CAMBRIDGE SYSTEMATICS

Binghamton Regional Freight Study

final report

prepared for

Binghamton Metropolitan Transportation Study

prepared by

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September 2008

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Executive Summary

Project Introduction

The Binghamton Metropolitan Transportation Study (BMTS) identified improving freight movement as a priority action in its 2005 long range transportation plan, *TRANSPORTATION TOMORROW 2030 ~ PLACEMAKING FOR PROSPERITY*. The intent of this study is to help BMTS, the New York State Department of Transportation (NYSDOT), and their partners better understand current and future freight movements to and through Greater Binghamton, and how to best serve the needs of local businesses and encourage future economic development. The study examines all modes of surface freight transportation.

Similar to other upstate metropolitan areas, the Binghamton region has seen an evolution in its economic and commercial base over the past thirty years from manufacturing of a broad base of products to a focus on production, research and development of computers and electronics, aerospace, food processing, and industrial machinery; warehousing and distribution of goods produced elsewhere; and service-related industries. Coupled with this is the transformation which has taken place over the last decade in the way that goods are now produced, transported and distributed. The combination of containerization of cargo, computers and real-time global communication, and freight transport deregulation has permitted manufacturers, at greater distances from their markets, to better meet their customer's requirements in terms of product needs, reduced transit time and lower prices, while having more control over their supply chain and inventory.

The issues central to this study's analyses and recommendations include mobility and reliability, environmental improvement, economic sustainability and competitiveness, safety and security.

National and Global Trends: Setting the Stage

Fundamental sectoral shifts have transformed the U.S. economy and the global economy over the last quarter century. They have been felt in the decline of businesses that traditionally have underpinned the Binghamton economy, but these shifts also present its opportunities for the future. Two longer-term trends include:

- The growth in the importance of foreign trade to the U.S. economy; and

- A decline in domestic manufacturing, accompanied by an increase in the need for domestic transport and distribution of goods made overseas.

Meanwhile, while it remains to be seen whether two more recent trends have the potential to stem or even reverse the tide of globalization, they already are being felt locally in the Binghamton region. These more recent trends include:

- Recent rapid increases in energy costs that are leading to shifts in where and how products and components of products are manufactured, warehoused, and distributed to consumer markets, including some manufacturing being moved from Asia to Central America; and

- A decline in the value of the dollar, which makes domestically produced goods more competitively priced both here and abroad.

Chapter 1 of this report investigates each of these trends in more detail, setting the stage for the more detailed analysis of the region's freight transportation system in the remainder of this report. While the growth in foreign trade and decline in domestic manufacturing are long-term trends that would take years if not decades to reverse, both the value of the dollar and the price of fuel are subject to volatility, and recent short-term trends, while quite dramatic, may not be sustained over a long enough period of time to lead to structural shifts in the U.S. economy. The region should, however, be prepared to capitalize on its strengths in order to take advantage of any opportunities that present themselves in the short-term, and be prepared for the possibility that there could be another series of major global economic shifts in the coming decade.

Economic Profile

The Binghamton area maintains economic assets in its skilled workforce, advanced technological capabilities, fertile land, and a location on the edge of the Northeastern Megalopolis, stretching from Boston to Washington, D.C. Despite these strengths, the Binghamton area has confronted economic headwinds for more than 15 years, at least in part due to its long-term reliance on manufacturing. As manufacturers have shifted production from the northeast and Midwest to lower cost locations, the Binghamton area has seen jobs leave and a prolonged out-migration of its population to regions possessing stronger employment growth.

Today, the combined strengths of Binghamton's technological base, centered on the advanced skill sets of its people and the cutting-edge research activities taking place at Binghamton University, a flagship of the New York university system, the Binghamton area is demonstrating resilience and is poised for low to moderate growth in the future. The Binghamton region's transportation infrastructure – its roadways, railways, and airports – are paramount in supporting the area's economic revitalization. The ability of the Binghamton area to connect efficiently to large domestic and international markets, both in

terms of the movement of freight and the movement of people, will have a direct bearing on the region's long-term economic prospects.

Tied to the wealthy and populous Eastern Seaboard cities via I-88 and I-81, and to the U.S. industrial Midwest via I-86/NY 17, the Binghamton region has emerged as an increasingly popular location for the logistics, warehousing, and distribution industries. The Binghamton region's 250,000 people and Central New York's tourism industry stimulate demand for construction materials and consumer goods, while the area's technology industries and business services require frequent and reliable parcel deliveries to maintain competitiveness. Although distribution, construction, tourism, and services are becoming larger parts of the Binghamton area's economy, the region's economic legacy remains tied to manufacturing.

The key findings of the Economic Profile in Chapter 2 of the report include the following:

- After experiencing little or no growth between 1970 and 1990, the Binghamton region's population declined six percent between 1990 and 2006. Binghamton area's population is expected to stabilize and resume some growth, although at rates below either New York State or the U.S. as a whole. In 2030, the Binghamton area is expected to see its population increase very slightly to 249,000 people according to forecasts developed by Global Insight.

- As the Binghamton area's economic prospects have begun to improve, per capita income levels have shown signs of recovery in recent years, with the region gaining some ground compared to the United States during the 2003 to 2005 period. Long-term, this is a trend that economic development and public officials would like to see sustained as it is emblematic of a more robust, higher wage, and more competitive economy.

- Between 1985 and 2006, the number of people employed in the Binghamton area declined by 4 percent, compared to 11 percent and 40 percent increases, respectively, for the State of New York and the U.S. Consistent with other signs of the Binghamton area's economic recovery (e.g., rising relative per capita income levels, lower rates of population out-migration), the region is forecast to add about 6,000 jobs over the next 15 years, representing a 5.3 percent increase.

- While the Binghamton area's unemployment rates are relatively low, this may be more a reflection of a shrinking labor force than evidence of a tight jobs market associated with strong economic growth

- The economic trends observed from 1995 to 2005, including the secular decline in manufacturing and the shift towards services industries, have significant momentum and will continue to mark the period through 2020. However, the pace of these changes is expected to slow. In particular, the fall off in manufacturing is expected to be much less pronounced, with manufacturing still accounting for a large share (13.2 percent) of Binghamton area jobs in 2020. Services will continue to climb in importance to the region, accompanied by construction, wholesale and retail trade, and transportation.

Freight Profile

Located at the intersection of I-81, I-88, and the NY 17/I-86 Southern Tier Expressway corridor, Binghamton lies about 80-miles equidistant between the major east/west routes of I-90 and I-80. Binghamton also is home to rail connections for Canadian Pacific (CP), Norfolk Southern, and New York Susquehanna and Western Rail (NYSW). Through the NYSW line, Binghamton freight also has an easy connection with the CSX line in Syracuse. Because Binghamton sits at a confluence of highway and rail routes, it is strongly connected to neighboring regions. However, Binghamton lacks a seaport or major air cargo airport and must rely on intermodal facilities in neighboring regions to connect to global markets.

Highway Network Overview and Conditions

A total of 95 million tons of freight moved into, out of, within, or through Binghamton in 2004, the most recent year for which data are available.[1] Nearly one million truck loads moved into the Binghamton region with an estimated value of this inbound truck freight at $24 billion. By virtually every measure, trucks dominate the movement of freight in the Binghamton region. In terms of tonnage, about 91 percent of inbound freight, 99 percent of outbound freight, and all local freight moves by truck. All inbound, outbound, and locally-shipped containers move by truck. By value, over 95 percent of inbound, outbound, local, and through freight moves by truck. Syracuse and New York City are currently Binghamton's largest trading partners. Together the two regions account for more than 13 percent of all goods trucked into Binghamton and more than one-third of truck exports from Binghamton. The rest of New York State and the Midwest are the next largest sources of freight for Binghamton.

An analysis of bridge conditions, bridge clearances, pavement conditions, highway congestion, and truck travel patterns, in combination with interviews with stakeholders who are truck operators or who rely on trucking, revealed the following conclusions about the region's highway network and its ability to accommodate freight transportation needs now and in the future:

- Of the 458 bridges in Broome County included in NYSDOT bridge inventory, 135 (30 percent) are rated "Deficient." In Tioga County, 97 of 220 bridges (44 percent) are rated "Deficient."

- There are six major rail bridges which have vertical clearances under 14'0," all of which are located along the Southern Tier Line in Binghamton.

[1] All freight flow data included in this report comes from Global Insight's TRANSEARCH Database, which includes public and proprietary freight flow information. Data is available at the county level of geographic detail and the 4-digit STCC commodity detail.

- The highest levels of truck activity occur on the interstate highway network and NY 17.

- The roadway segments with the highest truck volumes generally have very good pavement, while those segments with the worst pavement conditions tend to carry the fewest trucks.

Rail Network Overview and Conditions

About 14 percent of through tonnage (10 percent of rail traffic moving through containers) and 5 percent of the value of through traffic is moved by rail. More than 95 percent of all rail traffic in Binghamton is through traffic. An estimated 9.5 million tons move through Binghamton via rail, with 90 percent of this cargo moving rail carload, rather than rail intermodal (which accounts for the remaining 10 percent). This is, in part, due to the fact that the largest through commodities consist of coal, scrap metal, and grain, which rarely move intermodal. Geographically, Binghamton is used as a rail through-point for Midwest locations to reach New York State and New England markets. While cargo does flow from New York State and New England, west/south through Binghamton, most of the rail traffic flows north and east.

Physical and Operational Constraints

From a physical plant standpoint, the track structure on the tracks owned by NS and CP seems sufficient given the current level of rail freight traffic. For example, a recently released long-term needs analysis and capacity investment study of the national rail system by the American Association of Railroads cited the CP main line from Albany, New York to Sunbury, Pennsylvania as "green," or operating below capacity, and expected to remain at that classification in 2035. Many of the delays in rail traffic in Binghamton are due to chokepoints and bottlenecks outside the study area. Within the study area, some issues that are cause for concern include yard-related delays, lack of passing sidings on mainline tracks, low travel speeds due to hilly terrain and steep grades, and lack of local access points to the region's rail system.

Yard-Related Delays

All of Binghamton's rail lines (with the exception of the NS Johnson Lead and the OHRY line from Owego to Harford) converge in downtown Binghamton, where trains must either share track or cross over track controlled by one or more other operators. Essentially, NS operations between Buffalo and Albany conflict with CP operations from the Albany area to Scranton and points south, while NYSW trains between Syracuse and northern New Jersey must cross over and share tracks with both. Some delays have been observed because of these conflicts. Today's minor delays due to a lack of dedicated lines for through trains in the Binghamton and Bevier Street yards could expand into more significant delays that may impede the efficiency of rail freight operations in the region as traffic increases in the future. The importance of resolving conflicts at central Binghamton

rail yards will become one of the most pressing issues if passenger rail service is restarted on one or more lines radiating out of central Binghamton.

Lack of Passing Sidings on Mainline Tracks

Today, there are limited passing sidings on the CP main line to Albany and to Scranton and on the Southern Tier line east of Binghamton towards New Jersey. The rail operators, however, are adding siding capacity as necessary to accommodate increased traffic, but suitable locations for cost-feasible sidings (e.g., where a new tunnel or bridge is not necessary) are limited in the hilly terrain of the study area. For the time being, the major capacity constraint on the rail system is at the rail yards and intersections in central Binghamton and outside the region.

As growth in demand for freight transportation by rail increases the need for rail system capacity expansions, the rail operators may be faced with major capital projects to restore double-track on portions of their lines, with accompanying big-ticket structural improvements. If proposed passenger train service is to be successful, there must be sufficient track capacity to accommodate passenger trains on a reliable and reasonable schedule while also maintaining freight service. While it is not clear whether the CP line to Scranton would need to be fully double-tracked to accommodate passenger service, some capacity enhancements would be necessary.

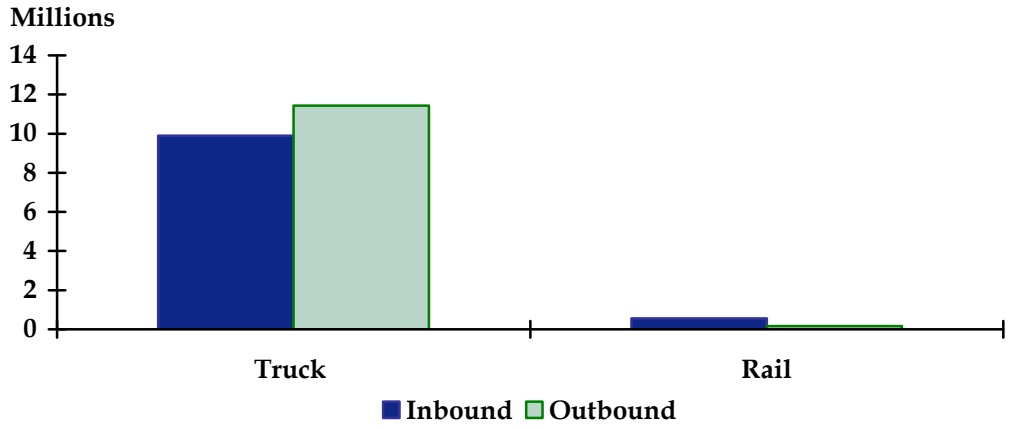
Slow Operating Speeds

Steep grades on the rail lines in the region, and in particular on the CP main line approaching the Belden Hill Tunnel, slow the speeds of trains. The condition of the track and signal system on the NYSW Syracuse Branch also prevents trains from exceeding 25 miles per hour for safety reasons. The slow speed increases the travel time of each train, and further impacts the travel time of trains waiting in passing sidings. Short of purchasing new rights-of-way and investing in new track and tunnels to bypass high points on the region's rail lines, there are few practical options to increase train speeds on hilly sections of rail track. With strategic investments in more and longer passing sidings, rail operators could mitigate the impact of train speeds on total travel time, particularly for trains that must currently stop in one or more siding to wait for one or more trains to pass in the opposite direction. On tracks like the NYSW Syracuse Branch where lack of advanced traffic control systems and track condition prevent faster operating speeds, incremental investments in tracks and signal systems could allow for greater throughput.

Lack of Local Access Points to the Region's Rail System

There are relatively few points where local businesses can access rail services in the Binghamton region, in particular for businesses not located directly on the track. A rail intermodal facility similar to the CSX facility in Syracuse could help attract firms to Binghamton that rely on import and export of goods via intermodal containers or who could benefit from long-distance transport of 53-foot truck trailers via rail flatcar (referred to as "trailer on flatcar," or TOFC. Construction of smaller bulk rail transfer facilities and industrial access sidings throughout the region could help more businesses access rail services, potentially lowering their freight logistics costs.

Figure ES.1 Binghamton Freight Tonnage
2004 (by Mode)



Source: Global Insight

Future development patterns in the region will determine where freight demand grows in the future and which modes can and will absorb the demand. For example, while warehouses and distribution facilities by their nature already are truck-oriented, the fact that they require large parcels of inexpensive land usually precludes the opportunity to locate them in developed areas near existing rail lines.

Carrier Profile and Stakeholder Feedback

The project team interviewed twenty-three logistics stakeholders in the study area which represented a fairly diverse spectrum of industries and counties. These interviews provided supplemental qualitative information about freight system characteristics, operations and needs. These stakeholders as well as public sector agencies were invited to participate in stakeholder meetings throughout the course of the project to provide further guidance and information.

Table ES.1 Summary of Stakeholder Responses

Strengths of Binghamton Region	Weaknesses of Binghamton Region
Transportation infrastructure	High taxes and utility costs
Highway connections to major markets	Low area production, resulting in movement of empty truckloads
Hard-working, well-trained workforce	Low truck clearances in many areas
Accessible undeveloped land	Unfavorable weather
	Limited access to some specific sites

Regional Freight Forecasts

A modeling effort was undertaken to determine how much freight volume will travel on segments of the road and railroad network in the BMTS region. The goal of the exercise was to produce an assignment of freight volumes to the road and rail networks and to thereby identify bottlenecks where investments may be needed to improve the efficiency of the network, and to identify areas where excess capacity may exist, providing economic development opportunities. These forecasts answer questions such as how much volume will travel on the rail and highway networks, how heavily will certain modes be utilized, and what commodities will be transported.

The freight forecasts relied on data collected from four sources, including the following models or databases:

- The existing **NYSDOT TRANSEARCH database,** which includes long-term freight forecasts with industrial, geographic, and modal detail through 2025. To obtain the best possible results for the BMTS Freight Study, the updated TRANSEARCH database with 2006 base year data was utilized. This BMTS forecast is built from 2006 base year data, backcasted to 2004 using annual growth rates of the underlying forecast drivers between 2004 and 2006. As such, the BMTS forecast still begins with 2004 base data, to be consistent with other ongoing freight studies around the state.

- Global Insight's **Business Demographics Model**, which provides a complete and detailed view of business conditions throughout the United States. The model presents both historical and forecast data for every county in the United States and every industry grouping in the North American Industry Classification System (NAICS).

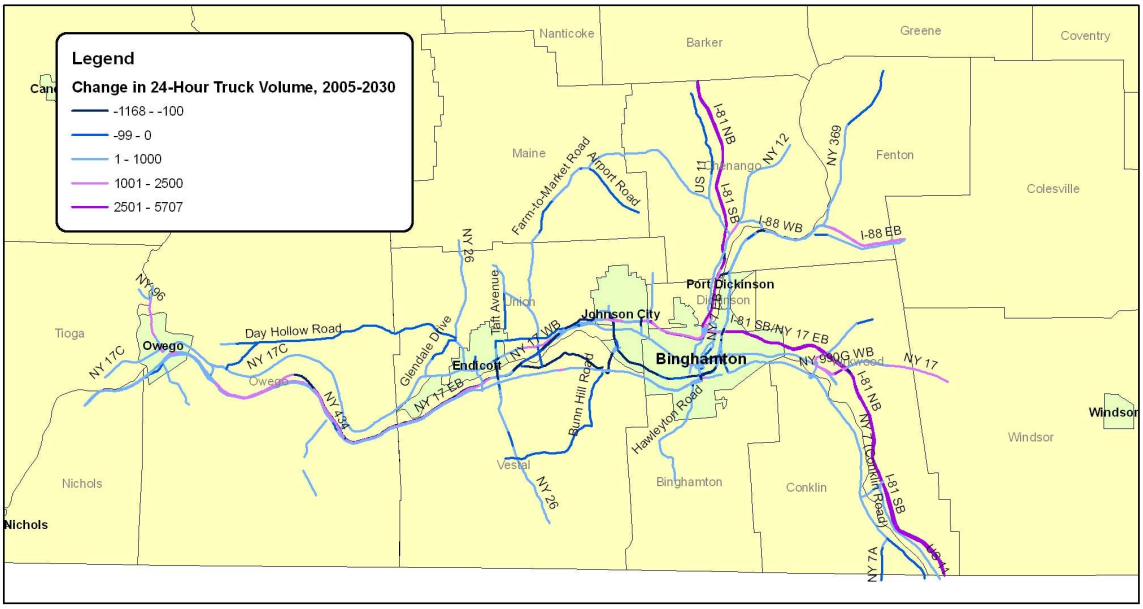
- Global Insight's **Business Transactions Matrix**, which captures the relationships and commercial activity between businesses.

- Information that is updated quarterly in the context of Global Insight's international network of **large-scale economic models,** which are the basis for forecasts at the county level and above. The use of these models improves the representation of changes in economic activity at all geographic scales. In this context, the estimates and forecasts account for changes in international, national, state, and local economic conditions and not merely projections of the trends embodied in past censuses.

Highway Forecast Implications

Freight moved by truck is forecast to continue to dominate as the primary mode of freight transport, carrying 98 percent of inbound and outbound tonnage in 2030. Truck handles similar shares of freight when measured in terms of twenty-foot equivalent units (TEUs, a standardized measure of containerized cargo) or value. However, truck traffic moving through Binghamton represents 70 percent of the expected growth of freight tonnage when considering freight moving by truck and rail, in and out of Binghamton. The greatest increases in truck trips will be observed on the major highways that pass through the Binghamton area. Along with the increasing through traffic, there will be increases in truck traffic on roads that serve major industrial and commercial facilities. Despite the projected increases in truck traffic on many network segments, freight-related bottlenecks are not anticipated to develop anywhere in the BMTS region by 2030. There may be opportunities to utilize excess roadway capacity for economic development. Figure ES.2 illustrates the anticipated growth in truck traffic between 2005 and 2030.

Figure ES.2 Change in Truck Volume (Numeric)
2005 to 2030



Rail Forecast Implications

Rail is expected to represent a declining fraction of Binghamton's total inbound freight between now and 2030, falling from 5 percent of total inbound tonnage in 2004 to 3 percent of inbound tonnage in 2030. This follows after outbound rail tonnage grows at an estimated annual rate of 2 percent and inbound rail tonnage remains flat at 0 percent.

The Midwest is becoming an increasingly important trading partner with Binghamton in terms of rail tonnage, increasing its share of inbound traffic from 17 to 19 percent between 2004 and 2030. The Midwest is an even larger player for Binghamton's outbound rail tonnage, accepting 35 percent in 2004 with expectations of 49 percent share by 2030.

Outbound tonnage growth will be fueled by growth in metal scrap and other miscellaneous waste and scrap materials, which is expected to grow by 3.1 percent annually through 2030. The declines in inbound rail tonnage are attributable to strong average annual declines in locomotive parts (-7.6), grain (-3.2), and plastics (-1.2 percent). Inbound coal via rail was the largest commodity (in terms of tonnage) at 245,000 rail tons in 2004. Growth in coal will not be robust, at an annual rate of 0.3 percent, and will yield 262,000 inbound rail tons in 2030. Rail carload tonnage moving through Binghamton is expected to grow annually at an average rate of 1.7 percent through 2030 while through intermodal tonnage grows at 3.1 percent. The result is a total 15 million tons of through rail traffic in 2030. Rail carload tonnage represents the majority of through traffic, with 87 percent of through tonnage in 2030

Despite the large growth anticipated between 2005 and 2030, the demand for rail is not expected to exceed the capacity of the rail main lines within the BMTS region. The likelihood of excess rail capacity provides the region with opportunities to spur rail-dependent industry and advocate intermodal transloading activities to shift a portion of the anticipated truck trips to rail.

While capacity exists on the main lines, there are bottlenecks that could develop in the region's rail yards where intermodal transloading and staging activities occur. Examples of such bottlenecks include the Binghamton Yard in the City of Binghamton and the East Binghamton Yard in Conklin. The addition of through tracks on the NYS&W line at the Binghamton Yard in the City of Binghamton would allow trains to pass through the region more quickly, reducing the delays they experience navigating through these facilities. The expansion of facilities such as the East Binghamton Yard in Conklin would provide an opportunity to accommodate demand for yard space and encourage intermodal activity in the region.

Freight Transportation Improvement Program

Capital projects that could improve freight transportation system operations and advance the Binghamton Region's economic development opportunities were identified and

analyzed to determine the costs and benefits associated with each. As a culmination of the information and analyses that have been presented in previous chapters, this section takes a three-pronged approach to project identification:

- First, the results of the regional economic forecast and the assignment of truck and rail traffic to the BMTS regional freight network were analyzed to determine where there might be congestion or where existing operational issues may be exacerbated due to increases in freight traffic.

- Second, based on stakeholder input, six specific subareas of the BMTS region were identified as Targeted Economic Development Zones (TEDZ), where investments in the freight transportation infrastructure could help attract new businesses and help existing businesses grow. The freight transportation systems in and around these subareas were analyzed to determine where targeted infrastructure investments could help spur economic development.

- Third, through stakeholder input gathered during all phases of this study, the consultant team developed a list of proposed improvements that were recommended by stakeholders, including users and operators of the region's freight transportation infrastructure. Stakeholder meetings were held on April 15 and June 10.

Tables ES.2 and ES.3 present the highway and rail projects that were analyzed, and the planning-level estimated cost.

Table ES.2. Highway Project Cost Estimates

Highway Project Description	Estimated Cost
Truck climbing lane on Interstate 81/NY Route 17 southbound from Interchange 4 to Windy Hill Road overpass	$30 million
Extension of Prospect Street connector to Anitec Site	$1.5 million
Griswold Street Extension and new access ramp from I-81 to Griswold St.	$3 million
Raise low-clearance rail bridges on Southern Tier Line in central and western Binghamton[a]	$123 to $138 million (bridge replacement); $70-$85 million (lower roadbed)
Intersection Improvements on NY Route 7 at Powers Road	$250,000
Interchange improvements along NY Route 17 in Tioga County	$1 to 10 million
Total	**$106-210 million**

[a] Includes project elements 2A-2D; see text in Section 6 of the report for description.

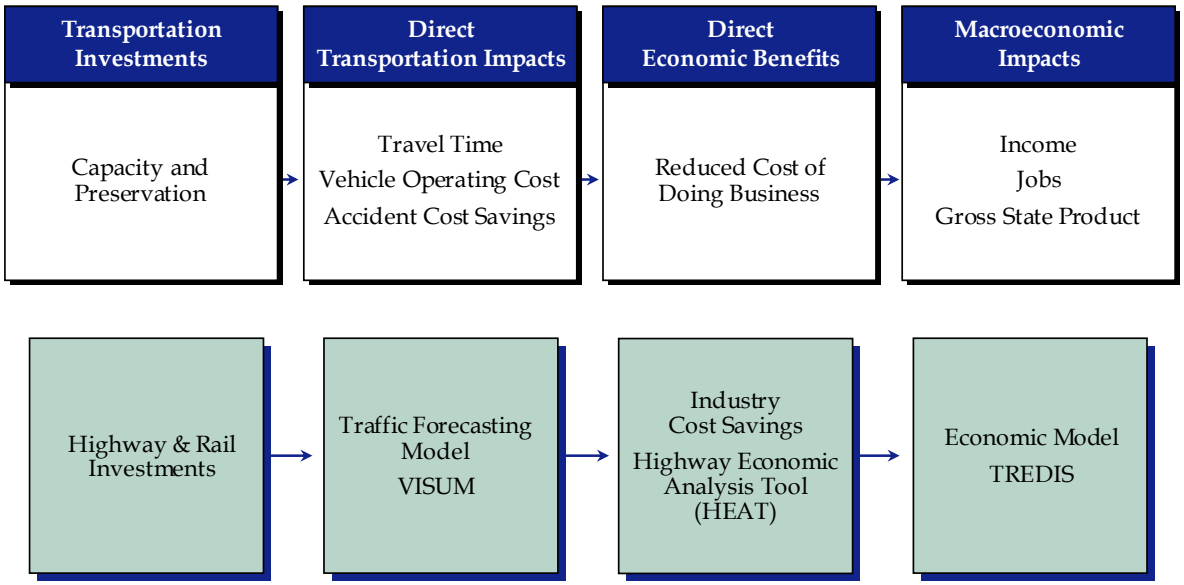
Table ES.3. Rail Project Cost Estimates

Rail Project Name	Estimated Cost
Reduce grade at east and west approaches to Belden Hill Tunnel (CP Main Line)	Minimum $10 million
Repair Portage Bridge and restore 286,000 pound capacity to the Southern Tier line from New Jersey to Buffalo (NS Southern Tier Line)	Minimum $30 million
Reduce conflicts between NS and CP trains in Binghamton and East Binghamton Yards (NS Southern Tier Line)	$1,430,000
Improve NYSW Syracuse Branch to Class II standards.	$1,500,000
Restore service on NYSW Utica Branch	$1,100,000
Create/restore through tracks in the Bevier Street and Binghamton Yards to separate CP and NYS&W through trains	$11,700,000
East Binghamton Yard reconstruction	$4,265,000
Bevier Street Yard access improvements	$500,000
New intermodal yard/inland port at East Binghamton Yard	$4,000,000
Total	**Minimum $64.5 million**

In addition to capital projects, many MPOs around the country have undertaken initiatives to better integrate freight into their planning processes and implement cost-effective freight transportation strategies. BMTS and NYSDOT and their partners may choose to advance one or more regional freight strategies that currently have no defined geography or timeframe. These strategies will be discussed at the end of this section.

Transportation system improvements create efficiencies that result in user benefits such as reduced travel time and lower vehicle operating costs as well as safety benefits. In addition, an improved transportation network may result in increased access to labor markets and jobs. In order to quantify these benefits, an economic impact analysis was performed on the highway and rail projects. Figure ES.3 illustrates the economic impact analysis process that was undertaken for highway projects.

Figure ES.3. Economic Impact Analysis Approach



The analysis of the benefits of the rail projects was conducted similarly. User benefits for shippers and carriers were estimated and split between internal and external effects. The internal effects then provided input into the economic model which estimated macroeconomic impacts as a result of the rail investments. The analysis also differentiated between private and public benefits. Private benefits accrued to shippers and carriers whereas public benefits were the macroeconomic changes to the regional economy as a result of the rail improvements.

Conclusions and Recommendations

Fundamental shifts in the national and global economies have presented challenges to the Binghamton region, as industries that produce locally-manufactured goods are being replaced by businesses that assemble and distribute goods that are largely produced elsewhere, or those that sell services that depend on intellectual capital rather than locally-sourced natural resources and components. Binghamton's location at a crossroads of major highway and rail corridors will enable the region to always benefit from easy connections to all components of various interwoven global supply chains, including sources of raw materials and parts, manufacturing and assembly facilities, import and export terminals in neighboring regions, warehouses and distribution centers, and consumers of goods and services along the East Coast, in the Midwest U.S. and in Eastern Canada.

Transportation's Link to the Economy

Although this is primarily a transportation study, the link between transportation and the economy cannot be severed. The study contains several recommendations that acknowledge the importance of the transportation system to economic development, summarized in the following bullets:

- Take advantage of unique assets and advantages that Binghamton has to offer.
- Recognize the critical value of providing tax incentives for rail investment and maintenance of existing rail infrastructure in New York State.
- The Binghamton region should target economic development in areas where transportation infrastructure exists today or where access to development sites could be improved at relatively low cost.

Recommended Highway Investments

Chapters 3 and 5 discuss the current and future freight transportation system in the Binghamton region. There is little congestion in the freight transportation system today, and despite modest growth in freight flowing to, from, within, and through Binghamton, both the highway and rail systems are expected to remain largely uncongested and free of bottlenecks through the 2030 forecast year.

For that reason, it is not surprising that the one candidate highway project with the most significant capacity expansion, a proposed addition of a climbing lane on I-81 southbound from Interchange 5 to Windy Hill Road, is estimated to have a benefit-cost ratio of only 0.17. In other words, every dollar invested in the project would yield 17 cents of associated public and private benefits.

A second capacity expansion project, the extension of Griswold Street to the area east of Brandywine Highway and south of I-81 and the provision of an access ramp that would eliminate the need for a circuitous routing for trucks into and out of the site, is estimated to have a benefit-cost ratio closer to 1.0, meaning a dollar of investment would yield almost equal public and private benefits. Given the uncertainties associated with the assumptions made in these cost and benefit estimates, this project may be worth additional investigation.

A third capacity expansion, the provision of an access road to the Anitec site from the planned new interchange on NY-17 (future I-86) at Prospect Street, is estimated to have a benefit-cost ratio of over 26 (equivalent to 26 dollars in benefits for every dollar of investment), assuming the site is developed with a land use and employment density similar to what currently exists at the Kirkwood Industrial Park. Other employment and land use assumptions could yield higher or lower benefits.

Other roadway projects recommended in this study are more localized in nature, including:

- BMTS should work with Norfolk Southern and NYSDOT to determine the cost and need for increasing bridge clearances for roads in the vicinity of Binghamton Yard and for roads running between Clinton and Main Streets along the Southern Tier rail line in western Binghamton.

- BMTS should investigate the need for intersection improvements along Powers Road at the north end of the Broome Corporate Park and for intersection and operational improvements on NY-7 (Conklin Road) between Broome Corporate Park and downtown Binghamton to accommodate increased truck traffic that could result from growth in Broome Corporate Park.

- NYSDOT, Tioga County, and BMTS should develop a plan for upgrading transportation infrastructure along NY-17 in coordination with planned economic development. Possible upgrades to the interchange ramps would include the addition of deceleration lanes, increasing the length of the acceleration lanes, expanding intersections to accommodate larger turn radii, etc.

Recommended Rail Investments

Two notable capacity and operational bottlenecks in the region's freight transportation system are the Binghamton and East Binghamton rail yards, where Binghamton's major rail operations converge. Of all the rail and highway projects recommended by this study, two of the three projects with the highest benefit-cost ratios involve rationalization of the Norfolk Southern (NS), Canadian Pacific (CP), and New York, Susquehanna, and Western (NYSW) rail operations through Binghamton and East Binghamton yards.

Projects to separate NS and CP operations at Binghamton Yard and provide through tracks at East Binghamton Yard were frequently mentioned by rail stakeholders as recommended projects. The Binghamton Yard project, estimated at $1.43 million, and the reconstruction of East Binghamton Yard, an estimated $4.265 million project, both are estimated to predominately benefit the private sector in the form of lower inventory costs for area businesses (as shipments become more reliable and take less time) and lower labor and equipment costs for rail service operators. Much larger benefits are estimated to accrue to businesses outside the study area, and there is a risk that the investment may actually cause some disbenefit to the Binghamton region in the form of social and environmental impacts caused by an increase in through rail freight traffic. Benefits from additional through traffic may accrue to the region through increased Binghamton area rail industry employment, and additional expenditures and income as a result of local purchases and multiplier effects.

Projects to increase access for local businesses to the rail system also could benefit the region's economy by providing these businesses with potentially lower-cost options for shipping and receiving freight. A combination of public and private rail investment will be required to develop necessary rail sidings, bulk transload facilities, and intermodal yards in the region. Therefore, while some public investment may be justified for these improvements, BMTS should work with rail operators in the region to form a public-

private financing plan that takes into account both public and private benefits and takes advantage of Federal and state funding that may be available for the projects.

Recommended Regional Freight Strategies

To improve freight operations and encourage smart economic development in the region, several small MPOs around the country have undertaken initiatives to better integrate freight into their planning processes and implement cost-effective freight transportation strategies. Chapter 6 of the report contained a multitude of recommendations related to these broad strategies. Some of these recommendations may be considered "low hanging fruit" that could be accomplished at relatively low cost and with relatively little controversy. In the short term, BMTS should:

- **Continue to integrate freight into the BMTS planning and programming processes.** The freight planning tools and techniques used by BMTS already are more advanced than those used by most MPOs in the U.S. BMTS should continue to provide opportunities for freight stakeholders to be involved in planning for specific projects and should provide opportunities for them to be involved in broader transportation planning and programming decisions. BMTS also should begin to integrate freight performance measures into its prioritization and project selection criteria for both passenger-oriented projects that might have substantial freight benefits (e.g., the Prospect Mountain Interchange reconstruction or proposed new passenger rail service from New York City via Scranton using improved freight rail tracks) and for projects primarily oriented towards freight.

- **Encourage private-sector participation in economic development and freight planning decisions.** BMTS should identify contacts at key freight shippers and receivers, for example, and involve them in major planning studies and visioning efforts;

- **Take immediate steps to preserve the regional rail system and rail service to businesses throughout the region.** BMTS should work quickly to build consensus around the segments of track that are most important to the region's economy and prioritize these tracks for maintenance and capacity funding, using existing and new funding sources.

- **Encourage currently-proposed investments in private rail infrastructure** that would benefit the Binghamton region and encourage growth in rail market share, and work with rail operators in the region to secure funding for necessary improvements;

- **Improve the dissemination of information to truck drivers and truck fleet dispatchers,** including information about transportation infrastructure conditions and incidents, to help truck drivers make informed decisions about routing their trips through and around the Binghamton region;

- **Implement regional wayfinding improvements**, including signage and improvements to base maps used by GPS service providers to direct truck drivers to

travel routes where geometric constraints and truck impacts on sensitive locations should be avoided; and

- **Increase truck parking capacity** at public and private rest areas in appropriate locations on and off the Interstate system and use available truck parking spaces more efficiently.

Other regional freight strategies may be more costly or may require more extensive consensus building among stakeholders. Some of these strategies are statewide or even national in nature, limiting BMTS' role. In the long term, BMTS should partner with NYSDOT, transportation system operators, and other stakeholders to:

- Improve the collection and reporting of freight data on local, state and Interstate highways;

- Identify previously unexploited freight funding sources and freight financing techniques (e.g., private activity bonds and new mechanisms permitted under the latest Federal transportation legislation) and build on the region's successes in acquiring needed rail funding;

- Determine where high levels of rail and/or roadway traffic require safety improvements at rail grade crossings and/or elimination of those crossings with high accident rates;

- Maintain the security of regional freight transportation infrastructure;

- Provide climbing and passing lanes at appropriate locations on two-lane rural roads to help prevent head-on collisions due to passing traffic and improve efficiency of truck travel;

- Identify a local truck route network and install appropriate and legal signage on local roadways to direct trucks onto roadways designed to accommodate them;

- Encourage construction of rail sidings additional small bulk transfer facilities regionwide to increase local access to rail service;

- Negotiate more frequent and more reliable interchanges of rail cars between the region's short lines and Class I operators to shorten delivery times by rail and make rail shipments more competitive with truck shipments;

- Encourage growth in rail market share by continuing to support private rail investments and providing incentives, where appropriate, to help businesses overcome obstacles to using freight rail services to ship goods;

- Expanding on work already accomplished in developing the Binghamton Regional ITS Architecture, develop a mechanism for quickly sharing information about alternate routes and diversions due to highway closures and other incidents directly with dispatchers for national truck fleet operators, post the maps on its website, and

transmit the maps to NYSDOT, the I-95 Corridor Coalition, and other transportation information clearinghouses so that information can get to truckers as quickly as possible;

- Encourage implementation of Commercial Vehicle Infrastructure Integration (CVII) initiatives in the region;

- Help implement freight emissions reduction and fuel efficiency initiatives being led by the New York State Energy Research and Development Authority (NYSERDA), the Federal Highway Administration (FHWA) and the U.S. Environmental Protection Agency (EPA);

- Study the need for and feasibility of truck-only lanes in the context of future industrial development in the BMTS region, long-term projections of growth in truck trips through the region, and changes in freight movement technologies;

- Develop "best practices" guidelines for large-scale commercial and industrial development, potentially including a model municipal ordinance for jurisdictions where truck- or rail-oriented industrial development is to be encouraged; and

- Develop subregional plans for industrial growth in desired growth areas such as the area around Broome Corporate Park and the NY-17 Corridor in Tioga County, including desirable locations where land should be preserved for commercial and industrial development (as opposed to farming, housing, retail, open space, or other uses).

By undertaking this study, BMTS has already taken positive steps toward integrating freight into its planning process in a sustainable way. While this study is based on certain economic assumptions and conditions that will change over time, the foundational principles of the study—that the region's economic development and its transportation system are inextricably linked and that transportation investments should be tools to support planned regional economic development strategies (as opposed to reactions to unplanned development)—will remain constant.

Many of the decisions to be made by BMTS and its partners can be supported by the data and forecasts in this report, but ultimately investment decisions must be driven by the region's policies and through a transparent open, consensus-driven decision-making process that takes into account many factors not considered here, such as environmental impacts and social impacts of transportation investments. This plan is one piece of a multi-dimensional framework that will guide future BMTS decisions.

1.0 National and Global Trends: Setting the Stage

Fundamental sectoral shifts have transformed the U.S. economy and the global economy over the last quarter century. They have been felt in the decline of businesses that traditionally have underpinned the Binghamton economy, but these shifts also present its opportunities for the future. This section will provide an overview of national and global trends that have implications for Binghamton's economy and the movement of freight in the Binghamton region.[1] Two longer-term trends include:

- The growth in the importance of foreign trade to the U.S. economy; and
- A decline in domestic manufacturing, accompanied by an increase in the need for domestic transport and distribution of goods made overseas.

Meanwhile, while it remains to be seen whether two more recent trends have the potential to stem or even reverse the tide of globalization, they already are being felt locally in the Binghamton region. These more recent trends include:

- Recent rapid increases in energy costs that are leading to shifts in where and how products and components of products are manufactured, warehoused, and distributed to consumer markets, as the balance between labor and transportation costs shifts. There are early indications of some manufacturing being moved from Asia to Central America, which will alter logistics patterns; and
- A decline in the value of the dollar, which makes domestically produced goods more competitively priced both here and abroad.

Each trend will be discussed briefly in this section in order to set the stage for the more detailed analysis of the region's freight transportation system in the remainder of this report.

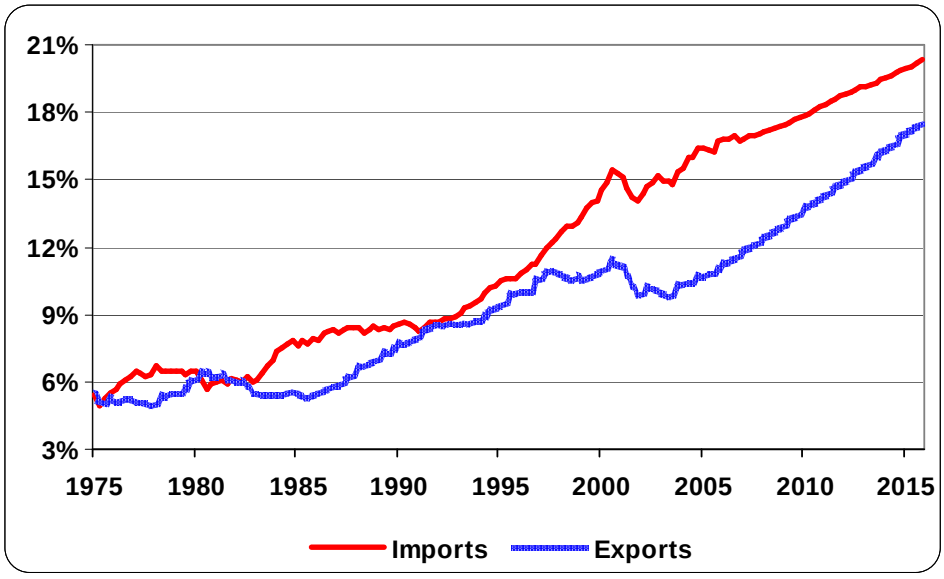
[1] Throughout this document, references to the "Binghamton region" specifically include Broome and Tioga counties.

1.1 Long-Term Trends

Foreign Trade

The first trend is the growth in the share of U.S. Gross Domestic Product (GDP) that is represented by foreign trade, which surpassed 25 percent by the middle of the current decade, and will approach one-third by decade's end (Figure 1.1). As manufacturing was shipped offshore in search of lower-cost production, U.S. imports outgrew exports (as shown in Figure 1.1). Notwithstanding relatively small shifts to regional sourcing of raw materials and semi-finished goods among domestic manufacturers, the U.S. is expected to maintain a trade deficit for the foreseeable future, barring a sustained decline in the value of the U.S. dollar or a major economic shock that, for example, reduces the gap in labor and other production costs in the U.S. relative to developing nations.

Figure 1.1 U.S. Imports and Exports as a Share of Gross Domestic Product



Source: Global Insight.

Shift from Domestic Manufacturing to Wholesale Distribution

A second, related trend with implications for Binghamton is the replacement of domestic manufacturing by wholesale distribution. Among the five economic sectors that drive freight transportation volumes, manufacturing today still retains its position of primacy in the U.S. Nevertheless, it has been losing ground to the distribution industry, and before 2035 it will be supplanted by distribution in dollar value (Table 1.1). What has occurred is

not just the outsourcing of production to foreign plants; it is the reorganization of American business in global terms, with fabrication taking place overseas, and design and distribution at home.

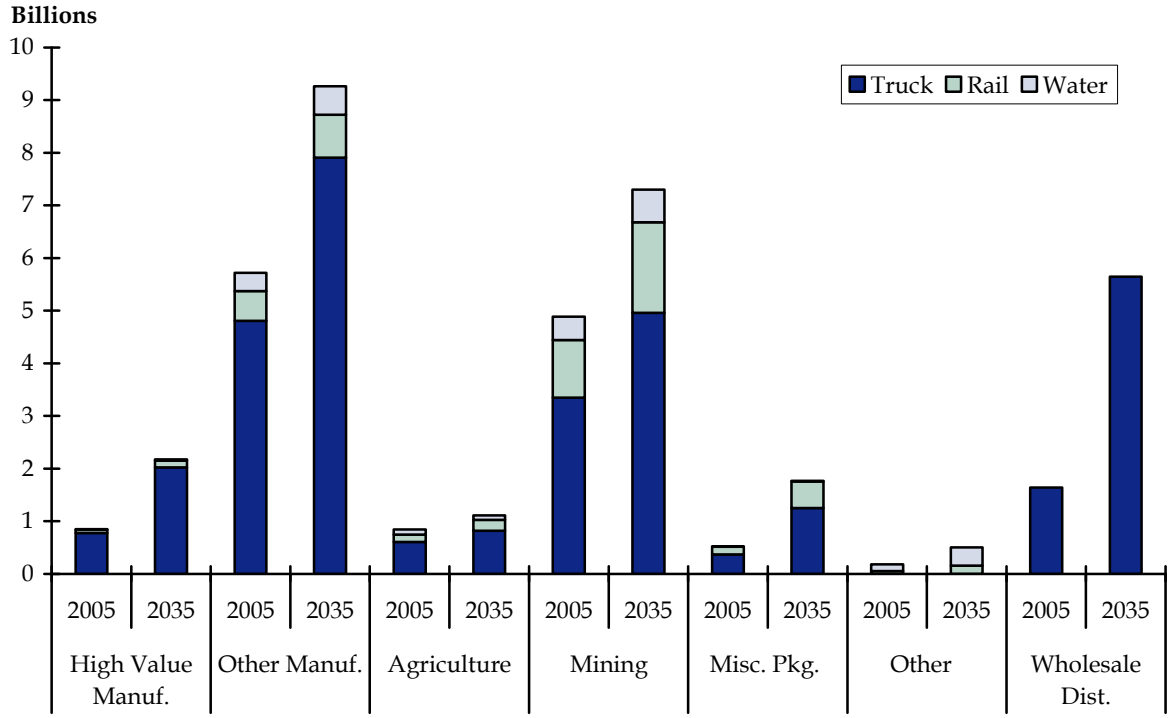
Looking at freight transportation by the measure of physical volume, the increased consumption of both imported and domestically produced manufactured items leads to growth in the total freight tons of manufactured items moving through the U.S. However, manufactured goods of higher value are growing faster than others, and the growth of goods moving through wholesale channels is outstripping everything. Figure 1.2 displays the total tons carried in 2005 and projected for 2035 by sector, and illustrates the nation's continuing reliance on trucking as its primary mode of freight transportation.

Table 1.1 Long-Range Sector Shift in the U.S. Economy

	Share of U.S. 5-Sector Value			
Sector	**2005**	**2035**	**Change in Share**	**CAGR[a] (by value)**
Agriculture	2%	1%	-50%	1.1%
Mining and extraction	2%	1%	-50%	1.9%
Wholesale distribution	29%	41%	41%	5.2%
Retail trade	29%	25%	-14%	3.4%
Manufacturing	38%	32%	-16%	3.4%
All U.S.				3.9%

[a] CAGR = Compound Annual Growth Rate.

Figure 1.2 Long-Range U.S. Freight Growth by Sector and Mode
in Tons



Implications of Globalization for the Binghamton Region

These shifts are indicative of other regional economic trends and will have implications for the Binghamton region. The first of these trends is the increasingly pervasive importance of foreign trade; not just as a now-common component of business activity, but as an essential feature of the way contemporary business is organized. Global supply chains depend on transportation (and information) systems to bind them together; and this means access to foreign trade routes and the performance of operations across them are now vital to the attraction and nurturing of industry.

As will be discussed in Chapter 2 (Regional Economic Profile), the means by which freight travels to the Binghamton region and the cost of transporting it have implications for local businesses' ability to remain competitive, whether they are manufacturers, distribution centers, or retail establishments. In addition, the cost of transporting freight to Binghamton depends in part on the amount of freight being exported from the region. The imbalance of imports and exports in the Binghamton region and in the U.S. as a whole means many shipping containers, trains, trucks, and other vehicles come to Binghamton full of goods and leave empty.

Recent anecdotal evidence and preliminary data indicate that the weaker dollar has made exports from the U.S. more competitive on the world market, and therefore has led to increased volumes of exports from U.S. ports. A discussion the implications of a potential increase in export volumes for the Binghamton region's freight transportation system is presented later in the section, and in more detail in Chapter 6 (Freight Transportation Improvement Program).

High-end manufacturing (e.g., electronics, helicopters)[2] and wholesale distribution of lower-value goods produced elsewhere are increasing in importance for U.S. regional economies. In Binghamton, the recent U.S. Department of Defense helicopter contract won by Lockheed Martin Corp. in Owego and the growth in warehouses and distribution centers in the region are local examples of these trends. For distribution particularly, there is vigorous competition for facilities serving the rich Northeast market from communities in north Jersey, eastern Pennsylvania, and the Hudson Valley.

A total rise in population of 4.7 percent will result in over 42 million people in this mid-Atlantic region in 2030. Further, a 193 percent increase in area sales will translate to greater freight traffic – exacerbating current congestion on major routes, such as I-80.[3] As population climbs and congestion in these areas worsens and spreads, the position of Binghamton at a key intersection of both the northeastern highway and rail networks could steadily accrue to its advantage as a competitive location for warehousing and distribution activity, in addition to final assembly of manufactured goods.

1.2 Recent Trends

Any forecasts of long-term trends in the national and global economies come with a caveat. While they are based on the best current knowledge and methodology, the potential for unforeseen situations, often referred to as "wild cards," can change everything. These may range from geopolitical strife to global energy disruption to a major unexpected technological advance.

The recent slowdown of the U.S. economy will have significant impacts on the economy of the Binghamton region. The deflation of the housing bubble, the rise in unemployment, and spiraling costs of health care all affect Binghamton, but two economic trends in particular directly affect freight transportation: the decline in the value of the dollar relative to other world currencies and a recent increase in transport costs due largely to increased fuel prices. The remainder of this section will focus on these two trends.

[2] Low value manufacturing includes items such as manufactured food, paper products, etc.

[3] Data from Global Insight Regional and Business Demographic Forecast Models.

Decline in the U.S. Dollar

After a peak in 2002, the U.S. dollar has been declining in value relative to the currencies of its major trading partners. Figure 1.3 shows the downward trends in the value of the U.S. dollar compared to the currencies of the Euro zone, the United Kingdom, Japan, Canada, Mexico, China, India, and Brazil, which collectively represent the largest trading partners of the U.S., the world's reserve currencies, and the world's most dominant emerging economies. A comparison to individual currencies can be misleading due to local economic conditions and currency manipulations by central banks. Therefore, Figure 1.4 shows the weighted average foreign exchange value of the U.S. dollar relative to a basket of foreign currencies representing a broad group of U.S. trading partners (on a normalized scale where the average for January 1997 equals 100).

The lower value of the dollar has made imports from other countries (including fuel) more expensive, and conversely, domestically produced goods and exports from the U.S. have become more competitively priced. As a result, if the value of the dollar remains relatively low over a long period of time, the volume of goods being shipped abroad from U.S. manufacturers is expected to increase, as is the percentage of goods consumed in the U.S. that are domestically manufactured, as a share of total consumption.

Figure 1.3 U.S. Dollar Exchange Rate Trends

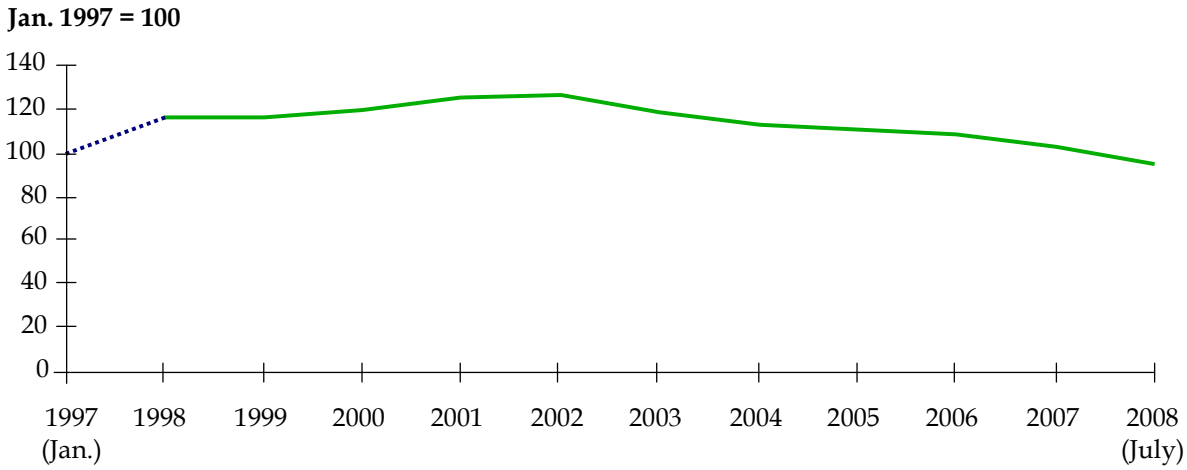
1997 to 2008

[a] The Euro was established in 2000.

Source: Federal Reserve Statistical Release G.5A.

Note: Data for 2008 reflect July 2008 monthly average, not year-to-date average. Data for prior years reflect annual averages.

Figure 1.4 U.S. Dollar Value Versus Major Trading Partner Currencies



Source: Federal Reserve Statistical Release G.5A. Represents a weighted average of the foreign exchange value of the U.S. dollar against the currencies of a broad group of major U.S. trading partners for each year. Years 1998 through 2007 represent annual averages; the 2008 figure represents the average for July 2008.

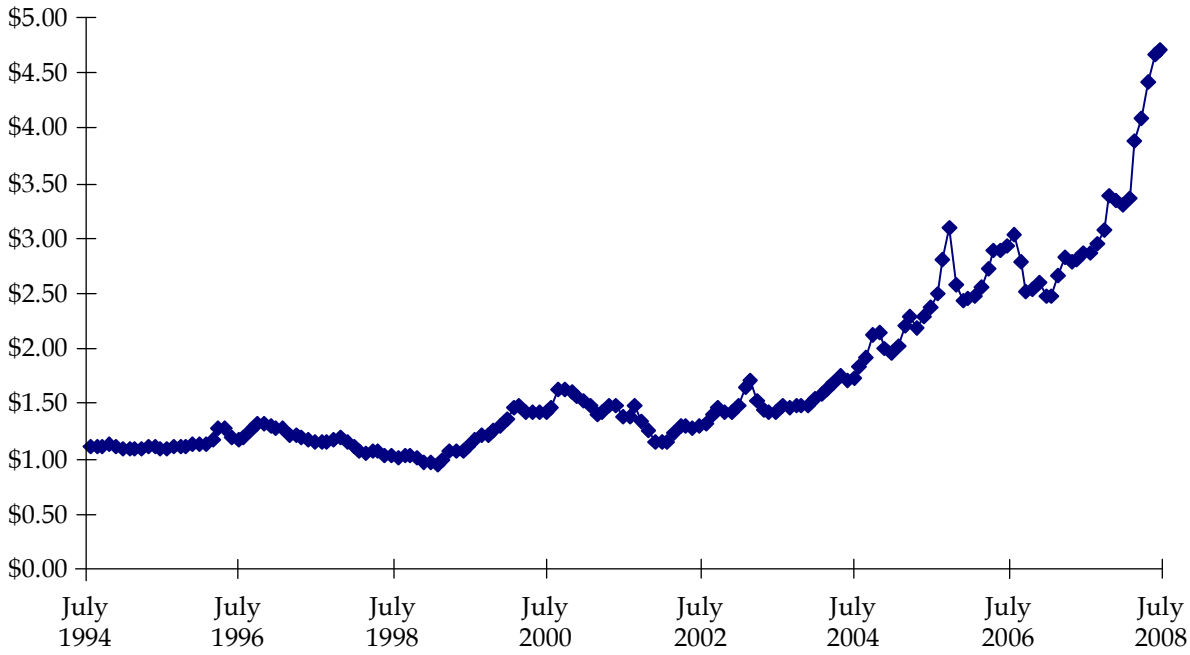
Increase in Fuel Prices

Fuel prices have increased somewhat dramatically over the past five years. Since 2003, diesel fuel prices in the U.S. have more than tripled, from a nationwide average of $1.44 in July 2003 to a recent high of $4.70 in July 2008 (Figure 1.5). Diesel fuel is used by all forms of ground freight transportation, from rail locomotives to long-haul trucks and local delivery vehicles.

The tripling of diesel fuel prices has hit smaller owner-operators of long-haul trucks and delivery vehicles particularly hard, eating into their small margins and making the profession only marginally economically viable. Increases in diesel fuel prices tend to make more fuel-efficient modes more cost-competitive. Per unit volume, marine transportation is the most fuel-efficient mode by far. Rail is the most fuel-efficient surface mode, with truck a distant second. Airplanes, which use a kerosene-like fuel instead of diesel, are the least fuel-efficient mode of freight transport.

While both crude oil and transport fuel prices have moderated in recent weeks, overall trends suggest they will remain at generally historically high levels.

Figure 1.5 Trends in Monthly Diesel Fuel Prices
1994 to 2008



Source: U.S. Department of Energy, Energy Information Administration, as of July 28, 2008.

Potential Impacts of Short-Term Trends on the Binghamton Region

As will be discussed in Chapters 2 and 3, the economy of the Binghamton region, upstate New York, and the Northeast U.S. has historically been highly dependent on manufacturing, and therefore a long-term weakening of the dollar could benefit the manufacturing sector of the regional economy. However, far from being a win-win situation, a cheaper dollar could have other consequences, such as an increase in borrowing costs (due to higher interest rates) and the potential for hostile takeovers of domestic firms by foreign conglomerates. The weakening of the dollar also is responsible, in part, for the recent rapid increase in fuel prices.

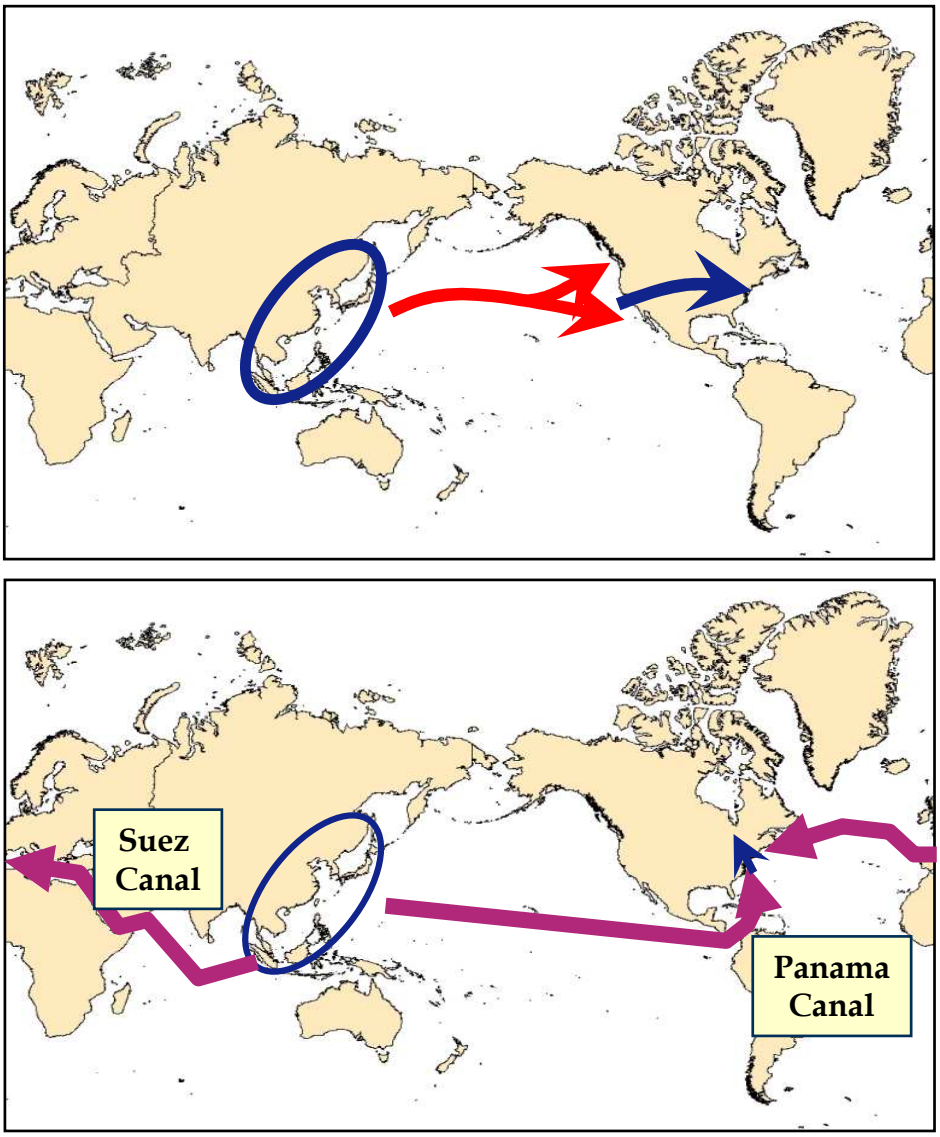
Fuel price increases, if sustained, could require businesses to rethink their global, "just-in-time" supply chains and their current methods of transporting freight, which until now have depended on historically low transportation and energy costs. As will be explained throughout this report, the vast majority of freight in the U.S. and in the Binghamton region currently is moved by truck. Businesses, their third-party logistics providers, and transportation service providers already have started to make major adjustments to their logistics strategies. Two changes in particular already have begun to impact Binghamton, and a third change presents longer-term opportunities.

First, some types of goods – particularly those that are moved in intermodal containers over long distances – are being shifted from truck to rail. Binghamton, which is served directly by two large freight rail operators and several smaller regional operators (and indirectly by a third via an intermodal rail terminal in Syracuse), could see substantial increases in rail traffic if high fuel prices persist. Local businesses could benefit from price competition between trucking firms and the three rail service providers, but larger volumes of through traffic also may drive the need for substantial investment in rail infrastructure in certain locations throughout the region (see Chapter 6 for details).

Second, the fuel efficiency of marine transportation has made it cheaper to move goods by ship to a port of entry located near consumer markets, even when accounting for the longer transit times. Freight from Asia that formerly entered the U.S. via the Ports of Los Angeles and Long Beach and then traveled east across the country by truck or rail is now being shipped directly to an East Coast or Gulf Coast port, where it travels a much shorter distance overland to large population centers in the Northeast, Southeast, and Midwest (see Figure 1.6). The expansion of the Panama Canal that currently is underway will allow much larger ships (but not the largest) to travel a more direct route to the Gulf and the Atlantic, cutting overall door-to-door transport costs even more.

The availability of these competitive marine transportation services coincides conveniently with a weaker dollar, the historically dense (although bottleneck- and congestion-prone) freight transportation network in the Northeast and Midwest (including rail, highway, and inland waterways), and the renewed interest in the public sector in investing in freight infrastructure, all to the benefit of manufacturers concentrated in the "Rust Belt" in the Northeast and Midwest.

Figure 1.6 Changes in Delivery Routes and Modes for Goods Imported from Southeast Asia



A third potential change in logistics practices will require a longer-term increase in fuel prices. If the cost of transporting raw materials, product components, and assembled goods is sustained over a long period of time, or if major disruptions in energy supplies seem likely, businesses will be forced to introduce more redundancy into their supply chains, including additional warehouses to store goods and possibly even additional manufacturing facilities located closer to sources of raw materials and/or consumers. With its location at the intersection of several highway and rail corridors, and proximity to major consumer markets on the East Coast, Binghamton is in a strategic location for these new facilities.

Finally, increased fuel prices are exacerbating an already severe shortage of truck drivers, as even those drivers already in the profession are finding it difficult to make a living. The driver shortage already has led to price increases, and rising diesel prices have led carriers and brokers to assess fuel surcharges; in the short-term, if there are fewer owner-operators in the market, small businesses in Binghamton may find it harder to make and receive deliveries on time and at a reasonable cost.

1.3 Long-Term Perspective

Both a weak dollar and increased fuel prices would need to be sustained over many years to affect the growth in imports and exports from the U.S. Globalization of supply chains and the decline of the manufacturing sector in the U.S. both are due to many other factors beyond energy and transport costs, such as the growth in the "BRIC" economies (Brazil, Russia, India, and China), relatively low labor costs outside the U.S., the locations and costs of raw materials, and regulatory environments outside the U.S.

Therefore, it would be premature at this point for Binghamton to make major policy adjustments based on what are (so far) relatively short-term trends in the value of the dollar and fuel prices. Furthermore, if longer-term trends such as relatively high U.S. labor costs (and accompanying standard of living) and relatively strong U.S. environmental regulations were to be reversed, both the U.S. and the Binghamton region would be faced with much graver concerns than the freight transportation system.

The region should, however, be prepared to capitalize on its strengths in order to take advantage of any opportunities that present themselves in the short-term, and be prepared for the possibility that there could be another series of major global economic shifts in the coming decade. The next section presents a profile of the Binghamton region's economy and points to areas that could have the greatest impact moving forward.

2.0 Economic Profile

The Binghamton area maintains economic assets in its skilled workforce, advanced technological capabilities, fertile land, and a location on the edge of the Northeastern Megalopolis, stretching from Boston to Washington, D.C. Despite these strengths, the Binghamton area has confronted economic headwinds for more than 15 years, at least in part due to its long-term reliance on manufacturing. As manufacturers have shifted production from the northeast and Midwest to lower cost locations, the Binghamton area has seen jobs leave and a prolonged out-migration of its population to regions possessing stronger employment growth.

