Prepared for

Hampton Roads Transportation Planning Organization

Hampton Roads High-Speed and Intercity Passenger Rail

Preliminary Vision Plan - July 2010

Prepared by

TEMS

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ACKNOWLEDGEMENT/DISCLAIMER

Prepared in cooperation with the U.S. Department of Transportation (USDOT), the Federal Highway Administration (FHWA), the Virginia Department of Rail and Public Transportation (DRPT), and the Virginia Department of Transportation (VDOT). The contents of this report reflect the views of the Hampton Roads Transportation Planning Organization (HRTPO). The HRTPO is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the FHWA, VDOT, or DRPT. This report does not constitute a standard, specification, or regulation.

These opinions, findings and conclusion are preliminary in nature and do not represent final statements of fact or final projections of high-speed and intercity passenger rail service to Hampton Roads. It is anticipated upon completion of the next phase of the study, these initial study results will be refined to a level that supports a Hampton Roads Vision Plan for High-Speed and Intercity Passenger Rail services from Washington D.C. to the Hampton Roads metropolitan area.

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EXECUTIVE SUMMARY

The study has assessed the potential for enhancing passenger rail service in the Washington-Richmond-Hampton Roads corridor and found that the corridor has the potential to support the Hampton Roads Transportation Planning Organization (HRTPO) objectives for –

- **"Enhanced"** 110-mph service on the CSXT/I-64 corridor from Newport News to Washington D.C. with a travel time of just over two hours and a service of 8 to 10 trains per day.
- **"High-Speed"** 150-mph service on the NS/Route 460 corridor from Norfolk to Washington D.C. with a travel time of about two hours and a service of 14 to 18 trains per day.

Not only does the Washington-Richmond-Hampton Roads corridor have "independent utility" – meaning it can support high-speed and intercity passenger rail on its own – but its connectivity with the Northeast and Southeast corridors doubles its travel market, which significantly enhances the economic case for developing the corridor.

The Preliminary Vision Plan finds that the Hampton Roads Passenger Rail system will meet all U.S. Department of Transportation (USDOT) Federal Railroad Administration (FRA) financial and economic requirements, making the system eligible for Federal High-Speed Rail Funding and a potential candidate for a public-private partnership (P3) to develop and operate the system. As a result, it can compete even with the strongest of other state corridors (e.g., Florida or Midwest) for the limited Federal funds available.

Apart from its transportation advantages, the system will provide a very real boost to the economy of the region and could add as many as 20,000-25,000 jobs, $5-7 billion in household income, and joint development at stations worth $1.5-2.0 billion.

Key challenges to the systems development include –

- The evaluation of potential railroad and greenfield alignments to determine their feasibility.
- Development of community and regional support for the project
- Completion of the work needed to document the social, economic, and environmental case for high-speed and intercity passenger rail in the corridor.
- The lengthening timescales in completing Environmental Studies due to USDOT FRA staff resource limitations.

Because of the strong benefits of High-Speed Rail together with the complexity of FRA funding processes and the lead times typically needed for completing environmental analysis, there continues to be a strong benefit to the Hampton Roads region of continuing to advance the development of a High-Speed Rail Vision Plan.

THE VISION

Hampton Roads Transportation Planning Organization Resolution #2009-05

- Enhanced Intercity Passenger Rail along the CSXT/I-64 corridor
- High-Speed Rail along the NS/Route 460 corridor

The HRTPO resolution expresses "The Vision" that the citizens of Hampton Roads have defined as a critical transportation need for the future. This preliminary assessment has evaluated the "prima facie"* case for "The Vision" and found that the case for it is strong. While there are still a large number of engineering, environmental, financial and economic questions to be answered, there is little doubt that the Washington-Richmond-Hampton Roads Corridor is one of the countries leading corridors and achieves the thresholds established by the USDOT FRA for a public-private partnership to build and operate High-Speed Passenger Rail. As such, and since it appears that the required financial and economic criteria can be met, the corridor should be further developed in line with the aspirations of the Hampton Roads community and objectives set by the HRTPO.

In developing this analysis, the HRTPO study team has worked closely with not just its own community stakeholders, but has sought the support of the two freight railroad companies: CSX Transportation (CSXT) and Norfolk Southern (NS) who are the owners of the critical railroad rights-of-way in the corridor. The HRTPO is seeking a long-term partnership with these railroads whose cooperation will undoubtedly play a major role in achieving the Vision.

Finally, the HRTPO study team has sought guidance and advice from Virginia Department of Rail and Public Transportation (DRPT). DRPT has already taken significant steps to develop the Washington-Richmond-Hampton Roads Corridor for conventional intercity passenger rail including significant track and safety upgrades, as well as planning to introduce rail service to the south Hampton Roads community. It is currently moving forward in preparing the next step to increase speed and service throughout the corridor in line with the recent Draft Environmental Impact Study (DEIS) that will increase speeds to 90-mph. These actions will set the scene for developing a High-Speed and Intercity Passenger Rail improvement program that will allow the HRTPO objectives to be fulfilled.

This assessment sets out both "The Vision" and how the Washington-Richmond-Hampton Roads Corridor meets USDOT FRA criteria. This establishes the case for moving forward with the further analysis and

* at first appearance; at first view, before investigation

assessment required to complete a Vision Plan. This will define the conditions, process, procedures, and requirements for turning the objectives of the HRTPO into reality.

WASHINGTON-RICHMOND-HAMPTON ROADS CORRIDOR

SYSTEM CONTEXT: The purpose of the HRTPO High-Speed and Intercity Passenger Rail Study is to develop a "Vision Plan" for the Washington-Richmond-Hampton Roads Corridor that can transform passenger rail service from today's very limited Amtrak service into a modern and fast high-speed and intercity passenger rail system that serves the most vibrant and dynamic intercity travel market in Virginia. The regions of Washington, Richmond and Hampton Roads form a corridor with a combined population of 8 million. This is similar to the Miami-Orlando corridor, Ohio's 3-C corridor, and Houston-San Antonio

corridors that have long been recognized as high-speed corridors. These corridors have all attracted private sector public-private partnership (P3) initiatives using technology capable of 150-mph and more.

Furthermore, the population of the corridor is highly integrated due to an extraordinary degree of complimentarily of its industries and businesses. Not only does the corridor support the massive service industry that is vital to the U.S. Federal Government and its associated businesses, but it also supports the interaction of the Pentagon and one of the countries largest naval and military complexes in Hampton Roads. All this generates a huge amount of intercity travel to specific locations and destinations from the U.S. Congress, to the Pentagon, to the State Capital in Richmond and the Naval Yards and military facilities of the Hampton Roads area.

In addition, the corridor is home to the huge bulk and container Port of Virginia, which is one of the fastest growing ports in the U.S. and critical to the U.S. East coast's trading potential. It provides import and exports to the major markets and manufacturing centers of the country, including the Northeast, Midwest, and South.

Finally, the corridor is home to major tourist and recreation centers and facilities including those in the I-95 corridor, like Kings Dominion and Six Flags, as well as I-64's Colonial Williamsburg, Busch Gardens, and Hampton Roads' Virginia Beach.

