

CHAPTER 7 Freight Element

The Burlington-Graham, Greensboro, High Point, and Winston-Salem Metropolitan Planning Organizations (MPOs) are undertaking a Regional approach to the Long Range Transportation Plan (LRTP) to develop a framework for an integrated freight planning document for their respective areas in recognition of the key role that freight transportation plays in the Piedmont Triad region.

The Piedmont Triad has become increasingly focused on freight transportation planning over the last several years with the loss of textile manufacturing and a shift to major Freight and Goods Movement Industry. The goals guiding regional freight planning and investment are:

- Provide a safe *freight* transportation system that sustains or improves existing levels of freight access and mobility;
- Support the region's economic well-being, while remaining sensitive to environmental needs and concerns; and
- Achieve efficiency in operations and investments in the *freight* transportation system.

Freight movement is critical to an advanced industrial economy and the ease of freight movement is key to a region's economic competitiveness. Freight movement also affects a region's quality of life, particularly with the need to ensure that truck traffic has suitable routes to and from the national highway or rail networks that avoid established residential areas.

Federal legislation emphasizes the role of freight in regional transportation planning. Freight must be considered both in its own right and as a supporting element of an area's economic vitality and competitiveness.

The *Journal of Commerce* recommends that Congress and the President improve our national freight policy by:

1. Clearly define national goals with respect to all transportation;
2. Begin work on strategic performance measures for freight;
3. Create a competitive freight discretionary grant program;
4. Strengthen and diversify freight funding sources;
5. Better define the national freight system;

6. Strengthen the freight component of the planning process;
7. Develop a plan for the reorganization of the DOT;
8. The marine transportation and ports need a stronger voice to speak to their needs in the national interest;
9. Embrace private sector participation;
10. Raise revenue (10 Steps to an Effective National Freight Policy, 2012).

This chapter describes the existing conditions and trends at national, statewide and within the Piedmont Triad study Area. It then identifies the current and future issues, at the same levels. NC ports and airports are included, followed by a summary of key points and a list of recommendations. The chapter discusses both highway freight and rail freight. Many of the issues and trends differ between the highway mode and the rail freight mode and are discussed separately. However, the two modes are closely linked and there are cross-cutting issues.

Relevance to the Transportation System and the Plan

Since NCDOT issued its previous State Transportation Plan (STP), "Charting a New Direction for NCDOT" in 2004, several initiatives have highlighted the importance of freight and logistics in relation to economic health and growth. In North Carolina, freight and logistics have emerged as a state priority that can affect economic development and competitiveness. In North Carolina, this topic then relates to the movement of raw goods and materials as well as finished goods and products, between their origins and destinations including in-state distribution to businesses and consumers and out-of-state markets. As a result, freight and logistics touch all aspects of the state's economic development targets including agriculture, biomedical, education, manufacturing, military, and tourism. The updated 2040 State Transportation plan (September 2012) considers freight to be a key issue. This section examines how and to what extent freight and logistical considerations are addressed in the 2040 Plan (Atkins, 2012).

Freight transportation is a major factor in manufacturing retail costs. Manufacturers look for reliability, speed, and quality control in the carriers that deliver their raw

materials and finished products. If materials do not arrive on time, all other processes are affected, productivity falls and costs go up.

Figure 7-1 is a schematic drawing of the relationship between shipping reliability and cost (Husdal, 2004). Retailers currently assume that the costs of transportation are less than the cost of maintaining large inventories (*i.e.*, warehousing). ‘Just-in-time’ inventory is widespread and points to the strength and reliability of the transportation system. However, as congestion affects transportation reliability, costs will increase because reliability will be a premium – affecting the price of retail items.

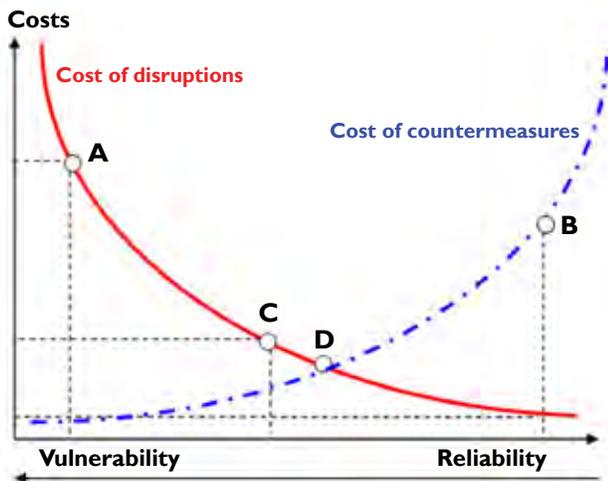


FIGURE 7-1
Freight Reliability vs. Cost (After Husdal)

Freight movement may be mysterious to the average consumer, but is crucial to maintaining our quality of life. The Federal Highway Administration has produced an excellent video entitled “Keeping the Global Supply Chain Moving” (<http://www.youtube.com/watch?v=OVYcxi1rDgE>). The video offers the following points about the supply chain. If the US Supply chain slows down:

- In 6-12 hours manufacturers assembly lines will stop;
- In 24 hours many hospitals will run out of critical supplies;
- In 48 hours Gas Stations will begin running out of fuel; and
- In 72 hours most Grocery Stores will run out of perishable foods.

In addition, transportation jobs generally pay well and, through multipliers, this income positively affects the local economy in a direct way.

Freight, in the study area, moves by air, highway, rail, and pipeline. The Piedmont Triad was an early crossroad for the railroads, moving freight from eastern ports to inland connections buyers. This logistical network contributes significantly to the regional economy. The highway system placed the Piedmont Triad at a crossroad of the interstate system. Two major pipelines provide another important source of freight transport, once again with the Piedmont Triad at the crossroad. (LRTP of Winston-Salem Area, 2009)

The Piedmont Triad is at an economic crossroad. Low-wage global competition, and more productive manufacturing, has stripped the Region’s traditional industrial clusters in furniture, textiles, and tobacco manufacturing of tens of thousands of jobs since 2000. With 1.6 million residents and a 1.5% annual growth rate, the population of the Piedmont Triad is expected to exceed 2 million by 2030.

On a positive note, new regional economics are emerging, the FedEx established its Mid-Atlantic hub at PTI, and the major UPS sort center, provides the Piedmont Triad with a competitive advantage in air logistics, offering time-sensitive industries fast, reliable long-distance connectivity. Just as shippers and manufacturers have traditionally located near seaports and railheads businesses today also want good access to airports (Glaser, 2011). Airport-linked e-commerce fulfillment centers complement flow-through facilities for perishables, just-in-time supply chain and emergency parts provision centers, and reverse logistics facilities for the repair and upgrade of high-tech products such as notebook computers and mobile phones. The clustering of time-critical goods facilities near air-express airports is stimulating expansion of air cargo, less than trailer load trucking (LTL), freight forwarders, and third party logistics providers (3PLs) along major highways accessible to these airports.

The Piedmont Triad has many logistics assets and is strategically located in the center of the Atlantic Coast Air Transport Corridor. The Triad offers excellent interstate highway access and competitive rail service, and is within six-hour trucking proximity to deep-water ports at Wilmington, NC, Morehead City, NC, Charleston, SC, Norfolk, VA and Savannah, GA. In addition, the area is served by the Norfolk Southern and CSX rail lines.

Company	Square Footage	County
Ralph Lauren Corp	1,873,000	Guilford
Kmart Distribution	1,600,000	Guilford
Liberty Hardware	1,210,000	Forsyth
Hanes Brands	930,451	Forsyth
Harris Teeter	908,000	Guilford
USPS Bulk Mail Center	892,000	Guilford
Phillips Van-Heusen	750,000	Yadkin
Kay Chemical Company	600,000	Forsyth
Powell Company	600,000	Guilford
Gildan Activewear	597,898	Rockingham
Gold Toe Brands	570,000	Alamance
Liberty Hardware	524,160	Forsyth
Lowes Companies Inc.	516,000	Guilford
Jockey International	500,000	Davie
Schenker Logistics	500,000	Guilford
VF Jeanswear	494,700	Davie
Replacements Lt.	460,000	Guilford
Loomcraft Textiles	454,219	Alamance
FedEx Ground	415,000	Guilford
Klaussner Furniture Industries	381,402	Randolph
Dart Container	366,000	Randolph
Legacy Classic Furniture	349,960	Guilford
United Parcel Service	336,000	Guilford
Sav-A-Lot	325,000	Davidson
Lentz Property Management	315,000	Forsyth
Mylan Pharmaceuticals	312,000	Guilford
O'Reilly Automotive Inc.	300,000	Guilford

FIGURE 7-2
Piedmont Triad Major Distribution Facilities

Existing Conditions and Trends

The NC Maritime Strategy report (AECOM; URS, 2012) shows that trucks carried 82.4% of freight traffic in North Carolina in 2007, while rail carried 13.6%. The analysis predicts that by 2040 the total truck freight carried will increase to 85.18% while the rail freight will decrease to 10.16%. **Figures 7-3** and **7-4** below show the distribution by mode in 2007 and expected in 2040.

This information seems to contradict information released by the railroad industry. A CSX application to the Federal Highway Administration’s Corridors of the Future program says “Each intermodal train can take 280

trucks off the roadways, while each bulk and merchandise train can remove up to 500 trucks.” Although true, in most cases trucks carry the goods to and from the rail facility. Intrastate freight movement in North Carolina moves mainly by truck. Therefore we would be remiss not to consider more truck movement into and through the Piedmont Triad.



FIGURE 7-3
2007 North Carolina Freight Movements



FIGURE 7-4
2040 North Carolina Freight Movements

Highway Freight

Highway Freight: National Conditions and Trends

Truck mileage has been consistently increasing nationally over the past decades, but has been confined to essentially the same road capacity. Urban freeways and arterials in particular have become increasingly congested, and this trend is expected to continue. Trucks are affected just as much as commuters by congestion with additional implications for freight travel time and reliability. The graph below compares truck congestion cost with TTI's travel time index in the Triad.