Today, the combined strengths of Binghamton's technological base, centered on the advanced skill sets of its people and the cutting-edge research activities taking place at Binghamton University, a flagship of the New York university system, the Binghamton area is demonstrating resilience and is poised for low to moderate growth in the future. The Binghamton region's transportation infrastructure – its roadways, railways, and airports – are paramount in supporting the area's economic revitalization. The ability of the Binghamton area to connect efficiently to large domestic and international markets, both in terms of the movement of freight and the movement of people, will have a direct bearing on the region's long-term economic prospects.

The Binghamton area is advantageously positioned at a crossroads of the U.S. Northeast, one of the most important economic regions of the world with a $2.7 trillion economy roughly comparable in size to Germany's. Tied to the wealthy and populous Eastern Seaboard cities via I-88 and I-81, and to the U.S. industrial Midwest via I-86/NY 17, the Binghamton region has emerged as an increasingly popular location for the logistics, warehousing, and distribution industries. Due to its crossroads location, the Binghamton area's freight movements include considerable through trips, as well as the origin/ destination movements tied to the area's manufacturers and logistics industries. The Binghamton region's 250,000 people and Central New York's tourism industry stimulate demand for construction materials and consumer goods, while the area's technology industries and business services require frequent and reliable parcel deliveries to maintain competitiveness. Although distribution, construction, tourism, and services are becoming larger parts of the Binghamton area's economy, the region's economic legacy remains tied to manufacturing.

The Binghamton area's major freight facilities and supporting freight transportation infrastructure are impacted directly by the local, statewide, and regional trends in freight volumes that are associated with changes in population and economic structure. This section of the report explains the main demographic and economic drivers that are contributing to freight demand in the Binghamton area.

In May 2007, eight economic development stakeholders in the study area were interviewed, providing the project team with valuable insights concerning the history, current conditions, and prospects for the Binghamton area's economy. The findings of the economic development interviews have been incorporated throughout this report.

2.1 Demographic Profile

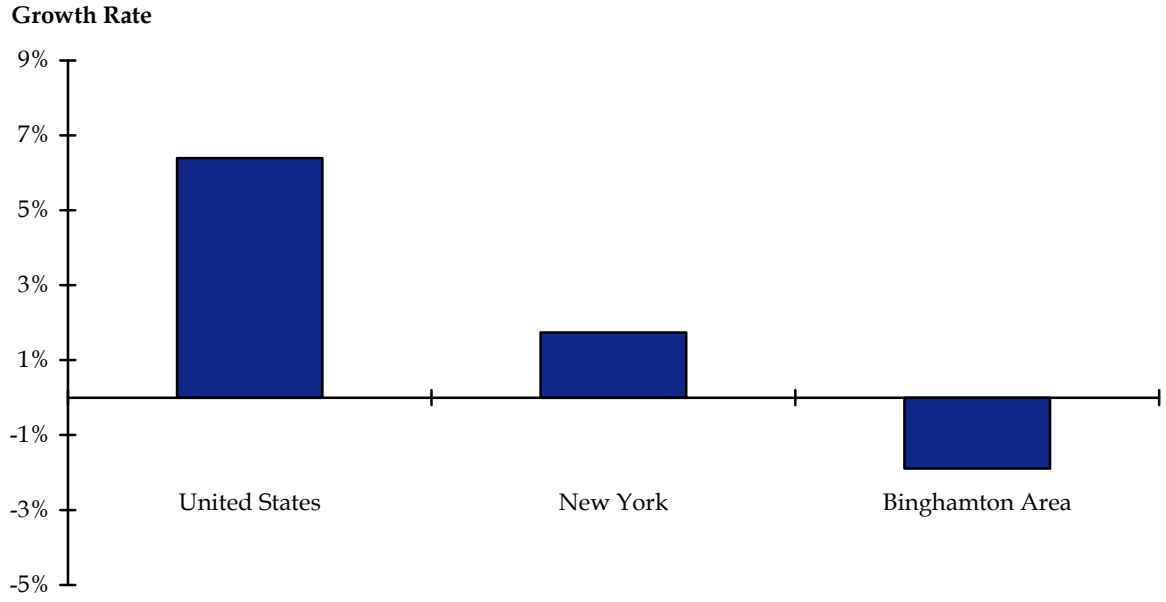
Population Growth

Population change is a key contributor to economic and freight growth, as increases in population create added demands for goods and services while reductions in population have an opposite effect. After experiencing little or no growth between 1970 and 1990, the Binghamton region's population declined from 264,000 in 1990 to 248,000 in 2006, a six percent drop. In 2030, the Binghamton area is expected to see its population increase very slightly to 249,000 people according to forecasts developed by Global Insight.

In contrast to either the United States or New York, the Binghamton area today is slowly losing population. As indicated in Figure 2.1, the rate of population growth (-1.9 percent) in the Binghamton area during the 2000 to 2006 period was counter that of the nation (+6 percent) and New York (+1.7 percent). Within the State of New York, the Binghamton area was not alone in its population decline. Other metropolitan areas that saw their populations fall between 2000 and 2006 include Buffalo-Niagara Falls, Utica-Rome, Elmira, Rochester, and Syracuse. The loss of population is a concern especially looking into future years when the regeneration of the workforce (ages 18 to 64) becomes more important as the baby boom generation retires.

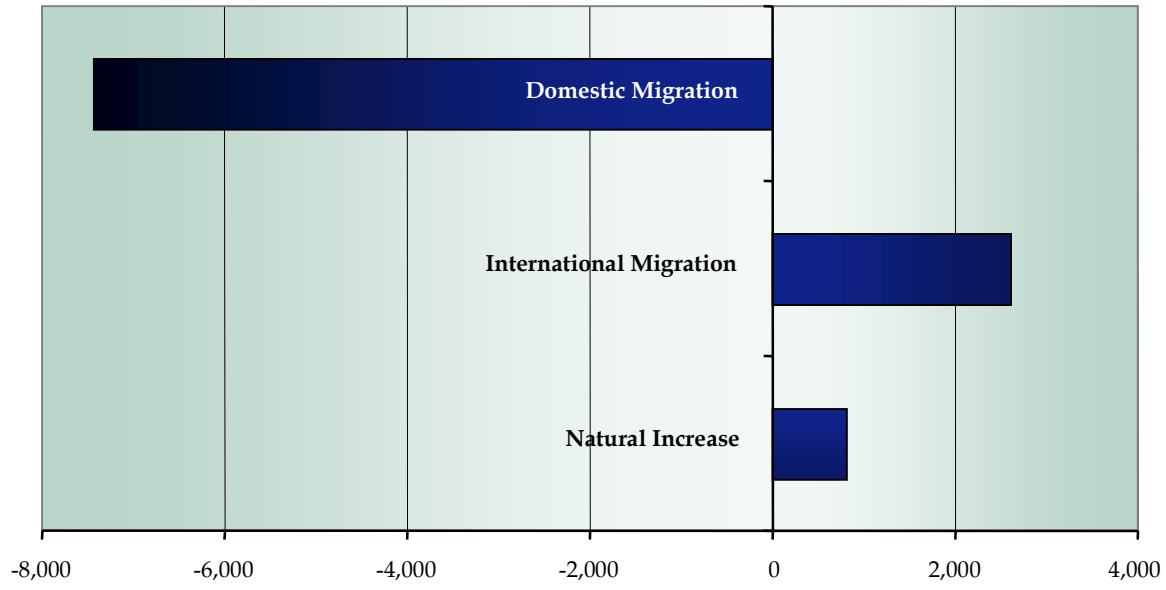
As illustrated in Figure 2.2, the primary cause for the decline in the Binghamton area's population is domestic out-migration – people leaving the region for other parts of the United States. As such, the Binghamton area is representative of a larger trend and decades-long migration pattern of people from the Northeast leaving for the Sunbelt states of the South and the West. This outflow has coincided with the decline in manufacturing jobs and has pushed thousands of people to seek opportunities in faster-growing parts of the United States. Longer term, the lack of growth combined with an aging population raises concerns about the availability of a working age population – people that can supply businesses in the region with needed labor. The Binghamton area, like the State of New York, has a positive inflow of international migrants, but unlike the State, this is insufficient to counteract the number of people that are moving from the area to other parts of the United States. Given these trends, the initiatives of local economic development organizations to leverage the region's resources (e.g., universities and other technology resources) for growth will be very important to the Binghamton area's future economic vitality and its ability to attract and retain labor.

Figure 2.1 Binghamton Area Population Decline
2000 to 2006



Source: U.S. Census Bureau.

Figure 2.2 Binghamton Area Components of Population Growth
2000 to 2006

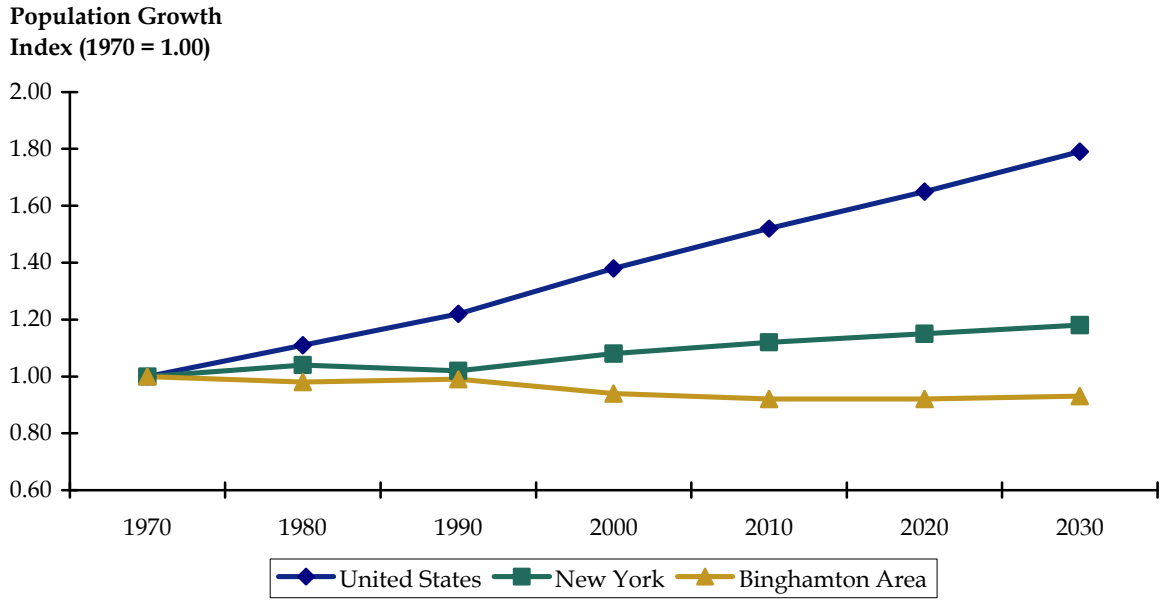


Source: U.S. Census Bureau.

In recent years, the rate of domestic out-migration from the Binghamton area has begun to decline, likely due to an incipient economic recovery in the region. As such, the Binghamton area's population is expected to stabilize and resume some growth. By 2030, the Binghamton area is projected to have 249,000 people, slightly higher than what it has today. Should this trend hold and if the transportation system is maintained, roadway congestion in the region should not rise markedly, and the dependability and timeliness of deliveries in the Binghamton area should be maintained.

Figure 2.3 below illustrates the plateauing of the Binghamton area's population growth (both historic and forecast), a contrast to both the State of New York and the U.S., which are anticipating greater gains in population through 2030. New York's population is expected to grow by nine percent, adding 1.6 million people from 2000 to 2030 – about one-third as fast as the United States (+29 percent). During the same period, the Binghamton area is expected to essentially remain the same size as it is today. If faster economic growth is combined with a lower outflow of population from the region, however, the Binghamton area's population growth could be higher. The availability of land (both within the city and its outlying areas), a plentiful water supply, and emerging strengths in the region's technology industries may help foster further development and growth in the Binghamton area in coming years.

Figure 2.3 Binghamton Area Population Growth
1970 to 2030

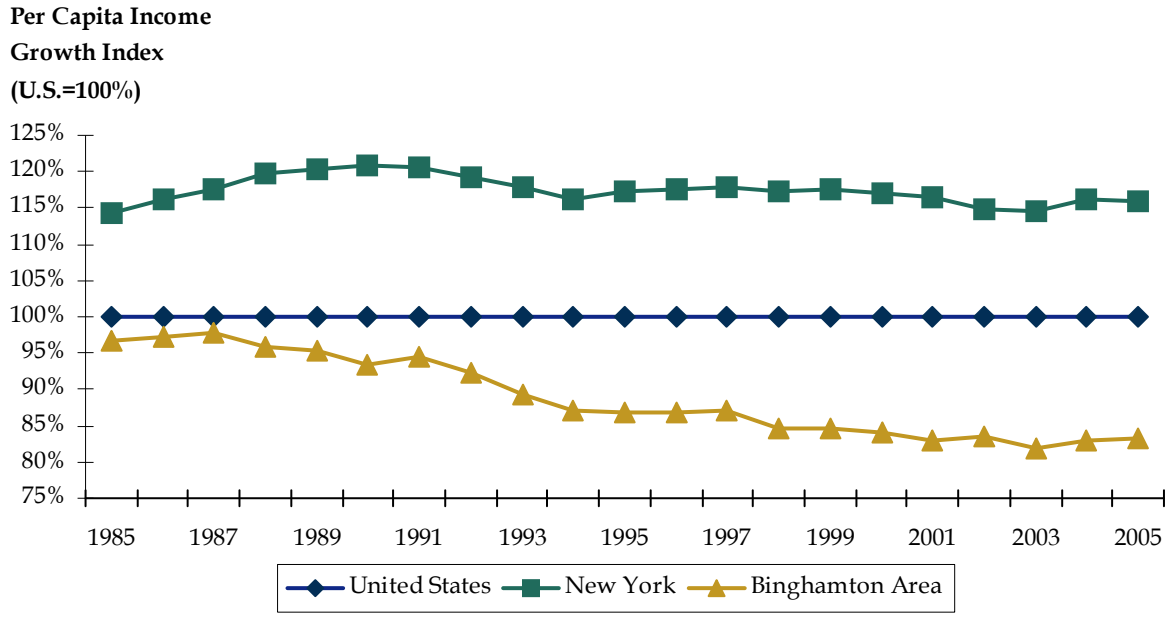


Source: U.S. Census Bureau and Global Insight.

Per Capita Personal Income

As a measure of average wealth per person, per capita income reflects the relative economic well being of the people in a region. Higher-income levels (and accompanying resources) can translate to higher levels of health and education, more disposable income for real estate and retail purchases, as well as more substantial government revenues available for infrastructure investments and other priorities. Per capita personal income in the Binghamton Metropolitan Area reached $28,700 in 2005, comparable to Elmira and Utica-Rome, and is 17 percent lower than the U.S. average ($34,500). Figure 2.4 shows the Binghamton area and New York's per capita income levels as a percentage of the U.S. average from 1985 to 2005. Coinciding with the relative decline of manufacturing jobs in the region, the Binghamton area's per capita income level fell from 98 percent of the U.S. average in 1987 to 82 percent of the average in 2003. Most of the decline took place in the early to mid-1990s, with much slower erosion since 1998. As the Binghamton area's economic prospects have begun to improve, per capita income levels have shown signs of recovery in recent years, with the region gaining some ground compared to the United States during the 2003 to 2005 period. Long-term, this is a trend that economic development and public officials would like to see sustained as it is emblematic of a more robust, higher wage, and more competitive economy.

Figure 2.4 Per Capita Income Growth Index
Binghamton Area and New York Compared to the United States (U.S. = 1.00)



Source: U.S. Department of Commerce, Bureau of Economic Analysis.

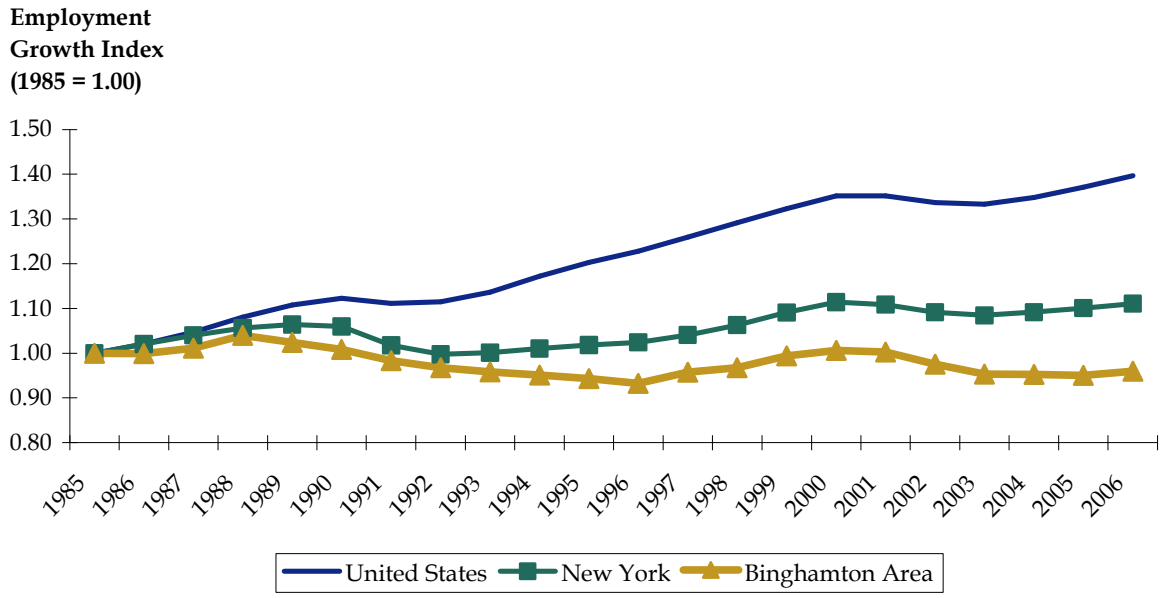
Employment Growth

One of the most tangible measures of a region's economic vitality is employment growth, and Binghamton Metropolitan Area's job numbers have stayed fairly steady for years. As demand rises for a business's products and services, employees and equipment are added to better satisfy the needs of customers. The jobs produced by these companies provide the incomes people need to sustain themselves and their families and attract additional workers.

The Binghamton region generally follows the U.S. economic cycles, experiencing job declines in recessions (such as the early 1990s and 2001 to 2003) and upswings during periods of national expansion (late 1980s and late 1990s). A crucial difference, however, is that the Binghamton area in recent decades has not enjoyed strong job increases during the U.S. growth periods, barely recovering the jobs lost in the recessions. The State of New York, while lagging the U.S. in overall long-term jobs growth, has benefited from more robust jobs growth during expansion periods than the Binghamton area. For example, New York's jobs growth rate (2.5 percent) since the trough of the last recession in 2003, is four times greater than the Binghamton area's (0.6 percent). These trends can be seen in Figure 2.5. Between 1985 and 2006, the number of people employed in the Binghamton area declined by 4 percent, compared to 11 percent and 40 percent *increases*, respectively, for the State of New York and the U.S.

Consistent with other signs of the Binghamton area's economic recovery (e.g., rising relative per capita income levels, lower rates of population out-migration), the region is forecast to add about 6,000 jobs over the next 15 years, representing a 5.3 percent increase. By comparison, the State of New York is expected to grow by almost 18 percent (+1.5 million jobs) over the same period.

Figure 2.5 Employment Growth
Binghamton Area Compared to New York and the United States (1985 = 1.00) (1985 to 2006)



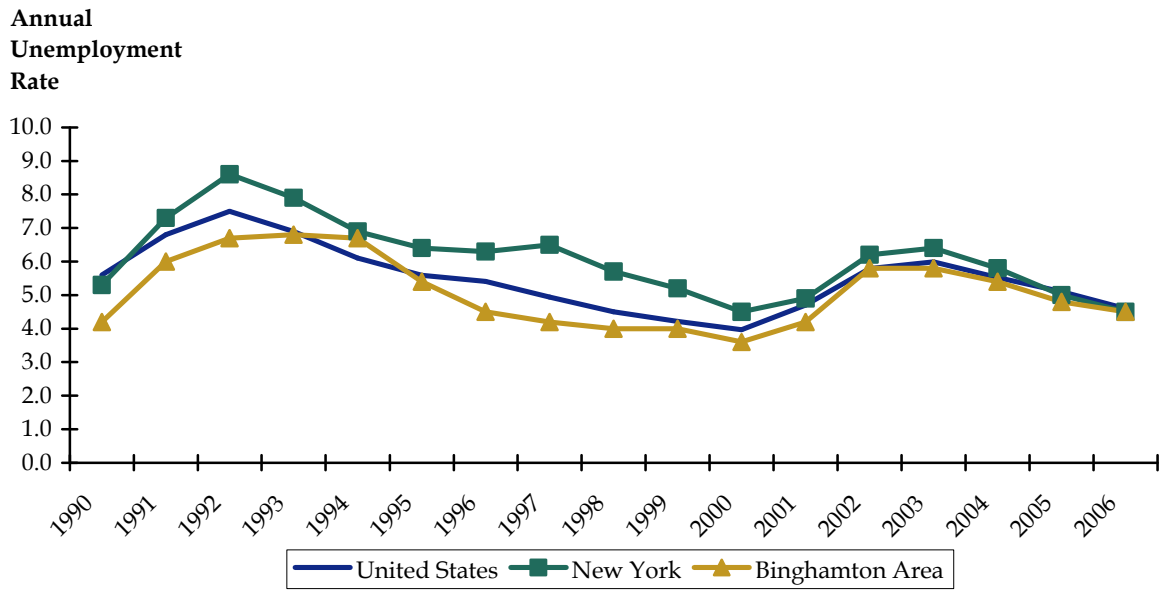
Source: Bureau of Economic Analysis.

Unemployment

One of the most frequently used economic indicators is the unemployment rate, with higher relative rates indicating potential economic distress, and very low rates being a sign of more robust conditions and possible tightness in the labor market. The unemployment rate, as calculated by the U.S. Bureau of Labor Statistics (BLS), measures the percentage of persons in the labor force that are unable to find a job.[1] Unemployment rates in the Binghamton area closely follow U.S. economic cycles and are historically similar to the nation's (see Figure 2.6). However, while the Binghamton area's unemployment rates are relatively low, this may be more a reflection of a shrinking labor force than evidence of a tight jobs market associated with strong economic growth.

[1] The labor force is composed of two primary groups above the age of 15; employed and unemployed. The unemployed category includes individuals currently without jobs who are actively seeking work. It does not include individuals without jobs who are not making efforts to find employment.

Figure 2.6 Unemployment
Binghamton Area Compared to New York and the United States (1990 to 2006)



Source: Bureau of Labor Statistics.

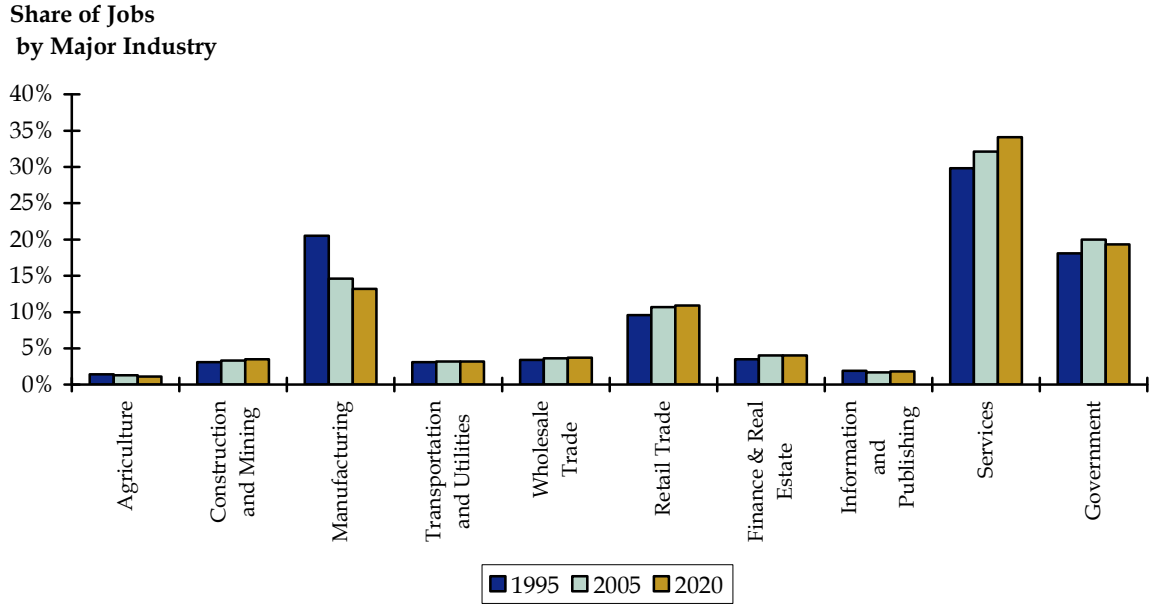
2.2 Industry Analysis

After falling in the early 1990s, the decade between 1995 and 2005 emerged as a period of low employment growth for the Binghamton economy, with the area adding fewer than 1,000 jobs over the 10-year period. As shown in Figure 2.7, the economic structure of the Binghamton region has changed since 1995 as the shares of jobs in manufacturing and agriculture dropped, while services (the sector that combines professional-, technical-, managerial-, administrative-, healthcare-, education-, and hospitality-related services) and government experienced a rapid ascent.

While manufacturing employment saw a sharp drop in employment, and is at the root of the Binghamton area's economic challenges in recent decades, a diverse set of major industry sectors beyond services and government also added jobs between 1995 and 2005 (see Figure 2.8 for jobs growth and decline in the Binghamton area for 1995, 2005, and 2020). Growing sectors in the Binghamton area's economy include construction, transportation, wholesale and retail trade, and finance. These industries have been able to compensate for the loss of manufacturing jobs in the region, but have not produced sufficient new jobs to introduce a period of more robust growth into the Binghamton area. They also do not produce the same types of freight demand that manufacturing created in

the past. Manufacturing firms are faced with high shipping costs for inputs to the manufacturing process because there is an imbalance between the types and amounts of freight being imported to Binghamton and what is being exported. Truckers often must travel as far as Syracuse to find enough freight to backhaul to their points of origin.

Figure 2.7 Binghamton Area Employment Shares by Major Industry
1995, 2005, and Forecast to 2020



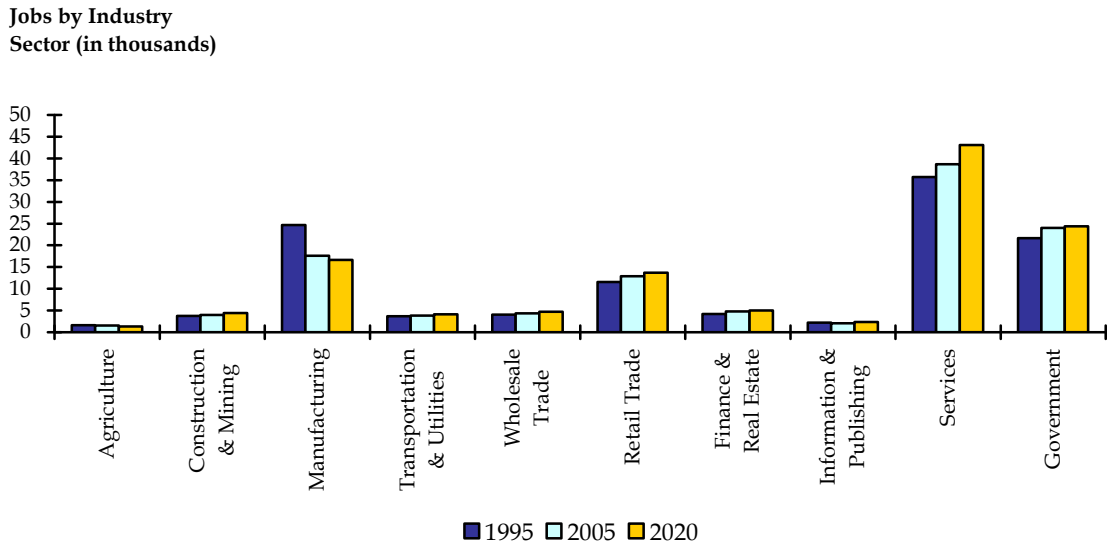
Source: Global Insight.

Growing by 8.1 percent, services led jobs growth (2,900 jobs) in the Binghamton area between 1995 and 2005. The services industry was closely followed by government, which added 2,300 jobs over the 10-year period. As national retailers have moved into the region, helping to keep Binghamton area shoppers from going to Syracuse or Scranton, retail payrolls in the region grew by some 1,300 jobs between 1995 and 2005. Locations west of Binghamton near NY 17 have been especially popular for retail expansions. Reflecting the Binghamton area's emergence as a distribution point for the Northeast and East Coast markets, the transportation and wholesale trade industries (combined) saw a gain of over 500 jobs.

After a decade of moderately fast growth, services accounted for 32.1 percent of Binghamton area jobs in 2005, up from 29.8 percent in 1995. Over the same 10-year period, government's share of jobs grew from 18.1 percent to 20 percent, while retail trade saw its share rise from 9.6 percent to 10.7 percent. The expansion of both sectors has implications concerning how the Binghamton area's transportation system is used and the types of transportation services needed. Contrary to perception, the shift to services has created a huge demand for freight services, especially courier, air cargo, and lighter-truck services.

Both retail- and tourism-related services (especially strong in the nearby Finger Lakes region), such as hotels and restaurants, require a regular flow of deliveries to keep them supplied with the materials and merchandise they need to operate. Trucking, in particular, is crucial to these industries.

Figure 2.8 Binghamton Area Employment by Major Industry
1995, 2005, and Forecast to 2020



Source: Global Insight.

The construction industry, also contributing to growth in the Binghamton area, is dependent on a reliable freight transportation system. The sand and gravel needed to make concrete and cement for buildings and roads frequently move by train and/or boat, and both small- and large-scale construction sites are fed by trucks carrying a range of materials. The reliability of the transportation system is crucial to keep construction workers busy, and to prevent batches of mixed cement from drying (a traffic jam can ruin the cement being carried by a truck). New homes and commercial buildings also require significant volumes of lumber and steel – goods transported to the region largely by long-haul rail and truck.

Figures 2.7 and 2.8 also show anticipated changes to the Binghamton area's economic structure through 2020. During the period between 2005 and 2020, as mentioned earlier, the Binghamton area is forecast to add an estimated 6,000 net new jobs, and the structure of the region's economy will continue to evolve. The economic trends already described for 1995 to 2005, including the secular decline in manufacturing and the shift towards services industries, have significant momentum and will continue to mark the period through 2020. However, the pace of these changes is expected to slow. In particular, the fall off in manufacturing is expected to be much less pronounced, with manufacturing still accounting for a large share (13.2 percent) of Binghamton area jobs in 2020. Services will continue to

climb in importance to the region, accompanied by construction, wholesale and retail trade, and transportation.

Manufacturing Sector

Manufacturing has long been the mainstay of the Binghamton area's economy, beginning with tobacco products and shoes in the 19th and early part of the 20th century, and progressing to computers and electronics as a key economic foundation since the 1960s. More recently, manufacturing has been largely responsible for job losses in the Binghamton area as the mass production of computers moved elsewhere. Despite the long-term declines in the nation, the state, and the region's manufacturing jobs, strategic imperatives to support the Binghamton area's industrial base, including transportation and other improvements, should continue to garner support as manufacturing will continue to be a key driver of the region's economy. Today, though smaller in size compared to a generation ago, manufacturing in the Binghamton area is showing resilience due to the strong innovative capacity of the region, notably in electronics and aerospace. Innovations in these industries may guide the Binghamton area to a new era of economic growth, depending on the extent to which their potential applications are successfully commercialized within the market.

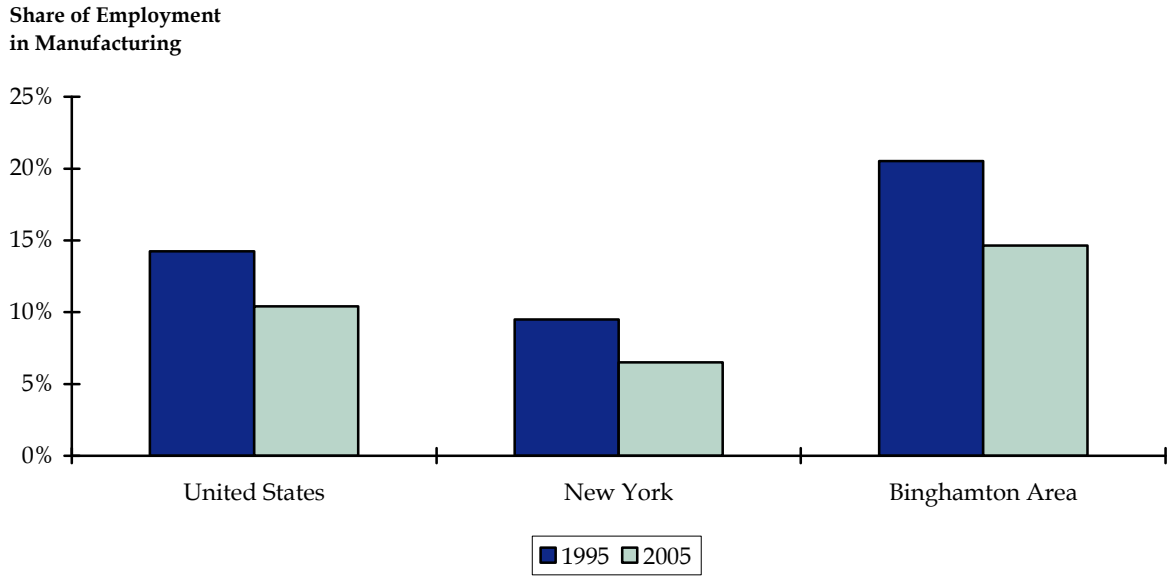
Despite the decline in manufacturing's share of the Binghamton area's jobs from 20.5 percent of the total in 1995 to 14.6 percent in 2005, the region remains much more dependent on manufacturing than either the State of New York or the United States (see Figure 2.9). In fact, almost one-fifth of the Binghamton area's total income is generated by manufacturing, an industry that still offers wages that are 62 percent higher than the regional average ($53,900 compared to a $33,300 average for all jobs in 2005).

Manufacturing in the Binghamton area is dependent on freight services to keep production running and to deliver finished products. The timeliness and reliability of the transportation system are imperatives for most manufacturers. Over the last two decades, the logistics techniques used by manufacturers have changed dramatically – all as part of a broader effort to control costs and increase productivity. This has included a transition from large, consolidated shipments to supply warehouse inventories capable of feeding a plant for weeks at a time to much more frequent and smaller deliveries for just-in-time (JIT) manufacturing. As a result of these efforts to reduce inventory costs, manufacturing has increased its demand for more frequent, smaller, and more varied shipments with increased use of trucks.

Manufacturing facilities require an inbound shipment of raw materials and component parts, generally from outside the region, and they also generate outbound interregional shipments, creating the potential for trucks to carry one load into the region and then leave the region with a backhaul load. The potential for backhaul loads grows as the manufacturing sector becomes more and more diversified, since the shipments into and out of a single facility may happen at different times or may require different types of truck trailers (e.g., an ice cream manufacturer may import cream and sugar via specialized bulk equipment and export ice cream cartons via refrigerated 53-foot truck trailers).

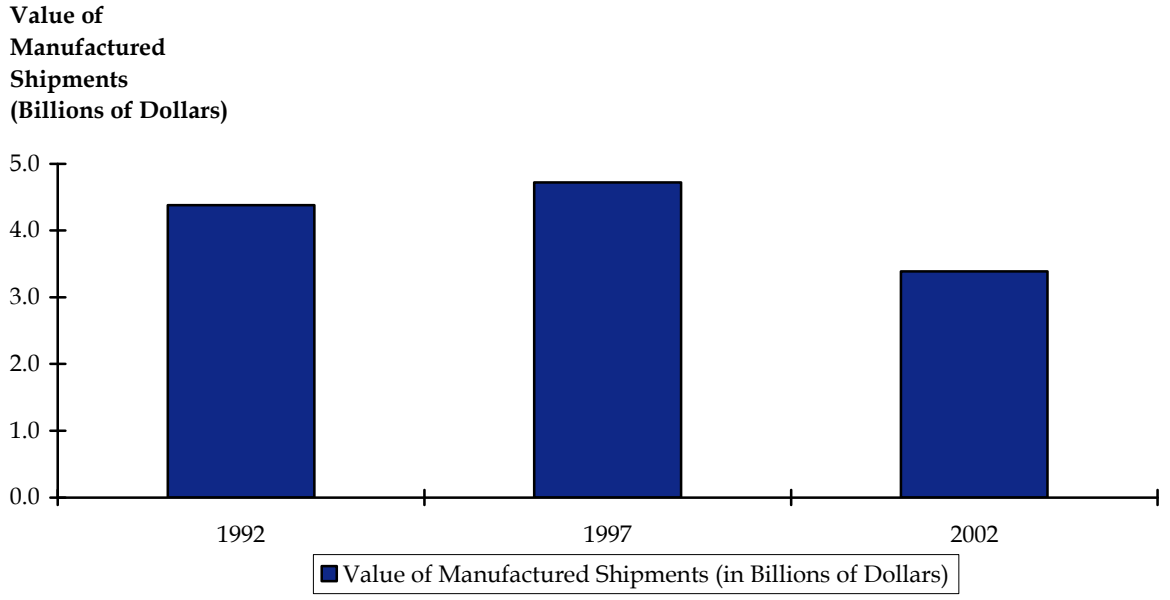
Figure 2.9 Manufacturing Employment

Binghamton Area Compared to New York and the U.S. (1995 and 2005)



Although the number of manufacturing jobs has been declining nationwide, this has not necessarily corresponded to commensurate drops in manufacturing output. As manufacturers adopt more productivity enhancing techniques, their need for labor declines (a factor contributing to the national drops in manufacturing employment). Between 1992 and 2002, manufacturing output in the United States *increased* by 30 percent, even as the number of jobs declined by 13 percent. In New York State, declines in manufacturing output were less than the declines in employment. Between 1992 and 2002, New York's manufacturing output declined by about three percent, while manufacturing jobs fell by close to 38 percent. During the same period, the Binghamton area's manufacturing output declined by a more substantial 23 percent from $4.4 billion in 1992 to $3.4 billion in 2002 (see Figure 2.10), while the number of manufacturing jobs fell by 36 percent. The decline is largely due to the computer and electronics industries.

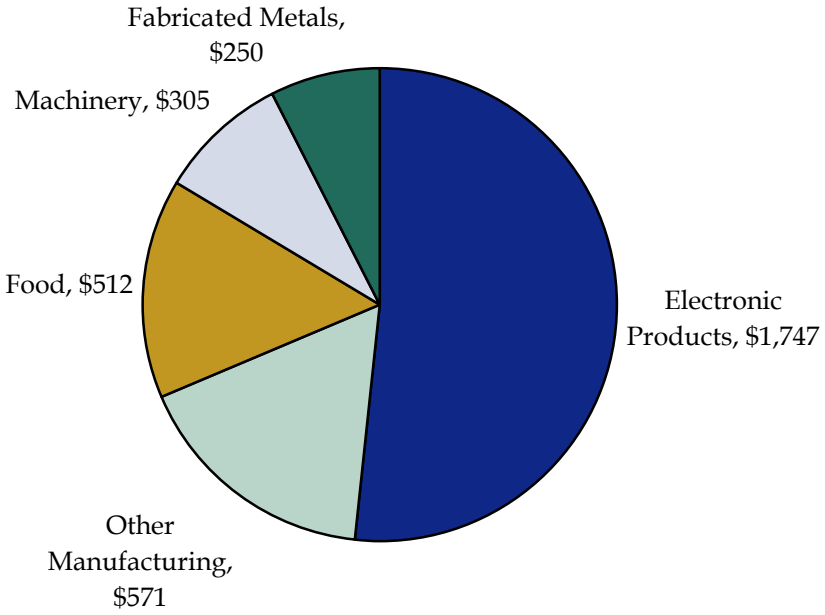
Figure 2.10 Value of Manufactured Shipments, Binghamton Area
1992 to 2002



Source: Census of Manufactures.

Manufacturing in the Binghamton area continues to be dominated by computers and electronics, which accounted for over one-half of total manufacturing output in 2002 (see Figure 2.11), despite the decline in International Business Machines' (IBM) huge Binghamton operations during the 1990s. This was followed by food processing ($571 million in shipments, accounting for about one-sixth of the total), an industry that is supported by the area's agricultural strengths (dairy) and location (production of food items to serve the Northeastern and Mid-Atlantic markets). Other major industries, including industrial machinery and fabricated metals, are both historical strengths of the Central New York region and continue to have a strong presence in the Binghamton area.

Figure 2.11 Binghamton Area, Manufacturing Shipments by Industry
(in Millions of Dollars)



Source: U.S. Census Bureau, Census of Manufactures, 2002.

2.3 Looking to the Future – Economic Prospects for the Binghamton Area

Data only explain a part of the story concerning the Binghamton area's economy. On the surface, population and employment declines – both precipitated by the decline of manufacturing in the region – paint an uncertain picture for the economic future of the area. However, several signs point to an economic reawakening of the area since the 2001 to 2003 recession. Overall employment numbers are beginning to grow again, manufacturing payroll and jobs are increasing, per capita income is rising, and out-migration has slowed. These more positive factors, combined with information collected through a series of interviews with economic development officials and companies located in the region, point to a more technologically innovative, diversified, and dynamic economy that may be able to sustain more robust growth in the future. The manner in which the Binghamton area's economy evolves in coming years will have a direct impact on the region's freight transportation system. Positive trends and potential concerns affecting the future prospects of the Binghamton area's economy will be discussed in this section.

Regional Strengths

Intellectual Capital

Companies like International Business Machines (IBM) and Link Flight Simulation were founded and grew, until recently, in the Binghamton area. Although IBM's operations have mostly shifted elsewhere, companies like IBM and Link have left a legacy of innovation in the Binghamton area, and electronics continues to be a dynamic industry in the region.

Today, many Binghamton area companies can trace their roots to IBM, and these companies continue to employ thousands. New electronic products, invented in the Binghamton area, are finding marketable applications and have the potential to introduce new growth to the region. A collaboration between Binghamton University and a local electronics manufacturer has led to the development of a flexible circuit board (built on a bendable film rather than a hard plate) that is expected to have many commercially viable applications. Already, Binghamton area electronics companies produce high-speed computers, circuit boards, and scanning devices used by the U.S. Postal Service, voting machines, telecommunications equipment, and circuit board manufacturing equipment. The Binghamton area is competing on research and development, prototypes, and the production of state-of-the-art products rather than commodity electronics production (goods that can be produced more cheaply in Mexico and China, and then imported into the United States). Also notable is the fact that much of the value in the region's electronics industry has shifted from manufacturing to software development and consulting services, with a corresponding shift in demand for freight transportation services.

Large research universities are increasingly recognized as fundamental contributors to a region's technological capacity and ability to compete, both domestically and globally. The presence of Binghamton University, a flagship of the SUNY system, feeds Binghamton area employers with a constant flow of highly educated people, particularly in the electronics, engineering, aerospace, software, and healthcare industries. This, combined with the research taking place at the University, plants the seeds to cultivate the growth of new companies in the region, and provides existing companies with exposure to advanced products and practices that they can use to become more competitive. The University's research capabilities were enhanced in 2005 with the opening of the Center for Advanced Microelectronics Manufacturing, a public-private consortium specializing in the development of flexible electronics.

Long-term, Binghamton University plans to increase its enrollment from 12,000 to 15,000 students. The expansion of the student body and academic programs also will be a catalyst for further economic growth in the Binghamton area, attracting companies that require engineers. The growth of the university (including an expansion to Downtown Binghamton), a good school system, quality healthcare, and the nascent economic recovery are helping to re-energize the Binghamton area. People interviewed for this study report a palpable improvement in the area's economic prospects over the past three to four years.

Aerospace

An aerospace cluster of industries has existed for years along the NY 17/I-86 corridor from Binghamton to Elmira. This includes helicopter manufacturing in Owego and Elmira, and simulators and avionics (aircraft control equipment) in Binghamton. The Binghamton area has a particular strength in flight simulators for helicopters used by air forces throughout the world to train pilots. The flight simulator industry in the Binghamton area is vertically integrated with many parts and subcomponents (e.g., metal parts, electronics, and software to convert military satellite images into three-dimensional visuals) being sourced locally. In addition, companies specializing in the repair and refurbishing of flight simulators have also developed in the Binghamton area. Recently, the Lockheed Martin facility in Owego was awarded with a contract to build the presidential (U.S.) helicopter fleet. In order to improve production efficiencies for helicopters, Lockheed and other aerospace-related companies are seeking to source more products, such as precision machinery and fabricated metals, locally. Improvements on NY 17 are helping to support the growth of an aerospace cluster in the region as it allows for supplies to be shipped and delivered more quickly and with greater reliability.

Not confined to planes and helicopters, Binghamton aerospace companies also are finding markets in related areas, such as hybrid drivetrains for city buses. BAE Systems, the manufacturer of these drivetrains, as well as avionics for both commercial and military aircraft, expects to add 125 jobs to its 1,300 existing workforce in Johnson City by mid-2008.

Food Processing and Natural Resources

The Binghamton area has strength in food processing due to its location – at the heart of one of the country's most productive dairy producing regions and nearby many of the largest markets in North America. Combined, New York and Pennsylvania account for 13 percent of U.S. milk production and have seen their production rise by 29 percent in the last 30 years. The dairy farms in both states provide the milk that is processed into cheese and other dairy products by Tioga and Broome County manufacturers. The largest manufacturer of mozzarella cheese (the primary cheese used in pizza) in the United States serves the Northeast from the Binghamton area, using locally produced milk. Likewise, other large food manufacturers and distributors have chosen to locate or expand in the Binghamton area to supply the Northeast and, to a lesser extant, Eastern Canadian markets.

The Binghamton area also is an excellent source of hardwoods, popular for flooring, furniture, and cabinetry throughout the world. Hardwoods are cut and dried in the region, and transported throughout the U.S. by truck and rail and as far away as Japan by ship. The demand for hardwoods has translated to moderate growth in the region's wood products industry.

Distribution and Logistics

The Binghamton area's location on the edge of the Boston-Washington corridor has helped grow and attract several of the largest distribution companies in the United States, as well as the logistics operations of some the country's best-known retailers. This includes the distribution of food products along the entire Eastern Seaboard and consumer electronics for the Northeast. Maines Paper and Food Service, the fifth largest food distributor in the country, has made very large investments in the Binghamton area in recent years, underlining their commitment to remain in/expand within the region in the future.

I-81, I-88, and NY 17/I-86 provide the Binghamton area with excellent access to major markets throughout the Northeast corridor and points south. I-86 is developing into a more viable east-west alternative, allowing truckers to save on I-90 tolls (and the proposed tolls on I-80), a further enhancement for distributors operating from the Binghamton area. The completion of improvements to NY 17 east of Binghamton as part of the NY 17 upgrade to Interstate standards will further improve access to the New York City area and Southern New England, while the conversion of U.S. 15 to I-99 in Pennsylvania will provide a new north-south route that will further enhance accessibility for the Binghamton region. Improved access to Stewart International Airport (via NY 17), a developing hub for air freight in Orange County, also will reinforce the Binghamton region as a logistics center. In addition, new interstates will add visibility to the region, making it more likely that other distributors will consider the Binghamton area a suitable location for expansion.

Additionally, Norfolk Southern Corporation has established a joint venture with Pan Am Railways, called Pan Am Southern, to improve the infrastructure along 150 track-miles on the so-called "Patriot Corridor" between Rotterdam Junction, New York (near Albany), and Ayer, Massachusetts. Track improvements along routes in northern New England and a new intermodal logistics center in the Albany region are planned (see Chapter 6 for details). Norfolk Southern's recently-announced "Empire Links" program a partnership with 10 western New York State shortline railroads, will allow the railroads to market short-haul loads along the Southern Tier Line in New York and on connecting lines into New Jersey and Pennsylvania.

Availability of Water, Land, and Natural Resources

Fueled by rising income, higher economic output, and a growing population, the Boston-Washington corridor will become more congested over the next 25 years; and land values, already amongst the highest in the country, will continue to increase. Areas just to the west of the corridor, like the Binghamton area, may benefit as industries requiring land (manufacturing, distribution, and utilities) find themselves priced out of the Boston-Washington market. In addition, other industries, including services and finance, as well as people, also may be attracted to the Binghamton area to save on costs while not giving up on the advantages of being in proximity to large markets.

The Binghamton area, as well as much of Upstate New York and Central Pennsylvania, also possesses a plentiful supply of clean water. While generally not a top site location determinant today, the availability of water may steer industry to the region in the future, especially if supplies dwindle and treatment/infrastructure costs continue to increase in the large coastal markets.

The recent identification of a sizeable natural gas deposit under Broome and Tioga Counties, the Marcellus Shale, which current energy prices and new extraction techniques have economically viable, may generate lease and royalties for area landowners, spurring the region's economy. The natural gas industry's main freight-related need will be short-term import of drilling and extraction equipment, followed by pipelines to export the natural gas and connect to a national network of natural gas supply lines.

Potential Concerns

Air Service

While scheduled air carrier service is available by three major airlines from Binghamton Regional Airport to major hub cities, the cost, frequency, and consistency of air freight service can be a problem. This is a particular concern for the high-technology industries in the region that need to receive and deliver products (or parts) from throughout the world, often on a moment's notice. Binghamton producers of machinery used in the manufacture of printed circuit boards and others report a need to ship goods on the "next plane out," but scheduled service on planes that can reliably accommodate air cargo is too infrequent at the Binghamton Regional Airport, and fluctuations in service destinations and frequencies make it difficult for shippers to commit to air cargo via Binghamton. More extensive services are available from nearby airports in Syracuse (where FedEx and UPS both operate air freight service) and Scranton, but even at these airports, commercial air carriers have shifted services from mainline jets to smaller "regional" jets and turbo props that sometimes must leave behind freight and/or passengers due to weather conditions, passenger loads, and luggage loads around peak travel periods.

State of New York Structural Issues

High taxes (property and income), high energy costs, and other expenses (unemployment insurance and workers compensation) in the State of New York make it more challenging for the Binghamton area to compete with Pennsylvania (and other locations) on the basis of cost, especially in attracting manufacturers. Economic incentives, including Empire State Development's "Empire Zone" program, has proved instrumental to help counteract New York's high costs of doing business by providing tax breaks.

Major companies in the Binghamton area have been beneficiaries of this program and have brought additional jobs into the region. This includes BAE Systems, which plans to consolidate a portion of its California operations in the Binghamton area. Until New York State's onerous structural costs (taxes and energy) are reduced, it will be important for

these incentives to be maintained, particularly as the Binghamton area competes with other locations to attract and retain manufacturers.

Defense Spending

The U.S. Department of Defense purchased more than $1.4 billion worth of goods and services from the Binghamton region in 2006, accounting for 18 percent of all procurements from New York State. While military spending continues to be a boon for the economy of the region, notably suppliers in the aerospace and electronics industries, a shift in military priorities or competition from suppliers in other locations could reduce Department of Defense spending in the region.

Limitations on Developable Land

The Binghamton area's geography is marked by valleys and hills, leaving relatively little flat land available for development. Today, industrial sites are often built successfully on tiered hills. Both Broome and Tioga Counties will need to ensure that there is an adequate supply of development-ready (i.e., full water, sewer, electrical, and roadway infrastructure in place) industrial sites to accommodate future growth, especially as existing industrial parks (e.g., Kirkwood) become fully occupied.

Infill and brownfield development within the City of Binghamton and the Town of Union is being pursued as an option, but this often requires investments in environmental remediation, razing (or restoration) of existing buildings, and transportation access (several older industrial properties have rail spurs but need roadway improvements) before these sites can be brought up to standards that will appeal to prospective employers. More intensive infill development, such as on the 33-acre, former Anitec site in Binghamton, would add economic vitality and would bring higher levels of truck and passenger vehicle traffic into the City.

3.0 Freight Profile

This chapter provides an overview of the existing freight transportation system, describes how freight currently flows over this system, and projects how changes in the economy will affect future freight flows in the region. The chapter is split into three subsections:

- Section 3.1 provides an overview of Binghamton's regional freight network, focusing on the operational characteristics of the highway and rail systems. Deficiencies identified in data and in stakeholder interviews are summarized in this subsection.
- Section 3.2 discusses in detail the commodities carried over Binghamton's freight network; the modes used to carry freight into, out of, within, and through Binghamton; and where freight is moving to and from.
- Section 3.3 describes the implications of shifts in trading patterns, the region's industry mix, and types of commodities that are expected to be moving on Binghamton's freight network in the future.

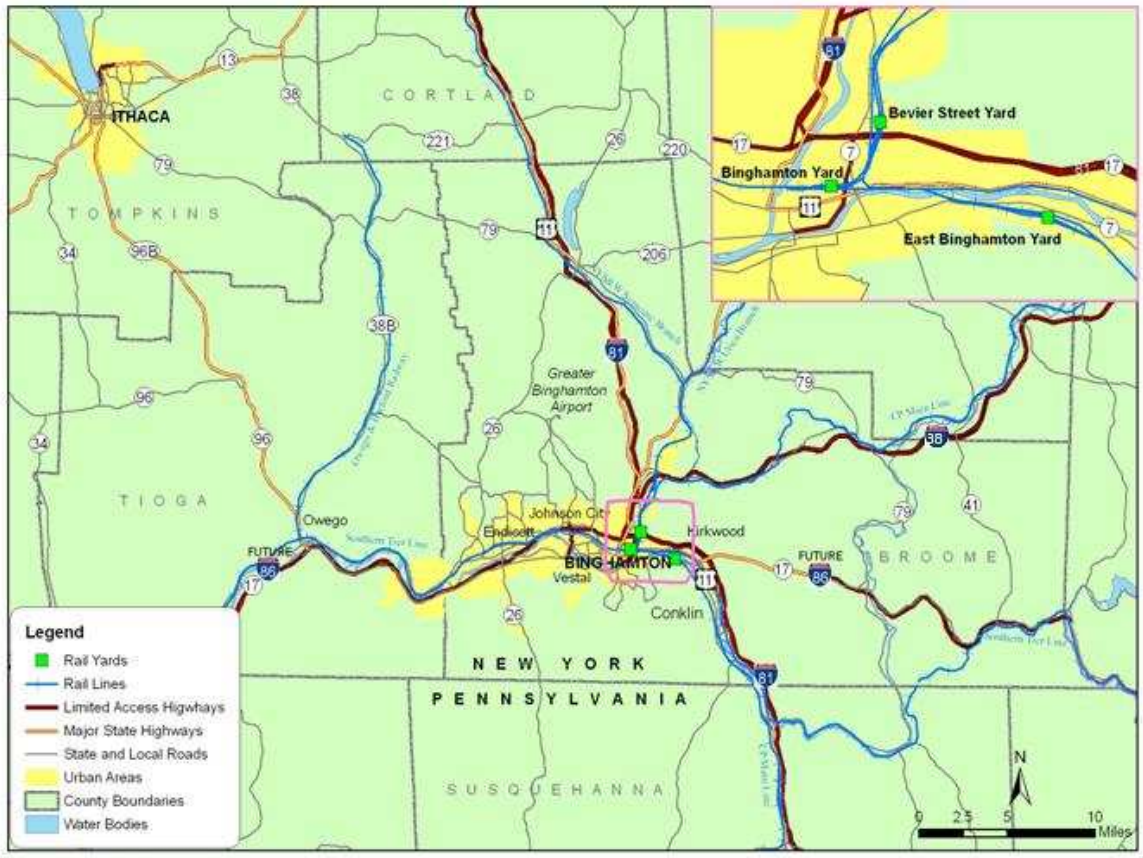
3.1 Overview of Regional Freight Network

Located at the intersection of I-81, I-88, and the NY 17/I-86 Southern Tier Expressway corridor, Binghamton lies about 80-miles equidistant between the major east/west routes of I-90 and I-80. At the heart of the region are the so-called "Triple Cities," comprised of Binghamton itself and the neighboring villages of Endicott and Johnson City, all falling in Broome County. Binghamton also is home to rail connections for Canadian Pacific (CP), Norfolk Southern, and New York Susquehanna and Western Rail (NYSW). Through the NYSW line, Binghamton freight also has an easy connection with the CSX line in Syracuse.

Because Binghamton sits at a confluence of highway and rail routes, it is strongly connected to neighboring regions. However, Binghamton lacks a seaport or major air cargo airport and must rely on intermodal facilities in neighboring regions to connect to global markets. This section provides an overview of each component of Binghamton's existing freight network, presenting quantitative analysis where available, supplemented by anecdotal observations collected via interviews with local freight shippers and carriers.

Figure 3.1 shows the location of facilities that make up Binghamton's freight network.

Figure 3.1 Binghamton Regional Freight Network



Highway Network

Overview

The Binghamton region is situated in a strategic location in the Northeastern U.S., unencumbered by the heavy roadway congestion that afflicts major population centers but with direct highway access to a number of these metropolitan areas via limited-access highways. With the ongoing initiative to upgrade Route NY 17 to I-86, Binghamton will soon find itself at the crossroads of three interstate highway routes, making it an ideal location for long-distance through traffic while perhaps serving as a major regional distribution hub.

Three Interstate Highway corridors (I-81, I-88, and the NY 17/I-86 Southern Tier Expressway corridor) allows trucks to reach much of the Northeast U.S. and eastern Canada within a one-day drive (see Figure 3.2), including:

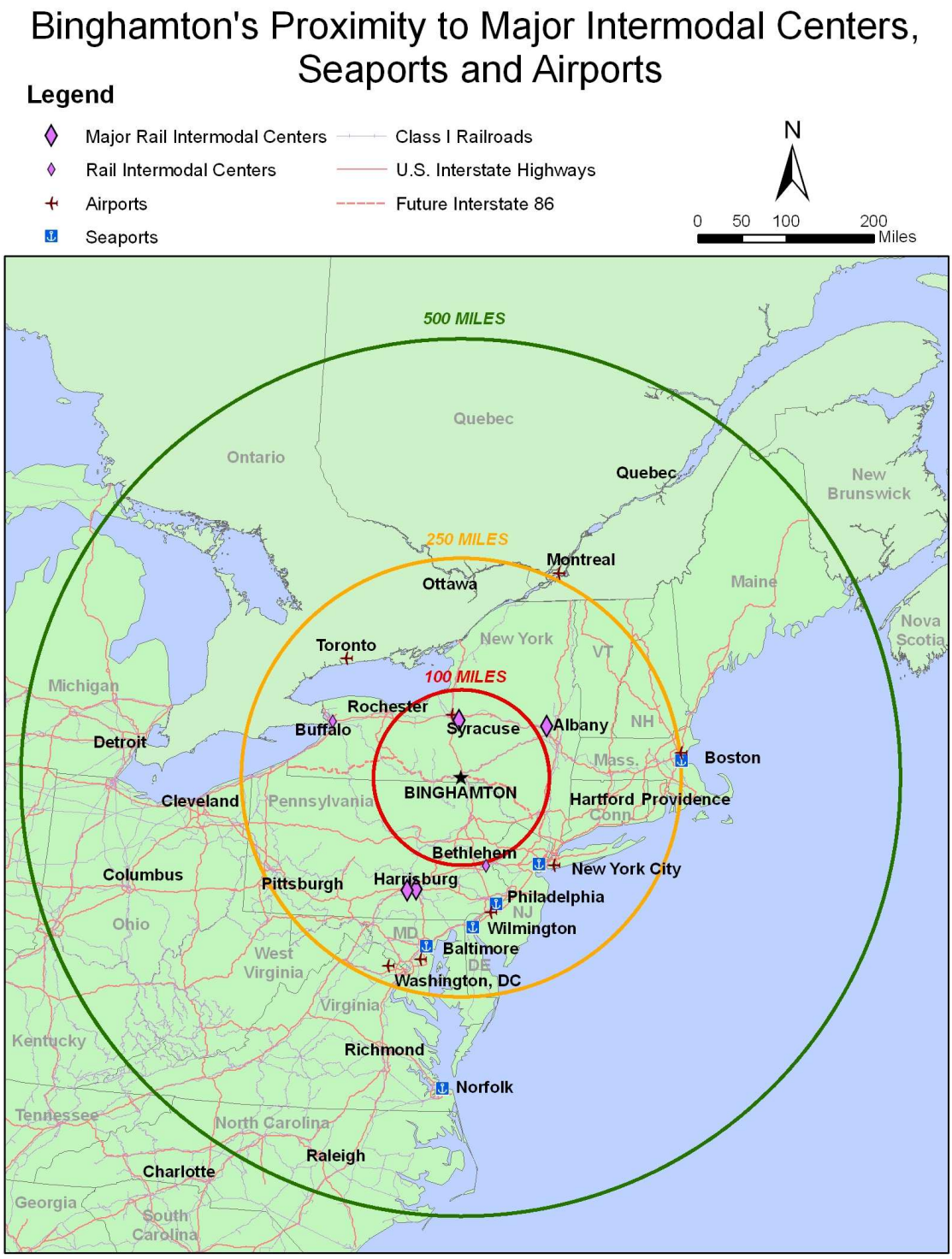
- Upstate New York (including Syracuse, Albany, Buffalo, and Rochester);

- The New York City metropolitan area (New York City, northern New Jersey, Long Island, and Southeast Connecticut);
- Southern and Central New England (Boston, Worcester, Springfield, Hartford, Providence, and New Haven);
- Pennsylvania and Eastern Ohio (Scranton, Philadelphia, Pittsburgh, Harrisburg, Cleveland, and Columbus);
- Maryland and northern Virginia (Baltimore, Washington, Richmond, Newport News, and Norfolk); and
- Eastern Canada (Toronto and Montreal)

These areas are not only population and employment centers; they also are locations of the major seaports, airports, and intermodal facilities that connect Binghamton to global markets.

I-81, one of the nation's principal trade corridors, runs straight through Binghamton. Its northern end is a major Canadian border crossing at the Thousand Islands International Bridge. On its way to its southern end in Tennessee, I-81 crosses several major east-west trade corridors linking the Eastern Seaboard to the Heartland and the West Coast. Notably, I-380 and I-80 are the main access routes to northern New Jersey and the New York Metropolitan Area, one of Binghamton's largest trading partners and the location of the Ports of Newark, Elizabeth, and New York, as well as major air cargo hubs at Newark and John F. Kennedy (JFK) International Airports. I-81 also provides access to major intermodal rail facilities in Syracuse and Harrisburg that allow for the transfer of containerized goods to and from the national rail network. Other major intermodal rail terminals are located in the Buffalo and Albany regions.

Figure 3.2 Major Metropolitan Areas and Intermodal Facilities within 500 Miles of Binghamton



To the west of Binghamton, the Southern Tier Expressway (I-86 and NY 17) connects to Buffalo, the Midwest, and Chicago. Although the driving time from Buffalo (and its international border crossings) to Binghamton may be shorter via Syracuse using the New York State Thruway and I-81, the Thruway tolls divert truck traffic to I-390 south and NY 17/I-86 east instead. The trucks then travel on NY 17/I-86 to Binghamton or pass through on their way from Buffalo to New York and Southern New England. NY 17/I-86 also is part of the shortest route to Binghamton from the Ports of Los Angeles and Long Beach, which combined are the nation's largest seaport and the principal port of entry for goods from Asia. To the east of Binghamton, I-88 connects to Albany, where I-90 provides access to Boston and Central and Northern New England, while the NY 17/I-86 corridor crosses I-84, the main access route to Southern New England.

These major Interstate corridors link Binghamton to its major trading partners, but several state roads also are key components of Binghamton's freight network, linking the core of the region to its hinterland. State highways that provide access off of the Interstate/freeway system to regional freight generators include State Routes 7, 8, 10, 11, 12, 17c, 23, 34, 38, 96, 201, and 434 (see Figure 3.3).[1]

The BMTS region has many characteristics that are typical of other upstate New York cities, with a highway network coming under increasing pressure to serve demands outside the region while at the same time a relatively stagnant population base cannot absorb the cost of keeping the roadway system in good working order and harsh weather conditions add a cost element to the maintenance picture.

