Valley Railroad State Park Economic Feasibility Study

Developed for

Lower Connecticut River Valley Council of Governments

Essex, Connecticut

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Contents

Tables

Figures

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Chapter 1: Current and Future Economic Assessment

This chapter describes the current freight and passenger rail system in Connecticut, the region, and local area around the Valley State Park. Existing conditions data collected for this study is presented, as well as findings from interviews and previously completed studies. An overall assessment of the opportunity to develop a passenger rail system beyond the excursion service currently provided on the Valley Railroad (VRR) Line is offered, as well as information related to the potential market for freight rail service on VRR infrastructure.

1.1 Freight Rail Market Analysis

If improvements are made to the existing VRR infrastructure, opportunities to expand freight rail service may exist. Understanding the market for expanded freight rail service, however, depends on a combination of freight-related data analysis and the findings of interviews held with potential freight rail users.

A description of overall freight flows into, within, and out of Connecticut, as well as information that is more specific to the Lower Connecticut River Valley (LCRV) Region is provided in the following sections. In addition, a discussion of the potential demand for freight rail operations along the full length of the VRR Line is provided.

1.1.1 Connecticut and Northeast Freight Market

Over the past 20 years, the freight transportation industry in the United States has undergone significant change. Consolidation and restructuring of freight transportation modes has occurred, in part due to shifts toward "just-in-time" delivery, "containerization," the changing regulation of many freight transportation industries, and the global economy. When possible, shippers may trend toward intermodalism using more cost-effective rail, air, or water transport for the long-haul portions of freight transportation and relying on trucks for the ends of rather than the entire trip.

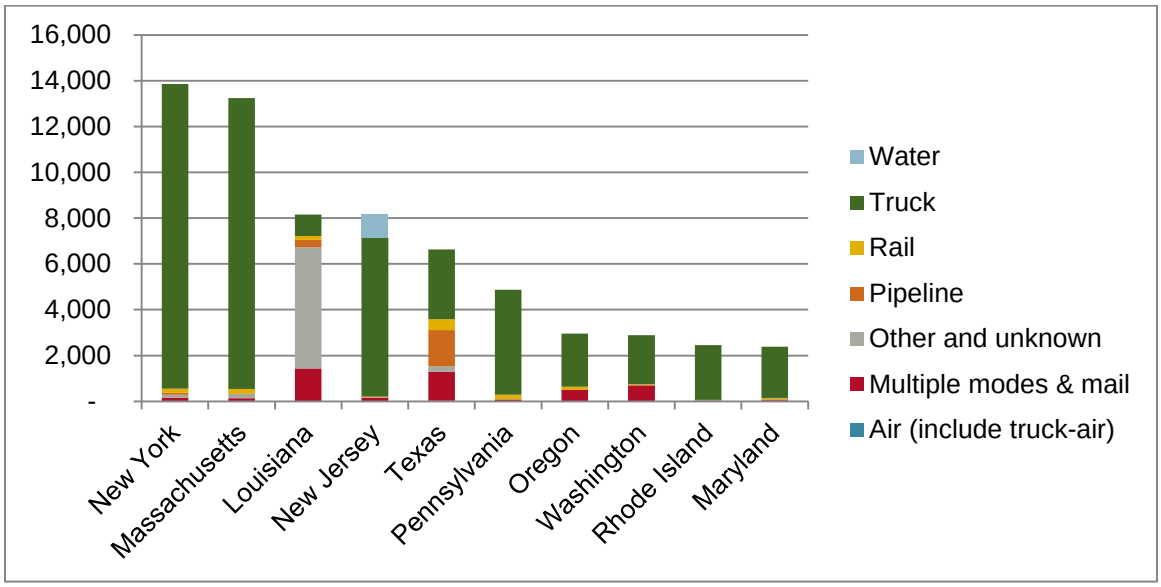
Connecticut is a relatively small geographic area located in close proximity to some of the nation's largest cities, ports, intermodal rail facilities, and airports. This positioning contributes to the state's relative reliance on truck transport for freight, and its tendency to be a part of primarily the truck portions of intermodal freight trips.[1] Nonetheless, marine ports, railroads, airports, and pipelines also provide transportation for cargo moving into, out of, and within Connecticut, just at a relatively smaller scale.

1.1.2 Connecticut Freight Imports & Exports

According to the Federal Highway Administration (FHWA) Freight Analysis Framework (FAF) data for 2012, 90.3 million tons of freight was moved into or out of Connecticut. This equates to $195 billion tons of freight value being moved. As shown in Figure 1.1, New York, Massachusetts, Louisiana, New Jersey, and Texas are the top five trading partners with Connecticut based on freight tonnage, with most of this freight being shipped by truck.

[1] *Rail Freight in the Housatonic Region, prepared for the Housatonic Valley Council of Elected Officials (HVCEO) by HARTransit, July 2011.*

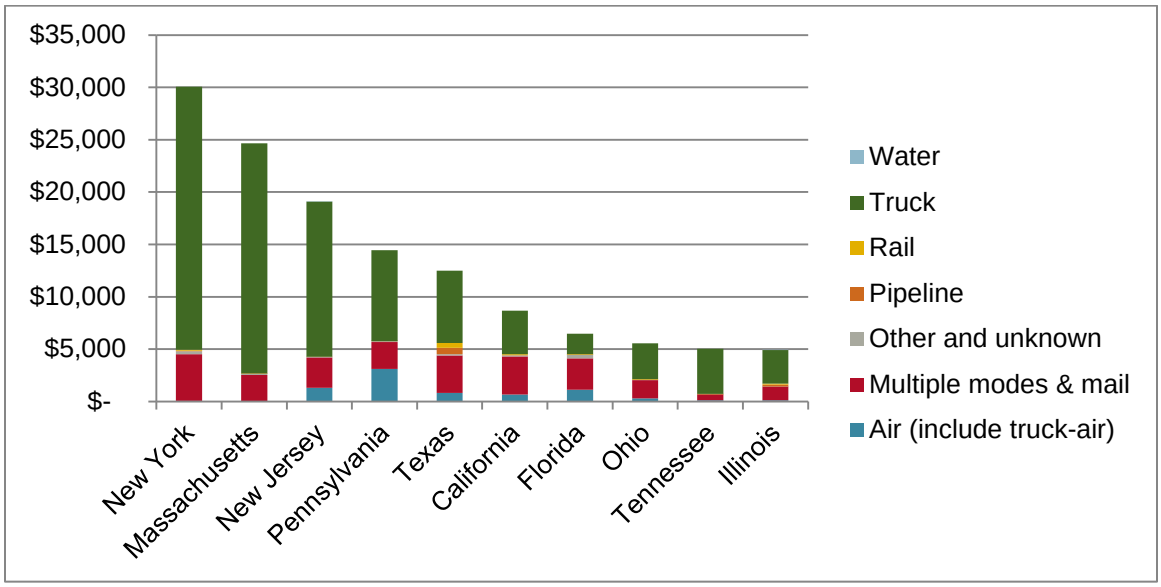
Figure 1.1: Top Ten Trading Partners with Connecticut based on Freight Weight (000s Tons) by Mode



Source: FHWA, Freight Analysis Framework, 2012.

The top two trading partners, New York and Massachusetts, are consistent regardless of whether they are ranked by weight or value. As shown in Figure 1.2, the third differs; Louisiana ranks third based on weight, while New Jersey ranks third based on value. As was the case when analyzed by weight, truck remains the most typical mode chosen to move freight from or into Connecticut.

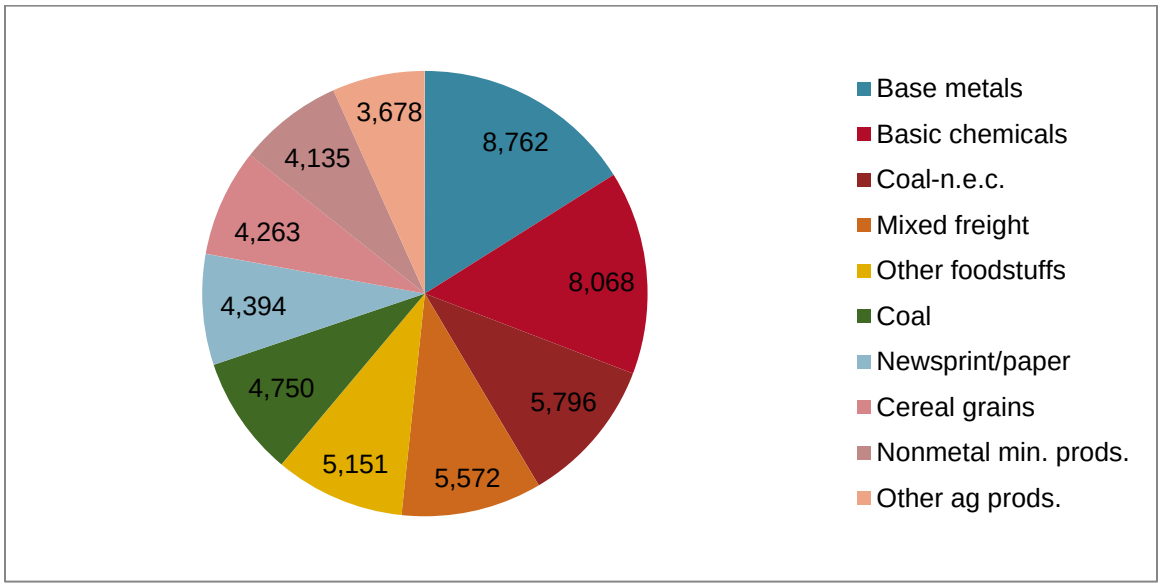
Figure 1.2: Top Ten Trading Partners with Connecticut based on Freight Value (Millions 2012$) by Mode



Source: FHWA, Freight Analysis Framework, 2012.

As shown in Figure 1.3 below, Base metals and Basic chemicals represent the two largest types of commodities shipped into or out of Connecticut, regardless of direction and mode of transportation, when based on weight. Other top commodities include petroleum/coal products (Coal n.e.c.), Mixed freight, and Other foodstuffs.

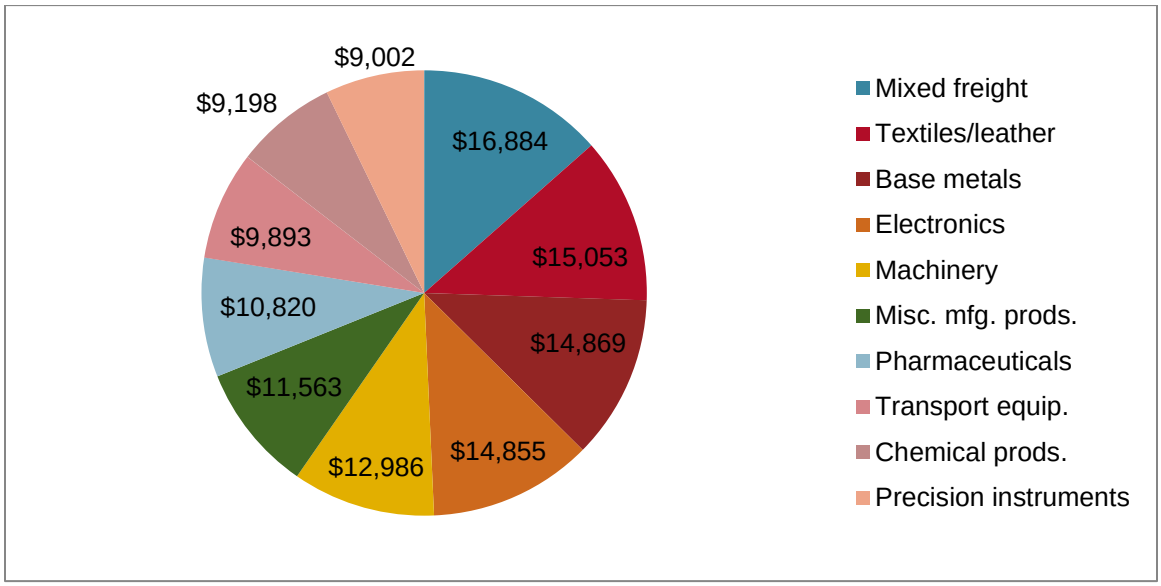
Figure 1.3: Top Ten Commodities Shipped into and out of Connecticut based on Weight (000s)



Source: FHWA, Freight Analysis Framework, 2012.

As shown in Figure 1.4, Mixed freight, Textiles/leather, Base metals, Electronics, and Machinery account for the largest share of overall freight value regardless of the mode utilized.

Figure 1.4: Top 10 Commodities Shipped into and out of Connecticut based on Value (Millions 2012$)



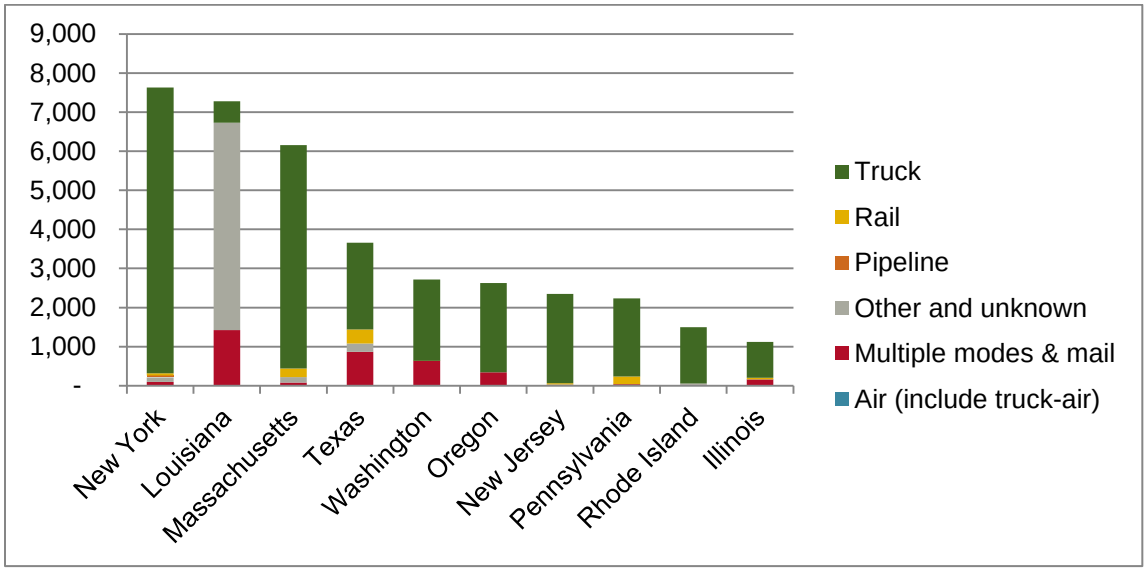
Source: FHWA, Freight Analysis Framework, 2012.

When direction of freight flow is examined for the state, there are some slight differences in trading partners and commodities shipped. The relative dominance of truck as the freight mode of choice, however, remains unchanged.

