

Briefing Report:
*The Economic Impact of the Proposed
New-Haven-Hartford-Springfield
Commuter Rail Line*

December 2006



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INTRODUCTION

This report is a brief analysis of the potential economic impact of the proposed, and under design, New Haven-Hartford-Springfield commuter rail line. While much of this report focuses on the economic impact across the commuter rail corridor, particular analyses are focused on the economic impact in Massachusetts and the City of Springfield. Rather than attempting to provide a single dollar estimate of the economic impact, which would provide clarity but not accuracy, this report presents estimates of the economic impact of the proposed service in a variety of areas such as employment, residential real estate values, and property tax revenues.

One methodological note that applies to the entire report, we have generally used conservative assumptions in each calculation in order to produce estimates that, to the extent they are inaccurate, understate rather than overstate the potential economic impact of the NHHS. Therefore, in reading this report, it is reasonable to assume that the likely economic impact of the commuter rail will not be less than the estimates offered here and could in fact be greater.

ECONOMIC IMPACT OF CAPITAL AND OPERATING INVESTMENTS

The most obvious economic impact of the proposed NHHS commuter rail line will be the impact of dollars spent building infrastructure for and operating the new service. Based on estimates of capital and operating costs contained in the final report of the Connecticut Department of Transportation's implementation study, we developed a series of inputs for use in an economic impact model.¹ It should be noted that the capital spending estimate used in this model does not include any investment for either of Springfield's possible stations (Union Station or downtown).

The recently developed Regional Dynamics input-output model was used for this analysis.² Input-output analysis considers the inter-relatedness of industries across the economy and, in the case of regional modeling, the relationships of industries within and between regions. Essentially, using a regional input-output model one can increase or decrease the output of a particular industry in a particular region and examine the ripple effects on other industries within the same region and in other regions. For example, given that the fabricated metal products manufacturing industry requires processed metals as an input, a national decline in the output of the primary metal manufacturing industry will lead to a decline in the output of the fabricated products industry.

In the case of capital or operating investments, such as those associated with the NHHS project, much of the spending will go towards the wages of workers, whether they be construction workers renovating stations or train operators and the input-output model examines the economic impact of these workers spending their wages on goods whether it be housing or groceries. Therefore, an input-output model will predict that an investment in heavy construction (building tracks for example) will result in the creation of jobs in the retail trade sector. This is not because the government is hiring people to work in stores, but because stores are hiring additional workers to meet the demand created by the wages paid to the construction workers. Essentially, the input-

¹ Cost estimates used in this report are based on the assumptions embedded in the Connecticut Department of Transportation's final implementation study report, but these assumptions and the resulting estimates may change as environmental impact and design studies move forward.

² Technical documentation on the Regional Dynamics model is available from www.redyn.com.

Briefing Report: The Economic Impact of the Proposed NHHS Commuter Rail Line December 2006

output model allows us to estimate the economic growth stimulated by the investment in capital and operating costs for the commuter rail.

We examined the economic impact of investments across three regions, the Expanded Knowledge Corridor, the remainder of Massachusetts, and the remainder of Connecticut. The Expanded Knowledge Corridor region includes Franklin, Hampden, and Hampshire counties in Massachusetts and Hartford, New Haven, and Tolland counties in Connecticut. We refer to this as the *Expanded Knowledge Corridor* because New Haven County is not typically included in the Knowledge Corridor as the region has been branded for economic development purposes. The other two regions modeled are, as their names suggest, those counties in each state that are not in the Expanded Knowledge Corridor. One advantage of the Regional Dynamics model is that it allows investments to be defined by their appropriate industry at a fine level of detail (5-digit North American Industrial Classification System codes).

The Regional Dynamics model provides a baseline forecast of economic data into the future and adding an economic impact, such as the commuter rail investment, produces results that suggest change relative to the baseline. In order to isolate the impact of the commuter rail capital investment versus operating expenditures, the model was run twice.

Capital investment

Capital investment in the NHHS commuter rail was divided into five industry categories. The first four were all categories of construction and are treated as demand for local output in each industry. The last category, railroad rolling stock manufacturing, was treated as state government demand for output from the particular industry. In this case, the output and economic effect is not necessarily notable within the Expanded Knowledge Corridor because the economic impact goes to whatever region of the country produces railroad rolling stock.

