WEST VIRGINIA PUBLIC PORT AUTHORITY

Heartland Intermodal Gateway Rail Service Cost Analysis

Final Report

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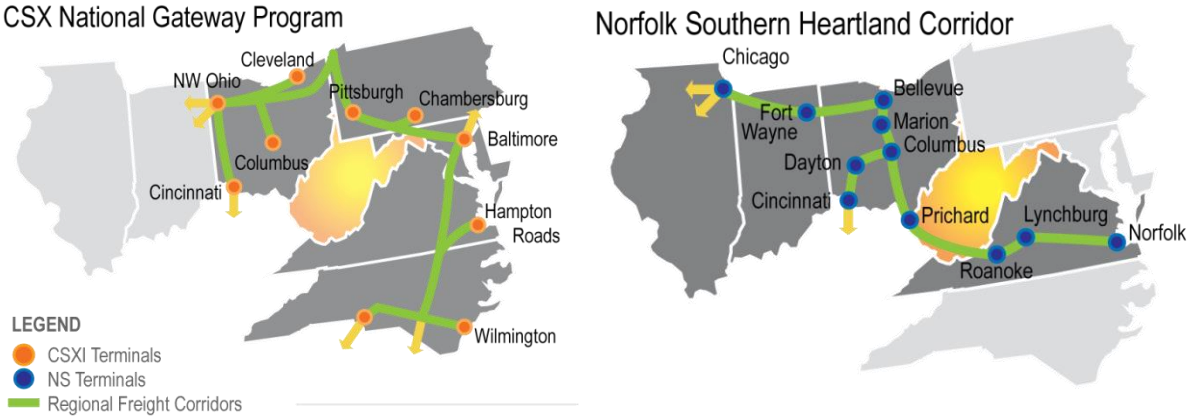
Introduction

The Heartland Intermodal Gateway (HIG) will occupy approximately 100 acres in Prichard, WV. It will provide West Virginia businesses with a truck/rail transfer facility that will establish intermodal connections to the Port of Virginia in Hampton Roads, VA and with Chicago, IL, with connecting service to West Coast ports. The concept of the Heartland Intermodal Gateway (HIG) at Prichard was originally explored as part of the Heartland Corridor Double Stack initiative. Feasibility studies in 1999 and 2003 identified the Prichard site as a preferred location. Construction of HIG was made possible by a $12 million federal grant, over $18 million in funding from the State of West Virginia, and contributions from Norfolk Southern (NS). The terminal is expected to be completed December 2015.

Figure 1 shows the intermodal networks of NS and CSX. As can be seen, HIG will fill a major hole in the U.S. intermodal network. For example, existing terminals are over 100 miles from Charleston or Huntington. Given the high cost of bringing containers from these relatively distant intermodal terminals to markets in West Virginia, the hope is that HIG will be able to offer meaningful cost savings to West Virginia intermodal customers.

Figure 1: CSX (left) and NS (right) Intermodal Networks



In order to ensure the success of the terminal, it is important that the terminal be marketed, that businesses within the terminal's service area be made aware of the terminal and the potential cost savings of using the terminal. The purpose of this report is to help clarify the geographic area within which shippers would benefit from cost savings of using the terminal and to quantify the level of potential cost savings. The West Virginia Public Port Authority (WVPPA) has provided a list of major importers/exporters within the potential service area of HIG. Based upon the locations of the largest of these shippers, WSP | Parsons Brinckerhoff has explored the relative costs of HIG and other transportation options at:

- Charleston, WV;
- Huntington, WV;
- Buffalo, WV;
- Parkersburg, WV;
- Williamstown, WV;
- Lexington, KY.

Analysis of Services Using Existing Rail Terminals

Rail Component

The U.S. Surface Transportation Board (STB) Carload Waybill sample is a stratified sample of terminating carload waybills. The most recently available Carload Waybill Sample is for 2013. The STB publishes both a proprietary Carload Waybill Sample and a Public Use Carload Waybill Sample. The latter masks some information considered proprietary, but has been used for this analysis because it is readily available. Table 1 provides average revenue per container for movements between Chicago or the Port of Virginia and terminals within the same region as HIG from the STB Public Use Waybill Sample. Revenue per container is assumed to be equivalent to the rates that shippers would pay per container.