Connecticut Freight Exports

More than 46.6 million tons of freight moved out of Connecticut, based on 2012 FHWA FAF data. Much of this freight is bound for states in the northeast, such as Massachusetts, New York, New Jersey, and Rhode Island. Nearly all of this freight tonnage is currently moved by truck as shown in the figure below. As shown in Figure 1.5, other top destinations include Louisiana, Texas, Washington, and Oregon.

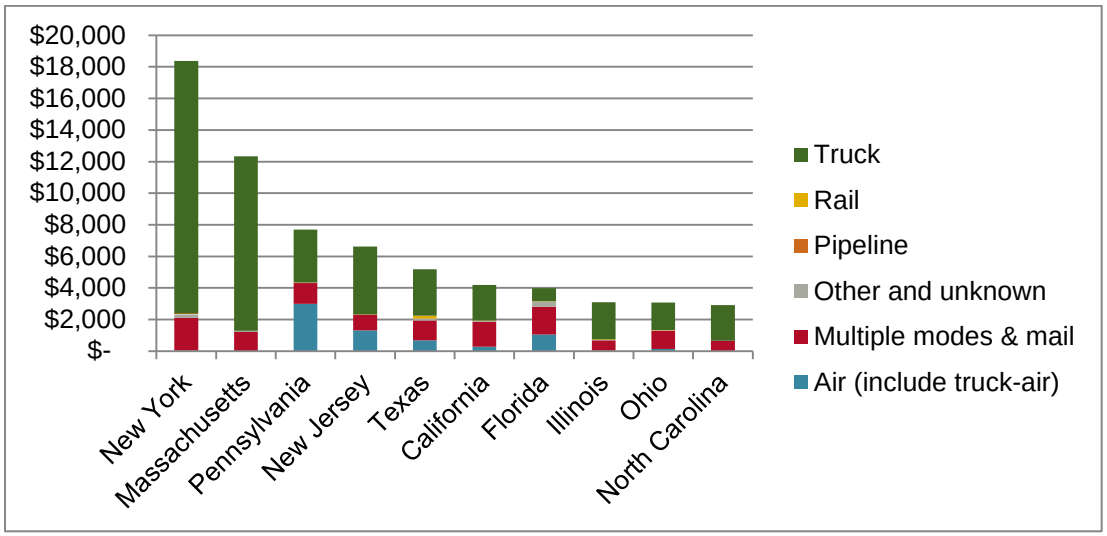
Figure 1.5: Top Ten Destinations for Connecticut Exports based on Freight Weight (000s Tons) by Mode



Source: FHWA, Freight Analysis Framework, 2012.

When analyzed, based on value, top destinations are still primarily northeastern states. Key exceptions are Texas and California. Not surprisingly, most of the highest valued freight is moved by truck, multiple modes, or air, as shown in Figure 6 below.

Figure 1.6: Top Ten Destinations for Connecticut Exports based on Freight Value (Millions of 2012$) by Mode

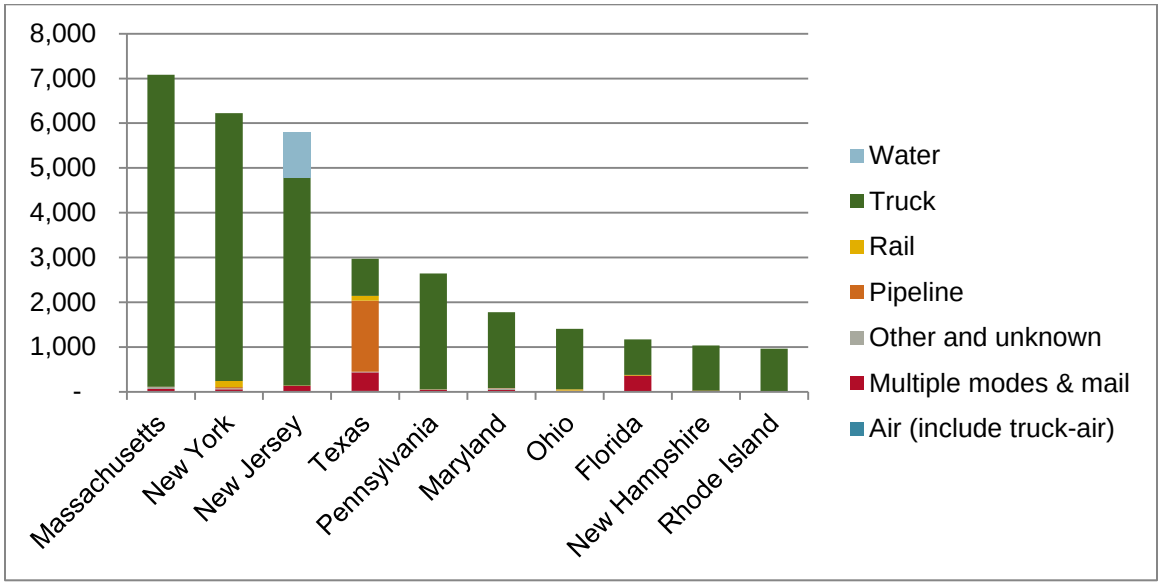


Source: FHWA, Freight Analysis Framework, 2012.

Connecticut Freight Imports

More than 43.7 million tons of freight was imported into Connecticut based on FHWA FAF data for 2012. Most of this entered the state by truck from other states in the northeast, Massachusetts, New York, and New Jersey. Truck transports most of the freight into the state, although Natural sands from New Jersey arrive to the state via water. As shown in Figure 1.7, Texas ranks the fourth highest, in terms of import tonnage into Connecticut. The majority of this freight, based on tonnage, arrives via pipeline. Specifically, Fuel oils and Coal-n.e.c. come into the state via pipeline from Texas.

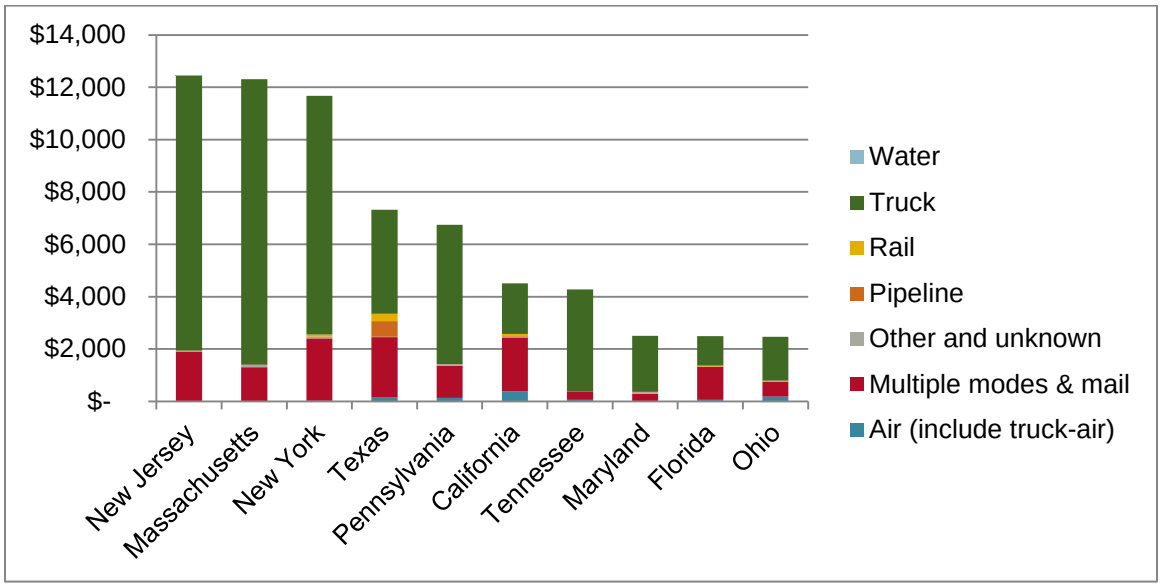
Figure 1.7: Top Ten Origins for Connecticut Imports based on Freight Weight (000s Tons) by Mode



Source: FHWA, Freight Analysis Framework, 2012.

Even when analyzed based on value, the top three states importing freight into Connecticut are New Jersey, Massachusetts, and New York. As shown in Figure 1.8, most of this freight travels by truck or multiple modes.

Figure 1.8: Top Ten Origins for Connecticut Imports based on Freight Value (Millions 2012$) by Mode



Source: FHWA, Freight Analysis Framework, 2012.

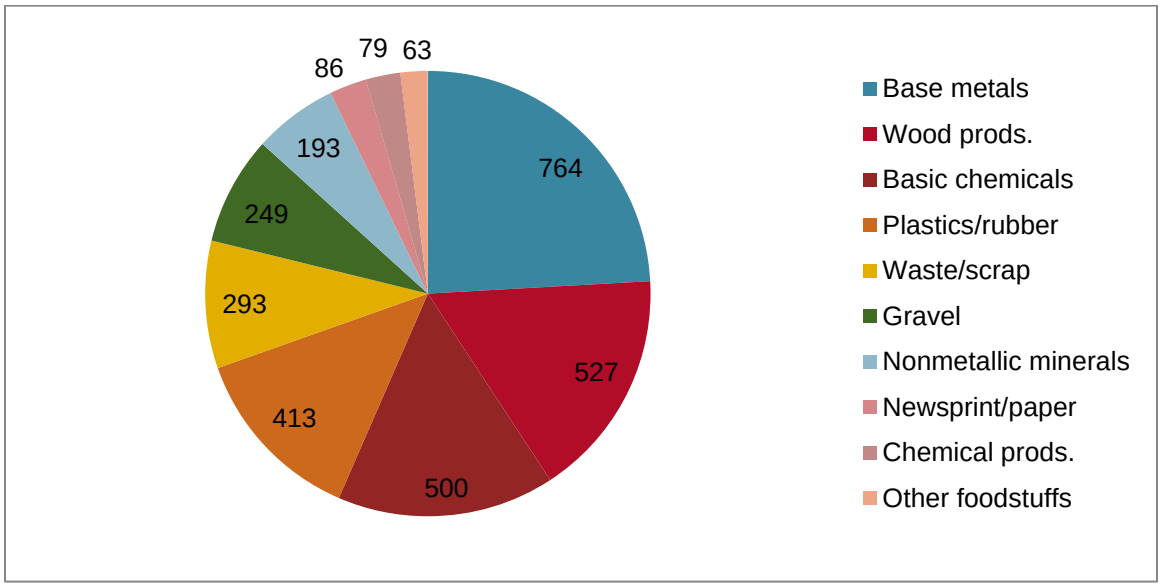
1.1.3 Rail Freight Into and Out of Connecticut

Freight is shipped via rail into and out of the state, though this mode represents a much smaller share of overall freight shipped. Of the 90 million tons of freight shipped into and out of Connecticut in 2012, only about 3.5 million tons was shipped by rail. Texas, Illinois, Georgia, Massachusetts, and Vermont were the top trading partners with Connecticut for freight transported by rail, based on weight. Basic chemicals accounted for the largest share of Texas tonnage, base metals for Illinois, and Wood products for GA. Rail transported tonnage with Massachusetts was almost entirely Gravel. Vermont commodities were more varied, Wood products, Base metals, Basic chemicals, as well as others.

When assessed based on value instead of weight, four of the top five trade partners were the same, with Massachusetts, being replaced by Louisiana. The primary commodities for each state were also the same for all states. Louisiana, as with Vermont, had a varied mix of commodities being moved with no one commodity dominating the trade.

Regardless of trading partner, Base metals accounted for the largest share of overall freight rail based on weight. As shown in Figure 1.9, Wood products and Basic chemicals were also a significant share of the top commodities.

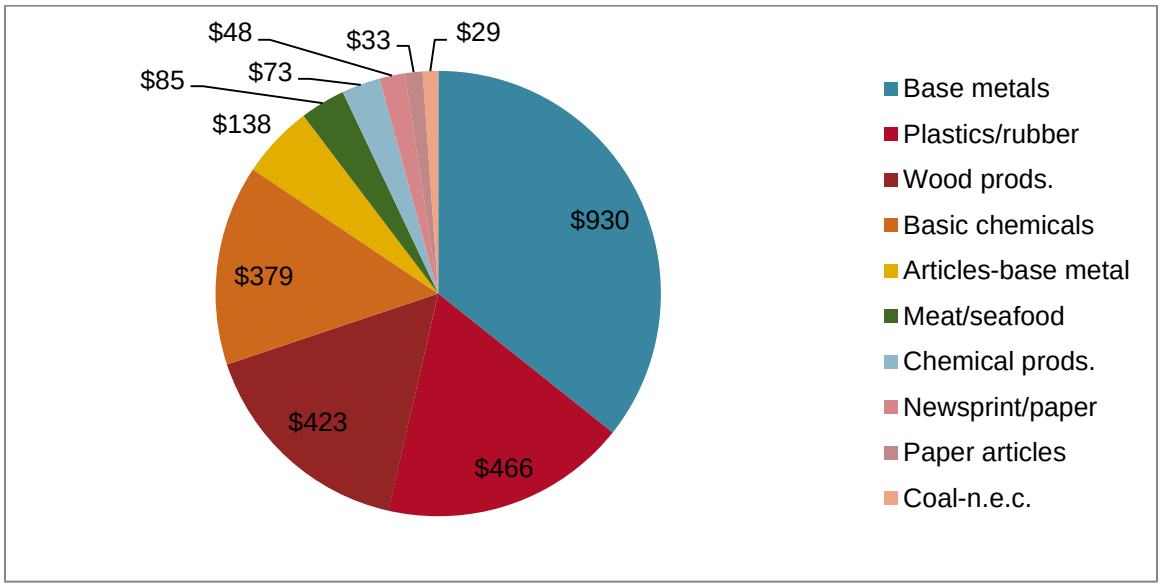
Figure 1.9: Top 10 Commodities Shipped by Rail into and out of Connecticut based on Weight (000s tons)



Source: FHWA, Freight Analysis Framework, 2012.

When ranked based on value, and shown below, Base metals accounted for the largest share of freight rail value, followed by Plastics/rubber and Wood products. The top ten commodities shipped by rail based on value are shown in Figure 1.10.

Figure 1.10: Top 10 Commodities Shipped by Rail into and out of Connecticut based on Value (Millions 2012$)



Source: FHWA, Freight Analysis Framework, 2012.