In each case the economic impact was modeled assuming national rather than local displacement. This assumes that the investment in commuter rail does not displace other investment in the region, but may displace investment more broadly. Costs associated with the hiring of Amtrak flagmen during track construction were excluded as they do not represent capital investment but simply reflect wages paid for a service of Amtrak during construction. Finally, we assumed that the capital spending would take place during the period from 2010 to 2013, therefore, as inputs to the model each capital investment was divided into four annual investments of equal size.

In total, the capital investment necessary to realize the NHHS commuter rail service as recommended by the Connecticut Department of Transportation is estimated to be about \$206 million, or \$52 million per year for four years. This is divided among commercial and industrial building construction for the renovations and improvements to stations, bridge and tunnel construction for bridge repairs, industrial non-building structure construction for the rail maintenance facility, other heavy construction for the additional trackage, and purchase of railroad rolling stock and engines.

**Briefing Report: The Economic Impact of the Proposed NHHS Commuter Rail Line
December 2006**

Table 1: Capital Investment Inputs to Economic Impact Model

Output industry	NAICS Code	Total investment	Per year 2010-2013
Commercial and industrial building construction (station construction & renovation)	23332	\$80,966,000	\$20,241,500
Bridge and tunnel construction	23412	\$505,000	\$126,250
Industrial nonbuilding structure construction (maintenance facility)	23493	\$20,696,000	\$5,174,000
All other heavy construction (rails)	23499	\$33,235,000	\$8,308,750
State government demand for railroad rolling stock manufacturing	33651	\$70,140,000	\$17,535,000
Total		\$205,542,000	\$51,385,500

As noted above, the Regional Dynamics model produces economic impact results for each defined region as well as for the remainder of the United States. Overall, for the four years that various construction activities take place, the public investment results in 529 jobs in the Expanded Knowledge Corridor and 97 jobs in the rest of Massachusetts and Connecticut combined. Based on estimates in the change to the region's wage bill, this suggests that the jobs created in the Expanded Knowledge Corridor will pay an average annual wage of \$55,000. Furthermore, the public investment in commuter rail results in an increase of \$50 million in economic output per year in the Expanded Knowledge Corridor with increases above \$7 million each in the rest of Massachusetts and Connecticut. Also of importance given that this investment is coming from public funds, the capital expenditures on the commuter rail are predicted to result in more than \$5 million per year in additional income tax revenues across the three regions.

Table 2: Predicted Economic Impact of NHHS Commuter Rail Capital Investments

	Average Annual Impact, 2010-2013*			Total 4-year impact
	Expanded Knowledge Corridor**	Rest of MA	Rest of CT	
Employment	529	46	51	****
Wage bill	\$28,921,000	\$2,442,000	\$3,082,000	\$137,776,000
Average annual wage***	\$54,671	\$54,671	\$60,431	
Economic output	\$49,519,000	\$7,022,000	\$7,810,000	\$257,405,000
Disposable income	\$24,136,000	\$2,442,000	\$5,264,000	\$127,370,000
Income tax revenues	\$4,071,000	\$374,000	\$911,000	\$21,428,000

Model: Regional Dynamics input-output model (www.redyn.com)

* Average annual impact should be understood as the average difference across the years 2010-2013 from baseline values predicted assuming no capital investment in the NHHS commuter rail.

** Expanded Knowledge Corridor includes Franklin, Hampden, and Hampshire counties in Massachusetts and Hartford, New Haven, and Tolland counties in Connecticut. Typically the Knowledge Corridor does not include New Haven County in Connecticut.

*** Average annual wage here is the average annual wage of new jobs created by the NHHS investment.

**** Total employment impact is not calculated, because the new employment slots created in the first year of impact remain through the following three years, but they are not new jobs in each year.

Examining the total economic impact of capital investment in the commuter rail, we find that over the four years of construction the total wage bill across all three regions increases by about \$138

**Briefing Report: The Economic Impact of the Proposed NHHS Commuter Rail Line
December 2006**

million. Economic output, which is a measure of total economic activity, across all three regions is increased by \$257 million during the four years, and additional income tax revenues amount to nearly \$22 million.