This extraordinary diversity puts enormous pressure on the transportation facilities of the corridor. This includes the congestion along the I-95 corridor and Peninsula's I-64 corridor, as well as bridges and tunnels in Hampton Roads.

THE CONCEPT: To help meet its mobility needs in the future, DRPT together with HRTPO has recognized the potential for a "green" energy efficient, environmentally friendly, travel option – High-Speed and Enhanced Intercity Passenger Rail. At a time when it is difficult to expand highways, increase air service, and build new bridges and tunnels, high-speed and enhanced intercity passenger rail can provide a very fast, efficient and environmentally friendly travel between the major cities and communities of the corridor.

To begin to evaluate this option, DRPT and HRTPO took the strategic initiative of proposing a "Vision Plan" for High-Speed and Enhanced Intercity Passenger Rail for the Washington-Richmond-Hampton Roads Corridor. The "Vision" will reflect transformation of both High-Speed and Intercity Passenger Rail technology and markets in the last thirty years, which have radically changed the potential for intercity passenger rail travel in 200-300 mile corridors such as that of Washington-Richmond-Hampton Roads. This is due to a range of improvements such as technology improvements, productivity increases, economies of scale, and industrial cost reductions that have increased the efficiency of High-Speed Passenger Rail. As

a result, today's High-Speed Passenger Train is very different from its 20th Century predecessor. Furthermore, while Intercity passenger rail costs have been falling, the costs of alternative modes has been rising due to increasing energy (and in particular oil) costs, as well as, increasing congestion, environmental and pollution costs that has been experienced as Virginia's highways have become gridlocked.

When implemented, the High-Speed and Enhanced Intercity Passenger Rail options being proposed by HRTPO and DRPT could offer modern comfortable high-speed passenger trains with travel times of close to two hours to Washington D.C. from Hampton Roads, and one hour service between Washington D.C. and Richmond and Richmond and Hampton Roads. The service would offer convenient travel times, a very high level of service reliability, onboard service, and comfort that is more than equal to what is offered by auto or air. It would provide comfortable large seats with room to stretch out, and the ability to have food and drink service at your seat or in the Bistro car. It would provide music and video facilities at each seat, along with the ability to plug in a laptop or video games.

A MODERN
HIGH-SPEED TRAIN

INTERIOR OF A
HIGH-SPEED TRAIN

Not only will High-Speed and Intercity Passenger Rail serve the cities of the Washington-Richmond-Hampton Roads Corridor, but in addition the aim is to connect the cities of the corridor with the Northeast corridor from Washington D.C. to New York and Boston, and even to extend the quality of service offered by modern high-speed passenger trains to the Southeast by means of the Southeast High-Speed Rail Corridor, with links to Raleigh and Charlotte.

This Preliminary "Vision" is the first step in determining how High-Speed and Enhanced Intercity Passenger Rail can be brought to Virginia's most important business and recreational intercity corridor (as measured by trips). It has begun by making a fundamental evaluation of the corridor, the potential for High-Speed and Enhanced Intercity Passenger Rail service, and the potential costs for infrastructure and service operation. The preliminary results suggest that despite a number of engineering, environmental and institutional issues that will need to be assessed in more detail to prepare the final Vision Plan, that there is a strong "prima facie" case in terms of the financial and economic objectives set by the USDOT FRA for Intercity Passenger Rail.

SYSTEM BENEFITS: The "Vision" will provide many new travel options for citizens and visitors to Virginia's Washington-Richmond-Hampton Roads Corridor. It will ensure Virginia is not left out of the growing network of high-speed corridors that will crisscross the U.S. in California, Texas, Florida, the Northeast from Washington D.C. to Boston from New York to Chicago via Albany, Buffalo, Rochester, Cleveland, and Philadelphia to Pittsburgh and Cleveland via Harrisburg. From Chicago it will reach out to Twin Cities, Detroit, St. Louis, Cincinnati, Indianapolis and Omaha. It will ensure that Virginia is properly represented in terms of travel options when major financial and manufacturing firms make their east coast location decisions.

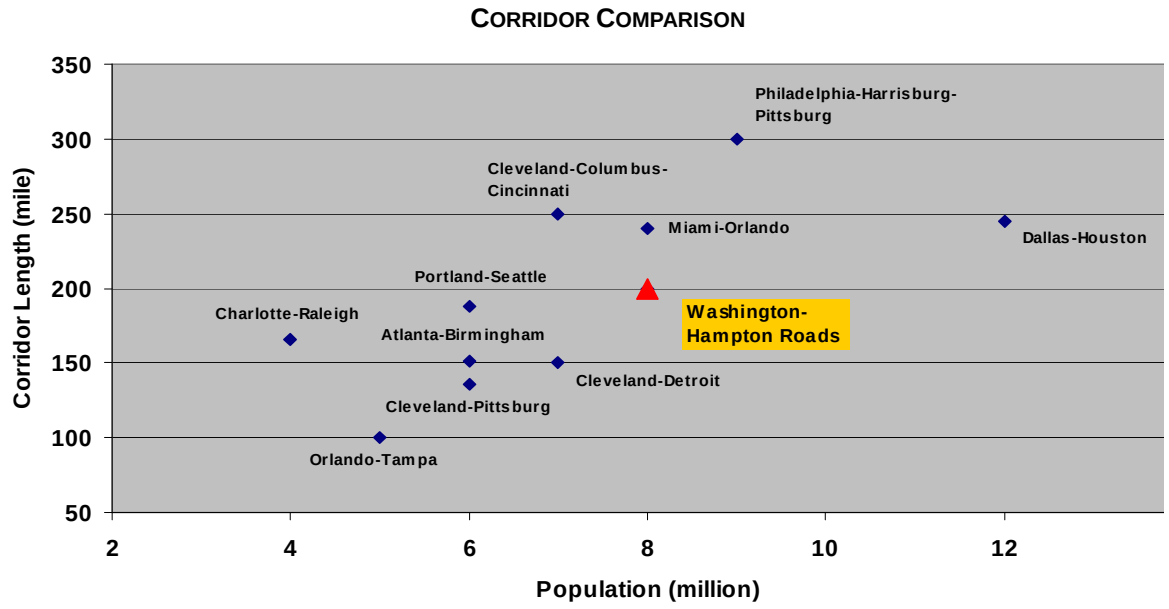
The High-Speed and Enhanced Intercity Passenger Rail system will –

- be Environmentally friendly and "Green"
- provide intercity travel at affordable prices of 50 to 70 percent of air fares
- support both private sector and government mobility to and from the big cities and many smaller communities in between the major cities of the corridor.
- create new jobs, joint development, income and tax base increases in city centers where such development is most needed to fight urban sprawl.
- support the freight railroad industry in the corridor providing capital for new technology (PTC) and increased capacity for compatible traffic (e.g., intermodal freight) and help support high train speeds. It will increase rail safety by ensuring a "sealed" and "secure" corridor and reduce community impacts by upgrading highway rail protection and separation.

The "Vision" will offer Virginia a new transport opportunity that links it with the 21st century and the New Economy that is developing to shape America's future.