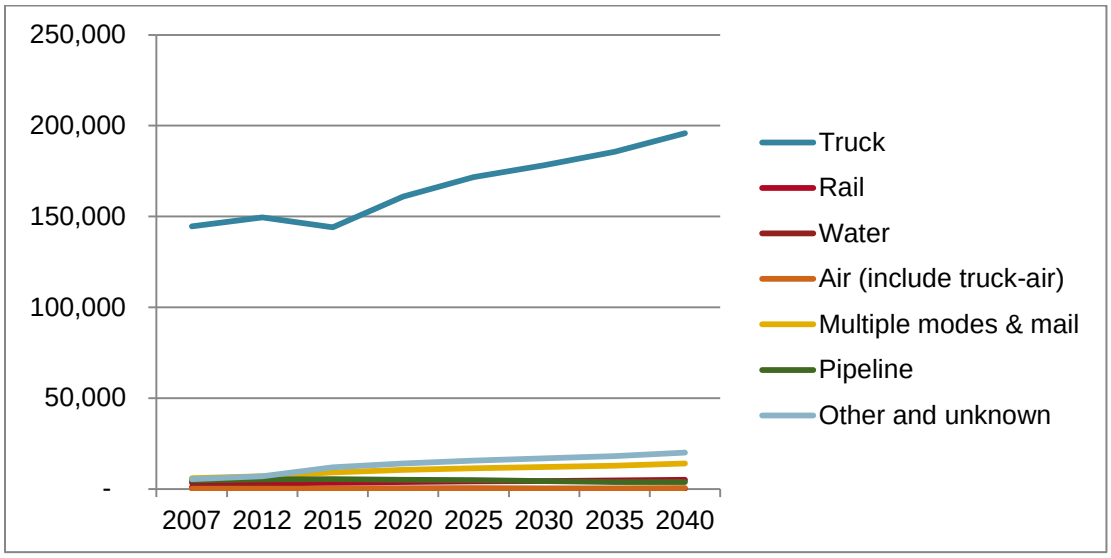
FHWA FAF data indicate that, based on current information available and overall trends, rail's share of freight tonnage into and out of the state is likely to decrease from 3.8 percent in 2012 to 3.1 percent in 2040. Multiple modes and mail, a category that does include some rail, is expected to increase during that same period by 1.5 percent. Generally, however, rail's share of tonnage in Connecticut is not

anticipated to grow significantly over the next 20 to 30 years. This is likely due to a number of factors, including that there is no double-stack rail freight service in Connecticut that could support increased rail freight service.[2]

1.1.4 Connecticut Freight Trends

As shown in the figures below, freight tonnage shipped into, out of and within Connecticut is expected to grow for all transportation modes, excepting water and pipeline. The most significant growth is expected to occur in air transport, with a 317 percent increase from 2012 to 2040. The category called "Multiple modes and mail" is also expected to increase more than 100 percent over that same period. Although growth in truck and rail transportation is less significant, both modes are expected to increase in terms of tonnage carried into and out of Connecticut. Truck tonnage is expected to increase by 31 percent and rail tonnage will increase by 36 percent between 2012 and 2040.

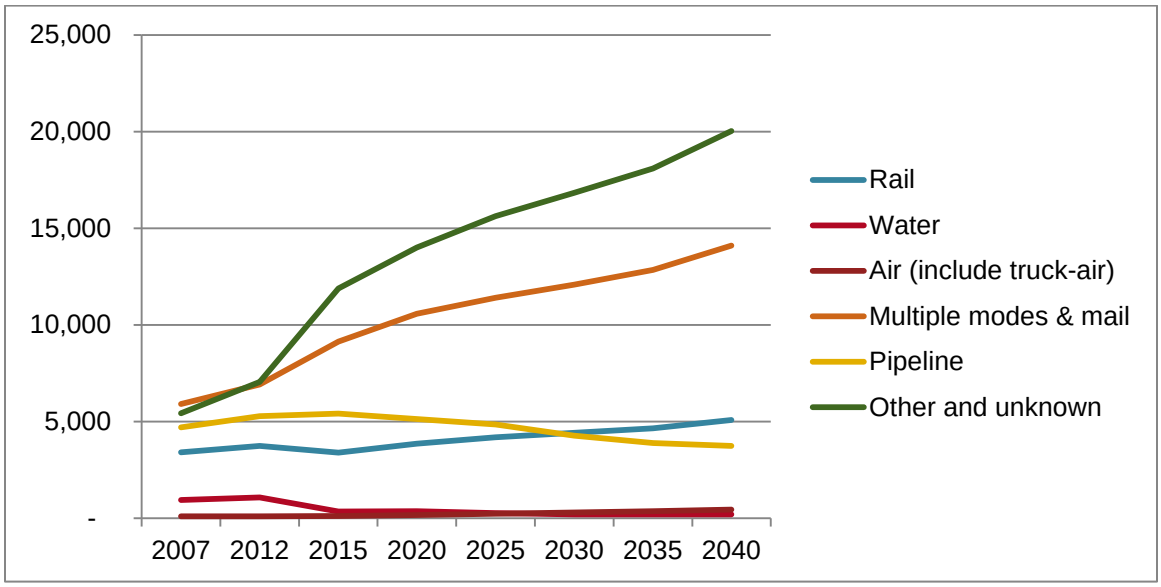
Figure 1.11: Connecticut Freight Tonnage Trends (000s Tons) by All Modes – 2007-2040



Source: FHWA, Freight Analysis Framework, 2012.

[2] *New London State Pier, Technical Memorandum -- Economic Data Collection and Existing Conditions Assessment, FXM Associates, October 18, 2010.*

Figure 1.12: Connecticut Freight Tonnage Trends (000s Tons) by All Modes Except Truck – 2007-2040



Source: FHWA, Freight Analysis Framework, 2012.

A number of businesses located along the VRR and throughout the region ship scrap metal, waste paper, stone, and other commodities that are well suited for rail transport. As discussed above, rail transport of freight is expected to grow in the state. Certain commodities are expected to see greater growth than others. For example, building stone tonnage shipped by rail is forecast to increase 96 percent between 2012 and 2040. Connecticut freight rail tonnage is also expected to increase for miscellaneous manufacturing products, milled grain products, precision instruments, natural sands, among other commodities.

This anticipated statewide growth in freight rail tonnage, particularly for commodities that are manufactured or mined in and around the VRR area, suggests that improving the state's rail infrastructure to accommodate greater freight capacity may be justified over the next 25 years. Market forces demanding the types of commodities that are suited for freight rail transport will dictate the magnitude of the freight rail system improvements that are financially feasible to pursue.

1.1.5 Regional Freight Market

FHWA FAF data is not generally available for sub regions that are smaller than states. As a result, other sources were consulted to frame the general freight picture in the Hartford and LCRV regions and along the VRR Line.

Total Freight Market

In 2005, a freight study of the Hartford region was conducted. The study defined the Hartford region as including Windham, Franklin, Berkshire, Hampshire, Hampden, Hartford, Litchfield, New Haven, Fairfield, and Middlesex Counties. According to the study, like the northeast and Connecticut in general, truck is the dominant form of freight transportation in the Hartford region. This mode accounts for approximately

98 percent of freight traffic moving in, out, and through the area.[3] While the study is several years old, indications are that truck continues to dominate in the Hartford and LCRV regions.

The regional economy is closely tied to the major metropolitan markets of Boston and New York, where high volume corridors (for both truck and rail) exist, but are short-haul in nature. This condition primarily favors shipment by truck over other modes, such as rail, because shorter distances are involved and the efficiencies of the other modes do not outweigh the flexibility of trucking. The Hartford area finding is consistent with the state's overall freight picture, which is largely truck oriented.

Based on the business demographics of the region, which lean toward service and public administration employment, most area shippers likely require multiple, frequent package and parcel deliveries. According to a freight study completed for the area, "shippers need to get products out quickly, while receivers seek to receive goods on a 'just-in-time' basis."[4] These requirements tend to favor trucking. The study also indicated that inbound freight was more than twice that of outbound freight, reflecting a consumer and not a producer regional economy in the Hartford area. It also suggested that through traffic was considerable; 40 percent according to the study.[5]

Data specific to the VRR Line is not readily available, though the study team collected some information through an interview process with abutters of the VRR Line. Based on the interviews, shippers rely almost exclusively on trucks for most of their freight transportation needs. This is, in part, because of a lack of freight rail available near their facilities. Many of the businesses located along the corridor, however, are smaller manufacturers who are not in a position to generate the volume that would be necessary to utilize other transportation modes, such as rail, even if it was available. A complete discussion of the potential freight rail market is provided later in this report, but the overall finding is that most businesses along the VRR Line are currently relying on truck transportation for their freight needs.

Rail Freight Market

Although rail carload and rail intermodal transportation is available to shippers in the Hartford and LCRV Regions, the 2005 study indicates that the area's market shares are well below national averages. This is due to several factors identified in the study, which include structural and network constraints for the railroads, commodity mix, shipment size, and delivery requirements for local shippers and receivers. Specifically, rail service was estimated to account for only two percent of the total tonnage moved into, out of and through the Hartford region as defined in the study.[6]

According to 2012 FHWA FAF data for the state, only one commodity type is moved by rail within the state. Specifically, 292,000 tons of fuel oil moved within the state, accounting for $221 million in freight value for Connecticut. While the FAF data are useful for freight transportation analyses, there are some limitations, particularly with rail. For example, freight shipments by rail and water are categorized in

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[3] *Freight Movement in the Hartford Metropolitan Area, A Regional Freight Market Overview, prepared for the Capitol Region Council of Governments, Central Connecticut Regional Planning Agency, & Midstate Regional Planning Agency, prepared by Global Insight.*

[4] *Freight Movement in the Hartford Metropolitan Area, A Regional Freight Market Overview, prepared for the Capitol Region Council of Governments, Central Connecticut Regional Planning Agency, & Midstate Regional Planning Agency, prepared by Global Insight.*

[5] *Freight Movement in the Hartford Metropolitan Area, A Regional Freight Market Overview, prepared for the Capitol Region Council of Governments, Central Connecticut Regional Planning Agency, & Midstate Regional Planning Agency, prepared by Global Insight.*

[6] *Freight Movement in the Hartford Metropolitan Area, A Regional Freight Market Overview, prepared for the Capitol Region Council of Governments, Central Connecticut Regional Planning Agency, & Midstate Regional Planning Agency, prepared by Global Insight.*

"multiple modes and mail." As a result, freight rail activity may be underrepresented in the "rail" category. In addition, some data may be suppressed or unavailable depending on factors such as business size.

The Hartford region study, as well interviews conducted for this analysis, suggest that there are some opportunities to leverage additional rail volume for the region in the near term. Proximity to the West Springfield, Massachusetts intermodal facility, which delivered 15,000 loads of its freight volumes to Central Connecticut according to the 2005 study, is one factor that supports expanded rail. Anticipated congestion on main roadways, such as I-95, may mean that businesses with some flexibility to choose between modes may opt to expand rail use for freight transport. In terms of the VRR Region specifically, a few businesses located along the VRR corridor also suggested that they would use rail if it were available. A greater discussion of the interview findings is presented later in the chapter.

1.2 New London/Groton Freight Market

New London, Connecticut is a seaport city, as well as a port of entry for the northeast United States. It is located at the mouth of the Thames River in southeastern Connecticut, approximately 100 miles from Boston, Massachusetts, slightly more than 50 miles from Providence, Rhode Island, 50 miles from the state's capital city, Hartford, and 180 miles from New York City.

Total Freight Market

Freight is transported in and around New London by roadway and rail. In addition, the Port of New London moves commercial cargos, such as gasoline, lumber, and copper. A study conducted in 2012[7] suggests that the Port of New London could support expansion of several key freight commodities, including wood pellets, break bulk lumber, copper and steel, as well as fresh food imports.

Although break bulk lumber, copper, and steel imports at the New London State Pier have declined since 2005, New London could increase lumber and/or copper imports if housing construction rebounds in the Northeast. Various steel imports, including plate steel, coiled steel, and "winter steel" (i.e., steel bound for the Midwest, but unable to access the frozen St. Lawrence Seaway during winter months), could also be handled.[8] This additional freight could be moved from the port either by truck or by rail, potentially increasing the overall tonnage and value shipped into and out of the Port of New London area.

Rail Freight Market

In recent years, annual rail shipments originating or terminating within Connecticut have generated 50,000 carloads carrying 3-4 million tons of goods; however, there is no double-stack rail freight service in Connecticut, which could allow increased rail freight service.[9] Some tracks in the state also have weight limits (263,000 lbs.), including the Connecticut segment of the New England Central Railroad (NECR), which serves the Port of New London. This weight limit restricts what can be moved and requires some carriers to take only partial loads or even partially unload freight to move it north from New London.

During the fall of 2014, however, the State of Connecticut was awarded $8.2 million through the Transportation Investment Generating Economic Recovery (TIGER) funding program to improve the state's freight rail infrastructure. The grant will support important upgrades to connect New London,

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[7] *Connecticut's Deepwater Port Strategy Study, Prepared by Moffatt & Nichol for the State of Connecticut Office of Policy and Management, September 2012.*

[8] *Connecticut's Deepwater Port Strategy Study, Prepared by Moffatt & Nichol for the State of Connecticut Office of Policy and Management, September 2012.*

[9] *Connecticut's Deepwater Port Strategy Study, Prepared by Moffatt & Nichol for the State of Connecticut Office of Policy and Management, September 2012.*

Norwich, Willimantic, and Stafford to the Canadian border via freight rail. Specifically, the project will upgrade the existing rail line to meet new freight standards, including increased weight capacity.

By upgrading 19 miles of outdated jointed rail now in service through Franklin, Norwich, Stafford, and Willimantic, Connecticut's section of the line will be brought up to the national standard. The project also upgrades the route by funding the installation of more than 15,000 new ties, and 15,000 tons of ballast through all of the towns along the route from New London to Stafford Springs. The estimated cost of this work is roughly $10.3 million with a private railroad match totaling $2 million. The remaining amount is being funded through the TIGER program.[10]

As mentioned previously, a deep water ports study conducted in 2012 indicates that there may be a market for wood pellets transported through the Port of New London. This commodity can be moved by rail and is often exported in empty containers to control moisture content. While Maine seaports may have an advantage in this export market, NECR provides direct access to Canadian and northern New England forestry production centers and has ondock rail at the New London State Pier. Some improvements and investment in specialized handling equipment would be required to expand the handling of these commodities at the Port, but the improvements being made as a result of the TIGER grant may help support the overall freight rail infrastructure in Connecticut. While these improvements may not directly benefit the VRR Line, improving the Connecticut rail infrastructure is good for freight rail transportation overall. Not only does it support existing freight rail traffic, but it also offers the opportunity for growth. This could have regional impacts that could support use of the VRR Line for freight rail in the longer term.

1.3 Re-routing of Rail Traffic to the Valley Railroad

1.3.1 Existing Rail Services

While the FHWA FAF data indicate that only fuel oils are transported within Connecticut, this data has some limitations and may underrepresent the intrastate freight rail tonnage that is being shipped. Based on other data and information, for example, stone is moved within and out of Connecticut. The Providence and Worcester Railroad (PWRR) handles much of this freight.

While Tilcon and PWRR did not provide information to suggest they would utilize freight rail service on the VRR, elements of their current operations were researched to better understand this potential. Because PWRR is the only freight railroad that serves the towns in the region, and because Tilcon has facilities located all over Connecticut, including in Old Saybrook, Connecticut, this company and its rail operation are of particular relevance to the study.

