Final Report

Economic and Market Analysis for an Inland Intermodal Port





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Heartland Corridor

Prepared for:
West Virginia Public Port Authority

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Executive Summary

Project Goal

Freight transportation is the backbone of America's commerce and the nation's economy has transitioned from a manufacturing economy to a trading economy. The goal today is to move goods quickly and cost effectively into, out of, and through the U.S. and to allow any community or industry to be served by freight to or from anywhere in the world.

In that context, the goal of this West Virginia Public Port Authority (WVPPA) Inland Intermodal Port Study is to evaluate the role that a proposed intermodal rail terminal will have on the economy of West Virginia. The results of the study indicate that $30 Million investment in the Prichard Intermodal Terminal will generate a net increase of between 700 and 1,000 jobs and statewide benefit of $47-69 Million (GSP Impact) by 2025.

Background

Over the past several decades, rail carriers have undergone an evolutionary process in the geographic concentration of intermodal services offered in terms of terminal and hub locations and therefore in terms of routes. The historical approach to intermodal infrastructure investment has been for each transportation provider to develop its own network of terminals. The size and spacing of the terminals therefore reflects the providers' perceptions of markets, operating costs, economies of scale, and return on investment. This situation is markedly different from that for ports and commercial airports, which are largely owned and financed by government agencies. More recently, there have been opportunities for local and state governments to work with railroads, air cargo firms and other transportation companies to promote improvements in the intermodal transportation system. Government agencies are assisting in the site selection process, in issues related to highway access and environmental concerns, and in financing improvements through the provisions of SAFETEA-LU or other legislation.

A network of "double-stacked" container train routes and terminals exists across the country. It involves virtually all major rail carriers and connects major U.S. port areas with major inland market areas. Exploiting the inherent efficiencies of double-stack container operations has been a critical strategy for most railroads over the past decade. The decidedly lower costs of trains carrying very large volumes of "double-stacked" containers long distances has created the current intermodal network of terminals concentrated around major metropolitan cities and port areas. Most of these facilities are operated by third-party contractors on behalf of the railroads. In the West Virginia study area, current intermodal service is provided by both CSX Corporation (CSX) and Norfolk Southern Corporation (NS), but in "single-stack" configurations. Until now, the compelling economics of double-stack service have eluded the Mountain State.

The SAFETEA-LU legislation enacted in 2005 identified the "Heartland Corridor", running along the southern border of West Virginia, as a Project of National and Regional Significance and provided funds for a portion of the nearly $200 Million improvement cost. The Heartland Corridor Clearance Project will ultimately provide double-stack clearance from the Ports of Virginia to Columbus, Ohio. The project is being executed as a public-private partnership between NS and the Federal Highway Administration in conjunction with the states of Virginia, West Virginia, and Ohio.

As a result of the Heartland Corridor Clearance Project, double-stacked international and domestic containers will be shipped from the Port of Norfolk to Chicago and other points in the mid-west in one day's less time than the

current double-stack routes through Harrisburg, Pennsylvania or Chattanooga, Tennessee. This will be accomplished by increasing the clearances through tunnels in Mercer, McDowell, Mingo, and Wayne Counties in southern West Virginia.

The $90 Million Federal funding made available through SAFETEA-LU for the Heartland Corridor has put double-stack intermodal service on the doorstep of West Virginia and offers the potential for the State's shippers to take advantage of the inherent economics of intermodal.

Purpose of Study

In 2007 the West Virginia legislature passed Senate Bill 569 requiring the West Virginia Public Port Authority to conduct a study relating to the feasibility of the intermodal facility at the unincorporated community of Prichard, Wayne County, West Virginia, including assessment of the initial planning, development, construction and operation and the long-term sustainability of the facility. The preliminary site of Prichard was identified during the Central Corridor Double-Stack Initiative Feasibility Analysis performed by the Nick J. Rahall, II, Appalachian Transportation Institute. A number of attributes were listed for the Prichard site including:

- current NS ownership of much of the necessary property;
- easy roll-through access to mainline trackage;
- close proximity to Interstate 64 via US 52; and
- a very limited number of proximal residential structures.

As design and construction of the Heartland Corridor Clearance Project are currently ongoing with an overall completion date anticipated for July 2010, the questions that remain for West Virginia are:

Is the proposed Prichard Intermodal Terminal the:

- Right location?
- Right size?
- Right time?
- Right investment?

Study Activities

The work plan for the Inland Intermodal Port Study included the following tasks:

- Conduct an Inland Port Market Analysis for the proposed study area, quantifying opportunities and identifying potential shippers at a local, national and international level,
- Evaluate compare the Prichard site with other viable sites, assess the impact of the proposed facility on local roads, and identify potential infrastructure investments that would be required to support ongoing operations,
- Determine what types of financing mechanisms could be used to facilitate the construction and ongoing operation of the proposed facility,
- Confirm that the construction and ongoing operation of the facility can create a lasting change in favor of rail intermodal for freight operations in the State,
- Evaluate the statewide economic impact of such a facility, in terms of jobs and gross output, and thus create opportunity for increased economic development.

Findings

"Is the proposed Prichard Intermodal Terminal the right location?"

The opportunity for the WV Intermodal Terminal development can be represented as a function of three elements:

- *Volume: Does the regional market offer sufficient local volume to support an intermodal facility?* The quantification of this opportunity was developed for the region using freight forecasting for the base international and domestic volumes, and showed that the favorable market centers on the I-64 Corridor as it intersects with the Heartland Corridor in Wayne County.
- *Divertability: Does the proposed facility offer a superior alternative in terms of a service and cost package to current offerings that it will actually divert traffic from competing modes or facilities to itself?* Diversion impacts were measured over the medium term (three to five years following completion of the facility) and based on a "Low" and "High" case. The medium-term result of the proposed Prichard Intermodal Terminal investment produces highway diversion of between 87,000 and 100,000 annual truck loads over three to five years, after construction. This represents approximately 300-350 trucks diverted daily to the new facility, or 12-14% of total highway loads. This reflects approximately 45,000 annual lifts at the terminal, slightly above the threshold considered necessary for profitable operation of an intermodal terminal.
- *Sustainability: Can the facility survive the vagaries of the commercial marketplace including economic downturns, and competitive assaults?* Evidence suggests there is enough economic growth to sustain the current traffic base, especially from Cabell County, Kanawha County and Boyd County, KY. Wayne County and surrounding counties provide even further support even with their sizably smaller volumes but are expected to grow at the same rate as the top three leading counties; and none of the counties reflect a slowdown in economic growth to negative over the forecast horizon. It can be concluded that the WV Intermodal Terminal will sustain average market growth rates for the foreseeable future, although projected volumes remain subject to the vagaries of the regional economy.

Successful rail intermodal terminals sites generally offer a portfolio of features that improve rail and motor carrier operating efficiency. The features include the following:

- *Reasonable proximity to the National Highway System (NHS)* - This would include a suitable NHS connector for moving large volumes of trucks onto and off of the network.
- *Close proximity to rail mainlines along primary intermodal routes* - The availability of "cleared" access to the national double-stack network will generally determine the degree of usability of a given terminal site.
- *Local Economic Base* – Transportation is a derived demand industry. Therefore, unless there is a sufficient base of nearby industrial and commercial activity to support trainload volumes, the economic sustainability of an intermodal terminal is threatened.
- *Proximity to Major Secondary Markets* – In addition to the economic gravity of major metropolitan areas, many intermodal terminals also enjoy access to a number of secondary markets.
- *Land Availability* – Rail intermodal is a land intensive operation, made more so by the vagaries of irregular operation. While railroads have traditionally constructed intermodal facilities on surplus land in urban areas, many recent constructions have located facilities in suburban or even rural sites.
- *Labor Force Availability* – While intermodal facilities themselves do not generate significant employment, the collateral impact of their introduction tends to attract additional employment to a region.

Evaluating the proposed WV Intermodal Terminal site in Prichard against these criteria suggests that it could become a valuable strategic asset in the region, but that the volumes are modest compared to most modern intermodal terminals. The market analysis suggests that the WV Intermodal Terminal can be an effective transportation force in the region, and an engine of economic development for West Virginia. While the diversion potential is modest over the medium term, longer term growth prospects in both the domestic and international markets offer a positive outlook for the future.

Alternate sites along the Heartland Corridor route in West Virginia were identified and evaluated for comparison with the preliminary Prichard site. Based on this evaluation, the Prichard site was clearly the best site identified along the rail corridor.

The Prichard site is currently in close proximity to Interstate 64, via US 52, but there are relatively few proximal residential or commercial structures, indicating access to the site has not been sufficient to support significant development to date. By providing access to Intermodal rail, the access to the site itself is increased. The addition of a complementary mode of transportation will arguably make the site more attractive for industrial development. The addition of rail access will make the site more accessible for Intermodal container traffic, leading to increased development opportunities. For example, the annual employment impact with strategic economic development considerations is as much as ten-fold the estimated impact arising from the transportation costs alone.

NS is currently proposing the development of a new facility in Roanoke, VA., The proximity to the proposed WV Intermodal Terminal to the proposed terminal in Roanoke, Virginia further supports that the Wayne County location is in the more favorable market for a WV facility. The proposed Roanoke terminal would most likely be privately funded by Norfolk Southern. This arrangement might make it necessary to structure financing or operations in a fashion that would mitigate any impact of a Roanoke facility and thus ensure the economic advantage of the Prichard terminal for Kanawha county shippers. The incremental dray cost to Roanoke from Kanawha County is estimated to be less than $200 more than dray to the preliminary site at Prichard. Thus there is little margin for user fees to pay for the WV facility. WVPPA will want to carefully monitor the developments for the Roanoke facility in order to protect its economic development interests and its investment in the Prichard site.

"Is the proposed Prichard Intermodal Terminal the right size?"

For purposes of this study, a range-of-magnitude cost estimate was developed for the proposed intermodal terminal. As the base case, an estimate was prepared using the preliminary schematic drawing provided by NS for the Prichard facility. As an alternative, a reduced start-up facility was identified eliminating the overhead bridge accessing the facility and replacement with a grade crossing. In addition, the amount of paving was reduced to reflect a reduced capacity facility that could be expanded in the future as the business grew.

The facility layout as illustrated by the original Norfolk Southern schematic below is estimated at $42.6 million and contains allowances for trackwork, communication and signal, permitting, drainage, structures, buildings, lighting, engineering and contingencies. The alternative reduced capacity start-up layout is estimated to cost $30.4 million and provides for those same items. The reduced layout facility is proposed as it more closely meets start-up needs and reduces the initial capital expenditure. The layout could be readily adaptable for expansion or reconfiguration to provide for additional rail business types.

"Is this the right time for the proposed Prichard Intermodal Terminal?"

There is a "first mover" benefit to locating a terminal along the new Heartland Corridor double-stacked route. With a plan to develop the associated infrastructure and establish operations to coincide with the anticipated July 2010

clearance of the Heartland Corridor route will help discourage potential competition in the catchment region, especially if operating costs are contained to a competitive level.

One potential threat to this proposed terminal could come from a railroad constructed site in the study catchment region. Though none are currently under construction, either NS or CSX could elect to complete their own facility along their nearby routes and thus siphon-off some measure of the cargo necessary to sustain an economic operation at the WV Intermodal Terminal.

The emergence of an intermodal terminal at Roanoke has the potential to negatively impact the WV Intermodal Terminal. Just in terms of location, Roanoke's eastward proximity to major seaports, namely the Virginia Port Authority, could influence traffic diversion away from West Virginia because of the shortened distance between the seaport and facility. Along with that advantage, highway and rail access for Roanoke comparable to the preliminary site at Prichard, thus lessening the comparative advantage that the WV Intermodal Terminal has over Roanoke. Roanoke would also compete for similar markets. An example is Kanawha County that contributes the most in terms of sheer volume to the WV Intermodal Terminal is particularly at risk for export traffic diversions to Roanoke.

"Is the proposed Prichard Intermodal Terminal the right investment?"

The results of the study indicate that investment in the Prichard Intermodal Terminal will generate a net increase of between 700 and 1,000 jobs by 2025; at the end of the twenty-year outlook the economic output of the state economy will increase by between $47 and $69 million with investment versus no investment.

The West Virginia economy, at nearly $53 Billion, is large enough that it is difficult for even an investment such as being considered for the Prichard Intermodal Terminal, to produce significant benefits in the State's economy. However, measuring the comparative "return" on the invested public capital gives an indicator as to the project's ability to convert public monies to statewide benefits. In the case of the Prichard Intermodal Terminal, a $30 Million investment yields a statewide benefit of $47- 69 Million (GSP Impact) by 2025.

The result of this is a relative economic return on invested public capital of between 160% and 230%. In the low case, the payoff of the initial capital investment is accomplished in less than fifteen years, while in the high case the payoff is achieved in less than ten years. This could be a relatively attractive investment for the state, although it would obviously compete for scarce public capital against other potential investments and their relative returns. If WVPPA were able to leverage federal monies or private sector capital for the construction, the economic return would be improved considerably for the project is made even more attractive.

Not surprisingly, one of the largest benefactors for the Prichard Intermodal Terminal investment is the private sector, who will benefit from reduced logistics costs with the introduction of intermodal competition to the area. The projections are that the region's private sector logistics costs will be reduced by approximately $17.5 Million annually by 2025. Obviously some of these savings produce local public sector benefit, through increased taxes, faster economic growth, and accelerated employment growth that are captured in the public sector benefits. The promise of this benefit could encourage private sector investment in the terminal construction, and further improve the public sector benefit performance.

From the diversion analysis it can be concluded that the WV Intermodal Terminal appears to be sustainable even at a relatively low level of diversion. However, it is important to mention other opportunities for the facility – like bulk transfer – that could build additional volumes for the terminal in addition to the projected intermodal traffic.

Where private bulk facilities generally support large-scale production sites, multi-client bulk facilities predominantly service light industrial activity. Bulk transfer facilities themselves do not provide significant employment themselves, but offer the potential to deliver lower transport costs to those shippers that utilize their services. This can further assist local economic developers in attracting additional industrial activity.

Currently, bulk transfer sites in Kenova and Charleston, WV compete for some of this business, including chemicals, plastics, sweeteners, and lumber products. The location of the WV Intermodal Terminal may offer better rail service and drayage economies and could better service these commodities than the other facilities in the region. This could be explored in a follow-up study, if the WVPPA commits to building the intermodal facility.

Conclusion

In summary, if the economic benefits of an intermodal terminal for West Virginia are acceptable to the State, the task remains to fine-tune the planning, design, and operations for a facility that can meet the State's investment threshold criteria. Specifically, the following items are recommended to advance the development of the WV Intermodal Terminal:

1. Discussions and coordination with NS regarding service, financing, operations, and plans for a facility in Roanoke.
2. Environmental clearance of the site.
3. Development of a master plan that balances capital costs with operational efficiency. It will be important to further coordinate with NS to review development of the master plan.
4. Development of a financial plan, project delivery concept/schedule and operations plan.
5. Expansion of commercial analysis including interviews with potential shippers and further exploration of alternate commodities and development of marketing plan.

1. Introduction

1. Introduction

The adoption of the modern shipping container may be a close second to the Internet in the way it has changed our lives. It has made products from every corner of the world commonplace and accessible everywhere. It has dramatically cut the cost of transportation and thereby made outsourcing a significant issue. It has transformed the world's port cities, and more. By making shipping so cheap that industry could locate factories far from its customers, the container paved the way for Asia to become the world's workshop and brought consumers a previously unimaginable variety of low-cost products from around the globe.

-- Marc Levinson, *The Box: How the shipping container made the world smaller and the world economy bigger.*

1.1 Intermodal Freight Transportation

The goal today is to move goods quickly and cost effectively into, out of, and through the U.S. and to allow any community or industry to be served by freight to or from anywhere in the world. Freight transportation is the backbone of America's commerce. The nation's economy has become a trading economy and is no longer a manufacturing economy. The purpose of this West Virginia Public Port Authority (WVPPA) Inland Intermodal Port Study is to evaluate the role that a proposed new intermodal rail terminal will have on the economy of West Virginia.

The historical approach to intermodal infrastructure investment has been for each transportation provider to develop its own network of terminals. The size and spacing of the terminals therefore reflects the providers' perceptions of markets, operating costs, economies of scale, and return on investment. This situation is markedly different from that for ports and commercial airports, which are largely owned and financed by government agencies. More recently, there have been opportunities for local and state governments to work with railroads, air cargo firms and other transportation companies to promote improvements in the intermodal transportation system. Government agencies are assisting in the site selection process, in issues related to highway access and environmental concerns, and in financing improvements through the provisions of SAFETEA-LU or other legislation.

From a systems perspective, we can say that a facility is "needed" if the overall benefits to the local region outweigh the overall costs to the region. The facility is "financially feasible" if there is a mechanism for covering the investment and operating costs on an ongoing, equitable basis.

From the local perspective, however, the cost-benefit calculus is somewhat different. Here, the need is to understand both the demand for and the financial feasibility of enhanced intermodal capabilities. Local planning bodies must answer several critical questions:

- What is the value of connecting to the national intermodal network more directly than through long-distance dray?
- Is there a regional market demand for such a service?
- Would the service offer a marketplace improvement over existing alternatives?, and
- Is there sufficient economic benefit to justify public investment in intermodal infrastructure?

1.2 The Opportunity for a Rail Intermodal Terminal

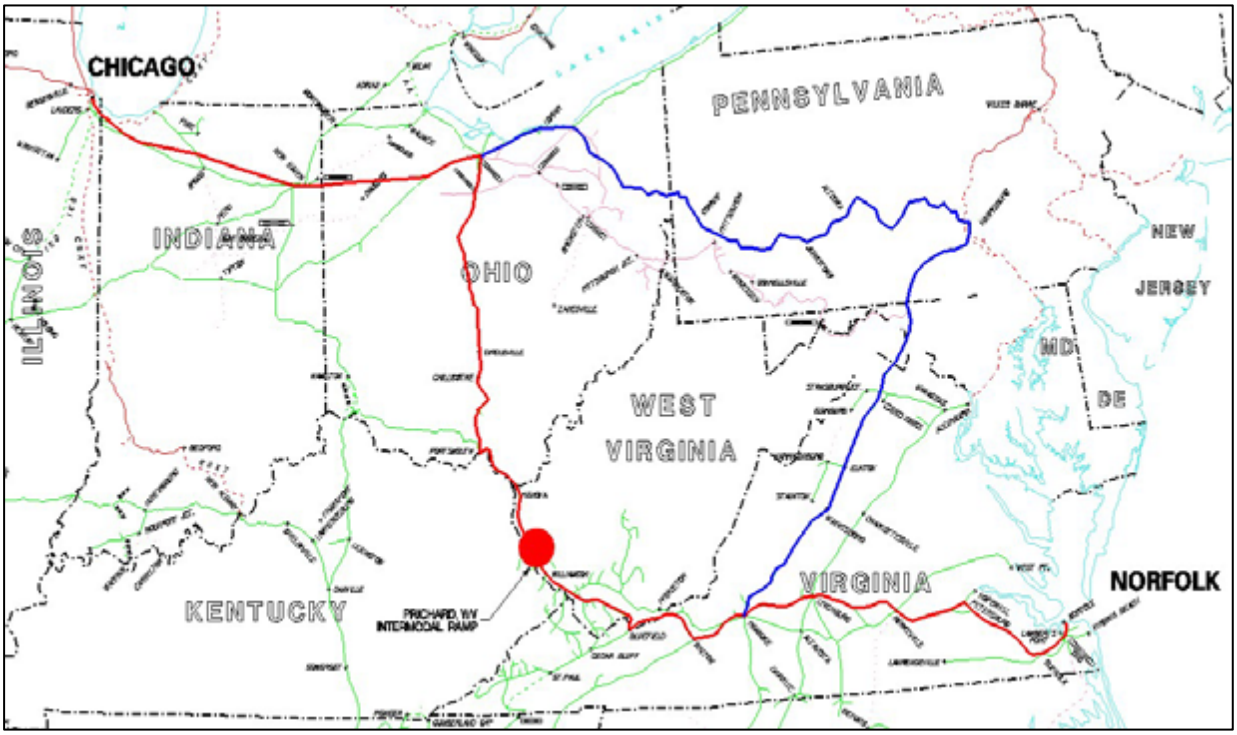
The great majority of motor freight travels only a short distance, and is thus not conducive to intermodal transportation. Likewise, many motor freight movements occur in volumes and at frequencies not generally appropriate for intermodal service. Intermodal market penetration then, is a function of two primary factors: (1) relative length of haul and (2) concentration of volume in traffic lanes. As the distance between the origin and the destination increases and lane volume (density) grows, intermodal service becomes more competitive relative to highway, and its cost advantage increases. Analyzing the relative lengths-of-haul and lane densities of traffic moving into, out of and through the region can help identify untapped opportunities for rail service.

1.3 Heartland Corridor Clearance Project

The Heartland Corridor Clearance Project will ultimately provide double-stack clearance from Roanoke, Virginia to Columbus, Ohio, passing through southern West Virginia. The project is being executed as a public-private partnership between Norfolk Southern Corporation and the Federal Highway Administration in conjunction with the states of Virginia, West Virginia, and Ohio. The SAFETEA-LU legislation enacted in 2005 includes the Heartland Corridor as a Project of National and Regional Significance.

As a result of the Heartland Corridor Clearance Project, double-stacked international and domestic containers will be shipped from the Port of Norfolk to Chicago and other points in the mid-west in one day's less time than the current double-stack routes through Harrisburg, Pennsylvania or Chattanooga, Tennessee. This will be accomplished by increasing the clearances through tunnels in Mercer, McDowell, Mingo, and Wayne Counties in southern West Virginia at a cost of nearly $200 Million.

Design and construction of the Heartland Corridor Clearance Project is currently ongoing with an overall completion date anticipated for July 2010.



The Heartland Corridor Clearance Project was a direct result of the Central Corridor Double-Stack Initiative Feasibility Analysis performed by the Nick J. Rahall, II, Appalachian Transportation Institute from 2000 to 2003. The Central Corridor Double-Stack Initiative study included the following tasks:

- Selection of best NS route
- Evaluation of clearance restrictions
- Assessment of methods / costs of eliminating restrictions
- Identification of site(s) for West Virginia facility
- Estimation of regional economic development benefits
- Measurement of national economic efficiency gains
- Consideration of equitable financial participation

The 2003 report for the Central Corridor Double-Stack Initiative points out that the Heartland Corridor will do nothing to increase the region's access to intermodal transport without a rail–truck intermodal terminal.

As a result of the task to identify a site(s) for a West Virginia facility a tentative site for the facility was identified at Prichard in Wayne County, West Virginia. A number of attributes were listed for the Prichard site including:

- current NS ownership of much of the necessary property;
- easy roll-through access to mainline trackage;
- close proximity to Interstate 64 via US 52; and
- a very limited number of proximal residential structures.

The 2003 report for the Central Corridor Double-Stack Initiative includes the following conclusion:

> *Under the most extraordinarily conservative assumptions regarding traffic growth and project costs, the investment required to open the NS route to double–stack container movements and develop an intermodal facility that serves the study region are amply justified.*

Now that the Heartland Corridor has become a reality and is estimated to be cleared for double-stack service by 2010, the questions that remain for West Virginia are:

"Is the proposed Prichard Intermodal Terminal the:

- Right location?
- Right size?
- Right time?
- Right investment?"

As pointed out in the 2003 report for the Central Corridor Double-Stack Initiative,

> *… the addition of an intermodal facility to the State's inventory of transportation infrastructures does not guarantee an increase in the volume of international trade and a resulting growth in container movements. However, the lack of such facilities does virtually guarantee that no such increase in international commerce will be forthcoming.*

1.4 United States Rail Intermodal Network

Overall, freight traffic in the region has been growing and is expected to continue to increase for all counties. There are approximately 37 million tons of commodities going to and from the study region of which dry van commodities represent 29% of this traffic. Much like the trend of overall traffic in the region, the data suggests that 60% of long haul dry van traffic represents outbound traffic. Part of this study seeks to determine whether the WV Intermodal Terminal will support the regional growth in the region. The second part of the study will assess the impact of terminal traffic diversion to the region and traffic volume sustainability; two important criteria that help to substantiate the development of the WV Intermodal Terminal and portend the success of the Terminal in terms of greater economic development for West Virginia.

Over the past several decades, rail carriers have undergone an evolutionary process in the geographic concentration of intermodal services offered in terms of terminal and hub locations and therefore in terms of routes. In the early 1970's there were no fewer than 1,400 intermodal terminals in the continental United States. More recently, the number has been reduced to approximately one tenth that amount.

From both a service and cost standpoint, maintaining small Trailer on Flat Car (TOFC) ramps in secondary markets is generally not viable for rail carriers. Intermodal strategy over the past decade has focused on building large terminals served by large, dedicated intermodal trains to take advantage of the economies of scale and density. The decidedly lower costs of trains carrying very large volumes of "double-stacked" containers long distances has created the current intermodal network of terminals concentrated around major metropolitan cities and port areas. Most of these facilities are operated by third-party contractors on behalf of the railroads. In the West Virginia study area, current intermodal service is provided from CSX and NS terminals in Columbus, OH.

The greater the throughput at an intermodal terminal, the lower is its cost per unit. As part of the struggle for scarce railroad capital, in reviewing potential intermodal investment opportunities, railroads routinely use an "annual lift" threshold that, at least for one major carrier, is 40,000 annual units. Opportunities above this level generally offer attractive market opportunities while those that fall below that figure are generally deemed too small for investment. The potential of the WV Intermodal Terminal as an economically viable intermodal facility should be evaluated under that general condition.

Terminals serving double-stack container trains are typically among the most up-to-date and most efficient facilities. The need to lift stacked containers requires these facilities to be equipped with mechanical lifting devices -- either gantry cranes or side lift transfer units -- to handle the stacking and unloading of containers.

Economies of scale and density apply in intermodal operations. The decidedly lower costs of trains carrying very large volumes of containers dovetails into the advantages of large, regional intermodal hub terminals. Typically, the greater the "terminal throughput" the lower the cost per unit.

A network of double-stack container train routes and terminals exists across the country. It involves virtually all major rail carriers and connects major U.S. port areas with major inland market areas. Exploiting the inherent efficiencies of double-stack container operations has been a critical strategy for most railroads over the past decade. The costs of "clearing" rail routes for the 20'6" vertical envelope that is required for domestic double-stack service remains prohibitive for all but the highest density mainlines, connecting the largest metropolitan areas. In the extant case, even the economic gravity of the Boston metropolitan market has historically provided insufficient income to the railroads to justify the steep cost of constructing a "cleared" route into New England. However, the Federal funding made available through SAFETEA-LU for the Heartland Corridor has put double-stack intermodal service on the doorstep of West Virginia and offers the potential for the State's shippers to take advantage of the inherent economics of intermodal.

A review of US intermodal facilities reveals a concentration of terminals around each major metropolitan area. Most of these facilities are operated by third-party contractors on behalf of the railroads. In the WV catchment area, current rail intermodal service is provided from terminals in Cincinnati, OH; Columbus, OH; Pittsburgh, PA and Harrisburg, PA.

1.5 Study Overview

During the 2007 regular session of the West Virginia legislature, Senate Bill 569 was passed on March 8, 2007, creating a Special Railroad and Intermodal Enhancement Fund. The legislation included the following section that was partially the of the subject study:

> *§17-16B-7b. Study of feasibility intermodal facility at Prichard, West Virginia.*
>
> *The West Virginia Public Port Authority shall conduct a study relating to the feasibility of the planning, development, construction and operation of the intermodal facility at Prichard, West Virginia, to determine whether the same is sustainable.*

In general terms, the purpose of this West Virginia Public Ports Authority (WVPPA) Inland Intermodal Port Study is to evaluate the role that a proposed new intermodal rail terminal will have on the economy of West Virginia.

To assist the West Virginia Public Port Authority in the study process, DMJM Harris, in association with Global Insight and E. L. Robinson Engineering Company, developed a work plan to evaluate the feasibility of the proposed WV Intermodal Terminal. The work plan included the following tasks:

- Conduct an Inland Port Market Analysis for the proposed study area, quantifying opportunities and identifying potential shippers at a local, national and international level,
- Evaluate compare the Prichard site with other viable sites, assess the impact of the proposed facility on local roads, and identify potential infrastructure investments that would be required to support ongoing operations,
- Determine what types of financing mechanisms could be used to facilitate the construction and ongoing operation of the proposed facility,
- Confirm that the construction and ongoing operation of the facility can create a lasting change in favor of rail intermodal for freight operations in the State,
- Evaluate the statewide economic impact of such a facility, in terms of jobs and gross output, and thus create opportunity for increased economic development.

The work plan was approved on May 24, 2007 and the DMJM Harris team was given “Notice to Proceed” at that time.

1.6 Scope of Report

This report has been prepared to summarize the activities and results of the study. Section 2 provides the results of the Market Analysis. Section 3 summarizes the data collected for the Prichard site and provides comparison with alternate sites identified as part of the study. Section 4 presents an overview of the site development and construction activities required for the proposed facility and provides and analysis of finance and funding alternatives available to the WVPPA. Section 5 includes an analysis of operations and sustainability. Section 6 provides the results of the economic impact analysis for the proposed intermodal facility. Section 7 provides recommendations for an implementation plan resulting from the study.

2. Port Market Analysis

2. Port Market Analysis

Opportunity Quantification

The opportunity for the WV Intermodal Terminal development can be represented as a function of three elements. These are:

- *Volume:* Does the regional market offer sufficient local volume to support an intermodal facility? This volume can be comprised of international or domestic freight that by virtue of its length-of-haul and/or commodity characteristics can be attracted to an intermodal product.
- *Divertability:* Does the proposed facility offer a superior alternative in terms of a service and cost package to current offerings that it will actually divert traffic from competing modes or facilities to itself?
- *Sustainability:* Can the facility survive the vagaries of the commercial marketplace including economic downturns, and competitive assaults?

The market analysis for the WV Intermodal Terminal sought to address these three elements to determine of the proposed facility could provide a new and effective transportation alternative for West Virginia's shipping community.

Evaluation of Available Rail Traffic Volumes

The first major task of the analysis is an evaluation of the freight volumes available for intermodal conversion. This analysis needs to first determine the volume, composition and distribution of divertible traffic in the region, based on direction of flow. A proposed intermodal services in West Virginia would compete for originating (outbound) and terminating (inbound) traffic flows, both domestically produced (U.S to U.S.) and import/export (Non-U.S. to U.S. and vice versa).

2.1 Current Traffic Volumes

The purpose of analyzing freight flow data is to establish the basic characteristics of freight demand, its future and potential to shift, and its performance requirements. The data assembled for this analysis represents current freight volumes for the catchment region (Wayne County, and surrounding counties in West Virginia, Ohio, and Kentucky). These data were used to help (1) locate infrastructure demand conflicts and economic development opportunities, (2) identify operational planning and cross-modal synchronization opportunities for the region, and (3) determine the degree of jurisdictional coordination and control required to balance these demands.

The freight traffic data, for international and domestic traffic, used in this report has been assembled using Global Insights' Year 2005 TRANSEARCH database. TRANSEARCH covers U.S. domestic trade, NAFTA trade, and major elements of inland seatrade activity. This data provides the origins and destinations of freight in and around West Virginia, the quantity and commodity mix of that traffic, and the distribution of modes. TRANSEARCH data are used by numerous states, MPOs and academic agencies, as well as by the Federal Highway Administration, and are an accepted and credible market information source among transportation providers. This database offers several distinct advantages:

- It draws from an unparalleled truck data sample, including trucks engaged in Intermodal operations;
- It is produced nationally by county, thus allowing for the detailed corridor and sub-regional analysis required to accurately assess the freight impacts for the state and region; and,

- It is issued annually, so that information can be renewed readily for future analysis.

The modes captured in TRANSEARCH include truckload, less than truckload (LTL) and private trucks, carload and Intermodal rail, air and water. Volumes are expressed in terms of tons, but can be converted to loads (rail, rail Intermodal and all truck modes) and even truck equipment types and configurations (for truck modes only). County-to-county traffic is flowed with routing models along highway and railroad networks, to provide identification of volumes relevant to the corridor and region. Goods are specified by 2 or 4-digit commodity codes, giving a basis for forecasting, a window on industrial supply and distribution patterns, and an indication of freight service requirements.

A complete description of TRANSEARCH and the companion Intermodal Freight Visual Database (IFVD) are located in **Appendix 1** to this document.

2.1.1 International Traffic Flows in the Study Catchment Region

As one of the opportunities identified in the prior studies was the construction of an "inland port" along the Heartland Corridor in WV, the consulting team sought first to identify the volume of international truck freight moving into and out of the study catchment region[1]. For purposes of this analysis, we divided international traffic into two categories, import and export. These categories were created to address specific questions about the balance of international goods movement in the region and are maintained throughout the analysis.

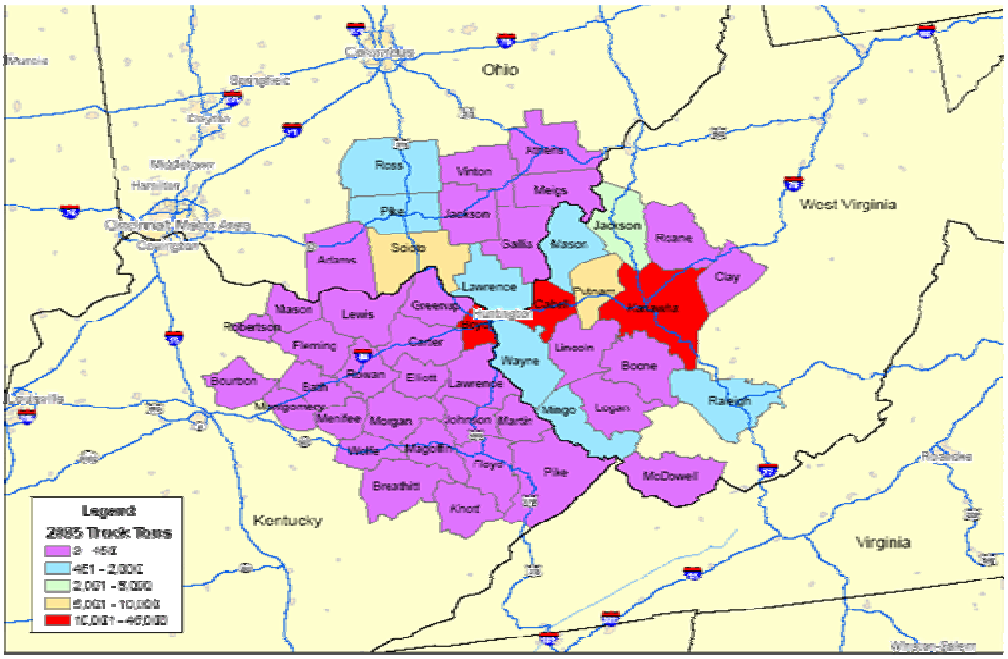
- **Import Traffic** –Traffic moving *from* specific world regions to US gateways *into* the study region. The structure for this data is defined as US customs districts as original destination and the specific Business Economic Area (BEA) region as the final destination. Volumes are reported in tons, for all truck modes [Truckload, LTL, and Private Truck]. The results of the import traffic analysis helped to determine the demand available in the regional market and the measure of growth or decline in freight activity – a measure of real transportation activity.
- **Export Traffic –** Traffic moving *from* the study region to US gateways to specific world regions. The structure for this data is defined as Business Economic Area (BEA) region as the ultimate origin and US ports as the final origin. Volumes are reported in tons, for all truck modes [Truckload, LTL, and Private Truck]. The results of the export traffic analysis helped to determine the degree of "balance" available in the region and the measure of growth or decline in freight activity – a measure of real transportation activity.