Table 1: Average Rail Revenue per Container for Existing Intermodal Movements

Market	Between Columbus, OH and Chicago, IL	Between Port of Virginia and Columbus, OH	Between Louisville, KY and Chicago	Between Cincinnati, OH and Chicago, IL
Avg. Revenue per Container	$562	$1,126	$791	$591

Local Drayage Component

The American Transportation Research Institute (ATRI) the research arm of the American Trucking Associations recently estimated that the marginal cost of truck transportation is $1.70 per mile.[1] Multiplying this by an assumed profit margin of 10 percent yields an assumed truck rate of $1.87 per mile. But trucking economics are heavily influenced by equipment utilization, so that if a trucking company believes that hauling a load will require the truck to return empty, the rate will be much higher than if the company believes it can find a revenue load at destination. Also, the more loads a driver can deliver in a given day, the lower the rate per load, regardless of the specific distance the load is hauled. Drayage rates in small drayage markets will tend to be higher than drayage rates in busy drayage markets, since utilization of drivers and equipment in these small markets is not as favorable.

Several trucking companies were contacted regarding the likely cost of providing service from Columbus, OH to markets in West Virginia and to Lexington, KY. Quotes were received for movements between Columbus and Parkersburg, Huntington, and Lexington, KY. The costs of serving additional nearby locations have been extrapolated based on mileage. The results suggest that the cost of draying containers from Columbus, OH to various West Virginia markets varies between $583 and $835 per container. Quoted rates include the base drayage fee, fuel surcharge, any generally applicable accessorial fees.

[1] *An Analysis of the Operating Cost of Trucking: 2015 Update, http://atri-online.org/2015/09/29/an-analysis-of-the-operational-costs-of-trucking-2015-update/*

Table 2: Cost of Drayage from Columbus, OH to West Virginia Markets and Lexington, KY

	Parkersburg, WV (26101)	Williamstown, WV (26187)	Buffalo, WV (25033)	Huntington, WV (25755)	Charleston, WV (25301)	Lexington, KY (40507)
Truck Miles	110	127	135	135	162	190
Estimated Truck Cost per Loaded Mile	5.30	5.21	5.21	5.21	5.21	4.81
Average Truck Cost	$583	$662	$704	$704	$845	$913

Rates were also received for drayage operators serving Georgetown, KY, both for a local dray between Georgetown and Winchester, KY; and for a more distant dray between Georgetown and Buffalo, WV. The results suggest that drayage rates are lower on a per mile basis for more distant markets. For example, the implied per mile rate of the short 21 mile move between Georgetown, KY and Winchester, KY is $10.16 per mile. In reality, the trucking company is charging a significant fixed cost for time spent waiting for receipt/delivery service at both terminals. Georgetown to Buffalo is also an established origin/destination pair for trucks serving the Buffalo Toyota Motor Plant, which may further reduce quoted rates for this relatively distant move.

Table 3: Cost of Drayage from Georgetown, KY to Winchester, KY and Buffalo, WV

	Winchester, KY	Buffalo, WV
Truck Miles	32	181
Effective Rate per Loaded Mile	10.16	3.91
Rate	$325	$708

Analysis of Services Using Heartland Intermodal Gateway

Rail Component

Since there is currently no intermodal service at HIG, the likely rail costs to shippers using HIG were estimated based on rail rates to/from Columbus, OH. Rail mileage between Columbus and Chicago is about 34 percent shorter than mileage between HIG and Chicago. However, not all rail costs vary by mileage, so one cannot assume that service between HIG and Chicago will be 34 percent more expensive than service between Columbus and Chicago. Analysis of costs using the STB's Uniform Rail Cost Model (URCS) suggests that the additional mileage between HIG and Chicago as compared to Columbus and Chicago should add about 25 percent to the cost of the rail move. The mileage between HIG and the Port of Virginia is about 79 percent of the mileage between Columbus and the Port of Virginia. An analysis using the URCS model suggests that this reduced mileage should decrease the costs of serving HIG from the Port of Virginia compared to Columbus by about 17 percent. Adjusting rates to/from Columbus by these amounts yields the estimated rail rates found in Table 4.

Table 4: Estimated Rail Rates for Service between HIG and Chicago, Port of Virginia Based on Rail Mileage

Market	Between Chicago, IL and HIG	Between Port of Virginia and HIG
Avg. Revenue per Container	$703	$935

Local Drayage Component

Local drayage companies serving HIG would be expected to have a similar cost structure to drayage companies serving other nearby markets such as Columbus, OH or Georgetown, KY. Therefore, per mile rates that appear in Table 2 and Table 3 were used to approximate the costs of a drayage operator serving markets in West Virginia and Kentucky from HIG. Table 5 provides the estimated cost of local drayage.