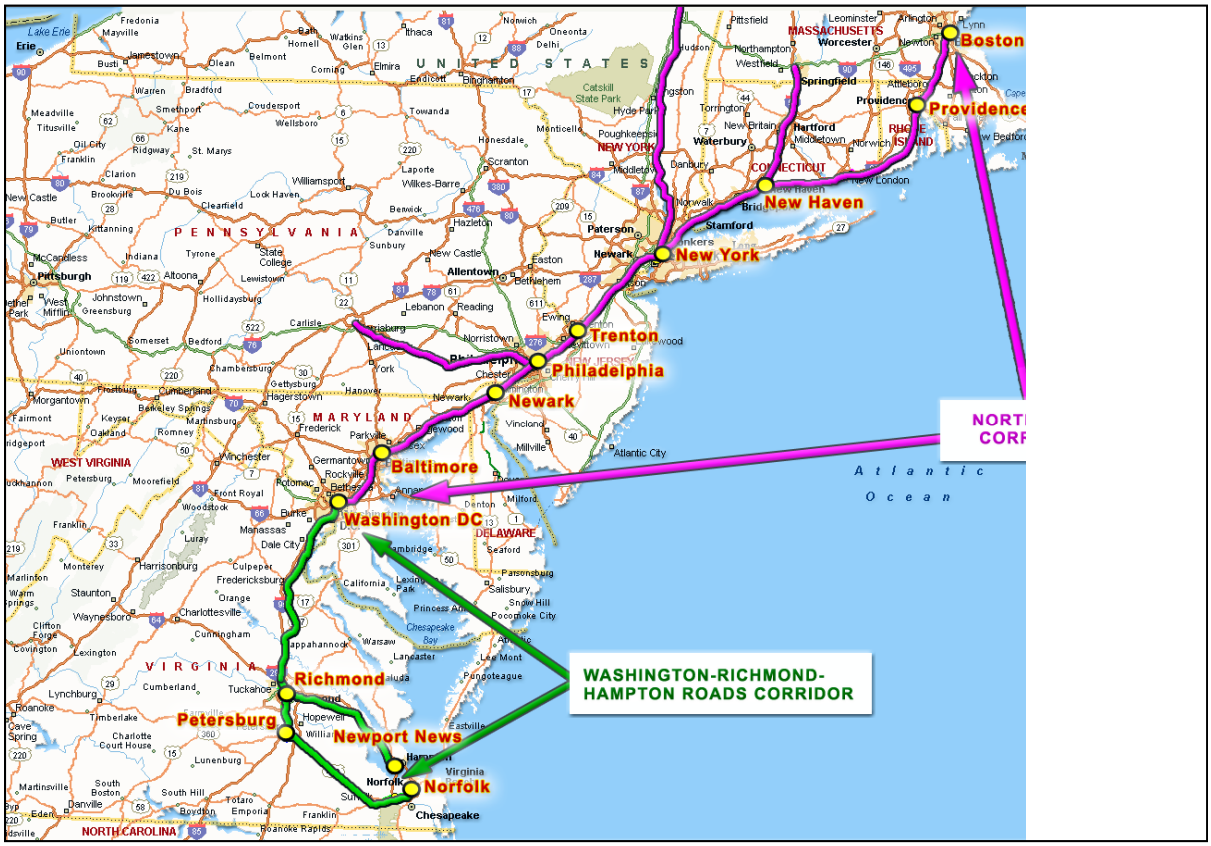
THE MARKET

The Washington-Richmond-Hampton Roads Corridor is one of the top intercity corridors in the U.S. being comparable with Florida's Miami-Orlando, Ohio's Cleveland-Columbus-Cincinnati, Pennsylvania's Philadelphia-Harrisburg-Pittsburgh, and Texas's Houston-San Antonio, and much stronger than many other corridors like Atlanta-Birmingham, Portland-Seattle, or Charlotte-Raleigh. As such, the corridor has independent utility as a high-speed corridor.



In addition to this corridor having independent utility in its own right, it is really the southern extension of the Northeast corridor and a logical part of the "East Coast Mega Region" that stretches from Boston to New York to Philadelphia to Washington D.C. and on to Richmond and Hampton Roads. The impact of being linked to this Mega Region is to effectively double the volume of trips that the corridor would have as a freestanding corridor, and thus significantly enhances its potential for High-Speed and Enhanced Intercity Passenger Rail.

EAST COAST MEGA REGION



Like many intercity passenger rail corridors the demand for travel in the corridor will grow strongly in the future with trips increasing from 48 million to 70 million by 2050 or by nearly 40 percent. These increases will put significant pressure on the corridors' transportation resources, which are already at or approaching capacity. This includes Interstate highways I-95 and I-64, but also the tunnels in Hampton Roads and many arterial roads that serve the state highway system. As a result, at the north end of the corridor there is significant all day traffic flows into and out of Washington D.C., and to and from Richmond that bottleneck in peak periods, adverse weather conditions, or whenever there is an accident. At the south end there is congestion in peak periods or when accidents occur on I-64 and Bridge Tunnels the key gateways to Hampton Roads. In the middle of the corridor congestion on Richmond's interstates and beltways is considerable and growing fast.

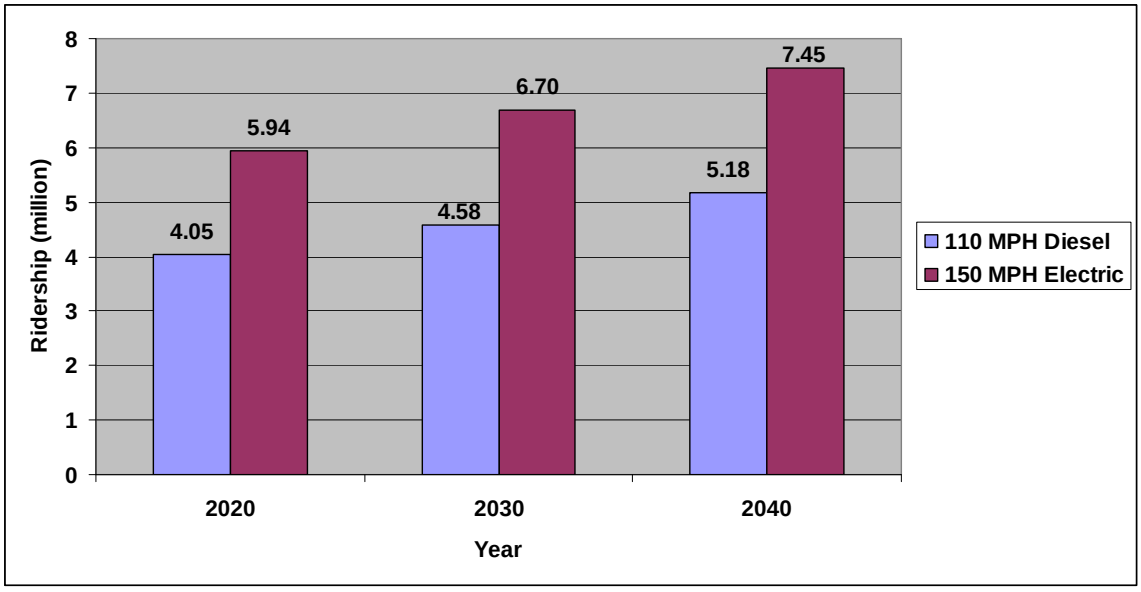
In considering the cost of transportation in the corridor, one significant factor is the price of gasoline. Estimates by the International Energy Agency (IEA) suggest that gas prices will quickly rise to $4 per gallon after the current recession and to $5 per gallon by 2050. This makes auto use increasingly expensive, and options like passenger rail more competitive.

