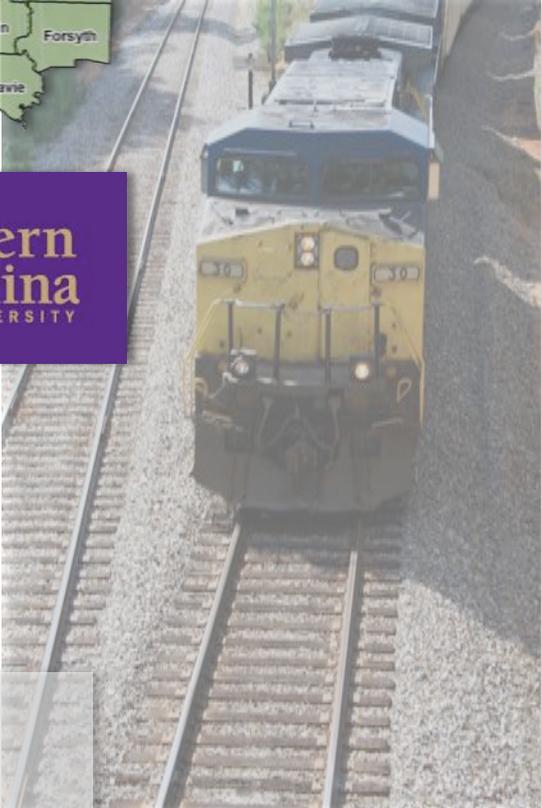


# Western North Carolina Inland Port Feasibility Study



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College of Business,  
Institute for the Economy and the Future



AdvantageWest



The Louis Berger Group  
The Tioga Group



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### Western Carolina University, College of Business and The Institute for the Economy and the Future



Western Carolina University's College of Business and the Institute for the Economy and the Future (IEF), developed and managed the Western North Carolina (WNC) Inland Port Feasibility Study in response to a legislative mandate and growing regional interest mechanisms to facilitate freight flows in order to promote economic development. Dr. Michael E. Smith, Associate Professor of Global Management and Strategy in the College of Business served as Principal Investigator and led the Study Team comprised of staff from the IEF and The Louis Berger Group in partnership with The Tioga Group (Project Consultants). Additional support in executing the study was provided by AdvantageWest and the Appalachian Regional Commission.

### Funding Partners

The IEF worked with numerous agencies and commissions to establish a funding partnership to conduct the WNC Inland Port Feasibility Study. Initially funded through legislation created by the North Carolina General Assembly, three additional regional and statewide partners have contributed to the effort and served in a facilitation and outreach capacity.

### AdvantageWest



As the economic development commission for Western North Carolina (WNC), AdvantageWest markets the mountain region to businesses looking to relocate, open new facilities or expand an existing business within the mountain region. Throughout the WNC Inland Port Feasibility Study, AdvantageWest has been an active participant in the process and a conduit to regional interests who could benefit from future efforts aimed at streamlining freight operations in the mountains.

Chartered in 1994, AdvantageWest is a non-profit public-private partnership that serves the 23 counties that comprise the mountain region of North Carolina and cover more than 10,000 square miles. AdvantageWest also seeks commercial enterprises such as filmmakers, entrepreneurs and tourism-based businesses in an effort to improve the quality of life for citizens within the region.

### Appalachian Regional Commission



The Appalachian Regional Commission (ARC) is a federal agency established in 1965 to increase job opportunities and per capita income in the Appalachian region of the United States to reach parity with the nation; strengthen the capacity of the people of Appalachia to compete in the global economy; develop and improve Appalachia's infrastructure to make the Region economically competitive; and build the Appalachian Development Highway System (ADHS) to reduce Appalachia's isolation. ARC's region covers parts of 13 states, including all of West Virginia. In North Carolina, ARC encompasses 29 counties, including all 23 counties within the AdvantageWest Region. ARC's interest in examining the feasibility of an inland port in Western North Carolina is an outgrowth of efforts in the early 2000s to identify freight-related transportation issues affecting the region, and recent efforts to identify strategies to connect Appalachia to global markets. The current study was funded in part by the ARC and addresses implementation of a regional strategy as appropriate to Western North Carolina. ARC has provided technical support to the IEF and the study team throughout the study.

### North Carolina Rural Economic Development Center



The North Carolina Rural Economic Development Center was established to develop, promote, and implement economic strategies to improve the quality of life of rural North Carolinians. With a special focus on individuals with low to moderate incomes and communities with limited resources, the Rural Center serves the state's 85 rural counties. Created in 1987, the Center operates a multi-faceted program that includes conducting research into rural issues; advocating for policy and program innovations; and building the productive capacity of rural leaders, entrepreneurs and community organizations. The center is a private, non-profit organization, funded by both public and private sources and led by a 50-member board of directors.



## I. Executive Summary

The development of inland ports or other trade processing facilities to facilitate trade and enhance shipping options for manufacturers at locations removed from traditional sea ports has been a growing trend in the United States over the past 25 years. Successful examples of different models of inland ports in the U.S. range from traditional port facilities located hundreds of miles from a seaport to networks of small freight transfer and consolidation facilities to virtual ports aimed at increasing regional trade and developing partnerships among manufacturers and shippers.

The purpose of the Western North Carolina Inland Port Feasibility Study was to determine the most appropriate type of inland port, if any, to promote overall economic development and be suitable to the geography and manufacturing characteristics of this unique region. The State of North Carolina, Appalachian Regional Commission, AdvantageWest and Western Carolina University, through the support of its funding partners, commissioned the study. In order to accomplish the purpose of the study, an exhaustive analysis of comparable cases from around the country, detailed analyses of shipping data, and extensive local area manufacturer interviews were undertaken. The results were then examined with spatial and network analyses and assessed using multi-criteria analysis (MCA) to create the foundation of our current understanding of the positioning of the western North Carolina region to support an inland port facility.

Inland ports are generally defined as facilities or organizations that process and handle shipments at a site displaced from ports of entry (sea, air, and land). These facilities also generally provide for the transfer of shipments between transportation modes involving highway, rail and/or air transportation.

For Western North Carolina, the nearest and most utilized sea ports for manufacturers within the region are the Port of Savannah, Georgia and the Port of Charleston, South Carolina. Based on feedback from area manufacturers and analysis of freight and travel time data, the transportation and freight networks connecting Western North Carolina to these seaports, as well as the ports themselves, are very reliable in terms of their service and responsiveness and are a vital part of various supply chains in the region. While these are positive aspects of WNC's freight transportation network, they are not indicators that would necessarily aid in the justification of a major inland port facility within the region.

The primary factor that contributes to the potential for an inland port facility that primarily focuses on the transloading of shipping containers is the volume of export shipping containers generated by manufacturers within Western North Carolina or a sub-area of the region. Analysis of the key indicator for container volumes, the Port Import Export Reporting Service (PIERS), shows that at this time the volume of export shipments spread among the 28 western counties of the State (approximately 10,000 twenty-foot-equivalent container units, or TEUs, per year) does not justify an inland port that serves as an intermodal container facility.

Early in the study it was understood that the region may not generate the necessary volumes, which led to an examination of other inland port types that exist in the United States. For purposes of identifying these different models, the study team examined several sites through visits and a review by the consultant team of previous work on identifying inland port typologies.

Despite the region not having the current volume of exports to justify a container facility, Western North Carolina is well-positioned to approach the development of an inland port through a tiered process. This approach provides a more flexible inland port solution which evolves as regional manufacturing characteristics change and proactively works to attract new business. Therefore, it is recommended that Western North Carolina, through a variety of potential partnerships, begin development of an inland port through the following tiered process.

- Tier 1 – A Regional Logistics Organization / Alliance;
- Tier 2 – A Network of Sub-Regional Freight Consolidation Facilities; and
- Tier 3 – A Large-scale Intermodal Facility.

Depending on the estimated demand and benefit of a facility, a Tier 1 facility could be created and slowly transformed into a Tier 2 and then Tier 3 facility. Alternatively, immediate construction of a Tier 3 facility may directly benefit the region if the area is able to generate support from a combination of manufacturer(s) and a willing Class I railroad. The three tiers are described below:

### **Tier 1 – Regional Logistics Organization / Alliance**

As a first step for a Tier 1 facility, the western North Carolina region should establish an organization or alliance to assist manufacturers in developing logistics solutions and partners to consolidate freight loads to and from sea ports and other destinations. The main goal is to develop a partnership among shippers with common origins or destinations for their products. This model of e-Port could be organized under an entity such as the NC Ports Authority, AdvantageWest, or through one of the region’s universities. It could also be organized as a subset of a larger statewide logistics authority, as recommended in the 2008 Statewide Logistics Plan for North Carolina. The regional logistics organization model requires minimal staffing and capital costs. The only capital cost is office space, likely within an existing organization’s office. Similar ongoing efforts include the NC Ports operation at the Charlotte Inland Terminal, the WNC Transportation Alliance under the Asheville Chamber of Commerce, and the Farmers Fresh Market in Rutherford County. This model is immediately feasible and has been effective in other regions. Thus, the Study Team recommends that this model be implemented in WNC.

### **Tier 2 –Network of Sub-Regional Freight Consolidation Facilities**

Beyond the development of a regional body involved in coordinating freight flows and advocacy for freight-related issues within the region, steps should be taken toward developing a network of sub-regional freight facilities to assist area manufacturers and shippers in consolidating freight and organizing shipments. Three potential sites were identified as part of this study, including an existing industrial park in Rutherford County, a site in Marion and potential development in the Buncombe County-Henderson County area. Based on Study findings, the site in Rutherford County appears to be the highest priority given a number of factors, including initial indications of interest in a public-private partnership including local government, Duke Power and CSX. However, the other two sites have potential as described in this study and rapidly changing conditions may warrant more immediate attention to developing these sites.

The form of the facility which appears to best meet current conditions would be a rail park, similar to the facility recently opened in Somerset, Kentucky. Such a facility is relatively inexpensive compared with other options, provides for improved shipping options and requires only relatively modest volumes for cost effectiveness. Further, such a facility can serve to promote the development of ancillary business activities which drive economic development in the region and better access to global markets for local businesses. Finally, the success of such a relatively modest facility can be utilized to justify expansion if appropriate market conditions develop.

As the Class I Railroads adapted to changing economic conditions during the completion of this study, railroad executives expressed interest in the utilization of freight consolidation facilities to aggregate shipping activity and speed service along their mainline tracks. One particularly attractive regional scenario includes a network or networks of freight consolidation facilities to serve the region with a hub or hubs that coordinate and aggregate shipments to and from the spokes. This general concept opens opportunities for new methods and facilities to facilitate freight flows, in addition to expanding the reach of current approaches. For example, such a spoke and hub model could leverage the Charlotte Inland Terminal operated by the North Carolina State Ports Authority to create a broader freight network.

### **Tier 3 –Large-scale Intermodal Facility**

The establishment of a logistics organization and utilization of freight consolidation facilities is part of a regional economic development toolbox to attract new manufacturers to the region. If this materialized to a scale that results in more than 10,000 TEUs/year of exports in a concentrated area in WNC, the region could then move toward establishing a full-scale intermodal facility. The intermodal facility has the same characteristics as the freight consolidation facilities but on a larger scale, with the option of transferring goods to and from rail services and a rail link to sea ports.

This would most likely be constructed in conjunction with private investment from one of the Class I railroads serving the region. This could occur in the hub location of the freight consolidation facilities or be a secondary inclusion in the development of a privately-financed rail intermodal center in other areas as identified by Norfolk Southern or CSX. The intermodal facility can be expected to capitalize on proximity to other markets in the upstate of South Carolina or eastern Tennessee, depending on its ultimate location.

### **Conclusion**

The central concern is that the economic development of Western North Carolina depends on the Region being connected to global markets by a system that promotes effective freight movement. As work recently completed by the Appalachian Regional Commission indicates, regions that take steps to ensure that they are part of effective transportation networks aligned to provide effective access not just to national markets, but to global markets will be placed at an advantage relative to less proactive regions. The appropriate concern is not if steps should be taken to create coordinating mechanisms and freight facilitating infrastructure in Western North Carolina, but instead with the type, level, and location of investments.

## II. Introduction

The Western North Carolina Inland Port Feasibility Study was conducted under the direction of the Western Carolina University's College of Business and the Institute for the Economy and the Future (IEF), in cooperation with AdvantageWest with support from the State of North Carolina, the NC Rural Center, and the Appalachian Regional Commission. The Louis Berger Group, Inc., a worldwide engineering and planning firm with offices in Raleigh and Asheville, aided in conducting the study in partnership with The Tioga Group, a nationwide firm specializing in freight transportation.

The purpose of the study was to perform a feasibility analysis for locating an inland port and potentially related facilities in Western North Carolina. The need for such an analysis arises from the confluence of a number of economic and transportation challenges: increasing globalization; significant levels of outsourcing; capacity constraints within the existing transportation system; and rising transportation costs. In the face of these challenges, numerous solutions have been proposed. Among the proposed solutions, there has been particular interest expressed in inland ports as an approach to connecting regional assets to global markets.

There are several successful examples of inland ports across the U.S. but their characteristics can vary greatly, from traditional port facilities located hundreds of miles from a seaport to a network of small freight transfer and consolidation facilities. An inland port typically processes and handles shipments at a site displaced from congested ports of entry (sea, air and land). These facilities also generally provide for the transfer of shipments between transportation modes involving highway, rail and/or air transportation.

Key components of the Inland Port Feasibility Study were identified as:

- Analysis of freight data (rail, truck, air) for the 29 counties in Western North Carolina;
- Regional profiles, including demographics and major manufacturers/shippers;
- A survey of WNC companies and their freight characteristics and needs;
- Interviews with major companies, manufacturers, shippers and trade groups;
- Outreach to other groups such as artisan cooperatives and farmers;
- An analysis and identification of potential candidate counties and/or sites; and
- Outreach to regional stakeholders, elected officials and the public.
- Participation with the Appalachian Regional Commission Network Appalachia Study Group in developing a study and ARC strategy related to intermodal freight (entitled "Enhancing Access to Global Opportunity") and ensuring that WNC strategies are integrated with the broader regional efforts.

The primary challenge in the study was to identify the appropriate inland port type to serve the business interests of the region with close attention paid to the unique environment and customs that exist in the mountains. The need to find new freight and economic solutions is underscored by population growth and changes in the regional economy. The economy in Western North Carolina is based on a wide variety of business activities, including traditional manufacturing, services and increased interest in niche opportunities such as organic farming and artisan crafts.

Beyond the examination of the feasibility of inland port development, the study also examined the role of related activities in economic development. Increasingly, the existence of freight-handling facilities is being seen as inadequate to generate substantial economic advantage for the regions that surround them. Thus, it is important to examine the potential for additional value-adding activities within the region. This study also focused on the need for storage and processing facilities that support value creation and enhance trade for manufacturers, shippers, artisans, farmers and other businesses in WNC.



Additionally, the study examined the potential for international trade and facilitation of efficient utilization of logistics assets. Given the increasing importance of domestic and international trade for the WNC economy, regional economic development was identified as a key goal of the inland port study. The project's ability to promote job growth, industry attraction and business expansion are critical components in the feasibility of an inland port facility. The study also highlighted the value of cooperation among the various entities (manufacturers and shippers, transportation firms, governmental entities, economic development representatives, chambers of commerce and universities) in the region as a necessary ingredient in the successful implementation of the recommendations from the study.



## III. Study Methodology

The Western North Carolina Inland Port Feasibility Study is comprised of four key activities: 1) Characterization of existing conditions as they relate to relevant local and regional trade and transportation data; 2) Examination of location-based market conditions for each of Western North Carolina's 28 counties; 3) Assessing feasibility; and 4) Coordinating conduct of the study with the work of the Appalachian Regional Commission Network Appalachia Working Group.

### Characterization of Existing Conditions

Gathering information such as commodity flows, truck volume data, shipping company contact information, and primary data on regional shipping was a critical first step in the assessing feasibility of an inland port facility in Western North Carolina. Using industry contacts, federal and state data sources, and local knowledge of commodity shipments, the study team analyzed this data to create a freight portrait of the region contained in the "Trade and Transportation" section of the study. This information was supplemented with county-specific demographic, economic and transportation system information compiled by the North Carolina Department of Commerce, Department of Transportation, NC Ports Authority and others.

Understanding the feasibility of the inland port also depends on understanding the primary and secondary purposes of the proposed port facility – what existing port facilities or operations will the proposed facility be relieving, what markets will it serve, what other ports will it connect with, and what are the site-specific advantages that various locations may realize? The study team and representatives of the Institute for the Economy and the Future visited 10 seaports, inland port facilities, and logistics groups to better understand the appropriate analytical approach and to identify potential opportunities in Western North Carolina. This analysis included visits to or discussions with representatives from:

- Port of Wilmington, North Carolina;
- North Carolina Inland Terminal, Charlotte, North Carolina;
- Port of Savannah, Georgia;
- Virginia Inland Port, Front Royal, Virginia;
- Somerset, Kentucky;
- Port of Huntsville, Alabama;
- Kansas City Smartport;
- Port of Long Beach, California;
- Southern California Logistics Airport in Victorville, California;
- Port of Stockton, California; and
- Crow's Landing, Modesto, California.

Based upon these visits, interviews with local shippers and manufacturers, and baseline data gathering, seven national examples relevant to Western North Carolina were developed.

### Location-Based Market Conditions

Concurrent with the other data gathering tasks, an assessment of each county in the 29 North Carolina counties designated under the Appalachian Regional Commission (ARC) was conducted to serve as a first-tier evaluation to determine salient economic, geographic, demographic and transportation features. The 23 counties covered by AdvantageWest are among those under the ARC designation.

The first-tier evaluation hinged primarily on third-party data sources that describe the transportation network and driving/rail times; demographic and economic data; political climate; proximity to origins and distribution facilities identified; and other characteristics such as proximity to an air freight facility. The mapping associated with this step serves as a foundation for specific sites, routing, and condition

information. The other products from this sub-task were evaluation and ranking of candidate counties to carry into a second, more detailed level of analysis. The results were analyzed in the context of existing market conditions to establish a list of qualified counties / locations to assess for potential for an inland port.

### **Assess Inland Port Feasibility**

Based on information gathered in previous steps, as well as field inventories of candidate areas and nearby transportation system analysis, the study team produced an assessment of three preferred sites (Buncombe County, Rutherford County, McDowell County). From this, a multi-criteria analysis (MCA) was developed and applied. The first step in applying the MCA method was to identify criteria that influence the definition of success of an inland port. The second step was to assess the relative importance of each of the criteria to derive a score that indicates each criterion's influence on the success of the inland port project. After determining relative weights of criteria and applying the weights to the indicators that represent the criteria, an evaluation of each candidate site was conducted by the study team.

### **Coordinating with the Appalachian Regional Commission Network Appalachia Working Group**

Representation from the study team involved with this feasibility study has been included and involved in the work under way by the Network Appalachia Working Group. Exchange of data and coordination of efforts has reduced duplication of efforts and ensured that WNC efforts dovetail with strategies being implemented by the ARC. This coordination should help to provide greater impact of the efforts taken at both the local and Regional levels.

#### **IV. Review of Relevant Literature**

A national and regional literature review was conducted to gather salient information on existing inland port practices as well as ongoing or previous efforts related to Western North Carolina and the Southeastern United States. The purpose of the literature review was to help define the issues related to manufacturing and shipping in the region and state, detail previous work that could inform the study, and explore the various possibilities that inland ports offer.

Through this research, five key documents were identified and are summarized below.

- Meeting the Transportation Challenges of the 21st Century: Intermodal Opportunities in the Appalachian Region (2004);
- Statewide Logistics Plan for North Carolina (2008);
- Southern California Inland Port Feasibility Study: Inland Port Case Studies (2006);
- North Carolina Waybill Analysis, Executive Summary (2006); and
- South Carolina Inland Container Port Concept Study.

### **Meeting the Transportation Challenges of the 21st Century: Intermodal Opportunities in the Appalachian Region (2004)<sup>1</sup>**

The Appalachian Regional Commission (ARC) developed a series of four studies aimed at identifying freight-related challenges and opportunities for Appalachia. ARC has coordinated completion of nearly 85 percent of the Appalachian Development Highway System (ADHS) since its inception and is now examining other aspects of transportation within the region, including freight. The *Intermodal Opportunities* report analyzed commodity movements to, from and through Appalachia in order to position the region to adapt to changes brought about by globalization and increased congestion on transportation networks.

Some of the key findings of the study that have relevance to the WNC Inland Port Feasibility Study are:

- National and regional transportation capacity, efficiency and responsiveness can be enhanced through expanding intermodal links in Appalachia along the ADHS, rail systems, inland navigation, and aviation modes;
- Appalachia transportation assets are poorly coordinated and interconnected;
- The ADHS and its intermodal linkages can attract new commerce and jobs to the region due to lack of congestion when compared to alternative routes in other areas of the United States;
- A comprehensive, region-wide transportation system is essential to economic success and offers security, safety, environmental, and quality of life benefits;
- The emergence of global trade is expanding and diversifying commodity flows within the region;
- Global and domestic commodities are subject to increasing reliance on multi-modal shipping containers;
- Supply chains involving containers are built around seamless, intermodal transportation that features high speed, high efficiency and highly responsive customer service; and
- Growth in the volume of commodities being processed through seaports along the Atlantic coast of the U.S. is beginning to strain transportation capacity.

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<sup>1</sup> *Meeting the Transportation Challenges of the 21<sup>st</sup> Century: Intermodal Opportunities in the Appalachian Region*. Appalachian Regional Commission. Washington, DC. December 2004.

**Exhibit 1: The Appalachian Region is Comprised of Portions of 13 States.**  
*The Appalachian Region*



Source: Appalachian Regional Commission

The study also included sections regarding changes that have occurred in supply chain management and production technologies that were echoed through the interviews with Western North Carolina area manufacturers. Changes include an emergence of more just-in-time (JIT) delivery systems, specialization and custom-made production; JIT manufacturing; and decentralization of manufacturing. These trends have collectively placed more emphasis on delivery reliability and efficient transportation systems in order for regions to remain competitive. These findings directly correlate to economic development, as increased congestion on existing transportation routes and a lack of alternatives can place areas at economic disadvantage.

Increased congestion is evident in the study's findings regarding roadway congestion in North Carolina's ARC counties. Forecasted traffic volumes for the Appalachian region indicate North Carolina's ARC counties will continue to rank among the top three among 13 ARC states in congestion through 2020. This applies to roadways in both urban and rural areas.

Data for South Carolina including counties in the upstate region that border Western North Carolina, project congestion rates by 2020 to be the highest in Appalachia's rural areas. This area includes the cities of Greenville and Spartanburg and the Interstate 85 corridor that links Charlotte to Atlanta. These counties include strategic highways such as I-26, US 221, and US 25 that link Western North Carolina to seaports in Charleston, Jacksonville and Savannah, and to inland intermodal freight terminals in Atlanta and Charlotte via I-85.

The study concluded that ARC should continue to work to establish and integrate relationships between the Region's transportation and economic development interests. Specific recommendations were:



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- Seek and identify institutional mechanisms to more effectively develop regional transport initiatives that transcend traditional jurisdictional boundaries;
  - Optimize the capacity, efficiency and responsiveness of Appalachia's transportation resources;
  - Continually track economic trends and commodity flows to anticipate and position the region for change; and
  - Seek opportunities to utilize advanced information, communication and security technologies to enhance Appalachia's transportation efficiency and expand its potential to attract new commercial and employment opportunities.



### Statewide Logistics Plan for North Carolina (2008)<sup>2</sup>

This study was conducted in response to legislation instructing the state to undertake a statewide logistics planning effort to address long-term economic, infrastructure and mobility needs. The result addresses three key components: 1) identifying priority commerce needs; 2) enumerating transportation infrastructure actions, including multi-modal solutions; and 3) a timetable to meet these needs. The plan also addresses highway freight movements, rail-based freight, and air freight.

Of relevance to the WNC Inland Port Feasibility Study are the data contained in the report as well as the recommendations which, if enacted, could potentially position regional partners such as the Institute for the Economy and the Future, ARC, the Asheville Chamber of Commerce, WNC Transportation Alliance, and AdvantageWest to take a leading role in representing Western North Carolina in statewide freight initiatives. A key recommendation of the plan is the establishment of a state-level freight logistics authority that would oversee and assist in synchronizing freight-related transportation infrastructure investments through a consortium of public agencies and private industry representatives. While the *Statewide Logistics Plan* profiled freight logistics organizations in other states as potential models for North Carolina with a focus at a state level, examples of regional organizations (such as Kansas City Smartport) that could support and participate in a statewide group were not discussed.

While the study did not provide an in-depth analysis or recommendations for highway-related freight in Western North Carolina, it did contain pertinent information on railroad corridors and air freight facilities that characterize current and future conditions for the WNC Inland Port Feasibility Study area.

The absence of specific analyses or recommendations related to the highway system in the mountain region is likely due to traffic volume and congestion issues in other reaches of the state that either are currently, or are projected to be more severe than those anticipated for WNC. The infrastructure summary, however, includes some needs and issues that could directly impact the region. These include:

- Improving "last mile" intermodal connections;
- Providing priority status to maintenance and expansion projects for National Truck Network Roads, urban interstates and interstate connectors;
- Retaining existing rail corridors and halting track removal efforts;
- Exploring routing options for hazardous materials shipments to avoid highly populated areas; and
- Continuing support for short-line railroad infrastructure improvements.

Of secondary but notable importance are the identified needs that could impact access to seaport facilities that are not currently a major factor in freight traffic in Western North Carolina. These included: a) Improving highway links between Charlotte and Wilmington; and b) Providing priority status to high priority National Highway System Corridors, including a future Interstate highway facility between Raleigh and Norfolk, Virginia.

Finally, the *Statewide Logistics Plan* recommends the development of a comprehensive goods movement plan. Much of the analysis conducted as a part of the WNC Inland Port Feasibility Study could potentially feed into the statewide effort.

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<sup>2</sup> List, George F, et al. *Statewide Logistics Plan for North Carolina: An Investigation of the Issues with Recommendations for Action*. North Carolina Office of State Budget and Management. Raleigh, NC. May 2008.

### **Southern California Inland Port Feasibility Study: Inland Port Case Studies (2006)<sup>3</sup>**

Twenty-nine inland ports in the United States and Europe were characterized in a project for the Southern California Association of Government (SCAG) led by The Tioga Group. Inland Ports are loosely defined and can take the shape of a variety of facilities and economic development initiatives. *Inland Port Case Studies* was organized into eight different classifications of Inland Ports to attempt to characterize them within this broad spectrum. The ports profiled were organized into eight different models:

- Satellite marine terminals;
- Multimodal logistics parks;
- Rail intermodal parks;
- Logistics airports;
- Networks and corridors;
- Shuttle services;
- Trade processing centers; and
- Economic development initiatives.

These case studies, along with the site visits conducted by the WNC Inland Port study team and relevant regional data, form the basis for identifying which model might work best for Western North Carolina. The case studies profiled port initiatives that are considered a success and those that are considered failures. They were a combination of efforts led by government agencies, railroads, airports and private investors.

Tioga Group used the case studies contained in the report for SCAG to narrow the list of inland ports to be updated and profiled as part of the WNC effort.

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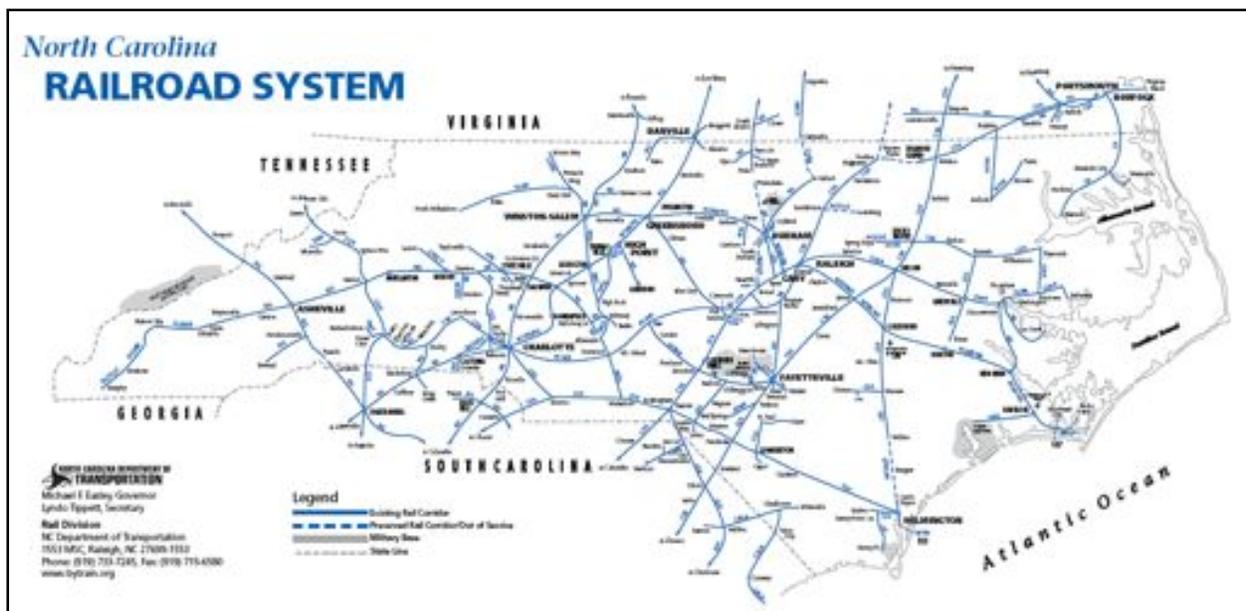
<sup>3</sup> Tioga Group, et al. *Inland Port Feasibility Study: Inland Port Case Studies*. Southern California Association of Governments. Los Angeles. June 2006.

**North Carolina Waybill Analysis, Executive Summary (2006)<sup>4</sup>**

The North Carolina Department of Transportation (NCDOT) regularly tracks the volume and type of rail shipments occurring throughout the state, not just for commodities flowing to international ports but also for commodities flowing to and from other states. The method for analysis of such freight movements is contained in the federal Surface Transportation Board Carload Waybill Sample data. The Carload Waybill Sample data are collected from the major railroads in the United States and contains written documentation on origin, destination, volume, commodity, carrier and type of railroad car for freight shipments.

In 2006, NCDOT published a summary analysis of this data from the years 1999 to 2003. The data are protected under a confidentiality agreement between NCDOT and the federal government since proprietary information on the nation’s railroads, which are private corporations, is included in the raw data. Given the protected nature of these data, only the executive summary is available for reference in the WNC Inland Port Feasibility Study, although the study team was able to review the full report and take its entire scope into account in making recommendations.

**Exhibit 2: North Carolina Railroad System**



Despite these limitations, the report contains information relevant to railroad corridors (Exhibit 2) within Western North Carolina. The study shows that the majority of inbound rail traffic is shipped from coal-producing regions in Kentucky and West Virginia to power plants in North Carolina. The Norfolk Southern and CSX lines that traverse Western North Carolina provide some of the primary linkages to the coal mines that fuel much of North Carolina’s energy production.

Three segments of rail lines in Western North Carolina are summarized, with coal identified as the primary on-line commodity on these routes:

- **Norfolk Southern line between Asheville and Salisbury**, which is identified as a 139-mile secondary mainline with medium through traffic levels;

<sup>4</sup> *North Carolina Waybill Analysis: Executive Summary*. North Carolina Department of Transportation, Rail Division. Raleigh, NC. November 2006.