Operating expenditures

Turning our attention to the operating expenditures necessary to run and maintain the commuter rail service, the economic impact model is somewhat simpler. The estimated \$10,079,000 per year necessary to operate the service is applied in the model as an increase in the local output of the urban transit system industry. In this case, we assume that the commuter rail service will begin operating in 2011 and we estimate the economic impact through 2020. This allows us to look at the economic impact over a ten-year period. The input to the model is simply an increase in output from the urban transit system of \$10,079,000 in each year from 2011 to 2020.

Table 3: Operating Expenditure Inputs to Economic Impact Model

Output industry	NAICS Code	Total investment (1 st 10 years)	Per year 2011-2020
Urban transit systems	48511	\$100,790,000	\$10,079,000

The Regional Dynamics model predicts that the operation of the commuter rail will result in the creation of about 249 jobs in the Expanded Knowledge Corridor, with about 35 in the other two regions combined. The limited job creation outside the immediate region being served by the rail is unsurprising given that most of the new employment will stem from operators and businesses in close proximity to stations. The total wage bill also increases, but it is evident that the jobs created by operating expenditures are not as high wage as those created by capital investment. In the Expanded Knowledge Corridor the average annual wage of jobs resulting from operating expenditures is about \$34,000 (compared to nearly \$55,000 for jobs from capital investment). The operation of the rail service is predicted to increase regional economic output by almost \$15 million per year and regional income tax revenues by about \$1.2 million per year.

Table 4: Predicted Economic Impact of NHHS Commuter Rail Operating Expenditures

	Average Annual Impact, 2011-2020*			Total 10-year impact
	Expanded Knowledge Corridor**	Rest of MA	Rest of CT	
Employment	246	20	15	****
Wage bill	\$8,443,000	\$1,156,000	\$912,000	\$105,104,000
Average annual wage***	\$34,321	\$57,800	\$60,800	
Economic output	\$14,820,000	\$3,092,000	\$2,196,000	\$201,081,000
Disposable income	\$7,052,000	\$1,130,000	\$1,582,000	\$97,640,000
Income tax revenues	\$1,189,000	\$173,000	\$274,000	\$16,364,000

Model: Regional Dynamics input-output model (www.redyn.com)

* Average annual impact should be understood as the average difference across the years 2011-2020 from baseline values predicted assuming no capital investment in the NHHS commuter rail.

** Knowledge Corridor includes Franklin, Hampden, and Hampshire counties in Massachusetts and Hartford, New Haven, and Tolland counties in Connecticut. Typically the Knowledge Corridor does not include New Haven County in Connecticut.

*** Average annual wage here is the average annual wage of new jobs created by the NHHS investment.

**Briefing Report: The Economic Impact of the Proposed NHHS Commuter Rail Line
December 2006**

**** Total employment impact is not calculated, because the new employment slots created in the first year of impact remain through the following three years, but they are not new jobs in each year.

When reviewing the total impact of operating expenditures during the first ten years of operations, the impacts become quite notable. For example, economic output across all three regions is predicted to be \$201 million higher in total across the 2011 to 2020 period than would have been the case without these operating expenditures. Likewise, income tax revenues across all three regions would increase by about \$16 million in total during the service's first 10 years.

Employment by Industry

The Regional Dynamics model also allows an analysis of the various industries in which new jobs will be created as a result of the capital and operating investments in the commuter rail.

Unsurprisingly, nearly three quarters of jobs created by capital investment are in construction, while 85 percent of jobs created by operating expenditures are in transportation and warehousing. The retail trade and health care are the only other industries gaining at least 20 jobs when combining both capital and operating expenditures.