Congestion Cost vs Travel Time Index

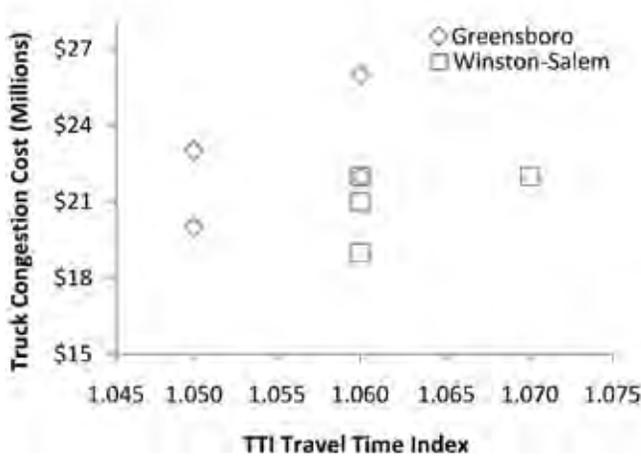


FIGURE 7-5
Congestion Cost vs. Travel Time Index

By 2020, the trucking industry expects to move three billion more tons of freight than it hauls today. To meet this demand, the industry will put another 1.8 million trucks on the road. On average, 10,500 trucks a day travel some sections of the Interstate Highway System. By 2035, this more than double -to 22,700- trucks for the most heavily used parts of the Interstate, with the most heavily used segments seeing upwards of 50,000 trucks a day. (Transportation Reboot, 2010)

Highway Freight: Statewide and Regional Conditions and Trends

Highway infrastructure in North Carolina includes state, municipal, and federally owned roadways. According to the 2010 Maintenance Condition Assessment Report, the NCDOT owns and maintains 80,000 miles of roadways, which represents approximately three-fourths of the total roadway inventory in the state. The state-owned roadway inventory includes 160,806 paved lane miles, approximately 4,500 centerline miles of unpaved roads,

and 18,205 structures. This wealth of paved roads is critical to the overall economic vitality of our state and region. Just as critical however is the need to properly maintain this road system after initial construction.

The 2004 STP established the North Carolina Multimodal Investment Network (NCMIN). The NCMIN stratifies each modal system into three tiers: statewide, regional, and sub-regional. **Figure 7-6** shows the NCMIN definitions of Statewide, Regional, and Subregional facilities for the highway networks.

Mode	Highways
Statewide Tier	Strategic Highway Corridors as approved by the Board of Transportation
Regional Tier	All primary routes (US and NC) not on the statewide tier.
Subregional Tier	All secondary routes not on the statewide tier.

FIGURE 7-6
North Carolina Tier Definitions (NCDOT)

Beginning in the 2004 State Transportation Plan, NCDOT classified all transportation facilities in the state into NCMIN (North Carolina Multimodal Investment Network) tiers. Statewide tier facilities serve long-distance trips, connect regional centers, have the highest usage, and provide mobility at the expense of land access. Regional tier facilities connect major population centers and balance mobility with land access. Sub-regional tier facilities serve local movements and favor land access over mobility. For the highway mode, the statewide tier includes facilities that have been designated as Strategic Highway Corridors. Currently, 55 corridors have this designation, with a total length of approximately 5,500 miles. Regional tier facilities include all primary routes (designated US or NC) not on the statewide tier. Sub-regional tier facilities include all roads not on the statewide or regional tiers (Atkins, 2012).

Existing roadway conditions, along with future conditions under various scenarios, were evaluated based on funded highway projects, long range planning projects, and other projects under consideration. Travel time, distance, and potential capital costs were identified for various highway investment alternatives for existing and proposed ports and inland freight nodes. In consideration of freight movement patterns in the South Atlantic region,

evaluation of regional highway infrastructure included interstate and state highway networks in North Carolina as well as Virginia, South Carolina and Georgia.

The multi-state highway network was evaluated using the Freight Analysis Framework-3 (FAF) model, developed by the Federal Highway Administration (FHWA) in cooperation with the US Department of Transportation (USDOT). The GIS-based FAF model is a national network of roads developed to evaluate 2007 truck flow and to assess system wide congestion on the nation's highway system in forecast year 2040. (AECOM; URS, 2012)

Highway Freight: Conditions and Trends in the Piedmont Triad Study Area

Road conditions for freight are generally better in North Carolina than in many areas of the US. However, the region must remain vigilant to ensure that our growth does not create bottlenecks and conditions that will limit our ability to increase current and bring new business to our area.

Six programmed projects in the Triad seem to further this goal (George F. List; Robert Foyle, 2011). **Figure 7-7** below describes these six projects.

TIP Number	Route	Project Description
U-3109	NC 119	Relocate NC 119 from I-85 to Mebane Rogers Road in Alamance County
Construction Year: 2015		
U-2524, U-2525	Greensboro Eastern and Western Loop(s)	Greensboro Eastern Loop from Lawndale Drive to I-40/85 in Greensboro
Construction Year: Various (2012 –18)		
R-2528	NC 24-27	Widening NC 24-27 from US 220 to Carthage in Moore County
Construction Year: Not Scheduled		
R-2413	US 220/ NC 68 Connector	Multi-lane freeway on new location from US 220/NC 68 Intersection in Rockingham County North to NC 68 in Greensboro
Construction Year: 2012 –17		

TIP Number	Route	Project Description
R-2579	WS Northern Beltway (Eastern Section)	Multi-lane freeway on new location from US 52 to US 311.
Construction Year: 2013		
U-2800	Macy Grove Road Interchange	Construct a new interchange of Macy Grove Rd. with I-40 Business
Construction Year: 2012		

**FIGURE 7-7
Triad Regional Projects**

Although other projects benefitting freight and logistics will be cited later in this report, one particular project should be noted in this section. The NC Ports Authority Piedmont Triad Inland Terminal (PTIT) is located at 505 Chimney Rock Road with the major point of access being the intersection of Chimney Rock Road and Gallimore Dairy Road. PTIT is a location for the storage, pick-up and delivery of containers used in international shipping for steamship lines calling at the port of Wilmington. This terminal and other terminals of its type are a major link in international transportation and logistics movements and give the region an additional asset in economic development efforts. TIP project U-4015A, scheduled for construction in 2020 will improve access to the PTIT for routine and emergency response at both PTIT and the Colonial Pipeline Tank Farm off Gallimore Dairy Road.

Two other challenges to freight mobility need to be addressed. The first, is congestion along US 52 from I-40 to University Parkway in Winston-Salem. US 52 is a key north to south corridor between I-85 in the south, I-40 in the middle and I-74 in the north. US 52 between I-85 and I-40 is in good repair and uncongested. However, from I-40 to University Parkway the roadway is obsolete and congested. Although major construction is taking place on this segment, until it and the northern loop around Winston-Salem is completed, this transportation corridor is crippling. The second is the signage on Interstate 40/85 in Greensboro. Road signage can drastically change the flow through and around Greensboro. Upon the completion of the southern loop around Greensboro (I-73/I-85), signage properly directed east and westbound I-40 traffic to and from Raleigh/Durham via the by-pass taking traffic off of the major interstate through Greensboro. Within the past 3 years however, the signage has been changed directing east and westbound I-40 traffic through Greensboro and off of the I-73/I-85 corridor. While this

may be a blessing for truckers, travelers unfamiliar with the area are directed through one of the most congested freeway segments in the region.

The roadway network plays a critical role in efficient movement of freight. The following offers the ideal roadway network and various criteria that can be utilized in designing future roadways:

Criterion: Site Distance	
Trucks are large heavy vehicles traveling at least as high a speed as most automobiles on the nation's roadways. As such the distance that a truck driver can see the road before him/her adds additional safety benefits to the highway system.	
Overall Benefit:	<i>Safety, Fuel Economy</i>

Criterion: Entrance and Exit Ramp Radii	
The most efficient entrance and exit ramp design for any motor vehicle is one that allows the vehicle to slow to a stop or turn gracefully or to enter a high speed section of highway safely and smoothly. This design takes a large amount of land and not all current highway designs are able to offer this opportunity at all times. When a tighter entrance/exit ramp is necessary, it should be understood that the larger the radii the safer the entrance/exit to/from a roadway will be. This is not only a matter of weight distribution shift as a truck enters a corner, but as well allows a "site distance safety" as well as monetary economies due to lessened brake wear and tire scrub.	
Overall Benefit:	<i>Safety, Fuel Economy, Operating Costs, Less Congestion</i>

Criterion: Truck Lanes	
HOV (High Occupancy Vehicle) Lanes are very valuable. However, the HOV lanes force trucks (heavier and larger vehicles) into general traffic flow. This in turn creates additional congestion as trucks take longer to stop and accelerate and this in turn slows down traffic flow in general. Better to have through moving truck traffic in a lane of its own freeing the general traffic lanes for local truck traffic if entering/exiting a highway and passenger automobiles which can by their nature flow together and maintain speed easier.	
Overall Benefit:	<i>Safety, Fuel Economy, Less Congestion</i>

Criterion: Grade	
Although trucks <i>are heavy</i> and powerful they are designed to carry loads not accelerate quickly. They have little reserve power to climb hills. The steeper a grade is designed and built, the more congestion it will create when trucks share the lanes with automobiles. To the extent practical, designers should minimize road grades.	
Overall Benefit:	<i>Safety, Fuel Economy, Less Congestion</i>

Criterion: Intersections	
A car can turn in a much shorter distance than a truck. Especially if the truck in question is a tractor/trailer combination. These units can be anywhere from 60' to 75' in total length. Compare that to an automobile which is normally 10' to 15' and you can see the difficulties in designing a turn or intersection for both. From a freight perspective "always plan" for at least a 60' unit.	
Overall Benefit:	<i>Fuel Economy, Safety, Operating Costs</i>

Criterion: Lane Width	
From freight perspective, wider is better. It can be hard enough at times to estimate the furthest edge of a road from a passenger car driver's perspective. As a heavy freight vehicle is 8' wide with the driver at 6' from the road surface additional width adds a safety factor that is lacking in many newly designed road networks. In addition a wider road allows truck drivers to better see and react to traffic around them.	
Overall Benefit:	<i>Safety</i>

Criterion: Road Surface	
Smoother roads allow for better fuel economies, Rougher surfaces create better adhesion. The newest technologies developed for road engineering should always be utilized.	
Overall Benefit:	<i>Fuel Economy, Safety, Operating Costs</i>

FIGURE 7-8
Criteria For Freight and Roadways

Rail Freight

Rail Freight: National Conditions and Trends

The US freight railroad industry is stable and growing after major structural changes between 1970 and 2000. The economic growth experienced in recent years has particularly benefited some freight flows, such as containers to and from the major ports, with the result that railroads have been adding or reinstating capacity on their main lines. Although, today's railroads focus strongly unit trains (entire trains of a single commodity, such as coal¹ or containers), the traditional, service (carload freight - single cars or small numbers of cars to/from local industries) remains important to the industry.