For intermodal moves, it is assumed that shippers only pay for drayage to/from HIG and not for drayage in Chicago or at the Port of Virginia. Rail moves to/from the Port of Virginia are assumed to be loaded at the Virginia International Gateway, and so have the same origin/destination as a truck move. For West Coast intermodal movements through Chicago, it is assumed that shippers do not pay a local dray, and that intermodal containers are transferred between western railroads and NS by steel wheel interchange.

Table 5: Estimated Cost of Drayage between HIG and Markets in West Virginia, Lexington, KY

	Parkersburg, WV (26101)	Williamstown, WV (26187)	Buffalo, WV (25033)	Huntington, WV (25755)	Charleston, WV (25301)	Lexington, KY (40507)
Truck Miles	120	156	67	21	70	131
Estimated Truck Cost per Loaded Mile	5.21	5.00	5.30	10.16	5.30	5.21
Average Total Truck Cost	$626	$780	$355	$213	$371	$694

Analysis of Services Using Long-Haul Trucking in Lieu of Rail

Several truck drayage companies were surveyed with regards to the pricing and level of service they would offer for hypothetical containers that needed to be moved to and from several cities near Prichard. The survey focused on two markets: containers originating from the Norfolk Southern Landers Terminal in Chicago, and containers originating from the Port of Virginia, Virginia International Gateway Terminal in Portsmouth, VA. Truck drayage companies were also asked about moving containers in the opposite direction, to Portsmouth or Chicago, however their quotes remained the same, because in both cases it was necessary to pay for a full round trip.

Table 6 shows the results of the survey for truck travel to and from the Port of Virginia and Table 7 shows the results for travel to and from Chicago. These costs assumed that: the container is 40 foot in length, does not contain hazardous materials, and is not overweight. The cost estimates include fuel surcharges and chassis rental fees, in addition to line haul costs.

Table 6: Truck Dray Costs To/From Port of Virginia

	Parkersburg, WV (26101)	Williamstown, WV (26187)	Buffalo, WV (25033)	Huntington, WV (25755)	Charleston, WV (25301)	Lexington, KY (40507)
Truck Miles	485	495	443	461	409	584
Estimated Truck Cost per Loaded Mile	4.39	4.42	4.42	4.42	4.42	4.38
Average Total Truck Cost	$2,131	$2,190	$1,960	$2,039	$1,809	$2,556

Table 7: Truck Dray Costs To/From Chicago Landers Terminal

	Parkersburg, WV (26101)	Williamstown, WV (26187)	Buffalo, WV (25033)	Huntington, WV (25755)	Charleston, WV (25301)	Lexington, KY (40507)
Truck Miles	460	476	457	438	484	370
Estimated Truck Cost per Loaded Mile	4.76	4.85	4.85	4.85	4.85	5.17
Average Total Truck Cost	$2,188	$2,310	$2,218	$2,126	$2,349	$1,913

Cost Comparison

Moves to/from the Port of Virginia

Table 8 compares the cost of intermodal service between the Port of Virginia through HIG to the cost of comparable all truck service or intermodal through the Rickenbacker, OH and Georgetown, KY terminals. Service through HIG would be significantly less expensive than all truck service for the markets analyzed. HIG also maintains a cost advantage versus rail service via Rickenbacker, being closer to the Port of Virginia than Rickenbacker for West Virginia markets. Using HIG for movement between the Port of Virginia and West Virginia markets, shippers benefit from an "inline dray," meaning that both the rail and truck portions of the intermodal move are in the same direction. Savings are less significant for markets in northern West Virginia.

Table 8: Cost Comparison of Container Moves To/From the Port of Virginia

		Parkersburg, WV	Williamstown, WV	Buffalo, WV	Huntington, WV	Charleston, WV	Lexington, KY
All Truck	All Truck Miles	485	495	443	461	409	584
	All Truck Costs	**$2,131**	**$2,190**	**$1,960**	**$2,039**	**$1,809**	**$2,556**
Through Rickenbacker Intermodal	Rail Miles	639	639	639	639	639	639
	Truck Dray Miles	110	127	135	135	162	190
	Rail Costs	$1,126	$1,126	$1,126	$1,126	$1,126	$1,126
	Truck Dray Costs	$583	$662	$704	$704	$845	$913
	Intermodal Move Cost	**$1,709**	**$1,788**	**$1,830**	**$1,830**	**$1,971**	**$2,039**
Through HIG Intermodal	Rail Miles	507	507	507	507	507	507
	Truck Dray Miles	120	156	67	21	70	131
	Rail Costs	$935	$935	$935	$935	$935	$935
	Truck Dray Costs	$626	$780	$355	$213	$371	$683
	Intermodal Move Costs	**$1,561**	**$1,715**	**$1,290**	**$1,148**	**$1,306**	**$1,618**
Relative Cost of Intermodal Service through HIG	**Vs All Truck Service**	**($571)**	**($475)**	**($670)**	**($891)**	**($504)**	**($938)**
	Vs Intermodal Service through Rickenbacker	**($148)**	**($73)**	**($540)**	**($681)**	**($665)**	**($421)**