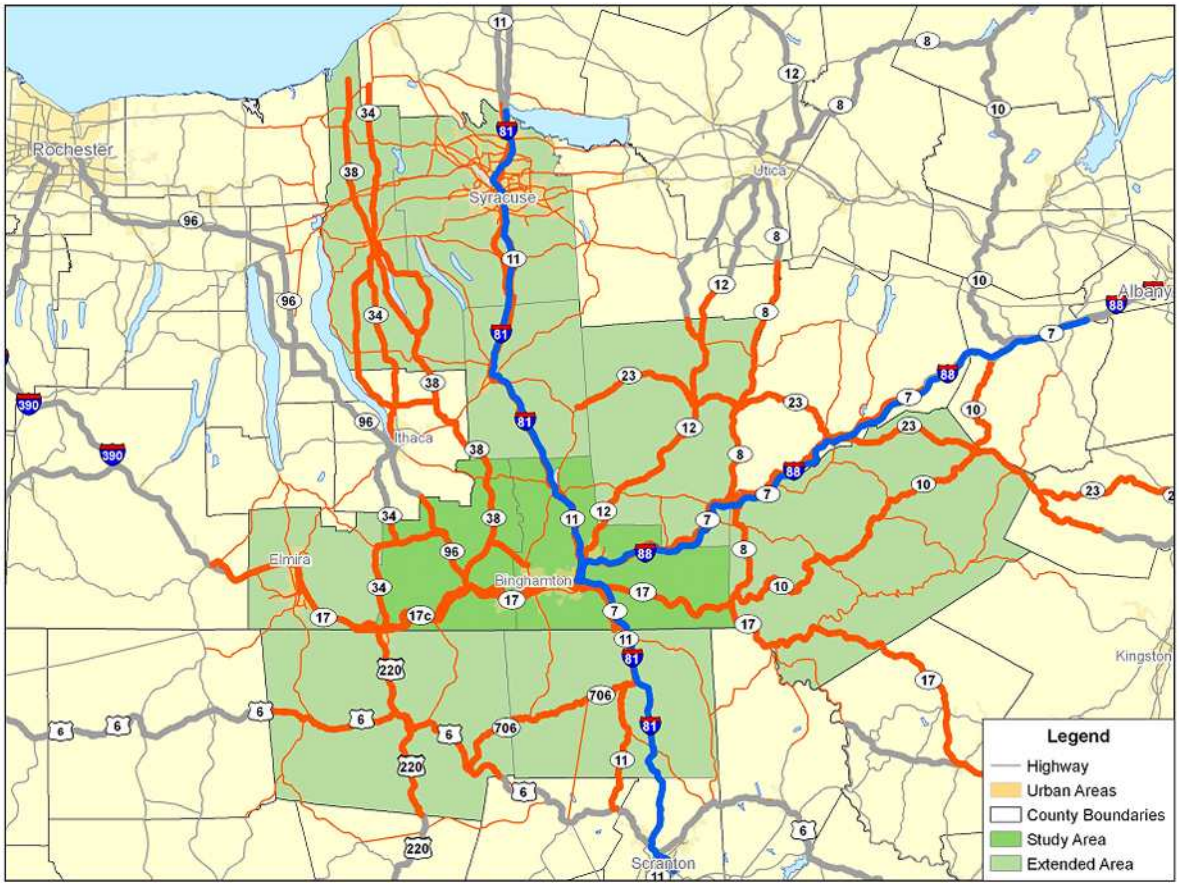
The assessment of the existing highway network in the Broome-Tioga region and greater Binghamton metropolitan area is focused on four key elements:

- Bridges;
- Pavement conditions;
- Highway operations (congestion); and
- Truck activity.

Each of these elements of the regional highway system was analyzed using existing data sources within the BMTS – including NYSDOT highway sufficiency files for the two-county area – and other information from trucking industry sources for overhead bridge clearances.

[1] Stem Routes identified from stakeholder interviews and confirmed during field research.

Figure 3.3 Key Routes in the Binghamton Area



Source: Global Insight.

Bridge Condition

A total of 778 bridges are contained in the NYSDOT bridge inventory for the BMTS region, including 458 in Broome County and 220 in Tioga County. Most of these have been inspected recently, and NYSDOT has documented the condition ratings using a scale from 1 to 7 with 7 representing a bridge in "new" condition, 5 to 7 considered "good" condition, and a rating of less than 5 defined as a "deficient" bridge. The median condition ratings for bridges in Broome and Tioga Counties are 5.339 and 5.094, respectively, while the average ratings are 5.396 and 5.115, respectively. A total of 232 bridges in the region are rated as deficient in the NYSDOT inventory, including 135 in Broome County and 97 in Tioga County. The bridge condition data for the BMTS region are summarized below in Table 3.1.

Table 3.1 Bridge Condition Data for BMTS Region

Broome County		Tioga County	
Total Bridges	458	Total Bridges	220
Bridges Rated Good or Better (5.0 or Greater)	323 (70%)	Bridges Rated Good or Better (5.0 or Greater)	123 (56%)
Bridges Rated Deficient (less than 5.0)	135 (30%)	Bridges Rated Deficient (less than 5.0)	97 (44%)
Median Rating	5.339	Median Rating	5.094
Average Rating	5.396	Average Rating	5.115

Source: NYSDOT Bridge Inventory.

The information listed in the table above indicates that roughly one out of every three bridges in the BMTS region have a deficient rating – an issue that has received much public attention in the aftermath of the I-35W bridge collapse in Minneapolis in August of 2007. According to NYSDOT, bridges are considered "structurally deficient," according to the Federal Highway Administration, if significant load carrying elements are found to be in poor or worse condition due to deterioration and/or damage, the bridge has inadequate load capacity, or repeated bridge flooding causes traffic delays. The fact that a bridge is "structurally deficient" does not imply that it is unsafe or likely to collapse.

A "structurally deficient" bridge, when left open to traffic, typically requires significant maintenance and repair to remain in service and eventual rehabilitation or replacement to address deficiencies. In order to remain in service, structurally deficient bridges are often posted with weight limits.

NYSDOT uses the term "functionally obsolete" to refer to a bridge's inability to meet current standards for managing the volume of traffic it carries, not its structural integrity. For example, a bridge may be functionally obsolete if it has narrow lanes, no shoulders, or low clearances (see next section).

Of the 232 bridges in the two-county area that have received deficient ratings, a total of 31 have ratings below 4.0 – including 9 within Broome County and 22 in Tioga County. All of these "severely deficient" bridges are listed in Table 3.2. From the standpoint of freight mobility, the bridges in Table 3.2 that are of primary concern include the I-81 overpass at I-86 and those whose condition could potentially impact freight railroad operations (e.g., the NY 34 and Barton Road bridges over the Norfolk Southern railroad alignment in Tioga County).

Table 3.2 Bridges with Condition Ratings Below 4.000

Roadway Bridge Carries	Bridge Crosses	Bridge Condition Rating
Broome County		
NY 38B[1]	Crocker Creek	3.966
NY 7	Osborne Creek	3.963
I-81	Access Road to I-86	3.953
U.S. 11	Langon Creek	3.943
NY 201[1]	NY-434	3.736
County Road 28	Occanum Creek	3.710
Millburn Drive	Little Snake Creek	3.672
Banta Road	Susquehanna River	3.421
Tioga County		
NY 34	Norfolk Southern	3.971
NY 96[1]	Catatonk Creek	3.963
East River Road	Smith Creek	3.953
Moore Hill Road	Hunt Creek	3.947
Jewett Hill Road	Jewett Hill Creek	3.944
NY 34	Cayuta Creek	3.917
Foster Road	Foster Creek	3.917
West Creek Road	West Hill Creek	3.865
West Creek Road	Owego Creek	3.778
Dean Creek Road	Dean Creek	3.750
Emery Road	Sulphur Spring Creek	3.737
NY 96	Sulphur Springs Creek	3.714
South Side Drive	Pumpelly Creek	3.709
Miller Hollow Road	Cayuta Creek	3.697
Camptown Road	Cayuta Creek	3.652
NY 96B[1]	Prospect Valley Creek	3.583
Honey Pot Road	Cole Brook	3.571
Camptown Road	Glory Gulch Creek	3.500
NY 96	Catatonk Creek	3.417
Bridge Street	Owego Creek	3.271
Tappan Road	Owego Creek	3.148
Barton Road	Norfolk Southern	2.667

Source: NYSDOT Bridge Inventory.

[1] Bridge replacement funded for construction.

Bridges: Vertical Clearances

Low overhead bridge clearances impose some constraints to freight mobility in the BMTS region. The six major overhead bridges in Broome and Tioga Counties with vertical clearances below the New York State statutory height of 14'-0" are listed in Table 3.3.[2] Several of these bridges are located in close proximity to each other in Binghamton. The NY 7 bridge in Binghamton underneath the Southern Tier Line has long been recognized as a key impediment for truck traffic in the city, and several locations along U.S. 11 have similar vertical constraints.

Highway bridges along Norfolk Southern Railway's Southern Tier Line present challenging constraints particularly in Binghamton itself, since any effort to raise the railroad grade would be costly and the low elevation of the roadway and proximity to the Susquehanna and Chenango Rivers effectively limits options to lower the roadways underneath the bridges. The owners of rail rights-of-way often argue that any improvements to bridges that are not structurally deficient should be borne by the local or state government, rather than the rail owners, since the benefits of the improvement accrue disproportionately to local businesses and trucking companies. Chapter 6 discusses potential bridge clearance improvements along the Southern Tier Line.

Table 3.3 Low Overhead Bridge Clearances in BMTS Region

Roadway/Location	Vertical Clearance
Route NY 7 (Robinson Street) at Southern Tier Line (Binghamton)	11'-4"
Route U.S. 11 (Court Street) south of NY 7 (Binghamton)	12'-1"
Route NY 7 at CP Main Line in Sanitaria Springs	13'-7"
Route NY 96 at Southern Tier Line (Owego)	13'-7"
Route U.S. 11 at I-81	13'-11"
Route U.S. 11 (Front Street) at Southern Tier Line	13'-11"

Source: NYSDOT Bridge Inventory.

[2] Source: Rand McNally *Motor Carriers' Road Atlas* (2006).

Pavement Conditions

NYSDOT maintains a comprehensive pavement condition inventory for Broome and Tioga Counties, including all interstate highways, Federal (U.S.) routes, and major New York State routes as well as non-state Federal Aid roads within the greater Binghamton metropolitan area. The inventory includes a 10-point rating system for roadway segments along these routes, based on the following parameters:

- A rating of 9 or 10 indicates a roadway segment with excellent pavement condition, with no action required;
- A 7 or 8 corresponds to good pavement condition, with a potential need for preventive maintenance or paving;
- A rating of 6 is considered "fair" and requires paving; and
- Segments rated 5 or below are considered to be in poor condition and require rehabilitation.

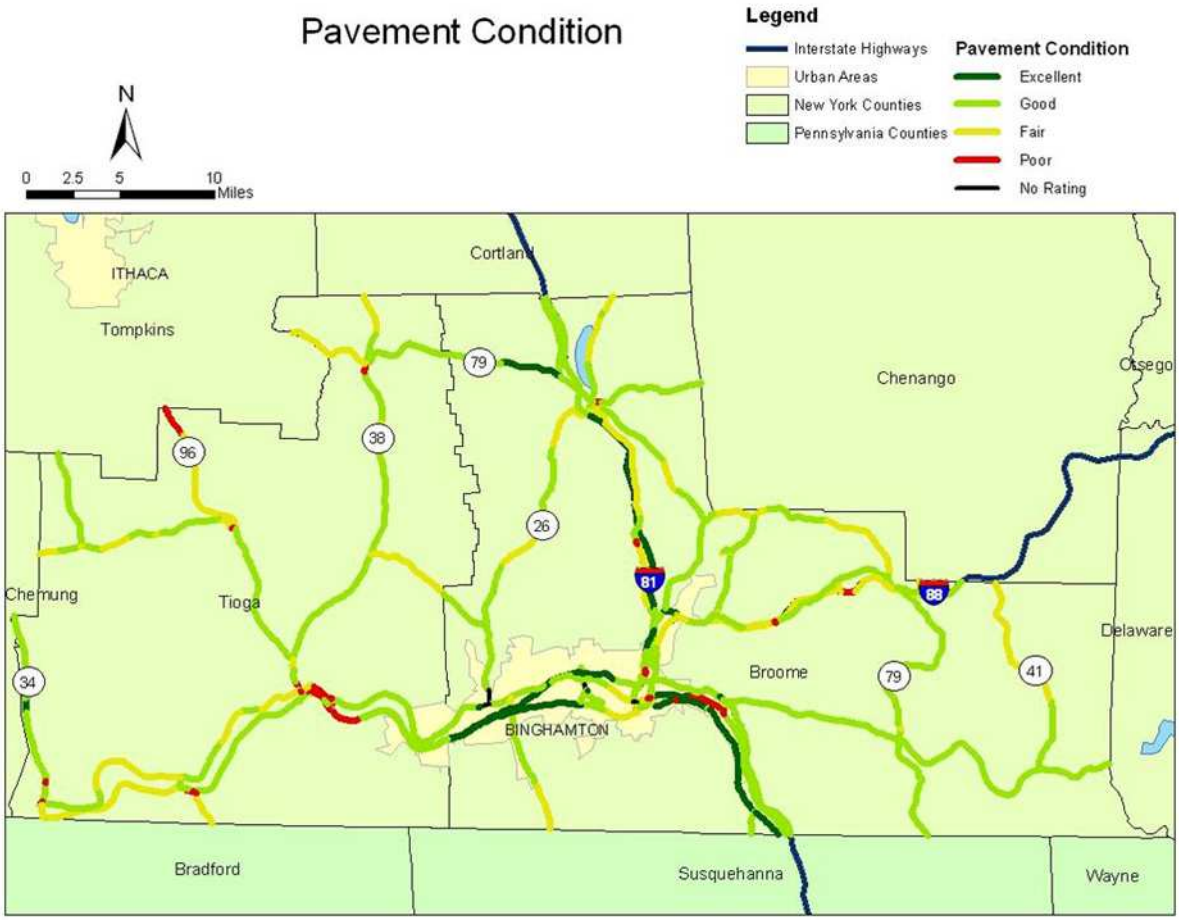
The 2005 NYSDOT highway sufficiency file contains 678 rated roadway segments in the BMTS region, covering a total of nearly 480 miles. The median pavement condition rating for the region in 2005 was 7, while the average was 7.023; the weighted average (accounting for segment lengths) was 7.020. A regional summary of the condition ratings for the BMTS region is shown in Table 3.4, while these condition ratings are illustrated in Figure 3.4.

Table 3.4 Pavement Condition Rating Data for Interstate, Federal, and Major New York State Roadways within Broome and Tioga Counties

Pavement Condition Ratings	Segments	Miles
Excellent (9 or 10)	77	49.04
Good (7 or 8)	416	295.09
Fair (6)	135	118.69
Poor (5 and below)	39	14.38
Under Construction	11	2.25
Total	**678 segments**	**479.45 miles**

Source: 2005 NYSDOT Highway Sufficiency File.

Figure 3.4 Pavement Condition Ratings for Interstate, Federal, and Major New York State Roadways within Broome and Tioga Counties



Source: 2005 NYSDOT Highway Sufficiency File.

The information shown in Table 3.4 indicates that pavement conditions throughout the region are generally good. Fifty roadway segments representing nearly 17 total roadway miles are rated "poor" or are currently under construction; these figures represent 7.4 percent of the roadway segments and less than 3.5 percent of the roadway miles in the region.

As shown in Figure 3.4, the majority of the segments rated "excellent" are situated along I-81, I-88, and NY 17/I-86 in the vicinity of Binghamton. All of the 39 segments rated "poor" have ratings of 5; none have a rating of 4 or less. The majority of the roadway segments with poor pavement conditions are located near Owego along NY 17/I-86, NY 17C, and North Avenue, and in Binghamton along U.S. 11 near the I-81/NY 17/I-86 interchange.

Table 3.5 Pavement Condition Rating Data for Nonstate Federal-Aid roads within the Greater Binghamton Metropolitan Area

Pavement Condition Ratings	Segments	Miles
Excellent (9 or 10)	66	28.43
Good (7 or 8)	182	102.39
Fair (6)	97	53.99
Poor (5 and below)	94	36.51
Total	**439 segments**	**221.32 miles**

Source: BMTS.

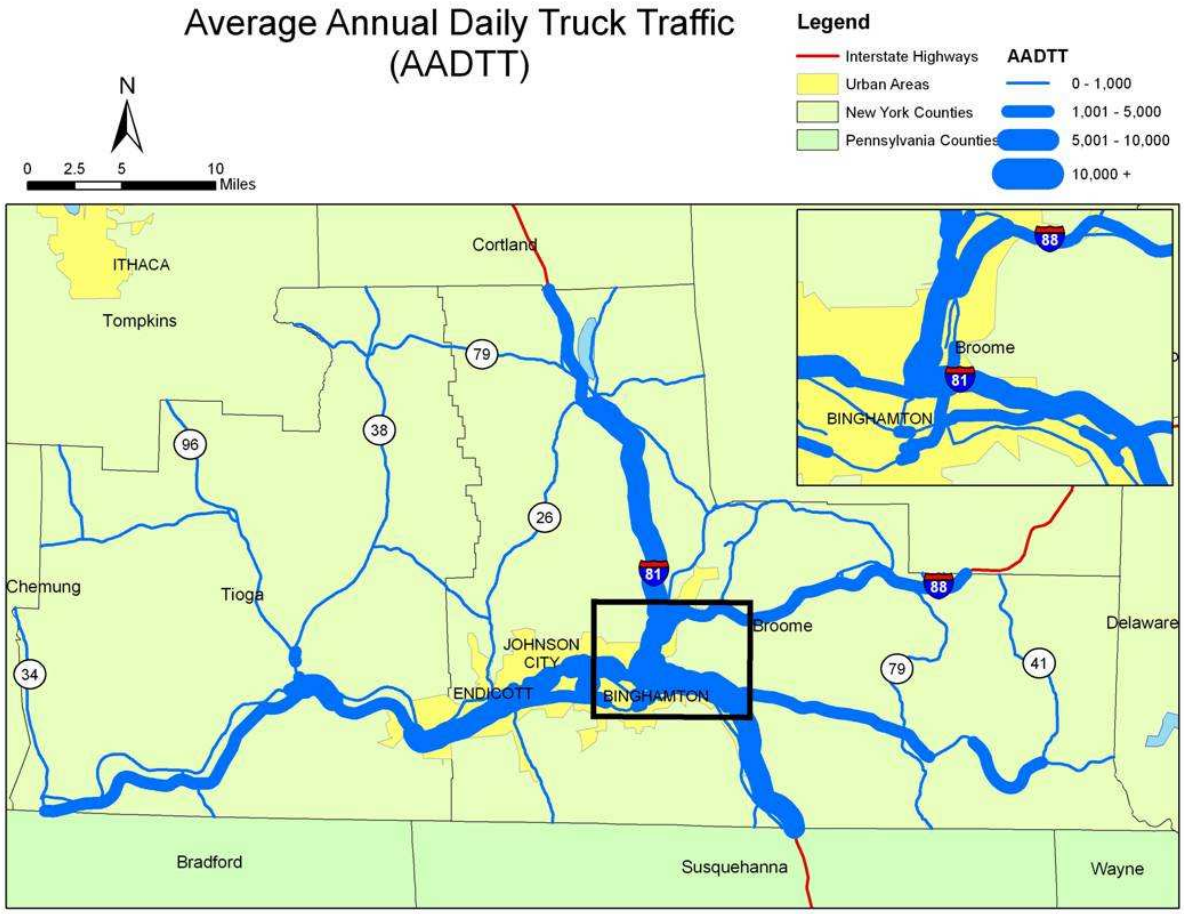
In 2007, pavement conditions for 439 nonstate Federal-aid roads within the greater Binghamton metropolitan area were rated using parameters similar to those described previously for the NYSDOT database. Of these segments the median rating was 7, the average was 6.81, and the weighted average accounting for segment lengths was 6.85. Table 3.5 summarizes the same data as shown in Table 3.4, but for the nonstate Federal-aid roads near Binghamton.

Twenty-three segments with a total length of 9.9 miles have a rating of 4 or below (21 rated 4, two rated 3). The roadway segments with poor pavement ratings are concentrated in the core areas of Binghamton, Johnson City, and Endwell. Nearly the entire length of Route NY-49 between Endwell and East Maine (to the north) is rated only "fair" or "poor," which may present some mobility concerns because this roadway connects Endwell to the Greater Binghamton Airport north of Johnson City.

Roadway Operations/Congestion

The NYSDOT highway sufficiency file contains a wealth of information about operational characteristics in the BMTS region, including daily traffic volumes (AADT), estimated truck volumes (these will be discussed later in the "Truck Activity" section), and estimates of congestion based on roadway volumes and vehicular capacity. Total daily traffic volumes for the core roadway network in Broome and Tioga Counties are shown in Figure 3.5. The heaviest traffic volumes can be found along I-81 and NY 17/I-86 in the vicinity of Binghamton, particularly along the roadway segment where I-81 and NY 17/I-86 operate together. I-88 and the Vestal Parkway (NY 434) also carry substantial volumes of traffic on a daily basis.

Figure 3.5 Average Annual Daily Traffic Volumes



Source: 2005 NYSDOT Highway Sufficiency File. Includes Single Unit (FHWA Scheme E 5-7) and Combination Trailers (FHWA Scheme E 8-13).

Accurate measurements of congestion cannot be made using the NYSDOT data, since the traffic volumes listed in the highway sufficiency file are not compiled to the level of detail required for this type of location-specific analysis (hourly volumes, with turning movements at intersections). For this study, an overall volume-to-capacity ratio was computed for each of the 678 roadway segments listed in the NYSDOT data, and the segments stratified into five separate quintiles to give a rough measure of which roadway segments are most congested in comparison to the overall regional roadway network. The results of this effort are illustrated in Figure 3.6.

Figure 3.6 Congestion in Binghamton Regional Roadway Network

Source: 2005 NYSDOT Highway Sufficiency File.

Based on this method of estimating congestion across the BMTS region, the following areas in particular show a number of roadway segments in the bottom two quintiles for volume-to-capacity measurements:

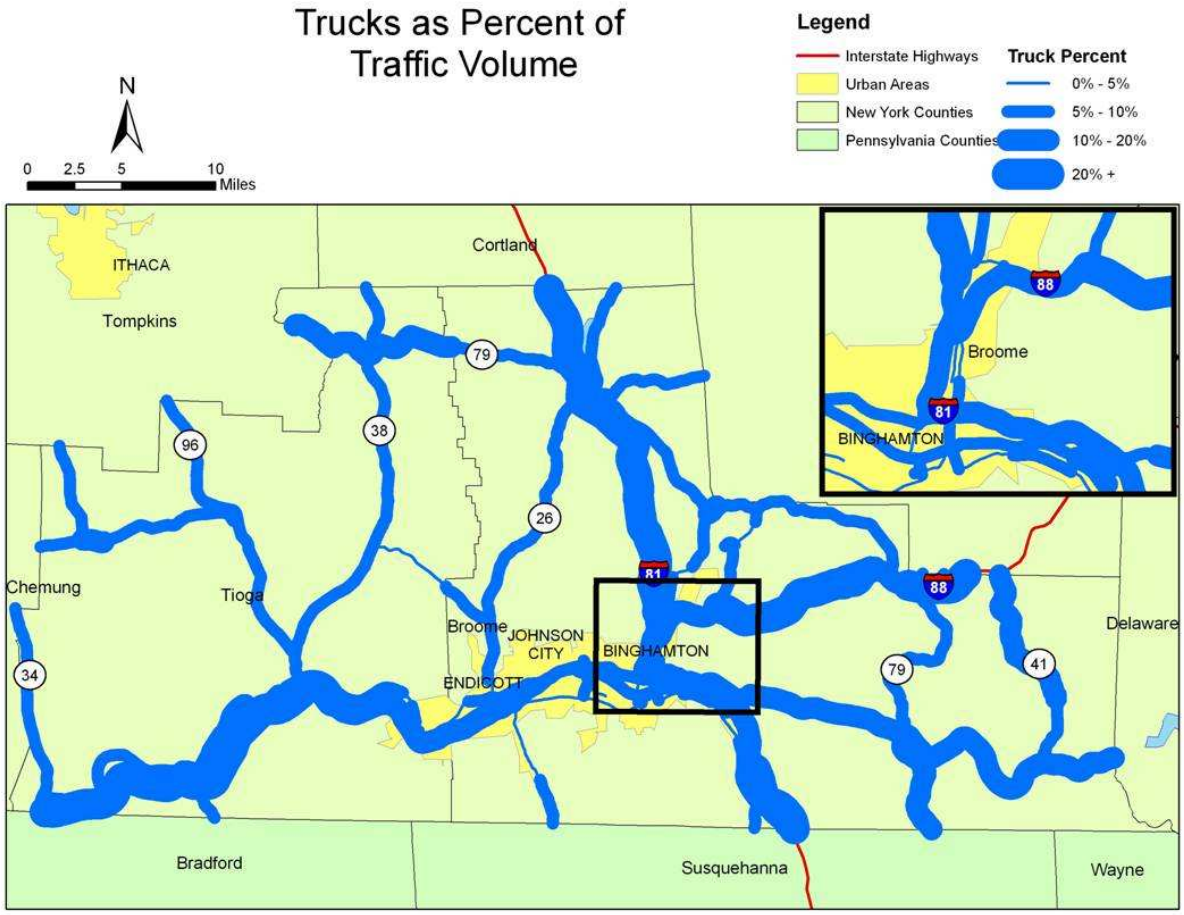
- Most interstate, Federal, and state highways in the immediate vicinity of Binghamton;
- Interstate 81 along much of its length (primarily north of Binghamton), particularly along the segment within Binghamton where I-81 and NY 17/I-86 operate as a common roadway;
- The NY 17/I-86 corridor and NY 17C west of Binghamton through Johnson City, Endwell, Endicott, and Vestal;
- Route NY 26 north of Endicott and south of Vestal; and
- Routes NY 17C and NY-96 in Owego.

In general, roadways in the eastern reaches of Broome County appear to be among the least congested in the region, particularly along the NY 17/I-86 corridor and the easternmost segments of I-88 in the study area. Along the I-81 corridor north of the Binghamton metro area, Routes U.S. 11 and NY 79 are relatively free of congestion compared to I-81 itself.

Truck Activity

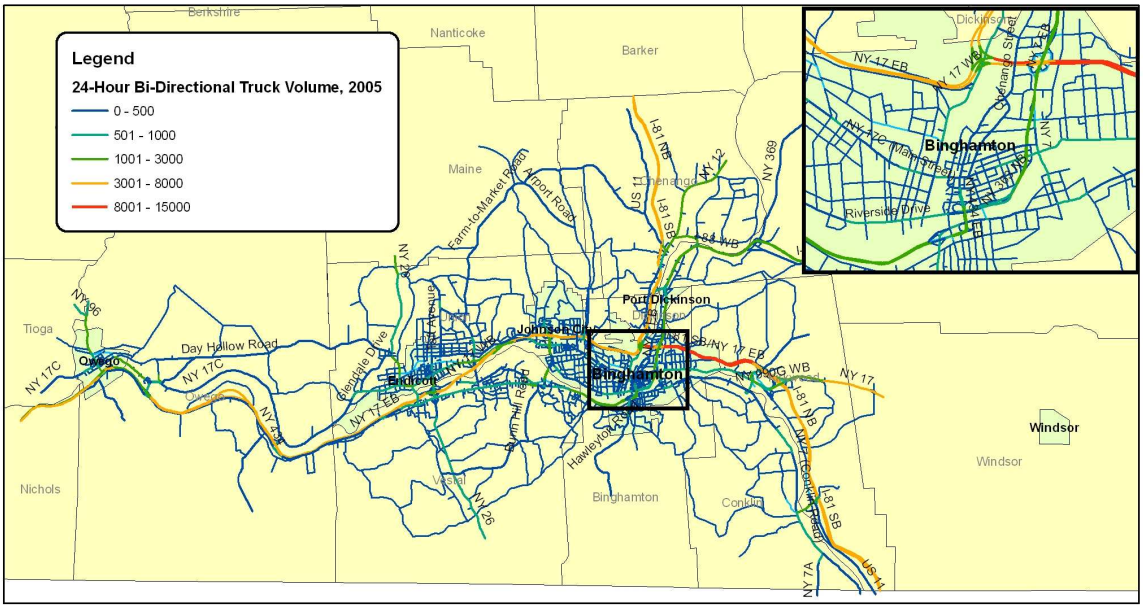
Truck activity was analyzed using several different measures incorporated in the NYSDOT highway data and calculated from other data within the sufficiency file. The NYSDOT data contained a real or estimated (based on roadway classification) truck percentage for each of the 678 roadway segments in the BMTS region; Figure 3.7 provides a graphical representation of the regional roadway network based on the heaviest concentration of trucks in the vehicle mix (as measured by truck percentage), while Figure 3.8 shows a similar view of the BMTS highway network based on computed truck volumes (AADTT).

Figure 3.7 Truck Percentages on NYSDOT-Maintained Roadways in BMTS Region



Source: 2005 NYSDOT Highway Sufficiency File.

Figure 3.8 Average Annual Daily Truck Volumes on BMTS Roadways



Source: BMTS. Includes Single Unit (FHWA Scheme E 5-7) and Combination Trailers (FHWA Scheme E 8-13).

As one might expect, the highest daily truck volumes exist along the interstate highways (including NY 17/I-86), with the heaviest concentration of trucks computed along the common I-81/NY 17/I-86 segment in Binghamton. Somewhat lower truck volumes can be found along NY 17/I-86 to the east of Binghamton, and the lowest levels of truck activity occur along the less frequently traveled state routes throughout the region. One notable exception to this last point is Route NY 79 in the northern part of the region; this roadway is one of the primary routes between Binghamton and the Finger Lakes region and serves a number of small industrial land uses between Whitney Point and Ithaca.

Additional summaries for truck percentages and AADTT are shown in Tables 3.6 and 3.7.

Table 3.6 Truck Percentage Summary for BMTS Region

Truck Percentage	Segments within Range	Roadway Miles within Range
0-5.0 Percent	92	47.71
5.1-10.0 Percent	443	277.32
10.1-20.0 Percent	106	98.13
20.1 Percent and Greater	37	56.29
Total	**678**	**479.45**

Source: BMTS.

Table 3.7 Truck Volume Summary for BMTS Region

AADTT Range	Segments within Range	Roadway Miles within Range
0-1,000 Daily Trucks	478	333.21
1,001-5,000 Daily Trucks	139	97.73
5,001-10,000 Daily Trucks	55	46.89
10,001 Daily Trucks and Greater	6	1.62
Total	**678**	**479.45**

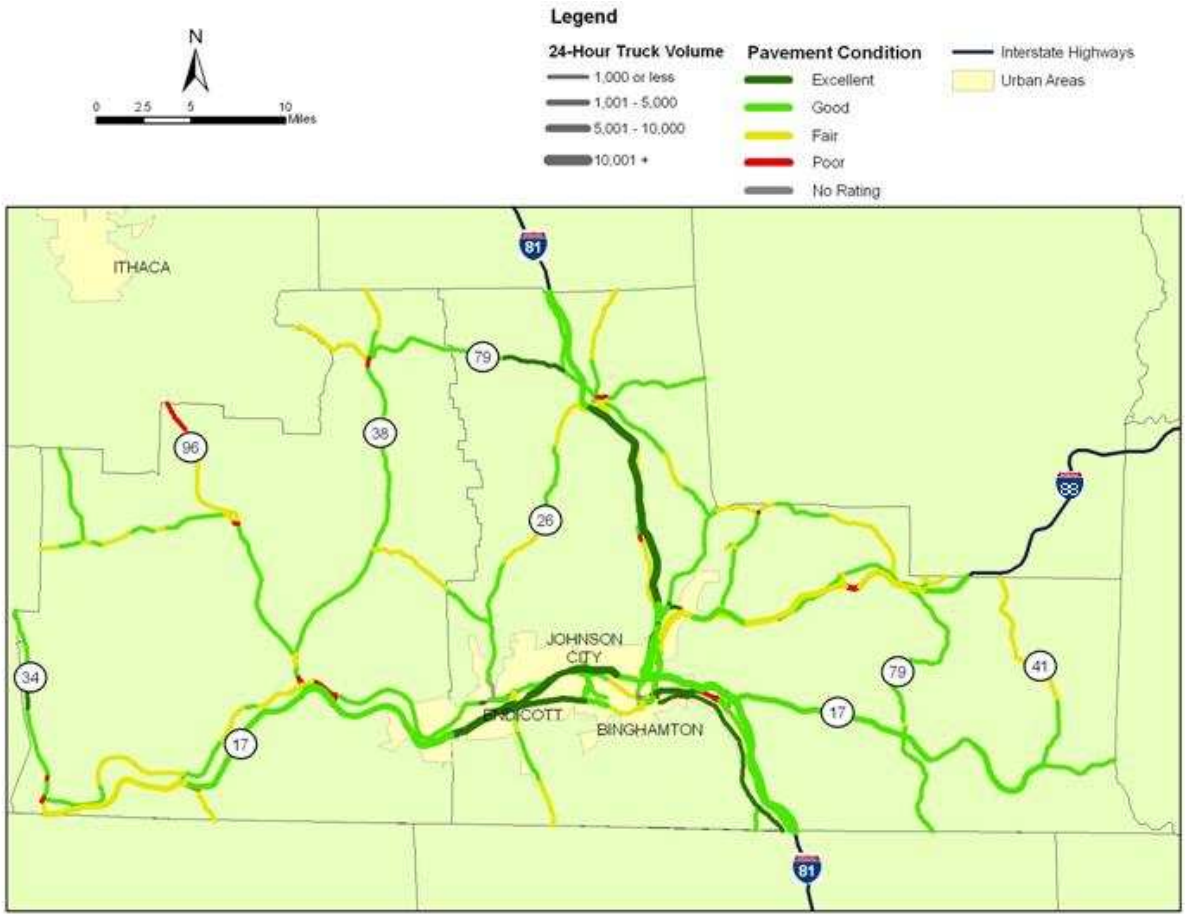
Source: BMTS.

The six segments with a daily truck volume greater than 10,000 trucks lie along the common I-81/NY 17/I-86 adjacent to the downtown Binghamton area. The 55 segments with truck volumes between 5,001 and 10,000 daily trucks generally exist along the remainder of the I-81 corridor and along NY 17/I-86 west of Binghamton.

From a freight mobility standpoint, the most critical roadway segments within the Binghamton region are those that have high levels of truck activity along with other characteristics that could adversely impact the flow of traffic (high levels of congestion, poor pavement condition, deficient bridges, or a combination of these factors).

Figure 3.9 shows the truck volumes combined with the pavement conditions for each of the 678 roadway segments in the NYSDOT highway sufficiency file. The colors in this figure correspond to the pavement conditions shown previously in Figure 3.4, while the line widths correspond to the truck volumes shown previously in Figure 3.9. The information in this figure indicates that the roadway segments with the highest truck volumes generally have very good pavement, while those segments with the worst pavement conditions tend to carry the fewest trucks.

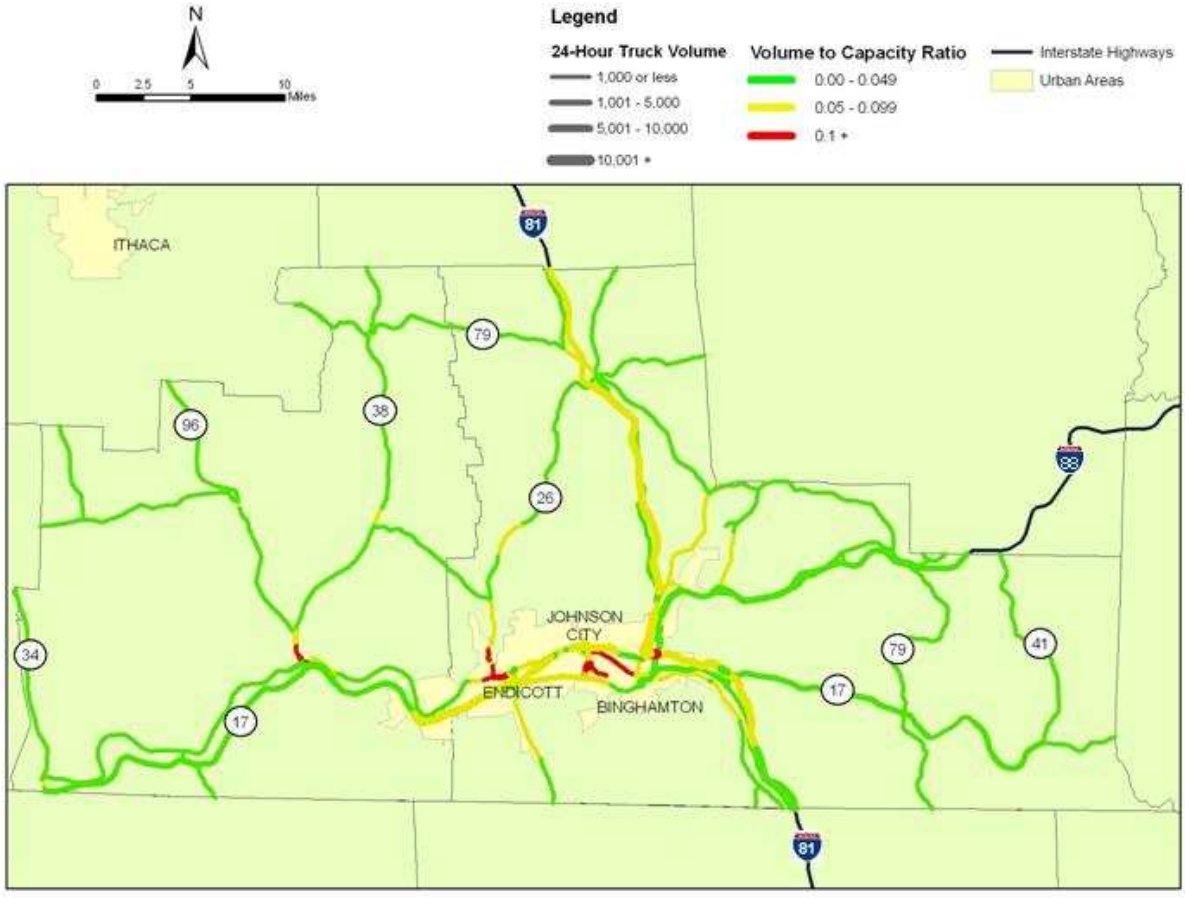
Figure 3.9 Truck Volumes with Pavement Conditions



Source: 2005 NYSDOT Highway Sufficiency File.

Figure 3.10 is similar to the previous figure, but with colors that correspond to the quintile-based congestion measures shown in Figure 3.6 instead of pavement conditions. The information presented in this figure indicates that the shared I-81/NY 17/I-86 roadway segment in Binghamton is the most heavily constrained area of the regional roadway network for truck traffic, as it carries the highest truck volumes in the region (including the six segments with the highest daily truck volumes) and also is among the top 20 percent of the roadway segments in terms of congestion. Additional critical "truck constrained" roadway segments can be seen along I-81 north of the Binghamton metro area as well as along the NY 17/I-86 corridor from Binghamton through Johnson City, Endwell and Vestal

Figure 3.10 Truck Volumes with Levels of Congestion



Source: 2005 NYSDOT Highway Sufficiency File.

Of the 61 segments with daily truck volumes over 5,000, 26 segments are among the top quintile in the region as categorized for congestion (i.e., the 20 percent most congested) and 31 are within the next quintile. In general, I-81 is moderately congested with high truck volumes, while the NY 17/I-86 corridor (west of Binghamton) is somewhat less congested with lower truck volumes. The major limited-access highways east of Binghamton (NY 17/I-86 and I-88) are generally uncongested and carry low truck volumes.

Interview Notes: Highways

The entire Binghamton study area benefits from a broad roadway network. Not only do the primary Interstate routes provide ready access to and across the region, but they are largely in good condition with 70 percent of interview respondents claiming that there is no congestion at all, save for occasional disruptions due to weather or accidents. As such, stakeholder interviews suggest that road capacity is not an area for concern, to the extent that congestion bottlenecks serve as the measure of adequate capacity.

I-81 was identified by most interview respondents as a primary route in company operations, yet few complained of congestion or major problems. Although trade with Canada was not cited as a critical part of operations for most of the stakeholders interviewed, truck lines in Binghamton offer overnight service to major Canadian metropolitan markets, and are able to reach most of the industrial centers in Quebec and Ontario within two days. As the North American Free Trade Agreement (NAFTA) trading bloc evolves and the U.S. and Canadian economies grow together, trade with Canada represents a continuing market opportunity served by the I-81 corridor.

The NY 17/I-86 corridor is the second primary route identified by stakeholders as critical to freight operations in the Binghamton area. While currently it is not the efficient link to the wider continent that I-81 affords, it is the central artery for service across the southern New York region. There were no complaints of congestion limiting freight operations on this route, although stakeholders admit that there is heavier traffic around the intersection of NY 17/I-86 and I-81 at the Prospect Mountain interchange.

Lack of visible traffic constraints then leads some stakeholders to question the need for upgrading NY 17 to I-86 between Binghamton and Erie Pennsylvania; however, it is worth noting that the trade route for goods from the Midwest and from West Coast ports is chiefly through Pennsylvania and not along the southern tier. Motor carriers in Binghamton today have begun to offer guaranteed fourth day delivery for Asian goods imported through Los Angeles, yet they are coming into the region via Harrisburg. The transformation of NY 17 to I-86 begins to create a trade corridor flowing through Binghamton that relieves I-80 and competes with its facilities; and in combination with I-81, it establishes a true crossroads in the BMTS region.[3]

Few stakeholders interviewed identified I-88 as a route pivotal to their operations. Its capacity appears ample, with no interviewees identifying congestion or access problems. Issues that were cited centered on the absence of truck stops and the dearth of industry to provide cargo for backhauls.

Secondary routes through the Binghamton region largely are not plagued with congestion, but do suffer from several difficult access points, which limit their overall freight capacity. Points of concern raised by stakeholders include congestion and low-bridge clearances along Old Vestal Road, and passenger congestion along Vestal Parkway, due to the rising concentration of retail outlets.

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[3] The impact of Route 17's expansion will be discussed in greater detail in Task 3.

Rail Network

Overview

The Binghamton area rail network can be described in terms of the rail infrastructure in the region (rail tracks, yards, bridges, tunnels, etc.) or in terms of the services operated over the infrastructure. The region is served by four operators over eight rail lines radiating out from central Binghamton. These eight lines are labeled on the map in Figure 3.11 with the companies that own each line and the companies that operate services over each line. Clockwise, from 12 o'clock, these consist of the following:

1. New York Susquehanna & Western Railway (NYSW) owns and operates service over the line from Binghamton north to Syracuse, New York by way of Chenango Forks, New York and Whitney Point, New York. At Syracuse, NYSW connects to the CSX-owned Main Line (CSXT Main Line) from New York City to Buffalo and to the CSXT St. Lawrence Subdivision (former Conrail Montreal Secondary) starting in Syracuse and heading north. This line "competes" with the CP north-south main line which runs from Montreal through Albany to Binghamton.

2. NYSW also owns a line branching off at Chenango Forks that runs northeast to Utica, New York, by way of Greene, Norwich, and Sherburne, but NYSW only operates trains on the northern section of this line between Sherburne and Utica (another interchange point for the CSXT Mail Line) after a washout in 2006 destroyed a bridge over the Chenango River near Sherburne. NYSW recently filed a petition with the Surface Transportation Board to discontinue service on the portion of the line between Chenango Forks and Sherburne, south of the washout.

3. Canadian Pacific Railway (CP) owns and operates the line between Binghamton and Mohawk Yard (Schenectady) by way of Nineveh. From Schenectady, CP operates service north via Saratoga to Montreal. At both Mohawk Yard and Saratoga, CP interchanges with PanAm railway, which serves New England Markets. Norfolk Southern Railway (NS) has agreements with CP and PanAm to operate trains over their rail lines to serve customers in New England.

4. NYSW leases from NS a portion of the Southern Tier line running southeast from Binghamton to Port Jervis, New York by way of Lanesboro, Pennsylvania, and operates service via this line and the Hudson Secondary to Sparta Junction, New Jersey where the NYSW rejoins its own trackage to serve the northern New Jersey region. Central New York Railroad (CNYK), a subsidiary of the same company that owns NYSW, provides service to local customers on this line between Binghamton and Port Jervis. Also, Norfolk Southern, the owner, still retains freight rights over Southern Tier East.

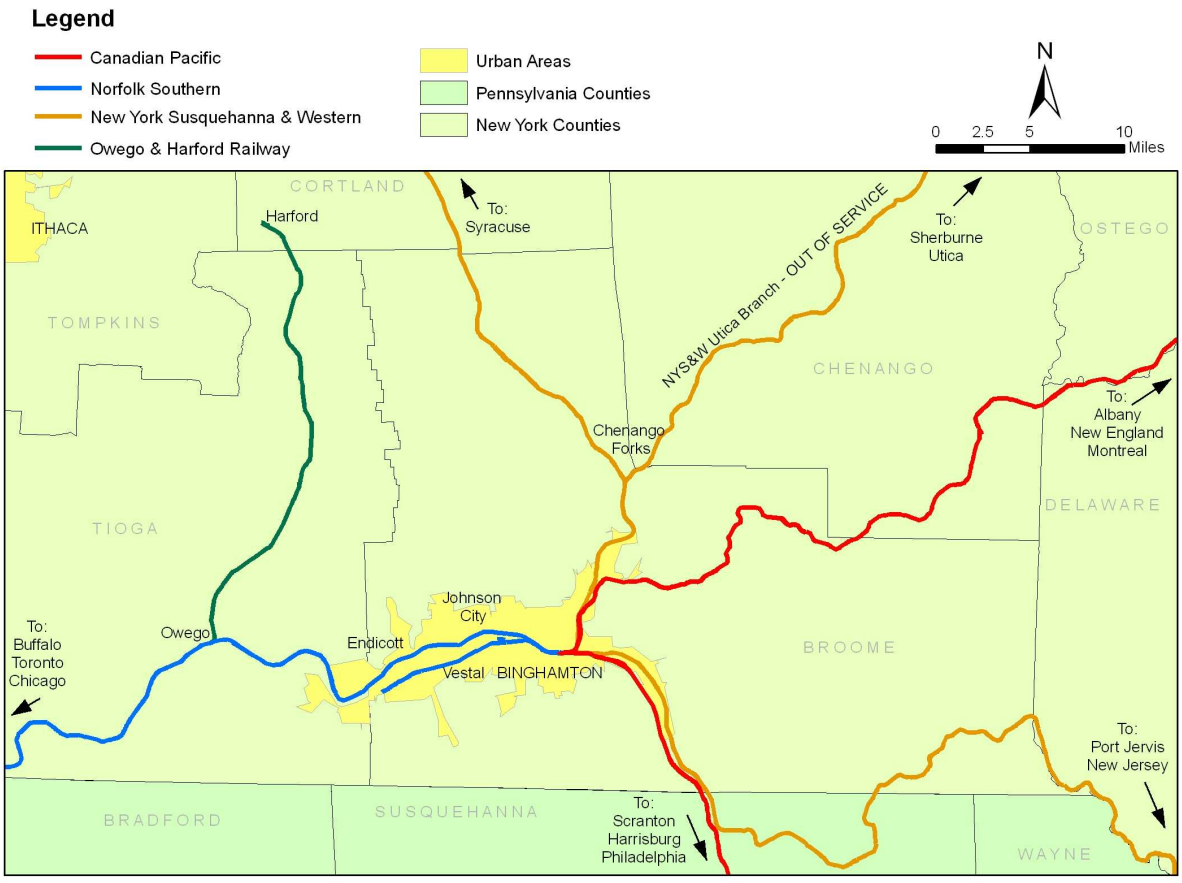
5. CP owns and operates the line running south from Binghamton to Scranton by way of Hallstead, Pennsylvania. NS also has rights to operate trains over this line to access its large intermodal hub in Harrisburg, and both NS and CP operate trains to and from Philadelphia, southeastern Pennsylvania, and southern New Jersey.

6. NS owns and operates a relatively short spur running west from Binghamton to Vestal, New York, on the south side of the Susquehanna River.

7. NS owns and operates service over the remainder of the Southern Tier line running west from Binghamton to Buffalo, New York by way of Owego, New York. NS then carries traffic from Buffalo to Chicago along the former Nickel Plate Route along the shore of Lake Erie. At Buffalo, NS interchanges with CP and Canadian Northern (CN) lines to Canada. At Hornell, southeast of Buffalo, the Southern Tier Extension splits off from the Southern Tier Line and heads west to Olean and Jamestown, New York, and then through the northwest corner of Pennsylvania to Corry, Pennsylvania, where it joins the Norfolk Southern mainline at Erie via the Allegheny Railroad. The Southern Tier Extension is leased from NS by the Southern Tier West Rail Authority and operated by the WNYP. It now serves as a (modestly used) West-East rail bypass of the Buffalo terminal area, mainly for NS unit coal trains.

8. Owego & Harford Railway (OHRY) owns and operates a line branching north from the Southern Tier Line at Owego to Harford, New York.

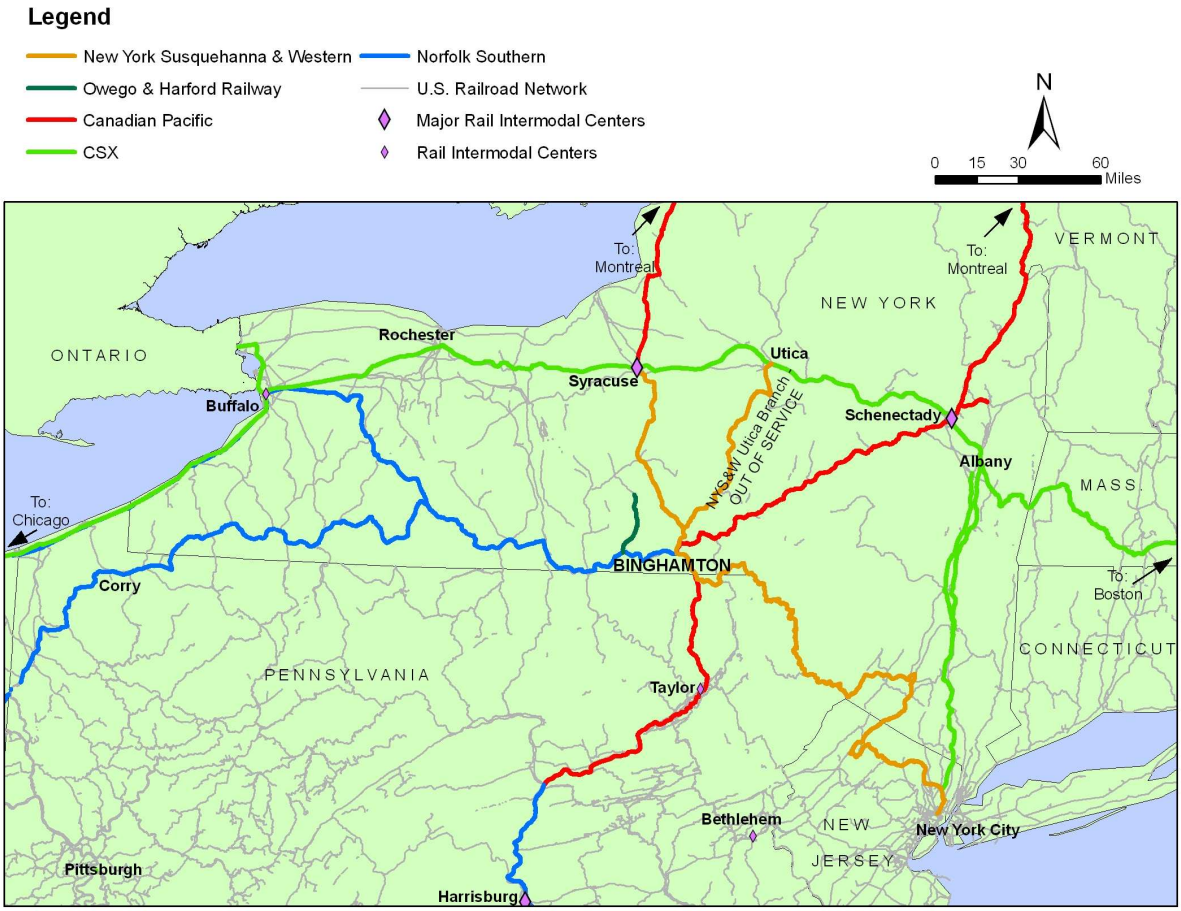
Figure 3.11 Primary Operators of Regional Rail Lines



CP and NS are two of the seven largest rail operators in the United States, categorized as "Class I" rail operators by the Surface Transportation Board, the body responsible for regulating rail operations in the United States. Class I rail lines are those with more than $319.3 million in revenues in 2005. NYSW, CNYK, and OHRY are classified as short line railroads.

Figure 3.12 shows how Binghamton's rail operators connect the region to other regions. Not all rail lines are shown on the map for purposes of legibility, but the map does show how Binghamton is directly connected to the New York City metropolitan area; to Chicago, Toronto, and points west; to Albany, New England, and Montreal; and to Scranton, Harrisburg, and points south. The map also shows the locations of major intermodal rail terminals that serve Binghamton-area businesses.

Figure 3.12 Direct Rail Connections to Other Regions



Throughout this section, references are made to the condition of track and the degree to which it meets modern weight and clearance standards. The current national standard for rail clearances set by the American Railway Engineering and Maintenance-of-Way

Association (AREMA) is 23 feet from the top of the rail. The 23-foot standard allows for a train with "double-stacked," "high cube" containers to pass at full speed, and allows for installation of overhead catenary wire to power electric trains. ("double-stacked," as the name suggests, involves stacking two containers on a single flat rail car. "High cube" refers to the tallest shipping container currently in widespread use, measuring 9-feet 6-inches high.) Given the almost universal (and perhaps permanent) use of diesel locomotives, rather than electric locomotives, to power freight trains in the U.S., many rail lines revert to a 22-foot clearance standard for double-stack, high cube trains, or a 20-foot, 9-inch minimum standard for these trains at low operating speeds. (Lower operating speeds reduce the safety margin required to accommodate vertical movement of railcars.)

The national standard maximum loaded weight of a single railcar is 286,000 pounds. Thus, tracks are considered to meet national standards if all structures and the railbed are able to accommodate 286,000 pound railcars (also referred to as "286K" cars). Rail lines with weight capacity below 286K are at a disadvantage in terms of the efficiency of freight movement. In addition, with a new 315K standard on the horizon in the U.S., and already being adopted overseas, rail lines with weight capacity limitations will be even further behind in terms of their economic viability.

The study team conducted field inspections of these rail lines from public access points between November 27 and 29, 2007, focusing on areas contained within Broome and Tioga Counties. The team also conducted interviews with NYSW and NS to gain insight into the operational characteristics of the region's rail services. The remainder of this section provides a detailed analysis of the physical and operational characteristics of Binghamton's rail network.

Rail Operations

NYSW and CNYK Operations

NYSW and CNYK, both subsidiaries of the Delaware Otsego Corporation, operate on three lines radiating from central Binghamton.

The NYSW track running north from Binghamton to Syracuse was formerly owned and operated by Conrail, and before that by the Delaware, Lackawanna & Western Railroad Company (DL&W). It extends 75 miles between Binghamton and Syracuse. At Syracuse, the NYSW interchanges with the CSXT Main Line that runs across the State from Albany to Buffalo. The single track NYSW line consists of jointed rail and is not equipped with a signal system, limiting speeds to between 15 and 25 miles per hour along most of the route. The track can accommodate 286,000-pound railcars. NYSW mainly carries aggregate along this line and shuttles a few railcars per day between customers along the line and the CP and NS networks. The line also operates as a detour route for CSX intermodal trains, when there is a service disruption on CSX's River Line between Albany and New Jersey.

NYSW also owns a former DL&W line branching off the Syracuse line at Chenango Forks and running northeast 93 miles to Utica (see Figure 3.13). At Utica, this line interchanges

with the CSXT Main Line. Also like the Syracuse line, this single track line consists of jointed rail and is not equipped with a signal system. After sustaining flood damage in 2006 near the Chenango River crossing, service along this line was discontinued between Chenango Forks and Sherburne, but NYSW still is able to provide service to customers north of Sherburne by operating on its own tracks to Utica, then west along the CSXT Main Line to Syracuse, and then south via NYSW tracks to Binghamton and connecting points.

Figure 3.13 Chenango Forks Junction on NYSW

Both lines from the north converge at Chenango Forks, where NYSW trains run south through central Binghamton and then either interchange with NS and CP or run east over the Southern Tier line to northern New Jersey. The full Southern Tier rail line, which extends from northern New Jersey through Binghamton to Buffalo, is owned by Norfolk Southern. NS leases the portion of the line between Port Jervis and Binghamton to Delaware Otsego, while maintaining trackage rights to access the Conrail Shared Assets infrastructure in northern New Jersey.[4] Delaware Otsego uses the track to run through NYSW trains to northern New Jersey and local CNYK trains to service customers between Binghamton and Port Jervis. CNYK interchanges with NS and NYSW in Binghamton.

East of Binghamton, the Southern Tier line is predominately single track, with jointed rail and several sidings in excess of 15,000 feet. Significantly, the line has sufficient clearance

[4] After the dissolution of Conrail in 1997, NS and CSX formed an agreement to share rail tracks and terminals in the northern New Jersey, South Jersey/Philadelphia, and Detroit regions. The infrastructure that is jointly owned and operated by the two firms is referred to as the "Conrail Shared Assets" operations.

for double-stack train cars and can accept cars loaded up to 286,000 pounds. Speed limits range between 25 and 40 miles-per-hour, but signals have been disconnected.

From Port Jervis south to the New Jersey border, the Southern Tier line is owned and maintained by the New York Metropolitan Transportation Authority's Metro North Railroad, which operates relatively high-frequency passenger trains during the day under contract to NJ Transit on the New Jersey side of the border. Thus, most freight traffic on the Southern Tier line east of Binghamton is restricted to overnight hours. The restriction has limited the amount of rail freight that can be carried via this route between Binghamton and northern New Jersey, and limits the opportunity for this route to serve as an alternative to increasingly congested CSX and NS lines serving ports, intermodal facilities, and businesses in New Jersey.

Another constraint on both NYSW and CNYK is the operation of trains through the rail yards in central Binghamton, where both rail operators must share track space with CP and NS. Issues related to rail yards will be discussed in the next section.

CP Operations

The CP main line that runs from the Albany area to Binghamton and then south to Scranton is one of the most important lines in CP's network. Northeast of Binghamton, the line extends 125 miles between Binghamton and Mohawk Yard before continuing on to Montreal. This single track line features continuous welded rail (CWR) as well as three passing sidings of between 15,000 and 24,000 feet and one siding of 7,400 feet. Near Tunnel, New York, the line passes through the Belden Hill Tunnel, a single-track tunnel (see Figure 3.14). The line is double-stack cleared and can handle 286,000 pound cars. The line also features centralized traffic control systems and a 30 to 40 miles-per-hour speed limit. During field inspections, signal improvements and installation of welded rail appeared to be underway at many locations on the line to upgrade the line to FRA Class III track, a project that in part is being financed by NSYDOT.

Figure 3.14 Entrance to Belden Hill Tunnel on CP Main Line near Tunnel, New York

South of Binghamton, the CP main line extends 130 miles to Sunbury, Pennsylvania. Since 2006, CP has added three sidings between Binghamton and Sunbury, PA: Milford (10,000 feet), Lafen (6,000 ft.), and Hanover Township (10,000 feet). All are powered and dispatcher controlled, although much of the line is still unsignalled. A major upcoming investment is likely to be installing signaling along the entire route, which will improve the reliability and capacity of the route, and make it far more suitable for passenger operations. It is cleared for international double stack containers and features speed limits ranging between 25 and 40 miles-per-hour. The line can accept 286,000 pound rail cars.

CP also has trackage rights to haul trains over the NS-owned Southern Tier Line from Binghamton to Buffalo. At Buffalo, the Southern Tier Line connects to CP's network into Ontario.

CP operates a mix of intermodal and bulk trains to and from the Port of Montreal via its main line to Albany and north to the Rouses Point border crossing. About six CP intermodal trains pass through the region per day on average, in addition to several trains per week carrying grain products, coal, and other bulk cargoes. CP serves customers in the Binghamton region, eastern Pennsylvania, and the Baltimore-Washington metropolitan area. CP also serves several grain processors in the Albany-Binghamton-Scranton corridor.

The capacity of the CP main line between Albany and Scranton (via Binghamton) is constrained by two features. First, the single-track CP main line has only three passing sidings between Albany and Binghamton, and three more between Binghamton and Scranton. Trains must pull into a siding wait for one or more trains to pass before continuing. Second, the line passes through steep grades that limit train speeds. For

example, during a field visit, the study team observed a northbound NS intermodal train cresting the over one percent grade near Tunnel, New York at approximately 13 miles-per-hour. The 2,260-foot long Belden Hill Tunnel and the steep approach grades on both sides restrict the capacity of this line. However, CP indicated in interviews that the line has sufficient capacity to handle current demand and projected future growth.

Slow speeds mean trains take even longer to pass one another at sidings. If a train can only average 25 to 30 miles-per-hour over 130 miles due to hilly terrain, and must wait 40 to 60 minutes at each siding to allow one or more trains to pass, a truck would have a clear competitive advantage for the short-haul trip. Over longer distances, other factors such as vehicle operating costs and truck driver hours of service regulations come into play, making rail more competitive. Following sections contain a more detailed discussion of the operational advantages of truck versus rail for trips between Binghamton and various origin and destination markets.

NS Operations

NS owns and operates the portion of the Southern Tier line between Binghamton and Buffalo. As mentioned above, southeast of Binghamton the Southern Tier line is owned by NS but primarily carries NYSW and CNYK trains.

West of Binghamton, the Southern Tier line is double tracked with continuously welded rail on one track for 45 miles to Waverly and bolted, or "stick," rail on the other track. The rest of the way to Buffalo, the line is single tracked with 10,000- to 26,400-foot sidings. The Southern Tier line features automatic block signals and a speed limit varying between 25 and 50 miles-per-hour. It has been cleared to accommodate double-stack trains and can handle 286,000 pound cars, with the exception of a 17-mile section in the middle of the line that is only rated for 273,000 pounds due to the deteriorating condition of the historic Portage Bridge. Through a project being funded in part by NYSDOT, NS is going to "single-track" the line from Binghamton to Waverly. The project will improve operating speeds to 50 MPH throughout and implement a modern traffic management system, with no impact on Binghamton-area capacity. However, the Portage Bridge restrictions and rail infrastructure maintenance and operational issues in the Buffalo area do impact Binghamton rail operations in that these bottlenecks limit the density of rail traffic that can use the line.

In fact, in May 2008, NS announced an initiative called "Empire Links" that will allow 10 New York-based short-line railroads to make use of excess freight capacity along the Southern Tier Line from Binghamton to Silver Spring, New York (which is east of the bottleneck at the Portage Bridge). NYSW and OHRY both are partners with NS in the initiative. The short-line railroads will be able to market short-hail rail services that could become competitive with truck trips in the range of 400-500 miles, which is approximately the maximum distance a truck can travel in one day on roads and highways in the Southern Tier. If this marketing initiative is successful in generating demand for more frequent rail service and connections to the national rail network, businesses in the Binghamton region could benefit from increased transportation options and more competitive shipping rates.

Through agreements with CP and Pan Am Railways, NS also has announced plans to begin intermodal service along the "Patriot Corridor" to Ayer, Massachusetts (outside Boston). The plans are subject to approval by the Surface Transportation Board. The new Patriot Corridor will connect NS intermodal terminals throughout its system to New England, and many of the new or extended trains will run via Binghamton. From points west, intermodal trains will arrive in Binghamton primarily on the NS Southern Tier line and then transit via trackage rights over the CP main line from Binghamton to Mechanicville, the western end of the Patriot Corridor. (The Patriot Corridor itself will run from Mechanicville, New York to Ayer, Massachusetts.) From the south, trains will run from the large NS intermodal yards in Harrisburg, one of the three primary NS intermodal hubs in the U.S., via the NS Buffalo Line to Sunbury, Pennsylvania. From Sunbury to Mohawk Yard, NS has trackage rights over the CP line that runs through Binghamton.

The NS Johnson Running Track branches off from the Southern Tier line in Johnson City and runs to its current end at Vestal. The line is unsignaled and limited to a maximum of 10 miles-per-hour. Customers on the line include the AES Energy Westover Plant (on the east side of the Susquehanna River) and National Pipe and Plastics, located west of the river at the far west (stub) end of the line.

Approximately 8 to 10 NS-operated trains pass through Binghamton on an average day. Most of these are running between Saratoga Springs and Buffalo via the CP main line and the NS Southern Tier line or between Saratoga Springs and Harrisburg via the CP main line. Some NS traffic is interchanged with NYSW in Binghamton to be hauled to/from points in northern New Jersey or to/from customers north of Binghamton. On occasion, due to a bottleneck or incident in another part of the NS system, trains bound for other destinations may also pass through Binghamton.

NS experiences most of its delays not on its own tracks, but rather at interchange points in the region and outside the study area. The next section discusses issues with rail yards and interchange points in the Binghamton region.

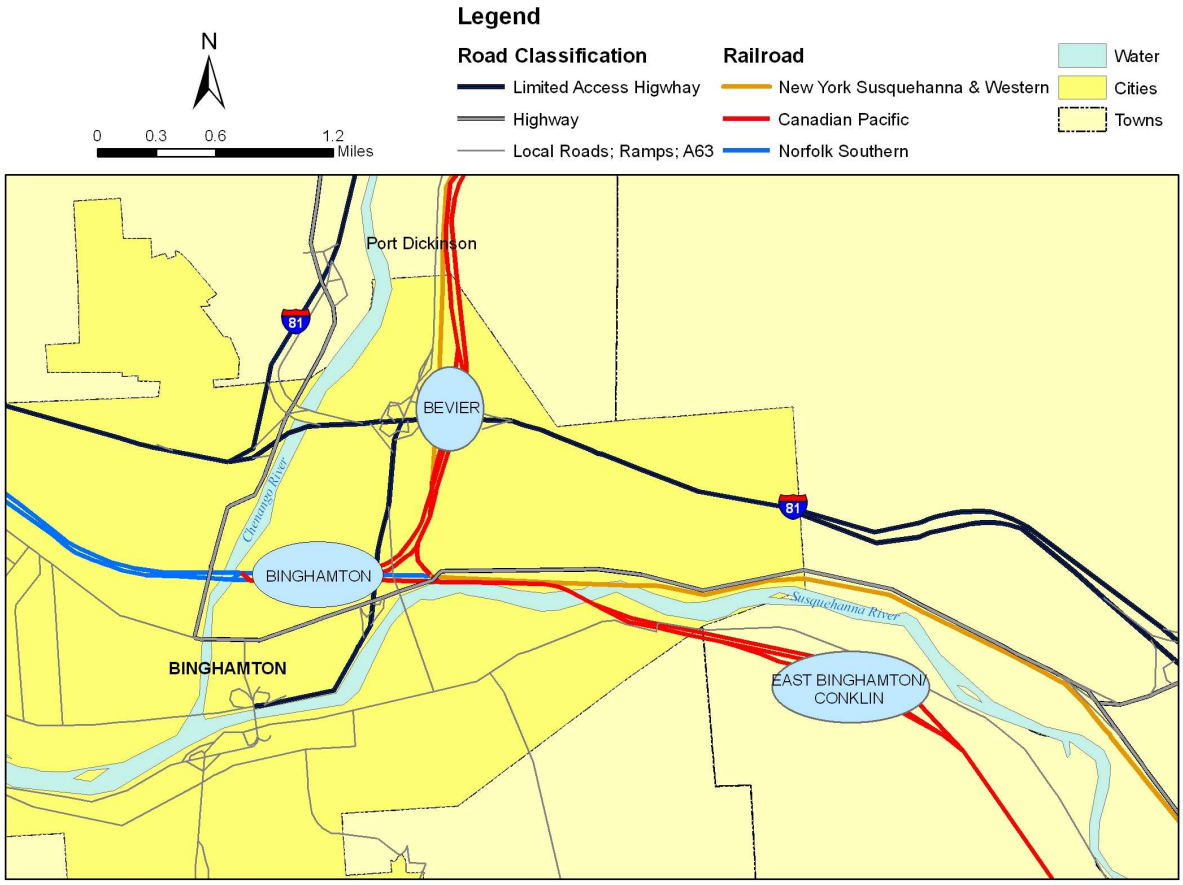
OHRY Operations

The OHRY line between Owego and Harford branches off from the NS Southern Tier line at Owego. The OHRY is a short line rail operator serving industries in Owego as well as a propane facility at Harford Mills. In Owego, rail cars are exchanged between NS and OHRY at a small rail yard.