In this environment a new mode of travel that can offer fast and frequent downtown to downtown travel both within the corridor and beyond to the Northeast and Southeast corridors, competitive fares, and a high level of reliability even in peak hours, in an environmentally friendly way presents a unique opportunity to improve travel in the corridor for all existing and future travelers.

The Washington-Richmond-Hampton Roads Vision Plan provides a flexible framework that can be geared to the implementation program needs of the corridor, and to both Public and Private Sector funding capabilities. At build-out, the corridor will be a fast high-speed service that links the key urban areas of Virginia by a single integrated transport system some 300 miles in length. It will provide direct access from both the north and south of the James River to the Northeast and Southeast corridors. It will use fast modern electric trains (150+ mph) similar to those used on the Northeast corridor to link South Hampton Roads with Richmond and Washington D.C. and fast modern diesel trains (110-130 mph) to connect North Hampton Roads to Richmond and Washington D.C. The aim with both the CSXT/I-64 service and the NS/Route 460 service is to have travel times of about two hours between the ends of the corridor. This allows out and back business and social trips to be made on the same day.

Train fares will be set at about 50-70 percent of air fares. The system will be operated under franchise by an experienced operator and have a high level of reliability and on time performance. Stations will be modern and built as multimodal terminals with car parking, car hire, taxi, and transit connections.

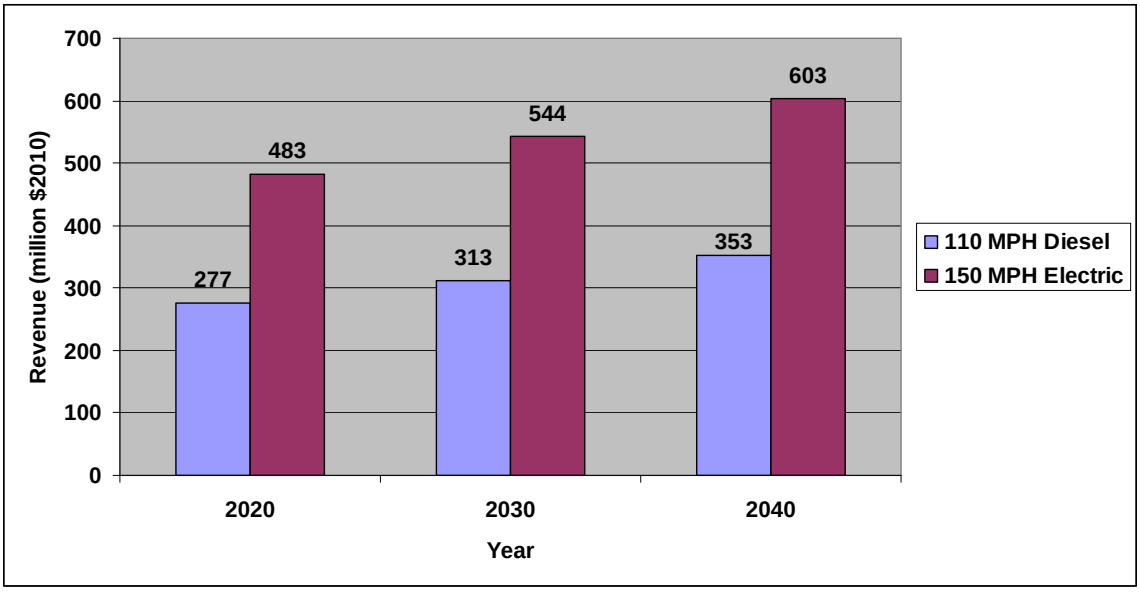
TOTAL RIDERSHIP FOR DIESEL AND ELECTRIC SERVICE



* Includes ridership for both the CSXT/I-64 and NS/Route 460 corridors

The system could handle up to 8 million travelers per year with about 30 percent for business, 16 percent commuter, and 54 percent for social and recreational travel. The major source of passengers would be from auto, with individuals increasingly picking high-speed and enhanced intercity passenger rail as congestion and gas prices rise for intercity travel. Eventually, the passenger rail system will carry 10 to 12 percent of total intercity travelers and provide significant relief to highways across the corridor. In the multimodal terminals along the corridor, the rail system will connect with urban bus, LRT, and METRO connections, and both car hire and taxi facilities. The passenger rail system can provide a seamless connection that allows individuals to complete their journey to the office, home, and social and tourist attractions.

TOTAL REVENUE FOR DIESEL AND ELECTRIC SERVICE ($2010)



* Includes revenue for both the CSXT/I-64 and NS/Route 460 corridors

The preliminary revenue forecasts for a high-speed rail system increase steadily over the life of the project to over $350 million per year for 110-mph Diesel service to about $600 million per year for 150-mph Electric service by 2040.

THE HIGH-SPEED AND INTERCITY PASSENGER RAIL SYSTEM

High-Speed Passenger Rail systems operate in 200 to 300 mile corridors linking major urban centers and showing a level of market attraction that gives them independent utility. As a result, the evaluation of High-Speed and Enhanced Intercity Passenger Rail for Hampton Roads needs to consider both the railroad corridors linking Newport News and Norfolk to Richmond and Washington D.C. Furthermore, the ridership and cost projections indicated significant benefits of using both the CSXT/I-64 and the NS/Route 460 rail corridors for connecting the Hampton Roads metropolitan area with Richmond and Washington D.C. This increases both the financial and economic performance and helps to reach USDOT FRA funding requirements.

Based on the preliminary analysis of the two routes, the Hampton Roads Vision provides a balanced approach for providing High-Speed and Intercity Passenger Rail Service to all of the Hampton Roads area. While today's intercity passenger rail service operates at a top operating speed of 79-mph the HRTPO objectives would seek to increase this to 110-mph and even 150-mph. High-Speed Diesel Rail service with an operational top speed of 110-mph is proposed to Newport News and High-Speed Electric Rail service with an operational top speed of 150-mph to Norfolk. Proposed High-Speed Rail service will require the purchase of a modern train fleet, the construction of new track and a sealed or grade separated corridor to handle 110-mph and 150-mph operations respectively. The development of new right-of-way to support High-Speed and Enhanced Intercity Passenger Rail operations will be necessary in parts of the corridor between Washington D.C and Hampton Roads to achieve the full benefits of the high-speed operations, given the geometry of the existing corridors.

The passenger rail segments between Richmond and Hampton Roads would have as many as four stations at Petersburg, Suffolk, Bowers Hill, Norfolk, on the Richmond-Norfolk segment; and as many as three stations at Williamsburg, Newport News Airport and Newport News Downtown on the Richmond-Newport News segment.