Moves to/from Chicago

As with shipments to/from the Port of Virginia, intermodal service through HIG is consistently less expensive than the all-truck alternative for movements to/from Chicago, IL. However, because Rickenbacker lies to the northwest of HIG, Chicago freight movements between HIG and northern West

Virginia are not in line drays, whereas Chicago freight movements between northern West Virginia and the Rickenbacker terminal are. Therefore, the relative economics between HIG and the Rickenbacker terminal are not as compelling for HIG for Chicago traffic to/from northern West Virginia traffic as is the case for Port of Virginia traffic. Service through HIG is more expensive for Parkersburg and Williamstown traffic than through Rickenbacker. Other areas closer to Prichard such as Buffalo, Huntington, and Charleston remain less expensive through HIG relative to Rickenbacker. For markets in West Virginia, HIG is consistently less expensive for Chicago intermodal service than intermodal service through Georgetown, KY. This includes Buffalo, WV. In the past, the Toyota Motor Manufacturing Plant in Buffalo has been supplied through the Georgetown terminal.

Table 9: Cost Comparison of Container Moves To/From the Landers Chicago Rail Terminal

		Parkersburg, WV	Williamstown, WV	Buffalo, WV	Huntington, WV	Charleston, WV	Lexington, KY
All Truck	All Truck Miles	460	476	457	438	484	370
	All Truck Costs	**$2,188**	**$2,310**	**$2,218**	**$2,126**	**$2,349**	**$1,913**
Through Rickenbacker Intermodal	Rail Miles	382	382	382	382	382	382
	Truck Dray Miles	110	127	135	135	162	190
	Rail Costs	$562	$562	$562	$562	$562	$562
	Truck Dray Costs	$583	$662	$704	$704	$845	$913
	Intermodal Move Costs	**$1,145**	**$1,224**	**$1,266**	**$1,266**	**$1,407**	**$1,475**
Through Georgetown, KY	Rail Miles	407	407	407	407	407	407
	Truck Dray Miles	233	270	181	136	185	14
	Rail Costs	$681	$681	$681	$681	$681	$681
	Truck Dray Costs	$1,120	$1,298	$708	$709	$889	$150
	Intermodal Move Costs	**$1,800**	**$1,978**	**$1,389**	**$1,390**	**$1,570**	**$831**
Through HIG Intermodal	Rail Miles	514	514	514	514	514	514
	Truck Dray Miles	120	156	67	21	70	131
	Rail Costs	$703	$703	$703	$703	$703	$703
	Truck Dray Costs	$626	$780	$355	$213	$371	$683
	Intermodal Move Costs	**$1,329**	**$1,483**	**$1,058**	**$916**	**$1,074**	**$1,386**
Relative Cost of Intermodal Service through HIG	**Vs All Truck Service**	**($859)**	**($827)**	**($1,160)**	**($1,209)**	**($1,275)**	**($527)**
	Vs Intermodal Service through Rickenbacker	**$184**	**$259**	**($208)**	**($349)**	**($333)**	**($89)**
	Vs Intermodal Service through Georgetown, KY	**($472)**	**($495)**	**($331)**	**($473)**	**($496)**	**$555**

For markets in Kentucky, HIG is similarly more competitive for East Coast relative to West Coast traffic. While HIG is clearly less expensive than Columbus for freight between Lexington, KY and the Port of Virginia, Chicago freight service between Lexington and HIG and between Lexington and Rickenbacker are relatively comparable. The Georgetown facility does not provide service to East Coast ports, so HIG will provide shippers in this area with a new transportation option to the Port of Virginia. But because the Georgetown facility is close to markets in Lexington, it is a less expensive option for intermodal freight between Chicago and Lexington when compared to intermodal service through HIG.