FIGURE 7-9
US Rail Traffic Flows, 2000

Figure 7-9 presents information on US shipments by rail. Until recently, bulk products have dominated US rail shipments. Coal accounts for approximately half of US rail tonnage, so that coal shipments dominate the map.

¹John McPhee provides an excellent discussion of unit trains in Uncommon Carriers

Coal's importance is clear once the reader understands that coal fields in Colorado fuel power plants in the eastern and southern U.S. and are a significant part of the exports through the port of Houston. The heavy lines connecting the areas of Los Angeles, Portland, and Salem to the east are dominated by container trains moving to Chicago, Saint Louis, and Dallas before being transhipped further east.



FIGURE 7-10
US Intermodal Rail Flows

Intermodal rail shipments have been growing rapidly. In **Figure 7-10**, several popular intermodal routes are visible, including one from Los Angeles east to the Chicago distribution yards. An increase in intermodal traffic from Mexico north along the NAFTA Corridor is expected should energy cost, urban Chinese wages, or the relative value of Chinese currency increase. Accordingly, a set of rail-based intermodal terminals are developing along that corridor which also serve east-west traffic. (George F. List; Robert Foyle, 2011) **Figure 7-10** shows major container movements discharging at West Coast Ports. When the Panama Canal capacity improvements are completed, in 2014, many container movements will probably shift to the East Coast and Gulf Coast for discharge.

Rail Freight: Statewide and Regional Conditions and Trends

North Carolina's rail network serves 86 of the state's 100 counties. The network provides access to strategic locations, such as ports, power plants, mines, and military installations. The rail network facilitates the movement of goods for agriculture, forestry, plastic, furniture, coal, food products, and chemicals.

Mentioned earlier, the NCMIN stratifies each modal system into three tiers: statewide, regional, and sub-regional. **Figure 7-11** shows the NCMIN definitions of Statewide, Regional, and Subregional facilities for the rail networks.

Mode	Rail (Freight)
Statewide Tier	Rail lines of strategic importance as determined by the Rail Division
Regional Tier	All rail lines not included on the statewide tier
Subregional Tier	N/A

FIGURE 7-11
North Carolina Rail Context

Figure 7-12 provides some context for North Carolina's rail system based on 2008 data. Most of North Carolina's rail system is owned, operated, and maintained by the private sector. Of 5,767 miles of rail lines in North Carolina, 491 miles are owned by the State. The state of North Carolina owns the North Carolina Railroad Company (NCCR), with Norfolk Southern Railroad Company (NS) operating trackage rights over its 317-mile corridor from Charlotte to Morehead City. **Figures 7-13** and **7-14** show the miles and locations of freight railroads operated in North Carolina, with 2,422 miles of Class I railroads comprising 72.4 percent of all railroads in the state.

NC Rank	Statistic
13th in number of railroad companies	23
17th in total rail miles	3,250
32nd in originated rail tons	12,086,168
13th in terminated rail tons	58,440,018
13th in originated rail carloads	211,572
14th in terminated rail carloads	665,580
32nd in rail tons carried	103,254,917
34th in rail carloads carried	1,467,318
29th in freight rail employment	2,425
30th in freight rail wages	\$163.2 Million

FIGURE 7-12
North Carolina Rail Context

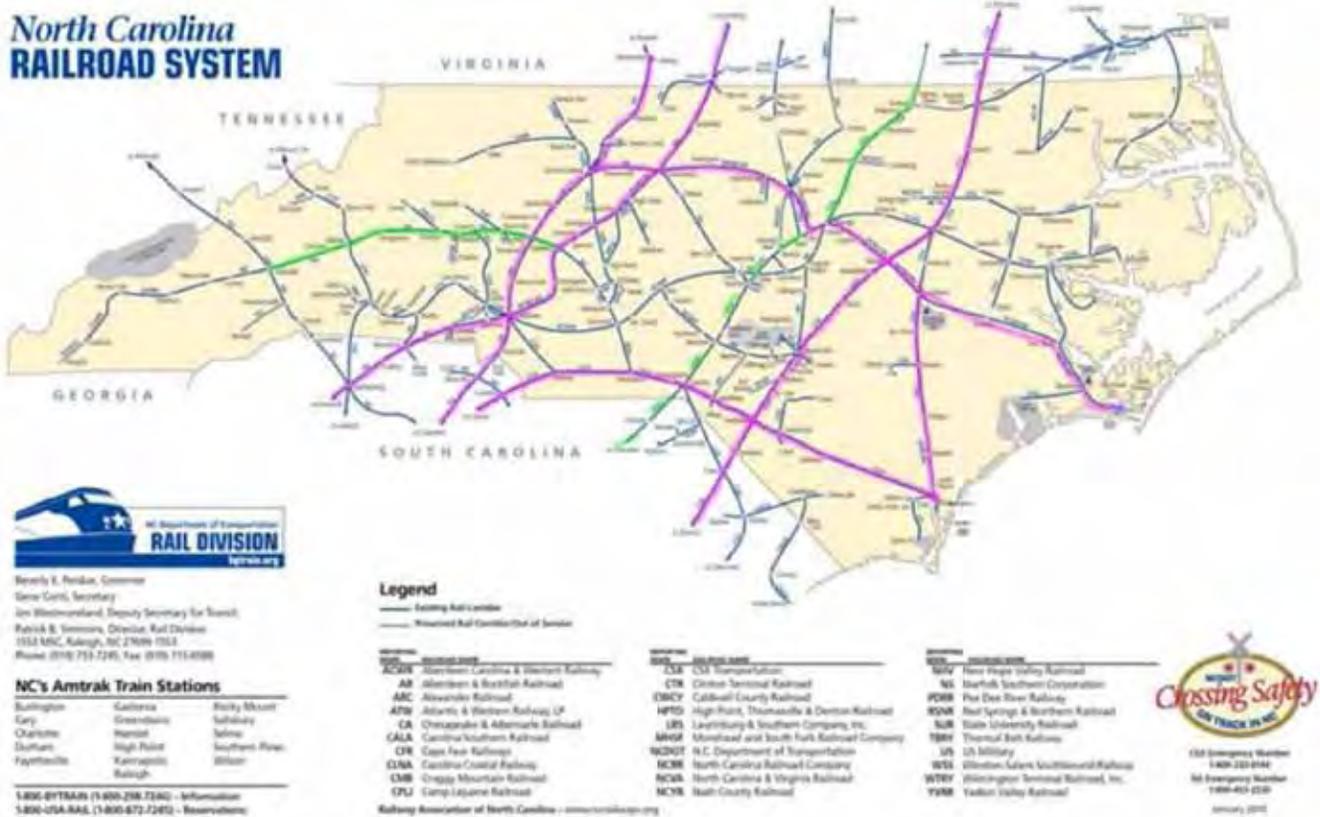


FIGURE 7-16
North Carolina Railroad Network With Corridors Marked

Despite the strength of these lines, North Carolina is critical to neither the NS nor the CSX. One estimate is that less than 2% of the revenues for either railroad are derived from shippers in North Carolina. *The implication might be that the state needs a strategic plan that relies on partnerships with short lines or shared rights-of-way.*

Figure 7-16 shows North Carolina’s railroad network. The primary interest of CSX lies in its north/south main line stretching Weldon to Rowland, through Selma and Fayetteville where it intersects with NS. The primary interest of NS is its north-south main line from Lynchburg (VA) to Greenville (SC) through Greensboro to Charlotte, where it intersects with CSX. There are other secondary lines in the state as well as locations served by both CSX and NS: Goldsboro, Colon, and Cary to Raleigh. Arguably, the entire length of the Aberdeen, Carolina, and Western Railway Company is also served by both Class 1 railroads since the ACWR interchanges with both CSX and NS. The same is true for the Carolina Coastal Railway (CLNA) between Raleigh and Wilson and the Aberdeen & Rockfish Railroad (AR).

A tiered network approach to railroad network planning seems needed. There also seems to be value in developing a sense of the types of railroads that would be best to

operate what parts of the network – Class I railroads versus short lines – and where service by two Class I railroads is needed. **Figure 7-15** illustrates one realization of this tiered network idea, borrowing from the highway network ideas of interstates, state highways, and local “roads”.

North Carolina has two “interstate” quality rail lines (high performance lines). One is the CSX north-south main line from Petersburg (VA), through Rocky Mount, Selma, and Fayetteville to Florence (SC). The other is the NS north-south main line from Lynchburg (VA), through Danville, Greensboro, and Charlotte to Greenville (SC).

The state might want to develop more east-west high performance lines. The goal of the east-west line would be to reach the Midwest and the Mississippi River at Memphis and St. Louis. One option is the CSX east-west main line from Wilmington, through Monroe, Charlotte, and Marion to Johnson City (TN). It is perfectly straight in the east – in fact it has the longest stretch of tangent (straight) track in the US – steep grades and crooked trackage in western North Carolina limited speed through the Blue Ridge Mountains. It is used primarily to bring coal out of the Appalachians. Improving the alignment to main line standards would be expensive and require work

in two states. Another option involves a combination of the CSX east-west main line from Wilmington through Monroe, and not Charlotte, to Chester (SC) and then back into North Carolina via NS from Spartanburg (SC), through Asheville into Tennessee. But upgrading this line would also be pricey and would involve putting the Saluda Grade back in service. What might make the most sense would be to use the CSX main line from Wilmington through Monroe to Chester (SC) and not attempt to create an in-state route through the North Carolina Mountains. Two other options make sense, both on NS. One route is from Morehead City west through Raleigh to Greensboro, and then north to Lynchburg, VA. The second is similar: from Morehead City west through Raleigh and Greensboro to Winston-Salem, and then north to Roanoke, Virginia.