International imports into the study region are presented below in **Figure 1** and show *heat zones*[2] by truck tons of international traffic terminating in the catchment region. Kanawha, Cabell, and Boyd counties represent primary destinations of this international traffic, each greater than 10,000 truck tons. This represents approximately 2 trucks per day to each of the counties studied and reflects the minimum volume threshold for intermodal density at a county level.

[1] The study region is defined by the all counties that (1) have import/export and inbound/outbound traffic and (2) lie within a 100 mile radius (catchment area) of Wayne County, West Virginia. The 100-mile radius reflects the basic economics of rail intermodal – long-haul rail movements and short-haul truck delivery. Although truck drayage can exceed 100 miles, the average for intermodal traffic annually, is within this range.

[2] "Heat zones" is a term used to describe the map portrayal of freight volumes in a given area by colors – from "cool" colors to "hot" colors, based on their relative level of activity. Thus, purples and blues reflect smaller volumes, while oranges and reds reflect higher volumes. In this way, the largest regional volumes are quickly identified on the map.

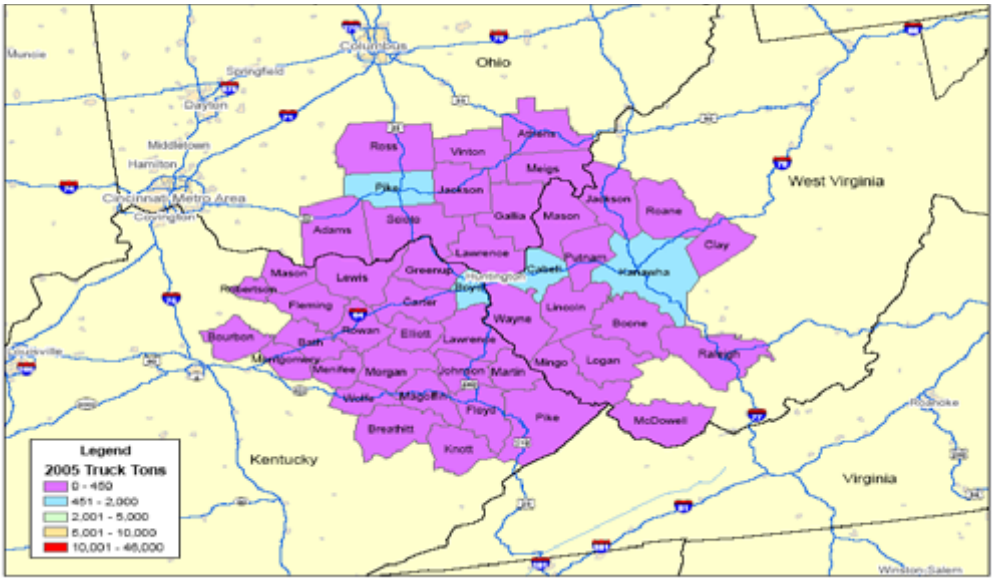
Figure 2.1: International Import Truck Traffic in Annual Tons to Study Region in 2005



These three counties are located along the Interstate-64 corridor, and conveniently connect to the preliminary terminal location at Prichard. Its volume represents 92,000 tons (or an equivalent 4,600 annual truckloads), with the three primary counties representing 73% of total import volume for the entire catchment region.

Like the import volumes, international export traffic originating from within the study region is concentrated again in Kanawha, Cabell and Boyd counties. Export volumes from the catchment region are lower than imports, representing 7,100 tons (361 annual truckloads) with the three primary counties comprising 58% of total catchment area volume.

Figure 2.2: International Export Truck Traffic in Annual Tons from Study Region in 2005



This international data indicates that counties in West Virginia's southwestern region, specifically Kanawha and Cabell Counties and Boyd County Kentucky are the region's largest international import and export locations, and offer the greatest potential for related import/export warehouse and storage activity, a topic discussed later in the report.

Domestic Truck Traffic Flows in the Prichard Catchment Region

Similar to international, for purposes of this analysis, domestic truck and rail traffic are separated into two distinct categories, structured to address specific questions about the viability of transportation infrastructure investment, and maintained throughout the analysis. These categories are:

- **Inbound Traffic** – Traffic moving domestically *from* regions across the nation *into* the study region. The structure for this data is defined as a Business Economic Area (BEA) region as the origin, and the specific terminating county [reported as a Federal Information Processing Standard (FIPS) code] as the destination. Volumes are reported in tons, for all truck modes [Truckload, LTL, and Private Truck]. The results of the inbound traffic analysis help to determine the size of the available local market, the depth and fit of the industrial sectors served by this freight transport activity, and the measure of growth or decline in freight activity – a measure of real transportation activity, and a proxy measure for industrial *demand.*
- **Outbound Traffic –** Traffic moving domestically *to* regions across the nation *from* the study region. The structure for this data is defined as a county in Kentucky, Ohio, or West Virginia within the study region [reported as a Federal Information Processing Standard (FIPS) code] as the origin, and a Business Economic Area (BEA) region as a destination. Volumes are reported in tons, for all truck modes [Truckload, LTL, and Private Truck]. The results of the outbound traffic analysis help to determine the degree of "balance" available in the local market, the fit of the commodities shipped relative to the equipment made empty in the region, and the measure of growth or decline in freight activity – a measure of real transportation activity, and a proxy measure for industrial *output.*

Domestic freight activity is comprised of local, regional and interregional movements. For this analysis, we focused on regional and interregional freight activity.

Figure 3 shows West Virginia's domestic inbound traffic flows as defined above. Kanawha County, WV comprises 41% of the total inbound volume making it the largest destination county in the region studied. It receives over 1.7 million truck tons annually that represents approximately 116,000 units. The next leading import counties in the region are Cabell, Boyd and Scioto Counties that collectively represent 22% of total inbound volume.

Figure 2.3: Domestic Inbound Truck Traffic in Annual Tons to Study Region in 2005

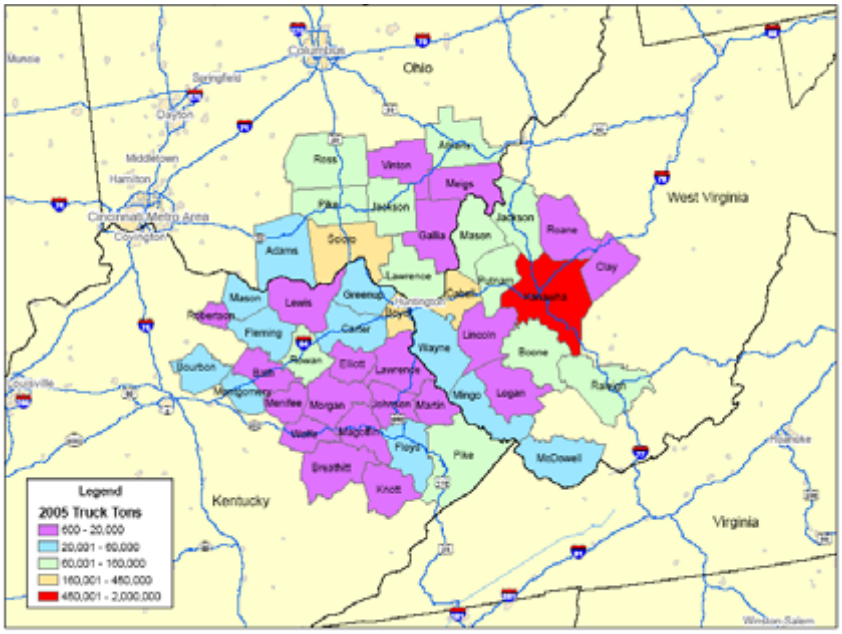
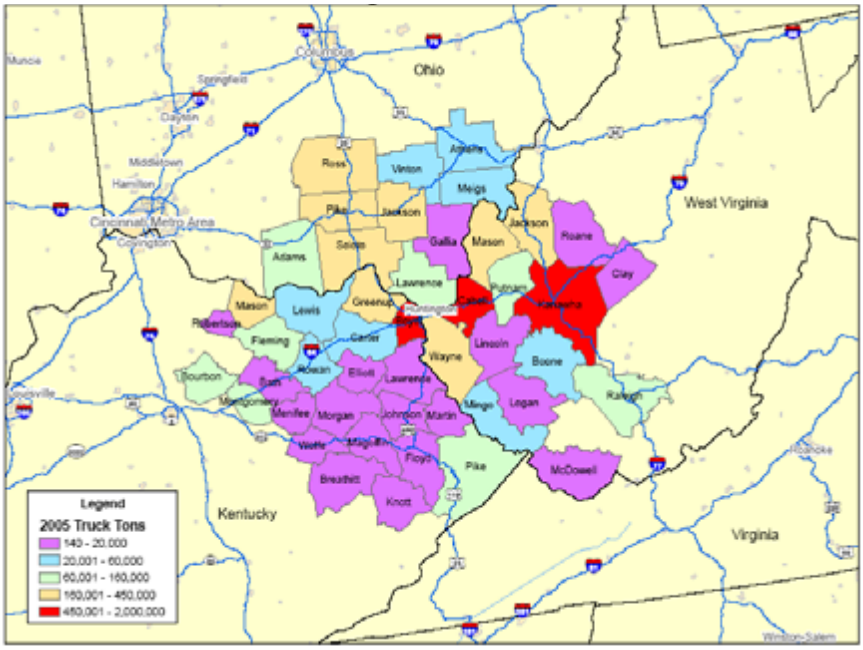


Figure 2.4: Domestic Outbound Truck Traffic in Annual Tons to Study Region in 2005



Domestic outbound truck traffic flows are shown in Figure 4. Kanawha, Cabell and Boyd counties represent the most significant origins in the region studied. Generally, outbound domestic flows are more spread out within the region than inbound flows. For the entire catchment region, total outbound volume represents 6.3 million tons or an equivalent 400,000 units annually, with the three primary counties of Kanawha, Cabell and Boyd representing 42% of the total volume in the catchment area.

Forecasted Traffic Volumes

Another conclusion from the prior studies was that volumes along the Heartland Corridor would expand as a result of the improved vertical clearances, and thus the development of an intermodal terminal in Prichard, WV could help direct additional investment to the West Virginia economy. The quantification of this opportunity was developed using freight forecasting for the base international and domestic volumes. As in the previous section of the report, these volumes were treated separately, and in fact, forecasted using two distinctly different methodologies to reflect the independent nature of their underlying economic drivers.

The Development of the Long-Range Forecasts

The objective of this project is to create a forecast through 2025 for domestic and international freight flows, by origin, destination, and STCC for the study catchment region. After developing the 2005 base year data, origin and destination data were linked to Global Insight's econometric forecasts to provide additional information regarding future traffic flow estimates. Global Insight's economic assumptions and the methodology used to link the Global Insight forecast to the 2005 base year data set are discussed below.

Summary of Global Insight's Economic Assumptions

Global Insight's Macroeconomic Service Long-Term Trend Scenario from the second quarter of 2007 served as the basis for estimating and forecasting the national freight flow equations by STCC code. The baseline international forecasts were supplied by Global Insight's World Trade Monitor forecast, also from the second quarter of 2007.

The forecast is a long term forecast to the year 2025. The long term analysis is concerned with the expansion of potential output or aggregate supply. The growth of aggregate supply is the fundamental constraint on the long-run level of economic activity. Two additional forecasts were developed: one assuming higher long term growth path and a second assuming lower economic growth.

In the long term forecast, potential GDP is a measure of the economy's ability to produce goods and services, and what economic growth could be achieved if resources were fully utilized. In an environment free of exogenous shocks, one can assume that economic output will converge to its potential or fully utilized level. The long-range outlook is dominated by supply factors, such as population growth and demographics, labor force participation rates, average weekly hours worked, national saving and capital stock accumulation, productivity growth, fiscal and monetary policies, foreign developments, and internationally determined prices. The forecast assumes that no exogenous (external) shocks occur to the economy and that the economy expands at its long-run potential path in the absence of any business cycles, which are difficult to predict over the long term. **Table 1** lists Global Insight's long-term economic assumptions for the traffic forecast.

Table 2.1: The Global Insight Long-Term Baseline Forecast Assumes

Population and Labor Force	Population growth will slow from 1% to 0.8% annually, slowing civilian labor force growth.
Employment and Unemployment	Manufacturing employment will continue to decline as a share of total employment, while service sectors will generate an increasing share of employment growth.
Productivity and Aggregate Supply	Potential GDP growth will slow relative to historical rates due to slower growth in the labor force, while productivity growth will remain steady.
Government Policy	The government sector share of GDP will decline due to slower growth in defense spending and a reduction in the share of interest payments relative to the federal budget.

Monetary and Financial	The Federal Reserve Board will remain watchful of inflation while ensuring growth in output consistent with potential output.
Consumption	The share of real consumption devoted to services and durable goods will rise, while it falls for nondurable goods, such as energy.
Business Investment	The investment share of structures will decline, while equipment's share will rise. The fastest growing sector of the economy for investment will be producers' durable equipment.
International Trade	Real export growth will slow growth in the trade deficit due to a decline in the value of the dollar and a reduction in US real unit labor costs relative to the rest of the industrialized world.
Industrial Production	Manufacturing of durable goods, particularly non-electrical machinery such as computers, will grow faster than nondurable goods. Plastics and paper will lead nondurable goods production.

Methodology Used in Linking the Forecast to the Transearch Database

The general methodology involved taking benchmark values for 2005, and growing these values into the future based on Global Insight's forecasted growth rates. The result represents either shipments or purchases for a given SIC code in a particular region of the country. The shipment growth rates are determined based on the growth rate in output in a particular region of the country and SIC code, from Global Insight's Business Demographic Monitor (BDM). The purchase growth rate is determined based on Global Insight's Business Transactions Matrix (BTM), which measures the purchases of a product made in one industry by industries in all other SIC codes, as well as the retail sector, in a particular region of the country. A national constraint is used to ensure shipments and purchases for each STCC and region combination were matched to area totals.

For the international freight flows, a similar methodology is applied for freight movements within the United States. The World Trade Service (WTS) forecast is used to estimate flows outside of the United States. The international freight flows were constrained to the WTS forecast by STCC code, world region, U.S. gateway, and domestic region.

The development of the forecasts involved ten overall steps.

1. 2005 TRANSEARCH data were geographically aggregated to a combination of 20 metropolitan BAs and 9 Census Divisions (Appendix Tables 2 and 3). The BEAs were selected for a number of reasons including both modal, regional importance, however time and costs limited the forecast to the 20 areas. (These 20 metropolitan BEAs accounted for approximately 35 to 40% of domestic freight flows in the U.S. in 1998.)
2. Historical data from earlier years (and versions) of TRANSEARCH were assembled in time series back to 1985, in a format parallel to the 1998 database.
3. Domestic origin/destination freight flows in 1998 were increased to a 2025 level based on Global Insight forecasts of growth in real output at the two-digit STCC commodity level for the specified regions.
4. Utilizing the Global Insight input-output system to capture regional purchases, a supply/demand balance is enforced to ensure consistency on a national level. This step provided a method of allowing shipments of a particular commodity from all regions to a particular region (supply) will equal purchases of that commodity by that particular region (demand.)
5. A specially designed Global Insight national freight model was applied to regional freight flow forecasts. This national freight model by two-digit STCC code is developed to serve as a top-level constraint for the freight flows by region. Equations were estimated for the total freight flows and 36 two-digit STCC codes at a national level, using time series data from Global Insight's TRANSEARCH database as the dependent variables. All equations included an index of industrial production as the primary independent variable. In some cases, a trend variable or price variable is also included. A dummy variable is added in cases where a

specific problem with the data is identified. Again, these forecasts served as a top-down national constraint on the regional freight flow forecasts developed in step three. It is important to note that the incorporation of the national model as a top-down constraint reduces any bias associated with the generation of forecasts from one point in time (1998). The national freight model is not tied to a particular year and therefore provides an unbiased perspective in terms of national freight flow estimates developed for 2025.

6. Export and import freight flows by commodity from/to US gateways to/from specified world regions in 1998 (taken from TRANSEARCH /LATTS) were estimated on the basis of forecasts from Global Insight's World Trade Service
7. Shipments to gateways from ultimate US origins (exports) were estimated utilizing Global Insight's forecast of real output by commodity at the regional level.
8. Shipments from gateways to ultimate US destinations (imports) were developed on the basis of Global Insight's input-output system capturing future regional purchases.
9. The internal export/import flows to/from the gateways were constrained by those established by the Global Insight World Trade Service forecast in terms of STCC, world region of origin or destination, and gateway combination.
10. Finally, forecasted traffic was broken down into both component counties and four digit STCC commodity codes. This is done by applying two digit commodity growth rates observed in a given origin/destination geographic set to all 4 digit commodities observed in the base year in the corresponding counties within the same 2 digit commodity class. The current 1998 routing programs and network were used in the forecasted database also.

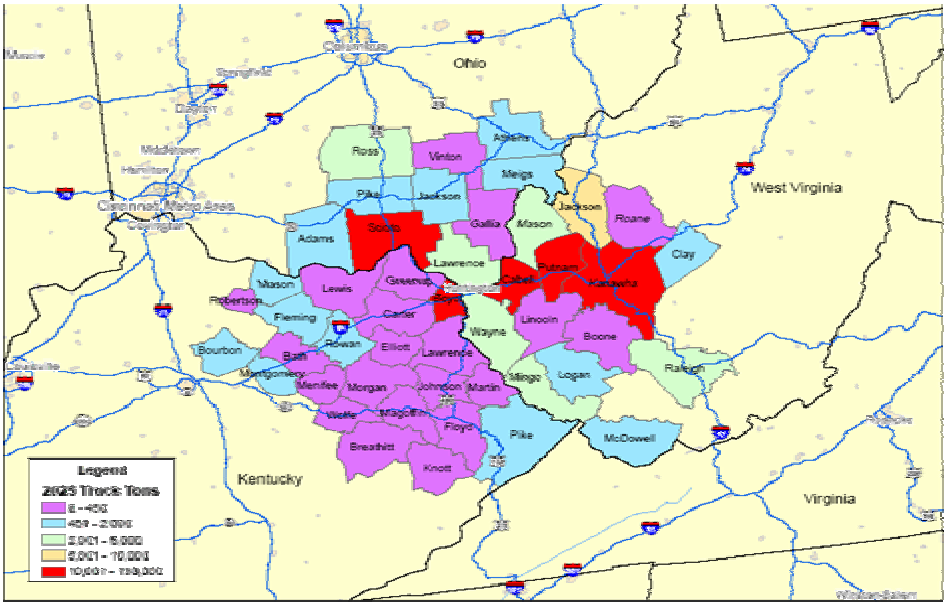
It should be noted that the forecasts are commodity-based demand driven.[3] As a result, modal distributions over time are jointly determined by the differential growth in commodity flows and changes in the pattern of origin and destination. The advantage of this approach is that it supplies a baseline against which modal diversion – including changes in input costs and service competitiveness – can be separately assessed.

Forecast of International Truck Traffic Flows in the Study Catchment Region

International forecasted traffic volumes were generated using Transearch Insight's 2005 Database as the base year on a sector level basis, and projected to 2025 using Global Insight's World Trade Service. The future volumes for individual railroad routes were developed using sector-level forecasts, projected to specific railroads based on their historical commodity mix of traffic, and the origin-destination pairs impacted. Refer to **Figure 5** and **Figure 6** below for geographic detail and forecasted import and export 2025 traffic flow results.

[3] In common economic practice, long term forecasts implicitly assume that the necessary infrastructure and productivity gains will become available in order to handle projected freight volumes. The FHWA'S Office of Freight Management is conducting other analyses to examine the linkage between long term economic growth and increased congestion.

Figure 2.5: International Import Truck Traffic in Annual Tons to Study Region in 2025



The *heat map* above extends the concentration of terminating traffic counties from Kanawha, Cabell and Boyd in 2005 to include Putnam and Scioto in 2025, showing growth across all counties in the region studied. For the entire catchment region, this volume represents 259,000 tons, or an equivalent 13,000 units, with the leading counties comprising 78% of the total area's import volume in 2025.

Figure 2.6: International Export Truck Traffic in Annual Tons from Study Region in 2025

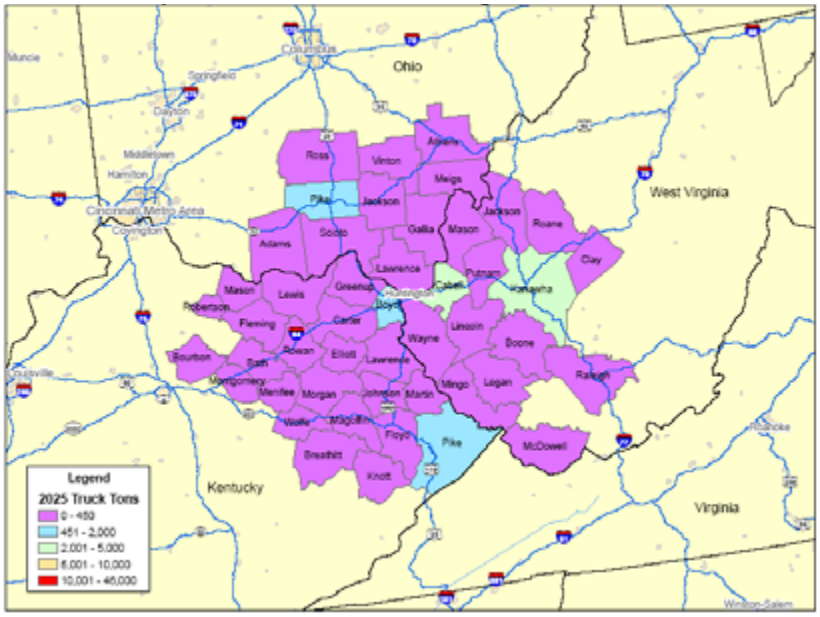
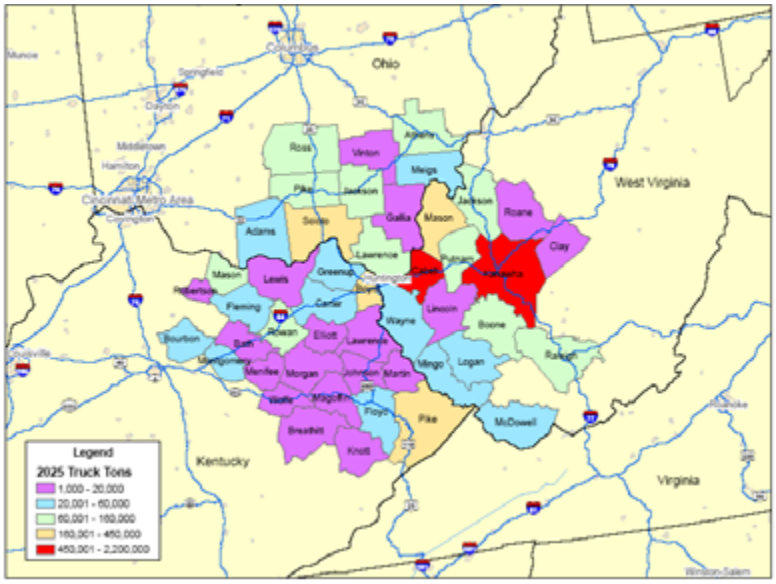


Figure 6 above portrays the forecasted growth in international export traffic volume in 2025 by county. Exports forecasted from the study region are more widely dispersed than imports and no county is expected to exports more than 10,000 truck tons annually. For the entire catchment region, total export volume represents 14,000 tons, or an equivalent 700 units, with the Kanawha and Cabell County representing 49% of the area's total export

volume in 2025. Hardwoods are the predominant export commodity from the region, a product that does not traditionally move via intermodal[4].

Forecasted Domestic Truck Traffic Flows in the Study Catchment Region

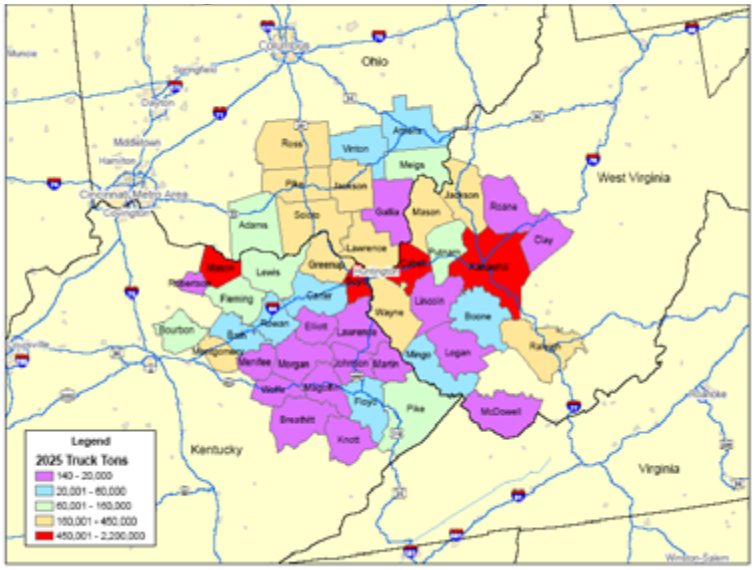
Figure 2.7: Domestic Inbound Truck Traffic in Annual Tons to Prichard Region in 2025



Similar to international imports into the region, Kanawha and Cabell counties represent the region's major areas for future inbound freight. For the entire catchment region, the inbound volume for Kanawha and Cabell County alone represents 50% of all total inbound volume for the region by 2025.

[4] WVPPA has indicated a significant level of interest in the Prichard facility by hardwood manufacturers that anticipate an opportunity to utilize the proposed NS intermodal service to ship product to Western US Ports for export to Asia. This would represent a beneficial volume of backhaul freight from the proposed Prichard facility. However, as this expressed interest was anecdotal, and the divertability of export volumes uncertain, these volumes were excluded form the analysis.

Figure 2.8: Domestic Outbound Truck Traffic in Annual Tons from Study Region in 2025



Almost half (48%) of the projected growth in outbound domestic traffic from the study catchment region is expected to be generated from four primary counties: Kanawha, Cabell, Boyd, and Mason. Cabell County, WV in particular is projected to almost double its outbound domestic volumes by 2025 to nearly 1.26 million. Huntington WV, located mostly in Cabell County, is the urban area most responsible for this growth. Its size – the second largest city in West Virginia after Charleston – and its location, make it a driver for economic development in the region.

Combined 2005 freight traffic for the study catchment region are summarized in **Table 2.** In the diversion analysis in the following section we will assess what level of these annual units can be diverted to the proposed Prichard terminal.

Table 2.2: Summary of Freight Traffic Estimates for the Study Catchment Region in Tons

	2005		
Prichard Catchment Region Freight Volume	Annual Tons	Annual Units	Daily Units
Total Domestic Truck Outbound Tons >500 Miles	5,123,000	349,000	1,200
Total Domestic Truck Inbound Tons >500 Miles	5,624,000	383,000	1,300
Total Domestic Truck Tons > 500 Miles	10,747,000	731,000	2,400
			1
Total Import (Inbound) Tons >500 Miles or through VPA	4,900	300	-
Total Import/Export Tons	66,000	4,500	20
20Total Import/Export Tons	71,000	4,800	20
Total Divertible Tons	5,128,000	349,000	1,200
Total Divertible Inbound Tons >500 Miles	5,690,000	387,000	1,300
Total Divertible Tons	10,818,000	736,000	2,500

Source: Global Insight USA, Inc. 2007

Truck to Rail Traffic Diversion Analysis

The second major task in the market analysis of the proposed Prichard terminal is an estimation of the potential for the Prichard facility to divert traffic currently moving over the highway or via competing intermodal facilities in the region. The great majority of motor freight in the region travels short distances and is not conducive to intermodal transportation. Likewise, many motor freight movements occur in volumes or at frequencies not generally appropriate for intermodal service. In the course of our analysis, we developed a series of tests to identify those lanes, which by virtue of their commodity, distance, density, geography and circuitry, would be positively impacted by hypothetical improvements in the rail intermodal rate and service calculus and likely to shift to intermodal transport.

Intermodal market penetration is a function of two primary factors; (1) Relative length of haul, and (2) Concentration of volume in traffic lanes. As the distance between the origin and the destination increases and lane volume (density) grows, intermodal service becomes more competitive relative to highway, and its cost advantage increases. A statistical interpretation of this principle underlies Global Insight's Comparative Cross-Modal Economics Model (CCMEM) that was used in this analysis.

The CCMEM permits analysis of carrier performance and shipper costs for different modes and modal combinations for existing and potential service options. The model identifies and compares the individual cost and service attributes of highway and rail Intermodal options for a selected scenario. A full range of distribution cost and service considerations that shippers would take into account are addressed, and the model further contains both carrier revenue and cost components.

Revenue Projections

The revenue analysis assumed that a prospective new entrant (in this case, the Prichard intermodal facility) must be priced competitively versus existing alternatives such as highway or rail services. Using the potentially divertible traffic identified in the market analysis, a cost and service indifference model is calibrated for each of the relevant carrier market segments. This model identified the approximate switching point at which shippers would likely opt for a new alternative versus existing service(s). As new entrants must typically provide a discount initially, the price discounts by individual mode are based on the availability of competitive service options, their relative market participation, the transit time differentials between modes, and the need to "incentivize" shifting from one mode to another.

The model was calibrated to reflect current service levels for each of the service options that were analyzed. Furthermore, potential future trends, such as shifts in relative operating costs between modes, changes in travel time, etc. were also be incorporated into the model.

Cost Projections

For each service option, the estimated operating costs and service performance are developed for trailer-load and/or containerized freight moving on a door-to-door basis between origin and destination points for the particular corridors. These costs were built up from a number of different elements in order to reflect time, mileage, and routing variances among the different modes. Developing the costs per trailer-load by mode required the following steps:

1. Identify the origins and destinations of all the traffic moving over the respective corridors;
2. Determine the available railroad Intermodal service options for the service lanes that are analyzed;

3. Determine, if necessary, the railroad routing (specific railroads, interchanges and miles on each) that would be involved in providing rail Intermodal service;
4. Determine the practical highway miles that would be traversed by a motor carrier serving the same origin-destination pair
5. Determine the cost for Intermodal drayage from shipper to origin rail ramp or marine terminal and from destination rail ramp to ultimate receiver
6. Determine terminal handling costs appropriate for each movement
7. Determine the cost of providing comparative door-to-door service on each mode using mode-specific cost models

For a truck operator, fully allocated cost data provided by a major motor carrier were used as the starting point in developing the truck economics. Truck operations can be based on different staffing and operating strategies, including single driver operating within current hours of service (HOS) restrictions and team driver operations. Additional highway cost data is developed from a variety of public and private data sources, which allowed for the disaggregation of wages and benefits, equipment, insurance, fuel and other expenses. Global Insight's Intermodal Cost Analysis Model (ICAM) was used to prepare estimates of the rail Intermodal door-to-door delivery costs for each of the selected service lanes.

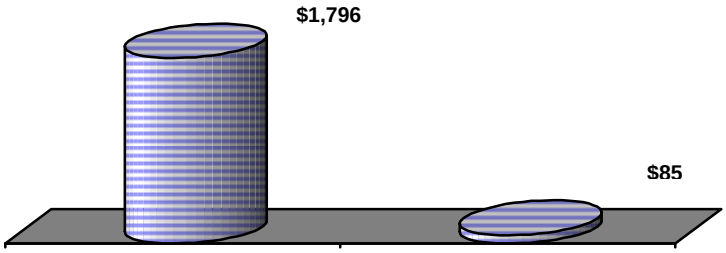
The key cost elements for motor carriers include pick-up and delivery, over the road vehicle operations, fuel, driver costs, dispatching, insurance, as well as other factors that would be directly affected by the choice of transport mode between the origin and destination markets in the pilot project lanes. Highway tolls were reflected as a separate cost item in the model and were estimated based on average toll costs per mile and average toll miles adjusted for specific corridors. Sales and administrative overhead were also included.

Rail Intermodal direct operating cost elements included locomotives and fuel, track and right-of-way, yard and terminal operations, lift-on and lift-off movements, railcar, crew, trailer/container, and drayage expense. Sales and administrative overhead are also included. Again, this information is typically developed from public data, carrier interviews, and the general industry knowledge of the project team.

The different components of a carrier's costs that are built into the transportation models for each mode's operational "value chain" are described in the following example for a sample analysis comparing an all-truck move with a rail Intermodal alternative. The analysis shows the relative proportions of each major cost component and the total cost to the carrier and the transit time involved in moving a trailer-load of freight on the selected corridor. In this example, the total carrier cost for truck is $1,881, while it is $1,070 for rail Intermodal. Although the selection of the rail option would give the shipper a savings of $811 over truck, the travel time for rail Intermodal is 5.0 hours longer than truck. In addition to the increased travel time, the difference in variability in travel time for the rail Intermodal versus the highway option would also have to be considered.