PROPOSED INFRASTRUCTURE

A key feature for implementing passenger rail service to Hampton Roads is the use of existing freight railroad track infrastructure for 79-mph and 90-mph train operations. For High-Speed operations, new dedicated track would be required along side the existing freight rail corridors or on potential Greenfield alignments necessary to support the higher train speed operations. On dedicated passenger tracks, the speeds can be increased to 110-mph or more as the new track is separated from other rail operations as well as adjacent highways. Within the rail corridor from Washington D.C to Hampton Roads metropolitan area, with the addition of electrification, the speeds can be increased to 150-mph, again, depending on alignment and segment.

Major capital improvements for the Washington-Richmond-Hampton Roads High-Speed Rail Corridor for different train operating scenarios include, but are not limited to –

Item	110-mph Diesel HSR Service	150-mph Electric HSR Service
Track	Construct Class 6	Construct Class 8
Speed Restrictive Geometry	New Geometry and adjusted where feasible	New Geometry
Crossings	All Updated to Quadgates	Grade Separations
Speed Restrictions – Communities	Raised to higher levels	Speed Restrictions in Urban Areas
Movable Bridges	Retrofitted to 60 mph	Retrofitted to 60 mph
Corridor Protection	Corridor is sealed and totally fenced	Corridor is sealed and totally fenced
Signal Systems	All New PTC	All New PTC
Double Tracking	Dedicated Signal Track	All Dedicated Double Track - Electrified
Grade Separation	Sealed Corridor	All Grade Separated

The preliminary estimated capital costs for the whole corridor for developing the HRTPO High-Speed and Enhanced Intercity Passenger Rail objectives range from $3 billion to $6 billion, depending on the service scenarios and the rail corridors selected. These capital costs include all expenditures for the Washington-Richmond, Richmond-South Hampton Roads, and Richmond-North Hampton Roads, the full 300-mile system. For the ultimate development of the rail system it would need to be double tracked and electrified for 150-mph service. In the rail corridor between Petersburg and Washington D.C., potential new rail alignments (Greenfield alignments) will need to be explored for achieving the trip time potential of 2 hours between Washington D.C. and Hampton Roads.

Implementation of the Hampton Roads Vision for High-Speed and Intercity Passenger Rail will improve freight, as well as passenger operations by developing advanced signaling systems increasing capacity, improving freight rail speeds and enhancing both passenger and freight rail train operation safety.

WASHINGTON-RICHMOND-HAMPTON ROADS CORRIDOR:

CAPITAL COST SUMMARY ($1000'S 2010)*

Diesel HSR Option	Total Capital Cost
Norfolk-Richmond	$1,530,699
Newport News-Richmond	$ 477,499
Richmond-Washington D.C.	$ 932,160
Total	$2,940,358

Electric HSR Option	Total Capital Cost
Norfolk-Richmond	$2,734,781
Newport News-Richmond	$1,128,407
Richmond-Washington D.C.	$2,129,468
Total	$5,992,657

*Assumes 35% funding from SEHSR

PROPOSED TECHNOLOGY

The development of High-Speed and Enhanced Intercity Passenger Rail in the Washington-Richmond-Hampton Roads Corridor will require the purchase of a new fleet of modern diesel and electric high-speed rail trains. These advanced passenger rail systems offer real advantages in terms of performance and comfort over existing Amfleet trains. Key attributes for the high-speed trains include –

- Fast and frequent rail service, with speeds up to 130-mph for the diesel fleet, and 150-mph plus for the electric trains.
- A very high level of performance including –
  - Rapid acceleration and deceleration
  - Low center of gravity
  - Tilt capabilities to increase the speed in curves
- A high level of onboard comfort including onboard amenities for business and leisure travelers. This includes food and beverage, video and laptops, comfortable seating, air conditioning and quiet cars.
- The latest vehicle design that is built to meet a high standard of safety and reliability. The system safely is enhanced by advanced signaling and IT technology, which not only improves train control and performance, but also provides a sealed corridor to prevent grade crossing conflicts and separation of highway and rail traffic.

HIGH-SPEED DIESEL TRAIN

HIGH-SPEED ELECTRIC TRAIN

ONBOARD AMENITIES

PROPOSED TRAIN SCHEDULES

Upgrading the rail system would result in speed and running time improvements that, in turn, boost ridership and revenues and allow more train frequencies to be operated. This results in a "multiplier effect" on the initial investment in speed improvement, since stronger market demand then supports the operation of more train frequencies as well.

Passenger trains from Newport News to Washington D.C. currently need more than four hours with poor on-time performance, because of track conditions on some segments of the route, and delays as a result of busy shared infrastructure.

POOR TRACK ON PASSENGER LINE SOUTH OF ACCA YARD, RICHMOND

WELL DESIGNED MODERN TRACK

By providing high-speed diesel or electric train service on high quality Greenfield corridors between the urban areas, and upgrading track quality and providing dedicated passenger tracks within urban areas, this schedule time can be cut by more than half and reliability improved.

Rail Infrastructure improvements that must be addressed in order to provide High-Speed and Enhanced Intercity Passenger Rail service in the corridor are the busy, curvy CSXT alignment from Washington, D.C. to Doswell, VA; street running through downtown Ashland, VA and around Acca Yard in Richmond; the curvy "S" line connector from Acca Yard down to Richmond Main Street station and across the James River to Centralia; and the complex Petersburg terminal area. A possible approach to solving some of these issues is to develop Greenfield bypasses that would provide a geometric alignment that can support High-Speed and Intercity Passenger Rail operations between cities. The CSXT/I-64 corridor shares single track with heavy coal trains, which hurts service reliability in this corridor, while the NS/Route 460 corridor is double track and very straight, and so has an excellent capability to be upgraded to support true High-Speed and Enhanced Intercity Passenger rail service in the future.

In the implementation process for conventional and high-speed rail to be efficient it is essential to improve train schedules and frequencies in a balanced way. Typically as speeds increase, the market expands and frequency needs to be increased. The ability to attain proposed train speeds depends on the opportunity of achieving Greenfield segments in the corridor, as well as the ability to upgrade existing rail corridors within urban areas. Using these assumptions for the current level of planning, the schedules have been validated with previous planning studies as well as verified using current train performance simulations, and found both reasonable and achievable.

For example, a 20-30% reduction in travel times is normal for 110-mph tilting trains on existing rail lines; for Washington D.C. to Richmond Main Street a 110-mph train travel times compared with a conventional train with 90-mph speed limit could achieve these savings: its time would be reduced from 2:45 down to 2:05, a 25% savings.

However, the construction of the Occoquan to Doswell Greenfield with Electric operation could potentially shorten this Washington D.C. to Richmond time to 1:05, and Richmond to Norfolk to 55 minutes. This would create a 2-hour service from Washington D.C. to Norfolk.