In a third tier are the rest of the rail lines shown in **Figure 7-16**. These would have a local focus, either for short hauls or pick-up and delivery to and from shippers and consignees. This third-tier network might best be operated by short lines, whose cost structures make short-distance moves profitable. These short line operators might be local to the state or subsidiaries of national holding companies. These short-line companies tend to have stronger interest in local businesses, they provide more frequent service, with shorter trains, and they are invested in the success of the state's economy.

The railroad business model is for trains and crews to operate only on trackage owned or leased by that railroad. Railroads charge fees for hauling freight in other brand cars. A challenging, but valuable idea is to treat the second and third tier lines as public rights-of-way, over which any rail carrier can operate. This idea, suggested by Robert L. Banks and others in the 1970's, is at least 40 years old. Except in limited instances, where governments have argued successfully before the Surface Transportation Board (and the earlier Interstate Commerce Commission) to provide trackage rights for

multiple carriers over a particular rail line, this shared use idea has not been popular. Pursuing this idea could lead to more competitive rail rates and higher quality service to the ports of Wilmington and Morehead City and to strategic development locations such as Global TransPark⁴.

The goal of this strategy is to achieve two objectives:

1. Have a high-quality railroad network that connects to the major industrial locations in the state; and
2. Get high quality service at reasonable rates, from the railroads that operate over these lines.

Several specific improvements that seem helpful from a logistics perspective, surfaced during the review conducted for this project. They include:

- Restoring the line from Wallace to Castle Hayne;
- Building a wye (triangular junction) in Pembroke;
- Getting two-carrier service to both the State ports;
- Completing the wye on the branch that services MOTSU (Military Ocean Terminal at Sunny Point),
- Providing more direct service to the Port of Wilmington, one that eliminates crisscrossing the City of Wilmington multiple times;
- Simplifying the rail alignments through Charlotte; and
- Eliminating single-track sections along the main lines—Greensboro to Raleigh, Charlotte to Greensboro, and along the entire CSX main line.

Improvements at site specific locations would also be beneficial such as, improving access to Morehead City (including Radio Island), building a larger local yard west of Morehead City to help service the port; and reorganizing the tracks in Goldsboro, as well as Raleigh, Greensboro, and Winston-Salem; and bypassing cities like New Bern.



⁴Houston Power & Lighting Company took similar approach by building a second rail line to serve a large coal-fired generating station in Texas. By introducing competition into the logistics mix Houston Power saved \$10 Million the first year and gained flexibility and redundancy in their supply chain. This case is discussed in Shell's Bargaining for Advantage.

Rail Freight: Condition and Trends in the Piedmont Triad Study Area

Proposed Piedmont Triad Regional Freight Villages⁵ based on NC Governors Logistics Task Force – 7 Portals Report

1. Burlington (Alamance County Ind. Dev. Corp./ Burlington/Alamance AP): There is rail service on the north side of the airport, running E-W.
2. Greensboro (Aerotropolis site at PTD): NS trackage is adjacent to the site.
3. Montgomery/Moore (The Heart of NC Mega-site): The site is near the Montgomery Airport and the railroad is near the airport (Aberdeen), about 2 miles from the site; it would be easy to construct a rail spur into the area; there are connections to CSX in Wadesboro and NS in Albemarle.
4. Winston-Salem (Smith Reynolds Airport): NS trackage is adjacent to the site. (Seven Portals Study, page 107, 2011)

Rail freight transportation in the Winston-Salem Urban Area is operated by three different railroads, the Yadkin Valley Railroad, the Winston-Salem Southbound Railway, and the Norfolk Southern Railway.

The Yadkin Valley Railroad Company is owned and operated by Gulf and Ohio Railways of Knoxville, TN and operates in the counties of Forsyth, Stokes, Surry, and Wilkes. The railroad carries forest products, coal, grain, and fiberboard. The Yadkin Valley Railroad has

two lines, one from Rural Hall to Mount Airy and one from Rural Hall to North Wilkesboro. Both lines connect to the Norfolk Southern Railway at Rural Hall.

Norfolk Southern Railway (NS) is owned and operated by Norfolk Southern Corporation headquartered in Norfolk, VA. NS connects the Winston-Salem Urban Area to Roanoke, VA to the north and Greensboro to the east. NS also owns a line in which is currently not in use that connects Winston-Salem with Charlotte. One of the largest commodities carried by the railroad is automobiles. NS operates an automobile distribution center in Winston-Salem. In October of 2011, Norfolk Southern announced the expansion of its Triad freight operations with a dedicated double-stack train service to the Triad, from the Port of Norfolk. This service will run 6 days per week and continue on to Atlanta and points south. This additional intermodal capacity to/from Norfolk ports will increase the amount of truck movement on the I-85/I-40 corridor within this LRTP's study area, as well as the Patterson Street intermodal connector in Greensboro. The impact of the volume is unknown at this point. However, it is important to understand that with the Panama Canal widening to be completed in 2014 and with the larger vessel capacity it brings, coupled with the fact that the Port of Norfolk is the only east coast port with the capacity to handle the large vessels, the Triad stands to gain volume and business. To assist with this possible congestion scenario, the Greensboro MPO has identified a project known as the Norwalk Street Connector, which would provide alternate access to I-40 using Patterson Street or full access to I-40 via Wendover Avenue.



FIGURE 7-17
Double-Stack Train at Pomona Yard

⁵“a defined area within which all activities relating to transport, logistics and the distribution of goods, both for national and international transit, are carried out by various operators.” (NC Governors Logistics Task Force, 7 Portals report December, 2011. Additional information concerning NC Freight Villages may be obtained in this report (section 2.5 pages 41-48) and may be located at: <http://www.ncdot.gov/doh/preconstruct/tpb/research/download/2010-34-0masterfinalreport.pdf>

Winston-Salem Southbound Railway (WSS) began service in 1910 and is independently operated; however, CSX and Norfolk Southern jointly own all of its stock. WSS connects Winston-Salem and Forsyth County to Lexington, Albemarle, and Wadesboro to the south. The railway operates in Forsyth, Davidson, Stanly, and Anson Counties. The railroad carries grain, sand, gravel, stone, forest products, paper products, coal, coke, cement, clay, fertilizer, chemicals, aluminum, iron, and steel. One of the principal shippers is Ingredion Corporation, manufacturers of corn syrup and related products in Winston-Salem. WSS connects with NS in Winston-Salem on the north end and with CSX in Wadesboro on the south end. WSS also connects to High Point, Thomasville, and Denton Railroad (HPTD) and Aberdeen, Carolina, and Western Railroad (ACWR) along the railway. (LRTP of Winston-Salem Area, 2009)

The High Point, Thomasville & Denton Railroad Co. (HPT&D) operates from High Point through Thomasville and Denton to a junction with the Winston-Salem Southbound Railway at High Rock. The company, founded in 1923, is owned by the Winston-Salem Southbound Railway. The railroad carries forest products, paper products, chemicals, brick, coal, cement, and furniture. Principal shippers are: Thomasville Forest Products of Shale Brick – a division of Lowes Inc.; Carolina Container Corp. of High Point – manufacturer of pulp board; and Georgia Pacific of Denton – chemical manufacturer.

Working with the North Carolina Railroad (NCRR), Norfolk Southern Railway (NS) and CSX Transportation, the NCDOT is upgrading existing rail corridors to improve safety, efficiency and capacity for freight and passenger train services. The first phase of improvements is scheduled along the North Carolina Railroad. The 317-mile, state owned corridor links Charlotte, Greensboro and Raleigh and extends to the state's seaport at Morehead City. Norfolk Southern Railway operates trains along the entire corridor under a lease agreement with NCRR. CSX Transportation shares operation of a portion of the NCRR's corridor between Raleigh and Cary.

At one time, the whole corridor between Greensboro and Charlotte had two tracks. Portions of the second track were removed in the late 1960's as part of a signal system improvement. Railroad traffic has increased greatly since that time and additional capacity is now needed. Rebuilding the second track in four separate areas will create a 92-mile stretch of double-track railroad, between Greensboro and Charlotte. This long double-track section will increase corridor capacity, improve traffic flow and

schedule reliability, by allowing freight and passenger trains to meet or pass one another without slowing down to enter a siding.

Concerning Southeast High Speed Rail Projects in the Greensboro Urban Area, NCDOT has been awarded \$545 million from the American Recovery and Reinvestment Act to support implementation of Southeast High Speed Rail Corridor (SEHSR). \$520 million in improvements are anticipated between Raleigh and Charlotte, to enable higher speeds and more reliable service through the corridor while improving rail security. The goal of the SEHSR corridor upgrade is to allow trains to travel between Charlotte and Washington, D.C. at speeds of 90-110 miles per hour (mph) and an average speed of 86 mph. NCDOT's original request was for \$5.2 billion, which is the current estimated cost, to fully complete SEHSR improvements in the state.

Since the USDOT designated Charlotte to Washington, D.C. as a high-speed rail corridor in 1992, the N.C. Department of Transportation has invested more than \$300 million in the state's intercity passenger rail service for renovation and construction of train stations, track work improvements and corridor preservation projects in order to pave the way for high-speed service. The ARRA funding requires projects to meet readiness criteria that will enable them to move to construction in the near term. Corridor wide, the improvements include expanding all single track sections to double track, removing and improving crossings, and station security upgrades.

Another notable project, built an 8.7-mile section of second main track on the old roadbed (east of the existing track) between "Cox" in west Greensboro and near Hoskins Street in High Point. New crossovers will be constructed to allow trains to quickly change from one track to the other at Cox and at Hoskins. The project cost an estimated \$20 million and according to The Greensboro News & Record was completed in December of 2009, http://www.news-record.com/content/2009/12/16/article/work_ends_to_expand_railroad_tracks_between-greensboro_high_point. The new double track section will improve reliability and traffic flow, increase capacity and at least one minute of travel time per train.