Trucking Move Transportation Components on Sample Corridor

Total Carrier Cost: $1,881 Transit Time: 54.5 hours



Long-Haul Truck

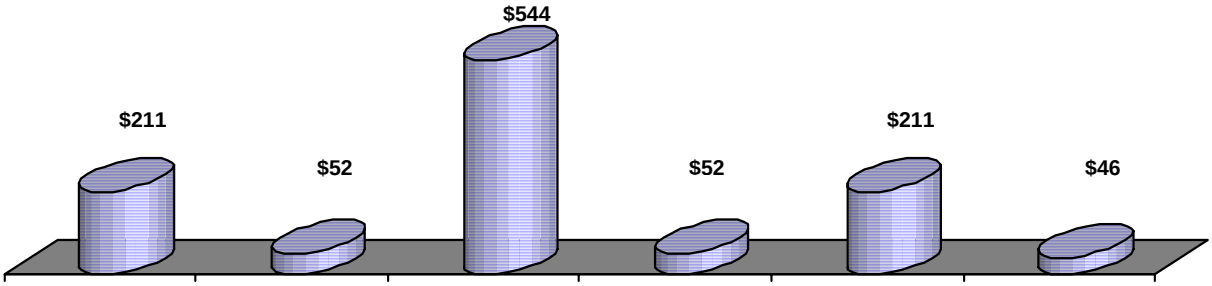
- Driver Wages & Benefits
- Tractor & Trailer
- Fuel, tires, oil, maintenance
- Insurance
- Tolls
- Sales & Administration
- Depreciation

Repositioning

- Total costs for driver & equipment to be repositioned for new revenue load

Rail Intermodal Move Transportation Components on Sample Corridor

Total Carrier Cost: $1,070 Transit Time: 60.5 hours



Drayage

- Local dray to Intermodal terminal

Intermodal Terminal

- Yard & Terminal Transfer to Rail

Rail Move

- Locomotives & Fuel
- Track & R.O.W.
- Railcar costs
- Crew
- Insurance
- Sales & Administration
- Depreciation

Intermodal Terminal

- Yard & Terminal Transfer to Road

Drayage

- Local dray to consignee

Equipment

- Trailer or container & chassis hire & maintenance

In addition to the carrier's costs for the respective modes on each service lane that is being examined, the total cost for moving a trailer-load of freight on the particular corridor that would be incurred by the shipper of that freight are calculated. The shipper's cost would include any "mark-up" or profit margin added to the carrier's costs, the incremental inventory carrying costs that would be incurred by using a slower or less reliable service option, plus any usage fees, such as per-container terminal that would apply to a particular option. Carrier mark-ups are estimated based on current practices and conditions in the freight markets for each of the modes.

Results

The key dynamic in the traffic diversion analysis conducted for this study is that the proposed public investment in the Prichard facility would (1) allow the introduction of new intermodal services to the region, and (2) reduce the structural cost of railroading by moderating its capital intensity. Traffic is won away to rail particularly by appealing to motor carriers to substitute intermodal for their "line-haul" intercity road operations. The appeal is presumed persuasive to the extent that it can offer fully equivalent performance at a significantly lower cost than the motor carriers can achieve operating trucks over the highway.

Diversion impacts were measured over the medium term (three to five years following completion of the facility) and based on a "Low" and "High" case. Regional traffic diversions are driven by capital improvements to infrastructure, in this case, through the development of the WV Intermodal Terminal. This investment spawns the service improvement, and ultimately the lower price-to-market that stimulates the traffic diversions. The medium-term results of this analysis appear in **Table 3**.

Table 2.3: Summary of Diversion Analysis Results

Lanes Evaluated	1,155	
Lanes that diverted traffic	467	
Lanes that did not divert traffic	688	

Source: Global Insight USA, Inc. 2007

The medium-term result of the WV Intermodal Terminal investment produces highway diversion of between 87,000 and 100,000 annual truck loads over three to five years, after construction. This represents approximately 300-350 trucks diverted daily to the new facility, or 12-14% of total highway loads. This reflects approximately 45,000 annual lifts at the terminal, slightly above the threshold considered necessary for profitable operation of an intermodal. In addition, the inbound/outbound balance ratio of 74% across both scenarios is very good and suggests strong economic performance for Norfolk Southern since equipment repositioning at the terminal can be kept to a minimum. Likewise the average length-of-haul for the diverted lanes – 826 miles – would generally provide a consistent economic advantage to intermodal service versus over-the-road operations.

Sustainability of Diversions

The third major element of the market analysis is the sustainability of the traffic that will use the proposed Prichard terminal. Measuring sustainability is largely a qualitative exercise since it can only measure the *conditions* under which growth can occur, not the actual growth itself (which is measured implicitly by the freight forecast). Sustainability factors could include

1. Regional economic growth
2. Diversification of products and markets
3. Presence of effective competition
4. Effective marketing of the facility

For purposes of this analysis, we addressed the first three of these factors that would help the terminal remain a vital presence in the region.

Regional Economic Growth

The condition of the economy is implicit in the manufacturing and service sectors that support the transportation industry. As transportation service is a derived demand and the strength and geographic dispersion of transportation's ultimate customers determines the region's industrial base; but more importantly, it identifies the region's potential to sustain economic growth thereby adding to the success of the intermodal facility.

Using Global Insights Business Demographic Model **Table 4** forecasts the value of output (in $) to 2025 in the counties surrounding the proposed Prichard terminal. The table shows that economic growth in the counties figuring high freight volume 2005 will be sustained through the forecast horizon (2025). Two additional counties outside of West Virginia that show considerable growth, over the next 20 years are Pike County in Ohio and Montgomery County in Kentucky. Our forecasts show gross economic output and per capita income in these two counties to grow on average of 3% annually through 2025.

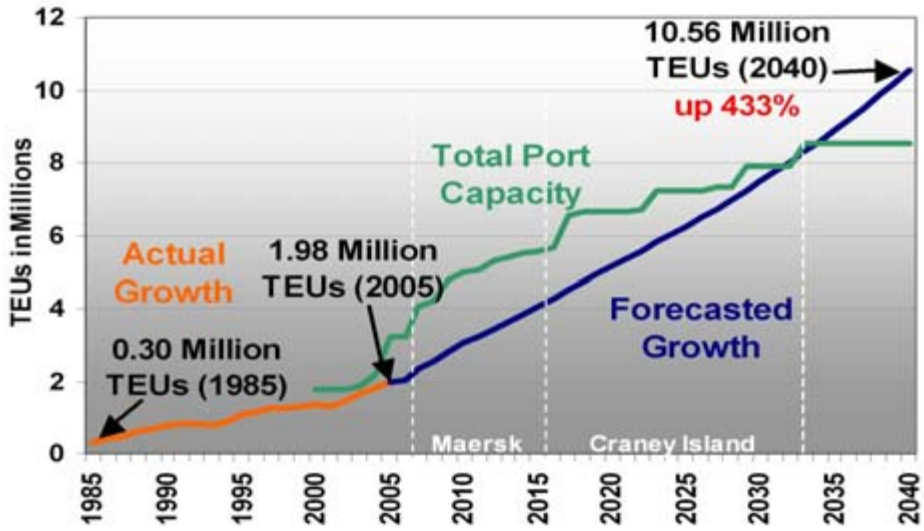
Table 2.4: Projected Economic Growth ($ output 1996$) by County to 2025

Counties	2005 Total	2015 Forecast	2025 Forecast	2005 - 2015 Growth	2015 - 2025 Growth
KANAWHA, WV--39	8,828,055,274	11,214,284,931	15,774,570,777	2%	3%
BOYD, KY--19	5,232,677,401	6,034,102,250	7,527,336,499	1%	2%
CABELL, WV--11	4,671,604,433	6,889,935,562	11,051,469,303	4%	5%
ROSS, OH--141	3,074,558,260	3,930,678,564	5,410,399,903	2%	3%
PIKE, OH--131	2,532,437,968	2,844,727,930	3,352,217,096	1%	2%
RALEIGH, WV--81	2,332,813,896	3,405,969,839	5,402,455,800	4%	5%
PIKE, KY--195	2,241,467,023	3,691,070,362	6,394,839,320	5%	6%
PUTNAM, WV--79	1,975,322,408	2,815,986,163	4,225,856,361	4%	4%
SCIOTO, OH--145	1,746,859,562	2,280,057,352	3,161,101,995	3%	3%
LAWRENCE, OH--87	1,679,016,566	2,376,755,174	3,536,298,882	4%	4%
JACKSON, OH--79	1,620,622,872	2,106,210,715	2,839,870,563	3%	3%
JACKSON, WV--35	1,458,466,825	1,834,647,926	2,726,867,166	2%	4%
MONTGOMERY, KY--173	1,265,673,353	2,091,927,618	3,673,314,462	5%	6%
ATHENS, OH--9	1,153,906,115	1,570,003,686	2,264,207,483	3%	4%
MASON, KY--161	1,151,018,148	1,482,686,928	2,190,805,736	3%	4%
FLOYD, KY--71	1,057,764,174	1,481,587,317	2,178,453,730	3%	4%
LOGAN, WV--45	1,011,424,949	1,535,655,079	2,446,743,847	4%	5%
BOURBON, KY--17	937,697,621	1,218,745,440	1,556,325,287	3%	2%
GALLIA, OH--53	840,283,323	1,044,272,406	1,356,817,790	2%	3%
WAYNE, WV--99	807,058,098	1,011,408,401	1,314,152,712	2%	3%
MASON, WV--53	784,670,984	819,870,334	793,059,209	0%	0%
ROWAN, KY--205	734,623,039	1,243,025,853	2,231,079,708	5%	6%
JOHNSON, KY--115	685,706,551	1,200,528,412	2,296,452,468	6%	7%
GREENUP, KY--89	587,219,817	912,653,306	1,531,889,685	5%	5%

Source: Global Insight USA, Inc. 2007

Freight traffic, for both domestic and international trade flows, is expected to grow in the study region. The sustainability of international traffic is also significant for the WV Intermodal Terminal. Since much of this traffic will originate or terminate at the Ports of Virginia, forecasted levels of traffic for ports in that area are one indicator of future sustainable levels of international traffic for WV. **Figure 9** shows expected port traffic levels over the next 20 years at the Virginia Port Authority (ports of Norfolk, Newport News, Portsmouth), growing from 1.98 million TEUs in 2005 to over 10 million in 2040, greater than the port's expected capacity. This forecast supports the sustainability of international traffic flowing to/from WV and creates a potential opportunity for WV Intermodal Facility to be used as an Inland Port facility to ease potential capacity issues at the Port over the long term.

Figure 2.9: Virginia Port Authority is expected to handle nearly 6.5 million TEUs by 2025



Source: Virginia Port Authority, 2006

The evidence suggests that there is sufficient economic growth in both the domestic and international market segments to sustain and grow the current intermodal traffic base in the region. Surrounding counties provide even further opportunity with sizably smaller volumes but with higher relative growth rates. None of the counties in the catchment region reflect negative growth over the forecast horizon. It can be concluded that the WV Intermodal Terminal will sustain average market growth rates for the foreseeable future, although projected volumes remain subject to the vagaries of the regional economy, and the marketing efforts of Norfolk Southern and the WVPPA .

Diversification of Product

From the diversion analysis we can conclude that the WV Intermodal Terminal appears to be sustainable even at a relatively low level of diversion. However, it is important to mention other opportunities for the facility – like bulk transfer – that could build additional volumes for the terminal in addition to the projected intermodal traffic.

Where private bulk facilities generally support large-scale production sites, multi-client bulk facilities predominantly service light industrial activity. Bulk transfer facilities themselves do not provide significant employment themselves, but offer the potential to deliver lower transport costs to those shippers that utilize their services. This can further assist local economic developers in attracting additional industrial activity.

Table 5 identifies the total inbound volume (in truck loads) of typical bulk-transfer commodities terminating in the Prichard catchment area.

Table 2.5: Non Dry Van Commodities Inbound to the Prichard Region

2005 Annual Units

Category	0 - 25 Miles From Prichard	25 - 50 Miles From Prichard	50 - 75 Miles From Prichard	75 - 100 Miles From Prichard
Chemicals and Plastics	41,400	25,000	64,700	8,000
Corn Sweeteners/Oils	3,300	300	7,200	900
Motor Vehicles	500	200	4,600	2,200
Paper Products	100	0	700	200
Steel	3,100	6,600	17,200	1,700
Wood Products/Lumber	1,900	400	13,100	2,000

Source: Global Insight USA, Inc. 2007

Non Dry Van Commodities Inbound to the Prichard Region

2005 Annual Units

Category	0 - 25 Miles From Prichard	25 - 50 Miles From Prichard	50 - 75 Miles From Prichard	75 - 100 Miles From Prichard
Chemicals and Plastics	19,573	10,627	32,112	3,108
Corn Sweeteners/Oils	1,106	84	2,687	288
Motor Vehicles	93	99	903	526
Paper Products	17	6	171	32
Steel	327	1,006	2,011	114
Wood Products/Lumber	572	77	3,217	506

Table 6 identifies the total outbound volume (in truck loads) of typical bulk-transfer commodities originating in the study catchment area.

Table 2.6: Total Outbound Volume

Non Dry Van Commodities Outbound from the Prichard Region
2005 Annual Units

Category	0 - 25 Miles From Prichard	25 - 50 Miles From Prichard	50 - 75 Miles From Prichard	75 - 100 Miles From Prichard
Chemicals and Plastics	817,600	347,100	1,732,200	136,800
Corn Sweeteners/Oils	200	10,500	1,600	3,800
Motor Vehicles	200	0	200	100
Paper Products	100	0	0	0
Steel	25,700	10,000	40,800	40,700
Wood Products/Lumber	500	3,600	64,900	26,600

Source: Global Insight USA, Inc. 2007

Non Dry Van Commodities Outbound from the Prichard Region
2005 Annual Units

Category	0 - 25 Miles From Prichard	25 - 50 Miles From Prichard	50 - 75 Miles From Prichard	75 - 100 Miles From Prichard
Chemicals and Plastics	39,337	17,024	83,905	6,779
Corn Sweeteners/Oils	9	458	78	170
Motor Vehicles	15	0	15	4
Paper Products	6			
Steel	1,458	550	2,275	1,202
Wood Products/Lumber	19	144	2,556	1,061

Currently, bulk transfer sites in Kenova and Charleston, WV compete for some of this business, including chemicals, plastics, sweeteners, and lumber products. The location of the WV Intermodal Terminal may offer better rail service and drayage economies and could better service these commodities than the other facilities in the region. This could be explored in a follow-up study, if the West Virginia Public Port Authority (WVPPA) commits to building the intermodal facility.

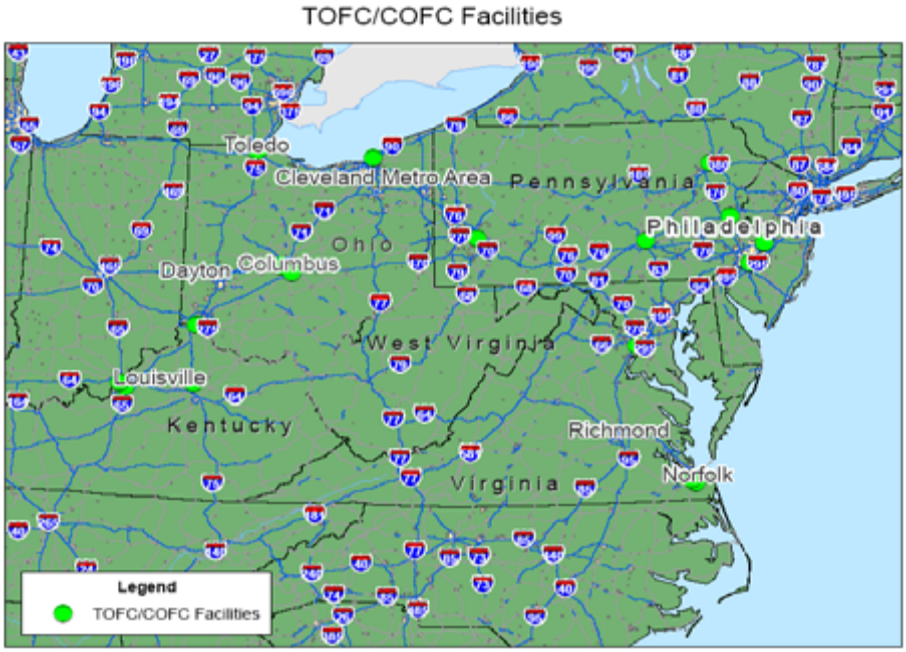
Presence of Effective Competition

The current inventory of trailer/container intermodal facilities in the region could present potential competition for the WV Intermodal Terminal, although most are located some distance from the proposed facility's target market. **Figure 10** shows major intermodal terminals within 500 miles of the study region. Of all the terminals in the region, the closest is in Columbus, Ohio approximately 180 miles away. The drayage differential to the proposed WV Intermodal Terminal needs to be explored further to see to what extent it would compete.

One potential threat could come from a railroad constructed site in the study catchment region. Though none are currently under construction, either Norfolk Southern (NS) or CSX could elect to complete their own facility along their nearby routes and thus siphon-off some measure of the cargo necessary to sustain an economic operation at the WV Intermodal Terminal.

In addition, NS is currently proposing to WV is the development of a new facility in Roanoke, VA., Roanoke's proximity to Wayne County (250 miles away) and to the Virginia Ports (280 miles away) creates an opportunity to divert traffic away from the proposed WV facility, especially from Kanawha County, which is connected to the Roanoke region by Interstate highways 64, 77 and 81.

Figure 2.10: Rail TOFC/COFC Intermodal Facilities



Source: Global Insight USA, Inc. 2007

With respect to construction capital, Roanoke would most likely be privately funded by Norfolk Southern. This arrangement might make it necessary for WVPPA to reconsider investment in the WV Intermodal Terminal or to structure financing or operations in a fashion that would mitigate any impact of a Roanoke facility and thus ensure the economic advantage of the Prichard terminal for Kanawha County shippers. The incremental dray cost to Roanoke from Kanawha County is estimated to be less than $200 more than dray to the preliminary site at Prichard. Thus there is little margin for user fees to pay for the WV facility. WVPPA will want to carefully monitor the developments for the Roanoke facility in order to protect its economic development interests and potentially its investment in the Prichard site.

Refer to **Appendix 4** for the full list of Trailer-On-Flat-Car (TOFC) and Container-On-Flat-Car (COFC) Intermodal Facilities.

Identification of Potential Clients

The degree to which primary freight transportation stakeholders contribute to the current level of freight movement activity is an important factor in identifying areas that have the basic characteristics of trade demand, potential and future shift in freight traffic and its performance requirements. To establish what areas of the state offered the greatest potential need for transportation infrastructure investment, economic development opportunities, as well as locate infrastructure demand conflicts we analyzed current freight volumes for the Prichard region and surrounding regions using Global Insight's Freight Locater Data for 2007. We collected the shipping and receiving volumes of establishments within the 100 mile radius of Wayne County, also referred to as the catchment area.

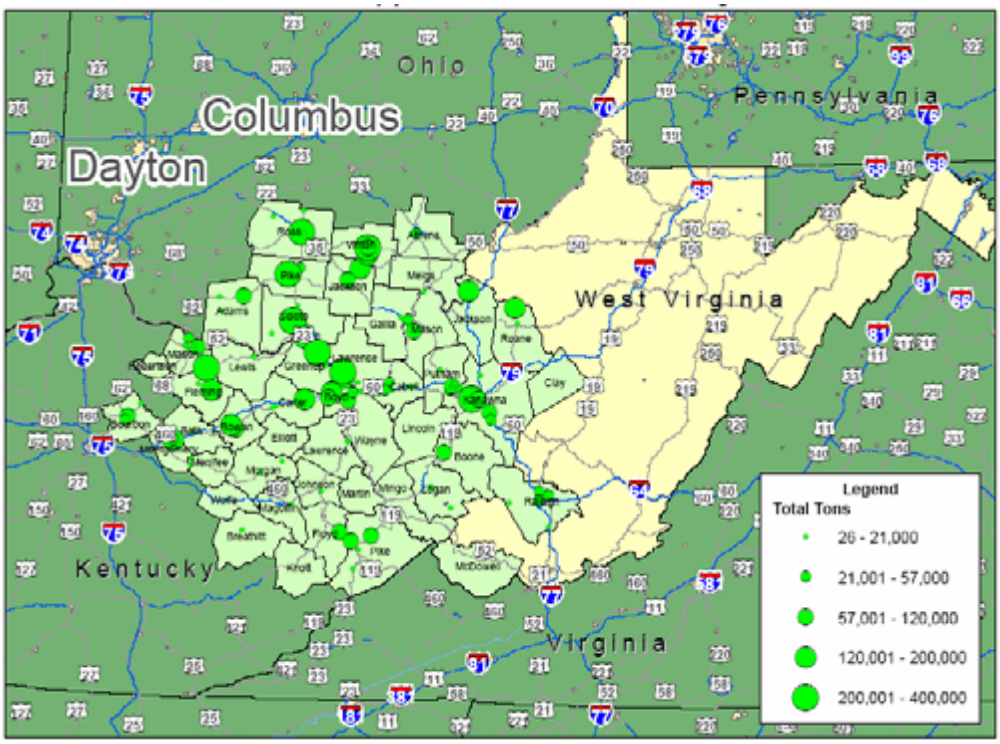
Freight Locater is a data service provided by Global Insight as an adjunct to the Transearch freight commodity flow database. Freight Locater is based upon information supplied by InfoUSA, for which Global Insight adds several fields to the Freight Locater database for the purpose of making it more effective in applications to freight transportation planning and marketing.

Establishments that move at least 400,000 annual tons of freight are plotted in Figure 11 shown below. These establishments have been identified as potential shippers and receivers in the regions that stand to benefit from having an Intermodal facility servicing their region.

For the full list of Shippers and Receivers located in the defined study region catchment area, refer to **Appendix 2**.

International volumes were developed on a country-specific basis, using Global Insight's World Trade Service. These volumes are summarized in the tables contained in Appendix 3.

Figure 2.11: Total Traffic of Potential Shippers/Receivers in the Study Region



Source: Global Insight USA, Inc. 2007

Figure 11 shows the total traffic of dry-van freight for establishments within the catchment region that handle significant tonnage. More specifically, the data shows that these establishments handle nearly 35 % of total traffic for the study region. Establishments moving the most volume in the region are concentrated in around adjoining counties to Wayne County.

Conclusions from Market Study

Successful rail intermodal terminals sites generally offer a portfolio of features that improve rail and motor carrier operating efficiency. The features include the following:

- *Reasonable proximity to the National Highway System (NHS)* - This would include a suitable NHS connector for moving large volumes of trucks onto and off of the network.
- *Close proximity to rail mainlines along primary intermodal routes* - The availability of "cleared" access to the national double-stack network will generally determine the degree of usability of a given terminal site.
- *Local Economic Base* – Transportation is a derived demand industry. Therefore, unless there is a sufficient base of nearby industrial and commercial activity to support trainload volumes, the economic sustainability of an intermodal terminal is threatened[5].

[5] There are exceptions to this principle however, where a terminal is able to "piggyback" [sic] on the regional largesse of a major metropolitan area or port facility. Examples of this include the Virginia Inland Port (VIP) which siphons traffic from the port of Norfolk and the metropolitan areas surrounding Washington, DC and Baltimore, or the Beth Intermodal facility in Bethlehem, PA that services the Eastern Pennsylvania, New Jersey, New York Metropolitan regions.

- *Proximity to Major Secondary Markets* – In addition to the economic gravity of major metropolitan areas, many intermodal terminals also enjoy access to a number of secondary markets[6]. Whereas the primary metropolitan area generally represents the headhaul market, the industrial and commercial base of these additional markets are often the source of backhaul freight opportunities for intermodal transport providers seeking to balance loaded flows[7].
- *Land Availability* – Rail intermodal is a land intensive operation, made more so by the vagaries of irregular operation. While railroads have traditionally constructed intermodal facilities on surplus land in urban areas, many recent constructions have located facilities in suburban or even rural sites to minimize the cost of land acquisition, the reduce the likelihood of NIMBY[8] backlash, and to avoid the delays associated with urban congestion. In addition, the migration of industrial and consumer activity from the city centers has prompted a shift of freight traffic patterns. Whereas freight traffic traditionally moved from storage and queuing facilities on the periphery into the city centers, now the industries are co-located with their storage facilities in suburban regions.
- *Labor Force Availability* – While intermodal facilities themselves do not generate significant employment, the collateral impact of their introduction tends to attract additional employment to a region. The inauguration of intermodal service in a region has the effect of temporarily destabilizing the transportation pricing patterns of the surrounding region. Over the longer term, as prices stabilize, resident shippers generally enjoy a lower transportation cost profile, and new shippers are attracted by the region's improved logistics efficiency.

Evaluating the proposed WV Intermodal Terminal against these criteria suggests that it offers many of these critical success features, and could become a valuable strategic asset in the region.

- *Reasonable proximity to the National Highway System (NHS)* - The site is in close proximity to Interstate 64, the primary artery of commerce in Southern West Virginia.
- *Close proximity to rail mainlines along primary intermodal routes* - The Prichard site is located adjacent to the Norfolk Southern Heartland Corridor, soon to become a critical link in the national double-stack network.
- *Local Economic Base* – Significant freight markets in Kanawha, Cabell and Boyd Counties provide the necessary industrial and commercial "baseload" for the terminal, and positive growth outlooks will provide increasing freight volumes over the longer term.
- *Proximity to Major Secondary Markets* – Access to backhaul freight volumes should make the economics of rail intermodal competitive for the region, and the potential to attract unconventional freight volumes (hardwoods for export) could further expand the opportunity

[6] The large majority of intermodal freight travels only a short distance from the origin or destination ramp. Therefore, most intermodal terminals are located near major metropolitan or traffic generating centers. Some long-haul intermodal traffic, however, originates at locations not proximate to the intermodal network hubs, and must be drayed to a convenient intermodal facility for subsequent rail movement. This phenomenon is particularly evident in Chicago, where eastern and western rail carriers' intermodal networks meet. Shippers in Wisconsin will dray loads to Chicago for subsequent rail intermodal movement east, while shippers from as far away as Pennsylvania will transport loads to Chicago for movement beyond to the west.

[7] "Headhaul" is the term used to define the primary direction of freight travel – such as Chicago to New York is the headhaul direction (more freight moves into New York than outbound from the region). Conversely, "Backhaul" is the term used to define the secondary direction of freight travel. Efficient freight carriers – both rail and truck – seek to balance loaded movements in one direction with loaded movements in the opposite direction. While rail intermodal is able to reposition empty equipment more economically, seeking balanced lanes generally maximized total returns on investment.

[8] Colloquial acronym for "Not In My Back Yard". In this context, it represents the combined interests of community agencies and citizens groups that generally rise-up against intermodal terminal constructions.

- *Land Availability* – The ready availability of the 78-acre parcel at Prichard should provide sufficient expansion room for more than a decade.

The market analysis indicates that the local freight volume is available, and that a reasonable projection of diversion provides sufficient traffic for competitive and sustained operations. While these near term volumes are modest compared to most recent intermodal terminal constructions, longer term growth prospects suggest that the WV Intermodal Terminal can become an effective transportation force in the region, and an engine of economic development for Southern West Virginia.

Identification of Road Feeder Network

The preliminary Prichard site is connected to the major markets in Kanawha and Cabell Counties in West Virginia, and to Boyd County in Kentucky by U.S. Route 52. The thirteen miles between the proposed site and I-64 are, not surprisingly, anticipated to see the highest volume increase as a result of the terminal construction in Prichard. In addition to the diverted units (87,000-99,600 annually), this route will also see truck movements for operations and maintenance of the terminal and terminal equipment, and the movement of empty trucks repositioning to the Prichard site for outbound loading. Altogether, this is likely to represent nearly 400 additional trucks per day, or the equivalent of about 16 trucks per hour. This totals 1.3M to 1.5M additional VMT for U.S. 52 on that segment.

To identify those other roads that serve as the feeder network to the proposed Prichard site and to measure the impact on those roads in terms of additional Vehicle Miles Traveled (VMT), changes in VMT[9] were quantified for the local road network as a result of the Prichard intermodal terminal.

Building from the volume and shipper identification data developed above, "Net VMTs" were calculated by compiling total units and truck miles currently driven and subtracting the truck drayage miles projected to be driven between Wayne County and the 46 counties that made-up the study catchment region. Using the Transearch Insight database these data were identified on the basis of what roads are used to move diverted loads to and from Wayne County. Consequently, for each diverted load and road, the VMT to and from Wayne County was calculated and aggregated by major route to derive Net VMTs.

[9] In addition to the primary benefit of congestion relief, the diversion of highway traffic to rail intermodal offers a number of other secondary but related benefits to the study area, including:

- Reduced highway user costs and avoided highway investments;
- Improved fuel efficiency and lower emissions;
- Strengthened industrial competitiveness; and
- Network redundancy for national security and emergency response.

The analytical evaluation of these types of benefits generally hinges on a quantification of changes in Vehicle Miles Traveled (VMT) as a result of new intermodal terminal. VMT is a measure of the reduced truck usage of highways. In this case, the number of vehicle miles not driven on West Virginia's highways (and its concomitant reduction in emissions, highway maintenance, etc.) as a result on the Prichard intermodal facility. Inasmuch as this analysis was to evaluate the collateral impacts of diversions on the area's other highway corridors, we calculated the impact of the diversions – in terms of reduced VMT – for the region's major arteries.

Table 2.7: Net Vehicle Miles Traveled

Road	WV Net VMT Total (12 % Diversion)	WV Net VMT Total (14 % Diversion)
U.S. Route 52	1,340,800	1,484,900
Interstate 64	173,800	148,900
U.S. Route 23	19,700	16,900
State Road 152	14,500	12,500
State Road 2	8,300	7,100
State Road 3	8,100	6,900
Interstate 77	7,200	6,200
State Road 10	6,100	5,200
State Road 423	5,200	4,500
County Road 3/2	4,000	3,400

Source: Global Insight USA, Inc. 2007

The results of the analysis of Net VMT for major West Virginia roads in the study area appear in **Table 7** under two scenarios: a 12% diversion (baseline) and more optimistic 14% diversion. In the base case, the Prichard terminal results in an annual increase of almost 1.5M VMT's annually from a 12% diversion of truck to intermodal. An additional 2% increase in diversion (optimistic case) increases VMT's by another 15% to almost 1.75M VMT's annually. Note that the table above only represents roads that experience the greatest impact in divertible VMT's from the intermodal terminal at Prichard. Other roads in the area with smaller VMT impacts are not displayed.

Other than the impacts to U.S. 52, the remainder of the VMT impacts is small, and thus probably not noticeable from the standpoint of the average driver, or from a highway maintenance perspective. Thus, if the increased volumes on U.S. 52 can be accommodated, the secondary impacts on other routes are likely to be easily absorbed.

Warehousing and Distribution Center Site Analysis

One of the principal economic development opportunities flowing out of intermodal terminal development – particularly intermodal facilities targeting international cargoes – is warehousing and distribution center expansion. Global sourcing of raw materials and global distribution of finished goods have created supply chains that are many thousand miles long, and are often subject to a variety of unforeseen interruptions. To offset the risks inherent in these longer supply chains, shippers and receivers often inventory product either at the source or the destination to insure continuous and rapid re-supply for production or sale.

In the potential development of the WV Intermodal facility, either as an inland port or as a domestically-focused terminal in the national double-stack network, there is an apparent need for a local supply of warehousing and distribution facilities to support the local shipper network. Such facilities range from modern Class A, B, and C warehouses, to minimalist cross-docks that can transload ocean containers in to larger and more efficient domestic 53-foot truck trailers. The presence of modern facilities near intermodal terminals has been a recent development, growing out of the cost effectiveness of staging low-cost foreign goods for local distribution, and for

providing value-added, assembly or customization services to semi-finished products shipped knocked-down from overseas suppliers.

To determine whether or not the proposed WV Intermodal facility would require the development of new warehousing and distribution facilities in the region, and hence lead to the creation of new jobs in the area, an assessment of a similar rural intermodal facility as carried out.

The Front Royal Inland Port Facility in Warren County, Virginia was used as a proxy for the study region so as not to dilute the analysis with more urban geographies as would be apparent for facilities located in major commercial regions.

Data on the number of warehouse and distribution facilities in the comparison regions was developed using Global Insight's Business Demographics Monitor, and U.S. Census figures. The analysis evaluated the demand for Warehouse and Distribution facilities to determine to what degree there would be unmet demand for such services given the completion of the Prichard facility.

The three methodologies evaluated the study region against the two on the basis of (1) the reported ratio of warehouse establishments to all establishments for each region, (2) the estimated square footage of warehouse space available for each region, and (3) the reported employment in warehousing for each region. Given that warehouse and distribution facilities for the study region would likely – for operating convenience – be located along the Interstate 64 corridor, we included a number of adjacent counties in addition to Wayne County to more accurately reflect the location choices of operators in the area[10].

The Front Royal inland Port facility located in Warren County, Virginia represents a proxy for the Prichard Intermodal facility in Wayne County, West Virginia. As a first step, an assessment of employment growth in the two counties was conducted. The following table depicts employment growth in all industries compared to employment growth in warehousing and distribution in Warren County, VA and Wayne County, WV in the last 16 years:

Table 2.8: Employment Growth

Employment				
Industry:	All Industries	All Industries	Warehousing and distribution	Warehousing and distribution
County:	Warren, VA	Wayne, WV	Warren, VA	Wayne, WV
1990	8,397	10,478	160	869
1991	8,086	10,246	156	839
1992	8,000	10,518	156	878
1993	8,160	10,577	173	913
1994	8,452	10,810	184	982
1995	9,204	10,860	174	942
1996	9,370	10,809	187	876
1997	9,814	10,880	198	806

[10] While the inclusion of these counties would necessarily dilute the apparent demand for warehousing space in the region, it was decided that the availability of comparable capacity in these counties would likely be consumed before new construction would be required.

Employment				
Industry:	All Industries	All Industries	Warehousing and distribution	Warehousing and distribution
County:	Warren, VA	Wayne, WV	Warren, VA	Wayne, WV
1998	10,216	11,044	212	745
1999	10,630	10,920	269	828
2000	10,670	11,137	349	874
2001	10,599	10,815	332	1,025
2002	10,690	10,634	351	1,027
2003	11,275	11,228	740	1,119
2004	11,361	11,427	810	1,173
2005	11,683	11,614	834	1,231
2006	11,876	11,690	823	1,252
CAGR[11]	2.2%	0.7%	10.8%	2.3%

While Wayne County has higher number of employed persons than Warren County to begin with, Warren County has had greater employment growth in all industries than Wayne County. Employment growth in Total Industries was 2.2% in Warren County compared to only 0.7% in Wayne County. Furthermore in the last 16 years employment in warehousing and distribution has grown at a much stronger rate in Warren County (10.8%) than in Wayne County (2.3%). At least a portion of this growth can be attributed to the development of the Front Royal Inland Port Facility.