- **Norfolk Southern line north and south of Asheville**, which is shown as an 87-mile mainline segment with medium through traffic north of Asheville and discontinued service on portions of the line south of Asheville (Saluda Grade);
- **CSX line between Charlotte and the North Carolina-Tennessee state line**, characterized as a 173-mile key mainline segment with medium/high through traffic levels.

*Note: the Norfolk Southern line between Asheville and Sylva, and the Great Smoky Mountain Railroad short line between Sylva and Murphy, were not summarized as part of this report.*

### **South Carolina Inland Container Port Concept Study<sup>5</sup>**

The South Carolina study examined shipping container throughput volumes primarily generated by the Port of Charleston to determine if such volumes justified further examination of an inland port facility somewhere in the state. Using the Virginia Inland Port (VIP) as a benchmark (20,000 containers per year) and a key case study, the analysis was conducted to determine the ability to attract new shippers to the inland port and the Port of Charleston.

The South Carolina study is relevant to the WNC study in that it profiles the potential for container movements related to the Port of Charleston, which has been found to be a primary location for ocean-going containers imported to or exported from Western North Carolina. Federal data indicate a significant amount of the truck traffic (more than one million tons annually in 1998) generated by the Port of Charleston utilizes the Interstate 26 corridor through Western North Carolina (Exhibit 3). The study also examined the potential of locating an inland port in the Upstate region of South Carolina, generally between Greenville and Spartanburg – less than 70 miles from core freight activity areas in Western North Carolina (Asheville/Hendersonville and Marion/Morganton).

The perspective contained in the South Carolina study indicates that there are public and political concerns related to increased traffic generated by the Port of Charleston and this appears to be in part an impetus for the study. The study recognized that an inland port would likely mean increased costs for shipping in exchange for increased benefits in terms of freight processing, availability of empty containers, and access to uncongested highway corridors that link key destinations across the southeast. Additionally, there are references to conflicts between the storage of empty containers and local land uses; the potential for an inland port to move operation-related congestion away from the Port of Charleston; and ability of an inland port to alleviate congestion in the Charleston metropolitan area.

The South Carolina Inland Port study concluded that the preliminary assessment indicated that such a facility “may not be market-driven and financially viable” in the current environment, but could provide operational and societal benefits to warrant public investment. It also concluded that an inland port could become viable in the future as congestion worsens in the Charleston area and fuel costs increase to the point that there is a shift from truck to rail transportation.

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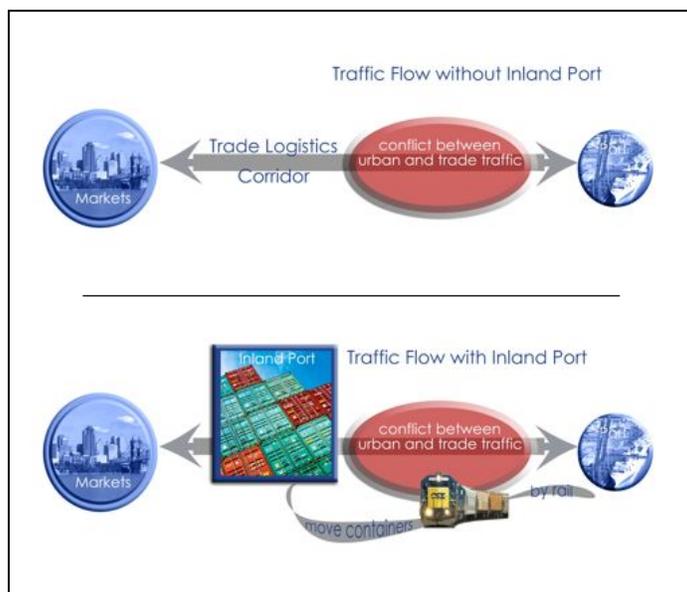
<sup>5</sup> Wilbur Smith Associates. *South Carolina Inland Container Port Concept Study – Final Report*. 2002.

**Exhibit 3: Inland Movement of Maritime Cargo by Truck from the Port of Charleston (1998)**



Exhibit 4 is adapted from the South Carolina study and illustrates how an inland port can function within a transportation network.

**Exhibit 4: Inland Port Concept. An Inland Port Improves Transportation Through Freight Aggregation and Transfer between Transportation Modes.**



## V. Inland Ports

### What is an Inland Port?

Inland ports are defined by the University of Texas Center for Transportation Research as a facility “located away from traditional coastal borders with the vision to facilitate and process international trade through strategic investments in multi-modal transportation assets and by promoting value-added services as goods move through the supply chain.”<sup>6</sup> Based on this definition, the goal of an inland port is to achieve maximum efficiency for freight cargo through avoiding or bypassing congestion associated with the adjacent roadway and rail systems linking to traditional seaports. Containerized cargo (20-foot and 40-foot shipping containers) is the typical mode of transport as it is easily transferrable from truck to rail to ship and vice versa, however some inland ports process more specialized commodities or bulk goods.

### The Potential of Inland Ports

Ports are more than locations where ships are loaded and unloaded. The commerce passing through seaports attracts a wide variety of warehousing, processing facilities and ancillary services. The “inland port” concept refers to the idea that some port facilities could be duplicated or complemented at inland locations, thus promoting economic development and logistics integration inland while reducing the demands on scarce space at the seaport. A distinguishing feature of an “inland port” is the use of transportation assets as an “anchor tenant” for logistics-based economic development.

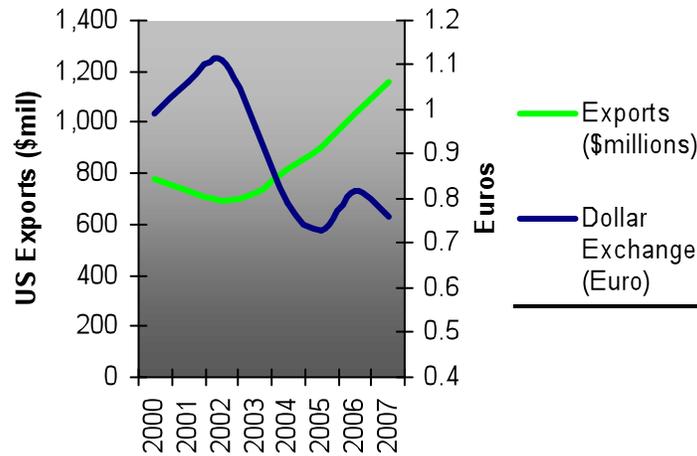
Recognizing that potential, various public and private interests have realized that inland ports are a burgeoning trend in the international, national and regional freight logistics industry. These trends have been magnified as traditional infrastructure is either constrained or experiencing unprecedented levels of congestion, and financial resources are strained due to economic conditions, fuel costs, and materials costs. Port-related congestion has been created as growth has occurred in all forms of freight traffic resulting from trade pacts such as NAFTA, and trade volatility results from increased trade to and from Asia, and recent substantial increase in U.S. exports resulting from the declining exchange rate of the dollar (Exhibit 5). Further, future growth in freight demand will result both from economic trends and projected increases in population. Demand on East Coast ports is expected to increase through efforts to increase capacity through the Panama Canal. While container ships are being expanded and ports modified to accommodate worldwide demand, seaports are also working to expand their facilities to meet the demand for these new ships. This includes addressing constraints such as existing railroad and highway systems, empty container storage facilities, and processing centers. In some cases, there are additional challenges to expanding seaports such as increasing opposition from local citizens and municipalities that are adjacent to such facilities.

From a national perspective, inland ports are being developed or sought as another option within the existing network of railroads, highways and seaports where there is emerging and unprecedented congestion combined with a limited pool of resources for expansion. As U.S. exports have grown in the 2000s, manufacturers and shippers are faced with a new set of challenges. These include: finding empty intermodal containers at inland locations, as the trade imbalance created a shipping paradigm where containers return to port empty for shipment back to overseas locations; identifying shipping lanes that can guarantee delivery for time-sensitive commodities; and seeking efficiencies in the existing transportation network where logistics models are based on fossil fuel prices that were less than half of today’s rates when the models were developed.

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<sup>6</sup> Harrison, Robert, et. al. *Inland Port Transportation Evaluation Guide*. Center for Transportation Research. University of Texas at Austin. 2002.

**Exhibit 5: US Dollar Exchange Rate (EURO) Compared to US Worldwide Exports, 2000-2007**



These challenges also affect the Appalachian Region, as ARC discovered in its series of freight studies that have led to a region-wide exploration of potential inland port facilities across its 13 states. Just as the Appalachian Development Highway System was developed to connect to the rest of the country via new and upgraded roadways, ARC is examining how other facets of the transportation system, particularly freight facilities, can be developed to provide a competitive advantage to Appalachia. Over time, a network of new freight-related facilities has been developed or proposed along the borders of, or connecting to, Appalachia. However, these facilities have not been coordinated in terms of how they can service the region. These facilities include the Virginia Inland Port, the Port of Huntsville, the Trans-Tennessee Railroad, the Heartland Corridor and the proposed Port of Pittsburgh container-on-barge facility.<sup>7</sup>

In North Carolina, the *Statewide Logistics Plan* noted the value facilities such as the rail intermodal parks in Charlotte and Greensboro and seaports at Wilmington and Morehead City potentially contribute to the state’s economy and competitive advantage. As result, the plan recommended major upgrades to existing highway and freight facilities to help link these facilities and alleviate congestion between them. It also recommended upgraded or new connections to and from the Port of Norfolk and along highways that will eventually lead to Charleston.

While not specifically noted in the recommendations for port facilities in the NC *Statewide Logistics Plan*, Western North Carolina will play a role in the state’s economic future as it relates to freight movement. WNC is in a position that is unique to the rest of North Carolina in that it enjoys rather uncongested access to the Port of Charleston and the Port of Savannah via Interstate 26. Links to these ports from other parts of North Carolina experience higher levels of congestion or are out of the way when compared to access to the Port of Norfolk or Port of Wilmington. Rail intermodal facilities located in the Charlotte region are also easy to access for Asheville and points east, while Atlanta is within a 2-3 hour drive of the westernmost counties.

With these factors in mind, the mountain region of North Carolina must approach its freight solutions from a regional perspective unique from the Piedmont and Coastal Plains in that it draws upon what is

<sup>7</sup> Appalachian Regional Commission. *Meeting the Transportation Challenges of the 21st Century: Intermodal Opportunities in the Appalachian Region Intermodal Case Studies*. Washington, DC. 2004.

occurring in nearby portions of Georgia, South Carolina, Tennessee, and Virginia as well as North Carolina. As the ARC intermodal and the South Carolina Inland Container Port studies show, congestion is projected to increase along the corridors that serve Western North Carolina from these surrounding states. This growth will continue to stress the existing transportation system.

### Options

As the Case Studies examined for this report and the *Inland Port Case Studies* report articulate, inland ports differ greatly from the basic concept of a satellite marine terminal. A broader definition should include a variety of inland port project types, including physical facilities to handle marine containers, air cargo ports, and facilities to facilitate value-adding activities (e.g., light manufacturing) as goods move through the supply chain. Although the types of projects may differ, there is one common element, and that is that they all should have the goal of developing economic activity around transportation infrastructure at inland points. Following is a brief overview of the different types of inland port facilities.

#### Satellite Marine Terminals

As the original inland ports, these facilities offer the key commercial and operational functions of a seaport at an inland location. Shippers, consignees, truckers, brokers and other commercial entities interact with the satellite terminal just as they would with a marine terminal. In both cases the customer has no responsibility for movement between the satellite terminal and the seaport. All such movement is accomplished under the steamship bill of lading.

The Virginia Inland Port (VIP) located in Front Royal Virginia is a North American model of a satellite terminal of this kind. VIP was initially established by the Virginia Port Authority (VPA) as a market initiative to take business from the Port of Baltimore. VPA was trying to attract Western Pennsylvania and Eastern Ohio container cargo to Front Royal for movement by Norfolk Southern rail shuttle to Norfolk. This initiative had little success in diverting cargo from Baltimore. However, it eventually attracted a significant amount of industrial and distribution warehouse development which could utilize the rail shuttle.

One of the case studies describes a similar project currently under development in California's Central Valley. The San Joaquin Valley Inland Port is a project to develop a rail shuttle between a new Central Valley terminal and the Port of Oakland to address agricultural export markets. The new terminal and industrial park are to be located at the former naval air facility at Crows Landing. This is an example of an existing export market driving the need for a rail shuttle service.

#### All-Cargo Logistics Airports

Closure of military bases across the country has led to the establishment of several logistics-based industrial developments around former military airports. In each case, promoters are attempting to attract tenants based on air cargo capabilities. Success has been mixed. All-cargo air operations are very limited; about half of all air cargo travels in the baggage space on passenger flights. Express carriers such as FedEx, DHL, Airborne, and UPS carry large volumes of parcels, but have a limited need for additional hubs. Moreover, there is a very limited range of manufacturers and distributors with such a great reliance on air cargo that they would locate at an all-cargo airport. Many of the firms with such heavy air cargo or express needs are located at existing major air express hubs, such as Memphis. It appears that air cargo based developments have been most successful in attracting tenants in the aircraft industry itself whose need for runway access is paramount.

#### Multi-Modal Logistics Parks

Multi-modal logistics parks have been the most successful type of inland ports at attracting economic development. These developments have used multi-modal infrastructure (air-rail-truck or sea-rail-truck)

as the core of business or industrial parks. Whereas conventional business or industrial parks used office buildings or manufacturers as “anchor tenants”, these “logistics parks” use the transportation infrastructure as a selling point. These developments have much in common with the shippers, consignees, and ancillary businesses that surround seaports. They are “inland ports” without being extensions of seaports.

A well known example of a multi-modal logistics park is the Alliance, Texas, Logistics Park 15 miles north of Fort Worth. This multi-use business park, covering 15,000 acres, was a master planned project developed by Hillwood Investments, a Ross Perot-owned company. Logistics based anchor tenants include an all cargo airport and a BNSF rail intermodal facility.

A lesser known development is the Port of Huntsville in Northern Alabama. This project was started in 1967 as a small regional airport and has evolved over 30 years into a 4,000-acre industrial park. The logistic based anchor tenants include an air cargo airport with two 12,000 foot runways and a rail intermodal facility served by Norfolk Southern.

### **Rail Intermodal Parks**

Rail intermodal parks or integrated logistics centers (ILC), as they are often referred to, are industrial parks built around a rail intermodal terminal “anchor tenant.” This model appears to be the type development which most economic development agencies have in their vision of an inland port. Rail intermodal terminals have strong economies of scale which require large concentrated volumes of business to be economically viable. Railroads, therefore, are highly selective about the markets in which they locate terminals and provide intermodal train service. They usually have only one terminal in a relatively large market and are reluctant to take the risk of developing terminals and extending service to smaller markets.

Almost all rail intermodal terminals are built and owned by the railroads. In very few cases public or public/private agencies have created intermodal terminals in the hopes of encouraging development in the same manner as multi-modal logistics parks.

The high profile example of a successful rail intermodal park is the CenterPoint Properties development at the former Joliet Arsenal. Logistics Park Chicago is a 2,500-acre, master planned development. This facility includes a 750-acre BNSF Railroad intermodal terminal serving the largest distribution market in the United States. CenterPoint has developed eight million square feet of industrial property with plans to expand to 12.5 million square feet. This level of development and success can be seen as a very fortuitous convergence of circumstances. Unfortunately, it may be very difficult for new projects to replicate the success of Logistics Park Chicago.

Most rail intermodal terminals have attracted some industrial development. In the past, terminals were developed independently with no integrated industrial park. Rail carriers have now realized the industrial development value of their intermodal terminals. As new or replacement terminals are developed additional land is generally acquired to incorporate an ILC.

One case study describes the development of the Neomodal terminal in Stark County, Ohio. This facility was built with government funding and the case study was selected to demonstrate problems which can result from development of a facility which does not sustain a minimum volume.

### **Networks and Corridors**

In some cases, several facilities link together inland ports, seaports and related developments into operating networks or corridors. The networks and corridors concept does not represent a central facility like the previous examples. The focus of such a collection of facilities is on promotion of development and

trade on the corridor. These projects also show the value of being located on a trade or transportation corridor.

Two case studies will describe corridor projects. The North American Inland Port Network (NAIPN) is an organization established to develop and promote an active inland port network along the NAFTA corridor between Central Mexico and Canada. The Heartland Corridor project is centered on a Norfolk Southern rail corridor and double stack clearance project between Virginia's Ports of Norfolk and Portsmouth and Midwest market intermodal terminals of Columbus and Chicago. The key aspect of this case study is the potential development of intermodal terminals in small inland markets along the corridor.

### **Economic Development Initiatives Designated Inland Ports**

There are a number of initiatives that are called inland ports that are economic development initiatives designed to promote logistics-based development. The creation of Kansas City Smart Port was such an initiative. Kansas City Smart Port is an organization formed to promote and enhance the Kansas City metro area's status as "America's Inland Port Solution." One of its main missions is to grow the region's transportation industry by attracting business with significant transportation and logistics elements.

Another such organization is the Des Moines Area Metropolitan Planning Organization which promotes the Des Moines Inland Port as a great economic development opportunity to business. The Des Moines Area MPO mission is "... to work with the public and private sector to maximize the Des Moines metropolitan area's, central Iowa's and Iowa's economic opportunity through development of and advocacy for an efficient transportation system to promote economic development and trade in the North American Trade Corridor ..." . One of the case studies will describe the Des Moines Inland Port.

### **Trade Processing Centers**

U.S. Customs and Border Protection has encouraged the concept of International Trade Processing Centers (ITPC's) to shift some of the trade-related activity away from congested ports and border crossings. A number of proposed projects include initiatives to relocate various "trade processing" activities from congested and costly border gateways to inland points. A key issue for these initiatives is the definition of "trade processing" and their ability to define and market a value proposition.

Given a broad commercial goal of moving imports and exports as quickly and economically as possible, "trade processing" functions would generally be regarded as sources of cost and delay to be avoided or minimized. For some commodities there is a strong preference to not process goods due to the required time and administrative requirements.

Unavoidable trade processing steps are primarily related to Customs and other government regulatory and security functions. For most containerized cargo, Customs clearance is accomplished electronically through the Customs and Border Protection (CBP) Automated Manifest System, with no physical cargo or container contact. There is no relationship between the AMS data entry and cargo location. A significant part of the carrier and NVOCC (Non-Vessel Operating Common Carrier) data entry and processing is actually outsourced to foreign companies. For the great majority of containerized cargo, therefore, there are no "trade processing" functions that could be relocated inland from the seaport. For these reasons, ITPC's will not be the primary driver of a logistics based economic development initiative.

### **Inland Port Functions**

Just as there are a variety of inland port typologies, the functions of the inland port also vary. Ideally, these functions are in alignment with the economic objectives of the region.

## Value-Added Functions

For a facility along a trade or goods movement corridor to add value, it must ordinarily do one or more of three things: process the goods, consolidate the goods or distribute the goods.

- **Processing.** “Processing” in the broadest sense could include refining, sorting, packaging, testing, assembling, or any other operation that increases the value of the goods to the customer. Classic examples include milling grain into flour, light manufacturing and assembly of manufactured goods, or packaging bulk goods for retail sale. Completion of regulatory requirements such as Customs clearance or agricultural inspection can, in some sense, be regarded as increasing the value of the goods by making them legal to sell, but the importers, carriers, and customers do not willingly pay for those types of “processing.”
- **Consolidation.** Consolidation is a second means of adding value. Consolidation can include consolidation of multiple small shipments into a single, more efficient large shipment or consolidation of multiple items into a single delivered product. The first type of consolidation is typical of LTL trucking, air freight forwarding, export containers, freight stations, or outbound truck/rail transloading. The second type, also called “kitting” is typical of computer retailers (e.g., Dell Computing) or retail packages of seasonal promotions (e.g. end-of-aisle Christmas card displays).
- **Distribution.** Distribution in its simplest sense is the act of splitting large shipments into smaller shipments for local delivery. This simple sort of distribution is also called “deconsolidation.” Typical examples include:
  - wholesale-to-retail distribution centers (DCs);
  - inbound rail/truck transloading for local delivery;
  - inbound air freight forwarding;
  - inbound LTL trucking; and
  - import container freight stations.
- **Combinations.** Most facilities host a combination of these basic value-added steps. For example:
  - LTL truck terminals receive inbound consolidated loads from other hubs, deconsolidate them, resort them, and send them out as consolidated loads to be distributed along a local route. The process is reversed for outbound shipments.
  - Retail chain distribution centers receive truckload lots from multiple vendors and create consolidated loads for individual stores. They also receive returned merchandise and shipping containers from individual stores and consolidate them for return to vendors.
  - Import distribution centers receive consolidated container loads of merchandise. They sort the merchandise into new consolidated loads for regional DCs or stores, and often “process” imports by packaging and pricing.
  - Air freight forwarders may function like LTL truck terminals but may also offer export crating or Customs brokerage services.

## Adding Value at Inland Ports

With these basic types of value creation as building blocks, the different types of value-added processes are evident. Most inland ports combine modal transfer (including consolidation/deconsolidation of trainload or planeloads) with providing facilities for processing/consolidation/deconsolidation by tenants. The modal transfer and consolidation/deconsolidation of shipments is analogous to a seaport handling vessels with multiple shipments, hence the “inland port” nomenclature. The business of providing land or facilities for processing/consolidation/deconsolidation by tenants is basically the same as industrial park development, with an emphasis on logistics rather than manufacturing.

## Commercial Customs Functions

**Customs Inspections.** Only a small percentage of all import containers are opened or otherwise physically inspected by Customs and Border Protection (CBP). Containers are inspected for contraband (e.g. drugs), undeclared or incorrectly declared cargo (e.g. commodities banned, governed by quotas, or subject to higher duties than the declared contents), or stowaways. CBP relies primarily on the Automated Targeting System (ATS), which identifies shipments to be physically inspected based on origin, destination, commodity, shipper/consignee, and other factors. Containers declared to contain handicrafts from Columbia, for example, are much more likely targeted than auto parts from Japan.

Containerized cargo may be inspected via remote sensors, X-rays, cursory examination, or complete unloading for an item-by-item examination. Cargo is cleared for delivery or transport inland only after necessary CBP inspections are completed. Other inspections may be required as well, such as USDA inspection of imported meat.

Imported goods must be “cleared” by Customs before the consignee can take possession. To be “cleared,” the consignee or his agent (e.g. a Customs Broker) must complete electronic or paper forms, pay any applicable duties, and make the cargo available for inspection if required. Import shipments can be “bonded” and move “in bond” if a Customs Broker has posted a bond sufficient to cover any applicable duties. Once “bonded” a shipment can be moved inland or to a Customs Bonded Warehouse to await final clearance.

**Centralized Examination Stations.** Shipments requiring detailed examination are frequently directed to a Centralized Examination Station (CES), essentially a warehouse or transloading facility where CBP agents can have access to the goods in question. The importer or exporter bears the cost of this examination and any transportation to and from the CES.

**In-bond transport.** If the only issue involving the cargo is payment of applicable duties, cargo owners or their agents (e.g. a Customs House Broker) may post a bond and transport the container in-bond to an inland location pending Customs clearance. A large portion of West Coast import containers moving inland by rail moves in-bond, with Customs clearance completed before the container is released from the inland rail terminal. In this case, the cargo “enters” the United States in the inland Customs District where it was released. The “processing” function is minimal, and is usually completed without CBP personnel on site.

**Foreign Trade Zones.** A Foreign Trade Zone (FTZ), also known as a Free Trade Zone, is a federally sanctioned site where foreign and domestic goods are considered to be outside of the U.S. customs territory. Foreign Trade Zones operate at the intersection of regulatory and commercial interests. Cargo received into a Foreign Trade Zone has not technically entered the United States in a regulatory sense and is therefore not yet subject to duties, quotas or other regulations. Importers can leave inventory in an FTZ (at some cost) until it is advantageous to actually receive it. Under carefully described conditions, cargo can be packaged, combined, or otherwise processed in an FTZ and re-exported without U.S. duties or limits. Merchandise can be brought into an FTZ to be stored, exhibited, repackaged, assembled, or used for manufacturing free of customs duty, quota, and other import restrictions until the decision is made for the goods to enter into the U.S. market. Foreign Trade Zones are used for a variety of purposes and commodity movements within global supply chains. For example:

- **Cash Flow.** Customs duties are paid only when imported merchandise is shipped into the U.S. Customs territory. Merchandise may be held in inventory in the FTZ without Customs duty payment. Merchandise Processing Fees are owed only when and if merchandise is transferred to the U.S. Customs territory.
- **Exports.** No customs duties are paid on merchandise exported from a FTZ.

- **Spare Parts.** To service many products, spare parts must be on hand in the United States for prompt shipment. Spare parts may be held in the FTZ without Customs duty payment.
- **Quota Management.** Merchandise may be held in a FTZ even if it is subject to U.S. quota restriction. When the quota opens, the merchandise may be immediately shipped into U.S. Customs territory.
- **Quality Control.** The FTZ may be used for quality control inspections to insure that only merchandise that meets specifications is imported. All other materials may be repaired, returned to the foreign vendor, or destroyed under Customs supervision.
- **Inventory Control.** The FTZ is subject to U.S. Customs Service supervision and security requirements. Operations in a FTZ require careful accounting of receipt, processing and shipment of merchandise. Firms have found that the increased accountability cuts down on inaccurate inventory, receiving and shipping concerns, and waste and scrap. Merchandise consumed in processing in a FTZ generally is not subject to U.S. Customs duties.
- **Exhibition.** Merchandise may be held for exhibition without Customs duty payment.
- **Reduced Insurance Costs.** The insurable value of merchandise held in a FTZ need not include the Customs duty payable on the merchandise. Some users of FTZ's have negotiated a reduction in cargo insurance rates because imported merchandise is shipped directly to an FTZ without the opportunity for potential pilferage at deepwater ports or major international airports.

The advantages of a Foreign Trade Zone are, of course, highly specific to the import flows and company circumstances involved. Most of all, an FTZ offers flexibility and potential savings to creative shippers and receivers who can take advantage of these opportunities.

## Economic Development

The common goal of each of the inland port models described above is economic development. Exhibit 6 describes three different types of economic development: "conventional" economic development, logistics-based development and inland ports. The table shows the distinctions between the types of economic development and compares the different types of anchor tenants that are sought. The columns are cumulative from left to right; logistics based and inland port developments have all the issues and tools of conventional economic development, plus their own set of more specific elements.

### Conventional Economic Development

Traditional economic development agencies focus on industry attraction in an attempt to expand the economic base which results in more jobs and increased tax revenues. The target organizations and businesses can range from a franchise restaurant to a department store to an auto manufacturer. The basic message of most economic development agencies is "our region is an attractive place for your organization." For businesses, the message tends to emphasize low capital and operating costs, a high-yield market, and various financial incentives. For headquarters offices, the agency is more likely to emphasize quality of life and cultural advantages. In seeking an "anchor tenant" for a large development, an economic development agency is likely to seek a manufacturer, hotel, department store, or office building as appropriate. Economic development agencies address transportation issues but tend to emphasize passenger transportation and access to regional markets. Economic development agencies use a wide range of regulatory and financial tools, as shown in Exhibit 6.

### Logistics-based Economic Development

By focusing on the freight transportation and logistics advantages of a candidate site, logistics-based developers bring additional tools and leverage to bear on location decisions. A critical distinction is that

logistics-based advantages complement and strengthen the basic attractions of a city, region or site, but cannot override poor location. This distinction is evident in the Neomodal case study. Logistics-based development is much more likely to succeed with the involvement of a specialized master developer such as CenterPoint Properties development Logistics Park Chicago. Another key factor in successful logistics development is willing long-term commitments from the railroad, air cargo operator, or other carriers. The difference between logistics-based development and market-based development is illustrated by the emergence of trade and transportation corridors as distribution center (DC) candidates. DCs are traditionally located to serve a given local or regional market at the least cost, usually by locating them at or near the center of the market. However, a new category of DCs is emerging intended for forward distribution of transloaded or sorted goods to more distant points in a corridor.

### **Inland Ports as Economic Development**

On the spectrum demonstrated in Exhibit 6, inland ports take the concept of logistics-based development one step further to complete the economic development "tool kit." By conceptualizing an inland location as a "port," with all the ancillary port facilities and services that can be translated inland, this approach focuses on trade-based businesses for which conventional economic development and logistics-based development may not be enough. An inland port will not thrive in a poor economic location or with poor logistics. The presence of Customs and Foreign Trade Zone services can be regarded as thresholds for a fully developed example of an inland port.

**Exhibit 6: Characteristics of Economic Development and Inland Ports**

Economic Development	Logistics-based Development	Inland Ports
<p><b>Goal:</b> Attract beneficial businesses and organizations to the region.</p> <p><b>Message:</b> The region is an attractive, low-cost, and high-yield place to do business.</p>	<p><b>Goal:</b> Attract logistics-based businesses.</p> <p><b>Message:</b> The region/site offers specific logistical advantages (beyond its general business advantages).</p>	<p><b>Goal:</b> Attract trade-based businesses.</p> <p><b>Message:</b> The region/site offers specific advantages for handling international trade (beyond its general business and logistical advantages).</p>
<p><b>Anchor Tenants:</b> Any business, but often manufacturers.</p>	<p><b>Anchor Tenants:</b> Distribution centers, carrier facilities.</p>	<p><b>Anchor Tenants:</b> Carriers, Customs, FTZ, transloaders.</p>
<p><b>Issues &amp; Tools</b></p> <ul style="list-style-type: none"> <li>• Location assistance</li> <li>• Zoning &amp; Permitting</li> <li>• Telecom &amp; Utilities</li> <li>• Basic roads</li> <li>• Tax Incentives</li> <li>• Labor pool</li> <li>• Marketing assistance</li> <li>• Financial incentives</li> <li>• Cost of doing business</li> <li>• Local business climate</li> </ul>	<p><b>Issues &amp; Tools</b></p> <ul style="list-style-type: none"> <li>• Freight transportation infrastructure (truck, rail, air, water)</li> <li>• Location on trade lanes &amp; corridors</li> <li>• Role in supply chains</li> <li>• Freight carrier participation</li> <li>• Regional &amp; national market access</li> <li>• Cost of logistics</li> <li>• Local receptivity to freight &amp; logistics</li> </ul>	<p><b>Issues &amp; Tools</b></p> <ul style="list-style-type: none"> <li>• Customs functions</li> <li>• Port of Entry status</li> <li>• Foreign Trade Zone</li> <li>• Security</li> <li>• Location on trade lanes</li> <li>• Distance to border</li> <li>• Cost of trade movements</li> <li>• Local receptivity to trade</li> </ul>

**Characteristics of Successful Inland Ports**

As described above, inland port initiatives can take many forms spanning the range from satellite marine terminals and rail intermodal parks which require significant capital investment to virtual ports and economic development organizations which promote inland ports and logistics-based development in their jurisdiction. Following is a summary of many of the characteristics or other assets which can be found in a viable inland port.

- Transportation infrastructure such as air cargo capacity, rail links and cooperative railroads with intermodal terminals, and an accessible Interstate or similar highway system;
- Demographic advantage in the form of proximity to large population centers or advantage to a significant base of manufacturing activity;
- Geographic advantage in the form of accessibility to coastal ports and a lack of barriers to efficient transportation to the port;
- Presence of large shippers seeking to leverage the benefits of an inland port development;
- Access to and support of leading-edge information technologies required to facilitate the efficient movement of goods into and out of the area. This includes telecommunications networks and information service providers that can readily meet the needs of the international trade and transportation community;
- Cooperation among public and private entities focused on the improvement of transportation and logistics services, for the benefit of the whole community;



- 
- The formation of councils or authorities to expand public and private involvement through groups of related participants that address common concerns of logistics based constituents;
  - The willingness and organizational capability to aggressively market the inland port concept locally, nationally, and internationally, to gain community support and attract potential relocation prospects; and
  - Capable program development and program management, which is essential in bringing together multiple entities from both the public and private sectors.