HAMPTON ROADS CORRIDOR – SERVICE OBJECTIVES

	CSXT/I-64	NS/Route 460
Washington D.C. to Richmond	**1:30**	**1:05**
Richmond to Norfolk		**0:55**
Richmond to Newport News	**0:52**	
Total	**2:22**	**2:00**

Finally, for the Newport News Richmond-Washington segments it should be noted that the 110-mph train proposed is capable of speeds up to 130 mph. As a result, if track is built that can accommodate 150-mph Electric trains, the 110-mph Diesel would be capable of increasing speed to 130-mph "under the wire" and reduce the timetable. This would create a just over 2-hour timetable for Washington D.C. to Newport News.

In order to finalize the schedules for the corridor, detailed track and performance calculations need to be completed as part of Phase II. In addition, detailed capacity studies will be completed with the freight railroads in order to ensure that the passenger train systems do not create capacity problems for their operations. Typically these studies are carried out in a collaborative way with the freight railroads to ensure that they will be able to agree to the high-speed and intercity passenger rail plans.

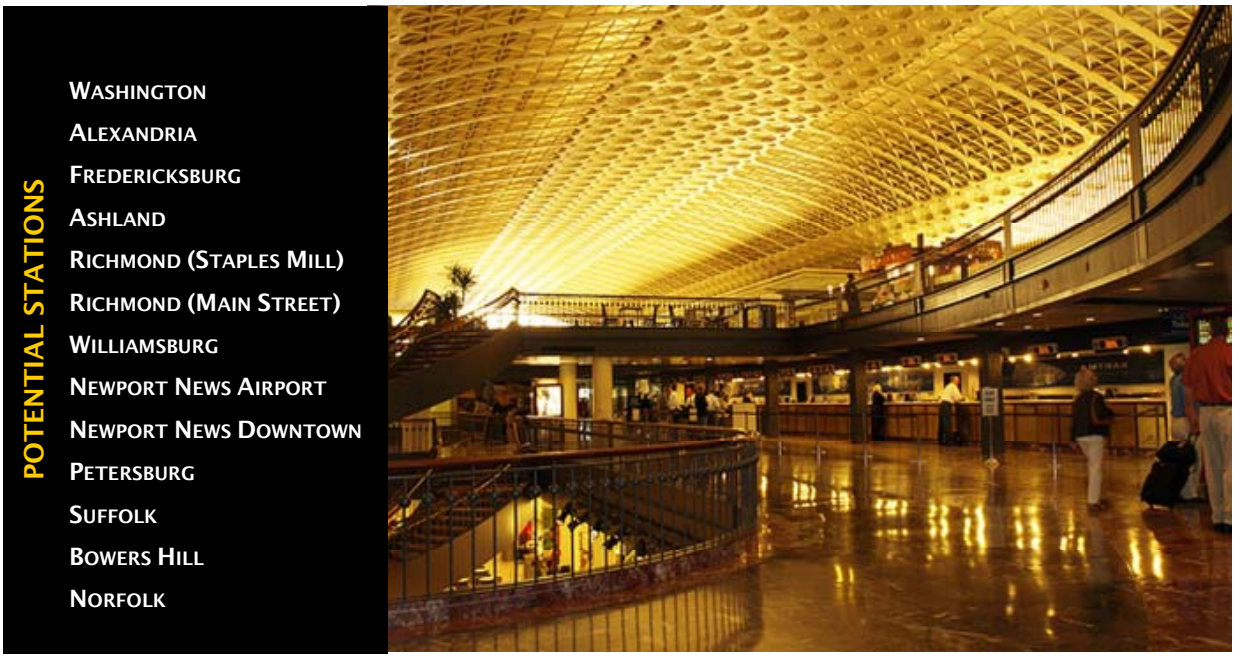
DIESEL HIGH-SPEED TRAIN ON ELECTRIFIED TRACK

PROPOSED STATIONS

A key part of "The Vision" for High-Speed and Enhanced Intercity Passenger Rail is modern multimodal passenger terminals. These are a critical element in the success of a passenger rail system as they are not only the gateway to the system, but provide the access and egress to the system for local residents. Access and egress should be as seamless as possible and should include LRT and Bus connections, Taxi and Van service, and rental car facilities. The terminals need significant parking facilities as many people will drive to the station. The terminals themselves should be modern with desirable spaces to sit, meet and wait. The station depending on size should offer a range of facilities such as restaurants and cafes, shops, newspaper and book stores, and the other travel facilities such as restrooms and seating areas needed by travelers.

These multimodal terminals will also offer significant opportunities for Joint Development projects by local and private development communities. HRTPO needs to work with local communities to maximize the potential of these locations.

WASHINGTON UNION STATION: THE NORTHERN TERMINAL



High-Speed and Enhanced Intercity Passenger Rail Terminals that offer significant opportunities for Joint Development are large in size, and include enough retail and commercial space to entice private sector developers. Examples of HSR Terminals being proposed by California are shown below. The level of joint development proposed can be seen.

PROPOSED SAN JOSE HIGH-SPEED RAIL STATION

PROPOSED SACRAMENTO HIGH-SPEED RAIL STATION

IMPLEMENTATION AND EVALUATION

The implementation of HRTPO Objectives for High-Speed and Enhanced Intercity Passenger Rail can be achieved by building on the base of the conventional speed (79-mph – 90-mph) passenger rail proposals set out in the DEIS. Preliminary analysis of the proposed High-Speed and Intercity Passenger Rail System includes all the proposed conventional speed investments and wraps them into the two High-Speed development steps being considered to meet the HRTPO Objectives. To evaluate the potential for developing the HRTPO Objectives a series of preliminary steps were defined for both the Conventional and High-Speed and Enhanced Intercity Passenger Rail development process.

CONVENTIONAL SPEED DEVELOPMENT PROCESS

The conventional speed development steps being implemented by DRPT are shown below –

CONVENTIONAL RAIL DEVELOPMENT STEPS

Steps	Route	Max Speed	No. of Trains	Infrastructure	Stations*
Step 1	CSXT/I-64	79-mph	2	Shared Track Schedule Enhancement	Main Street Newport News (existing)
	NS/Route 460	79-mph	1	Shared Track	Staples Mill Petersburg Norfolk
Step 2	CSXT/I-64	79-mph	3	Shared Track	Main Street Newport News (existing)
	NS/Route 460	90-mph**	6	Shared Track V Line	Main Street Bowers Hill Norfolk

* Recommended stations to be determined

** 79-mph speed on NS Track

Step 1 considers the introduction of one train per day to Norfolk and a continuation of the two trains per day for Newport News. The aim is to get this step implemented by 2013 following the construction work needed to make the Collier Connection between CSXT and NS in Petersburg, and other improvements on NS and CSXT.

It is anticipated that other improvements such as implementing three train services per day to Norfolk may be subsequently achieved, but the timetable and costs for these improvements is still being developed by DRPT.

Step 2 is the implementation of the DEIS Service Scenarios, which will provide three trains at a maximum speed of 79-mph to the CSXT/I-64 route and six trains per day at up to 90-mph to the NS/Route 460 option. In this step the intent is on the NS/Route 460 option to use the V line to provide a Bowers Hill station, and to connect via the S line to Main Street Station in Richmond.