Through track and signal improvements, the NCDOT has reduced the travel time between Raleigh and Charlotte by more than 35 minutes since the work began in 2001. In addition to reducing the travel time, the work will increase efficiency and reliability for both freight and passenger trains in the corridor (High Point Enterprise).

Current and Future Issues

Entire Freight System: Statewide and Regional Current and Future issues

State Departments of Transportation (DOTs) have a historic linkage to freight and freight movements. This linkage dates to the early days of DOTs, when their primary focus tended to be on creating “farm to market” roads to meet basic societal needs - bringing food from the point of production (the farm) to where people live (cities and towns). Accordingly, including freight considerations in the transportation process is less of a new trend than a revisiting of a historical relationship.

Compared to the historic role of freight in DOT activities and planning, recent efforts to incorporate freight considerations into the transportation planning process tend to be reflective of shifts toward the use of global rather than national or regional supply chains. In a global supply chain environment (where markets are operating freely), it is natural and predictable that labor-intensive industries would tend to locate in areas where labor costs are low (subject to the impact of transportation costs), while industries that tend to be capital-intensive (or for which transportation costs are a major component of final product cost) are less affected. These predictable trends have proven true in the United States and North Carolina and have had significant impacts on many domestic industries such as textiles, furniture, and other industries with similar economics. However, while such industry and employment impacts are predictable, it does not change the difficulty associated with adjusting to the job losses and industry displacements associated with these market-driven adjustments or the desire for governments to attempt to avoid or mitigate these impacts. Such mitigation efforts can and do include using transportation system projects to encourage the location of new businesses or improve the competitive standing of existing businesses.

Because of the factors noted above, the Federal Highway Administration (FHWA) and state DOTs are increasingly devoting resources to understanding and determining how to best incorporate freight considerations into transportation planning and/or project selection. Specifically, the FHWA, through the efforts of its Offices of Planning and Freight Management and Operations, has sponsored the development of, and/or compiled a considerable library of, resources directed to this topic. Specific tools include freight data sources, demand modeling tools, guides, and technical resources directed to practitioners so that they can incorporate freight

into state planning activities. Additionally, a number of state DOTs have actively been developing state-specific models for including freight in both project planning and prioritization efforts. Of particular note, the Florida Strategic Intermodal System prioritization model represents one of the more mature and comprehensive efforts to systemically incorporate freight into the project planning and prioritization process. Other notable state DOT efforts to include freight in transportation planning include Indiana, Minnesota, Ohio, and Washington. (2040 North Carolina Statewide Transportation plan, page 2-25, 2012) *It should be noted that while the FHWA and NCDOT are looking at various models to better include freight flow and logistics into their planning efforts, the models and tools do not yet bring the level of detail down to regional and county levels in sufficient detail to be useful.*

Since the issuance of NCDOT’s previous STP, “Charting a New Direction for NCDOT” in 2004, a number of national and North Carolina initiatives have highlighted the importance of freight and logistics, in relation to long-term economic health and growth in the state. In North Carolina, freight and logistics have emerged as a state priority that can help underpin economic development and economic competitiveness. In North Carolina, this topic then relates to the movement of raw goods and materials, as well as finished goods and products, between their origins and ultimate destinations including in-state distribution to businesses and consumers and out-of-state markets. As a result, freight and logistics touch all key aspects of the state’s multifaceted economic development, targets including agriculture, biomedical, tourism, education, military, and manufacturing.

The 2004 STP included a number of direct and indirect references to the importance of “freight” and “logistics” in establishing transportation planning priorities. Starting with its initial discussion of domestic and international trade factors, the report identified a linkage between North Carolina’s future economic prosperity on the ability of its transportation system to support freight and logistics demands. The report further discusses the importance of the freight rail infrastructure needs and the economic impact of the industries primarily served by rail as a means of further underscoring this freight/economic growth linkage. Finally, the report encouraged the enhanced adoption and use of NCDOT’s Strategic Highway Corridor (SHC) concept, which specifically identifies statewide economic prosperity as a major focus for SHC-designated assets; this effectively acknowledges the linkage between freight movements and economic growth.

This report acknowledges the linkage of economic growth to the state's transportation infrastructure. However, while the freight/economics/transportation linkage was generally understood, the report did not define how freight/logistics considerations should be weighted within NCDOT's project prioritization and selection process. (2040 North Carolina Statewide Transportation Plan, 2011) Although NCDOT acknowledges the importance of freight planning, it is struggling with how to evaluate the data. This is an area where regional coordination between industry and transportation planners comes into play. With this team effort, regional freight planning can partner with NCDOT to supply the information and needed to make "informed" decisions.

Highway Freight: National Current and Future Issues

Nationally, decision-makers are realizing that keeping the system in good repair competes with adding capacity and that today's funding streams are (a) inadequate to the task, and (b) have begun to fall off. Much of the congestion occurs today at bottlenecks on the highway system—specific locations that experience recurring congestion and backups because traffic volumes exceed highway capacity. The American Trucking Association estimates that the annual cost of delay at these bottlenecks comes to \$19 billion. Our economy depends on a well-functioning and efficient transportation system, which in turn depends on the capacity and condition of the underlying infrastructure—our highways, bridges, rail lines, tunnels, ports, harbors, and channels. We know that demand for freight transportation is growing. We know that this will exacerbate congestion that already is adding to shipper and carrier costs. We know where the bottlenecks and choke points are, and we know how to fix them. We are not addressing these problems because few state transportation agencies have the money to tackle them. In the case of several major projects that would create benefits both regionally and nationally, their costs are so high they cannot be funded by a single state. (Transportation reboot) However, as we mentioned "10 Steps to an Effective National Freight Policy" on page 1, the third suggestion, create a competitive freight discretionary program and the fourth suggestion, strengthen and diversify freight funding sources may assist development of funding streams. Nationally, the USDOT TIGER grant program addressed a significant number of major freight bottlenecks including, the I-85 Bridge over the Yadkin River, Norfolk Southern Rail Road's Crescent Corridor Project and the Appalachian Regional Short Line Rail Project (which shows the

growing importance of Short Line Rail Roads to the national freight infrastructure. In addition, the MAP-21 reauthorization bill Creates a new competitive projects of national significance program that will help. These are only first steps though and it appears a greater emphasis is needed nationally on these issues.

Highway Freight: Statewide and Regional Current and Future Issues

Freight mobility through North Carolina's highway network will rely on improvements that provide direct and timely access for trucks to port facilities from inland freight nodes and facilities, including rail intermodal facilities, manufacturing, agricultural production, warehousing and distribution centers.

Based on the maritime market opportunities identified for North Carolina, investment in the US 70, I-73/I-74, and I-40 highway corridors will have the greatest effect in reducing trucking travel times within the state. Focused investments along these targeted freight corridors is also consistent with the 2010 Statewide Logistics Plan recommendations for highway improvements, including creating of a multimodal corridor between Charlotte and Wilmington and enhancing the primary highways of the National Truck Network in North Carolina. The Logistics Plan also recommended improvements to I-95 to support pass-through traffic; while there are many benefits to the enhancement of this vital corridor, improvements to I-95 were not demonstrated to support the specific market scenarios evaluated under this study. (North Carolina Maritime Strategy, page 104, 2012)

The roadway needs estimate was developed with assistance from several NCDOT Business Units and all seventeen MPOs in the state. The highway mobility estimate was completed in two parts. Each MPO provided an estimate for highway needs within its jurisdiction based on local plans. For areas not in an MPO, an estimate for highway widening was developed based on a volume-to-capacity analysis using a GIS database developed by the NCDOT GIS Unit and SPOT (Strategic Planning Office of Transportation). In addition, the highway mobility estimate includes the policy-driven estimate for completion of urban loops and the intrastate system. The highway safety needs estimate was developed by the NCDOT Traffic Safety Unit and includes funding needs for the Spot Safety, Hazard Elimination, and High Risk Rural Road safety programs. The infrastructure health needs estimates were developed by the NCDOT Pavement Management and State Road Maintenance Units. (2040 North Carolina Statewide Transportation Plan, page 3-10, 2012)

Rail Freight: National Current and Future Issues

Nationwide forecasts suggest that long-term economic growth will create demand for substantial additional capacity on the main rail corridors – and that the railroad industry will not be able to pay for all that capacity on its own. Public-private partnerships are therefore likely to be a key funding mechanism for achieving the necessary capacity. Railroads are increasingly open to strategies that combine public funding of public benefits (principally reductions in truck traffic) with railroad funding of private benefits. In particular, states and municipalities are increasingly recognizing the public benefit of diverting truck traffic from highways to railroads. (LRTP of Rock Hill Fort Area)

FHWA has served as the lead agency on many state rail system projects because they have more robust staff resources than the FRA. FHWA is involved in safety improvements as related to railway grade crossings through Section 130, of its Highway Safety Program.

The Rail Safety Improvement Act of 2008 updated safety regulations and authorized the installation of new train control systems on all routes that handle certain classes of hazardous materials. The new regulations take effect at the end of 2015. (2040 North Carolina Statewide Transportation Plan, page 7-7, 2012)

Rail Freight: Statewide and Regional Current and Future Issues

The North Carolina General Assembly established the House Select Committee on a Comprehensive Rail Service Plan for North Carolina in 2008, to study development of a comprehensive rail plan. Freight rail needs identified by the committee, include rail capacity to promote economic development, better service for the military and ports, accommodating heavier rail cars (286,000 pounds), and addressing rail and highway congestion.

In its 2009 final report the 21st Century Transportation Committee recommended:

- Using more rail to transport freight;
- Investing in rail connections between intermodal facilities and inland ports;
- Restoring abandoned rail lines; and
- Expanding and upgrading passenger, freight, commuter, and short line service.

In 2007, the General Assembly instructed the Office of State Budget and Management to develop a Statewide

Logistics Plan to address long-term economic, mobility, and infrastructure needs. Short- and mid-term freight rail-specific recommendations in the plan include:

- Encourage further development along the Crescent Rail Corridor (0 to 5 years);
- Retain existing rail corridors; halt track removal (0 to 5 years);
- Support short line infrastructure improvements (0 to 5 years);
- Coordinate schedules to optimize freight and passenger services (5 to 15 years);
- Create a Charlotte to Wilmington multimodal corridor (5 to 15 years); and
- Expand high-use corridor capacity (5 to 15 years).