Table 5: Average Annual New Employment by Industry in the Expanded Knowledge Corridor

	Average Annual Jobs Capital Investment (2010-2013)	Average Annual Jobs Operating Expenditures (2011-2020)
Construction	389	2
Manufacturing	15	2
Wholesale trade	6	2
Retail trade	23	6
Transportation and warehousing	5	209
Information	2	1
Finance and insurance	5	3
Real estate, rental, and leasing	4	1
Professional, scientific, and technical svcs.	13	3
Management of companies and enterprises	1	0
Administrative, support, and waste svcs.	9	2
Educational services	5	2
Health care and social assistance	23	7
Arts, entertainment, and recreation	4	1
Accommodation and food services	10	3
Other services	10	3
Government	3	1
Total*	529	246

Model: Regional Dynamics input-output model (www.redyn.com)

* Totals may be larger than the sum of visible figures as a result of rounding.

Return on Investment

Finally, taking the total investment in both capital and operating costs for the first 10 years of the NHHS' operations, and comparing it to the predicted economic impact, we can get a sense of the overall return on public investment from the project. The necessary capital costs and the operating expenditures for the first 10 years of operation total to a public investment of \$306 million.

However, the total increase in economic output, across Massachusetts and Connecticut combined,

**Briefing Report: The Economic Impact of the Proposed NHHS Commuter Rail Line
December 2006**

during the first 10 years of operation is about \$458 million. Therefore, the public investment will multiply by stimulating an additional \$152 million in economic activity. Furthermore, the public investment will result in more than 600 new jobs during construction activities and more than 250 permanent new jobs resulting from operating expenditures.

Table 6: Estimating NHHS Commuter Rail Return on Investment Over First 10 Years of Operation

Increase in economic output as a result of investment		\$458,486,000
Total 10-year investment in capital and operations	minus	\$306,332,000
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Total additional economic output stimulated by public investment	equals	\$152,154,000

As has already been noted, the public investment in the commuter rail, because it creates jobs and wages, also results in increased income tax revenues. Therefore, it is worth considering the actual public cost of the project as the total expenditures minus the amount of new income tax generated as a result of the investment. While the public investment over the rail service's first 10 years is about \$306 million, income tax revenues increase by almost \$38 million as a result. Therefore, it would be more accurate to consider the total public cost of the project in the first ten years as \$269 million.

Table 7: Estimating Actual Public Investment in Capital and Operations Over NHHS' First 10 Years

Total 10-year investment in capital and operations		\$306,332,000
New tax revenues as a result of investment	minus	\$37,792,000
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Total actual public 10-year investment	equals	\$268,540,000

PROXIMITY TO POTENTIAL RIDERS

One way of understanding the potential impact of the NHHS commuter rail line involves understanding the proximity of proposed stations to people's homes and work. Since a primary purpose of the commuter rail will be, obviously, offering alternative modes of transportation to commuters, knowing the numbers of people living and working near a station gives a broad indication of how many potential riders are available to take advantage of the new service.

Using a web-based tool, DemographicsNOW, we are able to obtain 2006 demographic and economic estimates for areas within a particular distance of proposed stations. The tool relies on estimates produced by Applied Geographic Solutions using on a variety of data sources including the U.S. Census Bureau and the U.S. Bureau of Labor Statistics. For purposes of examining the proximity of people and workers to proposed commuter rail stations, we plotted radii around each proposed station at 1/2 mile and 2 mile distances, extracting demographic and economic data for these areas as shown in Table 8.

Using geographic information systems (GIS), we developed a map of the proposed rail corridor and inserted circles around each proposed station at half and five mile radii. We then integrated this

**Briefing Report: The Economic Impact of the Proposed NHHS Commuter Rail Line
December 2006**

map with a map of 2000 Census block groups. Using this technique we identified all Census block groups that are in full or in part within a half mile or five miles of a proposed station.³

Within easy walking distance of a proposed commuter rail station (1/2 mile) are more than 50,000 residents and 120,000 workers. If even five percent of the 50,000 people living within a half mile of a station are also among those who work within a half mile of a station, that would be more than 2,500 potential daily commuters. Furthermore, there are an estimated 9,266 businesses located within a half mile of a proposed station. Finally, nearly 5,000 households living within a half mile of a station have no vehicle available to their household, suggesting that the commuter rail would be an important new transportation option for some of the region's residents.