## VI. Freight Movement Trends and Impacts on Feasibility

In the dynamic environment of transportation there are always a number of evolving issues that are driving changes in supply chain economics and development of logistics infrastructure. Following is a summary of several trends that have impacted freight movement and distribution:

- Imports from China and other Asian countries have been the major driver of import supply chains and this growth is expected to continue;
- Port congestion and delays experienced in 2002 in the California ports of Los Angeles, Long Beach, and Oakland due to labor issues have driven importers to find alternative strategies to reduce their dependence on these ports;
- All water East Coast routing through the Panama Canal continues to grow but Panama Canal throughput capacity has become an issue suppressing continued growth until the expansion project is completed in 2015;
- All water East Coast routing through the Suez Canal from origins in Southeast Asia and the Indian sub continent has had significant growth but on a very small base, therefore Suez traffic is not a major factor in East Coast port volume;
- Ocean carriers are building larger vessels in excess of 10,000 TEU to increase economies of scale while the ports capable of handling these vessels are expected to increase their market share of container traffic;
- Growth in export from US manufacturers;
- Increased fuel prices that make rail a more viable option; and
- Specialized import distribution centers are being built by major retailers in interior markets favoring intact 40-foot international container movement.

Key considerations for a Western North Carolina inland port are the trends that impact East Coast ports, particularly the Ports of Savannah and Charleston. In addition, the trends in logistics chains affecting regional import and export markets are important to Western North Carolina. The prospects of carbon trading or purchasing of carbon credits may also influence freight movement and enhance the trend toward rail transport as many industries begin to prepare for such approaches. The following is a review of these relevant trends.

### Escalating Fuel Cost

Escalating and volatile fuel costs are leading shippers to reevaluate their long-term reliance on trucking and search for more economical long-term solutions, such as rail intermodal service, that are not so vulnerable to fuel-driven price increases. The high fuel costs are making rail intermodal service more competitive with trucking, especially on shorter distance moves of less than 500 miles. It may be too soon to tell but higher fuel costs may also have a long-term impact on distribution patterns and the location of distribution centers. Higher trucking costs may lead to an increase in the number of distribution centers with a shorter radius of distribution from each center. Rail carload services which have been limited to very long haul, heavy loading commodities like canned goods or lumber products may become more competitive in certain truck lanes, increasing demand for rail served warehouse facilities. A recent Norfolk Southern initiative in upstate New York is promoting development of short haul carload services in partnership with regional short line railroads.

Another impact of higher fuel cost is its affect on continued use of certain off shore production facilities, as indicated in the cost of shipping a container from Asia to the U.S. East Coast, which has tripled since 2000. The shipping costs, along with increases in production in China, are driving U.S. manufacturers to consider relocating certain manufacturing facilities back to the U.S. or to Mexico. Beyond fuel costs, costs of doing business in China are increasing as China becomes more industrialized, worker wages increase and environmental regulations are enforced. These trends will favor growth of U.S.-based production.

### **Shift of Imports to All Water East Coast Routes**

Following the delays at West Coast ports in 2002, shippers began to develop alternative distribution plans to reduce their reliance on these ports. This led to a trend of increased development of distribution center capacity near East and Gulf Coast ports and a shift to all water routing via the Panama Canal. Container traffic through the Panama Canal has grown from about 6.2 million TEU in 2002 to about 13.8 million TEU in 2007. This represents an average compounded annual growth rate of over 17%. While challenging economic times have slowed the growth, it is anticipated that we will continue to see expansion. A major beneficiary of this growth has been the Port of Savannah, which has a strategy to locate import distribution centers to locations near the port.

There has also been an increase in all water routing through the Suez Canal to East Coast ports. However, the Suez route is not competitive with the Panama Canal from China and Northeast Asia, the dominant sources of U.S. Imports. Suez Canal container traffic increased by 39% from 2006 to 2007, however, the 2007 volume was only 2.3 million TEU; about 16.7% of the Panama Canal volume. The trend favoring the Suez Canal is a shift in manufacturing origins to Southeast Asia. As manufacturing costs have increased in China, companies have changed their sources of supply to producers in Singapore and Vietnam and to the Indian subcontinent. These locations have shorter shipping distances to the U.S. East Coast via the Suez Canal.

Another driver of all water routing has been rail carrier import container rate increases from West Coast ports to Eastern markets. Ocean carriers utilize inland rail service (also known as landbridging) to move a significant number of import containers from West Coast ports to Eastern U.S. markets. As ocean carrier rail transportation contracts were renewed in 2005 and 2006, rail carriers were in a strong market position due to fuel cost increases and rail capacity shortages. Western rail carriers reportedly increased their inland rates to ocean carriers by as much as 30% providing additional incentive to utilize all water routes to the East Coast. In response to these rail rate increases, most ocean carriers evaluated their inland service networks and reduced the number of inland destinations to which they would offer rail service for their import containers.

### **Dollar Devaluation and Export Growth**

Containerized exports increased significantly in 2007 and 2008. Outbound loads for the major West Coast ports were up 15.4% and East Coast ports were up 14.4%. There are two major trends driving the growth of exports. Clearly, the devaluation of the dollar made U.S. products more competitive, especially in European markets while the other driver of container exports has been the market for export grain and agricultural commodities moving in containers.

At the same time there was been a decline in U.S. imports. With the decline in imports and the growth of exports, there has been a shortage of containers and tight vessel capacity for export products. One manufacturer reported he had to book vessel space up to six weeks in advance for Atlantic sailings and three to four weeks in advance for Pacific sailings. This is as compared with previous periods during which the situation was reversed. Clearly, volatile demand represents a challenge for planning logistics capacity.

The increased competitiveness of U.S. exports can be a market opportunity for southeastern manufacturing companies. However, the issues of container availability and vessel capacity will need to be addressed, especially for smaller shippers who don't have a great deal of leverage.

### **Rail Capacity and Pricing Trends**

Rail carrier track miles have declined by more than 50% since 1960 as rail carriers have eliminated excess capacity and improved capacity utilization. This long-term trend in track mile reduction along with normal traffic growth has reached the point where rail capacity has become an issue for the carriers.

At the same time motor carrier productivity has declined and costs have increased. Motor carriers have had to deal with driver shortages, new hours of service regulations, increased insurance costs and mandated emission standards that have reduced fuel economy. Most recently, the fuel cost increases have placed rail carriers in an even stronger competitive position relative to motor carriers. The recent strong economy, along with rail capacity constraints and improved competitive position, has given rail carriers the opportunity to increase prices.

Although rail carriers are moving forward to increase the capacity of their rail networks, these infrastructure investments are very capital intensive, are implemented at a measured pace and are not expected to greatly expand capacity. As a result, this trend of increased rail pricing has continued even in the face of the current economic downturn. In the short run the rail carriers are expected to continue to take advantage of their strong competitive position to increase rates and improve profitability. Since the industry is now very concentrated with only six major carriers, competition among competing carriers is not expected to moderate the upward price pressure in the near term.

### Supply Chain Management

Supply Chain Management (SCM) has become a standard requirement for competitive success among businesses as a result of increasing levels of outsourcing and globalization. The central concern in SCM is to systemically manage the creation of customer value from resource extraction to manufacturing or service delivery to the ultimate customer and then disposal or resource recovery when the ultimate customer is finished with the product (in this case, a product can be anything that is purchased, from tangible manufactured goods to intangible services, or a combination of goods and services)<sup>8</sup>. Transportation is essential to linking the organizations in the supply chain together. Events and issues that increase the cost of transportation or increase the likelihood of disruptions in transportation seriously degrade supply chain performance, and have the potential to expose the firms that contribute to a given supply chain to risk of loss of their competitive position.

In the current global business environment, businesses with higher performing supply chains gain advantage over organizations that do not have the same level of performance in their supply chains. The terms of business competition are no longer between individual business organizations, but between supply chains. Thus, to the extent that challenges with their roots in the transportation networks that serve as links between organizations in the supply chain limit or damage supply chain effectiveness, the competitiveness of the organizations dependent upon supply chains so affected is reduced. In this way, the state of our transportation networks impact the ability of firms to succeed, which in the aggregate can serve to derail economic development efforts.

In recent years there have been substantial increases in the proportion of US Gross Domestic Product (GDP) that has been devoted to logistics activities, such that in a five-year period between 2003 and 2008, nearly all of the gains of the previous 20 years had been lost (in 2003, 8.6% of GDP was in logistics costs, and in 2007, 10.1% of GDP was in logistics costs<sup>9</sup>). In 2008, overall logistics costs declined due to reduced costs of carrying inventory as the economic decline impacted business activity. However, transportation costs continued to climb.

<sup>8</sup> Smith, M.E. & L. Bুদ্ধress (2005). "Supply chain management: Borrowing our way to a discipline." *International Journal of Services and Operations Management*, 1(4), 305-319.

<sup>9</sup> Burnson, P. (2009). "2009 State of Logistics: Collaboration Time." *Logistics Management*, July.

In addition to increasing transportation costs, logistics cost increases have been due to increasing inventory carrying costs, which result in part from businesses attempting to deal with uncertainty due to challenges in the transportation networks by holding inventory. Thus, we have seen transportation both as a direct cause of increased costs that harm the competitiveness of our businesses, and also as an indirect cause of increasing costs and inability to compete as a result of uncertainty due to failings in the transportation system. A confluence of increasing and shifting demand, capacity constraints, and failing infrastructure has created erratic lead times for shipped goods<sup>10</sup>. In 2008, these three ill forces that served to increase business risk because of their impact of value creation within the supply chain were joined by rapidly increasing fuel costs that drove up fuel prices and resulted in transportation disruptions. While economic slowing has reduced the extent to which transportation networks have negatively impacted business risk, all projections suggest that the issues enumerated above will return in full force as the economy improves. We are already seeing increases in fuel prices.

To the extent that regional approaches to resolving transportation issues are effective, business competitiveness can be improved. Such regional approaches are particularly important since business risk that results from issues within our freight transportation networks is largely beyond the control of individual businesses. Thus, options and implications for supporting business competitiveness will be examined, as will also the extent to which various approaches can serve to stimulate and support the development of new networks of businesses that rely on transportation assets but are not directly involved in transportation.

Increasingly, the value of ports is being seen not as a processor of freight, an activity that generates relatively little economic value for the area surrounding the port facility, but as a source for supporting supply chains that promote new value-adding activities such as light manufacturing in the surrounding area<sup>11</sup>. As the case of the Virginia Inland Port, to be described later, illustrates, inland ports and related infrastructure can only be evaluated as a success when it drives more economic activity than just the jobs associated with the processing of freight. Increasingly, transportation assets represent both a support for existing businesses and their supply chains, and a nexus for the development of supply chains that support new business activity for the region in which these assets are located.

<sup>10</sup> Buddress, L. & M.E. Smith (2008) "A Logistics Perfect Storm." *Inside Supply Management*, 19(7), 12, 14.

<sup>11</sup> Mangan, J., C. Lalwani & B. Fynes (2008). "Port-centric Logistics." *The International Journal of Logistics Management*, 19(1), 29-41

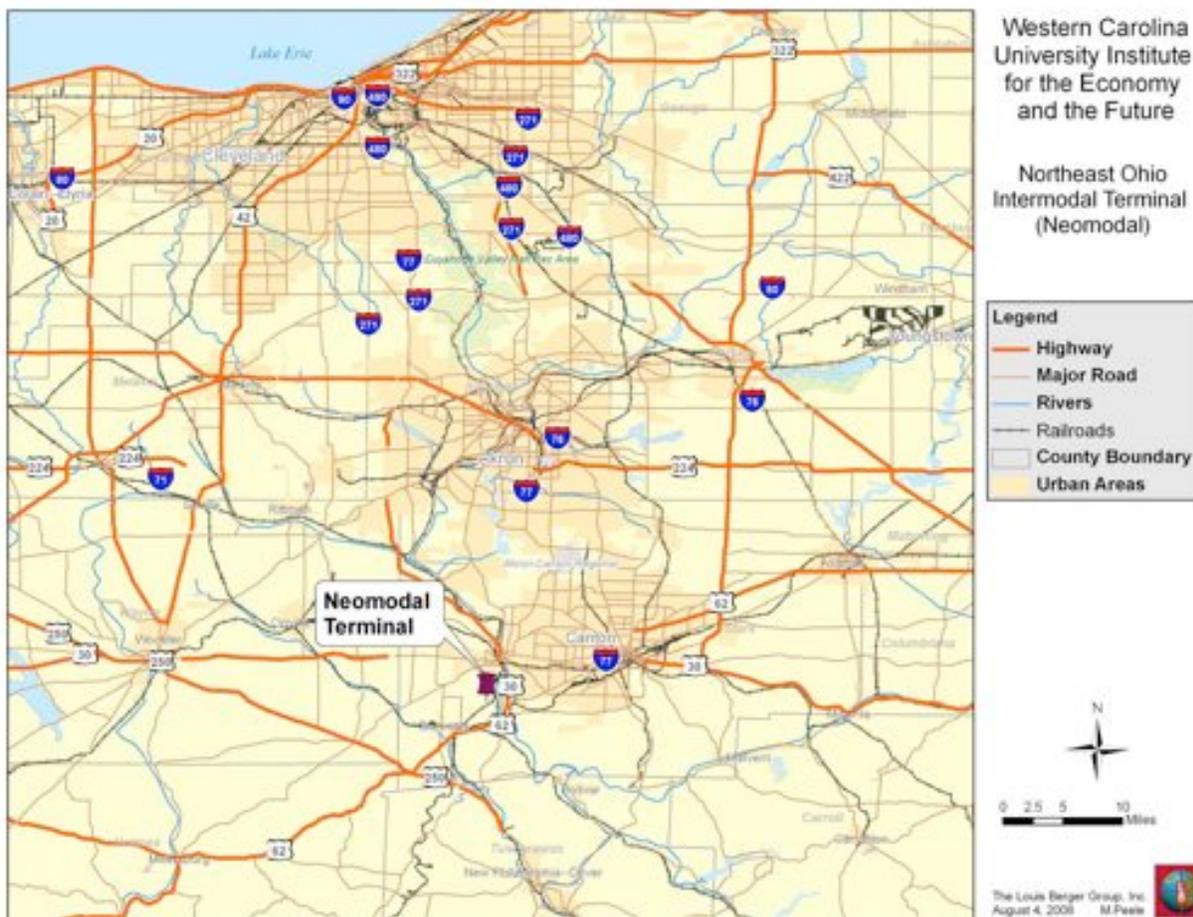
## VII. Inland Port Case Studies

This section provides case studies which demonstrate different types of inland port projects which provide insight into the feasibility of developing an inland port in Western North Carolina. The case studies were selected to highlight specific factors which impact the development and success of inland ports, and provide lessons learned which apply to the situation in Western North Carolina. Additional descriptions of operational models of the inland port concept are provided to address features that the study team observed with particular applicability to the current study.

### Northeast Ohio Intermodal Terminal (Neomodal)

The Neomodal intermodal terminal was built in 1996 by the Stark Development Board (SDB), a non-profit economic development arm of Stark County, Ohio. It was built on a 28-acre site in Navarre, Ohio about 10 miles southeast of Canton, Ohio, at a cost of \$11.2 million. Exhibit 7 shows the location of the terminal. The terminal was developed by SDB who contributed the land for the terminal.

**Exhibit 7: Neomodal Terminal Location**



The terminal was served by the Wheeling and Lake Erie Railroad (WLE) a short line railroad serving North Central Ohio. WLE connected with Class I rail carriers CSX and Norfolk Southern (NS). The terminal was built with advanced design overhead cranes. The cranes were remotely controlled by operators on the

ground wearing chest pack control units. The entrance gate facility was state-of-the-art for its time (see Exhibit 8).

**Exhibit 8: Neomodal Terminal**



The principal intermodal markets at the time were international and domestic container movements from and to West Coast markets in conjunction with Burlington Northern Santa Fe (BNSF) and Union Pacific (UP) over the Chicago gateway. Unfortunately, the distance to Chicago is around 375 miles from the North Central Ohio market and this distance is very truck competitive with rail intermodal. In addition, the WLE had to interchange with CSX and NS to reach Chicago. The necessity of using two railroads over this short distance made it even more of a competitive challenge.

A second major problem was that there was little or no contact or service agreement with CSX or NS before developing the facility. CSX and NS had competing rail intermodal terminals in Cleveland approximately 50 miles to the north. Cleveland served a much bigger market and benefited from better service options as it was on both CSX and NS main lines between Chicago and Northern New Jersey. Ultimately, CSX did offer service to Neomodal in connection with WLE, but NS never agreed to establish a service.

As it turned out, the expected volume never materialized. At one point the volume reached 500 lifts per month, still far short of the original projections. With marginal volumes and profitability, CSX discontinued its service in 1999. The CSX decision may also have been driven by the opening of an expanded intermodal terminal in Cleveland.

In 2000, Canadian National (CN) announced it would begin service to Neomodal. This prospect resulted from trackage rights granted by the Surface Transportation Board to the WLE as part of the sale of Conrail to CSX and NS. This gave WLE the ability to interchange to CN at Toledo, providing a service route to Detroit and Canada. This initiative did not produce significant results and CN discontinued the service. The Neomodal terminal is now closed to intermodal operations. SDB has currently leased the property for ground storage.

## **Financing Arrangements**

The financing arrangement which funded the Neomodal terminal was quite unique and deserves mention in this case study. An eight million dollar line of credit using Congestion Management and Air Quality (CMAQ) funds was used to fund most of the project. The \$8 million CMAQ loan was to be paid by operating profits from the terminal. There was a provision in the agreement between the Ohio DOT and SDB releasing SDB from financial payment responsibility in the event of operating deficits.

Loan repayments were to be remitted equally to three parties: Ohio DOT CMAQ revolving fund; Ohio's Erie Canal Heritage Account (established under the National Heritage Corridor program); and Stark County Area Transportation Study (the area MPO). Instead of a 20 percent direct local match, Ohio DOT used toll revenue credits from tolls generated by the Ohio Turnpike Authority under provisions of Section 1044 of ISTEA (from FHWA). Ultimately, the project failed leaving Ohio DOT responsible for repaying the loan.

### **Lessons Learned**

In order to be successful, an intermodal terminal project needs to meet the following criteria:

- There must be a significant market to serve and an effective plan for marketing the service;
- Class I rail carriers must agree to provide the services necessary to attract the market; and
- Sufficient funding must exist to develop the project; ideally the serving rail carrier will have a meaningful financial interest in the terminal.

In the case of Neomodal, the intermodal market was difficult because the length of haul was short and there was a competitive rail terminal with a better service product. In addition, the service product was weak because of an interline rail movement in a short haul lane. Furthermore, the developer did not reach out to the Class I rail carriers to get them involved and supportive of the development. Completion of this step would have disclosed the commercial weakness of the proposal. While there was sufficient funding for the project, it appears the availability of the funding may have driven the project rather than a solid business case.

**Heartland Corridor**

The Heartland Corridor is an example of a corridor project in which intermodal terminals are being planned in relatively small markets located on a significant intermodal freight transportation corridor. These markets would not be able to justify intermodal service or terminal investment on their own. However, because they are located on the corridor these cities will be able to participate in the corridor-based rail service.

The Heartland Corridor is a series of intermodal projects designed to improve freight mobility and rail intermodal capacity along the Norfolk Southern (NS) rail line between the Port of Virginia and Columbus, Ohio (Exhibit 9). This line serves the marine terminals at Norfolk and Portsmouth and runs through southern Virginia and southern West Virginia to Columbus, Ohio. NS routes continue beyond Columbus to serve other Midwest markets including Chicago and connections with western rail carriers. The projects will enable doublestack train operations on the route, improve rail access to developing marine terminals in Portsmouth, and increase intermodal terminal capacity along the route with new terminals in Columbus; Roanoke, Virginia; and Prichard, West Virginia.

**Exhibit 9: Heartland Corridor**

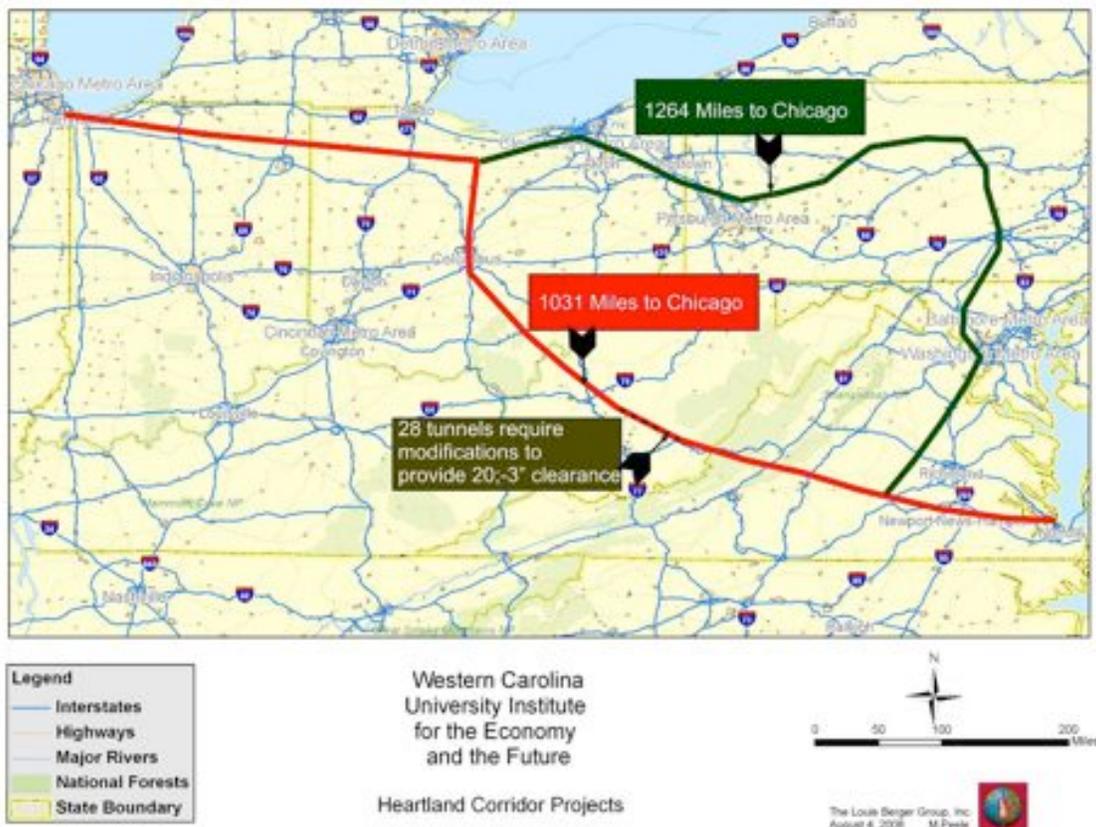


**Heartland Corridor Projects**

Two of the largest inland rail intermodal markets for the Port of Virginia are Chicago and Columbus. NS currently operates its doublestack trains to Chicago via a circuitous route through Harrisburg, PA. The present route is 1264 miles while the Heartland corridor route is 1031 miles (Exhibit 10). However, the Heartland corridor route does not have the 20'3" vertical clearance necessary to operate doublestack container trains and there are 28 tunnels between Roanoke and Columbus which require modification to enable doublestack operations. The project to clear these tunnels is the most significant project of the Heartland Corridor with an estimated cost of \$130 million. Once the clearance project has been completed, NS will be able to operate its Norfolk-Chicago doublestack trains on the Heartland Corridor route. This will save 233 miles relative to the route through Harrisburg and improve transit time to Chicago by about one day. Since Columbus will be on the route of the Chicago trains, doublestack service to Columbus will be significantly improved as well.

Succinctly, the project establishes a new and better rail intermodal route between The Port of Virginia and the Midwest.

**Exhibit 10: Heartland Corridor Projects**

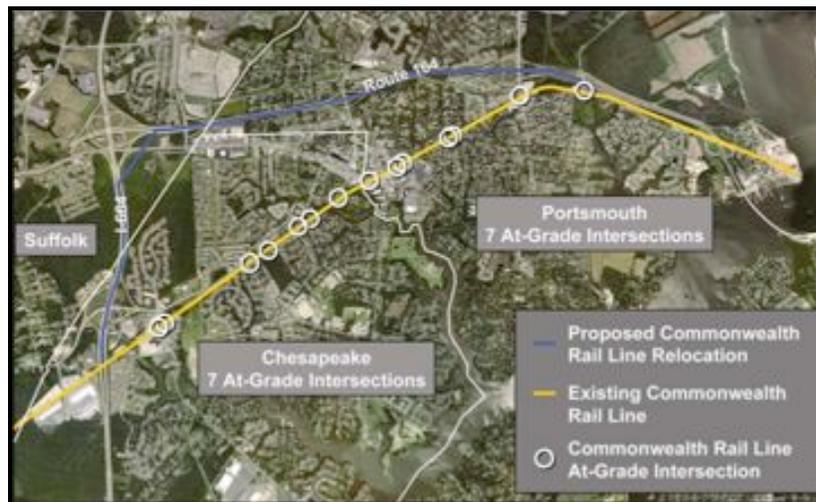


**Portsmouth Rail Project**

There are two new marine terminals being developed in Portsmouth. The first is being developed by APM Terminals, a subsidiary of AP Moller Company which owns Maersk SeaLand. The APM terminal was completed and began operation in 2007. The second marine terminal is being developed by the Virginia

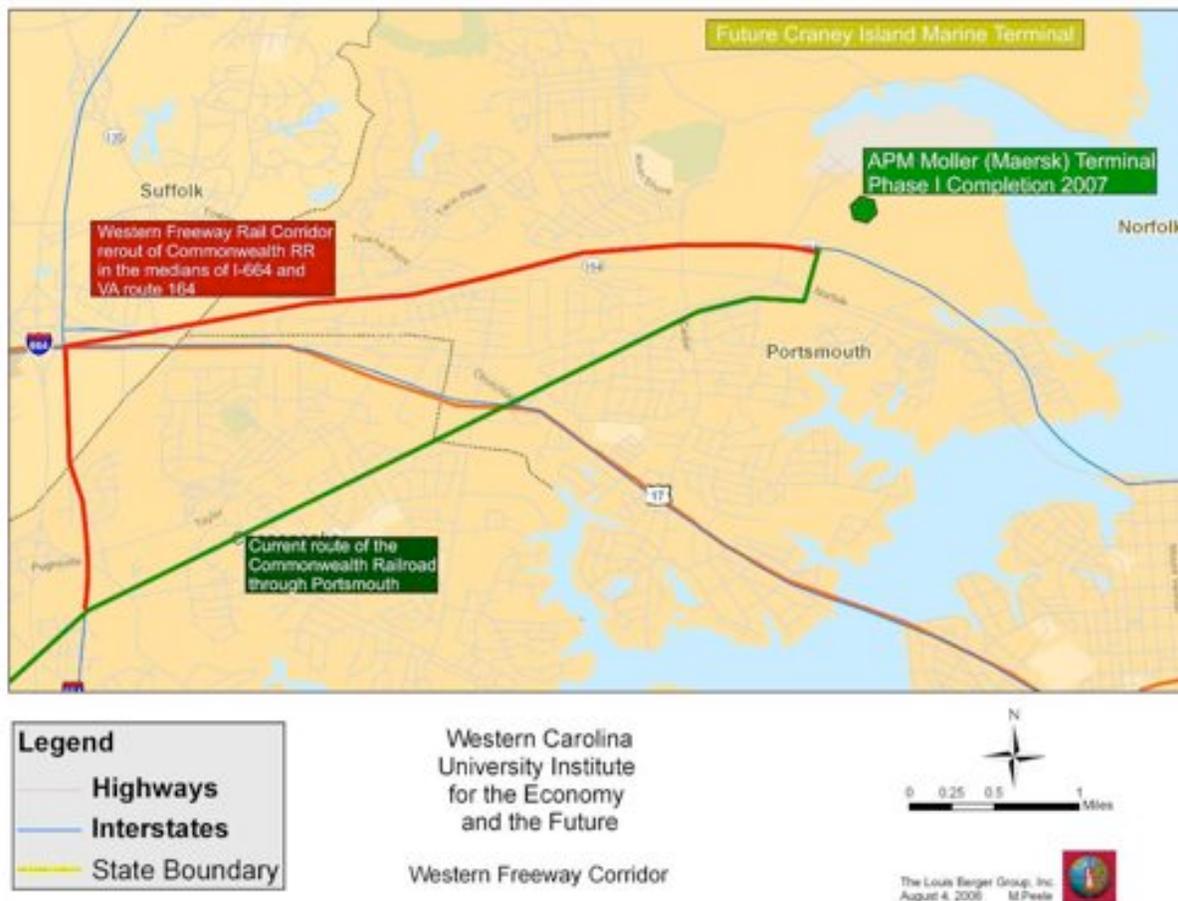
Port Authority on Craney Island just north of the APM terminal, and is planned to begin operations in 2017. Both of these terminals will be served by the Commonwealth Railway, a short line that operates from Suffolk to Portsmouth. The Commonwealth Railway will connect with NS and CSX at Suffolk to bring NS and CSX container trains to the APM and Craney Island marine terminals. On its existing route, the Commonwealth Railway must operate its trains through the cities of Chesapeake and Portsmouth to reach the APM terminal and future Craney Island terminal. This route passes through 14 at-grade street crossings creating the potential for significant conflict with local street traffic as train operations increase to serve the marine terminals (Exhibit 11).

**Exhibit 11: Portsmouth Rail Projects**



The Western Freeway Rail Corridor project (Exhibit 12) will relocate the Commonwealth Railway line to the median of highway routes I-664 and Route 164, eliminating the at-grade rail crossings. This will improve the safety of the rail operation and enable faster train speeds for rail service to the marine terminals. The Rail Corridor was planned in the 1980s when Route 164 was built. All of the bridges that cross Route 164 were built to accommodate two rail lines with sufficient clearance to allow doublestack train operations. The Western Freeway project is estimated to cost \$60 million.

**Exhibit 12: Western Freeway Corridor**



**Columbus Terminal Expansion**

The present NS terminal at Columbus (Discovery Park) is currently operating well beyond its design capacity of 125,000 lifts as Columbus’ growth as a logistics and distribution hub is driving the need for additional terminal capacity. An NS forecast projects over 240,000 lifts by 2015. NS has been working with the Columbus Regional Airport Authority (CRAA) to build a new intermodal terminal on a site of 275 to 300 acres located adjacent to the Rickenbacker Airport.

This project is a part of the Heartland Corridor and the terminal opened in March 2008 at a cost of \$68.5 million. The initial capacity of this facility is 250,000 lifts with the ability to expand to 400,000. The NS terminal will be an attractive feature of the adjacent Rickenbacker Industrial Park where 1,000 acres of additional development are being planned.

**Roanoke, VA and Prichard, WV Intermodal Terminals**

Once the rail lines are cleared for doublestack train operations and NS is operating trains to Columbus and Chicago on the Heartland Corridor, regions of Virginia and West Virginia can be opened to intermodal rail service. New intermodal terminals will be required for this service. The base load volume density needed to establish regular intermodal service will initially come from the Port of Virginia, Columbus and Chicago markets enabling the smaller markets at Roanoke and Prichard to be included in the NS intermodal service network. Small intermodal terminals have been planned at Roanoke and Prichard.