Rail Classification and Storage Yards

Figure 3.15 shows the locations of the three main rail yards in the Binghamton region. CP operates the East Binghamton rail yard (also known as the Conklin Yard) in coordination with NS, and CP also owns the Bevier Street yard north of downtown. NYSW owns and operates the Binghamton yard in downtown Binghamton. All three of these yards primarily are used to store and sort rail cars for inbound and outbound trains. NYSW operates a low-capacity bulk transfer facility located at the Binghamton Yard in central Binghamton.

Figure 3.15 Major Rail Yards in the Binghamton Region



CP's East Binghamton Yard is east of Binghamton between Conklin Road and Woodside Avenue, just south of where the CP main line crosses the Susquehanna River. The East Binghamton yard, CP's primary rail yard in the region, is a moderate sized yard, four miles long with 17 tracks, a flat switching yard, and a locomotive fueling and servicing facility. CP and NS have an agreement to share use of the yard to "classify" or exchange cars between trains. The main access points to the yard, primarily for employee

automobiles, are at Holmes Place at the north end of the yard and Terrace Drive (NY 173) at the south end of the yard.

CP's Bevier Street Yard is located at the intersection of the NYSW and CP main line, roughly between Bevier and Robinson Streets in downtown Binghamton (see Figure 3.16). The yard consists of a main track for through traffic and five yard tracks. The Bevier yard primarily served the Agway grain elevator and feed processing facility, located at the south end of the yard as seen in the background of the photo in Figure 3.17. Due to the closure of the Agway facility, the yard is used mainly for railcar storage. NYSW historically had a yard at Bevier Street as well, but the yard now consists only of a stub track that is used primarily for storage.

Figure 3.16 CP Bevier Street Yard

The NYSW Binghamton Yard is located in central Binghamton between Chenango Street and Brandywine Avenue. NYSW can transload freight from up to 15 railcars at the facility via a loading dock. NYSW primarily transloads iron and steel scrap at the yard. In addition, both NYSW and CNYK exchange cars with NS at the Binghamton Yard.

Truck access to the NYSW was cited as a problem during an interview with representatives of the company. There are separate entrances for truck and cars and both are very difficult with narrow passages and bad sight lines. Trucks have little to no turn around space and a very narrow strip of road on which to pull up next to rail cars.

Physical and Operational Constraints

From a physical plant standpoint, the track structure on the tracks owned by NS and CP seems sufficient given the current level of rail freight traffic. For example, a recently released long-term needs analysis and capacity investment study of the national rail system by the American Association of Railroads cited the CP main line from Albany, New York to Sunbury, Pennsylvania as "green," or operating below capacity, and expected to remain at that classification in 2035. Many of the delays in rail traffic in Binghamton are due to chokepoints and bottlenecks outside the study area.

Notwithstanding the national view, there are physical and operational constraints on the Binghamton region's rail system today. Three types of constraints could cause delays within and outside the region if rail freight traffic grows in the future, and in particular if passenger service is added to the existing rail infrastructure:

1. Delays at yards and interchange points;
2. Lack of adequate passing sidings on mainline tracks; and
3. Low speeds due to hilly terrain and relatively steep grades.

Two existing physical issues are constraints on the growth of rail mode share for imports and exports, and thus represent a constraint on the growth potential of Binghamton's economy:

4. Lack of access points to the rail network for local businesses; and
5. Insufficient clearance on rail bridges over local roads used by truck deliveries (largely a truck issue).

Each of these constraints is discussed further in the remainder of this section. Potential rail improvements are to be discussed in Chapter 6 of this report.

Yard-Related Delays

All of Binghamton's rail lines (with the exception of the NS Johnson Lead and the OHRY line from Owego to Harford) converge in downtown Binghamton, where trains must either share track or cross over track controlled by one or more other operators. Essentially, NS operations between Buffalo and Albany conflict with CP operations from the Albany area to Scranton and points south, while NYSW trains between Syracuse and northern New Jersey must cross over and share tracks with both.

Having connections that allow all the rail operators to exchange cars amongst themselves is a benefit to the entire region in that it provides rail-related jobs in Binghamton and allows smaller operators like NYSW, CNYK, and OHRY (and their local customers) to access national and international markets via CP and NS. However, today's minor delays due to a lack of dedicated lines for through trains in the Binghamton and Bevier Street yards could expand into more significant delays that may impede the efficiency of rail freight operations in the region as traffic increases in the future.

Although the number of freight trains per day passing through central Binghamton (about 20 on a moderately busy day) does not seem high, a CP or NS train may take 30 minutes or more to pass through Binghamton's rail yards, depending on the length of the train and the amount of congestion ahead of the train. Meanwhile, NYSW, lacking its own through track, regularly has trains experiencing several hours delay to pass through Binghamton as they wait for CS and NS trains to clear. Added to this, local switching operations on the limited space in Binghamton's rail yards further contribute to delays, and local movements are delayed themselves as they wait for through trains to pass.

The predecessors to NYSW and CP used to have separate passages through Binghamton, but various projects have eliminated tracks that provided needed redundancy and operational flexibility in central Binghamton. One interviewee cited a project undertaken to increase bridge clearances for trucks on roadways in central Binghamton, in which the State opted to reduce the number of rail bridges from three to two (and thus the number of tracks from three to two) as a cost-saving measure (for maintenance and property taxes).

The importance of resolving conflicts at central Binghamton rail yards will become one of the most pressing issues if passenger rail service is restarted on one or more lines radiating out of central Binghamton. Unless passenger trains are assumed to have priority on freight rail lines, delays of 30 minutes or more could prevent passenger rail from becoming a viable option for intercity passenger travel to Scranton, New York City, or other destinations.

Lack of Passing Sidings on Mainline Tracks

Each of the rail lines radiating out of central Binghamton had at least two tracks in the past, and the right-of-way still exists to accommodate two or more tracks. However, over the years when the region's rail traffic declined from its peak, rail operators opted to decommission large parts of their second tracks in order to save on property taxes and direct limited capital improvement budgets (e.g., for enhanced signal systems allowing more closely spaced trains or for or improved weight-bearing capacity to accommodate heavier 286,000-pound rail cars) into a single track rather than two tracks. Norfolk Southern is undertaking a NYSDOT-funded project to single-track the Southern Tier line west of Binghamton to Waverly.

Today, there are limited passing sidings on the CP main line to Albany and to Scranton and on the Southern Tier line east of Binghamton towards New Jersey. The rail operators, however, are adding siding capacity as necessary to accommodate increased traffic, but suitable locations for cost-feasible sidings (e.g., where a new tunnel or bridge is not necessary) are limited in the hilly terrain of the study area. For the time being, the major capacity constraint on the rail system is at the rail yards and intersections in central Binghamton and outside the region. The Norfolk Southern single-tracking of the Southern Tier Line, for example, is expected to result in no net decrease in capacity as strategic passing sidings will remain and the remaining single track will be maintained at higher standards, allowing for higher operating speeds.

As growth in demand for freight transportation by rail increases the need for rail system capacity expansions, the rail operators may be faced with major capital projects to restore double-track on portions of their lines, with accompanying big-ticket structural improvements. If proposed passenger train service is to be successful, there must be sufficient track capacity to accommodate passenger trains on a reliable and reasonable schedule while also maintaining freight service. While it is not clear whether the CP line to Scranton would need to be fully double-tracked to accommodate passenger service, some capacity enhancements would be necessary.

Low Operating Speeds

As mentioned above, steep grades on the rail lines in the region, and in particular on the CP main line approaching the Belden Hill Tunnel, slow the speeds of trains. The slow speed increases the travel time of each train, and further impacts the travel time of trains waiting in passing sidings.

Short of purchasing new rights-of-way and investing in new track and tunnels to bypass high points on the region's rail lines, there are few practical options to increase train speeds. With strategic investments in more and longer passing sidings, rail operators could mitigate the impact of train speeds on total travel time, particularly for trains that must currently stop in one or more siding to wait for one or more trains to pass in the opposite direction.

In addition, the condition of the track and signal system on the NYSW Syracuse Branch also prevents trains from exceeding 25 miles per hour for safety reasons. Incremental track and signal upgrades on the NYSW lines and on rail main lines could permit corresponding incremental increases in operating speeds, closer spacing of trains, and increased rail throughput.

Lack of Local Access Points to the Region's Rail System

There are relatively few points where local businesses can access rail services in the Binghamton region, in particular for businesses not located directly on the track. One significant trend in the rail industry has been a shift from direct access to businesses via rail sidings to indirect access via centralized hubs for transloading freight between truck and rail. Whereas sidings allow a rail car to pull up directly to a business's loading dock or a grain elevator, for example, transload facilities require freight to be drayed (shipped a short distance by truck) from a business to a centralized transfer point.

From the standpoint of the rail operators, the centralized facilities are usually much more efficient because they eliminate the need to stop a train on the mainline track, uncouple one or more cars, move them into place on the siding, recouple the remaining cars, and then continue to the next stop. Instead, trains can pull into a large rail yard and multiple cars can be loaded and unloaded simultaneously. The downside is the additional local (and sometimes interregional) truck traffic created by the new drayage moves.

Businesses that generate significant volumes of freight may still be able to negotiate direct service to a siding or dedicated rail yard, and may be eligible for Industrial Access Grants

from NYSDOT to help fund construction of rail sidings or spurs, although this program has not been funded in recent years. NYSDOT, BMTS, and local businesses must be proactive in working with rail operators to design and construct new sidings, as rail operators typically do not have an incentive to do so on their own.

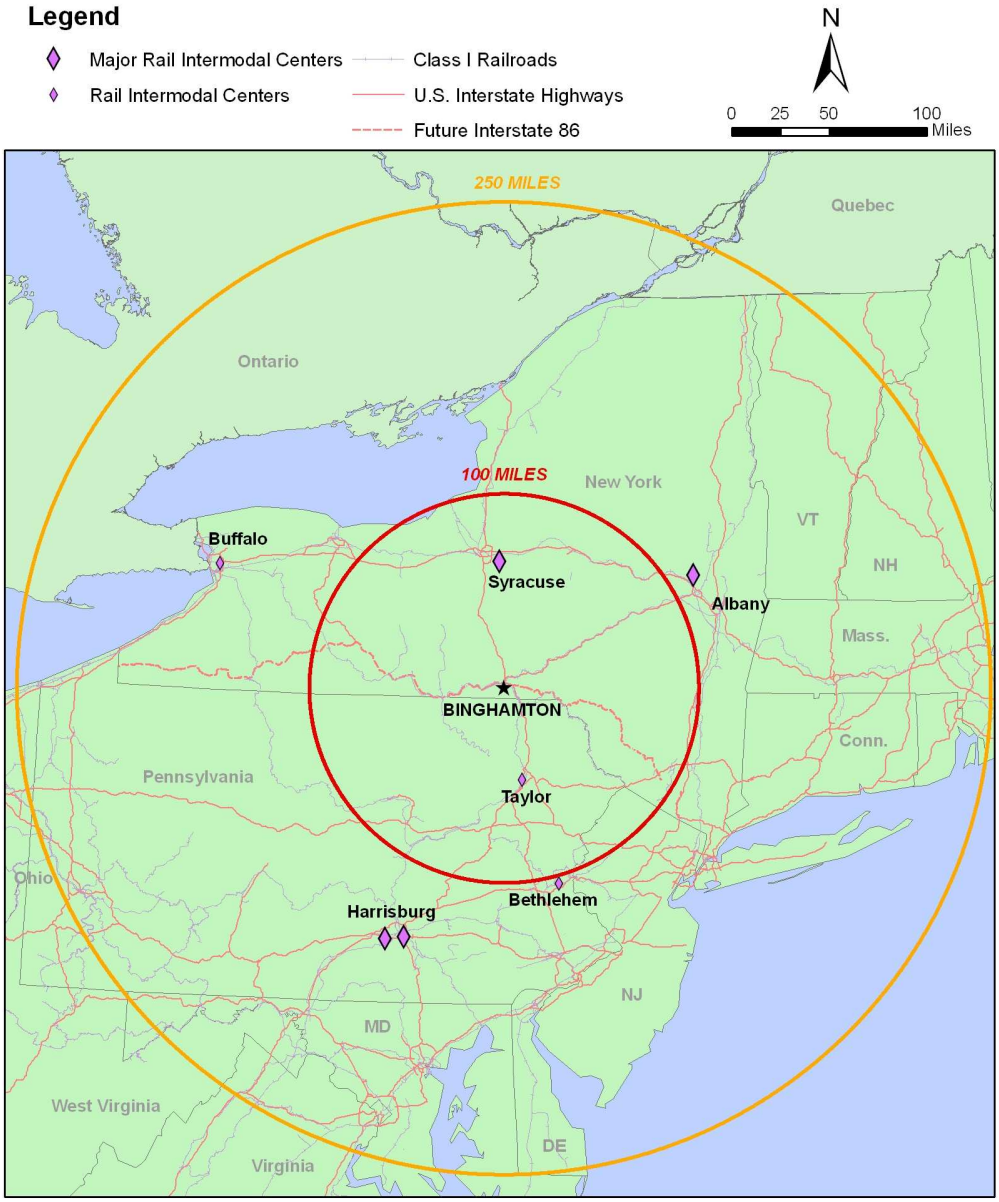
Bulk freight can be loaded onto rail using mechanisms such as pipes for liquid bulk rail cars (e.g., dairy, chemical or petroleum products), conveyor belts for hopper cars (for grains, sand, coal and other granular materials), forklifts for boxcars (for palletized and packaged cargo), and cranes for heavy, bulky cargo that travels on rail flatcars. Liquid bulk rail cars and hopper cars most commonly are loaded directly at the facility where they are produced/mined and unloaded directly at the facility where they are used as raw inputs. Other types of bulk rail freight also can be loaded directly or can travel by truck to or from a rail transfer facility.

Intermodal rail transload facilities, locations where containerized freight is transferred from truck to rail or vice versa, are a second type of rail transload facility. Currently, there is no intermodal facility in the immediate Binghamton area. The closest major intermodal facilities are located in Syracuse (CSX), Albany (CP and NS), and Harrisburg, Pennsylvania (two NS terminals), with smaller NS facilities near Taylor (just south of Scranton) and Bethlehem, Pennsylvania. Figure 3.17 shows major intermodal facilities located within 250 miles of Binghamton.

While some shippers have requested intermodal service in the Binghamton area, there are several challenges to procuring such a facility. Some of the Class I railroads operating in the area have expressed a lack of interest in developing an intermodal facility due to the effect such a facility could have on the on-time performance of through traffic. Some shippers have expressed skepticism about the viability of such a facility if connected to the primarily single-track lines radiating out from Binghamton, and therefore prefer the time and cost savings of draying containers to the intermodal facility on the CSX line in Syracuse or to other intermodal facilities located within a reasonable drayage distance of Binghamton. These challenges and potential strategies that can be employed to overcome them are discussed further in Chapter 6 of this report.

A rail intermodal facility similar to the CSX facility in Syracuse or the smaller NS facility in Taylor, Pennsylvania, could help attract firms to Binghamton that rely on import and export of goods via intermodal containers or who could benefit from long-distance transport of 53-foot truck trailers via rail flatcar (referred to as “trailer on flatcar,” or TOFC). Trucks currently dray intermodal containers to and from rail intermodal facilities surrounding the region, not to mention from seaports in northern New Jersey, Philadelphia, Baltimore, and more distant points served by CP and/or NS.

Figure 3.17 Binghamton's Proximity to Intermodal Rail Facilities



Railroad Bridges over Highways with Limited Highway Clearance

As discussed in the section on roadway deficiencies, the issue of low-clearance railroad bridges affects the delivery of goods to local businesses by truck. During the interview process, certain shippers mentioned low-clearance highway bridges, which go underneath railroads, as a potential barrier to growth.

From the point of view of the railroads, many (if not all) existing bridges are structurally sound and sufficient for railroad use. Therefore, railroads are not inclined to rebuild aging bridges until they reach a point of deterioration that affects railroad operations. To improve or eliminate road clearance restrictions, the agency responsible for capital improvements on the most likely will be forced to bear the majority, if not all, cost associated with that bridge replacement. Chapter 6 discusses potential bridge clearance projects in the context of local truck operations.

Interview Notes: Rail Network

While rail traffic through Binghamton has witnessed growth over the past several years, most of Binghamton's rail traffic is through traffic as opposed to traffic that originates in or that is destined for the Binghamton region. According to stakeholders interviewed, the reason rests in lack of an intermodal yard, limited rail sidings for area companies, and unreliable service. As mentioned above, one rail carrier suggested that the construction of an intermodal yard would help improve the rail offerings in Binghamton and improve the area's competitive advantage.

Unreliable service appears to stem from track sharing arrangements in Binghamton, where large intermodal trains traveling through Binghamton delay other trains coming into or out of the yards. For example, CP trains coming through the NYSW yard in downtown Binghamton results in NYSW trains waiting several hours to enter the yard. The NYSW also shares track with NS in Binghamton, further contributing to service delays. Potential improvements to rail operations in the Binghamton area will be discussed in Chapter 6.

Air Freight

Greater Binghamton Airport does not have regularly scheduled air cargo service. However, the airport's 7,500-foot main runway is able to accommodate small jets. Binghamton's proximity to major international airports such as JFK and Newark, and larger, more reliable regional airports such as Syracuse, limit its attractiveness to integrated air freight carriers such as FedEx or UPS. Instead, these firms serve the region via truck connections to airports in larger markets, notably Syracuse.

Although airlines have used aircraft as large as Boeing 737s and DC-9s for scheduled passenger service in the past, major air carriers currently serve the airport with "regional jets" that have limited cargo space. Since regional jet operators on occasion have to offload passenger luggage so as not to exceed the jets' maximum takeoff weights, air

carriers currently serving Greater Binghamton Airport cannot compete with the tight freight schedules and door to door service offered by integrated freight carriers.

Marine Cargo

Binghamton's lack of a navigable waterway does not imply that seaports are irrelevant to the region's freight network. The Port of New York and New Jersey is the largest port of entry for goods moving to the region, handling 40 percent of Binghamton's imports, while ports in Baltimore, Philadelphia, and New Orleans also handle significant amounts of cargo destined for Binghamton. Roughly 70 percent of Binghamton's exports move through New York and New Jersey, Charleston, Wilmington, or Mobile. Cargo is drayed between Binghamton and these ports primarily via truck.

3.2 Trade Patterns and Commodity Flows

This section explores in more detail the commodities carried over Binghamton's freight network; the modes used to carry freight into, out of, within, and through Binghamton; and where freight is moving to and from.

Overview of Major Regional Commodity Flows

Chapter 4 provides a detailed overview of Binghamton's economy, but a short discussion is provided here to introduce the major generators of demand for freight movement in the Binghamton region. The industries that generate the most freight tonnage include warehouse and distribution centers, construction aggregates, chemical and fertilizer materials, grain, and manufacturing (see Figures 3.18 through 3.21).[5] Measured by value, warehousing and distribution and manufacturing generate the most freight (see Figures 3.22 through 3.25).

Warehousing and distribution accounted for 19 percent of inbound shipments by weight and 17 percent of outbound shipments. While manufacturing[6] is on the decline in Binghamton, it still represents 2.3 million tons, or 20 percent of outbound truck tonnage. In 2004, manufacturing[7] value is estimated at $19.8 billion with plastics, wood products,

[5] Area's largest industries in terms of freight tonnage obtained from TRANSEARCH 2004 database.

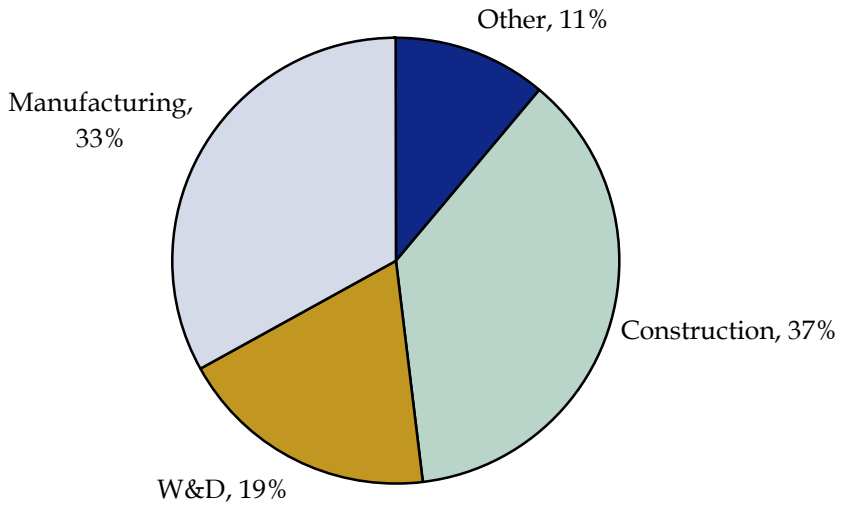
[6] Defined as Standard Transportation Commodity Code (STCC) 20-39, less 3241 portland cement and 3273 ready-mix cement.

[7] Total Outbound.

instruments, and food/beverages representing nearly one-half of Binghamton's manufacturing outbound freight value.

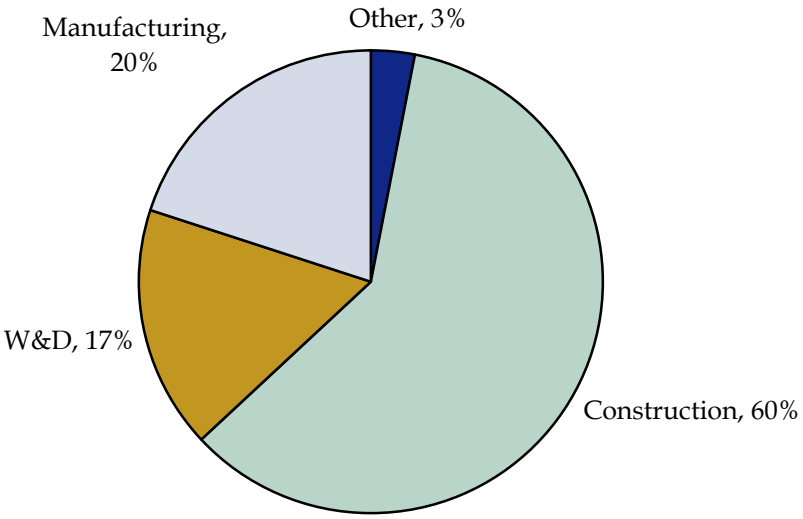
Other industries generating significant freight demand in Binghamton include the movement of goods that are not necessarily heavy, but require special attention. These products range from high-tech items to inorganic chemicals (some of which may be considered Hazardous Materials, which require special permits and careful handling while in transit).

Figure 3.18 Inbound Commodity Split
by Weight



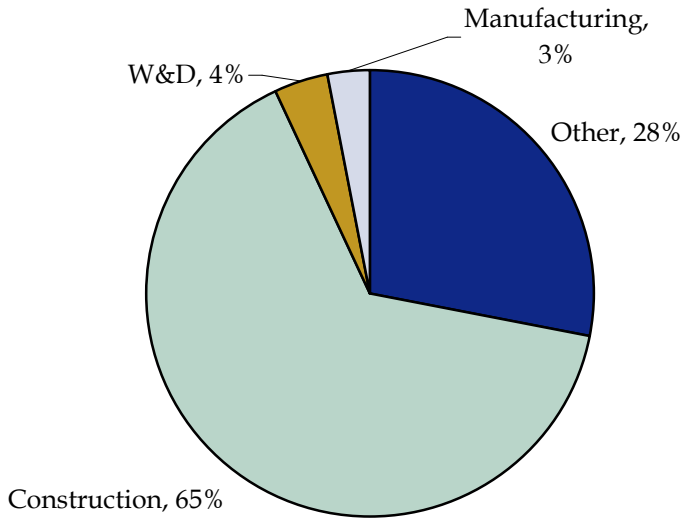
Source: Global Insight.

Figure 3.19 Outbound Commodity Split
by Weight



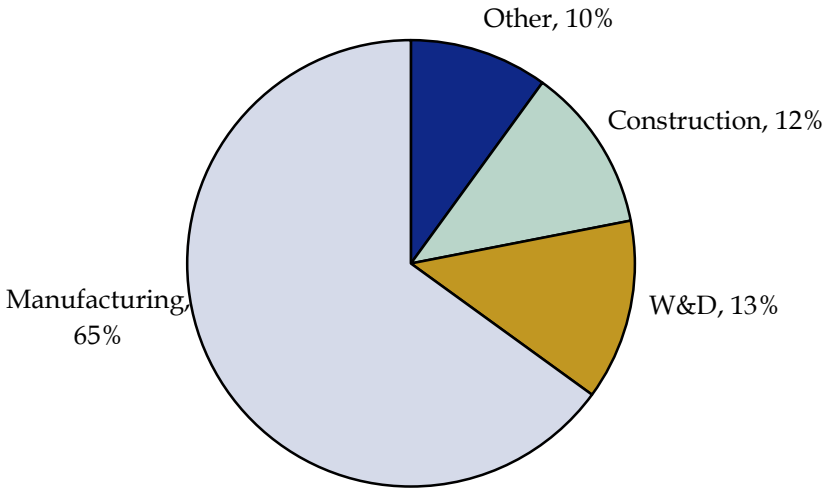
Source: Global Insight.

Figure 3.20 Within Binghamton Commodity Split
by Weight



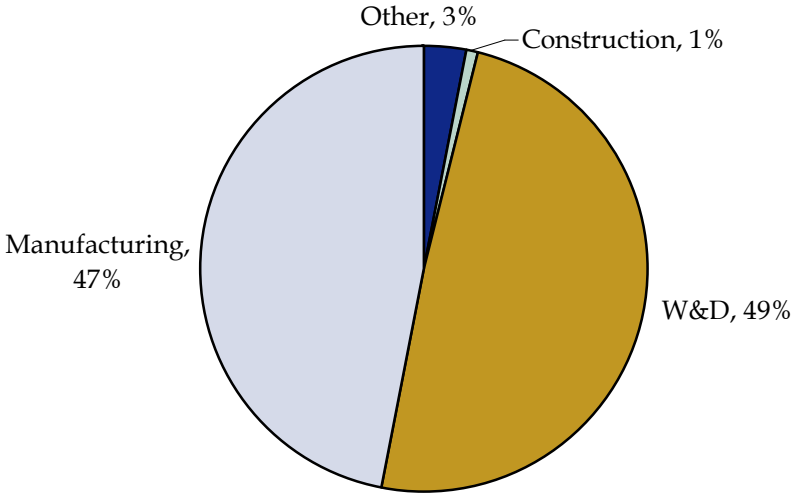
Source: Global Insight.

Figure 3.21 Through Commodity Split
by Weight



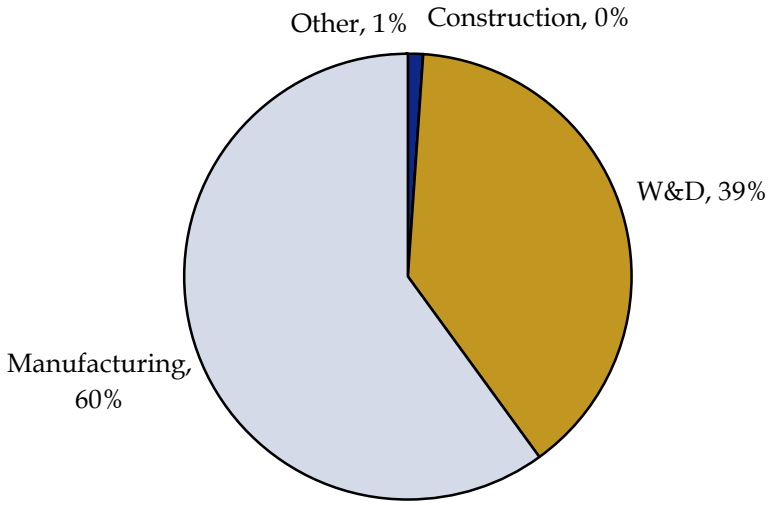
Source: Global Insight.

Figure 3.22 Inbound Commodity Split
by Value



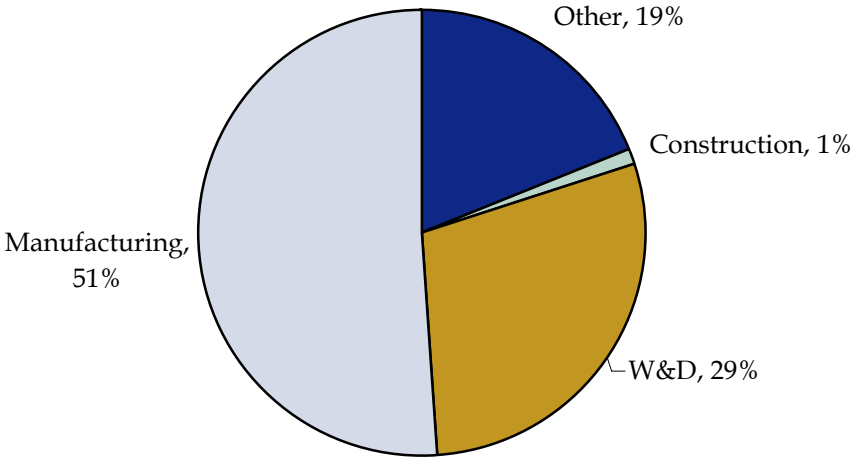
Source: Global Insight.

Figure 3.23 Outbound Commodity Split
by Value



Source: Global Insight.

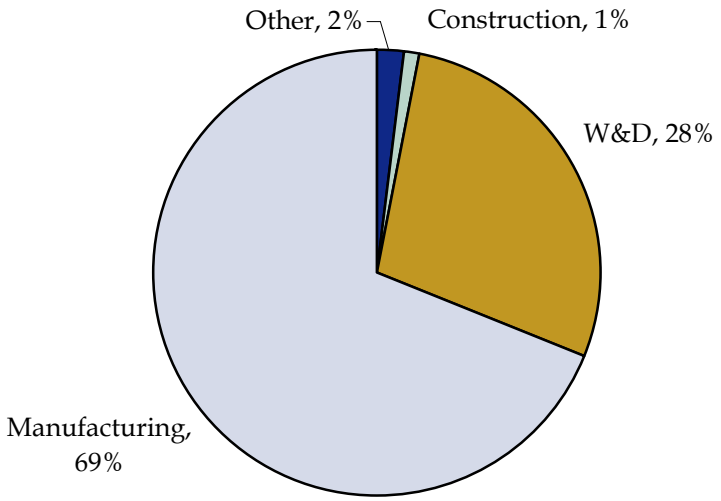
Figure 3.24 Within Binghamton Commodity Split[a]
by Value



[a] Warehouse and distribution traffic also includes drayage.

Source: Global Insight.

Figure 3.25 Through Commodity Split
by Value



Source: Global Insight.

Overview of Freight Movements by Mode

A total of 95 million tons of freight moved into, out of, within, or through Binghamton in 2004, the most recent year for which data are available.[8] Nearly one million truck loads moved into the Binghamton region with an estimated value of this inbound truck freight at $24 billion.

By virtually every measure, trucks dominate the movement of freight in the Binghamton region. In terms of tonnage, about 91 percent of inbound freight, 99 percent of outbound freight, and all local freight moves by truck (see Table 3.8 and Figure 3.27). All inbound, outbound, and locally-shipped containers move by truck. By value, over 95 percent of inbound, outbound, local, and through freight moves by truck (see Table 3.9).

About 14 percent of through tonnage (10 percent of rail traffic moving through containers) and 5 percent of the value of through traffic is moved by rail. More than 95 percent of all rail traffic in Binghamton is through traffic. As mentioned previously, no freight moves directly by water in Binghamton.

Generally, truck has an advantage over rail for moves of relatively lightweight products under 350 miles. Rail has an advantage for longer and/or heavier moves. This advantage

[8] All freight flow data included in this report comes from Global Insight's TRANSEARCH Database, which includes public and proprietary freight flow information. Data is available at the county level of geographic detail and the 4-digit STCC commodity detail.

exists because trucks can carry loads directly to their destination without transferring to a different mode, an activity which incurs additional time and cost. The cost is lower for intermodal rail than carload rail because intermodal containers can be transferred directly onto trucks, while carloads need to be unpacked and repacked into truck containers. Trucking directly from the origin to the destination, over short distances, is cheaper and faster than transferring to rail.

For longer trips, rail becomes less costly than trucking because the per-mile cost of rail transport is lower. Truck diesel fuel and labor costs outweigh the initial costs of transferring goods to and from rail. Using the latest statistics available, at about 350 miles, the higher per-mile cost of trucking overcomes the higher initial cost of carload rail. At approximately 900 miles, the costs of trucking exceed the costs of intermodal rail. With the recent rapid increases in diesel fuel prices, the per-mile cost of all modes has increased since these data were generated, giving rail a cost advantage at even shorter distances.

Figure 3.26 illustrates the cost-per-ton of transporting freight on truck, intermodal rail, and rail carloads over various distances. The highway distances between Binghamton and major freight hubs (New York City, Montreal, Chicago, and Los Angeles) are illustrated for reference.

Figure 3.26 Cost per Ton by Distance (Miles) for Truck, Rail and Intermodal Rail Modes, in 1998 Dollars

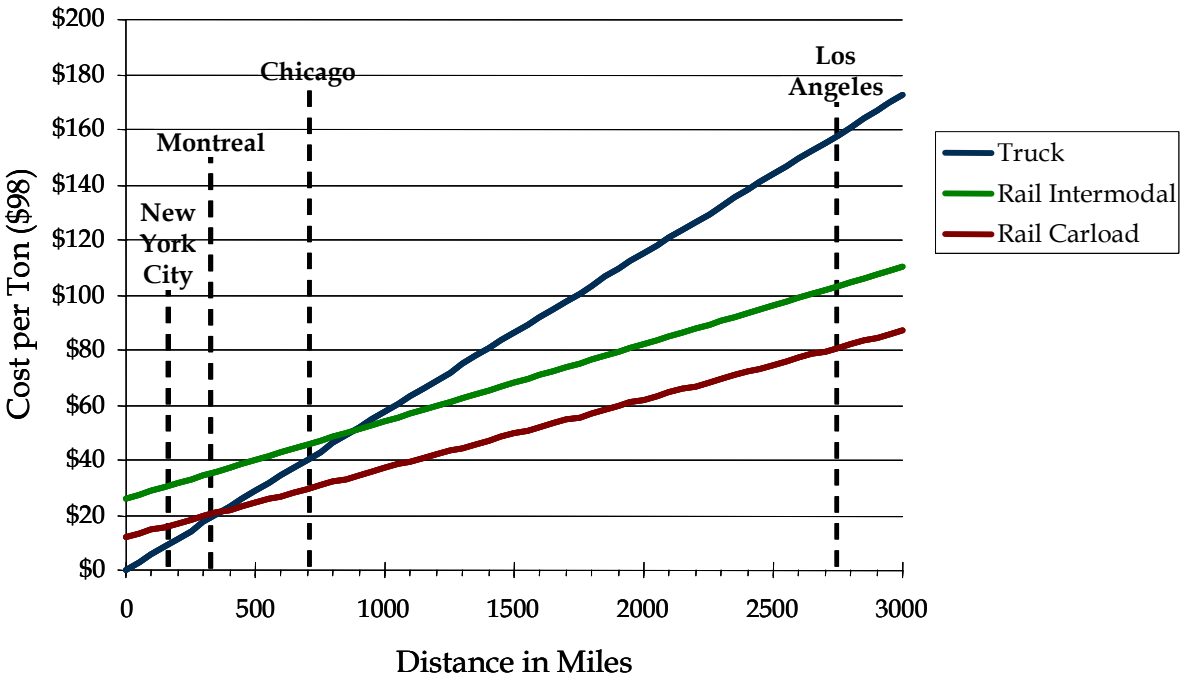
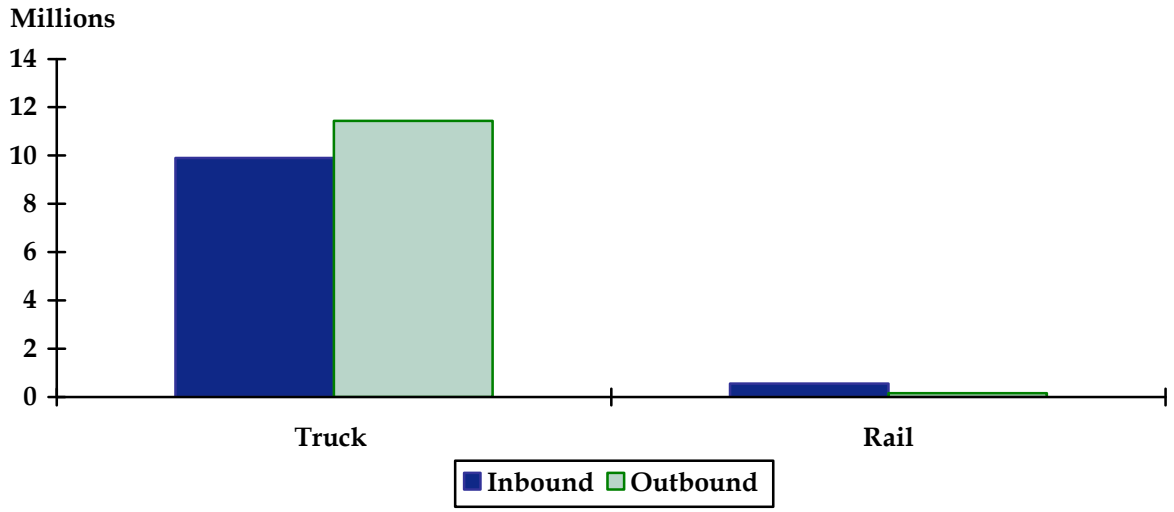


Table 3.8 Freight Tonnage by Mode
2004 (in Millions of Tons)

	Truck	Rail	Total
Inbound	9.9	0.6	10.5
Outbound	11.4	0.2	11.6
Local	1.8	0.0	1.8
Through	61.0	9.5	70.5
Total	**84.2**	**10.2**	**94.8**

Source: Global Insight.

Figure 3.27 Binghamton Freight Tonnage
2004 (by Mode)



Source: Global Insight.

Table 3.9 Value of Freight Moved by Truck and Rail
2004 (in Billions of Dollars)

	Truck	Rail	Total
Inbound	$24.1	$0.3	$24.4
Outbound	$33.2	$0.2	$33.4
Local	$0.5	$0.0	$0.5
Through	$207.9	$10.6	$218.5
Total	**$265.7**	**$11.1**	**$276.8**

Source: Global Insight.

Detailed Commodity Flows by Mode

Truck Commodity Flows

Binghamton is the smallest of New York State's MSAs in terms of total inbound and outbound tonnage, but represents an important two percent of the truck traffic in the State. Binghamton is a smaller market for inbound and outbound truck activity than either Scranton or Harrisburg, Pennsylvania. These are competing areas for warehouse and distribution center sites, and Harrisburg in particular is well established in the warehousing and distribution industry.

As summarized in Table 3.10, Syracuse and New York City are currently Binghamton's largest trading partners. Together the two regions account for more than 13 percent of all goods trucked into Binghamton and more than one-third of truck exports from Binghamton. The rest of New York State and the Midwest are the next largest sources of freight for Binghamton. The region imports goods and raw materials from the Midwest, the East Coast, and New England states. The rest of the U.S. accounts for 16 percent of goods imported to Binghamton by truck, measured in tons.

Inbound truck tonnage is quite diverse. Construction represents 20 percent of the tonnage imported, while warehouse and distribution center traffic accounts for 19 percent. Food products like field crops (15 percent) and electrometallurgical goods (4 percent) also stand out.

In addition to New York and Syracuse, significant export markets for Binghamton include the remainder of New York State (43.5 percent of exports) and Pennsylvania (19.3 percent). More than one-third of outbound truck tonnage consists of construction-related bulk products (broken stone, gravel and sand, and ready-mix concrete). Warehouse and

distribution center traffic and manufacturing account for another 17 and 20 percent of the outbound volume, respectively.

Table 3.10 Binghamton Trading Patterns and Partners for Freight Shipped by Truck

Region	2004 Tons (Millions)	Share
Inbound to Binghamton		
Syracuse, New York	0.4	3.9%
New York, New York [a]	0.9	9.5%
Rest of New York State	5.0	50.4%
Pennsylvania	0.4	4.1%
Midwest	0.8	8.2%
East Coast	0.5	5.0%
Rest of U.S.	1.6	16.0%
Canada and Mexico	0.3	2.8%
Total Inbound Freight	**9.9**	**100.0%**
Outbound from Binghamton		
New York, New York	1.7	14.9%
Syracuse, New York	0.8	6.7%
Buffalo, New York	0.3	2.9%
Rest of New York State	5.0	43.5%
Scranton, Pennsylvania	0.1	0.8%
Rest of Pennsylvania	2.1	18.5%
Rest of U.S.	1.3	11.2%
Canada and Mexico	0.2	1.5%
Total Outbound Freight	**11.4**	**100.0%**
Local Freight within Region	**2.7**	
Through Movements	**61.0**	

[a] New York, NY is defined as the following counties: Bronx NY, Dutchess NY, Orange NY, Putnam NY, Queens NY, Nassau NY, New York NY, Kings NY, Ulster NY, Westchester NY, Suffolk NY, Sullivan NY, Richmond NY, and Rockland NY.

Source: Global Insight.

Table 3.11 Intraregional Truck Traffic

Origin	Destination	Truck Tons
Binghamton	Chemung	347,000
Binghamton	Bradford	257,000
Binghamton	Chenango	175,000
Binghamton	Delaware	150,000
Chenango	Binghamton	99,700
Chemung	Binghamton	71,000
Bradford	Binghamton	51,000
Delaware	Binghamton	3,600

Source: Global Insight.

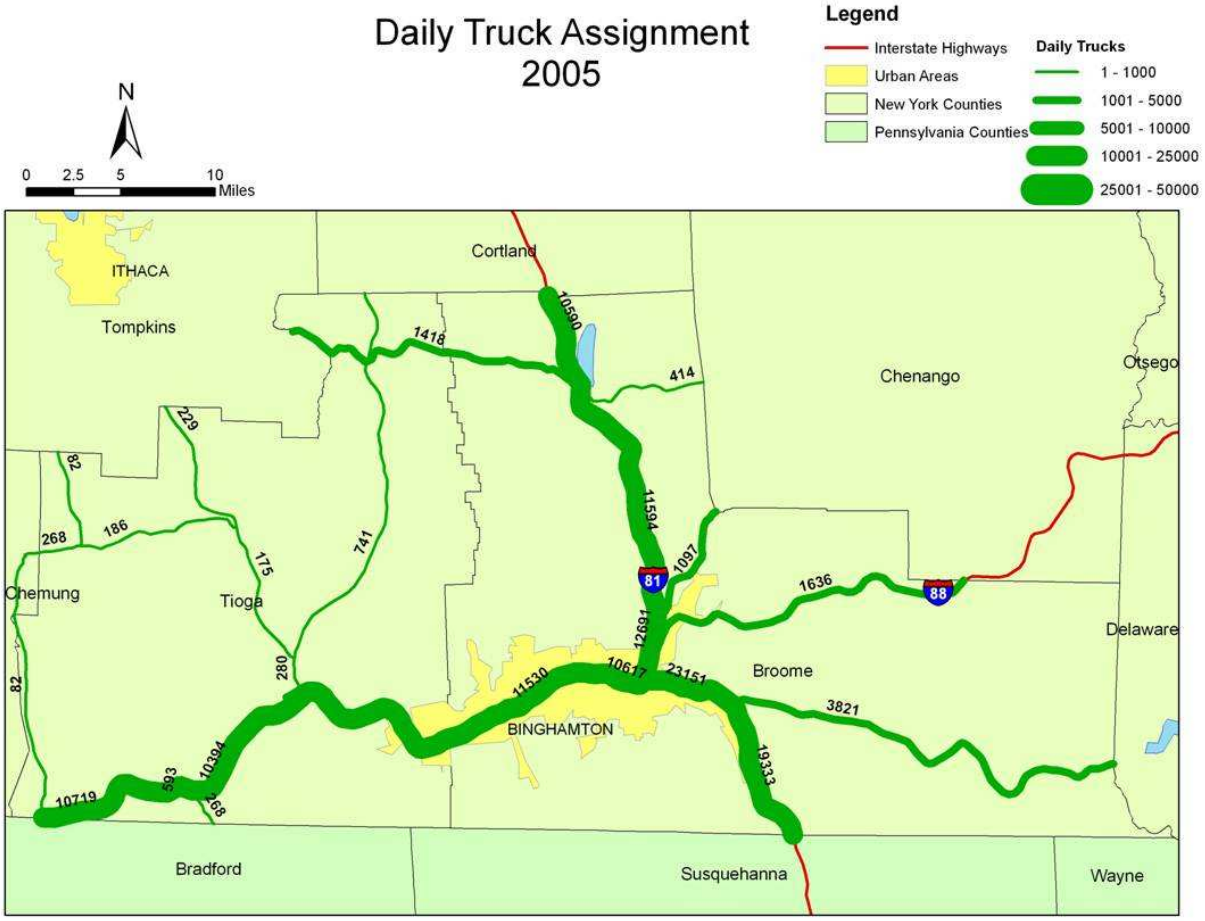
Intra-Binghamton traffic (within and between Broome and Tioga Counties) is estimated at 1.8 million truck tons in 2004. Truck tonnage movements between Broome and Tioga Counties and the greater Binghamton area counties also are quite active. Table 3.11 below illustrates major origin-destination pairs between Binghamton and its neighboring counties. Intracounty truck tonnage is largely represented by heavy commodities that move more efficiently over short distances. These commodities include construction aggregates like sand, stone, gravel, cement, and concrete, as well as grain and field products.

Binghamton also has a significant amount of through truck traffic with 61.0 million truck tons in 2004. Thus, through truck traffic represents 64 percent of total Binghamton tonnage. Much of this traffic stems from counties in New York, including Erie, New York, Kings, Queens, and Onondaga. New Jersey also plays a significant role with traffic stemming from Bergen, Middlesex, and Essex Counties. As shown in Figure 3.28, I-81 is the most utilized road for north-south traffic, with the NY 17/I-86 corridor being significant, particularly to the west of Binghamton. (Note that Figure 3.28 is a representation of county-to-county truck flows; a more detailed discussion of intraregional truck flows is presented in Chapter 5 (Regional Freight Forecasts).)

Binghamton's proximity to Montreal and Toronto makes it a prime location to serve Canadian markets. Likewise, Binghamton also sees significant through traffic destined for Canada. In 2004, an estimated 4.7 million tons moved through Binghamton via truck destined for Canada. This south-north route represents 7.8 percent of Binghamton's total through traffic (measured in truck tons), and primarily utilizes I-81.

Trade between Binghamton and Canada is nearly as large as Binghamton's through traffic with Canada, with 271,000 truck tons arriving in Binghamton from Canada (3 percent of Binghamton's inbound truck tons) and 165,000 truck tons leaving Binghamton for Canada (1 percent of Binghamton's outbound truck tons). Stakeholder interviews confirmed lack of trade between Canada and Binghamton, but with uncongested infrastructure, particularly along I-81, the Canadian market from a logistics perspective could be a source of growth for current and future companies located in Binghamton.

Figure 3.28 Truck Freight Flows in and around Binghamton



Source: Global Insight.

Rail Commodity Flows

As mentioned previously, much of Binghamton's rail tonnage is through-traffic. In fact in 2004, only 161,000 tons moved out of Binghamton via rail. Just over 556,000 tons moved inbound. Inbound rail tonnage consists of coal (44 percent of inbound rail tonnage, most of it from the area around Pittsburgh), broken stone and riprap (13 percent), and plastic matter/synthetic fibers (14 percent). Stakeholder interviews revealed that oils and calcium chlorate come into Binghamton to serve paving, plastics, and food production companies.

Metal scrap or tailings are the largest outbound commodity group moving via rail, accounting for 45 percent of outbound rail tonnage. Although the majority of metal scrap moves from Binghamton to the Midwest, Binghamton also ships this commodity grouping to the East Coast and Philadelphia. Waste and scrap account for another 9 percent (moving to the Midwest), and grain accounts for just over 7 percent (moving to Buffalo) of outbound rail tonnage. Syracuse receives soybean oil, distilled/blended liquors, and plywood by rail via Binghamton, most likely via an interchange between CP or NS and NYSW.

Major rail trading partners are listed in Table 3.12. The Pittsburg, the Midwest, and Syracuse account for about three quarters of inbound rail tonnage, while the Midwest, Syracuse, and the East Coast represent more than 72 percent of outbound rail tonnage.[9]

Since long-haul routes generally produce the greatest efficiencies for rail, it is not surprising that there is little intracounty rail traffic to speak of. The exception is small movements of rail cars moving from Broome County to Chemung County and Bradford County, Pennsylvania. The Syracuse region of Onondaga County trades a fair amount with Binghamton via rail; thanks to a rail connection available from the NYSW line. In 2004, Syracuse was estimated to ship roughly 90,000 tons of broken stone and nonmetallic minerals. In the same year, Binghamton shipped roughly 34,000 tons of rail cargo to Syracuse in the form of soybean oil, liquors, and plywood and lumber.

[9] It is important to note that Global Insight's rail data attempts to capture the ultimate starting and ending point when assessing trading partners. In some instances, freight changing lines (e.g. the UP to CSX in Chicago) confuses the actual end destination due to the filing of different waybills. Global Insight works to avoid this confusion in its Transearch database as best as possible. Although the NYSW interchanges with the CSX in Syracuse and both CP and NS in Binghamton, we do not believe the rail volumes between Binghamton and Syracuse to be misstated. While it is possible that a small percentage of the rail tonnage shown between Binghamton and Syracuse is bound for a destination other than Syracuse via the CSX (e.g., a customer along the NYSW Utica Branch north of the Sherburne washout), we believe the vast majority of the tonnage shown remains in Syracuse.

Table 3.12 Binghamton Trading Patterns and Partners for Freight Shipped by Rail

Rail Tons

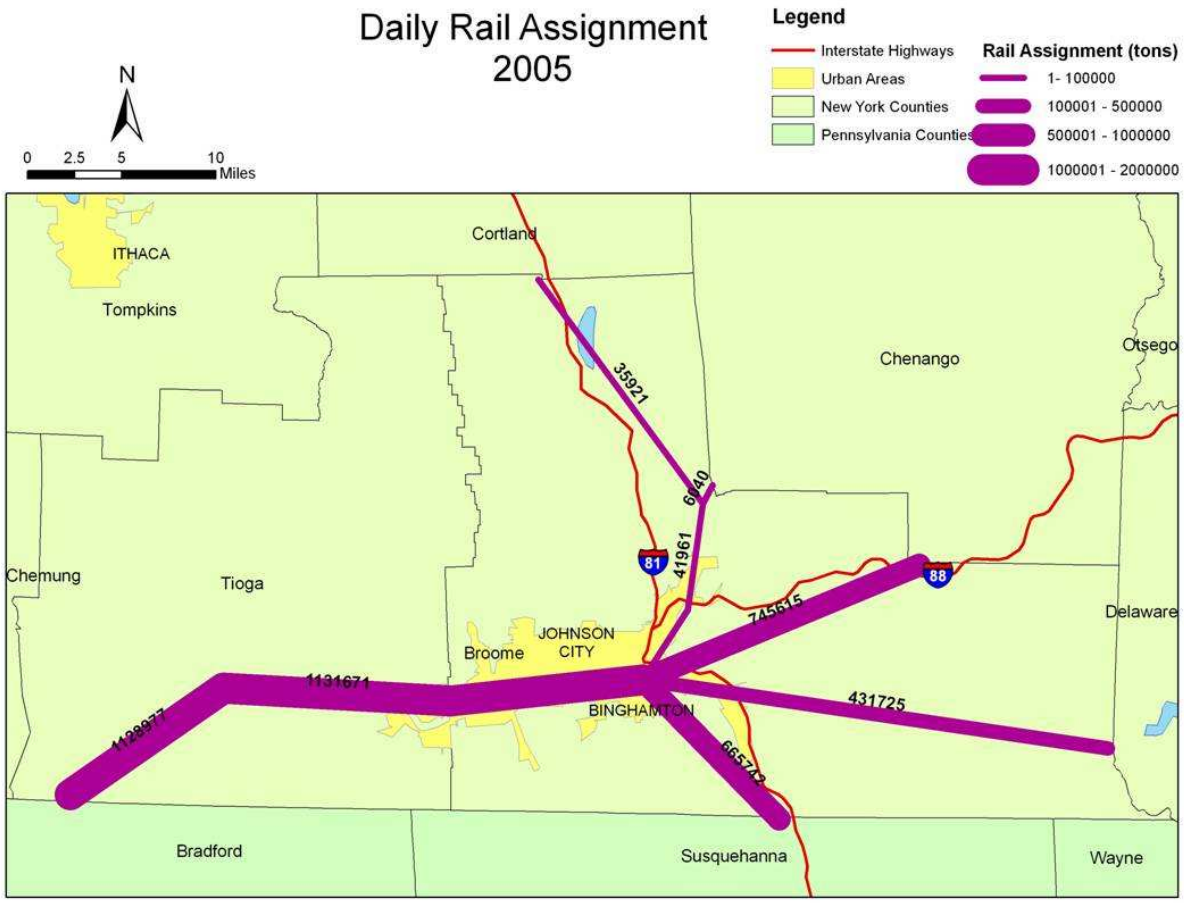
Region	2004 Rail Tons	Percent Share
Inbound from Binghamton		
Pittsburgh	245,000	44.1%
Midwest	97,000	17.4%
Syracuse	89,000	16.0%
Rest of U.S.	125,000	22.5%
Total	**556,000**	**100.0%**
Outbound from Binghamton		
Midwest	57,000	35.5%
Syracuse	34,000	21.1%
East Coast	26,000	16.4%
Rest of U.S.	44,000	27.1%
Total	**161,000**	**100.0%**
Local Freight within Region	**0**	
Through Movements	**9,483,000**	

Source: Global Insight.

Note: Global Insight's Rail data is included in TRANSEARCH Insight and is compiled using the Carload Waybill file, and proprietary carrier data.

An estimated 9.5 million tons move through Binghamton via rail, with 90 percent of this cargo moving rail carload, rather than rail intermodal (which accounts for the remaining 10 percent). This is, in part, due to the fact that the largest through commodities consist of coal, scrap metal, and grain, which rarely move intermodal. Geographically, Binghamton is used as a rail through-point for Midwest locations to reach New York State and New England markets. While cargo does flow from New York State and New England, west/south through Binghamton, most of the rail traffic flows north and east, as shown in Figure 3. 29.

Figure 3.29 Rail Freight Flow Routing



Source: Global Insight.

Air Cargo Drayage

Based on stakeholder interviews as well as the Global Insight TRANSEARCH database, connecting truck drayage from Binghamton to New York Metro area airports (Newark, JFK, and LaGuardia) is small, with less than 3,000 tons in 2004, or an estimated value of approximately $2 million. Drayage from Binghamton to Syracuse Hopkins International Airport is estimated to be greater with large carriers like FedEx Express and smaller dray specialists like Herlihy Trucking serving Binghamton out of Syracuse. The estimated volume of air freight shipped from Binghamton to Syracuse is roughly 5,000 tons (about $3.4 million worth of goods). Figure 3.2 near the beginning of this section shows the locations of major air cargo airports in close proximity to Binghamton.

3.3 Changing Freight Patterns

Industrial manufacturing was once a major driver in the Binghamton economy, but as stakeholders have universally observed, much of this activity has left the region over the recent decades. IBM has shifted much of its production elsewhere, as have various footwear and other manufacturing companies. The helicopter contract won by Lockheed in Owego is a bright spot that will provide jobs for years, yet respondents could name few other sources of manufacturing growth.

In the absence of manufacturing, services like health care and the retail base are growing. The former is exemplified by medical and geriatric networks like United Health Services and Lourdes Hospital, serving retirement populations, as well as working generations and the growing body of college students. Interviews with these area shippers reveal that they keep steady inventories and receive regular shipments (sometimes as often as four times per week) from major vendors.

Retail development can be seen particularly along Vestal Parkway, an area recently filled with shopping centers and big-box outlets. Like the health care sector, the retail sector requires regular freight deliveries with a typically high-performance profile, although the goods are lighter and shipments are smaller than the region was accustomed to in an earlier era.

The need for frequent deliveries on a reliable schedule precludes the use of rail for most shipments to "new economy" manufacturing, retail, distribution, and service-oriented industries. In fact, some logistics firms like FedEx and UPS have shifted away from large trucks to smaller vans for local deliveries. At the same time, ever larger trucks are plying the region's Interstate highways, and drivers that must make local pickups or deliveries may not be familiar with the local roadway network (or even speak English as their native language). Maintaining an uncongested truck route network through Binghamton will enable reliable deliveries to continue, and will help attract new business to the area.

The national shift away from manufacturing and towards warehousing and distribution of goods produced elsewhere also has been felt in Binghamton. Binghamton's locational advantages will help it benefit from this national trend. First, the region is well-connected to major markets of New York, New England, and Pennsylvania via a network of Interstate highways. In particular, I-81 and I-88 are uncongested and provide quick and efficient access to portions of these market areas. The completion of the western segment of I-86 will add a faster and more reliable connection to the production centers of the Midwest.

Reliable service is crucial to warehouses and distribution centers; and to the extent that the highway network in Binghamton and the surrounding region remains uncongested, new distribution activity may replace manufacturing volume and place continuing demands on transportation infrastructure. Distribution centers for Maines Paper & Food Service, Best Buy, Team World, and Willow Run Foods already have established successful operating facilities in the Binghamton area. The region's relative wealth of capacity in

infrastructure and land leaves room for others to emulate them. However, high New York taxes pose one prominent challenge for Binghamton's long-term economic growth, and its declining area goods production is detrimental to efficient freight operations (although it also creates inexpensive industrial brownfield sites). These points are revisited later in this technical memorandum in Chapter 4.

Industries generating freight activity are currently clustered in the industrial parks like Conklin and Kirkwood, and the retail center of Vestal. However, industry is spread throughout the area with some facilities situated away from town centers or in rural locations (such as Best Buy, Lockheed Martin, and Kraft).[10] Future development patterns in the region will determine where freight demand grows in the future and which modes can and will absorb the demand. For example, while warehouses and distribution facilities by their nature already are truck-oriented, the fact that they require large parcels of inexpensive land usually precludes the opportunity to locate them in developed areas near existing rail lines. However, less expensive land may be available near rail lines in rural areas of the region.

[10] Best Buy = Nichols; Lockheed Martin = Owego; Kraft = Delaware County.

4.0 Carrier Profile and Stakeholder Feedback

4.1 Research and Field Observation

The purpose of these tasks of the Binghamton Regional Freight Study was to evaluate existing freight conditions, evaluate the economy, assess future freight needs in the region, and lay the foundation for the development of future strategies. Two key components included the conduct of targeted interviews and in-the-field observation. This section describes the study team's methodology and the findings of this work.

4.2 Methodology

The selection of companies to interview strove to represent industries of importance to Binghamton (such as the warehousing and distribution sector, technology, etc.), but also included companies mentioned by economic development offices and recommendations of other stakeholders as being of particular importance, or having special insight to the region. Further, the interview selection process focused on location and size (including both smaller as well as larger stakeholders). An important requirement was to reach the sectors generating growth in the economy, particularly the so-called trade clusters that are crucial to regional prosperity and place demands on the local network, as well as the regional network. The Dun & Bradstreet establishment dataset was used as a starting point for determining major companies by size and industry. The combination of the Dun and Bradstreet data set and recommendations of other stakeholders helped to ensure the study team met with a broad cross section of companies. Once the target list was developed, internal and local contacts were leveraged to obtain a "foot in the door," and to identify the most appropriate individuals to interview. In the event that the team did not possess internal contacts, companies were mailed a preapproach letter. This letter served to introduce the project, and for purposes of identifying a point of contact at each company.

A list of the firms that were interviewed for this study is included as Appendix A. Appendix B provides the sample interview guides listing the questions that were asked of each interview subject.

Field observation is the second key component of area research. Through the interview process, a variety of bottlenecks, underdeveloped areas, and facility access problems were

identified. To adequately understand the freight operating conditions described, the project team viewed and confirmed many of these locations first hand. As a result of this effort, it has become clearer why companies view Binghamton as either supportive of or problematic for their business operations.

4.3 Interviews Completed

Twenty-three logistics stakeholders in the study area were interviewed, providing the project team with a fairly diverse representation of industries and counties. In addition, 8 interviews among public agencies have been completed, bringing the total interviews to date to 30. Table 4.1 below depicts the number of stakeholders interviewed in each industry group. A full list of interviewees can be found in Appendix C.

Table 4.1 Stakeholder Interview Count by Industry

Industry	Total
Air Dray	1
Defense	1
Food/Beverage	3
LTL Carrier	7
Manufacturing	6
Medical	2
Rail	2
Retail	1

While the project team strove to interview companies in the two counties in the study area (Broome and Tioga), many of the interviews conducted were concentrated in Broome County as a result of industrial concentration there. It is important to note, however, that a number of the stakeholders interviewed serve geographical areas extending beyond Broome and Tioga Counties into the surrounding counties and regions in Pennsylvania; Syracuse, New York; and New York City.

Carrier Profile

The Binghamton area (Broome and Tioga Counties) is served by several national and regional carriers, further providing Binghamton with excellent freight access throughout the country. Major truck carriers include the UPS and FedEx freight companies, the Yellow/Roadway group, regional lines such as New England Motor Freight and Conway, local niche carriers such as Herlihy Trucking, and a variety of truckload carriers serving the region, as well as numerous private fleets. Rail carriers include Canadian Pacific Railway (CP), Norfolk Southern (NS), and New York Susquehanna & Western Railway (NYSW).

Markets served by truck carriers vary widely across carriers, but each serves areas beyond the immediate BMTS study area. Connections between Binghamton and the rest of the country are provided through UPS, FedEx, and Roadway that each serves Binghamton and surrounding areas via terminals in Binghamton,[1] and moves long-haul freight via larger hub operations elsewhere in the U.S. Binghamton terminals for these carriers cover New York State, as well as much of Pennsylvania and New England.

Regional truck carriers have more limited geographical scope with local pick-up and delivery operations covering locations as far as 90 miles away, but more frequently operating within a 20- to 40-mile radius, where both Pennsylvania and New York are covered.

Through companies like Herlihy and Conway, Binghamton has excellent international coverage. Herlihy operates as a local pickup and delivery (P&D) and air dray company serving JFK, Newark, Syracuse, and Rochester Airports. In addition, Conway provides service to Canada and Mexico. The existence of these services can be used as a marketing point, supporting Binghamton's excellent proximity to major freight consuming markets.

The decline of manufacturing output and the rise of retail have impacted carriers serving Binghamton, particularly the Less Than Truckload (LTL) carriers, for which manufacturing items used to represent a larger share of their business. The result, according to one LTL carrier, is that LTL carriers are fighting for a piece of a dwindling manufacturing pie and are not benefiting from growth in retail (where many companies handle their own freight). Another carrier cited Pennsylvania and areas such as Scranton as better carrier locations because more freight is handled there.

The carriers interviewed expressed concerns that reflect the impacts of perceived and real transportation system deficiencies on area shippers. For instance, the most common complaint among carriers interviewed was low truck clearances in the Binghamton area. The carriers interviewed serve businesses located throughout Binghamton, whereas large manufacturers or distribution centers haul the majority of their freight between their Binghamton area locations to a destination outside of Binghamton. As such, the large

[1] UPS and FedEx freight terminals are both located in the Kirkwood Industrial Park. Roadway is located on Whitney Avenue in Binghamton.

manufacturers do not deal with the low truck clearances on as broad a scale as the locally based carriers.