The PWRR moves stone from three Tilcon quarries: North Branford, Reed's Gap, and Plainfield. Stone is moved from these quarries to other points in Connecticut, as well as to New York.

Based on information documented in the *Atlantic Northeast Rails & Ports*, the Branford Steam Railroad (BSRR) hauls, when operating at capacity, about six million tons of crushed stone out of the Tilcon-owned North Branford quarry to the Pine Orchard marshalling yard where the cars are re-arranged and then hauled to the Buchanan Marine barge facility. The stone is then moved to coastal Connecticut, Long Island, and New York. BSRR also moves Tilcon's interchange cars into its Yard in Brandford at the

[10] *http://www.courtney.house.gov/press-releases/connecticut-officials-announce-tiger-grant-for-new-england-central-rail/, September 2014.*

Amtrak interchange, where PWRR picks them up and delivers them to other Tilcon facilities or directly to customers.

PWRR also moves crushed stone out of Wallingford to Tilcon facilities and customers. Approximately 400,000 tons of stone go to Danbury, typically via Derby Junction. From the Plainfield quarry, PWRR hauls stone and sand outbound for Tilcon's Old Saybrook and Groton facilities and to Tilcon customers. The Old Saybrook facility is located in close proximity to the existing VRR.

Other rail-served Tilcon facilities include the Plainville North Mountain quarry, which has a small rail siding that is seldom used. Tilcon also has a PWRR-served receiving terminal in Danbury, as well as a separate asphalt plant one mile away. Approximately 400,000 tons per year of aggregate from Reeds Gap is used at the plant and some is sold directly to customers and then trucked out. There are other rail-served Tilcon facilities in Groton and Waterbury, and Tilcon has a receiving terminal, asphalt plant, and concrete plant located in Old Saybrook, Most aggregate comes in via PWRR rail to the Old Saybrook facilities, but some is trucked in as well. Outbound material is trucked.

The movement of stone using freight rail services in the state, as well as the fact that Tilcon is located in the VRR area, suggests that freight rail service at Tilcon's Old Saybrook plant may be an option. There are a number of factors to consider, however. First, Tilcon is able to meet its existing customers' needs using a combination of freight rail and trucking. It is not necessarily the case that freight rail service accessing Tilcon's Old Saybrook facility would guarantee a switch from truck to freight rail. Market forces and the comparative cost of truck and rail would determine whether Tilcon would utilize freight rail service on the VRR infrastructure. An increase in the demand for stone and other Tilcon products could also impact the company's decision to ship by rail or truck. Whether they would reroute to utilize the VRR right of way would again depend on the relative cost of truck and rail.

1.4 Market Potential for New Freight Rail Business along the Corridor

HDR conducted interviews with businesses located along the VRR Line who are potential candidates for using freight rail services. Light industrial, industrial, and waste businesses were the focus of the interviews.

Most of the businesses interviewed did not indicate that they would use freight rail if it were available. This is primarily because many of the light industrial businesses located along the Valley Railroad make special order products or produce on a scale too small for rail transportation to be viable. Larger companies, like Pratt and Whitney, produce time sensitive products that would not be well suited for rail according to company representatives. The owner of an industrial park located near the railroad indicated that present tenants would not be good candidates for freight rail but, because of the park's proximity to the railroad, the availability of freight rail service might mean a shift in tenant mix.

One business located along the VRR Line that did express interest in rail transportation was a scrap steel, stainless steel, construction, and demolition debris business. This particular business currently employs 32 people and has doubled in size over the past 15 years. They own their trucking fleet, which they use to make shipments to Pennsylvania, Massachusetts, Rhode Island, Connecticut, and upstate New York.

If freight rail was available, this business believes that it could be more national in scale. Currently, they ship roughly 10,000 tons monthly, but anticipate that rail would support significantly more shipments, depending on the availability of rail cars. The business is located less than a block away from the railroad, but they would need to construct a rail access siding prior to using rail. The owner of the

business anticipates that they could save on operations costs if rail were available. For example, insurance costs associated with transporting the freight would potentially be less if it was moved by rail rather than truck.

As described previously, there may be opportunities for Tilcon to utilize freight rail service operated along the VRR, but this would depend on market forces and cost competitiveness considerations. This assessment, however, is based on third-party information related to their operations. Tilcon was not available to be interviewed.

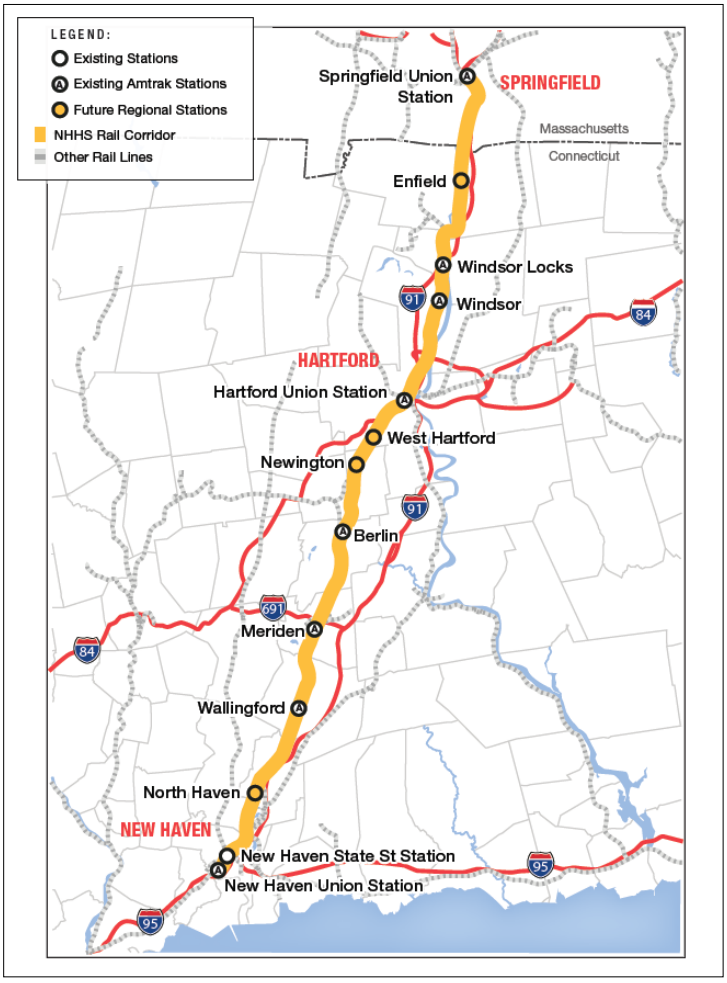
While there is no guarantee that businesses abutting the VRR would use freight rail service if it were available, there are some businesses for whom rail may be an option. Their decision would depend on market forces, as well as the relative cost of truck versus rail transport.

1.5 Impacts of Proposed Passenger Rail Service Improvements

The New Haven-Hartford-Springfield (NHHS) Commuter Rail Project will provide commuter rail service between New Haven and Springfield starting in 2016, with the completion of the first phase. In the full build, the project will include 12 stations and service operating 16 weekday round trips with 30-minute headways during peak hours and 1-2 hour headways during off-peak times. The project will complement the existing Amtrak New Haven-Springfield Shuttle, Vermonter, and Northeast Regional services that currently operate on the corridor. Services will also directly connect to Metro North in New Haven, providing cross-platform transfers to New York City.

As shown in Figure 1.13, the NHHS project is located approximately 15 miles west of the Lower Connecticut Valley Council of Government (LCRVCOG) region, with approximately a 20-30 minute travel time to Berlin, Meriden, Wallingford, or North Haven stations. The project will allow residents of the LCRVCOG communities to access rail service to New Haven and Hartford and most stations provide parking facilities. Residents will also be able to access service to New York City more easily on the NHHS corridor, providing improved access to the associated business, employment, and cultural opportunities.

Figure 1.13 Future NHHS Commuter Rail Service[11]



Freight rail focused improvements included in the project are limited to construction of three new railroad passing sidings. The sidings would run parallel to the main line tracks and be used to hold freight trains to avoid delays to passenger trains. The sidings would be located as follows:

- Berlin Siding: Mile Post (MP) 26.6-27.8. This siding, which would not be required until 2030 service levels are achieved, would reduce train conflicts south of Hartford for Connecticut Southern Railroad (CSO) trains serving local area shippers.
- Hartford Yard Siding: MP 37.3-38.8. This siding would be located within the existing Hartford Railroad Yard and provide storage for freight trains operating to and from the yard and adjoining branch lines.
- Armory Branch (Springfield) Siding: MP 62.6-62.9. This siding, consisting of either upgrading an existing track or construction of a parallel track, would provide access to the proposed Springfield layover and light maintenance facility.

In analysis of rail operations upon completion of the project, the estimated impacts (both positive and negative) for freight railroad operations will be minor. The capital improvement plan identified above was developed to accommodate anticipated growth in freight rail business. While passenger train speed limits

[11] *"NHHS Project Map." Connecticut Department of Transportation, http://www.nhhsrail.com/, accessed November 4, 2013*

would be increased to a maximum of 110 mph at selected locations, freight train speeds will not change. Even with the increased rail service along the line freight train delay is estimated to increase by only 10 minutes per 100 train miles or about 3 minutes per trip.

The combination of the additional sidings and changed operations on the line will result in improved flexibility for the freight rail operators to better meet their customers' needs. However, the changes are not anticipated to be substantive enough to alter freight volumes or operations along the line and are not anticipated to influence demand for service on the VRR.

1.6 Passenger Market Analysis

Commuter rail is mode of transit that typically connects large central business districts to lower-density suburban regions and systems are publically owned by local or state agencies. Service patterns on commuter railroads tend to provide higher frequencies during morning and evening rush hours with limited or no service during off peak week days or weekends. Examples in Connecticut include Metro North, Shore Line East, and the soon to open New Haven-Hartford-Springfield Commuter Rail Line. Commuter rail systems vary in size and ridership. The Long Island Rail Road is the busiest in the United States, carrying 334,000 riders per day and the Music City Star in Nashville is the least used, operating with approximately 1,000 passengers daily.

1.6.1 Existing Potential Demand for Passenger Rail Service

Measuring the potential efficacy of proposed commuter rail is possible through an Indicator-based method, where characteristics of a particular corridor may help determine the project's success.[12] The Indicator method is a simplified method used to analyze the potential for commuter rail in the LCRVCOG region. This method studies key real estate, demographic, and transit habits as a means of determining potential ridership for a commuter rail line.

The total square footage of office space in a downtown is an indicator of potential viability for transit systems. Analyzing the effectiveness of transit systems across the nation and the relative size of downtown office space provides general characteristics for support of transit systems. For example, the report found that local bus service can be supported with 2.5 million square feet of residential space and 4 to 15 units per acre in the corridor that serves the downtown area.[13] Only downtowns with the greatest amount of office space, over 70 million square feet, are able to support commuter rail systems.[14] Table 1.1 profiles transit modes compared with minimum downtown office space and minimum residential densities along the commuter rail corridor.

[12] *"Making Effective Fixed Guideway Transit Investments: Indicators of Success." Transit Research Board, January 2014, Page 1-6.*

[13] *"Making Effective." Page 1-7.*

[14] *"Making Effective." Page 1-7.*

Table 1.1: Transit Mode Suitability Criteria

Transit Vehicle Mode	Minimum Downtown Size, Square Feet of Contiguous Non-Residential Floor Space (millions)	Minimum Residential Density, Dwelling Units per Acre
Local Bus	2.5	4 to 15
Express Bus	7	3 to 15
Light Rail	21	9
Heavy Rail	50	12
Commuter Rail	70	1 to 2

Hartford is the most likely destination of most LCRV Region commuter rail passengers. The City has 10 million square feet of rentable office space according to property research firm CBRE.[15] Additionally, the city has government and institutional space that contributes to overall office space totals. However, even assuming government and institutional office space doubles the total office space in Downtown Hartford, the area falls significantly short of the 70 million square feet necessary to support a commuter rail line.

Additionally, an analysis of U.S. Census Bureau's American Community Survey data (2006-2010 Five Year Estimates) reveals that relatively small numbers of people commute from the communities in the LCRVCOG study area to Hartford. According to the survey results, total Hartford employment for the LCRVCOG communities of Chester, Deep River, Essex, Haddam, and Old Saybrook was approximately 616 people in 2010. Table 1.2 highlights existing commute volumes from each corridor community to other (out of town) employment locations along the potential route.

Table 1.2: Corridor Community Commute Volumes by City and Town

Out of Town Employment Locations	Chester Residents	Deep River Resident	Essex Residents	Haddam Residents	Old Saybrook Residents
Chester	N/A	311	76	177	28
Deep River	108	N/A	122	82	90
Essex	156	401	N/A	95	253
Haddam	0	27	0	N/A	40
Old Saybrook	90	238	502	23	N/A
Cromwell	26	13	33	122	11
Hartford	104	78	112	214	108

[15] *"Hartford Office Market View Q2 2013." CBRE. Page 3, http://www.cbre.us/o/hartford/Pages/market-reports.aspx*

Out of Town Employment Locations	Chester Residents	Deep River Resident	Essex Residents	Haddam Residents	Old Saybrook Residents
Middletown	279	114	69	843	213
Rocky Hill	0	19	25	90	36
Weathersfield	0	0	0	98	0
Total Corridor Employment	**763**	**1,201**	**939**	**1,744**	**779**

According to the U.S. Census, slightly less than five percent of Hartford area commuters use transit to commute to work.[16] Assuming a typical mode share distribution to the rest of the Hartford region, approximately 31 people would be expected to use a new commuter rail line from the LCRVCOG communities into Hartford on a regular work day. Even if transit usage were double the regional average, only 60-70 riders would be expected to use the train on an average weekday.

Therefore, the viability of a commuter rail line from the LCRVCOG region to Hartford would be seriously undermined by the likely low ridership. The low ridership stems from the size of the Hartford office market, existing commuters from the LCVCOG region to Hartford, and existing mode share in the Hartford region.

1.6.2 Future Potential Demand for Passenger Rail Service

To provide an example of the level of ridership necessary to support a commuter rail service, an example service was identified in which the local community has provided the subsidy needed to support the service. Minneapolis, Minnesota was identified as a relevant example to consider. Minneapolis has a commuter rail network that serves its downtown, which has 28 million square feet of commercial office space,[17] about 2.5 times the amount of office space that Hartford has. Downtown Minneapolis is served by the Northstar Commuter Rail Line, a service extending from Target Field in downtown to Big Lake, a northern suburb, with five intermediate station stops. The service operates over 40 miles and parallels a busy Interstate highway (I-94) for much of its length. The service averages 2,400 riders per day and operates at least hourly service during daytime hours.[18]

Not only does Minneapolis have a large downtown office market, but it also has two professional sports teams, numerous theaters and cultural attractions, and is in close proximity to Downtown St. Paul, which also attracts riders. However, the Northstar Line only manages to attract 2,400 riders per day. While the comparison to Hartford is not perfect, a commuter rail line in Hartford with similar frequencies and service characteristics would likely attract significantly less than 1,000 riders per day given today's conditions. Dramatic changes would need to occur within the economics of commuting, such as significant gas prices or parking rate increases or, changes in the densities in corridor communities, or linkages made on the New Haven-Hartford-Springfield line, for commuter service to be sustainable along the Valley Railroad Line.