(Exhibit 13), and the terminal at Roanoke will connect I-81 and I-64 to the Heartland Corridor. The terminals at Roanoke and Prichard will give the Roanoke Valley region of southeastern Virginia, and southwest West Virginia rail access to the Port of Virginia, Chicago and western markets through connections from Chicago. The initial terminals are expected to be able to handle 15,000 to 20,000 lifts, with an estimated cost of about \$8 million each.

**Exhibit 13: Roanoke and Prichard Terminals**



**Legend**

- Interstates
- Highways
- Rivers
- State Boundary

Western Carolina  
University Institute  
for the Economy  
and the Future

Roanoke and Prichard Terminals



The Louis Berger Group, Inc.  
August 4, 2006 M. Peedy

**Funding**

The Heartland Corridor projects are estimated to cost \$266 million and will take approximately five years to complete. More than \$200 million of this amount will be for clearance projects and intermodal terminals on NS, which is more than can be justified based on private sector benefits alone.

While the Heartland Corridor Project will provide benefits to a broad spectrum of public and private stakeholders, it appears the primary beneficiaries will be NS and the Port of Virginia. A cleared route from Norfolk to Columbus will improve the NS competitive position to Midwest markets and western U.S. markets through Chicago. The Port of Virginia will benefit by having improved doublestack rail access to its major interior markets. As Asian container imports continue to grow, ocean carriers are moving more cargo via all water services to the east coast, creating growth opportunities for east coast ports. The Port of Virginia, with its deep-water channels, its new APM marine terminal and long-term plan for marine terminal capacity at Craney Island is well positioned to take advantage of this growth opportunity. The improved rail access provided by the Heartland Corridor will provide strategic advantage for the Port as it competes for Midwest cargo.

As the key beneficiaries of the Heartland Corridor, NS and the Virginia Port Authority (VPA) worked to develop support for public funding for these projects. NS and the VPA have a long-standing relationship in development of intermodal services for the Port, and as a result, local and congressional support from all three states was developed to enable \$143 million in federal funding earmarks (Exhibit 14).

**Exhibit 14: Heartland Corridor Funding**

Project	Total Cost	Federal Funding	NS/State/Local funding
Double Stack Clearances	\$130M	\$95M	\$35M
Intermodal Terminals	\$76M	\$33M	\$43M
Western Freeway	\$60M	\$15M	\$45M
Total	\$266M	\$143M	\$128M

Securing the federal funding was a major accomplishment and excellent example of a public-private partnership in the development of a major transportation initiative. It is very likely that without federal support the key clearance and terminal projects would not have gone forward.

**Lessons Learned**

The Heartland Corridor is a very large project which required the primary stakeholders to gain the needed political support at all levels to secure funding and drive the project to completion. In this case the NS and VPA were the key players. The states of Virginia, West Virginia, and Ohio were also beneficiaries of and received support for intermodal terminals in their states. It is also important that a significant share of the funding came from the private sector, relative to the private sector benefits.

The other important lesson is that a community must be located on the rail service corridor to have any chance of having access to the service through an intermediate intermodal terminal. Small market communities like Roanoke, Virginia and Prichard, West Virginia could not have justified an intermodal terminal if they weren't on the service corridor.

**San Joaquin Valley Inland Port**

California’s Central Valley is one of the largest agricultural production areas in the country and lies between California’s coastal mountains and the Sierra Nevada range, running roughly from Stockton to Bakersfield (Exhibit 15). Agricultural products from this region are a source of export containers moving through the Port of Oakland, and the transportation of these international containers between the Central Valley and the Port of Oakland is Northern California’s lifeline to foreign markets. This lifeline is threatened as exporters rely on increasingly congested freeways to move their products.

**Exhibit 15: California Central Valley**



The concept of using underutilized portions of Northern California’s privately owned rail system to provide an alternative to moving containerized freight by highway from the Central Valley to the Port of Oakland has been studied for several years. In 2003, the Port of Oakland, in partnership with the San Joaquin Council of Governments (SJCOG) and the Alameda County Congestion Management Agency, undertook a study to determine the feasibility of a short-haul container rail service. The study found that the service was feasible and could have positive impacts in reducing truck traffic and improving air quality while providing capacity to handle growing trade. In 2006 an Implementation Plan for an “Inter-Regional Intermodal System” was developed. Since then, the concept for a Central Valley rail system has been carried forward in all of the region’s goods movement plans.

In 1999 legislation was passed authorizing the federal government to convey more than 1,500 acres of property known as Crows Landing Air Facility to Stanislaus County under the Department of Defense Base

Closure and Realignment Act (BRAC). These events set in motion an initiative by Stanislaus County and a private developer to move forward with the San Joaquin Valley Short Haul Rail / Inland Port Project.

**San Joaquin Valley Inland Port Project Review**

In 2007, after a comprehensive selection process, Stanislaus County (County) approved an exclusive negotiation agreement with PCCP West Park LLC (West Park) for development of the former military base. West Park is a joint venture owned by a Central Valley developer, and two investment firms. The County and its private development partner, West Park, are now developing the Inland Port Facility and a short haul rail service as a major feature of the redevelopment of the former military installation.

The Crows Landing site is located about 10 miles southwest of Modesto (Exhibit 16). The Inland Port complex will provide logistics, distribution, processing and cargo support services to San Joaquin Valley importers and exporters for goods moving through the Port of Oakland. Altogether, some 4,800 acres of County and private land will be developed into distribution centers, industrial facilities, business parks, and public service facilities. The County has designated 170 acres of the site for a rail intermodal facility.

**Exhibit 16: Crows Landing Site & Rail Route**



**Legend**

- Interstates
- Highways
- Rivers
- Railroads

Western Carolina University Institute for the Economy and the Future  
 Crows Landing Site and Rail Route

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The Louis Berger Group, Inc.  
 August 4, 2006 M. Paele

West Park will build the rail facility at Crows Landing to provide loading and unloading of containers to and from railcars on the site. The rail terminal will be designed to handle about 250,000 annual lifts.

The short haul rail service will be operated by West Park through a separate operating entity. The rail service will use existing railroad rights-of-way for a service route to the Port of Oakland. The trains will operate over the UP line between Oakland and Lyoth Junction south of Tracy and over the California Northern Railroad between Lyoth Junction and Crows Landing (see Exhibit 16). This is clearly a short haul rail operation as the highway distance to the Port of Oakland is only about 85 miles. The initial plan calls for one train per day in each direction starting in 2011. Each train will handle up to 50 doublestack platforms or a maximum of 100 40-foot containers double-stacked. The initial train design plan is specified to accommodate expansion to up to six round trip trains per day seven days per week. West Park, working through the County, will provide financial operating subsidies that are needed in the initial phase of the project through land assessments from the 4,800 acres of development.

A key feature of this development is the environmental sensitivity and commitment of the developer. In every aspect of the development a conscious effort is being made to use the best available, most efficient, "green" technology to build and operate both the business park and the related transportation services.

### **Project Financing and Current Status**

In January 2008 Stanislaus County Council of Governments submitted a funding request application for State of California Trade Corridor Infrastructure Fund (TCIF) for the Inland Port project. The value of the project was estimated at \$57.48 million and the TCIF bond request was for \$26 million. The remaining \$31.48 million would be funded through local in-kind contributions and cash payments with Stanislaus County contributing \$12.5 million worth of land in-kind, and West Park would contribute \$18.98 million cash.

In April 2008, the California Transportation Commission adopted the TCIF Bond funding allocations, which included \$22.4 million for the Inland Port Project. West Park increased its allocation to \$22.5 million to match the TCIF allocation and provide the necessary funding for the project. The County also approved the recommendations to go forward with actions necessary to advance the project, and at this point West Park has issued a request for proposals to proceed with development. The current plan envisions phase one start up by the end of 2011.

### **Lessons Learned**

The San Joaquin Valley Inland Port project is a very large and complex project that has taken nearly 10 years to develop. It appears that the primary driver of the project was a private sector local developer who championed the project and took the risk of investing his resources to advance it. Additionally, local political support was necessary to secure the public funding and land contribution that enabled the project to go forward.

Public funding programs were necessary to supplement private capital, as the California TCIF Bond fund and the Federal BRAC Program provided the public resources. The private sector partner with his capital at risk gives the project private sector drive and an additional level of due diligence.

There was a long-term strategy within the State for the Central Valley short haul rail service. The concept was in place for over five years and the San Joaquin Valley Inland Park and short haul rail was an excellent fit for a prototype project.

There is a well-defined market that supports the private investment. In addition, there was a unique mechanism to fund start up operating losses through an assessment on the development property. This

land assessment in effect is a way to spread the short-term, start up losses across a broad spectrum of stakeholders who should ultimately benefit from the availability of the rail service.

**North American Inland Port Network (NAIPN)**

The North American Inland Port Network (NAIPN) is a sub-committee of the North America's SuperCorridor Coalition (NASCO). NASCO is a non-profit trade organization dedicated to increasing economic development activity along the NASCO corridor. The NASCO Corridor represents the existing trade and transportation infrastructure, roughly shadowing U.S. Interstate Highways 35, 29 and 94, and the connecting transportation infrastructure in Canada and Mexico. (Exhibit 17) This includes major intermodal "inland ports" located and in development along the corridor.

**Exhibit 17: North American SuperCorridor**



NASCO, based in Dallas, Texas, is a multi-national advocacy and lobbying group with the goal of promoting trade along the north-south corridor from Winnipeg to Mexico City. NAIPN, as a sub-committee of NASCO, was tasked with developing an active inland port network along the corridor and to alleviate congestion at maritime ports and U.S. international border crossings with Mexico and Canada. NAIPN envisions an integrated, efficient and secure network of inland ports specializing in the transportation of containerized cargo in North America. The main guiding principle of NAIPN is to develop logistics systems that enhance global security, but at the same time do not impede the cost-effective and efficient flow of goods.

### NAIPN Case Study Review

NAIPN uses a University of Texas definition of an inland port as follows: "An Inland Port is a site located away from traditional land, air and coastal borders with the vision to facilitate and process international trade through strategic investment in multi-modal transportation assets and by promoting value-added services as goods move through the supply chain." Using this broad definition, NAIPN sees its role as an advocate of the interests of inland ports along the corridor. NAIPN implements its advocacy through a membership program with the following advertised benefits:

- Active participation in positioning the NAIPN as the preferred network for the transportation industry throughout the North American market;
- Access and Web portal for your inland port on the NAIPN interactive promotional website and map;
- Data / Information sharing with other inland port initiatives in Canada, the United States and Mexico;
- Lobbying / Advocacy to Canada, US, and Mexican governments to ensure new regulations are balanced with trade and security;
- Involvement with the development and marketing of the tri-lateral inland port network;
- Exclusive updates on and opportunity to participate in NASCO's North American Facilitation of Transportation, Trade, Reduced Congestion and Security (NAFTRACS) project;
- Periodic speaking opportunities at NASCO events and other member events
- Copies of NASCO studies and reports;
- Opportunity to be featured in NASCO publications;
- Promotion through an introductory feature article in NASCO News, the monthly newsletter;
- Feature local and regional initiatives in NASCO publications and at events;
- Media exposure through press releases and industry articles
- Matchmaking specific business development opportunities with other members and contacts;
- Access to Corridor logistical information;
- Be the first to receive exclusive updates on local & regional projects along the corridor;
- Participate in NASCO Corridor-wide initiatives;
- Special invitations and discounted registration fees (NASCO & Partner events);
- Frequent / Monthly reports prepared by the NASCO federal lobbying team;
- Timely email updates regarding NASCO activities and initiatives;
- Subscription to NASCO News;
- Company name recognition and logo on the NASCO Website;
- NASCO Service Directory with member contact information;
- NASCO logistics expert available to members only (additional services negotiated on an individual basis); and
- Access to NASCO web site and Member's Only section (under development).

Key members of NAIPN include the following organizations:

- Alliance Texas International Trade and Logistics Complex: Developed by Hillwood Investments this 17,000 acre development includes Fort Worth Alliance Airport, BNSF Intermodal terminal, Fed-Ex Southwest Regional Sort Hub, and the Alliance Air Trade Center;
- Dallas Logistics Hub: Developed by The Allen Group this 6000 acre master planned development includes the UP Dallas intermodal terminal, a planned BNSF intermodal terminal and Lancaster Airport, a general aviation facility;
- Free Trade Alliance San Antonio: Free Trade Alliance is the lead economic development organization for promoting the inland port strategy in San Antonio. Inland Port San Antonio promotes all of the transportation, distribution, logistics facilities and services that make up this communities capacity to serve international trade. In addition, the Port Authority of San Antonio at Kelly USA operates an 1,800-acre, multi-modal port offering air cargo, warehousing, rail and highway infrastructure;
- Destination Winnipeg: Destination Winnipeg is the economic development agency for the city of Winnipeg, Manitoba, promoting all of the logistics capability of the Province of Manitoba;
- Central Mexico Inland Port: The mission of Central Mexico Inland Port initiative is to promote and enhance Central Mexico's status as a premiere Inland Port Solution Provider and to contribute to its emergence as a competitive international trade center and cluster of strategic international facilities. The region includes four maritime ports, Manzanillo, Lazaro Cardenas, Veracruz and Tampico. The region is served by two rail carriers KCS de Mexico (formerly TFM Railway) and FerroMex. The region encompasses nine Mexican States.(see Exhibit 18);
- Port Des Moines Concept: The Des Moines Area Metropolitan Planning Organization (DMAMPO) through its Freight Roundtable has a mission "to work with the public and the private sector to maximize the Des Moines metropolitan area's, central Iowa's, and Iowa's economic opportunity through development of and advocacy for an efficient transportation system to promote economic development and trade in the North American trade corridor ..." The Inland Port facilities identified include Foreign Trade Zone 107, Centennial Warehouse Company, Des Moines International Airport, Iowa Cold Storage, Iowa Interstate Railroad, Bridgestone / Firestone North American Tire, and PDM Distribution Services; and
- Meridian 100 Laredo: Meridian 100 is a privately owned logistics infrastructure developer that is developing warehouse and Foreign Trade Zone facilities in Port Laredo, Mexico. Facility development is in the planning stages with availability expected in 2011.

The primary promotion initiative of NAIPN is its membership program and the comprehensive NAIPN web site which was developed to raise the awareness of individual inland ports along the corridor. The NAIPN website contains sections for each of its members to display information describing their inland ports and facilities. Each section contains standardized information for each member. Information for each member includes:

- Infrastructure;
- Facilities;
- Best Practices;
- Location Maps;
- Current Initiatives;
- Current Projects;
- Links to relevant web sites; and
- Photos.

NAIPN has also established a Leadership Steering Committee that reports to the Board of NASCO and establishes policies and direction for NAIPN. (2006)

**Exhibit 18: Central Mexico Inland Port**



**Lessons Learned**

NAIPN is an umbrella promotional organization which supports its members and its parent agency by promoting inland ports. NAIPN provides a long list of support functions to its members. The lesson here is that an inland port does not have to operate as a physical facility. Using the University of Texas broad definition of an inland port, an organization can act as an advocate for physical inland ports and transportation infrastructure within its jurisdiction.

In addition, a number of the members of NAIPN were also advocates for inland port facilities in their regions. These members included the Free Trade Alliance San Antonio, Destination Winnipeg, Central Mexico Inland Port and Iowa Inland Port.

## Port Des Moines Concept

The history of the Point Des Moines Concept provides a cautionary case for development of inland ports. The Des Moines Area Metropolitan Planning Organization (DMAMPO) and its member governments in cooperation with the Greater Des Moines Partnership, the Region's economic development organization, believe that the Des Moines Inland Port offers a great economic development opportunity to greater Des Moines businesses. DMAMPO promotes the Des Moines Inland Port through its membership in NAIPN as noted above. The Des Moines Inland Port symbolizes the strong public-private partnerships that are committed to providing the strongest possible connectivity to the North American transportation system.

Driven by potential opportunity from the "NAFTA Superhighway" which passes through Des Moines on I-35, regional organizations developed a renewed interest in looking at the role of central Iowa in international trade. One result of this interest was the development of a feasibility assessment of the Port Des Moines Concept. A research team was formed as a joint effort of the College of Business, Iowa State University, the Iowa DOT, the DMAMPO and the Greater Des Moines Partnership to conduct the study. The research report entitled "The Port Des Moines Concept: A Feasibility Assessment" (Assessment) was completed in 2001. This report presents a study of transportation and international trade practices of business firms in the eight counties surrounding Des Moines in order to determine the feasibility of the "Port Des Moines Concept".

The Port Des Moines Concept is defined as "an inland, intermodal port that would facilitate international and domestic commerce; it would support export and import opportunities by consolidating at a single source all services related to trade, licensing, loading, storage, light assembly and bonding". This case study provides a review of the report and its key findings as it relates to development of an inland port.

## Port Des Moines Concept Case Study Review

The Assessment began with a series of focus group interviews conducted with representatives of participating firms to identify current practices and problems. Next, two questionnaires were deployed to collect information and opinions from 620 potential users and service providers of Port Des Moines. The questionnaires generated substantial participation, with responses received from 29% of users and 53% of service providers.

The survey of needs for import and export activities identified the following activities in greatest need of improvement.

- Information about foreign documentation requirements;
- Information about foreign trade regulations;
- Information about international trade and logistics service providers in Central Iowa;
- Information about US federal trade regulations;
- US Customs operations;
- Trucking service from and to ports and airports; and
- Freight forwarder services.

The survey also provided information about the Port Des Moines Concept features. The following features were rated as most desirable.

- Single source for federal and state transportation agencies (most important);
- Transportation Center;
- Single source for federal and state trade support agencies;
- Internet web sites;
- Travel plaza;
- Intermodal transfer facilities; and
- Information clearinghouse.

In concluding the study the report addressed the following two questions:

1. Is the Port Des Moines Concept feasible?
2. If feasible, what is the best way to implement the Port Des Moines Concept?

Slightly over half of the firms surveyed already had export or import experience and their expectation was continued growth of international trade. The respondents generally agreed that there were opportunities for improvement of both import- and export-related activities. However, the ratings of users and providers relative to the need for implementing the Port Des Moines Concept were mixed. The ratings of users and providers supported the general need for implementing the Port Des Moines Concept, although less than a majority of the users agreed or strongly agreed with this statement. Further moderating the supportive findings were expressions of low anticipated use of a Port Des Moines and a lack of agreement that there would be sufficient demand to support a consolidated Port Des Moines. Likewise, firms did not see the inland port as reducing their overall transportation and/or logistics costs or improving their services.

The question of Port Des Moines Concept feasibility was answered as follows: "There exists a moderate level of support for pursuing the Port Des Moines Concept rather than maintaining the status quo of no action. The results also suggest a degree of caution while proceeding and the need for an educational and promotional program to bolster support for an inland port". This does not represent a very strong endorsement for implementation.

In considering implementation issues the Assessment indicated the greatest needs should be satisfied. The activities most needing improvement were information-related (e.g. foreign documentation and trade regulations and central Iowa service providers). Activities requiring a physical presence would be U.S. Customs operations, trucking service and freight forwarder services. In summary, the Assessment suggested that any development of Port Des Moines must be strongly based upon information and technology. Development should also focus on selectively coordinating the most desirable features and facilities.

Based on the survey results, the Assessment proposed four alternative configurations for implementing the Port Des Moines Concept displayed as a four cell matrix (Exhibit 19). The matrix has "information technology capability" (from low to high) on the vertical axis and "extent of physical assets" (also from low to high) on the horizontal axis. Following is a description of each block. These descriptions can also be viewed as the stages of development from the simplest to the most advanced.

1. The lower-left block describes the "Basic E-port" with a minimum of physical assets. It provides transportation and trade related information shown using static web pages.
2. The upper-left block describes an "Advanced E-port" with a minimum of physical assets. It envisions an electronic gateway or central virtual portal. It uses dynamic web sites to enable on-line interactions to complete transportation and trade service functions.
3. The lower-right block describes a traditional "brick and mortar" inland port facility for handling and moving shipments. It includes rail intermodal and trucking services plus Customs and freight forwarder facilities. This cell would also include the Basic E-port functionality.
4. The upper-right block describes the most advanced level of development for both physical assets and dynamic information systems referred to as "click and mortar". It includes the basic assets of stage 3 as well as the Advanced E-port systems of stage 2.

The study suggests that implementation in this fashion could be staged to minimize risk and only advance to subsequent stages if market acceptance and projected demand warranted the added investment.

**Exhibit 19: Port Des Moines Implementation Alternatives**

	<b>Low Physical Asset Requirements</b>	<b>High Physical Asset Requirements</b>
<b>High Information Technology Capability</b>	<p>Advanced E-Port: Electronic gateway and web sites allowing on-line interactions with other parties to completed transactions related to transportation and trade services. Includes Basic E-port, plus:</p> <ol style="list-style-type: none"> <li>1. transaction capabilities with transportation providers:                             <ol style="list-style-type: none"> <li>a. Trucking (w/ports &amp; airports, Canada, Mexico)</li> <li>b. Air cargo and air express</li> <li>c. Surface transport (small shipments)</li> </ol> </li> <li>2. Interactive connections with:                             <ol style="list-style-type: none"> <li>a. U.S. Customs</li> <li>b. Freight forwarder</li> <li>c. Customs in other countries</li> <li>d. Customs Broker</li> </ol> </li> </ol>	<p>“Click &amp; mortar” modern inland port facility: Physical assets for handling and moving shipments <u>and</u> transactional/interactive capability. Includes traditional “Brick &amp; mortar” plus:</p> <ol style="list-style-type: none"> <li>1. Facilities for and transactions with transportation providers                             <ol style="list-style-type: none"> <li>a. Trucking (w/ports &amp; airports, Canada, Mexico)</li> <li>b. Air cargo and air express</li> <li>c. Surface transport (small shipments)</li> </ol> </li> <li>2. facilities for service providers                             <ol style="list-style-type: none"> <li>a. Freight forwarder</li> <li>b. Customs from other countries</li> <li>c. Customs broker</li> <li>d. Inspection</li> </ol> </li> <li>3. Web site(s) for information on:                             <ol style="list-style-type: none"> <li>a. Foreign documentation</li> <li>b. Foreign trade regulations</li> <li>c. Central Iowa providers</li> <li>d. U.S. trade regulations</li> <li>e. Export statistics</li> <li>f. Export documentation</li> </ol> </li> </ol>
<b>Low Information Technology Capability</b>	<p>Basic E-port: Use of static Web pages providing basic transportation and trade information; limited interactive capability (e.g., email):</p> <ol style="list-style-type: none"> <li>1. Information on foreign documentation</li> <li>2. Info: foreign trade regulations</li> <li>3. Info: Central Iowa providers</li> <li>4. Info: U.S. trade regulations</li> </ol>	<p>“Brick &amp; mortar” traditional inland port facility for handling and moving shipments; Web site for transmitting information:</p> <ol style="list-style-type: none"> <li>1. U.S. Customs</li> <li>2. Trucking service w/ports &amp; airports</li> <li>3. Freight Forwarder</li> <li>4. Intermodal Facility</li> </ol>



### **Port Des Moines Concept Current Status**

Although the Port Des Moines Concept Feasibility Assessment was completed in 2001, there has not been any development of any of the E-Port stages described. The DMAMPO 2006 Goods Movement update mentioned the feasibility assessment. Apparently some discussion of possible funding has occurred; however, there has been no public announcement and the project remains dormant. DMAMPO does promote the Des Moines Inland Port on the NAIPN website without the detailed information support described in the Assessment.



### Kansas City Smartport

On a positive note, there has been progress on developing inland port information capability. One of the leading organizations in the development of inland port promotion and information is KC Smartport. Smartport is a non-profit economic development organization that promotes and enhances the Kansas City Region as a leading North American logistics hub. The Smartport mission has two key objectives:

1. To grow the Kansas City area’s transportation and logistics elements; and
2. To make it cheaper, faster, more efficient and secure for companies to move goods into, from, and through the Kansas City area.

KC Smartport was founded in 2001 and has been promoting Kansas City logistics development and building its information capability since that time. The Smartport website has a well developed information capability which probably fits the description of the Basic E-port discussed above. In developing its programs Smartport started with a study of regional trade flows and identified the specific needs of local business and industry. Its initial programs were designed to fit the information needs of its local constituents.

Smartport is also developing a more sophisticated information application named Trade Development Exchange (TDE). This system is capable of integrating disparate systems and combining the data to track shipment across multiple carriers. Smartport and its technology partners are currently working on commercial implementation of TDE.

### Lessons Learned

There are opportunities to support inland port development that do not require physical assets. The information and promotion programs developed by KC Smartport are a good example of non-asset-based inland port development. In addition the Basic E-Port functionality appears to be a relatively low cost way to get started.

Without funding and a champion for advancement, goods concepts remain undeveloped. In 2001 The Port Des Moines Concept Feasibility Assessment was completed and KC Smartport was founded. The contrasting progress of the two inland ports demonstrates the lesson.

Representatives of the study team visited with the Executive Director of the Kansas City Smartport in April 2008. The group also toured the region, examining new and historically relevant infrastructure and facilities that contribute to Kansas City’s status as an inland port.



The purpose of the visit was to develop an understanding of Smartport, which is a unique entity in that it is not a traditional “bricks and mortar” port; rather it is a regional transportation and logistics authority that promotes Kansas City’s freight-related facilities that collectively form an inland port in the Region.

Kansas City has been a multi-modal transportation hub since the 1800s and has capitalized on its mid-America location to form a modern-day center of international trade. KC is the largest rail center in the United States based on tonnage; connects to major corridors, both rail and roadway, that link the United States with Canada and Mexico and the major east and west coast seaports; contains more Foreign Trade Zone space than any other US city; and ships the most air cargo of the six states in the Region.

Smartport grew out of a trade processing study in the 1990s that identified the need for an economic development group to increase freight moving through the region, promote the region for its ability to provide effective supply chain management solutions, and increase investment in freight-based products.

Smartport is a not-for-profit agency that is funded primarily by private investors and has a focus in three main areas:

- Economic development, by focusing on attracting investment from corporations that require transportation and logistics services;
- Business services that support goods movements for companies and investors by attracting additional trade-related services such as foreign customs offices to the region; and
- Trade Data Exchange, a pilot program designed to develop real-time visibility and cargo security to increase efficiency as goods move through the supply chain.

**Exhibit 20: The CenterPoint – KCS Intermodal Center, which is being developed on a former air force base south of Kansas City.**



Numerous facilities in the Kansas City region collectively form the inland port network within the region, including the following examples:

- Kansas City Southern (KCS) Railroad headquarters and location of intermodal transfer facilities for BNSF and Norfolk Southern, including vehicle mixing;
- Subtropolis and other underground warehousing and storage facilities that have been developed in now-defunct limestone mines;
- CenterPoint KCS Intermodal Center (Exhibit 20), a de-commissioned air force base being developed by the railroad and others as a logistics park similar to the CenterPoint facility in Joliet, Illinois; and
- Various distribution and third party logistics centers across the region, notably Musician’s Friend, FedEx, Ford and New Holland.

**Relevance to the WNC Inland Port Feasibility Study**

Smartport’s status as an economic development agency specifically formed to promote the region as an inland port solution was of most interest in regards to the study for Western North Carolina. Smartport is funded primarily through private investors and has taken a regional role in conducting freight and other trade-related studies as well as developing the Trade Data Exchange, which is intended to be a prototype for a nationwide rollout of the technology. It is conceivable that a similar entity could be formed in North Carolina to help promote existing facilities, draw investors to the region and provide efficiencies for companies that already exist in the mountains.

The Kansas City Region also yields examples of how supporting or complementary facilities in the Midwest interact with the region. These complementary facilities have the potential to process and consolidate freight before it enters the Kansas City market, thus providing a smoother flow through existing multi-modal facilities. Smartport officials identified two case studies that can potentially serve as lessons-learned for Western North Carolina – Des Moines and Wichita. The key differences were in the approach and involvement among Des Moines and Wichita with officials in Kansas City and how they identified complementary roles.

Des Moines, Iowa has been actively pursuing development of an inland port project with the goal of providing a support facility or logistics solution to feed into the Kansas City Inland Port. Des Moines benefits from its proximity to Chicago and Kansas City as well as its location within the North America Super Corridor (NASCO) that links Mexico and Canada. Officials from Des Moines proactively approached



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Smartport to jointly develop ideas and gain understanding of the issues in an around Kansas City in order to make the Iowa effort a success and identify appropriate roles that an Iowa-based inland port could play within the network.

Wichita, Kansas also sits along the NASCO and is approximately the same distance from Kansas City as Des Moines, and also enjoys access to the Dallas region. The city is interested in developing an international trade processing facility. Smartport noted that this effort has had trouble moving to the next stages of development of the idea. It appears that the peer-to-peer exchange of information has not been as robust as the Des Moines example and has resulted in the project being stalled.



### **Southern California’s Port Network: Ports of Los Angeles and Long Beach & the Southern California Logistics Airport**

The study group toured port facilities in southern California during a visit in June 2008. A representative from the WCU Institute for the Economy and the Future as well as planning and economic development staff from the Louis Berger Group, Inc. participated in the tour. The site visits included a boat tour of the Port of Los Angeles, a discussion with the Master Planning Director of the Port of Long Beach, and a tour and discussion with representatives of Global Access at the Southern California Logistics Airport in Victorville.

The purpose of the visit was to gather information on how major port facilities view the role that inland ports currently or potentially could play in a regional and national framework. The Southern California region was chosen primarily for the Global Access inland port and the Victorville facility’s relationship with California State University at Long Beach. The region also happens to be a worldwide hub of freight activity, is the location of some of the largest port facilities in the world, and represents a different model than has historically evolved in the eastern United States.

Marine ports along the East Coast have historically been smaller and closer together along the Atlantic Coast when compared to their counterparts on the Pacific Coast. Along the Pacific Coast, major ports are concentrated among fewer major port facilities, with the Ports of Los Angeles and Long Beach (which essentially operate as one major facility even though they are managed through two separate agencies), the Port of Oakland and the Port of Seattle handling much of the containerized freight cargo. Nearly half of all of the containers that arrive in LA-Long Beach are shipped throughout the United States and across the “land bridge” to points east of the Rocky Mountains, including Chicago and the eastern seaboard. The increased trade in recent decades with Asia has spawned much of this market as these freight movements are less costly and more efficient than U.S.-bound ships using the Panama Canal to reach markets close to marine terminals in the eastern United States.



Global Access at the Southern California Logistics Airport is being developed not only as a logistics airport, but also as a collection of airport cargo operations and aerospace tenants; a rail inter-modal facility; large-scale distribution centers; specialty and high-tech manufacturing; and a public-private partnership aimed at generating economic development for the Inland Empire Region and the city of Victorville. It is located on land that was the former George Air Force Base, which closed in the 1990s. The City of Victorville, through its municipal airport and railroad authorities, has been the major public driver of the facility, working closely with a prominent regional developer to market and re-develop the former military properties.

As the WNC study team learned in the Kansas City visit, the major freight companies (e.g. railroad, third-party logistics operators, steamship lines) are and will most likely remain the major players in the United States framework, however there is potential for complementary freight facilities to serve some operations that support high volume freight facilities even if they do not serve a major role in relieving congestion. Strategically placed and purposefully operated inland ports can be effective in this role.

After visits with personnel representing the Port of Long Beach and Global Access, it appears that such a relationship has not been fully analyzed and articulated to either party. With the Ports of Los Angeles and Long Beach processing more than 16 million TEUs per year, any inland port that could potentially and optimistically relieve the full processing of 100,000 TEUs would not represent a level significant enough to be recognized in the day-to-day operations of LA-Long Beach.