Carriers also expressed concerns about the rural locations they have to serve. The Kraft facility in Delaware County, while an extreme example, exemplifies a regional facility located in a rural and difficult-to-access area. Not only is the plant located more than 20 miles off of I-88, but the route to the plant is plagued with steep hills and tight turns. The two photographs below (Figures 4.1 and 4.2) were taken during field research and show the facility and two of its loading docks, as well as the entrance to the facility from Route 206. The background of the photos shows the type of terrain in the area surrounding the Kraft facility, trucks must navigate in order to reach I-88.

Figure 4.1 Loading Docks at Kraft Foods, Delaware County

Figure 4.2 Entrance of Kraft Foods Facility on Route 206, with Surrounding Terrain in Background

While the major interstates are in excellent condition, many access routes are not designed to accommodate large trucks, and the lack of industrial clustering in rural areas requires carriers to access these locations to serve one client. To the extent that companies, such as the Best Buy distribution center, or Maines, are located directly off of major routes, rural access is not a problem for carriers. However, when serving companies located in difficult-to-access areas, carriers face a number of operational hurdles. The public sector can support the efficiency of service to these facilities by ensuring that weather (i.e., snow and debris from storms) does not further erode conditions on these access routes.

Feedback by Industry

The interview process resulted in responses unique to each stakeholder, such as truck access problems at the Wilson Medical Center receiving ramp in Johnson City, but also resulted in common themes across many stakeholders. Generally, the themes presented above are those observed by the field observation team and communicated by several stakeholders.

In many cities, as in Binghamton, stakeholder complaints, recommendations, and area observations may be common for certain industries and not for others. Understanding stakeholder feedback by industry is useful for planning efforts, particularly if there is interest in attracting a particular sector.

The Binghamton Regional Airport is viewed by two of the three high-value manufacturing companies that were interviewed as being unreliable and not meeting their needs. Other companies utilizing air freight often have freight trucked to JFK or

LaGuardia Airports. One carrier relying on airports has its air express hub located near the Syracuse Airport, and serves Binghamton via the Syracuse location.

The benefits of a strong work ethic among the area workforce were cited by multiple businesses, but all from industries employing lower-skilled labor. Companies looking to attract higher-skilled labor look to State University of New York (SUNY) in Binghamton and Cornell University as good sources of educated employees.

An area electronics distributor expressed concern about West Coast port congestion and poor rail service from the West Coast into Binghamton. In fact, poor rail service from Chicago into Binghamton leads this company to transport cargo from the West Coast to Chicago via rail before trucking cargo from Chicago to Binghamton. This same company stressed that if quality intermodal options existed from East Coast ports to Binghamton, they would consider routing their freight via East Coast ports instead. Other companies relying on West Coast imports may be concerned with locating in Binghamton due to poor rail service, and as such, improved intermodal handling either from the West Coast or East Coast will enhance Binghamton's attractiveness to these types of companies.

Feedback and Observations: Binghamton Area Strengths

One manufacturing stakeholder described three critical transportation assets necessary for the location of any manufacturing or distribution facility: 1) reliability; 2) cost effectiveness; and 3) security. From the perspective of this manufacturer, Binghamton excels in all three attributes. As noted previously, one of Binghamton's greatest assets is its transportation infrastructure; particularly its interstate highway and rail connections, which together work to connect Binghamton to larger markets such as New York City, Syracuse, Pittsburgh, Philadelphia, and Canada. It is these connections to other large markets that can act as a strong pull for manufacturing in the Binghamton area, despite Binghamton having a relatively small local market. Furthermore, area infrastructure has ample capacity and therefore can support additional growth of freight in ways that competing regions perhaps cannot.

Binghamton has an abundance of undeveloped land with good access to major routes. This abundance, coupled with low land prices, are excellent selling points for growth in the warehouse and distribution sector. According to a logistics manager at Best Buy, the four-year old Best Buy distribution center in Nichols is in an excellent location off of 17 with zero congestion and room to expand if needed. Considering the advantages of Binghamton's transportation infrastructure and location, this respondent wonders why more distribution centers have not located along the I-81/17 corridor.

Twenty-five percent of the stakeholders interviewed listed the Binghamton area workforce as the area's second-best asset (next to road infrastructure). One Kirkwood-based trucking company stressed that the average Binghamton citizen is hard-working, well trained, and wants to provide for their family. Another large employer labeled the employees as resilient, appreciative of their jobs and as such, has low turnover among truck drivers and facility personnel. These attributes overall lead to lower area driver

turnover, better trust in employees, and a generally better product or service level. Other stakeholders argue that the positive work ethic found in Binghamton does not exist elsewhere in the country and should be used to market Binghamton to manufacturing companies choosing production and distribution locations. Lastly, the growth in the region's local colleges – Broome County and especially Binghamton University – offers advanced educations to the local populace, as well as to youth from the wider region; and some of these students will stay or return to raise a family and make a living.

Feedback and Observations: Binghamton Area Challenges

High Taxes and Utilities

High taxes and/or utilities were listed by nearly every stakeholder as the single largest factor causing companies to leave Binghamton. These same factors make it difficult to attract new businesses to the area. Binghamton's proximity to Pennsylvania, which makes the area attractive from a freight standpoint, also works as a deterrent when New York State taxes and energy costs are much higher than Pennsylvania. Forty percent of shippers and carriers interviewed viewed taxes as a major hurdle to the area's development, and two specifically mentioned that their companies were considering relocating to Pennsylvania due to its lower taxes and energy costs – never mind its good interstate access to the same markets these firms serve from Binghamton. This point is discussed in more detail in sections below.

Low Area Production

Binghamton's production of manufactured goods is not high relative to the amount of manufactured goods imported to the region. Approximately 2.5 million manufacturing tons moved outbound from the Binghamton region by truck in 2004 compared to 4.0 million manufacturing tons coming into Binghamton.[2] As a result, some firms complained that moving freight by truck into Binghamton becomes costly because there is little cargo to fill backhauls.

The manufacturing imbalance of 1.5 million tons certainly contributes to higher costs. According to one stakeholder, trucks serving their Binghamton facility from the south, midwest, or western portions of the country must travel often as far as Syracuse to get enough cargo to fill a back-haul. The added distance that the trucks must travel drives up the cost of bringing freight into Binghamton.

Low-Truck Clearances

The landscape of the downtown Binghamton area conveys the City's past as a rail town. There are a plethora of rail crossings and overpasses; many of which are no longer in

[2] Source: Global Insight.

service, which intersect and cross over major roads in the City. Built when trucks were smaller, many of the overpasses do not accommodate today's larger trucks. The result is inefficient truck routing as large trucks are forced to take alternate routes to avoid low clearances. Alternatively, some companies rely on smaller trucks in their fleets specifically to service areas with low clearances. While low truck clearances appear to be posted visibly, there is some belief among truck drivers that clearances are posted as being lower than they actually are. This leads some drivers to "chance" the posting – a move that is typically successful until roads are resurfaced, robbing drivers of the much needed extra inch of clearance.

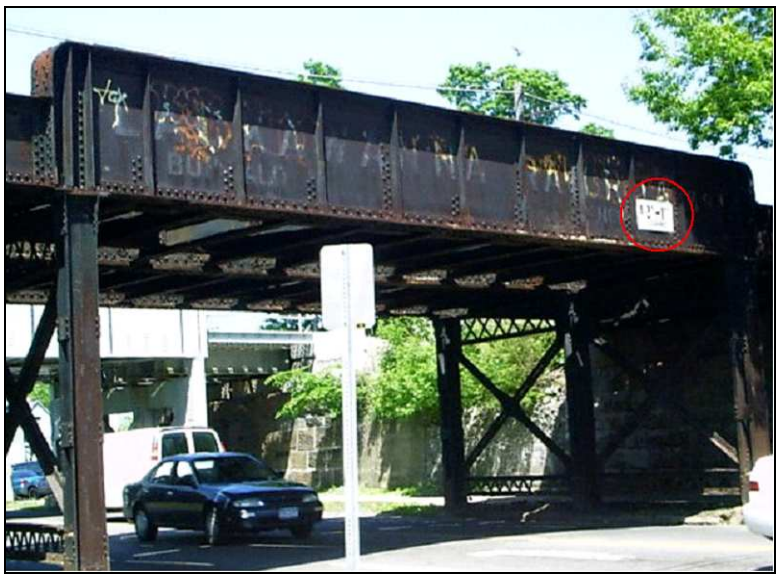
Front Street (near the Clinton Street intersection) is one example of a low clearance posting that may be prone to chancing by drivers. A Federally funded capital project to eliminate this low clearance has been approved, and at the time this report was written the project was scheduled to begin construction by the end of 2008 The picture below in Figure 4.3 shows the approach to two consecutive bridges that are clearly posted at 11 feet and 11 inches. Upon closer approach to the bridges, a second sign is posted warning that the second bridge is lower than the first (Figure 4.4). However, note that the bridge itself is obscurely posted at 12 feet and 1 inch (Figure 4.5). The second bridge, previously posted as being lower than the first, is posted on its opposing side as also having a clearance of 12 feet and 1 inch (Figure 4.6).

Figure 4.3 Low Clearance Warning Sign on Front Street in advance of Railroad Overpass

Figure 4.4 Warning Sign near Railroad Bridges over Front Street

Figure 4.5 12'-1" Clearance Sign on Railroad Overpass over Front Street

Figure 4.6 12'-1" Clearance Posted on Opposite Approach to Front Street Railroad Overpasses



Other low rail overpass clearances include:

- The Southern Tier Line over Glenwood Avenue, Jarvis Street, and Murray Street, all between Main and Clinton Streets;
- The Southern Tier Line over Brandywine Avenue (Route 7) and Court Street (U.S. Route 11) in central Binghamton;
- The CP and NYSW lines over Robinson Street between the Binghamton and Bevier Street yards; and
- The abandoned portion of the outer Vestal Spur over Old Vestal Road in Vestal.

Weather

Binghamton deals with flooding, snow/ice, and storms that can hinder freight operations. On June 28, 2006, the Susquehanna River flooded in the worst flood on record for the region. The Town of Conklin in Broome County was the hardest hit, and many businesses located near the river in Broome County have yet to return. Companies forced to completely close facilities are questioning whether or not they should return. Dick's Sporting Goods that used to have a main distribution center in Conklin reopened its major facility in Pennsylvania following the destruction of its facility last year. Dick's currently keeps a small distribution center for return goods in Conklin.

Many stakeholders who did not endure facility damage experienced impaired operations ranging from two to four days due to flooded roads. Sections of 17 and 17c (among oth-

ers) experienced heavy flooding, hindering the ability for carriers to reach customers and for employees to reach their employers.

While some stakeholders interviewed view flooding as a major concern that could increase in frequency due to global warming, others view the event as a one-time phenomenon and see no need to relocate outside of Binghamton. Despite the various views held by stakeholders, the damage caused by the 2006 flood, the heightened flood plane, and the risk for future flooding may act as a deterrent for attracting new business. As such, it will be important for investments to be made in dikes and other infrastructure preventing the flooding of important stem and access routes traversing low lying areas.

Winter also provides a set of challenges for operators in the Binghamton area. Many stakeholders compliment the State on its snow removal for the major interstates, but complain that moving freight on the secondary/county roads is a major obstacle when it snows. In addition, several stakeholders referenced the well-known "Kamikaze Curve" – a tight, elevated turn at NY 17 and I-81 that freezes quickly in the winter and results in frequent accidents and traffic delays. Here, stakeholders suggest that improving the warning and lighting for the curve, along with improved deicing methods, would go far in improving wintertime operations. NYSDOT is planning to reconstruct the interchange to modern design standards to address safety, maintenance, and capacity issues.

Generally speaking, stakeholders are quite pleased with snow removal along interstates in Broome and Tioga Counties. Stakeholder feedback for secondary roads is mixed with many stakeholders feeling that county snow removal is spotty and inconsistent, but better in Broome County than in Tioga. With the dispersion of industry in rural areas in Broome and Tioga Counties, efficient snow removal on secondary roads is critical for maintaining freight operations and industrial productivity, and thus also for attracting new companies to these locations. Although snow removal may not deter a new company from locating in the area, unreliable snow removal may be used as a bargaining point to receive better tax advantages for locating in the area. There is finally the point that, as direct distribution of goods to homes grows through electronic commerce, the need for freight trucks to penetrate rural roads will grow with it. If these roads are not kept passable, the citizens will wait for their purchases.

Stakeholders also complain of poor debris removal following major storms. Downed trees and debris in the downtown area make streets impassable for trucks. Giving maintenance priority to industrial access routes will be one way of making the Binghamton area attractive to companies fearing clean up efforts for weather-related debris. The weather also impacts road quality, and failure to repair damaged roads fails to communicate a public sector committed to maintenance. The following photograph in Figure 4.7 exemplifies a poorly maintained roadway.

Figure 4.7 Poorly Maintained Roadway in Vicinity of Major Shipper

Specific Access Issues

Many cities are plagued by truck access issues. Trucks may have difficulty accessing and maneuvering within facilities constructed before the age of large trucks, and there may be related parking difficulties at these facilities as well. Such issues impact not only the operations of the facility itself, but also carriers serving that facility. Carriers that have difficulty accessing one facility may be delayed reaching subsequent destinations, or they may be forced to use smaller vehicles (and hire additional drivers) to make their deliveries. Binghamton is not immune to such issues, and has a handful of areas that are difficult for trucks to access, thus impeding efficient freight operations.

In some cases, access problems arise when the access to a facility is located near rail overpasses, as is the case with Waste Management on Emma Street (Figure 4.8) and the employee entrance to the NYSW line.

Figure 4.8 Entrance to Waste Management on Emma Street

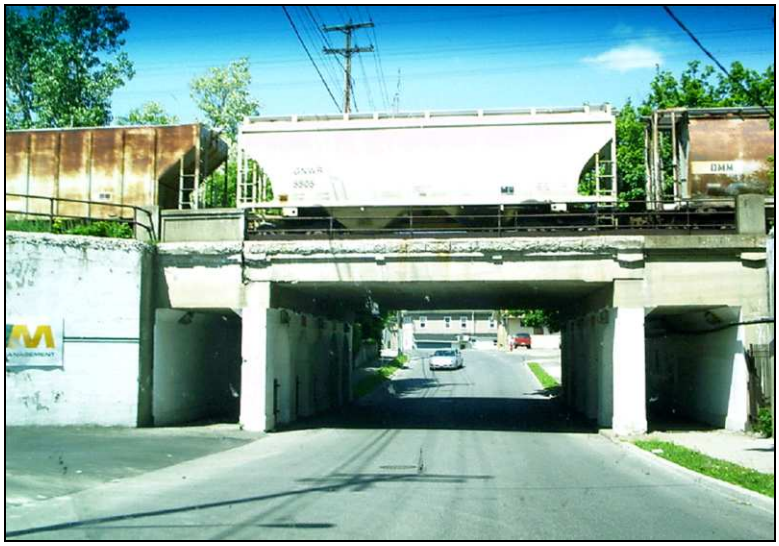
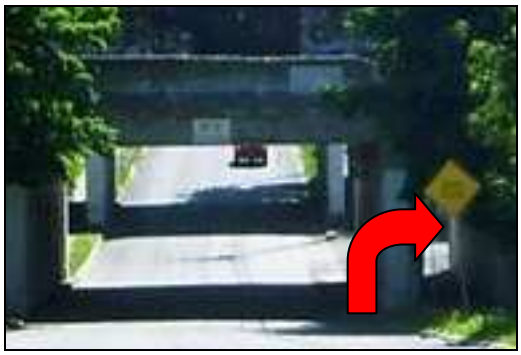


Figure 4.9 Entrance to NYSW Bulk Transload Facility on Brandywine Avenue



The growing retail area of Vestal Parkway is reported to have some congestion, but also has modern, well-designed access points for freight. One Vestal Parkway mall contains Wal-Mart, Sam's Club, Lowes, Pet Depot, and TJ Maxx, as well as other smaller shops and a movie theatre and has excellent truck access, as shown by the photo below (Figure 4.9). Its recent development likely contributed to a facility designed to handle the large 53-foot trucks.

Figure 4.10 Truck Access to a Vestal Parkway Shopping Center

The firms that were interviewed did not specifically cite a lack of rail access as a hindrance to importing and exporting goods from the region, but they did seem open to the idea of using rail service if it was cost-competitive with truck service. Specific rail access issues and recommendations, such as lack of sidings at industrial facilities and operational issues, will be discussed in Chapter 6, Freight Transportation Improvement Program.

5.0 Regional Freight Forecasts

Chapters 1 and 2 of this report summarized broad national economic trends, the current economy in the Binghamton region, and trends that are expected to shape the region's economy in the future. Chapter 3 described the state of the current freight transportation system, explained how goods (and which goods) currently move over the region's highway and rail transportation network, and suggested the types of improvements that need to be made to accommodate current demand for freight movement. Chapter 4 provided a glimpse of how the users of the freight transportation system perceive the function and performance of the system.

Freight planning requires an understanding of the current state of the transportation system and background trends, but forecasts of the long-term demand for freight transportation can help Binghamton assess the need for freight system improvements that will be necessary to accommodate future demand. This chapter answers questions such as how much volume will travel on the rail and highway networks, how heavily will certain modes be utilized, and what commodities will be transported. The freight forecast in this chapter forms the critical base for analysis in later chapters of the Binghamton Regional Freight Study. In addition to future commodity flow information, this chapter discusses the methodology used to develop the Binghamton freight demand forecasts.

5.1 Development of the Binghamton Regional Freight Forecasts

The development of the freight forecast relies on data assembled from four types of models and databases, each of which is described in more detail at the conclusion of this section:

- The existing **NYSDOT TRANSEARCH database,** which includes long-term freight forecasts with industrial, geographic, and modal detail through 2025. To obtain the best possible results for the BMTS Freight Study, the updated TRANSEARCH database with 2006 base year data was utilized. This BMTS forecast is built from 2006 base year data, backcasted to 2004 using annual growth rates of the underlying forecast drivers between 2004 and 2006. As such, the BMTS forecast still begins with 2004 base data, to be consistent with other ongoing freight studies around the state.

- Global Insight's **Business Demographics Model**, which provides a complete and detailed view of business conditions throughout the United States. The model presents both historical and forecast data for every county in the United States and

every industry grouping in the North American Industry Classification System (NAICS).

- Global Insight's **Business Transactions Matrix**, which captures the relationships and commercial activity between businesses.

- Information that is updated quarterly in the context of Global Insight's international network of **large-scale economic models,** which are the basis for forecasts at the county level and above. The use of these models improves the representation of changes in economic activity at all geographic scales. In this context, the estimates and forecasts account for changes in international, national, state, and local economic conditions and not merely projections of the trends embodied in past censuses.

Key improvements found in TRANSEARCH 2006 include the following:

- **Benchmarking to Annual Average Daily Truck Traffic (AADTT) estimates.** TRANSEARCH databanks prior to 2006 were constructed independent from estimates of truck counts due to a variety of problems with many Annual Average Daily Truck Traffic (AADTT) estimates. Realizing that our clients often use AADTT estimates in their own planning, Global Insight decided to utilize AADTT figures as a benchmark for truck movements on the national road network. The result is overhead traffic numbers for BMTS that more closely follow NYSDOT AADTT estimates.

- **Including route impedance in models of empty truck movements.** A focus on freight movement may lead to not recognizing the fact that trucks must often travel empty from a delivery destination to their next load origin. When modeling for empty trucks moving in the U.S. road network TRANSEARCH 2006 introduces route impedance into the equation. Now, empties are modeled to include driver decision-making such as avoidance of toll roads and preference for limited access highways. This improvement greatly enhances the quality of the empty truck flows in TRANSEARCH.

In addition to the aforementioned changes, TRANSEARCH 2006 base year and forecast more accurately capture anticipated economic declines (e.g., slower construction growth). The combination of these changes leads Global Insight to advocate for the use of TRANSEARCH 2006 as it creates a stronger, more accurate dataset from which to build the BMTS forecast.

While the NYSDOT TRANSEARCH Database includes forecasts out to 2025, for application to the BMTS Freight Study, the out-year was extended to 2030, which is the horizon year of the current BMTS long range transportation plan, and interim forecasts were added in five-year increments, consistent with the overall NYSDOT framework. To ensure that the baseline data accurately reflect local conditions in Binghamton, the data on freight flows and routings were adjusted slightly to take into account quantitative and qualitative information gleaned from interviews of freight shippers and carriers and economic development officials. Further, because the Binghamton freight forecast is built on the freight forecast developed for NYSDOT in 2006, the forecast methodology and

exogenous variables used are consistent with those accepted and used in state-level freight planning.

A modeling effort was undertaken to determine how much freight volume will travel on segments of the road and railroad network in the BMTS region. The goal of the exercise was to produce an assignment of freight volumes to the road and rail networks and to thereby identify bottlenecks where investments may be needed to improve the efficiency of the network, and to identify areas where excess capacity may exist, providing economic development opportunities.

More information about the forecast methodology can be found at the conclusion of this section.

Implications of I-86 Construction

As mentioned in Chapter 4, many stakeholders interviewed commented on the impact of the Route 17 upgrade to their freight operations. While some stakeholders did not see an immediate operational impact, those moving freight between Binghamton and the New York City area confirmed that Route 17 at interstate quality could prove to be an attractive alternative to the I-80 route through Pennsylvania that many take today.

The completion of I-86 through Binghamton will provide an interstate that connects Midwestern cities of Erie, Pennsylvania and Cleveland, Ohio to New York City in the East. This through-route is expected to result in higher amounts of truck traffic through Binghamton beginning in the 2015 forecast timeframe.

While it is possible that I-86 will help spur production and consumption in Binghamton, greater inbound and outbound truck tonnage resulting from I-86 is not explicitly forecast. The factors explicitly considered in the forecast process are as follows:

- I-80 is a shorter route from the Midwest to NYC for through traffic, but I-80 is becoming more congested. Global Insight tested the time effect on congestion versus an interstate-standard southern tier (I-86) route;

- The impact of I-86 begins in 2015 because the forecast is modeled in five-year increments. Therefore, 2015 is the first tier where we expect the effect to be felt;

- The forecast does not consider the impact of possible tolling of I-80. This had been proposed by the state of Pennsylvania, but has been rejected by USDOT; and

- The forecast only tests the overhead truck traffic for Task 3 due to the fact that this is the only factor that affects the region's freight traffic totals (as opposed to routes used by the freight). The key result is a higher level of total traffic in BMTS resulting from greater through volumes; specifically, 8.7 percent of forecast through truck tonnage (7.9 percent of units) moving through Binghamton in 2030 is estimated to result from traffic diverted off of I-80. Of course, a second possible result of I-86 is a route change for traffic between Binghamton and NYC, with more of it favoring I-86 eastward

versus I-81 to I-80 today. However, this is a change of facility, rather than a change of outbound or inbound traffic volume, and will be discussed in Chapter 6, along with other potential external changes that may affect the flows of freight through the region and thus the region's freight transportation needs.

5.2 Freight Forecast Results

Overview

Throughout this section, unless otherwise noted, the freight forecasts for 2030 are compared to the 2004 baseline data. Forecasts for intermediate years 2010, 2015, 2020, and 2025 are contained in Appendix A of this report.

Table 5.1 Summary of Freight Forecasts for Binghamton Region

	2004		2030		2004 to 2030		
Truck and Rail	**Millions of Tons**	**Mix**	**Millions of Tons**	**Mix**	**Share of Growth**	**Total Growth**	**CAGR[a]**
Inbound	10.9	*11.5%*	19.1	*12.3%*	13.6%	74.5%	2.2%
Outbound	11.6	*12.2%*	20.3	*13.1%*	14.4%	74.7%	2.2%
Local	1.8	*1.9%*	2.2	*1.4%*	0.7%	22.3%	0.8%
Through	70.5	*74.3%*	113.4	*73.2%*	71.3%	60.8%	1.8%
Total Freight	**94.9**	**100.0%**	**148.85**	**100.0%**	**100.0%**	**63.3%**	**1.9%**

[a] Compound Annual Growth Rate (CAGR).

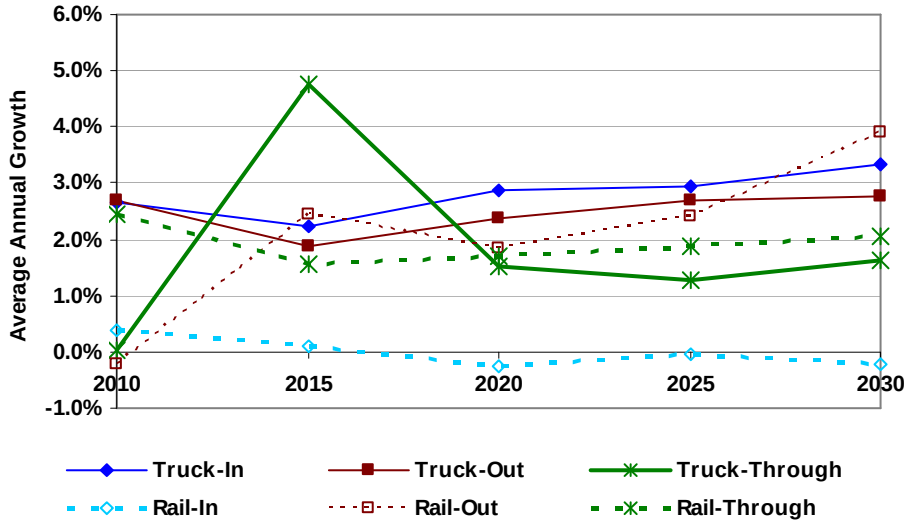
Source: Global Insight.

Figure 5.1 illustrates that tonnage growth over the forecast period is estimated to be slower between 2010 and 2015 for both truck and rail in nearly every direction. For both inbound and outbound truck-based cargo, the slower rate of growth is attributable to declines in construction-related tonnage, linked to slower construction growth in this period. Growth is expected to recover over the remainder of the forecast period for all modes and directions, with the strongest growth coming from inbound and outbound truck tonnage over 2025 and 2030, at around three percent (CAGR).

Outbound rail growth between 2010 and 2015 can be explained by increasing growth in outbound oils and beverages, lumber and wood products, and railcars. Outbound rail

tonnage is expected to enjoy the strongest growth in the late years of the forecast at 3.9 percent between 2025 and 2030.

Figure 5.1 Average Annual Tonnage Growth
2010 to 2030



Forecasts of Freight Movements by Mode

Similar to the mode split in 2004, freight moved by truck is forecast to continue to dominate as the primary mode of freight transport, carrying 98 percent of inbound and outbound tonnage in 2030 (see Figure 5.2 and Table 5.2).[1] Truck handles similar shares of freight when measured in terms of twenty-foot equivalent units (TEUs, a standardized measure of containerized cargo) or value (Table 5.3). However, truck traffic moving through Binghamton represents 70 percent of the expected growth of freight tonnage when considering freight moving by truck and rail, in and out of Binghamton (see Figure 5.2).

[1] It is important to note here that Global Insight's freight forecasts are driven by underlying commodity forecasts. As such, mode share is not explicitly forecast, but mode share may change due to varying growth rates in movements of underlying commodities utilizing truck and rail.

Table 5.2 Forecast of Freight Tonnage by Mode – 2004 versus 2030

in Millions of Tons

	2004			2030		
	Truck	**Rail**	**Total**	**Truck**	**Rail**	**Total**
Inbound	9.9	0.6	10.9	18.5	0.6	19.1
Outbound	11.4	0.2	11.6	20.0	0.3	20.3
Local	1.8	0.0	1.8	0.8	0.0	0.8
Through	61.0	9.5	70.5	98.1	15.3	113.4
Total	**84.1**	**10.2**	**94.9**	**137.5**	**16.1**	**153.6**

Source: Global Insight.

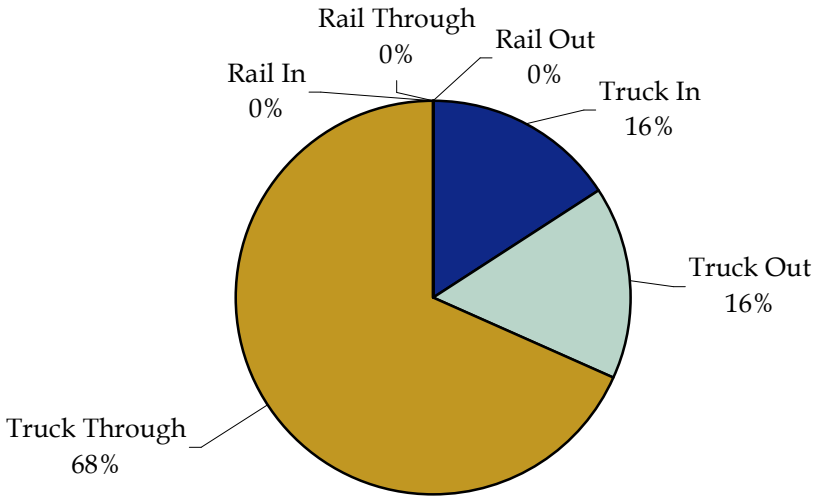
Table 5.3 Forecast of Value of Freight Moved by Mode – 2004 versus 2030

in Billions of 2004 Dollars

	2004			2030		
	Truck	**Rail**	**Total**	**Truck**	**Rail**	**Total**
Inbound	$24.1	$0.3	$24.4	$73.7	$0.3	$74.0
Outbound	$33.2	$0.2	$33.4	$103.4	$0.3	$103.7
Local	$0.5	$0.0	$0.5	$1.9	$0.0	$1.9
Through	$207.9	$10.6	$218.5	$313.3	$15.8	$329.1
Total	**$265.7**	**$11.1**	**$276.8**	**$492.3**	**$16.3**	**$508.7**

Source: Global Insight.

Figure 5.2 Mode and Directional Share of Growth in Tonnage
2004 to 2030



Source: Global Insight.

Truck Freight Forecast

New York State as a whole generates 64 percent of Binghamton's inbound truck tonnage with the New York metro area and Syracuse representing two of the largest source regions. New York State will gain importance as a source region for truck tonnage, supplying Binghamton with over 66 percent of its inbound truck tonnage by 2030. Canada and Mexico together supply 2.8 percent of Binghamton's truck tonnage, but will lose share, dropping to 2.6 percent by 2030 – a move that suggests weakening imports for Binghamton.

Chemung County, New York represents the largest intraregional trading partner for Binghamton in both 2004 and 2030, despite only growing by 1.9 percent CAGR over the 26-year period. Tonnage between Binghamton and Delaware County will grow at the fastest rates with outbound and inbound tonnage posting annual growth rates of 2.3 and 2.6 percent, respectively. Truck tonnage from Bradford County, Pennsylvania to Binghamton is the only intraregional flow that is expected to decline with average annual declines of 0.2 percent anticipated.

Table 5.4 Binghamton Trading Patterns and Partners for Freight Shipped by Truck – 2004 versus 2030

Region	2004 Tons (Millions)	Share	2030 Tons (Millions)	Share
Inbound to Binghamton				
Syracuse, NY	0.4	3.9%	0.8	4.1%
New York, NY[a]	0.9	9.5%	2.4	12.7%
Rest of New York State	5.0	50.4%	9.1	49.3%
Pennsylvania	0.4	4.1%	0.7	3.8%
Midwest	0.8	8.2%	1.3	7.1%
New England	0.5	5.0%	0.6	3.0%
Rest of U.S.	1.6	16.0%	3.2	17.4%
Canada and Mexico	0.3	2.8%	0.5	2.6%
Total Inbound Freight	**9.9**	**100.0%**	**18.5**	**100.0%**
Outbound from Binghamton				
New York, NY	1.7	14.9%	3.2	15.9%
Syracuse, NY	0.8	6.7%	1.3	6.5%
Buffalo, NY	0.3	2.9%	0.7	3.3%
Rest of New York State	5.0	43.5%	8.0	39.8%
Scranton, PA	0.1	0.8%	0.1	0.7%
Rest of Pennsylvania	2.1	18.5%	3.6	18.0%
Rest of U.S.	1.3	11.2%	2.9	14.6%
Canada and Mexico	0.2	1.5%	0.2	1.2%
Total Outbound Freight	**11.4**	**100.0%**	**20.0**	**100.0%**
Local Freight within Region	**1.8**		**2.2**	
Through Movements	**55.6**		**87.5**	

[a] New York, NY is defined as the following counties: Pike PA, Bronx NY, Dutchess NY, Orange NY, Putnam NY, Queens NY, Nassau NY, New York NY, Kings NY, Ulster NY, Westchester NY, Suffolk NY, Sullivan NY, Richmond NY, and Rockland NY.

Source: Global Insight.

Table 5.5 Intraregional Truck Traffic in 2004 and 2030

Origin	Destination	2004 Truck Tons	2030 Truck Tons
Binghamton	Chemung	347,000	566,300
Binghamton	Bradford	257,000	304,400
Binghamton	Chenango	175,000	266,500
Binghamton	Delaware	150,000	269,475
Chenango	Binghamton	99,700	170,500
Chemung	Binghamton	71,000	206,000
Bradford	Binghamton	51,000	48,000
Delaware	Binghamton	3,600	7,000

Source: Global Insight.

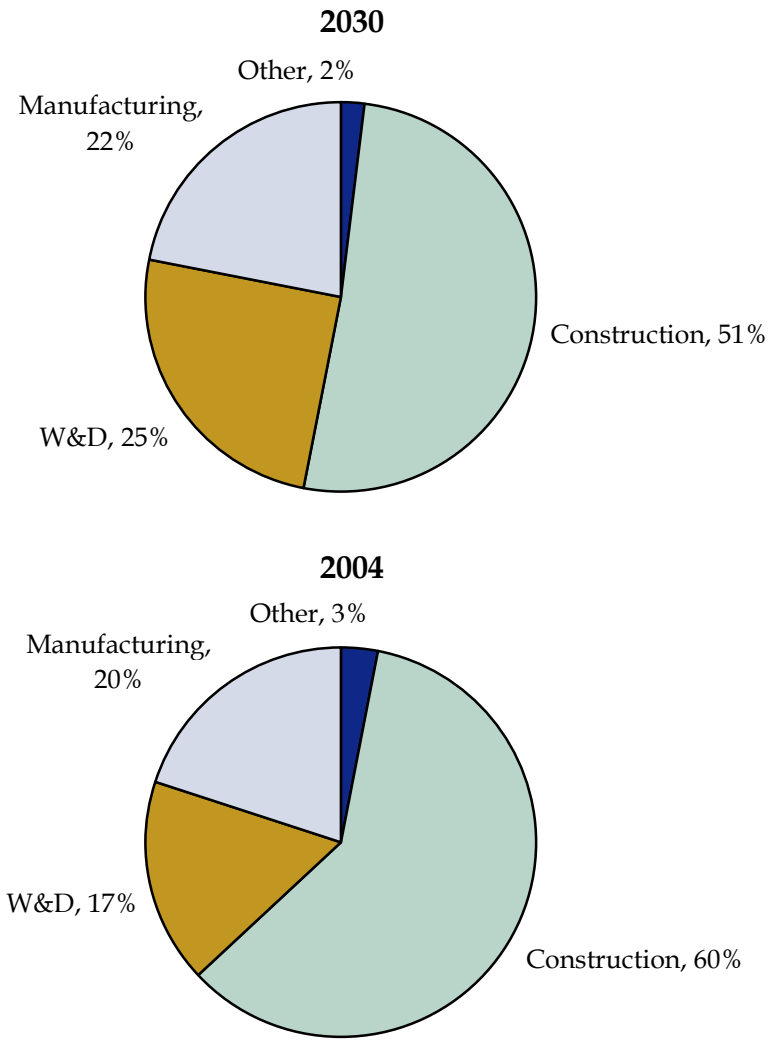
Binghamton shipped out an estimated 11.4 million truck tons of freight in 2004 – a level that is expected to grow at 2.2 percent annually to reach 20.0 million outbound truck tons in 2030. Outbound truck loads is forecast to grow at 2.4 to reach 1.9 million outbound loads in 2030 (up from 1.1 million loads in 2004). Considered on a per-day basis, truck loads leaving Binghamton are forecast to double from roughly 2,900 per day in 2004 to nearly 5,300 trucks per day[2] in 2030.

The outbound commodity mix carried by trucks is not expected to shift dramatically, but important changes are worth noting. While construction materials such as broken stone, sand and gravel, and ready-mix concrete were among the largest commodities (in terms of tonnage) shipped out via truck in 2004, manufacturing and warehouse and distribution center traffic also represented comparable shares. Outbound warehouse and distribution center traffic is expected to grow annually at an average rate of 3.7 percent[3] to reach 5.1 million tons in 2030. Strong growth in this area is explained through Binghamton's excellent access to major consumption centers. The aforementioned construction commodities will remain the largest outbound commodity but will experience slow growth, at 1.5 percent. Figure 5.3 below shows that, while warehouse and distribution commodities represented 17 percent of outbound commodities in 2004, they are forecast to represent 25 percent by 2030, while construction materials will shrink from 60 percent to 51 percent by 2030.

[2] Per day calculations based on a 365 day year.

[3] Growth forecast assumes current conditions only; this is discussed in greater detail below.

Figure 5.3 Outbound Commodity Split by Truck – 2030 versus 2004



Source: Global Insight.

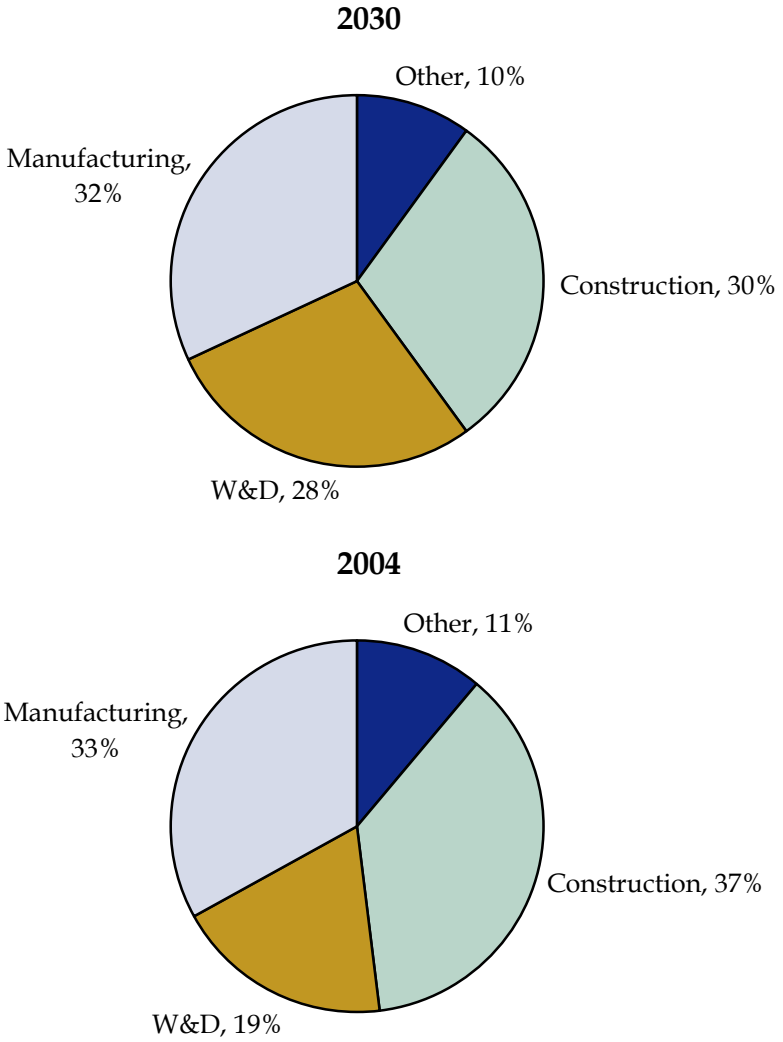
Binghamton's inbound truck freight is expected to demonstrate a similar pattern. After receiving approximately nine million truck tons in 2004, inbound truck tonnage to the region is expected to grow annually at an average annual rate of 2.4 percent, resulting in 18.5 million inbound truck tons in 2030. About 1.8 million inbound truck loads are anticipated in 2030 (up from 960,000 in 2004). This growth translates to an increase of over 2,200 additional trucks coming into Binghamton each day in 2030.

The inbound commodity mix carried by trucks is not expected to shift dramatically, but important changes are worth noting. Like outbound traffic, warehouse and distribution center inbound traffic is expected to enjoy strong growth (4 percent annually) over the forecast period. While construction materials such as broken stone, sand and gravel, and ready-mix concrete remain among the largest commodities (in terms of tonnage) shipped in via truck, construction material growth is not expected to be strong with a combined

average annual rates of 2.1 percent annually. Figure 5.4 shows that warehousing and distribution is expected to grow from less than one-fourth of inbound tonnage by truck in 2004 to almost one-third by 2030.

Figure 5.5, portraying compound annual growth of inbound and outbound truck tonnage by sector, demonstrates the importance of warehouse and distribution center traffic to the expected growth in freight over the forecast period. As stated previously, through truck traffic dominates Binghamton area traffic. Shown on the right axis of Figure 5.6, through truck tonnage can be seen approaching 98 million tons in 2030.

Figure 5.4 Inbound Commodity Split by Truck – 2030 versus 2004



Source: Global Insight.

Figure 5.5 Growth in Inbound and Outbound Truck Tonnage by Sector
2004 to 2030

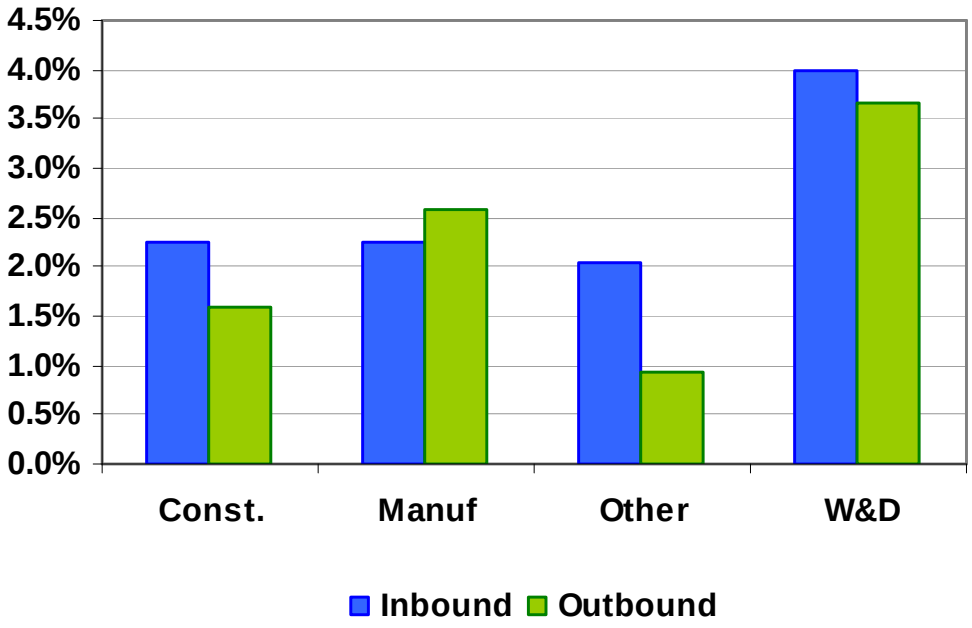
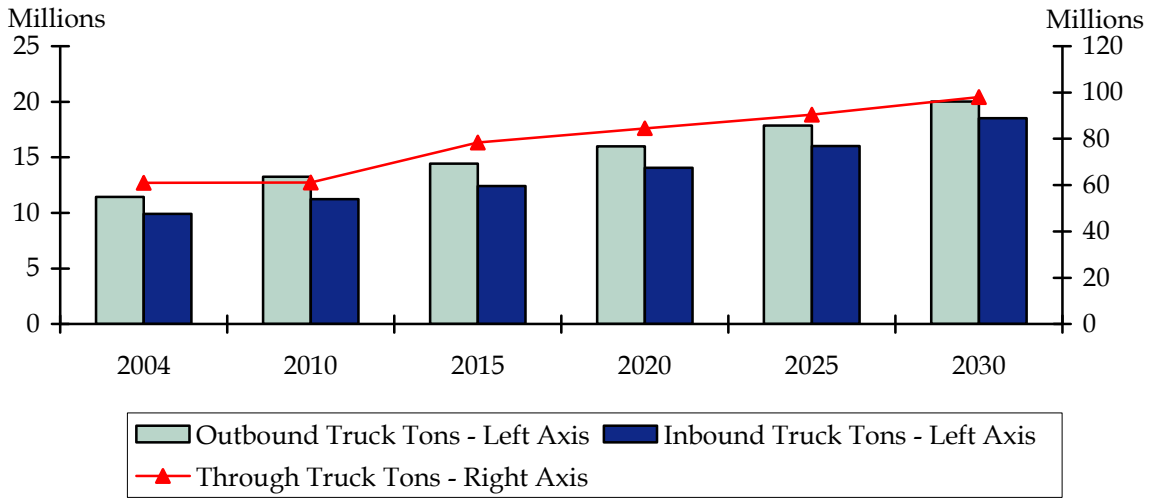


Figure 5.6 Truck Tons by Direction



Through truck tonnage is mostly comprised of warehouse and distribution center traffic which, after growing at 3.2 percent annually over the forecast period, should account for 18.1 million truck tons moving through Binghamton in 2030. Construction materials and manufactured goods also account for significant tonnage with 8 percent and 65 percent of through truck tonnage, respectively, in 2030.

As shown in Figure 5.1, annual growth in total through traffic by all modes is expected to be 1.9 percent from 2004 to 2030. Similarly, the truck tonnage portion of through traffic is expected to post average annual growth rates of 1.8 percent over the forecast period, partly in response to traffic shifting off of the congested I-80 and onto the I-86 corridor through Binghamton following 2015, as well as additional truck traffic along I-81.

Implications of Truck Forecasts

When examining total daily traffic, the model identifies several roadways which are expected to have higher traffic volumes than what NYSDOT traffic data has shown. The data shows AADT volumes of less than 10,000 vehicles on Routes U.S. 11 and NY 7, 20, 26, 96, and 434. The BMTS model shows modestly higher volumes on portions of Routes NY 7, 20, and 26, and significantly higher volumes on portions of Routes U.S. 11, NY 96, and NY 434. With respect to AADTT (Average Annual Daily Truck Traffic), the BMTS model shows very similar results.

In the base year, the BMTS model shows the highest truck volumes in the region occurring on the major highways such as:

- Interstate 81;
- Interstate 88;
- Route NY 12 (north of Interstate 88);
- Route NY 17;
- County Route 20 (between Interstate 81 and Broome Corporate Park);
- Route NY 26;
- Route NY 38/96 (Between Owego and the Route 38/Route 96 split); and
- Route NY 434 (segments in Vestal area).

Each of the highway segments listed above are shown to carry more than 1,000 trucks per day on all or some portions, when accounting for travel in both directions. The highest truck volumes are shown to occur where Interstate 81 and Route NY 17 operate as a complex in the City of Binghamton. Many of the listed routes are paths that thousands of trucks and automobiles use to pass through the Binghamton area while traveling between origin and destination points outside the region. Routes such as NY 434 (Vestal Parkway) and County Route 20 (Cedarhurst Road) provide access to truck generating facilities such as retail establishments in the case of Vestal Parkway and industrial facilities in Broome Corporate Park in Conklin near Cedarhurst Road.

Figure 5.7 illustrates the base year 24-hour truck volumes throughout the entire BMTS network. The colors represent the sum of truck volumes in both travel directions on each segment. Because divided highways (Interstates 81 and 88, Routes NY 17, NY 201) are represented in the model shapefile by two polyline features (one for each travel direction), the sum of the volumes for each direction have been added to both polylines. This allows the map to display the total bidirectional volumes on these roadways in proper proportion to the bidirectional volumes on nondivided (single polyline) roads.

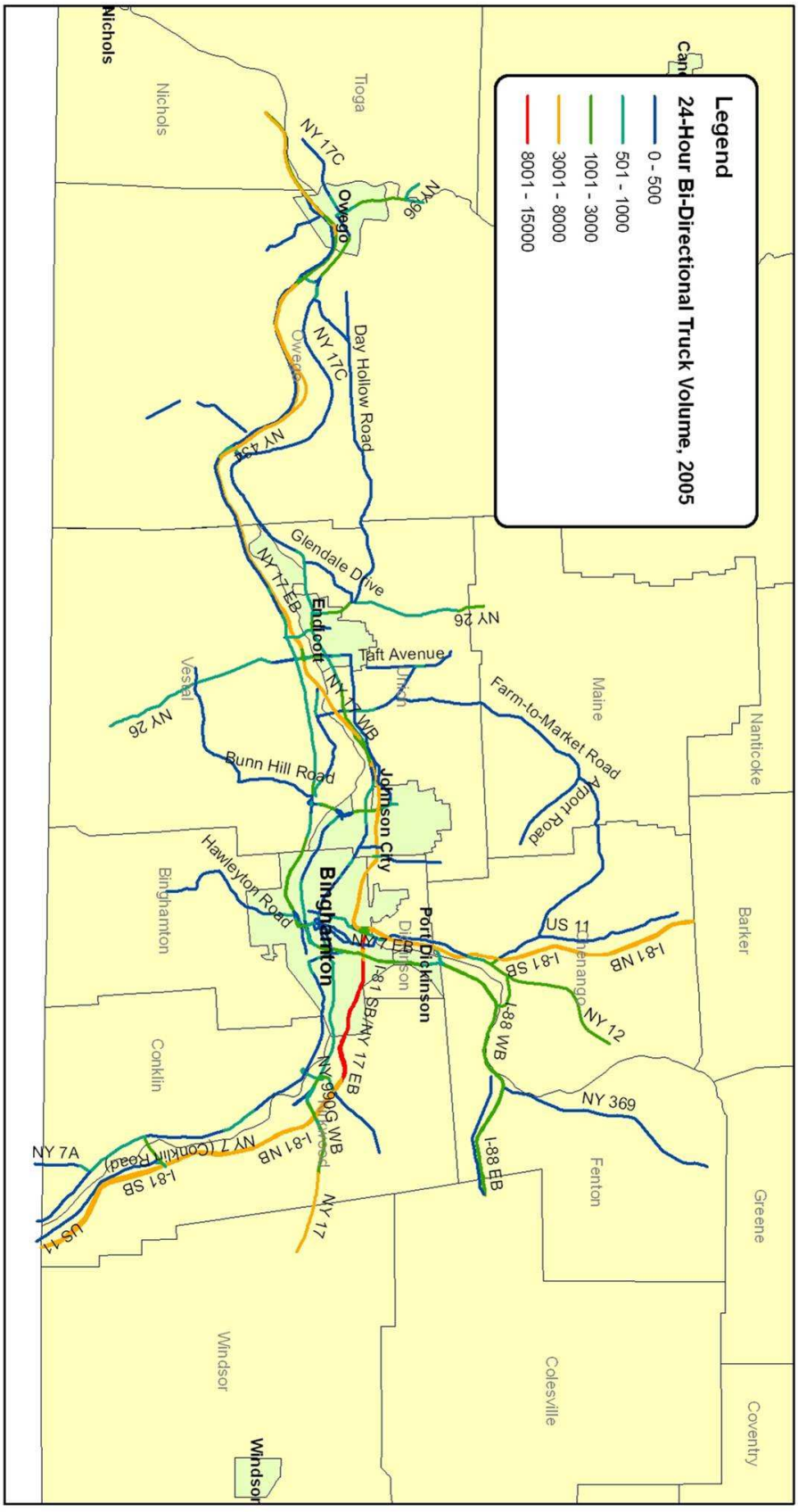


Figure 5.7 Base Year 24-Hour Truck Volume

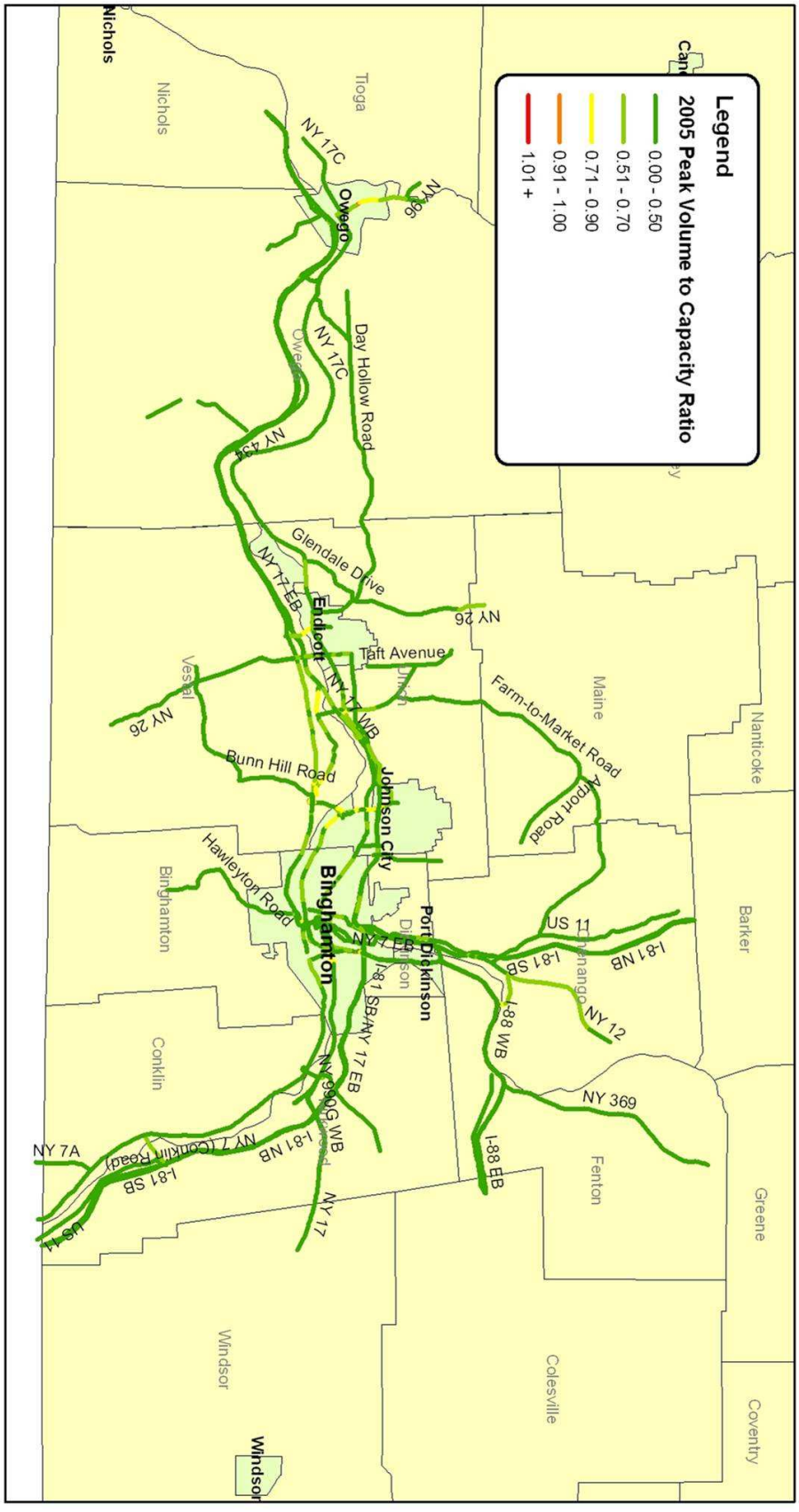


Figure 5.8 Base Year Volume to Capacity Ratio

The roadways in the BMTS region are capable of accommodating the existing traffic volumes. The model's base year volumes (truck and automobile combined) do not exceed roadway capacity on any road segments. Figure 5.8 illustrates base year volume to capacity ratios on the BMTS network, accounting for the volume and capacity of both travel directions on each segment.

According to the BMTS model, the roadways that carry the heaviest truck traffic in the base year will continue to carry the heaviest truck traffic in the forecast year. Interstate 81, Interstate 88, and Route NY 17 will remain the three most heavily traveled routes in the BMTS region. Routes NY 12, 20, 26, 38, 96, and 434 also will continue to carry large numbers of trucks entering and exiting the BMTS region. Figure 5.9 illustrates the 24-hour truck volumes estimated by the BMTS model for the forecast year.

While the routes that serve the largest numbers of trucks in the region are expected to remain the same over time, it is important to note where significant changes in truck volume are expected to occur. Figure 5.10 illustrates the expected change in truck volume (by number) on segments throughout the BMTS network between the base and forecast years. Interstates 81 and 88 and Route NY 17 will experience the greatest numeric increases in truck volume. Segments scattered throughout the BMTS region which are shaded in orange in Figure 5.10 are expected to see 500 to 1,000 more trucks heading in both directions over a 24-hour period in the forecast year than they did in the base year.

The model suggests that there are many roadway segments which are expected to serve a smaller number of trucks in the forecast year than they did in the base year. Portions of Old Vestal Road in Vestal, Riverside Drive in Binghamton and Johnson City, Loughlin Road in Kirkwood, and Willis Road and Dorman Road in Chenango will see a bidirectional decrease in truck volumes of more than 100 trucks per day. Many streets in central Binghamton, Johnson City, Endicott, and Owego are expected to see fewer trucks in the forecast year than in the model's base year. These decreases could be the result of the reassignment of truck trips to alternative routes nearby (Old Vestal Road trips could be diverted to Vestal Parkway, accounting for a portion of the projected truck volume growth on Vestal Parkway, for example). The numeric increase in truck traffic is illustrated in Figure 5.10. Additionally, Figure 5.11 shows the increase in truck traffic as a percent of the base year (2005) truck traffic volume. The orange lines representing the major highways show that there is a significant percent increase in truck traffic anticipated on these roadways. Orange lines also represent many smaller roads in Conklin, Fenton, Chenango, and Owego, where modest numeric increases in truck traffic represent large percent increases due to low base year truck volumes.