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[16] *U.S. Census Bureau. "Commuting in the United States: 2009." Page 8, http://www.census.gov/prod/2011pubs/acs-15.pdf*

[17] *"Minneapolis-St. Paul Office Market Report, Q2 2013" Colliers International, CBRE. Page 6, http://www.colliers.com/~/media/5eb47546525b490c868c7fab98a03230.ashx*

[18] *"Transit Ridership Report, First Quarter 2014." American Public Transit Administration, http://www.apta.com/resources/statistics/Documents/Ridership/2014-q1-ridership-APTA.pdf*

1.7 Analysis of Joint Use of the Rail Line

In 1969, the State of Connecticut acquired the Valley Railroad Line through the abandonment process from the New York, New Haven, and Hartford Railroad. The Connecticut Department of Energy and Environmental Protection (CTDEEP) manages the 22–mile long line running from Old Saybrook to a location south of Middletown as the Valley Railroad State Park. The CTDEEP leases to the line to the Valley Railroad Company, which operates the Essex Steam Train, a major tourist destination in Connecticut.

The Essex Steam Train has operated for over 40 years along the corridor. The train currently runs between Old Saybrook to Haddam. The service operates generally from May through December with up to five round-trips per day. The trains operate between three and seven days a week and provide rides to over 150,000 passengers per year. In addition to the typical service, the Essex Steam Train also offers special events trains, which can operate up to 40 round trips per day.

1.7.1 Existing Railroad Property Leases and Legal Requirements

Acquisition of the line

As previously noted, the State of Connecticut purchased the Valley Railroad line in 1969. This was purchase was made with support from the U.S. Department of Interior's Land and Water Conservation Fund Grant (LWCF). LWCF support of the property acquisition was made with the intent of using the line as a scenic railway as stated in the LWCF Grant "If it is deemed possible, the abandoned rail line [the Valley Railroad] will be converted into a scenic railway".[19]

The LWCF State Assistance Program was established by the LWCF Act of 1965 to stimulate a nationwide action program to assist in preserving, developing, and assuring to all citizens of the United States of present and future generations such quality and quantity of outdoor recreation resources as may be available and are necessary and desirable for individual active participation. The program provides 50 percent matching grants for the acquisition and development of public outdoor recreation sites and facilities.

Section 6(f) of the LWCF Act requires all funded lands to be retained and used solely for outdoor recreation in perpetuity. Based on the support of the acquisition of the property through the LWCF, the determination was made that scenic railroad operations constitutes outdoor recreation. Therefore, exclusive freight or passenger rail operations (without allowing for scenic rail operations to continue) would constitute a conversion of the property.

Any conversion of LWCF supported lands must be approved by the National Park Service (NPS). The NPS will only consider approval if all alternatives to the conversion have been evaluated and rejected on a sound basis. If approved, the grant recipient must acquire replacement lands of at least equal fair market value and recreational usefulness.

Furthermore, NPS approval must be obtained prior to any change from one eligible use to another when the proposed use would significantly contravene the original plans or intent for the area as described in the original LWCF project(s). This means that any use of the line that would preclude scenic rail operations would need to be approved by the National Park Service to confirm that the conversion was being made with the original intent of the acquisition. As noted in the original grant, although the grant intent for the 300 acres that make up the Valley Railroad was for the operation of scenic rail services, the

[19] *Notification of Land and Water Conservation Fund Grant, United States Department of Interior, April 26, 1968.*

possibility of that service was questionable. This clouds the interpretation of the original intent of the federal assistance and would certainly come into play if a conversion assessment was ever required. The US Department of Interior provides as an example that even in a case where a swimming pool surrounded by substantially developed recreational uses (i.e. playgrounds, sport courts) is modified to a less intense area of limited development (such as a passive park) that NPS approval would be required and may, depending on the details, be considered a conversion.

In the case of the Valley Railroad property, it is unlikely that by itself, use of the railroad for both scenic railway and freight rail services would constitute a conversion as many, if not most, scenic railroads around the country require freight operations to be financially viable. However, certain other attributes of rail use may come into play in the NPS determination of conversion. These include particular attributes of the contemplated freight services and related operations that cannot be made at this time, such as

- public access limitations to the property,
- the level of freight rail service planned,
- the viability of continued scenic rail services from the introduction of freight rail operations

Prior to initiating freight rail service or interchanging freight, the Valley Railroad would be required to obtain common carrier status from the Surface Transportation Board (STB). It is through this STB process that the parameters of the freight service and its relationship to other uses of the line would be further evaluated. Depending on the level of service anticipated an environmental review under the National Environmental Policy Act (NEPA) may be required. Under the Surface Transportation Board's environmental rules, requests for new operational authority on a rail line typically are excluded from NEPA review unless they trigger certain thresholds (generally an increase of 3 or 8 trains per day depending on whether the area is in attainment under the Clean Air Act). The details of the contemplated freight rail service, any potential limitations that could be placed on that service and the related impacts from the service that are evaluated and discussed through that process would certainly impact the NPS determination of conversion. If it is determined that a conversion would take place with the introduction of freight rail service, it is estimated that the value of the replacement property would be approximately $12 to $15 million, the value of similarly sized rail corridor recently purchases in New England.

Valley Railroad Company Lease

The Valley Railroad Company has held a lease from the State of Connecticut for the railroad property since 1970. The lease has gone through several amendments over time, the latest lease amendment being executed last year. Under the terms of the lease, the Valley Railroad Company holds the passenger and freight rail operating rights to the property on renewable terms that could run through 2077. The Valley Railroad Company's responsibilities include maintenance of the property (consistent with Federal Railroad Administration [FRA] regulations and American Railway Engineering and Maintenance-of-Way Association [AREMA] standards), and providing a minimum level of scenic rail services to be approved annually by the Director of the State Parks Division.

Additionally, the Valley Railroad Company is responsible for providing or facilitating the operation of freight rail service along the line, to operate in concert with the scenic rail services at the request of the State, in concert. The state also reserves the right to assign "overhead" trackage rights to a freight railroad. Overhead trackage rights allow a railroad company to travel along a rail line, without stopping to serve any customers along the line. As noted in the lease, prior to the interchanging of freight service, the Valley Railroad Company would be required to obtain common carrier status from the U.S. Department of Transportation's Surface Transportation Board (STB).

In addition to the rights that the Valley Railroad Company holds on the segment of the line between Old Saybrook and Maromas, they also hold passenger rights to the line from Maromas to Hartford. These rights would allow potential expansion of scenic rail operations being discussed along that portion of the line, most notably in Middletown.

1.7.2 Requirements for Joint Use of Rail Line

The FRA has regulatory authority over "every area of railroad safety." The term "railroad" in the United States federal code is defined as "any form of non-highway ground transportation that runs on rails or electromagnetic guideways."[20] While the definition goes on to exclude rapid transit systems, all other types of rail system, regardless to their connection to the national railroad network, are included. This means that the FRA has regulatory control over scenic train operations. In many cases, the FRA does not exercise the same level of regulation over tracks or services where freight or commuter rail is not also in operation. This mixing of freight and/or passenger service and scenic rail service would be identified as joint use of the line.

Federal Requirements for Tourist Train Operations

For resource and policy reasons, FRA does not extend the reach of most of its regulations as far as the statute permits. FRA determines the level of regulatory control depending upon the following questions:

- Are the railroad tracks a standard gage?
- Is there a public highway-rail crossing that is in use?
- Is there an at-grade rail crossing that is in use?
- Is there a bridge along the line that crosses over a public road or waters used for commercial navigation?
- Is the track within 30 feet of any other railroad in operation?

Since the Valley Railroad crosses public highways and has a physical connection to another railroad on the northern and southern end, the FRA considers the VRR a "non-insular" railroad. On non-insular tourist railroads, FRA exercises it regulatory powers in the following areas:

- Federal signal inspection laws,
- hazardous materials regulations,
- noise emission regulations,
- freight car safety standards,
- bridge safety standards
- accident/incident reports regulations,
- hours of service restrictions on duty hours,
- steam locomotive inspection regulations,
- grade crossing signal system safety regulations,
- rail safety statutes enforcement provisions, and
- emergency order authority.

Of note in the list above are items that are specific to freight operations even in the regulation of tourist train operators. VRR is relatively unique in that the tourist service does not either operate along an existing freight rail line, or operate some freight service in order to support the tourist operations.

[20] *49 U.S.C. § 20102(2)(A)*

Additional Federal Requirements for Freight Train Operations

If freight operations were initiated over the rail line, the Valley Railroad Company would be required to comply with an additional set of FRA regulations. A summary of these additional regulations is listed below.

- Railroad Police Officers
- Railroad Safety Enforcement Procedures
- Track Safety Standards
- Railroad Workplace Safety
- Railroad Operating Rules
- Railroad Operating Practices
- Control Of Alcohol And Drug Use
- Railroad Communications
- Rear End Marking Device—Passenger, Commuter And Freight Trains
- Safety Glazing Standards—Locomotives, Passenger Cars And Cabooses
- Occupational Noise Exposure
- Railroad Locomotive Safety Standards
- Railroad Safety Appliance Standards
- Brake System Safety Standards For Freight And Other Non-Passenger Trains And Equipment; End-Of-Train Devices
- Signal Systems Reporting Requirements
- Rules, Standards, And Instructions Governing The Installation, Inspection, Maintenance, And Repair Of Signal And Train Control Systems, Devices, And Appliances
- Qualification And Certification Of Locomotive Engineers
- Qualification And Certification Of Conductors

It should be noted that many of the safety standards, such as the track safety standards, are being currently followed by the Valley Railroad as both good business practice and as required as part of their lease. Other FRA regulations would represent a significant administrative change to the way that they currently operate and would need to be considered in to costs of freight operations along the line. As part of the cost benefit analysis for this study, estimates will be made regarding the cost to the railroad of the additional regulatory requirements.

In addition to the FRA regulatory requirements, the introduction of freight service by Valley Railroad Company would require establishing the railroad as a common carrier (as noted in their lease). This change in railroad status would require railroad employees, and possibly volunteers, to be managed under that railroad retirement system, which would certainly change the labor structure of Valley Railroad Company.

2 Chapter 2: Rail Line Engineering Analysis

As part of determining the future best use of the VRR right-of-way, HDR conducted an analysis of existing conditions along the VRR with the goal of providing an order-of-magnitude cost estimate for rehabilitation and restoration of the line to FTA Class 2 freight service. The corridor is owned by the Connecticut Department of Energy and Environmental Protection (CTDEEP) and is operated and maintained by the Valley Railroad Company. The CTDEEP-owned portion of right of way connects the Pratt and Whitney Manufacturing Facility in Middletown, Connecticut with Amtrak's Northeast Corridor in Old Saybrook, Connecticut. The remaining 5.5 miles from the Pratt and Whitney Manufacturing Facility to Middletown Center is owned by the Providence and Worcester Railroad (PWRR). An engineering analysis of the PWRR section was not included as part of this study.

2.1 Existing Track Conditions

HDR reviewed New York, New Haven, and Hartford Railroad Valuation Maps dated June 30, 1915 to determine the physical characteristics of the VRR operated line. Additionally, maintenance history and practices were identified by an interview with Mr. Rob Bradway, Vice President of Track and Property for the Valley Railroad Company. This information was used to asses a general quantity and condition of the Valley Railroad Line. Conditions were verified during a hi-rail inspection taken with Mr. Bradway on November 14, 2014. Locations were photographed to document existing conditions of major assets such as, bridges, turnouts, and road crossings. Additionally, obstructions and other items that would require additional analysis were photographed. Tie conditions were observed from the hi-rail truck and, when conditions significantly changed, an on-foot inspection was conducted to determine the number of ties that need to be included in upgrade projects.

2.1.1 Corridor Segments

Based on the interview, field inspection, and analysis of the maintenance practices of the Valley Railroad, the corridor has been broken up into four sections. Each section will have slightly different requirements to support freight operations at FRA Class 2 speeds. The four segments considered, including the Mile Post's (MP) used to describe the segments, are defined in Table 2.1.

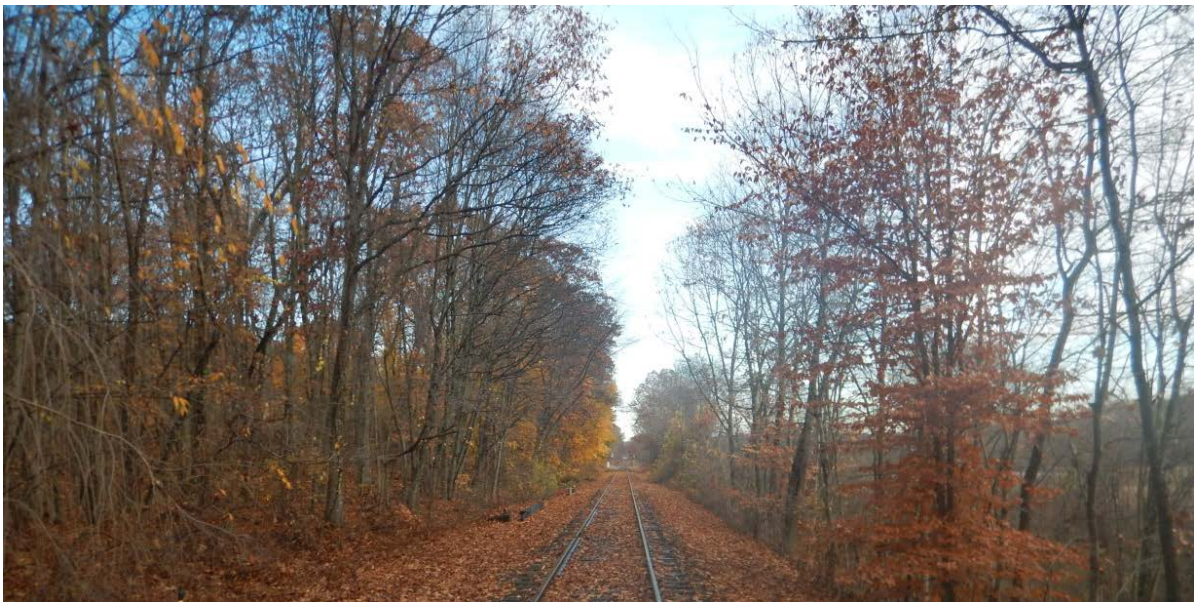
Table 2.1: Valley Railroad Corridor Segments

Segment	Starting Mile Post (MP)	Ending Mile Post (MP)	Total Miles	Current Maintenance Level
1	0.0	4.0	4.0	FRA Class 1
2	4.0	12.3	8.3	FRA Class 2
3	12.3	12.9	0.6	Undergoing work to meet FRA Class 1 standards.
4	12.9	22.7	9.8	Active preservation for future use.