NCDOT has pursued multiple initiatives to increase safety on the state's freight rail systems. These new programs include the Crossing Hazard Elimination Program, Sealed Corridor Program, Private Crossing Safety Initiative, and Safety Oversight Program.

Improvements to the Southeast High-Speed Rail Corridor will benefit freight transportation, double (or triple) tracking will increase the train capacity and freight movement efficiency in the affected areas, and the Sealed Corridor Program will improve trackside safety. NCDOT has been awarded \$545 million from the American Recovery and Reinvestment Act to support implementation of Southeast High Speed Rail Corridor (SEHSR). \$520 million in improvements are anticipated between Raleigh and Charlotte to enable higher speeds and more reliable service through the corridor while improving rail security. Although this funding is to be utilized for increasing the capability of passenger traffic, any upgrades to the rail system in North Carolina will benefit freight movement as both passenger and freight trains operate on the same tracks.

Major strategic freight rail transportation initiatives will benefit freight rail. These efforts include the NS Crescent Corridor, the CSXT National Gateway, the doubling of the CSXT intermodal yard in Charlotte and the relocation of the NS intermodal yard in Charlotte. The NS intermodal yard relocation is a \$100 million joint venture among NS, the state, the City of Charlotte, the federal government, and the Charlotte Douglas International Airport. These initiatives will improve efficiency and cost-effectiveness of the freight rail network.

Freight System: Current and Future Issues Within the Piedmont Triad Study Area

The three goals of the region are:

1. Be recognized as the Premier Logistics Center of the East Coast of the United States providing air, highway, and rail infrastructure within and easily accessible to companies operating in the region.
2. Be a major player in the aviation industry, including companies that engage in aircraft design and construction, aviation parts manufacturers, and aviation services providers, the aviation industry continues to generate economic and job growth. Most of the aviation related activity in the region is happening at the Piedmont Triad International Airport. However, aviation-related activity is rapidly spreading throughout the region, notably in Winston-Salem, Davidson County and the area surrounding Burlington-Alamance Airport.
3. Fulfill the potential of the Aerotropolis/NC Center for Global Logistics initiative which targets the melding of business, education, research, and planned economic development to provide a blueprint for a vibrant future for the Triad Region and the entire state. The elements of the initiative operate synergistically to provide the leverage and mass needed to promote economic development, job growth, and educational opportunity in the region and state. (Seven Portals Study, page 84, 2011).

Given the Piedmont Triad's logistics and other assets which are reinforced by the FedEx Mid-Atlantic hub, the Region has a good opportunity to create a world-class, differentiating competency in multi-modal logistics that can strengthen the traditional manufacturing economy and attract new industries such as aerospace equipment, medical devices, microelectronics, and pharmaceuticals. Indeed, the Piedmont Triad's combination of location, interstate highways, PII and its new FedEx hub give the Region a competitive advantage that can help brand the Piedmont Triad the same way that RTP and research have branded the Raleigh-Durham-Chapel Hill area and financial services have branded Charlotte. Beyond branding, the Piedmont Triad's combination of logistical assets gives the Region economic advantage that has the potential to create tens of thousands of new jobs in the 12-county Region.

With the above in mind, an area that should be paid close attention to is the region's push to develop a major economic driver called a "Mega-Site". Because economic development efforts are competitive and as they have far reaching impact to job creation, real estate values and incentive packages, the information, in the following image and paragraphs, are gleaned from open sources (press, publications, internet, etc.)



FIGURE 7-18
Piedmont Triad Proposed Mega-Site Locations

It appears that there are four possible locations being studied inclusion in the regions efforts to create a mega-site. These are:

1. Heart of North Carolina MegaPark straddling Moore and Montgomery Counties just east of I-73;
2. Davidson County, near the intersection of I-85 Business and I-85;
3. Berry Hill Mega Park in Virginia near the intersection of Rockingham and Caswell County in North Carolina and Pittsylvania County in Virginia, and
4. A site in Randolph County, Liberty.

Success at any of these sites will have a major impact to traffic and freight flow in the region. Not only will the areas outlined in the comments below have a significant increase in traffic flow, the area surrounding the possible sites and the region in general will see a major increase in commuters and freight flow due to the increase of workers and suppliers of the company or companies that would locate to these sites. Further, with manufacturing now a global endeavor, freight flowing to and from container ports will impact traffic congestion here. Import and

export freight movement would increase on primarily I-40 and I-85 as they are the major routes into and out of the region from the ports of Norfolk, Wilmington and Charleston. In addition, intermodal cargo movements will increase along these routes with a major impact being felt at the Norfolk Southern Intermodal ramp in Greensboro (Patterson Street). Without room to grow, the Greensboro intermodal ramp may be required to shift cargo movement to the Charlotte, NC facility. In any case, the increase of truck traffic will be serious.

Basic comments follow concerning each location mentioned above:

1. Heart of North Carolina MegaPark - The impact to the study capture area in this case would be primarily at the intersections of I-73 and I-85 as well as I-74 and I-85. In addition, freight flow on I-85, I-40 and other major arteries would be affected. Traffic flow south would have no major impact. The Greensboro MPO has several projects identified that address maintenance and upgrades to affected roadways. They include the following:
 - I-5393 – I-40: Pavement Rehabilitation from I-73 to I-40/I-85 Split;
 - I-5337 – I-40: Pavement Rehabilitation from I-40 Business To Sandy Ridge Road;
 - I-5363- I-40/I-85: Pavement Rehabilitation from I-40/I-85 Split to Rock Creek Dairy Road;
 - I-5339 – I-85: Pavement Rehabilitation from I-85 Bus. to I-73;
 - R-952- I-40 Business /US 421: Pavement and Bridge Rehabilitation from Linville Rd. to west of Sandy Ridge Rd.;
 - I-4921- US 220: Upgrade to Interstate Standards from I-85 to Asheboro.
2. Davidson County - Impact area looks to be both the I-85 corridor as it moves northeast through the region as well as Highway 52, which would be a natural artery to I-40 and beyond. With the current issues as they exist today at Hwy 52 and I-40, this is an area to watch very carefully. Freight traffic moving southwest on I-85 would as well increase, however would not impact our region other than traffic backup if a major accident ensued.

3. Berry Hill Mega Park - As this site is in southern Virginia, the major impact to the region would be freight moving south along both Highway 29/I-785 and perhaps Highway US 220/I-73. The intersections of these roadways in Greensboro will become a major bottleneck. The loop around Greensboro will alleviate this somewhat depending upon the entrance/exit ramp design and should be completed before this mega-site begins affecting regional traffic and freight flow. R-4707, a project in the Greensboro MPO, identifies improvements to the interchange at Reedy Fork Parkway. The project includes reconfiguration of the interchange and improvements to Reedy Fork Parkway and Summit Avenue. In addition, the MPO has also identified a project that would upgrade US 29 to Interstate Standards and widen it from south of Reedy Fork Parkway to Rockingham County. Funding is in place for projects on the west side of Guilford County for US 220 (widening from US 220/ NC 68 Connector to Horse Pen Creek) and for the US 220/ NC 68 Connector (widening and new location project from US 220/ NC 68 intersection in Rockingham County to NC 68).
4. Randolph County - Again, understanding that any recruitment of a large manufacturing company will have major impact to this area of the region, the prime freight flow impact will occur at the intersection of Highway 421 and I-85. This will lead to increased traffic on both I-85 north and south as well as I-40 east. Fortunately the I-85 expansion project has been completed and is designed and constructed to handle much more traffic than currently exists.

The Region already has two examples of the impact large employers can have on the transportation network. The new Caterpillar plant, in Forsyth County, will cause a big increase in freight at the Union Cross Road interchanges with I-40 and US 311. Trailers hauling new heavy equipment have capacity, durability, and safety impacts on Union Cross Road and at the two interchanges. In Davie County, the new Ashley Furniture manufacturing facility may add as many as 200 trucks per day on I-40. The impact of this freight traffic increase is yet unknown. However, all major regional highways and interstates will be affected. In addition, Ashley Furniture is a major importer from the Far East we can expect increased container traffic flow from the Port of Wilmington along the I-40/I-85 corridor.

Regional transportation planners need to maintain a very close working relationship with all economic development groups in the region and most specifically the North Carolina Department of Commerce. Now economic development in one county affects the surrounding counties and the shared transportation network.

NC Ports

The North Carolina State Ports Authority is an Enterprise agency reporting to the NCDOT. The North Carolina ports system is owned and operated by the North Carolina State Ports Authority (NCSPA), an independent public agency that has not been part of NCDOT and has not received dedicated state funding for operating or capital expenditures. The North Carolina ports system consists of two seaports (Wilmington and Morehead City) and two inland terminals (Charlotte and Piedmont Triad, located in Greensboro). The inland terminals at Charlotte and Greensboro are served by I-77 and I-85 and I-40 and I-85, respectively. CSX and Norfolk Southern rail lines run through both cities. (2040 North Carolina Statewide Transportation Plan, page 10-1, 2012)

For many years, ships using the Panama Canal have been limited to dimensions of less than 1000 feet of length, 107 feet of width (beam) and 41 feet of depth. At this writing roughly 37% of cargo vessels are too large to use the Canal. However, Panamanian government is funding

a project to improve the canal that will eliminate the size restrictions and significantly increase the number of ships that can transit the Canal during the year. This widening will have big effects on the ports of call for the world's container ships. Once even the largest vessels can transit the Canal, all ships from Asia can travel directly to Port Elizabeth, Norfolk, and other east coast and gulf coast ports. **Figure 7-19** shows that the shipping patterns will become more heavily focused on direct shipments through the Panama Canal as well as trade lanes through the Suez Canal. The largest ships may even travel around the world, both east- and west-bound, and make stops at ports in the same direction on a continuing basis, rather than shuttling back-and forth across the Pacific or to-Europe-and-back through the Suez Canal. (Seven Portals Study, page 17, 2011)