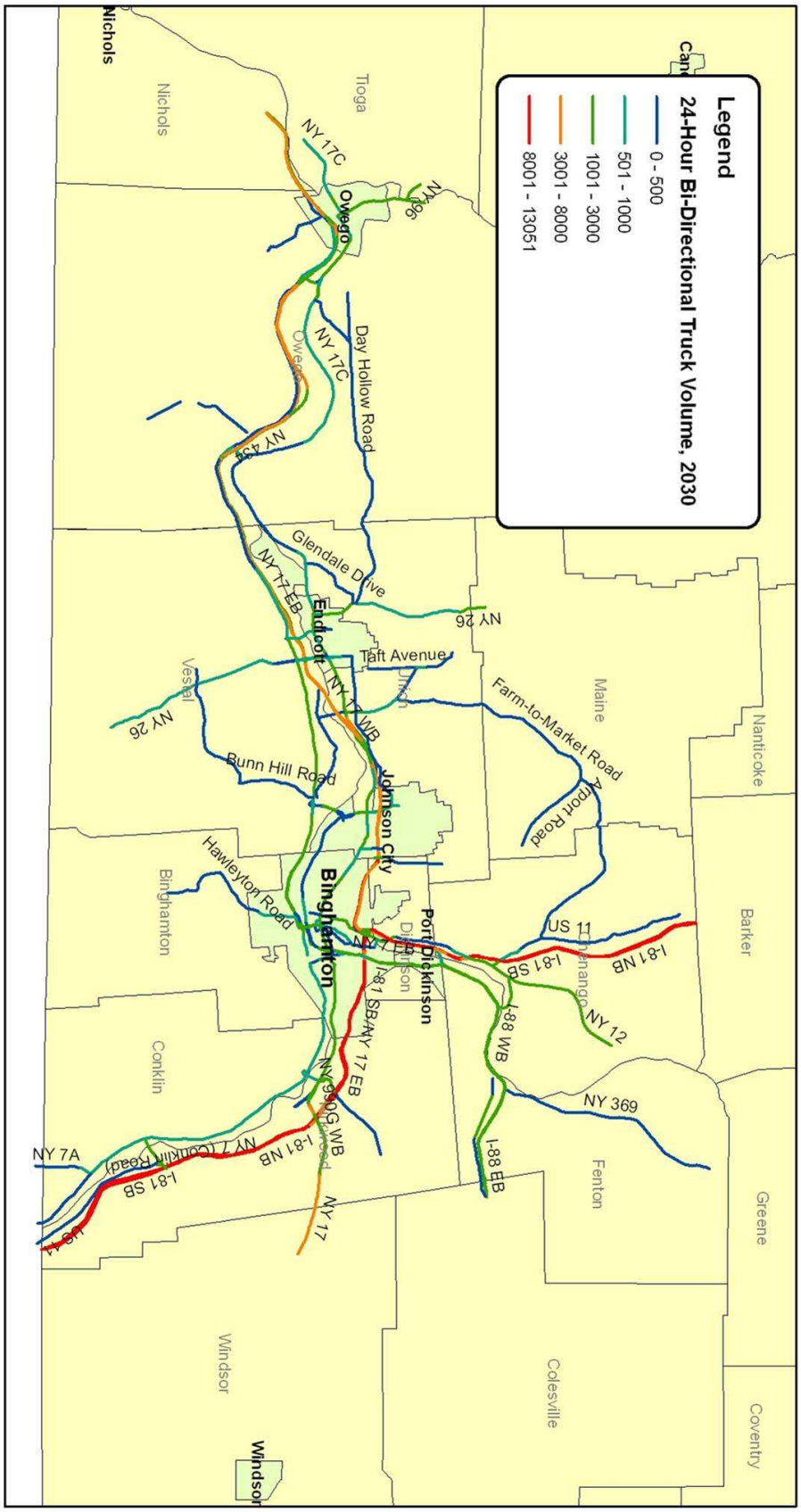


Figure 5.9 Future Year 24-Hour Truck Volume

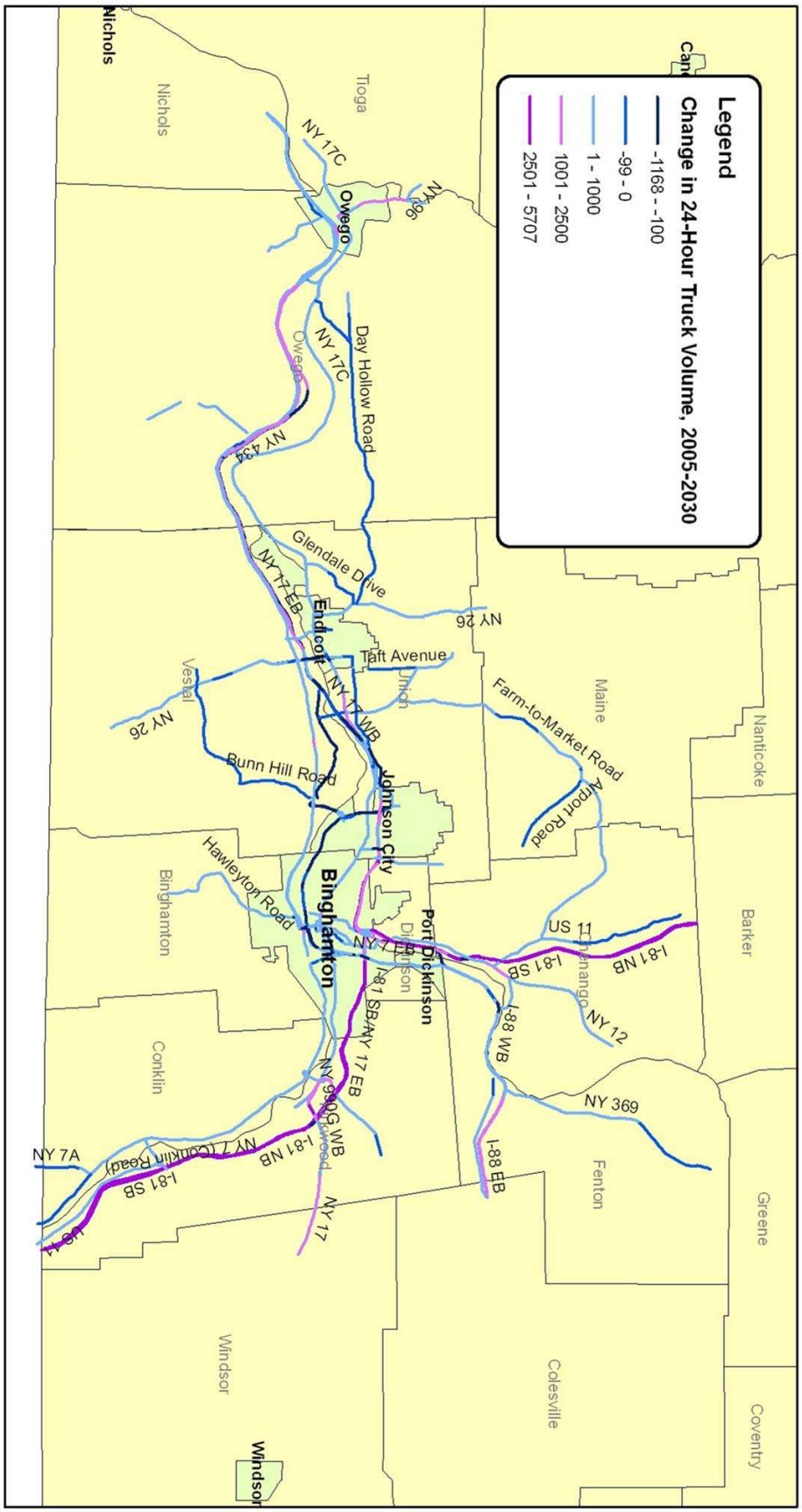


Figure 5.10 Change in Truck Volume (Numeric)
2005 to 2030

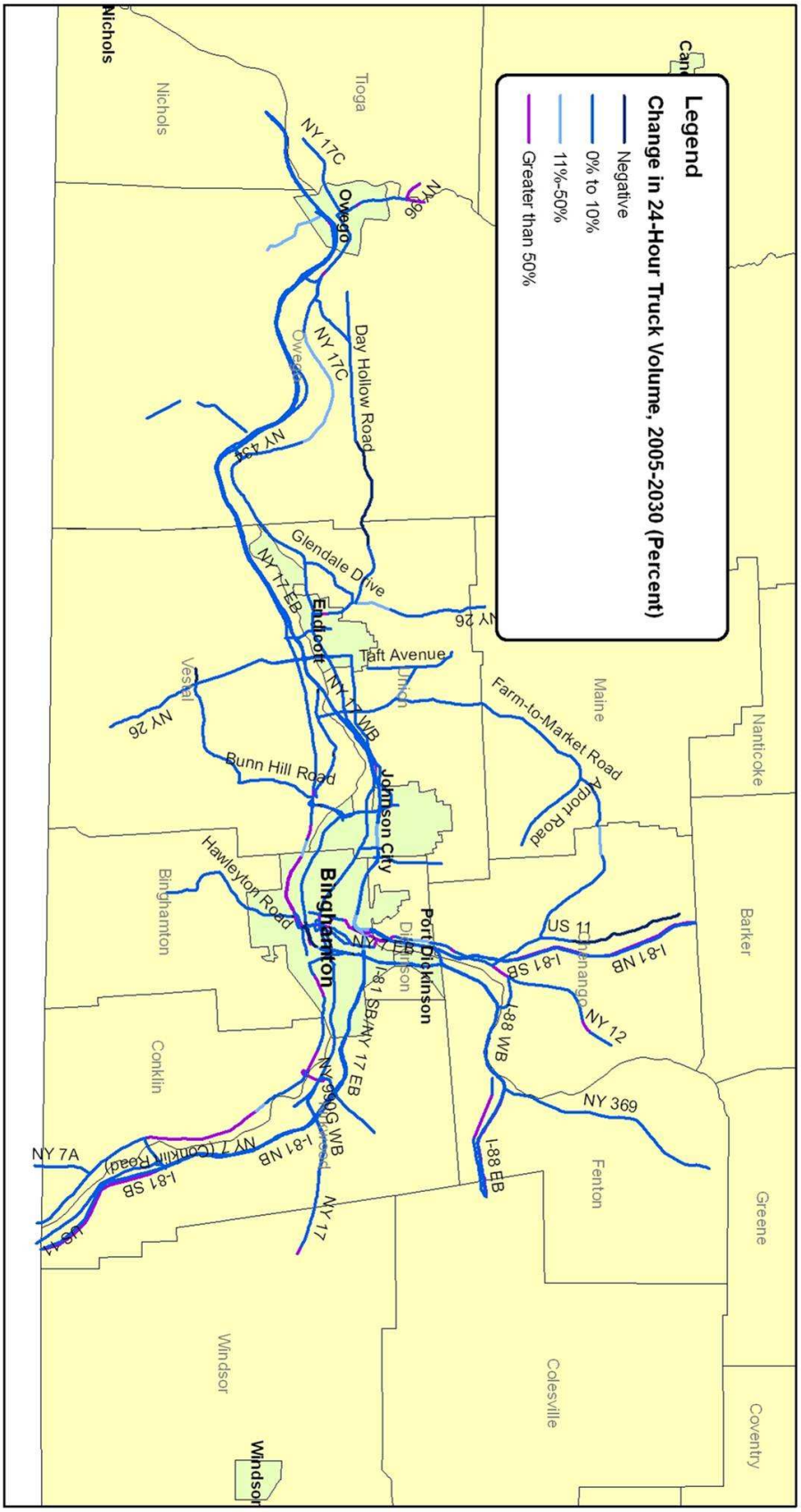


Figure 5.11 Change in Truck Volume (Percent)
2005 to 2030

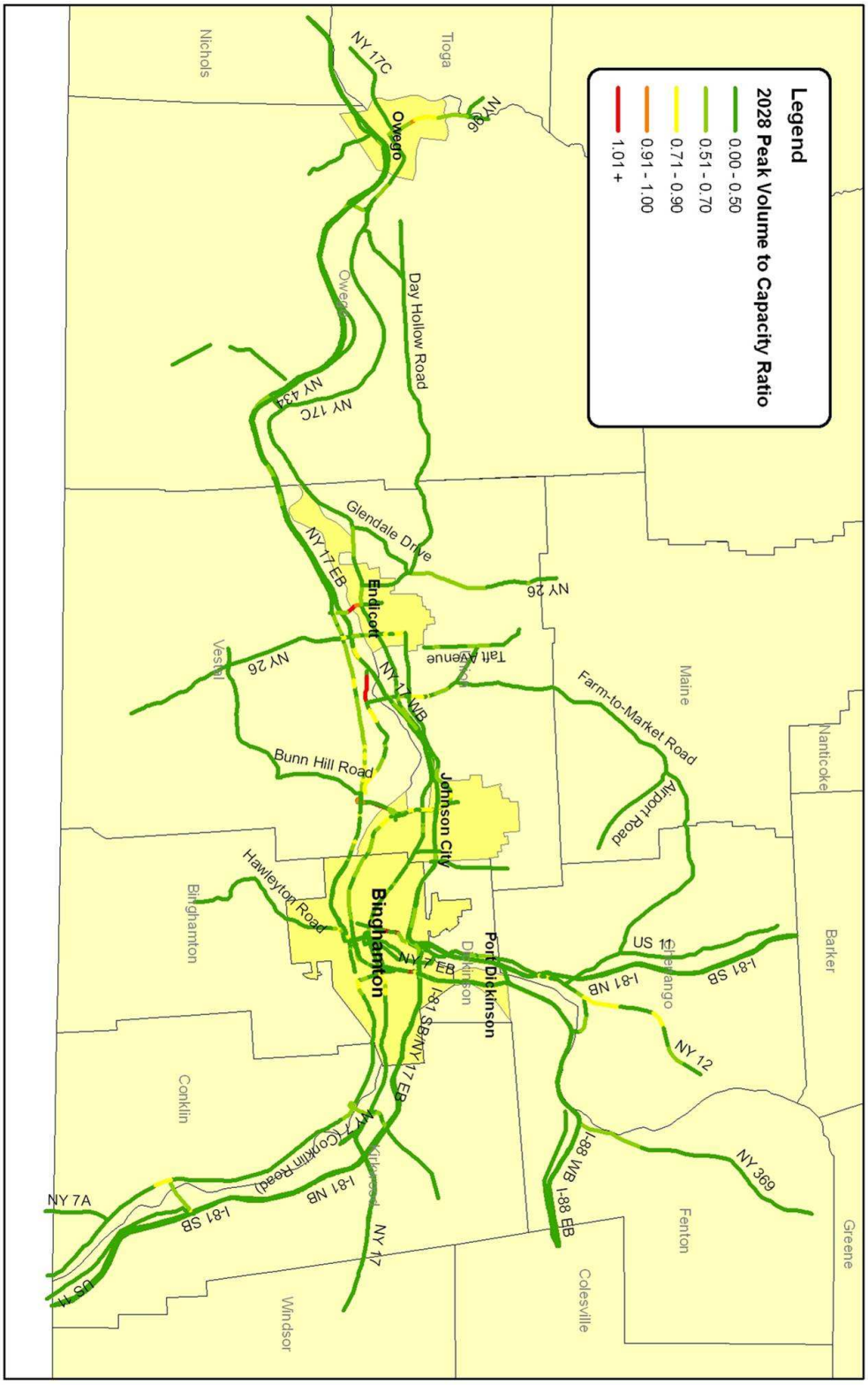


Figure 5.12 Future Year Volume to Capacity Ratio

The BMTS model shows that current and anticipated future truck traffic will rely heavily on the major highways in the region. Interstates 81 and 88 and Route 17 are and will continue to be the predominant routes used by trucks traveling through the BMTS region. This result is consistent with Global Insight forecasts that anticipate an increasingly larger share of truck traffic to be making through trips, with origin and destination points outside the region. These vehicles will be using the major highways to pass through the Binghamton area. Along with the increasing through traffic, there will be increases in truck traffic on roads that serve major industrial and commercial facilities. Routes NY 7, 20, and 434 are examples of such roads.

Despite the projected increases in truck traffic on many network segments, freight-related bottlenecks are not anticipated to develop anywhere in the BMTS region by 2030. There may be opportunities to utilize excess roadway capacity for economic development. Chapter 6 of this report proposes economic development strategies that the region could pursue and the transportation infrastructure investments that would be necessary to support them.

Rail Freight Forecast

Rail is expected to represent a declining fraction of Binghamton's total inbound freight between now and 2030 falling from 5 percent of total inbound tonnage in 2004 to 3 percent of inbound tonnage in 2030. This follows after outbound rail tonnage grows at an estimated annual rate of 2 percent and inbound rail tonnage remains flat at 0percent.

The Midwest is becoming an increasingly important trading partner with Binghamton in terms of rail tonnage, increasing its share of inbound traffic from 17 to 19 percent between 2004 and 2030. The Midwest is an even larger player for Binghamton's outbound rail tonnage, accepting 35 percent in 2004 with expectations of 49 percent share by 2030. Syracuse will diminish in importance with negative growth of 0.4 percent per year anticipated for inbound rail traffic and a 7.5 percent drop in market share for outbound traffic.

Table 5.6 Binghamton Trading Patterns and Partners for Freight Shipped by Rail – 2004 versus 2030

in Tons

Region	2004 Tons	Percent Share	2030 Tons	Percent Share
Inbound to Binghamton				
Pittsburgh	245,000	44.1%	262,000	47.1%
Midwest	97,000	17.4%	107,000	19.3%
Syracuse	89,000	16.0%	81,000	14.6%
Rest of U.S.	125,000	22.5%	105,500	19.0%
Total	**556,000**	**100.0%**	**556,000**	**100.0%**
Outbound to Binghamton				
Midwest	57,000	35.5%	132,000	49.1%
Syracuse	34,000	21.0%	37,000	13.6%
East Coast	26,000	16.4%	44,000	16.3%
Rest of U.S.	44,000	27.1%	56,500	21.0%
Total	**161,000**	**100.0%**	**269,000**	**100.0%**
Local Freight within Region	**0**		0	
Through Movements	**9,500,000**		**15,300,000**	

Source: Global Insight.

Note: Global Insight's Rail data is included in TRANSEARCH Insight and is compiled using the Carload Waybill file, and proprietary carrier data.

Outbound tonnage growth will be fueled by growth in metal scrap and other miscellaneous waste and scrap materials. These categories represent a combined 88,000 tons carried by rail into Binghamton in 2004 and are expected to grow at average annual rates of 3.1 percent between 2004 and 2030. Dampening outbound growth are grain, plywood, and plastics, each declining annually at rates of 0.8 percent from 2004 to 2030.

The declines in inbound rail tonnage are attributable to strong average annual declines in locomotive parts (-7.6), grain (-3.2), and plastics (-1.2 percent). Inbound coal via rail was the largest commodity (in terms of tonnage) at 245,000 rail tons in 2004. Growth in coal will not be robust, at an annual rate of 0.3 percent, and will yield 262,000 inbound rail tons in 2030.

Rail carload tonnage moving through Binghamton is expected to grow annually at an average rate of 1.7 percent through 2030 while through intermodal tonnage grows at 3.1 percent. The result is a total 15 million tons of through rail traffic in 2030. Rail carload

tonnage represents the majority of through traffic, with 87 percent of through tonnage in 2030. Considered on a unit basis, it is expected that 148,000 rail carload units and 160,000 intermodal units will move through Binghamton in 2030.

Rail Forecast Implications

Much of the rail intermodal traffic is heading through Binghamton to the north and west with New Jersey, New England, Buffalo, and Syracuse representing a combined 698,000 intermodal tons in 2030. While the majority of intermodal through traffic moves north through Binghamton, significant tonnage moves south with 577,000 tons moving through Binghamton to the Midwest in 2030. Intermodal traffic to the Midwest will enjoy the strongest compound annual growth at 3.4 percent and 4.0 percent between 2004 and 2030.

Figures 5.13 and 5.14 illustrate the county-to-county rail flows anticipated by the Global Insight forecast in the base year (2005) and forecast year (2030), respectively. The largest increases in rail freight tonnage (by numbers and percent) are expected to occur between the BMTS region and points south along the CP Mainline toward Scranton and Sunbury, Pennsylvania and to the west along the NS Southern Tier Line toward Buffalo.

Figure 5.13 Daily Rail Assignment
2005

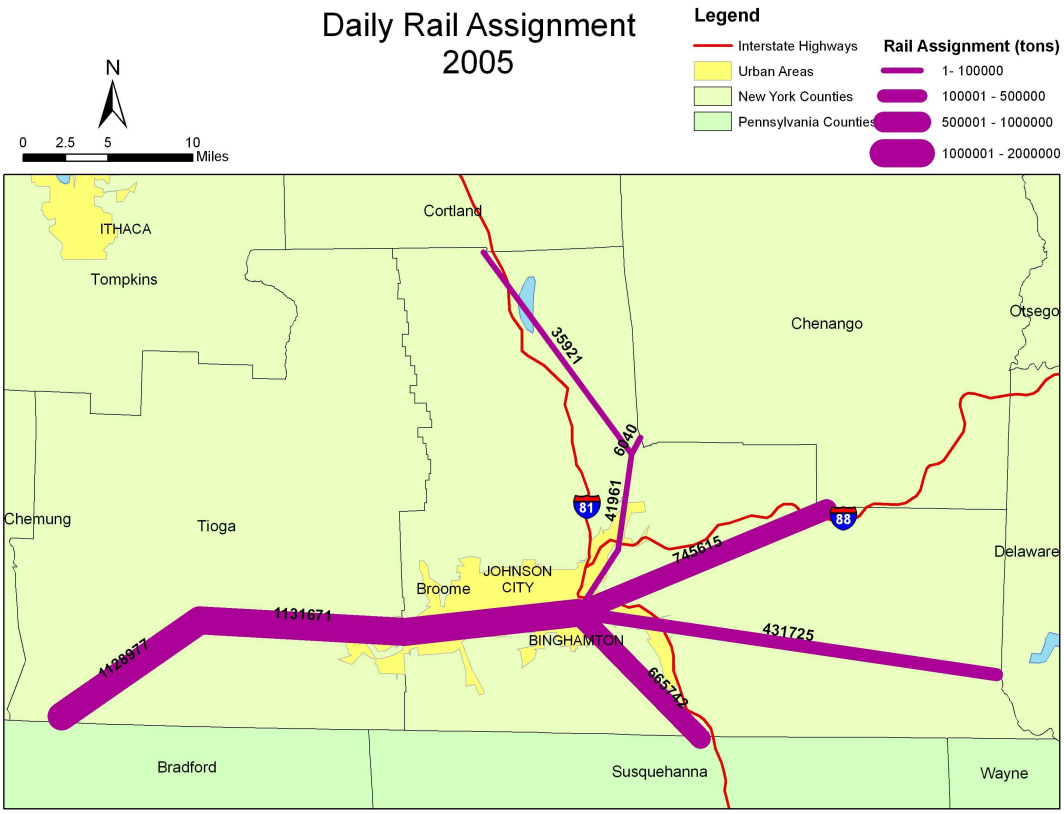
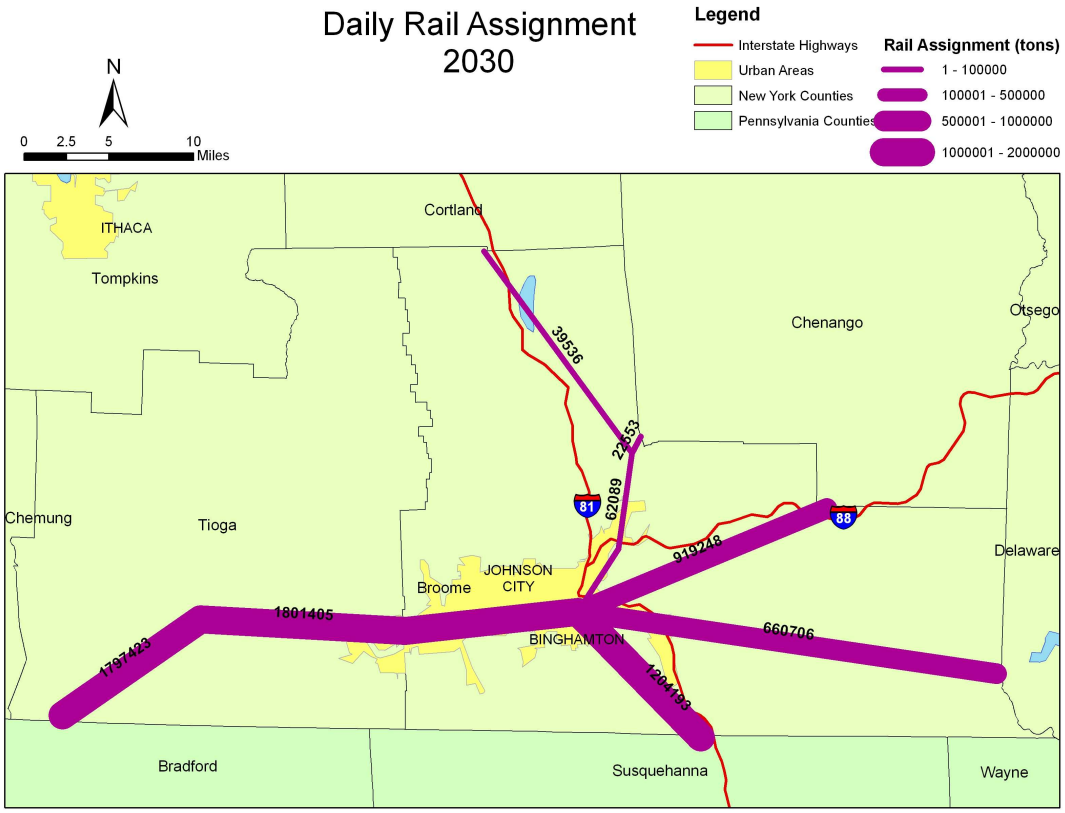


Figure 5.14 Daily Rail Assignment
2030



The rail lines that pass through the Binghamton area are part of a national network of rail lines that transport freight nationwide. Most of the major rail lines are owned and operated by Class I railroad corporations who manage their respective rail operations throughout the United States and Canada. According to the American Association of Railroads,[4] demand for rail freight will increase 88 percent by 2035. This jump in demand will create a tremendous strain on the capacity of the existing national rail system. Much of the nation's future rail growth will be associated with the transport of intermodal containers arriving in the United States from overseas full of consumer goods and components that are destined for retailers and assembly plants in the central and eastern United States. Another significant contributor to growth in rail traffic in terms of volume and weight recently has been the transport of coal from Wyoming's Powder River Basin to power plants around the nation. Coal is the single largest commodity transported by rail, dwarfing all other products.

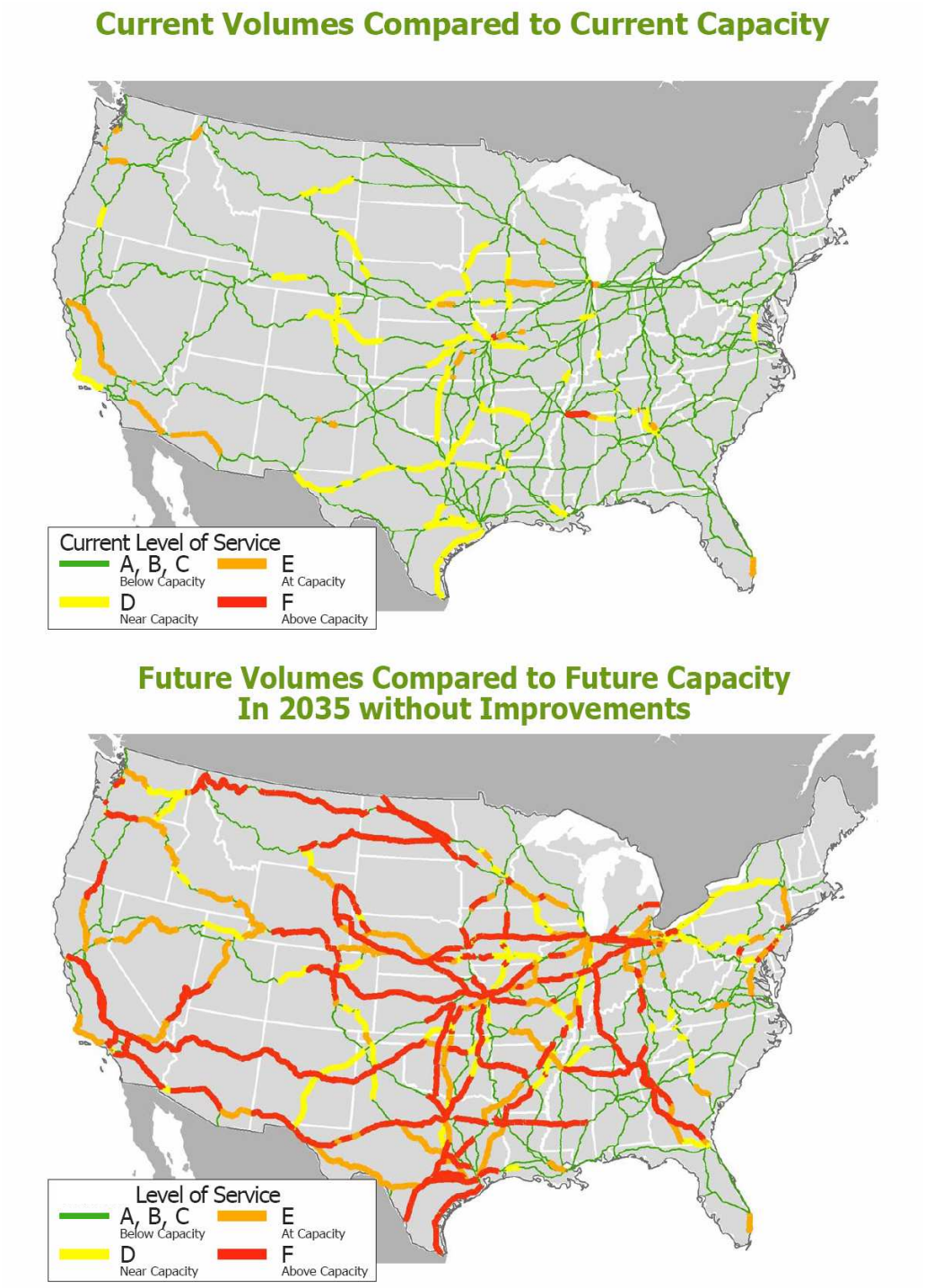
[4]American Association of Railroads, "National Rail Freight Infrastructure Capacity and Investment Study," September 2007.

Figure 5.15 shows existing and forecast levels of service on the national rail network. The CP Mainline, which passes through the BMTS region, is not likely to be affected in such a manner that the level of service is compromised locally. (The NS Southern Tier Line did not meet the report's criteria to be included in the AAR analysis, but based on data available from Global Insight for use on this study, the Southern Tier Line would appear in green on both the current and forecast maps had it been included in the study.) The major bottlenecks will be in areas of the Midwest, Plains, and Western states where sufficient rail capacity does not yet exist. Improvements in these areas will be the top priorities of the Class I railroads, as they will enhance the efficiency of the national rail system and reduce delays experienced locally which are due to chokepoints upstream or downstream from Binghamton.

Despite the large growth anticipated between 2005 and 2030 illustrated in Figures 5.14 and 5.15, the demand for rail is not expected to exceed the capacity of the rail main lines within the BMTS region. The likelihood of excess rail capacity provides the region with opportunities to spur rail-dependent industry and advocate intermodal transloading activities to shift a portion of the anticipated truck trips to rail.

While capacity exists on the main lines, there are bottlenecks that could develop in the region's rail yards where intermodal transloading and staging activities occur. Examples of such bottlenecks include the Binghamton Yard in the City of Binghamton and the East Binghamton Yard in Conklin. The addition of through tracks on the NYS&W line at the Binghamton Yard in the City of Binghamton would allow trains to pass through the region more quickly, reducing the delays they experience navigating through these facilities. The expansion of facilities such as the East Binghamton Yard in Conklin would provide an opportunity to accommodate demand for yard space and encourage intermodal activity in the region. These and other opportunities to improve the local rail network and encourage economic development are discussed further in Chapter 6 of this report.

Figure 5.15 Rail System Volume to Capacity Ratios
2005 and 2035



Source: American Association of Railroads, "National Rail Freight Infrastructure Capacity and Investment Study," September 2007.

5.3 Opportunities and Implications of Forecast

The warehouse and distribution center sector represents a strong opportunity for growth in Binghamton. As discussed above, warehouse and distribution center traffic is expected to be one of the fastest growing commodity groups representing over one-quarter of both inbound and outbound traffic.

In value terms, Binghamton's warehouse and distribution center sector is anticipated to post annual growth[5] of 4 percent per year through 2030, to become an industry handling $33.5 billion worth of goods. Despite an expansion rate somewhat below the expected national average growth of 5.2 percent annually in this sector, Binghamton's participation in the rising warehouse and distribution business translates to a cumulative growth of 156 percent from 2004 to 2030.

Furthermore, as noted in Figure 5.17, Broome County already exceeds warehouse and distribution center volume generated from surrounding counties in New York, and stays ahead through the forecast horizon. Tioga County, while enjoying moderate rates of growth over the forecast period, remains a smaller player in this sector under the baseline projection.

Table 5.7 Warehouse and Distribution Center Outbound Truck Tonnage (millions) Growth in BMTS and Regional Counties

Benchmark Counties	2004	2030	CAGR 2004 to 2030	Total Growth
Broome County, NY	**2.0**	**5.1**	**3.7%**	**155.6%**
Onondaga County, NY	0.38	0.73	2.5%	92.1%
Chemung County, NY	0.14	0.34	3.6%	150.6%
Cayuga County, NY	0.09	0.16	2.3%	80.1%
Delaware County, NY	0.57	1.27	3.1%	122.4%
Tioga County, NY	0.01	0.03	3.7%	155.1%
Cortland County, NY	0.09	0.27	4.5%	215.8%
Chenango County, NY	0.05	0.15	4.5%	215.0%
Lackawanna County, PA	0.02	0.03	3.0%	113.8%

[5] In outbound volume.

It is important to note that the forecast presented here considers known changes and trend line macroeconomic forecasts based on historic conditions. As such, Binghamton can foster the further development of this sector and enhance projected growth, by taking advantage of its improved I-86 connection to the New York metro market, and the possible disadvantage of competing areas in Pennsylvania due to factors like access route congestion and potential implementation of tolls on I-80.

The forecast also shows the growing importance of truck as a mode of transport for cargo inbound, outbound, and traveling through Binghamton. Truck in all directions accounted for roughly 88 percent of tonnage in 2004 and will hold this share in 2030. This additional tonnage on the roads reflects increased demand on road infrastructure and sheds light onto where future infrastructure maintenance funds will be needed. As with warehouse and distribution center growth, this forecast is not absolute, and improvements in rail reliability and infrastructure, such as the addition of an intermodal yard, could change this mode mix going forward.

Manufacturing activity will continue to play an important role in Binghamton's freight traffic. While this traditional business base is not expected to return to its former prominence, outbound truck tons of manufactured products is expected to grow annually at an average rate of 2.6 percent, reaching 4.5 million tons and $69 billion in 2030. The forecast also anticipates growth in high-value manufacturing sectors. Production of photographic equipment and electronic data equipment are expected to grow at 5.8 percent and 6.0 percent annually from 2004 to 2030. While the exports of these goods add represent the output of Binghamton's economy, their growth will be accompanied by a corresponding growth in manufacturing inputs such as raw materials and component parts.

6.0 Freight Transportation Improvement Program

6.1 Transportation Project Identification

This section identifies the capital projects that could improve freight transportation system operations and advance the Binghamton Region's economic development opportunities. As a culmination of the information and analyses that have been presented in previous sections, this section takes a three-pronged approach to project identification:

- First, the results of the regional economic forecast and the assignment of truck and rail traffic to the BMTS regional freight network were analyzed to determine where there might be congestion or where existing operational issues may be exacerbated due to increases in freight traffic.

- Second, based on stakeholder input, six specific subareas of the BMTS region were identified as targeted economic development zones, where investments in the freight transportation infrastructure could help attract new businesses and help existing businesses grow. The freight transportation systems in and around these subareas were analyzed to determine where targeted infrastructure investments could help spur economic development.

- Third, through stakeholder input gathered during all phases of this study, the consultant team developed a list of proposed improvements that were recommended by stakeholders, including users and operators of the region's freight transportation infrastructure. Stakeholder meetings were held on April 15 and June 10.

NYSDOT and BMTS stakeholders vetted the proposed transportation investments before further analysis was performed to determine benefits and costs of the proposed improvements.

The projects presented in this report are classified as "highway projects" (those that primarily benefit truck traffic) and "rail projects" (those that primarily benefit rail traffic) for purposes of discussion, but some are truly multimodal, and all must be considered in the context of the BMTS region's broader freight (and passenger) transportation system.

During discussions with the railroads serving the Binghamton region and with other stakeholders, a number of physical improvements to the rail infrastructure were identified as being necessary to maintain and improve rail service through the region. In some instances, these improvements were quite specific, while in others they were more

general. As part of the consultant team's analysis, each of these improvements are being evaluated from the perspective of their potential economic value to the region, the results of which will then be used to help BMTS compare and prioritize potential investments in transportation infrastructure in the greater Binghamton region. The recommendations in this report alone are not intended to lead directly to prioritization of projects, as there are a multitude of non-economic factors, such as environmental and social impacts, that should be considered by BMTS and its stakeholders in making any investment decision.

This section also contains a discussion of projects such as an intermodal rail terminal and an inland port that might enhance connections to the Port of New York and New Jersey and provide better intermodal connectivity, modal options, and route options for moving freight to, from, within, and through Binghamton. In addition to site-specific improvements, this report also identifies regional freight transportation strategies that can be undertaken by BMTS and NYSDOT to further regional freight transportation goals.

Highway projects are defined in this report as those projects which improve operations on the highway network, and primarily affect freight moving within, to, from, or through the region by truck. Roadway capacity expansion, geometric reconfiguration, and resolution of clearance issues are examples of the issues these highway projects are aimed at resolving. Highway projects were identified using input from project stakeholders, and improvements identified to improve truck access to the region's desired economic development areas.

Projects already identified in the BMTS Transportation Improvement Program (TIP) were not included in this analysis because the region already has reached consensus that these projects should be funded. Some projects that may have been identified primarily for their benefits to automobiles and other personal vehicles may have significant benefits to freight traffic, and conversely some of the projects identified via this freight study may have benefits to nonfreight traffic.

In the following sections, a brief description of each project or strategy, its goals, and a planning-level estimate of the cost required to complete the project, are provided. Although the scope of this study is centered around economic performance measures, a variety of other regional goals and objectives should be considered by the region's stakeholders as they build consensus around which projects to advocate for and advance into the TIP. The conclusion of this section presents a summary of information and principles that BMTS, NYSDOT, and their stakeholders may consider as they determine which freight projects should be the region's priorities for public funding and which projects might be priorities for partnerships with the private sector.

Link Between Freight Forecasts and Transportation Investment Needs

One goal of this study is to determine the need for transportation improvements that might stem from increases in economic activity and related freight traffic within and outside the Binghamton region. As shown in Section 5, Global Insight forecasts for the region anticipate an increasingly larger share of truck traffic in the future, with origin and desti-

nation points outside the region. These vehicles will be using the major highways to pass through the Binghamton area.

Despite the projected increases in truck traffic on many roadway segments, freight-related bottlenecks are not anticipated to develop anywhere in the BMTS region by 2030. The busiest highway is expected to be the portion of roadway that carries I-81, I-86, and NY 17 in central Binghamton, but even this segment is not anticipated to be congested by 2030. Similar to highways, projected increases in rail traffic are not expected to overburden the rail infrastructure in Binghamton if certain key operational improvements are made. The lack of congestion means the identification of freight transportation improvement needs was driven by economic development concerns rather than locations of specific bottlenecks. Also, several operational issues identified in Section 3 on the rail and highway networks are investigated in this section of the report.

While economic growth and anticipated growth in freight traffic do not lead directly to transportation investment needs, there may be opportunities to utilize excess freight system capacity to accommodate economic development. In particular, investments in rail infrastructure can help divert growth in freight demand from trucks to rail, which could produce environmental and social benefits for the region in addition to economic impacts. The next section will discuss the process used by BMTS and its stakeholders to identify areas to be targeted for freight-intensive economic development, and the associated rail and highway improvements that could assist in both attracting and serving development activity.

Identification of Targeted Economic Development Zones

With the assistance of project stakeholders and BMTS staff, a set of Targeted Economic Development Zones (TEDZ) was developed. The TEDZ represent areas where the region's stakeholders expect, or plan to encourage, economic development in the future. The TEDZ that have been identified in the BMTS region represent areas with a variety of existing land uses, freight transportation infrastructure, and development or redevelopment potential. The identified TEDZ are shown in Figure 6.1 and are discussed in the following paragraphs.

Kirkwood Industrial Park

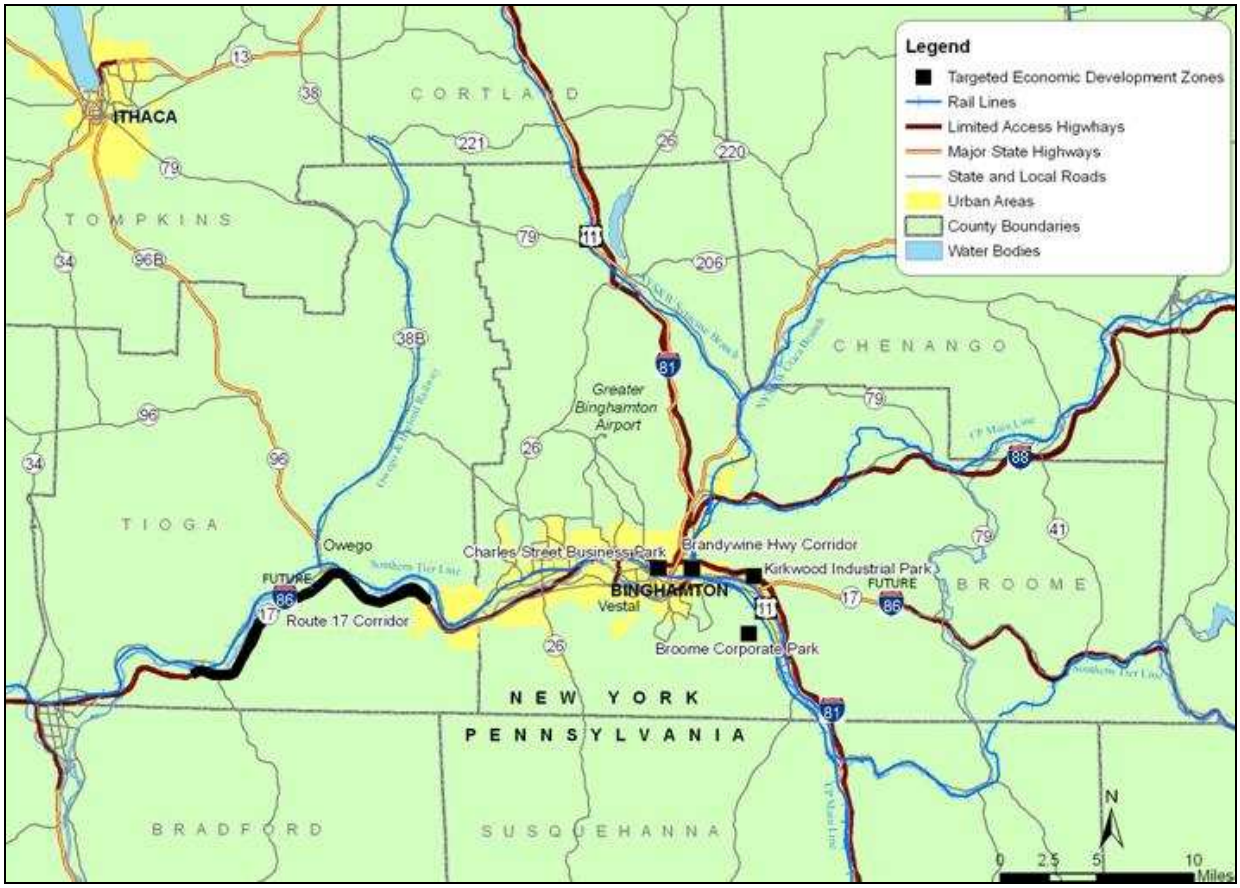
Kirkwood Industrial Park is located near Interchange 2 along Interstate 81 (I-81). Colesville Road connects portions of the industrial park to the Interstate and to U.S. Route 11 at the south end of the park. The park is occupied by a number of facilities specializing in light manufacturing, food processing, various services, and some distribution activities.

The park has matured since its opening in the 1970s, and few parcels in the park remain undeveloped. Transportation issues that exist in the area include the unusual configuration of Interchange 3, a uni-directional interchange where the I-81 northbound entrance

ramp is located on Corporate Drive. Trucks headed to I-81 southbound must find their way to U.S. Route 1 South and follow that roadway to Interchange 2.

The park's large size and layout on two sides of the Interstate make it somewhat difficult to locate facilities within the park. One recommended improvement for the Kirkwood Industrial Park is improved wayfinding to help truckers find their way to and from the park when entering and exiting I-81. This improvement will be discussed later in this section in the context of a regional freight wayfinding initiative.

Figure 6.1 Targeted Economic Development Zones



Broome Corporate Park

A younger, developing corporate park exists in the Town of Conklin. Broome Corporate Park is located adjacent to the Canadian Pacific Main Line, and near NY Route 7 (NY 7). Most vehicles access the park from I-81 via Interchange 1 and County Route 20 (Cedarhurst Road). The park's largest tenant is Maines Paper and Food Service, a distributor of supplies to restaurants. Some available parcels in Broome Corporate Park are located adjacent to the Canadian Pacific Main Line and could utilize rail service via a rail siding; this reflects an original site layout decision to attract rail shippers.

As remaining available parcels in the park become occupied, the northern access point into the park, Powers Road, and the segment of NY 7 (Conklin Road) that connects the park to central Binghamton both could experience increases in traffic. The region should be aware of potential traffic growth on Conklin Road as development occurs in Broome Corporate Park and take measures to either direct traffic to I-81 or limit the volume of trucks passing sensitive residential areas and schools along Conklin Road.

Brandywine Highway Corridor

Closer to central Binghamton is the Brandywine Highway (NY 7) corridor. Between Court Street to the south and Bevier Street to the north, the area is occupied by many aging and vacant industrial facilities, sometimes referred to as "brownfield" sites. This area is the subject of a Brownfield Opportunity Area assessment funded by a grant from the New York State Department of Environmental Conservation (NYSDEC), with the ultimate goal of encouraging redevelopment. Importantly, these sites are adjacent to or in close proximity to two rail yards, the Binghamton Rail Yard (served by NS) and the Bevier Street Rail Yard (NYSW and CP).

Truck access to facilities along this corridor is challenging. Four major intersections are in close proximity on a short, one-mile stretch of roadway: The grade separated diamond interchange between Brandywine Highway and Bevier Street at the north end; the grade separated cloverleaf interchange between Brandywine Highway and I-81/NY 17 just south; the signalized intersection at Frederick Street; and the grade separated ramps Robinson Street at the south end. Vehicles attempting to merge from I-81 onto Southbound NY 7 (some of which was attempting to weave across two lanes of traffic to turn left on Frederick Street) would create congestion on the short stretch of roadway between I-81 and Frederick Street, causing traffic to back up onto the I-81 mainline. Partially in response to the dangers posed by the weaving traffic, the backups onto I-81, and the desire to increase through capacity on NY 7 by eliminating signal phases at the intersection, NYSDOT eliminated several turning movements at the intersection of Brandywine Highway and Frederick Street. The turning movement restrictions limit access to potential redevelopment parcels in the quadrant bounded by NY 7 to the west, I-81 to the north, the Bevier Street railyard to the east, and Robinson Street to the south.

Improved truck access and rail yard enhancements could make this area more desirable for redevelopment for industries that rely on truck and/or rail for their shipments. The current preferred design for the Prospect Mountain Interchange project (part of which includes a reconfiguration of the I-81/NY 7 interchange) includes a provision for access to facilities near Frederick Street via a ramp and extension of Griswold Street. This project, part of the upgrade of NY 17 to I-86, is discussed in greater detail in Section 6.2.

Charles Street Business Park

The site of the former Anitec facility on Elm Street in Binghamton holds potential for redevelopment into a new industrial facility. The parcel, approximately 22-acres in size, could become a more desirable location for an industrial user if truck access is improved. Currently one truck access route to the property from NY 17 westbound (Future I-86) uses

Mygatt Street and Elm Street, both of which border a cemetery on one side and are lined with residences on the other. Other trucks must use a circuitous route through Johnson City or western Binghamton to access the property.

There is no reentry to westbound NY 17 from the Mygatt Street interchange, leaving vehicles to find alternate routes for the return trip to NY 17. From NY 17 eastbound, the most direct route to the Charles Street Business Park requires vehicles to exit at Front Street or Airport Highway and then use Clinton Street to access the property from the south. The intersection of Front and Clinton Street currently has an acute angle, which makes the right turn onto Clinton Street difficult or impossible for larger trucks. Low-rail bridge clearances in the area further limit accessibility. A project currently programmed in the region's Transportation Improvement Program for funding will improve the turn from southbound Front Street to westbound Clinton Street and increase the vertical clearances of both railroad bridges on the north and west sides of the intersection. Several other recommended rail bridge clearance projects in the area are discussed in Section 6.2.

As part of the Prospect Mountain Interchange project, the Mygatt Street interchange will be removed and replaced with a half-diamond interchange onto a new connector roadway to Prospect Street west of Mygatt Street. The potential to provide direct access to the Charles Street Business Park from this new interchange is discussed in Section 6.2.

NY Route 17 Corridor in Tioga County

The NY 17 corridor in Tioga County contains many flat, open parcels currently used for farming that could be used for warehouses, distribution centers, or commercial or industrial uses that require large floor plates. Best Buy opened a 650,000 square-foot distribution facility off of Stanton Hill Road near NY 17 Interchange 63 in the Town of Nichols in 2005. More trucks are now using Interchange 63 and a service center has opened near the interchange to cater to truck drivers. The interchange is the closest to the center of the metropolitan area along NY 17 in which all four quadrants of the interchange are available for development. Other interchanges further east along NY 17 are either adjacent to the river, making two quadrants inaccessible, or already are surrounded by development.

While the area surrounding Interchange 63 and other areas in Tioga County remain predominantly rural, there is the potential for additional economic development to occur along this corridor, even though it is relatively remote from potential pools of labor in the region. Additional economic development in this corridor may bring several benefits to the region's economy; however, it should be noted that warehousing and distribution activity does not create large numbers of local jobs, but does generate significant truck traffic. The transportation network, including interchanges and secondary roads in the area where development occurs, will need to be capable of accommodating increased truck volumes. Highway projects to improve freight mobility near NY 17 interchanges in Tioga County are discussed in Section 6.2.

6.2 Recommended Projects and Strategies

The previous descriptions of the TEDZ suggested specific freight transportation improvements that could benefit these areas, but, as mentioned previously, the project identification process also took into account general growth in freight traffic anticipated through the 2030 forecast year as well as stakeholder input about needed freight transportation system improvements. This section summarizes recommended highway and rail projects as well as general freight-related policies and strategies that the region could undertake to achieve its freight mobility and economic development goals.

Recommended Highway Projects

The project identification process resulted in six projects that primarily would benefit truck traffic in the BMTS region. Table 6.1 summarizes these projects, with an indication of whether each project would have regional impacts or would benefit one of the targeted economic development areas identified in Section 6.1. Planning-level cost estimates also are provided; detailed engineering studies and environmental reviews have not yet been performed. Figure 6.1 shows the location of each project.

The BMTS Transportation Improvement Program, estimates from stakeholders, and costs of similar types of projects completed outside the BMTS region served as sources and guidelines for the estimation of costs for the projects identified in this report. Highway project cost estimates include all costs associated with the construction of roadway segments, bridge replacements, and interchange or intersection reconfigurations. The need to acquire property is mentioned, where applicable, however the values of the parcels needed to complete the project are not estimated. In addition, these projects may be required to satisfy state and/or Federal environmental review regulations, which may unearth additional mitigation costs that would be required to implement each project.

Figure 6.2 Map of Recommended Highway Projects

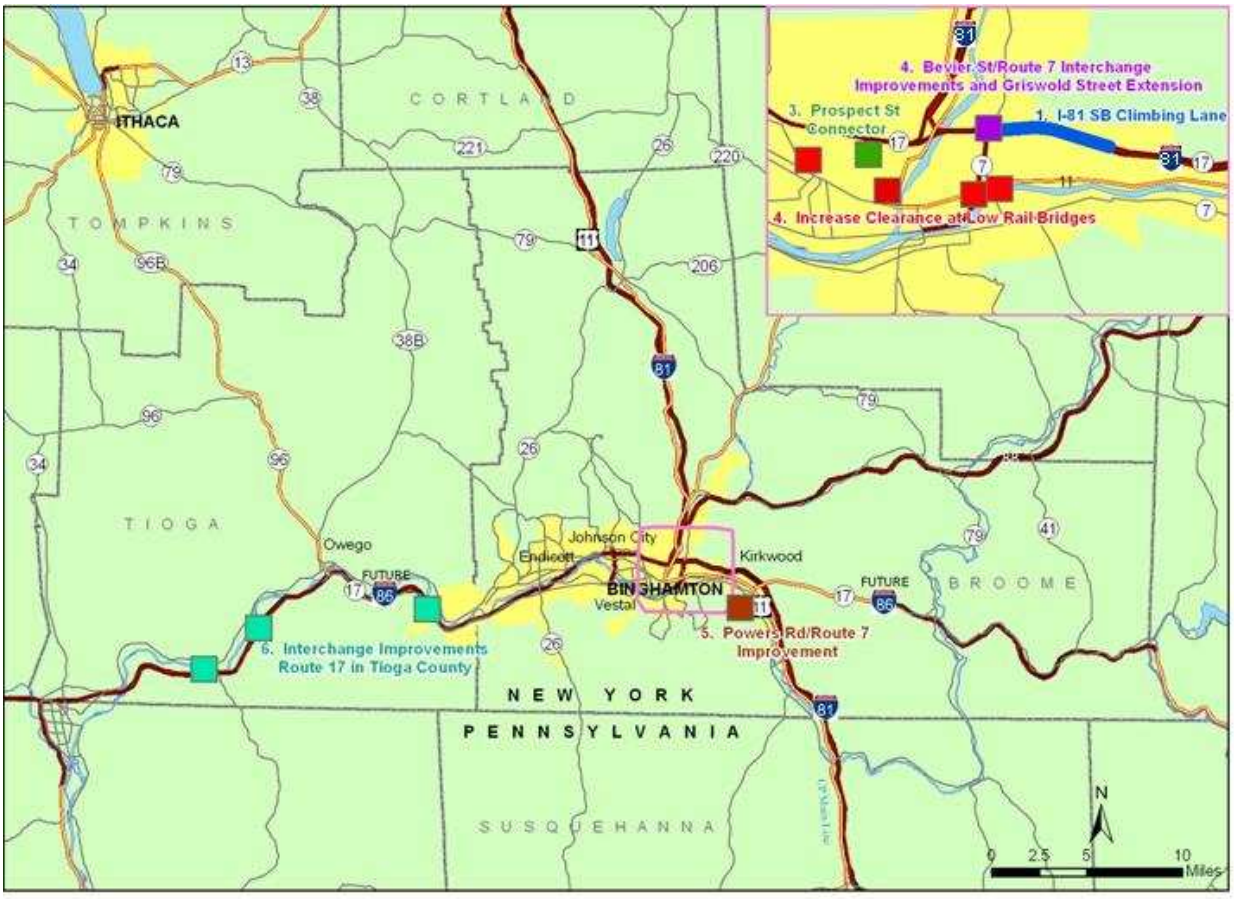


Table 6.1. Highway Project Cost Estimates

Highway Project Description	Project Source	Economic Development Area Affected	Estimated Cost
Truck climbing lane on Interstate 81/NY Route 17 southbound from Interchange 4 to Windy Hill Road overpass	Regional economic forecast and truck volume forecasts	Regional Significance	$30 million
Extension of Prospect Street connector to Charles Street Business Park	Analysis of targeted economic development zones	Charles Street Business Park	$1.5 million
Griswold Street Extension and new access ramp from I-81 to Griswold St.	Analysis of targeted economic development zones and stakeholder input	Brandywine Highway Corridor	$3 million
Raise low-clearance rail bridges on Southern Tier Line in central and western Binghamton[a]	Analysis of targeted economic development zones and stakeholder input	Regional Significance	$123 to $138 million (bridge replacement); $70-$85 million (lower roadbed)
Intersection Improvements on NY Route 7 at Powers Road	Analysis of targeted economic development zones	Broome Corporate Park	$250,000
Interchange improvements along NY Route 17 in Tioga County	Regional economic forecast, analysis of targeted economic development zones, and stakeholder input	NY Route 17 Corridor, Tioga County	$1 to 10 million
Total			**$106-210 million**

[a] Includes project elements 2A-2D; see text for description.

Highway Project 1: Truck Climbing Lane on Interstate 81/NY Route 17 Southbound from Interchange 4 to Windy Hill Road Overpass

According to model estimates, I-81 in the area between Interchange 4 and Interchange 2 will see the greatest increases in truck traffic in the BMTS region between 2005 and 2030. In addition, this roadway segment carries both I-81 and I-86/NY 17 traffic through the region, and has some of the highest existing truck volumes within the study area. While traveling southbound on I-81/NY 17 between Interchange 4 and the Windy Hill Road overpass, travelers encounter a steep incline. Currently, there are three travel lanes available to southbound travelers on this segment of roadway, including one lane that is added as the Interchange 4 collector-distributor lane merges into the I-81 mainline. As traffic continues to grow on this segment, an additional climbing lane for heavy and slow-moving vehicles will likely be necessary for safety reasons and to maintain a reasonably high-level of service.

An additional lane for truck climbing on this segment of roadway would reduce friction and improve the flow of traffic on the ascending grade. Because I-81 and NY 17 are tremendously important travel routes for freight traffic throughout the region, this project will have regionwide implications and benefits. The estimated cost of this project is $30 million (approximately $10 million per mile for three miles).[1]

Highway Project 2: Extension of Prospect Street Connector to Charles Street Business Park

The site of the former Anitec Image Corporation facility is an area that is likely to be redeveloped into a new industrial facility in the future. The site is located within close proximity of NY 17, but access to and from the expressway to the site presently requires travel on single-lane streets that run through residential areas and adjacent to a cemetery.

The interchange of NY 17 with Prospect Street is slated to be reconstructed as a half-diamond interchange west of its current location at Mygatt Street. The new interchange, part of the I-86 Prospect Mountain project, is being designed to provide westbound-off and westbound-on movements; the location's geometry does not allow for ramps to/from the eastbound lanes. The connector between the half-diamond and Prospect Street is planned to have its southern terminus at Prospect Street. An extension of the connector south from Prospect Street into the Charles Street Business Park would provide partial direct access to the property from NY 17 and reduce the potential for conflicts between heavy truck traffic and residential sensitivities in this area. The estimated construction cost of this project is $1.5 million. A detailed study to determine potential environmental and community impacts and benefits would be required to determine the full scope of the Prospect Street connector improvement.

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[1] The estimate of $10 million per mile is based on engineering studies for two recent, comparable projects: $71.6 million for 7.7 miles of widening of I-81 in Virginia (similar to this effort in that it also includes 3-4 overpasses/under-passes) and $9 million for 1.1 miles of highway in California.

Highway Project 3: Griswold Street Extension and New Access Ramp from I-81 to Griswold Street

The Bevier Street interchange on Brandywine Highway is located approximately a quarter mile north of the I-81 overpass at the I-81/NY 17/NY 7 interchange. Because of the close proximity of the two interchanges, there is a significant level of weaving activity as vehicles entering and exiting Brandywine Highway between the two interchanges maneuver into their desired positions. The reconfiguration of the Bevier Street interchange would improve mobility along the Brandywine Highway corridor, and improve access to desirable development parcels along and near Bevier Street and Broad Street. The specific attributes of the interchange enhancement will ultimately depend upon the future configuration of the adjoining I-81/NY 17/NY 7 Interchange, which is included among the NY 17/Prospect Mountain improvements currently in its final design phase for the I-86 initiative.

Similarly, the intersection of Brandywine Highway and Frederick Street is situated about a quarter mile south of I-81/NY 17/NY 7 interchange. Presently this intersection has a number of restricted movements that limit mobility for traffic destined for or originating at parcels south of I-81 on both sides of Brandywine Highway. These limitations include the following: 1) no left turns from northbound Brandywine Highway to westbound Frederick Street; 2) no left turns from southbound Brandywine Highway to eastbound Frederick Street; 3) no through movements along eastbound and westbound Frederick Street; and 4) no left turns from westbound Frederick Street to southbound Brandywine Highway.

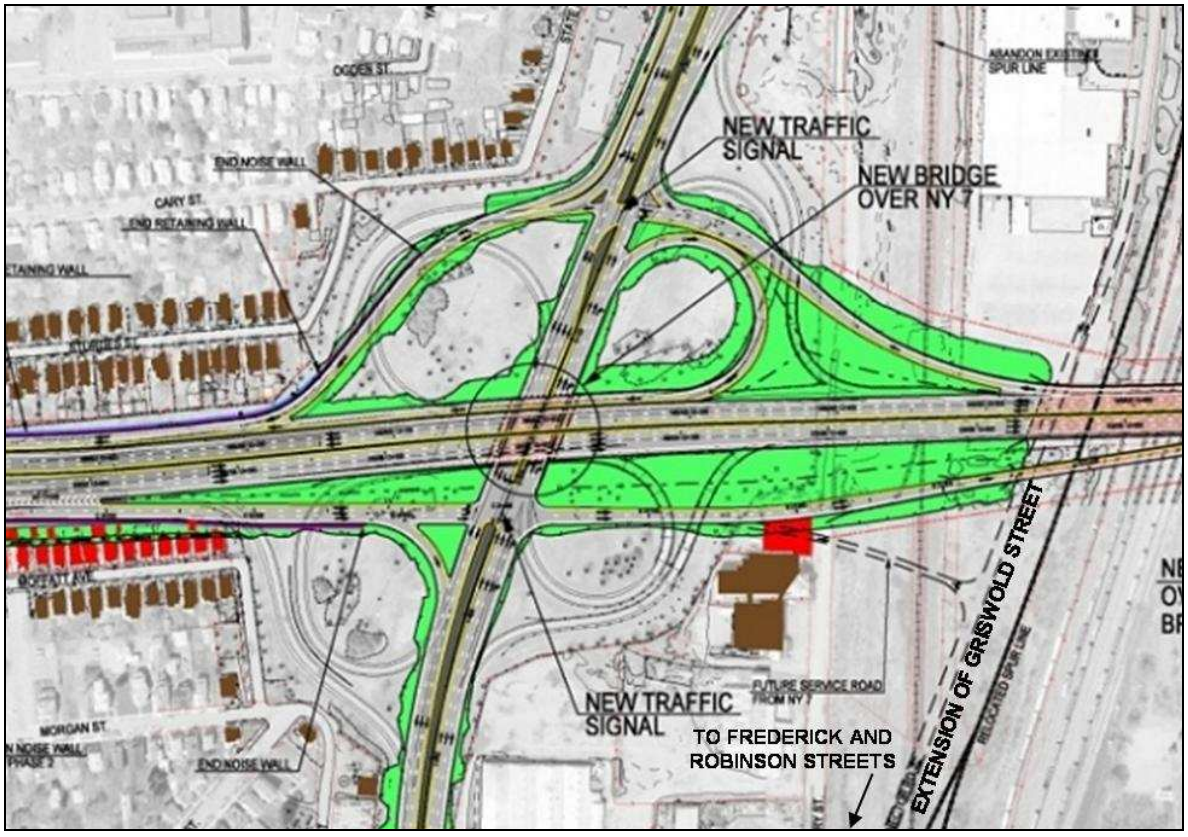
The limited movements permitted at this intersection limit the accessibility to potential economic development sites between Brandywine Highway and Montgomery Street. Even with the planned reconfiguration of the Exit 4 Interchange associated with the Prospect Mountain project, full directional access at the Brandywine Highway/Frederick Street intersection is not feasible.

As an alternative, an extension of Griswold Street from its current southern terminus and a new connection to the Griswold Street extension from the future Exit 4 Interchange on-ramp from NY 7 northbound onto I-81 southbound, both are provided for, but not currently included in, the proposed redesign of the interchange (see Figure 6.3). The extension of Griswold Street will improve access to sites along the CP and NYS&W rail lines and adjacent industrial parcels. The extension will intersect with Frederick Street and Robinson Street.

Vehicles approaching the area from the north via NY 7 will therefore be able to access the industrial area by turning left onto the on-ramp leading to I-81 southbound, and bearing right onto the ramp leading to the extension of Griswold Street (labeled "Future Service Road from NY 7" on the map in Figure 6.3). From I-81 southbound/NY 17 eastbound, vehicles will exit at Exit 4, proceed straight across Brandywine Highway, and bear right onto the ramp leading to the extension of Griswold Street. Vehicles leaving the area will be able to use Frederick Street to turn right onto Brandywine Highway northbound to access the Exit 4 Interchange, or they may proceed south on the extension of Griswold

Street to Robinson Street where left turns are permitted onto Brandywine Highway southbound toward central Binghamton. Figure 6.3 illustrates the existing condition and proposed improvement, which is estimated to cost $3 million. (The relatively low cost of the project is due to the fact that both the Griswold Street extension and the slip ramp to Griswold Street are provided for in the reconstruction of the I-81/NY 17/NY 7 interchange, even though these two small projects are not included in the project's final design.)

Figure 6.3 Exit 4 Interchange Alternative in Final Design



Source: New York State Department of Transportation

Highway Project 4: Increase Clearance at Low Rail Bridges on Southern Tier Line

The Binghamton metropolitan region lies at the confluence of several rail lines, which is particularly evident in the rail tracks that travel through the core communities of Binghamton and Johnson City. Many of the bridges which carry the rail lines over city streets are functionally obsolete (as opposed to structurally deficient) and do not offer adequate clearances for today's modern truck fleet.

Raising rail bridge clearances is being recommended as a means of providing improved truck access to many of the region's desired economic development areas and improved truck circulation regionwide. These projects are classified as highway projects for purposes of this analysis, because the inclusion of the project is driven by highway needs rather than the rail needs. However, implementation of each project would require a partnership between Norfolk Southern Corporation (the owner of the rail right-of-way), NYSDOT, BMTS, and the municipalities of Binghamton and Johnson City.

There are two strategies for increasing bridge clearances:

1. Remove the existing rail overpass and replace it with a new bridge (estimated at $15 million per bridge, which includes bridge replacement and resolving the resulting grade discrepancies on the rail approaches to the new bridges); or

2. Lower the road bed below the rail bridge and reinforce the foundations of the existing bridge, without removing or replacing the existing bridge (estimated at $1,675,000 per bridge, where this approach is feasible).

In sum, three rail bridge clearances are recommended for raising. A brief description and cost estimate for each is provided below.

- **Highway Project 4A –** Raise Rail Bridge on Southern Tier Line at Glenwood Avenue. This project would improve truck access to the commercial district of Johnson City and the Charles Street Business Park/Clinton Street corridor in Binghamton, and would improve mobility to these areas. Locally, this project will allow trucks to use Exit 71 of NY 17 for direct access to NY 17C (Main Street) along Glenwood Avenue. Today, trucks traveling to the West Binghamton area with destinations near NY 17C must use Exit 70 or U.S. 11 and NY 7. In the future, trucks traveling along westbound NY 17 (Future I-86) to a destination along NY 17C in the vicinity of Glenwood Avenue would eliminate approximately five miles of travel distance (half of which is along Main Street, which experiences some congestion and has many signals) with this improvement. Estimated cost: $30 million for replacement or $3,350,000 for lowering the roadbed.

- **Highway Project 4B –** Raise Rail Bridge on Southern Tier Line at Court Street, Binghamton. This project would improve local truck access to Central Binghamton, the Binghamton Yard area, and the Brandywine Highway corridor economic development area. The existing low-clearance restriction forces trucks making local trips along U.S. 11 to downtown and western Binghamton to take indirect routes along I-81 or NY 7 and NY 363. This project will enhance the desirability of the Kirkwood Industrial Park by providing a more efficient route from the Industrial Park to central Binghamton along U.S. 11. Increasing the rail bridge clearance on Court Street also will allow U.S. 11 to be an equally direct and efficient route to downtown Binghamton as the NY 7 (Conklin Road) route from the Broome Corporate Park, allowing truck traffic to bypass residential areas on Conklin Road. Estimated cost: $30 million for replacement or $3,350,000 for lowering the roadbed.

- **Highway Project 4C –** Raise Rail Bridge on Southern Tier Line at Brandywine Avenue, Binghamton. This project would improve truck access to the Brandywine Highway desired economic development area from downtown Binghamton as well as existing commercial/industrial sites along the U.S. 11 corridor south and east of central Binghamton. Furthermore, future industrial development at the Brandywine Highway sites will have increased flexibility when making regional or local truck trips. For example, these sites will become more inviting to users who make frequent truck delivery trips throughout the Binghamton area, as well as trips to other regions. Estimated cost: $60 to $75 million for replacement of bridge spans.

Detailed engineering studies would be required to determine which option for improving the vertical clearances at each bridge would be feasible, and what the specific scope of work, mitigation measures, and cost would be for each project.

Highway Project 5: Intersection Improvements on NY Route 7 at Powers Road

The Broome Corporate Park in Conklin is an area that may see additional freight traffic in the future, as the remaining vacant parcels become developed to serve various types of industrial tenants. Currently, a large share of the trucks entering and exiting the park uses County Route 20 (Cedarhurst Road) at the south end of the park to access I-81. As parcels at the north end of the corporate park are developed, and as the potential for additional industrial development or intermodal facility development at East Binghamton Yard develops, improved access from the north may be warranted. The improvement of the intersection of NY 7 with Powers Road could enhance connections between Broome Corporate Park and other development sites to the north as well as existing industrial/ commercial sites in the vicinity of the Kirkwood Industrial Park (the access road to the Kirkwood Industrial Park from NY 7 is less than three miles north of Powers Road on NY 7). The improvements include extension of southbound right, northbound left, and eastbound left approaches in order to accommodate larger volumes of truck traffic, and the development of a timing plan for the existing signal at the intersection, which currently is operating in flashing mode. The estimated cost of improving this intersection is $250,000.

Highway Project 6: Enhance Interchanges or Develop New Interchanges to Accommodate Potential Development in NY Route 17 Corridor in Tioga County.

The development of the Best Buy warehouse facility in Lounsberry near Interchange 63 on NY 17 may be the first of several potential developments of its kind in this corridor in Tioga County. Parcels adjacent to all four quadrants of Interchange 63 appear to be suitable for large-plate warehouse and manufacturing facilities, so long as they are outside the flood plain.

Working together, NYSDOT, Tioga County, and BMTS should develop a plan to focus or encourage development in specific areas along this corridor. The establishment of a commerce or industrial park in Tioga County could result. Should development occur

near existing interchanges, such as Interchanges 62, 63, or 64, it is likely that the interchanges will need to be upgraded in order to accommodate an influx in truck traffic. Possible upgrades to the ramps would include the addition of deceleration lanes, increasing the length of the acceleration lanes, expanding intersections to accommodate larger turn radii, etc.

Regionally, improvements that would make these areas an attractive industrial/warehouse site would benefit BMTS by locating this type of development in areas of the region outside Binghamton, whose land use patterns, roadway geometry and current traffic levels make them less conducive to truck-oriented development. Developable land also may exist in areas not easily accessible to an existing interchange, thereby warranting the construction of a new interchange on NY 17. Depending upon the type of scenario that arises, the estimated cost of enhancing existing interchanges or developing new interchanges ranges from $1 to $10 million.

Recommended Rail Projects

The project identification process resulted in 10 projects that primarily would benefit rail traffic in the BMTS region. Table 6.2 summarizes these projects, with an indication of whether each project would have regional impacts or would benefit one of the targeted economic development areas identified in Section 6.1. Planning-level cost estimates also are provided. Figure 6.4 shows the location of each project.

This section provides a rough estimate for most of these proposed improvements, which run the gamut from relatively straightforward siding and yard construction to more complex initiatives that involve substantial earth moving and civil works such as bridges and tunnels. Estimating costs for improvements simply involving the addition of track where a proper subgrade already exists can be quite simple. This is often the case where a line of track that is now single track once was double track, or track reconfiguration and/or additions are being made at an existing yard. Several of the proposed projects are of that nature. Costs are then generally limited to the track materials themselves (rail, ties, and ballast) plus labor and equipment for installation, for which a typical installed cost per unit of length (usually foot or mile) can be applied.

Beyond earth moving and construction of civil works, the integration into an existing or new traffic control system will increase costs at levels up to 50 percent or more of the track cost. These systems are quite complex, and include not only the wayside signals and associated wiring, but also power turnouts and switchlocks and a variety of other wayside equipment. Currently the CP main line is governed by traffic control systems, while the rest of the lines in the region are not.