Regularly Operated Segments

A total of 12.3 miles is maintained to support some level of scenic train operations. Four miles are maintained to FRA Class 1 Standards, while 8.3 miles are maintained to FRA Class 2 Standards. As such, tie conditions, drainage, and ballast are generally adequate to support safe train operations. The Valley Railroad Company is currently upgrading approximately 0.6 miles to support scenic train operations. Such work includes joint bar replacement, bolt maintenance, installation of five ties per rail, and other work to ensure compliance with FRA Class 1 Standards. The following pages include photographs of the current conditions along these two segments of the corridor.

Looking North along the Line (north of MP 4)



Looking North along the Line (north of MP 6)

Bridge over the Deep River (MP 8.15)

Looking North along the Line (north of MP 9)

Maintained Segments

Work on approximately 0.6 miles of track is currently underway to restore that section to FRA Class 1 conditions. This work primarily includes the replacement of ties in the segment between MP 12.3 and 12.9. The remaining 9.8 miles is being preserved in a manner that would expedite future use. As such, this segment experiences brush cutting and minimal drainage work from volunteers to prevent the corridor from reforesting and to prevent erosion that would damage the roadbed. This area contains several discontinuities caused by washouts, encroachment, and emergency bridge repairs. More engineering design will be required in this segment to upgrade it for freight use.

The entire corridor undergoes a vegetation management program. This is done to prevent vegetation from reclaiming the right of way and to minimize more expensive mechanical vegetation removal. The following pages include photographs of the current conditions along this segment of the corridor.

Looking North along corridor where track is being restored to FRA Class 1 (MP 12.9)

Valley Railroad Line at Midway Marina (MP 13.3)

Driveway embankment constructed across line (MP 14.4)

Mill River Bridge (MP 14.74)

Looking North along Corridor (north of MP 16)

Looking North along Corridor (north of MP 17)

Washout along the line (MP 17.67)

Higganum Cove Bridge (MP 18.48)

2.2 Railroad Rehabilitation Improvements

2.2.1 Assumptions

In the development of rehabilitation requirements and costs, two operating scenarios were considered. Scenario #1 includes requirements for upgrading the line for freight operations with continued tourist train operations. Scenario #2 includes requirements for upgrades for tourist train operations along the whole corridor with no freight operations.

For Scenario #1, it is assumed that the required upgrades to the track and bridge infrastructure would be sufficient to support a 286,000 pound freight car, which is an industry standard in the movement of railroad freight. In addition, current AREMA standards would be followed to support the heavier axle loading cycles caused by the increased frequency of freight traffic. Items like ties, rail, ballast, and "other track material" (OTM) will be sourced in larger quantities than what is currently purchased by the Valley Railroad Company. To reduce operations and maintenance costs, higher-grade materials than what are currently used by the Valley Railroad Company will be required.

For planning purposes, it was assumed that the VRR would experience two freight movements per weekday, consisting of one loaded 80 car aggregate train plus one empty 80 car aggregate train. This would total approximately 3.4 million gross tons (MGT) of freight traffic per year. A total of five

million MGT would be a conservative estimate, which would take into account scenic train operations and miscellaneous freight traffic.

Track upgrades would be done in a manner that will meet or exceed FRA Class 2 standards to take full advantage of large scale efficiencies, the completed work product will require more tie installation work than what would be required to meet the minimum requirements. The higher cost associated with total reconstruction is typically justified by the increased useful operating life of the infrastructure. In addition the higher quantities of material to be installed result in a lower unit cost associated with a mechanized installation processes.

For Scenario #1, it is assumed that the required upgrades to the track and bridge infrastructure would be sufficient to support 20 kip wheel loads, an industry standard. In addition, current Valley Railroad Company maintenance practices would need to be carried out on the entire segment. Work required would entail installation of ties, replacement of defective joint bars, and tightening of bolts along the line.

2.2.2 Scenario #1 (Freight Rail and Tourist Rail)

Segments 1, 2, and 3 (MP 0 to 12.9)

Due to the ongoing efforts by the Valley Railroad Company, the work scope for upgrades to operating segments is mostly limited to infrastructure improvements to meet current industry standards for freight operations. This line consists of smaller rail sections, including 78NH, 107NH, 74NH, and 80ARA-A rail sections. These smaller rail sections are not adequate for the increased tonnage and related stress that freight traffic would bring. Additionally, jointed rail sections would require a higher level of maintenance due to the increased tonnage. In order for the Valley Railroad Company to maintain the increased quantity of infrastructure with the same staffing levels, more modern track components are required, as they will require a lower level of maintenance and operating expense over time. The following cost estimate for this section assumes total replacement of the mixture of smaller rail sections with 115RE continuous welded rail. This rail section is a typical standard rail size for any modern improvements related to any freight service. The larger rail section will require the replacement of rail through road crossings and the upgrading of switches. The cost estimate provided in Table 2.2 assumes a lower quantity of ties to be installed due to the good tie replacement practices carried out by the Valley Railroad Company.

Table 2.2: Scenario #1 Segments 1-3 (MP 0-12.9) Cost Estimate

Project Task	Quantity	Unit	Unit Cost	Total Cost
Install New Turnouts	10	Each	$100,000.00	$1,000,000
RR Crossing Surface	22	Each	$100,000.00	$2,200,000
Furnish Ties	10,380	Each	$65.00	$674,700
Install Ties	10,380	Each	$35.00	$363,300
Furnish Rail and OTM	136,224	Linear Foot	$33.33	$4,540,346
Install Rail	136,224	Linear Foot	$26.00	$3,541,824
Furnish Ballast	7,980	Ton	$25.00	$199,500
Install Ballast	7,980	Ton	$15.00	$119,700
Surfacing	13	Pass Mile	$5,280.00	$68,112
Engineering & Management	N/A	N/A	10%	$1,270,748
Contingency	N/A	N/A	10%	$1,270,748
Cost for Improvements from MP 0 to 12.9				$15,248,978

Segment 4 (MP 12.9 to 22.7)

Efforts made by the Valley Railroad Company to preserve this corridor for future use has minimized the need to reclaim portions of the right of way prior to restoring track infrastructure. Three discontinuities currently exist along this segment of the corridor:

- a portion of track has been covered inside a boatyard at MP 13.3;
- a cut section at MP 14.41 has been filled in to preserve access to a property that was formerly accessible by an overhead bridge; and
- a washout has occurred at MP 17.67.

Washouts have been prevented by the efforts of the Valley Railroad Company to ensure drainage ways are clear. Major work scope through this location includes replacement of existing rail with 115RE continuous welded rail, tie renewal, and bridge work.

Three bridge structures will require replacement of bridge timber and undergo repairs to their abutments and superstructure. Two of these structures are steel deck girder structures and are located near MP 14.74 and MP 18.21. A three-span structure containing a through plate girder bridge and two deck plate girder approach spans, totaling 149 feet in length, has experienced section loss along the bottom flange angle connections. There was some noticeable rivet head loss. Structural steel repairs are required to ensure this bridge will rate for 286,000 pound rail car traffic.

Three bridge structures will require complete replacement. One timber trestle located near MP 15.69, spanning a floodway approximately 20 feet requires replacement. The area where the washout occurred

would require the installation of a 12-foot box culvert. The one span deck plate girder bridge located near MP 19.75 requires significant work to the masonry abutments. Renewal of the abutments may require replacement of the superstructure due to the shortened overall span. Table 2.3 outlines the likely costs associated with upgrading this segment.

Table 2.3: Scenario #1 Segments 4 (MP 12.9-22.7) Cost Estimate

Project Task	Quantity	Unit	Unit Cost	Total Cost
Install New Turnouts	1	Each	$100,000.00	$100,000
Bridge Rehabilitation	244	Track Foot	$4,000.00	$976,000
RR Crossing Surface	7	Each	$100,000.00	$700,000
Bridge Replacement	62	Track Foot	$12,000.00	$744,000
Bridge Redecking	244	Track Foot	$1,000.00	$244,000
Furnish Ties	15,680	Each	$65.00	$1,019,200
Install Ties	15,680	Each	$35.00	$548,800
Furnish Rail and OTM	103,488	Linear Foot	$33.33	$3,449,255
Install Rail	103,488	Linear Foot	$26.00	$2,690,688
Furnish Ballast	9,800	Ton	$25.00	$245,000
Install Ballast	9,800	Ton	$15.00	$147,000
Surfacing	20	Pass Mile	$5,280.00	$103,488
Replace Overhead Bridge	1,608	Square Ft.	$366.00	$588,528
Engineering & Management	N/A	N/A	10%	$1,155,596
Contingency	N/A	N/A	10%	$1,155,596
Cost for Improvements from MP 12.9 to 22.7				$13,867,151

Capital Cost Summary

In summary, a significant capital investment in the fourth segment (MP 12.9 to 22.7) would be required. The largest driver is the requirement for bridge repairs. This work will need to be completed for any rail service to occur along the line regardless of the volume or type. In addition to the bridge work, in order for freight rail traffic to operate in a safe and operationally sustainable manner, total replacement of rail is required. Upgrading rail requires all mainline switches and at-grade road crossings connecting to the new rail section to be replaced, thereby increasing the total cost of the work.

The total estimated capital cost for upgrade all sections of the line to facilitate freight rail operations would be approximately $30 million. The total costs are shown in Table 2.4.

Table 2.4: Scenario #1 Cost Estimate

Component	Cost
Structural (Bridge) Cost	$2.5 million
Track Costs	$22.0 million
Engineering & Construction Maintenance Costs	$2.5 million
Contingency	$3.0 million
Total	$30.0 million

2.2.3 Scenario #2 (Tourist Rail Extension)

Segment 4 (MP 12.9 to 22.7)

Due to the lower demand placed on the track infrastructure in this scenario, the quantity and scope of work has been reduced. Efforts would be concentrated in the MP 12.9 to 22.7 segment of the corridor. A tie replacement rate of 1,280 ties per mile is assumed because of the generally poor tie condition. This quantity will put the corridor in a FRA Class 3 tie compliance level. This was done to take advantage of a quantity that would take the most advantage of employing a mechanized tie replacement team. Table 2.5 outlines the likely costs associated with upgrading this segment.

Table 2.5: Scenario #2 Segments 4 (MP 12.9-22.7) Cost Estimate

Project Task	Quantity	Unit	Unit Cost	Total Cost
Bridge Rehabilitation	244	Track Foot	$4,000.00	$976,000
RR Crossing Surface	2	Each	$100,000.00	$200,000
Bridge Replacement	62	Track Foot	$12,000.00	$744,000
Bridge Redecking	244	Track Foot	$1,000.00	$244,000
Furnish Ties	12,544	Each	$65.00	$815,360
Install Ties	12,544	Each	$35.00	$439,040
Joint Maintenance	3,136	Pair	$6.50	$20,384
Furnish Ballast	7,840	Ton	$25.00	$196,000
Install Ballast	7,840	Ton	$15.00	$117,600
Surfacing	9.8	Pass Mile	$5,280.00	$51,744

Project Task	Quantity	Unit	Unit Cost	Total Cost
Replace Overhead Bridge	1,608	Square Ft.	$366.00	$588,528
Engineering & Management	N/A	N/A	10%	$439,266
Contingency	N/A	N/A	10%	$439,266
Cost for Improvements from MP 12.9 to 22.7				$5,271,187

Major drivers to the total cost include, tie installation costs and bridge repairs. It is unknown if the $588,528 bridge replacement cost can be recovered from the grantee of easement to cross the right of way.

Capital Cost Summary

Scenic train operations require less scope of work over a smaller area than required for freight service. Since limited new capital work is needed along the currently operated corridor to maintain tourist train operations and the tourist train puts more limited loads and stresses on the facilities, the cost to extend tourist train operations is significantly less. As shown in Table 2.6, the total estimated capital cost for upgrade all sections of the line to for extended tourist train operations would be approximately $5.3 million.

Table 2.6: Scenario #2 Cost Estimate

Component	Cost
Structural (Bridge) Cost	$2.5 million
Track Costs	$1.8 million
Engineering & Construction Maintenance Costs	$0.5 million
Contingency	$0.5 million
Total	$5.3 million

2.2.4 Passenger Rail

Improvements to the track structure and right-of-way to facilitate implementation of passenger rail service would not vary dramatically from the freight rail service driven improvements identified above in Scenario #1. The primary infrastructure improvements related to bridge rehabilitation, rail replacement, and tie and track structure improvements would be the same for regularly operated passenger rail service as they would for freight service. Although the freight rail service improvements are primarily due to the heavier loads place on the track, regularly operated passenger rail service, which operate at higher speeds, requires the same improvements for both safety and ride quality considerations.

In addition to the track and right-of-way modifications, other capital improvements would be necessary to implement passenger rail service along the corridor. This would include the following:

- A train layover/maintenance yard,
- Fully accessible train-platforms, and
- A train signal system, with positive train control.

The costs of the additional equipment required to operate passenger rail service would likely double or triple the total cost of the projected improvements depending upon specific site conditions for each of the needed improvements.

2.3 Environmental Conditions and Constraints

2.3.1 Review of Issues Related to Potential Track Improvements

The conditions along the VRR Line in relation to environmental constraints and conditions are typical for railroad corridors in New England. The alignment of the VRR Line is immediately adjacent to wetlands and floodplains though much of the corridor. Due to the grade limitation of railroads, it was common practice in the early day of rail line construction to build them where the flattest ground could be found, and in New England that was most often along the riverbank.

Although the rail line is, in some cases, immediately adjacent to the Connecticut River or other environmentally sensitive areas, the improvements necessary to upgrade the line for freight service or extended operation of tourist rail service is not limited due to these conditions. All improvements would be conducted on or within the existing railroad embankment; this would include replacement of ties, rail, and some bridge structures and therefore would not be constrained by proximity to the natural conditions. It is assumed that the work would be designed and conducted in compliance with industry standards,

which would mean compliance with AREMA standards. These standards, which are continually updated, are based on the collective experience of railroaders and their century long experience in building railroads.

As noted from the field investigation, there is one location along the corridor where a washout has occurred. In the restoration of the track through this segment, careful consideration would be required to restore the embankment that did not result in impacts to adjacent areas or would result in continued erosion and washout issues in this location. Restoration of the embankment in that area would likely require reinforcement of the embankment through the placement of additional stone.

2.3.2 Risk to Environmental Conditions Related to Ongoing Operations

Inherent in the movement of goods and people, there is risk of an accident that could lead to bodily, property, or environmental harm. In light of this ongoing risk, it is important to consider risk in relation to other options and alternatives for the required transportation. In the following section, the environmental risk as it relates to the restoration of freight rail along the VRR Line is considered.