Table 8: Population and Employment by Proximity to Proposed NHHS Stations, 2006

	Within a 1/2 mile of a station	Within 2 miles of a station
Population	51,207	642,547
Housing units	25,244	267,378
Households without a vehicle available	4,755	41,348
Employees	123,078	535,167
Business establishments	9,266	40,000

Sources: PVPC custom geographic analysis using DemographicsNOW and data from Applied Geographic Solutions.

Expanding the area of impact to two miles, probably the longest distance we can anticipate riders might regularly walk to a station, we find more than 600,000 residents and 535,000 workers. Hypothetically, if one percent of those living within two miles of a station were also among those working within two miles of a station, this would create a possible commuter population of more than 6,000. Expanding to two miles increases the number of businesses in proximity to a station by four-fold to 40,000 establishments. Finally, the number of households within two miles of a station who do not have a vehicle is above 40,000.

These numbers do not necessarily predict any impact of commuter rail, but they suggest the possibility of extensive ridership and they indicate the number of residents and businesses that benefit from their proximity to a new transportation option.

SPRINGFIELD UNION STATION

A 2001 study commissioned by The Great American Station Foundation and completed by Transportation Economics and Management Systems (TEMS) used data compiled from a series of studies on the economic impact of railroad station revitalization projects in order to estimate the likely economic impact of station revitalization given the particularities of a rail corridor.⁴ Relying on the estimates produced by TEMS' economic impact model, and assuming that Springfield is a

³ For purposes of this analysis, a block group was considered to be within the half or five mile radius if any part of the block group was within the radius. This may bias our results upwards slightly, but because the proposed stations are within the region's most urbanized areas, the block groups near the stations tend to be quite small in size.

⁴ The Great American Station Foundation (2001). *Economic Impact of Station Revitalization*. Las Vegas, NM: The Great American Station Foundation.

**Briefing Report: The Economic Impact of the Proposed NHHS Commuter Rail Line
December 2006**

medium-sized city and the NHHS is a medium-density rail corridor, at the lowest end one would expect the revitalization of Springfield Union Station, apart from commuter rail developments, to result in the creation of 335 jobs, an average increase of \$195 in household incomes across the metropolitan area, a \$35 million increase in property values, and a \$1.75 million increase in property tax revenues.⁵

Again, these are the low-end estimates if we assume Springfield is a medium-sized city and the NHHS is a medium-density corridor. Based on TEMS' definitions, Springfield's metropolitan area should actually be considered a large city and if you consider the NHHS' connection to New York City through rail links in New Haven the corridor could also be considered high-density. At the low-end, estimates based on a large city in a high-density corridor suggest 480 new jobs, \$350 average increase in household income, \$70 million increase in property values, and a \$3.5 million increase in property tax revenues. At the highest end, revitalizing Union Station could yield nearly 1,500 jobs, a \$205 million increase in property values, and more than \$10 million in new property tax revenue. As with ridership estimates, the true impact is likely to be somewhere between the lowest and highest end estimates. Table 4 presents the estimated impacts of station revitalization based on assumptions about city size and corridor density.

Table 9: Potential Impact from Union Station Revitalization

	Increase employment	Increase average household income	Increase property values (millions)	Increase property taxes (millions)
Medium city Medium density corridor	335 – 1,000	\$195 – \$585	\$35 – \$110	\$1.75 – \$5.5
Large city High density corridor	480 – 1,435	\$350 – \$1,055	\$70 – \$205	\$3.5 – \$10.25

Source: The Great American Station Foundation (2001). *Economic Impact of Station Revitalization*. Las Vegas, NM: The Great American Station Foundation.

These estimated impacts are those projected from the revitalization of Springfield Union Station, apart from the installation of new commuter rail service, so they should be thought of in addition to other impacts discussed throughout this report.

RESIDENTIAL REAL ESTATE

One likely impact of implementation of the NHHS commuter rail service is an increase in the value of residential property that is proximate to commuter rail stations. A 1994 study of the Massachusetts Bay Transit Authority's Fitchburg commuter rail line found that single-family residences located in a community with a commuter rail station had a market value about 6.7 percent higher than those homes located in community's without commuter rail stations.⁶ Likewise, a 1993

⁵ While similar impacts might be expected with renovation activities at other stations in the corridor, I focused exclusively on the impact of Union Station for this analysis.