The following table displays the number of growth of all industries and then just warehousing facilities in Wayne County, West Virginia and Warren County, Virginia:

Table 2.9: Growth of Industries

Establishments				
Industry:	All Industries	All Industries	Warehousing and distribution	Warehousing and distribution
County:	Warren	Wayne	Warren	Wayne
1990	514	439	13	33
1991	548	444	13	34
1992	518	614	13	46
1993	548	654	13	48
1994	656	654	14	48
1995	901	900	23	73
1996	938	736	22	59
1997	958	781	22	67
1998	1,112	885	24	74
1999	1,104	894	27	80
2000	1,146	892	27	84
2001	1,104	833	29	89

[11] Compound Annual Growth Rate

Establishments				
Industry:	All Industries	All Industries	Warehousing and distribution	Warehousing and distribution
County:	Warren	Wayne	Warren	Wayne
2002	1,119	839	32	81
2003	1,118	835	37	80
2004	1,150	855	44	76
2005	1,185	911	46	77
2006	1,215	929	46	79
CAGR	5.5%	4.8%	8.2%	5.6%

The total number of establishments in both Wayne County and Warren County has increased, although Warren County appears to be growing at a higher rate than Wayne County 5.5% compared to 4.8%. A similar trend can be seen in the number of warehousing and distribution establishments in these counties. The number of warehousing and distribution establishments in Warren County has grown at a higher rate (8.2%) than in Wayne County (5.6%).

In Warren County employment in warehousing and distribution has grown at a higher rate than the actual number of establishments. An 8.2% increase in the number of warehousing and distribution establishments in Warren County has resulted in an even higher increase in warehousing industry employment by 10.8%. This is not the case in Wayne County, where employment in warehousing and distribution has grown at a much lower rate than the actual number of establishments. The 5.6% increase in the number of warehousing and distribution establishments in Wayne County has resulted in a much smaller increase in warehousing and distribution employment in the county; only 2.3%.

The development of the Front Royal Intermodal facility in Warren County can be significantly credited for the higher warehousing and distribution employment growth. Similar growth rates could be anticipated in Wayne County with the completion of the Prichard Intermodal facility. Furthermore, even though Wayne County has more warehousing and distribution facilities than Warren County, Warren County has more workers per establishment than Wayne County. The data indicates approximately 18 workers per establishment in Warren County in 2006 compared to 16 workers per establishment in Wayne County[12]. This suggests that with increased traffic through the Prichard region, the number of workers per establishment is likely to increase, even without building additional facilities. An additional two workers per establishment could result in 158 new jobs in Wayne County alone.

Prichard Region

The four counties along I-64 are most likely to benefit from increased activity in warehousing and distribution in the area. The 'Prichard Region' depicted in the following tables include Wayne County, Cabell County, Putnam County, and Kanawha County.

[12] Workers per establishment = number of workers/ number of establishments

Table 2.10: Prichard Region Employment – Wayne, Cabell, Putnam and Kanawha

Employment		
Industry	Total Industries	Warehousing and Dist.
Regions	Prichard Region	Prichard Region
1990	169,044	4,631
1991	169,767	4,636
1992	172,301	4,784
1993	177,381	5,074
1994	182,633	5,504
1995	188,673	5,164
1996	192,082	4,989
1997	195,508	4,753
1998	198,818	4,637
1999	202,192	4,795
2000	205,044	4,511
2001	205,785	4,626
2002	206,114	4,505
2003	205,621	5,261
2004	208,029	5,684
2005	208,569	5,882
2006	210,292	5,976
CAGR	1.4%	1.6%

The Prichard Region as a whole has experienced lower employment growth overall than the growth rates experienced by Warren and Wayne counties respectively. It is interesting to note however that employment in warehousing and distribution has grown at a higher rate than total employment.

Table 2.11: Prichard Region Employment

Number of Establishments		
Industry	Total Industries	Warehousing and Dist.
Regions	Prichard Region	Prichard Region
1990	226	7,979
1991	229	8,105
1992	249	8,472
1993	254	8,741
1994	255	8,848
1995	394	10,919
1996	378	11,075
1997	390	11,285
1998	421	12,692
1999	424	12,714
2000	430	12,738

Number of Establishments		
Industry	Total Industries	Warehousing and Dist.
Regions	Prichard Region	Prichard Region
2001	425	12,487
2002	408	12,410
2003	431	12,380
2004	433	12,528
2005	435	12,724
2006	446	12,837
CAGR	4.3%	3.0%

Both the total number of establishments in the Prichard Region as well as the number of warehousing and distribution establishments has grown at a stronger rate than employment. A 3% growth in the number of warehousing and distribution establishments in the region has resulted in a smaller 1.6% growth in employment in that industry.

In 2006 there was less than one worker per establishment in the Prichard region. This suggests that while there may be no need to increase the number of warehousing and distribution facilities in the region there may have to be an increase in the number of workers per facility. A 10% increase in the number of warehousing and distribution jobs in the region would result in an additional 600 jobs for the region.

Front Royal Virginia and Warren County as a whole saw an increase in warehouse and distribution jobs with the completion of the Front Royal Inland Port Facility. In the first analysis, we measured the ratio of warehousing and storage to total establishments for the study region and for the comparable regions.

Table 2.12: Number of Establishments in Warehouse and Storage as a Share of Total Establishments

Counties	2004	2005	2006
STUDY REGION[13]	0.19%	0.18%	0.18%
WESTMORELAND, PA (Westmoreland Facility)	0.10%	0.10%	0.11%
WARREN, VA (Front Royal Facility)	0.09%	0.08%	0.08%

From the table above it would appear that there is currently a sufficient supply of warehouse and storage facilities in the study region when compared to the other two comparable regions. However, even though it appears that the number of establishments is sufficient, this does not attest to the quality and or the available capacity of those establishments at the point the facility might be available.

Warehousing Square Footage Estimates

In the second analysis, we measured the estimated square footage of warehousing and storage for the region, based on the ratio of employment to square footage from known warehouse facilities for the study region and for the comparable regions.

[13] In this analysis, the Study Region includes Wayne, Boyd, Cabell, Putnam, and Kanawha Counties.

Table 2.13: Warehouse and Storage Square Footage (Approximation)

	2004	2005	2006
WESTMORELAND, PA (Westmoreland Facility)	369,600	336,000	369,600
STUDY REGION	141,120	134,400	147,840
WARREN, VA (Front Royal Facility)	33,600	33,600	33,600

A closer examination of the average warehouse and storage space available revealed that the Westmoreland facility offers substantially more space on a square footage basis than either the study region or the Front Royal area. This could be a result of more labor-intensive work being performed at the Westmoreland facilities than in the study region or in the Front Royal area. Thus, while there may be a sufficient number of warehouse and storage establishments in the study region, these facilities may be too small, too old or otherwise unsuitable for the needs of the region should an intermodal terminal be built at the preliminary site in Prichard, WV.

Warehousing Employment

In the final analysis, we measured the reported regional employment of warehousing and storage for the study region and for the comparable regions.

Table 2.14: Employment in Warehouse and Storage As a Share of Total Employment

	2004	2005	2006
WARREN, VA (Front Royal Facility)	3.02%	3.04%	2.94%
STUDY REGION	0.52%	0.55%	0.56%
WESTMORELAND, PA (Westmoreland Facility)	0.24%	0.25%	0.26%

The comparative employment data suggests that the creation of an intermodal facility in Prichard could foster higher rates of employment in the region. With the diversion of traffic to the Prichard intermodal facility, employment in warehouse and distribution could also be expected to increase. Presently employment in warehouse and storage is much lower in the study region than it is in Front Royal Virginia. Currently employment in warehouse and storage represents a 3% share of employment in Warren County, compared to only 0.54% in the study region. With the diversion of traffic to the WV Intermodal Terminal, employment in warehouse and storage is also projected to increase. Both the Front Royal Virginia and the Westmoreland Pennsylvania saw an increase in warehouse and storage jobs with the completion of their respective intermodal facilities, a similar average increase in employment would result in an additional 200 jobs in warehouse and storage in the study region. This is based on the calculation that for the Westmoreland intermodal facility each additional 150,000 square ft of warehouse and storage space fostered the creation of 200 additional jobs.

The difficulty in comparing to regional economies is that the composition of shippers, the commodities they transport, and the adjoining economies they support are unique. Past experience suggests that the development of the Prichard facility WV Intermodal Terminal will foster additional employment in warehousing for the region, and could stimulate the development of additional and/or more modern distribution facilities. Likewise, the facility will also encourage the development of regional distribution hubs for major retailers or shippers in the region, who can take advantage of rail intermodal's lower cost structure for international cargo. Even using the results of this benchmarking analysis, the specific size of that impact is not so easily determined.

3. Site Feasibility Analysis

3. Site Feasibility Analysis

Prichard Site

A preliminary site for the proposed intermodal facility was identified at the unincorporated community of Prichard, Wayne County, West Virginia during the Central Corridor Double-Stack Initiative Feasibility Analysis performed by the Nick J. Rahall, II, Appalachian Transportation Institute. While not specifically mentioned in the final SAFETEA LU legislation, references to a proposed intermodal facility at Prichard are made in *Meeting the Transportation Challenges of the 21st Century: Intermodal Opportunities in the Appalachian Region, Intermodal Case Studies*, December 2004, commissioned by Appalachian Regional Commission; *Financing Freight Improvements* (Report No. FHWA-HOP-06-108 (EDL 14295)), published by the Federal Highway Administration in January 2007, and other technical reports, journal articles, and miscellaneous sources.

Norfolk Southern made the following commitments toward the "Prichard intermodal ramp" in a letter dated December 29, 2005 addressed to the West Virginia Department of Commerce:

- Donation of 78 acres of real estate at Prichard to the State of West Virginia.
- Commitment to serve the intermodal facility in Prichard initially with six trains per week (three in each direction).
- Commitment to increase service to ten trains per week (five in each direction for five days a week) once the facility is generating an agreed upon number of lifts (30,000 lifts per year suggested by NS).
- Offer of a $9 Million loan for construction of the facility to be repaid over a five year period starting upon operation of the facility.
- Assistance from the NS Industrial Development Department to market development associated with the Prichard facility.

As discussed in Section 1, the West Virginia legislature passed Senate Bill 569 in 2007, requiring the West Virginia Public Port Authority to conduct a study relating to the feasibility of the intermodal facility at Prichard, including assessment of the initial planning, development, construction and operation and the long-term sustainability of the facility. As part of this study, the Prichard site was evaluated in terms of highway and rail access, site characteristics, environmental constraints, utility infrastructure and land use compatibility. The purpose of this evaluation was to determine general feasibility of the site by identification of positive and negative attributes with respect to development, operations, and the potential for related industries.

Highway Access

Accessibility of truck traffic will be a key component to the success of the proposed intermodal facility. The desired highway access includes the following components:

- Proximity to markets served
- Adequate capacity for efficiency
- Safety
- Reliability and availability of alternate routes

The Prichard site is located thirteen miles south of I-64 as it passes through Wayne County. As discussed in Section 2, the anticipated markets will be along the I-64 corridor in West Virginia and Kentucky. Access from the Prichard site to I-64 is via US 52, otherwise known as the Tolsia Highway.

Figure 3.1: Highway Access to Prichard Site

Currently, US 52 from Prichard to I-64 is generally a 2-lane rural arterial with twelve foot lanes and seven foot graded shoulders. This section of US 52 is on the National Highway System and is included in the Coal Resource Transportation System as a coal haul route with no bridge restrictions.

US 52 has been realigned to a new 4-lane section through Prichard as part of the Tolsia Highway project. Additional construction of the Tolsia Highway is currently unfunded.

The most recent (2004) AADT values for this section of US 52 range from 5000-5300 vehicles per day which is comparable to the 1991 traffic reported in the 1995 Final Environmental Impact Statement and considerably less than the 2011 prediction of 10,200 vehicles. The FEIS reported a Level of Service LOS E for this section of US 52 due to the high percentage of trucks, numerous no passing zones, and rolling/mountainous terrain. The FEIS also noted a high proportion of rear-end and head-on accidents

An alternate route to US 52 is US 23 in Kentucky which currently has no direct access across the Big Sandy River from Prichard. US 23 is a 4-lane Rural Principal Arterial that was constructed as Appalachian Development Highway System Corridor B. US 23 is on the National Highway System and is a designated coal haul route. The most recent (2004) AADT values for this section of US 52 range from 10,000-14,000 vehicles per day. Currently, access to US 23 from Prichard requires an eleven mile detour to the south where there is a bridge from Fort Gay, WV to Louisa, KY.

Access from the Prichard site to US 52 will be accommodated with new access roads connecting to old US 52 which connects to the new US 52 via a high speed interchange.

Rail Access

Good rail access with parcel well shaped for rail terminal and tangent track layout.

Figure 3.2: Proposed Site at Prichard

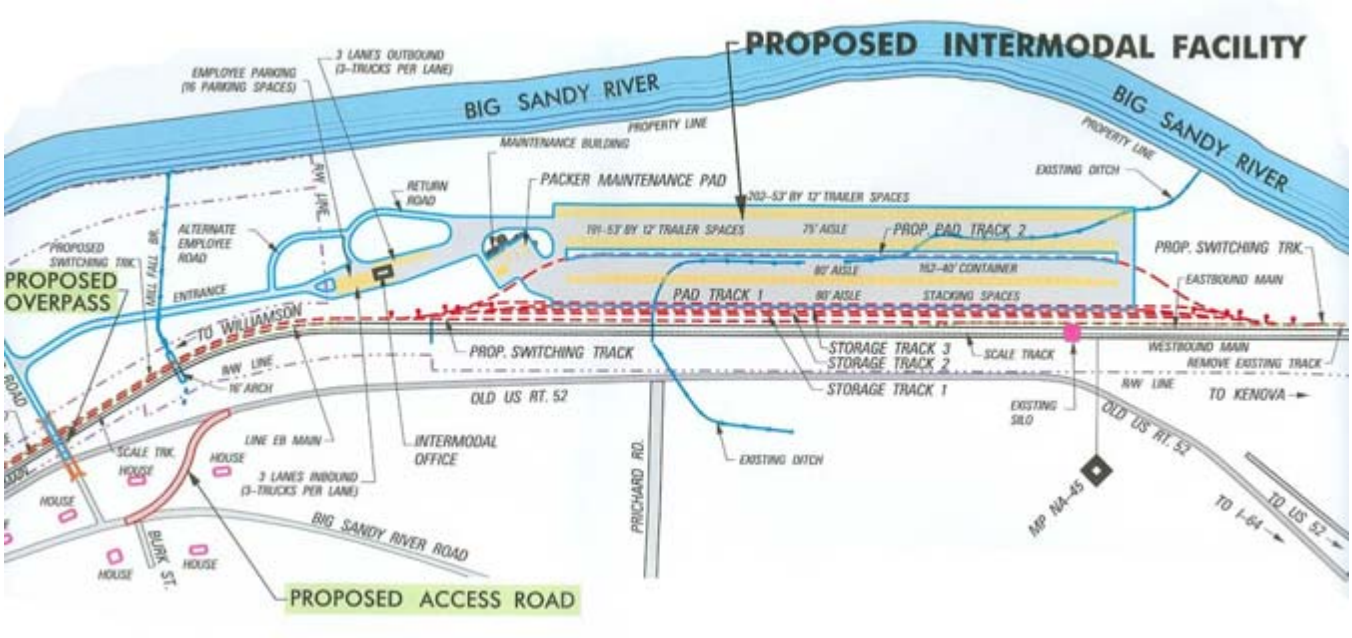
Site characteristics

Preliminary Layout of Intermodal Facility

NS prepared the Prichard Intermodal Facility concept drawing shown in Figure 3.3. The preliminary layout includes the following attributes:

- Naturally secure area with river providing a natural boundary along western side.
- No grade crossings translates to no interference with rail service.
- Long queuing area for truck access.
- Run through facility much more efficient than stub-ended

Figure 3.3: Proposed Intermodal Facility



While NS has offered to donate 78 acres of real property for the Prichard Intermodal Facility, the preliminary concept assumes right of way acquisition for the entrance and access roads.

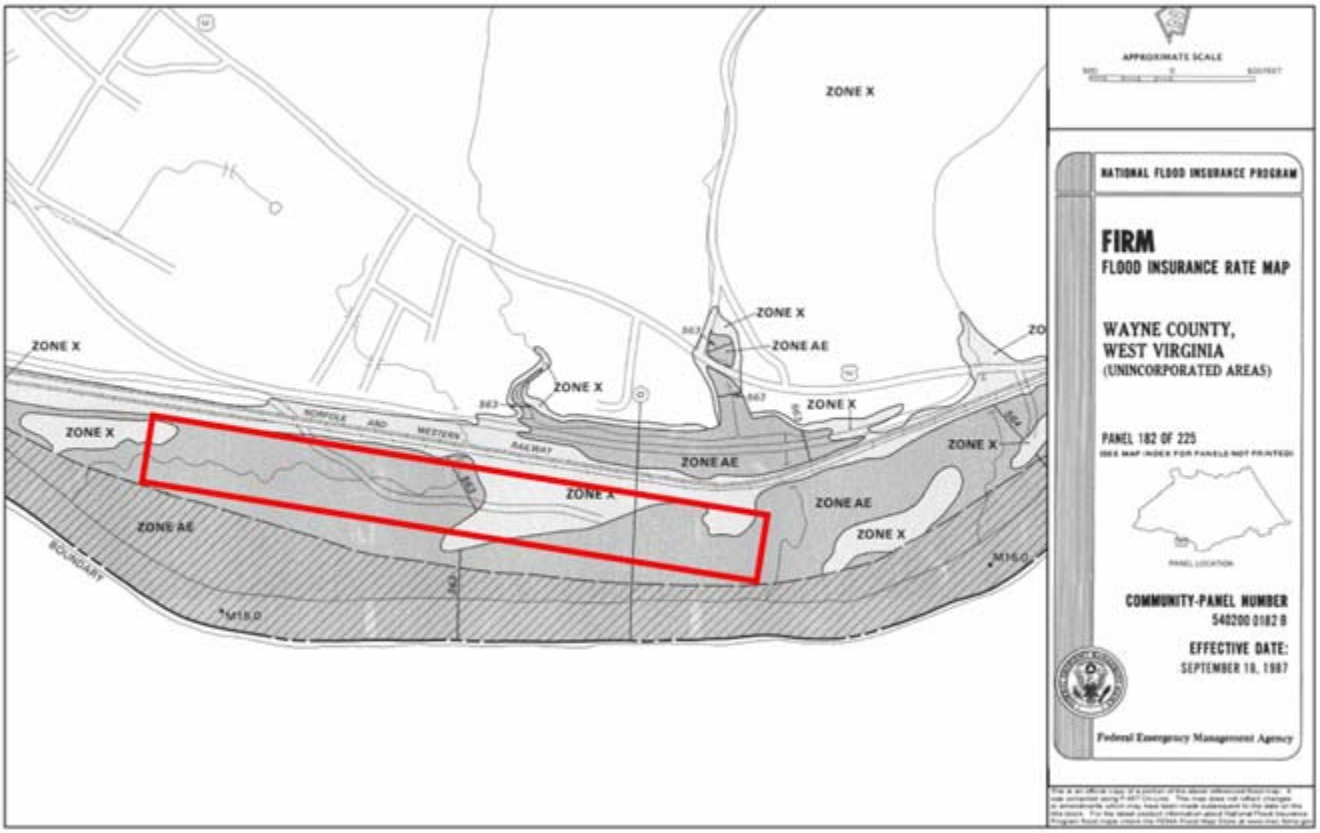
Flood Plain

As shown in Figure 3.4, much of the proposed Prichard site is located within the 100 year flood plain (Zone AE) used to define the base flood elevation for flood insurance purposes. It is assumed that earth fill is required to raise portions of the site above the 100 year flood plain and to match the elevations of mainline track for connection of the pad, storage, and switching tracks.

It is estimated that portions of the site will need to be filled with approximately 8-20 ft. of fill material to raise the site above the base flood elevation. A preliminary estimate of the volume of fill required for the Prichard Intermodal Facility concept prepared by NS is on the magnitude of 500,000 cubic yards.

The Flood Plain Administrator for Wayne County is currently Randy Fry of the Wayne County Commission. Mr. Fry was contacted and stated familiarity with the proposed intermodal facility project. Since the project site is within a detailed FIS which has a defined floodway, it is anticipated that impacts to water surface elevations resulting from any development outside the floodway will not require FEMA approval. While the concept plan developed by NS might imply some fill to be placed within the floodway, the site will accommodate a facility design that does not encroach into the floodway. To avoid the need for a hydraulic analysis, and a potential FEMA Map Revision, we recommend that the facility design avoid encroachment into the floodway.

Figure 3.4: FEMA Firmette for Prichard Site

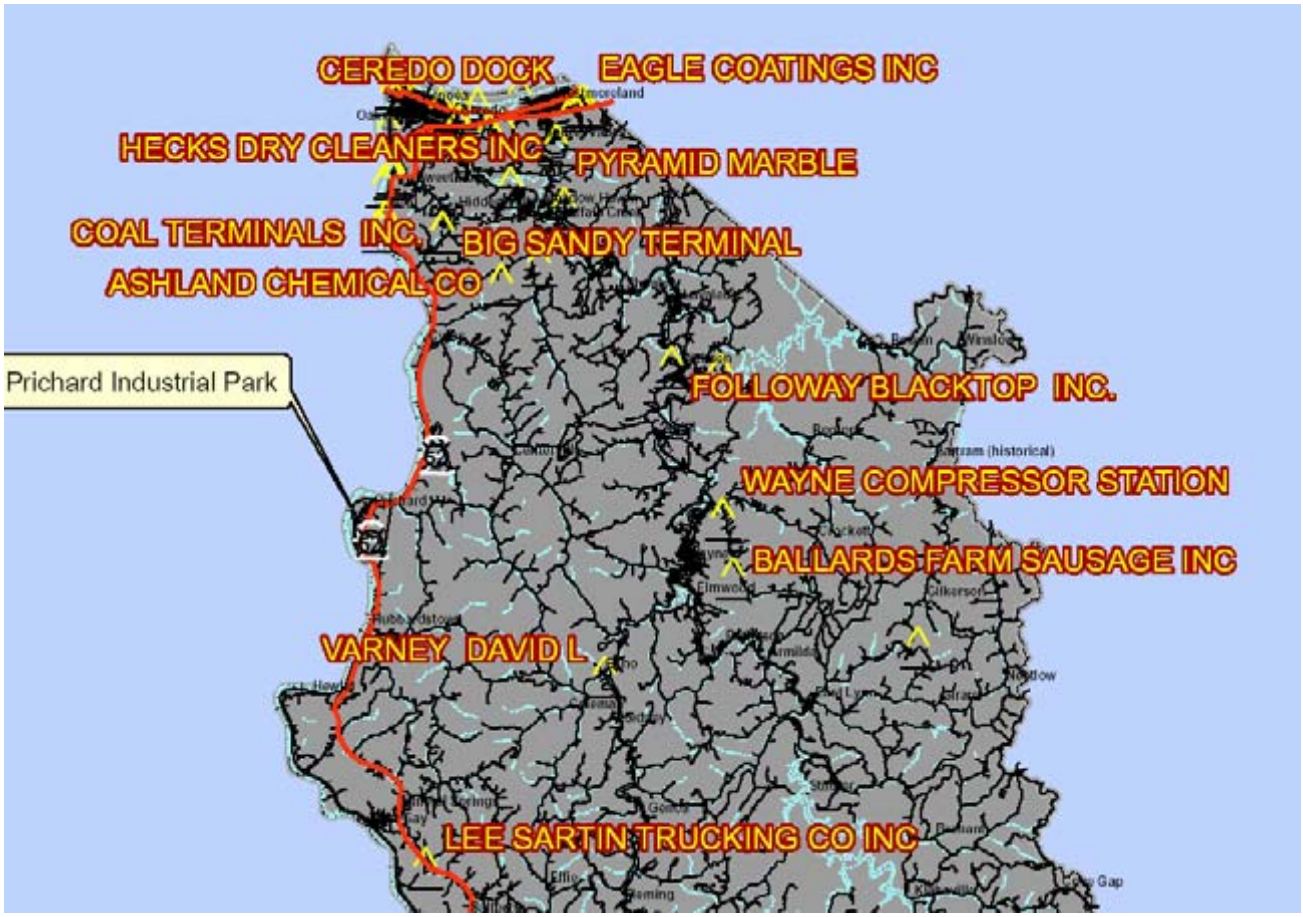


Environmental Constraints

Utilizing previous studies and other publicly available information the DMJM Harris team considered potential environmental constraints that may affect the site development cost and feasibility. Items considered included hazardous materials, cultural resources, wetlands, and threatened and endangered species. Much of the base information was available from the 1995 Final Environmental Impact Statement for US 52 (Tolsia Highway).

At this time, there have been no environmental constraints identified that would adversely affect the feasibility of development. However, it was not within the Scope of Services to prepare a Phase I Environmental Site Assessment or perform other related environmental investigations which will ultimately be required for development of the Prichard site.

Figure 3.5: Wayne County EPA Sites



Utility Infrastructure

The Prichard Industrial Park has both water and sewer in place. A 300,000 gallon per day wastewater treatment plant was recently installed at the northeast corner of the industrial park. Sewer service in the Prichard area is operated and maintained by the Prichard Public Service District. Water service is provided to Prichard by the City of Kenova. The water treatment plant has a maximum capacity of 3.88 million gallons per day (mgd), with an average daily flow of 2.05 mgd.

Figure 3.6: Water and Sewer at Prichard

Water

Sewer

Compatible Land Use

The Prichard Site is a 78 acre site situated along the Big Sandy River. The primary existing land use in the Prichard area is residential. There are agricultural and commercial areas dispersed throughout the residential areas throughout the Prichard community. Other significant land usage consists of industrial, warehousing, and manufacturing.

Alternate Sites

As part of this study, the DMJM Harris team identified and evaluated alternate sites along the Heartland Corridor route in West Virginia for comparison with the Prichard site.

Screening Methodology

A two-phase approach was performed to identify and evaluate potential alternate sites. First, the entire Heartland Corridor route in West Virginia was screened for forty-acre or larger sites with direct access to the railroad mainline. Each county along route was initially considered, although the intersection of the Heartland Corridor with the I-64 corridor in Wayne County was determined to be the more favorable market as a result of the Market

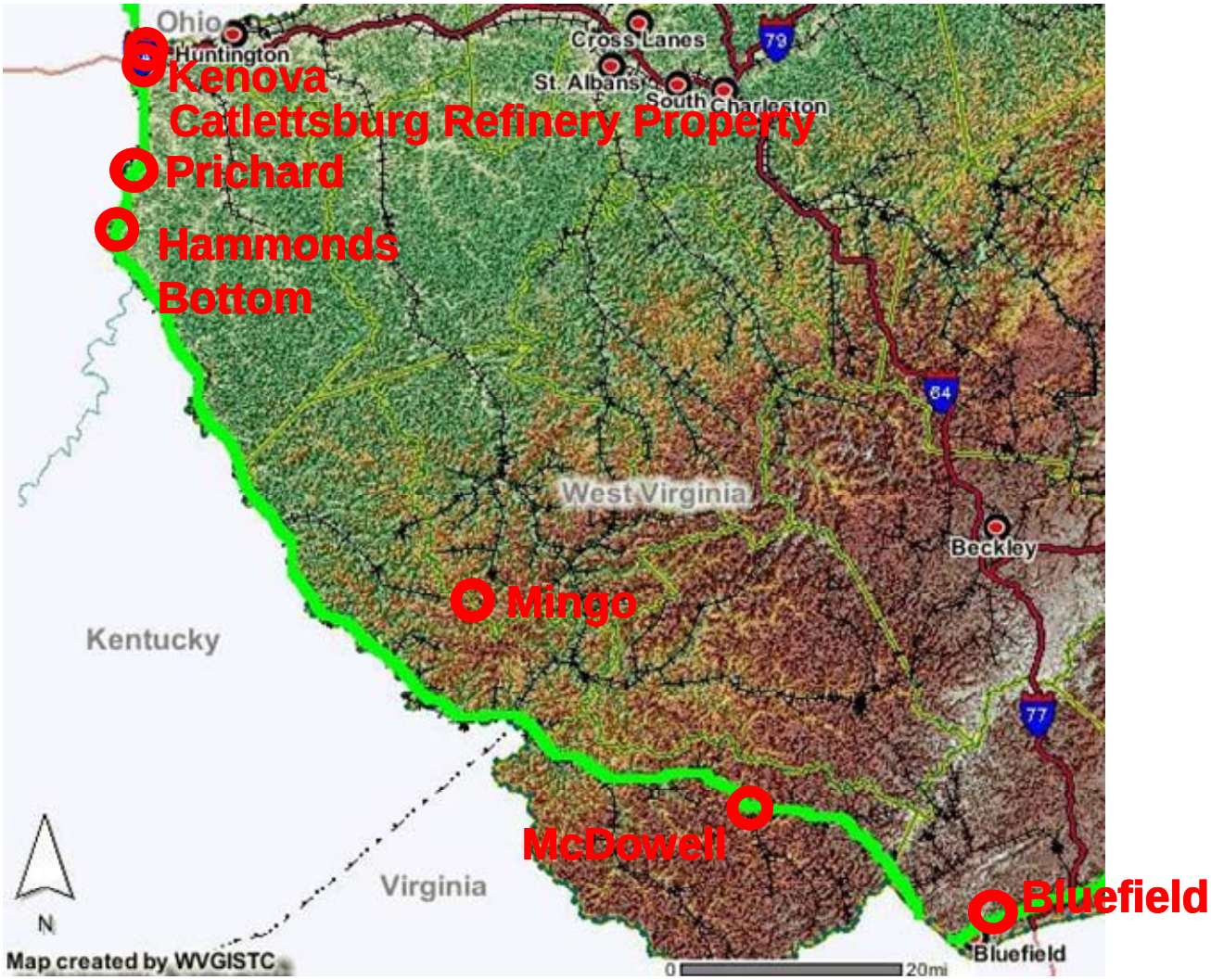
analysis. The sites identified were assessed with respect to highway access, rail access and general site characteristics.

Second, as a result of the initial screening, five sites were further evaluated with respect to utility infrastructure, land-use compatibility, and known environmental constraints for comparison with the Prichard site.

Alternate Sites Identified

Figure 3.7 shows the alternate sites were identified and evaluated.

Figure 3.7: Alternate Sites



Kenova, Wayne County

The Kenova site was previously identified by the WVPPA. The site is within the incorporated City of Kenova and is located at the intersection of 18th and Sycamore streets with the railroad along the sites northern boundary. The site's existing land use is characterized as residential. Further from the site land uses vary between residential, commercial and industrial. Water and sewer service is provided by the City of Kenova.

Catlettsburg Refinery Property, Wayne County

The Catlettsburg Refinery currently owns a large parcel of river bottom land directly north of I-64 across the Big Sandy River from the Catlettsburg Refinery in Kentucky. The parcel is currently used for farming and is completely within the the 100 year flood plain and would require up to 30 ft. of fill to raise the grade for compatibility with the NS mainline.

While the site is situated close to I-64, highway access is currently constrained by an underpass below the railroad which would need to be upgraded to provide adequate access to the site.

Hammonds Bottom, Wayne County

The Hammonds Bottom site is a 100+ acre site in Fort Gay, eleven miles south of Prichard. The site has apparently good, direct rail access. As with the Prichard and Catlettsburg Refinery sites, there are some flood plain issues with the site.

Mingo County

Mike Whitt, the Executive Director of the Mingo County Redevelopment Authority was contacted and stated that there are currently no available sites with direct access to the railroad mainline. The Wood Products Park in Mingo County is a mountain-top industrial park near Corridor G and a rail spur off of the Heartland Corridor. While the Wood Products Park is an attractive industrial site, it would not be feasible to develop an intermodal facility at this location.

McDowell County

Jack Caffrey of the McDowell County Development Authority was contacted and suggested several former coal sites as potential sites for the intermodal facility. While the sites suggested have direct access to the railroad mainline the other site characteristics are unfavorable.

Bluefield, Mercer County

While NS currently has a number of facilities in the Bluefield Yard, and it is possible that a site could be pieced together with satisfactory characteristics, a Bluefield site was not specifically evaluated as a result of the Market analysis presented in Section 1.

Site Ranking

To quantitatively compare the preliminary site chosen at Prichard with the alternate sites identified as part of this study, each site was scored using the following positive attributes as the standard:

- Highway Access – close proximity to Interstate haul routes with connecting roads of ample capacity, limited conflicts, and minimal safety hazards including no at-grade rail crossings.
- Rail Access – direct access along the Heartland Corridor mainline, preferably on a horizontal tangent, with a pull-through capability and ample space for track storage and switching.
- Site Characteristics – Forty acres or more of developable, consistently flat property parallel to the Heartland Corridor mainline, situated above the base flood elevation.
- Environmental Constraints – No affected public facilities, historic structures, contamination sites, high quality streams, prime farmland, wetlands, or threatened and endangered species.
- Utility Infrastructure – All utilities available at the site.
- Land Use Compatibility – surrounding land use is Industrial, transportation, or mining.

Table 3.1: Site Ranking

Site	Highway Access	Rail Access	Site Characteristics	Utility Infrastructure	Compatible Land Use	Environmental Constraints
Prichard	2	1	2	2	2	2
Kenova	3	3	4	1	5	*
Catlettsburg Refinery	3	2	3	2	2	*
Hammonds Bottom	4	1	2	3	3	*
Mingo County	3	5	4	2	1	*
McDowell County	5	3	4	*	*	*
Bluefield (NS Yard)	*	*	*	*	*	*

Score: 1 = Best 5 = Worst

The scores for each site should be considered approximate values due to the cursory nature of the evaluation. However, the scores can be used for planning purposes to assess and rank the attributes of each site for relative comparison.