Railroad System Safety

Since the Staggers Act was passed in 1980, which deregulated the railroads, a tremendous change has occurred in the industry. Railroads have consolidated, merged, and been abandoned, which have all led to today's railroad network. During this period of change, the deregulation process led to an increase in competition, which prompted the railroads to implement changes in efficiency and to change business practices in order to limit their liability. These changes have made freight rail transportation more efficient and safer than ever.

The push to increase efficiency and safety means that railroads have developed an operating environment that is safer and has less risk of accident than what was historically the case. Furthermore, stricter environmental regulations mean that the oil and chemical spills that were frequent on the railroad in the past are now rare events. Railroad tank cars are engineered to much higher standards than they were in the past and are usually not ruptured in derailments.

The rail industry as a whole has increased safety provisions including investments in infrastructure and equipment, which have reduced train accidents rates. Many railroads have turned to new technologies to increase safety, such as installing detectors along the tracks to identify defects in passing railcars, ground-penetrating radar to detect subsurface conditions that could compromise the track, and detectors to identify defects in the track itself or rail wheels traveling down the tracks. The Association of American Railroads reports a decline of over 42 percent in the train accident rate since 2000.

Alternative Modes

No matter how goods are moved into and out of a community, there is risk of an accident. Typically, the alternative to movement of goods by rail is truck. Truck and rail accidents are different in nature and cause different problems, though either can be mitigated effectively with appropriate safety programs.

Trucks move in an environment where safety regulations are somewhat limited. Other than driver licensing programs and Department of Transportation inspections, there is little control over the movement of trucks and evaluation of the condition of driver and vehicles. Even so, truck accidents are not often catastrophic. However, truck accidents usually result in many more fatalities than auto-only accidents and the disruption caused by truck accidents can inconvenience many people and cause significant environmental damage.

In contrast, the design of railcars is more focused on enduring an accident and therefore, routine railroad incidents usually result in fewer consequences than comparable incidents involving trucks. Minor rail accidents typically involve fewer people, fewer disruption, and less environmental damage. However, a major rail incident can be much more catastrophic and can result in the evacuation of a neighborhood or an entire town. When railcars fail, damage to freight, equipment, and the environment tend to be much more severe simply because of the much greater equipment capacity.

2.3.3 Valley Railroad Line

Environmental risk along the VRR Line is best looked at in terms of risk assessment and risk mitigation. Risk assessment involves identifying accidents that may potentially occur and estimating the likelihood of their occurrence. The context of the VRR Line is inherently safer than most rail corridors. It has limited at-grade crossings, it is not in an urban environment where other unanticipated conflicts could occur, and there is limited rail traffic along the line, thereby limiting rail to rail conflicts. In total, the railroad operating environment along the VRR Line is relatively safe and free of obvious risks that would result in an accident. The one condition located along the line that represents a potential operating and environmental risk is along the bank of the Connecticut River and other streams where the possibility for bank erosion and associated track failures could result in environmental impacts. The potential for flooding across the tracks appears to be high.

Risk mitigation means to devise a scheme that can reduce the probabilities of accidents occurring, or given that the accident will occur, how severity and resultant impacts could be reduced. As noted above, the one condition that represents a risk is the proximity of the track to the Connecticut River and the potential for flood-related damage. The best environmental risk mitigation for the location is the frequent inspection of the line and making repairs as soon as needed. As noted in a recent inspection report, the Valley Railroad Company has recently initiated a program of increased maintenance along the northern segment of the line. This will allow them to identify and repair any bank erosion that appears to be threatening the line. As noted, this is most often done through the placement of stone or large boulders (called rip-rap) to solidify the bank and minimize or eliminate any further erosion. In operating segments, the best and most typical mitigation is to inspect the line prior to operation during periods of heavy rain or high water. It is anticipated that this is a normal operating procedure and a process that would be undertaken whether tourist train or freight trains operate along the line.

3 Chapter 3: Impacts and Public Benefits

For this study, two primary uses of the existing Valley Railroad (VRR) right-of-way (ROW) were considered: freight rail use and expanded tourist excursion service. In addition, general information related to tourist activities is also provided. The intent of this analysis is to inform the public and selectpersons of the economic benefits and/or impacts generated by each of these uses. This information may be useful in town planning efforts, as well as more regional initiatives.

3.1 Benefits versus Impacts

There are a number of different ways to think about how a project may benefit or impact the public. Often, people point to jobs generation as an important benefit. For public entities, the estimation of the benefits to society that are likely to be generated by a proposed improvement is most critical. Municipalities may be concerned with potential tax revenue.

While there are generally accepted methodologies for estimating each of these types of benefits and impacts, not all benefits and impacts can be measured for all types of projects. Data and methodological limitations may impede conducting, for example, a public benefits analysis of a tourist excursion train. In contrast, estimating expenditures and the economic impacts (e.g., jobs) associated with tourist activities is a relatively simple activity. Similarly, there are approved approaches for estimating the public benefits generated by, for example, moving cargo out of trucks and onto freight rail cars. The economic impacts of freight rail may be more difficult to quantify, primarily because freight rail is a private business and there may be confidentiality concerns.

Estimating public benefits, tax revenues, and economic impacts are all acceptable ways of discussing benefits of a project. Comparing the economic impact of tourist rail to public benefits associated with freight rail to property value changes, however, is not an apples-to-apples comparison. As a result, this assessment highlights the individual benefits and impacts generated by different rail uses along the VRR ROW, but it does not include a side-by-side comparison. Economic impacts related to the actual construction of either a freight rail line or an upgraded tourist excursion rail line are provided, as well as public benefits and costs associated with freight rail. Freight rail impacts on property taxes are discussed, and economic impact estimates for tourist excursion services and general tourism activities are also offered. The intent of these metrics is to provide useful information to the public and selectpersons who will ultimately make planning decisions that are potentially impacted by the railroad's use.

3.2 General Methodology

For the benefits assessment, three different metrics are considered: public benefits, economic impacts, and tax revenue impacts. A more qualitative discussion of the impacts and/or benefits of each potential rail use is also provided.

The first section of this chapter discusses the estimation of jobs anticipated by the construction of an expanded tourist excursion rail service or freight rail upgrades. The next section considers the public benefits associated with freight rail. Questions that are contemplated during the freight rail benefits analysis include:

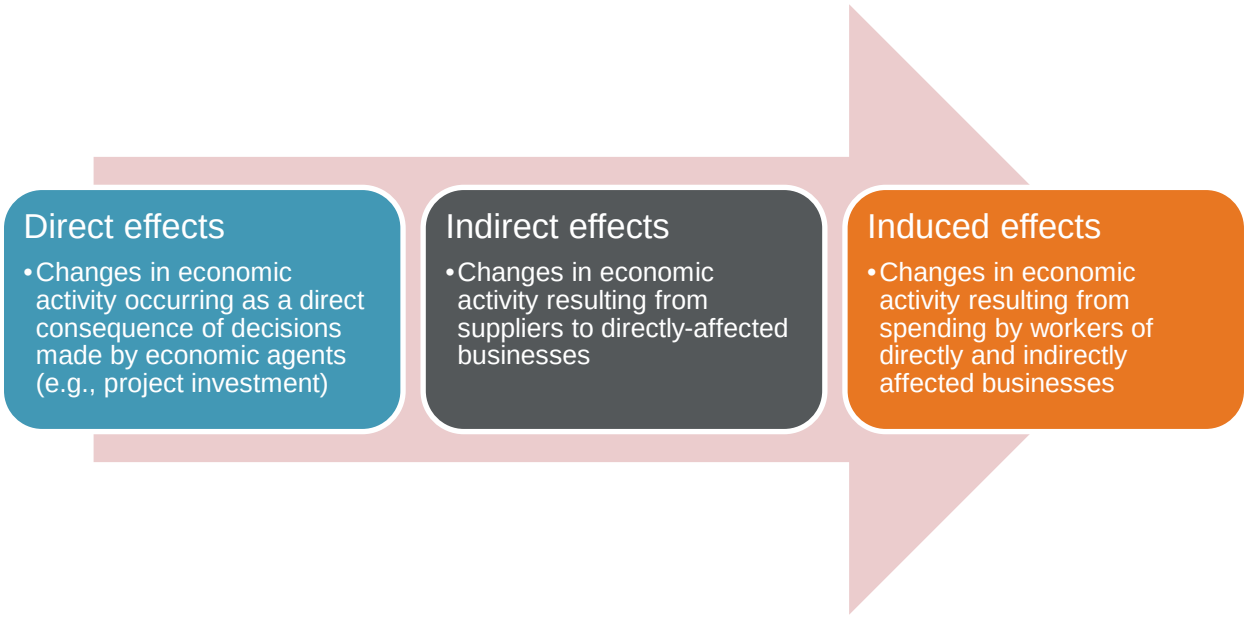
- Does the project reduce carbon and non-carbon emissions?
- Will the project save people time?
- Will fewer accidents occur because of the project?

Expected impacts on property values due to a new freight rail service are also provided.

Jobs generated by tourism spending are estimated for the existing tourist excursion service and also for potential growth in that service, based on the experiences of Connecticut, other New England states, and tourist excursion rail services in the northeast. General tourism impacts are also provided.

3.2.1 Construction Impacts

Economic impact analyses utilize expenditures and multipliers by industry to estimate direct, indirect, and induced effects. The figure below describes each of these effects. In general, direct effects are those associated with the direct expenditure; for example, the construction expense for upgrading the VRR ROW to accommodate freight rail. Indirect effects are those expenditures made on goods and services that support the direct investment. Induced effects are generated when employees of businesses associated with the construction and indirect activities spend their wages.



There were two primary improvements considered for this study: upgrading the existing track and rebuilding the currently unused portion of the ROW to accommodate freight rail; extending the unused portion of the ROW to support expanded tourist rail operations.

Upgrade Entire Right of Way to Support Freight Operations

This improvement would include:

- Upgrades to support a 286K lb. freight car;
- Following current AREMA standards;
- Using higher-grade materials to reduce O&M costs;
- Upgrading the track upgrades to meet or exceed FRA Class 2 standards; and
- Installing ties, replacing defective joint bars, tightening of bolts along the line.

The table below itemizes key cost components:

Table 3.1: Upgrade Entire Right of Way to Support Freight Operations

Component	Cost
Structural (Bridge) Cost	$2.5 million
Track Costs	$22.0 million
Engineering & Construction Maintenance Costs	$2.5 million
Contingency	$3.0 million
Total	$30.0 million

Expand Existing Tourist Excursion Service

An alternative to upgrading the entire line to support freight rail service would be to upgrade the currently unused portion of the ROW to accommodate expanded tourist excursion activities. Improvements would include:

- Lowering demand/stresses placed on the track infrastructure;
- Improvements concentrated in MP 12.9-22.7 corridor segment;
- Tie replacement rate of 1,280 ties per mile due to generally poor tie condition in the segment; and
- Upgrading to put the corridor in a FRA Class 3 tie-compliance level.

Table 3-2 presents the key cost components for this upgrade.

Table 3.2: Expand Existing Tourist Excursion Service

Component	Cost
Structural (Bridge) Cost	$2.5 million
Track Costs	$1.8 million
Engineering & Construction Maintenance Costs	$0.5 million
Contingency	$0.5 million
Total	$5.3 million

Based on the Council of Economic Advisors' (CEAs') study of the job impacts associated with public investment in infrastructure, the freight rail upgrade of $30 million could potentially generate 390 job-years. One job-year is equal to one job for one year[21]. Upgrading the underutilized portion of the existing

[21] *https://www.whitehouse.gov/assets/documents/Job-Years_Revised5-8.pdf*

ROW to accommodate additional tourist excursion activities is estimated to cost $5.3 million. This investment would generate 69 job-years, based on the CEA methodology.

Studies suggest that most of these jobs, approximately 68 percent, would likely be in the construction sector. Another 10 percent would likely be in manufacturing and six percent in retail trade. The remaining jobs would be spread across other economic sectors.

3.2.2 Freight Rail

The United States' freight rail system is a $60 billion industry that moves more freight than any other system in the world. It supports 221,000 jobs. In the State of Connecticut, there are eight freight railroads, operating 364 miles of track, and employing 108 people. The average wage of rail employees is $63,900.

When freight rail projects are evaluated by entities such as the United States Department of Transportation (USDOT), the focus is typically on the benefits to society that the project is likely to generate. For freight rail, these public benefits include:

- Reductions to carbon and non-carbon emissions
- Accident reduction
- Pavement maintenance savings
- Roadway congestion impacts
- Cost savings to local shipping operators

USDOT provides guidance on measuring these public benefits, including parameters and assumptions that are recommended for use in this benefits estimation. For this study, this guidance was utilized by the team. Where possible, regional parameters and other data were utilized in the estimation of benefits.

A first step in estimating public benefits of a potential freight rail investment is to determine how the existence of a freight rail option may alter the way that existing shippers transport their goods. The HDR team contacted businesses in the region that, based on experience and conversations with stakeholders, may have some incentive to utilize freight rail rather than truck. Businesses that ship or receive heavy, bulk materials that are not time sensitive, such as sand, aggregate, or scrap metal, may be suited to freight rail transportation of their products. In contrast, manufactured goods that are delivered in small quantities are not generally suited for freight rail service. Instead, these sorts of commodities are more likely to be shipped by truck.

HDR's outreach identified that some businesses that are located very close to the existing VRR ROW tend to operate in a just-in-time environment and serve small- to medium-sized customers. As a result, the relatively longer time to ship by freight rail, along with insufficient scale of production to support a full train car load, means that these businesses are not likely to utilize freight rail service, even if it was available at their back door. There were several businesses that did indicate that they would consider freight rail service if it were available, but many businesses that the team contacted indicated that they did not see a need for this service.

Calamari Recycling, the Middletown waste facility, and Tilcon are businesses that would consider using VRR freight rail service if it were offered. Other businesses that were contacted varied in terms of interest. Some felt that the presence of freight rail service on the VRR might induce some businesses to

relocate closer to the railroad, but this was anecdotal and no businesses were explicitly named. Most businesses rely on trucking for reasons related to their operational scale or their customers' needs.

Calamari Recycling is a full service scrap metal recycling facility located in Essex, Connecticut. Its key products are steel and construction/demolition debris. The site is positioned roughly 0.1 miles from VRR. Presently, Calamari transports its scrap metal and construction debris by truck. This is despite the fact that some of its customers are as far away as California. Based on discussions with this business, it is estimated that they ship 4,000 tons of steel each month. This tonnage is primarily local. The company also ships 4,000 tons of debris per month, most of which is traveling to Ohio. Currently, Calamari moves all of its debris and steel via truck. If freight rail service were available, the company would consider using it.

There are several factors that would play into Calamari's decision to shift a portion of its tonnage to freight rail. These include the relative cost of shipping by rail versus truck, as well as the investment required to access the railroad. Calamari currently operates its own truck fleet for shipping, but strongly believes converting the VRR for partial freight use would result in significant operating cost savings to them. Discussions with Calamari also suggest that they would be willing to invest to access the railroad, though it would depend on the expense associated with doing so. Nonetheless, Calamari represents a typical freight rail customer. They move large amounts of heavy and bulky commodities over relatively long distances.