HIGH-SPEED RAIL

To attain the HRTPO Objectives of Enhanced Passenger Rail in the CSXT/I-64 corridor and High-Speed Rail in the NS/Route 460 corridor, two development steps were defined. These steps build off the Conventional Rail steps upgrading the system to High-Speed Rail.

HIGH-SPEED RAIL DEVELOPMENT STEPS

Steps	Route	Max Speed	No. of Trains	Infrastructure	Stations*
Step 3	CSXT/I-64	90-mph	6	Shared Track	Main Street Newport News Downtown/Airport
	NS/Route 460	110-mph	12	Dedicated Track V Line	Main Street Bowers Hill/Suffolk Norfolk
Step 4	CSXT/I-64	110-mph	9	Dedicated Track	Main Street Newport News Downtown/Airport
	NS/Route 460	150-mph	16	Dedicated Track V Line	Main Street Bowers Hill/Suffolk Norfolk

* Recommended stations to be determined

Step 3 – In this step the number of trains is increased to 12 trains at 110-mph on the NS/Route 460 corridor, and 6 trains at 90 mph on the CSXT/I-64 route. New stations are opened at Newport News airport and at Suffolk. While at 90 mph the CSXT/I-64 route can use shared track, at 110-mph on the NS/Route 460 segment a new dedicated track is built along the NS right-of-way.

Step 4 – In this step the train speeds on the CSXT/I-64 route is raised to 110-mph with 9 trains per day. This requires a dedicated track be built in the CSXT right-of-way. High-Speed Diesel trains that were operated on the NS/Route 460 segment in Step 3 can be redeployed to the CSXT/I-64 route in Step 4, so the trains can take full advantage of the new dedicated infrastructure that has been installed on this route. Meanwhile, new electric trains are purchased for the NS/Route 460 corridor. For the NS/Route 460 segment the proposal for 150-mph and 16 trains per day requires a dedicated double electrified track all the way from Washington D.C. to Norfolk. The High-Speed Diesel trains from Newport News can share this electrified track, and improve their performance up to 130-mph.

THE RANGE OF HIGH-SPEED RAIL TRAINS AVAILABLE

FINANCIAL AND ECONOMIC RESULTS

The goal of the Washington-Richmond-Hampton Roads Corridor Vision Plan is to evaluate the potential for a typical state based public sector funding process, and/or public-private partnership to develop a modern High-Speed and Enhanced Intercity Passenger Rail service for the corridor.

To meet this objective the financial and economic criteria used to evaluate the project are the USDOT FRA public-private partnership investment criteria that are used to justify Federal High-Speed Rail Funding. These require that:

- A fully developed High-Speed Rail system must show a positive Operating Ratio (i.e., greater than 1.0), which ensures that the system does not require an operating subsidy after the ramp up period. This allows the system to be franchised to Amtrak or the private sector and make a potential contribution towards funding a share of its own capital costs.
- A fully developed intercity passenger rail system must have a positive Cost Benefit Ratio (i.e., greater than 1.0), which ensures that the revenues and benefits of the intercity passenger rail system exceed its capital and operating costs over the life of the project. The Benefits of the system include travel time savings by mode, reduced emissions, resource savings, and improved efficiency. A positive Cost Benefit Ratio shows that a project is good for the communities of the corridor, good for Virginia and good for the country.

OPERATING RATIO

The Operating Ratio for the development of the Washington-Richmond-Hampton Roads Corridor was developed for each step. The preliminary results show that the lower speed conventional train options, 79-mph and 90-mph have negative Operating Ratios (i.e., less than 1.0), which requires operating subsidies but once the speed is increased to 110-mph and 150-mph, the project produces positive Operating Ratios (i.e., greater than 1.0). Since the FRA requirement for High-Speed funding is for the fully developed project to show a positive Operating Ratio, it is clear that the High-Speed and Enhanced Intercity Passenger Rail project as envisaged by HRTPO meets the USDOT FRA financial goal.

OPERATING RATIOS FOR HIGH-SPEED RAIL PROGRAM DEVELOPMENT STEPS (2025)

Step 1		Step 2		Step 3		Step 4	
CSXT/ I-64	NS/ Route 460	CSXT/ I-64	NS/ Route 460	CSXT / I-64	NS/ Route 460	CSXT / I-64	NS / Route 460
0.67	0.73	0.85	0.91	1.06	1.19	1.52	1.51

The analysis used operating revenues and costs specifically estimated for the corridor, using unit costs. These costs do not reflect subsidies from Amtrak, USDOT, or state of Virginia. It is likely that Amtrak will continue to subsidize passenger operations through Step 1. Given the recent Passenger Rail Investment & Improvement Act (PRIIA-2008) legislation, and the current investigation by the Surface Transportation Board (STB), it is questionable that Amtrak will continue this subsidy for Step 2. As such, DRPT is seeking to establish a funding mechanism.

Cost Benefit Ratio

The Cost Benefit Ratio was calculated using USDOT FRA cost benefit procedures, which include estimating the Net Present Value of a project at both 3 and 7 percent real. The 3 percent real rate represents the long-term government bond rate, while the 7 percent represents an onerous capital rationing threshold that is designed to limit the number of potential projects. Many projects find it difficult to achieve a 7 percent threshold. However, the preliminary Cost Benefit results in the following exhibits show that the Washington-Richmond-Hampton Roads Corridor project has a very substantial cost benefit result at both the 3 and 7 percent levels. This shows that the project is very good, and that subject to further more detailed analysis, it provides a strong "prima facie" case for the high-speed and intercity passenger rail options posed by HRTPO Resolution 2009-05.

Project Benefit Cost Ratio – 3% Discount Rate ($2010)

Step 1		Step 2		Step 3		Step 4	
CSXT/ I-64	NS/ Route 460	CSXT/ I-64	NS/ Route 460	CSXT/ I-64	NS/ Route 460	CSXT/ I-64	NS/ Route 460
2.68	2.09	2.32	2.43	2.57	2.26	2.46	2.25

Project Benefit Cost Ratio – 7% Discount Rate ($2010)

Step 1		Step 2		Step 3		Step 4	
CSXT/ I-64	NS/ Route 460	CSXT/ I-64	NS/ Route 460	CSXT/ I-64	NS/ Route 460	CSXT/ I-64	NS/ Route 460
2.53	1.57	1.72	1.81	1.88	1.55	1.63	1.45

FUNDING

It is important to understand that High-Speed Rail funding is treated differently in PRIIA-2008 than conventional intercity passenger rail projects and has different qualification requirements.

At this stage of the project it is recognized that two different approaches could be used to develop High-Speed Rail funding –

- A classic Public Project implements a Federal/State process as typified by most highway and transit projects. This uses an 80/20 funding of infrastructure rights-of-way and rail equipment. To qualify for High-Speed Rail funding, the system must be capable of achieving speeds of 110-mph.
- A Public-Private Partnership – Design Build Operate Maintain and Finance (DBOM-F) Program that combines Private Sector financing with public sector financing. Typically this type of funding relies more heavily on private contributions and the fare box revenue. This type of funding has the advantage that it only asks for 35 to 50 percent Federal support

PUBLIC PROJECT

In this case of a public project for High-Speed Rail, the Federal Government would provide 80 percent of the funding. Typically, states have suggested that they can provide 20-30 percent of the cost, with local contributions being 5 to 10 percent. However, this state match requirement adds financial stress to state participation. State funding has typically been from general tax revenue sources or Transportation Bonds. The Transportation Bonds are sometimes suggested to be Tax Credit Bonds rather than simple state Bonds. This would increase the funds available and reduce pressure on the states. One exception to this process is the Stimulus funds, which under ARRA did not in some instances have a match requirement.