4. Construction and Finance Analysis

4. Construction and Finance Analysis

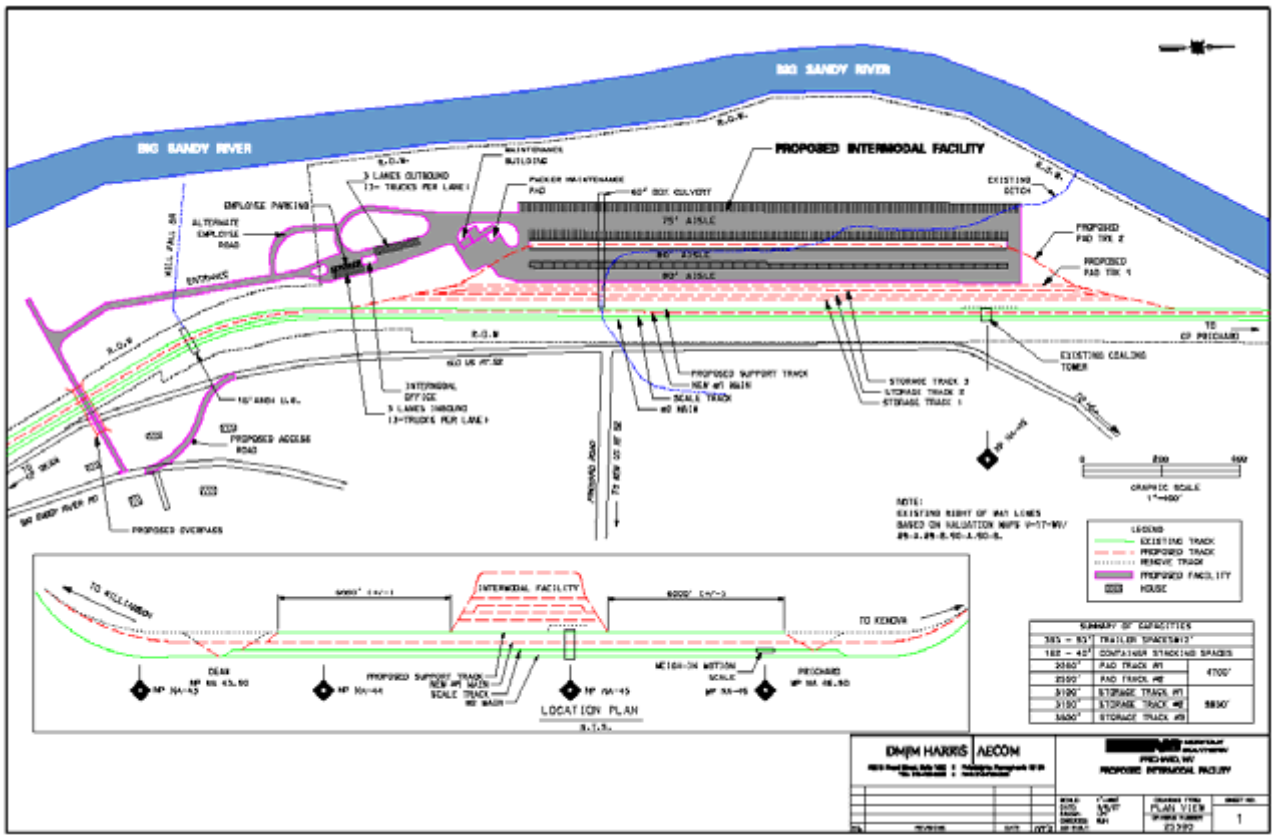
Site Development

For purposes of this study, a range-of-magnitude cost estimate was developed for the proposed West Virginia intermodal terminal. As the base case, an estimate was prepared using the schematic provided by Norfolk Southern. As an alternative, a reduced start-up facility was identified eliminating the overhead bridge accessing the facility and replacement with a grade crossing. In addition, the amount of paving was reduced to reflect a reduced capacity facility that could be expanded in the future as the business grew.

Capital Costs

The appendices contain a summary of the range of magnitude cost for each alternative. The facility layout as illustrated by the original Norfolk Southern schematic below is estimated at $ 42.6 million and contains allowances for trackwork, communication and signal, permitting, drainage, structures, buildings, lighting, engineering and contingencies. The alternative reduced capacity start-up layout is estimated to cost $ 30.4 million and provides for those same items. Both costs seem reasonable when compared to the current construction costs for terminals today.

Figure 4.1: Norfolk Southern Layout Schematic



Implementation Schedule

The proposed construction of this facility could be accomplished in one (1) construction season. If preliminary design engineering were begun by January 1, 2008, it would be projected that the facility could be constructed and open for service by December 31, 2009.

Potential for Phasing

A reduced layout facility is proposed for evaluation as it more closely meets start-up needs and reduces the initial capital expenditure. The layout could be readily adaptable for expansion or reconfiguration to provide for additional rail business types.

Funding and Financing

Unquestionably, any consideration for an intermodal inland port in West Virginia must include consideration for funding and financing sources that are real and viable. *Financing Freight Improvements* (Report No. FHWA-HOP-06-108 (EDL 14295)), published by the Federal Highway Administration in January 2007 identifies much of the available funding and financing alternatives available for freight infrastructure investment. However, analysis is required to determine the correct course of financing for this location and project.

It is projected that that the financial plan for this location may require a variety of funding opportunities from multiple sources. The key is to identify and/or list the potential funding sources to fund the building of this inland port in West Virginia and do so in a manner that is timely to reap the benefits of the Heartland Corridor rail improvements.

The following sections provide an overview of existing federal and state funding programs and financing tools that could be used for development of the WV Intermodal Terminal.

Federal Funding Programs

The following table summarizes federal funding information excerpted from *Financing Freight Improvements* and other sources. Commentary is included regarding the applicability of each item for the proposed WV Intermodal Terminal.

Table 4.1: Federal Funding Programs

Funding Program	Eligibility	SAFETEA-LU Funding Level (FY 2005-2009)	Freight Application	Project Size	Who Approves Funding?	Applicability to WV Intermodal Terminal
Interstate Maintenance (IM) 23 USC 119	Provides funding for resurfacing, restoration, rehabilitation, and reconstruction (4R) of Interstate facilities. Freight-specific projects are not eligible.	$25.2 billion	Some activities may improve freight mobility.	Any size depending on funds available to state DOT; may require combination with other funding sources for very large projects.	State DOTs http://www.transportation.org/?siteid=37&pageid=332	Not directly applicable to WV Intermodal Terminal.

Funding Program	Eligibility	SAFETEA-LU Funding Level (FY 2005-2009)	Freight Application	Project Size	Who Approves Funding?	Applicability to WV Intermodal Terminal
National Highway System (NHS) 23 USC 103	Provides funding on designated highway intermodal connectors to intermodal facilities also NHS.	$30.5 billion	Funds can be applied for construction, reconstruction, resurfacing, and rehabilitation on a roadway connecting the NHS with a truck-rail transfer facility or an airport.	Any size; may require combination with other funding sources for very large projects.	State DOTs http://www.transportation.org/?siteid=37&pageid=332	U.S. 52 is on the NHS and this is possibly applicable for funding as a inermodal connector. WV currently has intermodal connector projects.
Surface Transportation Program (STP) 23 USC 133	Funds projects on any Federal aid highway, bridge projects on any public road, transit capital projects, and other state or local projects. Can be used for improvements to accommodate rail freight, provided that the improvements enhance grade crossing safety.	$32.6 billion	Rail freight improvements include: • Lengthening or increasing vertical clearance of bridges; • Adjusting drainage facilities; • Lightning; • Signage; • Minor adjustments to highway alignment.	Any size; may require combination with other funding sources for very large projects.	State DOTs/MPOs http://www.transportation.org/?siteid=37&pageid=332 http://www.ampo.org/directory/index.php	Not directly applicable to WV Intermodal Terminal unless funds are reassigned from another project currently on the WVDOH Six-Year Program.
Coordinated Border Infrastructure Program SAFETEA-LU Section 1303	Provides funding to border states for projects that improve the safe movement of motor vehicles and cargo at or across the U.S. border with Canada and Mexico.	$710 million	Projects that facilitate/expedite cross border crossing, such as: • Operational improvements related to electronic data interchange and use of telecommunications • Safety enforcement facilities related to international trade.	Small projects; requires combination with other funding sources for very large projects.	State DOTs http://www.transportation.org/?siteid=37&pageid=332	Not applicable to WV Intermodal Terminal.

Funding Program	Eligibility	SAFETEA-LU Funding Level (FY 2005-2009)	Freight Application	Project Size	Who Approves Funding?	Applicability to WV Intermodal Terminal
CMAQ Improvement Program 23 USC 149	Funds transportation projects in nonattainment and maintenance areas that improve air quality. Can be used for start up costs associated with operations (for up to three years).	$8.6 billion	Freight-related eligible projects include: • Advanced truck stop electrification systems; • Construction of Intermodal freight facilities that result in air quality improvements; • On-road and nonroad diesel engine retrofits; • Cost-effective congestion mitigation activities.	Any size.	State DOTs/MPOs http://www.transportation.org/?siteid=37&pageid=332 http://www.ampo.org/directory/index.php	Wayne County is in a nonattainment area. For the WV Intermodal Terminal to be eligible, it would have to be shown to result in air quality improvements.
Bridge 23 USC 144	Provides funding for replacement, rehabilitation, and systematic preventive maintenance of bridges.	$21.6 billion	Bridge rehabilitation and replacement with freight-related components or serving high truck volumes. In some cases bridge replacements or rehabilitation can benefit freight by increasing height of ships that can pass under a bridge.	Any size; may require combination with other funding sources for very large projects.	State DOTs http://www.transportation.org/?siteid=37&pageid=332	Not directly applicable to WV Intermodal Terminal.
Rail Grade Crossings 23 USC 130	Provides funding to eliminate rail-highway crossing hazards.	$880 million	Eligible uses include: • Separation or protection of at-grade crossings; • Reconstruction of at-grade crossings; • Highway relocation to eliminate crossing; • Rail relocation to eliminate crossing (where most cost-effective).	Small projects; requires combination with other funding sources for very large projects.	State DOTs/MPOs http://www.transportation.org/?siteid=37&pageid=332 http://www.ampo.org/directory/index.php	Possibly applicable for funding of the access road.

Funding Program	Eligibility	SAFETEA-LU Funding Level (FY 2005-2009)	Freight Application	Project Size	Who Approves Funding?	Applicability to WV Intermodal Terminal
Truck Parking Facilities SAFETEA-LU Section 1305	New funding program; provides funds for projects addressing the shortage of long-term parking for commercial vehicles on the NHS.	$25 million	Eligible projects include: • Construction of commercial vehicle parking facilities adjacent to truck stops and travel plazas; • Constructing turnouts for commercial vehicles; • Improving geometric design of interchanges to improve truck access to parking facilities; • Advanced truck electrification systems.	Small project; requires combination with other funding sources for very large projects.	U.S. DOT/FHWA	Not likely to be applicable to WV Intermodal Terminal.
Capital Grants for Rail Relocation Projects SAFETEA-LU Section 9002	New program that provides grants for local rail line relocation and improvement projects. Projects should improve vehicle traffic flow, quality of life, and economic development.	$1.4 billion authorized, subject to appropriations	Relocation of a rail line, such that rail crossing impacts are mitigated.	Any size, although legislation requires that at least half of the funding is used for projects that are $20 million or less.	U.S. DOT/FHWA	Not applicable to WV Intermodal Terminal.
FTA Rail Modernization 49 USC 5309	Funds for capital improvements on "fixed guideway" systems that have been operating for at least seven years.	$6.07 billion	Rehabilitation of tracks, structures, signals and communications, power equipment and substations, and preventive maintenance. Rail freight benefits from capital improvements on shared commuter rail lines.	Any size; may require combination with other funding sources for very large projects.	Transit Agencies http://www.fta.dot.gov/35_ENG_HTML.htm	Not directly applicable to WV Intermodal Terminal.
USACE Harbor Maintenance	Funding for operations and maintenance of federally authorized channels for commercial navigation	Not applicable	Port O&M costs (e.g., dredging)	Small projects; requires combination with other funding sources for very large projects.	USACE http://www.usace.army.mil/	Not applicable to WV Intermodal Terminal.

Funding Program	Eligibility	SAFETEA-LU Funding Level (FY 2005-2009)	Freight Application	Project Size	Who Approves Funding?	Applicability to WV Intermodal Terminal
U.S. Department of Commerce – Economic Development Administration Funds	Grants for projects sites that promote job creation and/or retention in economically distressed industrial. Eligible projects should be located within an EDA-designated redevelopment area or economic development center.	Not applicable	Industrial access roads, port development and expansion, and railroad sidings.	Small projects; requires combination with other funding sources for very large projects.	U.S. Department of Commerce – EDA http://www.eda.gov	Possibly applicable to WV Intermodal Terminal.
U.S. Department of Agriculture – Community Facility Program	Grants and loans to fund construction, enlargement, extension or improvement of community facilities in rural areas (population less than 20,000).	Not applicable	Roads, transportation infrastructure for industrial parks, and airports.	Small projects; requires combination with other funding sources for very large projects.	USDA– Rural Development http://www.rurdev.usda.gov/rhs/cf/cp.htm	Possibly applicable to WV Intermodal Terminal.
Environmental Protection Agency – Brownfield Redevelopment Program	Provides grants and loans for brownfield site cleanup.	Not applicable	Brownfield sites could be redeveloped for commercial, residential, and/or industrial uses, including intermodal facilities (e.g., rail-truck transfer facilities).	Small projects; requires combination with other funding sources for very large projects.	USEPA http://www.epa.gov/brownfields/	Not applicable to WV Intermodal Terminal.

Reference: Information in this table is reprinted from Table 2.1 of *Financing Freight Improvements.*

Federal Financing Tools

The following table summarizes federal financing information excerpted from *Financing Freight Improvements* and other sources. Commentary is included regarding the applicability of each item for the proposed intermodal Terminal in West Virginia.

Table 4.2: Federal Funding Programs

Funding Program	Eligibility	SAFETEA-LU Funding Level FY 2005-2009)	Application	Project Size	Who Approves Funding?	Applicability to WV Intermodal Terminal
Transportation Infrastructure Finance and Innovation Act (TIFIA) SAFETEA-LU Section 1601	Provides loans and credit assistance for major transportation investments of national or regional significance, including public intermodal freight facilities. SAFETEA-LU expanded TIFIA eligibility to private rail projects. Private sponsors are eligible.	SAFETEA-LU authorizes $122 million per year to pay the subsidy costs of supporting federal credit under TIFIA. This level of funding can support loans with a total value of more than $2 billion annually.	Any project eligible for federal funding under Title 23 and Chapter 53 of Title 49. International bridge or tunnel Intercity passenger bus and rail facilities and vehicles (including Amtrak and magnetic levitation systems) Freight-specific projects eligible for TIFIA include: • Public or private rail facilities providing benefits to highway users; • Intermodal freight transfer facilities; • Access to freight facilities and service improvements, including ITS; • Surface transportation infrastructure modifications to facilitate intermodal interchange, transfer, and access into and out of ports.	$50 million minimum, no specific maximum, but credit assistance under TIFIA can only support 33% of eligible project costs.	U.S. DOT http://tifia.fhwa.dot.gov	With minimum requirement of $50 Million, not likely to be applicable to WV Intermodal Terminal.

Funding Program	Eligibility	SAFETEA-LU Funding Level FY 2005-2009)	Application	Project Size	Who Approves Funding?	Applicability to WV Intermodal Terminal
State Infrastructure Banks (SIB) SAFETEA-LU Section 1602	SAFETEA-LU authorizes all 50 states, the District of Columbia, Puerto Rico, and U.S. territories to establish infrastructure revolving funds that can be capitalized with federal transportation funds authorized through FY 2009. Current legislation allows for the creation of rail accounts. Private sponsors are eligible.	Highway Account – up to 10% of NHS, STP, Bridge, and Equity Bonus programs, at the discretion of the state DOT. Rail Account – funds made available for capital projects under Subtitle V (Rail Programs) of Title 49.	Any project eligible for federal funding under Title 23 and Section 5302 of Title 49.	Any size; depends on state capitalization. Generally small projects are funded.	State DOT (and/or SIB Board established). http://www.transportation.org/?siteid=37&pageid=332	Not applicable in West Virginia at this time.
Rail Rehabilitation and Improvement Financing (RRIF) SAFETEA-LU Section 9003	Loans and credit assistance to both public and private sponsors of rail and intermodal projects. Private sponsors are eligible.	$35 billion; $7 billion is directed to short line and regional railroads.	Acquisition, development, improvement, or rehabilitation of intermodal or rail equipment and facilities.	Any size; generally small projects.	U.S. DOT/FRA http://www.fra.dot.gov	Possibly applicable to WV Intermodal Terminal.
Private Activity Bonds SAFETEA-LU Section 11143	Title XI Section 1143 of SAFETEA-LU amends Section 142(a) of the IRS code to allow the issuance of tax-exempt private activity bonds for highway and freight transfer facilities. Private sponsors are eligible.	Up to $15 billion.	Surface transportation projects (including highways, toll roads and truck only lanes), international bridges and tunnels receiving federal assistance under Title 23. Rail-truck transfer facilities receiving federal assistance under Title 23 or 49.	Any size; potential for large infrastructure projects.	U.S. DOT http://www.fhwa.dot.gov/ppp/private_activity_bonds.htm	Possibly applicable to WV Intermodal Terminal.
GARVEE Bonds 23 USC 122	Financing instrument that allows state to issue debt backed by future federal-aid highway revenues. Eligibility for freight projects is constrained by the underlying federal-aid programs that will be used for debt service. 63-20 Corporation may be eligible.	Not applicable	All Title 23 eligible projects. Intermodal facilities that are eligible for federal assistance under Title 23 or 49; NHS-eligible intermodal connectors.	Typically large projects or groups of projects ($10 million or larger).	State DOT/Local Government must be willing to dedicate future revenue. http://www.transportation.org/?siteid=37&pageid=332	Not likely to be applicable to WV Intermodal Terminal unless future funds are reassigned from another project currently on the WVDOH Six-Year Program.

Reference: Information in this table is reprinted from Table 2.2 of *Financing Freight Improvements.*

An additional funding source that may be applicable to the WV Intermodal Terminal is the Appalachian Regional Commission (ARC). ARC provides grants to projects that support the following goals:

- Goal 1: Increase job opportunities and per capita income in Appalachia to reach parity with the nation
- Goal 2: Strengthen the capacity of the people of Appalachia to compete in the global economy
- Goal 3: Develop and improve Appalachia's infrastructure to make the Region economically competitive
- Goal 4: Build the Appalachian Development Highway System to reduce Appalachia's isolation

ARC recognizes that access to global suppliers and markets is essential Appalachia and it supports research, planning, and development activities related to intermodal transportation. In 2004, a series of reports under the title of *Meeting the Transportation Challenges of the 21st Century* were prepared by the Rahall Transportation Institute and Wilbur Smith Associates and issued by ARC. One of these reports included a case study on the Central Corridor Doublestack (Heartland Corridor) and the intermodal facility tentatively located in Prichard, WV.

The WVPPA has developed a strong working relationship with ARC that should be continued and drawn upon as the financial plan for the WV Intermodal Terminal evolves.

State Grant and Loan Programs for Freight Improvements

As discussed in *Financing Freight Improvements*, several states have created programs to provide funding resources for freight-related improvements. In West Virginia the "Special Railroad and Intermodal Enhancement Fund" was created during the 2007 Regular Session of the West Virginia Legislature. Starting in 2008 the legislation dedicates up to $4,300,000 per year from corporation net income tax to be used for construction and maintenance of railways and railway-related structures and payment of principal and interest on state bonds issued for railway purposes. The fund is administered by the West Virginia Public Port Authority.

The State of West Virginia also has other programs such as direct and indirect loan programs, tax increment financing, and the Economic Infrastructure Bond Fund through the West Virginia Infrastructure and Jobs Development Council that might be applicable to the proposed WV Intermodal Terminal.

Other Funding Methods and Financing Tools

In addition to the federal and state programs discussed in the previous sections, this section includes discussion of other funding methods and financing tools, grouped in three categories as presented in *Financing Freight Improvements*:

- **Funding Sources** to "pay-as-you-go" or to support debt;
- **Financing Tools** that use debt; and
- **Institutional Arrangements**, such as public-private partnerships.

The following sources have been identified and used to fund freight improvements as a dedicated revenue sources for ongoing expenses or debt:

- User Fees/Tolls – As a result of the Market Analysis discussed in Section 2, the implementation of special user fees or tolls to help fund the proposed intermodal facility is not likely to bring overall benefit. For startup and sustainability of the intermodal facility, the objective should be to minimize user costs.
- Dedicated Taxes – Similar to User Fees/Tolls, levying a special tax to help fund the proposed intermodal facility is not likely to bring overall benefit.

- Special Taxing and Assessment Districts – In 2002 tax increment financing (TIF) legislation was passed by the West Virginia Legislature and ratified by a statewide election. Incremental property tax increases, collected within a TIF district, are used to pay the debt service on bonds issued to finance public infrastructure improvements. The establishment of a TIF district for the proposed intermodal facility may be a vehicle to finance portions of the access road or other infrastructure. However, it should be noted that property owned by the WVPPA is exempt from state and local taxes but subject to an annual payment in lieu of taxes for the county property tax. Legislation for Business Improvement Districts (BID) also exists in West Virginia, but is not likely applicable to WV Intermodal Facility.
- Equity and In-Kind Contributions – As previously discussed, in 2005 Norfolk Southern offered to donate 78 acres of real estate at Prichard for the proposed intermodal facility. The value of this land would be part of the project cost and can be used as a local match for federal funding.

The WVPPA has a number of public and private sources available to finance the debt required for development of the intermodal facility. Through its enabling legislation, the WVPPA has the authority to issue revenue bonds and as previously discussed the Special Railroad and Intermodal Enhancement Fund established in 2007 can be used for payment of principal and interest on state bonds issued for railway purposes, which would appear to be a tax-supported bond. Also, as previously discussed, in 2005 Norfolk Southern offered a $9 Million loan for construction of the facility to be repaid over a five year period starting upon operation of the facility.

There appears to be opportunities for various public-private partnerships for development and operation of the proposed intermodal facility. Overall, the Heartland Corridor Clearance Project is being executed as a public-private partnership between NS and the Federal Highway Administration in conjunction with the states of Virginia, West Virginia, and Ohio. For the proposed intermodal facility in West Virginia there will likely be a public-private partnership between NS and the WVPPA for joint development of the facility and the commitment of NS to provide service to the facility. While a revenue-sharing arrangement between NS and the WVPPA is not currently anticipated, the various commitments by NS can be viewed as a cost-sharing arrangement for development of the facility.

Other than the cost-sharing arrangement described previously, it does not appear that NS desires to participate in a public-private partnership (PPP) for development or operations and maintenance of the facility. This may allow other private sector participation for these aspects. The right to participate in a PPP arrangement is apparently authorized through the enabling legislation of the WVPPA which states that *the authority…shall foster and encourage the participation of private enterprise in the development of the port facilities to the fullest extent it deems practicable in the interest of limiting the necessity of construction and operation of such facilities by the port authority.*

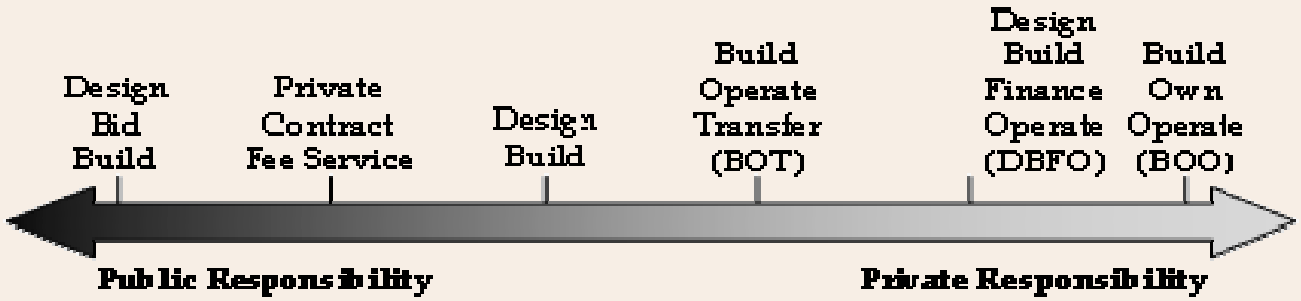
Several benefits of the use of PPPs for freight-related projects are highlighted in *Financing Freight Improvements:*

> *In the case of freight investments, PPPs are essential for project implementation for several reasons. First, the private sector is heavily invested in freight transportation, whether it is through ownership of infrastructure or by facilitating the movement of goods. Second, unlike other transportation investments, much of the freight investments are on private property, which makes it difficult for allocation of public funding. Third, the efficient movement of goods is important to both the private and public sectors. Overall, the creation of partnerships can facilitate freight investments by leveraging scarce resources, and accelerating the benefits realized through these investments.*

Figure 4.1 presents various PPP options available for the proposed intermodal facility. For options other than Design-Bid-Build and Private Contract Fee Services, will likely have to follow the West Virginia Design-Build laws and rules or additional legislation may be required. Currently, for Design-Build, an agency and project must meet the following requirements:

- The agency has the appropriate legal authority to enter into a design-build contract;
- The agency requires a project design and construction time line that is faster than the traditional design-bid-build process would allow;
- The project requires close coordination of design and construction expertise or an extreme amount of coordination;
- The agency requires early cost commitments;
- The agency provides a written plan for funding the project including, but not limited to, the funding necessary to pay for design services and construction costs; and
- The agency has completed and submitted a written application for approval to the Board and requested a meeting with the Board to present its request for approval from the Board.

Figure 4.2: Public-Private Partnership Arrangement Options (Source *Financing Freight Improvements*)



Design-Bid-Build. This is the traditional project delivery approach for public works. The design-bid-build model separates design and construction responsibilities by awarding them to an independent private design engineer and a separate private contractor. The design engineering firm is responsible for completing the final project design, including plans, specifications, and supporting documentation. During the bidding phase, contractors submit competitive bids, which are reviewed by the public entity. Once a contractor is selected (based on the lowest bid), the project moves into the construction phase. Once construction is completed, the facility is operated and maintained by the public sector. The project design and construction is financed by the public sector.

Private Contract Fee Services. For this PPP option, the public sector transfers the responsibility for services that would be typically performed in-house to the private sector. Two functions that the public sector has transferred to private sector partners as contract fee services are operations and maintenance of public-owned facilities, and program and financial management.

Design-Build. The design-build method combines two typically separate services into one single contract. The public sector owns the facility under construction, and retains responsibility for financing, operating, and maintaining the project. It is usual for the project sponsor to have completed a certain level of preliminary engineering and project definition (e.g., preliminary design at about 10-15 percent complete) before letting the project for bids.

Build-Operate-Transfer/Design-Build-Operate-Maintain This model (also known as "turnkey" procurement) combines design-build with operations and maintenance. A single contract is awarded to a private entity that would design, construct, and operate/maintain the project. Once the contract expires, the facility is turned over to the public owner. The public sector can decide on whether to extend or rebid the operations and maintenance contract or take over the operations and maintenance responsibilities. For this model, the financing responsibility is retained by the public sector.

Design-Build-Finance-Operate. With this approach, the responsibilities for designing, building, financing, and operating are bundled together and transferred to private sector partners. Arrangements can vary greatly, especially concerning the degree of financial responsibilities that are actually transferred to the private sector. For this model, a project could be entirely financed by either the public sector or the private sector or a combination of both. A common trait across all Design-Build-Finance-Operate projects is that they are either partly or wholly financed by debt that is backed by revenue sources dedicated to the project. Direct user fees are the most common revenue source. However, others ranging from shadow tolls to vehicle registration fees and other dedicated revenues. [Shadow tolls refer to public sector "toll" payments to the private operator for the use of a facility. Drivers do not pay tolls for using the roadway. Instead, the public sector make payments based on the volumes and service levels.] Future revenues are leveraged to issue bonds or other debt that provide funds for capital and project development costs. They also are often supplemented by public sector grants in the form of money or contributions in kind, such as right-of-way. In certain cases, private partners may be required to make equity investments as well. Ownership of the facility remains in the public sector.

Build-Own-Operate. With this model, a private company is granted the right to develop, finance, design, build, own, operate, and maintain a transportation project for a specified concession period. Public sector involvement is limited to assuring performance of the concession provisions.

5. Sustainability Analysis

5. Sustainability Analysis

Sustainability Analysis

Another major consideration in the analysis is an evaluation of the sustainability of the traffic needed to support the WV Intermodal Terminal. This includes a regional economic growth forecast, and an evaluation of alternative site developments that might be considered by the railroads operating in the region.

Sustained Economic Growth

The condition of the economy is implicit in the manufacturing and service sectors that support the transportation industry. As transportation service is a derived demand the strength and geographic dispersion of transportation's ultimate customers determines the region's industrial base; but more importantly, it identifies the region's potential to sustain economic growth thereby adding to the success of the intermodal facility.

Table 5.1: Projected economic growth in volumes (all flows) by county to 2025.

Counties	2005 Total	2015 Forecast	2025 Forecast	2005 - 2015 Growth	2015 - 2025 Growth
KANAWHA, WV--39	8,828,055,274	11214284931	15774570777	2%	3%
BOYD, KY--19	5,232,677,401	6,034,102,250	7,527,336,499	1%	2%
CABELL, WV--11	4,671,604,433	6,889,935,562	11051469303	4%	5%
ROSS, OH--141	3,074,558,260	3,930,678,564	5,410,399,903	2%	3%
PIKE, OH--131	2,532,437,968	2,844,727,930	3,352,217,096	1%	2%
RALEIGH, WV--81	2,332,813,896	3,405,969,839	5,402,455,800	4%	5%
PIKE, KY--195	2,241,467,023	3,691,070,362	6,394,839,320	5%	6%
PUTNAM, WV--79	1,975,322,408	2,815,986,163	4,225,856,361	4%	4%
SCIOTO, OH--145	1,746,859,562	2,280,057,352	3,161,101,995	3%	3%
LAWRENCE, OH--87	1,679,016,566	2,376,755,174	3,536,298,882	4%	4%
JACKSON, OH--79	1,620,622,872	2,106,210,715	2,839,870,563	3%	3%
JACKSON, WV--35	1,458,466,825	1,834,647,926	2,726,867,166	2%	4%
MONTGOMERY, KY--173	1,265,673,353	2,091,927,618	3,673,314,462	5%	6%
ATHENS, OH--9	1,153,906,115	1,570,003,686	2,264,207,483	3%	4%
MASON, KY--161	1,151,018,148	1,482,686,928	2,190,805,736	3%	4%
FLOYD, KY--71	1,057,764,174	1,481,587,317	2,178,453,730	3%	4%
LOGAN, WV--45	1,011,424,949	1,535,655,079	2,446,743,847	4%	5%
BOURBON, KY--17	937,697,621	1,218,745,440	1,556,325,287	3%	2%
GALLIA, OH--53	840,283,323	1,044,272,406	1,356,817,790	2%	3%
WAYNE, WV--99	807,058,098	1,011,408,401	1,314,152,712	2%	3%
MASON, WV--53	784,670,984	819,870,334	793,059,209	0%	0%
ROWAN, KY--205	734,623,039	1,243,025,853	2,231,079,708	5%	6%
JOHNSON, KY--115	685,706,551	1,200,528,412	2,296,452,468	6%	7%
GREENUP, KY--89	587,219,817	912,653,306	1,531,889,685	5%	5%

The table shows that growth in the counties exhibiting high volumes in 2005 are sustained through the forecast horizon. Two additional counties outside of West Virginia that show considerable growth, 5%-6% over the next 20 years are Pike Kentucky and Montgomery KY, respectively.

Evidence suggests there is enough economic growth to sustain the current traffic base. Surrounding counties provide even further support even with their sizably smaller volumes but are expected to grow at the same rate as the top three leading counties; and none of the counties reflect a slowdown in economic growth to negative over the forecast horizon. It can be concluded that the WV Intermodal Terminal will sustain average market growth rates for the foreseeable future, although projected volumes remain subject to the vagaries of the regional economy.

Sustainability from Competitors

The emergence of an intermodal terminal at Roanoke has the potential to negatively impact volumes for the WV Intermodal Terminal. Just in terms of location, Roanoke's eastward proximity to major seaports, namely the Virginia Port Authority, could influence traffic diversion away from West Virginia because of the shortened distance between the seaport and facility. Along with that advantage, highway and rail access for Roanoke is the same for the preliminary site at Prichard, thus lessening the comparative advantage that the WV Intermodal Terminal has over Roanoke. Roanoke would also compete for similar markets. An example is Kanawha County that contributes the most in terms of sheer volume to the WV Intermodal Terminal is particularly at risk to get traffic diverted to Roanoke.

Another component that dampens the net sustainable growth for the WV Intermodal Terminal is the drayage cost comparison of competing facilities in the area, namely Roanoke. Dray to Roanoke costs approximately $200 more than dray to Prichard for Kanawha County. This suggests that West Virginia must keep the WV Intermodal Terminal efficient in order to sustain traffic in light of a Roanoke development.

Sustainability from Leveraging Bulk-Intermodal Opportunities

From the diversion analysis we can conclude that the WV Intermodal Terminal is sustainable at a relatively low diversion threshold. However, incorporating operational costs over time to grow as a percentage of total costs it is important to mention other opportunities like bulk transfer sites that could be viable alternative uses for the WV Intermodal Terminal if the facility cannot be sustainable on bulk alone. Where private bulk Intermodal facilities generally support large-scale production sites, multi-client bulk facilities predominantly service light industrial activity. Bulk transfer facilities themselves do not provide significant employment themselves, but rather offer the potential to deliver lower transport costs to those shippers that utilize the services. This can assist regions in attracting additional industrial development.

Table 5.2 identifies the total inbound and outbound traffic of Non-Dry Van commodity mixes that originate from or terminate in the 100 mile catchment area for the WV Intermodal Terminal. Currently, bulk transfer sites in Kenova and Charleston, WV compete for some of this business, including chemicals, plastics, sweeteners, and lumber products. The location of an intermodal facility at Prichard may provide better rail service and drayage economies and could better service these commodities than the other facilities in the region. This could be explored in a follow-up study.