Where possible, costs were drawn from available analyses provided to the consulting team. Information for some of the Binghamton terminal area modifications was contained in a September 25, 2006 memorandum submitted to Raymond Hessinger of the NYSDOT Freight Bureau by the CP, NS, NYS&W, and the Central New York Railroad. The memorandum (referred to as the "Hessinger memo" in the remainder of this report) was produced as part of an effort to seek public support for a set of projects that would improve

network fluidity in and around Binghamton. For the other projects, construction costs were estimated using available cost data from a variety of sources, including the Hessinger memo.[2]

For projects where specific costs were available, these were used, along with the year in which the estimate was produced. It is important to understand that cost inflation in rail construction (and heavy construction in general) has significantly exceeded general inflation since 2001. In part, this is due to a rapid run-up in the cost of materials, particularly finished steel, which has more than doubled in price since 2001. Other metals used in track construction have experienced similar increases. Since most track material, apart from crossties, is made from steel, the cost impacts have been substantial. Further compounding the cost challenge has been a growing demand for track material that has outstripped the railroad supply industry's ability to produce.[3] In the following sections, each of the proposed projects is briefly discussed and an initial price estimate provided. Table 6.2 contains a summary of the proposed rail projects.

[2] Cost data was derived from the following sources:

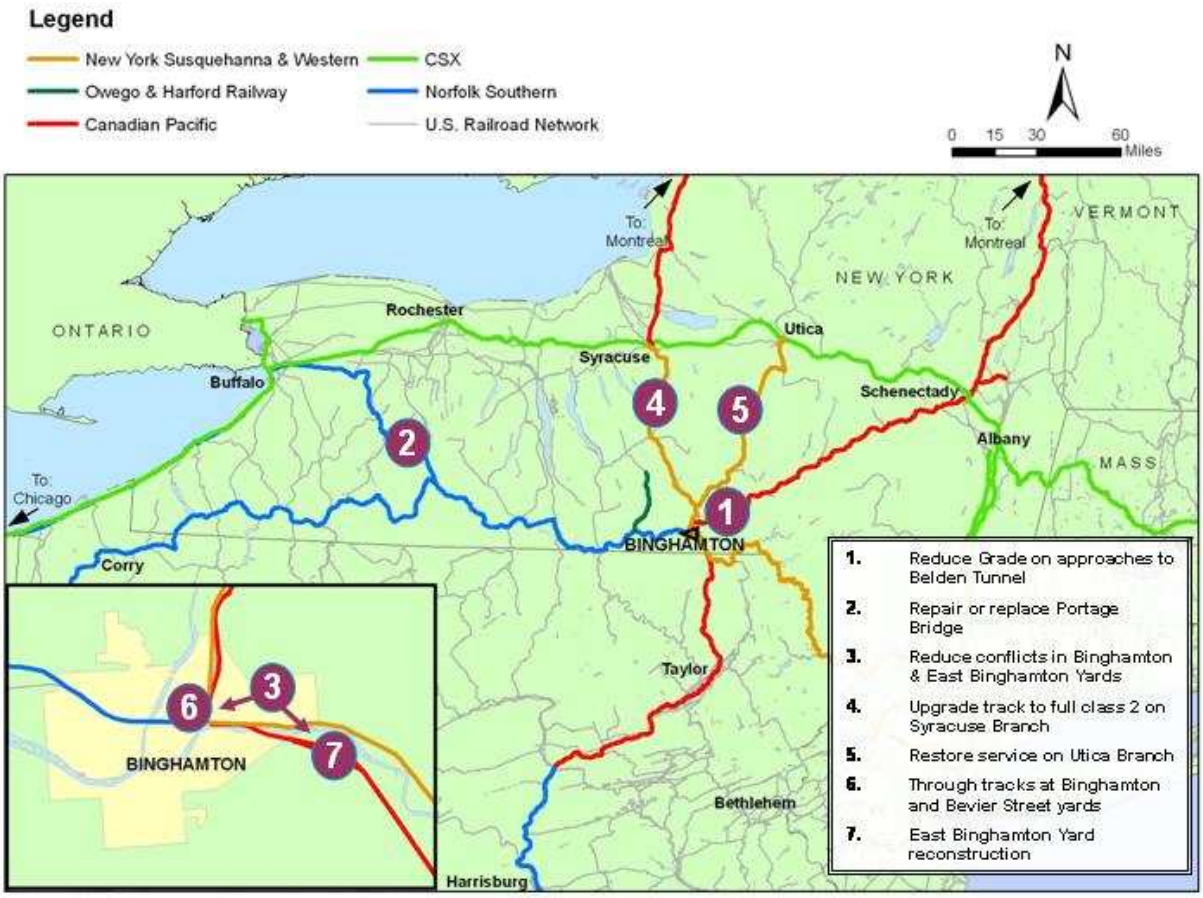
- The abovementioned September 25, 2006 memo to Raymond Hessinger.
- NCDOT Rail Division, Track Improvements (www.bytrain.org/track/groclt.html), which contains a list of projects being undertaken in 2007 and 2008 between Greensboro and Charlotte, NC. Several of the listed projects entail construction of sidings and/or second main where the right of way already exists. Compared to Binghamton-area needs, these estimates may be a bit high, since they entail installation of FRA Class IV track on a fully signaled line.
- Trains Magazine article: Tom Murray, *How Much Does it Cost?*, January 2008, pages 35-43.
- Estimation of Investment in Track and Structures Needed to Handle 129 844 KG (286,000-LB) Railcars on Short-Line Railroads, published by the Transportation Research Board, 2001. Although the cost figures shown in this report are no longer current, the authors provide a detailed discussion on track construction costs.

[3] See Tom Murray, *How Much Does it Cost?*, page 35.

Table 6.2. Rail Project Cost Estimates

Rail Project Name	Project Source	Economic Development Area Affected	Estimated Cost
1. Reduce grade at east and west approaches to Belden Hill Tunnel (CP Main Line)	Regional economic forecasts (rail traffic forecasts) and stakeholder input	Regionwide impacts	Minimum $10 million
2. Repair Portage Bridge and restore 286,000 pound capacity to the Southern Tier line from New Jersey to Buffalo (NS Southern Tier Line)	Stakeholder input	Regionwide impacts	Minimum $30 million
3. Reduce conflicts between NS and CP trains in Binghamton and East Binghamton Yards (NS Southern Tier Line)	Stakeholder input	Regionwide impacts	$1,430,000
4. Improve NYSW Syracuse Branch to Class II standards.	Stakeholder input	Regionwide impacts	$1,500,000
5. Restore service on NYSW Utica Branch	Stakeholder input	Regionwide impacts	$1,100,000
6. Create/restore through tracks in the Bevier Street and Binghamton Yards to separate CP and NYS&W through trains	Regional economic forecasts (rail traffic forecasts) and stakeholder input	Regionwide impacts	$11,700,000
7. East Binghamton Yard reconstruction	Stakeholder input	Regionwide impacts	$4,265,000
8. Bevier Street Yard access improvements	Analysis of targeted economic development zones and stakeholder input	Brandywine Highway Corridor and Regionwide impacts	$500,000
9. New intermodal yard or inland port at East Binghamton Yard	Stakeholder input	Regionwide impacts	$4,000,000
Total			**Minimum $64.5 million**

Figure 6.4 Map of Recommended Rail Projects



CP Main Line

Improvements entail increasing capacity and travel time of the line between Sunbury, Pennsylvania and Mohawk Yard, New York to accommodate additional intermodal trains in NS' new Patriot Corridor initiative (see below). These enhancements are as follows:

1. **Reduce grade at east and west approaches to Belden Hill Tunnel.** There is no specific concept for this project. At minimum, this project will entail realignment of the line going up to the tunnel on both approaches, which will not only entail earth moving costs, but also land acquisition. A superior and more expensive solution might be to build a new tunnel at a lower elevation. Minimum cost for any alternative will be at least $10 million, and likely far more.

NS Southern Tier Line

2. **Repair Portage Bridge and restore 286,000 pound capacity to the Southern Tier line from New Jersey to Buffalo.** Repair or replacement of the Portage Bridge, a single

track span of 800 feet in length and up to 234 feet above Letchworth Falls, will be the keystone to restoring 286k capacity to the route. In December 2005 the State announced a grant of $3.5 million for engineering work to replace the span. While we are aware that the engineering work is underway, there have not been any official announcements on the expected cost of a replacement span. However, given the length and height of the span and the environmental sensitivity of the location, a replacement span will cost at least $30 million.

3. **Reduce conflicts between NS and CP trains in Binghamton and East Binghamton Yards.** The Hessinger memo identified the "Buffalo Runner Power Switch" project, which would substantially reduce congestion at the interchange between NS and CP. An estimate of $1,430,000 was provided for this improvement.

- Increasing vertical clearances along key truck routes that pass under Southern Tier line rail bridges was discussed in the highway improvements listed above.

NYS&W

4. **Improve NYSW Syracuse Branch to full FRA Class 2 track standards.** An upgrade of the NYSW Syracuse Branch to accommodate more frequent and reliable freight service would provide Binghamton with better access to the CSX rail network via the NYSW interchange with CSX at Syracuse. To accommodate regular freight operations at 30-35 miles per hour, several improvements would need to be made to tracks, rail ties, and the underlying ballast on the line. At an estimated $10,000 to $25,000 per mile along about 75 miles of track, a conservative estimate of $1.9 million in improvements would be necessary. Further upgrades to Class 3 or Class 4 track to accommodate proposed passenger rail service at 79 miles per hour from Binghamton to Syracuse and then points east (e.g., Albany, Springfield, and Boston) and west (Buffalo, Cleveland, and Chicago) would require far more substantial upgrades to the track and structures along the route, in addition to improved signals, and more detailed engineering studies would be required to determine approximate costs. In the mean time, passenger service at 30 miles per hour along Class 2 track would require a schedule time of at least 2 hours and 30 minutes, which is not feasible for the passenger market.

5. **Restore service on NYSW Utica Branch**. Flooding in 2006 washed out a segment of track and damaged a bridge on the NYSW Utica Branch across the Chenango River in Sherburne. Since the washout, NYSW has been servicing customers north of Sherburne by routing traffic along the Syracuse Branch, then east along CSX right of way and then south on the Utica Branch. A cost estimate to repair the washout was made shortly after the washout occurred. Since then the cost has increased due to rapid increases in the price of construction materials, and a NYSW representative advised that the current repair cost will be around $1.1 million. NYSW has filed a discontinuation of service proceeding with the Surface Transportatation Board on the Utica Branch, indicating their reluctance to maintain and pay property taxes on the remaining rail right of way south of Sherburne. This action will allow them to retain ownership, but not compel them to serve any shippers on that segment.

Binghamton Yard and Bevier Street Yard

Various parts of these yards are used by CP, NS, and NYSW. Four projects were identified for this area:

6. **Create/restore through tracks in the Bevier Street and Binghamton Yards to separate CP and NYSW through trains, and restore operational flexibility and redundancy in the system.** This project requires new bridges at Robinson Street and Bevier Street. Assuming $5 million per double-track bridge, plus approximately two miles of track at $1.7 million produces a net cost of $11.7 million, using the Hessinger cost figures. This assumes that all turnouts will be manually controlled, and track will consist of new ties and welded relay rail.

7. **East Binghamton Yard reconstruction.** CP already has undertaken some improvements to this yard, which had sustained flood damage, with more to come as part of the Patriot Corridor expansion. The 2006 Hessinger memo identifies two projects in East Binghamton, a yard rehabilitation with an estimated cost of $1,854,000, and a new bypass track along the north side of the yard at an estimated cost of $2,411,000. The total cost of these improvements is estimated to be $4,265,000.

In addition to the above projects, implementing Local Area Radio Controlled power switches in the Binghamton Terminal area to replace conventional hand-thrown switches could significantly improve operating efficiency and safety in the Binghamton yards and nearby junctions at a modest price (each switch to be replaced would cost in the neighborhood of $10,000 per switch).

Various access improvements to the Bevier Street and Binghamton Yards also have been proposed. Highway improvements along NY 7/Brandywine Highway were discussed above in the highway section. Improving the roadway into Bevier Street Yard would be a low-cost improvement (under $500,000) but would have to be justified by the initiation of bulk or intermodal rail transfer activities that would generate truck traffic.

Another project proposed by stakeholders at Binghamton Yard involves closing the access road on Brandywine Avenue and replacing it with a new entrance on Liberty Street, which would require a grade crossing into the center of the yard across the NS Southern Tier line. A grade crossing across the NS main line would be an unattractive proposition from a safety and operational standpoint.

As will be discussed in the Regional Freight Strategy recommendations below, in light of fuel price increases, construction of one or more bulk transfer facilities in the Binghamton region could help area businesses lower shipping costs by transporting freight by rail instead of by truck. Norfolk Southern's Empire Link initiative also presents opportunities for NYSW and OHRY to market rail service in the Southern Tier that could be more cost-competitive over truck for medium-haul (500-mile) and long-haul (more than 500-mile) shipments. The success of these services will depend on whether businesses have access to the rail system.

Patriot Corridor Improvements

As mentioned in Chapter 3, Norfolk Southern Corporation has established a joint venture with Pan Am Railways, called Pan Am Southern, to improve the infrastructure along 150 track-miles on the so-called "Patriot Corridor" between Mechanicville, New York (near Albany), and Ayer, Massachusetts. Track improvements along routes in northern New England and a new intermodal logistics center in the Albany region are planned (see Figure 6.5).

These improvements are slated to make rail connections between the New England region and other parts of the United States faster and more seamless, and will likely induce more demand for rail traffic through the corridor. The Patriot Corridor will connect to the larger Norfolk Southern rail network via trackage rights on the Canadian Pacific main line between Mechanicville and Binghamton.

Figure 6.5 Link between the Patriot Corridor and Norfolk Southern Rail Network via Binghamton

Source: Norfolk Southern Corporation.

The project will likely have significant impacts in the Binghamton region. Positive regional impacts may include increased service options for local rail customers as more trains pass through the region. However, a major increase in through traffic could result in increased congestion in Binghamton Yard and surrounding tracks, requiring investments in expanded infrastructure. The improvements recommended above between Binghamton and points west (Rail Improvement 1) and improvements to Binghamton Yard (Improvement 3) all will benefit the Patriot Corridor.

It is likely that additional infrastructure improvements beyond those cited here will be required if traffic on this new corridor grows as expected. These improvements may include additional capacity through the Binghamton terminal area (e.g., through tracks), upgraded signaling and track on the CP main line from Binghamton to Mohawk Yard to allow for faster and more frequent trains, and potentially similar operational improvements on the CP main line south of Binghamton and the NS Southern Tier line west of Binghamton. Also, depending on the amount of demand generated for traffic between New England and Buffalo and points west, the Portage Bridge replacement project may become more urgent sooner rather than later due to demand rather than safety and maintenance concerns.

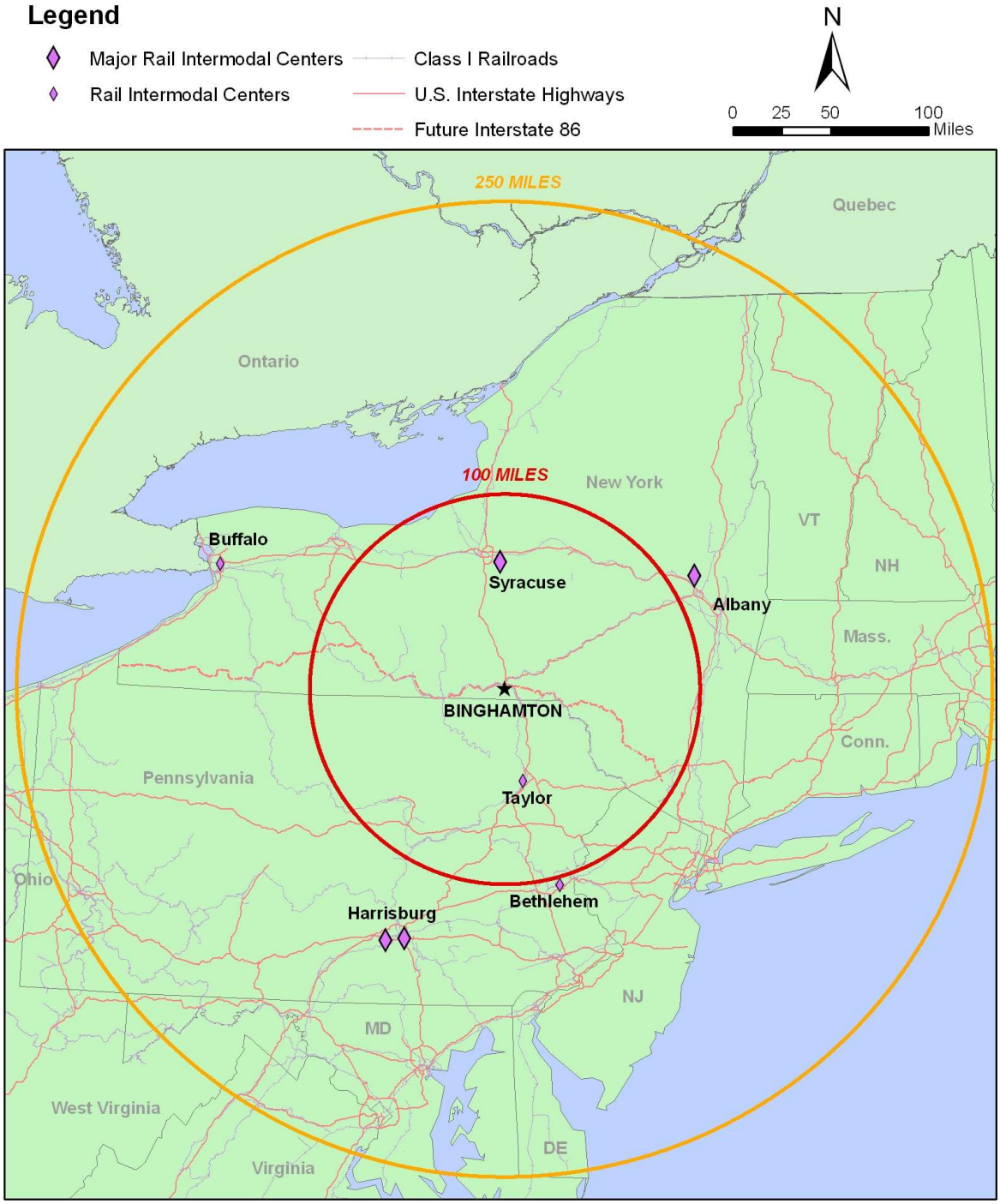
Binghamton Intermodal Rail Terminal

An intermodal rail transfer facility is a location where an intermodal shipping container or highway trailer switches modes between highway and rail. Given the increasing role of intermodal containers in the transport of goods worldwide, and the increasing role that rail transportation can play in fuel efficient and environmentally sustainable movement of freight over long distances, an intermodal rail terminal in the Binghamton region could help increase the region's competitiveness and attractiveness to businesses that depend on shipping freight longer distances. Typically, use of rail intermodal becomes increasingly viable for distances in excess of 750 miles, where the financial burden and time penalties associated with switching modes at the beginning and end of a trip are more than offset by the substantially lower line-haul costs of rail transport. Savings can be very substantial for long-haul trips, as is the case with minilandbridge traffic from West Coast ports.

One objective of the draft NYSDOT State Rail Plan is the development of "at least three new intermodal facilities/inland ports across the State." Binghamton's largest obstacle to developing an intermodal rail terminal is the degree to which nearby existing intermodal terminals already serve the market and would compete with a new terminal. Most notably, major system terminals are located at Syracuse (CSX), Albany (CP), and Harrisburg (two NS terminals). As part of the Patriot Corridor announcement, NS announced plans to construct a modern intermodal terminal at Mechanicville, NY (near Albany), which adds further competition to the region.

The proximity of CSX Intermodal's Syracuse terminal (about 75 miles or 90 minutes from Binghamton) allows a single truck driver to make two or possibly three round trips per day within the maximum 10 hours of service window mandated by Federal regulations. Both the Albany and Harrisburg terminals are less than 200 miles away, a round trip that can be easily accomplished in a single day for a local trucker.

Figure 6.6 Binghamton's Proximity to Intermodal Rail Terminals



Also nearby are several smaller intermodal terminals at Taylor, Pennsylvania (near Scranton, served by CP) and Bethlehem, Pennsylvania (operated by Lehigh Valley Rail Management, with access to both the NS and CP). Taylor, which handles NS traffic under

a haulage agreement with CP, is the smallest with 10,000 lifts in 2007, and, at 65 miles, the closest terminal to Binghamton. Bethlehem is approximately 130 miles away (see Figure 6.6).

The key to developing a viable intermodal rail terminal in Binghamton will be to divert some of the growth in longer distance moves from truck to rail. Several variables determine the minimum volumes that would make for a viable terminal. These include:

- **Proximity to nearby terminals**. If a carrier already has a terminal(s) that can readily serve the Binghamton market, it usually would rather not dilute existing volumes, given the railroad's substantial economies of scale.

- **Potential for new business**. The prospect of attracting business that already is not being handled elsewhere may convince a carrier to open a terminal with relatively low volumes. The presence of a large anchor customer that would generate a guaranteed number of lifts per year, and with balanced inbound and outbound volumes, could be a substantial attractive influence.

- **Carrier intermodal network strategy**. The long-term trend in intermodal networks has been to make them as simple as possible, so as to maximize single-train service with high-volume density and reliability. As volumes have increased, density in some markets has reached a level where additional terminals are viable. For example, NS' use of CP's Taylor terminal in the Scranton area secures that market for NS, even though NS could readily serve it from their Harrisburg terminals.

- **Market strategy**. Carriers differ in strategy about the kinds of business that they wish to attract. Smaller railroads will often pursue lower volume opportunities that would not be of interest to a Class I carrier. Most intermodal terminals located on short lines handle volumes that would not be sufficient for a Class I carrier.

Due to these many variables affecting the siting of a new intermodal terminal, it is difficult to provide a specific number of "lifts" that would make a new facility viable. A smaller facility, like the Taylor facility near Scranton, can be viable with as few as 18,000 to 24,000 lifts per year depending on a number of factors including carrier commitment and reliability and consistency of traffic from the shipper. Notwithstanding the fact that incremental growth in demand for an intermodal terminal over time could eventually justify a facility in the Binghamton region, it is unlikely that either NS or CP would establish an intermodal terminal on their own, given competing rail investment priorities nationwide. The private and public sectors would have to work together to build a strong, convincing case for construction of a terminal.

The single biggest factor that would make an intermodal terminal in the Binghamton region more attractive to a rail service operator might include availability of a major customer that would generate a guaranteed number of lifts per year for service lanes that fit into the carrier's market and operating strategy. The flow from this anchor customer could be supplemented by other area businesses that would shift their shipping from truck to rail or from a more distant intermodal terminal to a Binghamton intermodal terminal.

One potential location for an intermodal terminal in the Binghamton area would be at the East Binghamton yard. At a minimum, a yard would require two intermodal loading tracks and adjacent truck aprons, container storage areas, and truck access at the south end of the yard at Terrace Drive. Although there are some drawbacks to this location (including unknown environmental mitigation needs related to the site's former use as a locomotive maintenance yard), physical yard improvements could be constructed at relatively low cost.

Given the initial modest volumes that are expected to be handled at this facility, this cost estimate assuming a minimum use of pavement and no fixed structures. Three miles of track with six turnouts, using new ties and relay rail as specified in the Hessinger memo, would cost approximately $2.5 million. Adding another $1.5 million for site preparation, asphalt aprons, an improved level crossing at Terrace Drive and an office trailer for yard staff, results in a cost for a minimal facility of around $4 million. Additional features will, of course, substantially increase this cost.

It also should be noted that East Binghamton Yard is not the only possible location for such a facility, but construction costs elsewhere may be higher due to the need for property acquisition, or they may be lower due to less need for site remediation. BMTS should study potential locations for an intermodal terminal and work with Class I and short-line operators to determine the conditions that would be necessary to make the terminal feasible.

Binghamton Inland Port

The previous section suggested that a dedicated anchor customer could provide the impetus to establish an intermodal facility in the Binghamton region. This anchor customer need not be located in Binghamton, however. Several studies in the past have suggested the need for an "inland port" facility that would enable the Port Authority of New York and New Jersey (or another North Atlantic port) to unload a container ship, quickly flush the containers from the port via on-dock rail facilities, transport the containers via rail to a remote, inland location, and finally sort them for distribution to customers throughout the port's hinterland.

One advantage of the inland port concept over an intermodal rail yard is the potential to attract economic development to the area around the inland port that would not otherwise locate far from a marine port. For example, many businesses import goods in fully packed shipping containers that are too heavy to be transported legally over roadways and are too heavy even to be accommodated by rail. To reach their destination, goods in these containers must be unpacked and repacked into multiple domestic shipping containers, 53-foot long-haul trucks, or smaller delivery vehicles. In some cases, unfinished materials and components arriving from overseas must be assembled in a final step in the manufacturing process before being considered a finished product ready for consumption. These processes are referred to as "value added," because they add value to the goods that are finished, and they add value to the local economy as related employment levels and economic output both grow.

In reverse, some industries that are exporting goods from the U.S. to overseas trading partner will locate near a port (inland or marine) to have convenient access to the port. An example is a chicken processor that is located near Virginia's Inland Port near Front Royal, Virginia (coincidentally also on I-81), and currently loads shipping containers full of frozen chicken that are transported by rail to be exported via the Port of Norfolk, Virginia.

An inland port is a specialized type of intermodal logistics center, also sometimes referred to as a freight village. An intermodal logistics center includes an intermodal transfer hub, some combination of rail, truck, and marine-dependant industrial development, and related support services. In addition to the inbound and outbound marine cargo that would use an inland port, warehousing and distribution activities are naturally attracted to the area around any intermodal facility due to the volumes of goods flowing through the facilities. Restaurants, service stations, truck repair shops, and other support facilities also tend to prosper in these high-traffic areas.

Unlike an intermodal rail yard that primarily would serve business in the Binghamton region, an inland port could have a much broader hinterland. The inland port also would consume much more land than would be available at East Binghamton Yard—for comparison purposes, the Virginia Inland Port has 152 acres. Therefore the region would need to find a suitable location elsewhere with adequate rail and highway access. However, in order for an inland port to be successful, volumes must be sufficient to justify at least daily intermodal service to and from the port, and, ideally, a specific industry or industries that would use the facilities, such as is the case with the Front Royal, Virginia chicken processor.

Regional Freight Strategies

To improve freight operations and encourage smart economic development in the region, several small MPOs around the country have undertaken initiatives to better integrate freight into their planning processes and implement cost-effective freight transportation strategies. BMTS and NYSDOT and their partners may choose to advance one or more regional freight strategies that currently have no defined geography or timeframe. These strategies may include the following:

1. Integrate freight into the BMTS planning and programming processes;
2. Preserve rail service;
3. Address safety of freight infrastructure;
4. Provide adequate rail access points regionwide;
5. Encourage growth of rail mode share over time;
6. Use information technology to improve freight safety and efficiency;
7. Implement freight emissions reduction strategies;
8. Implement regional wayfinding improvements
9. Provide adequate truck parking;
10. Study the feasibility of establishing truck-only lanes on major regional highways; and
11. Coordinate transportation and land use planning for large-scale industrial development.

Strategy 1: Integrate Freight into the BMTS Planning and Programming Processes

The National Cooperative Highway Research Program (NCHRP) in 2005 published a "Guidebook for Freight Policy, Planning, and Programming in Small- and Medium-Sized Metropolitan Areas" (Project 8-47). Most of the recommendations in the guidebook apply directly to BMTS, and the effort that has gone into this study covers many of the initial recommendations in the guidebook. Specifically, the initial sections of this report have developed a regional freight profile, identified freight needs and deficiencies, and developed what could become the freight element of the BMTS Long Range Plan.

Perhaps the most important recommendation that will benefit BMTS in the future as this plan is adopted is continuing to provide opportunities for freight stakeholders and economic development agencies to be involved in planning decisions. Appendix C of this report documents the extensive freight stakeholder outreach that took place as part of this study. BMTS already maintains a list of freight stakeholders and economic development officials who are invited to participate in various meetings and provide input to specific

plans and projects. In support of specific regional projects and initiatives, the MPO may consider convening freight task forces with defined roles and responsibilities, goals, and objectives, so that the group does not settle into a regular pattern of "meeting for the sake of meeting," and so that the group's membership can be tailored to each initiative.

One of the most difficult challenges facing BMTS and every MPO is determining effective methods of getting stakeholder input from key players in freight movement, such as the largest transportation service providers and the largest shippers of freight in the region. Typically, representatives of these firms are extremely busy and may not see the value of participating in MPO planning activities until a specific transportation improvement project affecting their operations is announced in the local media. In some cases, BMTS may need to identify a specific contact and forge an ongoing relationship involving periodic meetings to update the firms about ongoing BMTS initiatives and, in return, to enable the firms to provide relevant information about their expansion plans or upcoming changes to their operations that may impact the freight system.

Beyond stakeholder outreach, BMTS should continue to integrate freight performance measures into its project evaluation process to ensure that projects driven by passenger transportation needs can benefit both passenger and freight mobility and accessibility. The development of a truck trip table as part of this initiative should be the first step in better integrating freight traffic into BMTS' Binghamton Regional Travel Model. BMTS should work with NYSDOT and local municipalities to improve the collection of freight data on local, state, and interstate highways to provide better inputs to the BMTS travel demand model and better information to inform future policy and planning decisions.

On the programming side, BMTS should ensure that a steady pipeline of freight projects is ready to be advanced into the Transportation Improvement Program as funding becomes available. BMTS should work with NYSDOT to identify previously unexploited freight funding sources and freight financing techniques that have been made available under the Federal Safe Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFTEA-LU) and are expected to be expanded in the next five-year authorization of Federal transportation funding. For example, private activity bonds may now be issued to help pay for passenger and freight transportation projects; however, Federal and New York State law cap the annual volume of these bonds at $2 billion, except in specific situations such as the Liberty Bonds that have been authorized to help finance reconstruction of lower Manhattan.

BMTS should:

- Continue to provide opportunities for freight stakeholders to be involved in planning decisions, including establishing freight task forces and roundtables to provide input for specific projects and initiatives;

- Identify key contacts at larger freight shippers and service operators and forge an ongoing relationship involving periodic meetings to update the firms about ongoing BMTS initiatives and, in return, to enable the firms to provide relevant information about their expansion plans or upcoming changes to their operations that may impact the freight system;

- Continue to integrate freight performance measures into its project evaluation process to ensure that projects driven by passenger transportation needs can benefit both passenger and freight mobility and accessibility;

- Coordinate with local and state economic development officials to identify strategic freight planning initiatives and provide incentives for users of the freight system to make logistics decisions with economic, social, and environmental factors in mind;

- Work with NYSDOT and local municipalities to improve the collection of freight data on local, state and Interstate highways; and

- Work with NYSDOT to identify previously unexploited freight funding sources and freight financing techniques.

Strategy 2: Preserve Rail Service

Although the BMTS region is served by two Class I rail lines (Norfolk Southern and Canadian Pacific), with a third (CSX) about 75 miles away in Syracuse, local businesses depend on direct rail access to ship raw materials, components, and finished goods to and from their facilities. Class I rail lines typically do not serve smaller rail customers directly, but instead interchange rail cars with local Class III regional and short-line railroads, who in turn deliver individual cars or small groups of cars to various businesses in the region. Businesses lacking rail access must perform this "last mile" shipment by truck.

As the 2006 washout and subsequent closure of the southern portion of NYSW's Utica Branch demonstrated, once rail service is interrupted even for a brief time, customers quickly switch to truck to maintain continuity in their supply chains, if possible. Customers who cannot ship by truck due to the weight, volume, or size of their shipments must rely on their rail service providers to provide workarounds, such as the circuitous routing that NYSW takes from Binghamton to Syracuse, then east along CSX tracks to Utica, and then south to their few remaining customers on the Utica Branch. The economic development potential for the remaining development sites on the Utica Branch is diminished until service can be restored, and any development that does occur must depend on truck shipments, exacerbating safety issues in the NY 12 corridor.

Preservation of rail service should be a proactive strategy to prevent situations like washouts on the Utica Branch. NYSW and Owego and Harford tracks should be maintained to Class 2 standards regionwide, and bridges, retaining walls and other support infrastructure should be inspected and maintained at a state of good repair.

On the rail main lines, BMTS should work with NS, NYSW, and NYSDOT to ensure that the Southern Tier line remains a viable alternative to other routes between the New York City metropolitan area, Upstate New York, and the Midwest. In particular, sections of the line east of Binghamton that are owned by NS but maintained and operated by NYSW currently are not in heavy use, but they could become more and more important as competing, capacity-constrained routes (e.g., the CSX main line that runs north to Albany and

then west to Buffalo, and the NS Lehigh Valley Line that runs west from New Jersey through Pennsylvania) become congested.

In reality, public and private funding is insufficient to maintain the entire Binghamton regional rail network at a state of good repair, so the region must prioritize the segments of track that are considered most important to the region's economy. As the previous section explained, although some investments in local rail infrastructure may primarily benefit through traffic and have little local economic impact, a viable Southern Tier line, for example, could divert some truck trips to rail that otherwise would add to through truck traffic on I-81 and the future I-86.

BMTS should:

- Ensure that short-line railroads are maintained such that they can continue to provide reliable and economical service to local customers;
- Based on information presented in Sections 3 and 5 of this report, build consensus around the segments of track that are most important to the region's economy and prioritize these tracks for maintenance and capacity funding to ensure that they meet FRA Class 2 track standards and provide sufficient capacity to meet demand; and
- Work with NS, NYSW, WNYP, and NYSDOT to ensure that the Southern Tier line remains a viable alternative to other routes between the New York City metropolitan area, Upstate New York, and the Midwest.

Strategy 3: Address Safety and Operations of Freight Infrastructure

Second only to preservation of transportation infrastructure and services, safety is one of the region's top priorities. Many rail and highway safety initiatives are led by NYSDOT or Federal agencies, such as commercial vehicle inspections and permitting, setting roadway and rail design standards, leading transportation security initiatives, and tracking HAZMAT shipments, to name but a few. However, BMTS can play a role in freight safety, including performing regional analyses and providing data to support identification of high accident locations for freight and passenger vehicles and conducting road safety audits with both passenger and freight vehicles in mind.

BMTS should support NYSDOT efforts to:

- Ensure that roadway safety initiatives consider both passenger and freight transportation;
- Improve safety at highway-rail grade crossings and eliminate those crossings with high levels of rail and/or roadway traffic, in coordination with rail operators;
- Ensure the security of regional freight transportation infrastructure;
- Provide climbing and passing lanes at appropriate locations on two-lane rural roads; and
- Install signage on local roadways to direct trucks onto roadways designed to accommodate them.

Strategy 4: Provide Adequate Rail Access Points Regionwide

As mentioned in Section 3, during shipper and carrier interviews and during various stakeholder involvement meetings throughout this project, businesses cited a need for improved access to the rail system so that they could conveniently and more cost-effectively ship goods via rail instead of by truck. The intermodal terminal and inland port concepts described above are relatively large scale investments that would dramatically improve rail access in the region.

However, BMTS also could pursue smaller, less costly investments in rail access. BMTS should:

- As part of the region's industrial development strategy, support the provision of rail sidings to existing businesses handling rail-oriented freight in significant volumes, utilizing NYSDOT's Industrial Access Program grants if eligible, and if the program is funded;

- Work with rail operators and NYSDOT to initiate rail access to potential new rail customers as they are making their location decisions;

- Encourage construction of additional small bulk transfer facilities regionwide to allow businesses not located adjacent to a rail track to have access to rail service; and

- Negotiation of more frequent and more reliable interchanges of rail cars between the region's short lines and Class I operators to shorten delivery times by rail and make rail shipments more competitive with truck shipments.

Strategy 5: Encourage Growth in Rail Market Share over Time

The first objective of the draft State Rail Plan under development by NYSDOT is to grow rail market share statewide by 25 percent by 2020. With a 3.6 percent rail mode share (by weight) for inbound and outbound shipments and a 13.5 percent mode share for through shipments, there is an opportunity to grow the rail market to, from and through the Binghamton region.

BMTS should:

- Partner with NYSDOT and other neighboring regions in New York and Pennsylvania to support rail initiatives such as the proposed Patriot Corridor rail investments and the Empire Link initiative to divert future growth in freight traffic to rail to the greatest extent possible; and

- Where feasible and fair, and in cooperation with other public sector entities, offer incentives to businesses to overcome obstacles to shipping by rail, so that both truck and rail can make more efficient use of their resources (such as employees, trucks, and railcars) and their networks.

Strategy 6: Use Information Technology to Improve Freight Safety and Efficiency

Both rail and truck operations can benefit from the exponential expansion of information technology applications in the transportation sector. For trucks, in-vehicle GPS systems have become widespread among both truck fleet operators and independent truck owner-operators, offering a platform to push many enhancements to driver information to end users (including both drivers and truck fleet dispatchers in centralized command centers).

As the previous set of recommendations suggests, many long-haul truckers are unfamiliar with local roadways, and the wealth of information available today on in-vehicle GPS navigation systems usually is focused on Interstate and major interregional highways. Any information that local municipalities and MPOs like BMTS can provide in GIS format can help reduce the incidence of trucks causing damage to overhead structures, driving on unapproved routes through residential areas, or getting stuck at an intersection with turning radii too tight for a truck to safely maneuver.

This information is useful to drivers making local deliveries, but it is essential in the case of a major roadway closure, due perhaps to an accident on I-81 that requires diversion of trucks to local roadways precleared for truck travel by the Incident Management Committee cosponsored by BMTS and NYSDOT. If, for example, BMTS were to define a recommended local truck route network in its GIS, as recommended above, the MPO could then pass along this information directly to dispatchers for national truck fleet operators, post the maps on its web site, transmit the maps to NYSDOT, the I-95 Corridor Coalition, and other transportation information clearinghouses, and get useful information about the incident to truckers as soon as possible.

Over a longer timeframe, BMTS could work with the developers of base maps for GPS systems to incorporate the information into their databases and keep it up to date. Information on availability of public and private truck parking and other truck services off the Interstate highways also could be incorporated into these systems. Typically the systems rely on information provided by state DOTs and are limited to the state highway system.

As Commercial Vehicle Infrastructure Integration (CVII) expands, trucks will be able to communicate with roadside infrastructure, allowing state and Federal agencies to track location of hazardous material shipments and oversize and overweight trucks and more accurately track vehicle miles traveled for tax assessment purposes. Fleet dispatchers will be able to track truck diagnostic information such as speed, fuel remaining, tire pressure, and even seat belt use. Drivers will be able to see information on roadway conditions and potential alternate routes to avoid congestion and incidents.

Rail was an early adopter of CVII due to the need for safer train tracking and control systems. Some systems to improve the safety and efficiency of rail operations, such as automatic train control (ATC) and in-cab signals, have existed for decades, but have not yet been implemented on most Binghamton-area railroads (aside from the CP main line from Binghamton to Mohawk yard) due to resource constraints. A simpler and cost-effective technology is the Local Area Radio Controlled Switch (LARCS), which allows a locomotive with a local area radio beacon to transmit its identity and destination to a

switch, which then automatically positions itself in the correct position and eliminates the need to throw each switch by hand.

BMTS should work with the Federal Rail Administration, NYSDOT's Rail Office, and the rail operators to ensure that appropriate rail information and control technology is implemented throughout the region as rail freight volumes increase. These technologies can increase train speeds on mainlines, allowing for closer spacing of trains, increasing throughput, and deferring the need for large investments in infrastructure. LARCS installations in Binghamton's railyards, which have many sequential switches, could dramatically increase efficiency with a relatively small investment by rail operators.

Information technology has not just affected operations of transportation infrastructure, but also the tracking and security of freight as it moves through global supply chains. Smart containers, boxcars, and truck trailers can now relay information about location, internal temperature, and whether and when the container was opened and closed, among other data. The use of smart containers and simple software applications can dramatically reduce container dwell time at intermodal rail and seaport facilities, for example, as it becomes easier to sort containers and track their location at large facilities.

BMTS and other MPOs will play a critical role in deployment and maintenance of the infrastructure used to improve information about freight movement. For example, MPOs that support traffic management centers have been working to incorporate freight management as well as passenger vehicle and transit system management into the facilities. In the short term, BMTS should look for opportunities to partner with freight system operators and multistate organizations like the I-81 Corridor Coalition and the I-95 Corridor Coalition to expand the use of CVII and other freight communication technologies.

BMTS should:

- Add information about dimensional and weight restrictions to GIS information maintained by BMTS and distribute the information to various firms that maintain base maps for GPS navigation systems used by commercial vehicles;
- Develop a mechanism for quickly sharing information about alternate routes and diversions due to highway closures and other incidents directly with dispatchers for national truck fleet operators, post the maps on its web site, and transmit the maps to NYSDOT, the I-95 Corridor Coalition, and other transportation information clearinghouses so that information can get to truckers as quickly as possible;
- Work with NYSDOT and FHWA as Commercial Vehicle Infrastructure Integration (CVII) initiatives are implemented in the region;
- Work with rail operators to install cost-effective technology upgrades on rail mainlines and in the rail yards in the Binghamton terminal area, and in particular investigate the feasibility and cost of installing Local Area Radio Controlled Switches (LARCS) in Binghamton's rail yards; and
- Look for opportunities to partner with freight system operators and multistate organizations like the I-81 Corridor Coalition and the I-95 Corridor Coalition to expand the use of CVII and other freight communication technologies in the region.

Strategy 7: Implement Freight Emissions Reduction Initiatives

Binghamton's economy depends on the efficient movement of freight. However, the diesel fuel that powers truck and rail locomotives in the region generate environmental and social impacts. The U.S. Environmental Production Agency estimates that freight movement accounts for 20 percent of all energy consumed in the transportation sector. Trucks and the trailers and intermodal containers they carry are designed to haul as much freight as possible; they are not designed to be aerodynamic or fuel efficient. Advances have been made in diesel rail locomotives, but much work remains to be done to improve their aerodynamics. And although idling is illegal in many jurisdictions, truckers (and especially those that carry specialized cargo or food that must be maintained in a climate controlled environment) idle their trucks while stopped at delivery and pick up locations and at rest areas, burning even more fuel to keep their cabs and their cargo at a comfortable temperature.

With rising fuel prices (as discussed in Section 1) and predictions that diesel fuel may remain relatively expensive for a sustained period of time, truckers and rail operators may start looking to better designs and technologies to increase fuel efficiency while driving and idling. NYSDOT's draft Statewide Rail Plan calls for New York to have the nation's first "green" short-line locomotive fleet in the country. The EPA, FHWA, and the New York State Energy Research and Development Authority (NYSERDA) are partnering to provide financial incentives to rail firms, truck fleet operators and independent owner-operators in New York State to retrofit existing locomotives and trucks with "green" technologies and gradually replace the locomotive and truck fleets with more modern and fuel-efficient models. Both diesel engines and truck bodies can be retrofitted to increase fuel efficiency while reducing truck emissions. One potential starting point could be to investigate the feasibility of using "green" low-emission locomotives in Binghamton's rail yards for switching and local movements of rail cars, and on shorter trips made by NYSW and OHRY trains.

While all of these programs are beyond the purview of the MPO, BMTS should:

- Track efforts by NYSERDA, rail operators, locally based truck fleet operators, and independent owner-operators to adapt best practices in freight fuel efficiency for trucks and rail locomotives, adapting existing Federal and state programs to the region's unique economic and regulatory environment;
- Encourage truck stop electrification programs as an alternative to overnight idling; and
- Support the use of "green" or low emissions locomotives in Binghamton rail yards for yard switching and for local service provided by short lines in the region.

Strategy 8: Implement Regional Wayfinding Improvements

One of the characteristics of industrial parks and warehouse/distribution districts is that they serve a regional function and are often expected to serve businesses whose customers and contractors (notably long-haul trucking firms) may not be familiar with the local roadway system. For industrial sites that do not have good visual highway exposure and are not directly accessible from a highway interchange, a system of wayfinding signs is an effective, low-cost measure for enhancing exposure and improving access for drivers from outside the region. In addition, a major reason residents make complaints about truck traffic on residential streets, or trucks enter a roadway with geometry they cannot successfully navigate, is that some drivers are unfamiliar with the area they are traveling in, or do not have clear directions to guide them to their destinations.

By definition, a wayfinding sign system is a series of signs and/or graphical elements that assist motorists in finding specific destinations. "Targets" of such wayfinding signs typically include sites such as tourist attractions and major sports venues, but a cohesive wayfinding system also can serve as a valuable amenity for industrial sites of regional significance in and around Binghamton.

While many truck drivers visit facilities in the region frequently enough to know their way around and to use roads that are best suited for trucks, drivers who are not familiar with the area may benefit from the assistance of a well-signed network of truck routes to deliver them to their destination, or onto the Interstate and state highway systems. GPS navigation systems commonly used by truck drivers often do not have sufficient information or even accurate information about local roadways, in particular information about truck restrictions. Therefore, the region may consider establishing a truck route network that includes state highways and key local and regional roadways that provide access to major truck generators. A network of truck routes would direct truck drivers to travel routes where geometric constraints and truck impacts on sensitive land uses such as residences, parks, and schools are minimal.

As an example, Kirkwood Industrial Park contains one of the region's largest concentrations of industrial land uses and generates a large amount of truck traffic. The park has matured and there are limited opportunities for significant new development within the park. It is unlikely that truck traffic will increase significantly enough that reconstruction or reconfiguration of Interchanges 2 or 3 would be warranted, particularly because of the geometric design constraints associated with the park's close proximity to the I-81/NY 17 interchange. A strategy that improves wayfinding throughout and around the Kirkwood Industrial Park would provide a transportation benefit for truck drivers, while at the same time providing a tangible economic benefit by giving this site an "identity of place."

Because the park is divided by I-81, and because Interchanges 2 and 3 do not individually permit full entry and exit access for all movements between the park and I-81, truck drivers who are not familiar with the park and its access routes may find navigating through the area to be confusing. A signage program which designates the two distinct portions of the park on either side of the Interstate (e.g., "Kirkwood East" and "Kirkwood West") and assists drivers in finding the park tenants and access routes to and from the Interstate is

recommended. This signage should be done in accordance with all pertinent governing regulations and guidelines (NYSDOT, MUTCD, etc.), and should be incorporated into the existing sign system on the surrounding regional roadways to the extent possible. Such a signage program is estimated to cost $100,000 for the Kirkwood area alone, and the costs could be borne by the industrial park owner and their tenant businesses if they find access to be a problem for their carriers.

Similar initiatives would be recommended for other existing industrial parks (at the Broome Corporate Park in Conklin, to direct most trucks away from the NY 7 corridor, for example) and other areas of the BMTS region identified as opportunities for truck-oriented industrial development (e.g., along NY 17 in Tioga County).

BMTS should:

- Consider establishing a truck route network that includes state highways and key local and regional roadways that provide access to major truck generators; and

- Design and implement a regional wayfinding program, including signage to direct truck drivers to travel routes where geometric constraints and truck impacts on sensitive land uses such as residences, parks, and schools are minimal.

Strategy 9: Provide Adequate Truck Parking

The growth of truck traffic on the nation's highway system, coupled with recent changes in Federal hours-of-service regulations under which commercial drivers are required to rest for longer continuous time periods, has resulted in a dramatic increase in parking demand at public rest areas and private off-highway facilities. A study of this issue for the BMTS region is recommended, particularly in light of long-term truck volume growth projections and potential new industrial development within Broome and Tioga Counties. While the safety issues associated with truck parking on highway shoulders was not raised by BMTS freight stakeholders specifically, shoulder parking has become an issue in neighboring regions that could expand to the Binghamton region as driver habits are influenced over time by a lack of off-highway truck parking elsewhere.

Particularly if Binghamton seeks to attract truck-intensive warehousing and distribution center-related economic development, the issue of truck parking will need to be addressed as part of a broader economic development strategy. This issue also has implications that relate to other regional freight strategies listed in this section, including freight safety, energy efficiency, and emissions reduction (through idle reduction technology and related mandates).

Measures to address the need for truck parking might include the establishment of public-private partnerships to tie private-sector investment in truck stops and travel centers to regional parking/staging needs of the trucking industry. Local blanket restrictions on overnight truck parking at warehouses, distribution centers, and facilities that generate high volumes of trucks also could be relaxed where appropriate. NYSDOT already is

heavily involved in multistate efforts to address the issue of truck parking and could be a good partner for BMTS in proactively addressing this issue.

BMTS should:

- Work with NYSDOT to determine the current and future need for short-term and long-term truck parking in the region;
- Work with NYSDOT, locally based trucking firms, area shippers and receivers, and truck parking providers to increase truck parking capacity in appropriate locations and use available spaces efficiently; and
- Provide information about available parking to truckers who may be unfamiliar with the region to reduce their need to park on the shoulders and ramps of Interstate and interregional highways.

Strategy 10: Study Feasibility of Establishing Truck-Only Lanes

Virginia, faced with forecasts of rapid increases in truck traffic along I-81 in that State, already has studied the feasibility of adding truck-only toll lanes along the portion of I-81 that runs through that State. Truck-only lanes, which may be tolled or funded through conventional sources, separate truck traffic from automobile traffic to increase freight mobility and safety. While Virginia is studying the lanes primarily as an alternative for needed expansion of their portion of I-81, all states may need to consider truck-only lanes in the future as a means of allowing longer truck trailers and multiple units of four or more trailers, which cannot safely mix with automobile traffic at high speeds.

In addition, just over the horizon are semi or fully automated freight (and passenger) vehicles that employ advanced versions of technologies that already are appearing the vehicle fleet, such as adaptive cruise control and collision avoidance systems. Driverless "AGVs" (Automated Guided Vehicles) already are in widespread use in warehouses around the world, but it is unclear whether financial constraints (related to construction of infrastructure) and economic feasibility (compared to conventional or higher-speed rail-roads) will enable this concept to translate to the open road.

A multistate truck-only lane strategy would ideally be pursued through an initiative similar to the U.S. DOT "Corridors of the Future" program, and possibly in conjunction with a tolling/pricing study to finance the development of this type of infrastructure. This strategy would likely be multijurisdictional in nature, involving other counties and MPO regions in New York (for I-86/NY 17 or I-88) and potentially even Pennsylvania, Maryland, West Virginia, Virginia, and Ontario for the I-81 corridor.

BMTS should:

- Track and cooperate with ongoing and future state or multi-state studies about the need for and feasibility of truck-only lanes in the context of future industrial development, long-term projections of growth in truck trips and changes in freight movement technologies.

Strategy 11: Coordinate Transportation and Land Use Planning for Large-Scale Commercial and Industrial Development

While the region is hoping to attract economic development and the additional jobs and taxes that accompany growth, BMTS and its partners should consider the development of a set of "best practices" guidelines for large-scale industrial development, potentially including a model municipal ordinance for jurisdictions where truck- or rail-oriented industrial development is to be encouraged. This would help address unique land use considerations related to large-scale warehouse development, including special roadway and intersection design standards, strategies to avoid rail/pedestrian and rail/auto/truck conflicts, easements for shared truck staging areas to reduce parking requirements for individual sites, and tying truck parking and staging capacity (public or private) to operational parameters for this type of industrial land use (i.e., provision of offsite truck parking spaces per 1,000 square feet, per warehouse door, etc.).

Any potential development of warehousing and distribution facilities, electronics manufacturers, and other industries in the region is likely to have impacts on interchanges and adjacent roadways. The range in the project cost estimate associated with recommended projects for the NY 17 corridor in Tioga County represents the possibilities that will exist when a development strategy is decided. Development of facilities could occur case-by-case, which may result in warehousing and distribution centers widely scattered throughout the area and may require improvements to several interchanges.

The development of a strategy that establishes a single warehousing development area (such as an industrial or corporate park) could direct such developments to a particular desired area, served by one interchange that is capable of accommodating the truck traffic that will be generated. The Binghamton region already has undertaken studies such as this when developing the Broome Corporate Park and when considering the potential for development on the Airport Road corridor. The region could take an additional step and consider the need for support facilities that could be co-located with the development to form a small freight village, albeit with a single mode (truck).

BMTS should:

- Partner with Broome and Tioga Counties and their constituent municipalities that have land use authority to develop "best practices" guidelines for large-scale commercial and industrial development, potentially including a model municipal ordinance for jurisdictions where truck- or rail-oriented industrial development is to be encouraged; and

- Participate in the development of subregional plans for industrial growth in desired growth areas such as the area around Broome Corporate Park and the NY 17 Corridor in Tioga County, including desirable locations where land should be preserved for commercial and industrial development (as opposed to farming, housing, retail, open space, or other uses).

6.3 Estimated Benefits and Benefit/Cost Ratios of Recommended Projects

This section contains discussion of a benefit/cost analysis for the freight transportation projects as identified earlier in this section. Transportation system improvements create efficiencies that result in user benefits such as reduced travel time and lower vehicle operating costs as well as safety benefits. In addition, an improved transportation network may result in increased access to labor markets and jobs.

A comparison of the aggregate benefits of a project with the construction and maintenance costs yields a measure of the desirability and financial feasibility of making the investment as expressed by a benefit/cost ratio. As an essential part of this approach, all economic benefits need to be estimated and measured in monetary terms. Specifically, the analysis takes into account the following issues:

- User benefits and subsequent economic impacts are estimated by applying methodologies that are consistent with the approach developed by Cambridge Systematics for the U.S. DOT. In a two-step process, initial user benefits, i.e., reductions in travel time and vehicle operating savings for households and the "cost of doing business" for industry in addition to total systemwide accident reductions, are estimated using travel demand analysis that is based on traditional passenger travel demand modeling. In a second step, macroeconomic effects are added in order to account for the total public impacts of the transportation improvements.

- User benefits are differentiated for automobiles and trucks and further between private and public benefits. Public benefits include the nonbusiness automobile user benefits and the economic impacts created by lower business costs as measured by the changes in Gross Regional Product (GRP), employment, or income. Private benefits include industry travel time and vehicle operating-cost savings in the form of nonbusiness auto and truck benefits.

- Direct user benefits [travel time savings, vehicle operating cost, and safety improvements] are estimated using the VISUM[4] travel model in combination with Cambridge Systematics' Highway Economic Analysis Tool (HEAT). In particular, VISUM provides volumes and travel times on links. HEAT sums these links' specific information, summarizes them into overall VHT reductions, and applies general assumptions such as the value of time for trucks and automobiles in order to derive monetized user benefits.

- Public benefits are estimated by expanding on previous economic model runs completed for the Appalachian Regional Commission for a study of the Appalachian Development Highway System (ADHS). The model that was used in this study was the Transportation Economic Development Impact System (TREDIS). TREDIS is a

[4] VISUM is a registered trademark of PTV America, Inc.

dynamic economic impact tool that takes into consideration the linkages between different industries, their demand for transportation services, and "New Geography" economic measuring techniques. Changes to the transportation system are incorporated in a complex series of analytical steps which bring together the many distinct regional economic features to product projections of macroeconomic measures. The assumption is that the multipliers and economic relationships developed by TREDIS will be valid for this cost-benefit analysis because Broome and Tioga counties also were part of the study that estimated the economic impact of completing the Appalachian Development Highway System.

Highway Projects

Binghamton Metropolitan Transportation Study's regional travel demand model software, VISUM, was used to estimate the benefits of three of the recommended highway projects, where new highway segments are proposed. These projects include the additional climbing lane on I-81 (Highway Project 1), the Prospect Street connector to the Charles Street Business Park (Highway Project 3), and the Griswold Street Extension and new access ramp from I-81 to Griswold Street near I-81 Interchange 4 (Highway Project 3).

Travel model runs using VISUM generated highway performance data for the build and no-build case. The benefit of the highway improvements that are evaluated in this section can be demonstrated by taking the difference between the two travel model runs for each alternative. Specifically, the outputs are configured in the form of daily changes in vehicle hours traveled (VHT) and vehicle miles traveled (VMT) for autos and trucks as shown in Table 6.4 below.

Table 6.3 Estimated Daily VHT/VMT Reduction in 2030 for Proposed Highway Projects

	Vehicle Hours Traveled (VHT)			Vehicle Miles Traveled VMT		
	Auto	**Truck**	**Total**	**Auto**	**Truck**	**Total**
Highway Project 1 – I-81 Truck Climbing Lane						
No-Build	105,765.0	12,499.0	118,264.0	4,259,573.9	605,347.0	4,864,920.9
Build	105,724.0	12,491.2	118,215.2	4,259,718.0	605,363.9	4,865,081.9
VHT/VMT Savings	**41.0**	**7.8**	**48.8**	**-144.1**	**-16.9**	**-161.0**
Highway Project 2 – Improvement of Charles Street Business Park						
No-Build	105,707.6	12,516.1	118,223.7	4,262,247.5	606,630.7	4,868,878.1
Build	105,497.6	12,501.5	117,999.1	4,258,805.7	606,378.4	4,865,184.1
VHT/VMT Savings	**210.0**	**14.6**	**224.6**	**3,441.8**	**252.2**	**3,694.0**
Highway Project 3 – Griswold Street Extension and New Access Ramp from I-81 to Griswold Street						
No-Build	105606.2	12482.5	118088.7	4259230.9	605184.6	4864415.5
Build	105607.8	12482.5	118090.3	4258871.2	605129.9	4864001.2
VHT/VMT Savings	**-1.6**	**0.0**	**-1.6**	**359.7**	**54.6**	**414.3**

Improvements to highway infrastructure have an impact on a transportation system's performance. By adding capacity or making operational changes, travel times are reduced as a result of lowered congestion, fuel consumption and costs incurred by motorists likely fall because of improved traffic conditions (less time spent idling in congestion), and the number of accidents diminishes. These user benefits can be valued by using estimated value-of-time measures, accident cost assumptions, or fuel costs.

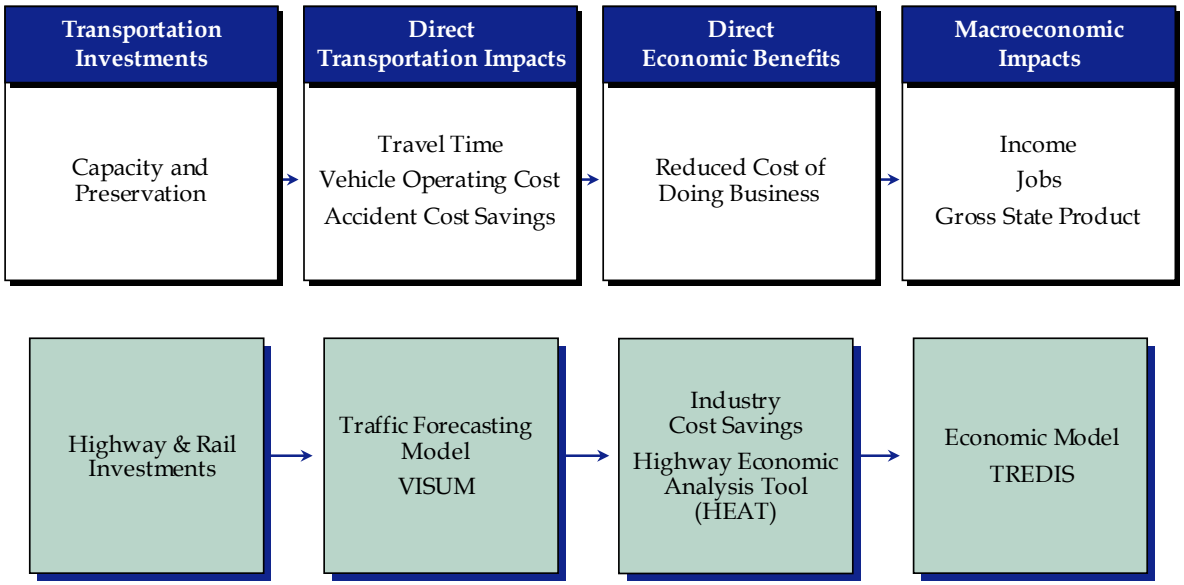
In the chosen methodology, which is detailed in Appendix B, the benefits are split into three categories based on modes: truck, business automobile, and nonbusiness automobile trips. Each category incurs costs and benefits at a different rate based on the characteristics of each travel mode, i.e., travel time valuations. The user benefits represent cost savings for businesses, i.e., by lowering delay and fuel costs businesses experience productivity improvements.

These productivity improvements ultimately result in increased business activity which in turn generates multiplier effects on employment, income, and output gains which also can be quantified. User benefits for nonbusiness automobile trips also are valued by using estimated value-of-time and other cost measures. However, these private trip user benefits do not result in productivity impacts that generate changes in aggregate economic variables.

The economic impacts of the project were quantified by linking the outputs from the VISUM travel model software to an economic impact model that translates these transportation impacts into industry cost savings and macroeconomic impacts. Specifically, the Highway Economic Analysis Tool (HEAT) uses the build and no-build network data as

well as build and no-build trip information taken from the highway travel model. Network system improvements and performance changes are then monetized by using estimated value-of-time estimates and other parameters in HEAT. The outputs from HEAT, i.e., user benefits, are then used as inputs into an economic model. In this case, HEAT was linked to the Transportation Economic Development Impact System (TREDIS) to generate gains in employment, income, and gross state product (GSP). Figure 6.7 shows the steps involved for estimating the economic benefits of the project.

Figure 6.7 Economic Impact Analysis Approach



Specifically, HEAT uses VHT savings for auto and truck traffic and combined those with the assumed values of time. By applying a value of time of $13.25 (auto) and $53 (truck) in 2006 dollars to VHT savings, travel time savings have been monetized. Savings for automobile users are then split between savings for business and nonbusiness trips. The split is based on data obtained from the 2001 National Household Travel Survey. Business or "on the clock" auto trips affect industries' cost of doing business and constitute an input into the economic model. Nonbusiness household time savings are benefits that accrue to private entities and are entered directly into the cost-benefit analysis. In other words, nonbusiness benefits do not have any impact on industry cost and competitiveness.

The analysis of economic impacts further assumes that benefits accrue either inside or outside of the study area. Consideration of origin-destination data yielded an assessment of how auto and truck traffic can be attributed relative to the Binghamton study area. In essence, the analysis of traffic data showed that 89 percent of automobile trips and 59 percent of truck trips accrue to the study area. These estimates are based on the assumption that in case of trips that have either their respective origin or destination in the study area 50 percent of the benefit will be counted as having been generated within the Binghamton region. Trips that originate and terminate in Binghamton are counted as 100 percent.

Industry cost savings are fed into the economic model which estimates the macroeconomic impacts that are generated as a result of the highway transportation improvements. In case of this analysis, a TREDIS model that was calibrated for the analysis of the completion of the Appalachian Development Highway System was used to estimate the economic impacts.

Project 1: Climbing Lane on Interstate 81

Table 6.5 shows the estimates transportation user benefits for Project 1. The estimates are presented for the year 2030. Business auto benefits amount to approximately $4,000, truck user benefits to roughly $110,000 and household benefits to $121,000 bringing the total user benefits for this option to approximately $235,000 annually.

Public economic benefits include the macroeconomic changes that are caused by the transportation efficiency improvements. For the year 2030, the public economic impacts are shown in Table 6.6.

Table 6.4 Estimated Private User Benefits in 2030 – Highway Project 1
in 2008 Dollars

Private User Benefits	**2030**
Business Auto User Savings	
Time Savings	$5,322
Vehicle Operating costs	-$1,119
Safety costs	-$183
Total	**$4,020**
Truck User Savings	
Time Savings	$126,538
Vehicle Operating costs	-$16,346
Safety costs	-$483
Total	**$109,709**
Household Benefits	
Time Savings	$160,466
Cost Savings	-$39,239
Total	**$121,227**
Grand Total	**$234,957**

Table 6.5 Estimated Public Economic Benefits in 2030 – Highway Project 1

in 2008 Dollars

Public Economic Benefits	2030
Business Output	$331,758
Value Added	$169,387
Wages	$107,032
Employment	3

A cost-benefit calculation was performed using both private and public benefits of the project. On the benefit side, business user savings, household cost, and value of time savings as well as value added needed to be combined to create a total benefit concept. For 2030, the total benefit is equal to $1.6 million which is equivalent to a present value calculated over 30 years using a seven percent discount rate of $19.5 million. Using the present value is more consistent with economic principles because user and economic benefits are accrued in every year of the life of the project and therefore it is important to compute an aggregate measure.

The total cost of the project has been estimated as $30 million which brings the estimated cost-benefit ratio to 0.17. In other words, every dollar invested in the project only yields 17 cents of associated public and private benefits.

Table 6.6 Summary of Benefits and Estimated Benefit-Cost Ratio – Highway Project 1

in 2008 Dollars

	2030	30-Year PV
User Benefits		
Business User Savings	$113,730	$1,411,275
Household Savings	-$39,239	-$486,914
Household Value of Time Savings	$160,466	$1,991,228
Total	**$234,957**	**$2,915,589**
Economic Benefits		
Value Added	$169,387	$2,101,930
Project Cost Estimate		$30,000,000
Total Benefits for B-C Ratio	$404,344	$5,017,519
Total Costs for B-C Ratio		$30,000,000
Estimated B-C Ratio		0.17

Project 2: Prospect Street Connector to Charles Street Business Park

The calculations of benefits of the Prospect Street Connector to the Charles Street Business Park are predicated on the assumption that the entire 22-acre property would be developed with approximately the same intensity (employment density and economic output) as the parcels that make up the Kirkwood Industrial Park. With these assumptions, private and public benefits for Project 2 are significantly higher than for Project 1. In fact, the total user benefits have been estimated as $2.3 million consisting of roughly $58,000 of business auto benefits, $487,000 of truck user benefits, and $1.8 million of household time and cost savings.