PUBLIC-PRIVATE PARTNERSHIP

The typical contribution from the USDOT FRA would only be in the order of 35-50 percent, as proposed by the previous P3 projects such as the FOX project in Florida, and recent proposals for the Northeast corridor. Other financial instruments include Revenue Bonds, Vendor Equity or Private Financing, along with revenues from station joint development, TIF district/parking, and state and local contributions (e.g., rights-of-way). Such funding could well provide the $2 to 4 billion needed for 110-mph service, and the $5 to 7 billion needed for 150-mph service. Meanwhile the stronger economic development associated with High-Speed Rail implementation would likely ensure that any state or local contributions are fully recouped through increased tax revenues.

The following table shows the type of financial structure that private sector could use to fund a major infrastructure project.

PRELIMINARY FUNDING PLAN ($BILLION)

	Step 3	Step4
Federal Grants	1.2 – 1.5	2.4 – 2.5
Revenue Bonds	0.2 – 0.4	0.8 – 1.0
Vendor Equity Contribution	0.5 – 1.0	1.2 – 1.5
Station Development	0.2 – 0.3	0.3 – 0.5
TIF District/Parking	0.2 – 0.3	0.2 – 0.4
State and Local Contribution	0.3 – 0.4	0.4 – 0.5
Total Funding Range	2.69 – 3.9	5.3 – 6.4

CONCLUSIONS

The focus of the initial phase of this study has been to assess the potential of the HRTPO Objectives for High-Speed and Enhanced Intercity Passenger Rail in the Washington-Richmond-Hampton Roads Corridor. The key finding of the study is that this corridor has the potential to support the HRTPO Objectives and to create a modern High-Speed Rail system for both the Newport News-Richmond segment, as well as the Norfolk-Richmond segment.

This ability is due to the fact that not only does the Washington-Richmond-Hampton Roads Corridor have "independent utility," which means that it can support high-speed rail on its own right, but also because the corridor is attached to both the Northeast corridor and Southeast corridor, the demand for travel in the corridor is doubled. This significantly enhances its potential for High-Speed and Enhanced Intercity Passenger Rail and the corridor's ability to compete even with the strongest of other state's corridors (e.g., California or Florida) for the limited amount of Federal funds available.

SYSTEM BENEFITS

The Preliminary Vision Plan results are –

- It is possible to achieve the HRTPO Resolution #2009-05 goal by –
  - Providing "Enhanced" 110-mph service from Newport News to Washington D.C. with a travel time of just over two hours and a service of 8 to 10 trains per day.
  - Providing "High-Speed" 150-mph service from Norfolk to Washington D.C. with a travel time of about two hours and a service of 14 to 18 trains per day.
- The system will meet FRA public-private partnership, financial and cost benefit requirements making the system –
  - eligible for Federal funds
  - a potential candidate for a public-private partnership (P3) that will allow the private sector to participate in the development and operation of the system.
  - developable using a combination of CSXT and Norfolk Southern (NS) rail routes together with Greenfield options between Petersburg, Richmond, and Washington D.C.
- The system will provide a very real boost to the economy of the Washington-Richmond-Hampton Roads corridor over the life of the project and could generate as much as –
  - 800-900 thousand person years of work or 20,0000-25,000 jobs per year due to productivity
  - $5-7 billion gain in household income
  - $1.5-2.0 billion gains for joint development around the station sites in Norfolk, Newport News, Bowers Hill, Williamsburg, Petersburg, Richmond, Fredericksburg, Alexandria, and Washington D.C., once the project is built out.
  - Improve the financial viability of the Richmond-D.C. corridor.

CHALLENGES

In today's market, to advance and implement major high-speed rail improvements takes the combined resources of the region and support of all interested parties. The study defined four steps in the evolution of High-Speed and Enhanced Intercity Passenger Rail service to the Washington-Richmond-Hampton Roads Corridor. Each of these steps has the ability to be "building blocks" for the next steps cumulating in a High-Speed and Enhanced Intercity Passenger Rail service between Washington – Richmond – Hampton Roads.

The implementation of these four steps will involve a number of critical challenges –

- Develop an effective financing and funding approach that meets the needs of USDOT FRA and satisfies the requirement of PRIIA-2008 for high-speed rail funding.
- Given the overburdening of the USDOT FRA with ARRA and PRIIA grants, the Environmental process requirements have been expanded, and are having an adverse impact on project timelines. It may be that as the USDOT FRA gears up to process high-speed rail applications some of these timelines may be reduced.
- The development of potential Greenfield alignments should be further examined to determine the preliminary feasibility of advancing improved service.
- Development of community and regional support for the project and providing an effective case in identifying the potential for High-Speed Rail in the corridor.

Because of the identified benefits of High-Speed Rail together with the complexity of FRA funding processes and the typical environmental schedules, there continues to be a benefit to the Hampton Roads Region to continue to advance the development of a High-Speed and Intercity Passenger Rail Vision Plan.

NEXT STEPS

To move towards implementing the HRTPO Objectives, HRTPO should take the following steps –

- Complete the Vision Plan to confirm and support the results of this preliminary phase.
- Develop a public-private partnership with the freight railroads and undertake joint assessments of track capacity needed for freight and passenger train operations.
- Develop partnerships with local communities regarding station development to evaluate potential transit connections, and auto requirements.
- Identify the potential financial parameters for a public-private partnership considering Design, Build, Operate, Maintain and Finance (DBOM-F) options.

Key documentation for FRA application for High-Speed Rail funds includes –

- Service Development Plan
- Environmental Documentation
- Agreements with Freight Railroads
- Agreements with local communities on station development
- Financial and Funding Plan
- Give the need for 110-mph operation in order to compete for USDOT FRA High-Speed Rail Funds, Champion the designation of the Washington-Richmond-Hampton Roads Corridor as a High-Speed Corridor.

The PRIIA-2008 Legislation provides Federal Grants of up to 80 percent of Infrastructure Costs for High-Speed Rail projects that can be reasonably expected to achieve 110 mph.

This is the objective of the HRTPO Resolution for the Washington-Richmond-Hampton Roads Corridor.

The PRIIA legislation states that preference should be given to projects that –
Have high levels of ridership, increase On Time Performance (OTP), reduce trip time, provide additional service frequency, provide intermodal connectivity, improve freight and/or commuter operations, reduce highway or airport congestion, have significant environmental benefits, have positive economic development or employment benefits, and meet other specified criteria.

Quite clearly the Washington-Richmond-Hampton Roads High-Speed Rail Corridor could achieve these objectives.