With these factors in mind, it appears that Global Access is positioning itself to be diverse enough to serve a variety of freight-related needs for Southern California, even if that model does not represent a Satellite Marine Terminal similar to Virginia Inland Port. Global Access is also in a position where there is a tax-increment financing zone, a city favorable to utility expansion and business enterprises, and relatively cheap land that collectively will allow it to evolve with whatever markets emerge for the facility.

**Exhibit 21: Global Access Facilities.**

**The Role of a University**

A unique component of Global Access is that it has teamed with representatives from California State University at Long Beach (Long Beach State) on a variety of logistics-related initiatives that have positioned the facility to be an incubator and test site for streamlining logistics of private companies and even the U.S. Department of Defense. Recognizing there is a transformation occurring in the logistics framework at the business, individual and military level, this partnership is working to develop solutions for each of those unique interests.



Long Beach State has provided its expertise as well as stable federal funding sources to assist Global Access in identifying potential tenants and helping the facility tap into Long Beach State’s relationship with freight logistics efforts for U.S. military operations. The University is also working with other schools in the Cal State system to develop a curriculum aimed at logistics engineering with coursework ranging from training certificates to doctoral programs.

**The “Agile Port Concept”**

The research efforts of Long Beach State have also identified another schematic for inland freight operations: the agile port. The agile port concept that in theory ties inland freight facilities with marine terminals as part of a regional network. The agile port is a combination of an efficient marine terminal and an inland multi-modal facility with dedicated surface transportation, be it highways with dedicated freight lanes or rail-based link shuttle or unit trains. Under this concept, the key functions of a marine terminal (except ship berthing) can be shifted to an inland location. According to Dr. Larry Mallon with Long Beach State, these functions include:

- Truck gate operations;
- Container yard;
- Yard management;
- Equipment pool maintenance and interchange;
- Rail operations;
- Consolidation;
- Transload; and
- Cross dock operations.

In addition to being a multi-modal facility within a regional freight distribution system, the agile port’s key component is a “smart and secure trade corridor” that is not subject to random customs inspections and other interruptions that can hamper specialized freight operations. For military operations, the agile port can serve as an integrated node and pre-staging area for various military operations, including force deployment.

### Relevance to the WNC Inland Port Feasibility Study

The Southern California examples represent a strong international player in logistics and containerized freight (Ports of LA-Long Beach) along with a public-private initiative (Global Access) with properties and a business plan aimed at generating local economic development that at the same time provides another element of a regional freight network. This is a different model from Kansas City Smartport, which is strictly an economic development agent aimed at promoting and providing freight logistics through existing and other private facilities for a region through the support of regional stakeholders and private interests.

As with the Des Moines approach to Kansas City, the importance of determining how an inland port can effectively complement major ports seems to be an issue that impacts cooperation and the willingness of the major facilities to consider the benefits of an inland port. The Ports of LA-Long Beach are public agencies that have major plans to reconfigure their facilities to ensure that future capacity can meet shipping demands, which would negate the gains a container-based inland port could provide to a facility that otherwise would be constrained. Global Access was established as part of a municipality's goal to reinvent itself after seeing the negative impacts of a military base closure, and is being led by a private development company who needs to make a profit. The lack of a formal arrangement between LA-Long Beach (at the agency or logistics operator level) and Global Access appears to have created misunderstandings about roles the two parties could serve as part of a collective network – such as the agile port.

The partnership that has emerged between Global Access and Long Beach State showcases the potential for a university to play an active role in both the logistics operations and economic development functions related to an inland port. This notable feature could be of particular relevance to Western North Carolina due to the relatively recent emergence of freight-related issues and concerns across the Region. Private industries are trying to organize among themselves to help solve these issues and will likely be seeking a third party to help manage a regional logistics operation. Western Carolina University, perhaps with other universities and community colleges across the Region could potentially lead a similar effort.

With that, the concept of an "agile port" may represent another type of inland port model that could potentially be considered for Western North Carolina, albeit a model that exists only in theory at this point.

### **Huntsville's International Intermodal Center**

Representatives of the study team visited with representatives of the Port of Huntsville in March 2008 as an extension of a meeting of the ARC's Network Appalachia Working Group. The team members also toured port facilities, including the International Intermodal Center, and discussed the development of inland ports with port representatives and Working Group members.

In many ways, the facilities and functioning of the International Intermodal Center can be viewed as prototypical of large-scale inland port developments. The Center is adjacent to the airport, and serves to provide for container transfers among three of the four modes of transportation potentially involved in inland port facilities. Highway, rail and air access to the Intermodal Center serve to provide for Huntsville's operations representing nearly a full service inland port, with the exception only of service by inland waterway.

In sharp contrast to the Smartport concept, Huntsville's Intermodal Center is based on substantial investments in infrastructure (see Exhibit 22). Development required champions who lobbied extensively over long periods for public investment, and a regional cluster focused on the aerospace industry was an important contributor to sustaining a focus on developing the required infrastructure.

Key factors that have contributed to the success of the Intermodal Center include ready availability of land that is easily converted to port and industrial expansion, a location where connections to existing transportation corridors could be developed, and an industrial base that facilitated developing substantial airport facilities. Flat, relatively undeveloped land has been easily converted to expansions at the airport and intermodal facilities, as well as providing for industrial facilities adjacent to port facilities (now incorporated into the port concept as the Jetplex Industrial Park). Availability of transportation alternatives, along with a location removed from congested hubs, such as in Atlanta, have allowed Huntsville to position itself as an alternative without the delays of more established competitors, but this advantage has only been realized through substantial investments in improving transportation infrastructure in the region and connecting corridors. Finally, business activity in the surrounding area has provided for development of effective air transportation in a city that is not a hub for a major airline. This has allowed for development of effective air freight operations while also increasing feasibility for investments in the other modes of transportation.

**Exhibit 22: Huntsville’s International Intermodal Center (foreground) with a Portion of the Airport in the Background, and Surrounding Industrial Development in the Immediate Foreground.**



**Relevance to the WNC Inland Port Feasibility Study**

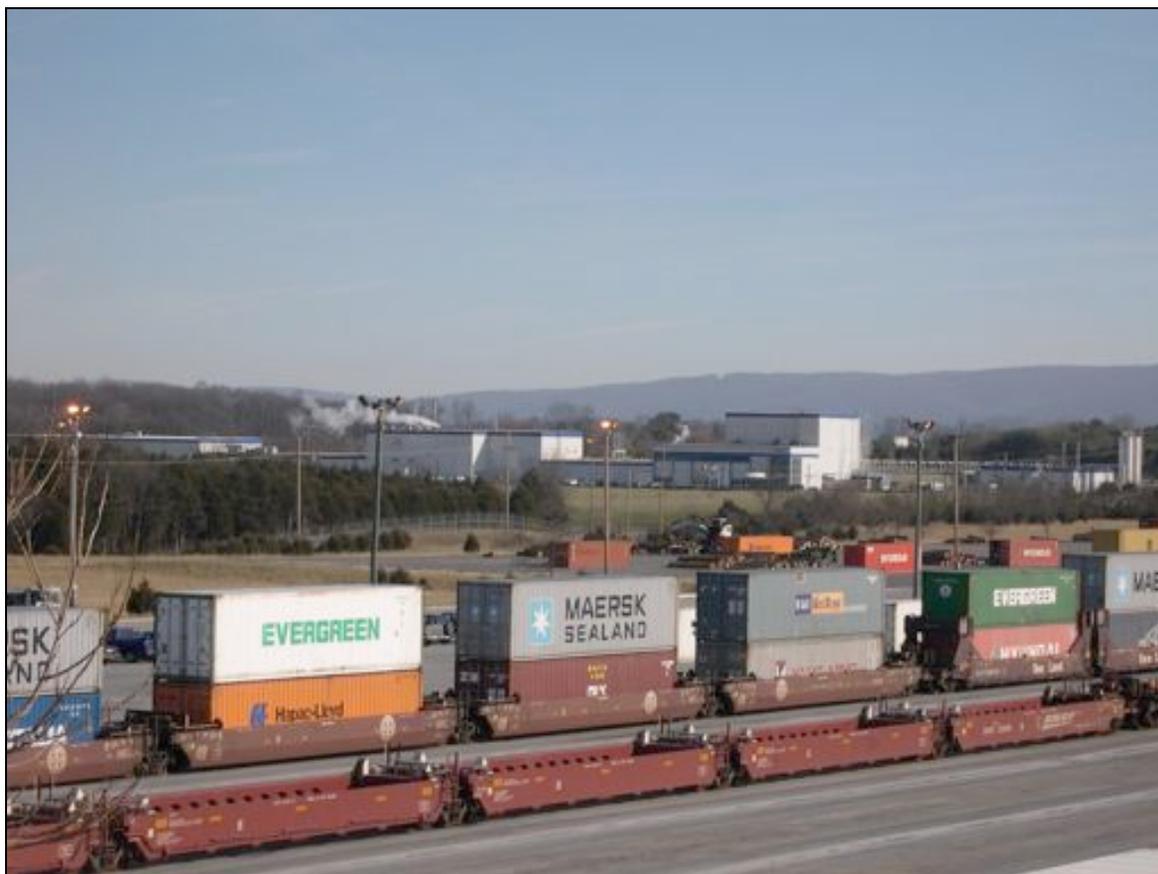
While topography and economic conditions make a facility such as Huntsville’s non feasible in WNC, Huntsville’s example does illustrate some important considerations for freight-based economic development relevant to this study. Perhaps most importantly, success at the Port of Huntsville supports the value of considering the placement of critical freight handling facilities away from congested transportation assets associated with major cities. Major expansion of the airport facilities in Huntsville has been substantially driven by demand from businesses seeking an alternative to airfreight operations through Atlanta’s Hartsfield-Jackson International Airport. Businesses have found that air freight moved through Huntsville is subject to predictable schedules and quick turn-around. While sites in WNC will not be able to attain the scale of the Huntsville facilities (the airport with planned expansions will rival Atlanta in size), it may be possible to create a smaller scale model that offers similar advantages to businesses. One site for consideration of such an alternative would be in the Buncombe-Henderson County area surrounding Asheville Regional Airport.

The facility in Huntsville also illustrates the value of strong advocates. Officials were clear that without such strong and long term advocacy the Intermodal Center would not have become a reality. Finally, the Huntsville example provides a clear indication that freight-based economic development can be a reality. However, the success of the Intermodal Center is also partially a result of the development of the Jetplex Industrial Park. That is, an intermodal facility becomes feasible not just as a way to process freight, but also as an engine for economic development. Inland port development in WNC should be planned to support effective and efficient freight transportation, but the development of facilities should also anticipate and facilitate the development of adjacent value-adding activities including appropriate levels of manufacturing.

### Virginia Inland Port

Members of the study team accompanied by a representative from the ARC visited the Virginia Inland Port (VIP) in Front Royal, VA in December, 2007. Although less extensive than the facilities at the Port of Huntsville, VIP is another example of a large-scale inland port facility that serves as an intermodal container transfer facility. Located on 161 acres, VIP became operational in 1989, but according to officials with the Virginia Ports Authority (of which VIP is part, as are also operations at the Port of Norfolk, Newport News and Hampton Roads), self-supporting operations were not accomplished until 1999.

**Exhibit 23: Virginia Inland Port Facilities with Industrial Development Adjacent to the Port Visible in the Background.**



As the team approached VIP, its presence was not immediately clear except by signage. VIP is hard to see from the highway, but to the informed observer, its location can be determined by the presence of business facilities that have built close to the port facilities. Such industrial development marked the turning point as VIP progressed from a long history as a facility dependent on revenues from other port operations for survival to emerge as a self-sustaining enterprise.

Originally the major purpose in developing the VIP was to capture freight originating in the Ohio Valley Region that was being shipped through the Port of Baltimore and route it through the Port of Virginia. Merely serving as a freight processing center was not adequate to ensure self-sustainable operation. Economic development surrounding the port facilities drove both vitality for the region within which the facilities are located and the volume of freight necessary for success of the port itself. Today, the central

purpose of VIP is viewed as being economic development, and in the pursuit of such development VIP has found a role that makes its operations feasible.

### **Relevance to the WNC Inland Port Feasibility Study**

This facility is often cited as a prototypical example of an inland port and the benefits that can accrue from the development of such a facility. However, the port was only viable because of capital from other operations during the first ten years of operations. True viability from the perspective of being self sustaining only occurred when industrial development brought value-adding activities to the area surrounding the inland port facilities. The history of VIP clearly illustrates that benefits from inland ports can be a long-range proposition. Further, the VIP case serves to reinforce the importance of considering economic development a central concern in determinations of the feasibility of inland port development on a regional basis. Officials associated with VIP operations have repeatedly told groups examining the inland port concept that VIP became a success when they started to focus on economic development as its purpose, instead of focusing on processing freight. Additionally, the long delay in reaching a point where returns on investment materialized suggest the risk associated with large-scale inland ports.

**Somerset Kentucky’s Rail Park**

A member of the study team visited the Rail Park in Somerset Kentucky in October 2007 to participate in an ARC Working Group meeting and to develop a better understanding of the Rail Park and its operations. The Rail Park represents an alternative to the large-scale inland ports exemplified by the Huntsville International Intermodal Center and the Virginia Inland Port.

During the meeting, it was frequently noted that the Rail Park presents an approach that can provide an area with access to alternatives in freight transportation and access to broader markets without the substantial investments required to develop more extensive facilities. Like the public access rail facility recently completed in Lenoir, North Carolina, the Rail Park in Somerset seeks to improve access to railroad transportation, and both facilities are intended to be cost-effective solutions for relatively rural areas. However, the Somerset Rail Park provides more extensive facilities affording greater opportunity to promote industrial development and regional economic impact.

**Exhibit 24: Master Plan for the Somerset Rail Park.**



Exhibit 24 presents the Master Plan for the Rail Park. Note that the park provides substantial support for trucking, rail operations and warehousing. Additionally, adjacent industrial facilities (formerly Crane Plumbing) provide immediate opportunity for developing value-adding business activities that leverage Rail Park based transportation advantages. Note that the park is a bulk transfer facility and does not handle containers and containerized freight. It is also not a Customs facility at this time.

The Somerset Rail Park was developed at a total cost of \$8.5 million on a 34-acre tract of land. While not a full-scale intermodal container transfer facility like Huntsville or VIP, the Somerset facility does provide a substantial array of services and capabilities, including rail service five days per week, an enclosed facility with 24-hour security, facilities to accommodate 72 rail cars, truck washing and scales, switching to the Norfolk Southern mainline, and 78,750 square feet of warehouse space with cross-docking between rail and truck transportation.

### **Relevance to the WNC Inland Port Feasibility Study**

The Somerset Rail Park is in its infancy, but even with relatively modest volumes, because of its scale, success is also more readily within reach. Serving more than just transportation needs, the Rail Park in Somerset was intended to serve as an economic development investment. Development and administration are a function of the Southeast Kentucky Economic Development Corporation through coordination of a public-private partnership. This partnership came together to lower transportation costs for existing businesses, attract new businesses to the area, and reduce traffic concerns related to trucking freight. These elements in concert with relative cost effectiveness makes this facility and the approach taken to its development a good example for other relatively rural communities.

The site selected for his facility is quite similar to many potential sites in WNC. Although relatively rural and without the immediate access to interstate highways that might be considered advantageous, existing available industrial space, a site that could be readily developed without extensive grading, availability of land for expansion, and access to a rail mainline all contributed to success for this particular location.

Challenges that the developers confronted in developing this facility included difficulty in identifying key stakeholders and anticipating their needs. For example, extensive negotiations were required to obtain interest from a Class I railroad and reach an agreement for a consistent level of rail service. Indications of interest by a Class I railroad are an important part of facility feasibility.

The developers also found that identifying likely users was difficult and it was difficult to determine the volume of freight that would be attracted to the facility. Surprisingly, some of the greatest demand for the Rail Park facilities came from organizations that were originally considered unlikely customers because they already had rail sidings. Better levels of rail service available through the Rail Park caused organizations to begin shipping and receiving through this facility instead of relying on sporadic service to their own sidings.

A facility like the Rail Park may allow existing businesses to refine and expand their operations in ways that contribute to business success. For example, one business was able to expand its operations and accept a sizeable order for manufactured goods delivered to a major retail chain because they could rent warehouse space at the Rail Park. Another local business could move away from costly trucking of asphalt and the challenges of maintaining the asphalt in useable form because they could construct appropriate storage tanks on the grounds at the park. Now instead of daily truck runs to transport the amount of asphalt necessary for the day's production from Louisville, they rely on regular rail deliveries and local storage.

Success in Somerset is not just a matter of providing access to rail transportation, but also a function of other services that can be provided along with that access. Facilities like the Somerset Rail Park and the Lenoir, NC Transload Facility serve to demonstrate that appropriately scaling planned investments in transportation projects helps to assure benefits even in relatively rural settings.

## VIII. Western North Carolina Transportation & Trade

### Port Import-Export Report Service (PIERS)

The Port Import Export Reporting Service (PIERS) is a private industry resource that compiles freight-related customs data from the ports. The data compiled by PIERS are shipment-specific and generally includes the name of the shipping company, company location, TEUs per shipment, origin/destination city, and U.S. and International origin/destination ports. The study team has worked with the North Carolina State Ports Authority (NC Ports), which purchases PIERS data on a quarterly basis, to obtain data for the State. NC Ports has provided this information for exclusive use in this study.

While PIERS provides a large data set and critical information regarding international shipments in Western North Carolina, it should be noted that the data are not perfect, as the data do not always correctly identify the inland location associated with the particular shipment. The origin-destination field is sometimes populated with the company or logistics firm paying for the shipment and the firms are not always co-located with the shipment location. With these limitations in mind, the PIERS data and the study team's analysis are not intended to be interpreted as a final decision-making tool to determine inland port feasibility; rather this approach represents one of the tools that help characterize the nature of the import and export business in Western North Carolina. Figures have been rounded to the nearest 100 or 1,000 depending on the volume of shipments.

The export data set for one-year (2<sup>nd</sup> Quarter of 2007 through 1<sup>st</sup> Quarter of 2008) contained approximately 35,000 export shipments from North Carolina. The WNC-specific data were pulled from this set by the cities located with the study area, then organized by county. The study area data accounted for more than 4,000 data points, with some communities exporting as few as one shipment in the data year and others with more than 400 in that same timeframe. The more than 4,000 shipments in the study year constituted approximately 10,000 TEUs being exported from the Western North Carolina Region. Total figures may not match in the PIERS analysis due to rounding.

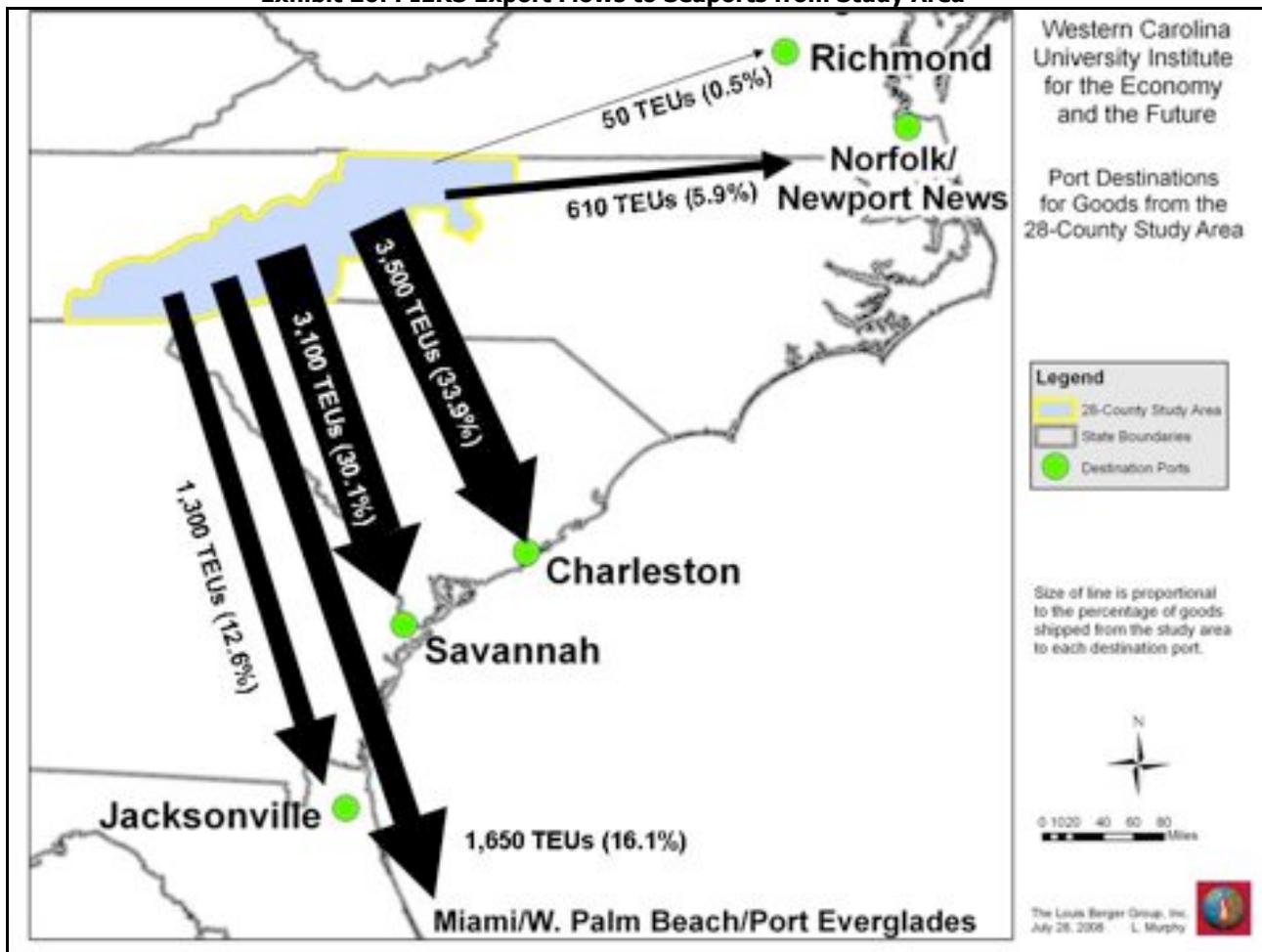
Origin and destination seaports for export TEUs were calculated for the Western North Carolina study area and the state of North Carolina (Exhibits 25-27).

Charleston and Savannah each represent approximately a third of the total export volume from the region, with Florida ports combining for approximately 29%. The almost equal split between Charleston and Savannah was a key finding in this data, as the reliance upon Savannah was unexpected based on feedback from area manufacturers, shippers and other interests. The reliance on Florida ports most likely reflects the service to and from those ports to markets in the Caribbean, Puerto Rico, Central and South America.

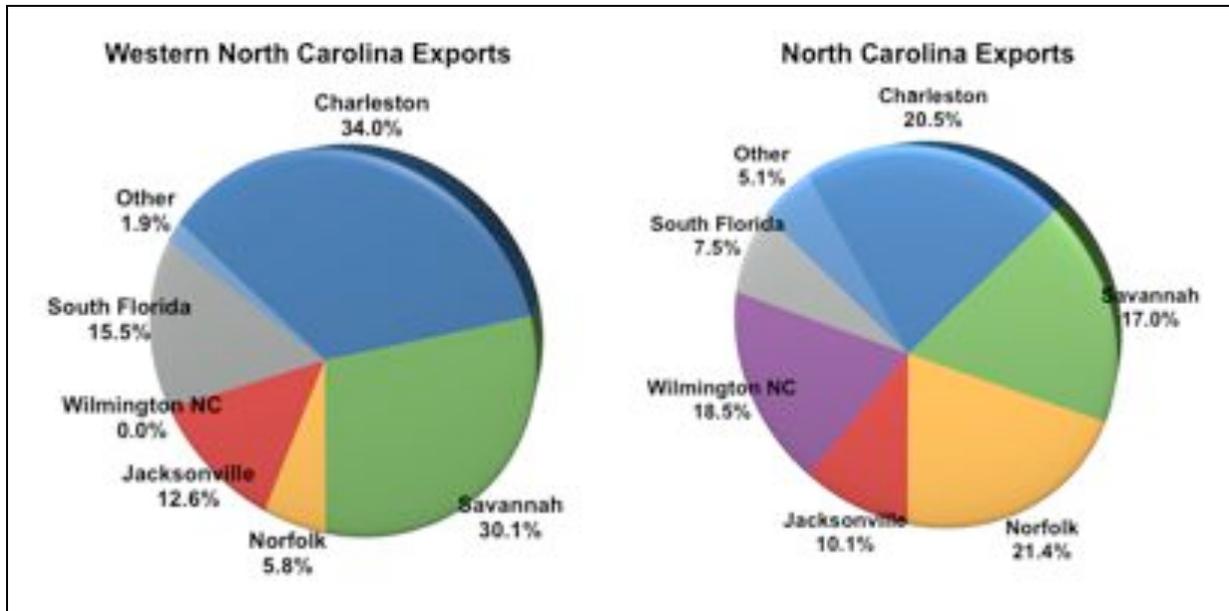
**Exhibit 25: Origin and Destination Ports for North Carolina  
Export Commodities, by Region (2007)**

Ports	North Carolina	Western North Carolina	Charlotte	G'boro / Winston-Salem	Raleigh - Durham	Hickory - Unifour
<b>Total TEUs</b>	<b>113,800</b>	<b>10,300</b>	<b>21,900</b>	<b>15,600</b>	<b>3,550</b>	<b>5,750</b>
<b>% of Total NC</b>	<b>100.0%</b>	<b>9.1%</b>	<b>19.2%</b>	<b>13.7%</b>	<b>3.1%</b>	<b>5.1%</b>
<b>Charleston</b>						
TEUs	23,300	3,500	4,400	3,900	100	3,300
%	20.5%	34.0%	20.1%	25.0%	2.8%	57.4%
<b>Savannah</b>						
TEUs	19,400	3,100	9,900	1,400	50	900
%	17.0%	30.1%	45.2%	9.0%	1.4%	15.7%
<b>Norfolk</b>						
TEUs	24,300	600	300	5,700	1,400	150
%	21.4%	5.8%	1.4%	36.5%	39.4%	2.6%
<b>Jacksonville, FL</b>						
TEUs	11,500	1,300	5,200	1,300	650	450
%	10.1%	12.6%	23.7%	8.3%	18.3%	7.8%
<b>Wilmington, NC</b>						
TEUs	21,000	-	150	50	-	-
%	18.5%	0.0%	0.7%	0.3%	0.0%	0.0%
<b>South Florida</b>						
TEUs	8,500	1,600	1,400	1,300	-	650
%	7.5%	15.5%	6.4%	8.3%	0.0%	11.3%
<b>Other</b>						
TEUs	5,800	200	550	1,950	1,350	300
%	5.1%	1.9%	2.5%	12.5%	38.0%	5.2%

Exhibit 26: PIERS Export Flows to Seaports from Study Area



**Exhibit 27: PIERS Export Flows to Seaports from Study Area Compared With North Carolina State Totals.**

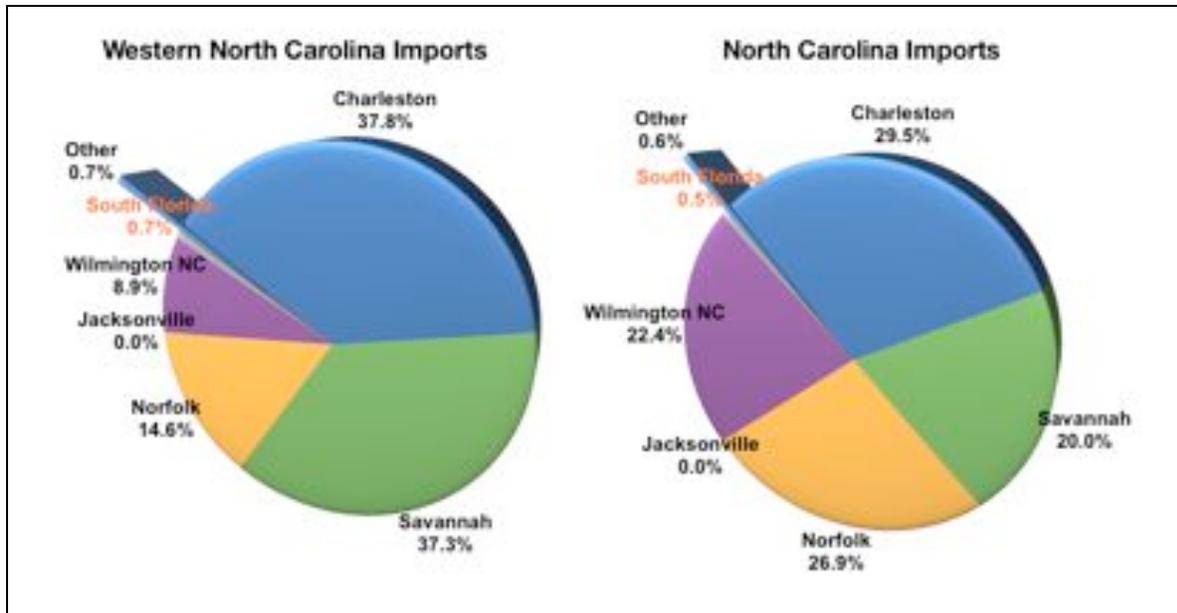


As shown in Exhibit 27, WNC shipping patterns vary markedly from the patterns witnessed for the state as a whole. In particular, in WNC the ports of Charleston and Savannah dominate export activity whereas such clear dominance is not present for North Carolina. Further, while Wilmington, North Carolina does not play an important role in WNC shipments, it does play an important role in business activity for the State as a whole. These differences suggest that policies and programs that prove effective in supporting export shipments in other portions on North Carolina may not well serve WNC. Freight-based approaches to economic development will need to be specific to WNC if they are to be effective in supporting the vitality of the Region.

Import data from PIERS are more difficult to interpret given that much of the inbound freight is bound for existing warehouses and distribution centers. The nature of these facilities and the related activities and the associated reporting imposes limitations on the accuracy of evaluation, and further, such flows are not likely to be captured by new facilities. However, general patterns in routes may provide an indication of inbound freight flow patterns that may impact a well positioned inland port facility as economic development drives investment in new facilities adjacent to the port.

Exhibit 28 shows that import freight flows also vary markedly between WNC and the state as a whole. However, while import flows are dominated by the ports of Savannah and Charleston, as was also the case with exports, with import flows, the port of Wilmington, NC plays a much more significant role than in the case of exports. This finding suggests value to a coordinated state-wide effort to improve transportation linkages between WNC and the Port of Wilmington. Further, the development of freight processing facilities such as the proposed freight consolidation facilities in WNC may play an important role in enhancing the role of developments at the Port of Wilmington in the economy of WNC.