More than 60 percent of foreign imports to North Carolina traveled by water, though primarily through ports in other states. Six states account for 90 percent of North Carolina's waterborne imports: Virginia, South Carolina, California, Georgia, Florida, and North Carolina. As shown in **Figure 7-20** North Carolina is the top destination for imports handled by the Port of Norfolk (AECOM; URS, 2012). *Thus the importance of the information outlined on page 24 of this study concerning the increased capacity of the double-stack intermodal train service from the Port of Norfolk to the Norfolk Southern Rail Road ramp in Greensboro.*

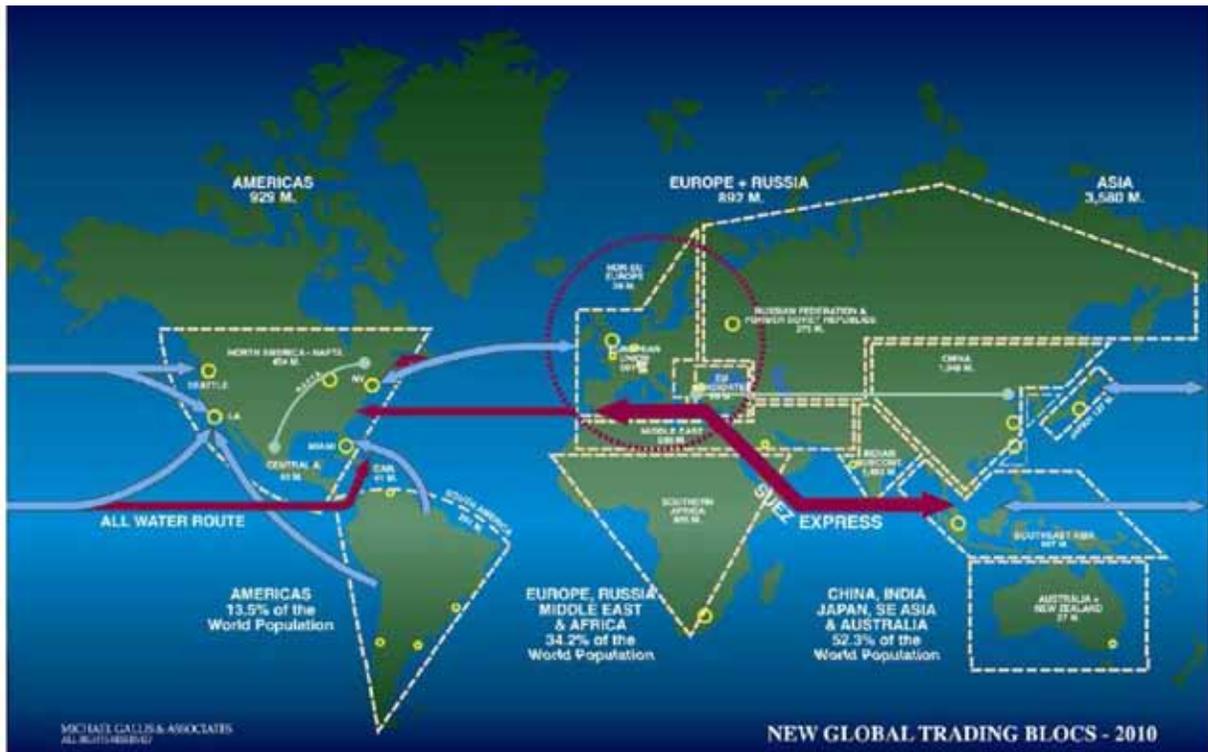


FIGURE 7-19
Emerging Global Trade Patterns



Source: Delcan, *Private Data for Public Purposes*, AASHTO Special Committee on Intermodal Transportation & Economic Expansion, Richard Mudge PhD, Delcan (October 14, 2011)

North Carolina ports rely more on truck freight than their peers do. **Figures 7-21 and 7-22** summarize the mode of travel to North Carolina’s ports and their peers for exports and imports. As truck freight is more readily divertible than rail freight, this supports efforts to retain North Carolina shipments and attract freight from other ports. The emphasis on retaining North Carolina freight stems from this study’s objective in assessing economic development potential; reducing costs for North Carolina shippers translates into productivity gains and competitiveness for the North Carolina economy directly. Attracting the freight from out-of-state shippers increases volumes at North Carolina’s ports and may yield scale efficiencies that benefit all port users and the state’s costs of operation. However, the productivity gains for out-of-state shippers remain out of state. (North Carolina Maritime Strategy, page 35, 2012)

FIGURE 7-20
Top Destinations of Freight from the Port of Norfolk

Port	NC Exports Leaving from the Port (A)			NC Imports Arriving at the Port (B)		
	Truck Only	Rail Only	Other ⁶	Truck Only	Rail Only	Other
North Carolina ⁷	97.3%	0.3%	2.5%	94.8%	4.6%	0.7%
Norfolk	83.8%	3.2%	13.0%	90.8%	0.0%	9.2%
Charleston	83.2%	3.3%	13.5%	70.8%	14.2%	15.0%
Savannah	55.9%	2.8%	41.3%	91.9%	1.7%	6.4%

Source: FAF, 3.1

FIGURE 7-21
Mode of Travel by Weight Percent 2010

Port	NC Exports Leaving from the Port (A)			NC Imports Arriving at the Port (B)		
	% Truck Only	% Rail Only	% Other	% Truck Only	% Rail Only	% Other
North Carolina ⁸	97.3%	0.3%	2.5%	94.8%	4.6%	0.7%
Norfolk	83.8%	3.2%	13.0%	90.8%	0.0%	9.2%
Charleston	83.2%	3.3%	13.5%	70.8%	14.2%	15.0%
Savannah	55.9%	2.8%	41.3%	91.9%	1.7%	6.4%

FIGURE 7-22
Mode of Travel by Value Percent 2010

⁶Includes Multiple Modes.

⁷Because of their proximity to one another, the North Carolina Ports cannot be isolated in the FAF 3.1 commodity data table. (A) North Carolina exports shipped to a port using the indicated mode. (B) Imports to North Carolina shipped from the port using the indicated mode.

⁸See note 6.

Airports

Because the region is focusing on aviation related industries and manufacturing, and because the FedEx Mid-Atlantic hub has recently opened airports are an important component of freight movement in the region⁹. We will not duplicate the various airport master-plans in this report because most are available on the internet. However, we will comment on specific facilities which we believe are important to readers.

Piedmont Triad International Airport (PTI)

The PTI's Airport Master Plan Executive Summary states:

“The expanded airfield infrastructure makes the airport an ideal candidate for enhanced service from its existing air carriers, potential new air carriers, fixed base operators and tenants and provides new capabilities to attract additional aviation-related tenants engaged in distribution, logistics, manufacturing, cargo, and aircraft repair and maintenance.”

“The airport continues to be a center for important regional economic development, with such major tenants as FedEx, Honda Aircraft, TIMCO, and CESNA, and with an outstanding infrastructure to attract new tenants.”

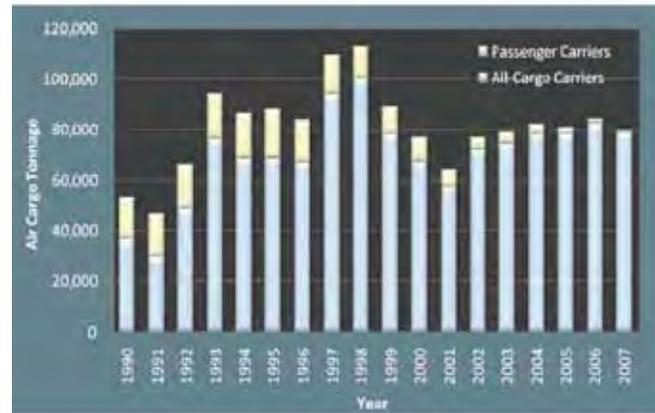
“The Airport Master Plan Update anticipates that the airport's most likely growth in the Near-Term will be the result of new tenants locating at the airport to take advantage of its outstanding infrastructure and its central location on the East Coast. Airport planning should embrace this trend. Finally, PTAA must plan for Long-Term growth. Undeveloped land, primarily to the north and west of the airport, must be acquired and protected to allow for future growth. This Airport Master Plan Update includes a long range strategic vision that goes beyond the typical 20-year planning horizon addressed in most Airport Master Plan Updates. The strategic vision proposes a future “fence line” to the north and west of the airport that will help guide decision-making as PTAA and land use and transportation planners consider land use around the airport.”

PTI's expansion opportunities are in the northwest quadrant of airport property. To properly access this, a new cross-field taxiway perpendicular to the second parallel runway and crossing the I-73 Connector (which will replace Bryan Boulevard at this location) needs to be constructed.

Based on the above statements, it is apparent that the growth and expansion of PTI will impact the freight flow in the region. Because economic development can move quickly, it is important that transportation and

land planners develop and maintain a close working relationship with PTI to enable them to act quickly as the planned expansion happens and economic development opportunities present themselves.

Projects identified in the Greensboro LRTP that would improve access to the airport include I-73 Connector (I-5110), US 220/ NC 68 Connector (R-2413), Airport Connector, E. Mountain Street widening (U-3617), Sandy Ridge Road widening and extension and widening of NC 68 and Pleasant Ridge.



Source: Piedmont Triad Airport Authority

Note: Data represents sum of enplaned and deplaned freight and mail.

FIGURE 7-23:
Trends in Total Air Cargo, by Carrier Type
(calendar years; freight and mail in tons)

Smith Reynolds Airport, Winston Salem

Although Smith Reynolds Airport does not have multiple runways or the runway length of PTI, it is an important asset of the region. Currently, utilized primarily for private aircraft and the maintenance of larger commercial aircraft, it maintains the capability for a freight/logistics operation using turbo-prop and regional jets. Smith Reynolds is a solid performer in the region's aviation efforts and careful attention should be paid to planned expansions, especially as affected by the modernization of Business 40 and US 52 in Winston-Salem.

Other Airports in the Region

Asheboro Regional Airport (ICAO: KHBI, FAA LID: HBI) is a city-owned public-use airport located 5.2 miles (11 km) southwest of the central business district of Asheboro. It was formerly known as Asheboro Municipal Airport. Asheboro Regional Airport covers an area of 454 acres (184 ha) at an elevation of 671 feet (205 m) above mean sea level. It has one runway designated 3/21 with an asphalt surface measuring 5,501 by 100 feet (1,677 x 30 m).

