	10
Coal	5	5	5	5	5	5	5	5	5	5
All Other	1,556	1,616	1,679	1,699	1,614	1,614	1,695	1,746	1,781	1,816
Total Cars / Day	10,399	11,453	12,743	12,337	12,151	12,109	12,409	12,755	13,022	13,152
Total Cars / Year	3,795,462	4,180,215	4,651,219	4,503,071	4,435,046	4,419,927	4,529,172	4,655,709	4,753,058	4,800,524

Source: Amfahr Consulting, LLC Traffic History and Forecasts, 2015. *Note: this category reflects carload movements handling trailers or containers, which are not equivalent to intermodal units.

Figure A4 Hennepin County Rail Traffic Summary and Growth, 2014-2020

HENNEPIN COUNTY ESTIMATED RAIL TRAFFIC SUMMARY

COMMODITY	2014 UNITS	2020 UNITS	GROWTH (2014-2020)	CAGR (2014-2020)
Trailers / Containers*	1,800	2,270	26%	3.9%
Crude Oil	1,267	915	-28%	-5.3%
Ore	402	362	-10%	-1.7%
Grain	619	706	14%	2.2%
Lumber	350	412	18%	2.8%
Vehicles	285	322	13%	2.1%
Empty Cars	5,665	6,041	7%	1.1%
Ethanol	34	43	27%	4.0%
Potash	71	76	6%	1.0%
LPG	102	142	39%	5.7%
Lumber / Plywood	6	7	17%	2.7%
Steel & Steel Products	4	4	10%	1.5%
Petroleum Products	2	2	13%	2.0%
Flour	12	13	6%	1.0%
Plastic Pellets	6	6	9%	1.5%
Wheat	9	10	6%	1.0%
Coal	5	5	0%	0.0%
All Other	1,699	1,816	7%	1.1%
Total Cars / Day	12,337	13,152	7%	1.1%
Total Cars / Year	4,503,071	4,800,524	7%	1.1%

Source: Amfahr Consulting, LLC Traffic History and Forecasts, 2015. CAGR = Compound Annual Growth Rate. *Note: This category reflects carload movements handling trailers or containers, which are not equivalent to intermodal units.

Hennepin County

Department of Public Works

701 4th Avenue S, Suite 700, Minneapolis, MN 55415

Tel [Telephone]

www.hennepin.us