**Exhibit 28: PIERS Import Flows from Seaports into the Study Area Compared With North Carolina State Totals.**

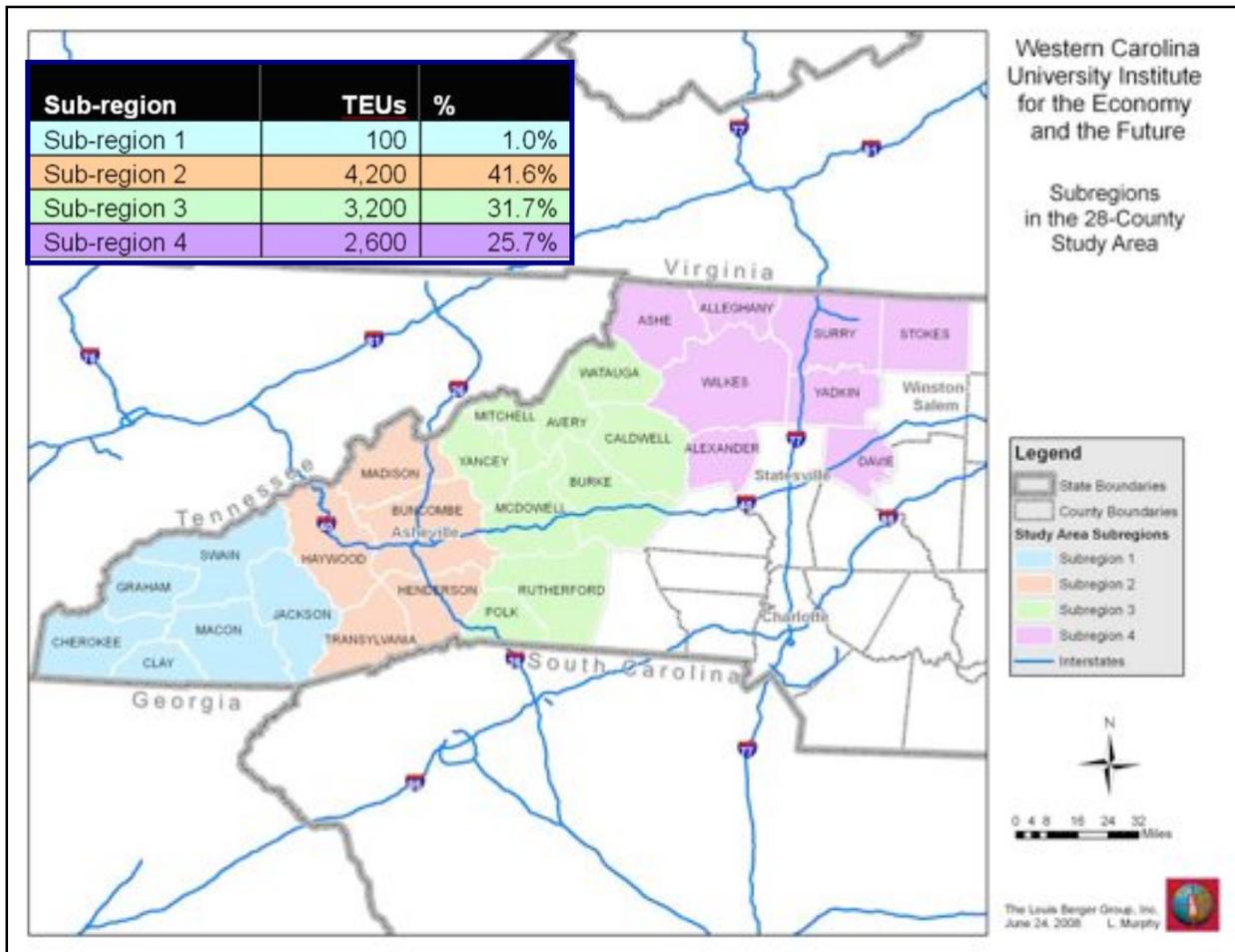


To gain a better understanding of what is occurring with exporting freight flows at the sub-regional level and determine if a sub-region has reliance on a particular port, Western North Carolina was divided into four sub-areas. These sub-areas were based on broad-based service sheds and Exhibit 29 indicates major flows to seaports from the sub-regions. Below is summary of the sub-regional analysis for exports.

- **Sub-region 1** is clearly the lowest-producing region of the study area in terms of exports based on the PIERS data. While low levels of exports were not unexpected, the relatively dearth of exports was a surprise to the study team. However previously known exporters (e.g. wood products) in this sub-region were a part of the data but levels were less than 10 TEUs in the study year.
- **Sub-region 2** generally comprises the Asheville region and generates more than 40% of the region’s export TEUs, which originate from a variety of industries. This is not unexpected as Asheville-Hendersonville-Waynesville is the manufacturing hub of the study area.
- **Sub-region 3**, in generating more than 30% of the export TEUs, includes areas of Burke and Caldwell Counties that are part of the hub of furniture manufacturing associated with the Hickory area. These counties, combined with a silica products industry in Yancey County and medical products manufacturing in McDowell County, account for the majority of TEUs within sub-region 3 and approximately 1/3 of the total exports for the study area.
- **Sub-region 4** consists of counties proximate to the larger population base in Statesville and Winston-Salem and appears to support the larger textile- and fabric-based manufacturing as well as the tobacco industry.

Sub-regions 2 & 3 account for more than 70% of the regional export TEUs, and as such, drive much of the reliance on Charleston and Savannah. Individually, these sub-regions reflect the regional trends for each of those ports. They differ from the region in the number of TEUs bound for Florida ports, as sub-region 4 is the origin for many of the TEUs bound for Jacksonville, Miami, West Palm Beach and Port Everglades.

Exhibit 29: PIERS Sub-regions for Western North Carolina & Export TEUs



**Air Freight**

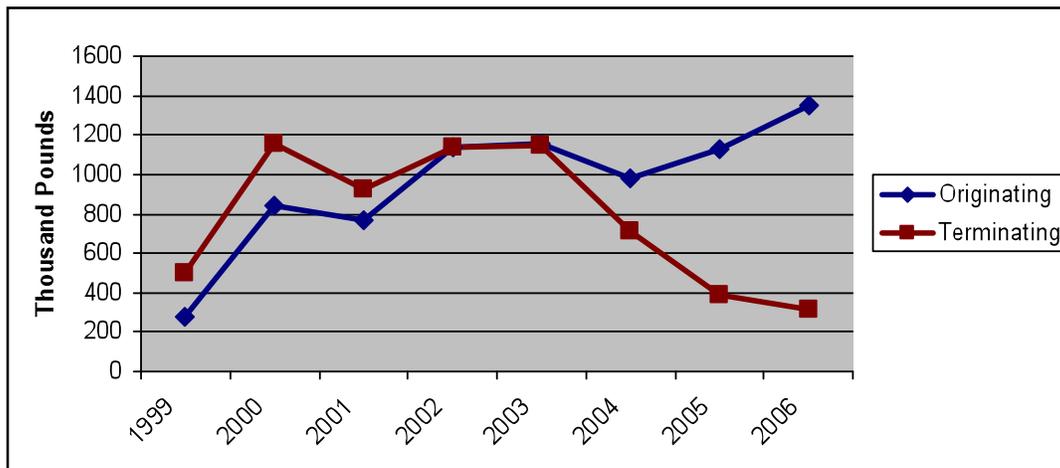
The Asheville Regional Airport (AVL) is the only facility in Western North Carolina that is a conduit for air freight. Based on information contained the 2008 NC Statewide Logistics Plan, the Asheville Regional Airport ranked 6<sup>th</sup> out of 12 facilities in terms of freight originating at North Carolina airports.

In 2006, freight originating at AVL totaled 1.35 million pounds and ranked fifth in the state in this category. AVL’s originating freight was slightly greater than New Hanover County airport (Wilmington) with 1.23 million pounds and approximately 1/3 less than Craven County Regional Airport (New Bern). Charlotte-Douglas International, Raleigh-Durham International, and Piedmont Triad International were the top three cargo airports in North Carolina and accounted for 98% of the statewide total. Charlotte had the highest originating volume with 114 million pounds, with 99.6 million pounds originating at Raleigh-Durham and 88.3 million pounds at Piedmont Triad.

Asheville Regional Airport ranked only sixth in terms of terminating freight, with 314,000 pounds, well behind Craven County’s total of 2.295 million pounds.

Exhibit 30 depicts originating and terminating freight volumes at AVL from 1999 to 2006.<sup>12</sup> The growth in freight originating at AVL suggests increased value in exporting, an activity important to economic vitality in WNC.

**Exhibit 30: Asheville Regional Airport Freight Volumes**



<sup>12</sup> List, George F, et al. *Statewide Logistics Plan for North Carolina: An Investigation of the Issues with Recommendations for Action*. North Carolina Office of State Budget and Management. Raleigh, NC. May 2008.p. 119.

### **WNC Examples of Freight Consolidation and Coordination**

With national and regional trends in inland port development becoming more of a reality in Western North Carolina, the mountains have seen the emergence of localized efforts and partnerships that could potentially be enhanced through either an inland port facility or logistics organization. Two such examples will be profiled as part of the final report:

- Western North Carolina Transportation Alliance (Asheville-Hendersonville); and
- Farmers Fresh Market (Rutherford County).

#### **Western North Carolina Transportation Alliance**

The Western North Carolina Transportation Alliance was organized by the Asheville Chamber of Commerce to support a discussion among the leading manufacturers in the Asheville-Hendersonville area to potentially consolidate less-than-truckload (LTL) or empty container shipments. This organization, only in its naissance, has already yielded a level of mutual understanding and information sharing among its participants. Key participants in this effort include:

- Volvo Construction Equipment;
- Southeastern Container;
- Colbond;
- CPU2;
- Ingles Supermarkets;
- Consolidated Container;
- Eaton Corporation;
- Silverline Plastics;
- Thermo Fisher Scientific;
- UPM Raflatac;
- Industries for the Blind; and
- C&H Tooling.

The Western North Carolina Transportation Alliance illustrates the value of structures that promote cooperation among businesses with high volumes of freight shipment. This represnets an approach to addressing logistics problems that does not require large amounts of capital or extensive commitment of parties beyond the business interests. Efforts to promote and coordinate such efforts represent a promising avenue for faclitation of freight flows in WNC.

#### **Farmers Fresh Market**

A unique effort in Rutherford County to link local farmers with Charlotte-area restaurants holds some lessons for freight consolidation in light of increased transportation costs. Led by the Foothills Connect Business and Technology Center, a rural economic development program in Rutherforddon, the Farmers Fresh Market is an Internet-based produce market that links chefs and restaurants in the Charlotte area with food producers, farmers and ranchers in Rutherford County.

Located 70 miles from Charlotte and within an isothermal belt that allows for a long growing season, Rutherford County is uniquely positioned to provide for the growing niche market for organic and locally grown produce. The Farmers Fresh Market acts as a trucking agent for the local producers by arranging for pick-up and delivery of products. To keep transportation costs manageable, the Farmers Fresh Market has developed a partnership with Charlotte-area distributors who make routine deliveries to Rutherford County and return to Charlotte with empty trucks. By teaming with these distributors, who range from produce distributors to office supply companies, the otherwise empty loads are returning with cargo to make deliveries in Charlotte.

Approximately 35 area farmers, all of them smaller than 50 acres, are part of the project. For the 2008 growing season, the Farmers Fresh Market managed three to five runs per week to Charlotte and eclipsed the two million pounds of products delivered in 2007.

The model established by the Farmers Fresh Market holds some potential for duplication across Western North Carolina, not only for food producers but for other small businesses and manufacturers who could benefit from sub-regional partnerships that combine consolidation facilities with transportation logistics management.

From an economic development perspective, the project has created added value to the region by keeping area farmers competitive with the major produce distributors based on Atlanta. Through the Internet-based brokering system (similar to other freight logistics operations, with the added component of fresh produce), the project has created an online marketplace where chefs can buy directly from producers. It has also created a more diverse workforce through working with Isothermal Community College's Small Business Center to help the area recuperate from the recent loss of 6,000 textile and furniture manufacturing jobs.

### **Interviews with Regional Manufacturers/Shippers**

The project team has conducted in-person interviews and distributed surveys to manufacturers and shippers to gain information to guide the study. Through these surveys and information gathered through the Port Import Export Reporting Service (PIERS) data, the study team was able to identify manufacturers throughout the study area and assemble a portrait of current conditions for these businesses.

Below is a summary of general information gleaned from these interviews:

- Despite the recent downturn in the economy, companies expect to grow at moderate rates over the next one to five years;
- Companies are not experiencing congestion related delays on regional highways or corridors connecting to marine terminals;
- Interstate 26 is a key freight corridor serving the region due to its direct connection to Charleston and access to Atlanta and Charlotte;
- Trucking remains the dominant mode of transport, even as fuel costs have risen;
- There is a desire to explore consolidation of loads with other area manufacturers;
- Just-in-time manufacturing is key component to their operations;
- Some companies are using their own trucking fleets to fill backhaul trips following deliveries to other domestic locations;
- Western North Carolina is located in an advantageous position in relation to population centers in the mid-Atlantic, northeast and Florida and corridors linking to those regions;
- Companies are mostly satisfied with services provided by the Ports of Charleston and Savannah;
- Containerized cargo shipments are associated with larger companies, who are primarily conducting import business; and
- Access to outbound shipping lanes through the port of Charleston has been challenging for low value commodities.

### **ARC Regional Workshop**

On February 3, 2009, the study group worked with the ARC to present a one-day workshop in Asheville to expand awareness of the region's transportation, economic development and international trade issues. The workshop also provided participants with an opportunity to participate in the planning

process. This workshop was one of the four workshops held throughout the ARC region as a way of gathering public participation and input into initiatives to address freight-related economic development from a Regional perspective. In addition to Asheville, workshops were also held in Muscle Shoals, Alabama; State College, Pennsylvania; and Huntington, West Virginia. Together, these workshops served to generate a listing of potential projects that can be undertaken and issues that need to be addressed in freight-related economic development. The ARC Regional perspective is presented in the report of the Network Appalachia Working Group ("Network Appalachia: Access to Global Opportunity." <http://www.arc.gov/images/programs/transp/intermodal/NetworkAppalachiaAccessToGlobalOpportunity.pdf>).

The Asheville workshop brought together 46 participants, including representation from North Carolina, South Carolina, Georgia, Alabama, Tennessee, and Virginia. A major theme that developed as a result of the process involving regional representation was that cooperative efforts across jurisdictions will be required to successfully address the transportation challenges associated with more effectively linking communities within this multi-state region to the global marketplace. Many of the potential initiatives presented at the end of the day depended upon coordinated planning that could benefit multiple communities. For communities to prosper, the region will need to develop a strong network of freight transportation assets.

Participant input identified a number of projects, some within the boundaries of individual states, and others crossing state borders, that can address particular freight transportation issues impacting economic development in the Carolinas, Georgia, Tennessee, and Virginia. Among the 29 initiatives derived from the four workshops to address the ARC region, the initiatives related to this study include:

1. **Inland Port, Trans-load & Consolidation Center, Western North Carolina.** Develop new trans-load and consolidation center to enhance access to both domestic and international markets for western North Carolina.
2. **Restoration, Murphy Gap NC GA, TN.** Restore abandoned rail link near Murphy, NC to reconnect western North Carolina, northern Georgia, and eastern Tennessee rail corridors, enhancing rail access for western North Carolina, northern Georgia, and eastern Tennessee.
3. **Inland Port, Intermodal Container Transfer Facility, East Tennessee.** In cooperation with the Norfolk Southern Crescent Corridor project, develop new intermodal container transfer facility to enhance access to both domestic and international markets for east Tennessee, southwest Virginia, and western North Carolina.
4. **ADHS Corridor K Completion, TN.** Complete construction of the ADHS Corridor K highway corridor linking eastern Tennessee with western North Carolina.
5. **Saluda Rail Restoration, NC, SC.** Restore rail freight service along the Asheville, NC — Spartanburg, SC route to enhance western North Carolina access to both the Crescent Corridor and to the Port of Charleston, SC.

These initiatives, which have been included among the ARC Working Group listing of tactical opportunities supporting the ARC Regional strategy, illustrate the importance of a regional focus in evaluating project feasibility. Additionally, the inter-related nature of these initiatives suggests the importance of considering transportation planning efforts from a networked perspective and including multiple transportation modes in proposals. Improvements in one location and a particular mode often require, or at least are potentiated by improvements in other locations and potentially involving other modes of transportation.

## IX. Operational Models for an Inland Port in Western North Carolina

The key objective of this study is an assessment of the feasibility of developing an inland port in western North Carolina. As was discussed in the inland port section there are several types of inland ports. They range from economic development initiatives, which provide information but have no “inland port” facilities, to large scale inland logistics centers which incorporate an industrial park and a rail intermodal terminal.

This broad range of features and structures is consistent with the description used in University of Texas studies. Their definition describes an inland port as a facility “located away from traditional coastal borders with the vision to facilitate and process international trade through strategic investments in multi-modal transportation assets and by promoting value-added services as goods move through the supply chain.” The issue for Western North Carolina becomes defining exactly what sort of inland port is to be developed and what is the appropriate organizational structure. The purpose of this section is to outline a tiered approach to developing an inland port capability.

To begin, it is important to understand the key objectives of the inland port development. What is the purpose of this initiative? Taking a lesson from the Kansas City Smartport case study, an appropriate definition of the key objectives is as follows:

- Grow Western North Carolina’s transportation and logistics capability;
- Make it lower cost, faster, more efficient and secure for companies to move goods from, to and through Western North Carolina; and
- Promote the economic development of Western North Carolina.

The second issue that must be considered is the organizational structure needed to advance the initiative. A lead organization, with the capability to develop and execute the project plan for each tier of the inland port development, is mandatory. The lead organization must also be the project “champion” that drives the initiatives to successful completion. Its responsibilities will be determined by the requirements of each tier of the development. A three-tiered approach is recommended with each tier increasing in complexity and facility requirements.

- **Tier 1.** A regional logistics organization or alliance of the region’s shippers. Such an organization minimizes staffing and facility capital requirements.
- **Tier 2.** Regional inland port freight consolidation or transload and container yard facilities. This tier requires relatively small facilities and operational capability.
- **Tier 3.** Rail Intermodal and inland port facility. This tier requires significant capital investment and operational capability.

Ideally a single organization could be utilized to champion and implement all three tiers of development. This structure would provide continuity and enable a long-term perspective that would be needed to advance through to the Tier 3 intermodal terminal, which will be the most difficult and complex to implement. It would also create an organization that understands the issues and needs of the region and could create services to meet these needs. A number of existing organizations have been identified as potential champions of this inland port development process. These include AdvantageWest, North Carolina State Ports Authority (NCSPA), WNC Transportation Alliance, and local Metropolitan Planning Organizations (MPO) or Councils of Governments. Alternatively, it may be desirable to create a new independent authority whose primary mission is to drive the inland port development process and deal with the region’s transportation and logistics issues. Following are a number of the key capabilities that should be incorporated into the recommended organization:

- Develop and implement operational plans;

- Hire and manage employees;
- Receive and manage public funding;
- Acquire property;
- Operate facilities and provide services; and
- Enter into contractual agreements.

Following is a description of each of the three development tiers.

### **Tier 1 – Regional Logistics Organization / Alliance**

As a first step in developing an “inland port” capability it is important to understand the region’s transportation and logistics issues and provide a forum to create solutions for these issues. This can be accomplished at relatively low cost through the establishment of a logistics organization, which can initially serve as a forum to identify and deal with specific issues. Ideally this organization is able to assist regional shippers and service providers in developing cost effective logistics solutions through the interaction of the organization’s members. An example of a potential application may be the identification of partners to consolidate LTL loads to common destinations. Another example is the identification of methods to balance container loads moving between the region and its serving seaports. In order to be successful and receive continued support from its members the organization must identify the issues and provide value in creating solutions.

The logistics organization can also provide information and information services to its members. This capability is referred to as an “E-Port” and such functioning is accomplished through its website and web based applications. There are two organizations identified in the case studies that can serve as role models for this capability. They are the Kansas City Smartport and the Port Des Moines Concept.

Kansas City Smartport provides a very sophisticated website which provides a wide variety of information summarized below:

- A comprehensive list of logistics service providers;
- A description and maps of Kansas City trade corridors;
- A listing of logistics based real estate developments and property listings;
- A section on international shipping including an international quote application; and
- A section on regional and national transportation news, publications and information.

In addition, Smartport is working on a Trade Data Exchange (TDE) initiative, which will improve the supply chain visibility in the Kansas City region as well as on a global level.

Although the Port Des Moines concept is just that – a conceptual outline – it does provide ideas that can be considered for a Western NC E-Port. Following is a summary of these items.

- Information on foreign trade documentation and regulation;
- Information on US trade regulations;
- Transaction capability with transportation providers; and
- Interactive connectivity with US and foreign customs, freight forwarders and customs brokers.

Smartport is set up as a non-profit economic development organization. It was formed by three regional organizations the Kansas City Chamber of Commerce, the Kansas City Area Development Council, a regional economic development organization, and Mid-America Regional Council, the regional MPO. It has no operational facilities except its office in Kansas City. Smartport also has over 30 private sector members who contribute over \$200,000 annually to its support. Smartport has a number of other initiatives which provide additional examples of the role it has taken in the region.

- It has contracted with a full service marketing research and communications firm, International Marketing to support regional companies reach the global market.

- It advanced the implementation of two logistics training courses, supply chain logistics and inventory logistics.
- It advocated the development of a Kansas City customs facility which houses US and Mexican customs officers and clears Mexican exports in Kansas City.

Similarly, for Western North Carolina, this organization could be tasked to promote the region's export activities through market research, local education and other trade promotional activities.

Another potential benefit that could be developed for local export shippers is an export load matching service that would identify empty containers in the region that can be reloaded and moved to container ports serving the region. This is a service currently being provided by the NCSPA to facilitate export container loads to the Port of Wilmington. A similar service could be provided through a cooperative effort with the steamship lines and other east coast ports. These services may also be available through commercial providers interested in developing a specialized service capability that focuses on the needs of western North Carolina Shippers. Services of this nature can also be developed in conjunction with each individual port. Ports are anxious to develop new business opportunities and will often work with a regional organization to improve the access to their port.

The services outlined above represent a sample of those that can be provided through a logistics organization and E-Port without any facilities beyond offices and staff. In addition, a key function of this organization will be the necessary research needed to identify and justify other service products that require physical facilities discussed in Tier 2. It is this research and development that can serve to carry the organization and its services into the future.

### **Tier 2 – Freight Consolidation Facilities**

Once the regional logistics organization has matured and developed a support base of shippers and service providers, it can begin considering other initiatives, which require operational facilities. Again, development of these facilities must be based on a solid business case and a need, which cannot be fulfilled by private sector service providers. As previously described, the Somerset Rail Park provides a recent successful implementation of this level of freight operation.

Within North Carolina, the initial model for an inland port facility is the Charlotte Inland Terminal developed by the NCSPA to facilitate container transportation between Charlotte and the Port of Wilmington. This facility initially served as a container yard for containers moved by rail from the Port of Wilmington to the CSX Intermodal terminal in Charlotte. However, that intermodal rail service, which was funded by NCSPA, could not be sustained and it was discontinued. At that time the Port Authority began operating the facility to support container-trucking operations between Wilmington and Charlotte.

Today the facility provides neutral container yard services for container carriers who call on the Port of Wilmington. The terminal is bonded by US Customs enabling it to serve as a staging area for empty and loaded containers. It has the necessary equipment to provide grounding and mounting services. Users of the facility can also utilize container and chassis repair and maintenance services that are available on site from a third party vendor. It should be noted that similar container yard services are also available from motor carriers who transport containers from and to other east coast ports.

Another type inland port facility that may be considered is a freight consolidation or cross-dock facility that can be used to consolidate small shipments into rail cars or full container loads to reduce the cost of transportation to eastern ports. If sufficient demand can be identified, it may be possible to utilize existing warehouse operators or LTL motor carriers to provide the service. In this case the role of the logistics organization will be to identify and quantify the need and solicit development of services from

local providers to meet the potential demand. Actual operation of a consolidation / deconsolidation facility by the logistics organization should be advanced only when private operators cannot be secured.

Inland port operating facilities need not be limited to container operations. Consideration may also be given to establishing rail carload transload facilities. Both CSX and Norfolk Southern (NS) provide carload distribution facilities for a broad range of products. Most common are bulk distribution for commodities like plastic pellets or food grade products such as flour or vegetable oil. Other transfer facilities handle lumber and building or steel products. In each case shipments move in rail cars from the product source to destination where they are transloaded into trucks for movement to their final destination. Although these transfer facilities are very specialized, both CSX and NS utilize a network of private operators to enable broader market coverage. As fuel prices increase, rail carload service with transload to trucks becomes more economical as the receiver can get the benefit of rail carload movement with the convenience of truck delivery. In this case the role of the logistics organization will again be to identify and quantify the need and solicit development of the transload service from either CSX or NS. Although rail carrier responsiveness to customer needs is improving, it can sometimes be difficult to get a timely and positive response from a rail carrier. It may be a value added feature of the logistics organization to understand the available rail services and to act as a facilitator between the rail carrier and regional businesses.

### **Tier 3 – The Large-Scale Inland Port Facility**

Discussion of inland ports generally revolves around large-scale facilities, examples of which in and adjacent to the ARC Region include the Huntsville, AL, International Intermodal Center and the Virginia Inland Port, both described earlier in this report. Such facilities normally involve large investments, large footprints, and substantial equipment, and are largely involved in the transfer of containerized freight between modes of transportation. These properties have led some to label facilities of this type Intermodal Container Transfer Facilities (ICTFs).

Historically there were two intermodal terminals located in the AdvantageWest region of western North Carolina. The Southern Railway (now NS) had a terminal at Asheville on its line between Morristown, TN, and Spartanburg, SC. Similarly, the Clinchfield Railroad now CSX had a terminal at Marion, NC on its line between Kingsport, TN and Spartanburg. In the early days of intermodal transportation, rail carriers had terminals at nearly every large city that they served. Terminals were generally not mechanized and utilized "circus" style ramps to load trailers to flat cars with jockey tractors. Rail service was generally via the rail carriers' freight train network resulting in poor service reliability and a high incidence of loss and damage. These North Carolina terminals were closed in late 1980's.

Presently, both CSX and NS operate an intermodal network served predominantly by dedicated intermodal trains. All terminals are mechanized and the capital cost of new terminals is significant. In a recent discussion, a NS intermodal representative estimated the capital cost threshold for a small terminal at \$50 million. In today's market the development of new intermodal terminals is driven by large volumes. Depending on the market and nature of the service within the carrier's intermodal network, an annual volume of 25,000 to 50,000 new shipments is needed for a carrier to even consider establishing and serving a new facility. Even with that level of volume, the carrier may also require significant public funding to advance a new terminal project.

In considering an initiative to establish a new terminal, the case studies in this report provide several applicable "lessons learned" that must be considered. From the Neomodal case study, a successful intermodal project needs to meet the following criteria:

- There must be a significant market and an effective marketing plan;
- The class I rail carriers must agree to provide the necessary services; and

- There must be sufficient funding, and ideally the serving carrier will have a meaningful financial interest in the facility.

From the Heartland Corridor case study it was noted that the facility must be located on an intermodal rail service corridor to optimize the chances for successful development. In the case of the San Joaquin Inland Port project, there was a large market with the export movement of agricultural products moving from the California Central Valley to the Port of Oakland. However, the proposed terminal location was not on an existing intermodal route and the proposed start up operation will require an operating subsidy funded by the developer or the public sector.

There are cases where small terminals have remained in operation or have been established. In each case there are unique conditions that provide the basis for a valid business case. One example is the CSX intermodal terminal in Kingsport, TN, which operated at an estimated 25,000 to 30,000 annual loads. The driving market factor for this facility was its nearly exclusive use by Tennessee Eastman Corp. Eastman used the intermodal service to handle its outbound export container business and to provide its inbound empty container supply. With Tennessee Eastman as its "anchor tenant" CSX continued the intermodal service until a few years ago. Unfortunately, Tennessee Eastman's intermodal volume declined and CSX discontinued the service and closed the facility.

Another example is the Florida East Coast (FEC) terminal at Fort Pierce, FL. This is a small terminal adjacent to the FEC Fort Pierce Yard. This facility was established to support a movement of import containers from the Port of Savannah to a new one million square foot Wal-Mart distribution center in Fort Pierce. With Wal-Mart as the anchor tenant the FEC received enough volume to establish a new facility in Fort Pierce. A supporting factor for this development is the relatively low cost for the Fort Pierce terminal. The terminal is located on a small parcel of land directly adjacent to the Fort Pierce Yard which enabled a very low development cost. In addition to the significant "anchor tenant" volume, Fort Pierce is on the FEC main line between Jacksonville and Miami. FEC operates three to four trains per day in each direction on this route. Therefore, it was possible for FEC to provide a daily service to Fort Pierce with existing trains. As such, FEC was able to operate on a very efficient, incremental basis.

Although, it is generally difficult to justify the start up of a new intermodal terminal and supporting intermodal service, it is possible as long as there is enough volume and a reasonable business case. In addition, a small market entry may require public sector financial support for initial capital expense. The key requirements to justify a terminal will be a well-defined market and/or an anchor tenant, which will provide the minimum volume, and revenue needed to cover the start up cost and reduce associated start up risk. The other requirement will be a champion to overcome obstacles and drive the project forward. The role of the Western North Carolina logistics organization will be to identify and quantify the intermodal market and to take the lead as project champion with the rail carriers, the potential customers and the public sector.

## X. Multi-Criteria Analysis for an Inland Port in Western North Carolina

Transportation facilities are part of the necessary infrastructure of all economic regions. They service the region's base or "export" industries, generating revenue from other regions and bringing it to the local area, creating jobs and economic activity. For example, in Western North Carolina, plastics manufacturing is an emerging primary base industry for the area. Transportation is a crucial service to attract and maintain economic base activities.

A primary objective of the feasibility study is to determine if and where there is sufficient justification to build an inland port in Western North Carolina. Inland ports have numerous definitions; however, for the purposes of this assessment inland ports have been categorized into the three tiers described in the previous section: Tier 1 – Regional Logistics Organization / Alliance, Tier 2 - Network of Sub-Regional Freight Consolidation Facilities, and Tier 3 – large-scale Intermodal Facility. Depending on the estimated demand and benefit of a facility, a Tier 1 organization structure could be created and slowly transformed into a Tier 2 and then Tier 3 facility. Alternatively, initiating construction of a Tier 3 facility may directly benefit the region, depending on the region's ability to attract major manufacturers or work with a Class I railroad to develop such a facility.

Multi-criteria analysis (MCA) is a decision-making tool for complex multi-criteria problems that include qualitative and/or quantitative aspects of the problem in the decision-making process.<sup>13</sup> Due to the wide variety of criteria involved in locating an inland port to WNC, MCA provides a logical and well-structured process to consider market demand and socioeconomic impacts. In addition to the MCA, an explanation of secondary economic and environmental impacts resulting from an inland port is provided in Section V. The secondary impact on the economic competitiveness of a region in expanding the economic base and preserving quality of life should be included in the overall decision to locate an inland port in the region.