Table 5.2: Non Dry Van commodities originating in the Study Region

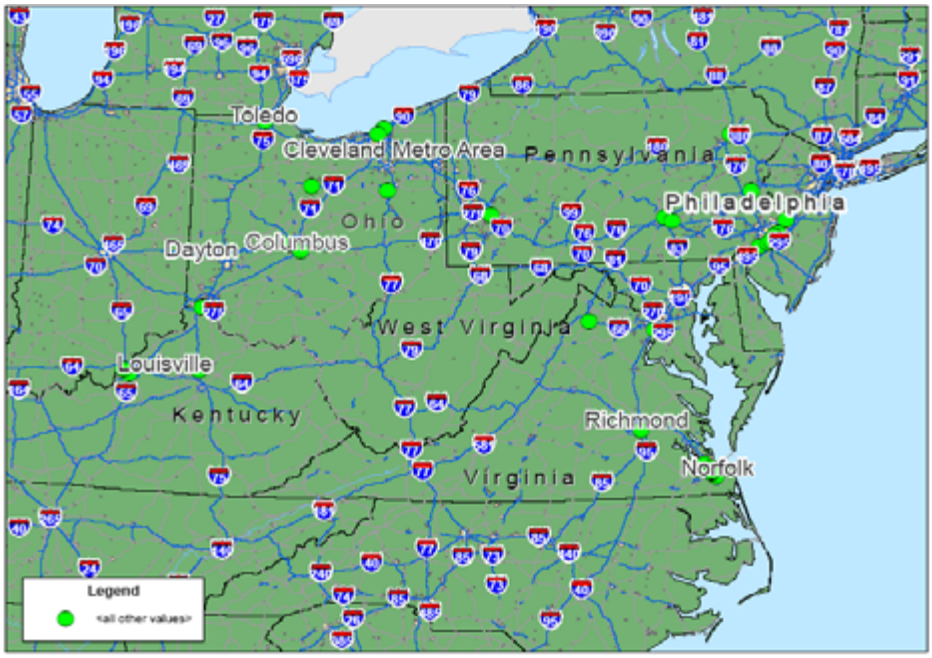
Category	0 - 25 Miles From Prichard	25 - 50 Miles From Prichard	50 - 75 Miles From Prichard	75 - 100 Miles From Prichard
Chemicals and Plastics	19,573	10,627	32,112	3,108
Corn Sweeteners/Oils	1,106	84	2,687	288
Motor Vehicles	93	99	903	526
Paper Products	17	6	171	32
Steel	327	1,006	2,011	114
Wood Products/Lumber	572	77	3,217	506

Table 5.3 shows the major dry bulk Intermodal facilities in West Virginia as well as surrounding states including Kentucky, Ohio, Pennsylvania, and Virginia. The dry bulk Intermodal facilities were identified using the Bureau of Transportation Services' National Transportation Atlas database.

Table 5.3: Non Dry Van commodities leaving in the Study Region

Category	0 - 25 Miles From Prichard	25 - 50 Miles From Prichard	50 - 75 Miles From Prichard	75 - 100 Miles From Prichard
Chemicals and Plastics	39,337	17,024	83,905	6,779
Corn Sweeteners/Oils	9	458	78	170
Motor Vehicles	15	0	15	4
Paper Products	6			
Steel	1,458	550	2,275	1,202
Wood Products/Lumber	19	144	2,556	1,061

Figure 5.1: Dry Bulk Intermodal Facilities



Other Considerations

Even though the preliminary site at Prichard is currently in close proximity to Interstate 64, via US 52, there are relatively few proximal residential or commercial structures, indicating access to the site is not sufficient enough to support significant development. By providing access to Intermodal rail, the access to the site itself is increased. The addition of a complementary mode of transportation will arguably make the site more attractive for industrial development. The addition of rail access will make the site more accessible for Intermodal container traffic, leading to increased development opportunities. For example, the annual employment impact with strategic economic development considerations is ten-fold the estimated impact arising from the transportation costs alone.

Conclusions

Together, in its proximity to the proposed WV Intermodal Terminal and backed funding by Norfolk Southern, Roanoke, could be a potential obstacle to development of the intermodal facility in West Virginia. Roanoke is in a position to directly compete for similar markets in the region.

6. Economic Impact Analysis

6. Economic Impact Analysis

The port market analysis presented in Section 1 sought to determine to what extent the state of West Virginia would be "better off" for having invested public monies in the proposed Intermodal Terminal in Wayne County, leveraging the Heartland Corridor initiative for the State. In the public sector, the measurement of these effects is traditionally performed through a *cost-benefit* or *economic impact* analysis.

The analysis presented in this section seeks to determine to what degree construction of an Intermodal Terminal at a site in Prichard could provide incremental economic benefit to the State of West Virginia, by improving productivity for shippers and receivers in the regional economy by expanding the intermodal options available to transport inter-regional trade volumes. The investment scenario proposed in this analysis specifically contemplates the construction of the Prichard Inland Intermodal Terminal, and the associated impact on economic development in terms of job creation and gross state product respectively.

Transportation Cost Indices

The construction of a transportation facility such as the proposed Prichard facility can generate a range of different economic impacts, both temporary and permanent, in a regional economy. To model these impacts, Global Insight developed Transportation Cost Indexes (TCI) for each 3-digit NAICS employment sector in the West Virginia economy.

Transportation impacts to a given sector depend on its pattern of utilization of rail transportation. As the use of rail transportation varies widely across sectors, so the impacts will vary substantially across sectors in the West Virginia economy. Any changes in the transportation infrastructure can affect the transportation use pattern for some sectors in the economy, which in turn has cost and efficiency implications. As a matter of terminology we have used Transportation Cost Index to reflect the true unit cost of rail transportation for a sector. The TCI for a sector represents a weighted average of the transportation cost per ton mile of rail transportation, with sector weights calculated based on intensity of use.

The derivation of the TCIs is shown below.

Where:

$B_{r,i}$	≡	Share of ton-miles in rail mode used by sector *i*
P_r	≡	Price of rail mode
W_r	≡	Weight of rail mode in total production costs

The TCI for the i^{th} sector in the West Virginia economy is:

$$TCI_i^{WV} = \left(\beta_{R,i}^{WV} * P_R^{WV} * W_R^{WV}\right)$$

Ton mile data by goods producing sectors were obtained from Transearch Insight®, Global Insight's proprietary transportation database, and the 2005 Surface Transportation Board (STB) Public-Use Carload Waybill Sample (CWS). Transearch Insight is compiled from public sources and data on primary shipments obtained from major freight carriers, while the CWS is derived from proprietary primary shipment data provided by individual freight carriers operating in the US. Ton-mile data for service providing sectors were estimated using an input-output framework primarily based on the data published by the Bureau of Economic Analysis. The linkage of the TCIs and the ton-mile data allowed us to derive a West Virginia rail ton mile distribution for each 3-digit NAICS sector.

To calculate the impacts of shifting freight from one mode to another, the marginal cost of transportation per mile for the truck and rail modes was developed using Global Insight's Truck Cost Analysis Model (TCAM) and Intermodal Cost Analysis Model (ICAM) respectively to cost sample origin-destination flows. Average freight revenue per ton mile for the truck and rail modes was developed from a variety of sources, including the Bureau of Transportation Statistics (BTS), the Motor Carrier Bluebook (Bluebook), and the STB Carload Waybill Sample. In general, the cost functions amounted to a weighted average of between 50-70 cents per highway mile for rail intermodal, or the equivalent of between $0.03 and $0.05 per ton-mile. Truck costs averaged between $0.12 and $0.14 per ton mile[1]. These data were compared and adjusted to reflect the mix of traffic and modes appropriate to West Virginia, and utilized to construct a "cost discount" for shifting current truck freight to lower cost rail intermodal.

Simulations

Two simulations were performed for the analysis. The first simulation estimated the effects of the current modal distribution of traffic in the region. The second simulation considered the presence of the Prichard Intermodal Terminal and the diversion of regional freight traffic to that facility.

The first simulation was deemed to represent the future base case. These effects were modeled in the values of $\beta_{R,i}^{WV}$ (rail ton miles) and $\beta_{T,i}^{WV}$ (truck).

In the second simulation, the presence of the Prichard Intermodal Terminal is reflected as the alternative case. This represents the construction of the Prichard terminal and the diversion of traffic to it from the catchment region.

The capital investment in the Prichard facility was entered into the model in two ways. First, some of the investment is devoted to labor and materials costs for the construction activity on the railroad. As labor, construction, and material investments are often supplied from regions outside the study area, an estimate of local content was based on professional judgment. Only this local content was absorbed in the model's calculations. These expenditures were entered into the model by directly augmenting the sector output in the appropriate manufacturing and construction sectors. This effect entered the model as increased employment in the construction sector, using the average wage in that sector to estimate the incremental change in jobs.

The second method for entering investment impacts is related to purchased materials, specifically the acquisition of fill, steel rails, railroad ties, stone, paving materials and intermodal terminal operating equipment. These expenditures were entered into the model by directly augmenting the GSP in the appropriate manufacturing and mining sectors.

A "high" and "low" case were prepared to account for unforeseen externalities[2] that could dampen or accelerate modal conversion, capital filtering, and operating savings pass-throughs.

[1] These costs are more reflective of truckload operations, rather than higher cost LTL activity. It is predominantly truckload operations which are converted to intermodal operations with the introduction of new services in the marketplace. The BTS reported figures – reflecting a significantly higher cost mix of truck (including more LTL and local delivery) traffic -- were adjusted downward to more reasonably reflect the figures found in the Bluebook for truckload carriers operating in the US.
[2] These included (1) fuel costs, (2) motor carrier labor rates, (3) environmental legislation, and (4) insurance rates. From the base forecast, the high and low case reflected sensitivity adjustments to these figures on a percentage (not actual) basis.

Public Sector Benefits

The comparative result of the two simulations, and the high and low cases produced a variance that reflected the statewide impacts of the development of the Prichard Intermodal Terminal. The impacts were measured across two significant economic metrics: jobs and regional output. The results for Total Non-Farm Employment (jobs) and West Virginia Gross State Product[3] (economic output) are reflected below.

Table 6.1: LOW-CASE Benefits Summary for Prichard Intermodal Terminal Project

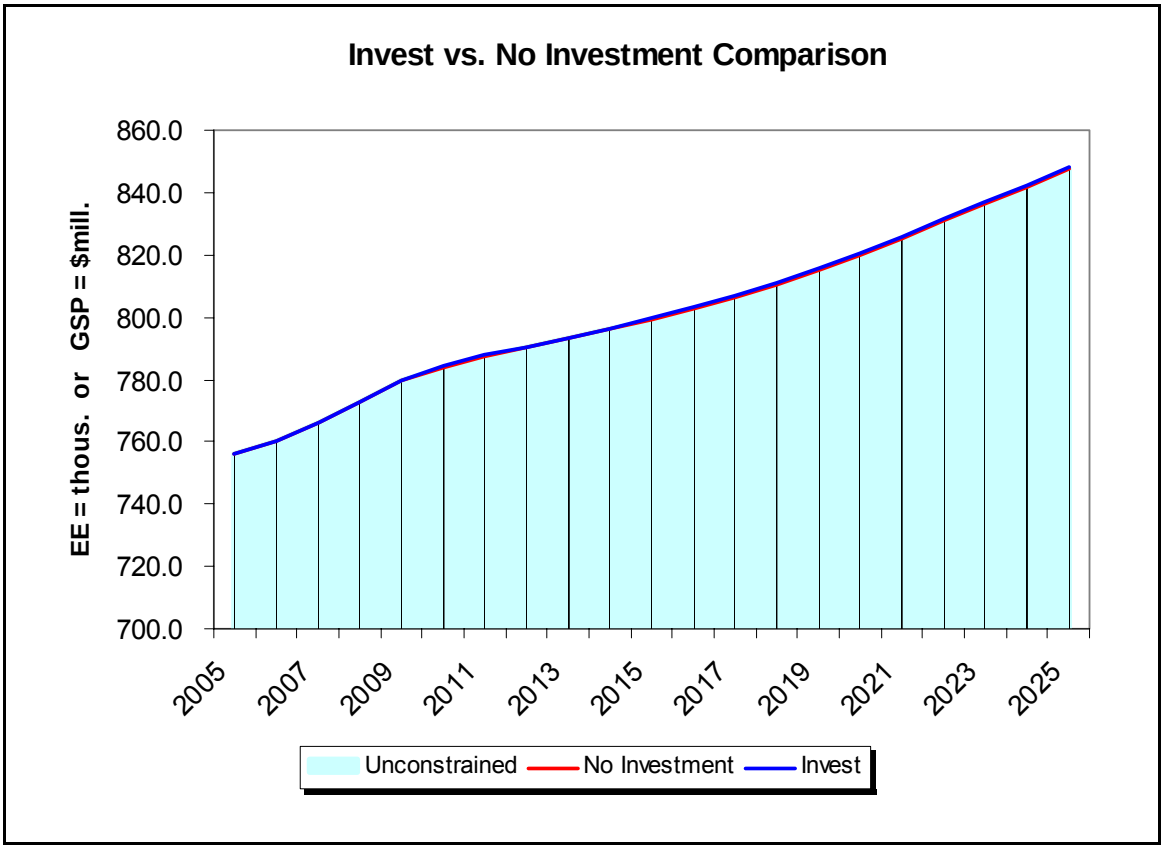
Total West Virginia Non-Farm Employment					
(Thousand)	2005	2010	2015	2020	2025
Investment	756.0	784.7	799.8	820.5	848.1
No Investment	756.0	784.0	799.4	820.1	847.4
Difference	0.0	0.7	0.3	0.5	0.7
Diff (%)	0.0%	0.1%	0.04%	0.06%	0.08%

Total West Virginia Gross State Product					
(Million 2000$)	2005	2010	2015	2020	2025
Investment	55,943.6	70,001.1	85,814.5	104,409.5	126,203.8
No Investment	55,943.6	69,978.0	85,790.1	104,376.0	126,157.4
Difference	0.0	23.1	24.4	33.5	46.4
Diff (%)	0.0%	0.0%	0.03%	0.03%	0.04%

Source: Global Insight USA, Inc. 2007

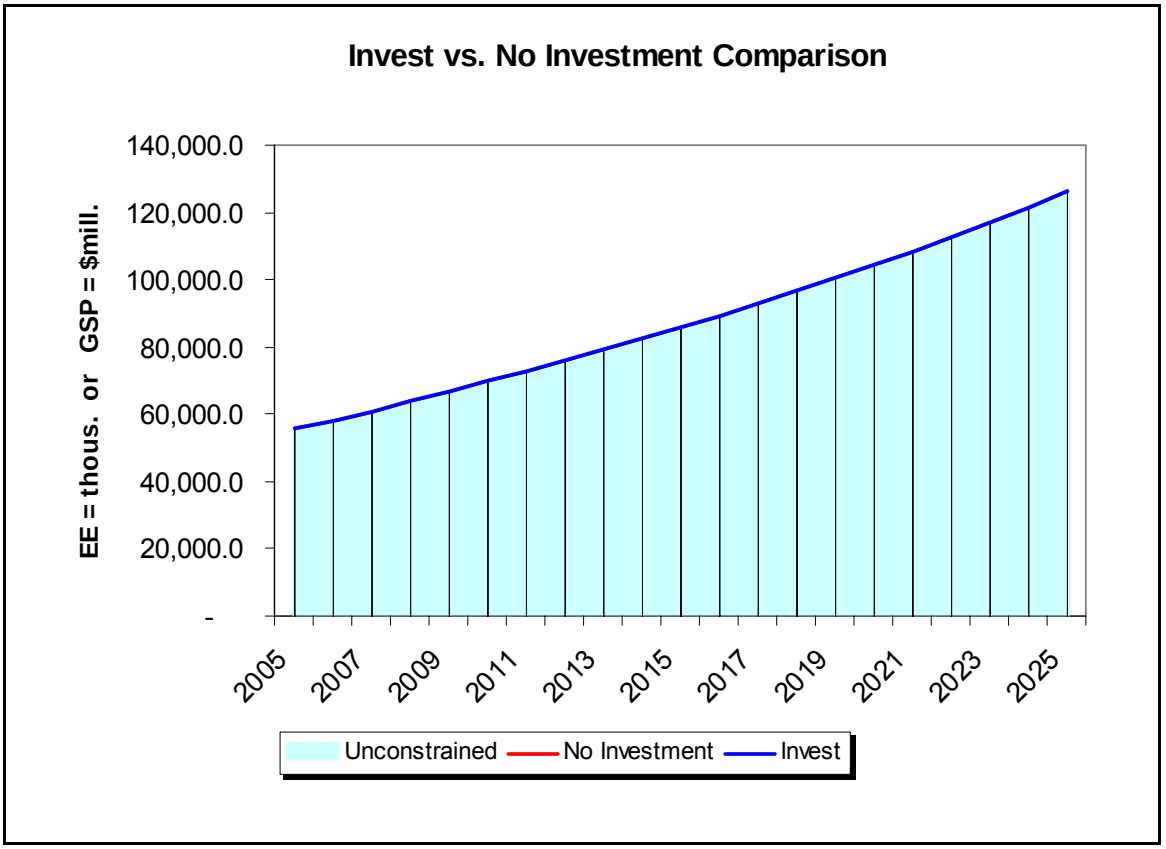
[3] The metrics selected to describe the impact of investments in the Prichard site and the resulting capacity increase for intermodal rail volume growth. The employment metrics consist of wage and salary employment and self-employment. This metric represents the job impacts resulting from the infrastructure investment, including those for railroad shippers directly impacted by the investment, and non-rail shippers in the region, that are indirectly impacted by the presence of the railroad in their community. The change in Gross State Product (GSP) reflects the overall economic benefit, to both the public and private sectors in West Virginia, of the investment simulation. GSP represents the value added in production by the labor and capital located in a state. Gross State Product for a state is derived as the sum of the GSP originating in all industries in the state. While GSP is the best measure of the total benefits developed from an investment, it is not the best measure of return on investment (ROI), in that it includes both public and private sector benefits. GSP reflects the social benefits of an investment, not just those that would accrue to the taxpayers responsible for the public investment.

Figure 6.1: LOW-CASE WVA Non-farm Employment: Benefits Summary for the Proposed Prichard Intermodal Terminal



Source: Global Insight USA, Inc. 2007

Figure 6.2: LOW-CASE Gross State Product: Benefits Summary for the Proposed Prichard Intermodal Terminal



Source: Global Insight USA, Inc. 2007

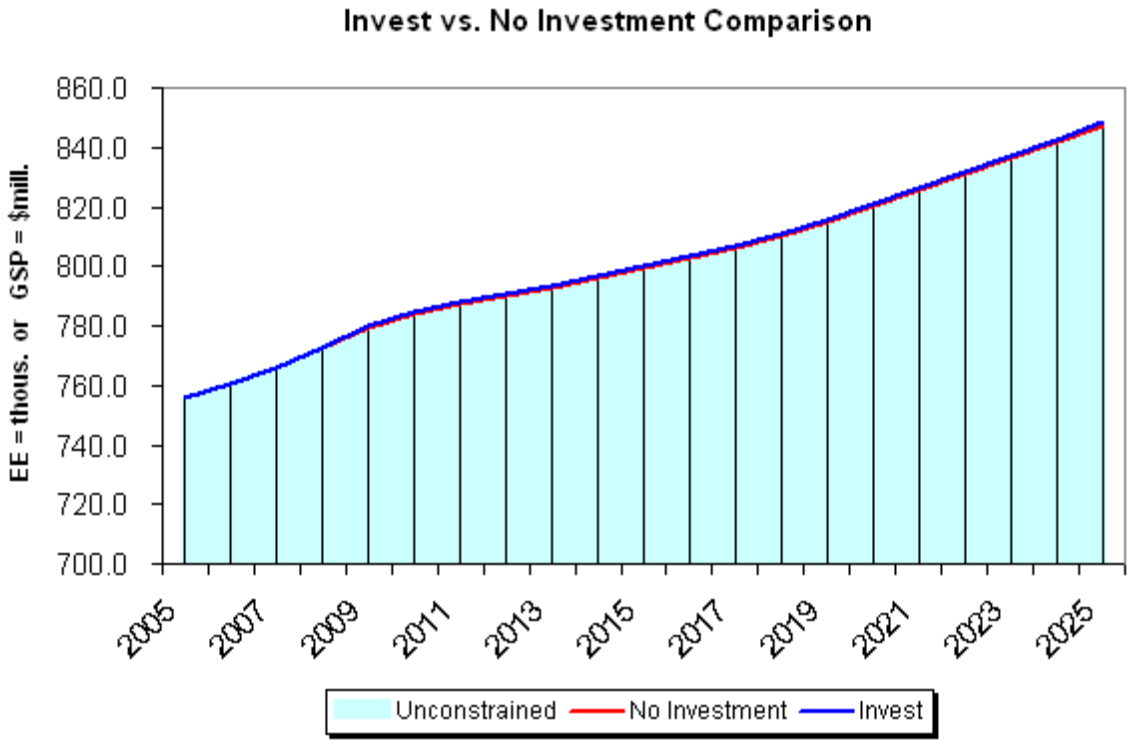
Table 6.2: HIGH-CASE Benefits Summary for Prichard Intermodal Terminal Project

Total West Virginia Non-Farm Employment					
(Thousand)	2005	2010	2015	2020	2025
Investment	756.0	784.7	800.0	820.8	848.4
No Investment	756.0	784.0	799.4	820.1	847.4
Difference	0.0	0.7	0.5	0.7	1.0
Diff (%)	0.0%	0.1%	0.1%	0.1%	0.1%

Total West Virginia Gross State Product					
(Million 2000$)	2005	2010	2015	2020	2025
Investment	55,943.6	69,995.6	85,826.4	104,426.0	126,226.7
No Investment	55,943.6	69,978.0	85,790.1	104,376.0	126,157.4
Difference	0.0	17.6	36.3	50.0	69.3
Diff (%)	0.0%	0.0%	0.0%	0.0%	0.1%

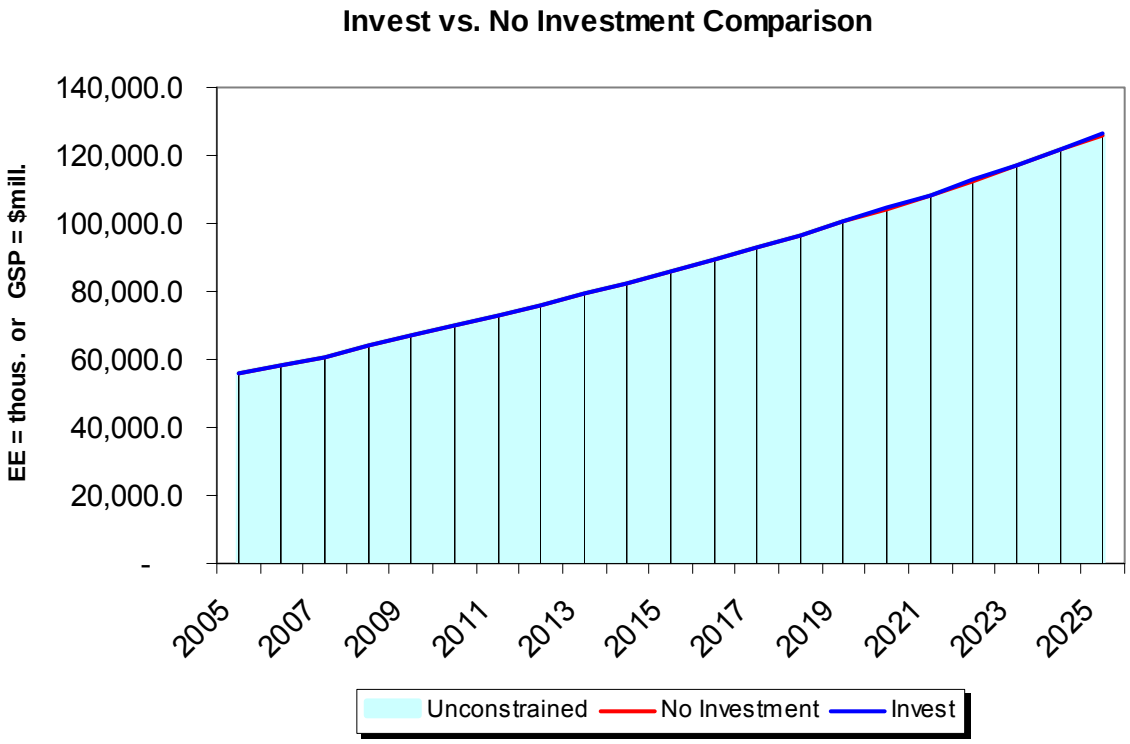
Source: Global Insight USA, Inc. 2007

Figure 6.3: HIGH-CASE WVA Non-farm Employment: Benefits Summary for Prichard Inland Intermodal Project



Source: Global Insight USA, Inc. 2007

Figure 6.4: HIGH-CASE Gross State Product: Benefits Summary for Prichard Inland Intermodal Project



Source: Global Insight USA, Inc. 2007

The results of the analysis indicate that investment in the Prichard Intermodal Terminal will generate a net increase of between 700 and 1,000 jobs by 2025; at the end of the twenty-year outlook the economic output of the state economy will increase by between $47 and $69 million with investment versus no investment.

The West Virginia economy, at nearly $56 Billion, is large enough that it is difficult for even an investment such as being considered for the Prichard Intermodal Terminal, to produce significant benefits in the State's economy. However, measuring the comparative "return" on the invested public capital gives an indicator as to the project's ability to convert public monies to statewide benefits. In the case of the Prichard Intermodal Terminal, a $30 Million investment yields a statewide benefit of $47- 69 Million (GSP Impact) by 2025. Thus the relative return on the invested capital can be calculated as follows:

I_k^{WV} ≡ Public Investment by West Virginia for project *k*

B_k^{WV} ≡ Benefits to West Virginia (GSP) for project *k*

R_k^{WV} ≡ Return on invested public capital for project *k*

$$R_k^{WV} = \left(B_k^{WV} \div I_k^{WV}\right)$$

The result of this is a relative economic return on invested public capital of between 160% and 230%. Using this number, the Prichard Intermodal Terminal investment can then be compared to other possible uses of public

capital and their respective returns. The higher the relative return the more efficiently the public capital is converted into economic benefit for the state.

Based on the projected construction cost, the state should seriously consider the construction of the Prichard facility as an instrument of enhanced economic development. For an investment of $30 Million, in twenty years, the state receives back about between 1.6 and 2.3 times the capital it invests. In the low case, the payoff of the initial capital investment is accomplished in less than fifteen years, while in the high case the payoff is achieved in less than ten years. This could be a relatively attractive investment for the state, although it would obviously compete for scarce public capital against other potential investments and their relative returns. If WVPPA were able to leverage federal monies or private sector capital for the construction, the economic return would be improved considerably for the project is made even more attractive.

Private Sector Benefits

Not surprisingly, one of the largest benefactors for the Prichard investment are private sector users, who will reduce their logistics costs with the introduction of intermodal competition to the area. Our projections are that the region's private sector logistics costs will be reduced by $17.5 Million annually by 2025. Obviously some of these savings produce local public sector benefit, through increased taxes, faster economic growth, and accelerated employment growth that are captured in the public sector benefits outlined above (thus these benefits are not additive). This promise of this benefit could encourage private sector investment in the terminal construction, and further improve the public sector benefit performance.

Conclusions from Economic Impact

In this benefits analysis, an *investment* in the Prichard Intermodal Terminal was evaluated against the alternative of "*no investment*" in the Prichard Intermodal Terminal. From that perspective, development in the Prichard Intermodal Terminal represents a positive public investment. Over a twenty-year time horizon, a $30 million capital investment generates a positive benefit to the region of between $47 and $69 million, returning its public capital outlay through increased GSP in a 9-15 year time horizon. Employment benefits are estimated at between 700 and 1,000, with the preponderance of these new jobs created in the southwestern portion of the state. Despite this attractive performance, the overall benefit to the state economy is barely measurable at between 0.04% and 0.1% GSP impact, and between 0.08% and 0.1% improvement on statewide employment.

While the investment in Prichard is not likely to have a significant impact on overall West Virginia GSP, the relevant issue for public sector legislators and their constituents is the relative economic return on invested public capital. At a return of 1.6 to 2.3 times the invested capital (over approximately a 20-year investment time horizon), the Prichard Intermodal Terminal can readily overcome its substantial construction costs, and should compete effectively with other potential public sector investments. The Prichard investment is likely to generate benefits for the State of West Virginia (as well as surrounding states) as freight shifts from one mode to another, and private sector shippers reap a logistics cost windfall. As the current investment scenario reflects all-public monies, WVPPA potentially bears the full weight of the public returns, and the risk of the investment.

If the benefits of an intermodal terminal for West Virginia are certain, the task remains to fine-tune both the location and design of a facility that can meet the State's investment threshold criteria.

7. Conclusions

7. Conclusions

Upon completion of the Economic and Market Analysis for an Inland Intermodal Port in the State of West Virginia, the following conclusions are made:

- The West Virginia market is large enough to support and inland intermodal terminal.
- The diversion potential of truck to rail freight traffic is sufficient to help support an inland intermodal terminal.
- Prichard, West Virginia is identified as the most optimal site for an inland intermodal terminal.
- The estimated range-of-magnitude cost for a proposed start-up terminal is approximately $ 30 million.
- There are several funding options available, as well as alternative project delivery methods.
- Any impacts to the regional highway system are modest.
- There is a potential to place warehousing in the project area.
- Economic returns are moderate, and improvement on those returns are possible.

In summary, if the economic benefits of an intermodal terminal for West Virginia are acceptable to the State, the task remains to fine-tune the planning, design, and operations for a facility that can meet the State's investment threshold criteria. Specifically, the following items are recommended to advance the development of the WV Intermodal Terminal:

1. Discussions and coordination with NS regarding service, financing, operations, and plans for a facility in Roanoke.
2. Environmental clearance of the site.
3. Development of a master plan that balances capital costs with operational efficiency. It will be important to further coordinate with NS to review development of the master plan.
4. Development of a financial plan, project delivery concept/schedule and operations plan.
5. Expansion of commercial analysis including interviews with potential shippers and further exploration of alternate commodities and development of marketing plan.

Accordingly, it is suggested that the project pursue the following steps:

- Further analysis: The commercial analysis could be expanded to gain more data for planning purposes. As an example, shipper interviews could be conducted and exploration could be performed on the movement of other commodities.
- In-depth Discussions with Norfolk Southern: A meeting, or series of meetings, could be held with Norfolk Southern engineering, operating and intermodal personnel to further define the layout of the proposed terminal and the role that NS anticipates Prichard to play in relationship to the proposed terminal along I-81 in Roanoke, VA.
- Develop a terminal master plan: As there is a potential to move other commodities, work should begin to develop a master plan to phase construction and operation. Master planning could also address permitting and utility issues.
- Begin preliminary and final engineering: In order to have a facility in place and operating to coincide with the completion of the NS heartland Corridor Project, engineering should be underway by January 1, 2008.

Appendix I

Appendix I. TRANSEARCH and Intermodal Freight Visual Database

Building from TRANSEARCH, the national database of freight traffic flows that Global Insight created and has maintained and provided to the transportation industry for 18 years and drawing on its experience with custom database development, the team researched information needs and data sources in the government and commercial markets and the capabilities of state-of-the-art software. The results of the effort have been to make available a national county-to-county and zip code-to-zip code data product. Key user needs like currency of the data, its reliability, flexibility in terms of seeing details of the traffic composition or relatively broad data summaries, and affordability can be satisfied.

Issued annually, the data can cover all modes and commodities, including empty truck movements, international shipping, and truck shipments of non-manufactured goods. Features like external trip ends, vehicle miles traveled, gross ton-miles, and forecasts can be provided, and traffic routed along major modal corridors can be displayed.

The database maps commodity flows (2, 3 and 4 digit STCC) in short tons between geographic entities (states, counties, BEA's) by mode (rail car, rail intermodal, truck load, less than truck load, private truck, air and water) for current year and forecast years. All volumes shown in tons are in short tons, for 2005.

A variety of data sources are used to compile the database ranging from government agencies to private sector industry associations and the carriers themselves, as shown in Figure A1.1.

The data sources vary by the different modes of transportation. The primary source for railroad data is the Carload Waybill Samples gathered from about 4% of total rail car traffic. Global Insight sources this data from the Surface Transportation Board. This data is compiled to provide both volumes and patterns of flow.

The primary source for waterborne commodity flows is the Waterborne Commerce Statistics compiled by the Army Corps of Engineers. This data tracks the flow of commodities along domestic lakes, rivers and canals, and is used to develop both volumes and patterns of flow.

Figure A1.1

INTERMODAL FREIGHT VISUAL DATABASE DATA SOURCES

Mode	Data Source	Agency/Organization
Rail	– Carload Waybill Sample	– Surface Transportation Board
Water	– Waterborne Commerce Statistics	– U.S. Army Corps of Engineers
Air	– FAA Airport Originating Tonnages – Airport to Airport Flows – Commodity Flow Survey – TRANSEARCH	– Office of Airline Statistics (DOT Form 41) – BTS Office of Airline Information – Bureau of Transportation Statistics – Global Insight
Truck	– Carrier Data Exchange Program – TRANSEARCH – Annual Survey of Manufactures – Freight Locater Data Service – General Statistics for Verification – Commodity Flow Survey	– Global Insight – Global Insight – U.S. Census Bureau – Global Insight – Industry Associations – Bureau of Transportation Statistics

The air data is compiled from four major sources. The first is FAA (Federal Aviation Administration) airport originating tonnages primarily from Form 41 reports and compiled by the Office of Airline Statistics (Federal). This source establishes volume estimates at airports. The second source is airport-to-airport (ATA) flows compiled by the BTS Office of Airline information. These data are used to establish flow patterns. The third source is from Commodity Flow Survey (CFS) data, used to define the commodity types. The fourth source is Global Insight' TRANSEARCH Database, which supplements the CFS data.

The trucking data process is more complex and comes from a wide variety of sources developed over the course of 20 years. However, there are four primary sources. The first is a data exchange program Global Insight has with motor carriers, which is used to estimate patterns and volumes. The second source is a variety of industry associations (timber, plastics, chemical, automotive, etc.), which provide overall volume information for the respective industry sectors. The third major source is from the Annual Survey of Manufactures, primary employment and output data by industry, distributed at the state and local level. This data maps production and consumption of commodities and is used to calibrate the trucking flows. The Freight Locater data service is a database of industrial facilities and their exact location. This data supplements the previously mentioned sources to help calibrate the flows of goods between specific geographic entities.

IFVDb Data Issues and Limitations – Global Insight recently developed a finer detailed version of its TRANSEARCH database in an FHWA sponsored project known as the Intermodal Freight Visual Database. It breaks down origin and destination market areas to the county level and is compatible with GIS applications. It has been incorporated into TRANSEARCH, with its most current base year as 2005.

For this study, TRANSEARCH data were identified at varying levels of detail. It is generally understood that large databases of this kind are never perfect, and TRANSEARCH is not an exception to the rule. It is, however, the best available source of its kind in the cognizance of the study team. TRANSEARCH is in use by virtually all major U.S. railroads and by more than a hundred motor carrier companies and several container shipping lines and air cargo carriers. State and federal planning agencies, as well as port authorities, equipment suppliers, investment banks and judicial and regulatory bodies also use it.

TRANSEARCH reports provide a broad picture of freight traffic movements in the United States. Various publicly available sources, as well as Global Insight's proprietary motor carrier data exchange information, are used in the development of the TRANSEARCH database. Understanding the nature of particular sources when using TRANSEARCH data is important to interpret the information correctly. The following guidelines should be helpful in gaining that understanding.