⁹John McPhee describes the impact of air freight in *Uncommon Carriers*.

Rockingham County NC Shiloh Airport (ICAO: KSIF, FAA LID: SIF, formerly 78N) is a county-owned, public-use airport in Rockingham County, North Carolina, United States. It is located in the town of Stoneville, 7.9 miles (12.7 km) northwest of the central business district of the city of Reidsville. It is also known as Rockingham County/NC Shiloh Airport, Rockingham County/Shiloh Airport, or simply as Shiloh Airport. The airport covers an area of 220 acres (89 ha) at an elevation of 694 feet (212 m) above mean sea level. It has one runway designated 13/31 is oriented southeast to northwest (1300, 3010) with an asphalt surface measuring 5,199 by 100 feet (1,585 x 30 m).

Davidson County Airport (ICAO: KEXX, FAA LID: EXX) is a public airport located 3 miles (5 km) southwest of the central business district of Lexington, a city in Davidson County, North Carolina, USA. This general aviation airport covers 75 acres and has one runway.

Burlington-Alamance Regional Airport (ICAO: KBUY, FAA LID: BUY) is a public use airport in Alamance County. It is 3.5 miles (5.6 km) southwest of the Burlington central business district and is owned by the Burlington-Alamance Airport Authority. The National Plan of Integrated Airport Systems for 2011–2015 categorized it as a general aviation facility. Burlington-Alamance Regional Airport covers 500 acres (202 ha) at an elevation of 616 feet (188 m) above mean sea level. It has one runway is designated 6/24, is oriented northeast to southwest (600 /2400), has an asphalt surface measuring 4,999 by 99 feet (1,524 x 30 m). The airport plans to extend its runway to 6,400 feet. The major tenant of the Burlington-Alamance LabCorp’s fleet of aircraft utilized to collect lab test samples for processing throughout the Southeast. The adjacent Burlington-Alamance Airports industrial park is where Honda Aircraft builds its jet engines.

Mount Airy/Surry County Airport (ICAO: KMWK, FAA LID: MWK) is a public use airport located 2.9 miles (4.6 km) southeast of the central business district of Mount Airy, in Surry County. The airport is owned by the city and county. The National Plan of Integrated Airport Systems for 2011–2015, classed it as a general aviation facility. Mount Airy/Surry County Airport covers an area of 147 acres (59 ha) at an elevation of 1,249 feet (381 m) above mean sea level. It has one runway designated 18/36 is oriented south to north (1800, 3600) with an asphalt surface measuring 4,301 by 75 feet (1,311 x 23 m).

Elkin Municipal Airport (ICAO: KZEF, FAA LID: ZEF) is a public airport located 3 miles (5 km) northeast of

the Elkin central business district of (what?), This general aviation airport covers 91 acres and has one runway. Elkin airport maintains a 4003 foot runway.

Montgomery County Airport (FAA LID: 43A) is a public use airport located in Star. It is owned and operated by Montgomery County. Montgomery County Airport covers an area of 65 acres (26 ha) at an elevation of 628 feet (191 m) above mean sea level. It has one asphalt paved runway designated 3/21 which measures 4,001 by 75 feet (1,220 x 23 m).

Swan Creek Airport is a private airport located on the western edge of Yadkin County, 5 miles (8 km) west of I-77. The airport covers 35 acres and has two runways. Runway 1 is 1650 ft. long and 200 ft. wide and runway 2 is 2600 ft. long and 200 ft. wide. The airport is accessible from I-77.

Hiatt Airport is a private airport on the eastern edge of Davidson County south of I-85. The airport covers 30 acres and has two runways. Runway 1 is 2500 ft. length and 75 ft. width and runway 2 is 1160 ft. length and 50 ft. width. The location is accessible from I-85.

Sugar Valley Airport is a private airport in northeast Davie County just north of I-40. The airport covers 70 acres and has two runways. Runway 1 is 2424 ft. length and 25 ft. width and runway 2 is 2000 ft. length and 100 ft. width.

Airport	Runway Length(s) in Feet		
	RUNWAY 1	RUNWAY 2	RUNWAY 3
Piedmont Triad International Airport	10,001	9,000	6,380
Smith Reynolds Airport	6,655	3,938	
Asheboro Regional Airport	5,510		
Rockingham Co., NC Shiloh Airport	5,199		
Davidson Co. Airport	5,004		
Burlington Alamance Regional Airport	4,999		
Mount Airy/Surry Co. Airport	4,301		
Elkin Municipal Airport	4,003		
Montgomery Co. Airport	4,001		
Swan Creek Airport	2,600	1,650	
Hiatt Airport	2,500	1,160	
Sugar Valley Airport	2,424	2,000	

FIGURE 7-24
Piedmont Triad Airport Runway Lengths

Recommendations for Piedmont Triad Study Area

Truck Route Recommendations

Trucks should be defined as vehicles with a manufacturer's gross vehicle weight of 33,000 pounds or more. This definition excludes most straight, panel, and delivery trucks, but includes large trucks with more than two axles, such as tractor-trailers (single and double trailers) and tandem axle dump trucks. This definition also excludes public service vehicles, such as garbage collection trucks. When truck routes are designated, signs should be posted at the city limits, highway exits, and other appropriate locations directing truck drivers to streets which permit their movements.

Restrictions may include limiting travel to US and NC routes or designated/signed routes through the city. Within the city limits, consideration could be given to amending the local ordinance to specifically prohibit through trip truck movements on local streets. Prohibition of trucks on any segment of state-maintained roadways will require approval from NCDOT. In addition, caution should be exercised when permitting vehicles carrying certain types of hazardous materials from utilizing certain routes (proximity to schools, housing, etc.)

Truck designations for major routes and industrial streets could prove beneficial. Using these routes provides better defined freight corridors. Likewise, truck traffic should be discouraged on roadways that do not meet the design criteria necessary to facilitate heavy truck traffic.

Industrial development will require efficient truck access and circulation to the arterial system, ultimately improving freight mobility while limiting cut-through truck traffic in neighboring subdivisions. Additional tasks associated with establishing a series of truck routes through the urban area include:

1. Work with NCDOT to prioritize resurfacing of designated routes in an effort to reduce noise and vibration from trucks;
2. Adjust signal timing along high priority routes to minimize delay to through movements based on posted speed limits. The result will be improved travel times, reduced noise, better fuel economy, and air pollution;
3. Publish and distribute educational materials to businesses and industries concerning proposed designated truck routes and to enlist their assistance in route planning;

4. Work with NCDOT to make improvements to critical intersections on truck routes to facilitate and encourage their use by truck operators. Improved turning radii, lane width and the provision of dedicate turn lanes will greatly improve the efficiency and safety of these corridors. This should include working with rail road operators in the region (North Carolina Rail Road, and Class 1 and Class 2 Rail Roads) to better understand rail traffic increases and/or decreases as they impact rail crossings within the regional infrastructure;
5. Identify streets in industrial areas that function as industrial collectors and work with stakeholders to evaluate and implement the appropriate cross-section

Summary Recommendations

Efficient and safe movement of goods

The following recommendations are intended to improve the efficient and safe movement of goods and services in the study area:

1. Continued expansion of the highway system to provide improved access and circulation around major transportation corridors. This should include working with NCDOT to complete the road projects suggested by the NC Governors Logistics Task Force "Seven Portals Committee" as outlined on page 11;
2. Continued investments within the vicinity of PTIA as outlined in the Airport Area Plan, Heart of The Triad Comprehensive Plan, Long Range Transportation Plan, Comprehensive Transportation Plan and the Thoroughfare and Collector Street Plan;
3. Coordinate needed improvements to meet the advancements of the PTIA logistical hub, and proposed PTI Air Logistics Hub and Piedmont Triad Aerotropolis
4. Implement an Intermodal Management System;
5. Coordinate with NCDOT on the development of future rail improvements. This should include discussion with both Class 1 (major) and Class 2 (short-line) railroads;
6. Coordinate area roadway planning with freight objectives, including access and mobility in the context of other planning objectives;

7. Increase the use and availability of intelligent transportation systems to reduce time trucks spend in congestion and ensure efficient timely movement of goods. (LRTP of Winston-Salem Area). This includes regular upgrades and improvement of signal management systems;
8. Coordinate with NCDOT on routine maintenance of truck routes carrying significant freight movements;

Awareness

- I. Coordinate and implement methods of keeping the regional consumer aware of the importance of freight and freight flow in the region;
- II. Monitor the freight traffic pattern shift due to the opening of the widened Panama Canal in 2014. As info, the canal opening may substantially shift Pacific Rim USWC discharge to a more USEC centric model for freight moving east of the Mississippi River;
- III. Establish and maintain communication with regional economic development offices as they pertain to large/mega-site projects in the region. (see pages 30-31).

Communication

- I. Establish annual meetings with the regions short-line Rail Roads to jointly discuss traffic flow and projected increase/decrease in the region;
- II. Establish and maintain communication with NCDOT Logistics Office concerning proposed regional “Freight Villages” studied and recommended for the region in the “Seven Portals Report” from the NC Governors Logistics Task Force;
- III. Create, implement and maintain a regional legislative workshop to discuss and promote the regions importance in freight flow and to secure funding to maintain and improve our infrastructure;
- IV. Create, implement and maintain a “Share the Road” campaign to elevate the importance of freight flow and how to properly share the road with heavyweight freight vehicles;
- V. Create an outreach campaign to truck stops serving the region. This is a “first stop” to greater safety for our citizens and national freight flow;

- VI. Schedule and maintain an annual regional Safety & Security meeting with government entities, NCDOT, private industry, US Customs and Police and Fire Departments.

Data Modeling

- I. Determine best ways and means of utilizing FHWA/NCDOT resources and data modeling to create a regional macro-view of national, state and regional freight projects/policies and their impact on the region. This capability will be a “must have” as we go forward and will provide a very strong tool for economic development recruitment.

Other

- I. Create and maintain a centralized/coordinated regional freight flow agency and ensure that all government entities are aware of and work with it.