Based on the literature review and interviews, indicators were identified that are required for both the successful operation of an inland port and the creation of regional economic development benefits. The MCA scoring consisted of the following steps:

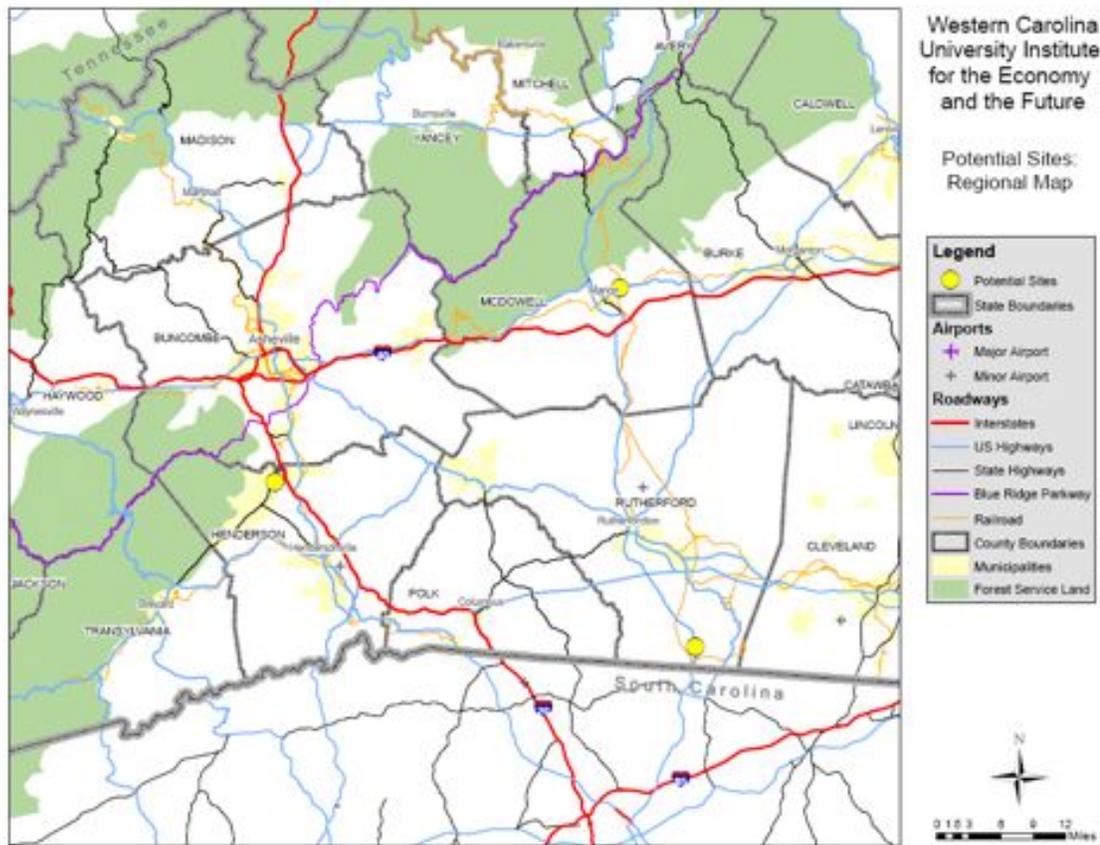
- The indicators are ranked according to the degree of importance relative to these operational and economic requirements (i.e., first, second, and third).
- The three locations are then rated by assigning "scores" to each indicator. The scores are derived from compiling data on each indicator by site location and then normalizing the three totals to assess the ratios and place them on a 0 to 10 scale.
- The rating score is then weighted by the indicator rank in order to account for the overall influence the indicator has on the decision. Indicators ranked first had a weight of 5, second rank received 3, and third rank received 1. For example, if an indicator was ranked first and the site received a score of 5, the weighted score is 25.
- Lastly, the weighted scores are summed by site location for comparison purposes.

Overall, the higher the score the more successful the inland port will be due to the fulfillment of key criteria. In addition to assessing the overall viability and enabling a comparison of sites, this scoring approach is transparent to all stakeholders and provides a mechanism for feedback concerning the consistency of the judgments made.

## Locations

<sup>13</sup> Center for International Forestry Research, *Guidelines for Applying Multi-Criteria Analysis to the Assessment of Criteria and Indicators*. [The Criteria and Indicators Toolbox Series](#), 1999.

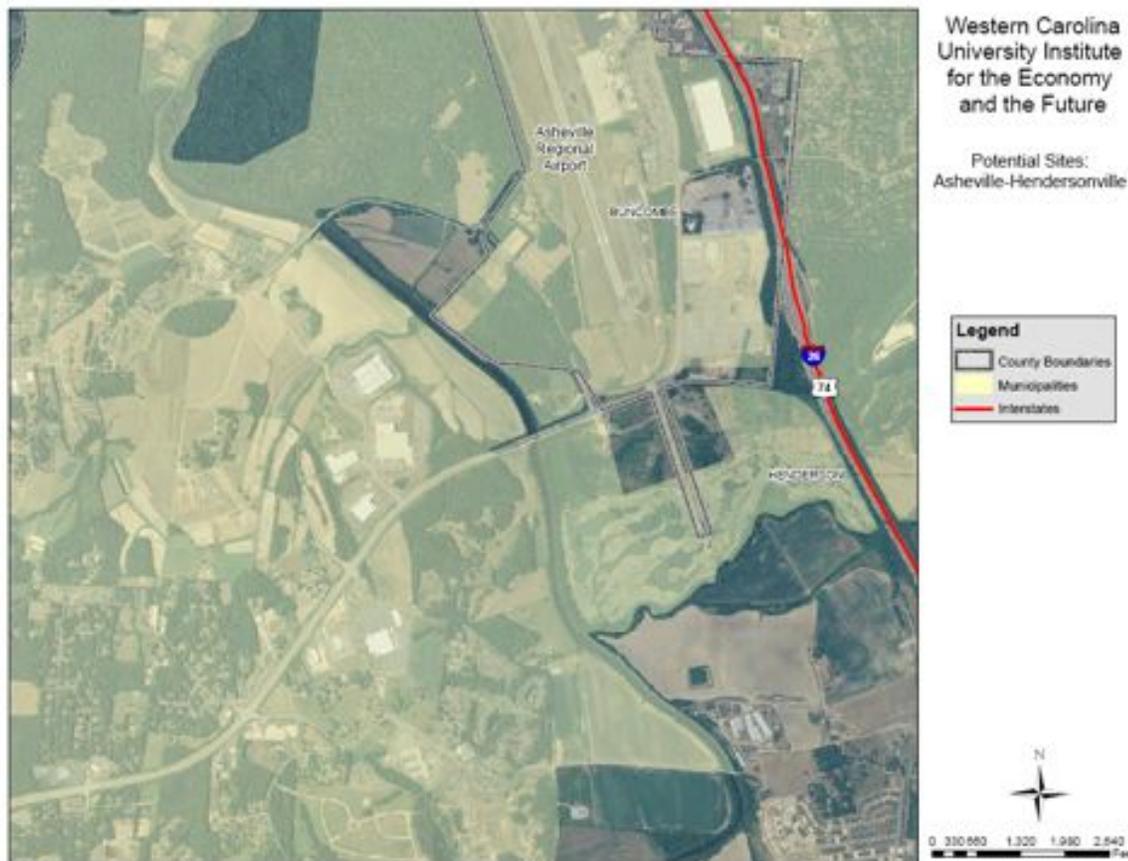
Buncombe, McDowell, and Rutherford Counties were chosen as locations for further examination for a Tier 2 or Tier 3 facility. The specific locations within each county are shown on Exhibit 31. In consultation with stakeholders, these locations were chosen based on a preliminary assessment of business clusters and regional shipping characteristics in addition to existing efforts that would serve as a foundation for an inland port. The study areas and associated market areas are described in greater detail.



**Exhibit 31: Potential Sites for Inland Port Facilities in Western North Carolina**

**Buncombe/Henderson County**

The Buncombe/Henderson County study area is located directly south of the Asheville Regional Airport and west of I-26 near the Buncombe and Henderson County border. The area contains industrial uses and is in close proximity of Airport Road / Boylston Highway which contains numerous manufacturing plants (Exhibit 32) In addition to I-26, which is a direct route to the Ports of Charleston and Savannah, the site is in close proximity to I-40, a major east-west route connecting North Carolina and Tennessee.



**Exhibit 32: Location Area for Potential Asheville-Hendersonville facility**

The Buncombe/Henderson County market area is shown in Exhibit 33. The market area is a 50-mile radius by road network from the study area. Based on relevant literature and interviews, a 50-mile dray distance is an appropriate limit for potential shippers to an inland port. The market area includes the following counties: Buncombe, McDowell, Rutherford, Polk, Henderson, Transylvania, Haywood, and Madison.

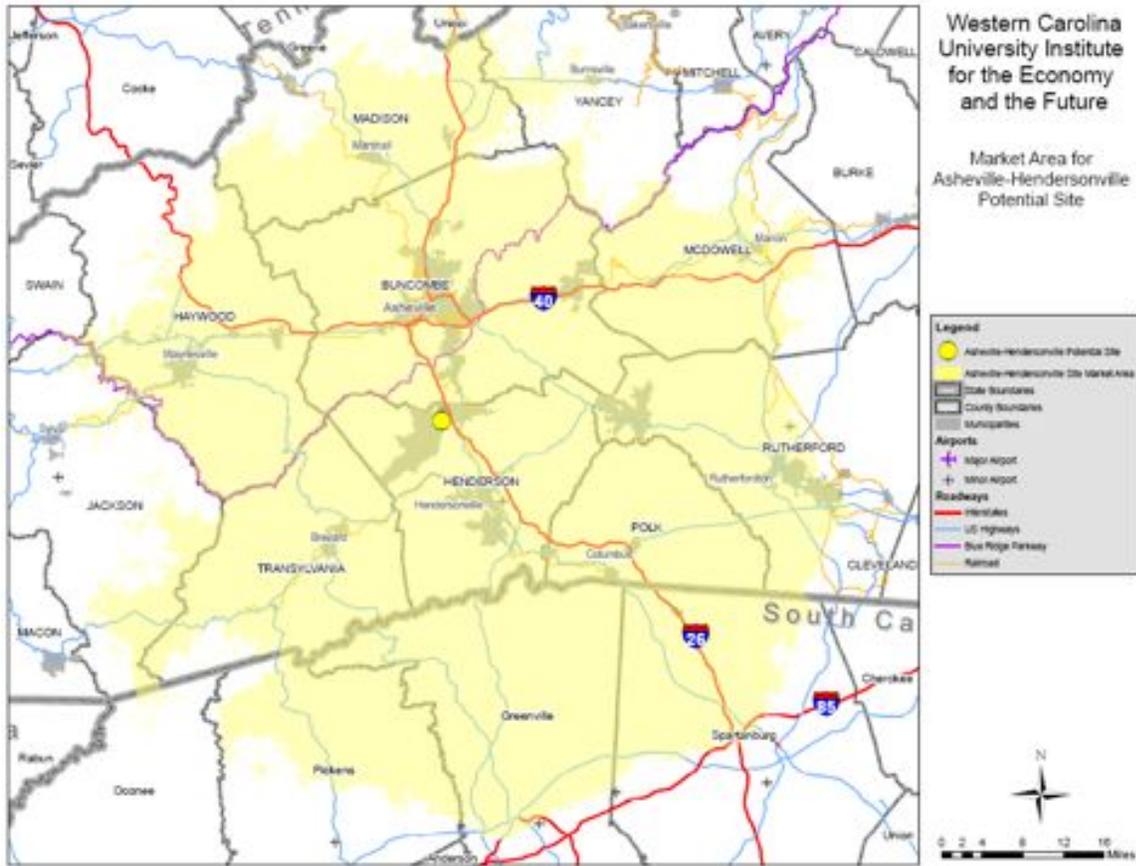
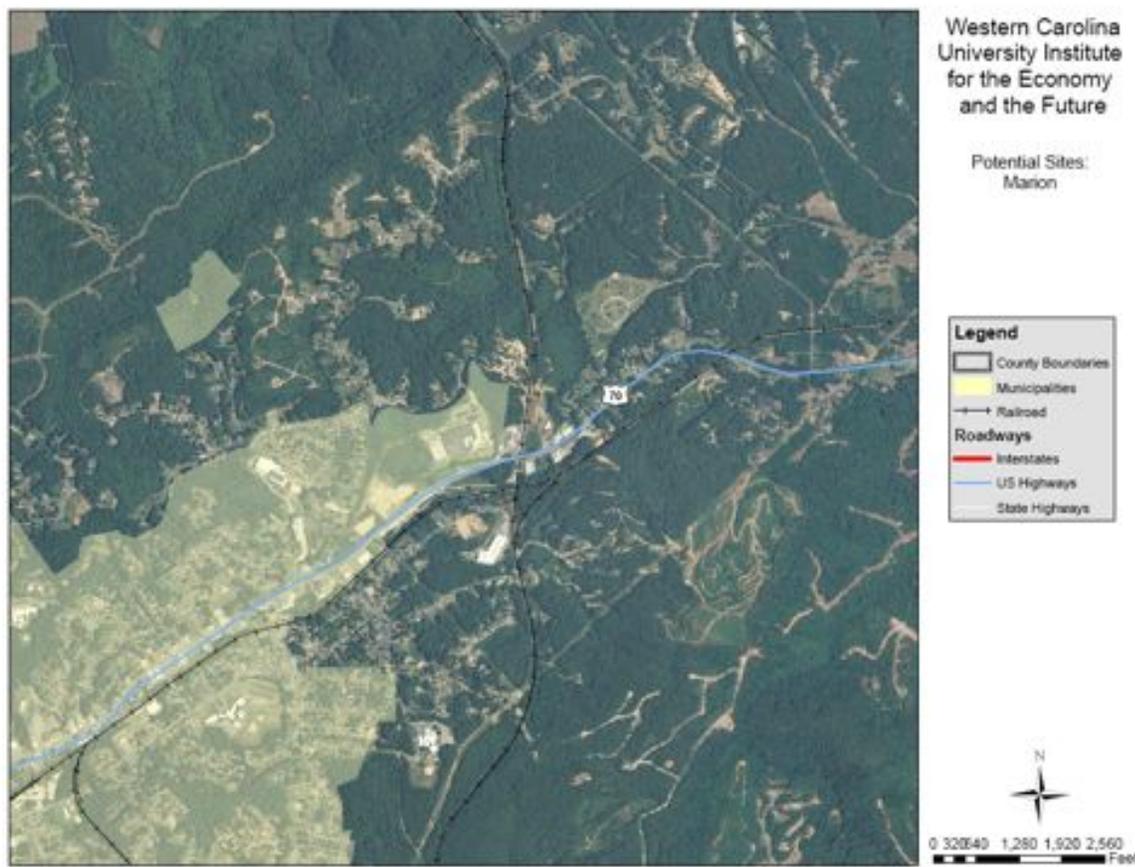


Exhibit 33: Market Area for Potential Asheville-Hendersonville facility

**McDowell County**

The McDowell County study area is located partly in the Town of Marion. The study area contains sections of State Highway 70, Norfolk Southern Railway, and CSXT Railway (Exhibit 34). The western section is mostly developed due to Marion however the eastern and northern sections are mostly vacant.



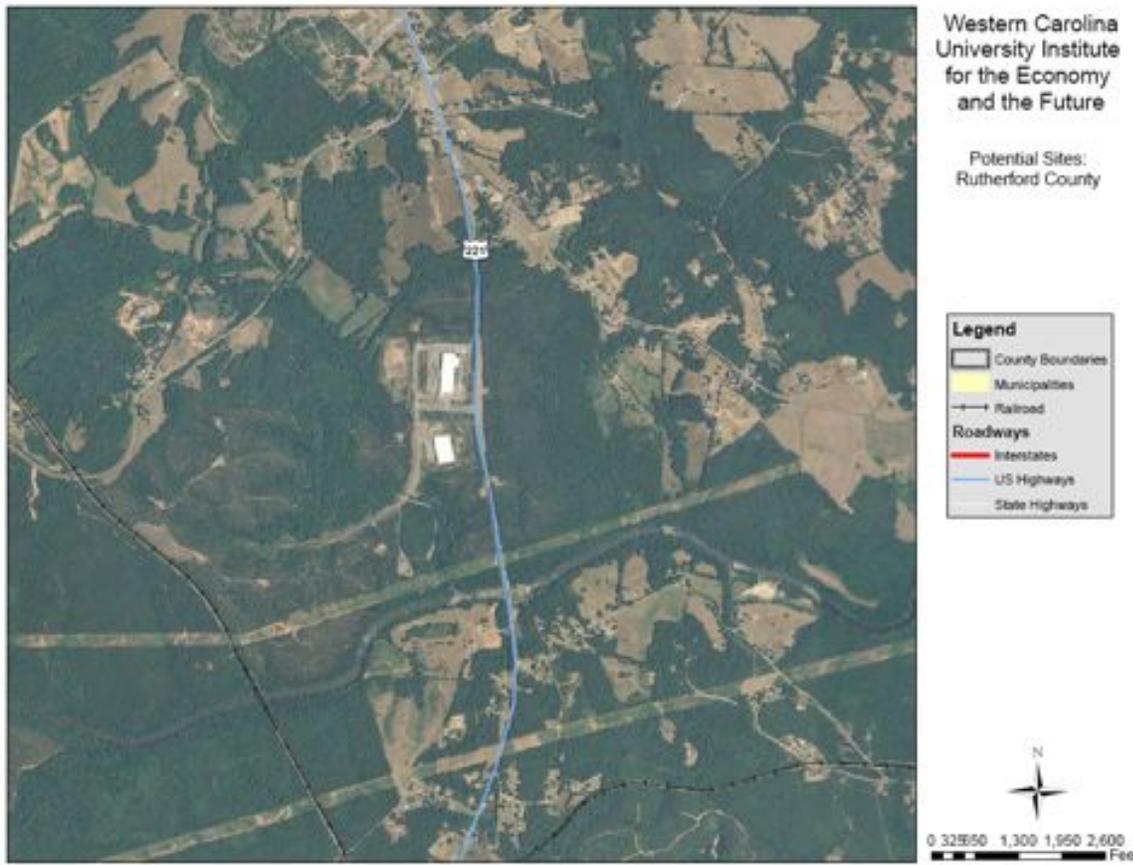
**Exhibit 34: Location Area for Potential McDowell County facility**

The McDowell County market area is shown in Exhibit 35. The market area is a 50-mile radius by road network from the study area. The market area includes the following counties: Buncombe, McDowell, Rutherford, Polk, Henderson, Yancey, Mitchell, Avery, Caldwell, Catawba, Cleveland, and Burke. Some of these counties are outside the WNC region, however are included because businesses located in these counties are potential users of the inland port.



**Rutherford County**

The Rutherford County study area is located south of Rutherfordton and just north of the North Carolina – South Carolina border. The study area contains sections of the State Highway 221 and CSXT Railway (Exhibit 36). The vast majority of the study area is vacant. The presence of a current industrial park with available land suitable for development of an inland port adjacent to the CSXT mainline and a motivated landowner represents an advantage for this site. Further, expressions of interest by Duke Energy in participating in development of this site by providing fill to bring the proposed site to grade, and initial expressions of interest in the site for a freight project by executives at CSXT represent important aspects of potential for the site.



**Exhibit 36: Location Area for Potential Rutherford County facility.**

The Rutherford County market area is shown in Exhibit 37. The market area is a 50-mile radius (by roadway travel time) from the study area. The market area includes the following counties: McDowell, Rutherford, Polk, Henderson, Lincoln, Cleveland, Burke, and Gaston. Some of these counties are outside the WNC region; however they are included because businesses within these counties are potential users of the inland port. South Carolina counties may also provide potential users of the inland port, but experience from the development of other inland ports suggest that such traffic is difficult to predict.

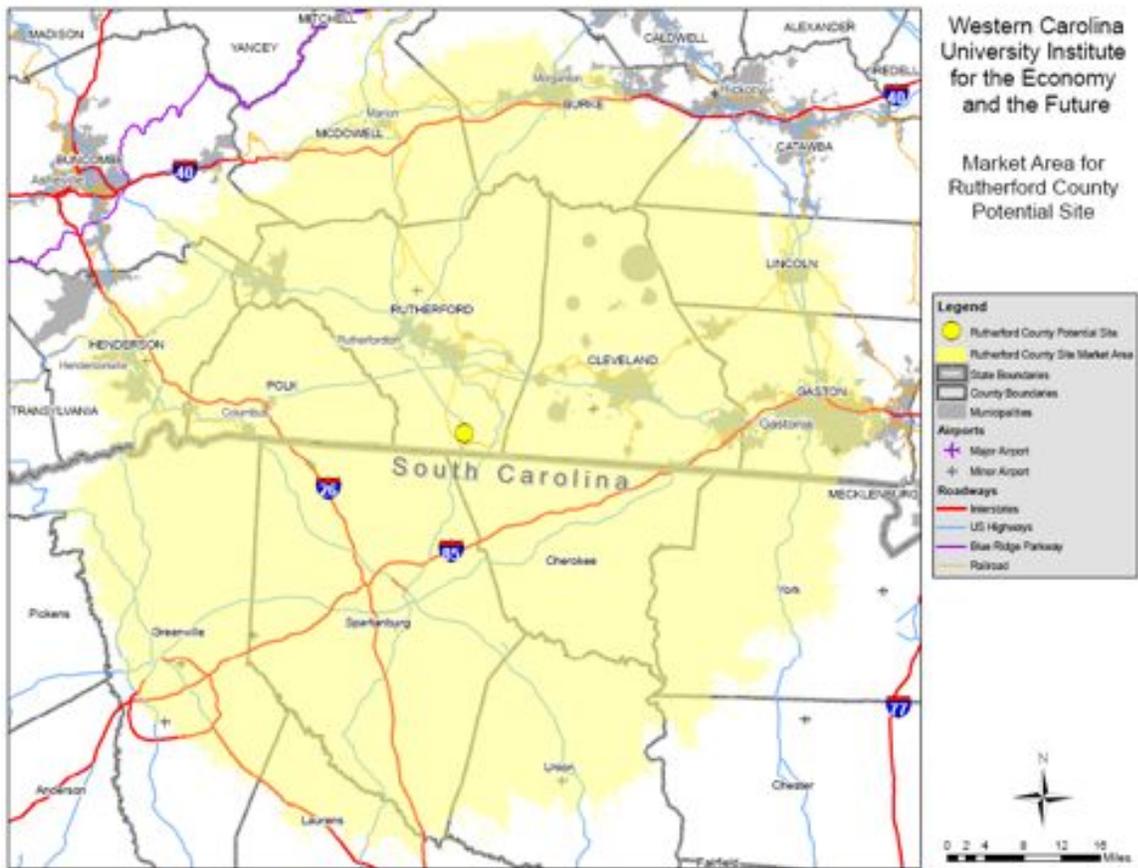


Exhibit 37: Market Area for Potential Rutherford County facility.

### Evaluation

A MCA is used to determine the success of an inland port facility (Tier 3), but this approach also provides an indication of the potential for a rail park (Tier 2). The ultimate success of this type of facility is best measured by assessing its net economic contribution from both a private and public standpoint. The private standpoint relates to profits while the public standpoint relates to improvements in economic efficiency and facilitation of economic activity. The private and public measures overlap to a very large extent and are mainly focused on the demand within the market area and site suitability characteristics.

Major categories of criteria include:

- Existing import/exports shipments;
- Number and type of potential users of the facility in catchment area;
- Distance to ports, consumer markets, and competition; and
- Suitable site with close access to highway/interstate, rail, and airport with low environmental impact.

In general, the analysis of the feasibility and site location focuses on the level of importance of the criteria and the associated trade-offs among the different locations. In comparing the alternatives, locations typically meet some criteria while not meeting others. Further, certain criteria are more critical to the success of the facility and the overall benefit to the region and these are weighted accordingly. The MCA uses a ranking of criteria to classify the degree of importance to decision-making.

A comprehensive set of criteria covering the above categories are applied to each market area and site location. These criteria cover most market and site characteristics needed for successful operation of an inland port facility and were identified through discussions with leading experts in goods movement and the development of inland ports, operators of existing inland ports within the U.S., a review of relevant literature, and discussions with business operators in the WNC region.

### Explanation of MCA

The MCA is illustrated in Exhibit 38. Both market and site location criteria are included within the same table. An explanation of individual criteria and results is provided.

**Exhibit 38: Multi-Criteria Analysis – Feasibility / Site Selection**

**WNC Inland Port Feasibility  
Multi Criteria Analysis - Feasibility/Site Selection**

Criteria	Indicators	Ranking (degree of importance)	Weighted Rating (scores 0 to 50)		
			Buncombe	McDowell	Rutherford
<i>Market Demand</i>	TEUs - Export	First	20	50	35
	Agriculture/Manuf/Trade Establishments	First	20	40	25
	Agriculture/Manuf/Trade Employment	First	15	40	25
	TEUs - Import	Second	6	30	9
	Total Employment	Third	4	9	4
	Population Forecast	Third	5	9	6
<i>Locational Convenience</i>	Distance to Ports	Second	9	6	12
	Distance to Consumer Markets	Second	9	3	24
	Distance to Competing Inland Ports	Second	30	21	18
<i>Transport Linkages</i>	Highways / Interstate	First	25	50	50
	Rail	First	5	50	30
	Rail - Originating/terminating rail cars	Second	6	3	30
	Airport	Third	10	1	2
<i>Site Suitability</i>	Developable Land	First	30	20	50
	Environmental Constraints	First	20	20	35
<i>SUM</i>			214	352	355

**Market Demand**

*Import and Export TEUs* – The number of shipments going into and out of the region is the main factor in the viability, location, and size of an inland port. Of particular importance to economic development is the volume and potential volume of export TEUs. The export of goods outside the local economy generates an inflow of capital to the local economy and thereby represents the transportation most critical to regional economic vitality (exporting industries serve to increase the living standard of the region). Import TEUs are less important in improving the regional economy, and are given less weight in the evaluation. Further, in WNC, many imports simply travel through freight or distribution centers to their final destination and offer little in terms of value added processing and job creation.

Due to McDowell County’s close proximity to the Hickory manufacturing hub, the McDowell County market area, as defined for this evaluation, was the source for approximately 12,000 export TEUs and the destination for over 40,000 import TEUs in 2007 (based upon *PIERS inland origin and destination data*). These volumes are significantly larger than the other two market areas, larger than the entire WNC region’s exports, and very close to the entire region’s imports. Many sources on inland ports cite a threshold of 10,000 export TEUs as a threshold for a viable inland port. However, there is no assurance that a large enough portion of the export TEUs from the hickory region would be processed through a facility in McDowell County to ensure obtaining this metric. Previous feasibility studies, such as the one

conducted for the Somerset, Kentucky facility (according to interviews with officials associated with the Rail Park) have dramatically overestimated the export volumes compared with actual facility utilization. This is particularly true when freight must be transported in a direction that is opposite routes to existing larger facilities, such as would be the case in moving freight to the Marion area from Hickory.

*Agriculture, Mining, Manufacturing, and Trade Establishments and Employment*– Agriculture, mining, manufacturing, and trade establishments are potential customers of an inland port due to dependence on bulk shipments on a regular basis for both inputs and items going to market. Due to the close proximity of Hickory, the McDowell County market area contains a dense network of manufacturing, approximately 3,600 businesses and over 102,000 employees in these sectors. *Source: ESRI Business Analyst Online, 2009*

*Total Employment* – The 2008 employment estimates for the three market areas are: 431,300 for McDowell, 255,300 for Rutherford, and 253,600 for Buncombe. Rutherford and Buncombe are lower due to their more rural counties. *Source: ESRI Business Analyst Online, 2009*

*Population Forecast* – Forecasted population growth is linked to job growth, increased consumer purchases, and additional economic development. These elements increase market demand for an intermodal facility due to the increase in shipments going into and out of the region. By 2013, the McDowell County market area is expected to be close to 1 million while Rutherford is 734,200 and Buncombe 607,210. Overall, WNC region is expected to have strong population growth. *Source: ESRI Business Analyst Online, 2009*

### **Location Convenience**

*Distance to Ports* – For WNC in 2007, the percentage of import TEUs coming from the Ports of Charleston and Savannah was 75% and the percentage of exports was 64%. The majority of the remaining TEUs were going into and out of the Ports of Norfolk and Jacksonville, FL. For these ports, the MCA included an assessment of the total network distance. All study areas had similar total distances, with Rutherford County being the lowest due its location closest to the southern ports.

*Distance to Consumer Markets* – Due to businesses' dependency on shipments to large consumer market areas, the distance to major urban areas is an indicator. The total network distance to regional urban areas was totaled and compared. Rutherford County was lowest due to close proximity to Greenville-Spartanburg, Charlotte, and Atlanta.

*Distance to Competing Inland Ports* – The closest inland port to WNC is the Charlotte inland port. Some businesses in WNC currently use this inland port; however they may be more likely to use a closer facility if a similar service is provided. A new inland port should be distant enough from the Charlotte port to not have to compete within the same market area. The network distance to the Charlotte port was used as an indicator. The Buncombe-Henderson County site is the farthest from Charlotte, 112 miles, due its more western location. Rutherford and McDowell counties were 57 and 93 miles, respectively, from the facility in Charlotte.

### **Transport Linkages**

*Highway / Interstate* – An essential criterion for an inland port site is direct access to a highway or interstate. McDowell and Rutherford are adjacent to a State Highway while the Buncombe-Henderson study area is 4 miles from the closest I-26 interchange.

*Rail*- Due to an intermodal center's dependence on rail, the distance to the closest operating rail line was measured. In the McDowell County study area, the Norfolk Southern Railway intersects the CSX Railway adjacent to State Highway 70, suggesting opportunities as a location for an intermodal center if the

appropriate construction details and cooperative agreements can be accomplished. The Rutherford County study area includes a CSX Railway mainline, and the Norfolk Southern Railway is 3.8 miles from the study area.

*Rail - Originating and terminating rail cars* – In addition to proximity to a rail line, it is important to review the number of carloads generated at the site since this demonstrates a potential for additional cars to be added through an inland port. Each study area has station car-loadings; however, Rutherford County has significantly more cars due to traffic on the CSXT railway terminating at the Brice station (Duke Power Cliffside power plant). In 2003, the station had 29,000 cars originating and terminating compared to Buncombe's 905 and McDowell's 275. *Source: North Carolina Waybill Analysis, November 2006*

*Airport* – As an intermodal hub, air cargo may be used and direct access to an airport will be needed. The network distance to the closest airport was measured and compared. Being adjacent to the airport, the Buncombe-Henderson study area has the lowest distance. The Rutherford study area is 38 miles from the Greenville-Spartanburg Airport and the McDowell study area is 49 miles from the Asheville Regional Airport.

### **Site Suitability**

*Developable Land* – All three study areas have ample developable land for an inland port with space for expansion. As shown in Exhibits 31, 32, 34 and 36, these areas are mostly either undeveloped or have compatible land uses for a distribution center. A development constraint present in the McDowell County site if the facility is to serve both Class I railroads is that there is a grade separation that must be addressed. Without addressing this constraint, the relative virtue of transportation linkages is substantially reduced.

*Environmental Constraints* – An environmental constraints evaluation was performed to gauge the approximate developable area of each study area and to ensure that development plans are protective of natural resources. The evaluation relied primarily on publicly available maps and Geographic Information System (GIS) files as well as site visits to each area. Other factors such as private interests to move or fill areas and availability of suitable land were also considered in the environmental analysis. Based on the maps, all study areas have land that is developable. However, as shown in Exhibits 39 through 41, some study areas have more environmental constraints than other sites. For example, the Buncombe-Henderson study area has a large area within the 100-year floodplain. Topography presents issues with slopes and fill in both the McDowell and Rutherford study areas.