Table 6.7 Estimated Private User Benefits in 2030 – Highway Project 2
in 2008 Dollars

Private User Benefits	2030
Business Auto User Savings	
Time Savings	$27,262
Vehicle Operating costs	$26,715
Safety costs	$4,361
Total	**$58,338**
Truck User Savings	
Time Savings	$235,574
Vehicle Operating costs	$243,961
Safety costs	$7,211
Total	**$486,746**
Household Benefits	
Time Savings	$822,023
Cost Savings	$937,022
Total	**$1,759,045**
Grand Total	**$2,304,129**

Macroeconomic impacts as a result also were more significant with the project creating a total of $1.3 million in annual value-added and $2.6 million in output in 2030. The increased benefits are represented by the calculated cost-benefit ratio which exceeds 26 for this alternative. In other words, a dollar invested in this project yields a return of 26 dollars in net present value terms.

Table 6.8 Estimated Public Economic Benefits in 2030 – Highway Project 2

in 2008 Dollars

Public Economic Benefits	2030
Business Output	$1,676,612
Value Added	$865,517
Wages	$545,114
Employment	14

Table 6.9 Summary of Benefits and Estimated Benefit-Cost Ratio – Highway Project 2

in 2008 Dollars

	2030	30-Year PV
User Benefits		
Business User Savings	$545,084	$6,763,968
Household Savings	$937,022	$11,627,545
Household Value of Time Savings	$822,023	$10,200,515
Total	**$2,304,129**	**$28,592,028**
Economic Benefits		
Value Added	$865,517	$10,740,231
Project Cost Estimate		$1,500,000
Total Benefits for B-C Ratio	$3,169,645	$39,332,260
Total Costs for B-C Ratio		$1,500,000
Estimated B-C Ratio		26.22

Project 3: Griswold Street Extension and New Access Ramp from I-81 to Griswold Street

Like the redevelopment of the Charles Street Business Park, estimating the public and private user benefits of Project 3 require some assumptions about the type and intensity of development that would occur at the site. Assuming the region can attract an employer with a similar level of employment and economic output as the industries formerly located in the Brandywine Highway Corridor, private user benefits of Project 3 amount to below $150,000 in 2030 with household time savings making up nearly two thirds of this total.

Table 6.10 Estimated Private User Benefits in 2030 – Highway Project 3
in 2008 Dollars

Private Economic Benefits	2030
Business Auto User Savings	
Time Savings	-$203
Vehicle Operating costs	$2,792
Safety costs	$456
Total	**$3,045**
Truck User Savings	
Time Savings	-$374
Vehicle Operating costs	$52,837
Safety costs	$1,562
Total	**$54,025**
Household Benefits	
Time Savings	-$6,122
Cost Savings	$97,926
Total	**$91,804**
Grand Total	**$148,874**

Public economic benefits account for $86,000 in value added and approximately $170,000 in additional business output. The benefit-cost ratio for this projected was calculated as 0.97 showing the relative desirability of the highway investment. A dollar invested in this project would return 97 cents in benefits. Since the methodology used to estimate benefits and costs depends on many assumptions about the types of development that would occur on the developable sites in this corridor and the traffic generated by them, the decision to implement the Griswold Street extension and the new access ramp depends on judgments about the likelihood of attracting development to these sites, versus other targeted economic development zones in the Binghamton region or competing regions. Since there may be additional business attraction and accessibility benefits that have not been fully captured by the analysis, the B-C ratios are a mere indication and could actually be somewhat higher if all benefits were included.

Table 6.11 Estimated Public Economic Benefits in 2030 – Highway Project 3

in 2008 Dollars

	2030
Business Output	$168,752
Value Added	$86,410
Wages	$54,553
Employment	1

Table 6.12 Summary of Benefits and Estimated Benefit-Cost Ratio – Highway Project 3

in 2008 Dollars

	2030	30-Year PV
User Benefits		
Business User Savings	$57,069	$708,178
Household Savings	$97,926	$1,215,169
Household Value of Time Savings	-$6,122	-$75,969
Total	**$148,874**	**$1,847,378**
Economic Benefits		
Value Added	$86,410	$1,072,261
Project Cost Estimate		$0
Total Benefits for B-C Ratio	$235,283	$2,919,639
Total Costs for B-C Ratio		$3,000,000
Estimated B-C Ratio		0.97

Rail Projects

The analysis of rail benefits is conducted similarly to the analysis of the highway improvements. User benefits for shippers and carriers are estimated and split between internal and external effects. The internal effects then provide input into the economic model which estimates macroeconomic impacts as a result of the rail investments.

The analysis also differentiates between private and public benefits. Private benefits accrue to shippers and carriers whereas public benefits are the macroeconomic changes to the regional economy as a result of the rail improvements.

In particular, private rail benefits substantially consist of:

- **Inventory costs.** Inefficient rail operations result in delays and consequently higher costs for shippers. The higher costs are in part due to higher inventory costs. Inventories need to be larger because of the delay that is caused in the shipper's supply line. Investments in rail reduce these opportunity costs. The chosen methodology assumes that seven percent is the annual rate at which inventories are valued.

- **Car hire**. As a result of train delays, shippers need to carry larger inventories which also require the railroads to provide more rail capacity. Such increases in capacity can be measured and monetized by assuming a rail car per-diem (rental) rate of $1.50 per hour.

- **Locomotive and Crew Costs**. Time delays require locomotives to be used for longer periods of time. The rate used in the analysis is $400 per day for the typical locomotive used for rail traffic in and through the Binghamton region. In addition, crews need to be paid for additional time spent. However, since it is standard practice in the rail industry to pay crews by day and not by the hour, any small travel time reductions may not be immediately result in cost savings. In fact, for the purpose of this analysis, we have treated crew costs as fixed.

The analysis presented in this section is based on the same 2006 TRANSEARCH data that were used to prepare freight forecasts in Section 5. Freight data was disaggregated by carload and value and assigned to an origin-destination pair relative to the Binghamton area and the rail lines crossing the region. Impacts were then measured by splitting internal and external effects keeping in mind that internal effects are benefits accrued by local businesses and industries and therefore become inputs into the economic model. Appendix B contains a detailed description of the methodology used to assign the O-D pairs and allocate traffic volumes and cargo values to the zonal pairs.

In addition, the analysis of user benefits was based on estimated time savings as a result of the rail improvements. Since specific time savings are difficult to develop because of the operational complexities, the assumptions have been chosen conservatively and consistent with the consultants' experience with similar projects.

Table 6.14 shows the assumed time savings by project. These estimated time savings, which represent the number of hours that would be saved for each train traveling through the region, are of necessity rather rough, and could in reality differ substantially. Time savings were not calculated for the NYSW Syracuse branch improvements (Project 3) and NYSW Utica Branch restoration (Project 4), as suitable data were not available to conduct the analysis. Also, benefits of an intermodal rail terminal and an inland port were not estimated in this analysis because these projects are not yet well-enough defined to estimate key performance metrics.

Using travel time savings by trip and applying the estimate and other assumptions to the TRANSEARCH data yielded estimates of annual private benefits as a result of the rail investments. Table 6.15 shows the benefits disaggregated by benefit category and relative to the study area.

The private user benefits then also constituted the inputs to the economic model. Internal private benefits are assumed to accrue to local shippers, and to a much smaller extent local carriers. These industry cost reductions generate macroeconomic impacts that were evaluated with TREDIS. The results of the estimation process can be seen in Table 6.16.

Nevertheless, the majority of private benefits accrue to industries and carriers outside of the study region. The cost reduction may now make the Binghamton rail corridors more competitive for supply lines targeting Eastern ports or the Western trade centers of the United States. Whereas this is a benefit for these regions and for the overall U.S. economy, the Binghamton area might well receive a disbenefit if these impacts result in increased through traffic in the form of congestion on the rail networks, diversion of rail freight onto local highways, and overall pollution. Benefits from additional through traffic may accrue to the region through increased Binghamton area rail industry employment, and additional expenditures and income as a result of local purchases and multiplier effects.

As stated above, most of the private benefits accrue outside of the Binghamton study area. This is reflected in the calculated benefit-cost ratios for the seven rail projects under consideration. Based on the Binghamton specific rail benefits, only projects 3, 6, and 7 have a benefit-cost ratio of greater than one. Including the external private benefits results in significantly higher benefit-cost ratios for all projects.

Table 6.13 Travel Time Savings

Time Savings in Hours per Trip	Travel Time Savings
Rail Project 1 – Belden Hill Tunnel	1.00
Rail Project 2 – Portage Bridge	0.50
Rail Project 3 – Reduce Yard Conflicts between NS and CP Trains	1.00
Rail Project 6 – Bevier Street Yard Through Tracks	1.00
Rail Project 7 – East Binghamton Yard Reconstruction	1.00

Table 6.14 Rail Investments – Estimated Private Benefits
in 2008 Dollars

	Inventory Costs	Car Hire	Crew costs	Total
Rail Project 1 – Belden Hill Tunnel				
Internal	$158,256	$220	$55	$158,531
External	$8,684,656	$86,976	$21,744	$8,793,376
Total	$8,842,912	$87,196	$21,799	$8,951,907
Rail Project 2 – Portage Bridge				
Internal	$279,440	$3,422	$1,711	$284,574
External	$6,254,659	$39,914	$19,957	$6,314,531
Total	$6,534,100	$43,337	$21,668	$6,599,105
Rail Project 3 – Reduce Yard Conflicts between NS and CP Trains				
Internal	$558,880	$6,845	$1,711	$567,436
External	$14,041,676	$84,606	$21,151	$14,147,433
Total	$14,600,556	$91,451	$22,863	$14,714,869
Rail Project 6 – Bevier Street Yard Through Tracks				
Internal	$372,127	$2,466	$616	$375,209
External	$10,007,359	$102,168	$25,542	$10,135,070
Total	$10,379,486	$104,634	$26,159	$10,510,279
Rail Project 7 – East Binghamton Yard Reconstruction				
Internal	$913,057	$5,090	$1,272	$919,419
External	$16,011,089	$123,152	$30,788	$16,165,029
Total	$16,924,145	$128,242	$32,061	$17,084,448
Grand Total	**$57,281,199**	**$454,860**	**$124,550**	**$57,860,608**

Table 6.15 Rail Investments – Estimated Public Benefits
in 2008 Dollars

	Rail Project 1	Rail Project 2	Rail Project 3	Rail Project 6	Rail Project 7	Total
Business Output	$734,365	$1,318,230	$2,628,534	$1,738,080	$4,259,023	$10,678,232
Value Added	$372,728	$669,069	$1,334,116	$882,165	$2,161,672	$5,419,750
Wages	$235,937	$423,521	$844,496	$558,410	$1,368,339	$3,430,703
Employment (jobs)	6	10	21	14	34	85

Table 6.16 Rail Investments – Benefit-Cost Analysis
in Millions of 2008 Dollars

	Rail Project 1	Rail Project 2	Rail Project 3	Rail Project 6	Rail Project 7
PV of Value Added	$4.63	$8.30	$16.56	$10.95	$26.82
PV of Internal Private Benefit	$1.97	$3.53	$7.04	$4.66	$11.41
PV of External Private Benefit	$109.12	$78.36	$175.56	$125.77	$200.59
Project Costs	$8.333	$20	$1.43	$11.7	$4.265
B-C Ratio (Internal Benefits Only)	0.79	0.59	16.50	1.33	8.96
B-C Ratio (Combined Benefits)	13.89	4.51	139.27	12.08	56.00

7.0 Conclusions and Recommendations

Fundamental shifts in the national and global economies have presented challenges to the Binghamton region, as industries that produce locally-manufactured goods are being replaced by businesses that assemble and distribute goods that are largely produced elsewhere, or those that sell services that depend on intellectual capital rather than locally-sourced natural resources and components. Binghamton's location at a crossroads of major highway and rail corridors will enable the region to always benefit from easy connections to all components of various interwoven global supply chains, including sources of raw materials and parts, manufacturing and assembly facilities, import and export terminals in neighboring regions, warehouses and distribution centers, and consumers of goods and services along the East Coast, in the Midwest U.S. and in Eastern Canada.

This section contains a summary of the key conclusions and recommendations of this study related to freight transportation and the regional economy.

Trends in the Global and Regional Economy

Chapter 1 of this report advised that both a weak dollar and the recent run up in fuel prices would need to be sustained over many years to alter trade patterns and reduce the volumes and types of freight traveling to, from, and through Binghamton. That is not to say with certainty that the dollar's value will rebound relative to other world currencies (most notably the Euro), or that fuel prices will return to the historically low levels seen over the past two decades. The most likely scenario is that the dollar will be somewhat weaker and fuel prices will be somewhat higher than recent historical averages.

Regardless, it would be premature at this point for Binghamton to make major policy adjustments based on what are (so far) relatively short-term trends in the value of the dollar and fuel prices. Perhaps the most valuable lesson is how rapidly the world economy can change in often unanticipated ways that affect goods movement logistics. What the region can and should do take advantage of unique assets and advantages that will not change overnight due to short-term economic fluctuations, and attempt to be nimble in response to change. Chapter 2 summarized many of these advantages:

- **Intellectual capital.** Although IBM has reduced its presence in the region, the company's legacy of innovation and culture of excellence are infused in Binghamton.

Binghamton University, a flagship of the SUNY system, feeds Binghamton area employers with a constant flow of highly educated people, particularly in the electronics, engineering, aerospace, software, and healthcare industries. The pipeline of talent, combined with the research taking place at the University, plants the seeds to cultivate the growth of new companies in the region, and provides existing companies with exposure to advanced products and practices that they can use to become more competitive. The growth of the university (including an expansion to Downtown Binghamton), a good school system, quality healthcare, and the nascent economic recovery are helping to re-energize the Binghamton area.

- **Aerospace.** An aerospace cluster of industries has existed for years along the NY-17/I-86 corridor from Binghamton to Elmira. This includes helicopter manufacturing in Owego and Elmira, and simulators and avionics (aircraft control equipment) in Binghamton. Economies of agglomeration have formed in the region as firms locate near each other to take advantage of a skilled labor pool and the increased likelihood that innovations and will find their way from creative types to implementers. In addition, improvements to NY-17, part of the I-86 project, are allowing supplies and finished products to be shipped and delivered more quickly and with greater reliability throughout the corridor and to surrounding regions.

- **Food Processing and Natural Resources.** The Binghamton area has strength in food processing due to its location – at the heart of one of the country's most productive dairy producing regions and nearby many of the largest consumer markets in North America. The Binghamton area also is an excellent source of hardwoods, popular for flooring, furniture, and cabinetry throughout the world. Hardwoods are cut and dried in the region, and transported throughout the U.S. by truck and rail and as far away as Japan by ship. The demand for hardwoods has translated to moderate growth in the region's wood products industry.

- **Distribution and Logistics.** The Binghamton area's location on the edge of the Boston-Washington mega-region, but outside the congested I-95 corridor has helped grow and attract several of the largest distribution companies in the United States, as well as the logistics operations of some the country's best-known retailers. This includes the distribution of food products along the entire Eastern Seaboard and consumer electronics for the Northeast. Several of these companies have made very large investments in the Binghamton area in recent years, underlining their commitment to remain in/expand within the region in the future.

- **Availability of Water and Land.** Fueled by rising income, higher economic output, and a growing population, the Boston-Washington mega-region will become more congested over the next 25 years; and land values, already amongst the highest in the country, will continue to increase, despite some fluctuations due, for example, to the collapse of the mortgage bubble. Areas just to the west of the Boston-Washington corridor, like the Binghamton area, may benefit as industries requiring land (manufacturing, distribution, and utilities) find themselves priced out of the Boston-Washington market. In addition, other industries, including services and finance, as well as people, also may be attracted to the Binghamton area to save on costs while not

giving up on the advantages of being in proximity to large markets. The Binghamton area, as well as much of Upstate New York and Central Pennsylvania, also possesses a plentiful supply of clean water. While generally not a top site location determinant today, the availability of water may steer industry to the region in the future, especially if supplies dwindle and treatment/infrastructure costs continue to increase in the large coastal markets.

Binghamton's strengths are partially offset by several challenges, including inadequate and inconsistent air passenger and air freight services; high taxes (property and income), high energy costs, and other expenses (unemployment insurance and workers compensation) in the State of New York that make it more challenging for the Binghamton area to compete with Pennsylvania (and other locations) on the basis of cost, especially in attracting manufacturers; a key industry (aerospace) that may be overly dependant on Federal defense spending; and a scenic but problematic geography for locating large businesses and land-intensive industrial facilities.

Transportation's Link to the Economy

Although this is primarily a transportation study, the link between transportation and the economy cannot be severed. The study contains several recommendations that acknowledge the importance of the transportation system to economic development, including the following:

As noted above, the first and most important recommendation for the region is to **take advantage of unique assets and advantages that Binghamton has to offer**. Binghamton's location at a transportation crossroads near large population centers and seaports on the East Coast can help the region grow its existing aerospace, specialty electronics, food processing, and natural resources extraction industries, while luring additional warehousing and distribution activity to the region.

High income taxes, corporate taxes, and property taxes make New York State less attractive to some types of investment than neighboring states. Just as the Empire Zones program was established to provide state incentives for development in economically disadvantaged areas, **BMTS, NYSDOT and the Department of Taxation and Finance should recognize the critical value of providing tax incentives for rail investment and maintenance of existing rail infrastructure in New York State.** Property taxes on railroads in the state provide disincentives to rail investment, and, as seen in the case of the single-tracking of the NS Southern Tier line from Binghamton to Waverly and the abandonment proceedings filed by NYSW for their washed-out Utica Branch, can even lead to loss of rail infrastructure (although operational improvements accompanying the Southern Tier single-tracking are projected to improve performance of the line and result in no net loss of capacity).

The Binghamton region should target economic development in areas where transportation infrastructure exists today or where access to development sites could be

improved at relatively low cost. With the assistance of project stakeholders and BMTS staff, a list of Targeted Economic Development Zones (TEDZ) was developed. The TEDZ represent areas where the region's stakeholders expect, or plan to encourage, economic development in the future. The TEDZ that have been identified in the BMTS region represent areas with a variety of existing land uses, freight transportation infrastructure, and development or redevelopment potential. The identified TEDZ include:

- Kirkwood Industrial Park;
- Broome Corporate Park;
- The Brandywine Highway corridor just north of downtown Binghamton;
- The site of the former Anitec facility on Elm Street in Binghamton; and
- The NY-17 corridor in Tioga County.

Both the Kirkwood Industrial Park and the Broome Corporate Park are, by their official designation, already areas where economic development is encouraged. The Brandywine Highway Corridor and the Charles Street Business Park site hold potential for brownfield development on sites where transportation infrastructure already exists or could be provided at relatively low incremental cost (based on improvements already planned and/or programmed in the region's Transportation Improvement Program as part of the upgrade of NY-17 to I-86 through Binghamton). The Brandywine Highway Corridor has been designated a Brownfield Opportunity Area and received a New York State Department of Environmental Conservation grant to assess development opportunities. The NY-17 corridor in Tioga County is an existing high-capacity freight artery that requires improved linkages to adjacent or nearby development parcels, as discussed below.

The TEDZ recommendations led to several candidate highway and rail investment projects, which were evaluated in a benefit-cost analysis. The results of the analysis are presented in Chapter 5 of this report, but the following sections summarize the recommended highway and rail investments that the region should pursue.

Recommended Highway Investments

Chapters 3 and 5 discuss the current and future freight transportation system in the Binghamton region. There is little congestion in the freight transportation system today, and despite modest growth in freight flowing to, from, within, and through Binghamton, both the highway and rail systems are expected to remain largely uncongested and free of bottlenecks through the 2030 forecast year. For that reason, it is not surprising that the one candidate highway project with the most significant capacity expansion, a proposed addition of a climbing lane on I-81 southbound from Interchange 4 to Windy Hill Road, is estimated to have a benefit-cost ratio of only 0.17. In other words, every dollar invested in the project would yield 17 cents of associated public and private benefits.

A second capacity expansion project, the extension of Griswold Street to the area east of Brandywine Highway and south of I-81 and the provision of an access ramp that would eliminate the need for a circuitous routing for trucks into and out of the site, is estimated to have a benefit-cost ratio closer to 1.0, meaning a dollar of investment would yield almost equal public and private benefits. Given the uncertainties associated with the assumptions made in these cost and benefit estimates, this project may be worth additional investigation.

A third capacity expansion, the provision of an access road to the Anitec site from the planned new interchange on NY-17 (future I-86) at Prospect Street, is estimated to have a benefit-cost ratio of over 26 (equivalent to 26 dollars in benefits for every dollar of investment), assuming the site is developed with a land use and employment density similar to what currently exists at the Kirkwood Industrial Park. Other employment and land use assumptions could yield higher or lower benefits.

Other roadway projects recommended in this study are more localized in nature. BMTS should work with Norfolk Southern and NYSDOT to determine the cost and need for increasing bridge clearances for roads in the vicinity of Binghamton Yard and for roads running between Clinton and Main Streets along the Southern Tier rail line in western Binghamton. This study did not collect the detailed traffic counts required to determine how many trucks are currently affected by the bridge clearances and how many would b benefit from raising the clearances in the future. BMTS also should investigate the need for intersection improvements along Powers Road at the north end of the Broome Corporate Park and for intersection and operational improvements on NY-7 (Conklin Road) between Broome Corporate Park and downtown Binghamton to accommodate increased truck traffic that could result from growth in Broome Corporate Park. Finally, as mentioned above, NYSDOT, Tioga County, and BMTS should develop a plan for upgrading transportation infrastructure along NY-17 in coordination with planned economic development. Possible upgrades to the interchange ramps would include the addition of deceleration lanes, increasing the length of the acceleration lanes, expanding intersections to accommodate larger turn radii, etc.

Recommended Rail Investments

Two notable capacity and operational bottlenecks in the region's freight transportation system are the Binghamton and East Binghamton rail yards, where Binghamton's major rail operations converge. Of all the rail and highway projects recommended by this study, two of the three projects with the highest benefit-cost ratios involve rationalization of the Norfolk Southern (NS), Canadian Pacific (CP), and New York, Susquehanna, and Western (NYSW) rail operations through Binghamton and East Binghamton yards. Although the number of freight trains per day passing through central Binghamton (about 20 on a moderately busy day) does not seem high, a CP or NS train may take 30 minutes or more to pass through Binghamton's rail yards, depending on the length of the train and the amount of congestion ahead of the train. Meanwhile, NYSW, lacking its own through

track, regularly has trains experiencing several hours delay to pass through Binghamton as they wait for CS and NS trains to clear. Added to this, local switching operations on the limited space in Binghamton's rail yards further contribute to delays, and local movements are delayed themselves as they wait for through trains to pass.

Projects to separate NS and CP operations at Binghamton Yard and provide through tracks at East Binghamton Yard were frequently mentioned by rail stakeholders as recommended projects. The Binghamton Yard project, estimated at $1.43 million, and the reconstruction of East Binghamton Yard, an estimated $4.265 million project, both are estimated to predominately benefit the private sector in the form of lower inventory costs for area businesses (as shipments become more reliable and take less time) and lower labor and equipment costs for rail service operators. Much larger benefits are estimated to accrue to businesses outside the study area, and there is a risk that the investment may actually cause some disbenefit to the Binghamton region in the form of social and environmental impacts caused by an increase in through rail freight traffic. Benefits from additional through traffic may accrue to the region through increased Binghamton area rail industry employment, and additional expenditures and income as a result of local purchases and multiplier effects.

Therefore, while some public investment may be justified for these improvements, NYSDOT and BMTS should work with rail operators in the region to form a public-private financing plan that takes into account both public and private benefits and takes advantage of Federal and state funding that may be available for the projects.

Recommended Regional Freight Strategies

To improve freight operations and encourage smart economic development in the region, several small MPOs around the country have undertaken initiatives to better integrate freight into their planning processes and implement cost-effective freight transportation strategies. Chapter 6 of the report contained a multitude of recommendations related to these broad strategies. Some of these recommendations may be considered "low hanging fruit" that could be accomplished at relatively low cost and with relatively little controversy. In the short term, BMTS should:

- **Continue to integrate freight into the BMTS planning and programming processes.** The freight planning tools and techniques used by BMTS already are more advanced than those used by most MPOs in the U.S. BMTS should continue to provide opportunities for freight stakeholders to be involved in planning for specific projects and should provide opportunities for them to be involved in broader transportation planning and programming decisions. BMTS also should begin to integrate freight performance measures into its prioritization and project selection criteria for both passenger-oriented projects that might have substantial freight benefits (e.g., the Prospect Mountain Interchange reconstruction or proposed new passenger rail service

from New York City via Scranton using improved freight rail tracks) and for projects primarily oriented towards freight.

- **Encourage private-sector participation in economic development and freight planning decisions.** BMTS should identify contacts at key freight shippers and receivers, for example, and involve them in major planning studies and visioning efforts;

- **Take immediate steps to preserve the regional rail system and rail service to businesses throughout the region.** BMTS should work quickly to build consensus around the segments of track that are most important to the region's economy and prioritize these tracks for maintenance and capacity funding, using existing and new funding sources.

- **Encourage currently-proposed investments in private rail infrastructure** that would benefit the Binghamton region and encourage growth in rail market share, and work with rail operators in the region to secure funding for necessary improvements;

- **Improve the dissemination of information to truck drivers and truck fleet dispatchers,** including information about transportation infrastructure conditions and incidents, to help truck drivers make informed decisions about routing their trips through and around the Binghamton region;

- **Implement regional wayfinding improvements**, including signage and improvements to base maps used by GPS service providers to direct truck drivers to travel routes where geometric constraints and truck impacts on sensitive locations should be avoided; and

- **Increase truck parking capacity** at public and private rest areas in appropriate locations on and off the Interstate system and use available truck parking spaces more efficiently.

Other regional freight strategies may be more costly or may require more extensive consensus building among stakeholders. In the long term, BMTS should work with NYSDOT, transportation system operators, and other stakeholders to:

- Improve the collection and reporting of freight data on local, state and Interstate highways;

- Identify previously unexploited freight funding sources and freight financing techniques and build on the region's successes in acquiring needed rail funding;

- Determine where high levels of rail and/or roadway traffic require safety improvements at rail grade crossings and/or elimination of those crossings with high accident rates;

- Maintain the security of regional freight transportation infrastructure;

- Provide climbing and passing lanes at appropriate locations on two-lane rural roads to help prevent head-on collisions due to passing traffic;

- Identify a local truck route network and install appropriate and legal signage on local roadways to direct trucks onto roadways designed to accommodate them;

- Encourage construction of rail sidings additional small bulk transfer facilities regionwide to increase local access to rail service;

- Negotiate more frequent and more reliable interchanges of rail cars between the region's short lines and Class I operators to shorten delivery times by rail and make rail shipments more competitive with truck shipments;

- Encourage growth in rail market share by continuing to support private rail investments and providing incentives, where appropriate, to help businesses overcome obstacles to using freight rail services to ship goods;

- Develop a mechanism for quickly sharing information about alternate routes and diversions due to highway closures and other incidents directly with dispatchers for national truck fleet operators, post the maps on its website, and transmit the maps to NYSDOT, the I-95 Corridor Coalition, and other transportation information clearinghouses so that information can get to truckers as quickly as possible;

- Encourage implementation of Commercial Vehicle Infrastructure Integration (CVII) initiatives in the region;

- Help implement freight emissions reduction and fuel efficiency initiatives being led by the New York State Energy Research and Development Authority (NYSERDA), the Federal Highway Administration (FHWA) and the U.S. Environmental Protection Agency (EPA);

- Study the need for and feasibility of truck-only lanes in the context of future industrial development in the BMTS region, long-term projections of growth in truck trips through the region, and changes in freight movement technologies;

- Develop "best practices" guidelines for large-scale commercial and industrial development, potentially including a model municipal ordinance for jurisdictions where truck- or rail-oriented industrial development is to be encouraged; and

- Develop subregional plans for industrial growth in desired growth areas such as the area around Broome Corporate Park and the NY-17 Corridor in Tioga County, including desirable locations where land should be preserved for commercial and industrial development (as opposed to farming, housing, retail, open space, or other uses).

By undertaking this study, BMTS has already taken positive steps toward integrating freight into its planning process in a sustainable way. While this study is based on certain economic assumptions and conditions that will change over time, the foundational

principles of the study—that the region's economic development and its transportation system are inextricably linked and that transportation investments should be tools to support planned regional economic development strategies (as opposed to reactions to unplanned development)—will remain constant.

Many of the decisions to be made by BMTS and its partners can be supported by the data and forecasts in this report, but ultimately investment decisions must be driven by the region's policies and through a transparent open, consensus-driven decision-making process that takes into account many factors not considered here, such as environmental impacts and social impacts of transportation investments. This plan is one piece of a multi-dimensional framework that will guide future BMTS decisions.

Appendix A

Detailed Freight Forecast Methodology

Detailed Freight Forecast Methodology

TRANSEARCH Database

Global Insight's underlying freight forecasting models used in the NYSDOT and Binghamton freight forecasts are built from business transactions and demographics at the county and industry level. The Global Insight forecast of freight transportation is specifically a depiction of freight, and not a general economic projection.

While modal detail also follow the base year, the projection of traffic growth is mode neutral. This means that carrier market shares rise or fall according to the differential growth rates of their current traffic base; explicit projections of mode diversion are left as a matter for independent analysis. Finally, the forecasts are extended to infrastructure demand through routed flow volumes.

The baseline freight forecasts were developed using comprehensive economic data and Global Insight projections of exogenous macroeconomic variables such as industrial production and employment.

Business Demographics Model

The econometric foundation of the freight flow forecast is Global Insight's Business Demographics Model, which provides a complete and detailed view of business conditions throughout the United States. Designed to support strategic planning, market segmentation, and economic development, this model presents both historical and forecast data for every county in the United States and industry classifications. Key variables included in this database are employment, number of establishments, and output, and it utilizes industry groupings based on the North American Industry Classification System (NAICS). Inter-industry purchases are defined through the Business Transactions Matrix, which the model uses to capture the relationships and commercial activity between businesses.

The county-level business demographic series are developed using current and historical data, as well as economic modeling techniques. This process enhances economic analysis in two important ways. First, it utilizes all current data and information to accurately estimate the current location of employment, establishments, and output. Second, it defines the relationships between each variable and the appropriate economic, cyclical, and migratory factors that cause their movements over time.

Forecast Approach

The model estimation process incorporates the effects of the business cycle on employment trends and, therefore, yields much more accurate forecasts at the county level and above. The estimated relationships are used to develop estimates for the current year and forecasts that reflect Global Insight's widely used regional, state, and county economic forecasts.

Forecasts at the county level and above are based on information that is updated quarterly in the context of Global Insight's international network of large-scale economic models. This accurately depicts changes in worldwide, domestic, state, and local economic activity. In this context, the estimates and forecasts account for changes in international, national, state, and local economic conditions and not merely the trends embodied in past censuses.

Global Insight's approach to county, state, and national demographic forecasting models represents a significant departure from previous detailed-geography modeling and forecasting efforts, which use only classical demographic modeling techniques. Most other models are constructed as extrapolated trends of the decennial census data and proportions of the U.S. totals. In the Global Insight system, however, each area is modeled both individually and linked to its respective county, metropolitan area, state, and national modeling system. Thus, the models do not forecast local and regional growth as simple trends and proportions of U.S. totals, but focus on internal economic growth dynamics, differential business cycle responses, and variable migration patterns. This approach is referred to as a top-down bottom-up model, contrasting sharply with pure national/regional share (top-down) models and models that are not linked to national/ regional economic models (bottom-up). It contains the best of both approaches.

The basis objective is to forecast local/regional activity in the context of a reliable, consistent, comprehensive, and detailed economic environment provided by Global Insight's U.S. Economic, Industry Analysis, and Regional Forecasting Models. To do this, two key phenomena must be explained:

1. Why local economic and demographic factors behave differently across geographic areas in the short term over the business cycle; and

2. Why local economic and demographic factors grow or decline relative to each other across geographic areas over the longer run.

These issues are addressed using detailed, consistent data and information about the local industrial mix, inter-industry and interregional relationships, productivity and relative business costs, cost of living and quality of life, purchases, wage and income patterns, and migration trends.

The state, Metropolitan Statistical Area (MSA), and county models are econometric in nature, incorporating underlying behavioral relationships between such concepts as income and jobs, population and jobs, household formation and housing starts, migration trends and life-cycle realities, and total wealth and types of income. The linkages at all

levels to local behavioral factors and regional/national/global economic factors lead to greater accuracy and complete consistency. Consequently, each model captures the full business-cycle behavior of the economy, including the timing and amplitude of the turning points, reflecting the disparities that exist across states, counties, and local areas.

The three major components of the Global Insight approach to regional, state, MSA, and county geo-demographic forecasting are summarized below.

1. The major linkages among the models across geographic areas and at different levels of aggregation occur in the economic base or export sectors. (Export refers not only to shipments out of the country, but also shipments from the state or locality to other parts of the country.) These include primarily agriculture, mining, the Federal government, and most manufacturing industries. In a few local economies, banking, insurance, or services (e.g., hotels) sectors are also classified as export sectors. For the most part, these industries serve national and international rather than local markets, or are not dependent upon the local market. On the other hand, the business transactions and income generated from these sectors provides one of the major stimuli to the local economy. The local growth and income generated from these sectors helps determine the economic health of the area and its attractiveness to individuals, families, and households.

2. The local economy is composed of construction, transportation, utilities, communications, finance, insurance, real estate, wholesale and retail trade, services, and state and local government. The major driving forces in this part of each area's economy are local in nature. The income generated by the export sectors circulates and multiplies through local economic transactions and generates the greater part of regional employment. These interactions and simultaneities can only be captured in an independent model. These factors further characterize economic activity and affect migration decisions of individuals, families, and households.

3. In the demographic sector, net migration is driven by economic conditions. The principal assumption here is that people follow jobs and higher incomes rather than vice versa. This does not mean that nonpecuniary determinants of migration do not exist. However, these are fixed (climate and landscape), vary only slowly (urbanization and life-cycle factors), or are special in nature (the ability to sell homes and retire to Sunbelt areas). Demographic factors significantly impact the consumption side of the regional, state, and local economy as well as housing, retail sales, autos, personal services, education, and healthcare. Population, number of households, income, and wealth are also important long-term determinants of the size of such sectors as state and local government.

These models combine the best of available data on trends with Global Insight's model-based economic outlook. The data is then used to analyze particular markets and anticipate shifts in demand. This feeds in turn into the projections for freight activity, and allows marketing and investment strategies to be developed on a foundation of sound data and accurate forecasts.

Because the Trade Overview Study with New York State is not yet under contract, and therefore has not yet been prepared, forecasts constructed for the Binghamton Regional Freight Study do not have the advantage of using data and forecasts developed for the Trade Overview Study, as originally planned.

Comparison of Forecast Results with BMTS Forecasts

The BMTS Long-Range Plan, prepared in 2005 with a 25-year forecast, provides household and employment projections for Municipalities and Transportation Analysis Zones by sector. These forecasts, built with local perspective are useful to compare to drivers used in the Binghamton freight forecasts prepared by Global Insight. Additionally, expected industrial shifts between Broome and Tioga Counties are used for further comparisons with the Binghamton freight forecasts.[1]

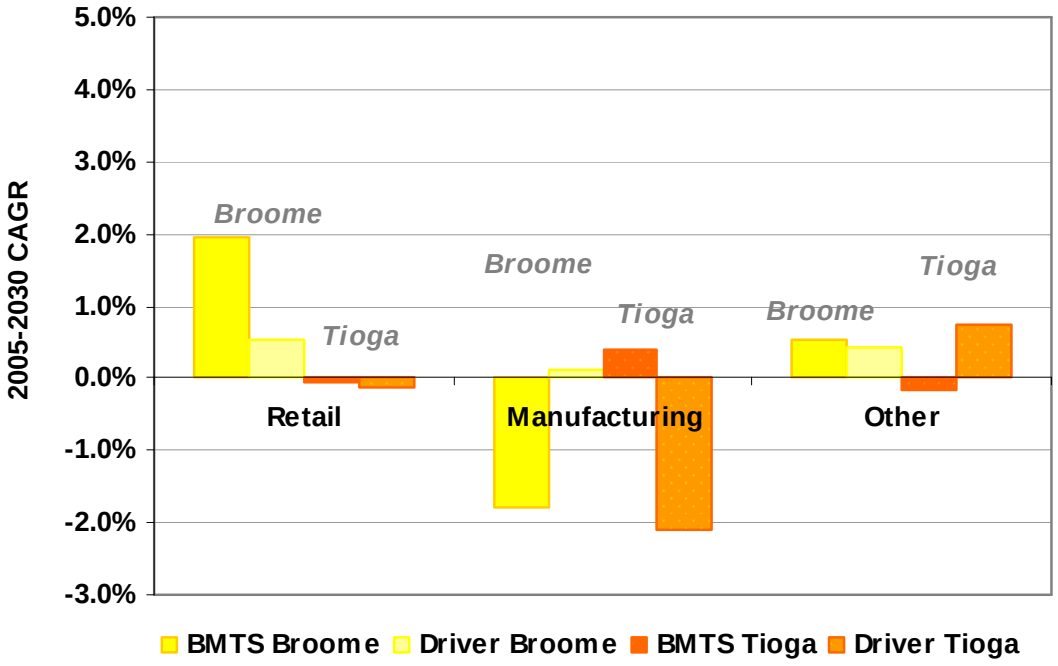
Figure A.1 illustrates projected growth in BMTS employment data relative to freight forecast employment (used in the freight forecast) for comparable sectors. Similarly, because the freight forecasts do not reflect health and education except as modest contributors to freight tonnage, BMTS data for this sector is not included here. Because the freight forecast drivers are available only by county, Global Insight aggregated the detailed TAZ detail received by BMTS into Broome and Tioga Counties.

The "other" category is assumed to capture all employment and traffic outside of manufacturing and retail sectors. Specifically, "other" in BMTS is expected to grow annually at 0.4 percent between 2005 and 2030 while the Global Insight freight forecast driver is expected to grow at 0.5 percent over the same period. The forecasts differ on which county sees the most growth. BMTS expects employment declines in Tioga relative to Broome and Global Insight anticipates 0.7 percent annual growth in Tioga and 0.4 percent in Broome between 2005 and 2030.

Regarding manufacturing employment, both forecasts indicate declining growth from 2005 to 2030 for Binghamton with BMTS indicating declines of -1.2 percent and Global Insight anticipating declines of -0.1 percent annually. The forecasts differ on which county experiences the largest decline in growth. BMTS anticipates the decline to come from Broome County at -1.8 percent (CAGR) while Tioga grows at 0.4 percent. Conversely, Global Insight sees a stronger decline (-2.1 percent) in Tioga County with slight growth in Broome.

[1] Because BMTS data were only provided for 2005 and 2030, these years will be used to compare BMTS with the freight forecast drivers.

Figure A.1 BMTS Employment Data versus Global Insight Employment Forecast



Source: Global Insight New York State Economic Forecast.

Global Insight's retail employment forecasts are more in line with projections from BMTS. Both forecasts show declines in retail sector employment of -0.1 percent for Tioga County. Global Insight sees retail employment growing at 0.5 percent while BMTS sees Broome County growth a bit stronger, at 1.9 percent from 2005 to 2030.

Despite differences seen here between Global Insight and BMTS employment forecasts, the freight forecasts remain viable because employment serves as only one of many freight forecast drivers. Ultimately, the differences in the two employment forecasts suggest that BMTS may derive a somewhat lower outbound tonnage forecast for Broome County relative to Tioga than what is produced by Global Insight.

An interesting application of the BMTS land use forecasts are employment shifts between Broome and Tioga Counties expected over the next 25 years. For this comparison we look directly to the Binghamton freight forecasts. Because BMTS measures employment while the freight forecasts measure tonnage, the comparisons between BMTS and the freight forecasts will focus on the relative shares held by Broome and Tioga Counties and anticipated sector growth.

Table A.1 displays the share of industry held by Broome and Tioga Counties now and over the forecast, as measured by BMTS (employment) and in the Global Insight freight forecast (truck tons).

Table A.1 Share of Industry in Broome and Tioga Counties in 2005 versus 2030

Comparing BMTS Employment Data to Global Insight Freight Forecast

Sector	Forecast	County	2005	2030	CAGR
Retail	BMTS (Employment)	Broome	93.2%	95.8%	1.9%
		Tioga	6.8%	4.2%	-0.1%
	Global Insight (Truck Tonnage)	Broome	82.8%	78.6%	3.8%
		Tioga	17.2%	21.4%	4.9%
Manufacturing	BMTS (Employment)	Broome	79.3%	69.0%	-1.8%
		Tioga	20.7%	31.0%	0.4%
	Global Insight (Truck Tonnage)	Broome	62.4%	56.3%	1.8%
		Tioga	37.6%	43.7%	2.8%

Source: Global Insight.

In both forecasts, retail activity is expected to be concentrated in Broome County, and while BMTS anticipates employment growing at less than 2 percent annually in Broome, freight tonnage estimates[2] are more optimistic at nearly 4 percent annual growth in both Broome and Tioga Counties. However, it is important to note that BMTS and the Global Insight freight forecasts are measuring different indicators. Here, BMTS measures retail sector employment where the Global Insight freight forecast measures outbound tonnage from warehouses and distribution centers, which can serve as a proxy for retail activity.

Manufacturing forecasts from BMTS and the freight forecast also show similar splits between Broome and Tioga Counties and although the shares between counties are not exact between the two forecasts, both indicate relative growth in Tioga County by 2030.

It is important to note that measuring physical volume will inevitably result in a slightly different county picture than employment as physically volumes reflect the underlying industrial mix. Furthermore, higher volumes may correspond with lower employment in for instance, particularly efficient manufacturing sectors. Ultimately, while precise growth rates may differ, both BMTS and Global Insight expect some manufacturing output to shift from Broome to Tioga County.

[2] Freight tonnage in the retail sector is estimated as outbound warehouse and distribution sector activity.

Appendix B

Benefit/Cost Methodology

Benefit/Cost Methodology

Highway Project Benefit Estimation Using VISUM

The BMTS VISUM travel demand model consists of a peak-hour network and total vehicle p.m. peak-hour trip table. In order to calculate the daily auto and truck VHT and VMT benefits for projects that would be analyzed by VISUM, it was necessary to create a daily auto and truck trip table and procedures to assign these trips to a daily network.

The BMTS VISUM model includes an All Vehicle trip table from covering the hour from 4:00 to 5:00 p.m. The use of that trip table to create a daily trip table had been described previously (Dan Beagan, March 20, 2008, *BMTS Travel Demand Model – Creating A Daily Trip Table*). That daily trip table serves as the seed table for a Fratar Iterative Proportional Fitting process. The Fratar factors were daily truck trip origins and destinations as calculated from BMTS TAZ socioeconomic data and the 1996 Quick Response Manual as described previously (Beagan, March 19, 2008, *Development of BTMTS Daily Truck Table*).

The future year table truck table was created by factoring the 2005 Daily Truck Table, the assignment of which had been previously reviewed and determined to be acceptable by BMTS for estimating freight project benefits. The internal-internal (I-I) trucks were factored by the ratio of the 2028 and 2005 peak-hour tables provided by BMTS by multiplying the cells of the 2005 Daily Truck Table by a factor that is the 2028 p.m. O-D All vehicles divided by the 2005 p.m. O-D All vehicles for the same cell of the truck table.

The external-internal (X-I), internal-external (I-X), and external-external (X-X) truck trips were factored based on the ratio of a selected zone analysis of the TRANSEARCH table of the tons moving through these external stations in the forecast year of 2030 to the tons in the base year of 2004, summed over all commodities. In the event that there were no trips in the TRANSEARCH table between and a BMTS station as an origin and a BMTS station as a destination, a growth factor similar to the I-I trips was used, that being the ratio of the BMTS all vehicle 2028 and 2005 all vehicle table.

The I-I growth is from 2005 to 2028 and the growth of EE/IE/EI is from 2004 to 2030, but given the nature of the other assumptions in this analysis, it is believed that adjusting the growth rates for these minor differences in years is not appropriate.

A 2005 Daily Auto table was created by subtracting the 2005 Daily Truck Table form the 2005 Daily Total Vehicle Table, both described previously, based on the fact that total vehicles is equal to autos plus trucks. That 2005 Daily Auto Table was factored to 2028 using the same methods described for the I-I trucks applied also to the X-I, I-X, and X-X

trips, since the auto trucks were not part of the freight forecast and should grow at the rate calculated by BMTS for all vehicles during the p.m. peak hour.

The daily assignment was made using the VISUM peak-hour capacities, typical default methods previously used for daily models. The daily assignment was a multiclass assignment of the daily truck and auto trip tables to allow their performance and volumes to be reported separately. The daily capacity was calculated by applying a factor of 10 times the hourly capacity on each link (e.g., TRANPLAN achieved this functionality through use of the CONFAC, whose default value was 10).

Highway Project 1 – Truck Climbing Lane on Interstate 81/Route NY 17 Southbound from Interchange 4 to Windy Hill Road Overpass

The functionality of a truck-climbing lane would be to add more capacity in a place where the Passenger Car Equivalent (PCE) for trucks would be greater than the typical rolling terrain. VISUM allows for a single PCE (called PCU for Passenger Car Unit in VISUM) to be used for all trucks everywhere. It is a constant applied to the truck trip table. VISUM does not allow PCEs to be changed on specific links. The existing coding for this link in the BMTS model is 1,900 vehicles per lane per hour, which clearly does not consider a lower capacity for trucks. CS has included terrain in travel demand models, and different PCEs by terrain by modifying the PCE for trucks used in calculating the volume going into the Vehicle Delay Function. However, there are no terrain codes for **all** links in the BMTS and the link capacities are **vehicle** capacities in the BMTS model not **the passenger** car capacities that would be needed so while this is the correct way to do it, an alternative approach was employed. In order to model the impact of this the capacity of these links were lower to reflect the extra impedance of trucks in a NoBuild network for Alternative Project 1 and to model the impact of adding a fourth lane with that same lower capacity.

The BMTS model codes this link's *vehicle* capacity at 1,900 per lane per hour. I-81 typically carries approximately 80 percent auto and 20 percent trucks on a daily basis. Given a standard freeway *Passenger Car* capacity of 2,200 per lane per hour, this equates to an effective PCE of 1.8. Given that the new truck table is a mix of heavy and medium trucks, and given standard default PCEs of 1.5 for medium trucks and 2.0 for heavy trucks, an effective PCE of 1.8 appears reasonable. It is proposed that a PCE of 4.0 be assumed for the mountainous terrain on I-81. That equates to a capacity of 1,400 vehicles per lane per hour for the link where the truck-climbing lane is proposed. Three lanes exist uphill in the NoBuild and four lanes will be coded in the Build VISUM with a PCU (i.e., PCE) of 1.8 elsewhere.

Highway Project 2 – Extension of Prospect Street Connector to Anitec Site

The Anitec site was identified as TAZ 49 of the BMTS model network, which has approximately the same trips in both the 2005 and 2028 trip tables. CS identified TAZ 94, the Kirkwood Industrial Park as a similar zone to the Anitec development. The developable land at the Anitec site is 22 acres compared to 270 developed acres in the

Kirkwood TAZ, which equates to a factor of 0.08. Using the trip table's row and column for TAZ 94, those trips were factored and added to the existing row and column mostly residential trips in TAZ 49. This factored trip table will be used for the Build and NoBuild of this Anitec project, since the project benefits will apply only to the new connector roadway. The NoBuild network will also include the half diamond interchange on I-81 at Prospect Street, which is in NYSDOT's program but not in the BMTS model. We will add the half diamond with connection to Prospect Street as a NoBuild for the Anitec network. The Alternative 2 Build project will be a connector from Prospect Street into the Anitec site.

Highway Project 3 – Interchange and Intersection Improvements on Brandywine Highway at Bevier Street and Frederick Street

The Prospect Mountain Interchange does not exist in the BMTS model. The schematics for Alternative D7D were used to develop diamond ramps with a signal to replace the existing cloverleaf ramps on the south side of the interchange. This network with the new interchange will be the Alternative Project 3 NoBuild network. The Alternative Project 3 Build network will include this interchange and the existing turning movement restrictions at Frederick Street. It will also include a connector road from the new I-81 Southbound diamond on-ramp to Griswold Street extended. The Griswold Street extension to Frederick is already in the BMTS model, but that link is functionally closed to traffic by VISUM. The Build alternative will open that link to all traffic.

A file containing the VISUM version files for the NoBuild and Build models for each of these projects is being prepared and will be delivered separately to BMTS.

Rail Project Benefit Estimation Methodology

The estimation methodology for rail projects contains three different components: Benefits for existing traffic, induced traffic, and the traffic through the planned intermodal terminal.

Existing Rail Traffic

Carrier savings consisting of reduced shipping time (crew cost), equipment cost and fuel cost. The main component of this benefit will likely be the time savings as a result of the investment. It will be critical to gather information or develop reasonable assumptions about the expected time reductions. The number of hours saved can be turned into monetary estimates by using established values of time-based operating and equipment costs using available industry rules of thumb.

Shipper savings primarily consist of reliability benefits and reduced inventory costs:

- *Reliability benefits* are based on the notion that improved travel conditions reduces the uncertainty of delays and therefore the buffer time that needs to be built in for the majority of shipments to arrive on time. The time saved from improved reliability can be monetized by using standard value of time assumptions.

- *Inventory costs* will be reduced if travel times improve as a result of an investment. In order to estimate these benefits, the commodity volume, mix, and typical commodity value needs to be known. Volume and commodity mix can be derived from the STB Private Waybill Sample or railroad supplied data, and commodity value can be obtained from public and proprietary sources.

Additionally, transportation charges could fall as a result of carrier cost reductions. These savings may be passed on to shippers but one needs to be careful to not double-count any potential benefits that accrue overall just because of their respective allocation.

Induced Rail Traffic

Reducing the transportation costs for rail traffic may attract additional traffic currently using other modes, or induce new traffic through the improved competitiveness of shippers that have access to the service.

Truck traffic that may be diverted onto rail which has several cost implications:

- **Congestion and delay** may possibly be lower because of the reduced number of trucks on highways and roads. These benefits can be measured by estimating VHT reductions and monetizing those by use of standard assumptions for the value of time.

- Less truck traffic may also affect **operating costs and environmental costs** for remaining users of highways. Again, such cost reductions can be estimated and monetized by use of VMT and VHT estimates and values of time and unit costs of pollution, etc.

- Likewise, increased rail traffic will have collateral environmental effects on abutters, through increased noise, pollution, disruptions at grade crossings, trespassing injuries/ fatalities, etc.

Intermodal Facility and/or Inland Port

The benefit of building an intermodal facility and/or inland port is based on logistics cost reductions created by the use of the terminal. Essentially, the benefits calculation compares the use of trucks versus rail and monetizes the net difference in cost in order to develop an overall estimate of the benefit. In this context, it will be important to consider the appropriate service territory for such a facility, i.e., what is the level of competition,

and what markets are being served. Benefits would only accrue for supply chains that generate lower transportation costs by going through the Binghamton area.

Potentially CS' recent work for Centerpoint and their intermodal terminal in Joliet, Illinois may be an appropriate point of reference.

Other Issues

Private versus Public Benefits

Most of the benefits stated above are private (user and non-user) benefits. However, as a result of these private benefits, there may be larger economic impacts (output, income, employment) that are generated for the region. These public benefits may be estimated by using general I-O multipliers and assumptions based on the recent TREDIS runs for the ADHS. The benefits estimation needs to be careful to not double count the private benefits and generated public benefits.

The allocation of benefits needs to take into consideration to what extent firms are local to the area and traffic either originates or terminates in the Binghamton region. Through traffic will affect the benefit calculation less as the recipients of the benefits may be external to the study area (except for users and non-users that now enjoy less delay and congestion); the impacts of additional through traffic (pollution, noise, etc.) could indeed outweigh the benefits such as employment, etc., to the region from the increased activity.

In regard to capacity improvements, it is important to consider how close the rail system currently operates at its capacity limits. At some volume level, service will deteriorate to the point where additional traffic will divert onto trucks. Investments therefore need to be looked at in terms of their ability to support traffic growth in addition to simply serving existing business volumes.

Possible required data and data sources may include:

- STB Waybill data;
- Commodity mix (attributes, tonnage, volume cost);
- Traffic volume by line segment; and
- Estimates of travel time savings and logistics effects as a result of investments.

Appendix C

Stakeholder Outreach

Stakeholder and Industry Outreach

The project team engaged in an outreach effort in order to receive input and cooperation from local freight transportation stakeholders. Stakeholders participating in this study represented state and local public sector agencies, and private shippers and carriers such as Class I and short line railroads and trucking companies. Stakeholder meetings were held at the Broome County Office Building or the New York State Office Building in central Binghamton. Table C.1 presents the stakeholder meeting dates and locations, and Table C.2 presents stakeholders who participated in the outreach process.

Table C.1 Participating Stakeholders

Government Agencies	Highway Stakeholders	Rail Stakeholders
BMTS	Nealan Transportation	New York Susquehanna & Western Railroad
NYSDOT Region 9	National Pipe and Plastics	Norfolk Southern Corporation
NYSDOT Freight and Economic Development Division		
Broome County Economic Development		
Tioga County Dept. of Economic Development and Planning		
Office of New York State Assemblyman Cliff Crouch		
Office of New York State Assemblywoman Donna Lupardo		

Additional support and information was provided during the interview process described in Section 4 of the report. Table C.2 below identifies the companies which participated in the interview process.

Table C.2 Interview Participants

Company or Division Name	Interview Date
Best Buy Distribution	June 28, 2007
Canadian Pacific Railway	June 27, 2007
Central Transport	May 18, 2007
Conway Freight Central	May 17, 2007
FedEx Freight	May 31, 2007
Herlihy Trucking	May 30, 2007
Lockheed Martin	June 27, 2007
Maine Paper and Food Service, Inc.	May 30, 2007
New England Motor Freight	May 18, 2007
NYS&W Railroad	May 31, 2007
Our Lady of Lourdes Hospital	June 27, 2007
PTG Logistics	
Roadway Express	May 17, 2007
United Health Services	June 28, 2007
UPS Ground Freight	May 31, 2007

August 22, 2007 Stakeholder Meeting

The first stakeholder meeting was held on August 22, 2007. The purpose of this meeting was to introduce the study to the stakeholders. The findings of the initial steps of the study were discussed, including national freight trends, regional freight forecasts, and the outcome of interviews with local shippers.

November 28, 2007 Presentation to the BMTS Policy Committee and Planning Committee

On November 28, 2007, the CS Team presented a project status update to the BMTS Policy Committee and Planning Committee. The presentation provided an overview of existing conditions, freight forecasts, and major issues facing the rail and highway freight

transportation systems. Members of the two BMTS committees supplied questions to the CS Team. Responses to the questions were submitted to BMTS. The questions and responses are included below:

Question 1. The presentation showed that there are a lot of challenges, and also a lot of opportunities. It is surprising that growth in truck traffic is expected to be so high, given the current high and rising costs of diesel fuel. Would there not be more of a shift to rail as a result?

Response: Yes, any increase in the cost of fuel would impact the way in which freight moves in the region. However, the impact would be limited because most of the freight moving in Binghamton cannot be moved efficiently by rail, regardless of fuel price. Truck transport is the most suitable mode for many of the commodity types that are traveling through the region (higher-value, time-sensitive goods such as electronic components used in just-in-time manufacturing processes). With such a heavy emphasis on just-in-time logistics for manufacturing and distribution, trucks can move these goods between ports of entry and markets faster and more reliably than rail. This speed gives greater value to truck transport.

Question 2. Is there a possibility that an intermodal facility could be constructed in Binghamton to improve accessibility to the region's rail assets? Approximately 10 years ago rumors circulated regarding such a possibility. Could it still happen?

Response: Stakeholders and industry representatives have mentioned repeatedly that such a facility is lacking in the region, and perhaps local industries could benefit from one. NYSDOT studied the feasibility of a facility in the Binghamton area, and according to the railroad industry, there is not enough demand in the area currently. This is a bit of a chicken-or-the-egg situation, however, because a facility could induce demand.

Question 3. Are inland ports an option in this region? There is one being developed in the Raleigh, North Carolina area that is entrepreneurial in nature, rather than demand-driven. Could a similar approach be taken if this concept were to take off here?

Response: That is a possibility. The Port Authority of New York and New Jersey is actively seeking opportunities for inland ports due to congestion in the seaport areas and limited on-dock storage space for intermodal containers. The NYS&W line southeast of Binghamton has clearance for double-stack trains from Binghamton to Port Jervis and into northern New Jersey, which could accommodate intermodal rail shipments from Port Newark and Port Elizabeth to Binghamton and beyond.

Comment: The presentation showed pavement quality on state highways in the region, and it appeared quite troubling. In addition, municipal departments are faced with pavement and bridge conditions that are just as worrisome. At the same time we are faced with rising cost of pavement materials, such as concrete and the oil used in asphalt, and higher off-peak evening and weekend labor costs for resurfacing work (compared to daytime labor costs), we have budget shortages for maintenance activities.

April 15, 2008 Stakeholder Meeting

The CS Team presented the progress to date of this study, reviewing the data collection process, findings, and explored the issues affecting highway and rail modes and access to future development sites. A needs assessment for highway and rail systems was performed to identify areas where improvements are necessary. A preliminary list of Targeted Economic Development Zones (TEDZ) was presented to the stakeholders.

Highway System Needs Assessment

- A concern was raised about the increasing use of 53-foot trailers industry-wide. Customers demand these larger, more efficient vehicles, yet many roads in the BMTS region cannot accommodate them. Posted restrictions on U.S. 11 in Kirkwood and Conklin were cited as an example.

- Whether or not the enhancement of roads off the major highway system is a priority was asked. The response given was that the locations where such physical constraints exist must be made known. Additionally, NYSDOT's Special Dimensional Vehicle GIS data may reveal some routes where 53-foot trailers are not permitted.

- Low bridges are another issue truck drivers encounter in the region. Longer trailers are being pulled by taller trucks, which cannot pass underneath many bridges, including rail bridges. The problems associated with raising rail bridges were discussed, as well as problems related to undercutting roadways.

- Where greenfield developments, which will require supporting infrastructure, are likely to occur should be identified. Possible locations include Western and Northern Broome Counties as well as Tioga County north of NY 17.

Rail System Needs Assessment

- Issues related to the rail system needs were also discussed. It was discovered that, contrary to data displayed in the presentation, the NYS&W spur to Syracuse is cleared for 286,000-pound cars.

- The "institutional and regulatory issues" that the presentation referred to were discussed in greater detail. According to rail operators, short line and Class I railroads are faced with the following issues and opportunities:

    1. Shortline railroads are finding it difficult to make money transporting intermodal containers due to the low volumes (at the level of each individual shortline) and the relatively complex handling required to properly route these containers from their origins to their destinations.

2. Making improvements that increase travel speeds from Buffalo to New York City would help promote the use of Norfolk Southern's Southern Tier Line as an alternative to the CSX main line from Buffalo to New York City.
3. Without eminent domain capability, railroads find it difficult to make improvements outside their existing rights-of-way.
4. There is a need to develop a reliable revenue stream dedicated to railroads that could be used for infrastructure improvements.
5. Rail firms oppose re-regulation and would prefer to maintain the ability to set rates at what the market will bear.
6. HAZMAT shipments are low-revenue, high-risk shipments, but rail firms are now required to conduct safety analyses and sometimes route these shipments over longer distances to avoid population centers.
7. Rail firms would like to find an appropriate balance between fuel efficiency and performance when buying new locomotives, but recently they have been feeling pressure to emphasize emissions reduction at the expense of performance and fuel efficiency.
8. New York State's high property taxes put communities like Binghamton at a disadvantage when it comes to rail infrastructure improvements. Rail firms are more likely to invest where their improvements will be subject to lower taxes, all other things being equal.

- Rail firms suggested that there is not enough demand for an intermodal terminal in Binghamton. Albany and Syracuse are close enough that a single driver can make two round trips per day, which is a relatively inexpensive way for Binghamton businesses to access the rail system. An intermodal yard in Binghamton could add another stop and slow the service of through trains. Sufficient demand would have to be demonstrated before interest in adding a service stop at East Binghamton Yard could be seriously considered by Class I railroads. Short lines are less capable of handling intermodal containers than Class Is.

- A point was made that rail issues tend not to be local issues. The source of problems and potential benefits that could be reaped if they are resolved, may be discovered if one takes a broad, regional view. For example the replacement of Portage Bridge near Buffalo could create an opportunity to send more freight west from Binghamton rather than north through Syracuse. (However, the replacement of the Portage Bridge was not seen as a capacity expansion project, but rather a maintenance project.)

- Finally, it was noted that since several Class I railroads operate through the BMTS region and adjacent regions, there are many options for shippers and increased competition, which drives down rail shipping rates. This type of competition is rare for a community the size of the BMTS region.

Additional Remarks

- Attention was brought to the high share of freight moving THROUGH the BMTS region. When asked if this share is this typical? Have other areas found innovative ways to deal with that? Brian: The Interstates here are the reason so much goes through.

- The more freight that grounds in an area, the more econ development happens, but Binghamton is primarily a through point. The NS Southern Tier Line serves primarily as competition to the CSX line from Chicago-Buffalo-Boston.

June 10, 2008 Stakeholder Meeting

The third stakeholder meeting occurred on June 10, 2008 in the New York State Office Building. The CS Team began the meeting with a presentation on tasks completed since the April meeting. Included in those tasks were the refinement of the list of Targeted Economic Development Zones (TEDZ), the continuation of the needs assessment to identify transportation improvement needs pertinent to the TEDZ, and the drafting of a preliminary list of highway projects, rail projects and supporting strategies. Upon the conclusion of the presentation, stakeholders identified additional potential TEDZ and offered comments on the preliminary list of projects and strategies. The comments are summarized below.

Comments on Highway Projects and Issues

- Broome Corporate Park may see additional development in the future. The Town of Conklin may have plans available for improvements to Carlin Road.

- Rail issues of importance include providing additional Intermodal capability and the removal impediments that limit operations at Binghamton Yard.

- Climbing Lane on Interstate 81 is a benefit to truck traffic and automobile traffic? Trucks do not use current right lane, they move to center. Future forecasts show that the largest increases in truck traffic will occur on this segment of Interstate 81, which indicates that this may be needed in the future.

- Kirkwood Industrial Park is nearing maturity, and access to the park is sufficient now and in the future. Wayfinding could make the park easier to navigate and more attractive. Identify places.

- The Airport Road corridor near Binghamton Airport was mentioned as a place that has potential for economic development. There could be general warehousing or air freight-related sites.

- Route 17 Corridor in Tioga County – Developable greenfield sites are limited due to the floodplain. Best Buy approached the County with a proposal to develop its facility in Nichols. The County assisted in the purchase of land.

- Interstate 88 Corridor may present challenges too. The consultant should investigate opportunities there if resources are available for an analysis.

Comments on Rail Projects and Issues

- Rail bridges – Old Vestal Road bridge creates a height restriction, however the bridge is being used for rail car storage.

- NYSDOT State Rail Plan – There will soon be a public outreach phase on the rail plan. CS will compare recommended actions in the BMTS study to the state plan.

Comments on Supporting Strategies

- Supporting Strategies: The client mentioned that there haven't been many supporting strategies identified yet. The consultant team will be working on developing strategies that support initiatives such as the projects and economic development.

August 27, 2008 Stakeholder Meeting

The fourth and final stakeholder meeting was held on August 27, 2008 in the State Office Building in Binghamton. Steve Gayle of BMTS introduced the project team and began the meeting discussion by stating that the real value of the freight study will be to put freight on the radar of BMTS and NYSDOT Region 9. The CS Team updated stakeholders on the progress of the project, describing the methodology for selecting transportation projects and supporting strategies, identifying the projects and strategies, describing the methodology for the benefit-cost analysis and sharing the results of the analysis, and a discussion of this study's final conclusions and recommendations.

Comments on Rail Projects and Issues

- NYSDOT looking to Oct to have Rail Plan finalized; would appreciate BMTS suggestions

- In light of NYS&W's pending discontinuation of service on the Utica Branch, a participant asked for clarification of the distinction is between discontinuation of service versus abandonment. Andy Mohr from NYSDOT replied that a

discontinuation of service implies that service will no longer be offered on the line, while abandonment can refer to a cease in operations and infrastructure removal. If there is an alternate route for through service and there has been no service for at least two years, they can discontinue service in an expedited manner.

Comments on Highway Projects and Issues

- The consultants were asked if they examined the potential truck impacts of intermodal facility or an inland port. CS replied, noting the difficulty of speculating the impacts of truck traffic when the location of a facility is not yet known. CS discussed a hypothetical example of potential impacts for an intermodal facility or inland port located at the East Binghamton Yard, mentioning the potential for issues related to truck trips getting across the river and onto I-81 and 86.

- A stakeholder stated that truck parking is a huge problem in the region. Parking in Kirkwood is limited and offers little in the way of amenities or safety. Emissions problem could be helped with electrification. Another participant stated that facilities of roughly 100 spaces or more are necessary to make the costs of land acquisition and electrification worthwhile. If industrial facilities are developed in large concentrations in the region, of developers could be asked to contribute to a fund for truck parking and receive incentives such as development bonuses in exchange. Steve Gayle discussed the concept of "freight villages," and the possibility that these concepts could guide industrial development in the region.

- A stakeholder commented that the wayfinding signage strategy is a good recommendation.

Benefit-Cost Analysis Comments

- A stakeholder asked why NYS&W rail projects were not included in the benefit-cost analysis. Brian replied, stating that CS has not received enough information from the railroad to do this level of analysis for those projects. CS is trying to get that information, and the absense of the NYS&W projects from the analysis is not a commentary on the validity of the projects.

- Clarification of what is involved in the proposed Prospect Street Connector project and whether additional improvements to Clinton Street were included. Brian replied that the project includes a new roadway link between Prospect Street and the Charles Street Business Park.