Freight Rehandled By Truck From Warehouse and Distribution Centers Is Identified as STCC 5010 and Referred to as Secondary Traffic at a 4-digit STCC level or STCC 50 at a 2-digit STCC level. Many of these types of facilities handle a wide range of different types of commodities, and outbound shipments may also be of mixed consists. For example, shipments from a supermarket chain distribution center are likely to contain a broad range of packaged food products and other consumer items.

The Truck Portion of Truck/Rail Intermodal Activity Is Shown as STCC 5020 at a 4-digit STCC level or STCC 50 at a 2-digit STCC level. This activity includes two segments: the truck shipment, by trailer or container, from true origin to the intermodal railhead, and from the intermodal railhead to final destination. The Rail Intermodal mode reveals the origin and destination points on the rail system, not the ultimate origin and destination.

STCC 5030 Is Used to Identify the Truck Drayage of Air Freight Traffic 5020 at a 4-digit STCC level or STCC 50 at a 2-digit STCC level. Both the true origin to airport, and airport to final destination are included. Origins and destination for movements classified in the air mode are airports. Volumes that are transloaded from one aircraft to another are not shown at the transloading point.

Large Portions of Today's Intermodal (TOFC or COFC) Traffic Are Reported In Non-Commodity Categories. Commercial arrangements in the railroad industry have fostered the use of "third parties" such as consolidators and forwarders. Such traffic typically is labeled as "Freight Forwarder Traffic", "FAK" (Freight: All Kinds), or "Miscellaneous Mixed Shipments". The specific commodities moving under these arrangements are not identified in the public use data sources.

Shipments Made Up Of Several Commodities Will Be Credited To The Dominant Commodity. This occasionally occurs in the commodity identification of rail shipments. In these instances, the tonnage attributed to the predominant commodity is greater than it should be, and the other commodities in the shipment are understated.

To Provide Maximum Product Identification, Commodities Are Shown At the Greatest Level of STCC Detail For Each Code. Truck data is available and shown at the 4-digit level for the manufacturing sector. Rail data, however, can be shown at 5-digits. Because of the desire to include the greatest amount of detail possible, commodities in a

traffic lane may be identified at different levels of detail for each mode. When this occurs, tonnages shown at the more detailed levels should be combined with those displayed at the more aggregate levels to gain a complete picture of modal share for the commodity. All freight traffic flow information in the study is expressed at the 4-digit STCC commodity code level, or consolidated to a 2-digit, or no commodity detail level.

Tonnage Data In Each Cell Should Be Used As An Indicator Of Relative Value—since many of the sources for traffic flow information use sample data. Consequently, the more specific the definition of a particular flow, the greater its sampling variability. The more aggregated the definition of the Geography/Mode/ Commodity combination, the more reliable the results.

State-To-State Movements Of "Primary" Freight At The 2-Digit STCC (or SIC) Level Provide The Best Picture Of Primary Freight Moves In The Data Base. Analysts and planners, however, want and need more disaggregate pictures of the flow activity. Not all of the data used in TRANSEARCH comes into the process beneath the state level or with more than 2-digit commodity/industry classification.

Appendix II

Appendix II. Identified Shippers and Receivers in the Prichard Region

COMPANY NAME	ADDRESS	CITY	ZIP	STATE	STANDARD INDUSTRY CLASSIFICATION	ESTIMATED ANNUAL TONS
GLATFELTER CO	PO BOX 2500	CHILLICOTHE	45601	OH	PAPER-MANUFACTURERS	394,328
PEPSI-COLA BOTTLING CO	PO BOX 299	FRANKLIN FURNACE	45629	OH	JUICES-MANUFACTURERS	352,476
MUTH LUMBER CO	1301 ADAMS LN	IRONTON	45638	OH	SAWMILLS & PLANING MILLS-GENERAL (MFRS)	337,049
CROWNOVER LUMBER	PO BOX 301	MC ARTHUR	45651	OH	SAWMILLS (MFRS)	317,728
TAYLOR LUMBER INC	18253 STATE ROUTE 73	MC DERMOTT	45652	OH	LUMBER-MANUFACTURERS	296,005
DRAVO LIME CO	9222 SPRINGDALE RD	MAYSVILLE	41056	KY	LIME-MANUFACTURERS	284,247
DOW CHEMICAL CO	PO BOX 8004	SOUTH CHARLESTON	25303	WV	INDUSTRIAL INORGANIC CHMCLS NEC (MFRS)	260,675
USEC INC	PO BOX 628	PIKETON	45661	OH	INDUSTRIAL INORGANIC CHMCLS NEC (MFRS)	239,820
NESTLE USA INC	150 OAK GROVE DR	MT STERLING	40353	KY	FOOD PRODUCTS & MANUFACTURERS	199,651
AK STEEL CORP	PO BOX 191	ASHLAND	41105	KY	STEEL MILLS (MFRS)	191,946
INDUSTRIAL TIMBER & LAND CO	35748 STATE ROUTE 93	HAMDEN	45634	OH	LUMBER-MANUFACTURERS	178,131
COOK'S HAMS INC	800 CW STEVENS BLVD	GRAYSON	41143	KY	MEAT PACKERS (MFRS)	172,334
LR-LANDEN RAY DANIELS TRANS	12030 PAUL COFFEY BLVD	ASHLAND	41102	KY	SCRAP METALS & IRON (WHOLESALE)	163,094
BURKE-PARSONS-BOWLBY CORP	3210 PARKERSBURG RD	REEDY	25270	WV	SAWMILLS & PLANING MILLS-GENERAL (MFRS)	157,840
HAROLD WHITE LUMBER INC	2920 FLEMINGSBURG RD	MOREHEAD	40351	KY	LUMBER-MANUFACTURERS	150,229
ALCAN ROLLED PRODUCTS	PO BOX 68	RAVENSWOOD	26164	WV	ALUMINUM SHEET PLATE & FOIL (MFRS)	143,841

COMPANY NAME	ADDRESS	CITY	ZIP	STATE	STANDARD INDUSTRY CLASSIFICATION	ESTIMATED ANNUAL TONS
GREEN TREE FOREST PRODUCTS INC	746 MUSES MILL RD	WALLINGFORD	41093	KY	LUMBER-MANUFACTURERS	139,913
RHI REFRACTORIES AMERICA	PO BOX 457	SOUTH SHORE	41175	KY	REFRACTORIES (MFRS)	134,283
SUPERIOR HARDWOODS OF OHIO	PO BOX 606	WELLSTON	45692	OH	LOGGING (MFRS)	123,375
CALGON CARBON CORP	PO BOX 664	CATLETTSBURG	41129	KY	CARBON-ACTIVATED (MANUFACTURERS)	116,112
UNITED VALLEY BELL DAIRY	508 ROANE ST	CHARLESTON	25302	WV	FLUID MILK (MANUFACTURERS)	110,082
PEPSI BOTTLING GROUP	100 INDEPENDENT AVE	NITRO	25143	WV	BEVERAGES-MANUFACTURERS	96,924
PEPSI BOTTLING GROUP	3591 N MAYO TRL	PIKEVILLE	41501	KY	BOTTLERS (MFRS)	94,340
AUSTIN POWDER CO	PO BOX 317	MC ARTHUR	45651	OH	EXPLOSIVES-MANUFACTURERS	91,702
J MC COY LUMBER CO LTD	PO BOX 306	PEEBLES	45660	OH	SAWMILLS & PLANING MILLS-GENERAL (MFRS)	88,400
JIM C HAMER CO	PO BOX 425	MADISON	25130	WV	LUMBER-MANUFACTURERS	87,973
SUPRESTA US LLC	PO BOX 1721	GALLIPOLIS FERRY	25515	WV	INDUSTRIAL INORGANIC CHMCLS NEC (MFRS)	86,195
R & S-GODWIN TRUCK BODY CO LLC	PO BOX 420	ALLEN	41601	KY	STEEL WORKS/BLAST FURNACES/ROLLING MLS	85,255
KENTUCKY ELECTRIC STEEL LLC	PO BOX 2119	ASHLAND	41105	KY	STEEL MILLS (MFRS)	82,443
MICHELINA'S INC	PO BOX 550	JACKSON	45640	OH	FROZEN FOOD PROCESSORS (MFRS)	80,658
MEAD WESTVACO CORP	PO BOX 1700	CHILLICOTHE	45601	OH	PAPER-MANUFACTURERS	74,701
HOMER GREGORY & CO INC	620 KY HIGHWAY 519	MOREHEAD	40351	KY	SAWMILLS & PLANING MILLS-GENERAL (MFRS)	72,480
EMERSON POWER TRANSMISSION	PO BOX 687	MAYSVILLE	41056	KY	RUBBER & PLASTICS-HOSE & BELTING (MFRS)	66,967
MALLINCKRODT INC	PO BOX 800	PARIS	40362	KY	INDUSTRIAL INORGANIC CHMCLS NEC (MFRS)	65,614

COMPANY NAME	ADDRESS	CITY	ZIP	STATE	STANDARD INDUSTRY CLASSIFICATION	ESTIMATED ANNUAL TONS
KELLOGG CO	3321 STATE HIGHWAY 194 E	KIMPER	41539	KY	COOKIES & CRACKERS-MANUFACTURERS	65,068
BUZZ FOOD SVC	4818 KANAWHA BLVD E	CHARLESTON	25306	WV	MEAT PRODUCTS (MFRS)	64,963
COCA-COLA BOTTLING CO CNSLDTD	640 WINFIELD RD	ST ALBANS	25177	WV	BOTTLERS (MFRS)	56,822
EASY GARDENER PRODUCTS LTD	1750 17TH ST	PARIS	40361	KY	FERTILIZER MIXING ONLY (MANUFACTURERS)	53,553
GKN SINTER METALS INC	2160 EASTERN AVE	GALLIPOLIS	45631	OH	POWDER METAL PARTS-INDUSTRIAL (MFRS)	53,335
JABO SUPPLY CORP	PO BOX 238	HUNTINGTON	25707	WV	DRAIN PIPES-CLAY-MANUFACTURERS	46,852
COCA-COLA BOTTLING CO CNSLDTD	700 S OAKWOOD AVE	BECKLEY	25801	WV	BOTTLERS (MFRS)	45,231
FLINT GROUP PIGMENTS	2401 5TH AVE	HUNTINGTON	25703	WV	COLORS & PIGMENTS-MANUFACTURERS	45,182
DAILY GAZETTE	1001 VIRGINIA ST E	CHARLESTON	25301	WV	NEWSPAPERS (PUBLISHERS/MFRS)	44,514
TEMPLE-INLAND	PO BOX 688	MAYSVILLE	41056	KY	PAPER-MANUFACTURERS	44,278
AMERICAN BOTTLING CO-BECKLEY	4419 ROBERT C BYRD DR	BECKLEY	25801	WV	BOTTLERS (MFRS)	43,715
DU PONT BELLE PLANT	901 W DUPONT AVE	BELLE	25015	WV	PLASTICS-RAW MTRLS/POWDER/RESIN-MFRS	43,216
BROWN CORP OF WAVERLY INC	611 W 2ND ST	WAVERLY	45690	OH	METAL STAMPING (MANUFACTURERS)	43,156
QUALITY ENVIRONMENTAL CNTNRS	PO BOX 1160	BEAVER	25813	WV	BOTTLES (MANUFACTURERS)	42,623
CHARLESTON NEWSPAPERS	PO BOX 2993	CHARLESTON	25330	WV	NEWSPAPERS (PUBLISHERS/MFRS)	34,206
DIAGNOSTIC HYBRIDS INC	350 W STATE ST	ATHENS	45701	OH	IN-VITRO/IN-VIVO DIAGNOSTIC SBSTNC (MFR)	32,408
ALCON MANUFACTURING LIMITED	6065 KYLE LN	HUNTINGTON	25702	WV	PHYSICIANS & SURGEONS EQUIP & SUPLS-MFRS	31,854
JIM C HAMER CO	PO BOX 418	KENOVA	25530	WV	HARDWOOD DIMENSION-FLOORING MILLS (MFRS)	29,360

COMPANY NAME	ADDRESS	CITY	ZIP	STATE	STANDARD INDUSTRY CLASSIFICATION	ESTIMATED ANNUAL TONS
S S LOGAN PACKING CO	PO BOX 5658	HUNTINGTON	25703	WV	MEAT PACKERS (MFRS)	27,883
MERIDIAN AUTOMOTIVE SYSTEMS	1020 E MAIN ST	JACKSON	45640	OH	PLASTICS & PLASTIC PRODUCTS (MFRS)	27,154
MANSBACH METAL CO	PO BOX 1179	ASHLAND	41105	KY	SCRAP METAL PRODUCTS-MFRS	26,814
COOPER-STANDARD AUTOMOTIVE	250 OAK GROVE DR	MT STERLING	40353	KY	TIRE-MANUFACTURERS	26,248
OSCO INDUSTRIES INC	PO BOX 1388	PORTSMOUTH	45662	OH	FOUNDRIES-GRAY IRON (MFRS)	23,716
GREIF INC	PO BOX 3068	HUNTINGTON	25702	WV	BARRELS & DRUMS (MANUFACTURERS)	21,613
UNION STAMPING & ASSEMBLY	3100 MACCORKLE AVE SW	SOUTH CHARLESTON	25303	WV	AUTOMOTIVE STAMPINGS (MANUFACTURERS)	20,167
REGISTER-HERALD	801 N KANAWHA ST	BECKLEY	25801	WV	NEWSPAPER PUBLISHING & PRINTING (MFRS)	19,475
HERALD-DISPATCH	946 5TH AVE	HUNTINGTON	25701	WV	NEWSPAPERS (PUBLISHERS/MFRS)	16,976
BERT WOLFE TOYOTA INC	PO BOX 2869	CHARLESTON	25330	WV	TRANSMISSIONS-AUTOMOBILE-MANUFACTURERS	15,906
CECIL I WALKER MACHINERY CO	PO BOX 2427	CHARLESTON	25329	WV	CONSTRUCTION MACHINERY & EQUIP (MFRS)	15,818
DOW CHEMICAL CO	925 COUNTY ROAD 1A	IRONTON	45638	OH	PLASTICS-FOAM (MANUFACTURERS)	15,019
GREEN TOKAI CO LTD	1725 DOWNING DR	MAYSVILLE	41056	KY	WEATHER STRIPS-MANUFACTURERS	14,918
BECKLEY NEWSPAPERS	PO BOX 2398	BECKLEY	25802	WV	NEWSPAPERS (PUBLISHERS/MFRS)	14,745
MITSUBISHI ELECTRIC MFG	1705 DOWNING DR	MAYSVILLE	41056	KY	ASSEMBLY & FABRICATING SERVICE (MFRS)	14,386
OSCO INDUSTRIES	PO BOX 327	JACKSON	45640	OH	FOUNDRIES-GRAY IRON (MFRS)	13,418
A C & S INC	PO BOX 335	NITRO	25143	WV	CHEMICALS-MANUFACTURERS	12,938
PAUL BUECHLER OFFICE	835 HILLCREST DR E	CHARLESTON	25311	WV	VALVES & PIPE FITTINGS NEC (MFRS)	12,357

COMPANY NAME	ADDRESS	CITY	ZIP	STATE	STANDARD INDUSTRY CLASSIFICATION	ESTIMATED ANNUAL TONS
PACTIV CORP	300 HARRIS RD	WURTLAND	41144	KY	PLASTICS-FOAM (MANUFACTURERS)	11,948
QUALITY CABINETS	51 CLARENCE DR	MT STERLING	40353	KY	CABINETS-MANUFACTURERS	11,753
RISH EQUIPMENT CO	PO BOX 429	ST ALBANS	25177	WV	CONTRACTORS-EQUIPMENT-MANUFACTURERS	11,683
HERR'S FOODS INC	476 E 7TH ST	CHILLICOTHE	45601	OH	POTATO CHIPS CORN CHIPS/SNACKS (MFRS)	11,598
WEST VIRGINIA MEDIA HOLDINGS	13 KANAWHA BLVD W	CHARLESTON	25302	WV	MULTIMEDIA (MANUFACTURERS)	10,787
APPALACHIAN PRECISION	PO BOX K	HOLDEN	25625	WV	HARDWOOD DIMENSION-FLOORING MILLS (MFRS)	10,451
EXEL HOMES INC	527 ODD RD	GHENT	25843	WV	MOBILE HOMES-MANUFACTURERS	10,331
ELECTROCRAFT ENGINEERED SLTNS	250 MCCORMICK RD	GALLIPOLIS	45631	OH	ELECTRIC MOTORS-MANUFACTURERS	10,271
AMERICAN CAR & FOUNDRY	2300 3RD AVE	HUNTINGTON	25703	WV	RAILROAD EQUIPMENT (MANUFACTURERS)	10,138
ATHENS MESSENGER	PO BOX 4210	ATHENS	45701	OH	NEWSPAPERS (PUBLISHERS/MFRS)	10,065
LEXINGTON METAL SYSTEMS LLC	310 FLINT DR	MT STERLING	40353	KY	METAL GOODS-MANUFACTURERS	10,051
PRECISION RESOURCE	171 OAK GROVE DR	MT STERLING	40353	KY	METAL STAMPING (MANUFACTURERS)	10,018
CRYSTAL TISSUE CO	1118 PROGRESS WAY	MAYSVILLE	41056	KY	CONVERTED PAPER/PAPERBRD PROD NEC (MFRS)	9,687
CONTINENTAL CONVEYOR & EQUIP	PO BOX 189	SALYERSVILLE	41465	KY	CONVEYORS & CONVEYING EQUIPMENT-MFRS	9,248
DAILY INDEPENDENT	PO BOX 311	ASHLAND	41105	KY	NEWSPAPERS (PUBLISHERS/MFRS)	8,963
HEINER'S BAKERY INC	PO BOX 9247	HUNTINGTON	25704	WV	BREAD/OTHER BAKERY PROD-EX COOKIES (MFR)	8,779
SUMMIT POLYMERS INC	160 CLARENCE DR	MT STERLING	40353	KY	PLASTICS-MOLD-MANUFACTURERS	8,723
NGK SPARK PLUG MFG USA	1 NGK DR	SISSONVILLE	25320	WV	AUTOMOBILE PARTS & SUPPLIES-MFRS	8,413

COMPANY NAME	ADDRESS	CITY	ZIP	STATE	STANDARD INDUSTRY CLASSIFICATION	ESTIMATED ANNUAL TONS
PORTSMOUTH DAILY TIMES	PO BOX 581	PORTSMOUTH	45662	OH	NEWSPAPERS (PUBLISHERS/MFRS)	8,293
CRAFTCO HARDWOOD FLOORS	9597 STATE ROUTE 125	WEST PORTSMOUTH	45663	OH	HARDWOOD DIMENSION-FLOORING MILLS (MFRS)	7,316
DIAMOND ELECTRIC MFG	PO BOX 830	ELEANOR	25070	WV	AUTOMOBILE PARTS & SUPPLIES-MFRS	7,211
MOULDAGRAPH CORP	PO BOX 99	NITRO	25143	WV	GASKETS-PACKING & SEALING DEVICES (MFRS)	7,175
AMERICAN NATIONAL RUBBER CO	PO BOX 878	CEREDO	25507	WV	RUBBER-MFRS SUPPLIES (MANUFACTURERS)	6,885
ASHLAND SPECIALTY CO	125 29TH ST	ASHLAND	41101	KY	CIGAR CIGARETTE & TOBACCO-MANUFACTURERS	6,813
RAVENSWOOD SPECIALTY	PO BOX 309	RAVENSWOOD	26164	WV	PLASTICS & PLASTIC PRODUCTS (MFRS)	6,711
SDR PLASTICS INC	PO BOX 249	RAVENSWOOD	26164	WV	PLASTICS-EXTRUDERS (MANUFACTURERS)	6,628
PENNCO INC	5601 ROBERTS DR	ASHLAND	41102	KY	ALUMINUM FABRICATORS (MFRS)	6,388
HOLLINEE MANUFACTURING	PO BOX 600	VANCEBURG	41179	KY	MANUFACTURERS	6,165
MANCHESTER SIGNAL	414 E 7TH ST	MANCHESTER	45144	OH	NEWSPAPERS (PUBLISHERS/MFRS)	6,121
GALLIPOLIS DAILY TRIBUNE	PO BOX 469	GALLIPOLIS	45631	OH	NEWSPAPERS (PUBLISHERS/MFRS)	5,920
BLENKO GLASS CO	PO BOX 67	MILTON	25541	WV	GLASS-MANUFACTURERS	5,744
M & J INDUSTRIES INC	832 FAIRGROUND RD	LUCASVILLE	45648	OH	STEEL-STRUCTURAL (MANUFACTURERS)	5,702
WHAYNE SUPPLY CO	359 S LANKS BR	PIKEVILLE	41501	KY	MANUFACTURERS DISTRS & INDL PRODUCTS	5,617
BIG SANDY NEWS	PO BOX 766	LOUISA	41230	KY	NEWSPAPERS (PUBLISHERS/MFRS)	5,564
SUN CHEMICAL	100 WURTS RD	WURTLAND	41144	KY	INORGANIC PIGMENTS (MANUFACTURERS)	5,503
LEDGER INDEPENDENT	120 LIMESTONE ST	MAYSVILLE	41056	KY	NEWSPAPERS (PUBLISHERS/MFRS)	5,305

COMPANY NAME	ADDRESS	CITY	ZIP	STATE	STANDARD INDUSTRY CLASSIFICATION	ESTIMATED ANNUAL TONS
WEASTEC	2495 MOORES RD	SEAMAN	45679	OH	MANUFACTURERS	5,265
ROGERS FOAM CORP	120 CLARENCE DR	MT STERLING	40353	KY	PHYSICIANS & SURGEONS EQUIP & SUPLS-MFRS	5,161
PORTEC RAIL PRODUCTS INC	900 9TH AVE W	HUNTINGTON	25701	WV	RAILROAD EQUIPMENT (MANUFACTURERS)	5,131
ACUMENT GLOBAL TECHNOLOGIES	525 MOUNT CARMEL AVE	FLEMINGSBURG	41041	KY	BOLTS NUTS SCREWS RIVETS/WASHERS (MFRS)	5,104
TERRAMITE CORPORATION	PO BOX 7146	CHARLESTON	25356	WV	CONSTRUCTION MACHINERY & EQUIP (MFRS)	5,057
S & E PRINTING	PO BOX 489	NITRO	25143	WV	SCREEN PRINTING (MFRS)	4,884
ENGINES INC	1 ELECTRIC RD	MILTON	25541	WV	STEEL-STRUCTURAL (MANUFACTURERS)	4,808
NATIONAL ARMATURE & MACHINE	PO BOX 655	HOLDEN	25625	WV	INDSTRL/COML MACHINERY/EQUIP NEC (MFRS)	4,710
ITW RAMSET	7000 BYPASS RD	PARIS	40361	KY	FASTENERS-INDUSTRIAL-PAINTING (MFRS)	4,652
SEALMASTER BEARINGS	101 SEALMASTER LN	MOREHEAD	40351	KY	BALL & ROLLER BEARING (MANUFACTURERS)	4,647
KANAWHA MANUFACTURING CO	PO BOX 1786	CHARLESTON	25326	WV	GRAY & DUCTILE IRON FOUNDRIES (MFRS)	4,571
LEVEL 1 FASTENERS INC	300 3RD AVE	HUNTINGTON	25701	WV	BOLTS & NUTS-MANUFACTURERS	4,486
TRI-RIVERS ADVERTISER	PO BOX 766	LOUISA	41230	KY	NEWSPAPERS (PUBLISHERS/MFRS)	4,174
MOUNTAIN INTERNATIONAL TRUCKS	PO BOX 7771	CHARLESTON	25356	WV	TRUCK EQUIPMENT & PARTS-MANUFACTURERS	4,113
LON MORE CO	6962 HIGHWAY 460	MEANS	40346	KY	MANUFACTURERS	4,095
APPALACHIAN NEWS-EXPRESS	129 CAROLINE AVE	PIKEVILLE	41501	KY	NEWSPAPERS (PUBLISHERS/MFRS)	3,927
LOGAN BANNER	435 STRATTON ST	LOGAN	25601	WV	NEWSPAPERS (PUBLISHERS/MFRS)	3,920
JOY MACHINERY INC	PO BOX 307	MILLERSBURG	40348	KY	CONSTRUCTION MACHINERY & EQUIP (MFRS)	3,889

COMPANY NAME	ADDRESS	CITY	ZIP	STATE	STANDARD INDUSTRY CLASSIFICATION	ESTIMATED ANNUAL TONS
WEST VIRGINIA STEEL	PO BOX 2511	CHARLESTON	25329	WV	STEEL-STRUCTURAL (MANUFACTURERS)	3,853
CARSON INDUSTRIES	280 MIDLAND TRL	MT STERLING	40353	KY	PLASTICS-MOLD-MANUFACTURERS	3,662
C I THORNBURG CO	4034 ALTIZER AVE	HUNTINGTON	25705	WV	FABRICATED PIPE & PIPE FITTINGS (MFRS)	3,625
GENESIS OXYGEN & HOME MEDICAL	PO BOX 1325	PORTSMOUTH	45662	OH	PHYSICIANS & SURGEONS EQUIP & SUPLS-MFRS	3,398
SCIOTO PLASTICS LLC	PO BOX 300	FRANKLIN FURNACE	45629	OH	PLASTICS-BLOW MOLDING (MANUFACTURERS)	3,314
ROD & STAFF PUBLISHERS	PO BOX 3	CROCKETT	41413	KY	BOOKS-PUBLISHING & PRINTING (MFRS)	3,136
A O SMITH ELECTRICAL PRODUCTS	2001 OWINGSVILLE RD	MT STERLING	40353	KY	POWER DISTR/SPECIALTY TRANSFORMER (MFRS)	3,056
TRIPLE S MANAGEMENT CORP	176 RAGLAND RD	BECKLEY	25801	WV	STEEL-STRUCTURAL (MANUFACTURERS)	3,018
APPALACHIAN REGIONAL MFG	1140 LAKESIDE DR	JACKSON	41339	KY	LOCKS-MFRS-EXCEPT SAFE VAULT COIN	2,941
GATEWAY MANUFACTURING	2671 OWINGSVILLE RD	MT STERLING	40353	KY	ASSEMBLY & FABRICATING SERVICE (MFRS)	2,925
WALD LLC	PO BOX 10	MAYSVILLE	41056	KY	MOTORCYCLE-BICYCLE & PARTS (MFRS)	2,884
COWDEN-MOREHEAD CO	606 W MAIN ST	MOREHEAD	40351	KY	WOMEN'S MISSES/JRS OUTERWEAR NEC (MFRS)	2,819
TRANSCRAFT	3379 OWINGSVILLE RD	MT STERLING	40353	KY	TRUCK-TRAILER (MANUFACTURERS)	2,760
COMPRECARE	1308 4TH AVE	HUNTINGTON	25701	WV	HOSPITAL EQUIPMENT & SUPPLIES-MFRS	2,744
BATH MANUFACTURING	PO BOX 960	OWINGSVILLE	40360	KY	MENS & BOYS WORK CLOTHING (MFRS)	2,692
WELDING INC	1712 PENNSYLVANIA AVE	CHARLESTON	25302	WV	PIPE BENDING & FABRICATING (MFRS)	2,643
SPECIAL METALS INC	29500 MAYO TRAIL RD	CATLETTSBURG	41129	KY	PRIMARY SMELTING/REFINING-NONFERROUS MTL	2,552
TRAMCO SERVICES INC	PO BOX 770	WILLIAMSON	25661	WV	METAL GOODS-MANUFACTURERS	2,512

COMPANY NAME	ADDRESS	CITY	ZIP	STATE	STANDARD INDUSTRY CLASSIFICATION	ESTIMATED ANNUAL TONS
AMERICAN STANDARD INC	PO BOX 910	PAINTSVILLE	41240	KY	PLUMBING FIXTURE FITTINGS & TRIM (MFRS)	2,505
ZIM'S BAGGING CO	PO BOX 455	KENOVA	25530	WV	BAGS-PLASTIC (MANUFACTURERS)	2,435
CMC/CLA	150 WHEAT DR	PARIS	40361	KY	AUTOMOBILE PARTS & SUPPLIES-MFRS	2,410
SYSCAN CORP	PO BOX 2029	CHARLESTON	25327	WV	PRINTERS (MFRS)	2,279
WEST VIRGINIA SPRING-RADIATOR	PO BOX 8155	SOUTH CHARLESTON	25303	WV	SPRINGS-MANUFACTURERS	2,258
IMPERIAL BEDDING CO	PO BOX 5347	HUNTINGTON	25703	WV	MATTRESSES/FOUNDATIONS/CONV BEDS (MFRS)	2,118
STEWART-MAC DONALD'S GUITAR	PO BOX 900	ATHENS	45701	OH	MUSICAL INSTRUMENTS-MANUFACTURERS	2,107
ASHLAND OFFICE SUPPLY INC	PO BOX 2409	ASHLAND	41105	KY	COMMERCIAL PRINTING NEC (MFRS)	2,023
HUNTINGTON STEEL & SUPPLY CO	PO BOX 1178	HUNTINGTON	25714	WV	CULVERTS	1,919
ROCK BRANCH MECHANICAL	132 HARRIS DR	POCA	25159	WV	HEATING CONTRACTORS	1,800
WHITE ARMATURE WORKS	PO BOX 330	MALLORY	25634	WV	MANUFACTURING-AUGERS & TRENCHERS	1,799
MAVERICK AWNING INC	1207 S KANAWHA ST	BECKLEY	25801	WV	AWNINGS & CANOPIES-MANUFACTURERS	1,717
BJW PRINTING & OFFICE SUPLS	PO BOX 1309	BECKLEY	25802	WV	PRINTERS-BOOKS (MFRS)	1,583
BONEAL INC	PO BOX 49	MEANS	40346	KY	MANUFACTURERS DISTRS & INDL PRODUCTS	1,561
WEST VIRGINIA STEEL	PO BOX 1029	POCA	25159	WV	BUILDINGS-METAL	1,445
MITCHELLACE INC	PO BOX 89	PORTSMOUTH	45662	OH	NARROW FABRIC & OTHER SMALLWARES-MILLS	1,384
EARLY WARNING SECURITY INC	PO BOX 1009	ASHLAND	41105	KY	SECURITY CONTROL EQUIP & SYSTEMS-MFRS	1,357
J H FLETCHER & CO	PO BOX 2187	HUNTINGTON	25722	WV	MANUFACTURING-AUGERS & TRENCHERS	1,310

COMPANY NAME	ADDRESS	CITY	ZIP	STATE	STANDARD INDUSTRY CLASSIFICATION	ESTIMATED ANNUAL TONS
PARIS MACHINING CO	1020 WES LEE DR	PARIS	40361	KY	MACHINE SHOPS (MFRS)	1,294
ARMACELL LLC	100 LOCUST AVE	SPENCER	25276	WV	RUBBER & PLASTICS-FOOTWEAR (MFRS)	1,192
ROCAL INC	3186 COUNTY ROAD 550	FRANKFORT	45628	OH	METAL GOODS-MANUFACTURERS	1,132
RICHWOOD INDUSTRIES INC	PO BOX 1298	HUNTINGTON	25714	WV	CONVEYOR PARTS & SUPPLIES (MFRS)	1,124
YSK CORP	1 COLOMET RD	CHILLICOTHE	45601	OH	MACHINE TOOLS-MANUFACTURERS	1,015
ADVANTAGE PLUS	PO BOX 99	NITRO	25143	WV	CENTRIFUGAL MACHINERY (MANUFACTURERS)	987
PERSINGER SUPPLY CO	122 PRICHARD INDUSTRIAL PK RD	PRICHARD	25555	WV	PUMPS-MANUFACTURERS	943
ASHLAND SALES & SVC INC	PO BOX 527	OLIVE HILL	41164	KY	COATS-MANUFACTURERS	917
AIR SYSTEMS SHEET METAL CO	PO BOX 9426	HUNTINGTON	25704	WV	SHEET METAL WORK CONTRACTORS	862
ESM II	100 ARMCO RD	ASHLAND	41101	KY	MACHINE SHOPS (MFRS)	859
LION APPAREL INC	318 DOGWOOD LN	WEST LIBERTY	41472	KY	APPAREL & ACCESSORIES NEC (MFRS)	856
BREWER & CO OF WV INC	PO BOX 3108	CHARLESTON	25331	WV	PLUMBING HEATING & AIR CONDITIONING	761
MC SWEENEY'S MILL & MINE SVC	3840 COUNTY ROAD 15	SOUTH POINT	45680	OH	TOOLS-MANUFACTURERS	716
WELCO TECHNOLOGIES	737 ARNOLD AVE	MAYSVILLE	41056	KY	ELECTRIC MOTORS-MANUFACTURERS	695
INFOSIGHT CORP	PO BOX 5000	CHILLICOTHE	45601	OH	METALWORKING MACHINERY NEC (MFRS)	672
IMPERIAL ELECTRIC CO	345 SYCAMORE ST	MIDDLEPORT	45760	OH	MOTOR & GENERATOR-MANUFACTURERS	661
STOBER DRIVES INC	1781 DOWNING DR	MAYSVILLE	41056	KY	GEARS & GEAR CUTTING (MANUFACTURERS)	566
CARTER INDUSTRIES	PO BOX 1360	OLIVE HILL	41164	KY	ARMY & NAVY GOODS-MANUFACTURERS	542

COMPANY NAME	ADDRESS	CITY	ZIP	STATE	STANDARD INDUSTRY CLASSIFICATION	ESTIMATED ANNUAL TONS
CREAMX PRODUCTS	PO BOX 110	BOLT	25817	WV	MANUFACTURING-AUGERS & TRENCHERS	523
STRUM INC	1305 MAIN ST	BARBOURSVILLE	25504	WV	PUMPS & PUMPING EQUIPMENT (MFRS)	518
CHANDLER'S PLYWOOD PRODUCTS	3716 WAVERLY RD	HUNTINGTON	25704	WV	BATHROOM REMODELING	514
AMERICAN ELECTRIC EQUIPMENT	PO BOX 710	BECKLEY	25802	WV	MANUFACTURING-AUGERS & TRENCHERS	513
BRENMAR CONSTRUCTION INC	900 MORTON ST	JACKSON	45640	OH	GENERAL CONTRACTORS	472
MC CORKLE MACHINE & ENGRG	PO BOX 2047	HUNTINGTON	25720	WV	ROLLING MILL MACHINERY (MANUFACTURERS)	428
WOOTEN MACHINE CO	3571 16TH STREET RD	HUNTINGTON	25701	WV	SPECIAL INDUSTRY MACHINERY NEC (MFRS)	359
RPM INC	12015 MIDLAND TRAIL RD	ASHLAND	41102	KY	PUMPS & PUMPING EQUIPMENT (MFRS)	264
MC GINNIS INC	502 2ND ST E	SOUTH POINT	45680	OH	CONSTRUCTION-HEAVY PROJECTS	222
SUPERIOR MARINE	PO BOX 519	SOUTH POINT	45680	OH	BOAT PART-USED & REBUILT (MFRS)	208
SERVICE PUMP & SUPPLY CO	PO BOX 2097	HUNTINGTON	25721	WV	PUMPS-MANUFACTURERS	158
SUPERIOR MANUFACTURING SVC INC	357 INDUSTRIAL PARK RD	BEAVER	25813	WV	PRINTED & ETCHED CIRCUITS-MFRS	36
AEROFRAME	3455 CROSS RD	WINCHESTER	45697	OH	AEROSPACE INDUSTRIES (MFRS)	26

Appendix III

Appendix III: Global Insight World Trade Service

A Brief Introduction to the World Trade Forecasting Methodology

Introduction

The primary purpose of Global Insight's world trade forecasting system is to provide information to assist decision makers involved with international transportation. International transportation businesses, such as ocean shipping companies, terminal operators and port authorities, need detailed global trade volume forecasts for their operations and development planning. Policy makers and managers in companies that are not in the transportation business also can use these comprehensive forecasts to analyze world trade issues.