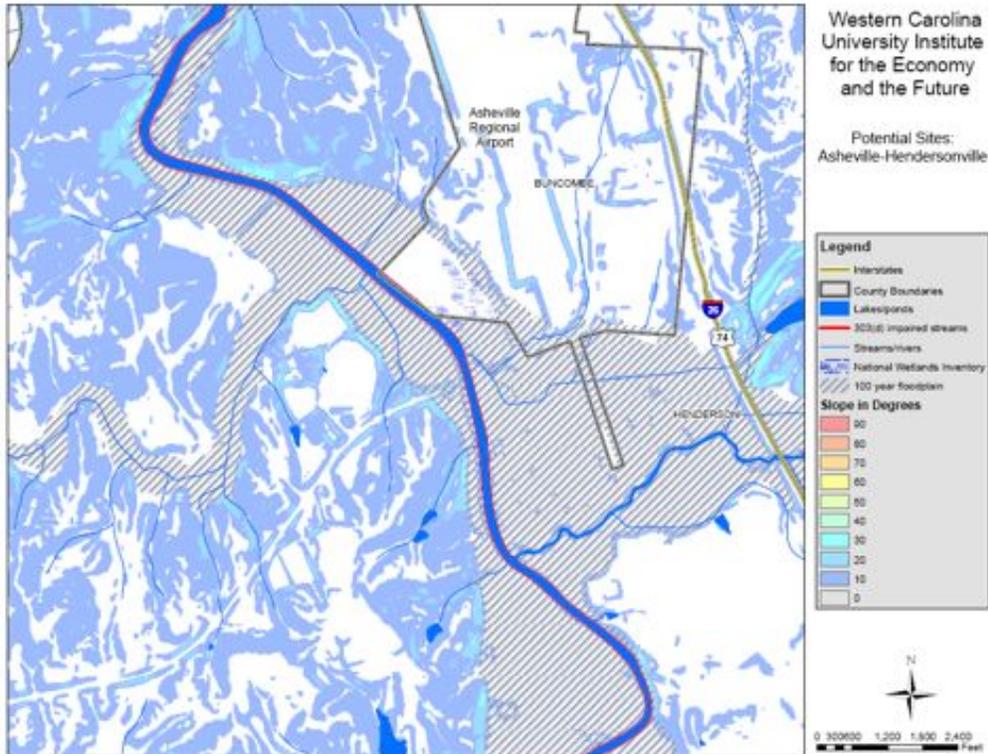


Exhibit 39: Asheville-Hendersonville Environmental Analysis.

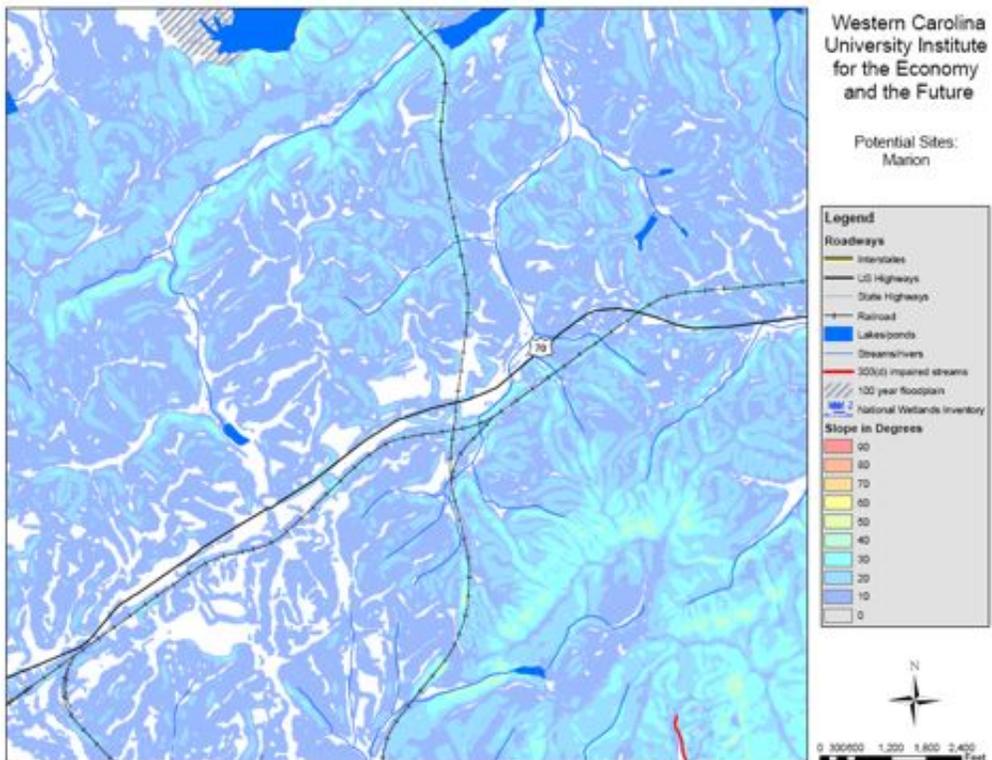
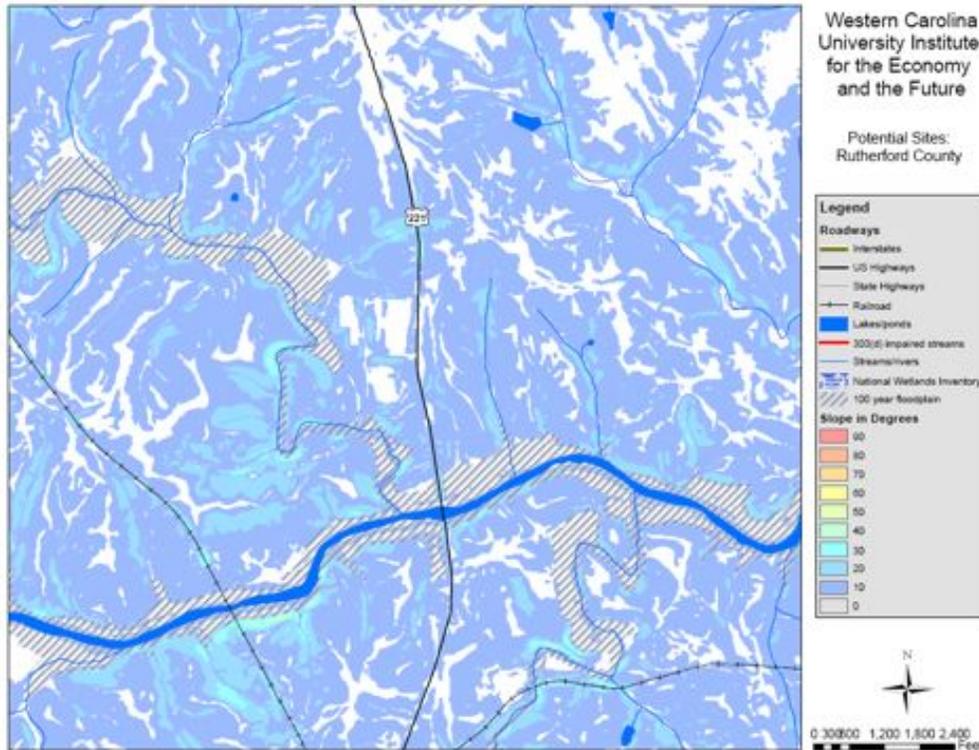


Exhibit 40: McDowell County / Marion Environmental Analysis.



**Exhibit 41: Rutherford County Environmental Analysis**

## Secondary Impacts Involving the Region’s Long-Term Attractiveness

### Long-Term Impacts on Regional Competitiveness

A reduction in relative transportation costs experienced by the WNC region’s firms of longer duration (i.e., reduction due to freight consolidation) could have an influence on the long-term competitiveness of the region’s industries. The measurement of this long-term impact on regional competitiveness must invariably consider how the regions’ various supplying industries, depending on their market orientation, are differentially able to pass along production cost increases to purchasing industries and consumers.

Depending on whether the local firm supplies products for a market that is regional (i.e., local) or national (i.e., non-local), a change in production costs such as that stemming from a transportation cost change will result in a relative change in the local firm’s relative selling prices or relative profitability. While site selection decision-making by firms involves highly complex decisions, involving an abundant array of factors (e.g., production costs, market proximity, resource availability, labor quality, tax, transportation infrastructure and executive convenience), national firms will tend to locate where it is profitable to do so.

An inland port, which facilitates freight consolidation, reduces production costs. This reduction benefits both existing firms and the relative attractiveness for a location from the perspective of firms outside the local market. Moreover, the economic geography literature supports the thesis that reduced transport costs acts to entrench in-place agglomerations and export industries (regional export industries). Low transport costs are a condition precedent for agglomerations to gain traction.

On the contrary, if transportation costs increase due to possible further road congestion, regional industries will confront the change with the potential in the short term to increase prices. As sales prices increase, the region will lose its attractiveness in competition with national markets and in supplying local demand, as there is a negative elasticity of response to the price change. That is, the region's ability to supply demand will be lower.

### **Impact of Modal Shift on Regional Infrastructure and Business**

A complete reliance on longer-distance truck service may impact a region's competitiveness due to future increases in fuel costs, congestion, and tax on carbon producing activities. A partial modal shift to rail may prove beneficial for the region in the long-term.

With the expected continued growth in WNC and along the I-26 corridor in South Carolina (i.e., GSP, Columbia, Charleston), truck service to the Port of Charleston and Port of Savannah will most likely experience increased congestion. Increased truck service will, in the absence of additional capacity improvements or transportation demand management remedies, also contribute to congestion on the regional network. Increased congestion has several impacts on firm shipping and transportation businesses that have not been quantified for this study but would likely include the following:

- Additional cost for the region's trucking firms and shippers/consignees that obtain from increased labor hours spent by truckers delayed in traffic;
- Higher operating costs for the region's commercial and personal vehicles attributable to lower operating speeds leading to a loss of fuel economy and greater wear and tear on the vehicle;
- Loss of efficiency in the utilization of commercial vehicles whose inventory is delayed in transit;
- Loss of reliability in the transportation network as the shipper/consignee must alter inventory management strategies and incorporate a greater commitment of resources in non-productive inventory to account for additional time/delay for transportation and to avoid inventory shortages;
- Increased travel time for employees on their journey-to-work. This increased travel time can negatively affect individual productivity by leading to greater workplace tardiness and lost business opportunities; and
- A loss of mobility can affect the perception of the region's attractiveness to residents, tourists and businesses.

These additional inland transportation services to serve local needs will generate several "externalities" that are difficult to quantify, but will negatively impact the WNC region's quality of life, necessitate additional infrastructure investment and maintenance for such items as pavement and equipment capacity, and reduce the region's accessibility for businesses, consumers, and tourists. Many of these factors could be quantified as part of a later-stage, comprehensive study.

### **Regional Air Quality**

While the level of truck traffic removed due to an intermodal facility is small in comparison with the total truck traffic in the region, adding more truck miles to both state's major roadways is inconsistent with the objectives of the region's air quality planning and compliance with National Ambient Air Quality Standards (NAAQS) with respect to ozone and carbon monoxide. It can be anticipated that there will be an increase in volatile organic compounds (VOC), nitrogen oxides (NOx), and carbon monoxide (CO) attributable to increased cargo volumes and additional truck miles.

When selecting regional transportation projects that will be included in their Transportation Improvement Program (TIP), the region's metropolitan planning organization must consider whether they are in

conformity with the state's implementation plan for air quality planning. In the long term, the region's flexibility to make necessary transportation infrastructure investments is detrimentally affected when the region's emissions budget (i.e., VOC and NOx levels) is further burdened.

More truck movements will likely add to more congestion on the region's highways and bridges. More delay and queuing will result in greater CO emissions at the region's "hot-spots." In addition to the health impacts, ultimately, the impact of more CO at the region's bottlenecks can lead to more difficulty in gaining regulatory approval for select transportation infrastructure investments because of microscale impacts. This difficulty can be translated into higher planning costs for regional infrastructure projects and greater uncertainty for project planning, as well as greater mitigation requirements. The region's ability to respond to congestion level-of-service problems with capacity enhancement projects will be further reduced.

In economic terms, air quality impacts are not generally borne by an identifiable project applicant but are hidden and/or "externalized" and borne by the general public in the form of additional requirements for pollution abatement, higher health costs and losses in personal and firm productivity, and greater delays or denials for project implementation and planning. The cost impact of emission levels should be properly included the assessment as "environmental externalities."

### **Conclusion**

The MCA demonstrates that from a long-term market perspective the regional economic indicators favor continued growth in the region and an inland port is viable from a review of both market and site suitability criteria. As shown, WNC is a large and diverse region with certain areas having more concentrated manufacturing and trade activity than the more rural, isolated areas. The viability of an inland port is greatly dependent on its location in the WNC region.

Rutherford and McDowell counties demonstrate potential market demand for an inland port due to their catchment areas containing denser manufacturing and trade areas. The Rutherford County study area's close proximity to consumer markets and manufacturing centers such as Greenville-Spartanburg and Charlotte, as well as the Interstate 85 corridor along which manufacturing clusters are developing, suitable site characteristics, and large number of export TEUs make it a prime candidate for an inland port. The McDowell County market area study area's close proximity to Catawba and Burke Counties increase the potential demand in addition to also being able to service many other parts of WNC such as western and northern sections. The McDowell County market area contained approximately 12,000 export TEUs and over 40,000 import TEUs in 2007. This number of TEUs is at the threshold cited as the threshold for sufficient demand and is larger than the entire WNC region's exports and very close to the entire region's imports, demonstrating potential viability for an inland port within the McDowell County study area.

Inland ports decrease the transportation costs in the region thus making the region more competitive for existing businesses and more attractive for new businesses. This reduced transport costs acts to entrench in-place agglomerations and export industries. In addition, other secondary benefits include reduction in road congestion due to the modal shift to rail and a decrease in air pollution from reduced truck traffic. Overall, an inland port, if sited in a location with sufficient market demand such as Rutherford County and McDowell County, is one key component of a long-term regional economic development strategy.

## **XI. Summary of Key Findings and Recommendations**

Given existing freight volumes and the dispersed nature of freight flows within western North Carolina (WNC), current feasibility of constructing a large-scale traditional inland port, as exemplified by the Virginia Inland Port or Huntsville's International Intermodal Center, is readily ruled out. However, considerable advantage may accrue to WNC from investments in developing approaches and infrastructure to facilitate freight movement to provide greater access to global markets in order to support economic development. Beyond benefits in the short term from such efforts, managing initial projects as a framework for future expansion as conditions develop that warrant greater investment could represent an important step in positioning WNC for economic success well into the future. The developmental focus that this study suggests has the advantage of moving forward with projects that should be considered necessary.

In fact, failure to move forward presents the risk of economically crippling the region. As experience with the Appalachian Developmental Highway System (ADHS) shows, as markets expand a lack infrastructure to support trade outside the region with those larger markets can be debilitating. The region has spent the last approximately 40 years seeking to recover from the lack of highway infrastructure connecting to national markets. In today's global economy WNC must be well connected to global markets in order to find success. Investments in freight-based projects that facilitate such connection will proactively position WNC with respect to competing regions. Alternatively, delay in making such investments is likely to position WNC to once again spend a substantial portion of time catching up as others move forward with efforts such as inland ports, freight consolidation centers, and approaches to coordinating freight flows that serve to make their regional economies stronger.

Efforts must be initiated in WNC to improve access to global markets, and that generally means that relative challenges in moving freight quickly, predictably and cost effectively must be overcome. Further, relative isolation from seaports must be surmounted. From a freight perspective, WNC remains substantially a land-locked island with respect to connections with seaports. Further, the nature of freight movement in WNC is sharply disparate from patterns observed elsewhere in North Carolina. The confluence of these factors suggests that planning and execution of freight initiatives in WNC must be coordinated with other initiatives within the State, but the WNC initiatives must not be subordinated to more general efforts. We anticipate that WNC initiatives may leverage mechanisms established from a State-wide perspective, but in order to be effective in WNC, approaches must adopt a distinctive nature. With this in mind, the following observations and suggestions are provided.

### **Regional Awareness**

It is the nature of transportation networks that they cross boundaries. Thus, measures that are effective in promoting better transportation linkages for WNC must not be excessively constrained by political boundaries. Freight flows in upstate South Carolina, northern Georgia, eastern Tennessee, and southeastern Virginia all have the potential to profoundly impact the feasibility and desirability of projects undertaken in WNC. For example, the ability to capture freight movement from upstate South Carolina can affect the success of a project in Rutherford County.

Beyond the impact of freight volumes, projects in adjacent areas in other states may also play an important role in promoting success for projects in WNC. If a planned Norfolk Southern Railroad inland port project in eastern Tennessee is completed, this could serve to make a freight consolidation facility in the Asheville area attractive, since there could be a direct rail link to the Tennessee site. For the western-most counties of WNC, coordination with Tennessee to complete Corridor K of the ADHS could impact the attractiveness of business activity tied to economic development, including a recently announced automotive facility in the Chattanooga area. These same counties could also benefit from coordination with Georgia that could provide a rail link through from Asheville through Murphy to Mineral Bluffs, Georgia and then on to Atlanta.

In each of the examples cited, project feasibility is partially a function of conditions outside of North Carolina. For progress to be made in WNC, efforts must move forward with awareness of events in other states, and close coordination will generally be required. It is this broader, more systemic perspective that is served by WNC participating in work by the Appalachian Regional Commission (ARC) to develop and implement an ARC Regional strategy.

### **The Value of Coordination: Virtual Ports**

The *State-wide Logistics Plan for North Carolina* provided a proposal for a freight logistics authority at a state-wide level. At a WNC regional level, a similar body could advocate for freight interests and potentially provide a coordinating function between shippers as is currently being accomplished in Kansas City, Missouri by the KC SmartPort. Such an approach could dovetail with and support nascent regional efforts, such as the Transportation Alliance currently being coordinated by the Asheville Chamber of Commerce. This could be an important step in regional planning that is tailored to WNC, and it could pay immediate dividends by reducing shipping costs for regional businesses. While multiple coordinating entities, or virtual ports, could be established, an organization that could encourage and provide oversight to local efforts would appear to provide distinct regional benefits. This study recommends the establishment of such a regional body, in accordance with the guidance previously provided in this report, as soon as reasonably possible.

### **Freight Consolidation Centers: Potentially a Step toward Developing an Inland Port**

Beyond the minimal investment required to move toward better advocacy for freight interests and coordination of freight flows, this study recommends that steps be taken to establish a network of freight consolidation centers. While a public-access rail head already has been developed and appears positioned to provide value to shippers in the community of Lenoir, this facility provides limited rail access at the end of a short-line railroad. We envision that from a regional perspective, a network of more substantial facilities positioned along mainline routes of Class I railroads would be an important addition to the Region's transportation assets. While feasibility is best addressed by rail park facilities such as the example provided by the facility in Somerset, Kentucky, such facilities also provide test cases and initial steps toward development of larger-scale inland ports if further development proves desirable.

The physical and capital requirements of rail, intermodal or freight consolidation parks (the terminology is not yet established for this type of a facility) are relatively small compared with facilities such as those in Huntsville, Alabama or the Virginia Inland Port. A similar large-scale facility in process in Pritchard West Virginia required donation of a 78-acre site by Norfolk Southern Railroad, and construction costs estimated to be between more than \$30 million and well in excess of \$40 million. Further, the findings of this study suggest that these large-scale facilities often require a considerable period of time to develop enough activity to be considered a success. By contrast, the facility in Somerset was established on a 34 acre site that provides room for expanding light manufacturing and warehousing beyond the initial development. The estimated costs for the Somerset facility, including a 78,750 square foot warehouse and room for expansion, totaled \$8.5 million.

### **Siting Freight Consolidation Centers**

Under current conditions, which favor leveraging private resources and interest by a Class I railroad, the Rutherford County site should be considered to have the highest priority for development. The site is adjacent to a CSX mainline, has a willing landholder, is the site of industrial development, and has been subject to expressions of interest by Duke Power as a site for disposal of dredging from their ash settling water impoundments, which represents a source of funding and resources for ground preparation. Further, as noted above, this location may well be positioned to capture freight from upstate South Carolina which may serve to drive success, while industrial development around the facility would

represent an important source of economic activity in a stressed county subject to high levels of unemployment.

A site in McDowell County bordering Marion has also been proposed. The major consideration that has been presented as favoring this site is the intersection of mainline tracks for both the Norfolk Southern Railroad and for CSX Railroad. Interstate 40 also passes near the site. This site might also draw freight from outside the study area, including shipments originating in Catawba County. However, feasibility depends on attracting interest by the railroads to a site that is constrained and subject to grade separation between the rail lines. While this site merits continuation under consideration, current conditions do not warrant high priority.

Finally, since Buncombe and Henderson Counties, and the Asheville area generally, are home to a substantial portion of the manufacturing base for WNC, as can be seen by export freight flows, this area also warrants consideration for a facility. The feasibility of such siting depends to a considerable extent on regional factors. First, if the proposed Norfolk Southern intermodal facility in eastern Tennessee is constructed as anticipated, a facility in the Asheville area could serve to aggregate freight to join freight flows along the proposed Crescent Corridor. Development of an Asheville area facility would particularly complement opening of the Saluda grade (as described below), which could serve to connect rail developments in South Carolina to the Crescent Corridor, if reopening of this connection was determined to be feasible. As illustrated by the Huntsville AL facility, an Asheville facility might serve to facilitate freight movement by truck, rail and air. While the scale present in Huntsville would not be possible in the Asheville area, such a facility might still serve to expedite service for businesses in WNC while bypassing congestion-related problems with existing facilities in more urbanized areas.

### **Additional Freight-Related Projects to Enhance Transportation in WNC**

From the regional workshop, held in conjunction with the ARC in Asheville in February 2009, there was a clear message that regional freight transportation planning should be about much more than just freight consolidation centers or inland ports. For example, there was clear support for completing Corridor K as part of the ADHS. Completion of this highway corridor could serve to provide opportunities for businesses in WNC to connect to economic opportunities projected for development west of the WNC region. In particular, the Volkswagen plant in Chattanooga and subsequent development could offer opportunity for a portion of WNC that is often subject to economic stress if freight could readily move along Corridor K.

As another example, although subject to substantial challenges due to the geography of the region, if feasibility could be established to reopen the Norfolk Southern rail line that traverses the Saluda grade, this could serve as an important means to improve connectivity for the WNC region. The regional nature of the transportation network would also be enhanced by restoring service to a lapsed rail line between Murphy and Murphy Junction in Georgia. Members of the study group, representatives from the Center for Transportation Research at the University of Tennessee and a representative from the ARC recently surveyed a gap that is present in the rail line. Study continues with respect to the feasibility of revitalizing and restoring the regional rail network that once played a robust role in the rural economies of western North Carolina, northern Georgia and eastern Tennessee. In addition to enhancing freight movement and supporting economic development, this rail line also once provided redundancy and additional capacity within the rail network, including serving to move freight following flood damage to other rail infrastructure in the region. Recent disruptions due to derailment, etc. serve to highlight the continuing value of such parallel capacity. For WNC, repairing this rail segment would enhance the potential for rail connections to major markets by providing a direct link to Atlanta.

### **Coordination with the ARC Regional Strategy**

The final report by the ARC Network Appalachia Working Group ("Network Appalachia: Access to Global Opportunity."



<http://www.arc.gov/images/programs/transp/intermodal/NetworkAppalachiaAccessToGlobalOpportunity.pdf>) includes language specifically recommending development of freight consolidation facility(ies) in WNC, investigation of restoring service to the rail line that traverses the Saluda grade, and study of the feasibility of revitalizing and replacing the rail between Murphy and Mineral Bluff Georgia. These recommended tactics do not limit alternatives that should be considered within WNC, but they do suggest the importance of the recommendations listed above. The study team is continuing to pursue work toward establishing the feasibility of freight consolidation parks and establishing the potential for rail service between Murphy and Murphy Junction (Blue Ridge) in Georgia under the provisions of an extension agreement with the ARC.



## XII. Appendix

### Glossary

All terms and related definitions, unless otherwise noted, are contained in the Federal Highway Administration Freight Glossary (<http://ops.fhwa.dot.gov/freight/fpd/glossary/index.htm>).

**Backhaul:** The process of a transportation vehicle (typically a truck) returning from the original destination point to the point of origin. A backhaul can be with a full or partially loaded trailer.

**Class I railroad:** Railroads operating in the U.S that have more than \$250 million a year in gross operating revenue. Only two – Norfolk Southern and CSX – operate within Western North Carolina.<sup>14</sup>

**Commodity:** An item that is traded in commerce. The term usually implies an undifferentiated product competing primarily on price and availability.

**Container:** A "box" typically ten to forty feet long, which is used primarily for ocean freight shipment. For travel to and from ports, containers are loaded onto truck chassis' or on railroad flatcars.

**Free Trade Zone (FTZ):** An area or zone set aside at or near a port or airport, under the control of the U.S. Customs Service, for holding goods duty-free pending customs clearance.

**Just-in-Time Delivery & Manufacturing:** Cargo or components that must be at a destination at the exact time needed. The container or vehicle is the movable warehouse.

**Inland Port:** A facility located away from traditional coastal borders with the vision to facilitate and process international trade through strategic investments in multi-modal transportation assets and by promoting value-added services as goods move through the supply chain.<sup>15</sup>

**Intermodal:** Movement of truck trailers or containers by rail and at least one other mode of transportation, usually trucks. For example, intermodal combines the door-to-door convenience of trucks with the long-haul economy of railroads.<sup>16</sup>

**Land bridge:** Containers moving from a foreign country by vessel, transiting the United States by railroad, and then loaded aboard another vessel for delivery to a second foreign country.<sup>17</sup>

**Less Than Truckload (LTL):** A container or trailer loaded with cargo from more than one shipper; loads that do not by themselves meet the container load or truckload requirements.

**Logistics:** All activities involved in the management of product movement; delivering the right product from the right origin to the right destination, with the right quality and quantity, at the right schedule and price.

**PIERS:** Ports Import Export Reporting Service, a private dataset of import and export cargo data that moves across United States ports.

<sup>14</sup> Source: <http://www.ncrr.com/ncrr-glossary.html>

<sup>15</sup> Source: University of Texas

<sup>16</sup> Source: <http://www.ncrr.com/ncrr-glossary.html>

<sup>17</sup> Source: [http://www.port-of-charleston.com/spa/about\\_the\\_spa/glossary.asp?first\\_letter=L](http://www.port-of-charleston.com/spa/about_the_spa/glossary.asp?first_letter=L)

**Supply chain:** Starting with unprocessed raw materials and ending with final customer using the finished goods.

**Twenty-foot equivalent unit (TEU):** The 8-foot by 8-foot by 20-foot intermodal container used as a basic measure in many statistics and is the standard measure used for containerized cargo.

**Waybill:** A document covering a shipment and showing the forwarding and receiving station, the names of consignor and consignee, the car initials and number, the routing, the description and weight of the commodity, instructions for special services, the rate, total charges, advances and waybill reference for previous services, and the amount prepaid.<sup>18</sup>

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<sup>18</sup> Source: [http://www.port-of-charleston.com/spa/about\\_the\\_spa/glossary.asp?first\\_letter=W](http://www.port-of-charleston.com/spa/about_the_spa/glossary.asp?first_letter=W)



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### Manufacturer/Shipper Questionnaire

#### Company Information

1. Company Name \_\_\_\_\_

Contact Person \_\_\_\_\_

Phone Number \_\_\_\_\_

2. How would you describe this business in terms of commodities hauled?

\_\_\_\_\_  
\_\_\_\_\_

SIC Codes, if known \_\_\_\_\_

3. What is the normal year-round employment at this facility?

\_\_\_\_\_

4. What is the seasonal peak employment (if the business is seasonal)?

\_\_\_\_\_ What months are the peak? \_\_\_\_\_

5. About how many square feet do the buildings in this facility occupy?

\_\_\_\_\_ total square feet.

6. Do you expect your business at this facility to grow? Yes\_\_ No\_\_

At about what rate? \_\_% per year.

7. Do you expect your business at this facility to shrink? Yes\_\_ No\_\_

At about what rate? \_\_% per year.

8. Where does your firm source raw materials? Please describe.

\_\_\_\_\_





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9. Where does it ship its finished products? Please describe.

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10. Is your facility part of a larger supply chain managed by your company?

Please describe. \_\_\_\_\_

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11. Do you work with other shippers in Western North Carolina to consolidate loads?

Please describe. \_\_\_\_\_

Is this a viable option for your firm? \_\_\_\_\_

12. Are there unique or unusual transportation features required by your company?

Please describe. \_\_\_\_\_

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13. What key service factors drive the selection of the transportation method?

Please describe. \_\_\_\_\_

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**Trucking Services**

14. What type of trucking services do you use (please check all that apply)

15. LTL \_\_\_ Truckload\_\_\_ Refrigerated \_\_\_ Flatbed \_\_\_ Tank\_\_\_ Bulk\_\_\_ Parcel\_\_\_ Intermodal  
or Port Drayage\_\_\_ Agricultural\_\_\_ Other (please describe)

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16. What truck types do you use to ship/receive?

Straight trucks \_\_\_% Tractor-trailers \_\_\_% Doubles \_\_\_%

17. What major/core motor carriers serve this facility?

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18. About how many inbound truck movements does this facility generate in an average week?

(a range is okay) \_\_\_\_\_ trips.

19. If seasonal, about how many inbound truck movements generate in a peak week? (a range is

okay) \_\_\_\_\_ trips.

20. About how many outbound truck movements does this facility generate in an average week?

(a range is okay) \_\_\_\_\_ trips.

21. If seasonal, about how many outbound truck movements generate in a peak week? (a range

is okay) \_\_\_\_\_ trips.

22. What are the peak shipping/outbound days/months for this facility?

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What are the peak hours? \_\_\_\_\_

Do you require pick-up appointments? Yes\_\_ No\_\_

Do drivers have any trouble arriving on time?

Yes, often\_\_ Yes, sometimes\_\_ No\_\_

23. What are the peak receiving/inbound days/months for this facility?

\_\_\_\_\_

What are the peak hours? \_\_\_\_\_

Do you require delivery appointments? Yes\_\_ No\_\_

Do drivers have any trouble arriving on time?

Yes, often\_\_ Yes, sometimes\_\_ No\_\_

24. What other kinds of trucks serve this facility? (please check all that apply)

Service vehicles \_\_\_\_

Parcel delivery (FedEx, UPS, RPS, etc.)\_\_\_\_

Local vendors (office supply, canteen, others)\_\_\_\_ Other (please describe)

\_\_\_\_\_

\_\_\_\_\_





**Truck Fleet Operations**

25. Do you operate a truck fleet at this facility (or does a contractor operate one for you)? Yes\_\_

No\_\_

(If “Yes”, please continue with the following questions, if “No” Please skip to the last page)

26. What kinds of trucks do you operate?

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27. About how many in the fleet?\_\_\_\_\_

28. What is the purpose of the truck fleet?

Local Delivery\_\_ Local Pickup\_\_ Local Service\_\_

Long-haul truckload delivery\_\_

Other (please describe\_\_\_\_\_

29. What local areas do you serve with this fleet?

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30. Do your drivers experience delays, congestion, safety hazards, or other operating problems in servicing your Western North Carolina locations? Please describe the problem and the locations.

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**Rail Shipping**

31. Do you ship or receive via rail carload service? Please describe

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32. If you use rail carload service, about what share of your total inbound is rail? \_\_\_% About what share of total outbound? \_\_\_% Is your rail carload use growing or shrinking? \_\_\_\_\_

33. Do you ship or receive via rail intermodal (piggyback or container) service? Please describe.

What rail carriers and intermodal hubs do you use? What drayage firms?

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34. If you use rail intermodal service, about what share of your total inbound is rail? \_\_\_% About what share of total outbound? \_\_\_% Is your rail intermodal use growing or shirking? \_\_\_\_\_





**International Shipping**

35. Do you ship or receive goods internationally? Please describe

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36. If you ship goods internationally, about what is inbound? \_\_\_% About what share is outbound? \_\_\_% Is this aspect of your business growing or shrinking? \_\_\_\_\_

37. What water ports or rail intermodal hubs do you use? What drayage firms?

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38. What transportation intermediaries do you use to facilitate your foreign trade (banks, brokers, packers, consolidators, forwarders, IMC, NVOCC etc.)?

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39. At the present time, what are the major obstacles to exporting from/importing to Western North Carolina?

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**Thank you for your assistance!**