Moves to/from the Ports of Charleston and Baltimore

All-truck alternatives between West Virginia markets and the Ports of Charleston, SC and Baltimore, MD were also investigated and compared to service through the Port of Virginia/HIG. Drayage operators were asked to quote rates between Baltimore, MD and Huntington, between Baltimore, MD and Parkersburg, and between Charleston, SC and Lexington, KY. Average per mile rates were used to extrapolate the costs between Charleston, SC and Baltimore, MD, and other West Virginia markets, and Lexington, KY. Per mile rates from Charleston, SC and Baltimore, MD were found to be similar to those from Chicago and the Port of Virginia and West Virginia markets.

Table 10: Cost Comparison of HIG/Port of Virginia Intermodal Service to All Truck Service through Ports of Baltimore, Charleston

		Parkersburg, WV	Williamstown, WV	Buffalo, WV	Huntington, WV	Charleston, WV	Lexington, KY
All Truck	All Truck Miles - Baltimore	323	329	400	419	368	542
	All Truck Miles - Charleston	548	558	506	525	472	543
	All Truck Costs – Baltimore	**$1,438**	**$1,464**	**$1,780**	**$1,865**	**$1,638**	**$2,412**
	All Truck Costs - Charleston	**$2,439**	**$2,484**	**$2,252**	**$2,337**	**$2,101**	**$2,417**
Through HIG Intermodal	Rail Miles	507	507	507	507	507	507
	Truck Dray Miles	120	156	67	21	70	131
	Rail Costs	$935	$935	$935	$935	$935	$935
	Truck Dray Costs	$626	$780	$355	$213	$371	$683
	Intermodal Move Costs	**$1,561**	**$1,715**	**$1,290**	**$1,148**	**$1,306**	**$1,618**
Relative Cost of Intermodal Service through HIG	**Vs All Truck Service - Baltimore**	**$123**	**$251**	**($490)**	**($717)**	**($332)**	**($794)**
	Vs All Truck Service - Charleston	**($878)**	**($769)**	**($962)**	**($1,189)**	**($795)**	**($799)**

The results suggest that service through the Port of Virginia and HIG is consistently less expensive than all truck service through the Port of Charleston. Based solely on the cost of inland transportation,

Charleston is too far from West Virginia markets to be competitive. Service through HIG and the Port of Virginia is also less expensive than all truck service from the Port of Baltimore for areas close to HIG such as Huntington, Charleston, and Buffalo, as well as Lexington, KY. But the Port of Baltimore has relatively direct highway connections to northern West Virginia. For example, Parkersburg is 323 miles from the Port of Baltimore, compared to 485 miles from the Virginia International Gateway in Portsmouth, VA. Therefore, based solely on the cost of inland transportation, service to/from the Port of Baltimore by truck was found to be slightly less expensive than intermodal service through the Port of Virginia and HIG.

Conclusion

Assuming that rail volumes through HIG are sufficient to allow typical pricing for rail line-haul services, HIG should offer significant cost advantages versus all-truck service and versus other intermodal rail gateways for most service pairs analyzed in this study.

This finding was tested by considering factors that could result in different price structures, and found that the basic conclusion remains unchanged.

- First, it is possible that rail line-haul rates presented in this report may be higher than what shippers at HIG and other intermodal terminals would pay in practice. At the outset, HIG would handle smaller 20 and 40 foot containers used for international trade and would not handle the larger 53 foot containers used for service between domestic markets. The waybill data analyzed includes handling of 53 foot containers, which have higher rail rates than smaller international containers. Additionally, fuel surcharges have also declined during 2015. In 2013, rail fuel surcharges were typically between 25 and 35 percent; as of late 2015, they are approximately 10 percent. The combined effects -- reductions in fuel surcharges and adjustments for smaller international containers -- could produce effective rail rates that are 20 to 30 percent lower than shown in this report. The relative efficiencies of HIG compared to other rail terminals remain the same.
- Second, it is possible that trucking rates presented in this report could be somewhat lower in practice. Trucking companies sometimes offer volume discounts to large customers. The customer that ships hundreds or thousands of loads per year receives a more favorable rate than the company that ships only one or several containers. Quotes received in preparing this report assumed only a single load. However, any reductions in trucking price would accrue only to high-volume shippers, and would benefit not only the all-truck option, but also each intermodal rail option, since truck drayage is a critical cost component of rail service.
- Combining these effects – potentially lower rail line-haul rates and potentially lower truck rates – the efficiencies of HIG versus other rail options and all-truck options remain unchanged, although the magnitudes of the differences could be slightly lower than shown. Rail cost savings in the absence of truck cost savings would increase HIG's advantage versus all-truck options.