Tilcon is another potential freight rail user, based on research conducted by the HDR team. They are the dominant supplier of stone aggregate, concrete, and hot asphalt in Connecticut. These commodities frequently move by freight rail. Tilcon operates eight facilities that are accessible by rail, including facilities in Wallingford and Old Saybrook. Despite the availability of rail between these two points, the current route is considered somewhat circuitous. Conversion of VRR would provide more direct route to connect the quarry in Wallingford to the facility in Old Saybrook.

Currently, trains carrying Tilcon product run south from Wallingford on company-owned tracks to North Haven, where a connection is made to CSXT branch line, which then interchanges onto Amtrak Northeast Corridor, traveling 23 miles to Old Saybrook. If the VRR were able to handle freight rail and Tilcon chose to use this route, trains would run north from Wallingford to Middletown on the existing Middletown Secondary tracks. They would then travel south on the existing Laurel Branch to Mamoras, where they would then connect to the VRR to reach Old Saybrook.

A final potential user of the VRR could be the Middletown waste facility. It is located very close to the railroad and interviews suggest that they would be interested in moving their waste via freight rail if the service were available and it were financially feasible. Currently, the facility ships between 2,000 and 3,200 tons of bulky waste per year to Berlin. From there, it moves to Ohio. They also ship metal, cardboard, and paper. During the interview, there was discussion of consolidating regional waste and moving it via rail. This would remove trucks from the local roadways, a key benefit of freight rail service.

If the commodities transported by Calamari, Tilcon, and the Middletown waste facility were moved by rail rather than truck, public benefits associated with reduced emissions, congestion reduction on roadways and pavement maintenance savings could be generated. Safety benefits could also be generated. Other businesses may also utilize freight rail service, if it were made available, potentially generating additional public benefits.

In the benefits estimation, ton-miles were estimated based on the distances traveled to ship and receive commodities and the total tonnage moved by Calamari, Tilcon, and Middletown waste. USDOT parameters were then applied to estimate the potential benefits generated by tonnage diverting from truck

to rail. While other users may be induced to use rail, data related to these additional users was not available. As a result, "new business" was not included in the freight rail benefits estimation.

For the study, the following benefits were estimated:

Environmental – Traditionally measured in terms of air emissions and greenhouse gases based on VMT, speeds, and idling. Increasingly, this category also includes noise pollution, though noise was not considered for this analysis.

Safety – The average rates of fatalities and injury accidents per billion ton-miles for each mode is calculated to indicate differences in the average cost of accidents for freight movement.

Pavement Maintenance – An externality associated with the wear-and-tear of heavy trucks on roadways, estimated at $0.11 per mile[22] and accrued based on the diversion of truck mileage to rail.

Congestion Reduction – Benefit attributed to users who remain on the highways due to the reduction in congestion associated with trucks using these roadways. Estimated at $0.12 per mile[23].

Shipper Cost Savings – Reflects efficiencies and general differences in the average cost per ton-mile of freight movement by either rail or truck based on estimates of the total costs of shipping freight by mode and the total number of ton-miles of freight moved by mode.

Calamari Recycling is typical of the type of business that would consider shipping via freight rail. As a result, their operations were utilized to provide an estimate of the likely benefits of a typical freight rail user. In the benefits estimation, it was assumed that they ship 200 truckloads of scrap and 200 truckloads of steel per month. If freight rail were available, it is assumed that the number of scrap truckloads would reduce to 60 per month with the remaining being moved by rail. All other Calamari operations are assumed to stay the same with trucks transporting the remaining scrap and all steel.

In addition to the Calamari operations, Tilcon's rerouting of its Wallingford to Old Saybrook rail operation is also factored into the benefits estimation. Relatively speaking, however, the benefits generated by this rerouting are minimal. Similarly, the Middletown waste facility's use of freight rail would be relatively small, based on today's activity, and generate a relatively low level of public benefits.

USDOT provides parameters for estimating public benefits that rely on total ton-miles. Safety benefits represent a significant share of the total public benefits generated by the freight rail investment. Benefits occur when the risk of a crash is reduced and/or the severity of the crashes is reduced because of the transportation improvement. When calculating safety benefits, USDOT parameters use actual crash data with freight tonnage to generate the average number of fatalities and injuries per ton-mile traveled for a particular mode. This data indicate that there are, on average, 4.35 truck fatalities per billion ton-miles. For rail, the figure is 5.81, suggesting that there are more fatalities associated with rail than with truck. In contrast, truck injuries per billion ton-miles are estimated by USDOT to be 99.04. For rail, the figure is 21.77 per billion ton-miles. Because of the significant difference between the truck injuries and rail injuries rates, and the relatively large number of ton-miles that could be moved from roadways to rail with

[22] *Based on the Addendum to the 1997 Federal Highway Cost Allocation Study, Final Report, U.S. Department of Transportation and Federal Highway Administration, May 2000; Table 13. Assuming a 50/50 split of 60,80 kip and rural roadways. Updated to 2014 dollars.*

[23] *Federal Highway Administration, 1997 Federal Highway Cost Allocation Study, Tables V-22, V-23 and V-24; Average of single and combination trucks; dollar values updated to 2014.*

this project, the total accidents avoided by using rail over truck is significant. The following describes the process of estimating safety benefits, based on USDOT and industry-accepted methodologies and parameters.

Total ton-miles of Tilcon and Calamari are estimated to be 331 million per month by truck and 10 million per month by rail today nation-wide. If Tilcon rerouted their Wallingford to Old Saybrook trip to use the VRR, and Calamari was able to divert a significant share of their long-haul tonnage to rail, total ton-miles by truck is estimated to be 33 million. For rail, 51 million ton-miles would be expected. While these are the total ton-miles for each company, only a portion of those ton-miles (based on miles within CT) are utilized to estimate the benefits of freight rail service in this study. The Connecticut portion of the network accounts for approximately 14 percent of the ton-miles moved nationally.

To estimate the number of injuries and fatalities today versus after freight rail is available, the safety rates are multiplied by the total ton-miles of freight moved by mode, and then divided by one billion. Total injuries and fatalities are adjusted to reflect that only a portion of these injuries and fatalities would be likely to occur in CT, based on mileage.

For every fatality, USDOT values human life at $9.3 million. Each injury is valued at approximately $108,000 based on a weighted average of injury severity costs and the statistical valuation of a human life. The product of net injuries (e.g., injuries with no freight rail service less injuries with freight rail service) and the injury value is calculated to estimate the total safety benefit related to injury reduction. A similar calculation is made for fatalities. Their sum is the total safety benefit shown in the table below.

Other benefits were also estimated, using ton-miles and based on USDOT guidance. In sum, total single-year “snap-shot” benefits associated with freight rail service in the region are estimated to be $28.5 million. Most of these benefits are monetized values of avoided costs and are not tangible benefits that could be actualized. Furthermore, it is not appropriate to simply multiply the annual benefits over multiple years to compare against the life cycle of the asset due to the time-value of money and the lack of information about future use. A dollar today is worth more than a dollar five years from now, even in the absence of inflation, because today's dollar can be used productively in the ensuing five years, yielding a value greater than the initial dollar. Future benefits and costs are discounted to reflect this fact. If a time series analysis of this project were conducted over the life of the asset, next year’s monetized public values would be less than this year’s monetized public values because of discounting. Additionally, no information or projections are available to indicate future use of the rail line or the costs associated with this use.

It should also be noted that the $30 million estimated to upgrade the VRR ROW to accommodate freight rail does not include any costs incurred by a business to access the service. For example, sidings and other infrastructure would need to be built for a company located near the VRR ROW to utilize rail service, even if it were available. Estimating the access costs to individual companies located along the ROW is beyond the scope of this assessment. In addition, freight rail operating and maintenance costs are not factored into the $30 million. The purpose of this analysis is to provide some sense of the types of benefits that could be generated by freight rail, as well as the relative magnitude of the public benefits based on USDOT guidance. Due to the lack of information on future costs and future use potential, the “snap-shot” benefits cannot be multiplied in an attempt to generate a future comparison of life-cycle benefits to costs.

Table 3.3: Example Total Benefits Generated by Freight Rail Service on VRR

Benefit Category	Connecticut Benefits
Emissions	$3,549,304
Safety	$22,441,582
Pavement Maintenance	$13,858
Congestion Reduction	$15,495
Shipper Cost Savings	$2,476,744
Total Annual Benefits	$28,496,983

3.2.3 Impact of Freight Rail on Property Value

By its nature, freight rail creates what is commonly referred to as “nuisance effects.” These effects can largely be attributed to the noise caused by freight rail service. As a result of these effects, it is theorized that proximity to freight rail lines will cause a negative impact on property values. The key factors in assessing whether or not this impact exists, and if so, to what extent, are proximity to freight rail tracks, and frequency of freight rail trips.

Research on this impact is limited and relatively new. However, studies generally agree that proximity to freight rail does indeed have a negative impact on property value. This impact typically trends in a gradient manner, meaning that the closer a property is to the tracks, the greater the negative impact on the property’s value. In Northeast Ohio, residential properties close to freight rail lines saw a decline in property value of approximately 4-8 percent, as freight service was re-routed throughout the region. While the effect of proximity to freight rail was shown to be statistically significant, properties that were impacted the most tended to be smaller. It is believed that this is because larger units are more prevalent in suburban areas, where other location-based amenities (i.e. quality of school district) which were not modeled may positively affect property value; conversely, smaller units tended to be clustered in urban areas.

Furthermore, the number of freight trips has also been shown to have a negative impact on property value. Based on repeat-sales data of residential properties, increases in freight rail traffic have been shown to moderately decrease historical growth in home values within a 1/3 mile band surrounding the freight tracks. This growth was approximately one percent less than residential property values in the same county outside of the 1/3 mile area. Interestingly, studies have shown that, on the aggregate, decreasing property value as a result of increased freight rail traffic is largely offset by gains in property value for those properties that experienced a decrease in traffic. This effect leads to localized winners and losers with respect to property value.

Looking from the other side of the issue, studies have also shown the value of decommissioning seldom-used or nonoperational existing freight tracks for recreational purposes. This research indicates that significant consumer surplus (over $7 million annually) can be reaped by converting these freight railways into public greenways. However, it is important to keep in mind that this effect is highly dependent on local needs and attitudes, and particularly, how vital this freight service is to the region. For regions where

freight rail had a significant public benefit – typically areas with limited connections to other regions for freight – the value of converting the rails to recreational use decreased.

3.2.4 Impact of Tourism in Connecticut

While freight rail is expected to generate some public benefits, tourism is also a source of positive economic impact to the region and a number of studies were reviewed to help quantify this impact. The studies that were reviewed include tourist excursion services, as well as general tourism activities in Connecticut and other New England and Northeastern states.

In Connecticut, tourism is estimated to generate $1.2 billion in state and local revenues and more than 110,000 total jobs annually[24]. In 2011, state parks and forests generated $1 billion a year in revenues and 8,800 jobs.

Park visitors who are CT residents generally travel in a party of, on average, 3.5 people. According to studies related to CT parks, each party of visitors who live in the state will generally spend $175.24 per day, net accommodations. This translates to approximately $50 per visitor. For those residents who stay overnight, the average spending is $233.45 per party or $66.70 per visitor. When a non-resident visits a Connecticut park, they generally travel in a party of 4.2 people. Average spending is $183.99 per party, net accommodations, or $43.81/visitor. Non-residents who require accommodations generally spend $230.34 per party, or $54.84/visitor.[25]

Other studies found similar spending patterns. A general tourism study conducted by Plymouth State University in 2012 estimates that the average spending per visitor day is $82.23. For every $1 spent, the typical NH tourist spent: $0.62 – Hospitality and leisure sector; $0.26 – Retail stores (including food and gasoline purchases); and $0.07 – Government services and licenses. The remainder is spent on wholesale trade/transport sector, other services, agricultural products, educational and health care services. It is likely that these spending patterns are similar to those in Connecticut.

In addition to general tourism studies, the team also reviewed a number of economic impact studies conducted for tourist excursion rail services. The studies of greatest relevance to the Essex Steam Train are the Adirondack Scenic Railroad and the Catskill Mountain Railroad. According to the analysis conducted for the Adirondack Scenic Railroad, the 50,000 annual visitors generate $9.2 million in estimated economic impact, along with 225 total jobs. The Catskill Mountain Railroad study estimates that the 14,823 annual riders generate $1.3 million in estimated economic impact and 20 total jobs.

The Essex Steam Train reported 159,030 train riders in 2014. Based on the economic impact studies conducted by other excursion railroads, this suggests that Essex Steam Train riders generated $13.7-$25.7 million in estimated economic impact and supported 27 to potentially hundreds of jobs today.

If the northern end of the existing VRR ROW was expanded, and tourist excursion service was increased, each additional rider on the Steam Train would potentially spend $44-$82 per day, based on the studies reviewed by the study team. If we assume that the investment on the northern end of the VRR ROW supported a modest 10 percent growth in ridership, $700,000-$1.3 million could be spent by visitors annually. Much of this direct spending would go to local businesses in the hospitality and leisure sector and to retail establishments in the region. Indirect and induced spending would also be generated. The total economic impact potentially generated by a 10 percent increase in ridership on the Essex Steam

[24] *"The Economic Impact of Arts, Film, History and Tourism in Connecticut," http://www.friendsctstateparks.org/FCSP/Economic_Impact_Study.html.*

[25] *http://www.friendsctstateparks.org/FCSP/Economic_Impact_Study.html*

Train is $1.4-$2.6 million per year, a significant impact for a $5.3 million investment to upgrade the northern end of the existing VRR ROW to accommodate tourist excursion service.

3.3 Summary

The following are the HDR Team's findings, based on the evaluation of the potential uses of the VRR ROW:

Tourism Impacts

- A $5.3 million investment in expanding tourist excursion service to the north is estimated to generate 69 job years.
- For every $1 spent by a tourist railroad visitor, an additional $0.96 may be generated in indirect and induced impacts. This means that $1 spent by a tourist may generate nearly $2 in economic activity in the region.

Freight Rail Benefits

- A $30 million investment to upgrade to freight rail is estimated to generate 390 job-years.
- This same investment is estimated to yield $28.5 million in regional public benefits.
- Based on USDOT guidance and benefits estimation methodologies, most of the public benefits generated by the freight rail investment are due to improved safety, $22.4 million, when freight is diverted from truck to rail.

Other Potential Impacts

- Every tourist to CT is estimated to spend $44-$82 per day, based on studies of spending patterns of CT park, tourist excursion, and general tourist visitors. This suggests that any increase in tourist activity in the region is likely to generate significant economic activity in the region.
- Based on limited studies, properties close to freight rail lines saw a decline in property value of approximately 4-8 percent as freight service was re-routed throughout the region.

4 Sources

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