⁶ Armstrong, R.J. (1994). *Impacts of commuter rail service as reflected in single-family residential property values*. Transportation Research Board, 73rd Annual Meeting.

**Briefing Report: The Economic Impact of the Proposed NHHS Commuter Rail Line
December 2006**

study of the Southeastern Pennsylvania Transit Authority’s rapid rail service found a 7.5 to 8.0 percent premium for single family homes with access to rail stations.⁷

Applying these percentages to an analysis of the numbers of housing units in Census block groups within a half mile of proposed NHHS stations, and the median values of these homes as recorded in the 2000 Census, we find that implementation of the commuter rail will likely increase the value of existing residential property by between \$437 million and \$490 million. In the City of Springfield, the increase would be between \$56 million and \$62 million in residential property value. At Springfield’s current residential property tax rate of \$17.00 per \$1,000 of value, this would yield between \$946,000 and \$1,059,000 in new property tax revenue per year.

These increases are strictly from gains in the value of existing residential property and do not reflect increased value or property tax revenue from commercial or industrial property or from new residential construction stimulated by the presence of the commuter rail.

Table 10: Estimated Commuter Rail Impacts on Existing Residential Real Estate

	NHHS Corridor	Springfield, MA
Estimated value of housing within ½ mile of a station	\$6,526,871,500	\$830,366,600
Percent increase in value due to proximity to station	6.7% to 7.5%	6.7% to 7.5%
Increase in value	\$437,300,391 to \$489,515,363	\$55,634,562 to \$62,277,495
Increase in property tax revenue	*	\$945,788 to \$1,058,717**

* Estimate of property tax revenue for the entire corridor is excluded because of differences in rates among communities.

** Springfield’s estimated increase in property tax revenue is based on a rate of \$17.00 in tax per \$1,000 of value.

PRIVATE INVESTMENT

One likely impact of the implementation of the NHHS commuter rail service is an increase in private investment near stations. This can mean investment both in new residential and non-residential development. From a regional and net economic output perspective, such development proximate to stations is only notable if it is development that would not have occurred within the region at all if not for the commuter rail. However, from a regional sustainability or smart growth perspective, locating new development near the proposed stations, which are primarily in urban or town centers, is positive even if the net economic effect is limited.

However, it is worth examining the potential for new development and private sector investment as an outcome of the proposed commuter rail project. New Jersey Transit has done careful analysis of the results of their “Transit Village Initiative,” which focused on community growth and revitalization with transit as a key component. Their study of the first seven Transit Villages found “an investment of \$186 million in construction . . . of which \$147 million was non-residential and

⁷ Voith, R. (1993). Changing capitalization of CBD-oriented transportation systems: Evidence from Philadelphia, 1970-1988. *Journal of Urban Economics*, 33: 3612-376.

\$39 million was spent on housing.”⁸ The key finding of the study was that the \$186 million in private construction activity was stimulated by between \$150 and \$175 million in public sector investment in developing these transit villages.

Because the New Jersey analysis was of public investments in creating transit-oriented village centers, it makes the most sense to compare their results to proposed public investments in stations along the NHHS line. If the public investment in the proposed stations along the NHHS commuter rail line, \$81 million, were to generate a similar rate of private construction activity as that found in New Jersey, we would expect between \$86 and \$100 million in private construction activity. Going further, if the ratio of residential to non-residential construction were consistent with that of New Jersey, we would expect investments of \$18 to \$21 million in residential construction and \$68 to \$79 million in non-residential construction. Furthermore, the New Jersey study found that the vast majority of private construction investment was located within a half mile of the transit stations. This level of investment in close proximity to the proposed NHHS stations could have a significant impact in the revitalization of areas like the one around Springfield’s Union Station.

⁸ Wells, J., & Renne, J. (2004). *Implementation of the assessment tool: measuring economic activity. Assessing the impacts of the New Jersey Transit Village Initiative*. Edward J. Bloustein School of Planning and Public Policy, Rutgers University, p. 2.