To meet the needs of the users, our global trade forecasts include all commodities that have physical volume, but not trade in services or commodities without physical volume, such as electricity. These commodities are grouped into our own categories derived from the International Standard Industrial Classification (ISIC). We cover 77 ISIC categories, as listed in Table 1 of the Appendix to this paper.

For all trade partners in the world, we track 54 major countries individually and group the rest of the countries in the world into 16 regions according to their geographic location.[1] Therefore, we forecast 77 commodities traded among 70 country/regions. This is a framework of 77×70×(70-1), or 371,910 potential trade flows. Because not every country trades every commodity with every other country, we presently have about 270,000 trade flows in our forecasts.

We forecast world trade in nominal and real commodity value and then convert to physical volume by transportation mode. Primary modes of transportation include air, overland and maritime transport, all measured in metric tons as well as in value. Maritime transport is further detailed for liquid bulk, dry bulk, general cargo/neobulk, and container trades. Container trade is measured in twenty foot equivalent units (TEUs) as well as metric tons. Table 3 in the Appendix shows the 18 concepts of the world trade in the forecast.

Trade Data Sources

The primary international trade history data come from the United Nations as processed and published by Statistics Canada. These commodity trade statistics are collected from each member country's customs agencies. Customs departments have records of both the export and import sides of trade flows. Statistics Canada produces export data in f.o.b. (free on board) terms, which are better to use in estimating the real value of the commodity trade. This data covers all UN member countries and non-member economies, such as Taiwan. Global Insight also purchases OECD International Trade by Commodity Statistics for more current data from the developed countries.

Because international trade statistics collected by different countries usually have discrepancies when compared to each other, and because no one source has entirely complete data, we also use U.S. Customs data and IMF Direction of Trade data to calibrate and supplement the historical commodity trade data. Data from different sources are recorded in different classification systems and units of measurement. We convert the data into thousands of current U.S. dollars and then into 1997 real commodity value.

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[1] Table 2 in the appendix lists the 54 countries and 16 regions used in the trade forecasting models.

The world trade forecasting models also rely on Global Insight's comprehensive macroeconomic history and forecast databases. Among the data used are population, GDP, GDP deflators, industrial output, foreign exchange rates, and export prices by country. We use these data as exogenous variables in the trade forecast models. For international commodity prices, we also obtain data from the U.S. Bureau of Labor Statistics' on international import and export prices. We also use other data, such as foreign direct investment and import tariffs, as available, as determinants of a country's export capacity and import costs.

Modeling International Trade

The basic structure of the model for the trade flow of a commodity is that a country's import from another country are driven by the importing country's demand forces, enabled by the exporting country's capacity of exporting (supplying) the commodity, and affected by the exporting country's export price and importing country's import cost for the commodity. A country will import more of a commodity if its demand for this commodity increases. At the same time, the country will import more of this commodity from a particular exporting country if that exporter's capacity to export this commodity is larger and its export price for this commodity is lower than in other exporting countries. Importers will ultimately purchase based on the delivered cost, importing more when the import cost decreases. The distance between two countries is also an important factor in determining the scale of trade between two countries. Our models are constructed to capture the dynamics of international trade so that geographic distance as a constant is embedded in determining the scale of the base.

Demand forces are commodity specific. Presently, we group 77 commodities into two types. For the first type of commodities, major demand forces are the importing country's population and income growth. For the second type of commodities, the major demand forces are the importing country's production and technology development.

A country's export capacity for a commodity is estimated based on the country's capacity to produce this commodity and its ability to export it. The infrastructure, the establishments and resources that are needed for production determine production capacity. For export capabilities, we pay attention to the capacity that exceeds that needed to meet a country's domestic demand. Export capability is also determined by the quality and cost of the products that face competition in world markets.

Import costs are determined by export prices, import tariffs, and each importing country's foreign exchange rates. We categorize our 77 commodities into three groups to control the estimation of the impact of import costs on countries' imports of each commodity. These three groups generally can be described as price inelastic, low price elastic, and price elastic.

The models are constructed in real value terms. That is, value type variables are in terms of value minus the effect of price inflation. For example, the trade flow of a commodity is measured in the 1997 value of this commodity, and GDP of a country is measured in its 1990 value of GDP. We use the data in real value terms, because only in real terms do the levels of imports and exports show clear respective responses to changes in demand, supply, and prices.

As our main purpose is not simply forecasting a country's aggregate imports and exports, the models must be able to forecast each country's imports and exports with each of its trade partners. Trade between each pair of trading partners is generally quite volatile with importing behavior exhibiting switching of suppliers on an ongoing basis. A very simple example of switching behavior is when the pattern of an exporter's supply dynamic is smaller

than the importer's demand dynamic, the exporter's supply dynamic will dominate the trade. In the opposite case, when an importer's demand dynamic is smaller than the exporter's supply dynamic, the importer's demand dynamic will dominate the trade. To capture such a pattern switch, we use multi-stage switch models.

Model Estimation

To minimize the impact of measurement errors and achieve stationarity for valid estimation of times series models, our models are constructed to represent the relationship between year-over-year growth indexes of commodity trade and the year-over-year growth indexes of other exogenous variables. Because the calculated year-over-year index is asymmetric around unity, it can exaggerate growth dynamics if the present year is an upturn and the previous year is a downturn. This problem can be serious for the detailed international trade data that have very volatile dynamics. To reduce such asymmetric distortion in model estimation, we rectify the asymmetry in the data before estimating the trade models.

Our trade models are nonlinear multi-stage switch models. Switch models are not continuous functions, so conventional derivative methods cannot be applied to estimating these models. So to estimate the trade models, we use a direct search method. Though thus use of the direct search method is infrequent in economic forecasting, it is popular in other scientific fields. This is because economists often abstract from reality to fit simplified theoretical models, while scientists must construct their models to capture reality as evidenced in empirical data. Our experience has shown that international trade of goods among world markets are so complicated with regard to each commodity, each pair of partners, and over time that they cannot be sufficiently abstracted to fit into simple continuous functions for accurate forecasting. Instead we have developed our system using complex switch functions, for which we employ a direct search method for estimation.

For estimating simple continuous functions, derivative methods have the advantage of quick convergence. However, with faster computers and decreasing computation costs convergence time is no longer a problem. This means our ability to estimate practical models can depend upon the criterion used for choosing our estimation method. The direct search method we use has three major advantages over conventional derivative methods. The first advantage, which is the most important one, is that it can be used to estimate switch functions. The second advantage is that it allows us to freely define our error minimization function. For forecasting it is minimizing the relative absolute error not the sum of squared error that is important for producing the most accurate models. However, an absolute error function is not continuous so we use a direct search method for its estimation. For nonlinear models, the continuous error function defined for derivative methods sometimes cannot avoid multi local minimums, so use of a derivative method frequently cannot attain global minima. Through the use of the direct search method, we can freely define the error function to only contain one minimum. The third advantage is that the direct search method allows us to conveniently set the boundary of model parameters. That means it allows us to apply prior information to our model estimation.

Forecast Approach

There are two key factors that influenced our choice of forecasting approach. One is the scale of our trade forecasts, and the other is the real character of international trade. The real character of international trade includes economic resource constraints, heterogeneous import behavior, and overall supply and demand equilibrium.

Previous international trade forecasting approaches can be categorized as bottom-up, top-down, and a (manual) hybrid approach. Our forecasting experience leads us to believe that none of these approaches are suitable to best meet our requirements. The bottom-up approach

requires that the individual items to be forecast are not subject to total resource constraints or an overall equilibrium. This denies the existence of real resource constraints in international trade. For just one example, a country's imports are limited by its income constraint. We also find that there is an overall equilibrium in international trade, where no country can export more than what other countries are willing to import from it. In contrast, the top-down approach requires that individual items to be forecast have identical dynamic patterns. Examining commodity trade statistics quickly reveals that it is difficult to find one country's imports of a commodity from two different countries that have the same dynamic patterns. So this approach is not appropriate either. To overcome the shortcomings of using the bottom-up or top-down approaches alone, some economists have forecast individual commodities and their aggregates simultaneously and then manually reconciled the difference between the sum of individual forecasts and the aggregate forecasts. This is called a hybrid approach, which is generally a manual method. Unfortunately, the manual reconciliation is very time consuming, so it cannot be efficiently applied to comprehensive forecasts such as ours, which include more than a quarter million forecast series.

To overcome the weaknesses in these approaches, we have built a system that can be described as a top-down controlled approach. To implement this approach, we aggregate detailed trade flows to three top levels. We call the most detailed trade flows Level 4 (the lowest level) and aggregate them up level-by-level in the following structure:

Level 1

L1: World trade of total commodities,

$1 \times 1 \times 1 = 1$ series.

Level 2

L2C: World trade by commodity,

$77 \times 1 \times 1 = 77$ series.

L2M: Total commodities that each country/region imports from the world,

$1 \times 1 \times 70 = 70$ series.

L2X: Total commodities that each country/region exports to the world,

$1 \times 70 \times 1 = 70$ series.

Level 3

L3M: Commodities that each country/region imports from the world,

$77 \times 1 \times 70 = 5{,}390$ series maximum.

L3X: Commodities that each country/region exports to the world,

77×70×1 = 5,390 series maximum.

Level 4

L4: Commodities traded between each pair of countries/regions,

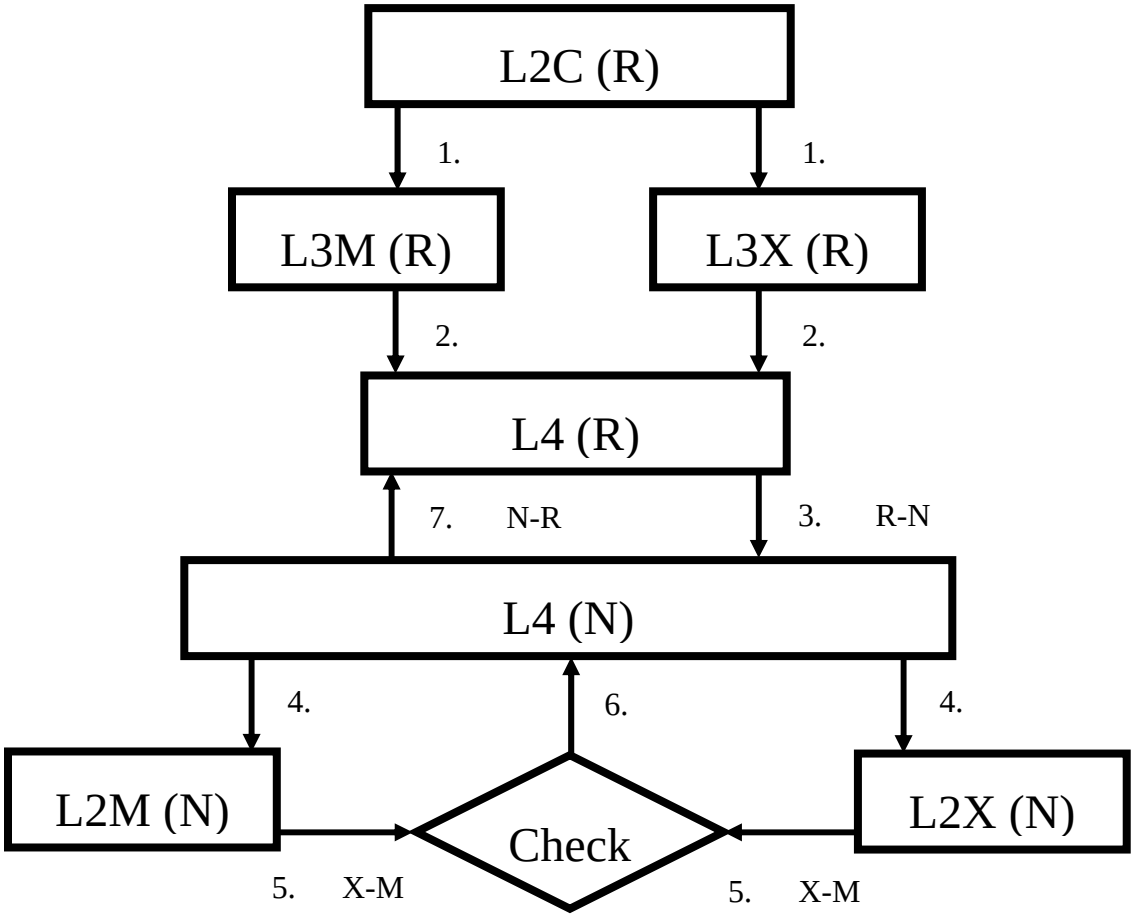
77×70×(70-1) = 371,910 series maximum.

In this hierarchical structure, each series in levels L2C, L3M, L3X, and L4 has its own behavioral equation in the model structure (as described above in section 3). In this top-down controlled forecasting approach, each series is forecast by its own behavioral equation, but individual items at the lower level are forecast under the control of the forecast of their aggregate at the higher level. The forecasting program detects the discrepancy between the sum of individual forecasts and the aggregate forecast, identifies individual items that can be adjusted, and adjusts them step by step to diminish the discrepancies. The identification and adjustment are based on the estimated allowable variation of the behavior models. With such a design, the top-down controlled forecast adheres to the reality that international trade is subject to economic resource constraints, has heterogeneous behavior, and will attain overall supply and demand equilibrium.

Forecasting Process

Our forecast approach determines our forecasting process, as shown by the flowchart that follows. The numbers in the flowchart indicate the sequence of the forecasting. The forecast starts from L2C. These are the top-level forecasts. We then use them to do top-down controlled forecasting of L3M and L3X, and in turn use L3M and L3X to do top-down controlled forecasting of L4. They are all forecast in real commodity value. After we obtain the detailed forecasts of the international trade in real commodity value, we check whether the overall forecast implies a reasonable trade balance that we should expect for every country/region according to their macro economic development. Trade balance is a financial concept that we need to examine in nominal, not real, value terms. Therefore, we convert real value L4 into nominal value L4 and then aggregate them to import and export by country/region, i.e., L2M and L2X in nominal value. Although our forecast does not include service sectors, we take into account the development of services trade for each country/region when examining the trade balance between L2M and L2X. If the forecasted trade balance for a country/region is not reasonable, we adjust L2M or L2X, or both, and then use the adjusted L2M and L2X to do a top-down controlled adjustment of the nominal L4 detailed trade. Because the trade of these countries/regions link to each other, adjusting the trade balance of one country/region affects the trade balance of other country/regions, depending on the magnitudes of their trade links. Therefore, usually we need several rounds of adjustments to attain reasonable trade balances for all country/regions. After completing the trade balance check and adjustment step, we convert nominal value L4 to real value L4 and aggregate these final detailed forecasts to their upper three levels.

Global Insight World Trade Forecasting Process



Where:

R – real commodity value

N – nominal value

TDCF – top-down-controlled forecast

R-N CV – real-nominal value conversion

AG – aggregation

X-M CP – export-import balance comparison

TDCAD – top-down-controlled adjustment

N-R CV – nominal-real value conversion

Because the release of trade data always lags behind current trade activity, and because behavioral forecasting models cannot include unexpected events, such as disease outbreaks in livestock, oil price shocks, earthquakes, strikes, wars, etc., we create dummy variable multipliers for each series, and modify some of them at certain levels in accordance with development of events in the world.

Converting Real Value Trade to Transportation Volume

There are predictable relationships between the physical volume and the real value of each trade flow. After we obtain the forecasts of world trade in real commodity value, we use these relationships to convert the real commodity value to the physical volume of 77 commodities transported among 70 countries/regions, by transportation mode. We first convert the commodity flows to the value and physical volumes shipped by different transportation modes. Transportation mode represents the primary mode of transport used in the international shipment, usually for the greatest distance (or line haul) part of the complete origin-to-destination shipment. These major modes are air, overland/other (comprised mainly of truck, rail and pipeline) and maritime. For maritime trade, we further distinguish between liquid bulk, dry bulk, general cargo/neobulk and container trade. The volume of commodities carried by each mode reflects the historic shares carried by each mode, at a commodity-specific and trade route-specific basis with adjustments made to maritime shares based on observed shifts in share between the types of maritime shipping. For container trades, the forecast tonnage volume is further translated into twenty-foot equivalent units (TEUs) through application of commodity-specific and trade route-specific stowage factors for twenty-foot and forty-foot containers and the mix of twenty-foot and forty-foot containers used on each trade route. (The full list of forecast trade concepts produced is shown in Table 3 of the Appendix.).

Forecast Range and Frequency

The history of our trade statistics starts from 1980 and extends to about a one-year lag from the current time. We forecast 20 or more years into the future, depending on clients' needs. Our forecasts are annual series, because the main historical trade data are reported as annual series. However, our supplementary trade data and exogenous macro economic data can be annual series, quarterly series, or monthly series. They are updated quarterly or monthly so we update our trade forecasts every quarter.

World Trade Methodology

Table 1. Global Insight World Trade Service Forecast Commodity Categories

Count	ISIC	Description
1	1A	3.1.1.1 Grain
2	1B	Oil Seeds
3	1C	Vegetables, Fruits and Eggs – Requiring Refrigeration
4	1D	Vegetables and Fruits - non-Refrigerated
5	1E	Cork and Wood
6	1F	Natural Rubber
7	1G	Cotton
8	1H	Other Raw Textile Materials
9	1I	Other Agriculture
Count	**ISIC**	**Descriptions (continued)**
10	2A	Stone, Clay and Other Crude Minerals
11	2B	Crude Fertilizers
12	2C	Ores and Scrap
13	2D	Coal
14	2E	Crude Petroleum
15	2F	Natural Gas
16	2G	Scrap
17	311A	Meat/Dairy/Fish Requiring Refrigeration
18	311B	Other Meat/Dairy/Fish

19	311C	Sugar
20	311D	Animal Feed
21	311E	Animal and Vegetable Oils
22	311F	Other Food
23	313	Beverages
24	314	Tobacco
25	321	Textiles
26	322	Wearing Apparel
27	323	Leather and Products
28	324	Footwear
29	331	Wood Products
30	332	Furniture and Fixtures
31	341A	Waste Paper
32	341B	Pulp
33	341C	Paper and Paperboard and Products
34	342	Printing and Publishing
35	3511A	Organic Chemicals
36	3511B	Inorganic Chemicals
37	3512	Fertilizers and Pesticides
38	3513	Synthetic Resins
39	3521	Paints, Varnishes and Lacquers

40	3522	Drugs and Medicines
41	3523	Soap and Cleaning Preparations
42	3529	Chemical Products, nec.
43	353	Petroleum Refineries
44	354A	Briquettes and Coke
45	354B	Residual Petroleum Products
46	355	Rubber Products
47	356	Plastic Products, nec.
48	361	Pottery, China etc.
49	362	Glass and Products
50	369	Non-Metallic Products, nec.
51	371	Iron and Steel
52	372	Non-Ferrous Metals
53	381	Metal Products
54	3821	Engines and Turbines
Count	**ISIC**	**Descriptions (continued)**
55	3822	Agricultural Machinery
56	3823	Metal and Wood Working Machinery
57	3824	Special Industrial Machinery
58	3825	Office and Computing Machinery
59	3829	Machinery and Equipment, nec.

60	3831	Electrical Industrial Machinery
61	3832A	Radio and TV
62	3832B	Semi-conductors, Electronic Tubes, etc.
63	3832C	Other Communications Equipment
64	3833	Electrical Appliances and Houseware
65	3839	Electrical Apparatus, nec.
66	3841	Shipbuilding and Repairing
67	3842	Railroad Equipment
68	3843A	Motor Vehicles
69	3843B	Parts of Motor Vehicles
70	3844	Motorcycles and Bicycles
71	3845	Aircraft
72	3849	Transport Equipment, nec.
73	3851	Professional Equipment
74	3852	Photographic and Optical Goods
75	3853	Watches and Clocks
76	390	Other Manufacturing, nes.
77	399	Goods not classified by kind

Note: nec – not elsewhere classified; nes – not elsewhere specified

Table 2. Global Insight World Trade Service Forecasting Countries/Regions

Count	Country Name	Count	Country Name
1	United States	41	3.1.1.2 Pakistan
2	Canada	42	Venezuela
3	Japan	43	Brazil
4	Germany	44	Argentina
5	France	45	3.1.1.3 Colombia
6	United Kingdom	46	Peru
7	Italy	47	Chile
8	Austria	48	Mexico
9	Belgium	49	Israel
10	Denmark	50	Saudi Arabia
11	Finland	51	United Arab Emirates
12	Greece	52	Egypt
13	Ireland	53	Kenya
14	Netherlands	54	South Africa
15	Norway		
16	Portugal	**Aggregate Regions**	
17	Spain	**Count**	**Region Name**
18	Sweden	55	Other Europe
19	Switzerland	56	Baltic States

20	Turkey	57	CIS West
21	Russia	58	CIS Southeast
22	Poland	59	Other Indian Subcontinent
23	Czech Republic	60	Other East Coast of South America
24	Slovak Republic	61	Other West Coast of South America
25	Hungary	62	Caribbean Basin
26	Romania	63	Other Central America
27	Bulgaria	64	Other Persian Gulf
28	Australia	65	Other Mediterranean Region
29	New Zealand	66	Other North Africa
30	China	67	Other East Africa
31	Taiwan	68	Western Africa
32	Hong Kong	69	Other South Africa
33	South Korea	70	Other Region
34	Indonesia		
35	Philippines		
36	Singapore		
37	Malaysia		
38	Thailand		
39	Vietnam		
40			

Table 3. Global Insight World Trade Service Forecast Concepts

Count	Concept
1	Nominal Value
2	Real Value
3	Airborne Nominal Value
4	Seaborne Nominal Value
5	Airborne Real Value
6	Seaborne Real Value
7	Airborne Metric Tons
8	Seaborne Metric Tons
9	Tanker Metric Tons
10	Dry Bulk Metric Tons
11	General Cargo/Neobulk Metric Tons
12	Container Metric Tons
13	Number of 20 foot Containers
14	Number of 40 foot Containers
15	Container Twenty-foot Equivalent Units (TEUs)
16	Over Land / Other Transportation Nominal Value
17	Over Land / Other Transportation Metric Tons
18	All Transportation Mode Metric Tons

Appendix IV

Appendix IV. List of Regional Trailer-On-Flat-Car (TOFC) and Container-On-Flat-Car (COFC) Intermodal Facilities

FACILITY NAME	STATE
NS Louisville TOFC/COFC	KY
PAL Louisville Oak St Yd TOFC/COFC	KY
IC/PAL Paducah TOFC	KY
NS Georgetown TOFC/COFC	KY
CSXI Cleveland TOFC/COFC	OH
NS Columbus Buckeye Yd TOFC/COFC	OH
NS Columbus TOFC/COFC	OH
CSXI Cincinnati TOFC/COFC	OH
NS Cincinnati TOFC/COFC	OH
NS Toledo TOFC/COFC	OH
NS Pittsburgh Pitcairn TOFC/COFC	PA
NS Morrisville TOFC/COFC	PA
NS Harrisburg Lucknow Yd TOFC/COFC	PA
CP Taylor TOFC/COFC	PA
NS Allentown TOFC/COFC	PA
CSXI Philadelphia TOFC/COFC	PA
NS Alexandria TOFC/COFC	VA
NS Chesapeake Portlock TOFC/COFC	VA
CSXI Portsmouth TOFC/COFC	VA

Source: Bureau of Transportation Services' National Transportation Atlas Database(2005)

Appendix V

Appendix V: Global Insight Business Demographics Model

Global Insight's business demographics forecast contains a consistent set of historical statistical estimates and forecasts for businesses in the country. The statistics include the number of business establishments, employees, and sales by industry. Industry aggregation levels include the sub-sectors and the 4-, 5-, and 6-digit classifications in the NAICs codes. The model specifically forecasts variables at the county and ZIP code level. Other geographic levels are created by combining, aggregating, or splitting data from these levels. All business demographics modeled databases are designed to meet two key criteria. First, they must reflect economic activity that is consistent with actual information available at these two levels of geography. Second, they must also agree with published values for national and state employment, establishment and sales data.

The table below lists the business demographic concepts included in the model.

Business Demographics Coverage

Number of Employees	**Business Size Segments***
Total	1 to 4 Employees
By Industry	5 to 9 Employees
By Occupation Group*	10 to 19 Employees
By Geographic Area	20 to 49 Employees
By Business Size*	50 to 99 Employees
Self-Employed*	100 to 249 Employees
Number of Business Locations	250 to 499 Employees
By Industry	500 to 999 Employees
By Business Size*	1000 Employees or More
By Geographic Area	Self-Employed

Industry Segments	**Geographic Segments**
2-Digit SIC Code	Nation
3-Digit SIC Code	Census Regions
4-Digit SIC Code	States
Custom Aggregations*	Metropolitan Areas

Counties

ZIP Codes*

Congressional Districts*

Client-Specified Territories*

* Typically undertaken as custom deliverable based on a client request.

The following discussion describes the data and estimation techniques utilized in the BDM.

Data

Every forecast must start with at least one observation of activity at the level of geography in which we are interested. This observation, generally collected by a government agency, is treated as an "actual" measurement of all of the economic activity within a given geographic area. In fact, this observation is also an estimate of activity. The government surveys a percentage of employers within the region and then imputes the value for the region as a whole from this sample. As with any estimate, these "actual" observations may deviate from the "true" actual. However, as the size of the geographic area increases, so too does the accuracy of the estimate. This occurs due to the law of averages, or the fact that as we add more local area estimates together, the odds of an error above the true actual being matched with an error below the truth increase, making the final result more accurate (i.e., unbiased). It is for this reason that the sum of our county level forecasts will always add up to a measurement or an estimate of state and national level activity.

The following data sources were used as a basis for our first round model of county employment and establishments. County Business Patterns (CBP) data provides us with a series of county level employment and establishments from 1980 to 2002 at the four-digit SIC code (six-digit NAICs) level of detail. This data serves as our starting observation of "actual" activity for most sectors of the economy. The CBP does not contain data for the government or agriculture sectors. Government data is obtained from the Bureau of Labor Statistics, and the agriculture data is obtained from the Census of Agriculture. Data from the Bureau of Labor Statistics (BLS) is the basis of Global Insight's national and state level macroeconomic forecasting services. These forecasts are available at the two-digit SIC code level of detail for counties, and at the one-digit level of detail for MSAs. Forecasts provided by these services serve as the national and state level constraints on our county level forecasts. The counties will always add up to the state, and the states will always sum to the nation. In this way we will always be consistent with widely accepted levels of economic activity while also ensuring that county estimates are a valid measure of local activity.

Estimation Techniques

Employment and the Number of Establishments

The description of modeling methodology is broken into two sections. First, the modeling of employment and the number of establishments are discussed, followed by a description of the estimation of output.

Like many of the Global Insight models, the underlying technique of county level estimation is the "Top-Down Bottom-Up" model. "Top-Down Bottom-Up" methodology relies on using all of the information available to us at any given time. First, county level data is employed to determine the trend of data in a particular county. Both trending and sharing techniques are used here to create an independent forecast of employment and establishments.

To begin, a first round forecast is calculated using CBP county level data. Employment and the number of establishments for each industry as defined by government four-digit SIC (or six-digit NAICs) codes are estimated by use of a five-year moving average of historical growth rates (from this point any description of procedures to estimate employment also applies to establishments). This forecast is independent of any information at the state, MSA, or national levels, and returns a unique growth path for each of the nation's 3,141 counties.

Next, a second level forecast is calculated using estimates provided in the first round. Over the period 2002 to 2030, employment in each county for every four-digit SIC code is recalculated as a percentage of the first round estimated total for that four-digit industry. The resulting series represents the relative movement of employment within the county relative to that at the state level, and to employment in other counties within the state. In other words, is employment in industry X in county Y growing faster, slower, or in step with its counterpart at the state level or in the next county. Next, an estimate of employment levels is made by apportioning the forecast state level employment for that industry to each county based on its share of first round estimated employment.

At this point we introduce data for over 300 Metropolitan Statistical Areas (MSAs) in the United States. In an iterative procedure, the county level forecasts are adjusted until the estimates solve for both the state and MSA. A brief description of this procedure follows. Estimates calculated by allocating state level data to the counties are summed to either the MSA to which the county belongs or to a "rest of state" variable. Those counties that comprise each MSA are aggregated into a summed MSA variable. From this, each county's share of MSA employment is calculated, and this share is used to allocate MSA employment to the counties. All of the MSAs in a state are then summed, and subtracted from the sum of the counties for each state. This value, the remainder of employment within each state but not in an MSA, is then allocated to the "rest of state" counties based on their share of the "rest of state" variable calculated above. This process continues until a number of criteria are met or the process fails to achieve a stable solution after five iterations.

Output

Output by industry on national level is obtained from Global Insight's Industrial Analysis Service. Industry output (sales) is measured in current dollars and is available for all the

four-digit SIC code detail. The Global Insight Industrial Analysis Service includes forecasts of constant dollar output and the corresponding price indexes for each of the industry sectors. Nominal dollar output is obtained as identities.

Constant dollar output is estimated as a function of total demand from the input/output block, cyclical variables, and a time trend. The functional form used imposes a unitary elasticity on the demand term, which embodies most of the explanatory power in the relationship. The additional non-demand terms are included in the equations to explain the pattern not well accounted for by the input/output model and its demand indicators – cyclicality and technological change.

National output by industry is transformed to regional measures by using region specific productivity measures from Global Insight's Regional Service. In addition, the share of employment by industry is used to allocate output to sub-regional geographies.

Data sources include the following: Economic Census, Department of Agriculture, Census of Mining, Annual Survey of Manufactures, Census of Transportation, FCC Statistics of Common Carrier, and Census of Services.

Business Transactions Matrix (BTM)

Information on inter-industry purchases is provided from Global Insight's Business Transactions Matrix. Our primary data source for the Business Transaction Matrix is the latest Bureau of Economic Analysis (BEA) input/output tables. This data is released every five years as the benchmark input-output accounts of the U.S. The industrial breakdown generally follows a standard four-digit SIC (six-digit NAICs) detail for the manufacturing sectors, and three- or two-digit SIC (generally four-digit or three-digit NAICs detail) for the non-manufacturing sectors.

Global Insight employs a modified RAS algorithm to forecast changes in the input-output coefficients over time. The chief merits of this method are twofold: its minimal data requirements, and the support of studies that have found the accuracy of the RAS method to be superior to other non-survey coefficient adjustment techniques.

The modified RAS method requires two sets of data: the direct coefficient matrix of an input-output table for an initial year *t* and a column vector of sectoral gross outputs in year *t+1*. Given these sets of data, an iterative adjustment procedure is applied to the direct coefficient matrix, which yields an adjusted coefficient matrix for year *t+1* that is consistent with the ratio of intermediate input to output and the gross output measures of that year.

Once the input-output matrix forecast estimation is complete, purchases by industry and county can be determined. National use factors (defined as purchases by industry *j* from industry *i* per employee in industry *j*) are calculated, and then multiplied by the number of employees in industry *j* by county from the BDM, resulting in an estimation of purchases by industry *j* from industry *i* in each county.

Appendix VI

Appendix VI. Schematic / Cost Estimate of NS-Proposed Terminal

Form: 041007

DMJM HARRIS | AECOM

Contract No. 60025390.0001
Location: PRICHARD, WV
Description: PROPOSED INTERMODAL TERMINAL

Preparation Date: 8/14/07

Preliminary Estimate	Cost Summary	
Work Items		**TOTAL**
Roadway Pavement		$10,760,000
Roadbed Preparation		$5,330,000
Contractor General Conditions		$1,062,000
Track Construction		$3,392,000
Track Retirement		$59,000
Turnouts		$2,730,000
Train Control (including engineering and contingencies)		$3,500,000
Permits -SESC		$40,000
Drainage		$1,820,000
Structures		$4,140,000
	SUBTOTAL:	**$32,833,000**
Engineering (10% - not including Train Control)		$3,284,000
Flagging		$120,000
	SUBTOTAL:	**$36,237,000**
Contingencies (20% - not including Train Control and Contractor General Conditons)		$6,340,000
	TOTAL:	**$42,577,000**

Appendix VII

Appendix VII. Schematic / Cost Estimate - Alternative Start-up Terminal

DMJM HARRIS | AECOM

Contract No.
Location: Prichard, WV
Description: Alternative Intermodal Facility

Reference Plan 25390 dated 8/17/07

Preparation Date: 9/20/2007

Preliminary Estimate	Cost Summary	
Work Items		**TOTAL**
Roadway		$6,270,000
Roadbed Preparation		$7,070,000
Contractor General Conditions		$700,900
Track Construction		$2,805,000
Track Retirement		$59,000
Turnouts		$2,730,000
Train Control (including engineering and contingencies)		$2,500,000
Permits -SESC		$110,000
Drainage		$650,000
Structures		$350,000
Buildings		$500,000
Lighting		$600,000
	SUBTOTAL:	**$24,344,900**
Engineering (10% - not including Train Control)		$2,435,000
Flagging		$60,000
	SUBTOTAL:	**$26,839,900**
Contingencies (15% - not including Train Control and Contractor General Conditons)		$3,550,000
	TOTAL:	**$30,389,900**